3.6 WILDLIFE

This section summarizes results of the extensive wildlife studies that have been done to characterize the existing wildlife present at the Project site and estimate potential impacts to wildlife from construction and operation of the Project. The complete results of the wildlife studies and all accompanying maps and figures are presented in Exhibit 14, 'Wildlife Baseline Study'.

The Applicant has contracted with Western Ecosystems Technology, Inc. (WEST) to develop and implement a survey protocol for a baseline study of wildlife and habitat in the Project area. The protocol for the ecological baseline study is similar to protocols used at the Kittitas Valley, Desert Claim, Vansycle, Klondike, Stateline, Maiden, Condon and Nine Canyon wind projects in Washington and Oregon, the Buffalo Ridge wind project in Minnesota, and the Foote Creek Rim wind project in Wyoming.

This section summarizes the results of a full year of ecological baseline studies conducted from May 10, 2002 through May 22, 2003. The wildlife portion of the ecological baseline study consisted of 1) point count and in-transit surveys for wildlife species, 2) an aerial survey within approximately two miles of the project boundary for visible raptor nests and wintering big game in the spring of 2003 and 3) aerial and ground surveys during the breeding season for sage grouse in the Project vicinity. Rare plant surveys and habitat mapping were also conducted and those results have been summarized in a separate report (Lack et al. 2003). The recent synthesis of baseline and operational monitoring studies at wind developments by Erickson et al. (2002), as well as other relevant information has been reviewed and has been utilized for predicting impacts from the Project. Agency personnel were contacted for information regarding their concerns and data available on wildlife of the general Project area.

Consultation with local, regional and central office personnel of WDFW was initiated in early 2003 for the proposed Project. Project consultants and WDFW met in March 2003 to discuss protocol components for the spring 2003 studies. Representatives of the Applicant, project consultants, and WDFW met in Ellensburg on May 25, 2003 to discuss the Project, including preliminary results of the studies and mitigation strategies. Information on sensitive plant and wildlife species within the vicinity of the Project was requested and received from the U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), and the Washington Natural Heritage Program (WNHP). Personnel from WDFW, WEST and the Applicant made a field visit to the site on September 25, 2003.

3.6.1 Existing Wildlife Conditions

The ecological and current habitat conditions of the Project area are described in detail in Section 3.4, 'Vegetation and Wetlands' and thus are not repeated here.

3.6.1.1 Baseline Study Methodology

Avian Use Surveys

The goal of the avian use surveys was to estimate the temporal and spatial use of the study area by birds. The avian use surveys combined observations collected at seven fixed-point circular plots in the study area with in-transit observations of birds made while driving to and from the study areas (Figure 3.6.1-1). All wildlife species of concern and uncommon species observed were recorded while the observers were in the study area traveling between observation points and while conducting other field activities. An experienced wildlife and avian biologist, Jay Jeffrey of WEST Inc., conducted the avian surveys. A total of 179 30-minute point count surveys were conducted in the Project area between May 10, 2002 and May 22, 2003. The avian use surveys meet the specifications contained in the WDFW Wind Power Guidelines for the conduct of general avian use surveys for the project.

Fixed-point Surveys:

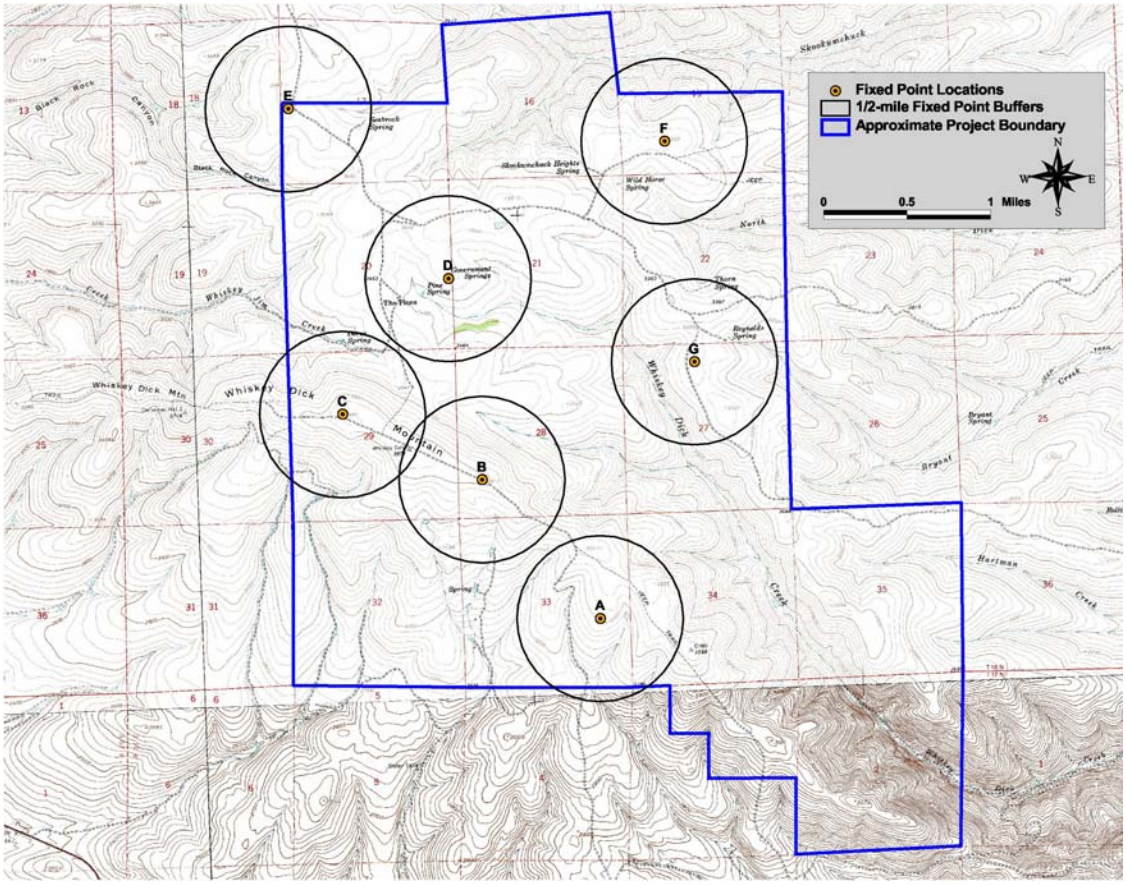
Each plot consists of an 800-m radius circle centered on an observation point location (Figure 3.6.1-1). Landmarks were located to aid in identifying the 800 meter boundary of each observation point. Observations of birds beyond the 800 meter radius were recorded, but these observations were not included in standardized use estimates.

All detections of birds, mammals, reptiles, and amphibians in and near plots during the 30-minute plot surveys were recorded. Visual and binocular scanning of the entire plot viewshed and beyond were continuously performed throughout the survey period. A unique observation number was assigned to each sighting. The following data were recorded for each plot survey: date, start and end time of observation period, plot ID, species or best possible identification, number of individuals, sex and age class when known, distance from plot center when first observed, closest distance, altitude above ground (first, low and high), flight direction, behavior(s), habitat(s), whether observed during one or more of the three instantaneous counts, and in which of the three ten minute periods it was observed. Flight paths were mapped for raptors and species of concern and given corresponding observation numbers. The map indicates whether the bird was within or outside the survey radius based on reference points at known distances from the plot center. Flight paths were digitized using ARCVIEW 3.2. Climate information, such as temperature, wind speed, wind direction, precipitation and cloud cover were also recorded for each point count survey.

Incidental/In-transit Observations:

All wildlife species of concern and uncommon species observed while field observers were traveling between plots were recorded on incidental/in-transit data sheets. Other incidental observations made during other surveys or visits to the sites were also recorded. These observations were recorded in a similar fashion to those recorded during the plot studies. The observation number, date, time, species, number, sex/age class, height above ground, and habitat were recorded.

Figure 3.6.1-1. Location of avian observation stations



Observation Schedule:
Surveys were conducted typically on weekly intervals during the spring, early summer and fall, and occasionally during the winter months, due to restricted site access. During a set of surveys, each selected plot was visited once. A pre-established schedule was developed prior to field work to ensure that each station was surveyed about the same number of times each period of the day, during each season, and to most efficiently utilize personnel time. The schedule was altered in response to adverse weather conditions, which required delays and/or rescheduling of observations.

Statistical Analysis:

Avian Use:
Species lists were generated by season including all observations of birds detected regardless of their distance from the observer. The number of birds seen during each point count survey was standardized to a unit area and unit time surveyed. The standardized unit time was 30 minutes and the standardized unit area was 0.78 square miles (2.01 square kilometers) with a 2,625 foot (800 meter) radius viewshed for each

station. For example, if four raptors were seen during the 30 minutes at a point with a viewing area of 0.78 mi^2 (2.01 km^2), these data may be standardized to 4/0.78 = 5.13 raptors/mi^2 (1.98 raptors/km^2) in a 30-minute survey. For the standardized avian use estimates, only observations of birds detected within 2,625 ft (800m) of the observer were used. Estimates of avian use (expressed in terms of number of birds/plot/30-minute survey) were used to compare differences in avian use between 1) avian groups and 2) seasons.

Avian Diversity and Richness:
The total number of unique species was calculated by season. The mean number of species observed per survey (i.e., per station per 30-minute survey) was tabulated to illustrate and compare differences in mean number of species per survey between seasons.

Avian Flight Height/Behavior:
The first flight height recorded was used to estimate percentages of birds flying below, within and above the rotor swept area (RSA). The zone of collision risk we used was 82-328 ft (25-100 m) above ground level (AGL).

Avian Exposure Index:
A relative index to collision exposure (R) was calculated for bird species observed during the fixed-point surveys using the following formula:

$$R = A*Pf*Pt$$

Where A = mean relative use for species i (observations within 2,625 ft (800 m) of observer) averaged across all surveys, Pf = proportion of all observations of species i where activity was recorded as flying (an index to the approximate percentage of time species i spends flying during the daylight period), and Pt = proportion of all flight height observations of species i within the rotor-swept area (RSA). This index does not account for differences in behavior other than flight characteristics (i.e., flight heights and percent of birds observed flying).

Data Compilation and Storage:
A Microsoft® ACCESS database was developed to store, organize and retrieve field observation data. Data from field forms were keyed into electronic data files using a pre-defined format to facilitate subsequent QA/QC and data analysis. All field data forms, field notebooks, and electronic data files were retained for reference.

Quality Assurance/Quality Control (QA/QC):
QA/QC measures were implemented at all stages of the study, field surveys, data entry, and during data analysis and report writing. At the end of each survey day, each observer was responsible for inspecting his or her data forms for completeness, accuracy, and legibility. Periodically data forms were reviewed to ensure completeness and legibility; any problems detected were corrected. Any changes made to the data forms were initialed and dated by the individual making the change.
A sample of records from the electronic files was compared to the raw data forms and any errors found were corrected. Any irregular codes detected, or any data suspected as

questionable, was discussed with the observer and study team leader. All changes made to the raw data were documented for future reference. Any errors or suspect data identified in later stages of analysis were traced back to the raw data forms, and appropriate changes in all steps made.

Raptor Nest Survey

Searches were conducted for raptor, raven and American crow nests within the Project area and a two-mile buffer, an area totaling approximately 49 mi^2 (127km^2) (Exhibit 14, Figure 6). Surveys were conducted from a helicopter with one observer on April 14, 2003. Search paths were recorded with a handheld Global Positioning System (GPS) at five second intervals. In addition to raptor nests, researchers also recorded observations of big game and searched for sage grouse (leks and flushed birds). The raptor nest survey protocol exceeds the minimum recommended protocol in the WDFW Wind Power Guidelines.[1] Flight paths totaled 290 miles (467km) in length, of which 95 miles (153km) were conducted during sage grouse lek surveys (Exhibit 14, Figure 6). The helicopter was kept at an elevation of approximately 250 ft (76m) above the ground during sage grouse lek surveys.

Raptor nest surveys were scheduled after most species of raptor finished courtship and were incubating eggs or brooding young. Surveys were also scheduled just prior to the onset of leaf out to increase the visibility of raptor nests within deciduous habitats. Nest searches were conducted by searching habitat suitable for most above ground nesting species, such as cottonwood, ponderosa pine, tall shrubs, and cliffs or rocky outcrops. The helicopter was flown at an altitude of tree top level to approximately 250' (76m) above the ground during surveys. If a nest was observed the helicopter was moved to a position where nest status and species present could be determined. Efforts were made to minimize disturbance to breeding raptors, including keeping the helicopter a maximum distance from the nest at which the species could be identified. Those distances varied depending upon nest location and wind conditions. Data recorded for each nest location included species occupying the nest, nest status (inactive, bird incubating, young present, eggs present, adult present, unknown or other), nest substrate (pine, oak, cottonwood, juniper, shrub, rocky outcrop, cliff or power line), number of young present, time and date of observation and the nest location (recorded with a handheld GPS). Mule deer and elk locations were also recorded while conducting sage grouse lek and raptor nest surveys.

