3.5 FISH, WILDLIFE AND SPECIAL STATUS ANIMAL SPECIES

The proposed transmission line and Echanis Wind Energy Project (Echanis Project) would overlap with known habitat for fish, wildlife, and special status animal species. This section describes the fish and wildlife habitat resources present in the Project Area and the potential effects each action alternative could have on these resources. Special status species analyzed include the Endangered Species Act (ESA) threatened, endangered, candidate, and proposed (TECP) species; U.S. Fish and Wildlife Service (USFWS) Species of Concern; Bureau of Land Management (BLM) Sensitive Species; and the State of Oregon endangered, threatened, critical, and vulnerable species. Field surveys were conducted to identify species and wildlife habitats within the Project Area, and local experts were consulted to review the species that could be present. Potential effects from the Project on fish and wildlife were evaluated based upon specific Project activities and the effects exhibited by other studies of similar projects.

3.5.1 Methodology

The description of the affected environment and evaluation of potential effects were conducted using available existing and field information acquired at different scales and levels of detail, depending upon the resource being reviewed. Field surveys for protected resources and their habitats were conducted by the Applicant beginning in 2007 and were completed in 2010. Data that were outstanding when the DEIS was published, but have now been added to the FEIS, include avian surveys along Alternative B – West Route (and the route options, including the proposed crossing of the Malheur National Wildlife Refuge [MNWR]) and Alternative C – North Route, special status plant and wildlife surveys along Alternative C, and plant community mapping along Alternative C.

Data sources used for this analysis included:

- Digital surface water data for streams and lakes based upon those present on the U.S. Geological Survey (USGS) 1:24,000-scale topographic maps, also known as 7.5-minute quadrangles.
- Topographic maps from the USGS Digital Raster Graphics of original 1:24,000 maps developed between 1940 and 1995.
- Watershed maps based upon digitized USGS 1:250,000-scale Hydrologic Unit Maps.
- Oregon Natural Heritage Program data for the Project Area and surrounding 2 miles.
- BLM GIS information for big game ranges, area habitats, and special status species observations; BLM records; and consultation with BLM biologists.
- Communication with the USFWS Malheur Refuge and USFWS Bend Ecological Services staff.
- Oregon Department of Fish and Wildlife (ODFW) Fish Survey reports.
- Field investigations conducted by Northwest Wildlife Consultants (NWC), as shown in Table 3.5-1 below.

Plant community field survey data were used to describe the locations of wildlife habitat types, yielding the following categories: grassland, agricultural areas, sagebrush, riparian/wetland areas, juniper woodlands, and talus slopes.

Table 3.5-1 Field Surveys Conducted by Northwest Wildlife Consultants

Survey Type	Location	Report Completed
Aerial Raptor Nest Surveys	Echanis Project	July 16, 2007
	Alternative B – West Route T-Line (incl. options)	January 26, 2010
	Alternative C – North Route T-Line	August 11, 2010
Avian Use Surveys	Echanis Project	November 30, 2007
	Alternative B – West Route T-line (incl. options)	October 11, 2010
	Alternative C – North Route T-Line	October 4, 2010
Special Status Wildlife	Echanis Project	September 10, 2008
	Alternative B – West Route T-Line (incl. options)	December 17, 2009
	Alternative C – North Route T-line	August 31, 2010
Special Status Plants	Echanis Project	September 1, 2008
	Alternative B – West Route T-Line (incl. options)	January 28, 2010
	Alternative C – North Route T-line	September 8, 2010
Small Plot Avian Use	Echanis Project	No Study
	Alternative B – West Route T-line (incl. options)	August 17, 2010
	Alternative C – North Route T-line	No Study
Habitat Mapping	Echanis Project	August 31, 2007
	Alternative B – West Route T-line (incl. options)	January 26, 2010
	Alternative C – North Route T-line	November 02, 2010
Bat Inventory	Echanis Project	No Study
	Alternative B – West Route T-Line (incl. options)	No Study

Note: * Special status plants are discussed in Section 3.3 Vegetation

The analysis presented in this section addresses wildlife-related comments received during the public scoping process that occurred from July to September 2009, and the DEIS comment period that occurred from July through September 2010. Agency representatives, local organizations, and private citizens requested the following issues be addressed in the EIS:

- Pre- and post-construction greater sage-grouse surveys.
- Bird and bat mortality reduction mitigation measures at the Echanis Project.
- Use of predator perch deterrents on Project components.
- Implementation of best management practices (BMPs).
- Protection of special status and big game species, with specific emphasis on greater sage-grouse, golden eagle, ferruginous hawk, burrowing owl, sandhill crane, Preble's shrew, pygmy rabbit, pronghorn antelope, and bighorn sheep.
- Habitat fragmentation, habitat loss, and displacement of wildlife.
- Migratory birds associated with the MNWR.

3.5.2 Affected Environment

The Project Area is located within the EPA Level III Northern Great Basin and Range Ecoregion (Thorsen et al. 2003) in southeastern Oregon. Four Level IV ecoregions are within the Project Area, including the High

Desert Wetlands found in the MNWR, High Lava Plains around MNWR vegetated by sagebrush and grasslands, Semiarid Uplands higher in elevation than the High Lava Plains and noted for the presence of juniper woodlands, and the Partly Forested Mountains zone which is above the juniper woodlands in elevation and is nearly treeless except for scattered groves of aspens. Land uses within the Project Area include agriculture and cattle grazing, and a network of dirt-track and improved access roads cross the region.

Field investigations were conducted to identify sensitive wildlife species, birds, bats, raptors, and habitat, as listed in Table 3.5-1 above.

Wildlife species are generally dependent upon the availability of suitable habitats, and associated with specific vegetation communities for their food, shelter, courtship and breeding, and development of young. Many species are migratory and change habitat use, or go to similar habitats in different geographic areas, throughout the year. Some species are present within the Project Area during certain seasons, while other species are year-round residents. The wildlife resources within the Project Area were evaluated by identifying whether suitable habitats were present to support their presence, and if so, whether they were known to be present. Wildlife was grouped into general fish resources, general wildlife, big game, and special status species for analysis. More detailed analyses were conducted on bird associations and individual species, where appropriate. Groups of wildlife species were analyzed together where they shared similar habitats or Project areas, and where the Project effects were anticipated to be similar for the grouped species.

3.5.2.1 General Fish Resources

The proposed Project Area is within the Donner und Blitzen and Harney-Malheur Lake subbasin of the Oregon closed basin. There are eight perennial creeks within the proposed Project Area, seven of which have known fisheries (Table 3.5-2). ~~The Donner und Blitzen River receives flow directly or indirectly from the other seven streams.~~ All streams within the Project Area except portions of the Donner und Blitzen River through the MNWR are open to recreational fishing under ODFW sport fishing regulations. Redband trout is the only species subject to catch limits (ODFW 2010) in these streams. There are several intermittent and ephemeral streams feeding the perennial streams within the Project Area, arising out of the Steens Mountains and generally flowing west and north.

At higher elevations, streams are confined within narrow and steep canyons, but gradually decrease in slope as they reach the valley floor. Higher elevation streams are typified by gravel and cobble substrate with some woody debris in forested riparian areas, but transition to smaller diameter sand, gravel, and silt substrate with decreasing gradient.

The Echanis Project site and the main access road to the Echanis Project site overlap five streams: Kiger, Cucamonga, McCoy, Booners, and Mud Creeks. The transmission line alternatives also cross many of these streams. Alternative B – West Route (Alternative B [including the South Diamond Lane and Hog Wallow Route Options]) would cross all of the streams listed in Table 3.5-2, except Riddle Creek and Swamp Creek. Alternative C – North Route (Alternative C) would cross Riddle, Swamp, Kiger, Cucamonga, McCoy, Booners, and Mud Creeks.

Table 3.5-2 Perennial Streams in the Project Area and Associated Fish Species

Common Name	Scientific Name	Donner und Blitzen River	Kiger Creek	Cucamonga Creek	McCoy Creek	Riddle Creek	Swamp Creek	Booners Creek	Mud Creek
Bridgelip sucker	*Catostomus columbianus*	X	X	X	X				
Bullhead	*Ameiurus sp.*	X							
Carp	*Ctenopharyngodon idella*	X							
Catlow tui chub	*Gila bicolor ssp.*	X							
Inland redband trout	*Oncorhynchus mykiss ssp.*	X	X	X	X	X		X	X
Long-nosed dace	*Rhinichthys cataractae*	X	X	X	X	X			
Malheur mottled sculpin	*Cottus bairdi ssp.*	X	X	X	X				
Mountain whitefish	*Prosopium williamsoni*	X	X						
Redside shiner	*Richarsonium balteatus*	X				X			
Sunfish	*Lepomis sp.*	X							

3.5.2.2 Wildlife Habitats

The vegetative communities in the Project Area (described in Section 3.3) were reviewed and combined into groups of similar vegetative types that represent wildlife habitats commonly associated with animal species (Tables 3.5-3 through 3.5-6). For example, low sagebrush and big sagebrush were combined because many ungulates (i.e., mammals with hooves) and passerine species will utilize the habitat based upon factors other than the size of the sagebrush (e.g., sagebrush spacing and herbaceous species abundance).

Wildlife habitat mapping within the North Steens 230-kV Transmission Line Project (the Project) Area was conducted in 2009 and 2010 (Figure 3.5-1). Initial habitat boundaries were delineated within this Project boundary at a scale of 1:5,000 in a digital GIS environment using 1-meter resolution 2005 orthophotographs (Alternative B: NAIP, 2005; image dates July 8 and 10, 2005; Alternative C: image dates July 8 and 10, 2005, USDA-FSA 2005; July 20, 26, and 27, 2009; USDA-FSA 2009). Initial boundaries were delineated based upon obvious differences in vegetation, land form, and land use. Overlay of USGS digital elevation model (DEM) data, hydrology, and transportation layers aided with these delineations. Habitat structure and composition were assessed in conjunction with 2010 special status plant (NWC 2010) and wildlife (NWC 2010b) ground surveys and 2009–2010 avian use surveys (NWC 2010c). ~~These field assessments were applied to the fall 2010 digital delineation.~~ Field assessments of the Project Area were subsequently conducted to accurately classify the habitat types present and to ground-truth habitat type boundaries, between July 17 and August 8, 2008 (Alternative B) and in spring and summer 2010 (Alternative C). Any necessary boundary corrections were hand drawn in the field on a basemap that included the fall 2010 digital delineation and orthophoto topographic data and were later transferred to the digital boundary layer. The mapping effort included reconnaissance sampling for species composition and cover, to assess dominant, co-dominant, and other common plant species within each habitat type.

Habitats were typed from the perspective of dominant vegetation and wildlife use, both general (for species assemblages, i.e., shrub-steppe obligates) and specific (for individual species). Wildlife habitat descriptions are provided below for habitats found inside the narrow mapping corridor. However, they also include the general setting of the mapped area relative to the adjacent vegetation and functionality in the immediate landscape. Wildlife species of interest were vertebrate species native to Oregon, with an emphasis on species having special state or federal status (a list of these can be found in NWC 2010). Habitat types are consistent with Conservation Strategy Habitats, as described by the ODFW (2006), and thus followed a wildlife-use

approach to vegetative habitat delineation, with some practical considerations related to mapping scale. Habitat mapping is discussed in additional detail in Section 3.3 Vegetation.

At lower elevations (4,100 to 4,500 feet), Project Area habitat is relatively flat to rolling terrain across and near the MNWR where rivers, wetlands, meadows, uplands, and agricultural lands are present at the western portion of Alternative B (and route options) and the northern extent of Alternative C. Grasslands and sagebrush are present from approximately 4,500 feet to the upper elevation limits of the Project Area (about 7,500 feet elevation), which becomes more steep and rugged with increasing elevation and along the creeks. Juniper woodlands begin at approximately 4,900 feet and are found as high as approximately 7,000 feet. The riparian areas along Project Area creeks (Table 3.5-2) include some wetlands. Talus slopes are found, associated with steep, eroding mountainsides at the upper extent of the Project Area (above 6,500 feet elevation), and rimrock is present in the valleys crossed by Alternative B (and route options). The Echanis Project would be located at the upper elevations of the Project Area in primarily sagebrush, aspen and juniper woodland habitats.

Noise levels in the upper elevations is primarily from natural sources where there is very limited development, and increases at lower elevations where there are active agricultural operations, paved roads, more gravel roads, higher recreational use, and homes and businesses. Noise levels in rural areas are typically higher during the day (40 dB(A)) than during the night (30 dB(A); BLM 2005). While no federal regulations exist for noise levels, the EPA has issued guidelines that recommend noise levels remain below 55 dB(A) in outdoor and residential areas (BLM 2005). While some studies of the effects of noise on wildlife species have been conducted, specific effects for each species present in the Project Area by season and habitat is not available. Therefore, the levels of noise generated during construction and operation of the Project are provided, and post-construction monitoring would be implemented to more accurately identify how some of the special status species are affected.

3.5.2.3 General Wildlife

General wildlife (i.e., animal species without special status) present within the Project Area include herptiles (i.e., reptiles and amphibians), mammals, raptors, waterfowl and shorebirds, passerines (i.e., perching birds and songbirds) and other birds (Tables 3.5-3 through 3.5-6). Common amphibians in the Project Area include the Pacific treefrog. Reptiles that occur are the western rattlesnake, sagebrush lizard, and western skink. Most of the species listed in Tables 3.5-3 through 3.5-6 were observed during field surveys conducted for the Project.

Mammals

Mammals found within the Project Area include big game (see Section 3.5.2.4), small and medium mammals, and bats. Small and medium mammals are found within each of the habitats throughout the Project Area. Badgers, black-tailed jackrabbits, and sagebrush voles are found in grasslands and sagebrush habitats, while golden-mantled ground squirrels and yellow-bellied marmots are associated with talus slopes and rocky areas (Table 3.5-3). Coyotes, porcupines, raccoons, and striped skunks are habitat generalists that forage throughout the various vegetative areas. Other mammal species common to the area include cottontail, Belding's ground squirrel, woodrats, deer mice, and chipmunks.

The Project Area is within the known range of 14 species of bats from eight genera (NWC 2009b, d), including the 10 ~~listed~~ special status species considered in Section 3.5.2.5. Field surveys using anabat bat detectors conducted immediately west of the proposed Echanis Project positively identified seven bat species (big brown bat, hoary bat, silver-haired bat, small-footed myotis, long-eared myotis, little brown bat, and long-legged myotis) and, because of call similarity, detected either California myotis or Yuma myotis (NWC 2009b, d). One partial call matched Townsend's big-eared bat; however, the call was incomplete so it could not be confirmed. Bats within the Project Area are insectivorous and nocturnal (or sometimes crepuscular), foraging over grassland, sagebrush, riparian, and juniper forested areas at all elevations. Bats vary in their

foraging heights, where some species remain close to the vegetative ceiling and other species will feed hundreds of feet above the plant community. Some of the species are only present in the Project Area during spring or fall migration (hoary bat, silver-haired bat, and possibly little brown bat), while the other species could be present year-round. Bats will roost in the bark of trees, in cliffs, or on buildings during the warm months but will congregate in hibernacula (caves or mines) during winter hibernation. Cliff sites, abandoned mines, and rock outcrops are present in the Steens Mountains, but surveys for hibernacula were not conducted within the Project Area and none have been recorded in or near the Project Area.

Table 3.5-3 Representative Mammal Species and Species Observed in the Project Area during Field Investigations

Common Name*	Scientific Name	Grassland	Agricultural Lands	Sagebrush	Juniper Woodlands	Wetland/ Riparian Areas	Talus Slopes
American badger	*Taxidea taxus*	X		X			
Black-tailed jackrabbit*	*Lepus californicus*	X		X			
Coyote*	*Canis latrans*	X	X	X	X	X	X
Elk*	*Cervus canadensis*	X	X	X	X	X	X
Golden-mantled ground squirrel*	*Spermophilus lateralis*						X
Hoary bat	*Lasiurus cinereus*			X	X	X	X
Least chipmunk*	*Tamias minimus*			X	X		
Mule deer*	*Odocoileus hemionus*	X	X	X	X	X	X
Muskrat	*Ondatra zibethicus*	X	X	X	X	X	
Northern pocket gopher	*Thomomys talpoides*	X					
Porcupine	*Erethizon dorsatum*	X	X	X	X	X	
Pronghorn antelope*	*Antilocarpa Americana*	X	X	X			
Raccoon	*Procyon lotor*	X	X	X	X	X	
Sagebrush vole	*Lemmiscus curtatus*	X	X				
Silver-haired bat	*Lasionycteris noctivagans*	X	X	X	X	X	X
Striped skunk	*Mephitis mephitis*	X	X	X	X	X	
Yellow-bellied marmot*	*Marmota flaviventris*						X

Note: * Species was observed during field surveys

Birds

Bird species found within the Project Area include numerous migrant and resident species using the various vegetative communities. For the purposes of this discussion, these species can be grouped as raptors; waterfowl, wading birds, and shorebirds; and passerines and other birds. Grasslands and sagebrush are present at lower elevations for sagebrush-grassland dependant species, while juniper woodlands and riparian areas provide habitat for many other species. The MNWR and adjacent streams and ponds provide important aquatic habitat for many species. Special status bird species are discussed in Section 3.5.2.5.

The Migratory Bird Treaty Act (MBTA) affords protection to most bird species that would be present within the Project Area, prohibiting taking of any kind. The Bald and Golden Eagle Protection Act (BGEPA) further protects bald and golden eagles from "take." Coordination with the USFWS, completion of an Eagle Conservation Plan (ECP), and application for an Eagle Take Permit are recommended by the USFWS for projects where incidental take of bald or golden eagles is likely.

Two types of bird surveys were conducted in the Project Area, avian use surveys and small plot avian surveys. Avian use surveys utilizing the industry standard avian point count methodology were conducted at the Echanis Project site in the fall of 2007, and along Alternative B (and route options) and Alternative C in spring, summer, winter, and fall 2009-2010 (Table 3.5-1) (NWC 2007; NWC 2010a, b). Monitoring was conducted for 13 weeks at the Echanis Project site, and one year (September 2009 through August 2010) at the transmission line points. All birds observed within a 20-minute observation period inside of an 800-foot radius were recorded with flight height, flight direction, and activity. The non-overlapping study plots were selected with the intent of surveying habitats frequently utilized by birds, such as the marsh and lake habitat adjacent to the MNWR. Surveys for the Echanis Project site reported only abundance numbers. The studies along the alternatives utilized three metrics, which were standardized so that the data could be compared with use estimates from other wind developments within the Columbia Plateau Ecoregion. The metrics utilized were:

- **Mean use** for a species equals the mean number of individuals/20-minute point count for each species and provides an index of avian relative abundance per survey point (plot). This index does not describe density, however, because individuals could have been observed at multiple points (particularly raptors) and data were not corrected for differences in detectability.

- **Percent composition** equals the mean use for a species/total use for all species, multiplied by 100, and provides an estimate of the relative use of a particular species compared with the use of all other species.

- **Frequency of occurrence** equals the percentage of 20-minute point counts in which a species was observed and it provides an index of how often a species occurred in the Project Area. Mean use and frequency of occurrence reflect different aspects of abundance, in that mean use is based upon the number of individuals (i.e., large flocks can produce high estimates), whereas frequency of occurrence is based upon the number of flocks (i.e., it is not influenced by flock size). Together, these two estimates help to discern the importance of high mean use values.

Overall, the mean use across all seasons was dominated by passerines, with the highest mean use during the summer along Alternative B and during the fall along Alternative C. Passerines also were dominant using the percent composition metric. Figure 3.5-1 shows the percent composition of all species groups for which the percent composition equaled at least five percent for at least one season. Species groups with percent composition that totaled less than five percent for every season surveyed were kingfisher, rails, doves, goatsuckers, swifts, and woodpeckers. Summary data tables from the avian use surveys are available in Appendix E of this EIS.

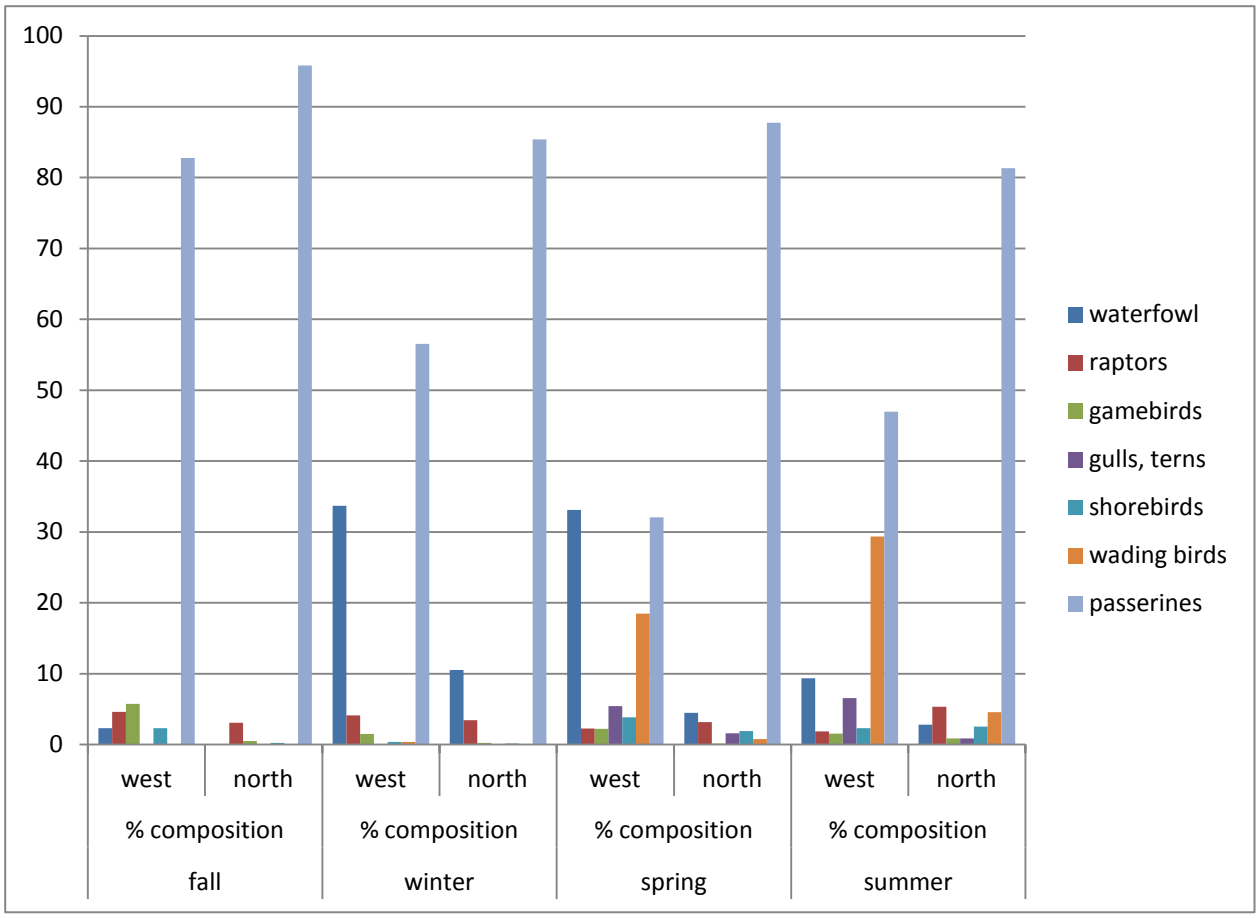

Figure 3.5-1 **Percent Composition of Species by Season for Alternatives B and C (West and North Routes, Respectively).**

Small plot avian surveys for the transmission line alternatives were requested by the staff of the Burns BLM District and the MNWR. These surveys complemented the avian use surveys, and were conducted for Alternative B (including the route options) in 2010 due to its interaction with lands administered by the MNWR. Small plot avian surveys were conducted during morning hours during only the breeding season, whereas avian use surveys (large plot) were conducted throughout the day in all seasons. In particular, the small plot surveys were meant to characterize the presence and relative abundance of breeding passerine species that might not be detected through the large plot avian use surveys. The results of these surveys could aid in describing overall habitat quality and value for native wildlife and in micrositing the transmission towers and access roads. The small plot avian surveys involved the establishment of fixed radius plots, each of which was surveyed three times during the breeding season. Survey methods were discussed and agreed to by the USFWS and BLM personnel, who also recommended the placement of the plots (NWC 2010m). The results of the small-plot avian surveys are discussed in the appropriate species-group sections below. Summary data tables from the small-plot avian surveys are available in Appendix E of this EIS.

Additional bird survey data were collected by the MNWR specifically for use for this Project and EIS. These data were collected utilizing a vehicular survey where observers drove a 17-mile route adjacent to the route of the proposed transmission line across the MNWR (Alternative B), where bird species that utilized the MNWR lands could be potentially impacted. Bird observations were conducted while the vehicle was moving unless large numbers of birds were encountered, in which case the vehicle was stopped to accurately document birds (Karges 2010).

The data collected during the MNWR surveys were abundance data, and only birds that were positively identified were recorded. The survey results depict a conservative estimate of the potential number of birds using the area in which the proposed transmission line (Alternative B) would be located (C. Karges, personal communication, March 8, 2011). Surveys were preformed weekly from January to December of 2010 and from January to February in 2011, and data were provided as a sum of all observations within a given year. Therefore, the metrics calculated in the avian use surveys, mean use, percent composition, and frequency of occurrence cannot be calculated from this data set. However, the data provides information about the occurrence and relative overall abundance of species in the area of the MNWR. Summary data tables from the MNWR bird surveys are available in Appendix E of this EIS.

RAPTORS

Raptor species are common in the Project Area primarily in the open habitats, although accipiters (i.e., hawks typically having short rounded wings and a long tail) are present in riparian areas, aspen stands, and juniper woodlands. The ferruginous hawk would be the only species that would nest in sagebrush habitats, while other hawks, eagles, and falcons would build nests in trees, on cliff faces, or in cavities in cliffs. Raptors were surveyed as a part of the avian use surveys (NWC 2010j, k). Nest surveys were also conducted at the Echanis Project site (2007), along Alternative B (and the route options; 2009) and Alternative C (2010). Active and inactive raptor nests were recorded during avian use surveys. Active nests were defined as those with signs of activity including behavior of adults, and presence of eggs, young, or whitewash, while inactive nests did not display these signs of activity. The presence of both active and inactive nests is important because not all raptor pairs breed every year or utilize the same individual nest within a nesting territory (Scott 1985). Individual raptor nests have been reported to be reused over a period of roughly seven years for species such as golden eagles or ferruginous hawks (C. White, BYU, 1988, personal communication, in USFWS 2002).

Surveys for diurnal raptors at the Echanis Project and along Alternative B (and route options) yielded observations of 12 species (Table 3.5-4). No nocturnal raptor species surveys were conducted, although a great horned owl was observed and other nocturnal owl species could be in the Project Area. Nocturnal raptors would avoid the area for hunting, because their hunting technique depends upon prey noise from movements, which would be difficult to discern in the area of the Echanis Project. Raptor mean use values were highest in the fall and lowest in the winter.

Table 3.5-4 Raptor Species Observed in the Project Area during Avian Use Surveys

Common Name	Scientific Name	Grassland	Agricultural Lands	Sagebrush	Juniper Woodlands	Wetland/ Riparian Areas	Talus Slopes
American kestrel	*Falco sparverius*	X	X	X	X	X	
Bald eagle	*Haliaeetus leucocephalus*	X		X		X	
Cooper's hawk	*Accipiter cooperii*				X	X	
Ferruginous hawk	*Buteo regalis*	X		X	X		X
Golden eagle	*Aquila chrysaetos*	X		X	X		X
Great horned owl	*Bubo virginianus*	X	X	X		X	
Northern harrier	*Circus cyaneus*			X		X	
Prairie falcon	*Falco mexicanus*	X	X	X	X	X	
Red-tailed hawk	*Buteo jamaicensis*	X	X	X	X	X	
Rough-legged hawk	*Buteo lagopus*	X	X	X	X		
Sharp-shinned hawk	*Accipiter striatus*				X	X	
Short-eared owl	*Asio flammeus*	X	X	X			
Swainson's hawk	*Buteo swainsoni*	X	X	X	X		
Turkey vulture	*Cathartes aura*	X	X	X	X	X	X

Sources: NWC 2010j,k

Overall abundance numbers for raptor species from the avian use surveys are provided in Table 3.5-5. Overall, red-tailed hawks were the most abundant raptors with 94 individuals observed (77 along the alternatives and 17 at the Echanis Project), followed by turkey vultures (61 individuals along the alternatives and 0 at the Echanis Project) and prairie falcons (39 individuals along the alternatives and three at the Echanis Project). Red-tailed hawks comprised 2.30 percent of species observed along the Alternative B in the fall and 1.15 percent of species along the Alternative C in the winter, it's most dominant seasons respectively. Additionally, two northern harriers were observed during the small plot surveys on Alternative B (NWC 2010m).

Raptor nest surveys were conducted along both Alternative B – West Route and Alternative C – North Route via helicopter using an experienced raptor ecologist and a helicopter pilot skilled at this type of survey. The surveyor identified all raptor and raven nests, both active and inactive, in the Project Area and within a 1-mile buffer of the proposed Project components. Raptors not included in this survey method were the ground-nesting owls and northern harriers (*Circus cyaneus*) and small cavity-nesters like American kestrels (*Falco sparverius*), due to the difficulty in detecting these types of nests during a helicopter survey. Within the survey area, all potential nesting areas, including trees, existing transmission lines, and rock formations, were examined. If detected, stick nests built by common ravens or black-billed magpies were also recorded, because some of these could be used by raptors in subsequent breeding years (NWC 2007, 2009, 2010).

Active nests were found for red-tailed hawks, Swainson's hawks, prairie falcons, great horned owls, golden eagles, barn owls, common ravens, ferruginous hawks, and an unknown falcon (NWC 2007, 2009, 2010; Figure 3.5-2). Additional inactive nests were found throughout and around the Project Area, including five large stick nests that could have been constructed by golden eagles, as well as nests for turkey vultures and ravens, which can be taken over by raptors. Raptors commonly build multiple nests within a small area and selectively vary use among years; so, many nests are alternate sites within a nesting pair's breeding territory.

Table 3.5-5 Raptor Abundance Reported in Avian Use Surveys

		Abundance (# of individuals)			
Common Name	Scientific Name	Echanis Wind Energy Project*	Alternative B – West Route	Alternative C – North Route	Total
American kestrel	*Falco sparverius*	12	10	1	23
Bald eagle	*Haliaeetus leucocephalus*	1	27	0	28
Cooper's hawk	*Accipiter cooperii*	4	1	2	7
Ferruginous hawk	*Buteo regalis*	0	14	0	14
Golden eagle	*Aquila chrysaetos*	11	14	2	27
Northern harrier	*Circus cyaneus*	3	19	16	38
Prairie falcon	*Falco mexicanus*	3	17	22	42
Red-tailed hawk	*Buteo jamaicensis*	17	65	12	94
Rough-legged hawk	*Buteo lagopus*	4	5	2	11
Sharp-Shinned Hawk	*Accipiter striatus*	6	0	0	6
Short-eared owl	*Asio flammeus*	0	0	1	1
Swainson's hawk	*Buteo swainsoni*	0	8	0	8
Turkey vulture	*Cathartes aura*	0	35	26	61
Total Raptors		61	215	84	360

Sources: NWC 2007; 2010d,e;

Note: North and West Alternative surveys were comprised of one year of data. Echanis Surveys were based on 13 weeks of field data.

Bird survey data reflecting presence and relative abundance were collected by the MNWR specifically for this Project, as described previously. In 2010, the surveys documented a total of 1,073 individual raptors, and 246 were documented through February 2011. The most common of these raptors were northern harriers, turkey vultures, red-tailed hawks, rough-legged hawks, bald eagles, and golden eagles.

WATERFOWL, SHOREBIRDS, AND WADING BIRDS

The MNWR is an important migratory, breeding, and year-round site for waterfowl, shorebirds, and wading birds, providing important habitat and attracting birds to the MNWR and surrounding area. The Project Area is in a region with a semi-arid climate, characterized by low precipitation and limited open water, elevating the importance of wetland and aquatic habitats. Numerous species of waterfowl and shorebirds stop at the MNWR during the spring and fall migrations. While the Echanis Project site does not have suitable waterfowl or shorebird habitat, Alternative B (including route options) would cross the MNWR and the Donner und Blitzen River in an area with wetland habitat. The area proposed for crossing by Alternative B (and route options) has valuable habitat used by tens of thousands of migratory and resident waterfowl, wading birds, and shorebirds. Thousands of white-faced ibises are known to nest in the area of the Alternative B (and route options) crossing, and the MNWR has important habitat for sandhill cranes (lesser and greater) and swans (tundra and trumpeter, Karges 2010). Alternative C would not cross the MNWR, but it would be approximately 2 miles from Malheur Lake along the northern portion of the route and pass through low-lying agricultural lands sometimes used by waterfowl and shorebirds. Waterfowl, shorebird, and wading bird species observed during the avian use surveys and small plot avian surveys are provided in Table 3.5-6.

Table 3.5-6 Waterfowl, Shorebird, and Wading Bird Species Observed in the Project Area during Field Investigations

Common Name	Scientific Name	Grassland	Agricultural Lands	Sagebrush	Juniper Woodlands	Wetland/ Riparian Areas	Talus Slopes
American avocet	*Recurvirostra americana*	X				X	
American coot	*Fulica americana*					X	
American white pelican	*Pelecanus erythrorhynchos*					X	
American wigeon	*Anas americana*					X	
Barrow's goldeneye	*Bucephala islandica*					X	
Belted Kingfisher	*Megaceryle alcyon*					X	
Black-necked stilt	*Himantopus mexicanus*	X				X	
California gull	*Larus californicus*					X	
Canada goose	*Branta canadensis*	X	X			X	
Canvasback	*Aythya valisineria*					X	
Cinnamon teal	*Anas cyanoptera*					X	
Common goldeneye	*Bucephala clangula*					X	
Common merganser	*Mergus merganser*					X	
Common snipe	*Gallinago gallinago*	X				X	
Double-crested cormorant	*Phalacrocorax auritus*					X	
Eared grebe	*Podiceps nigricollis*					X	
Forster's tern	*Sterna forsteri*					X	
Franklin's gull	*Larus pipixcan*					X	
Gadwall	*Anas strepera*					X	
Great blue heron	*Ardea herodias*	X				X	
Great egret	*Ardea alba*					X	
Greater sandhill crane	*Grus canadensis tabida*					X	
Greater white-fronted goose	*Anser albifrons*					X	
Green-winged teal	*Anas carolinensis*					X	
Killdeer	*Charadrius vociferus*	X	X			X	
Long-billed curlew	*Numenius americanus*					X	
Mallard	*Anas platyrhynchos*	X				X	
Marsh wren	*Cistothorus palustris*					X	
Northern pintail	*Anas acuta*					X	
Northern shoveler	*Anas clypeata*					X	
Redhead	*Aythya Americana*					X	
Ring-billed gull	*Larus delawarensis*					X	
Ross' goose	*Chen rossii*					X	
Ruddy duck	*Oxyura jamaicensis*					X	
Sandhill crane	*Grus Canadensis*	X	X			X	
Sora	*Porzana Carolina*					X	

Spotted sandpiper	*Actitis macularius*					X	
Trumpeter swan	*Cygnus buccinators*					X	
Tundra swan	*Cygnus columbianus*					X	
White-faced ibis	*Plegadis chihi*	X				X	
Willet	*Tringa semipalmata*					X	
Wilson's phalarope	*Phalaropus tricolor*					X	

Note: * Species was observed during field surveys

Waterfowl, shorebirds, and wading birds (including gulls, terns, and kingfisher) comprised 60.87 percent of birds surveyed on the Alternative B in the spring. Percent composition of all water birds for each season for both Alternatives B and C is provided in Table 3.5-7.

Table 3.5-7 Percent Composition of Avian Species that were Waterfowl, Shorebird, and Wading Bird, and other Water Bird Species, based upon 2010 Avian Use Surveys for Alternatives B and C

	Percent Composition							
	Fall		Winter		Spring		Summer	
	Alternative B – West Route	Alternative C - North Route	Alternative B – West Route	Alternative C – North Route	Alternative B – West Route	Alternative C – North Route	Alternative B – West Route	Alternative C – North Route
Waterfowl, shorebirds, wading birds, and other water birds	6.90	0.29	34.45	10.78	60.87	8.80	47.67	10.81

Sources: NWC 2010j,ke

According to the use surveys (NWC 2010 j, k), in the spring, water birds that most commonly occurred along Alternative B were white-faced ibis (319), Canada goose (198), Ross's goose (160), Franklin's gulls (93), and mallards (69). Along Alternative C, the most common species were Canada goose (53) and Franklins gulls (28). In the summer, water birds that were the most common along Alternative B were white faced ibis (426) and redheads (45), and along Alternative C were white faced ibis (44), Canada goose (27), and killdeer (16). In the winter, Canada goose (86) were common along Alternative B and tundra swans (86) and Canada goose (50) were common along Alternative C. Usage of the Project Area by waterbirds was low in the fall, with some use by mallards (2), killdeer (2), and kingfishers (2) along Alternative B, and killdeer (3) and mallards (1) along Alternative C.

As discussed above, small plot avian surveys were requested by the staff of the Burns BLM District and the MNWR. These surveys complemented the avian use surveys and were conducted for Alternative B (including route options) in 2010, due to its interaction with lands administered by the MNWR. Water birds counted as a part of the small-plot avian surveys are listed in Table 3.5-8.

Table 3.5-8 Water Birds Counted during the Small-plot Avian Surveys

Species	Number of Individuals
Canada goose	3
Cinnamon teal	7
Common merganser	6
Forster's tern	7
Franklin's gull	9
Gadwall	2
Great egret	1
Mallard	4
White-faced ibis	23
Total Water Birds	62

Source: (NWC 2010m)

In 2010, surveys conducted by MNWR documented a total of 85,527 individual shorebirds, wading birds, and waterfowl. A total of 4,043 were documented through February 2011. The most common of these were white-faced ibis, snow goose, Franklin's gulls, Canada goose, mallards, gadwalls, green-winged teals, pintails, cinnamon teals, shovelers, American widgeons, lesser scaups, and white pelicans.

PASSERINES AND OTHER BIRDS

Passerine bird species are primarily migratory and are present in the Project Area from spring through fall, although many species are year-round residents. A partial list of those observed during the avian use surveys and/or the small plot avian survey are provided in Table 3.5-9. This list is not all-inclusive because over 100 species were observed. Overall, mean use at all sites surveyed was dominated by passerines. For Alternatives B and C, the species with the highest mean use during spring, summer, and fall was Brewer's blackbirds (*Euphagus cynocephalus)* (Alternative B had 155 individuals in spring, 305 in summer, and 39 individuals in the fall; Alternative C had 388 individuals in spring, 145 in summer, and 605 individuals in the fall). Other species with relatively high mean use in spring and summer along Alternatives B and C were cliff swallows (*Petrochelidon pyrrhonata*) (Alternative B had 107 in the spring and 144 in the summer; Alternative C had 23 in the spring and 133 in the summer;) and red-winged blackbirds (*Agelaius phoenicus*) (Alternative B had 47 in spring and 67 in summer; Alternative C had 337 in spring and 62 in summer). Additionally, European starlings had relatively high mean use in the spring at Alternative C (345 individuals) but not at Alternative B (1 individual). The species with the highest mean use in winter was American robins *(Turdus migratorius)* (Alternative B had 80 and Alternative C had 444). Additionally, house sparrows (192) had high winter-time mean use at Alternative B and common ravens had high mean use year-round at Alternative C (214 individuals in spring, 103 in summer, 291 in winter, and 137 individuals in the fall).

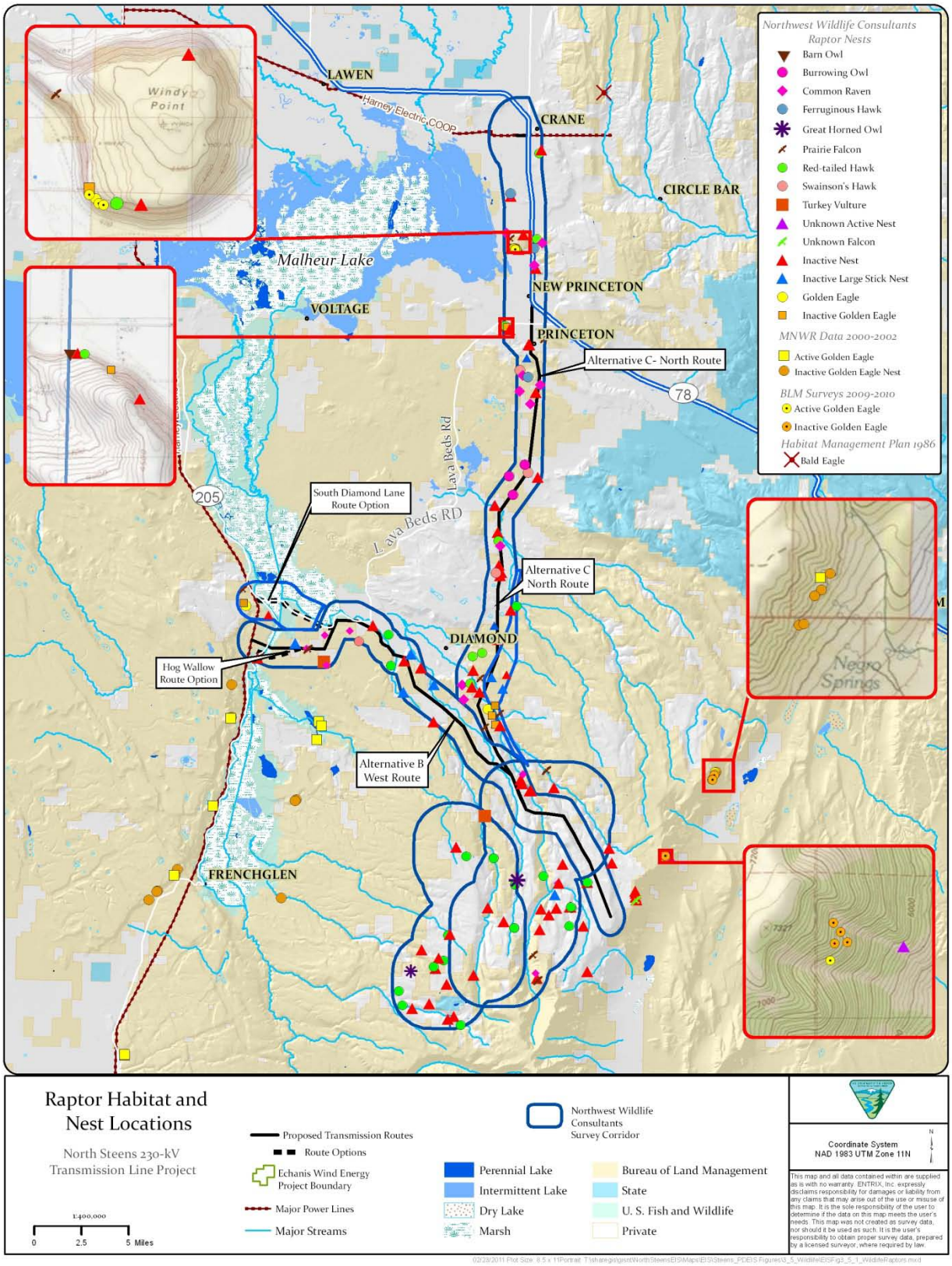

Figure 3.5-2 Raptor Habitat and Nest Locations.

Table 3.5-9 Partial List of Passerines and Other Bird Species Observed in the Project Area during Field Investigations

Common Name	Scientific Name	Grassland	Agricultural Lands	Sagebrush	Juniper Woodlands	Wetland/ Riparian Areas	Talus Slopes
American robin	*Turdus migratorius*	X	X	X	X	X	
Brewer's blackbird	*Euphagus cyanocephalus*		X			X	
Brewer's sparrow	*Spizella breweri*	X		X			
Broad-tailed hummingbird	*Selasphorus platycercus*	X		X			
California quail	*Callipepla californica*	X	X	X	X		
Cassin's finch	*Carpodacus cassinii*	X	X		X	X	
Chukar partridge	*Alectoris chukar*	X		X	X		
Common raven	*Corvus corax*	X	X	X	X		
Dark-eyed junco	*Junco hyemalis*	X		X	X		
Dusky flycatcher	*Empidonax oberholseri*	X	X				
Green-tailed towhee	*Pipilo chlorurus*			X	X		
Horned lark	*Eremophil alpestris*		X	X			
Magpie	*Pica sp.*	X		X	X		
Mountain bluebird	*Sialia currucoides*	X		X	X		
Mountain chickadee	*Poecile gambeli*				X	X	
Mourning dove*	*Zenaida macroura*	X	X	X		X	
Northern flicker	*Colaptes auratus*				X	X	
Orange-crowned warbler	*Vermivora celata*	X		X		X	
Rock wren	*Salpinctes obsoletus*		X	X			X
Sage sparrow	*Amphispiza belli*			X			
Savannah sparrow	*Passerculus sandwichensis*	X		X	X		
Townsend's solitare	*Myadestes townsendi*				X		X
Violet-green swallow	*Tachycineta thalassina*	X	X			X	
Warbling vireo	*Vireo gilvus*					X	
Western meadowlark	*Sturnella neglecta*	X	X	X			

Many passerine species are present in riparian and wetland areas, including swallows, sparrows, and blackbirds. The sagebrush and juniper habitats form a mosaic throughout much of the Echanis Project site, Alternative B, and the southern portion of Alternative C, supporting passerines adapted to these environments. Agricultural lands along the northern portion of Alternative C would be attractive to passerines for foraging, but breeding activity would likely occur in adjacent native habitats. MNWR meadows, wetlands, and uplands along Alternative B (and route options) would attract passerines such as horned larks, sparrows, and bobolinks for foraging and breeding activities. Gamebird species common to the Project Area include California quail, chukar partridge, ring-necked pheasant, and greater sage-grouse.

As discussed above, small plot avian surveys were requested by the staff of the Burns BLM District and the MNWR. These surveys complemented the avian use surveys, and were conducted for Alternative B (and

route options) in 2010 due to its interaction with lands administered by the MNWR. Passerines and other birds counted as a part of the small-plot avian surveys are listed in Table 3.5-10.

Table 3.5-10 Passerine and Other Bird Species Observed during Small Plot Avian Surveys

Species	Number of Individuals
American coot	4
American robin	4
Black-billed magpie	10
Brewer's blackbird	17
brown-headed cowbird	3
Cliff swallow	10
Common snipe	1
Common yellowthroat	6
Dusky flycatcher	1
Killdeer	2
MacGillivray's warbler	1
Marsh wren	5
Red-winged blackbird	23
Rock wren	1
Song sparrow	7
Violet-green swallow	2
Warbling vireo	1
Wilson's warbler	3
Yellow warbler	10
Total Passerines and Others	111

In 2010, the surveys preformed by the MNWR documented a total of 49,297 individual passerines and other birds. A total of 645 were documented through February 2011. The most common of these passerines were cliff swallows, American coots, red-winged blackbirds, yellow-headed blackbirds, barn swallows, tree swallows, brewer's blackbirds, California quail (USFWS 2010).

3.5.2.4 Big Game Species

Big game species that occur within the Project Area include mule deer, elk, pronghorn antelope, bighorn sheep, and mountain lion. Management ranges for these species is illustrated below (Figure 3.5-3). Although no delineated crucial winter range or production areas for any big game species are present within the Project Area, the ODFW considers all winter range ~~effectively~~ to be crucial winter range. Mule deer winter range occurs throughout much of the Project Area of Alternative B (and route options) and Alternative C, from where the two alternatives diverge to where they end at the new proposed substations. Elk winter range is present within the Echanis Project Area and along Alternatives B and C, from the Echanis Project to the north approximately to the point where the two alternatives diverge, and in a small area crossed by Alternative C. Pronghorn antelope winter range is crossed by Alternative B and the two Alternative B route options, as well as by the northern portion of Alternative C. Bighorn sheep range is present along the ridgeline of the Echanis Project site.

Mule deer and elk winter range provides important forage and cover for deer and elk during winter months when severe storms or a deep winter snowpack can increase mortality at higher elevations. These areas are important for deer and elk survival and health prior to the spring fawning and calving. The elk populations are at management objectives for population size (400 individuals; approximately 250 within the Project Area), while mule deer are well below objectives (11,000 individuals is the management objective while current herd size is approximately 3,500 to 4,000, or 35 percent of the management objective) (Klus 2010, Obradovich 2011). While pronghorn antelope and bighorn sheep objectives have not been set, populations are stable to slightly declining (Klus 2010). Wintering herds of mule deer and antelope have been observed using MNWR lands within the Project Area, with scattered individuals reported during all seasons.

Mule deer, elk, and sheep are found in ODFW Steens Mountain Wildlife Management Unit (WMU) 69, which consists of 1,916 square miles and encompasses the entire Project Area. Bighorn sheep range overlaps the Echanis Project site at the highest elevations, but does not overlap any other portion of the Project Area. The Project Area represents a very small proportion (less than one percent) of the WMU for these species.

3.5.2.5 Special Status Species

Special status species include ESA TECP species, USFWS species of concern, BLM sensitive species, and State of Oregon endangered, threatened, critical, and vulnerable species. All species present on any of these lists were evaluated for potential presence within the Project Area to determine whether they required additional analysis. The special status species were grouped into ESA TECP species; BGEPA species; BLM sensitive, USFWS species of concern, and Oregon listed species. Protection of special status species is consistent with the Three Rivers RMP ROD, which calls to "protect special status species and their habitat from BLM-authorized surface disturbing activities and land tenure adjustments" (SSS 3.1; BLM 1992). Currently, there are no specific stipulations for this type of project in the Steens Mountain CMPA or the Andrews Management Unit area.

The Oregon Natural Heritage Program (ONHP) was queried for all records within 2 miles of the Project Area, and the BLM provided their GIS records for special status species as well. ODFW also provided the location of known leks for greater sage-grouse. NWC conducted special status wildlife surveys within the Project Area; Alternative B area surveys were completed in 2009 and Alternative C area surveys in 2010. All protected species with documented occurrences within or near the Project Area were mapped (Figure 3.5-4).

The likelihood of occurrence of special status species was evaluated and assigned for each species that could potentially occur within the Project Area. Low likelihood was assigned to species that were anticipated to occur only rarely within their habitats in the Project Area (less than 10 percent likelihood), that were known to occur outside of but not in contiguous habitat to the Project Area, or for which very little suitable habitat was available in the Project Area. Moderate likelihood of occurrence was assigned to species that were anticipated to be uncommon within their habitats in the Project Area (10 to 50 percent likelihood), were known to occur outside of the Project Area, or for which some suitable habitat was available in the Project Area. High likelihood was assigned to species that were anticipated to be common in habitats in the Project Area (greater than 50 percent likelihood), was known to occur adjacent to the Project Area, or for which suitable habitat was available in the Project Area.

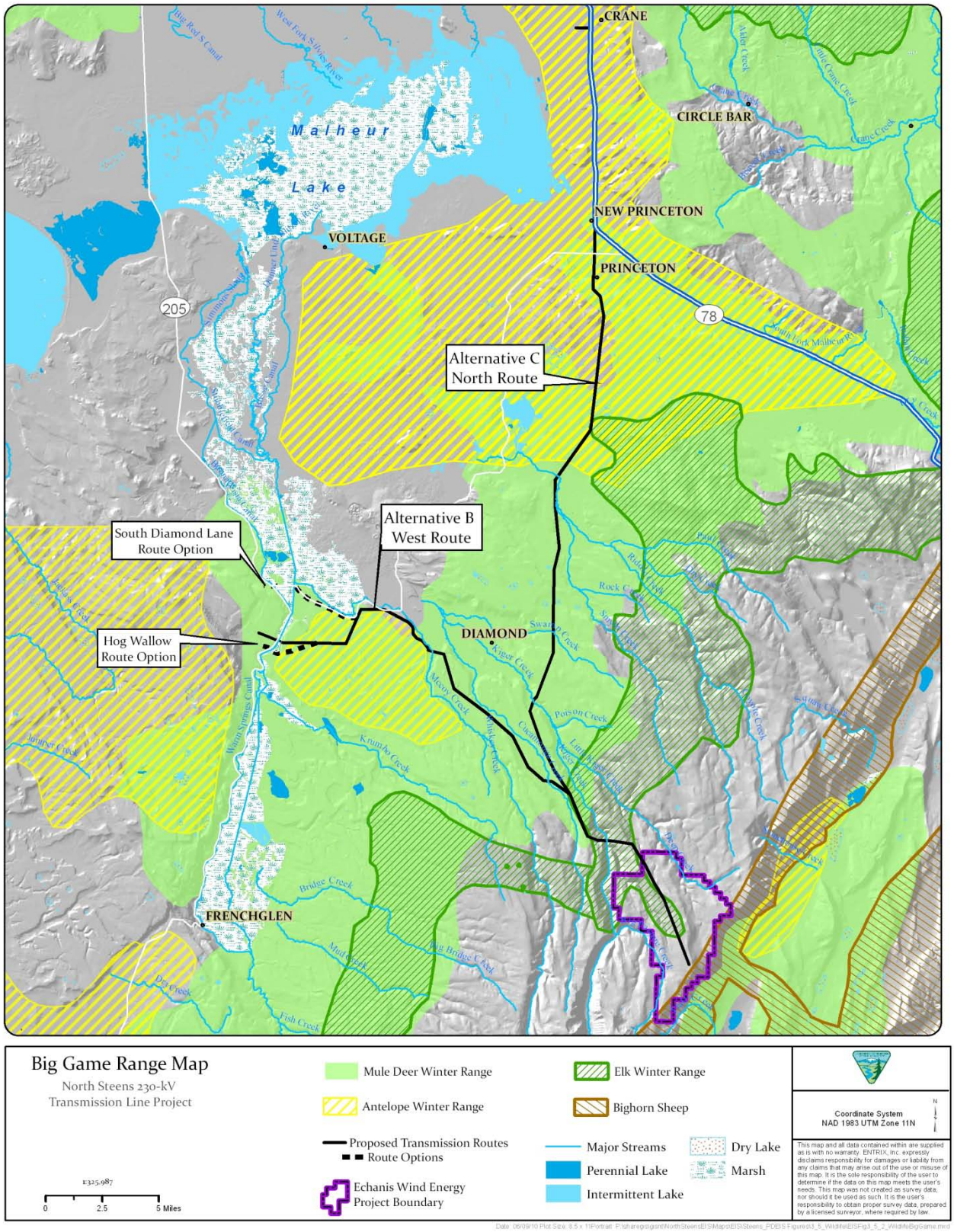

Figure 3.5-3 Big Game Range Map.

This figure for special status animals contains confidential information not available for public review.

Figure 3.5-4 Map of Documented Occurrences of Special Status Animals.

Endangered, Threatened, Candidate, and Proposed Animal Species

Six ESA TECP species occur within Harney County, and were evaluated to determine whether they could occur within the Project Area. The likelihood of occurrence for each species within the Project Area was determined by examining habitat suitability, species range, known occurrences within or near the Project Area, and discussion with BLM and USFWS biologists (Table 3.5-11). Two ESA TECP species that could occur within the Project Area, greater sage-grouse and Columbia spotted frog, are discussed in more detail.

Table 3.5-11 Summary of Federally Listed, Candidate, and Proposed Species found in Harney County, Oregon

Species	Status	Habitat Description	Likelihood of Occurrence
Birds			
Greater sage-grouse (Centrocercus urophasianus)	C	Depend on a variety of sagebrush community types and associated habitats, including basin-prairie and mountain foothills shrub lands, and wet-moist meadows. A good understory of grasses and forbs, openings in sagebrush, and associated wet meadow areas are essential for optimum habitat.	Present: known lek within 2 miles of Project Area. Yearlong habitat occurs within the Project Area above 4,500 feet on the Steens Mountain.
Yellow-billed Cuckoo (*Coccyzus americanus*)	C	Prefers to breed in large woodlands with an understory of dense vegetation, especially in floodplains. Extirpated from Oregon.	None: No suitable habitat in Project Area.
Fish			
Borax Lake Chub (*Gila boraxobius*)	E, CH	Endemic to Borax Lake and adjacent wetlands in the Alvord Basin, Harney County, Oregon.	None: Project Area is out of range for species.
Bull Trout (*Salvelinus confluentus*)	T, CH	Requires stable stream channels, clean spawning and rearing gravel, complex and diverse cover, unblocked migratory corridors, and cold water for survival (<16 ˚C). Juveniles use runs, riffles and pocket water but fish >1 year use deeper pools while resting. Critical habitat is located north of US-20, north of Project Area.	None: Project Area is out of range for species.
Lahontan Cutthroat Trout (*Oncorhynchus clarki henshawi*)	T	Found in a wide variety of cold-water habitats including large terminal alkaline lakes, alpine lakes, slow meandering rivers, mountain rivers, and small headwater tributary streams. Known to occur south and east of Project Area on east side of Steens Mountains ridgeline.	None: Project Area is out of range for species.
Amphibians			
Columbia Spotted Frog (*Rana luteiventris*)	C	Prime habitat usually includes more open riparian areas, along a stream or around a pond with permanent water, in slow moving areas such as sloughs or oxbows. Known to occur west of Steens Mountains south of the proposed Echanis Wind Energy Project development, and in the Malheur Refuge south of the three proposed transmission line alternatives that cross the Donner und Blitzen River	Low: Known occurrences upstream of proposed crossings of Donner und Blitzen River and upper reaches of McCoy Creek; minimal suitable habitat at crossing locations.

Sources: USFWS 2009d (http://www.fws.gov/oregonfwo/Species/); Csuti et al. 2001

Note: Key: E - Federal Endangered; T - Federal Threatened; C - Federal Candidate Species; CH – Critical Habitat has been designated.

GREATER SAGE-GROUSE

Specific to greater sage-grouse in Oregon, the following documents were utilized as sources for current scientific research and policy in drafting this EIS:

- **Greater Sage-Grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat, 22 April 2011 (*Sage-Grouse Strategy*) and accompanying Core Area GIS data (24 July 2011).** This document provides recommendations for long-term conservation of greater sage-grouse based upon the best available science, and is intended to inform decision-makers regarding the biological consequences of various actions on greater sage-grouse, but not dictate land management decisions. The accompanying GIS data illustrates the locations of Core and Low Density greater sage-grouse habitat. The development of the *Sage-Grouse Strategy* considered and incorporated information from the following two sources.

- **Notice of 12-Month Findings for Petitions to List the Greater Sage-Grouse (50 CFR Part 17, 05 March 2010).** The U.S. Fish and Wildlife Service (USFWS) reviewed primary sources of relevant science as well as information provided by states, federal agencies, and private citizens as part of this 12-Month Findings. The five listing factors considered by the USFWS in developing the findings are addressed in the Conservation Guidelines in Section V of the Oregon *Sage-Grouse Strategy*. At the direction of the Oregon Fish and Wildlife Commission or the Oregon Sage-Grouse and Sagebrush Habitat Conservation Team, the Oregon *Sage-Grouse Strategy* may be updated as new information is collected on the life-history of greater sage-grouse in Oregon or across the range of the species.

- **Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats. Studies in Avian Biology, No. 38. (Connely et al. 2011. Individual chapters cited independently).** The foundation for this volume was the 2004 Conservation Assessment for the Greater Sage-Grouse and Sagebrush Habitat compiled by the Western Association of Fish and Wildlife Agencies (WAFWA). The 2004 Assessment was compiled under tight timeframes and management considerations were not provided at that time. This published volume has revised, updated, and reconfigured the content of the 2004 Assessment and includes conservation implications for each chapter. Each chapter in this volume has followed a rigorous, scientific peer-review prior to publication. The chapters contained in this volume are recognized by the USFWS as the primary source of science for the 12-Month Findings for Petitions to List the greater sage-grouse, referenced above. This information was also considered and incorporated where appropriate during the development of the Oregon *Sage-Grouse Strategy*.

Greater sage-grouse are a sagebrush obligate species that use different sagebrush and riparian habitats throughout the year for courtship (lekking), nesting, brood rearing, and wintering, and rely on suitable habitat during each part of the year for their persistence. Sagebrush steppe habitat is present in a mosaic throughout the Project Area, primarily with grasslands, agricultural areas, and juniper woodlands. Specific habitat needs can be described in terms of breeding habitat, brood rearing habitat, and winter habitat. Unlike other upland game birds, greater sage-grouse have been known to exhibit extensive movement between seasonal ranges and home ranges (Knick and Connelly 2011). Suitable year-round sagebrush habitat is present at lower elevations, and high-quality summer brood rearing through winter range occurs along the access road to the Echanis Project site and on the Echanis Project site itself. Breeding habitat includes strutting grounds called leks, which are open areas surrounded by sagebrush and are typically used annually. Optimum greater sage-grouse nesting habitat contains a healthy sagebrush ecosystem complete with sagebrush and a strong native herbaceous understory composed of grasses and forbs (Hagen et al. 2007 in Hagen 2011a).

The greater sage-grouse is a USFWS candidate species and an Oregon sensitive (vulnerable) species in the Blue Mountain, Columbia Plateau, and Eastern Cascade Slopes and Foothills Ecoregions (ODFW 2008) that is endemic to the western United States and western Canada. The greater sage-grouse is a popular upland game bird that was once abundant throughout sagebrush habitats in the west. Its original range encompassed the western to northwestern United States and three provinces of southwestern Canada. Currently, the greater sage-grouse range has measurably decreased within 11 states and two Canadian provinces. Since the 1950s, the greater sage-grouse population has declined by an estimated 45 to 80 percent (Connelly et al. 2004), with about 150,000 to 200,000 breeding greater sage-grouse remaining throughout the range (as cited in BLM 2004a). Greater sage-grouse populations are continually declining throughout their range and individual populations have become increasingly separated. The species is considered "at risk" in Washington, California, Utah, Colorado, North Dakota, South Dakota, as well as Alberta and Saskatchewan in Canada. Although the population is considered to be "secure" in Oregon, Nevada, Idaho, Wyoming, and Montana, long term population declines have averaged 30 percent (Connelly and Braun 1997, Garton et al. 2011 in Hagen 2011a). Within the extant range in Oregon, although spring population indices have demonstrated an overall decline since the 1940s, indices over the past 30 years suggest relatively stable populations (Hagen 2011a). Additionally, in Oregon, the annual average number of males per active lek has not changed significantly since 1980 (Hagen 2011a).

The 12-Month Finding (DOI 2010) states that maintaining habitat connectivity and sage-grouse population numbers are essential for sage-grouse persistence. Sagebrush habitats are becoming increasingly degraded and fragmented because of the impacts of multiple threats, and sage-grouse population decline is thought to be a result of factors including direct conversion, urbanization, infrastructure such as roads and powerlines in sagebrush habitat, wildfire and the change in wildfire frequency, incursion of invasive plants, grazing, hunting and poaching, predation, weather, accidents, herbicides, and nonrenewable and renewable energy development. Many of these threat factors are exacerbated by the effects of climate change, which may influence long-term habitat trends (DOI 2010, Connelly et al. 2004).

The greater sage–grouse's decline throughout its historical range (Connelly and Braun 1997) led to a "warranted but precluded" designation and placement on the Candidate Species list by the USFWS in March 2010. As a candidate species, greater sage-grouse does not receive statutory protection under the ESA. The USFWS, however, encourages voluntary cooperative conservation efforts because candidate species, by definition, warrant future protection under the ESA (USFWS 2010).

In Oregon, greater sage-grouse were historically found in most sagebrush habitats east of the Cascade Mountains, but through European settlement and conversion of sagebrush steppe to agricultural production the species was extirpated from the northern portion of its range in the state (Hagen 2005). ~~Current threats to sagebrush habitat include fire and encroachment by juniper woodlands.~~ Data are available in Oregon from 1957 through 2003, over which the declining trend is evident, but since 1980 the population trend has been relatively stable with most areas showing an increasing trend since 1990. Compared to other states in greater sage-grouse range, Oregon greater sage-grouse populations are doing relatively well, and are found in Union, Baker, Deschutes, Crook, Lake, Harney, and Malheur Counties (ODFW 2011). The BLM manages 70 percent of the currently-occupied greater sage-grouse habitat in the state (ODFW 2011). The statewide management goal is to maintain or enhance greater sage-grouse numbers and distribution at the 2003 spring breeding population level (approximately 30,000 birds) until 2055 (ODFW 2011).

Statewide, 1,054 lek sites, comprising 756 lek complexes, have been identified; 126 of these complexes are in the Burns BLM District (Hagen 2011a). Recently, 32 percent of all leks in the District have been monitored annually, and 77 percent of those have been active (Hagen 2011a).

In the Burns BLM District, there has been an 8.8 percent decrease in sagebrush habitat from its historic distribution (Hagen 2011a). The greater sage-grouse population has declined after its peak in the late 1980s (in concert with the statewide trend of peaking abundance in the late 1980s, with a trough in the late 1990s, recovery in 2003, and decline again later in the decade) (Hagen 2011a). In 2010, the estimated size of the spring population in the Burns BLM District was 3,877 to 5,195 birds; the state-wide estimate was 21,064 to 27,115 birds (Hagen 2011a). The management goal for the Burns BLM District is to maintain or enhance greater sage-grouse numbers and distribution at the 2003 spring breeding population level (approximately 4,300 birds) until 2055 (Hagen 2011a).

Brood rearing typically occurs close to nest sites, however there is variability between individual broods. Brood rearing habitat values include a rich forb component, insects, and a wide diversity of plant species, which would provide a diversity of insects for chicks to eat (Hagen 2011a). Late brood-rearing coincides with the change in diets of greater sage-grouse chicks from predominantly insects to forbs and the change to drier summer weather. During this time, roughly July to early September, greater sage-grouse utilize habitats including riparian areas, wet meadows, and alfalfa fields (Connelly et al. 2011).