Sage Grouse Survey

The objective of the sage grouse surveys was to investigate the likelihood of presence of breeding sage grouse within the Project vicinity. This survey of a state sensitive species ("Threatened") is consistent with recommendations for pre-project surveys of

[1] WDFW Guidelines, August 2003 "At a minimum, one raptor nest survey during breeding season within 1-mile of the project site should be conducted to determine the location and species of active nests potentially disturbed by construction activities, and to identify active and potentially active nest sites with the highest likelihood of impacts from the operation of the wind plant. A larger survey area (e.g., a 2-mile buffer) is recommended if there is some likelihood of the occurrence of nesting state and/or federally threatened and endangered raptor species (e.g., ferruginous hawk, bald eagle, golden eagle)..."

Threatened, Endangered and Sensitive Status Wildlife in the WDFW Guidelines[2]. Surveys for breeding season sage grouse presence, including leks, included two helicopter surveys (March 20 and April 14, 2003) and 3 ground surveys (March 13, March 22, April 2, 2003). Surveys for sage grouse leks focused on relatively flat areas of sagebrush and steep canyons were avoided. Sage grouse surveys were conducted from 0600 – 0830 hours. Approximately 95 linear miles (153km) were flown for each aerial sage grouse survey. The helicopter was kept at an elevation of approximately 250' (76m) above the ground. Ground surveys focused on areas of historic observations and other relatively flat areas.

Big Game Survey
Big game surveys were done in conjunction with the avian use and raptor nest surveys. Standardized observations of big game were recorded during the fixed point surveys. Observations of big game were recorded and mapped during the raptor nest survey on April 14, 2003.

3.6.1.2 Wildlife Study Results

Field work (all survey types) was conducted on the Project site between May 10, 2002 through May 22, 2003. A total of 53 species were identified during the avian point count surveys, sage grouse surveys, in-transit travel, and incidentally while conducting other field tasks at the Project (Table 3.6.1-1).

Avian Use and Frequency
A total of 50 species were observed during the fixed-point surveys at the Project site. The mean number of species observed per survey (30-minute point count) was 2.43. The mean number of species was highest in the spring/summer and lowest during the fall and winter. The passerine diversity was relatively low for the Project, likely due to the low diversity of habitats associated with the point counts (Table 3.6.1-2).

A total of 1,332 individual bird detections within 512 separate groups were recorded during the fixed-point surveys. Cumulatively, three passerines and a corvid, (horned larks, snow bunting, European starling and common raven) comprised approximately 53% of the observations. All other species comprised less than 5% of the observations individually.

Passerines:
Passerines were the most abundant avian group observed during all seasons. Passerines showed higher abundance in spring/summer (7.244) compared to fall and winter (4.796 and 4.449, respectively, Figure 3.6.1-2). The moderate winter use was primarily due to several large flocks of snow buntings (140 individuals). Passerines made up approximately 74% or more of the avian use in all seasons. Passerines were observed

[2] WDFW Guidelines, August 2003: "If existing information suggests the probable occurrence of state and/or federal threatened or endangered or sensitive-status species on the project site at a level of concern, focused surveys are recommended during the appropriate season to determine the presence or likelihood of presence of the species."

during 90.11% of the surveys in the spring/summer, 58.16% in the fall and 33.16% in the winter.

Raptors:
Raptor use was second highest to passerines in the spring/summer (0.679) and third to passerines and corvids, in the fall (0.456) and winter (0.204). Raptor use decreased from spring/summer to fall and more from fall and winter with American kestrels, red-tailed hawks and golden eagles the most abundant species (Figure 3.6.1-2). In all seasons, raptors made up less than eight percent of the avian use, and were observed in 43.77% of the spring/summer surveys, 31.29% in the fall and 16.33% of the winter surveys.

Corvids:
Corvid use was similar in all seasons, and consisted of several groups of common ravens.

Waterfowl:
The only waterfowl use occurred in the spring/summer, and consisted of one group of Canada geese. Low use is anticipated at this project site due to the lack of foraging and roosting habitat.

Flight Height Characteristics
At least 10 groups of flying birds were observed for seven species during the fixed-point surveys. Of these species, golden eagle (53.8%), common raven (50.0%) and red-tailed hawk (42.9%) were most often observed within the RSA. Common passerines including horned lark (12.8%) and mountain bluebird (9.8%) were not often observed within the RSA.

Overall, 36.0% of the birds observed were recorded within the defined RSA, 63.3% were below the RSA, and 0.7% were flying above the RSA. As a group, raptors had the third highest percentage of observations within the RSA (36.5%) behind waterbirds and corvids. Raptor subgroups observed above this mean percent within the RSA included eagles (57.1%; mostly golden eagles), buteos (44.4%) and large falcons (40.0%). The majority of all groups were observed below the RSA except waterbirds, which were most often observed within the RSA (88.9%; all ring-billed gulls).

Table 3.6.1-1: List of avian species observed during fixed-point, in-transit and sage grouse surveys on the Wild Horse Project site.

Species/Group	Scientific Name	Species/Group	Scientific Name
Canada goose	*Branta canadensis*	northern shrike	*Lanius excubitor*
ring-billed gull	*Larus delawarensis*	rock wren	*Salpinctes obsoletus*
killdeer	*Charadrius vociferus*	ruby-crowned kinglet	*Regulus calendula*
American kestrel	*Falco sparverius*	sage sparrow	*Amphispiza belli*
Bald eagle	*Haliaeetus leucocephalus*	sage thrasher	*Oreoscoptes montanus*
Cooper's hawk	*Accipiter cooperii*	Say's phoebe	*Sayornis saya*
golden eagle	*Aquila chrysaetos*	snow bunting	*Plectrophenax nivalis*
gyrfalcon	*Falco rusticolus*	spotted towhee	*Pipilo maculatus*

Table 3.6.1-1: List of avian species observed during fixed-point, in-transit and sage grouse surveys on the Wild Horse Project site.

Species/Group	Scientific Name	Species/Group	Scientific Name
merlin	*Falco columbarius*	Swainson's thrush	*Catharus ustulatus*
northern goshawk	*Accipiter gentilis*	Townsend's warbler	*Dendroica townsendi*
northern harrier	*Circus cyaneus*	vesper sparrow	*Pooecetes gramineus*
prairie falcon	*Falco mexicanus*	violet-green swallow	*Tachycineta thalassina*
red-tailed hawk	*Buteo jamaicensis*	western bluebird	*Sialia mexicana*
rough-legged hawk	*Buteo lagopus*	western kingbird	*Tyrannus verticalis*
sharp-shinned hawk	*Accipter striatus*	western meadowlark	*Sturnella neglecta*
turkey vulture	*Cathartes aura*	white-crowned sparrow	*Zonotrichia leucophrys*
black-billed magpie	*Pica pica*	yellow-rumped warbler	*Dendroica coronata*
common raven	*Corvus corax*	California quail	*Callipepla californica*
American pipit	*Anthus rubescens*	chukar	*Alectoris chukar*
American robin	*Turdus migratorius*	gray partridge	*Perdix perdix*
Brewer's blackbird	*Euphagus cyanocephalus*	sage grouse[a]	*Centrocercus urophasianus*
Brewer's sparrow	*Spizella breweri*	mourning dove	*Zenaida macroura*
Bullock's oriole	*Icterus bullockii*	common nighthawk	*Chordeiles minor*
Dark-eyed junco	*Junco hyemalis*	northern flicker	*Colaptes auratus*
European starling	*Sturnus vulgaris*	unidentified gull	
gray-crowned rosy finch	*Leucosticte arctoa*	unidentified buteo	
horned lark	*Eremophila alpestris*	unidentified falcon	
loggerhead shrike	*Lanius ludovicianus*	unidentified empidonax	
mountain bluebird	*Sialia currucoides*	unidentified hummingbird	

[a] *pellets only*

Table 3.6.1-2: Avian species observed while conducting fixed-point surveys (May 10, 2002 – May 22, 2003) on the Project Site.

	Spring/ Summer		Fall		Winter		Grand Total	
Species/Group	#obs.	#groups	#obs.	#groups	#obs.	#groups	# obs.	#groups
Waterfowl								
Canada goose	32	1	0	0	0	0	32	1
Waterbird								
ring-billed gull	8	1	0	0	0	0	8	1
unidentified gull	0	0	1	1	0	0	1	1
Subtotal	8	1	1	1	0	0	9	2
Shorebirds								
killdeer	13	9	0	0	0	0	13	9
Raptors								
Accipiters								
northern goshawk	0	0	0	0	2	2	2	2
sharp-shinned hawk	0	0	2	2	0	0	2	2
Subtotal	0	0	2	2	2	2	4	4
Buteos								
red-tailed hawk	12	12	4	4	0	0	16	16
rough-legged hawk	1	1	1	1	2	2	4	4
unidentified buteo	0	0	1	1	0	0	1	1
Subtotal	13	13	6	6	2	2	21	21
Eagles								
bald eagle	0	0	0	0	1	1	1	1
golden eagle	3	3	7	7	5	5	15	15
Subtotal	3	3	7	7	6	6	16	16
Falcons								
American kestrel	34	31	1	1	0	0	35	32
merlin	1	1	1	1	0	0	2	2
prairie falcon	4	4	1	1	0	0	5	5
unidentified falcon	1	1	0	0	0	0	1	1
Subtotal	40	37	3	3	0	0	43	40
northern harrier	4	4	5	5	2	2	11	11
Raptor Subtotal	60	57	23	23	12	12	95	92
Corvids								
black-billed magpie	18	9	0	0	2	2	20	11
common raven	32	26	33	19	22	15	87	60
Subtotal	50	35	33	19	24	17	107	71
Passerines								
American pipit	0	0	7	1	0	0	7	1

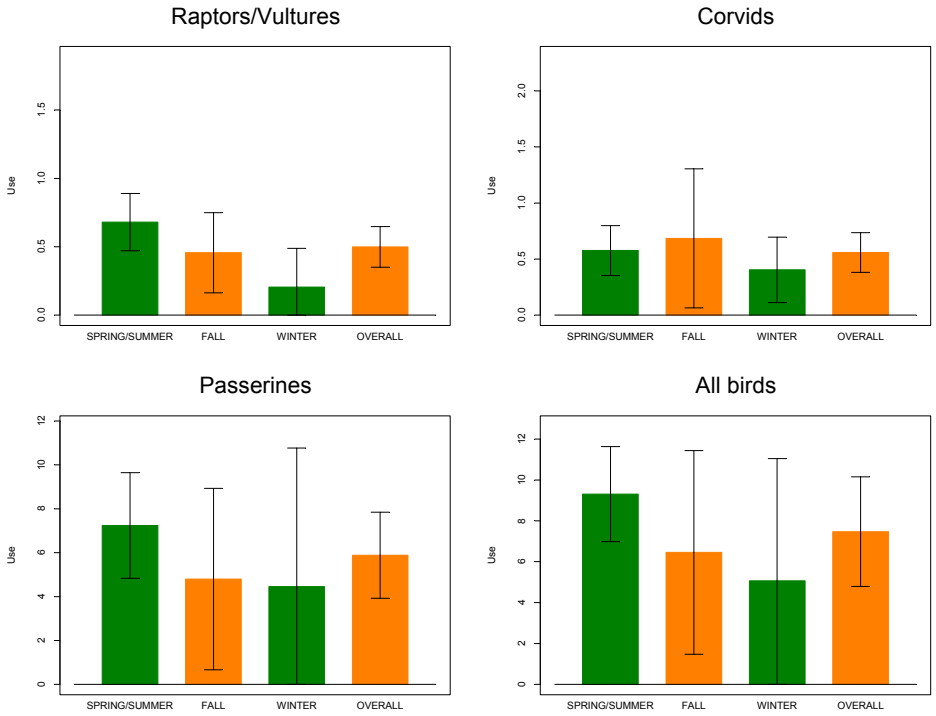
Table 3.6.1-2: Avian species observed while conducting fixed-point surveys (May 10, 2002 – May 22, 2003) on the Project Site.

	Spring/ Summer		Fall		Winter		Grand Total	
Species/Group	#obs.	#groups	#obs.	#groups	#obs.	#groups	# obs.	#groups
American robin	21	11	38	3	0	0	59	14
Brewer's blackbird	6	1	0	0	0	0	6	1
Brewer's sparrow	35	22	0	0	0	0	35	22
Bullock's oriole	1	1	0	0	0	0	1	1
dark-eyed junco	0	0	6	1	0	0	6	1
European starling	99	5	0	0	0	0	99	5
gray-crowned rosy finch	0	0	29	2	15	2	44	4
horned lark	271	94	73	14	31	6	375	114
loggerhead shrike	4	3	0	0	0	0	4	3
mountain bluebird	16	8	44	9	0	0	60	17
northern shrike	0	0	1	1	5	4	6	5
rock wren	0	0	1	1	0	0	1	1
ruby-crowned kinglet	1	1	0	0	0	0	1	1
sage sparrow	12	8	0	0	0	0	12	8
sage thrasher	42	41	1	1	0	0	43	42
Say's phoebe	0	0	1	1	0	0	1	1
snow bunting	0	0	1	1	140	4	141	5
spotted towhee	2	2	0	0	0	0	2	2
Townsend's warbler	1	1	0	0	0	0	1	1
unidentified empidonax	0	0	1	1	0	0	1	1
vesper sparrow	56	33	1	1	0	0	57	34
violet-green swallow	2	2	0	0	0	0	2	2
western bluebird	0	0	6	1	0	0	6	1
western kingbird	1	1	0	0	0	0	1	1
western meadowlark	48	27	7	2	0	0	55	29
yellow-rumped warbler	3	1	4	1	0	0	7	2
Subtotal	622	263	221	41	191	16	1034	320
Upland Gamebirds								
California quail	1	1	0	0	0	0	1	1
chukar	2	1	0	0	0	0	2	1
gray partridge	0	0	21	1	0	0	21	1
Subtotal	3	2	21	1	0	0	24	3
Doves								
mourning dove	1	1	0	0	0	0	1	1
Other Birds								
common nighthawk	2	2	0	0	0	0	2	2
northern flicker	13	9	1	1	0	0	14	10
unidentified hummingbird	1	1	0	0	0	0	1	1

Table 3.6.1-2: Avian species observed while conducting fixed-point surveys (May 10, 2002 – May 22, 2003) on the Project Site.