During the winter months, greater sage-grouse's diet consists almost entirely of sagebrush leaves and buds. Greater sage-grouse tend toward areas with high canopy and taller sagebrush plants (Hagen 2011a). Sagebrush must be exposed at least 9.8 to 11.8 inches (25 to 30 cm) above the snow level to provide adequate forage and cover, and if sagebrush is covered with snow, greater sage-grouse will move to areas where the

sagebrush is exposed (Hagen 2011a). The availability of sagebrush above the snowpack is critical to the survival of greater sage-grouse through the winter (ODFW 2011).

These seasonal greater sage-grouse habitats ~~(wintering, brood rearing, and late summer) have not been mapped to date~~ have not been mapped because of their variability, so specific estimates for acres of these habitats surrounding the Project are not available. Additionally, movement patterns of greater sage-grouse are not well documented. Birds have been known to be migratory or resident, depending upon habitat and landforms (Beck 1975, Wallestad 1975, Berry and Eng 1985, Connelly et al. 1988, Wakkinen 1990, Fischer 1994 in Hagen 2011a, Connelly et al. 2011). Throughout a given year, greater sage-grouse could stay confined to an area of 38.6 mi^2 or could exceed 580 mi^2. Likewise, breeding, brood rearing, and winter range for any given population, or individuals in a population, could overlap entirely, partially, or not at all (Hagen 2011a). Females have been documented to travel more than 12.5 miles to their nest site after mating (Connelly et al. 2001 in DOI 2010) but distances between a nest site and the lek on which breeding occurred is variable (Connelly et al. 2004 in DOI 2010). The South Steens Study was conducted to better understand greater sage-grouse habitat use and distribution in the South Steens Allotment (Crawford et al. 2000). The average distance from the lek where the female was captured to the nest site observed for the birds in this study was 6.9 miles (Crawford et al. 2000). More recent analysis showed that of the 29 greater sage-grouse nests found during the South Steens Study, 65 percent were within 2 miles of the nearest lek and 83 percent were within 3 miles of the nearest lek.

GIS data with greater sage-grouse lek locations was analyzed for lek distance from the proposed Project. Seventeen known leks occur within 6.2 miles of Alternatives B and C, including two lek complexes (number in parenthesis is number of leks), Ham Brown Lake (3) and Jack Mountain/Jack Mountain Lake (4). Other leks occurring outside of lek complexes are Dollar Lake, Irish Lake, and Little Kiger. Five of these leks also occur within 6.2 miles of the Echanis Project site (Ham Brown (3), Dollar Lake, and Little Kiger). Although these leks are within the distance range of possible movement to the Project Area, there is no evidence that supports what proportion of these birds utilize sagebrush habitat in the Project Area. Sagebrush habitat within the Project Area is provided in Table 3.5-12.

Table 3.5-12 Sagebrush Habitat in the Project Area (acres)

	Big Sagebrush Steppe	Dwarf Shrub Steppe	Total
Echanis Project	8,472.1	51.7	8,523.8
Alternative B – West Route	174.6	1.5	176.1
South Diamond Lane Route Option	171.6	1.5	173.1
Hog Wallow Route Option	202.5	1.5	204.0
Alternative C – West Route	401.7	48.8	450.5

Sources: Vegetation Section (Section 3.3) table 3.3-4; NWC 2010f,g,h,o

Field survey data collected on the Project site noted the presence of greater sage-grouse at many locations. At the Echanis site, surveys (NWC 2007) completed between August 21, 2007 and November 9, 2007 reported that "sage-grouse were frequently flushed as the surveyor arrived at plot D or traveled between plots." A total of 37 greater sage-grouse were counted at the Echanis Project site during the avian use surveys (NWC 2007c). Twelve individual greater sage-grouse and numerous locations of greater sage-grouse fecal matter were also recorded during the special status wildlife surveys on the Echanis Project site during July 25-31, 2008 (NWC 2008b). Additionally, one location of greater sage-grouse fecal matter was detected on the Alternative B site during the special status wildlife surveys conducted on June 5 and 10, 2008 (NWC 2008c). No greater sage-grouse were detected during the avian use surveys of Alternative B (NWC 2010j) or Alternative C (NWC 2010k), which included weeks in the winter, spring, summer, and fall.

Although oil- and gas-field development within greater sage-grouse range has been typically shown to cause measurable negative effects to sage-grouse, very little is known about wind energy and sage-grouse (Becker et al. 2009). Studies have not been completed to quantify wind energy effects on greater sage-grouse, but it is anticipated that greater sage-grouse responses to wind energy development would be related to the locations and densities of individual towers, the size and layout of individual wind farms, the density of wind farms across the landscape, and the amount and distribution of support infrastructure including roads and transmission lines (Becker et al. 2009). There is a potential conflict between wind energy development and greater sage-grouse winter foraging habitats, because the windswept ridges that keep sagebrush exposed during winter months could also be ideal locations for wind energy development (Hagen 2011a). Winter avian surveys were not conducted at the Echanis site, but were conducted at the East Ridge Wind Energy Project and West Ridge Wind Energy Project sites, adjacent to the Echanis Project site (NWC 2009). The East Ridge and West Ridge projects are similar but potentially at even lower elevations. Between November and March, 14 surveys were conducted on the East Ridge site and nine on the West Ridge site. These surveys found greater sage-grouse on the sites in December (36 birds on East Ridge on December 17 and nine birds on West Ridge on December 11). However, no greater sage-grouse were found later in December, or in January, February, March, or April, during the time that snow had accumulated. Because the Echanis Project area is generally covered with snow earlier and later in the season because of it's relatively higher elevation, it is reasonable to extrapolate winter use from the surveys at the East Ridge and West Ridge sites. Therefore, based upon these data, greater sage-grouse are assumed not to utilize the Echanis Project Area for winter habitat from the time that the vegetation is covered with snow until snowmelt, roughly December through April.

~~However, the BLM Burns Field Office is actively seeking funding to conduct grouse habitat and movement studies to identify seasonal use areas by grouse. One lek is located within 2 miles of Alternatives B and C, on the east side of Kiger Creek; however, Alternatives B and C are west of Kiger Creek and the associated canyon.~~

The *Greater Sage-grouse Conservation and Assessment Strategy for Oregon* (*Sage-Grouse Strategy*; Hagen 2011a) was adopted by the Wildlife Commission in April 2011. The *Steens Mountain CMPA ROD and RMP* and the *Andrews Management Unit ROD and RMP* state that management prescriptions may include avoidance or mitigation measures to prevent or minimize habitat disturbance, in accordance with the *Sage-Grouse Strategy*. Consistent with the USFWS *Wind Turbine Guidelines* (USFWS 2010b) and the mitigation hierarchy of the Council of Environmental Quality (2000), the Core Area framework in the *Sage-Grouse Strategy* seeks to maintain large resilient landscapes to support sustainable greater sage-grouse populations and habitats, and multiple uses of the sagebrush biome (Kiesecker et al. 2010). According to the *Sage-Grouse Strategy*, regardless of the location of an industrial development with respect to greater sage-grouse Core Areas, the ODFW staff would conduct local analyses to verify that habitats within Core or Low Density areas are in fact greater sage-grouse habitat. ODFW would provide appropriate recommendations about whether avoidance was necessary and what type of mitigation could be necessary. Generally, ODFW staff would recommend avoidance of impacts to greater sage-grouse habitat that occurred in Core Areas, and mitigate at no net loss with net benefit for impacts to greater sage-grouse habitat that occurred in Low Density Areas per ODFWs Mitigation Policy (OAR 635-415-0000; Hagen 2011a).

Geographical data accompanies the *Sage-Grouse Strategy*, and delineates greater sage-grouse "Core Areas" and "Low Density Areas" (Figure 3.5-5). Private lands are shaded on the figure because application of the *Sage-Grouse Strategy* would not be required on private lands. These Core and Low Density areas are further classified as Category 1 or Category 2 as follows:

- Category 1: essential for greater sage-grouse populations and is limited by the inability to mitigate for habitat loss in these areas in a reasonable time frame, and is irreplaceable; and

- Category 2: is essential habitat for greater sage-grouse populations and is limited physiographically as migration or movement corridors between Habitat Category 1 areas.

This guidance document indicates that Category 1 habitats are irreplaceable but that Category 2 habitats can be mitigated with a no net loss, net benefit guideline. The mitigation framework for the Core Area approach outlined in the *Sage-Grouse Strategy* is outlined in a document titled *Implementing Habitat Mitigation for Greater Sage-Grouse Under the Core Area Approach* ("*Mitigation Framework*"; Hagen 2011b). This *Mitigation Framework* is based upon recent science that demonstrates that sound levels greater than 40 dbA reduce breeding activity and increase stress levels in greater sage-grouse (Hagen 2011b).

BLM management objectives that apply to greater sage-grouse are found in the *Steens Mountain CMPA Record of Decision* (ROD) *and Resource Management Plan* (BLM 2005) and the *Andrews Management Unit ROD* and *RMP* (BLM 2005). These documents state that management prescriptions may include avoidance or mitigation measures to prevent or minimize adverse effects to special status species, and that big sagebrush habitat will be managed for the benefit of special status species and to meet DRCs (Desired Range of Conditions) in most big sagebrush habitats throughout the CMPA. Big sagebrush habitat will be managed in accordance with the *Migratory Bird Executive Order*, *Greater Sage-Grouse and Sagebrush-Steppe Ecosystem Management Guidelines*, BLM National (or OR/WA State level) *Sage-Grouse Habitat Conservation Strategy*, and the *Greater Sage-Grouse Conservation Assessment and Strategy for Oregon*. Currently, there are no specific stipulations for this type of project in the Steens Mountain CMPA/Andrews Management Unit area.

Under the Three Rivers RMP and Rangeland Summary Program (BLM 1992), the following greater sage-grouse stipulations apply:

- SSS 3.2: Allow no big sagebrush removal within 2 miles of sage-grouse strutting grounds when determined by a wildlife biologist to be detrimental to sage grouse habitat requirements.
- WL 7.7: Allow no big sagebrush removal within 2 miles of sage-grouse strutting grounds when determined by a wildlife biologist to be detrimental to sage-grouse habitat requirements.

COLUMBIA SPOTTED FROG

The Columbia spotted frog is a USFWS candidate and Oregon Sensitive species that lives in or near the edges of permanent ponds, marshes, springs, and slow streams where grasses and sedges are plentiful, or in forested or wooded wetlands with shallow edges that have cover (Bull 2005). Columbia spotted frogs are usually only heard during the breeding season when they make a weak 'clucking' sound repeated 6 to 9 times per call. Breeding occurs from March in the lower elevations to as late as June in the higher elevations. The current known distribution of this species in Harney County is south and west of the Project Area, and includes known breeding locations in the Donner und Blitzen basin upstream of the Alternative B (and route options) crossing. Suitable habitat for the Columbia spotted frog could exist on the MNWR where Alternative B (including route options) crosses the Donner und Blitzen River valley, but is not present along Alternative C or at the Echanis Project site. The nearest known site for Columbia spotted frog is in the upper reaches of McCoy Creek. The Great Basin population (including Malheur, Lake, Harney, and possibly Grant Counties) is either declining or almost extirpated. A plan or strategy for conservation of this species has not been developed by the USFWS or ODFW. However, like most amphibians, the major threat to this species is destruction, fragmentation, and degradation of wetlands. The introduction of bullfrogs is also thought to have lead to their decline (USFWS 2011).

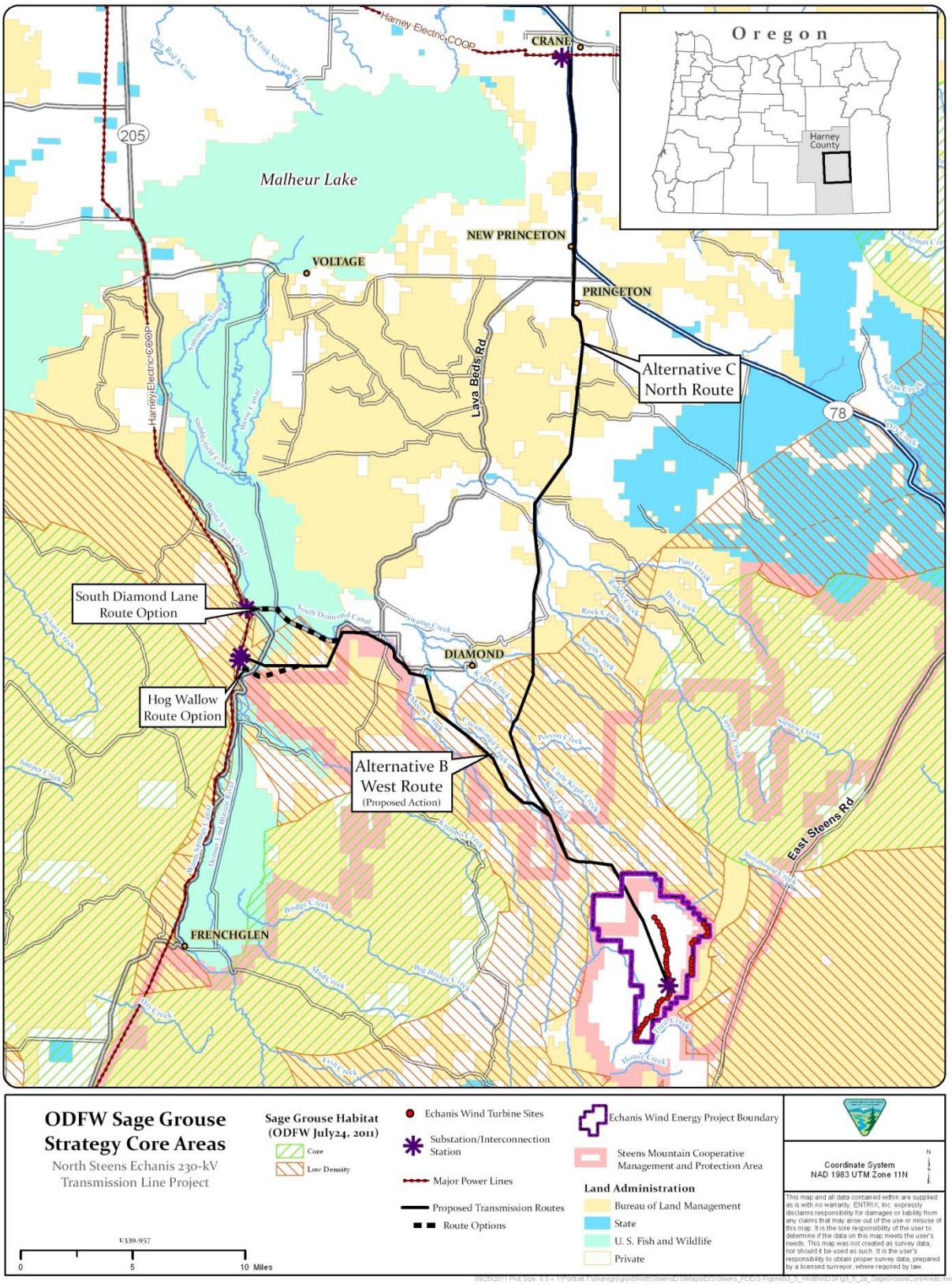

Figure 3.5-5 ODFW Greater Sage-Grouse Strategy Areas.

BALD AND GOLDEN EAGLES

The BGEPA affords protection for bald and golden eagles and their nests. The USFWS recently (September 11, 2009; DOI 2009) published their permit regulations to authorize take[1] of bald and golden eagles and eagle nests ''for the protection of . . . other interests in any particular locality'' where the take is compatible with the preservation of the bald eagle and the golden eagle, is associated with and not the purpose of an otherwise lawful activity, and cannot practicably be avoided (USFWS 2009a). The preservation standard is defined in USFWS (2009a) as "…consistent with the goal of increasing or stable breeding populations." Under 50 CFR 22.26, permits can be issued for one-time take or for programmatic take, that is, more than one individual take that occurs over a longer period of time. The Echanis Project fits the latter category.

Interpretation of population-level information for golden eagles suggests that populations might be declining across their range. Thus, the USFWS has established a no-net loss threshold for golden eagles, which means that any disturbance effects or mortalities that might lead to a decrease in the golden eagle breeding population must be compensated.

Guidance is being developed to inform the USFWS, other federal and state agencies, tribes, other partners, and industry about the proper analyses and steps needed to achieve the no-net loss management goal for golden eagles. *Draft Eagle Conservation Plan (ECP) Guidance* (USFWS 2011) describes the steps that potential permit applicants must take before the USFWS will consider issuance of a programmatic permit for a wind facility likely to take golden eagles. Programmatic take permits will authorize limited, incidental mortality and disturbance of eagles at wind facilities, provided that effective offsetting conservation measures that meet regulatory requirements are carried out. To comply with the permit regulations, conservation measures must avoid and minimize the take of eagles to the maximum degree possible and, for programmatic take permits, advanced conservation practices (ACPs) must be implemented such that any remaining take is unavoidable. Further, for eagle management populations that cannot sustain additional mortality, any remaining take must be offset through compensatory mitigation such that the net effect on the eagle populations is, at a minimum, no change.

The geographic scales relevant to this type of biological analysis are defined by regulations under the BGEPA (50 CFR Parts 13 and 22). Effects are considered at the scale of the Project Area, the Local Area Population[2], the Bird Conservation Region[3], and the USFWS Region[4].

The Applicant has crafted an ABPP/ECP (see Appendix F) that incorporates measures specific to eagle conservation and management and that meets the standards developed in the *Draft ECP Guidance*. The ABPP/ECP incorporates measures to avoid and minimize the take of golden eagles, commits to post-construction monitoring of eagles within the Project Area and adaptive measures to reduce future takes, and proposes to mitigate for estimated eagle mortalities resulting from the wind development.

Bald and golden eagles have been observed within the Project Area, and two active nests were observed during surveys of the Alternative C (NWC 2010) and two active golden eagle nests were identified along the Steens Mountain rim near the Echanis site. Within the Echanis Project site, four inactive nests were sufficiently large enough to have been constructed by golden eagles (NWC 2010), but no nests were observed that could conclusively be said to have been constructed by bald eagles. A total of nine of the inactive nests

[1] "Take" is defined in the BGEPA as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb." "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

2 The area included within a 140-mile zone around the Project (FR 74(175): 46836-46879)

3 Regions defined by the North American Bird Conservation Initiative (http://www.nabci-us.org/bcrs.htm) and adopted by regulation as an appropriate ecological area within which to manage golden eagles at the population level (FR 74(175): 46836-46879).

4 Geographical divisions of the United States used by the U.S. Fish and Wildlife Service to administer programs (http://www.fws.gov/where/)

found during raptor nest surveys were determined to have been built by golden eagles, because of their size and habitat (NWC 2007, 2009, 2010).

Bald eagles are known to migrate through the Project Area, and have wintered around Malheur Lake near Alternative B (and route options) and Alternative C. They are not known to generally spend the breeding season in or near the Project Area, although bald eagles have been observed during each season. Golden eagles have been reported in the vicinity of the Project Area during the breeding season, and the presence of large stick nests indicates that they could breed in areas along Alternative B (NWC 2007), including the Alternative B route options, and Alternative C (NWC 2010).

As previously reported, avian use surveys recorded 27 bald eagles along Alternative B, none along Alternative C, and one at the Echanis Project site. These surveys recorded 14 golden eagles along Alternative B, two along Alternative C, and 11 at the Echanis Project site (NWC 2011a, b). Bird survey data collected by the USFWS at the MNWR reported 51 bald eagles and 40 golden eagles in 2010 (12 months of survey data) and 34 bald eagles and 26 golden eagles in 2011 (two months of survey data) (Karges 2011). Bald eagles are known to migrate through the Project Area and have wintered around Malheur Lake near Alternative B (and the two route options) and Alternative C. Wintering bald eagles begin arriving during November, with peak numbers during mid-February to mid-April each year (Issacs et al. 1984). Food sources during this time period include wintering and spring migrating waterfowl, carrion, and small mammals, especially ground squirrels. A known bald eagle winter roost is located approximately 4 miles northeast of Crane, Oregon (Issacs et al. 1984, BLM 1986) near Alternative C, with counts ranging from six individuals to 67 individuals during 1999-2004 winter counts (Burns BLM District files). During 1982 to 1984, Issacs (1984) reported some bald eagles that fly out from this roost, feeding east of Malheur Lake in the area near Alternative C. Bald eagles can be seen in alfalfa fields south of Crane along Hwy 78 (Alternative C) feeding on ground squirrels that usually start emerging in late February (M. Obradovich, personal communication, 2011). Recently, bald eagles have been recorded establishing nest sites in forested areas at the northern end of the basin, at least 15 miles north of the end of Alternative C.

State of Oregon Listed, BLM Sensitive, and U.S. Fish and Wildlife Service Animal Species of Concern

State of Oregon listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and USFWS Animal Species of Concern found in Harney County were evaluated to determine the likelihood that they could be present within the Project Area based upon habitat preference, range, and observations during field studies (Table 3.5-9). Numerous protected species were observed ("present") during field studies, or were not observed but could be present within the Project Area, based upon the review of available existing and field information for each species (Table 3.5-13).

Oregon endangered and threatened species are protected, while critical and vulnerable species are targeted for conservation action and voluntary enhancement of primary habitats used. BLM Sensitive species have varying levels of protection, depending upon the level of rarity of a species and the Proposed Action that could have a detrimental effect. USFWS Species of Concern are targeted for voluntary protection and habitat enhancement, but do not have statutory regulations for their protection.

Thirteen special status mammal species could be or were found within the Project Area, of which 10 were bat species (Table 3.5-13). Five special status bat species were detected during the bat surveys, and five additional bat species were not detected, but varied in their likelihood of occurrence within the Project Area from low to high (Table 3.5-13). Moderate call similarity confounded positive identification of one bat species, either Yuma myotis (USFWS SC) or California myotis. A partial call was detected that matched Townsend's big-eared bat (USFWS SC, BLM S, and OV species), but insufficient call data was recorded for a positive identification. Bat species were discussed previously in Section 3.5.2.3.1.

Table 3.5-13 Summary of U.S. Fish and Wildlife Service Species of Concern, BLM Sensitive Species, and Oregon Special Status Species Found in Harney County, Oregon

Species	Designation	Habitat Description	Likelihood of Occurrence
Mammals			
California Wolverine (*Gulo gulo luteus*)	SC, S	Open forests at higher elevations and in alpine areas. Dens in caves, rock crevices, or hollow logs. Documented in the Steens Mountains (Verts and Carraway 1998).	Moderate: Suitable habitat, Project Area in species range.
Prebles's Shrew (*Sorex preblei*)	SC	Arid and semiarid sagebrush-grassland habitats and openings in subalpine coniferous forests dominated by sagebrush. Also occurs near creeks and bogs bordered by willow or riparian shrub. Documented in the Steens Mountains near Fish Lake (Verts and Carraway 1998).	Moderate: Suitable habitat, Project Area in species range.
Pygmy Rabbit *(Brachylagus idahoensis)*	SC, S, OV	Dense, tall stands of big sagebrush growing on deep, friable soils that allow the rabbits to dig rather extensive burrow systems. Documented in the vicinity of Princeton (Verts and Carraway 1998).	Moderate: known to occur west of Project Area, and historically in Project Area, but not currently documented in Project Area.
Fringed myotis (*Myotis thysanodes*)	SC, S, OV	Roosts in caves, mines, buildings, and other protected locations; oak, pinions, and juniper forests, desert scrub.	Low: Not documented in surveys. Suitable habitat could occur in Project Area.
Hoary bat (*Lasiurus cinereus*)	OV	A solitary long-ranging migratory tree bat that often roosts in conifers or deciduous trees near open areas.	Present: Found during surveys (NWC).
Long-eared Myotis (*Myotis evotis*)	SC	Associated with forested habitats and forested edges, including juniper woodlands, ponderosa pine woodlands, Douglas-fir, spruce and willow forests along streams. Also in shrubland if suitable roosting sites exist.	Present: Found during surveys (NWC).
Long-legged Myotis (*Myotis volans*)	SC, OV	Associated with coniferous forests including Douglas-fir, Sitka spruce, lodgepole pine and ponderosa pine forests. Also in riparian forests in more arid areas. Roosts in crevices in cliff faces, abandoned buildings, caves and mines.	Present: Found during surveys (NWC).
Pallid Bat (*Antrozous pallidus pacificus*)	SC, S, OV	Deserts; daytime roosts in buildings and crevices, less often caves, mines, hollow trees, and other shelters. Documented three miles south of Princeton (Verts and Carraway 1998).	High: Most likely present in Project Area.
Silver-haired Bat (*Lasionycteris noctivagans*)	SC, OV	In summer, resides in older Douglas-fir/western hemlock forests in protected spots. In winter, hibernates in trees, crevices, buildings, and other protected places.	Present: Found during surveys (NWC).
Small-footed Myotis (*Myotis ciliolabrum*)	SC	Arid habitat associated with cliffs and rocky canyons in arid grasslands and desert scrub. Also found in ponderosa pine and mixed conifer forests. Night roosts and day retreats in rock crevices, under boulders; hibernates in caves and mines.	Present: Found during surveys (NWC).
Spotted Bat (*Euderma maculatum*)	SC, S, OV	Distributed in a fairly broad and extremely patchy area highly associated with prominent rock features since it prefers to roost on rock-faced cliffs.	Low. Not documented in surveys. May migrate through Project Area.
Townsend's Big-eared Bat *(Corynorhinus townsendii townsendii)*	SC, S, OC	Rock formations and historic mining districts with suitable cavities. Roosts in buildings, caves, mines and bridges.	High: Likely present in Project Area.
Yuma Myotis (*Myotis yumanensis*)	SC	A wide variety of habitats including riparian, desert scrub, moist woodlands, and open forests.	High: Likely present in Project Area.

Table 3.5-13 Summary of U.S. Fish and Wildlife Service Species of Concern, BLM Sensitive Species, and Oregon Special Status Species Found in Harney County, Oregon

Species	Designation	Habitat Description	Likelihood of Occurrence
Birds			
American Peregrine Falcon *(Falco peregrinus anatum)*	O, S, OV	Inhabits various landscapes, including mountains, river corridors, marshes, lakes, coastlines, and cities.	Moderate: Not documented during surveys. Migrates through Project Area in spring and fall.
American White Pelican (*Pelecanus erythrorhynchos*)	S, OV	Nests inland on isolated islands in lakes and rivers and breed in large, dense colonies of up to several thousand birds. Feeds communally in shallow lakes, rivers, and marshes. On Malheur Refuge and migrates through Project Area.	Present: Found during surveys (NWC).
Bald Eagle *(Haliaeetus leucocephalus)*	O, S, OT, BGEPA	Associated with aquatic ecosystems, including lakes, rivers, coastlines, marshes, and reservoirs with forested habitat for breeding.	Present: Found during surveys (NWC; USFWS).
Black Rosy Finch (*Leucosticte atrata*)	S	Breeds on the barren tundra of mountain summits near glaciers and continual snowfields, usually on rocky or grassy areas and winters at lower elevations in open areas such as fields, cultivated lands and roadsides. Documented at the East Rim Overlook in the Steens Mountains (Littlefield 1990).	Moderate: Not documented in surveys. Breeding habitat on the east rim of Steens and higher elevations.
Black Tern (*Chlidonias niger*)	SC	Typically nests either on or in emergent vegetation in alkaline lakes and freshwater marshes, or in marshy areas along rivers or ponds.	Present: Found during surveys in MNWR (USFWS).
Ferruginous Hawk *(Buteo regalis)*	SC, OC	Flat and rolling terrain in grassland or shrubsteppe regions, typically avoiding high elevation, forest interior and narrow canyons. Grasslands, sagebrush country, saltbush–greasewood shrublands, and the periphery of pinyon–juniper forests.	Present: Found during surveys (NWC;USFWS).
Franklin's Gull (*Larus pipixcan*)	S, OV	Prefers large, relatively permanent prairie marsh complexes and breeds on freshwater marshes in inland prairies.	Present: Found during surveys (NWC; USFWS).
Golden Eagle (*Aquila chrysaetos*)	BGEPA	Prefers grassland and sagebrush habitats often in mountainous areas where it scavenges and hunts small mammals. Predominantly a cliff nester.	Present: Found during surveys (NWC; USFWS).
Greater Sage-grouse *(Centrocercus urophasianus)*	C, S, OV	Sagebrush–dominated habitats with succulent forbs and insects. Leks on open areas where males congregate for courtship display.	Present: Found during surveys (NWC).
Lewis' Woodpecker *(Melanerpes lewis)*	SC, S, OC	Breeding sites generally occur in burned ponderosa pine forests, riparian forests, aspen groves, and oak woodlands in large diameter snags in relatively open forests with a well-developed understory.	Present: Found during surveys (NWC).
Mountain Quail (*Oreortyx pictus*)	SC, OV	Open forests and woodland with an ample undergrowth of brushy vegetation. Also inhabits thickets of chaparral and riparian woodland, meadow edges in forests and brushy regrowth following timber. Not common in eastern Oregon.	Present: Found during surveys (NWC).
Northern Goshawk *(Accipiter gentilis)*	SC, OV	Nests in a wide variety of forest types including deciduous, coniferous, and mixed forests; typically old-growth. Will use quaking aspen groves on mountain ranges.	Moderate: Not documented in surveys. May migrate through Project Area.
Olive-sided Flycatcher *(Contopus borealis)*	SC, OV	Forests and woodlands, especially in burned-over areas with standing dead trees, in taiga, subalpine coniferous forest and mixed coniferous-deciduous forest.	Low: Not documented in surveys but some suitable habitat present in Project Area.

Table 3.5-13 Summary of U.S. Fish and Wildlife Service Species of Concern, BLM Sensitive Species, and Oregon Special Status Species Found in Harney County, Oregon

Species	Designation	Habitat Description	Likelihood of Occurrence
Snowy Egret (*Egretta thula*)	S, OV	Marshes, swamps, ponds, lakes, shallow coastal areas and tidal flats and foraging conditions range from small salt-marsh pools to large freshwater marshes and from solitary to mixed-species aggregations.	Present: Found during surveys in MNWR (NWC; USFWS).
Trumpeter Swan (*Cygnus buccinators*)	S	Nests on the margins of interconnected shallow marshes and lakes, lakes within forest or sagebrush habitat, and oxbows of rivers. Requires abundant, elevated nest sites; high volume and high diversity of aquatic invertebrates and/or plants; and a low level of human disturbance.	Present: Found during surveys in MNWR (NWC; USFWS).
Western Burrowing Owl (*Athene cunicularia hypugaea*)	SC,	Open areas within deserts, grasslands, and shrubsteppe; well-drained level to gently sloping areas characterized by sparse vegetation and bare ground.	Low: Not found during surveys but some suitable habitat present in Project Area.
Western Least Bittern (*Ixobrychus exilis hesperis)*	SC	Freshwater and brackish marshes with tall, dense emergent vegetation and clumps of woody plants over deep water.	Low: Not documented in surveys but some suitable habitat present in Project Area.
White-faced ibis (*Plegadis chihi)*	SC	Interior freshwater marshes. Nests among emergent hardstem bulrush and feeds in marshes meadows, the edges of ponds, pastures and irrigated alfalfa fields. Breeds at the Malheur National Wildlife Refuge from May through August.	Present: Found during surveys (NWC).
White-headed Woodpecker (*Picoides albolarvatus*)	SC, S, OC	Closely associated with ponderosa pine or ponderosa pine-mixed conifer forests. Requires large trees for foraging and snags for nesting.	Low: Not documented in surveys but some suitable habitat present in Project Area.
Willow Flycatcher *(Empidonax traillii)*	SC, OV	Strongly tied to brushy areas of willow and similar shrubs. Found in thickets; open second growth with brush, swamps, wetlands, streamsides, and open woodland.	Low: Not documented in surveys. Could occur near Project Area in suitable habitat
Yellow-billed Cuckoo (*Coccyzus americanus*)	C, S, OC	Prefers to breed in large tracts of riparian and floodplain woodlands with an understory of dense vegetation, especially near water.	None: Not documented in surveys no suitable habitat present in Project Area.
Yellow-breasted Chat (*Icteria virens*)	SC, OC	Requires riparian woodland or riparian shrub thickets with dense vegetation. Breeds in brushy areas such as blackberry or willow thickets and in riparian woodlands along streams.	Present: Found during surveys (NWC).
Fish			
Alvord Chub (*Gila alvordensis*)	SC	Endemic to the Alvord basin in southeastern Oregon and northwestern Nevada in springs and spring-fed streams. Known only from a few springs, streams, and marshes in the Sheldon National Wildlife Refuge, and one location elsewhere.	None: Does not occur in Project Area.
Borax Lake Chub (*Gila boraxobius*)	E, CH, OE	Endemic to Borax Lake and adjacent wetlands in the Alvord Basin, Harney County, Oregon.	None: Species or critical/suitable habitat not present in Project Area.
Bull Trout (*Salvelinus confluentus*)	T, CH, OC	Requires stable stream channels, clean spawning and rearing gravel, complex and diverse cover, unblocked migratory corridors, and cold water for survival (<16 ˚C). Juveniles use runs, riffles and pocket water but fish >1 year use deeper pools while resting.	None: Species or critical/suitable habitat not present in Project Area.
Catlow Tui Chub (*Gila bicolor ssp.*)	SC	Endemic to desert streams of the Catlow Basin in southeastern Oregon.	Present: Known to occur in Project Area creeks

Table 3.5-13 Summary of U.S. Fish and Wildlife Service Species of Concern, BLM Sensitive Species, and Oregon Special Status Species Found in Harney County, Oregon

Species	Designation	Habitat Description	Likelihood of Occurrence
Inland Redband Trout (*Onocorhynchus mykiss*) (all stocks)	S, OV	Winter habitat includes deep pools with extensive amounts of cover in third-order mountain streams. Low-gradient, medium-elevation reaches with an abundance of complex pools are critical areas for production.	Present: Kiger Creek, Cucamonga Creek, McCoy Creek, Riddle, Trail Creek and Donner und Blitzen River. (ODFW Fish Reports)
~~Malheur Mottled Sculpin (*Cottus bairdi ssp.*)~~	~~SC~~	~~Endemic to the Harney Basin (Silver River and its tributaries, Donner und Blitzen River, its tributaries and isolated southern creeks, Silvies River and its tributaries, and Poison Creek system), Malheur River, and Snake River Basin.~~	~~Present: Known to occur in Project Area creeks.~~
Reptiles			
Northern Sagebrush Lizard (*Sceloporus graciosus graciosus*)	SC, OV	Sagebrush and other types of shrublands, mainly in the mountains. Prefers open areas with scattered low bushes and sun.	Moderate: Not documented in surveys. Likely to be present in Project Area within suitable habitat.
Amphibians			
Columbia Spotted Frog (*Rana luteiventris*)	C, S, OC	Prime habitat usually includes more open riparian areas, along a stream or around a pond with permanent water, in slow moving areas such as sloughs or oxbows.	Low: Not documented in surveys. Suitable habitat could be present in Donner und Blitzen River area. [1,4,6]
Invertebrates			
California Floater Mussel (*Anodonta californiensis*)	SC	Inhabits shallow muddy or sandy habitat in large rivers, reservoirs and lakes.	None: Not present/known in Project Area.
Malheur Cave Amphipod (*Stygobromus hubbsi*)	SC	Found only in Malheur Cave.	None: Not present/known in Project Area.
Malheur Pseudoscorpion (*Apochtonius malheuri*)	SC	Found only in Malheur Cave, Oregon, in well-rotted wood chips, in cool damp crevices in the twilight zone of the cave.	None: Not present/known in Project Area.
Planarian (*Kenkia rhynchida)*	SC	Found only in Malheur Cave in relatively still water.	None: Not present/known in Project Area.