	Spring/ Summer		Fall		Winter		Grand Total	
Species/Group	#obs.	#groups	#obs.	#groups	#obs.	#groups	# obs.	#groups
Subtotal	16	12	1	1	0	0	17	13
Grand Total	805	381	300	86	227	45	1332	512

Figure 3.6.1-1 Avian use by major bird group



Relative Exposure Index

Relative exposure indices (use multiplied by proportion of observations where bird flew within the rotor swept area) were calculated by species (Table 3.6.1-3). This index is only based on flight height observations and relative abundance and does not account for other possible factors such as foraging behavior. Small bird species with the highest exposure indexes were snow bunting, European starling and gray-crowned rosy finch. Due to high use estimates, horned lark had the highest exposure index at the Stateline, Nine Canyon and Foote Creek Rim wind plants, and has been the most commonly observed fatality at those operating projects. The large bird species with the highest exposure index was common raven, followed by American kestrel, and ring-billed gull. Mortality studies at other wind projects have indicated that although ravens are often observed at wind projects within the zone of risk, they appear to be less susceptible to collision with wind turbines than other similar size birds (e.g., raptors, waterfowl).

Spatial Use of the Project Area

No large differences for use are apparent other than the higher use at station D from the large flocks of snow buntings, European starlings and Canadian geese observed (Exhibit 14, Figure 9). Passerine use by station shows the same pattern as all birds (Exhibit 14, Figure 10). Raptor use by station ranged from 0.1 to 0.8, indicating relatively similar spatial use of the Project area (Exhibit 14, Figure 11). Station F had the lowest raptor use. Station E, located to the northeast of the Project area, had moderate raptor use compared to the other stations.

Table 3.6.1-3: Mean exposure indices calculated by species observed during fixed-point surveys at the Project site.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
snow bunting	0.873	100.00	60.99	0.532
European starling	0.541	100.00	72.73	0.394
common raven	0.448	80.46	50.00	0.180
gray-crowned rosy finch	0.245	100.00	68.18	0.167
horned lark	2.119	58.13	12.84	0.158
American kestrel	0.193	88.57	32.26	0.055
American pipit	0.043	100.00	100.00	0.043
ring-billed gull	0.042	100.00	100.00	0.042
golden eagle	0.075	86.67	53.85	0.035
red-tailed hawk	0.085	87.50	42.86	0.032
mountain bluebird	0.318	68.33	9.76	0.021
common nighthawk	0.012	100.00	100.00	0.012
western meadowlark	0.310	12.73	28.57	0.011
prairie falcon	0.027	100.00	40.00	0.011
rough-legged hawk	0.021	100.00	50.00	0.011
northern harrier	0.055	100.00	18.18	0.010
killdeer	0.071	69.23	11.11	0.005
northern goshawk	0.011	100.00	50.00	0.005
bald eagle	0.005	100.00	100.00	0.005
vesper sparrow	0.325	5.26	0.00	0.000
American robin	0.325	81.36	0.00	0.000
sage thrasher	0.249	2.33	0.00	0.000
Brewer's sparrow	0.200	0.00	N/A	N/A
Canada goose	0.169	0.00	N/A	N/A
gray partridge	0.130	0.00	N/A	N/A
black-billed magpie	0.111	90.00	0.00	0.000
northern flicker	0.075	42.86	0.00	0.000
sage sparrow	0.073	8.33	0.00	0.000
Brewer's blackbird	0.037	100.00	0.00	0.000
yellow-rumped warbler	0.037	100.00	0.00	0.000
dark-eyed junco	0.032	100.00	0.00	0.000
northern shrike	0.032	50.00	0.00	0.000
western bluebird	0.032	100.00	0.00	0.000
loggerhead shrike	0.023	75.00	0.00	0.000
spotted towhee	0.018	0.00	N/A	N/A
violet-green swallow	0.011	100.00	0.00	0.000
merlin	0.011	100.00	0.00	0.000

Table 3.6.1-3: Mean exposure indices calculated by species observed during fixed-point surveys at the Project site.

Species/Group	Overall Mean Use	% Flying	% Flying within RSA	Exposure Index
sharp-shinned hawk	0.011	100.00	0.00	0.000
chukar	0.011	0.00	N/A	N/A
Say's phoebe	0.006	100.00	0.00	0.000
ruby-crowned kinglet	0.006	100.00	0.00	0.000
western kingbird	0.006	100.00	0.00	0.000
Bullock's oriole	0.005	100.00	0.00	0.000
Townsend's warbler	0.005	100.00	0.00	0.000
mourning dove	0.005	100.00	0.00	0.000
unidentified hummingbird	0.005	100.00	0.00	0.000
rock wren	0.006	0.00	N/A	N/A
California quail	0.005	0.00	N/A	N/A
unidentified empidonax	0.005	0.00	N/A	N/A
unidentified falcon	0.005	0.00	N/A	N/A
unidentified gull	N/A	100.00	0.00	N/A
unidentified buteo	N/A	0.00	N/A	N/A

Flight paths for large birds are found in Exhibit 14, Figures 12-15. A few spatial patterns of raptor use appear to exist. The ridge along Whiskey Dick Creek near station G is effectively perpendicular to prevailing winds. There appears to be a pattern of raptor flight paths flying parallel to the western side of the ridge, which is consistent with behavior observed in similar situations. The one bald eagle observed was flying along the Whiskey Dick drainage (Exhibit 14, Figure 13). There appears to be little pattern in the flight paths in the areas of the Project with less topographic relief, such as near station D and E. The raptor flight paths near station C at the highest point of the Project sometimes follow the main Whiskey Dick Mountain ridgeline and other times cross the ridgeline. The main ridgeline in this case is not perpendicular to the prevailing wind direction, likely affecting patterns of use in this area. The turbine arrangement near station C with gaps along the ridgeline may pose less collision risk for raptors compared to a long string of turbines along this ridgeline with no gaps based on these patterns of use. Most prominent saddles along the Whiskey Dick Mountain Ridge, which may have higher bird use, do not contain turbine locations. American kestrel observations did not show distinctive patterns in use of topography, but did appear more abundant near Station E, the one station where no turbines are proposed.

Raptor Nests

The majority of the study area is dominated by sagebrush habitats ranging from flat to steeply sloping draws. Raptor nesting habitat within these canyons includes relatively tall shrubs, widely scattered cliffs and rock outcrops, and occasional patches of ponderosa pine with some intermixed aspen and/or cottonwood. A few patches of ponderosa pine are also present on the north end of the search area. Overall, habitat for above ground nesting raptors is very limited within the search area.

A total of 23 nests were found during surveys, 11 of which showed no signs of raptor activity (Table 3.6.1-4). Species observed with active nests include red-tailed hawk, American crow and common raven. One great-horned owl was observed flying from a tree with a nest structure, but relatively dense branches prevented a good view of the nest. The status of the great-horned owl nest is considered unknown. One adult prairie falcon was observed perched on a cliff face and may have an unobserved nest within a pothole or cavity. One inactive nest was located in an area described as a historic golden eagle nest within the northern portion of the search area. No active golden eagle nests were found.

Table 3.6.1-4. Raptor and other nests observed within the two-mile search buffer of the Project.

Species	**Number of Nests**	**Nest Substrate**				
		Cottonwood	*Shrub*	*Pine*	*Radio Tower*	*Rock or Cliff*
Red-tailed Hawk	6	2	0	2	0	2
Great-horned Owl	1	1	0	0	0	0
Prairie Falcon	1	0	0	0	0	1
American Crow	3	1	0	0	0	2
Common Raven	1	0	0	0	1	0
Inactive	11	5	1	2	0	3
Total	**23**	**9**	**1**	**4**	**1**	**8**

Sage Grouse Surveys

No sage grouse observations (leks or flushed birds) were observed during any of the sage grouse surveys or during other activities.

Big Game Survey

Mule deer (Odocoileus hemionus) were commonly observed near points E, F and G. Observations of 3-11 individuals were commonly observed in the spring/summer, with 6 or fewer individuals observed throughout the winter and fall for each observation. Elk (Cervis elaphus) were observed in groups of 7-26 individuals near the northern points (A, D, F and G) during the spring/summer and winter surveys, with no observations made in the fall period.

Observations of 331 mule deer within 27 groups were recorded during the raptor nest survey. In addition, 129 elk observations within 17 groups were observed. Density from this survey is approximately 7 deer per square mile and 3 elk per square mile based on this one survey. Big game likely move between the survey area, the state wildlife areas to the east, private range and agricultural lands to the west and south, and the forested lands to the north of the Project.

Other Wildlife Observations

Reptiles and Amphibians:

The only reptiles observed during the field studies were short-horned lizards (Phrynosoma douglassii).

Other Mammals:
Townsend's ground squirrels[3] (Spermophilus townsendii nancyae) were seen regularly within the Project site but most commonly around Station B. Coyotes (Canis latrans) were observed on a regular basis, and white and black-tailed jackrabbits were observed in a few locations.

3.6.2 Impacts of the Proposed Action

3.6.2.1 Potential Wildlife Impacts

Bats
The potential for bats to occur is based on key habitat elements such as food sources, water, and roost sites. Potential roost structures such as trees are in general are limited within the Project to "the Pines" area near Government Springs and within the riparian corridors along Whiskey Dick and Skookumchuck Creeks. The various springs within the Project area may be used as foraging and watering areas. Little is known about bat species distribution, but several species of bats could occur in the Project area based on the Washington GAP project and inventories conducted on the Hanford Site, Arid Lands Ecology Reserve (ALE) located in Benton County to the south and east (Table 3.6.2-1).

Table 3.6.2-1. Bat species of potential occurrence in the Project area

Common Name Scientific Name	Typical Habitat	Expected Occurrence in Project Area	Occurrence Documentation
California bat *Myotis californicus*	Generally found in open habitats where it forages along tree edges, riparian areas, open water; roosts in cliffs, caves, trees	Possible; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; Fitzner and Gray, 1991
small-footed myotis *Myotis ciliolabrum*	Varied arid grass/shrublands, ponderosa pine and mixed forests; roosts in crevices and cliffs; hibernates in caves, mines	Possible; documented on ALE	WA GAP Analysis Project, 1999; England ,2000; West et al., 1998, 1999

[3] There is some confusion over taxonomic status (Derek Stinson, pers. comm.) Referred to as Piute's in Wilson and Ruff (1999) and Townsend's in Yentsen and Sherman (2003).

Table 3.6.2-1. Bat species of potential occurrence in the Project area			
Common Name Scientific Name	**Typical Habitat**	**Expected Occurrence in Project Area**	**Occurrence Documentation**
long-eared myotis *Myotis evotis*	Primarily forested habitats and edges, juniper woodland, mixed conifers, riparian areas; roosts snags, crevices, bridges, buildings, mines	Unlikely due to habitat; not documented on ALE	WA GAP Analysis Project, 1999; England, 2000; TNC, 1999
little brown bat *Myotis lucifugus*	Closely associated with water; riparian corridors; roosts buildings, caves, hollow trees; hibernates in caves	Possible; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999
fringed myotis *Myotis thysanodes*	Primarily forested or riparian habitats; roosts buildings, trees; hibernates in mines and caves	Possible in suitable habitat; not documented on ALE	WA GAP Analysis Project, 1999; England, 2000; TNC, 1999
long-legged myotis *Myotis volans*	Coniferous and mixed forests, riparian areas; roosts caves, crevices, buildings, mines	Possible in suitable habitat; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; Fitzner and Gray, 1991
yuma myotis *Myotis ymanensis*	Closely associated with water; varied habitats: riparian, shrublands, forests woodlands; roosts in mines, buildings, caves, bridges	Possible; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999
hoary bat *Lasiurus cinereus*	Forested habitats, closely associated with trees; roosts in trees; migratory species	Possible in suitable habitat; probable migrant; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999
silver-haired bat *Lasionycteris noctivagans*	Forested habitats; generally coniferous forests; roosts under bark; believed to be a migratory species	Possible in suitable habitat; probable migrant; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999

Table 3.6.2-1. Bat species of potential occurrence in the Project area			
Common Name Scientific Name	**Typical Habitat**	**Expected Occurrence in Project Area**	**Occurrence Documentation**
western pipistrelle *Pipistrellus hesperus*	Primarily desert lowlands; desert shrublands; canyons; roosts under rocks, crevices and possibly in sagebrush	Possible; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999
big brown bat *Eptesicus fuscus*	Generally deciduous forests; buildings; roosts in buildings, trees, crevices; hibernates in caves, mines	Possible; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999
spotted bat *Euderma maculatum*	Varied habitat—pine forests to desert scrub with nearby cliffs; roosts in crevices, cliff faces	Unlikely due to rarity; not documented on ALE	WA GAP Analysis Project, 1999; England, 2000; TNC, 1999
Townsend's big-eared bat *Corynorhinus townsendii*	Varied habitats—forests to desert scrub; roosts in buildings, caves, mines, bridges; hibernates in caves	Possible in suitable habitat; not documented on ALE	WA GAP Analysis Project, 1999; England, 2000; TNC, 1999
pallid bat *Antrozous pallidus*	Generally occurs in arid regions, desert scrub habitats; roosts in cliff faces, caves, mines, buildings	Unlikely due to lack of suitable habitat; documented on ALE	WA GAP Analysis Project, 1999; England, 2000; West *et al.*, 1998, 1999

[a] *GAP Analysis Program (GAP). The Washington State Gap Analysis Project is based on a two primary data sources: vegetation types (actual vegetation, vegetation zone, and ecoregion) and species distribution. The two data sources are combined to map the predicted distribution of vertebrate species. More information about the Washington Gap Analysis Project can be found on the WDFW web page: www.wa.gov/wdfw/wlm/gap/dataprod.htm*

Construction:
Impacts to bats or bat habitat on the site are unlikely during construction.