Sources: USFWS 2009d (http://www.fws.gov/oregonfwo/Species/); Csuti et al. 2001; USDA Plants Database (http://plants.usda.gov/index.html).

Note: Key: E - Federal Endangered; T - Federal Threatened; C - Federal Candidate Species; BGEPA – Bald and Golden Eagle Protection Act; SC - Federal Species of Concern; O – Federal Delisted; S - BLM Oregon Sensitive Species; CH – Critical Habitat has been designated; OC –Oregon State Critical Sensitive Species; OV – Oregon State Vulnerable Sensitive Species.

The three additional mammal species (pygmy rabbit, Preble's shrew, and wolverine) had a moderate likelihood of occurrence within the Project Area, based upon habitat suitability and the extent of known occurrences. Anecdotal sightings of wolverines have occurred in the Steens Mountains, including one observation by a BLM biologist in 2000 or 2001 (Obradovich 2010).

Twelve of the 20 special status bird species that could be present within the Project Area were found during field surveys, including bald eagles, golden eagles, greater sage-grouse, yellow-breasted chat, Lewis' woodpeckers, mountain quail, white-faced ibis, trumpeter swans, snowy egrets, Franklin's gulls, sandhill cranes, and American white pelicans. Eight additional species varied in likelihood from low to high within at least one portion of the Project Area.

~~Three~~ Two special status fish species are known to be present within at least one creek crossed by the Project Area: inland redband trout and ~~Malheur mottled sculpin~~ Catlow tui chub. Inland redband trout occurs in creeks crossed by Alternative B (including the route options) and Alternative C ~~while Malheur mottled sculpin is found in creeks crossed by Alternatives B (but not the two route options) and Alternative C~~. Catlow tui chub is found within the Donner und Blitzen River, crossed by Alternative B (including the route options) but not Alternative C.

Two herptile species, northern sagebrush lizard and Columbia spotted frog, could be present within the Project Area. Northern sagebrush lizard habitat is present in the sagebrush habitat crossed by the Echanis Project and Alternatives B and C, while Columbia spotted frog habitat could be present only where Alternative B and the two route options would cross the MNWR.

No listed invertebrate species have suitable habitat within the Project Area.

3.5.3 Environmental Consequences and Mitigation

Effects on fish and wildlife resources would result from construction and operation of the transmission line, the Echanis Project, access roads, and support facilities associated with both the transmission line and the wind farm. Environmental effects could be both permanent (long-term operational effects) and temporary (associated with Project construction). Permanent effects could include habitat loss due to displacement from various permanent Project features, such as transmission line poles, access roads, and wind turbine towers. Temporary effects could include vegetation damage or reduced water quality due to heavy equipment operation or the transport and storage of construction materials, and would last up to one year. Permanent effects would persist after the construction phase of the Project was complete. ~~Many effects were characterized as very low, minimal, or negligible, which generally would refer to effects that impact only an individual or a few individuals, or a small (less than one percent of area seasonally used by a species) area.~~ Mitigation is proposed where permanent and temporary effects could be reduced by implementing reasonable and effective mitigation measures.

While the Project footprint was used to identify the acreage of habitat loss from construction and operational development, the effects upon wildlife, especially greater sage-grouse, would extend well beyond the footprint because wildlife are sensitive to noise, activity from individuals and vehicles, and structures that are higher than the vegetation in an area. However, the effect of a particular activity or Project component on wildlife would vary by species, season, and habitat. Thus, specific analysis of a discrete distance around the Project footprint was not attempted because of the variability of effect distance has on species and the lack of uniform buffer distances that could be implemented specific to the proposed Project. Instead, a discussion is provided that identified species or groups of species and particular effects that are recognized beyond the Project footprint.

Initial mitigation measures are described in this section as well as in Section 2 and Appendix A. These initial mitigation measures have been developed to address impacts that are discussed in this document. Additionally, pre- and post- construction monitoring would be conducted to evaluate the Project during

operation and determine additional impacts, as discussed in the ABPP/ECP and Habitat Mitigation Plan (HMP) (Appendix F). Adaptive management has been designed to use this monitoring data, evaluate it with pre-established thresholds, and determine whether additional mitigation or minimization measures are necessary.

A Technical Advisory Committee (TAC) would track Project activities and monitoring data, and would determine the need for additional mitigation or minimization. The TAC would consist of representatives from the USFWS, BLM, ODFW, Echanis LLC, and Harney County. The TAC would provide advice and recommendations for developing and implementing effective measures to monitor, avoid, minimize, and mitigate impacts to avian species and their habitats during operation. The TAC would be formed prior to Project operations. The TAC is a component of the ABPP and the HMP, and is further described in those plans (Appendix F). ~~will be established for review of Project activities, habitat effects, and wildlife impacts during construction and operation of the proposed Project. The TAC will develop appropriate mitigation measures to offset the Project effects to wildlife.~~

The following concerns were considered during the analysis of permanent and temporary effects upon fish and wildlife:

- Sedimentation of perennial streams
- Habitat modification and loss
- Increased edge effects
- Increased fire potential
- Avian collision and electrocution mortality
- Effects of increased nest and perch sites for raptors
- Effects on special status species, including raptors and greater sage-grouse

3.5.3.1 Alternative A – No Action

Under the No Action Alternative, no new transmission lines, substations, interconnection stations, or related wind energy facilities would be constructed and new or improved access roads would not be needed. The Echanis Project site would remain undeveloped and would continue to be used for livestock grazing, and the existing HEC distribution line located along South Diamond Lane would remain above ground.

3.5.3.2 Echanis Project Effects Common to All Action Alternatives

The permanent and temporary effects upon fish and wildlife resources from construction and operation of the Echanis Project would be the same under all action alternatives (Table 3.5-14). The effects for the transmission line alternatives (Alternative B, Alternative B route options, and Alternative C) are described separately.

PERMANENT EFFECTS

FISH RESOURCES

Permanent effects from the Echanis Project on fish resources would primarily be associated with access road construction because the location of the substation, turbines, and overhead collection system would not be located near creeks. The new and improved portions of the main access road to the Echanis Project site would be 18.95 miles long and would cross three perennial creeks (Kiger, Booners, and Mud Creeks), as well as intermittent tributaries to Kiger and Mud Creeks.

Table 3.5-14 Summary of Permanent and Temporary Effects by Habitat Type at the Echanis Project Site

	Agriculture	Grassland	Sagebrush	Aspen	Juniper Woodlands	Talus Slopes	Wetland/ Riparian Areas	Total
Permanent Effects								
Echanis 40 to 69 turbines (acres)	0.0	0.0	1.3 - 2.3	0.1	0.0	0.0	0.0	1.4 - 2.4
Substation, O&M building (acres)	0.0	0.7	1.3	0.0	0.0	0.0	0.0	2.0
Overhead collection (miles)	0.0	0.0	0.8	0.4	0.0	0.0	0.0	1.2
Access Roads:								
Improved (acres)	*1.7*	*0.0*	*4.1*	*0.0*	*1.4*	*0.0*	*0.2*	*7.4*
New (acres)	*0.0*	*2.2*	*18.9*	*4.2*	*18.7*	*0.0*	*2.6*	*46.6*
String Roads (acres)	*0.0*	*0.0*	*29.8*	*3.3*	*0.0*	*0.0*	*0.0*	*33.1*
Overland Roads (acres)	*0.0*	*0.0*	*0.8*	*0.4*	*0.0*	*0.0*	*0.0*	*1.2*
Total Access Roads (acres)	1.7	2.2	53.6	7.9	20.1	0.0	2.8	88.3
Total Permanent Footprint (acres)	1.7	2.9	56.2 - 57.2	8.0	20.1	0.0	2.8	91.7 - 92.7
Temporary Effects								
Echanis 40 to 69 turbines (acres)	0.0	0.0	12.2 - 21.1	0.9-1.5	0.0	0.0	0.0	13.1 - 22.6
Overhead collection access (acres)	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2
String Roads (acres)	0.0	0.0	41.0	4.6	0.0	0.0	0.0	45.6
Underground collection (acres)	0.0	0.0	12.2	0.9	0.0	0.0	0.0	13.1
Total Temporary Footprint (acres)	0.0	0.0	65.6 - 74.5	6.4 - 7.0	0.0	0.0	0.0	72.0 - 81.5

The access road to the Echanis Project site would parallel Mud Creek for 2.5 miles and would parallel an intermittent tributary of Mud Creek for another 1.2 miles. The road bed would be constructed through cut and fill; upslope materials would be removed and placed downslope to build the road bed. The road alignment would be placed as far as possible from the creek. The minimum distance from the creek, as allowed by canyon width and the position of creek meanders, would range from 6 feet to greater than 50 feet. The exact locations of the road have not yet been finalized. All construction would be outside of the channel and bed of the stream (Kane, Marl, personal communication, January 12, 2010). The road would cross Mud Creek in three locations, where three bottomless culverts would be installed (Kane, Marl, personal communication, January 8, 2010). The culverts would be 23 feet by 90 feet, 18 feet by 110 feet, and 23 feet by 62 feet in size (Schott and Associates 2008a). The design of these bottomless culverts was chosen because they could be installed without disturbing the active stream channel.

Where the road crossed the tributary to Mud Creek, two arch culverts would be installed and would measure 20 feet by 65 feet and 16 feet by 55 feet (Schott and Associates 2008b). The culverts would be wide enough to pass 100-year flows and would have greater than 3 feet of clearance between the top of the culvert and the bed of the active channel. Native rock retaining walls and native soils would be used to cover the culvert and silt fencing would be installed to prevent sediment from entering the stream. Culvert design would adhere to design recommendations for fish passage, as required by ORS 498.351 and ORS 509.605 and described in Oregon Department of Fish and Wildlife *Guidelines and Criteria for Stream-Road Crossings*. The cut and

fill for road building would encroach upon the stream bed of this tributary for a total of 24.2 cubic yards of material (Schott and Associates 2008b).

Improvement and construction of the access road to the Echanis Project site would be confined to a narrow canyon along Mud Creek for 2.5 miles where the road would be located 6 to 75 feet from the channel. Run-off from the access road would have the potential to contribute to additional sedimentation of Mud Creek, causing clogged gills of fish, reduced oxygen in the stream, formation of additional sandbars, and filling-in of coarse substrate. As required by the Echanis Project's Conditional Use Permit from Harney County, facilities would be designed to operate to minimize erosion and disturbance to natural drainages. The Applicant would be required to obtain a NPDES 1200-C permit from the ODEQ prior to commencement of construction. This would require the Applicant to maintain any and all stormwater, flood control, and drainage facilities required by that permit in a safe condition, in good repair, and in a manner capable of being operated as designed.

Over time the culverts would require cleaning and maintenance, so periodic sedimentation would occur from culvert cleaning, repair, or replacement. Numerous dirt-track access roads of varying use and quality are currently present within the Project Area, so the potential erosion and sedimentation effects would be increased in the context of the existing road network. Livestock grazing currently occurs on private land along the primary access road to the Echanis Project, and the improvement of existing roads and construction of new roads would increase the ease of access for livestock along creeks in or near the Project Area, which would cause more unstable soils in riparian zones and increase sedimentation in creeks, notably Mud Creek.

WILDLIFE RESOURCES

The permanent effects on wildlife resources from the Echanis Project would be from the wind turbines, the overhead power collection system, the operations and maintenance (O&M) building, substation, and access roads. The Echanis Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

Approximately 91.7 to 92.7 acres of land would be permanently converted to facility use, including 56.2 to 57.2 acres of sagebrush habitat and 20.1 acres of juniper woodlands (Table 3.5-10). The loss of habitat from construction of permanent facilities would increase habitat fragmentation and directly displace individuals from developed areas. Construction and improvement of the main access road to the Echanis Project site and the on-site access roads (i.e., string roads), would result in the permanent loss of 88.3 acres of vegetative cover. The loss of cover would include 53.6 acres of sagebrush habitat, 21.1 acres of juniper woodlands, and 7.9 acres of aspen stands. The introduction of new access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, juniper, and riparian habitats where new or improved roads divided contiguous cover.

Noise would be generated by the wind turbines and operational maintenance activities associated with vehicles and personnel. Each wind turbine would generate from 58 to 62 dB(A) at 50 meters from the source, which would be the same as conversational speech at 1 meter (BLM 2005). The turbine arrays would generate more noise than an individual turbine, but at winds above 10 meters per second the ambient, wind-generated noise would be greater than any ~~the aerodynamic~~ turbine-generated noise (BLM 2005). At wind speeds below 10 meters per second the turbine noise (individual turbines as well as turbine strings) would be greater than the wind-generated noise, and become more distinct at lower wind speeds as the background noise faded. However, the turbines also would generate less sound at lower wind speeds.

GENERAL WILDLIFE

Permanent site features would directly and indirectly reduce the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species. Noise and human activity associated with operations would displace individuals throughout the year, and during the spring

maintenance vehicles could disrupt breeding of some species. ~~Operational noise from the turbines at ordinary wind levels would not be detectible above background noise levels to birds more than 82 feet from turbine bases (Dooling 2002).~~ Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use at the Echanis Project site.

The Echanis Project would include from 40 to 69 wind turbines arrayed in multiple strings across the site. Operation of the wind turbines would cause mortality to bird and bat species. Some bat species are vulnerable to mortality from wind turbines because they hunt at altitudes within the rotor-swept area, and either collide with blades or experience barotrauma[5] from flying very close to the blades (Kunz et al. 2007, Baerwald et al. 2008). Tree-dwelling migratory species account for the majority of bat fatalities (75 percent), led by the hoary bat, eastern red bat, and silver-haired bat. Bat fatality at wind developments at five locations in the Pacific Northwest ranged from 0.7 to 3.4 bats per turbine per year and is an order of magnitude lower than bat fatalities recorded in the eastern United States (Arnett et al. 2008). Based upon the fatality range for Pacific Northwest wind developments, the 40 to 69 turbines at the Echanis Project site would cause from 28 to 235 bat deaths per year. Based upon bats found within the Project Area, hoary bats and silver-haired bats would most likely comprise the majority of the bat fatalities on-site. Two other bat species present within the Project Area have been found during post-construction mortality studies at other wind developments in the United States, big brown bat and little brown bat. However, they have comprised a small proportion (less than or equal to 10 percent) of total bat mortality at other wind developments in the Pacific Northwest (Arnett et al. 2008).

Raptor species vary in their susceptibility to collisions with wind turbines, but red-tailed hawks, American kestrels, and golden eagles are the species most commonly found during post-construction mortality studies in areas where these raptor species are present (NWCC 2001). Although raptor use in an area is not strongly correlated with raptor mortality from wind developments, species that are more susceptible to collision with turbines generally have higher mortality in areas where they are more abundant (Orloff and Flannery 1992, Kerlinger et al. 2005).

Raptor use, a metric developed for comparison across pre-construction surveys at proposed wind developments, was monitored at eight points immediately west of the Project Area. Use was the greatest in summer and the least in the winter, and compared with 36 other pre-construction use estimates in the midwest and west, was categorically low to moderate (Derby et al. 2008). In a review of raptor mortality at 13 wind developments in the Columbia Plateau Ecoregion, raptor mortality varied from 0.00 to 0.32 (mean of 0.12) raptors per turbine per year (NWC 2010c). Three of the 13 sites had no raptor mortality.

Based upon these findings, raptor mortality at the Echanis Project site could vary from 0 to 22 raptors per year from collision with wind turbines. Monitoring at one point on the east edge of the Echanis Project yielded numerous fall migratory observations of raptors that were using the cliff-wall updraft to conserve energy during their long flights south. <u>However, turbines would be located at least 500 feet from the cliff-top edge which would reduce the potential for collisions with ridge-soaring raptors. This turbine set-back from cliff and rim edges has been supported by the USFWS in Project discussions regarding the ABPP/ECP, as a means to minimize collisions by ridge-soaring raptors with wind turbines. Curtailment and direct mitigation measures have been developed for this Project in conjunction with the USFWS and would be implemented as a component of the ABPP/ECP during conditions shown to produce kidding or soaring conditions over the site. This is further discussed in the Special Status Species and Mitigation sections below.</u>

Waterfowl and shorebirds would be affected only minimally by the Echanis Project because of the lack of suitable habitat at the Echanis Project site, and the presence of extensive open water and wetlands away from the Echanis Project site at the MNWR. Sites where waterfowl and shorebirds have had notable mortality are located in flat agricultural areas in Minnesota and Wisconsin (NWCC 2001). Given that surveys of the

[5] Barotrauma occurs near rapidly spinning rotors where the air pressure is decreased substantially, causing fatal lung tissue damage.

Echanis Project site and the area immediately west of the Echanis Project yielded very few observations of waterfowl or shorebirds (NWC 2007, 2010c), the potential for collision would be very low. The northern edge of the main access road to the Echanis Project site would pass through some lower elevation areas where waterfowl or shorebirds would be more likely to be present, but road improvement in this area would cause only a negligible (<1 percent) amount of habitat loss for these species. Additional vehicle use associated with operation and maintenance of the Echanis Project could cause an undetectable increase in vehicular-related mortality.

Passerines comprise the majority of bird mortality at wind developments outside of California, ranging from 67 to 91 percent of the total number of documented fatalities, with a mean of 78 percent (NWCC 2001)[6]. Although migrant species comprise the majority of bird fatalities, the absence of large overnight bird kills at wind development sites indicates that most fatalities are not occurring during migrations (NWCC 2001), although further research is on-going (Kunz et al. 2007). At 13 wind developments within the Columbia Plateau Ecoregion with similar habitat types to the proposed Project, fatality of all birds varied from 0.6 to 10.0 (mean of 3.68) deaths per turbine per year (NWC 2010c). Extrapolated to the Echanis Project site, the fatality estimate would be from 24 to 690 avian deaths per year, of which 19 to 538 would be passerine species (based upon the 78 percent average). Of the 13 studies, only two sites had bird fatalities greater than 5.0 birds per turbine per year. The native species most vulnerable to collision, based upon the percent composition of birds found during mortality studies, were horned lark (32 percent), golden-crowned kinglet (6.1 percent), and western meadowlark (3.3 percent). All other species comprised less than three percent of the total (NWC 2010c). Avian and bat mortalities for operating wind projects with habitat types similar to the Echanis Project were compiled as a part of the Project's ABPP, and are provided in Table 3.5-15 below.

Efforts to be as consistent as possible with the requirements of the MBTA would be ensured through implementation of the Project's ABPP/ECP, which is included in Appendix F. Non-golden eagle components of the ABPP/ECP would be implemented under the guidance of the TAC. All components of the ECP would be coordinated with the USFWS via the Project's application for an Eagle Take Permit. Other measures to reduce mortality would be implemented if the avian threshold (2.7 birds per turbine per year for all turbines, or 10 birds for an individual turbine in a single year) was exceeded, or if species-specific thresholds were exceeded. Species-specific thresholds could be developed for special status species and would be overseen by the TAC.

The Applicant would also provide $20,000 prior to construction and $30,000 for the next three years to fund wildlife interaction studies, as guided by the TAC. These studies could include topics such as population-level studies for wildlife impacted by wind energy development in the region, effects of increased recreational use of facility access roads on wildlife, and the ability of perch deterrents to reduce impacts to birds at wind energy projects and transmission lines.

The only overhead transmission line common to all alternatives would be a 1.18-mile power collection line between the easternmost turbine string and the Echanis Project substation. To avoid certain types of direct mortality (especially electrocution), the Applicant has agreed to adhere to the APLIC (2006) standards to all transmission line alternatives. The permanent effects of this power collection line upon wildlife would primarily be injury and death to passerine and raptor bird species from collision with the overhead line (USFS 2005). No fatality estimate can be calculated given the dearth of studies and variability of estimates available, but the short length of the line would suggest that only minimal effects would occur to bird species.

[6] Reference to studies outside California are made because the older Altamont, Tehachapi Pass, Montezuma Hills, and San Gorgonio wind developments (in California) have inordinately high avian mortality and are not appropriately comparable to the newer developments.

Table 3.5-15 Avian and Bat Mortalities for Operating Wind Projects with Habitat Types Similar to the Echanis Project

Source	WEF Study Area Location	Dates of Study	Turbines in WEF	Turbine/ Project MW	Avian Mortality per Turbine per Year	Bats Mortality per Turbine per Year
Young et al. 2006	Combine Hills, OR	02/04–02/05	41	Mitsubishi MWT-1000A / 41 MW	2.56	1.88
Johnson et al. 2003	Klondike, OR	02/02–02/03	16	Enron 1.5 MW / 24 MW	1.42	1.16
NWC and WEST 2007	Klondike II, OR	2006	50	GE / 75 MW	4.71	0.63
Erickson et al. 2000	Vansycle, OR	01/99–12/99	38	Vestas 660 kW / 24.9 MW	0.63	0.74
Erickson et al. 2004	Stateline, OR/WA	01/02–12/03	454	Vestas 660 kW / 299.64 MW	1.93	1.12
Kronner et al. 2008	Big Horn, WA	2006–2007	133	GE / 199.5 MW	3.81	2.86
Young et al. 2007	Hopkins Ridge, WA	01/06–12/06	83	Vestas / 150 MW	2.21	1.13
Erickson et al. 2003	Nine Canyon, WA	09/02–08/03	37	Bonus 1.3 MW / 48.1 MW	3.59	3.21
Erickson et al. 2008	Wild Horse, WA	01/08–12/08	127	V80 / 229 MW	2.79	0.71
TRC 2008	Judith Gap, MT	Fall 06–Spring 07	90	GE 1.5 SLE / 135 MW	4.52	13.40
Young et al. 2003	Foote Creek Rim, WY	11/98–06/02	69	600 kilowatt (kW) / 41.4 MW	1.50	1.34
Average:					2.70	2.56

Source: Echanis 2011.

BIG GAME

The Project would not likely cause direct adverse impacts to individual big game animals and big game populations. Recent big game monitoring associated with the Elkhorn Wind Project in Oregon showed shifts in mule deer winter range distribution, where deer were farther from turbine strings (Hagen 2011b). Compared to pre-construction use, counts of mule deer during post-construction surveys was reduced in the first seven distance bands evaluated, 0 to 1,640 feet (0 to 500 meters), out of 9,842 to 11,483 feet (3,000 to 3,500 meters). This shift in distribution is consistent with deer response to natural gas development in Wyoming (Sawyer et al. 2009). Actual numbers of mule deer counted within the Elkhorn Wind Project survey area decreased from 1,560 counted in three flights in 2004 to 2005, to 1,170 counted in four flights in 2008 to 2009 (BLM 2010).

Increased activity along roads is associated with the displacement of big game species (Rowland et al. 2005, Forman and Alexander 1998 in BLM 2010). Johnson et al. (2000) found that differing traffic levels have different impacts on deer and elk habitat use. After a literature review of linear route effects on wildlife, Gaines et al. (2003) reported that as traffic volumes increased, the mean distance elk moved away from roads increased (Gaines et al. 2003 in BLM 2010). Table 3.5-16 displays the mean distance elk moved away from roads.

Table 3.5-16 Mean Distance from Roads for Elk

Traffic Volume	Vehicles per Time	Mean Distance Elk Moved Away from Roads (meters)
Low Traffic	0 - 1 vehicles/12 hours	869 – 890
Moderate Traffic	2 - 4 vehicles/12 hours	909 - 1,032
High Traffic	>4 vehicles/12 hours	1,103 – 1,560

Source: Gaines et al. (2003) in BLM (2010).

Johnson et al. (2000) also found the effects of different traffic levels on deer and elk habitat use, as shown in Table 3.5-17. The zone of influence used in this table is defined as the area that is impacted in any way from the developed feature. These impacts could be temporary, positive or negative, but are a direct or indirect result of the feature's existence and use by humans.

Table 3.5-17 Zone of Influence Applied to Each Side of Road for Deer and Elk

Trail or Road Type Status	Zone of Influence (meters)
Motorized trails	300
Closed road (no vehicle traffic but open to ATVs)	300
Low traffic (0 -1 vehicles/12 hours)	900
Moderate traffic (2 - 4 vehicles/12 hours)	1,000
High traffic (>4 vehicles/12 hours)	1,300

Source: Johnson et al. (2000) in BLM (2010)

Prior to the above-referenced Elkhorn Wind Project, the long-term displacement effects of wind development on the habitats and winter ranges of big game species was largely unknown (WDFG 2009). Preliminary wind-specific studies suggested that big game continue to use habitats within wind farm sites (NWC 2000, Johnson et al. 2000b, Walter 2006). At the Big Horn Wind Project in Washington State, very young mule deer fawns (only a few days to a week old) were observed on eight occasions in May and June during post-construction wildlife fatality monitoring conducted on turbine search plots, indicating that mule deer birthing activities occurred near turbines (NWC 2008, BLM 2010).

However, Beckman et al. (2008) suggested that pronghorn distribution in the Upper Green River Basin of Wyoming was being negatively influenced by habitat loss and fragmentation.

A study conducted from March 2003 to March 2005 of 10 radio-collared Rocky Mountain elk at a southwest Oklahoma wind farm concluded that, while disturbance and loss of some grassland habitat was apparent, the elk herd was not adversely affected by wind energy development (45 turbines) as determined by home range and dietary quality (Walter et al. 2006). However, because this study was performed on a non-migratory elk herd, it could be difficult to draw clear inferences to large free-roaming elk herds (WGFD 2009). Recent big game monitoring concluded that the Elkhorn Wind Project showed a statistically significant increase in distance from turbines for elk and mule deer between post-construction surveys, and that facility presence and human disturbance likely impacted big game distribution and habitat selection (Hagen 2011b, BLM 2010). However, this study was based upon only two years of data and a longer term dataset would be necessary to see if these animals exhibited a long-term response or become acclimated to the Project.

The Echanis Project Area would overlap elk winter range (2,379 acres) and occupied bighorn sheep habitat (1,268 acres). The proposed access road to the Echanis Project site would overlap mule deer winter range (7.43 miles [7.4 acres] of improved and 14.49 miles [14.5 acres] of new roads), and elk winter range (4.95 miles [18.0 acres] of new construction). On-site access roads (i.e., string roads) between turbine locations would overlap 0.77 mile (1.5 acres) of elk winter range and 2.77 miles (5.3 acres) of bighorn sheep range.

The overhead power collection line would cross 0.93 mile of sheep range, where an access road would be constructed in 1.8 acres of sheep range. The direct loss of forage availability for big game from the Project footprint would be limited to 91.7 to 92.7 acres. With the implementation of the Noxious Weed Control Plan (see Section 3.3), adjacent areas could continue to provide forage of similar quality as currently found on site. Permanent loss of mule deer winter range, elk winter range, pronghorn antelope winter range, and bighorn sheep habitat would all be less than one percent within their respective game management units.

Initially, bighorn sheep at the Echanis Project site would avoid the area when vehicles or pedestrians were present. Eventually, if not unintentionally harassed, bighorn sheep would likely acclimate to the presence of the Project and use most of the occupied area, based upon the research cited above (in BLM 2010).

Elk and mule deer winter ranges are important habitat during colder and snowier winter months when forage availability is reduced. Vehicle activity on the site could displace animals or cause additional movement of elk and mule deer at a time when they have a high need to conserve energy, and would reduce habitat use in the areas surrounding the new and improved roads (Wisdom et al. 2005).

The effect on pronghorn antelope of widening the main access road to the Echanis Project site would be minimal, because there would be very little direct loss of forage habitat and the animals would likely acclimate to vehicular traffic. At the Foote Creek Rim Wind Project in Wyoming, pronghorn antelope use within 800 meters of survey points within the site did not change significantly about one year after construction (Johnson et al. 2000b).

SPECIAL STATUS SPECIES

PREBLE'S SHREW

Preble's shrew has been captured in wetland marsh and upland sagebrush habitats on Steens Mountain, but specific habitat requirements and behavior have been very poorly studied (Verts and Calloway 1998). Permanent effects would likely be limited for Preble's shrew because, once new construction was completed, Project support activities (including travel) would be primarily restricted to developed areas that would not be inhabited by this species.

CALIFORNIA WOLVERINE

Wolverines are extremely rare and private creatures with an aversion to anthropogenic activity that would make it likely that they would be directly affected by the Echanis Project during the operational phase if they enter the disturbed areas. Their rarity suggests they would have a low probability of crossing Project lands, but if they were to be present, they would be displaced from areas with active use. The wolverine would be indirectly affected by Project maintenance activities and the presence of vehicles and pedestrians in the Project Area by displacing individuals that could otherwise enter the Project Area.

SPECIAL STATUS BAT SPECIES

Of the 10 special status bat species that could potentially inhabit the Project Area, five species (silver-haired bat, hoary bat, small-footed myotis, long-eared myotis, and long-legged myotis) were positively identified during acoustic surveys (NWC 2009b, d) conducted adjacent to the Echanis Project site. Two additional species, Yuma myotis or California myotis and Townsend's big-eared bat, were potentially detected during surveys but call identification was inconclusive. Of the 10 special status bat species that could occur on-site, the silver-haired bat and hoary bat are the only two that have been commonly documented as fatalities at wind developments (Arnett et al. 2007). However, these two species comprise the majority of bat fatalities in the Pacific Northwest, and would likely account for nearly all of the 28 to 234 bat deaths estimated per year.

The Project's strategy for bat protection has been developed in the ABPP, which is included in draft form in Appendix F. Initial mitigation measures have been developed to address impacts that are likely to occur and are discussed in this EIS. Pre- and post-construction monitoring designed to evaluate the Project during

operation and determine actual impacts would be conducted as directed by the ABPP. The results of this monitoring would be evaluated to determine whether impacts were nearing or exceeding thresholds described in the ABPP, and would drive adaptive management. The threshold for bats is an average mortality of 2.56 bats per turbine per year or mortality of 10 bats at any one turbine in a given year. If these thresholds are exceeded, one or more of the adaptive management measures discussed in the ABPP would be initiated, as described in the Mitigation section of this EIS and in the ABPP. Results from post-construction monitoring would be reported to the TAC.

GREATER SAGE-GROUSE

Greater sage-grouse likely would be displaced from their spring, summer, fall, and early winter ~~and winter~~ habitats in the Echanis Project Area during maintenance activities, and reduce their time spent near the access roads and wind turbines. Direct mortality from collision with wind turbines would likely be very low, because few deaths have been documented (USFWS 2008). Greater sage-grouse tend to fly as high as about 50 feet (Christiansen n.d., UDWR 2009) and the minimum clearance for the Echanis Project turbines would be 75 feet, as described in the Project's Conditional Use Permit from Harney County. Greater sage-grouse avoid areas with tall structures such as wind turbines with moving blades and, although it is not well studied, could be displaced by noise, visual effects, habitat fragmentation, or other effects generated by ~~noise generated by~~ a wind energy development (USFWS 2008, Becker et al. 2009). The reaction of greater sage-grouse to vertical structures varies by the type of structure, and could be related to spatially associated activities (general industrial development) or could be related to the presence of the vertical structures themselves (Johnson et al. 2011). Tall structures are thought to be perceived as potential predator perch sites by sage-grouse, causing displacement from an area much larger than the Project footprint. Brood-rearing habitat present near the proposed turbines might not be used by sage-grouse, which would then re-locate to other, potentially less suitable, areas during late spring and summer.