Operations:
Bat research at other wind plants indicates that migratory bat species are at some risk of collision with wind turbines, mostly during the fall migration season (Johnson et al. 2003b). It is likely that some bat fatalities would occur during operation of the Project. Most bat fatalities found at wind plants have been tree-dwelling bats, with hoary and silver-haired bats being the most prevalent fatalities. Both hoary bats and silver-haired bats may use the forested habitats near the Project site and may migrate through the Project. Some mortality of mostly migratory bats, especially hoary and silver-haired bats, is anticipated during operation of the Project. At the Buffalo Ridge Wind Plant, Minnesota, based on a 2-year study, bat mortality was estimated to be 2.05 bats per

turbine per year (Johnson et al. 2003b). At the Foote Creek Rim Wind Plant, based on 3+ years of study, bat mortality was estimated at 1.34 bats per turbine per year (Young et al. 2003). At the Vansycle Ridge Wind Plant in Oregon, bat mortality was estimated at 0.74 bats per turbine for the first year of operation (Erickson et al. 2000). At the Klondike Wind Project, bat mortality was estimated at 1.16 bat fatalities per turbine per year (Johnson et al. 2003a). At the Stateline Wind Project, bat mortality was estimated at approximately 1 bat fatality per turbine per year (Erickson et al. 2003a) from July 2001 through December 31, 2002. At the Nine Canyon Wind Project, bat mortality was estimated at approximately 3 bat fatalities per turbine per year (Erickson et al. 2003b).

Although potential future mortality of migratory bats is difficult to predict, an estimate can be calculated based on levels of mortality documented at other wind plants. Using the estimates from other wind plants, operation of the Project could result in approximately 100 to 400 bat fatalities per year. Actual levels of mortality are unknown and could be higher or lower depending on regional migratory patterns of bats, patterns of local movements through the area, and the response of bats to turbines, individually and collectively. Mortality will likely involve silver-haired and hoary bats, two relatively common migratory species.

The significance of this impact is hard to predict since there is very little information available regarding bat populations. Studies do suggest resident bats do not appear to be significantly impacted by wind turbines (Johnson et al. 2003b, Johnson 2003, Gruver 2002), since almost all mortality is observed during the fall migration period. Furthermore, hoary bat, which is expected to be the most common fatality, is one of the most widely distributed bats in North America. Pre-construction surveys to predict impacts to bats may be relatively ineffective, because current state-of-the-art technology for studying bats does not appear to be highly effective for documenting migrant bat use of a site (Johnson et al. 2003b).

Big Game

The Project is located within habitats designated by WDFW as winter range for mule deer and elk, is located adjacent to the Quilomene migration corridor, and the northern boundary of the Project is approximately ½ mile (0.80km) from the Colockum elk calving area (Exhibit 14, Figure 16). The Quilomene elk winter range is approximately 83,000 acres in size and winters approximately 1,500-2,000 elk. The Quilomene mule deer winter range is approximately 40,000 acres in size and winters approximately 700-800 deer. The Project area is not located within the high-density deer sub-area of Quilomene mule deer winter range that typically supports 100-200 deer. This area begins approximately 1.5 miles (2.4 km) to the north east of the Project area, and extends to the east towards the Columbia River. The Project area is also located outside of the Quilomene primary winter range, a sub-area of the Quilomene winter range, which winters approximately 500 elk.

Wintering elk forage on native grass species such as Sandberg's bluegrass, which greens up with fall and winter rains, while mule deer likely utilize more shrub species in the Project area. Wind-blown slopes and ridges remain snow-free most of the year. West

and south-facing slopes green up earlier and provide accessible nutritious forage during the harsh winter months. Mule deer and elk also use the site during the other seasons. The riparian corridors of Whiskey Dick Creek provide some cover and the various developed and undeveloped springs provide a constant water source. Mule deer and elk hunting have been allowed on the Project area lands historically.

The site appears to get some year-round use by mule deer and elk, but is more concentrated in the winter. The biologist conducting the helicopter survey on April 14, 2003 identified 129 elk in 15 groups and 331 mule deer in 27 groups within 2 miles of the Project site. Several large groups (~ 4) of 50 or more elk were observed in March during reconnaissance level surveys of the Project site.

Aerial surveys were conducted for deer and elk near the project in February and March by WDFW. The Project area is overlapped by four different deer survey units (Exhibit 14, Appendix B). Three of the units were surveyed in March 2003, and a total of 1,065 deer were observed. The Project area (approximately 8,600 acres) comprises about 20% of the area surveyed in 2003. Historical WDFW elk and deer survey units and counts from WDFW surveys near the Project area are shown in Exhibit 14, Appendix B.

The WDFW has expressed some concern over the potential effects of wind project development and operation on wintering big game. Winter is a crucial period of time for the survival of many big game species. Deer, for example, cannot maintain body condition during the winter because of reduced forage availability combined with the increased costs of thermogenesis (Reeve and Lindzey 1991). In other words, as deer expend more energy than they take in, body condition gradually declines throughout the winter (Short 1981). Unnecessary energy expenditures may increase the rate at which body condition declines, and the energy balance determining whether a deer will survive the winter is thought to be relatively narrow, especially for fawns (Wood 1988). Overwinter fawn survival may decrease in response to human activity or other disturbances (Stephenson et al. 1996). Roads and energy development may also fragment otherwise continuous patches of suitable habitat, effectively decreasing the amount of winter range available for big game. Fragmentation of habitat may also limit the ability of big game populations to move throughout the winter range as conditions change, causing big game to utilize less suitable habitat (Brown 1992).

Construction:
During the construction period, it is expected that elk and mule deer will be temporarily displaced from the site due to the influx of humans and heavy construction equipment and associated disturbance (e.g., noise, blasting). All heavy construction, including road and foundation construction and blasting, will occur between April 15 and November 15, outside the critical winter periods. Construction activities in the winter will only include survey and design activities, which may have some minor displacement impacts to big game and elk. These activities in the winter would likely have a very minor reduction in the quantity and quality of big game winter range. The Quilomene elk winter range is approximately 83,000 acres in size and the Quilomene deer winter range is approximately 40,000 acres in size. The Project area is located south east of the Quilomene elk

migratory corridor. During winter construction activities, elk moving to winter range east of the Project may avoid areas of human disturbances locally within the Project, but overall increases in distances needed to travel would be insignificant. Following completion of the Project, the disturbance levels from construction equipment and humans will diminish dramatically and the primary disturbances will be associated with operations and maintenance personnel, occasionally vehicular traffic, and the presence of the turbines and other facilities.

Operations:
A few published studies of big game winter use may be relevant to the development of wind turbines and wintering deer and elk (Rost and Bailey 1979; Brakken and Musser 1993, Van Dyke and Klein 1996, Johnson et al. 2000c, Wisdom et al. 2002). Van Dyke and Klein (1996) documented elk movements through the use of radio telemetry before, during and after the installation of a single oil well within an area used year round by elk. Drilling activities during their study ceased by November 15, however, maintenance activities continued throughout the year.

Elk showed no shifts in home range between the pre and post drilling periods, however, elk shifted core use areas out of view from the drill pad during the drilling and post drilling periods. Elk also increased the intensity of use in core areas after drilling and slightly reduced the total amount of range used. It was not clear if the avoidance of the well site during the post-drilling period was related to maintenance activities or to the use of a new road by hunters and recreationalists. The authors concluded that if drilling activities occupy a relatively small amount of elk home ranges, that elk are able to compensate by shifting areas of use within home ranges.

WDFW conducted a radio telemetry study of the Colockum Elk herd between July 1987 and June 1992 (Brakken and Musser 1993). Elk showed some selection for areas close to roads, but these results are suspect because of incomplete road GIS coverage, and absence of traffic counts associated with the roads. In addition, elk also showed selection of habitat close to water sources, and distance to water sources and distance to roads were positively correlated, suggesting a confounding between the effect of water and roads. These positive relationships between elk selection and distance to roads occurred in spring, summer and fall, while in winter, no relationship between selection and distance to roads was observed.

Studies have been conducted at the Starkey Research Unit, a large fenced experimental study area near La Grande in northeast Oregon, using radio-collared elk and deer. Results of spring studies (April – early June) suggest that elk habitat selection may be negatively related to traffic and other human disturbance (Johnson et al. 2000c). Elk also tended to increase movement distances as a function of increased use by humans, including ATV use, hiking, and horse back riding (Wisdom et al. 2002). Mule deer habitat selection, on the other hand, appears to primarily be related to elk distribution, with mule deer avoiding areas used by elk. Traffic and roads did not appear to be an important factor in spring distribution of mule deer. In fact, there was some selection for areas close to roads with medium levels of traffic, but the cause of this relationship is

unknown. Mule deer showed some increase in movement distances as a function of increased use by humans, including ATV use, hiking and horseback riding (Wisdom et al. 2002), but much less response than elk showed. Rost and Bailey (1979) found that wintering mule deer and elk avoided areas within 656 ft (200m) of roads in eastern portions of their Colorado study area, where presumably greater amounts of winter habitat were present. Road avoidance was greater where roads were more traveled. Only mule deer showed a clear avoidance of roads in the western portion of their study area, where winter range was assumed to be more limiting. Mule deer also showed greater avoidance of roads in shrub habitats versus more forested areas. The authors concluded that impacts of roads depended on the availability of suitable winter range away from roads, as well as the amount of traffic associated with roads.

There is little information regarding the specific effects of wind projects on big game. At the Foote Creek Rim wind project in Wyoming, pronghorn observed during raptor use surveys were recorded year round (Johnson et al. 2000b). The mean number of pronghorn observed at the six survey points was 1.07 prior to construction of the wind plant and 1.59 and 1.14/survey the two years immediately following construction, indicating no reduction in use of the immediate area. Mule deer and elk also occurred at Foote Creek Rim, but their numbers were so low that meaningful data on wind plant avoidance could not be collected.

Due to the lack of knowledge regarding the potential impacts of energy development on big game, it is difficult to predict with certainty the effects of the Project on mule deer and elk. Van Dyke and Klein (1996) showed wintering elk shifted use of core areas out of view of human related activities associated with an oil well and access road. Most turbines and roads in the Project area will be located on ridges and will be visible over a fairly large area. While human related activity at wind turbines during regular maintenance will be relatively infrequent, it is not known if human activity associated with regular maintenance activity will exceed tolerance thresholds for wintering elk. If tolerance thresholds during regular maintenance activities were exceeded, elk would likely permanently utilize areas away from the wind development. The Project area proposed for development has historically received regular use throughout the year by hunters and other recreationalists including motorcycle and ATV riders, campers, birders and hikers. Access during construction and operation of the Project will be controlled by the Applicant and disturbance to big game may be minimized and actually less than that which occurred pre-development.

WDFW has also expressed concern regarding the potential for wind projects to increase elk and mule deer damage claims on private agricultural lands near wind projects. Elk and mule deer, if displaced from the Project area, may increase their utilization of agricultural lands in the vicinity of the Project area. If elk and mule deer are not displaced from the Project, then WDFW is concerned that the Project may create a "sanctuary" if hunting is not allowed in the Project area, and therefore limiting WDFW's ability to manage the herds. The Applicant has agreed to work with WDFW to allow for management of herds within the Project area if this becomes a problem. In addition, the

Applicant has agreed to allow controlled hunting within the Project area. With this management, the likelihood of the project becoming an elk sanctuary is remote.

The Project area is located south east of the Quilomene elk migratory corridor. Elk moving to winter range east of the Project may avoid areas close to the project and travel farther to the north. Given that the Project is located to the southeast of this movement corridor, the increase in distances needed to travel would not appear to be very large.

Other Mammals

Other mammals that are likely exist within the Project site include, badger, coyote, pocket gopher, Paiute ground squirrels and other small mammals such as rabbits, voles and mice. Construction of the Project may affect these mammals on site through loss of habitat and direct mortality of individuals occurring in construction zones. Excavation for turbine pads, roads, or other wind project facilities could kill individuals in underground burrows. Road and facility construction will result in loss of foraging and breeding habitat for small mammals. Ground-dwelling mammals will lose a limited amount of the use of the permanently impacted areas; however, they are expected to repopulate the temporarily impacted areas. Some small mammal fatalities can be expected from vehicle activity during operations. Impacts are expected to be very low and not significant.

Reptiles and Amphibians

Twenty-seven species of reptiles and amphibians occur in Kittitas County and could be present in the Project area. Short-horned lizards were commonly observed within the Project area. Other reptiles that may likely occur in the Project site include snakes such as the yellow-bellied racer and rattlesnakes. Amphibian and aquatic reptile habitat is limited within the Project area. No migration corridors for reptiles or amphibians are known to be present in the Project area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable wetlands and during fall dispersal of juveniles.

Construction:

Impacts to reptiles and amphibians on the Project site may occur through loss of habitat and direct mortality of individuals occurring in construction zones. No wetlands will be impacted by the Project, so habitat loss for amphibians would be minimal. Because best management practices will be employed on site and compliance with applicable permits regarding runoff and sediment control will be maintained, no amphibians should be affected by construction or operation of the Project. The level of mortality to reptiles on site associated with construction would be based on the abundance of species on site. Some mortality may be expected as common reptiles that may occur on site such as short-horned lizards and yellow-bellied racers often retreat to burrows underground for cover or during periods of winter dormancy. Excavation for turbine pads, roads, or other Project facilities could kill individuals in underground burrows. While above ground, yellow bellied racers and other snakes are likely mobile enough to escape construction equipment, however, short horned lizards do not move fast over long distances and rely heavily on camouflage for predator avoidance. Some individual lizard fatalities can be expected from vehicle activity.

Operations:
No impacts to amphibians are anticipated during operations. Impacts to reptiles during operation are likely limited to some potential direct mortality due to vehicle collisions. While above ground, yellow bellied racers and other snakes are likely mobile enough to escape most vehicles, however, short horned lizards do not move fast over long distances and rely heavily on camouflage for predator avoidance. Some individual lizard fatalities can be expected from vehicle activity.

Birds
Primary habitats for birds on the Project area are the grassland/shrub-steppe and riparian communities, although some species will utilize lithosol type habitats for various resources. The various springs on site likely provide important water sources for avian species.

Migration Routes:
The Project area is located within the Pacific Flyway, one of four principal north-south bird migration routes in North America. Bounded roughly by the Pacific Ocean and the Rocky Mountains, the Pacific Flyway extends from the arctic regions of Alaska and Canada to Central and South America. Within the flyway, certain groups of birds may travel along narrower migration corridors. The Project's location along the east flank of the Cascades places it within possible migration corridors of several bird species. Given the limited riparian and other important stopover habitat (water bodies), use by migratory birds is likely low. It would be expected that areas further to the east along and closer to the Columbia River would be more important to migrating birds, including songbirds, waterfowl and raptors.

Information about bird fatalities at other wind projects suggests that a wide variety of species and groups are susceptible to collision with turbines. Some evidence also suggests that peak mortality may occur during migration periods although some mortality has been documented throughout all seasons (see Erickson *et al.* 2000, Young *et al.* 2003, Johnson *et al.* 2002, Erickson *et al.* 2003a*,* Erickson *et al.* 2003b).

Potential impacts to birds using the study area include fatalities from collision with wind turbines or from construction equipment, loss of habitat, disturbance to foraging and breeding behavior, collision with overhead power lines, and electrocution. Project-related human activity could alter bird behavior and cause displacement during the construction phase of the Project, and the post-construction density of turbines and facilities on the developed portion of the site may alter avian use.

Construction:
Project construction may affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance/displacement effects from construction and human occupation of the area. Vegetation type/habitat losses from the Project are addressed in Section 3.4 ‘Vegetation and Wetlands’ and in Exhibit 1d. Potential mortality from construction equipment on site is expected to be quite low. Equipment

used in wind plant construction generally moves at slow rates (e.g., cranes) or is stationary for long periods. The risk of mortality from construction to avian species is most likely limited to potential destruction of a nest with eggs or young for ground and shrub nesting species when equipment initially disturbs the habitat. Disturbance type impacts can be expected to occur if construction activity occurs near an active nest or primary foraging area. Birds displaced from these areas may move to areas with less disturbance, however, breeding effort may be affected and foraging opportunities altered during the period of the construction (under one year). The proposed Project construction schedule is shown in Table 2.2.6.2-1. Proposed construction of roads and tower foundations is planned for the spring through the fall, and will have some effect on nesting birds and their young. No disturbance or displacement impacts to raptor nests are anticipated, since no active raptor nests were identified within ½ mile (0.80km) of Project facilities (Exhibit 14, Figure 6).

Operations – Mortality:

All Birds:
Bird fatality projections of 0.6 to 3.5 bird fatalities per turbine year are anticipated, based on the results of completed studies conducted at the Vansycle wind project in Umatilla County, Oregon (Erickson *et al.* 2000), the Foote Creek Rim Phase I wind project in Carbon County, Wyoming (Young *et al.* 2003), the Klondike Wind Project in Sherman County, Oregon (Johnson *et al.* 2003a), the Buffalo Ridge wind project in southwestern Minnesota (Johnson *et al.* 2002), the Stateline Wind Project in Umatilla County, Oregon and Walla Walla County, Washington (Erickson *et al.* 2003a), and the Nine Canyon Wind Project in Benton County, Washington (Erickson *et al*. 2003b). Most of the fatalities will likely involve resident songbirds such as horned lark, vesper sparrow, and western meadowlark, and other common species. Some upland gamebird fatalities are anticipated. Occasional nocturnal migrating songbird fatalities are also anticipated, but the risk of large mortality events would appear to be very low (Erickson *et al.* 2001). Waterfowl and other waterbird (e.g., gulls) mortality are estimated to be low, given the low use of the Project area by these groups. Low raptor mortality is anticipated.

Raptors:
Raptor use at the Project is estimated to be similar or lower compared to other wind projects with similar turbine types. Data were recorded in the field to allow standardization to 10, 20 and 30 minute survey duration, to allow comparison to survey data from other wind projects. As a group, raptor use ranged from 0.122 per 20 minute survey in the winter, to 0.41 and 0.35 in the spring and fall respectively. Raptor use at the Vansycle wind project in Oregon and the Buffalo Ridge wind project in Minnesota is estimated similar to the Wild Horse Project (0.36 and 0.49 raptors per 20-minute survey respectively). Raptor use at the Foote Creek Rim wind project was approximately 0.73 raptors per 20-minute survey.

Raptor mortality at new generation wind projects has been low. The estimate of raptor mortality at the Foote Creek Rim wind project in Wyoming, which is located in native grassland and shrub steppe habitat, was estimated at 0.03 raptors per turbine per year

based on a three-year study of 69 turbines (Young *et al.* 2002). No raptor mortality was observed at the Vansycle wind project in Oregon during a one-year study (Erickson *et al.* 2000); and 1 raptor fatality was recorded over a four-year study at the Buffalo Ridge wind project (Johnson *et al.* 2002). No raptor fatalities were observed at the 16-turbine Klondike wind project in Sherman County, Oregon (Johnson *et al.* 2003a), and one American kestrel fatality has been observed at the Ponnequin Wind Project in Weld County, Colorado (Kerlinger pers. comm.). Raptor mortality estimates from the Stateline Wind Project (Erickson *et al.* 2003a) and the Nine Canyon Wind Project (Erickson *et al.* 2003b) have ranged from 0.05 to 0.07 raptor fatalities per turbine per year, with most fatalities consisting of red-tailed hawks and American kestrels. Completed studies at other small wind projects have not documented any raptor fatalities (Erickson *et al.* 2001).

Considering these mortality results as well as raptor use estimates at these wind projects, it is estimated that potential raptor mortality at the Project will be within the range of raptor mortality observed at other wind projects in the west and midwest. We expect approximately 1 to 10 raptor fatalities per year at the Project if 136 turbines are constructed. It should be noted that the fatality estimates may vary from the expected range based on many factors, including the number of occupied raptor nests near the wind Project after construction, turbine size and other site specific and/or weather variables.

American kestrels and red-tailed hawks account for much of the diurnal raptor use at the site, and are expected to be the two species of raptors with the highest fatality rates over the life of the Project. Species with low risk of collisions includes northern harrier, golden eagle, rough-legged hawk, great horned owl and Swainson's hawk. Northern goshawk, bald eagle, Cooper's hawk and sharp-shinned hawk are expected to have a very low risk of collision. Turkey vultures appear less susceptible to collision that most other raptors (Orloff and Flannery 1992). Very few northern harrier fatalities, Cooper's hawks, sharp-shinned hawks and no rough-legged hawk or bald eagle fatalities have been observed at wind projects to date. Golden eagle use of the site is low relative to other wind sites and the mortality risk for golden eagles is also expected to be very low.

Passerines:
Passerines have been the most abundant avian fatality at other wind projects studied (see Johnson *et al.* 2002; Young *et al.* 2002; Erickson *et al.* 2000, Erickson *et al.* 2001), often comprising more than 80% of the avian fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations at the Project site, it is expected passerines will make up the largest proportion of fatalities. Species most common to the study area will likely be most at risk, including western meadowlark, vesper sparrow and horned lark. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle, Foote Creek Rim, Stateline, and Nine Canyon (Erickson *et al.* 2000, Young *et al.* 2002, Erickson *et al.* 2003a, Erickson *et al.* 2003b). A few large flocks of birds such as snow buntings were observed, but given their infrequent use, mortality would be expected to be low. Some nocturnal migrating songbird fatalities are expected. However, no large

events have been documented at wind projects. Only two small events have been reported. At Buffalo Ridge in Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were found at two turbines during a single night in May 2002 (Johnson *et al*. 2002). Approximately 25 to 30 migrating passerine fatalities (mostly warblers) were observed near three turbines and a well-lit substation at the Mountaineer wind project in West Virginia. Based on the mortality estimates from the other wind projects studied, between 50 and 300 passerine fatalities may occur per year at the Project if 136 turbines are constructed.

Carcass search studies at the Foote Creek Rim Wind Plant, Wyoming, have found avian casualties associated with guyed met towers. Based on searches of five permanent met towers at Foote Creek Rim over a three-year period, it was estimated that these towers resulted in approximately 8.1 avian casualties per tower per year (Young *et al.* 2002). The vast majority of these avian casualties were passerines. The nine permanent met towers proposed for the Project would be expected to result in collision deaths for passerines at the site, although the use of bird flight diverters on guy wires should reduce the risk of collision.

Waterfowl:
Some waterfowl mortality has been documented at other wind plants (Erickson *et al.* 2001, Johnson *et al.* 2002 2003a, Kerlinger pers. comm., Erickson *et al.* 2003). However, studies at Foote Creek Rim, Vansycle, and Buffalo Ridge have not documented mortality of Canada geese, the only waterfowl species observed flying over the Project area. Two Canada geese fatalities were recorded at the Klondike project, in an area where relatively high use has been documented (Johnson *et al.* 2003a), and one Canada goose fatality has been documented at the Stateline Wind Project (Erickson *et al.* 2003). Because of the low use of the site by waterfowl, little waterfowl mortality would be expected from the Project.

Other Avian Groups/Species:
Some upland game bird mortality has been documented at wind projects (Erickson *et al.* 2001, Erickson *et al.* 2003). Based on habitat and use, there is potential for mortality of some upland gamebirds such as chukars and gray partridge. Other avian groups (e.g., doves, shorebirds) occur in relatively low numbers within the study area and mortality would be expected to be very low.

Operations – Disturbance:

Most studies of disturbance or displacement effects have been conducted in Europe, and most of the impacts have involved wetland habitats and groups of birds not common on this Project, including waterfowl, shorebirds and waders (Larsen and Madsen 2000; Pederson and Poulsen 1991; Vauk 1990; Winkelman 1989; Winkelman 1990; Winkelman 1992). Most disturbance has involved feeding, resting, and migrating birds in these groups (Crockford 1992). European studies of disturbance to breeding birds suggest negligible impacts and disturbance effects were documented during only one study (Pedersen and Poulsen 1991). For most avian groups or species or at other

European wind plants, no displacement effects on breeding birds were observed (Karlsson 1983; Phillips 1994; Winkelman 1989; Winkelman 1990).

Avian disturbance or displacement associated with wind power development has not received as much attention in the U.S. At a large wind project on Buffalo Ridge, Minnesota, abundance of shorebirds, waterfowl, upland game birds, woodpeckers, and several groups of passerines was found to be significantly lower at survey plots with turbines than at plots without turbines. There were fewer differences in avian use as a function of distance from turbine, however, suggesting that the area of reduced use was limited primarily to those areas within 328 ft (100m) of the turbines (Johnson *et al.* 2000a). A sizeable portion of these effects are likely due to the direct loss of habitat near the turbine for the turbine pad and associated roads. These results are similar to those of Osborn *et al.* (1998) who reported that birds at Buffalo Ridge avoided flying in areas with turbines. Also at Buffalo Ridge, Leddy *et al.* (1999) found that densities of male songbirds were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines. Grasslands without turbines as well as portions of grasslands located at least 591 ft (180m) from turbines had bird densities four times greater than grasslands located near turbines. Reduced avian use near turbines was attributed to avoidance of turbine noise and maintenance activities and reduced habitat effectiveness due to the presence of access roads and large gravel pads surrounding turbines (Leddy 1996; Johnson *et al.* 2000a).