No leks are known to occur within 3 miles of the proposed turbine locations on the Echanis Project site, so courtship and breeding would not be affected by the Project. It is unclear how much displacement of greater sage-grouse would occur from the Project Area, because on-going studies have not been completed and results have not been reviewed and published that track greater sage-grouse movements before and after construction of wind energy projects. There has been one reported sighting of a nesting female greater sage-grouse within 492 feet (150 meters) of a wind turbine in Washington (Strickland 2010) but there have not been any other reports or studies to support this observation since then. While more studies have been completed on oil and gas development and its effects on greater sage-grouse, the overall vertical structure and vehicle traffic might differ from other types of renewable energy developments, while similarities occur due to fragmentation of native habitat by roads and infrastructure (Hagen 2011a). Greater sage-grouse would be displaced from an area beyond the turbine footprint, but for how far and during which seasons has not been adequately researched. Until empirical data are available that quantify the effects of such developments on greater sage-grouse populations, interim guidance from the ODFW is being used to quantify areas of impact of projects on greater sage-grouse (Hagen 2011b).

The access road to the Echanis Project would be located as close as 1.2 miles from the Little Kiger Lek, which was active in 2010, and increased traffic would contribute to greater noise in the area. ~~However, the presence of juniper woodlands and one or two topographic ridges between the access road and the lek would attenuate noise reception at the lek from the access road.~~ The main access road would be located below a ridge that would obstruct a direct view to the lek, and the Kiger Creek and Little Kiger Creek drainages and the presence of juniper woodlands would form natural barriers and noise attenuation between the lek and main access road. Additionally, the access road would not be visible from the lek. Fragmentation by rarely-traveled dirt roads has not been found to be a negative influence on lek persistence (Walker et al. 2007), nor has presence of secondary roads (Johnson et al. 2011). However, frequently used roads associated with coal bed natural gas development in Wyoming and Montana was found to negatively influence lek persistence (Walker et al. 2007). Section 3.14.3.2 discusses the traffic impacts from the Project. Six to eight technicians would travel to and from the site daily in a vanpool, resulting in one vehicle traveling round trip to and from

the site per during each work day. Traffic volume on Project roads would therefore be minor. This level of use would not likely have a negative influence on lek persistence, although the use of vehicles on the Echanis Project site would lead to an increased chance of direct mortality from collisions (up to one per year during construction and maintenance activities).

The *Sage-Grouse Strategy* (Hagen 2011a) and accompanying rules are implemented by the ODFW. The BLM recognizes the ODFW *Sage-Grouse Strategy* habitat categorization map and considers the recommendations for disturbances contained in that document, such as Project-related roads, power collection line, and turbines, and would implement the *Sage-Grouse Strategy* to the extent possible. The mitigation framework for the core area approach outlined in the *Sage-Grouse Strategy* is outlined in a document titled *Implementing Habitat Mitigation for Greater Sage-Grouse Under the Core Area Approach* ("*Mitigation Framework*"; Hagen 2011b). The effect of the presence of turbines in late brood rearing habitat is not certain at this time. The presence of roads would not necessarily reduce greater sage-grouse use, but the timing and amount of road use would determine the extent that greater sage-grouse and other wildlife would avoid the road. Application of the *Mitigation Framework* to the proposed Project is discussed under Mitigation in this section. Figure 3.5-5 shows the *Sage-Grouse Strategy* habitat categorization in the Project Area. The Applicant has committed to implement a greater sage-grouse mitigation plan consistent with the four phases of the *Mitigation Framework*, which are: assessment, mitigation site identification, conservation project identification, and creation and implementation of a monitoring and management plan. This is further discussed in the Mitigation section below.

SPECIAL STATUS RAPTORS

Special status raptor species include bald eagle, golden eagle, northern goshawk, ferruginous hawk, and western burrowing owl. No suitable burrowing owl habitat exists at the Echanis Project site or the main access road, and no northern goshawks or ferruginous hawks were observed during field surveys. Northern goshawks prefer forested areas and aspen stands that are larger and more densely spaced than found at the Echanis Project, and so they generally would not be present except during spring or fall migrations. Ferruginous hawks are associated with rolling grassland and sagebrush habitats without the steep slopes or juniper forests present at the Echanis Project, so they generally would not be present except during migrations. One bald eagle was observed in the fall during its southern migration over the Echanis Project site. Because the bald eagles' preference for sites is near water, bald eagles would generally occur only as migrants at the Echanis Project site. Bald eagle winter roost areas are not present at the Echanis Project site. Recently, there has been at least one confirmed bald eagle mortality at a wind energy project in North America (Pearce 2010). ~~No bald eagle has been documented as a fatality from wind turbine collision at any site in the United States.~~ Golden eagles were present at both the Echanis Project site and immediately west of the Echanis Project site, but were observed over canyons and away from the ridges where turbines are proposed (NWC 2010c). ~~Golden eagles have been killed at other wind developments, although the incidences of fatalities are very low.~~ No nests for any special status raptor species were found within 2 miles of the Echanis Project site.

Given the potential for a lethal collision of a golden eagle, since they were present in surveys at the Project site and immediately west of the site, with the proposed transmission line or wind development components, a Programmatic BGEPA permit would be required to provide operational protection for the Project.

Direct effects to golden eagles would result from disturbance and mortality. Actions that resulted in disturbance from the development of the Echanis Project would include the effects of construction of the turbines and associated infrastructure. The nearest active golden eagle nest in 2010 was 2.5 miles from the Project Area footprint, and not in line of sight of the Project Area. Potential direct effects could include the disturbance of foraging birds by the spinning turbines. Wildlife surveys did not reveal much, if any, foraging activities by golden eagles within the footprint of the Echanis site, thus this type of disturbance is expected to be minimal but would be considered under the BGEPA as "take" (see the discussion in the ABPP/ECP).

Indirect disturbances to golden eagles from the construction and operation of the proposed Project could include an increase or decrease in the golden eagle prey base throughout the Project Area. Changes in vegetation from construction, operation, and maintenance of the Project could decrease the prey populations that are dependent upon such vegetation. Removal and management of vegetation in and around the Project site, as described in the proposed Project Revegetation Plan (Appendix F), could lead to decreased vegetation canopy height and cover for golden eagle prey. Therefore, indirect effects arising from the construction and operation of the Project could indirectly result in golden eagle mortality from an increase in prey and foraging opportunities throughout the Project Area, drawing golden eagles into the area and increasing the opportunity for collisions. Maintenance activities, including the use of Project roads, could also increase the opportunity for collisions of golden eagles with maintenance or construction vehicles and, additionally, indirectly present a risk for golden eagle mortality to those individuals attracted to the road kill if it was not removed.

Alternatively, the same factors might reduce the use of the area by golden eagles, resulting in a decrease in mortality as a result of indirect effects from construction and operation of the Project. As above, effects might result from a decrease in prey base and reduced foraging over the Project Area. Disturbances resulting from the Project from visual obstructions, physical flight obstructions, and noise could decrease the use of the Project Area by golden eagles.

Per Draft Eagle Conservation Guidelines, "Danger Zone Factors," were addressed for the Echanis site as a part of the ECP. The danger zone factors are provided below in bold typeface, with an analysis of the situation at the Echanis site immediately following.

1. Topographic features conducive to slope soaring

a. On or bordering the top of a slope oriented perpendicular to the prevailing wind direction. The entire land mass upon which the Echanis Project is proposed is a gently-sloped fault block that rises from northwest to southeast. Though turbine orientation would be perpendicular to the prevailing wind direction (which is westerly), the slopes to the west of all turbines are gradual, and do not create consistent updrafts that would attract or concentrate eagles.

b. Near (within 164 feet [50 meters]) of a ridge-crest or cliff edge. Though some turbines were originally sited near the eastern rim, all were moved back from that cliff edge because of wildlife concerns.

2. Topographic features that create potential flight corridors

a. In a saddle or low point on a ridge line. Two saddles exist within the Echanis Project, but no turbines are sited in proximity to them.

b. Near a riparian corridor, at a forest or wetland edge, or near shorelines of large water bodies that eagles are reluctant to traverse. This feature does not apply to the Project Area.

3. Proximate to potential foraging sites

a. Near perennial or ephemeral water sources that support a robust fishery or harbor concentrations of waterfowl. These features are not found on the Project Area.

b. Near a prairie dog (Cynomys spp.) colony or area of high ground squirrel density. Belding's ground-squirrel (Urocitellus beldingi) colonies exist in the draws between turbine strings at East Ridge and West Ridge Projects, but turbines are sited far from these concentrations of potential prey. The Echanis Project is apparently at too great an elevation for any concentrations of this, the only colonial rodent species in the region.

c. Near cover likely to support rabbits or hares. Jackrabbits are abundant in the lower elevations to the east and north of the Echanis Project, and likely represent the dominant prey of golden eagles in the area. The Project Area itself, however, does not provide cover for rabbits or hares.

d. Near concentrations of livestock where carcasses and neonatal stock occur. Cattle are not moved to the Project Area until summer, well after calving is complete.

e. Near sources of carrion. No.

f. Near game dumps or landfills. No.

4. Near likely perch structures or roost sites. Naturally-occurring perches are not found in proximity to the proposed turbines.

5. In an area where eagles may frequently engage in territorial interactions

a. At about one-half of the mean project-area inter-nest distance (based on Stage 2 surveys) from an eagle nest site. Golden eagle territories, far from saturating the Project Area, are few and far between. The only meaningful inter-nest distance would be derived from the two nearest nests, and one-half that distance would be approximately 2 miles. Although a few turbines are sited within 2 miles of the nearest nest, they are in a different direction than the next-nearest nest and, thus, away from the areas where territorial interactions would occur.

Several of the concerns raised and discussed during the workshops conducted between the USFWS, ODFW, and BLM during completion of the ECP are addressed below:

- The USFWS expressed concerns about the ability of birds to pass through a "picket fence" of turbines, arrayed perpendicular to the prevailing west winds. The Applicant provided the USFWS detailed calculations and illustrations demonstrating the anticipated "rotor swept area" calculations and the resultant conditions across the site. The information used to calculate the rotor swept area is shown in Figure 3.5-6 below. The results show that the distance between rotor swept areas is approximately 176 meters. An analysis of these data showed that the site presents a low to moderate risk to eagles (See ABPP/ECP in Appendix F).
- The USFWS also expressed concerns about proximity to treed areas, in particular groves of aspen in lower elevation areas near the site. The Applicant provided maps delineating the buffer areas of 328 feet (100 meters) or more on nearly every turbine location.
- The USFWS expressed concerns about seasonal (fall) east winds that might create soaring or "kiting" conditions over the Project Area, prompting migrating raptors to possibly collide with turbines. The Applicant provided the USFWS with three years of data from on site meteorological measuring equipment that measured vertical wind patterns. Those data indicated that the types of conditions that might prompt such behavior occurs infrequently. Further discussions about the phenomenon led to the view that even in circumstances of east winds in fall and early winter months, during raptor migrations, there was nothing about the terrain where turbines would be located to suggest that eagles would be more likely to fly over the Project than over the valley to the east.

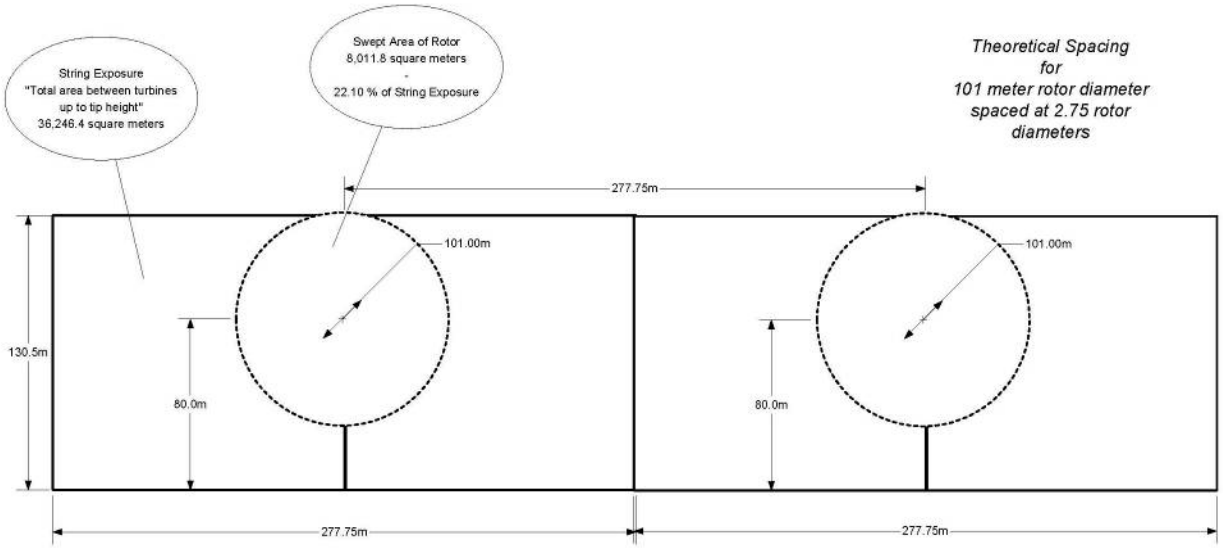

Figure 3.5-6. Calculation of Rotor Swept Area

Estimates were made for the degree of risk to golden eagles at several geographic scales, and considering the direct, indirect, and cumulative effects of the Echanis Project. As part of the process for the determining risk to golden eagles, the Applicant used data collected from the wildlife surveys (see Appendix E) and estimated mean use of the site by eagles. These data were compared to other mean raptor use at other wind turbine locations that also have post-construction mortality data (Table 3.5-18). A comparison of estimates of mean use versus post-construction mortality at these sites resulted in the following linear relationship, $y = 0.1267x + 0.001$ ($R^2 = 0.875$). When this linear relationship was used as a predictor of annual golden eagle mortality at the proposed Echanis Project, the result was 1.7 golden eagles per year (0.016/MW/year x 105MW). When taking into account the uncertainty included in this estimate, this translates into about 0 to 3 golden eagles per year (Echanis 2011).

A majority of the wind projects listed in Table 3.5-18 were constructed on wheat fields and are likely not directly comparable to projects built on native habitat. However, these data provide the best available information when comparing golden eagle mean use and post-construction mortality.

Eagle management by the USFWS is considered adaptive and mediated through the permit process. Take permits have a five-year life. At the end of five years, data accumulated over the previous five years, including eagle nest site occupancy, success, and productivity; eagle site use; and eagle mortality information, is evaluated relative to avoidance, minimization, monitoring, and compensatory mitigation carried out as conditions of the permit. If these measures are considered adequate to result in the USFWS management goal of no-net loss of eagles, either through disturbance or mortality, then it is likely that the permit would be re-issued with the same permit conditions as before. If analyses showed that existing permit conditions were inadequate to result in the USFWS management goal of no-net loss, then permit conditions would be modified to achieve that management goal. This adaptive process ensures that mitigations agreed to in the ABPP/ECP, and included as conditions on the permit, are effective in achieving the USFWS goal of no-net loss of eagles. At the end of the life of the Echanis Project, the turbines would no longer be operational and would be removed, so no raptor mortality would occur as a result of the retired turbines.

Table 3.5-18 Estimates of Raptor Use and Post-Construction Mortality at Various U.S. Wind Turbine Locations

Wind Project	Raptors Use (#/20-min point count)	Raptors Mortality (#/MW/yr)	Source
Combine Hills, OR	0.60	0	Young et al. 2005
Condon, OR	0.37	0.02	Fishman Ecological Services 2003
Elkhorn, OR	0.27	0.02	USFWS data, date unknown
Klondike I, OR	0.47	0	Johnson et al. 2003a
Klondike II, OR	0.47	0.11	NWC and WEST 2007
Leaning Juniper, OR	0.52	0.06	Kronner et al. 2007
Vansycle, OR	0.41	0	Erickson, date unknown
Stateline, WA/OR	0.41	0.09	Erickson et al. 2004
Bighorn I, WA	0.90	0.15	Kronner et al. 2008
Hopkins Ridge, WA	0.64	0.14	Young et al. 2007
Nine Canyon, WA	0.26	0.05	Erickson et al. 2003
Wild Horse, WA	0.40	0.09	Erickson, date unknown
Diablo Winds, CA	3.50	0.39	(reference unknown)
High Winds, CA	2.90	0.43	(reference unknown)

Source: Echanis 2011

PASSERINE AND WOODPECKERS

Six special status passerine and woodpecker species could occur on the Echanis Project site or the main access road Yellow-breasted chat, willow flycatcher, olive-sided flycatcher, black rosy finch, Lewis' woodpecker, and white-headed woodpecker. Each species would spend the majority of their time within the vegetative canopy of forested areas and at flight levels below the rotor-swept area. Therefore, there would be a low likelihood that these species would be affected by collisions with the turbines at the Echanis Project site. Because of their higher rate of occurrence at the Project site during the spring or fall migrations, these species could be at a greater risk of collision with turbines at these times due to higher migration flight patterns.

MOUNTAIN QUAIL

Wind developments are not known to have been constructed in quail habitat, so no records of mortality exist. However, other gamebird species fatalities have been found at wind developments, so it is possible that the Echanis Project could cause a low level of mortality for this species, from collisions with turbines. Quail flights are generally low and predominantly would be below the level of the rotor-swept area. Increased collisions with vehicles from maintenance and other operational traffic could occur, although it would be undetectable.

NORTHERN SAGEBRUSH LIZARD

Northern sagebrush lizard would be susceptible to crushing by vehicles from maintenance operations where access roads traversed suitable sagebrush habitat occupied by the lizard. Elevated levels of vehicle use during maintenance activities would cause an undetectable increase in mortality.

TEMPORARY EFFECTS

FISH RESOURCES

The main access road to the Echanis Project site would cross three creeks (Kiger, Booners, and Mud Creeks) where temporary effects of culvert installation and road widening would cause sediment to enter the creeks

and potentially clog gills and reduce visibility for coldwater fish. Construction activities at each road crossing would be completed in less than five days, so elevated turbidity levels would be of short duration. Road widening would occur along a 2.5-mile segment adjacent to Mud Creek, where it would be 6 to 75 feet from the creek. As required by the Project's Conditional Use Permit from Harney County, reasonable erosion and siltation controls would be provided within 100 feet of riparian areas during construction. The road widening could cause sedimentation in Mud Creek if heavy rainfall occurred at a rate that the BMPs could not process or if there was improper installation of protective barriers. As required by the Project's Conditional Use Permit from Harney County, facilities would be designed to operate to minimize erosion and disturbance to natural drainages. The Applicant would be required to obtain a NPDES 1200-C permit from the ODEQ prior to commencement of construction. This would require the Applicant to maintain any and all stormwater, flood control, and drainage facilities required by that permit in a safe condition, in good repair, and in a manner capable of being operated as designed. Fish are highly mobile and would be able to find refugia or swim away from construction areas, thereby avoiding some of these temporary effects, if BMPs were implemented properly and a heavy rainfall event did not occur. For streams with fish presence, a Scientific Take Permit would be required from the ODFW prior to conducting in-stream work. A small number of fish could be killed during construction from equipment operation and placement of materials within the creek channels, if fish salvage were not required prior to conducting in-stream work. ~~A fish salvage permit will be acquired from ODFW prior to construction, if ODFW determines that it is required.~~

WILDLIFE RESOURCES

Temporary effects on wildlife resources from the Echanis Project would occur during construction of the wind turbines, power collection system, the O&M building, substation, and access roads. The Echanis Project would affect habitat, general wildlife, big game, and special status species as described below.

HABITAT

Construction activities would cause the short-term loss of approximately 72.0 to 81.5 acres of wildlife habitat in sagebrush (65.6 to 74.5 acres) and aspen stands (6.4 to 7.0 acres; Table 3.5-9). Temporary lay-down areas and work space for the wind turbines would require 13.1 to 22.6 acres of ground disturbance in sagebrush and aspen habitat, depending upon the number of turbines installed. The amount of area affected by onsite access roads (i.e., string roads) and overland vehicle access would be greater during the construction phase than during long-term operation (the next 40 years). During construction, the access roads would have to be wide enough to accommodate the large cranes that would be used to erect the turbine towers and install the nacelles. This would result in the short-term loss of 65.6 to 75.6 acres of sagebrush and 6.4 to 7.0 acres of aspen habitat. Installation of the underground power collection system between turbines would require excavation of a ditch that would result in a short-term loss of 13.1 acres of sagebrush and aspen habitat.

Heavy equipment would typically generate construction noise of 80 to 90 dBA at a distance of 50 feet, and 60 to 70 dBA at 500 feet (BLM 2005). Where vegetation was present, noise attenuation would occur and lessen the distances that construction sounds travelled. During construction of the main access road and Echanis Project, noise levels would exceed the EPA guidelines for recreational areas (55 dBA). The noise would be present during daytime activities, but would drop to background levels at night. Noise generation would often be intermittent during the construction period.

GENERAL WILDLIFE

Construction would displace wildlife at the Echanis Project site from late spring through fall and would cause wildlife to disperse into adjacent habitats, which would temporarily increase inter- and intra-specific competition. Passerines would not nest in the Project Area once construction was initiated, and small- and medium-size mammals would avoid areas of activity, noise, and fugitive dust. Some less mobile mammals or reptiles could be killed during construction from crushing, entombment, or collision with vehicles and heavy equipment operation. Assuming vehicles operate onsite at reasonable speeds, wildlife mortality from collision with vehicles would not be detectible.

BIG GAME

Big game species would disperse from the Project Area during construction, so little to no direct mortality would occur on the Echanis Project site. Vehicle collisions with a big game species could occur on the main access road to the site from increased levels of vehicle traffic. There would be a temporary loss of 3.5 acres of elk winter range, and 26.4 acres for occupied bighorn sheep habitat in areas affected by construction. Most construction activities would take place during spring through fall and would not directly affect elk or mule deer that use the habitat during winter. Range conditions would recover over the short-term with implementation of the reclamation plan. Big game would take flight from the Project Area and surrounding habitat as far as 1 mile away during construction, which has been demonstrated in field studies (Wisdom et al. 2005). The construction area represents a small fraction (less than one percent) of the area within the management units for each species, so minimal change would be anticipated in big game carrying capacity.

SPECIAL STATUS SPECIES

PREBLE'S SHREW

Construction would overlap approximately 65.6 to 74.5 acres of sagebrush habitat, where Preble's shrew could be vulnerable to crushing by equipment. Shrews would be displaced from temporary work areas through the short-term, but with recovery of vegetation Preble's shrew would return to occupy suitable habitat. Temporary effects would be limited to the Project footprint during construction

CALIFORNIA WOLVERINE

Wolverines would be displaced from areas affected by construction, because they would avoid areas with pedestrian activity, vehicular movement, loud noise, and vibrations caused by construction activities. Short-term habitat loss would be undetectable for this species and, given the large range used by wolverines, the implementation would not have any affect.

BATS

Bats are highly mobile nocturnal species that would not be present during daytime construction activities, but would be displaced to adjacent habitats by lingering dust in the air on days when winds were calm and the air quality was reduced into the evening. Bats foraging at the site would not be roosting in aspens, because they provide few opportunities for suitable roost sites. Tree roosting species would be roosting at lower elevations, but could forage at the site. Only bats that are cliff or cave roosters might be near the Project site, but would not be affected by Project activities. The effects of construction would not have any impact on bat species.

GREATER SAGE-GROUSE

Greater sage-grouse would be displaced from their summer brood range during construction when pedestrian and vehicular activity, noise levels, and airborne dust levels would be high. Brood habitat would include the sagebrush and riparian areas on the Echanis Project site and along the main access road. The Applicant is developing a Habitat Mitigation Plan and details of implementation of the *Mitigation Framework* for this Project in consultation with the USFWS, ODFW, and BLM, are discussed in the Permanent Effects Section above, as well as the Mitigation Section below.

The main access road to the Echanis Project site would be located as close as 1.2 miles to the Little Kiger lek, which was active in 2010. ~~but unoccupied in 2009. The main access road would be located below a ridge that would obstruct a direct view to the lek, and the Deep Creek and Drake Creek drainages would form natural topographic barriers between the lek and main access road. Pre-construction lek surveys would be conducted to determine whether the Little Kiger lek was being used. If the Little Kiger lek was determined to be occupied, consultation with ODFW would be undertaken to determine whether timing restrictions would be required for construction and use of the main access road.~~[This discussion has been moved to the Permanent Effects discussion above.] Short-term and long-term effects would include loss of sagebrush habitat from construction activities that would require years to be reclaimed. An undetectable increase in

direct mortality would occur from increased vehicle traffic at the Echanis Project site and the main access road during the construction phase.

SPECIAL STATUS RAPTORS

Special status raptor species include bald eagle, golden eagle, northern goshawk, ferruginous hawk, and western burrowing owl. Raptor nest and burrowing owl surveys would be conducted prior to construction. If any nests or occupied owl burrows were encountered, avoidance would be undertaken in consultation with the USFWS.

During construction activities, raptors would be displaced from areas of disturbance, but would quickly reoccupy those areas for hunting and scavenging following completion of construction. There would be a slight chance that vehicle collisions could cause an increase in mortality, but with adherence to reasonable operating speeds, this risk would be minimal.

Actions that would result in disturbance take from development of this Project would include the effects of construction of the turbines and associated infrastructure. The nearest active golden eagle nest in 2010 was 2.5 miles from the Project Area footprint, and not in line of sight of the Project Area. Nesting birds at this distance, and at closer distances if not in line-of-sight, are not at risk of being disturbed from construction activities at the nest. Wildlife surveys did not reveal much foraging activities by golden eagles within the footprint of Echanis Project site, thus this type of disturbance would be minimal. Further, to avoid disturbance of special status raptors, the Applicant would employ Advanced Conservation Practices (ACPs) before and during construction, as discussed in the Mitigation section below and the Project's ECP.

WATERFOWL AND SHOREBIRDS

Waterfowl and shorebirds, if present, would be displaced from areas disturbed by construction activities. The lack of suitable habitat on the Echanis Project site or along the main access road indicates that the effects to these species, including collisions with vehicles, would be undetectable.

PASSERINE AND WOODPECKERS

Special status passerine and woodpecker species would be displaced into adjacent suitable habitat during one summer of construction. Pre-construction surveys would be conducted for nesting birds in sagebrush habitat and, where found, consultation would occur with the USFWS to determine whether timing or avoidance stipulations would be required.

MOUNTAIN QUAIL

Quail would be displaced during construction activities and would disperse into adjacent on- and off-site habitats. Mountain quail retreat to thick cover when disturbed and move further away from perceived threats within that habitat. Thick shrub habitat including sagebrush, juniper woodland, and scrub habitat near construction activities would not be available for mountain quail during one season. Because mountain quail were rarely detected during field studies, their local Steens Mountain population is assumed to be very small, and their presence at the Echanis Project site or along the main access road, very limited. Construction would have an undetectable effect to this species.

NORTHERN SAGEBRUSH LIZARD

Northern sagebrush lizard would be susceptible to crushing during construction activities in sagebrush habitat on the Echanis Project site. There are approximately 65.6 to 74.5 acres of sagebrush overlapping proposed Project construction areas along the main access road and on the Echanis Project site where sagebrush lizard could be killed. Construction would displace sagebrush lizard over the short-term that would be reclaimed during re-vegetation efforts. Given the small percentage of suitable habitat (less than one percent) within the Project Area where northern lizard would be displaced, and the limited direct mortality that would occur

during construction, the northern sagebrush lizard would experience undetectable effects from the Echanis Project.

MITIGATION

The following mitigation measures would be implemented in addition to the project design features (PDFs) and best management practices (BMPs) that were taken into account in the effects analysis in this section (see Section 2 and Appendix A.1.6 and A.3.5), to reduce the effects of Project development on fish and wildlife resources:

GENERAL MITIGATION MEASURES

- Speed limits for travel on the newly constructed portion of the main access road to the Echanis Project site would be posted at 25 mph to reduce the potential for wildlife collision.

- The Applicant would install anti-perch devices on transmission poles within 2 miles of the Echanis Project Area, as allowed by transmission operators. The Applicant would notify the USFWS of any transmission operators that were unwilling to allow the Applicant to retrofit their lines. The USFWS would provide outreach to these operators to encourage them to allow the work.

- Wind turbine sites would be sited more than 500 feet from the southern and eastern edges of ridges at the Echanis Project site, to reduce the impacts to raptors whose flight paths might include the updraft along the ridge edges.

- Pre-construction wildlife surveys would be conducted for greater sage-grouse, active raptor nests, and burrows and passerine nests. The results would be provided to the USFWS and BLM to determine whether any additional or modified construction timing restrictions would be required.

- Where aspen stands occurred in temporary use areas, and would not naturally regenerate, the TAC would review the restoration success and could require small prescribed burns to stimulate regrowth.

- Areas of temporary disturbance would be restored to pre-construction contours and revegetated with private landowner-approved seed mixtures. Additionally, any temporary impacts to native habitats would be restored to native habitat. Habitats would be reclaimed by establishing early succession sagebrush communities that over time would be restored to maturity. Monitoring of revegetation success would occur, and additional seeding or other measures could be required to ensure adequate reclamation of temporary use areas for construction.

- Operational activity in big game winter range between December and March would be limited to conducting required maintenance or use during emergency situations.

GREATER SAGE-GROUSE MITIGATION FRAMEWORK

Project Area habitat would be categorized in accordance with the ODFW's *Habitat Mitigation Policy* (OAR 635.415), to determine appropriate conservation measures to compensate for lost habitat availability to wildlife, particularly greater sage-grouse. Habitat mitigation is described in the Applicant's Habitat Mitigation Plan (HMP), included in Appendix F. Specific application of the ODFW *Mitigation Framework* to the effects of the

Project common to all alternatives, including the Echanis Wind Energy Project and the main access road, for greater sage-grouse habitat, is described as follows.

The ODFW *Mitigation Framework* (Hagen 2011b) identifies guidelines for mitigating for impacts to greater sage-grouse resulting from energy projects in areas identified as Core or Low Density under the Core Area approach described in the *Sage-Grouse Strategy*. The *Mitigation Framework* states that if the Project is in a Core Area and would impact greater sage-grouse habitat, the recommendation would be to avoid impacts to those habitats. For impacts in Low Density Areas, the ODFW recommends mitigation such that there is "no net loss with a net benefit" (Hagen 2011b).

DETERMINATION OF MITIGATION NEEDS

The *Mitigation Framework* sets out formulae for determining impacts from noise, roads, and transmission lines on greater sage-grouse and calculating an acreage mitigation requirement. Although the ecological footprint of these impacts for renewable energy developments has not been quantified, recent science demonstrates that sound levels greater than 40 dbA reduced breeding activity and increased stress in greater sage-grouse (Hagen 2011b). The ODFW has recommended the use of noise propagation models to identify habitat areas impacted, as defined by noise levels greater than 40 dbA, as well as a surrogate for other impacts.

The *Mitigation Framework* establishes a methodology for computing habitat disturbance and a mitigation ratio based upon the level of disturbance up to the 40 dbA threshold. Output from the noise propagation model is binned into 5 dbA contours from highest to lowest potentially affecting greater sage-grouse (40 dbA). Habitat disturbance and mitigation ratios are then calculated for areas falling within contours greater than 50 dbA (at a ratio of 2 mitigation acres per acre affected) and 40 to 50 dbA (at a ratio of 1 mitigation acre per acre affected) (Hagen 2011b). Specifically, the *Mitigation Framework* provides direction to: (a) calculate the recommended mitigation acreage requirement; (b) select a mitigation area (the "Mitigation Area"); (c) develop a baseline assessment and conservation actions to be implemented in the Mitigation Area; and (d) monitor and preserve the Mitigation Area.

NOISE MITIGATION

The output of a noise propagation model created by Siemens, the proposed vendor of the wind turbines for the Echanis Project, is shown in Figure 3.5-7. A vegetation layer was then applied to the resulting noise contours to determine the amount of sagebrush habitat within each noise contour (see Hagen 2011b). The total acreage of sagebrush habitat included in each 5 dB contour is provided in Table 3.5-19. The *Mitigation Framework* then recommends both a "habitat disturbance" factor for each noise contour and recommends a 2:1 mitigation requirement (i.e., 2 acres of mitigation for every 1 acre impacted) for noise contours above 50 dbA and 1:1 for noise contours between 40 and 49.9 dB.

As shown in Table 3.5-19, application of the habitat disturbance factors and the mitigation requirements set forth in the *Mitigation Framework* results in a total area impacted by noise of 5,195.2 acres and an associated noise mitigation requirement of 2,050.4 acres of sagebrush habitat. All of the impacted sagebrush habitat is located on private lands. The permanent loss of sagebrush habitat (5,915.2 acres) would be mitigated through the Project's HMP (see Appendix F). The model is subject to refinement by the Applicant and agencies, and may undergo revisions before a final mitigation acreage is calculated. Before beginning construction of the Project, the Applicant would provide Harney County, BLM, and ODFW a map showing the final design of the Project and the total permanent and temporary (i.e., construction) area impacts.