Construction and operation of the Foote Creek Rim wind plant did not appear to cause reduced use of the wind plant and adjacent areas by most avian groups, including raptors, corvids, or passerines (Johnson *et al.* 2000b). Some reduced use of the areas near turbines was apparent for a local population of mountain plovers, although a regional downward trend was also observed during the same time period (Young, 2003 pers. comm.). A pair of golden eagles successfully nested ½ mile (0.80km) from the wind plant after one phase was operational and another phase was under construction.

Development of wind turbines near raptor nests may result in indirect and direct impacts to the nesting birds; however, the only report of avoidance of wind plants by raptors occurred at Buffalo Ridge, where raptor nest density on 261 km^2 of land surrounding a windplant was 5.94/100 km^2, yet no nests were present in the 32 km^2 windplant facility itself, even though habitat was similar (Usgaard *et al*. 1997). The difference between observed (0 nests) and expected (2 nests) is not statistically significant. Similar numbers of raptor nests were found before and after construction of Phase 1 of the Montezuma Hills, California windplant (Howell and Noone 1992). A pair of golden eagles successfully nested 0.8 km from the Foote Creek Rim, Wyoming wind plant for three different years after it became operational (Johnson *et al*. 2000b), and a Swainson's hawk nested within 0.8 km of a small wind plant in Oregon (Johnson *et al*. 2003a). Anecdotal evidence indicates that raptor use of the Altamont Pass, California wind resource area (WRA) may have increased since installation of wind turbines (Orloff and Flannery 1992, American Wind Energy Association 1995).

Operation of the proposed Project would not affect raptor nests unless there were disturbance or displacement effects that caused raptors to not return to the nests close to the Project site. Such impacts are expected to be low since no active raptor nests were identified within ½ mile (0.80km) of proposed turbine sites, and since there is very little raptor nesting habitat near the wind turbines.

Based on the available information, it is probable that some disturbance or displacement effects may occur to the grassland/shrub-steppe avian species occupying the study area. The extent of these effects and their significance is unknown and hard to predict but could range from none to several hundred feet, resulting in a low level of impacts.

Potential Effects of Decommissioning:
Impacts from decommissioning the proposed Project would be lower than those for construction, as no access roads would need to be built and thus there would be less heavy equipment and ground disturbance. The period of disturbance for decommissioning would also be much shorter than for construction. Vehicles would travel on established roadways which would not impact habitat for special status species. Dismantling the project would eliminate avian and bat mortality caused by the presence of wind turbines. Wildlife habitat would have the potential to return to pre-project conditions over time, and disturbed areas would be reseeded with appropriate seed mixes to accelerate revegetation of these areas. Therefore impacts from decommissioning would be low.

A more detailed discussion of decommissioning and site restoration plans is provided in Section 4.8, 'Initial Site Restoration Plan'.

3.6.2.2 Critical Areas

The Kittitas County Code Title 17A defines "critical areas" as the following:

(1) wetlands;
(2) areas with a critical recharging effect on aquifers used for potable water;
(3) fish and wildlife habitat conservation areas;
(4) frequently flooded areas; and
(5) geologically hazardous areas.

Wetlands are addressed in Section 3.4 'Vegetation and Wetlands'; water resources (including aquifers and floodplains) are addressed in Section 3.3 'Water'; and geologically hazardous areas are addressed in Section 3.1 'Earth'.

The Kittitas County Code (Title 17A.02.090) further defines "fish and wildlife habitat conservation areas" as:

(1) Those lands in Kittitas County owned or leased by the Washington State Department of Fish and Wildlife;

(2) Those lands donated to or purchased by Kittitas County for corridors pursuant to RCW 36.70A.160;
(3) Wetlands;
(4) Big game winter range;
(5) Riparian habitat;
(6) Habitats for species of local importance.

Items 1, 4, and 6 are relevant to this section (wetlands and riparian habitat are addressed in Section 3.4 'Vegetation and Wetlands'). Based on the above definitions, the WDFW section within the Project area is considered a Kittitas County Critical Area. Big game winter range is also considered a Kittitas County Critical Area; however, by definition, the winter range is limited to areas owned or leased by WDFW (Kittitas County Code 17A.02.040) and therefore consists only of the one section of WDFW-owned land mentioned above within the Project area. Coordination for this project has involved contact with numerous federal, state, and local wildlife specialists and no habitats for species of local importance have been identified other than species and habitats previously addressed (see Sections 3.4.1.2, 3.4.1.3, and 3.6.3).

3.6.3 Unique Species

A list of state and federally protected species that potentially occur within the Project area was generated to assess the potential for impacts to these species (See Table 3.6.3-1). Species were identified based on the WDFW Species of Concern list, which includes state listed endangered, threatened, sensitive and candidate species; and the USFWS, Central Washington Ecological Services office list of Endangered, Threatened, Proposed, Candidate and Species of Concern for Kittitas County.

Information about occurrence of these species in the Project area is based largely on the following resources:

- Habitat mapping and predicted distribution from Washington State Gap Analysis Program (GAP) project;
- WDFW Priority Habitats and Species (PHS) records for the project area and a buffer or approximately 5 miles (8km);
- Breeding Bird Atlas of Washington State, Location Data and Predicted Distributions (Smith *et al.* 1997);
- Baseline field studies being conducted on site (this report); and
- Other published literature where available.

3.6.3.1 Critical Habitat

The Endangered Species Act defines critical habitat for threatened or endangered species as specific area(s) within the geographical range of a species where physical or biological features are found that are essential to the conservation of the species and which may require special management consideration or protection. Critical habitat is a specific geographic area designated by the USFWS for a particular species.

Under the ESA, it is unlawful to adversely modify designated critical habitat. According to the USFWS letter, critical habitat for the northern spotted owl may be present at or near the proposed wind plant. However, it was determined that no critical spotted owl habitat is present within the Project area after further review of critical habitat maps by the USFWS (Skip Stonesifer, USFWS, pers. comm.) Therefore, construction, maintenance, and operation of the proposed Project will not adversely modify critical habitat for endangered or threatened species.

3.6.3.2 No Effect

The USFWS indicated that bald eagle, gray wolf, bull trout, Canada lynx, northern spotted owl, Ute's ladies tresses orchid, western sage grouse, and western yellow-billed cuckoo potentially occur in the Project area due to potential species ranges. Resource investigations indicated that gray wolf, bull trout, Canda lynx, northern spotted owl, and western yellow-billed cuckoo are not likely to occur in the Project area due to lack of essential habitat for these species. The Project will not affect these species.

Western sage grouse is included on the USFWS list of candidate species but receives no protection under the Endangered Species Act. Western sage grouse is state listed, and is further discussed in section 3.6.3.4. No Ute's ladies tresses, a wetland plant species, were located in the Project area during surveys for this species, and the Project will not affect any wetlands. Bald eagle is the only federally listed species documented on the Project site, however, use of the site by bald eagle is very low (only one observed). Because use of the site by bald eagle was essentially incidental, based on best judgment, we cannot meaningfully measure, detect, or evaluate an effect or even expect an effect to occur. Therefore, the appropriate conclusion is that the project will not adversely affect bald eagle. In addition, no bald eagle fatality has ever been observed at a wind power project. The potential for the project to affect bald eagle is considered extremely unlikely and essentially immeasurable.

The Project will have no effect or is not likely to adversely affect federally threatened or endangered species. Should new information indicate the present of a federally listed species or if the proposed Project changes so that it may affect listed species, the appropriate actions under the Endangered Species Act will be taken. If power generated by the Project is purchased by the Bonneville Power Administration (BPA) or is transmitted across BPA lines, and new information indicates the Project may affect a federally threatened or endangered species, a Biological Assessment (BA) will be prepared to initiate consultation with the USFWS. If power generated by the Project is purchased by a private utility, and new information indicates that the Project may cause the take of a listed species, a Habitat Conservation Plan (HCP) will be prepared to acquire an incidental take permit from the USFWS.

Table 3.6.3-1. Species of special status documented as occurring or likely to occur within the vicinity of the Project area.

Group/Species	Status[a]	Notes

Table 3.6.3-1. Species of special status documented as occurring or likely to occur within the vicinity of the Project area.		
Group/Species	**Status[a]**	**Notes**
Mammals		
black-tailed jack rabbit (*Lepus californicus*)	SC	Documented as occurring near the Project area. The species is likely to occur within the Project area due to the presence of suitable sagebrush and shrub habitats.
white-tailed jack rabbit (*Lepus townsendi*)	SC	Documented as occurring near the Project area. The species is likely to occur within the Project area due to the presence of suitable sagebrush and shrub habitats.
brush prairie pocket gopher (*Thomomys talpoides douglasi*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the Project area.
Merriam's shrew (*Sorex merriami*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the Project area.
Townsend's big-eared bat (*Coryhorhinus townsendii*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the Project area.
Amphibians and Reptiles		
Columbia spotted frog (*Rana luteiventris*)	SC	The Project area occurs within the potential range for the species. However, no impacts to wetlands or springs from the Project are anticipated, and no impacts to the species are anticipated.
western toad (*Bufo boreas*)	SC	The Project area occurs within the potential range for the species. However, no impacts to wetlands or springs from the Project are expected, and no impacts to the species are anticipated.
sharptail snake (*Contia tenuis*)	SC	The Project area occurs within the potential range for the species.
striped whipsnake (*Masticophis taeniatus*)	SC	The Project area occurs within the potential range for the species.
Raptors		
bald eagle (Haliaeetus leucocephalus)	ST FT	One bald eagle was observed during the winter. No documented breeding records within two miles of the Project. Bald eagles may rarely fly through the Project area, especially in the winter. No impacts to bald eagles are anticipated. Potential reduction of cattle grazing may reduce bald eagle use and risk, due to reduction of carrion.

Table 3.6.3-1. Species of special status documented as occurring or likely to occur within the vicinity of the Project area.		
Group/Species	**Status[a]**	**Notes**
golden eagle (Aquila chrysaetos)	SC	WDFW has historic nesting records within two miles of the Project area. No active golden eagle nests were observed during raptor nest surveys in 2003. Mean use of the Project area was low overall, but highest in the fall (0.143 observations / 30-minute survey) and winter (0.082 observations / 30 minute survey). Two individuals were observed during the in-transit surveys.
peregrine falcon (Falco peregrinus)	SS	Potential exists for species to rarely fly through the Project area during migration or rarely to forage in breeding season. No peregrine falcons were observed during raptor nest, fixed-point, in-transit count surveys. Active eyries do exist more than 6.5 miles (10.5km) to the east of the Project between the Quilomene Creek and Vantage. No impacts to peregrine falcons are expected.
burrowing owl (Athene cunicularia)	SC	One documented burrowing owl breeding area occurs 3- 4 miles (5-6km) southeast of the Project area and transmission route. However, no burrowing owls were observed during surveys within the Project area, and no impacts to the species are expected.
ferruginous hawk (Buteo regalis)	ST	The species is considered a rare migrant and potential breeder within the Project area. No ferruginous hawks were observed during fixed-point, in-transit, or raptor nest surveys. No impacts to the species are anticipated.
merlin (Falco columbarius)	SC	Two observations of merlins were noted during fixed point surveys. The species is considered a rare migrant through the Project area and is not likely to breed within the Project area. No impacts to migrating merlins are expected.
flammulated owl (Otus flammeolus)	SC	The Project occurs within the potential range of flammulated owls. Suitable habitat exists for the species within patches of conifer within and to the north of the Project area. If flammulated owls occur within the Project area, a low potential exists for the species to collide with turbines. Only one flammulated owl has been documented as a fatality at wind plants within the U.S. (Erickson et al. 2001).

Table 3.6.3-1. Species of special status documented as occurring or likely to occur within the vicinity of the Project area.		
Group/Species	**Status[a]**	**Notes**
northern goshawk (Accipiter gentiles)	SC	Two observations of two individuals were made within the Project area during the winter of 2002 - 2003. Overall use of the Project area by breeding northern goshawks appears to be relatively low, and no impacts to the species are anticipated.
Grouse		
sage grouse (Centrocercus urophasianus)	ST FC	The Project area occurs within a mapped area of historic high use. One documented lek is present approximately 2.75 miles (4.43km) from the proposed PSE transmission feeder line route. No sage grouse or leks were observed during fixed point or lek surveys within the Project area, although pellets were found incidentally on the south side of Whiskey Dick Mountain in the fall. Although potentially used historically, the Project area is not currently occupied by sage grouse leks, and no to very low impacts to the species are anticipated. The project is located within the Colockum Management Unit in the Draft Washington Recovery Plan for Sage-grouse. This management unit is most important for potential connectivity between the breeding population on the Yakima Training Center and the populations in Douglas County.
sharp-tailed grouse (Tympanuchus phasianellus)	ST	The WDFW has one record of a sharp-tailed grouse sighting from 1981 approximately 4 – 6 miles (6-10km) from the Project area and a transmission feeder line. No sharp-tailed grouse were observed during surveys. It is unlikely that the species occupies the Project area and no impacts are expected.
Waterbirds/ Waterfowl		
common loon (Gavia immer)	SS	Common loons are considered a rare migrant through the Project area. No loons were observed during surveys, and no impacts to the species are anticipated.
western grebe (Aechmophorus occidentalis)	SC	Western grebes are considered a rare migrant through the Project area. No grebes were observed during surveys, and no impacts to the species are anticipated.
Songbirds		

Table 3.6.3-1. Species of special status documented as occurring or likely to occur within the vicinity of the Project area.		
Group/Species	**Status[a]**	**Notes**
Lewis' woodpecker (Melanerpes lewis)	SC	The Project occurs within the potential range of the Lewis' woodpecker. Suitable habitat exists for the species within patches of conifer within and to the north of the Project area. However, no Lewis' woodpeckers were observed during surveys, and no impacts to the species are anticipated.
white-headed woodpecker (Picoides albolarvatus)	SC	The Project occurs within the potential range of the white-headed woodpecker. Suitable habitat exists for the species within patches of conifer within and to the north of the Project area. However, no White-headed woodpeckers were observed during surveys, and no impacts to the species are anticipated.
loggerhead shrike (Lanius ludovicianus)	SC	Three observations totaling four individuals were observed within the Project area during the spring of 2002 and 2003. One observation was made along the PSE transmission route. Overall use of the Project area by breeding loggerhead shrikes appears to be relatively low, and low impacts to the species are anticipated.
sage sparrow (Amphispiza belli)	SC	Sage sparrows are documented as occurring within sagebrush habitats within and surrounding the Project area during fixed point surveys and by the WDFW. The potential exists for the migrating individuals to collide with turbines. Observations of breeding individuals indicate that the species generally does not fly within the Rotor Swept Area (RSA).
sage thrasher (Oreoscoptes montanus)	SC	Sage thrashers are documented as occurring within sagebrush habitats within and surrounding the Project during the fixed and in-transit surveys. The potential exists for the migrating individuals to collide with turbines. Observations of breeding individuals indicate that the species generally does not fly within RSA.
Vaux's swift (Chaetura vauxi)	SC	The Project area occurs within the potential range of the Vaux's swift. No individuals were observed during fixed point surveys. The potential exists for migrating individuals to collide with turbines, however, the overall risk to the species is considered low.

FE *Federal Endangered,* *SE* *State Endangered*
FT *Federal Threatened* *ST* *State Threatened*
FC *Federal Candidate* *SC* *State Candidate*
FSC *Federal Species of Concern* *SS* *State Sensitive*

3.6.3.4 Potentially Impacted Species

Impacts to wildlife species and in particular avian and bat species are expected to occur from the Project. Measured use of the site by avian species in addition to mortality estimates from other existing wind plants is used to predict mortality of birds and bats from the Project. For example, use of the site by raptors is relatively low compared to other wind plants and mortality estimates of raptors from other "newer generation" wind plants are relatively low (e.g. 0.07 raptors/turbine/year for Nine Canyon Wind Project, <0.04 raptors/turbine/year for Foote Creek Rim wind project, Wyoming; <0.01 raptors/turbine/ year for the Buffalo Ridge wind project, Minnesota). Therefore mortality estimates for raptors from the Project are expected to be low. Post construction monitoring is proposed to validate mortality predictions and monitor the actual level of mortality from the Project.

Other impacts include direct loss of habitat due to the Project facilities, and indirect impacts such as disturbance and displacement from the wind turbines, roads and human activities. Both construction (e.g., blasting) and operations impacts are discussed. Potential impacts are discussed for fish, bats, big game, other mammals, reptiles and amphibians, and birds. Discussion of potential impacts to unique species including State and Federal listed species is also included.

Birds

Bald Eagle:
Only one bald eagle was observed during surveys within the Project area. The bald eagle was observed during the winter, and no bald eagle nests were observed during raptor nest surveys. No bald eagle fatalities have been observed at other wind projects (Erickson *et al.* 2001), and many have estimated bald eagle use similar or higher than this site. Based on the apparent incidental use of the Project area by bald eagles, impacts to the species cannot be meaningfully measured, detected, evaluated and are not expected and are therefore considered negligible.

During Project construction the possibility of mortality effects to bald eagles is considered negligible and extremely unlikely to occur. Heavy construction activities will not occur in the winter, and the low levels of bald eagle use are expected to be confined to winter and early spring. If a Bald eagle were to fly through the area during the construction period it is unlikely to occur within the construction zones due to disturbances and therefore unlikely to be at risk of construction related mortality.

During Project operations, based on the available information about bald eagle use of the site as well as Kittitas County, potential bald eagle mortality due to operation of the wind plant will confined to the winter and early spring seasons. Bald eagles will not be at risk from the wind plant in the summer or fall. Bald eagles are not expected to frequently occur within the wind plant and operation of the wind plant should have no disturbance on bald eagles.

The range of the bald eagle is not expected to change due to the Project. Bald eagle populations appear to be generally increasing and the USFWS has proposed the species for delisting (USFWS 1999). Bald eagle populations in Washington and throughout North America will continue to increase during and after Project construction.

Golden Eagle:
During Project construction the possibility of mortality effects to golden eagles is considered negligible and very unlikely to occur. Golden eagles in the area during the construction period are unlikely to occur within the construction zones due to disturbances and therefore unlikely to be at risk of construction related mortality. No disturbance impacts to golden eagle nests from construction activities are anticipated since no active nests were documented within 2 miles of the project area. Although no active nests were documented during nest surveys, golden eagles were observed during fixed point surveys throughout the year and golden eagles have nested historically within two miles of the Project area. Overall use of the Project area by golden eagles is relatively low compared to other wind plants where golden eagle fatalities have been documented. While the potential exists for golden eagles to collide with turbines, overall risks to golden eagle populations are considered low and only a few individuals at most are expected to collide with turbines over the life of the Project.

Sage Sparrow and Sage Thrasher:
Sage sparrows and sage thrashers breed within sagebrush and shrub habitats within the Project area. During Project construction there is some likelihood of mortality of sage sparrows and sage thrashers from collision with construction equipment. Proposed construction of roads and tower foundations are planned for spring through fall, and could therefore have some effect on nesting birds and their young. Construction tasks such as wind turbine assembly and erection may occur during the nesting period for songbirds and raptors, and may disturb or otherwise impact nesting activity.

Most sagebrush and other shrub habitats within the Project area occur on the sides of ridges and in drainages, while most turbines will be located on ridge tops lacking dense shrub habitats. Observations of breeding individuals indicate that the species generally does not fly within the Rotor Swept Area (Exhibit 14, Table 7 and 9). The potential exists for the migrating individuals to collide with turbines. It is likely that the presence of turbines, roads and associated facilities will result in local displacement of breeding sage sparrows and sage thrashers from shrub habitats near Project facilities. However, based on research in Minnesota, displacement effects will likely be limited to areas within 328 ft (100m) of turbines and associated facilities (Johnson *et al.* 2000a). Overall impacts to sage sparrow and sage thrasher populations are considered negligible.

Sage Grouse:
The Project area has been used historically by sage grouse (WDFW, PHS Data). Sage grouse have historically been observed in the Project area, especially in the fall and winter, with the most recent observations that were entered into the WDFW PHS data occurring in the fall 1997. Portions of the project area are identified as a regular large concentration of sage grouse (WDFW, PHS Data). No leks have been observed near the

Project area based on systematic searches, as well as incidental observations. The nearest known lek is 5 miles (16km) south of the Project area and 2.75 miles (4.4km) at the closest point to the proposed PSE transmission feeder line (Exhibit 14, Figure 6). At least one brood was observed in the general vicinity of the Project in the early 1990's, suggesting nesting may have occurred near the Project at that time (WDFW PHS). No sage grouse or leks were observed during targeted surveys in March and April 2003 within and surrounding the proposed Project area. In addition, no sage grouse were observed during avian use surveys between May 10, 2002 and May 22, 2003. Two sage grouse pellet groups were observed on the south side of Whiskey Dick Mountain during the Fall of 2002.

Currently, two populations of sage grouse remain in Washington; one within the Yakima Training Center in Yakima and Kittitas counties south of the Project area, and one within Douglas and Grant counties to the northeast of the Project area. The sage grouse population in 1997 was estimated at approximately 1000 birds, with 600 located in Douglas County and 400 birds on the YTC (Hays *et al.* 1998).

The Project area is located within the western portion of the Colockum sage grouse management unit, as defined in the Draft Washington Sage Grouse Recovery Plan (Stinson *et al.* 2003). The Colockum management unit is approximately 128,000 acres in size and primarily provides a possible corridor between the sage grouse population within the Yakima Training Center (YTC) to the south of the Project and the populations to the north and west of the Project in Douglas County population. The potential function of the Colockum management unit includes secondary breeding[4], connectivity[5], and seasonal use[6] with uncertain but apparently limited potential for reintroduction and established breeding. Approximately 90% of this management unit is steppe habitat (Table 8 in Stinson et al. 2003). Limiting factors of this unit for providing these functions is the rugged terrain, much of which is unsuitable for sage grouse.

Historic data suggest the potential for sage grouse to use the proposed Project area for winter habitat and for potential movement between the YTC and Douglas County populations. It would appear there is currently much less likelihood of consistent use of the Project area for nesting, based on no documented birds observed in the Project vicinity during the breeding season in the past 10 years, the current nesting habitat quality, and other factors (Stinson *et al.* 2003). Important components to nest sites and nest success include a large grass and sagebrush canopy cover (Sveum 1995). The grass cover component would appear to be lacking within the Project area, due to current grazing practices.

There is very limited information on the potential disturbance and displacement impacts of wind projects on sage grouse, and no controlled studies. Presence of young broods at the Foote Creek Rim wind project suggest nesting has likely occurred somewhere near a wind project, although the exact nesting location relative to wind turbines is not known

[4] areas that may support limited breeding
[5] providing habitat connectivity between breeding areas or seasonal use areas
[6] areas likely to be used seasonally during winter, summer, or fall.

(D. Young, WEST, Inc., pers. comm.). Studies of prairie chickens suggest they avoid suitable habitat within ½ mile of residences, well-traveled roads and compressor stations, and did not nest in suitable habitat near a coal-fired generation station (Robel 2002). Sage grouse nested farther from leks in areas classified as disturbed compared to less disturbed areas in Wyoming (Lyons 2001).

The Project area is located on the western edge of the proposed sage grouse management area. It would appear the Project will not significantly impact connectivity between Douglas County populations and the Yakima and Kittitas County populations, given that the shrub steppe habitats (Whiskey Dick and Quilomene Wildlife Areas and private lands between the two Wildlife areas) to the east of the Project would remain intact. In addition, while turbine strings are linear features, they are highly permeable to wildlife movement because of the separation between turbines. Approximately 100 acres of shrub-steppe habitat will be permanently impacted by the footprint of the Project out of more than 8,600 acres of shrub-steppe habitat within the Project area. The 8,600 acres is approximately 7% of the 128,000 acre Colochum management area. The loss of 100 acres of this unit represents a loss of less than 0.08%.

Proposed mitigation measures include elimination of livestock grazing within parts of the Project area (Section 27), which likely would improve residual grass cover and potential nesting, brood-rearing and wintering habitat for sage grouse. It is not known what impact the Project will have on seasonal movements and movements, if they exist, between the two existing populations. Relatively large blocks of shrub-steppe habitats still exist within WDFW and WDNR lands to the east of the Project site that may serve to connect the two populations. The Quilomene Wildlife Area (17,803 acres) and the Whiskey Dick Wildlife Area (28,549 acres) and the private lands between them have vegetation similar to the Project area, but lower in elevation. Controlled access to the Project area during operations will limit human activity, and in fact, may reduce human disturbance levels compared to current levels.

Peregrine Falcon:
The nearest known peregrine eyrie is located approximately 6.5 miles (10.5km) from the Project area. No peregrine falcon eyries were located during raptor nest surveys. Cliff habitat is present within two miles of the Project area, and the potential exists for peregrine falcons to nest within these cliff habitats. However, most suitable peregrine falcon nesting habitat is located along the Columbia River and it is unlikely that peregrine falcons will nest within two miles of the Project area. Use of the Project area by peregrine falcons is likely limited to rare dispersal events or occasional individuals migrating or hunting within the Project area. No construction impacts are expected. Over the life of the Project there is a very low risk that an individual peregrine falcon will collide with turbines, however, there will be no effect to peregrine falcon populations from the Project.

Burrowing Owl:
Although no burrowing owls have been documented within the Project area during surveys, burrowing owl breeding areas have been designated by the WDFW 3-4 miles (5-

6km) southeast of the Project area. The potential exists for breeding burrowing owls to occur within the Project area. However, considering the lack of sightings within the Project area, burrowing owls likely occur only occasionally within the Project area, and no construction or operations impacts to burrowing owls are expected.

Other Bird Species:
The potential range of several other species listed as candidates under the Washington Endangered Species Act overlap with the Project, including ferruginous hawk, flammulated owl, merlin, northern goshawk, sharp-tailed grouse, common loon, western grebe, Lewis' woodpecker, white-headed woodpecker, and Vaux's swift (Table 3.6.3-1). The potential exists for these species to occur within the Project area; however, use of the Project area by these species is expected to occur very rarely during migration or dispersal events. The potential exists for a few individuals of each species to collide with turbines over the life of the Project; however, no population impacts to these species are anticipated.