Table 3.5-19 Noise Impacts from the Echanis Project to Sagebrush Habitat and Mitigation Calculations Common to All Alternatives (acres)

	Noise Range (dbA)				
Vegetation Type	>55	50 - 54.9	45 - 49.9	40 - 44.9	Total
Big Sagebrush Steppe	12.6	120.7	271.9	430.3	835.5
Big Sagebrush/Crested Wheatgrass	0.0	0.0	0.0	0.0	0.0
Big Sagebrush/Perennial Grassland	62.6	506.1	1,398.7	3,112.3	5,079.7
Low Sagebrush/Grassland	0.0	0.0	0.0	0.0	0.0
Mountain Big Sagebrush/Grassland	0.0	0.0	0.0	0.0	0.0
Sagebrush Shrubland and Steppe	0.0	0.0	0.0	0.0	0.0
Total	75.2	626.8	1,670.6	3,542.6	5,915.2
Habitat Density Factor	1	0.7	0.4	0.1	--
Acres Requiring Mitigation	75.2	438.8	668.2	354.3	1,536.5
Mitigation Ratio	2	2	1	1	--
Mitigation Acreage	150.4	877.5	668.2	354.3	2,050.4

Source: Echanis 2011.

Note: The acres requiring mitigation are based upon the noise modeling conducted by Siemens, as shown in Figure 3.5-7, and the land cover calculations conducted by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

ROAD MITIGATION

The Mitigation Framework recommends mitigating for impacts from new or existing roads. The impacts of roads on greater sage-grouse largely depends upon the type of traffic. The Echanis access road would be traversed by one vehicle per day (Kane, M., personal communication, 3 October 2011), it would be classified as a "Low Traffic" road, and the applicable Disturbance Band is 0.2 mile on either side of the road. As shown in Table 3.5-20, the access roads are in sage brush habitat, either on the Project site or located in a Low Density Area, and would result in a mitigation area of 2,114.7 acres. The model is subject to refinement by the Applicant and agencies, and may undergo revisions before a final mitigation acreage is calculated.

For the effects common to all alternatives, which includes the Echanis Project as well as the main access road, the total mitigation area is 4,165.1 acres. It should be noted that such calculations are derived from the best available information at the time of the EIS. Final acreage calculations for mitigation would be developed in coordination with the USFWS and ODFW, pursuant to the implementation of the HMP.

Table 3.5-20 Road Impacts to Sagebrush Habitat and Mitigation Calculations Common to All Alternatives (acres)

	Land Type		
Access Roads	BLM	Private	Total
Big Sagebrush Steppe	2.3	293.7	296.1
Big Sagebrush/Crested Wheatgrass	0.0	4.6	4.6
Big Sagebrush/Perennial Grassland	306.6	603.0	909.6
Low Sagebrush/Grassland	7.9	0.5	8.5
Mountain Big Sagebrush/Grassland	0.0	875.8	875.8
Sagebrush Shrubland and Steppe	0.0	20.2	20.2
Total	**316.9**	**1,797.9**	**2,114.7**
Habitat Density Factor	1	1	1
Mitigation Acreage	**316.9**	**1,797.9**	**2,114.7**

Source: Echanis 2011.

Note: The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*, using a disturbance band of 0.2 mile on the Echanis main access road.

MITIGATION AREA SELECTION

While the selection of the specific mitigation area would be made as part of the implementation of the HMP, the Mitigation Framework provides guidance as to what criteria should be used when identifying a potential mitigation area. Specifically, the Mitigation Framework states that when selecting a mitigation area, the following factors should be considered: (a) the greater sage-grouse population size in the impact area; (b) the habitat quality of the mitigation area; (c) and the potential to restore the mitigation area to high quality habitat through conservation actions. In addition, the Mitigation Framework states that "the [u]se of ecological site data and current vegetation condition is recommended to assist in targeting appropriate mitigation sites." The ODFW has also stated that because the mitigation area is intended to mitigate for "landscape scale" impacts, it is appropriate that a mitigation area be in a contiguous parcel.

To meet the "net benefit" objective of the Mitigation Policy with respect to greater sage-grouse habitats within Low Density Areas, the Mitigation Framework states that sites will be prioritized and selected based upon the following criteria (in order of preference):

1. Core Areas that occur within a Conservation Opportunity Area (COA) or other landscapes with on-going greater sage-grouse conservation actions.

2. Core Areas that occur outside of a COA.

3. Low Density Areas that occur within a COA or other landscapes with on-going greater sage-grouse conservation actions.

4. Low Density Areas that occur outside of a COA.

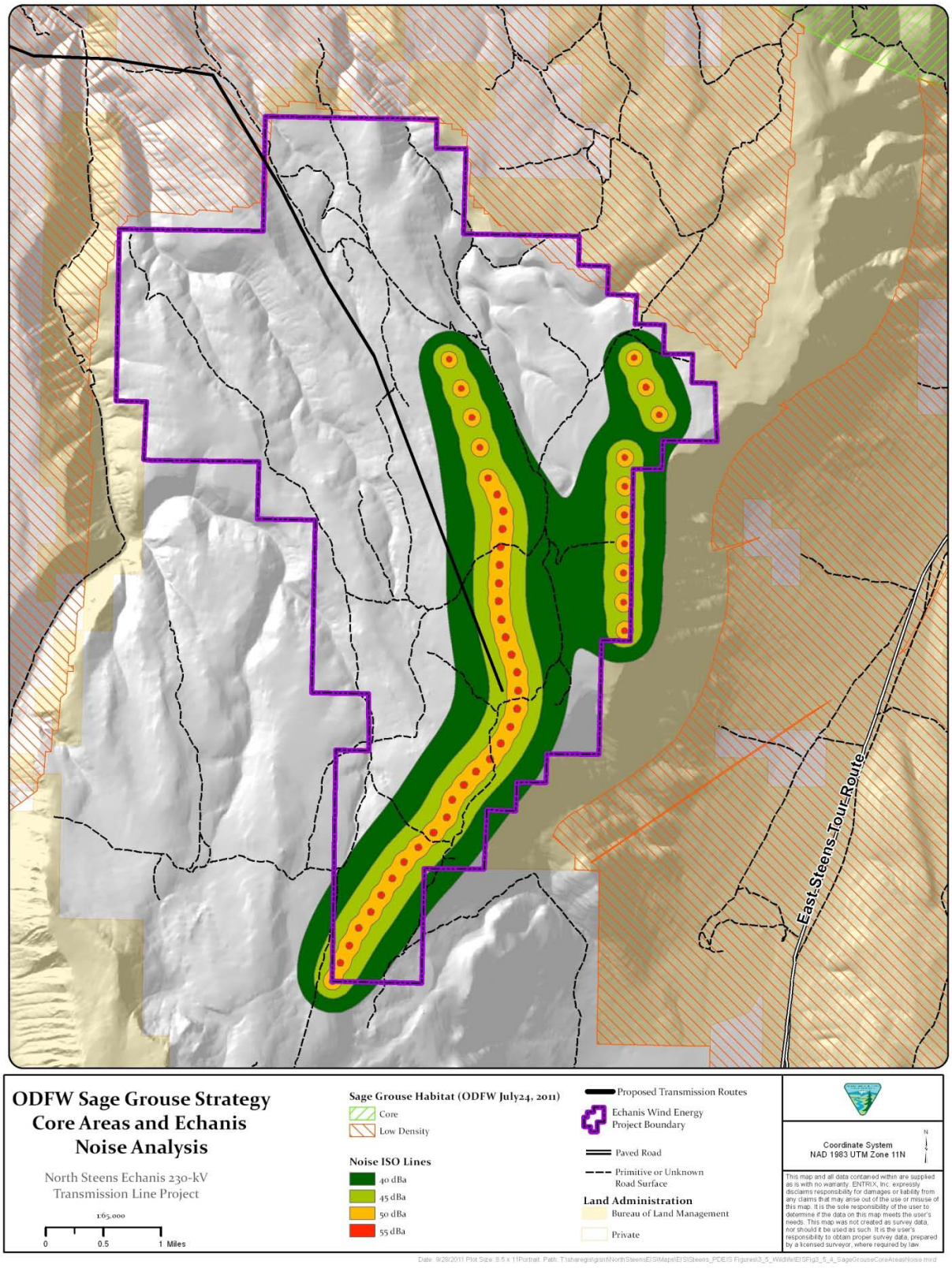

Figure 3.5-7 ODFW Greater Sage-Grouse Strategy Core Areas and the Echanis Project Noise Analysis.

COAs are landscapes of high biological integrity, as identified in the Oregon Conservation Strategy (ODFW 2006). These areas have an increased likelihood of successful conservation actions, and should benefit greater sage-grouse and other sagebrush dependent species. The greater sage-grouse population size in the impact area might also be considered when selecting a mitigation site. Mitigation sites should be of similar habitat quality, but can be of lesser quality. Mitigation sites of lesser quality should be selected based upon the potential success for the habitat to be enhanced, or restored to the same quality or better as the habitat that was impacted. Mitigation ratios can be increased based upon the quality of the mitigation site, to account for increased risk associated with restoration of lower quality habitats. Thus, a mitigation site with early phase juniper invasion would have a high likelihood of success in achieving habitat improvement. Alternatively, a potential mitigation site that has extensive cheat grass (Bromus tectorum) or medusahead rye (Taeniatherum caput-medusae) invasions would have a low likelihood of success (Hagen 2011b).

After selection of a mitigation area, the habitat conditions on such parcels and a baseline assessment would be developed to identify factors limiting the productivity of greater sage-grouse habitat at a mitigation site. This analysis would then assist in identifying factors that might limit productivity at a site. The following provides steps to identifying conservation actions, including but not limited to the following activities to improve or enhance greater sage-grouse habitat at the mitigation site:

- Evaluate habitat related factors that might be limiting population growth of greater sage-grouse in the area;
    - Identify actions to improve habitat quality
    - Juniper removal
    - Reduce risk of wildfire (e.g., suppression efforts, fuel break placement, invasive species reduction)
    - Prevent invasive weed establishment
    - Eradicate existing invasive weeds
    - General improvement of sagebrush habitat condition
    - Fence marking or removal
- Control access that compromises habitat effectiveness (on private lands only);
- Maintain mitigation site habitat quality, after improvements, for the life of energy project impacts;
- Secure assurances that a mitigation site will not be developed for the life of project impacts, which includes any subsequent project re-authorizations. Permanent or near-permanent impacts could include a conservation easement or simple fee purchase of the mitigation site, to assure habitat values are protected in perpetuity;
- Conduct periodic (3 to 5 years) on site mitigation effectiveness monitoring for the life of project impacts, thereby acknowledging that project impacts may exceed the life of project authorization;
- Apply scientifically-accepted methods of monitoring vegetation and greater sage-grouse;
- Develop population responses to mitigation actions to adaptively manage the mitigation site and future developments.

- ~~The TAC would propose a methodology for determining the effect on grouse and other wildlife, and a procedure for setting appropriate mitigation.~~

MONITORING AND ASSURANCES

The *Mitigation Framework* recommends two general types of monitoring for ongoing operation of a mitigation project, namely basic research and decision support. At a minimum, and consistent with the *Mitigation Framework*, the HMP would specify detailed "decision support-type" monitoring protocols for the mitigation area to assure that the mitigation area is properly functioning as greater sage-grouse habitat, so that the mitigation area continues to serve its purpose of meeting a no net loss, net benefit of habitat for greater sage-grouse. To assess the likely contribution of mitigation actions towards "no-net-loss," consider the new contribution to conservation in addition to the site's existing values, likelihood that a mitigation action would deliver expected conservation benefits, and time lag to achieve the conservation benefit. In addition, steps would have to be taken to ensure that the mitigation area remained intact for the duration of any project impacts.

MIGRATORY BIRDS, BATS, AND BALD AND GOLDEN EAGLES

The Applicant is working with the USFWS to develop an ABPP/ECP (Appendix F) for the Echanis Project site. This plan would be used to ensure consistency with both the MBTA and the BGEPA. This plan would apply to species covered under the MBTA and BGEPA.

Under the ABPP, together with recommendations of the TAC, the Applicant would monitor wildlife impacts through post-construction monitoring and implement additional mitigation measures if impacts exceeded threshold levels. The Applicant would continue to consult with the USFWS regarding all pre-construction studies and mitigation measures to ensure consistency with the MBTA. Mitigation to be employed before and during construction of the Project shall include the following:

- Minimizing the area and intensity of disturbances during pre-construction activities, such as monitoring and site reconnaissance, by keeping at least 0.5 mile away from all active nests (unless the purpose of the activity necessarily required personnel to be closer to the nest);
- Undertaking real-time monitoring of proximate occupied nest sites, and curtailing activity if eagles exhibited signs of distress;
- Utilize existing transmission corridors and roads to the greatest extent possible;
- Avoiding, to the greatest extent possible, vegetation removal and construction during the breeding season;
- Designing the Project layout to reduce collision and electrocution by:
- Set turbines back from ridge edges at least 328 feet (100 meters) where soaring might occur;
- Site structures away from high avian use areas and the flight zones between them;
- Dismantle nonoperational meteorological towers;
- Follow the Avian Power Line Interaction Committee (APLIC) guidance for power line construction (APLIC 2006) and power line siting (APLIC 1994);

- Develop a Transportation Plan, including road design, locations, and speed limits to minimize habitat fragmentation and wildlife collisions and minimize noise effects; and

- Minimize the extent of the road network.

- Select Project features that minimize effects to eagles, such as:

  - Avoid the use of lattice or structures that are attractive to birds for perching; and

  - Avoid construction designs (including structures such as permanent meteorological towers) that increase the risk of collision, such as guy wires. If guy wires are used, the Applicant shall mark them with bird flight diverters (according to the manufacturer's recommendation);

- The Applicant is proposing to offset golden eagle mortalities at the Echanis Project site with post-construction conservation measures in or near the Project Area. Specifically, the Applicant would implement conservation actions that would prevent mortalities at the same rate or greater within 10 to 20 miles of the Project Area, as described in the ABPP/ECP (Appendix F). These actions are as follows:

  - Minimize lighting at facilities. Require that all security lighting not be left "on" overnight, and down-shield all security and related infrastructure lights;

  - During construction, implement spatial and seasonal buffers to protect individual nest sites/territories and/or roost sites, including:

    - Maintain a 0.5-mile buffer area between construction activities and nest/communal roost sites;
    - Keep natural areas between the Project footprint and the nest site or communal roost by avoiding disturbance to natural landscapes.

  - Avoid activities that might disturb eagles.

  - Avoid siting turbines in areas where eagle prey are abundant and conduct practices that do not enhance prey availability at the Project site.

  - Maintain facilities to minimize eagle effects:

    - If rodents and rabbits are attracted to Project facilities, identify and eliminate activities that might be attract them.
    - Avoid management that indirectly results in attracting raptors to turbines, such as seeding forbs or maintaining rock piles that attract rabbits and rodents.

  - Move stored parts and equipment, that could be utilized by small mammals for cover, away from wind turbines.

  - If mammals burrow near tower footprints, where feasible on a case-by-case basis fill the holes and surround the pad with gravel at least 2 inches deep and out to a perimeter of at least 5 feet.

  - Immediately remove carcasses (other than those applicable to post-construction fatality monitoring; see below) that have the potential to attract raptors from roadways and from areas where eagles could collide with wind turbines.

  - Ensure responsible livestock husbandry (e.g., removing carcasses, fencing out livestock) is practiced if grazing occurs around turbines.

  - Reduce vehicle collision risk to wildlife:

    - Instruct project personnel and visitors to drive at low speeds (< 25 mph), and be alert for wildlife, especially in low visibility conditions.
    - Plow roads during the winter so that ungulate movement is not impeded. Snow banks can cause ungulates to run along roads, resulting in them colliding with vehicles. Roadside carcasses attract eagles, subjecting them to collisions as well.
  - Follow procedures that reduce the risks to wildlife:

    - Instruct employees, contractors, and visitors to avoid disturbing the wildlife, especially during breeding seasons and periods of winter stress.
    - Reduce fire hazards from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off road).
    - Follow federal and state measures for handling toxic substances.
  - Minimize the effects to wetlands and water resources by following the provisions of the Clean Water Act.

- The Applicant would pay $50,000 compensation for each golden eagle actually taken by the Project using one of the following mechanisms:

  - Funding a USFWS-approved compensatory project;

  - Paying into a USFWS-established account; or

  - Paying into a third-party mitigation account identified by the Applicant and approved by the USFWS.

- To reduce potential eagle mortality associated with the Project, the Applicant would work with Harney Electrical Cooperative to ensure that all of their distribution lines within Diamond Valley were raptor safe, to the greatest extent possible according to current APLIC guidelines (APLIC 2005).

- Based upon data provided in the ABPP, the average avian mortality per turbine of wind projects with habitat types similar to the Echanis Project is 2.70 birds and 2.56 bats per year, or mortality at any one turbine is 10.0 bats or birds in a given year. If these thresholds were exceeded, mitigation would be initiated. Mitigation would be conducted in phases, to be implemented chronologically as avian and/or bat thresholds were exceeded.

- Effects to avian species other than golden eagles and bats would be mitigated through implementation of Advanced Conservation Practices prior to, during, and after construction, as outlined in the Project's ABPP and further developed by the TAC.

3.5.3.3 Alternative B – West Route (Proposed Action)

In addition to the effects described for the Echanis Project, Alternative B would include a 28.87-mile transmission line, an interconnection station, new and improved access roads, overland access roads, and laydown areas and tensioning sites. The overlap of these Alternative B features with area habitat types is summarized in Table 3.5-21.

The effects of the transmission line are described separately below and do not include the combined effects of the Echanis Project and Alternative B. Please refer to the Summary of Effects Analysis in Section 2 for a complete comparison of the overall effects.

PERMANENT EFFECTS

FISH RESOURCES

Alternative B would cross four perennial fish bearing streams, Kiger Creek, Cucamonga Creek, McCoy Creek, and the Donner und Blitzen River. The Alternative B transmission line would not directly affect fish resources in these rivers and streams because no Project features, including transmission line poles, access roads, or the interconnection station, would be located in or immediately adjacent to these waterbodies. However, four transmission line poles and 0.74 acre of overland roads would be located in wetlands adjacent to the creeks, so erosion from the Project Area would have the potential to run off into the creeks and lead to sedimentation. ~~elevated turbidity and filling in of coarser stream substrates would reduce fish health and viability within reaches affected by Project development.~~ As required by the Project's Conditional Use Permit from Harney County, facilities would be designed to operate to minimize erosion and disturbance to natural drainages. The Applicant would be required to obtain a NPDES 1200-C permit from the ODEQ prior to commencement of construction. This would require the Applicant to maintain any and all stormwater, flood control, and drainage facilities required by that permit in a safe condition, in good repair, and in a manner capable of being operated as designed. If runoff occurred even with the appropriate infrastructure, elevated turbidity and filling-in of coarser stream substrates would reduce fish health and viability within reaches affected by Project development.

WILDLIFE RESOURCES

Permanent effects to wildlife resources from Alternative B would result from construction and operation of the transmission line, interconnection substation, and access roads. The Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

There would be 30.9 acres of habitat permanently lost from construction of Alternative B, including 12.0 acres of sagebrush habitat, 9.3 acres of grasslands, 6.4 acres of juniper woodlands, 2.4 acres of agricultural lands, 0.7 acre of wetlands, and 0.1 acre of developed lands (Table 3.5-21). Wetlands impacts are discussed in Section 3.4. Overland travel roads would account for 25.3 of the 28.5 acres affected by access roads, including 9.4 acres of sagebrush habitat, 6.9 acres of grassland, and 5.8 acres of juniper woodlands. The transmission line poles would have a total footprint of 1.9 acres, and the interconnection substation and O&M building would require 0.7 acre. New access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, meadow, and riparian habitats. While no large (i.e., thousands of acres) undissected tracts of sagebrush or grassland habitat exists in the Project Area, the addition of new roads would provide new access for recreational use, access to livestock grazing grounds, and would limit use by some species (some sagebrush obligate birds) that avoid breaks in sagebrush habitats.

GENERAL WILDLIFE

The Alternative B transmission line would have a small permanent footprint on the ground, affecting primarily grassland and sagebrush habitat used by big game (discussed below), small and medium mammals, reptiles, and birds. Displacement of these habitats by permanent Project features would affect these species year-round. Noise and human activity associated with maintenance activities would occur several times each year between the spring snowmelt and the summer fire season. Maintenance activities could disrupt the breeding of some species. Less mobile or burrowing non-game species would be susceptible to mortality from maintenance vehicles traveling overland through these affected habitats. The transmission poles would serve as perch sites for raptor species, which could prey on smaller birds, mammals, and reptiles.

Birds would be the most at-risk to injury and mortality from the transmission line, because they are susceptible to collision with above-ground towers or lines, electrocution, disturbance (particularly of breeding attempts) during construction, and habitat loss. Although each of these potential concerns differs somewhat among various bird groups, some general comments can be made. The concern for potential collisions and electrocutions has generally been associated with larger birds, including raptors, waterfowl, game birds, and wading birds. Raptors are known to occur along the entire length of Alternative B but the probability is low that raptors would collide with the transmission line because of line spacing (APLIC 1994). The probability of collisions increases where Alternative B borders or crosses the MNWR because raptors would be more likely to use wetland areas for foraging. Line markers would reduce the potential for raptor collisions with the wires. Waterfowl and shorebirds would most likely be affected in and near the MNWR in their daily flights as well as if they are flushed by raptors. Line markers would reduce the potential for waterfowl and shorebirds colliding with the wires. Estimates for collision mortality vary by orders of magnitude, depending upon the species and nearby habitat, making a mortality calculation unreliable, especially for individual species.

Construction related disturbance of birds would be minimal because BMPs (Appendix A) would be in place and dictate appropriate times for construction and enforce distance restrictions, which would reduce the potential for disturbance. Habitat loss during construction would be limited to the footprint of the power poles and the access roads, which would be rehabilitated and only used occasionally once the power poles were in place. This would most likely affect smaller migratory birds that might nest in shrubs, trees, or on the ground in grasslands. After the transmission line is in place, most birds would use the habitat relatively the same as before the construction.

Though the frequency with which smaller birds such as passerines are electrocuted by transmission lines is poorly studied, it is considered to be infrequent because body size is one of the most important characteristics that make species susceptible to electrocution. The ability to span the distance between energized conductors with outstretched wings or other body parts makes the electrocution risk far greater (APLIC 2006). For this reason, efforts to improve and standardize the design and installation of transmission towers and lines have targeted larger birds such as waterfowl and raptors. Because the APLIC (2006) standards would be followed with Alternative B, the risk of electrocution is considered to be minimal to raptors (M. Green, USFWS, personal communication, 2010 in NWC 2010). APLIC standards include designs that provide for separation of conductors to provide isolation of lines and insulation of phases or grounds where adequate separation is not feasible (APLIC 2006). The Applicant has agreed to follow the 2006 APLIC standards. This is consistent with the Three Rivers RMP ROD (BLM 1992) which requires that all power poles and transformers erected on public lands be installed using design features that prevent electrocution of raptors (WL 7.2). Currently, there are no specific stipulations for this type of project in the Steens Mountain CMPA or the Andrews Management Unit area.

Table 3.5-21 Summary of Permanent and Temporary Effects by Habitat Type for Alternative B – West Route

	Developed	Agriculture	Grassland	Sagebrush	Juniper Woodlands	Rocky/ Barren	Wetland/ Riparian Areas	Open Water	Total
Permanent Effects									
Transmission Line ROW overlap (miles)	4.2	8.1	218.9	176.1	95.7	2.6	19.1	0.7	525.4
Transmission line poles (acres)	0.0	0.0	0.8	0.6	0.3	0.0	<0.0	0.0	1.7
Interconnection Substation, O&M building (acres)	0.0	0.0	0.6	0.1	0.0	0.0	0.0	0.0	0.7
Access Roads:									
Improved (acres)	*0.0*	*0.0*	*0.8*	*1.4*	*0.3*	*0.0*	*0.0*	*0.0*	*2.5*
New (acres)	*0.0*	*0.0*	*0.1*	*0.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.4*
Overland (acres)	*0.1*	*2.4*	*6.9*	*9.4*	*5.8*	*0.0*	*0.7*	*0.0*	*25.3*
Total Access Roads (acres)	0.1	2.4	7.9	11.3	6.1	0.0	0.7	0.0	28.5
Total Permanent Footprint (acres)	0.1	2.4	9.3	12.0	6.4	0.0	0.7	0.0	30.9
Temporary Effects									
Transmission line poles (acres)	0.0	0.0	0.8	0.6	0.3	0.0	0.1	0.0	1.9
Tensioning sites (acres)	0.0	0.0	2.0	1.8	0.8	0.0	0.3	0.0	4.8
Staging areas (acres)	0.0	5.0	15.0	20.0	0.0	0.0	0.0	0.0	40.0
Total Temporary Footprint (acres)	0.0	5.0	17.8	22.4	1.1	0.0	0.3	0.0	46.6

The burial of an existing 1.35-mile distribution line would remove a current source of mortality to birds that fly into the line and are injured or killed. Mortality studies of this line prior to burial would be undertaken to identify the species and rate of mortality, for comparison with the mortality caused by the portion of the Alternative B transmission line that would cross the MNWR. If the mortality from the Alternative B transmission line were greater than the mortality from the distribution line, then additional measures would be identified so that the net effect from the Project would be a reduction in bird mortality. Mitigation measures to reduce bird mortality would be determined in coordination with the MNWR, to ensure that the Project contributed to the Refuge's purposes through the compatibility process.

BIG GAME

The 150-foot wide transmission line ROW for Alternative B would cross 101.7 acres of elk winter habitat, 342.5 acres of mule deer winter range, and 86.9 acres of antelope winter habitat. The transmission line would not require vegetative control in any of the antelope range, but in the elk and mule deer winter ranges the junipers and aspens would be periodically cut to control their height within the ROW. Tree removal would be limited to the 150-foot ROW, which would be maintained in an herbaceous or shrub-steppe vegetative state. The existing mosaic of grassland, sagebrush, and juniper habitats in the winter ranges would be permanently altered by vegetation management within the ROW, but the removal of trees would not limit winter range quality. The presence of grassland and sagebrush habitat in winter range would benefit big game forage, and the limited removal of woodland habitat would cause only a negligible loss of cover (<1 percent).

Access roads would be widened through 2.4 acres of mule deer winter range and new access roads would convert 0.7 acre of mule deer winter range to gravel surfaced roadway. Overland travel would occur through 4.8 acres of elk winter range, 14.5 acres of mule deer winter range, and 4.2 acres of antelope range. Maintenance vehicles traveling along access roads and overland to the transmission line would increase disturbances to big game species. If inspection or maintenance were to occur during winter, the additional activity would elevate the stress for animals in or near the transmission line corridor at a time when they have a high need to conserve energy. Operational activity in big game winter range between December and March would be limited to conducting required maintenance or use during emergency situations. Other routine activities would be avoided.

SPECIAL STATUS SPECIES

The permanent effects of Alternative B on Preble's shrew, California wolverine, and northern sagebrush lizard would be qualitatively the same as the effects described for these species in Section 3.5.3.2. Bats are not known to collide with transmission lines, based upon mortality surveys, so there would be no effect beyond displacement by permanent Project features.

PYGMY RABBIT

Alternative B would result in a small permanent loss of potential pygmy rabbit habitat (<1 percent) and displacement from the transmission line poles, access road improvements, and the interconnection station. Maintenance vehicles traveling overland to access the transmission line would have an undetectable chance of causing direct mortality because pygmy rabbits are a highly mobile species that would avoid vehicles by taking refuge in sagebrush or burrows.

GREATER SAGE-GROUSE

The effects to greater sage-grouse from Alternative B would result from habitat fragmentation caused by linear features, as well as mortality from vehicular collisions on overland Project roads, collisions with power lines, and increased predation if raptor abundance increased in response to perch availability on power poles. ~~Greater sage-grouse are known to avoid roads and transmission lines, so the effects on this species would be limited primarily to displacement by permanent Project features.~~

Increased raptor and corvid (i.e., ravens, crows, jays, and others) abundance has been documented in landscapes fragmented by man-made structures, and power poles have been identified as a threat to greater sage-grouse and other prey species (Prather and Messmer 2010, Johnson et al. 2011). The increased abundance of raptors and corvids within occupied greater sage-grouse habitats could result in predation rates outside of the range of natural variation (Lammers and Collopy 2007, Coataes 2007 in Hagen 2011a). Population level impacts of increased raptor and corvid perching opportunities on greater sage-grouse is mixed. Golden eagle predation of greater sage-grouse was found to increase from 26 to 73 percent after a transmission line was constructed within 220 yards of an occupied lek in northeastern Utah, and the lek was eventually extirpated (Ellis 1984 in Hagen 2011a). That study concluded that the presence of the transmission line resulted in changes to greater sage-grouse dispersal patterns and fragmentation of the landscape (Ellis 1984 in Hagen 2011a). In Washington, 95 percent of leks within 4.7 miles of 500-kV transmission lines are now unoccupied; unoccupied rates for leks farther from transmission lines is 59 percent (WDFW 2008 in Hagen 2011a). While the effectiveness of predator perch deterrents is inconsistent (Prather and Messmer 2010, Slather and Smith 2010), the effectiveness of the devices that would be used would be monitored by the TAC, and modified if needed. Predators would be deterred from perching on Project power poles through either design of the cross arm or other perch deterrents. However, raptor perch deterrents might not mitigate the effects of these structures on greater sage-grouse if population declines are related to avoidance of habitats in close proximity to vertical structures and not, in fact, from changes in predator distribution (APLIC 2006).

Some studies have shown that greater sage-grouse populations decrease in areas close to roads and transmission lines even when raptors are not present (Braun 1998) and avoidance behavior has been documented for distances up to 1 mile from power lines (Hagen et al. 2004, Pitman et al. 2005, Robel et al. 2005, Pruett et al. 2009, Braun 1998 in Hagen 2011a). Some research has suggested that greater sage-grouse avoid transmission lines in general and during the breeding season (Ellis 1985, Braun 1998 in Johnson et al. 2011). However, other studies have shown no effects on lek occurrence from power lines (Johnson et al. 2011) and nesting has been documented very close to transmission lines (Strickland 2010). Fragmentation by rarely-traveled dirt roads has not shown a negative influence on lek persistence (Walker et al. 2007). However, frequently-used roads associated with coal-bed natural gas development in Wyoming and Montana did negatively influence lek persistence (Walker et al. 2007). Studies in Wyoming have shown that coal-bed natural gas activity is correlated with sharp declines in lek attendance and occupancy status when development occurs within 4.0 miles (6.4 kilometers). This displacement was thought to be associated with the presence of transmission lines, greater use of access roads, and industrial noise (Walker et al. 2006). ~~Research is currently being conducted to more clearly determine the effect of wind developments on grouse throughout the year, because of the high level of uncertainty regarding the distance from a Project that grouse would be seasonally displaced. Pre-construction monitoring would be conducted to determine whether the lek was active and, if so, consultation with ODFW and BLM would occur prior to surface disturbing activities.~~ [The above text was removed because monitoring has shown that the lek is active].

An approximately 1.3-mile segment of the Alternative B transmission line would be located 1.85 to 2.00 miles from the Little Kiger Lek. Two topographic drainages, Kiger Creek and a portion of Little Kiger Creek, are located between the lek and the alignment of the proposed transmission line, and an intervening ridge line would prevent direct line-of-sight between the proposed transmission line and the lek. It is unlikely that Alternative B would have any effect on the Little Kiger lek because it would be out of the direct line-of- sight of the transmission line.

Some mortality could also occur from collisions with power lines (Beck et al. 2006 in Oyler-McCance and Quinn 2011).

SPECIAL STATUS RAPTORS

Special status raptor species have excellent eyesight and tend not to fly during low light conditions (e.g., dusk and inclement weather), which in part explains why raptors generally do not collide with transmission lines or

anchoring wires for poles. Raptors are susceptible to electrocution from older power lines that were not designed with the protective measures that would be implemented for Alternative B (RRF 1996, APLIC 2006). Post-construction monitoring conducted by the Applicant would be conducted to determine what level of raptor mortality was occurring from the transmission line, and whether mitigation measures would be required. Raptor mortality would be minimized by implementation of the S*uggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006). The residual impacts to raptors after implementing the APLIC (2006) standards would be negligible because raptor electrocution should not occur, although there would be a minimal possibility of collisions with wires. Overall, there should be no raptor mortalities from power lines.

Indirect disturbances to golden eagles from construction and operation of Alternative B could include an increase or decrease in the golden eagle prey base throughout the Alternative B Project Area. Changes in vegetation from construction, operation, and maintenance of the Project could decrease the prey populations that are dependent upon such vegetation. Removal and management of vegetation in and around the Project site, as described in the proposed Project Revegetation Plan (Appendix F), could lead to decreased vegetation canopy height and cover for golden eagle prey. This could lead to an indirect disturbance to eagles by providing an increase in forage opportunities and eagle use of the Alternative B Project Area. Disturbances resulting from the Project, such as visual obstructions, physical flight obstructions, and noise, could decrease golden eagle use of the Project Area.

Indirect effects arising from construction and operation of the Project could indirectly result in golden eagle mortalities. Indirect mortality could occur from an increase in prey and foraging opportunities throughout the Project Area, drawing eagles into the area and increasing the opportunity for mortality to occur. Maintenance activities, including the use of Project roads, would increase the opportunity for collisions of animals with maintenance or construction vehicles and indirectly present a risk for golden eagle mortality to those individuals attracted to the road kill if it was not removed.

Alternatively, the same factors might reduce golden eagle use of the area, resulting in a decrease in mortality as a result of indirect effects from construction and operation of the Project. As described above, effects might result from a decrease in prey base and reduced foraging over the Project Area. Disturbances resulting from the Project, such as visual obstructions, physical flight obstructions, and noise, could decrease golden eagle use of the Project Area. Mitigations for these impacts are discussed in the ABPP/ECP (Appendix F) and in the Mitigation section.

~~Consistency with the requirements of the BGEPA would be ensured through creation and implementation of an Avian and Bat Protection Plan/Eagle Conservation Plan (ABPP/ECP) and other measures, as determined by the TAC.~~

SPECIAL STATUS WATERFOWL AND SHOREBIRDS

Special status waterbirds are prone to collisions with transmission lines and, where Alternative B would cross the MNWR, mortality would occur. Seven species of special status waterbirds occur in the Project Area: western least bittern, white-faced ibis, black tern, trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The MNWR has highly valued waterfowl habitat and is located along a migratory pathway. The results of the 2010 avian use surveys, particularly the high use of white-faced ibis at points where the proposed transmission line would be near the MNWR, dictate that the APLIC 2006 best standards and practices be followed. APLIC (2006) standards include designs that provide for separation of conductors to provide isolation of lines and insulation of phases or grounds where adequate separation is not feasible (APLIC 2006), as well as the line marking devices described in the following paragraph. Failure to implement these measures would involve a risk to these wading birds as well as to other bird species. Additionally, occasional collisions with transmission lines by white-faced ibis could remain, because of the amount of use and the behavior of this species. Only flying white-faced ibis were counted during the field surveys, because this species moves frequently between foraging and nest sites. Consistency with the

requirements of the MBTA would be ensured through creation and implementation of an ABPP/ECP and other measures, as determined by the TAC. Special measures would be required to reduce the incidence of collision, as described below.

Use of line marking devices, similar to those described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), would make the transmission line more visible and less likely to cause waterfowl mortality. Line marking devices would be placed on all wires crossing, bordering, and running perpendicular to the flight paths of birds utilizing the MNWR, and on guide wires and substation lines at intervals determined by the latest standards used by the USFWS. Line markers would extend at least 1 mile outside of MNWR boundaries to minimize the potential for collision. The marking devices have been reported to reduce collision mortality by 40 to 90 percent (DOE 2008).

PASSERINE AND WOODPECKERS

Special status passerine and woodpecker species would be displaced from their locations of suitable habitat where the transmission lines, transmission poles, and substation are built. The displacement into adjacent habitat would cause an undetectable effect on these species, because of the small Project footprint and because most flight time for these birds would be below the elevation of the transmission lines. An undetermined level of mortality could occur for some of these species from collision with the transmission lines. Post-construction mortality monitoring conducted by the Applicant would identify whether any of these species were being killed from collisions with the transmission lines and, if so, consultation with TAC would occur to identify whether additional mitigation would be required.

MOUNTAIN QUAIL

Mountain quail are ground birds that make low-level flights that would occur primarily below the transmission line and therefore would be unlikely to collide with transmission lines. However, mountain quail interactions with transmission lines are not well understood, so the post-construction monitoring conducted by the Applicant would be useful for determining whether any quail mortality occurred. If quail collisions were documented, the BLM and ODFW would review the mortality data and discuss what adaptive management actions could occur that would reduce mortality.

TEMPORARY EFFECTS

FISH RESOURCES

Construction activities associated with Alternative B would not directly affect the four perennial fish bearing streams crossed by the transmission line, including Kiger Creek, Cucamonga Creek, McCoy Creek, and the Donner und Blitzen River. Ground disturbance associated with transmission line pole placement, access roads, temporary lay-down areas, and tensioning sites would not occur in or immediately adjacent to these waterbodies. However, four poles, one tensioning site, and 0.74 acre of overland roads would be located in wetlands near the creeks at locations that have not been identified. Erosion from the Project Area could run off into the Cucamonga Creek and lead to sedimentation. Project components are not planned for wetlands adjacent to the other creeks. Elevated turbidity and filling-in of coarser stream substrates could reduce fish health and viability within reaches affected by Project development.

Directional boring construction techniques would be used to relocate the HEC distribution line (that crosses the MNWR) under the Donner und Blitzen River. This construction technique would avoid disturbances to the river banks, stream bed, and overall water quality of the Donner und Blitzen River.

WILDLIFE RESOURCES

Temporary effects on wildlife resources would occur at transmission line pole locations, laydown areas and tensioning sites, at the new interconnection station site, in areas affected by new and improved access roads, and areas where overland vehicle travel would occur. Construction of Alternative B would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

Approximately 46.6 acres of wildlife habitat would be temporarily affected by construction of Alternative B, including 22.4 acres of sagebrush habitat, 17.8 acres of grassland, 5.0 acres of agricultural land, 1.1 acres of juniper woodlands, and 0.3 acre of wetland/riparian area (Table 3.5-21). Temporary laydown areas would affect approximately 40.0 acres, including 20.0 acres of sagebrush, 15.0 acres of grassland, and 5.0 acres of agricultural land. Tensioning sites would affect 4.8 acres of grassland, sagebrush, and juniper woodland habitat, while the transmission line pole work areas would affect 1.9 acres of the same habitat types, including a small amount (0.3 acre) of wetland/ riparian area. Areas of temporary disturbance would be restored to pre-construction contours and restored with BLM, MNWR, or private owner approved seed mixtures. Habitats would be reclaimed by establishing early succession sagebrush communities that over the long-term would be restored to maturity. The Applicant would monitor the success of revegetation and additional seeding or other measures could be required by BLM, to ensure adequate reclamation of temporary use areas affected by construction.

GENERAL WILDLIFE

Construction activities would displace the more mobile mammals, birds, and reptiles from areas of vegetation and ground disturbance, but the less mobile small mammals and reptiles could be killed from crushing and entombment. The associated activity, noise, and dust likely would cause some mammal and bird species to become more concentrated in areas adjacent to construction, increasing inter- and intra-specific competition during the spring through fall months when construction would occur.

The potential for disturbance to avian breeding attempts during construction of the proposed transmission line would likely increase with proximity to nests. For this reason, towers and lines would be sited to maximize the distance from identified nests (of raptors) or nesting colonies (of wading birds, waterfowl, or gulls). The raptor nest survey (NWC 2010i) identified a number of active and inactive raptor nests within 1 mile of the proposed transmission line, and micrositing of towers would consider these nests. In addition, nesting areas of waterfowl, gulls, and wading birds exist in the MNWR in areas adjacent to the proposed transmission line. Construction would likely occur near these nesting areas or near raptor nests but it would occur outside of the breeding season for those birds.

BIG GAME

Temporary effects to big game would include disturbance by heavy equipment operation, the presence of large numbers of construction workers, and the temporary loss of habitat at laydown areas, tensioning sites, and transmission line pole work areas, including, 6.3 acres of elk winter range, 30.4 acres of mule deer winter range, and 11.7 acres of antelope range. Because construction would not occur during winter months, an undetectable effect would occur from the loss of habitat in winter range. Big game would disperse from construction areas, moving to adjacent available habitat for forage and cover. If construction occurred in big game production areas, some displacement and additional activity of young-of-the-year would occur. A small increase in big game mortality as a result of vehicle collisions would occur in areas frequented by big game. Adherence to reasonable speed limits (less than 25 mph) in construction areas would limit this occurrence.

SPECIAL STATUS SPECIES

The temporary effects of Alternative B to Preble's shrew, California wolverine, bats, raptors, waterfowl and shorebirds, mountain quail, and northern sagebrush lizard would be qualitatively the same to the construction effects described in Section 3.5.3.2.

PYGMY RABBIT

Pygmy rabbit pre-construction surveys would be conducted to determine whether active burrows were located within the transmission corridor or areas identified for overland travel. If any burrows were found, the BLM and USFWS would be consulted to determine avoidance measures ~~that would be required or burrow destruction would be allowed~~. Previous surveys along the Alternative B alignment did not identify the

presence of pygmy rabbits. However, the BLM has records of pygmy rabbit observations west of the Project Area, so the species could be present. Any pygmy rabbits present in the areas of construction would disperse into adjacent habitat to avoid harm. There is a possibility that some individuals could be killed from collisions with vehicles.

GREATER SAGE-GROUSE

Temporary effects on greater sage-grouse during construction would include displacement of individuals from areas of sagebrush and riparian habitat during the summer brood season. With adherence to Project Area speed limits, direct mortality from collision with construction vehicles would be undetectable. Greater sage-grouse would expend more energy avoiding construction areas through one brood-rearing season, and would disperse into adjacent suitable habitats~~, which are readily available~~.

As noted previously, the Little Kiger lek is located within 2 miles of the alignment of Alternative B. Monitoring has shown that the lek is active, therefore construction would not be allowed during the March 15 to May 1 time period. ~~A pre-construction lek survey would be completed at the Little Kiger lek in 2011, and if it was determined that the lek was unoccupied, no consultation with ODFW regarding potential effects on this lek location would be required. If the Little Kiger lek was occupied in 2011, then consultation between BLM and ODFW would be conducted to determine whether construction timing stipulations would be required.~~

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, fish and wildlife in the Project Area would experience the same temporary construction related effects as described above, including the disruptive effects from the presence of workers, equipment operation, additional surface disturbance, and vegetation damage. Permanent effects on most wildlife species would be similar to the single-circuit transmission line, except for birds that could experience a greater level of mortality from collisions. Post-construction monitoring would take place to determine whether additional mortality was occurring, and the TAC would review the results to identify whether any additional mitigation would be required. This post-construction monitoring is in addition to pre-Project data collection and assessment required on the MNWR lands through the compatibility process.

MITIGATION

In addition to the mitigation measures that would be the same for all alternatives, including the PDFs and BMPs that were taken into account in the effects analysis in this section (see Section 2 and Appendix A.1.6 and A.3.5), the following mitigation measures would be implemented to reduce the effects of Alternative B development on fish and wildlife resources:

- Project Area habitat would be categorized in accordance with the ODFW's *Habitat Mitigation Policy* (OAR 635.415), to determine appropriate conservation measures to compensate for lost habitat availability to wildlife, particularly greater sage-grouse. Habitat mitigation is described in the Applicant's HMP (Appendix F).
- The ODFW *Mitigation Framework* would be applied to the effects of Alternative B on greater sage-grouse, in addition to those common to all alternatives. The effects of transmission lines on greater sage-grouse and other lekking grouse species is not well understood. However, the *Mitigation Framework* suggests that, at a minimum, a disturbance band of 0.6 mile on either side of the line should be used to calculate the area of impact. This 0.6 mile band is then broken into four 0.15 mile intervals around the transmission line, which should be used to quantify the habitat effectiveness ("habitat density factor") as it relates to the proximity of the line (Hagen 2011b). As shown in Tables 3.5-22 and 3.5-23, the impacts of the Alternative B transmission line in sagebrush habitat, including the Project Area and Low Density

greater sage-grouse habitat, would result in impacts to a total of 7,028.3 acres. When multiplied by the habitat density factor, this results in a total mitigation area of 4,568.9 acres for the Alternative B transmission line. Of this total, the 1,820 acres of impacted land in the transmission line Project Area is in private ownership, and results in a mitigation area of 1,585.3 acres. The 5,508.0 acres of impacted land within Low Density habitat impacted by the transmission line is in a combination of private and federal ownership, as shown in Table 3.5-24. It should be noted that such calculations are derived from the best available information at the time of the EIS. The final acreage calculations for mitigation would be developed in coordination with the USFWS and ODFW, pursuant to the implementation of a HMP.

Table 3.5-22 Transmission Line Impacts to Sagebrush Habitat – Project Area (all Private Lands), Alternative B (acres)

Transmission Line Project Area	Zone 1	Zone 2	Zone 3	Zone 4	Total
Big Sagebrush Steppe	231.8	9.4	19.4	15.5	276.1
Big Sagebrush/Annual Grassland	0.0	0.0	0.0	0.0	0.0
Big Sagebrush/Crested Wheatgrass	0.0	0.0	0.0	0.0	0.0
Big Sagebrush/Perennial Grassland	129.4	87.2	17.5	13.9	248.1
Dwarf Shrub Steppe	0.0	0.0	0.0	0.0	0.0
Low Sagebrush/Grassland	0.0	0.0	12.9	10.7	23.5
Mountain Big Sagebrush/Grassland	503.6	769.0	0.0	0.0	1,272.6
Sagebrush Shrubland and Steppe	0.0	0.0	0.0	0.0	0.0
Total	864.8	865.6	49.8	40.1	1,820.3
Habitat Density Factor	1	0.8	0.4	0.2	--
Mitigation Acreage	864.8	692.5	19.9	8.0	1,585.3

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative B. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

Table 3.5-23 Transmission Line Impacts to Sagebrush Habitat – Low Density Area, Alternative B (acres)

Transmission Line - Low Density	Zone 1	Zone 2	Zone 3	Zone 4	Total
Big Sagebrush Steppe	77.7	96.3	75.2	68.1	317.4
Big Sagebrush/Annual Grassland	66.0	147.8	241.8	270.8	726.4
Big Sagebrush/Crested Wheatgrass	0.0	0.0	9.1	77.0	86.1
Big Sagebrush/Perennial Grassland	847.5	837.1	873.5	936.4	3,494.6
Dwarf Shrub Steppe	24.6	0.48	5.3	3.1	33.5
Low Sagebrush/Grassland	0.0	0.0	0.0	24.3	24.3
Mountain Big Sagebrush/Grassland	0.0	0.0	0.0	0.0	0.0
Sagebrush Shrubland and Steppe	133.1	182.7	116.3	93.6	525.7
Total	1,149.0	1,264.4	1,321.1	1,473.6	5,208.0
Habitat Density Factor	1	0.8	0.4	0.2	--
Mitigation Acreage	1,149.0	1,011.5	528.4	294.7	2,983.6

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative B. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

Table 3.5-24 Land Ownership of Impacted Sagebrush Habitat (Table 3.5-22) – Alternative B Transmission Line (acres)

	BLM	USFWS	Private	Total
Project Area Acreage	0.0	0.0	1,820.3	1,820.3
Low Density Acreage	2,241.6	267.0	2,699.3	5,2080.0
Total Affected Acreage	2,241.6	267.0	4,519.6	7,028.2
Project Area Mitigation	0.0	0.0	1,585.3	1,585.3
Low Density Mitigation	1,163.0	123.5	1,697.1	2,983.6
Total Mitigation Acreage	1,163.0	123.5	3,282.4	4,568.9

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative B. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

- The *Suggested Practices for Avian Protection on Power Lines: The State of the Art* in 2006 would be implemented (APLIC 2006). If these standards are followed, the risk of electrocution is considered to be minimal (M. Green, USFWS, personal communication, 2010, in NWS 2010).
- ~~Speed limits for travel on the newly constructed roads would be posted at 30 mph to reduce the potential for wildlife collisions. Overland travel areas will have speed limits of 25 mph.~~
- To reduce the impacts to big game, operational activity in big game winter range between December and March would be limited to conducting required maintenance or use during emergency situations. Other routine activities would be avoided.
- Because pre-construction monitoring has shown that the Little Kiger greater sage-grouse lek is active, no construction activities would be allowed during the March 15 to May 1 time period.
- Increased raptor and corvid abundance has been documented in landscapes fragmented by man-made structures, and power poles have been identified as a threat to greater sage-grouse and other prey species (Prather and Messmer 2010). Predator perch deterrents would be installed to discourage raptors from perching on transmission towers in greater sage-grouse habitat on public lands. While the effectiveness of predator perch deterrents is inconsistent (Prather and Messmer 2010, Slather and Smith 2010), the effectiveness of the devices that would be used would be monitored by the TAC, and modified if needed. On private lands, the need for predator perch deterrents would be determined based upon an overall increase in perching by raptors. The requirement for perch deterrents on private land would be overseen by the TAC.
- The Applicant would monitor the success of revegetation after construction, and additional seeding or other measures could be required by the BLM to ensure the adequate reclamation of temporary use areas affected by construction.
- Micrositing of towers and lines would occur to maximize the distance from identified nests (of raptors) or nesting colonies (of wading birds, waterfowl, or gulls). Construction near these nesting areas or near raptor nests would occur outside of the breeding season of those birds.
- The burial of an existing 1.35-mile distribution line would remove a current source of mortality for birds that fly into the line and are injured or killed.
- Use of line marking devices, similar to those described in *Migrating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC 1994), would make the transmission line more visible and less likely to cause waterfowl mortality. Line marking devices would be placed on all wires crossing, bordering, and

running perpendicular to flight paths of birds utilizing the MNWR, and on guide wires and substation lines at intervals suggested by the manufacturer. Line markers would extend at least 1.0 mile outside of each MNWR boundary to minimize the potential for collision. The marking devices have been reported to reduce collision mortalities by 40 to 90 percent (DOE 2008).

- Post-construction mortality monitoring conducted by the Applicant would identify whether passerines or woodpeckers were killed from collisions with the transmission lines and, if so, consultation with the TAC would occur to identify whether additional mitigation would be required.
- If mountain quail collisions were documented, the BLM and ODFW would review mortality data and discuss whether additional mitigation measures would be required.

South Diamond Lane Route Option

The South Diamond Lane route option would have similar permanent and temporary effects as described for Alternative B, except for the changes noted below (Table 3.5-25).

PERMANENT EFFECTS

FISH RESOURCES

The South Diamond Lane Route Option would also cross Kiger Creek, Cucamonga Creek, McCoy Creek, and the Donner und Blitzen River. However, the Project would not directly affect fish resources in these streams because no Project features, including transmission line poles, access roads, and the interconnection station would be located in or immediately adjacent to these waters. There would be 13 poles and 0.74 acre of overland roads placed in wetlands adjacent to the creeks, and erosion from the Project Area could run off into the creeks and lead to sedimentation. Elevated turbidity and filling-in of coarser stream substrates could reduce fish health and viability within reaches affected by Project development.

WILDLIFE RESOURCES

Permanent effects on wildlife resources from the South Diamond Lane Route would occur from the transmission line, interconnection substation, and access roads. The Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

There would be 23.5 acres of habitat permanently lost from construction of the South Diamond Lane Route Option, including 9.7 acres of sagebrush habitat, 6.1 acres of juniper woodlands, 5.1 acres of grasslands, 1.6 acres of agricultural lands, 0.8 acre of wetlands/riparian areas, and 0.1 acre of developed lands (Table 3.5-25). Wetland effects are discussed in Section 3.4. Overland travel roads would affect 21.0 acres, of which 8.4 acres would be sagebrush habitat, 5.8 acres juniper woodlands, and 4.5 acres would be grasslands. The transmission line poles would have a total footprint of 1.8 acres, and the interconnection substation and operations and maintenance building would require 0.7 acre of sagebrush habitat. As with Alternative B, new access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats.

BIG GAME

The transmission line ROW (150 feet wide) for the South Diamond Lane Route would cross 101.7 acres of elk winter habitat, 331.3 acres of mule deer winter range, and 24.2 acres of antelope habitat. The transmission pole footprint and the interconnection station would be placed in 0.4 acre of elk winter range, 2.2 acres of mule deer winter range, and 0.6 acre of antelope winter range. Access roads would be widened through 2.4 acres of mule deer winter range and new access roads would convert 0.7 acre of mule deer winter range to gravel. Overland travel would occur through 4.8 acres of elk winter range, 10.2 acres of mule deer winter range, and 1.1 acres of antelope range. The footprint of all Diamond Lane alternative Project components

would be in 5.2 acres of elk winter range, 15.5 acres of mule deer winter range, and 1.7 acres of antelope winter range. Effects to big game in these areas would be similar to those described under Alternative B.

SPECIAL STATUS SPECIES

SPECIAL STATUS WATERFOWL AND SHOREBIRDS

Special status waterbirds are prone to collisions with transmission lines, and where the South Diamond Lane Route Option would cross 4.1 miles of the MNWR, mortality would take place. Seven species of special status waterbirds occur in the Project Area: western least bittern, white-faced ibis, black tern, trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The MNWR has highly valued waterfowl habitat and is located along a migratory pathway. The results of the 2010 avian use surveys, particularly the high use of white-faced ibis at points where the proposed transmission line would be near the MNWR, would dictate that the APLIC 2006 best standards and practices be followed. Failure to do so would involve risk to these wading birds, as well as to other bird species. Additionally, risk of occasional white-faced ibis collisions with transmission lines would remain, because of the amount of use and the behavior of this species. All detections of white-faced ibis during the field surveys included flying birds, because this species moves frequently between foraging and nest sites. Consistency with the requirements of the MBTA would be ensured through implementation of the ABPP/ECP and other measures, as determined by the TAC. Special measures would be required to reduce the incidence of collision, as described below.

As described in Alternative B, special measures would be required to reduce the incidence of collision, including the use of line marking devices similar to those described in ~~*Suggested Practices for Avian Protection on*~~ *Migrating Bird Collisions with Power Lines: The State of the Art in 2006* (APLIC ~~2006~~ 1994).

TEMPORARY EFFECTS

FISH RESOURCES

Construction activities associated with the South Diamond Lane Route Option would not directly affect the four perennial fish bearing streams crossed by the transmission line, including Kiger Creek, Cucamonga Creek, McCoy Creek, and the Donner und Blitzen River. Ground disturbance associated with transmission line pole placement, access roads, temporary lay-down areas, and tensioning sites would not occur in or immediately adjacent to these waterbodies. However, 13 poles and 0.74 acre of overland roads would occur in wetlands adjacent to the creeks, and erosion from the Project Area could run off into the creeks and lead to sedimentation. Elevated turbidity during construction activities and filling-in of coarser stream substrates could reduce fish health and viability within reaches affected by Project development.

As with Alternative B, directional boring construction techniques would be used to relocate the HEC distribution line under the Donner und Blitzen River to avoid disturbing the river banks, stream bed, and water quality of the river.

Table 3.5-25 Summary of Permanent and Temporary Effects by Habitat Type for the South Diamond Lane Route Option

	Developed	Agriculture	Grassland	Sagebrush	Juniper Woodlands	Rocky/ Barren	Wetland/ Riparian Areas	Open Water	Total
Permanent Effects									
Transmission line ROW overlap (miles)	17.3	36.7	164.7	174.4	95.7	1.9	22.8	0.7	514.2
Transmission line poles (acres)	0.1	0.1	0.6	0.6	0.3	0.0	0.1	0.0	1.8
Interconnection Substation, O&M building (acres)	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
Access Roads:									
Improved (acres)	*0.0*	*0.0*	*0.8*	*1.4*	*0.3*	*0.0*	*0.0*	*0.0*	*2.5*
New (acres)	*0.0*	*0.0*	*0.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*
Overland (acres)	*0.1*	*1.5*	*4.5*	*8.4*	*5.8*	*0.0*	*0.7*	*0.0*	*21.0*
Total Access Roads (acres)	0.1	1.5	5.5	10.3	6.1	0.0	0.7	0.0	24.2
Total Permanent Footprint (acres)	0.2	1.6	6.1	11.6	6.4	0.0	0.8	0.0	25.7
Temporary Effects									
Transmission line poles (acres)	0.1	0.2	0.7	0.8	0.4	0.0	0.1	0.0	2.3
Tensioning sites (acres)	0.0	0.5	1.3	1.3	0.8	0.0	0.3	0.0	4.5
Staging areas (acres)	0.0	5.0	10.0	20.0	0.0	0.0	0.0	0.0	35.0
Total Temporary Footprint (acres)	0.1	5.7	12.0	22.0	1.2	0.0	0.4	0.0	41.8

WILDLIFE RESOURCES

Temporary effects on wildlife resources from the South Diamond Lane Route Option would occur at transmission pole locations, staging and tensioning sites, at the interconnection substation, at new and improved access road locations, and where overland travel would occur. The Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

Construction activities would cause the short-term loss of approximately 41.8 acres of wildlife habitat, including 22.0 acres of sagebrush habitat, 12.0 acres of grasslands, 5.7 acres of agricultural lands, 1.2 acres of juniper woodlands, 0.4 acre of wetland/riparian areas, and 0.1 acre of developed area. Wetland effects are discussed in Section 3.4. Temporary laydown areas would account for the majority of the short-term effects, affecting 20.0 acres of sagebrush habitat, 10.0 acres of grasslands, and 5.0 acres of agricultural lands. Tensioning sites would affect 4.5 acres of primarily grassland, sagebrush, and juniper woodland habitat, while the transmission line pole work areas would affect 2.3 acres of the same habitat types, including a small amount (0.1 acre) of wetland/ riparian area. As with Alternative B, areas of temporary disturbance would be restored to pre-construction contours and with BLM or private owner approved seed mixtures. The Applicant would monitor the success of revegetation, and additional seeding or other measures could be required by the BLM and MNWR to ensure the adequate reclamation of temporary use areas affected by construction.

GENERAL WILDLIFE

The effects to general wildlife would be qualitatively the same as those described for Alternative B.

BIG GAME

Temporary effects to big game would include disturbance by heavy equipment operation, the presence of large numbers of construction workers, and the temporary loss of habitat at laydown areas, tensioning sites, and transmission line pole work spaces, including 6.3 acres of elk winter range, 24.9 acres of mule deer winter range, and 5.7 acres of antelope winter range. Other temporary effects, including dispersal from construction areas, displacement, additional activity of young-of-the-year, and mortality from vehicle collisions, could also occur, as described for Alternative B.

SPECIAL STATUS SPECIES

The effects to special status species would be qualitatively the same as those described for Alternative B.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a full double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, fish and wildlife in the Project Area would experience the same temporary construction related effects as described above, including the disruptive effects from the presence of workers, equipment operation, additional surface disturbance, and vegetation damage. Permanent effects on most wildlife species would be similar to the single-circuit transmission line, except for birds that could experience a higher level of mortality from collision. Post-construction monitoring would occur to determine whether additional mortality was occurring, and the TAC would review the results to identify whether any additional mitigation would be required. This post-construction monitoring is in addition to pre-Project data collection and assessment required on the MNWR lands through the compatibility process.

MITIGATION

Mitigation would be the same as that described for Alternative B, except for burial of the existing HEC distribution line and additional mitigation associated with implementation of the *Sage-Grouse Mitigation*

Framework. Specific mitigation area calculations for the Hog Wallow Route Option have not been completed, but would be similar to the mitigation calculated for Alternative B.

Hog Wallow Route Option

The Hog Wallow Route Option would have similar types of permanent and temporary effects as described for Alternative B, except for the changes noted below (Table 3.5-26).

PERMANENT EFFECTS

FISH RESOURCES

The effects of the Hog Wallow Route Option would be the same as those described for Alternative B.

WILDLIFE RESOURCES

Permanent effects to wildlife resources from the Hog Wallow Route Option would occur from the transmission line, interconnection substation, and access roads. The Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

There would be 31.4 acres of habitat permanently lost from construction of the Hog Wallow Route Option, including 14.3 acres of sagebrush habitat, 7.0 acres of grasslands, 6.4 acres of juniper woodlands, 2.7 acres of agricultural lands, 0.8 acre of wetlands, and 0.1 acre of developed lands (Table 3.5-26). Overland travel roads would account for 25.6 acres, while improved access roads would convert 2.5 acres and new access roads would cross 0.7 acre. The transmission line poles would have a total footprint of 1.9 acres, and the interconnection substation and operations and maintenance building would require 0.7 acre. As with other action alternatives, the introduction of new access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats.

BIG GAME

The 150-foot wide transmission line ROW for the Hog Wallow Route Option would cross 101.7 acres of elk winter habitat, 345.9 acres of mule deer winter range, and 95.6 acres of antelope habitat. Access roads would be widened through 2.4 acres of mule deer winter range and new access roads would convert 0.7 acre of mule deer winter range to gravel surfaced roadway. Overland vehicle travel would occur through 4.8 acres of elk winter range, 14.8 acres of mule deer winter range, and 4.7 acres of antelope range. Transmission line poles would occupy 0.4 acre of elk winter range, 1.5 acres of mule deer winter range, and 0.6 acre of antelope winter range. Effects to big game in these areas would be similar to those described for Alternative B.

Table 3.5-26 Summary of Permanent and Temporary Effects by Habitat Type for the Hog Wallow Route Option

	Developed	Agriculture	Grassland	Sagebrush	Juniper Woodlands	Rocky/ Barren	Wetland/ Riparian Areas	Open Water	Total
Permanent Effects									
Transmission line ROW overlap (miles)	4.7	13.6	191.7	206.1	95.7	2.0	14.2	0.8	528.8
Transmission line poles (acres)	0.0	0.0	0.8	0.8	0.3	0.0	<0.0	0.0	1.9
Interconnection Substation, O&M building (acres)	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
Access Roads:									
Improved (acres)	*0.0*	*0.0*	*0.8*	*1.4*	*0.3*	*0.0*	*0.0*	*0.0*	*2.5*
New (acres)	*0.0*	*0.0*	*0.2*	*0.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.7*
Overland (acres)	*0.1*	*2.7*	*5.3*	*11.0*	*5.8*	*0.0*	*0.7*	*0.0*	*25.6*
Total Access Roads (acres)	0.1	2.7	6.3	12.9	6.1	0.0	0.7	0.0	28.8
Total Permanent Footprint (acres)	0.1	2.7	7.1	14.4	6.4	0.0	0.7	0.0	31.4
Temporary Effects									
Transmission line poles (acres)	0.0	0.1	0.9	0.9	0.4	0.0	0.0	0.0	2.3
Tensioning sites (acres)	0.0	0.3	1.3	2.0	0.8	0.0	0.3	0.0	4.5
Staging areas (acres)	0.0	5.0	15.0	20.0	0.0	0.0	0.0	0.0	40.0
Total Temporary Footprint (acres)	0.0	5.3	17.1	22.9	1.2	0.0	0.3	0.0	46.8

SPECIAL STATUS SPECIES

SPECIAL STATUS WATERFOWL AND SHOREBIRDS

~~Special status waterfowl~~ Special status waterbirds are prone to collisions with transmission lines, and the Hog Wallow Route Option would cross 1.9 miles of the MNWR. Mortality would occur, potentially affecting the seven species of special status water birds that frequent the area, including western least bittern, white-faced ibis, black tern, trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The results of the 2010 avian use surveys, particularly the high use of white-faced ibis where the proposed transmission line would be near the MNWR, dictate that the APLIC 2006 best standards and practices be followed. Failure to do so would involve risks to these wading birds, as well as to other bird species. Additionally, risks of occasional white-faced ibis collisions with transmission lines could remain, because of the amount of use and the behavior of this species. Each detection of white-faced ibis during the field surveys included flying birds, because this species moves frequently between foraging and nest sites. Consistency with the requirements of the MBTA would be ensured through implementation of the ABPP/ECP and other measures, as determined by the TAC. Special measures would be required to reduce the incidences of collision, as described below. As discussed in Alternative B and the South Diamond Lane Route Option, special measures would be required to reduce the incidences of collision, including use of line marking devices similar to those described in *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).

TEMPORARY EFFECTS

FISH RESOURCES

Construction activities associated with the Hog Wallow Route Option would be the same as those described for Alternative B.

WILDLIFE RESOURCES

Temporary effects to wildlife resources from the Hog Wallow Route Option would occur at transmission pole locations, staging and tensioning sites, at the interconnection substation, at new and improved access road locations, and where overland travel would occur. The Project would affect habitat, general wildlife, big game, and special status species, as describe below.

HABITAT

Construction activities would cause the short-term loss of approximately 46.8 acres of wildlife habitat, including 22.9 acres of sagebrush habitat, 17.1 acres of grasslands, 5.3 acres of agricultural lands, 1.2 acres of juniper woodlands, and 0.3 acre of wetland/riparian areas. Temporary laydown areas would account for the majority of the short-term effects, affecting 20.0 acres of sagebrush habitat and 15.0 acres of grassland. Tensioning sites would affect 4.5 acres of primarily grassland, sagebrush, and juniper woodland habitat, while the transmission line pole work areas would affect 2.3 acres of the same habitat types. As with Alternative B, areas of temporary disturbance would be restored to pre-construction contours and with BLM or private owner approved seed mixtures. Monitoring of revegetation success would occur, and additional seeding or other measures could be required by the BLM and MNWR to ensure the adequate reclamation of temporary use areas affected by construction.

GENERAL WILDLIFE

The effects to general wildlife would be qualitatively the same as those described for Alternative B.

BIG GAME

As described for Alternative B, temporary effects to big game would include disturbance by heavy equipment operation, the presence of large numbers of construction workers, and the temporary loss of habitat at laydown areas, including 6.3 acres of elk winter range, 30.2 acres of mule deer winter range, and 11.2 acres of antelope range. Other temporary effects, including dispersal from construction areas, displacement from

areas around construction areas, additional activity of young-of-the-year, and mortality from vehicle collisions, could also occur. The effects to big game in these areas would be similar to those described for Alternative B.

SPECIAL STATUS SPECIES

The effects to special status species would be qualitatively the same as those described for Alternative B.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, fish and wildlife in the Project Area would experience the same temporary construction related effects as described above, including the disruptive effects from the presence workers, equipment operation, additional surface disturbance, and vegetation damage.

MITIGATION

Mitigation would be the same as that described for Alternative B, except for the burial of the existing HEC distribution line and additional mitigation associated with implementation of the *Sage-Grouse Mitigation Framework*. Specific mitigation area calculations for the Hog Wallow Route Option have not been completed, but would be similar to the mitigation calculated for Alternative B.

115-kV Transmission Line Option

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments as described above for Alternative B – West Route and the South Diamond Lane and Hog Wallow Route Options. The 115-kV Transmission Line Option would include a single three-phase (i.e., three-conductor) 115-kV circuit. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods, interconnection points, and access requirements would be the same as described for Alternative B and the two route options, described above.

PERMANENT AND TEMPORARY EFFECTS

The permanent and temporary effects of this design option to fish and wildlife would be similar to Alternative B, and the South Diamond Lane and Hog Wallow Route Options. The only notable differences between this design option and others is that this option would not require a second round of construction to upgrade the line to 230-kV, nor would additional equipment upgrades be required at the interconnection station adjacent to the HEC 115-kV line. This option would have fewer temporary construction related effects on fish and wildlife than Alternative B and the two route options because workers and equipment would not be operating on site during two separate construction phases, and a second round of construction activity would not cause additional surface disturbance and vegetation damage. Ongoing operations and maintenance activities would be the same as those described above for Alternative B and the two route options.

MITIGATION

The same mitigation described above for Alternative B and the South Diamond Lane and Hog Wallow Route Options would apply to the 115-kV Transmission Line Option, except for burial of the existing HEC distribution line.

Alternative C – North Route (Preferred Alternative)

Alternative C would have the same permanent and temporary effects, to the same categories of resources, as those described for Alternative B, except for the changes noted below (Table 3.5-27).

PERMANENT EFFECTS

FISH RESOURCES

Alternative C would cross three perennial fish bearing streams, including Kiger, Swamp, and Riddle Creeks. The Project would not directly affect fish resources in these streams because no Project features, including transmission line poles, access roads, or the interconnection station, would be located in or immediately adjacent to these waters. However, 0.5 acre of overland access roads would be located in wetlands adjacent to the creeks, so erosion from the Project Area would lead to sedimentation in these creeks. Elevated turbidity and filling-in of coarser stream substrates would reduce fish health and viability within reaches affected by Project development. Transmission line poles would be placed approximately 600 to 1,000 feet apart and pole locations would be selected to avoid riparian areas and perennial streams. The span lengths would be sufficient to allow transmission line poles to be placed well away from fish bearing rivers and streams.

WILDLIFE RESOURCES

Permanent effects to wildlife resources from Alternative C would occur from the transmission line, interconnection substation, and access roads. The Project would affect habitat, general wildlife, big game, and special status species, as described below.

HABITAT

There would be 38.2 acres of habitat permanently lost from construction of Alternative C, including 24.5 acres of sagebrush habitat, 8.6 acres of grasslands, 4.0 acres of juniper woodlands, 0.5 acre of wetlands, 0.3 acre of developed lands, and 0.2 acre of agricultural lands (Table 3.5-27). Wetland effects are discussed in Section 3.4. Overland travel roads would account for 24.4 of the 34.5 acres affected by access roads, including 16.2 acres of sagebrush habitat and 2.6 acres of juniper woodlands. The transmission line poles would have a total footprint of 3.0 acres, and the interconnection substation and operations and maintenance building would require 0.7 acre. As with other action alternatives, the introduction of new access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats.

BIG GAME

The 150-foot wide transmission line ROW for Alternative C would cross 110.6 acres of elk winter habitat, 466.1 acres of mule deer winter range, and 370.8 acres of antelope habitat. New access roads would convert 18.4 acres of mule deer winter range and 2.0 acres of antelope winter range to gravel surfaced roads. Overland travel would occur through 4.8 acres of elk winter range, 11.7 acres of mule deer winter range, and 7.3 acres of antelope winter range. The interconnection station would occupy 0.7 acre of antelope winter range. The transmission line poles would require 0.4 acre of elk winter range, 1.8 acres of mule deer winter range, and 1.3 acres of antelope winter range. The effects to big game in these areas would be similar to those described under Alternative B.

SPECIAL STATUS SPECIES

GREATER SAGE-GROUSE

An approximately 3.5-mile segment of the Alternative C transmission line would be located 1.05 to 2.00 miles from the Little Kiger lek. Two drainages, Kiger Creek and a portion of Little Kiger Creek, are located between the lek and the alignment of the proposed transmission line. Intervening topography would prevent direct line-of-sight between most of the proposed transmission line and the lek. At some points the upper portion of towers and lines would be visible from the lek, although portions of the Project would be obscured behind a ridge line. Alternative C would not have direct effects on Little Kiger lek activity, ~~Greater sage-grouse that would breed from that lek would remain on the east side of Kiger Creek, which is a steep and difficult crossing.~~ With adherence to Project Area speed limits, direct mortality from collisions with construction vehicles would be undetectable. The habitat along the Alternative C ROW would be grassland and juniper woodland, so no nesting would occur along that segment even in the absence of a transmission

line. ~~Pre-construction monitoring would be conducted to determine whether the lek was active and, if so, consultation would occur with the ODFW and BLM prior to surface disturbing activities, and timing restrictions would be determined~~.

TEMPORARY EFFECTS

FISH RESOURCES

Construction activities associated with Alternative C would not directly affect the three perennial fish bearing streams crossed by transmission line (Kiger, Swamp, and Riddle Creeks). Ground disturbance associated with transmission line pole placement, access roads, temporary lay-down areas, and tensioning sites would not occur in or immediately adjacent to these waterbodies. However, 0.49 acre of overland access roads would be located in wetlands near the creeks, so erosion from the Project Area would lead to sedimentation in these creeks. Elevated turbidity and filling-in of coarser stream substrates would reduce fish health and viability within the reaches affected by Project development. The transmission line poles would be spaced approximately 600 to 1,000 feet apart, allowing pole placement in locations that would avoid riparian areas and fish bearing streams.

WILDLIFE RESOURCES

Temporary effects to wildlife resources from Alternative C would occur at transmission pole locations, staging and tensioning sites, at the interconnection substation, at new and improved access road locations, and where overland travel would occur. The direct and indirect effects from the Project would impact habitat, general wildlife, big game, and special status species, as described below.

HABITAT

Construction activities would cause the short-term loss of approximately 56.75 acres of wildlife habitat, including 37.3 acres of sagebrush habitat, 10.7 acres of agricultural lands, 5.3 acres of grasslands, and 0.6 acre of juniper woodlands. No wetland or riparian areas would be directly affected. Temporary laydown areas would account for the majority of the short-term effects, affecting 30.0 acres of sagebrush habitat and 10.0 acres of grassland. Tensioning sites would affect 5.8 acres of primarily sagebrush habitat, while the transmission line pole work areas would affect 1.5 acres of the same habitat type. As with Alternative B, areas of temporary disturbance would be restored to pre-construction contours and with BLM or private owner approved seed mixtures. The Applicant would monitor the success of revegetation, and additional seeding or other measures could be required by the BLM to ensure adequate reclamation of temporary use areas affected by construction.

GENERAL WILDLIFE

The effects to general wildlife would be qualitatively the same as those described for Alternative B.

BIG GAME

As described for Alternative B, temporary effects to big game would include disturbance by heavy equipment operation, the presence of large numbers of construction workers, and the temporary loss of habitat at laydown areas and work areas around transmission poles, including 6.5 acres of elk winter range, 20.6 acres of antelope range, and 32.6 acres of mule deer winter range. Other temporary effects, including dispersal from construction areas, displacement, additional activity of young-of-the-year, and mortalities from vehicle collisions, would also occur.

Table 3.5-27 Summary of Permanent and Temporary Effects by Habitat Type for Alternative C – North Route

	Developed	Agriculture	Grassland	Sagebrush	Juniper Woodlands	Rocky/ Barren	Wetland/ Riparian Areas	Open Water	Total
Permanent Effects									
Transmission line ROW overlap (miles)	39.4	38.7	200.8	450.5	98.7	0.6	7.2	0.0	835.8
Transmission line poles (acres)	0.3	0.2	0.1	1.9	0.4	0.0	<0.0	0.0	3.0
Interconnection Substation, O&M building (acres)	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.7
Access Roads:									
Improved (acres)	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
New (acres)	*0.0*	*0.0*	*3.5*	*5.7*	*0.5*	*0.0*	*0.0*	*0.0*	*9.7*
Overland (acres)	*0.0*	*0.0*	*5.0*	*16.2*	*2.6*	*0.0*	*0.5*	*0.0*	*24.3*
Total Access Roads (acres)	0.0	0.0	8.5	21.9	3.6	0.0	0.5	0.0	34.5
Total Permanent Footprint (acres)	0.3	0.2	8.6	24.5	4.0	0.0	0.5	0.0	38.2
Temporary Effects									
Transmission line poles (acres)	0.3	0.2	0.1	1.5	0.3	0.0	0.0	0.0	2.4
Tensioning sites (acres)	0.3	0.5	2.5	5.75	0.3	0.0	0.0	0.0	9.3
Staging areas (acres)	0.0	10.0	5.0	30.0	0.0	0.0	0.0	0.0	45.0
Total Temporary Footprint (acres)	0.6	10.7	7.6	37.3	0.6	0.0	0.0	0.0	56.8

SPECIAL STATUS SPECIES

GREATER SAGE-GROUSE

An approximately 3.5-mile segment of the Alternative C transmission line would be located 1.05 to 2.00 miles from the Little Kiger lek. Two drainages, Kiger Creek and a portion of Little Kiger Creek, are located between the lek and the alignment of the proposed transmission line. An intervening ridge line would prevent direct line-of-sight between most of the proposed transmission line and the lek. At some points the upper portion of towers and lines would be visible from the lek, although obscured behind a ridge line. ~~Greater sage-grouse that would breed from that lek would remain on the east side of Kiger Creek, which is a steep and difficult crossing.~~ Temporary effects to greater sage-grouse during construction would include displacement of individuals from areas of sagebrush and riparian habitat during the summer brood season. Monitoring has shown that the lek is active, therefore construction would not be allowed during the March 15 to May 1 time period. Greater sage-grouse would expend more energy avoiding construction areas through one brood-rearing season, and would disperse into adjacent suitable habitats. ~~Pre-construction monitoring would be conducted to determine whether the lek was active and, if so, consultation with the ODFW and BLM would occur prior to surface disturbing activities to determine whether and where timing restrictions would apply.~~ The habitat along the Alternative C ROW would be grassland and juniper woodland, so no nesting would occur along that segment even in the absence of a transmission line.

FUTURE CONSTRUCTION PHASE – UPGRADE TO 230-KV

The upgrade of the initial single-circuit transmission line to a double-circuit 230-kV transmission line would require a second construction phase at a future date, when additional capacity was required on the transmission line. During the second construction phase, fish and wildlife in the Project Area would experience the same temporary construction related effects as described above, including the disruptive effects from the presence workers, equipment operation, additional surface disturbance, and vegetation damage.

MITIGATION

Mitigation would be the same as that described for Alternative B, except that this alternative would not include burial of the existing HEC distribution line and additional mitigation associated with implementation of the *Sage Grouse Strategy Mitigation Framework*. Project Area habitat would be categorized in accordance with the ODFW's *Habitat Mitigation Policy* (OAR 635.415), to determine appropriate conservation measures to compensate for lost habitat availability to wildlife, particularly greater sage-grouse. Habitat mitigation is described in the Applicant's Habitat Mitigation Plan, included in Appendix F.

The *Mitigation Framework* recommends mitigating for impacts from transmission lines. The effects of transmission lines on greater sage-grouse and other lekking grouse species is not well understood. However, the *Mitigation Framework* suggests that, at a minimum, a disturbance band of 0.6 mile on either side of the line should be used to calculate the area of impact. Four disturbance bands of 0.15 mile intervals around the transmission line should be used to quantify habitat effectiveness as it relates to the proximity of the line (Hagen 2011b). As shown in Tables 3.5-28 and 3.5-29, the impacts of the Alternative C transmission line in sagebrush habitat, including the Project Area and Low Density greater sage-grouse habitat, would result in impacts to a total of 7,551.4 acres and a total mitigation area of 4,857.0 acres for the Alternative C transmission line. Of this total, the 1,820.3 acres of impacted land in the transmission line Project Area is all in private ownership, and would result in a mitigation area of 1,585.3 acres. The 5,731.1 acres of impacted land within Low Density habitat impacted by the transmission line resulting in a mitigation area of 3,271.7 acres in a combination of private and federal ownership, as shown in Table 3.5-30. It should be noted that such calculations are derived from the best available information at the time of the EIS. The final acreage calculations for mitigation would be developed in coordination with the USFWS and ODFW, pursuant to the implementation of a Habitat Mitigation Plan.

Table 3.5-28 Transmission Line Impacts to Sagebrush Habitat – Project Area (all Private Lands), Alternative C (acres)

Transmission Line Project Area	Zone 1	Zone 2	Zone 3	Zone 4	Total
Big Sagebrush Steppe	231.8	9.4	19.4	15.5	276.1
Big Sagebrush/Crested Wheatgrass	0.0	0.0	0.0	0.0	0.0
Big Sagebrush/Perennial Grassland	129.4	87.2	17.5	13.9	248.1
Low Sagebrush/Grassland	0.0	0.0	12.9	10.7	23.5
Mountain Big Sagebrush/Grassland	503.6	769.0	0.0	0.0	1,272.6
Sagebrush Shrubland and Steppe	0.0	0.0	0.0	0.0	0.0
Total	864.8	865.6	49.8	40.1	1,820.3
Habitat Density Factor	1	0.8	0.4	0.2	--
Mitigation Acreage	864.8	692.5	19.9	8.0	1,585.3

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative C. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

Table 3.5-29 Transmission Line Impacts to Sagebrush Habitat – Low Density Area, Alternative C (acres)

Transmission Line - Low Density	Zone 1	Zone 2	Zone 3	Zone 4	Total
Big Sagebrush Steppe	242.0	214.3	217.3	198.5	872.0
Big Sagebrush/Crested Wheatgrass	220.5	183.3	151.6	61.4	616.7
Big Sagebrush/Perennial Grassland	280.0	420.9	646.9	703.2	2,051.2
Low Sagebrush/Grassland	505.6	511.9	540.9	562.8	2,121.2
Mountain Big Sagebrush/Grassland	3.3	0.2	2.6	6.7	12.8
Sagebrush Shrubland and Steppe	0.8	9.8	38.8	7.9	57.3
Total	1,252.2	1,340.3	1,598.0	1,540.6	5,731.1
Habitat Density Factor	1	0.8	0.4	0.2	--
Mitigation Acreage	1,252.2	1,072.2	639.2	308.1	3,271.7

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative C. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

Table 3.5-30 Land Ownership of Impacted Sagebrush Habitat – Alternative C Transmission Line (acres)

	BLM	USFWS	Private	Total
Project Area Acreage	0.0	0.0	1,820.3	1,820.3
Low Density Acreage	3,057.1	0.0	2,674.0	5,731.1
Total Affected Acreage	3,057.1	0.0	4,294.3	7,551.4
Project Area Mitigation	0.0	0.0	1,585.3	1,585.3
Low Density Mitigation	1,917.4	0.0	1,354.3	3,271.7
Total Mitigation Acreage	1,974.4	0.0	2,939.6	4,857.0

Source: Echanis 2011.

Note: Based upon the application of the *Mitigation Framework* to Alternative C. The acres requiring mitigation were calculated by Harney County (September 2011), based upon the guidelines provided in the *Sage-Grouse Mitigation Framework*.

115-kV Transmission Line Option

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments as described above for Alternative C – North Route. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods, interconnection points, and access requirements would be the same as those described for Alternative C.

PERMANENT AND TEMPORARY EFFECTS

The permanent and temporary effects of this design option to fish and wildlife would similar to Alternative C. The only notable differences between this design option and Alternative C is that this option would not require a second round of construction to upgrade the line to 230-kV, nor would additional equipment upgrades be required at the interconnection station to the HEC 115-kV line near Crane. This option would have less temporary construction related effects on fish and wildlife than Alternative C because workers and equipment would not be operating on site during two separate construction phases, and a second round of construction activity would not cause additional surface disturbance and vegetation damage. Ongoing operations and maintenance activities would be the same as those described for Alternative C, above.

MITIGATION

The same mitigation described above for Alternative C would apply to the 115-kV Transmission Line Option.

3.5.4 Residual Effects after Mitigation

The residual effects from construction of the Proposed Action and Alternatives would include habitat loss, dispersal of wildlife from construction areas, displacement, additional activity of young-of-the-year, and mortalities from vehicle collisions. Residual effects that would last at least as long as the life of the Project (an expected 40 years) would include a reduction in the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species including special status species. Noise and human activities associated with operations would displace individuals throughout the year, and during the spring maintenance vehicles could disrupt breeding of some species. Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use on the Echanis Project site. The residual effects of wind development, transmission lines, and road development on greater sage-grouse might last beyond the Project life, especially when displacement eventually causes loss of certain habitats or even abandonment of leks (Hagen 2011b).

3.5.5 Comparison of Alternatives

A comparison of the Project footprint by habitat for each alternative and the Echanis Project is summarized in Table 3.5-31. Additionally, the ROW easement for each transmission line alternative is shown. The permanent and temporary Project footprint areas are provided, with a range of acres for those habitat categories located in the Echanis Project where the number of turbines proposed varies from 40 to 69. Note that as discussed in the text, the actual displacement of wildlife would occur in an area larger than the Project footprint, but for a distance beyond the footprint that would vary by species, season, habitat, and phase of Project development (construction and operation). The big game species habitat footprint is compared across alternatives and for the Echanis Project during the construction (temporary) and operational (permanent) phases of development (Table 3.5-32). The acreage of the Project footprint is provided, but the actual displacement of big game would extend beyond the footprint to a distance that would vary by species, habitat, season, and development activity, as noted in the text.

A summary of the potential impacts of the Echanis Project and alternative transmission line ROWs is provided in Table 3.5-33.

Table 3.5-31 Summary of the Echanis Project Footprint and Transmission Line ROW Permanent and Temporary Effects by Alternative (acres)

		Alternative B - Transmission							
		West Route (Proposed Action)		South Diamond Lane Route Option		Hog Wallow Route Option		Alternative C – North Route –Transmission (Preferred Alternative)	
Project Component	Echanis Wind Energy Project	Footprint	ROW	Footprint	ROW	Footprint	ROW	Footprint	ROW
Permanent Effects									
Developed	0	0.1	4.2	0.2	17.3	0.1	4.7	0.3	97.7
Agriculture	1.7	2.4	8.1	1.6	36.7	2.7	13.6	2.5	66.9
Grassland	2.9	9.3	218.9	6.1	164.7	7.0	191.7	0.8	18.6
Sagebrush	56.2 - 57.2	12.0	176.1	11.6	174.4	14.3	206.1	38.2	528.5
Aspen	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Juniper Woodlands	20.1	6.4	95.7	6.4	95.7	6.4	95.7	4.0	118.2
Rocky/Barren	0	0.0	2.6	0.0	1.9	0.0	2.0	0.0	0.9
Wetland/Riparian	2.8	0.7	19.1	0.8	22.8	0.7	14.2	0.5	5.0
Open Water	0	0	0.7	0.0	0.7	0.0	0.8	0.0	0.0
Total Permanent Footprint (acres)	91.7 - 92.7	30.9	525.4	26.7	514.2	31.2	528.8	46.3	835.8
Temporary Effects									
Developed	0	0.0	-	0.1	-	0.0	-	0.8	-
Agriculture	0	5.0	-	5.7	-	5.3	-	10.7	-
Grassland	0	17.8	-	12.0	-	17.1	-	5.3	-
Sagebrush	65.6 - 74.5	22.4	-	22.0	-	22.9	-	38.5	-
Aspen	6.4 - 7.0	0.0	-	0.0	-	0.0	-	0.0	-
Juniper Woodlands	0	1.1	-	1.2	-	1.2	-	1.1	-
Rocky/Barren	0	0.0	-	0.0	-	0.0	-	0.0	-
Wetland/Riparian	0	0.3	-	0.4	-	0.3	-	0.0	-
Open Water	0	0.0	-	0.0	-	0.0	-	0.0	-
Total Temporary Footprint (acres)	72.0 - 81.5	46.6	-	41.4	-	46.8	-	56.4	-

Table 3.5-32 Summary of the Direct Effects of the Proposed Transmission Line and the Echanis Project on Big Game Winter Habitat (acres)

	Pronghorn				Mule Deer				Elk				Sheep			
Project Component	Alt B	DL[1]	HW[2]	Alt C	Alt B	DL[1]	HW[2]	Alt C	Alt B	DL[1]	HW[2]	Alt C	Alt B	DL[1]	HW[2]	Alt C
Permanent Effects																
Transmission line poles (314 square feet per pole)	0.6	0.6	0.6	1.3	1.5	1.5	1.5	1.8	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
Interconnection station	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Access Roads:																
Road improvements	*0.0*	*0.0*	*0.0*	*0.0*	*2.4*	*2.4*	*2.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
New access roads	*0.0*	*0.0*	*0.0*	*2.0*	*0.7*	*0.7*	*0.7*	*18.4*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Overland access roads	*4.2*	*1.1*	*4.7*	*7.3*	*14.5*	*10.2*	*14.8*	*11.7*	*4.8*	*4.8*	*4.8*	*4.8*	*0.0*	*0.0*	*0.0*	*0.0*
Total Access Roads	4.2	1.1	4.7	9.3	17.6	13.3	17.9	30.1	4.8	4.8	4.8	4.8	0.0	0.0	0.0	0.0
Echanis Project (effects in common)	0.0	0.0	0.0	0.0	21.9	21.9	21.9	21.9	19.5	19.5	19.5	19.5	7.5	7.5	7.5	7.5
Total Permanent Footprint (acres)	4.8	1.7	5.3	11.3	41.7	37.4	42.0	53.8	24.7	24.7	24.7	24.7	7.5	7.5	7.5	7.5
Temporary Effects																
Transmission line poles (400 square feet per pole)	0.7	0.7	0.7	1.6	1.9	1.9	1.9	2.1	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0
Laydown areas (5 acres per area)	10.0	5.0	10.0	15.0	25.0	20.0	25.0	25.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
Tensioning sites (0.25 acre per site)	1.0	0.0	0.5	4.0	3.5	3.0	3.3	5.5	0.8	0.8	0.8	1.0	0.0	0.0	0.0	0.0
Echanis Project (effects in common)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.5	3.5	3.5	26.4	26.4	26.4	26.4
Total Temporary Footprint (acres)	11.7	5.7	11.2	20.6	30.4	24.9	30.2	32.6	9.8	9.8	9.8	10.0	26.4	26.4	26.4	26.4

[1] Diamond Lane

[2] Hog Wallow

Table 3.5-33 Summary of Effects to Wildlife

		Alternative B			
Alternative A – No Action	Echanis Wind Energy Project	West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route (Preferred Alternative)
	Permanent Effects: Fish Resources Permanent effects from the Echanis Project on fish resources would primarily be associated with access road construction, which would increase sedimentation. Wildlife Resources Facility and road construction would occupy 91.7 to 92.7 acres of wildlife habitat. General Wildlife Permanent site features would directly and indirectly reduce the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species. Bat mortality estimate is from 28 to 234 bat deaths per year. Raptor mortality estimate is from 0 to 22 raptors per year. The location of the turbines away from the cliff-top edge would reduce impacts to ridge-soaring raptors. Bird fatality estimate would be from 24 to 690 bird deaths per year, of which 19 to 538 would be passerines. Big Game Permanent Project footprint loss of mule deer winter range, elk winter range, pronghorn antelope winter range, and bighorn sheep habitat would all be less than one percent of their respective game management units. Special Status Species Permanent effects are likely limited for Preble's shrew, California Wolverines likely would be displaced from the Project Area. Of the ten special status bat species that could occur on-site, the silver-haired bat and hoary bat are the only two that have been documented as fatalities at wind developments (Arnett et al 2007). However, these two species comprise the majority of bat fatalities in the Pacific Northwest. The threshold for bats is an average mortality of 2.56 bats per turbine	Permanent Effects: Fish Resources The Alternative B transmission line would not permanently affect fish resources in the four perennial streams crossed. Wildlife Resources There would be 30.9 acres of habitat permanently lost from construction of Alternative B, New access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats. Big Game The 150-foot wide transmission line ROW would cross 101.7 acres of elk winter habitat, 342.5 acres of mule deer winter range, and 86.9 acres of antelope winter habitat. Special Status Species The permanent effects of Alternative B for Preble's shrew, California wolverine, and northern sagebrush lizard would be qualitatively the same to the effects described for the Echanis Project. Bats are not known to collide with transmission lines, based on mortality surveys, so would be unlikely to have any effect beyond displacement by permanent Project features. Alternative B would result in a very small permanent loss of potential pygmy rabbit habitat. Greater sage-grouse are known to avoid roads and transmission lines, so effects on this species would be limited primarily to displacement by permanent Project features. It is unlikely that Alternative B would have any effect on the Little Kiger lek, since it would be out of direct line-of-sight of the transmission line. The effects to greater sage-grouse from Alternative B would result from habitat fragmentation caused by linear features, as well as mortality from vehicular collisions on overland Project roads, collisions with power lines, and increased predation if raptor abundance increased in response to perch availability on power poles. Increased predation by raptor prey species including ground nesting birds and rodents could result from	Permanent Effects: The South Diamond Lane route option would have the same types of permanent and temporary effects as described for Alternative B, except for the changes noted below. Wildlife Resources There would be 25.7 acres of habitat permanently lost from construction of the South Diamond Lane Route Option. Big Game The 150-foot wide transmission line ROW for would cross 101.7 acres of elk winter habitat, 331.3 acres of mule deer winter range, and 24.2 acres of antelope winter range. Special Status Species Special status waterbirds are prone to collisions with transmission lines, and the South Diamond Lane Route crosses 4.1 miles of the MNWR where mortality would take place potentially affecting the seven species of special status waterbirds. Temporary Effects Construction activities would cause the short-term loss of approximately 41.8 acres of wildlife habitat.	Permanent Effects: Hog Wallow Route Option would have the same types of permanent and temporary affects as Alternative B, except for the changes noted below. Wildlife Resources There would be 31.4 acres of habitat permanently lost from construction of the Hog Wallow Route. Big Game The 150-foot wide transmission line ROW would cross 101.7 acres of elk winter habitat, 345.9 acres of mule deer winter range, and 95.6 acres of antelope winter range. Special Status Species Special status waterbirds are prone to collisions with transmission lines, and the Hog Wallow Route crosses 1.9 miles of the MNWR where mortality would take place potentially affecting the seven species of special status waterbirds Temporary Effects Construction activities would cause the short-term loss of approximately 46.8 acres of wildlife habitat.	Permanent Effects: Alternative C would have the same permanent and temporary types of effects as Alternative B, except for the changes noted below. Wildlife Resources There would be 46.5 acres of habitat permanently lost from construction of Alternative C. Big Game The 150-foot wide transmission line ROW would cross 110.6 acres of elk winter habitat, and 466.1 acres of mule deer winter range, and 370.8 acres of antelope winter range. Special Status Species Alternative C would not cross the MNWR or high-quality waterfowl habitat. Temporary Effects Construction activities would cause the short-term loss of approximately 56.3 acres of wildlife habitat.

Table 3.5-33 Summary of Effects to Wildlife

Alternative A – No Action	Alternative B – Echanis Wind Energy Project	Alternative B – West Route (Proposed Action)	Alternative B – South Diamond Lane Route Option	Alternative B – Hog Wallow Route Option	Alternative C – North Route (Preferred Alternative)
	per year or mortality of 10 bats at any one turbine in a given year. If these thresholds are exceeded, one or more of the adaptive management measures discussed in the ABPP would be initiated, as described in the Mitigation section of this EIS and in the ABPP. Results from post-construction monitoring would be reported to the TAC.– Greater sage-grouse would likely be displaced from their spring, summer, fall and early winter habitats in the Echanis Project Area. Until empirical data are available that quantify the effects of such developments on greater sage-grouse populations, interim guidance from the ODFW is being used to quantify areas of impact of projects on greater sage-grouse (Hagen 2011b). No suitable habitat exists on the Echanis Project site or main access road for the burrowing owl, and no northern goshawks or ferruginous hawks were observed during field surveys. Bald eagles could occur in Project Area. Golden eagles were present at both the Echanis Project site and immediately west of the Echanis Project site, but were mainly observed over canyons and away from ridges where turbines are proposed (NWC 2010c). No raptor nests for any special status species was found within two miles of the Echanis Project site. Effects to eagles and mitigation for them are further discussed in the Project's ABPP/ECP. There is a low likelihood that the six special status passerine species that occur at the site could be affected by collisions with the turbines at the Echanis Project site. It is possible that the Echanis Project could cause a low level of mortality for mountain quail from collision with turbines. Northern sagebrush lizard would be susceptible to crushing by vehicles, so an undetectable level of mortality could occur. Temporary Effects: Construction of the main access road would	potential increased raptor abundance due to landscape fragmentation. The residual impacts to raptors after implementing the APLIC (2006) standards would be negligible because raptor electrocution should not occur, although there would be a minimal possibility of collisions with wires. Overall, there should be no raptor mortalities from power lines. Waterbirds are prone to collisions with transmission lines, and where Alternative B crosses the MNWR where mortality would take place. Seven species of special status waterbirds occur in the Project Area: western least bittern, white-faced ibis, black tern, trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The MNWR is highly valued waterbird habitat and is located along a migratory pathway. Consistency with the requirements of the MBTA would be ensured through creation and implementation of an ABPP/ECP and other measures, as determined by the TAC. Special status passerine and woodpecker species would be displaced from their locations of suitable habitat. If Mountain quail collisions are documented, the BLM and ODFW would review mortality data and discuss whether additional mitigation measures would be required. Temporary Effects Construction activities associated with Alternative B would not directly affect the four perennial fish bearing streams crossed by the transmission line. Approximately 46.6 acres of wildlife habitat would be temporarily affected by construction of Alternative B. Construction activities would displace the more mobile mammals, birds, and reptiles from areas of vegetation and ground disturbance, but the less mobile small mammals and reptiles could be killed from crushing and entombment. The potential for disturbance to avian breeding attempts during construction of the proposed transmission line would likely increase with proximity to nests. Towers and lines would be sited to maximize the distance from identified nests (of raptors) or			

Table 3.5-33 Summary of Effects to Wildlife

Alternative A – No Action	Alternative B – Echanis Wind Energy Project	Alternative B – West Route (Proposed Action)	Alternative B – South Diamond Lane Route Option	Alternative B – Hog Wallow Route Option	Alternative C – North Route (Preferred Alternative)
	temporarily impact fish resources through sedimentation, and a small number of fish could be killed. Construction activities would cause the short-term loss of approximately 72.0 to 81.5 acres of wildlife habitat. Construction would displace wildlife from late spring through fall on the Echanis Project site, and would cause wildlife to disperse into adjacent habitats which would temporarily increase inter- and intra-specific competition. Big game species would disperse from the Project Area during construction; carrying capacity likely would be reduced in the Project vicinity. Special Status Species Preble's Shrews would be displaced from temporary work areas through the short-term. Short-term displacement could occur for California Wolverine. It is not likely that construction would have an adverse impact on bats. Greater sage-grouse would be displaced from their summer brooding range during construction. The main access road to the Echanis Project site is located as close as 1.2 miles to the Little Kiger lek, which is active but without line of sight to the road. Raptor nest and burrowing owl surveys would be conducted prior to construction, and if any nests or occupied owl burrows are encountered then appropriate avoidance would be undertaken in consultation USFWS. Special status passerine and woodpecker species likely would be displaced into adjacent suitable habitat during one summer of construction. Construction is expected to have an undetectable effect on Mountain Quail. Northern sagebrush lizard would be susceptible to crushing during construction activities in sagebrush habitat on the Echanis Project site.	nesting colonies (of wading birds, waterfowl, or gulls). Big Game Temporary effects on big game would include disturbance by heavy equipment operation the presence of large numbers of construction workers, causing temporary displacement from areas around the Project. Because construction would not occur during winter months, an undetectable effect from loss of habitat in winter range would occur. Special Status Species The temporary effects of Alternative B for Preble's shrew, California wolverine, bats, raptors, waterfowl and shorebirds, mountain quail, and northern sagebrush lizard would be qualitatively the same as the temporary effects of the Echanis Project. Pygmy rabbits present in the areas of construction would predominantly be able to disperse into adjacent habitat to avoid harm. There is possibility that some individuals could be killed from collisions with vehicles. Greater sage-grouse would likely expend more energy avoiding construction areas through one brood-rearing season, and would disperse into adjacent suitable habitats. As noted previously, the Little Kiger lek is located within 2 miles of the alignment of Alternative B. Monitoring has shown that the lek is active, therefore construction would not be allowed during the March 15 to May 1 time period.			