Additional species not discussed above (Federal or State Threatened, Endangered or Candidate) but with documented declining populations in the Columbia Plateau that were also documented on the Wild Horse site are: American kestrel, Brewer's blackbird, Brewer's sparrow, horned lark, loggerhead shrike, western meadowlark, mourning dove and killdeer. Many of these species are very common and widely distributed (e.g., western meadowlark, horned lark, American kestrel), but nevertheless have shown apparent declines in abundance in shrub-steppe habitats from BBS data (Sauer 1999). The proposed Project construction schedule is shown in Table 2.2.6.2-1. Proposed construction of roads and tower foundations is planned for the spring through the fall, and will have some effect on nesting birds and their young. The risk of mortality from construction to avian species is most likely limited to potential destruction of a nest with eggs or young for ground and shrub nesting species when equipment initially disturbs the habitat. Disturbance type impacts can be expected to occur if construction activity occurs near an active nest or primary foraging area. Birds displaced from these areas may move to areas with less disturbance, however, breeding effort may be affected and foraging opportunities altered during the period of the construction (under one year). Of these species, horned lark, American kestrel, and western meadowlark appear to have the highest collision risks due to their abundance at the Project site.

Mammals:
The Project occurs within the potential range of several species of federally and state protected mammals, which are unlikely to occur within the Project area due to habitat constraints and/or uncertain population status in Washington. These species include Townsend's big-eared bat, long-legged myotis, and long-eared myotis. These species are not expected to occur within the Project area and no impacts to these species are likely to occur.

Both the white-tailed and black-tailed jackrabbits have been documented in the Project area. The potential exists for individuals to be killed by vehicles on roads, and some suitable habitat for these species will be lost to turbine pads and road construction. Limits on vehicle speeds within the Project will minimize the potential for road kills, and

the permanent loss of suitable habitat is relatively small. Overall, impacts to these species should be minimal.

Suitable habitat for three bat species, which are listed as federal species of concern, is present within the Project area: fringed myotis, small-footed myotis and Yuma myotis. However, only general descriptions of habitat requirements and potential distribution are available for the three species. Very little is known concerning the ecology of the three species, making it even more difficult to accurately predict potential impacts to these species. To date, we are unaware of any documented fatalities of these species at wind projects within the U.S.

Merriam's shrew has been documented within Kittitas County, and suitable habitat for the species occurs within the Project area. The potential also exists for the brush prairie pocket gopher to occur within the Project area. Assuming these species are present within the Project area, the construction of turbine pads and roads, and vehicle traffic have the potential to crush individuals within burrows or moving above ground. Overall, total impacts to habitat are expected to be small and no significant impacts to populations of these species are expected to occur as a result of this Project.

Reptiles and Amphibians:
The Project area occurs within the potential range of the striped whipsnake, sharptail snake, western toad and Columbia spotted frog. There is very little suitable habitat for amphibians or aquatic reptiles (e.g., turtles) in the study area. None of these sensitive status reptiles or amphibians were documented on the Project site and no impacts are anticipated.

3.6.4 Comparison of Impacts of Proposed Scenarios

Due to the relatively recent commercial introduction of wind turbines with rotor diameters greater than 70 meters, there is very little information comparing avian and bat fatality rates of 90 meter rotor diameter (RD) turbines to 60 meter RD turbines. New generation wind projects where standardized mortality studies have been conducted in the West and Midwest include turbines ranging from 30 m to 70 m RD (Erickson et al. 2001, Erickson et al. 2003a, Erickson et al. 2003b, Johnson et al. 2003a). Some characteristics of the larger turbines may lead to fewer raptor, resident passerines and other diurnal birds fatalities because of the lower RPM's (revolutions per minute) of the turbine blades and the higher tip clearance (above the ground.) The tip clearance for the 90 m RD turbine on an 80 m tower is 35 m, while the tip clearance for the 60 m RD turbine on a 60 m tower is 30 m. Most of the daytime passerines flight heights observed at this and other projects are below 35 m (Johnson et al. 2000a, Johnson et al. 2000b, Erickson et al. 2003c, Young et al. 2003a).

Models developed by Tucker (1996a, 1996b) suggest a lower theoretical collision risk per MW of nameplate capacity as the length of the rotors of the turbines increase and the RPM's decrease. Earlier work by Howell (1997) suggested lower raptor collision risk

with 33 m RD turbines compared to 18 m RD turbines in California. Nocturnal migrating songbirds, which fly at higher altitudes, may be more at risk to collision with taller, larger RD turbines compared to shorter, smaller RD turbines. For the purposes of the mortality estimates discussed in this report and to incorporate uncertainty into the predictions, the Applicant's biologists used the range of mortality observed (instead of average) during all studies in the West and Midwest (based on turbines ranging from 30 m rotor diameter to 70 m rotor diameter).

3.6.5 Impacts of the No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated, and the environmental impacts described in this ASC would not occur. The No Action Alternative assumes that future development would comply with existing zoning requirements for the Project area, which is zoned Commercial Agriculture and Forest and Range. According to the County's zoning code, the Commercial Agriculture zone is dominated by farming, ranching, and rural lifestyles, and permitted uses include residential, green houses and agricultural practices. Permitted uses in the Forest and Range zone include logging, mining, quarrying, and agricultural practices, as well as residential uses (Kittitas County 1991). However, if the proposed Project is not constructed, it is likely that the region's need for power would be addressed by user-end energy efficiency and conservation measures, by existing power generation sources, or by the development of new renewable and non-renewable generation sources. Baseload demand would likely be filled through expansion of existing, or development of new, thermal generation such as gas-fired combustion turbine technology. Such development could occur at conducive locations throughout the state of Washington.

A baseload natural gas-fired combustion turbine would have to generate 67 average MW of energy to replace an equivalent amount of power generated by the project (204 MW at 33% net capacity). (An average MW or "aMW" is the average amount of energy supplied over a specified period of time, in contrast to "MW," which indicates the maximum or peak output [capacity] that can be supplied for a short period.) See Section 2.3, 'Alternatives'.

3.6.6 Mitigation Measures

The potential direct wildlife from the Project can be grouped into two main categories, loss of habitat from construction and operation of the Project, and potential mortality to individual birds or other animals from construction and operation of the Project. The loss of habitat associated with the Project can be further broken down into "temporary" and "permanent" habitat impacts. "Temporary" impacts are those arising from ground disturbance necessary for the construction of Project infrastructure but that will be not be permanently occupied once construction is complete. Examples include trenches for underground electrical collector cables, construction staging areas, etc. These areas will be disturbed during the construction period but will be reseeded and restored after

construction is finished. The vast majority (approximately 75%) of the total area impacted by construction of the Project will only be temporarily disturbed (i.e. for less than one year.) The remainder, (approximately 25%) will continue to be occupied by the Project, such as string roads, turbine foundation pads, Project substation and the O&M facility. These are considered "permanent" impacts for the purpose of this analysis.

Potential indirect impacts to plants and animals are more diffuse and could be caused by habitat fragmentation, wildlife disturbance or avoidance of the Project site, and introduction of noxious weeds and/or wildfire.

A comprehensive mitigation package for plants and animals is proposed for this Project. It consists of several categories of actions, including:

- Thorough study and analysis to avoid impacts;
- Project design features to minimize impacts;
- Construction techniques and (Best Management Practices) BMPs to minimize impacts;
- Post-construction restoration of temporarily disturbed areas;
- Operational BMPs to minimize impacts;
- Monitoring and adaptive management to minimize impacts during operations; and
- Protection and enhancement of on-site habitat; specifically providing protection for the life of the Project for over 600 acres of shrub steppe and riparian habitat in Section 27 and the fencing of springs in other areas of Project to protect the springs from degradation by livestock.

3.6.6.1 Study and Analysis

The Applicant has commissioned extensive studies by qualified wildlife biologists at the Project site to avoid impacts to sensitive populations. These studies, results of which are included as Exhibits 12 & 14, include:

- Rare plant surveys;
- Habitat mapping;
- Avian use point count surveys;
- Aerial raptor nest surveys;
- Sage grouse surveys
- Big game surveys;
- Non-avian wildlife surveys;

The results and recommendations of these studies have been incorporated into the proposed design, construction, operation and mitigation for the Project.

3.6.6.2 Project Design

The proposed design of the Project incorporates numerous features to avoid and/or minimize impacts to plants and wildlife. These features are based on site surveys,

experience at other wind power projects, and recommendations from consultants performing studies at the site. Features of the Project that are designed to avoid or minimize impacts to wildlife include the following:

- Avoidance of construction in sensitive areas such as streams, riparian zones, wetlands, forested areas;
- Avoidance of locating wind turbines in prominent saddles along the main Whiskey Dick Ridge
- Minimization of new road construction by improving and using existing roads and trails instead of constructing new roads;
- Choice of underground (vs. overhead) electrical collection lines wherever feasible to minimize perching locations and electrocution hazards to birds;
- Choice of turbines with low RPM and use of tubular towers to minimize risk of bird collision with turbine blades and towers;
- Use of bird flight diverters on guyed permanent meteorological towers or use of unguyed permanent meteorological towers to minimize potential for avian collisions with guy wires;
- Equipping all overhead power lines with raptor perch guards to minimize risks to raptors; and
- Spacing of all overhead power line conductors to minimize potential for raptor electrocution.

3.6.6.3 Construction Techniques

Construction of the Project has the potential to impact both habitat and wildlife in a variety of ways. The Applicant proposes the use of construction techniques and Best Management Practices (BMPs) to minimize these potential impacts. These include the following:

- Use of BMPs to minimize construction-related surface water runoff and soil erosion (these are described in detail in Section 3.3.2.1, 'Water – Impacts of the Proposed Action – Construction - Surface Water runoff/Absorption');
- Use of certified "weed free" straw bales during construction to avoid introduction of noxious or invasive weeds;
- Flagging of any sensitive habitat areas (e.g. springs, raptor nests, wetlands, etc.) near proposed areas of construction activity and designation of such areas as "off limits" to all construction personnel;
- Development and implementation of a fire control plan, in coordination with local fire districts, to minimize risk of accidental fire during construction and respond effectively to any fire that does occur;
- Establishment and enforcement of reasonable driving speed limits (max 25 mph) during construction to minimize potential for road kills;
- Proper storage and management of all wastes generated during construction;
- Require construction personnel to avoid driving over or otherwise disturbing areas outside the designated construction areas;

- Limiting construction activities during winter months to minimize impacts to wintering big game;
- Designation of an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.

3.6.6.4 Post Construction Restoration

All temporarily disturbed areas which have been cleared of vegetation will be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to the prevent spread of noxious weeds. The Applicant will consult with Washington Department of Fish and Wildlife regarding the appropriate seed mixes for the Project area.

3.6.6.5 Operational BMP's

During Project operations, appropriate operational BMPs will be implemented to minimize impacts to plants and animals. These include the following:

- Implementation of a fire control plan, in coordination with local fire districts, to avoid accidental wildfires and respond effectively to any fire that might occur;
- Establishment and enforcement of reasonable driving speed limits (max 25 mph) during operations to minimize potential for road kills;
- Operational BMPs to minimize storm water runoff and soil erosion;
- Implementation of an effective noxious weed control program, in coordination with the Kittitas County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weeds;
- Identification and removal of all carcasses of livestock, big game, etc. from within the Project that may attract foraging bald eagles or other raptors;
- Control public access to the site to minimize disturbance impacts to wildlife, especially in the winter months;
- Allow limited and controlled hunting on the site and allow WDFW access to the site to manage big game herds and minimize potential big game damage to nearby agricultural lands.

3.6.6.6 Monitoring and Adaptive Management

The Applicant plans to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The TAC will be composed of representatives from Washington Department of Fish and Wildlife, EFSEC, Kittitas County, local interest groups (e.g., Kittitas Audubon Society), Project landowners, and the Applicant. The role of the TAC will be to review results of monitoring studies to evaluate impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during operation of the Project. The post-construction monitoring plan will be developed in coordination with the TAC.

The Applicant proposes to develop a post construction monitoring plan for the Project to quantify impacts to avian species and to assess the adequacy of mitigation measures implemented. The monitoring plan will include the following components: 1) fatality monitoring involving standardized carcass searches, scavenger removal trials, searcher efficiency trials, and reporting of incidental fatalities by maintenance personnel and others; and 2) a minimum of one breeding season raptor nest survey of the study area and a 1 mile buffer to locate and monitoring active raptor nests potentially affected by the construction and operation of the Project.

The protocol for the fatality monitoring study will be similar to protocols used at the Vansycle Wind Plant in northeastern Oregon (Erickson *et al.,* 2000) and the Stateline Wind Plant in Washington and Oregon (FPL *et al.,* 2001).

3.6.7 Significant Unavoidable Adverse Impacts

With mitigation, no significant unavoidable adverse impacts are anticipated for birds or other wildlife. The mitigation parcel for replacement of permanent and temporary habitat loss from the Project exceeds the mitigation ratios defined in the WDFW Wind Power Guidelines. Protection of springs through livestock exclusion will provide additional mitigation for impacts to wildlife. It is currently not clear what indirect impacts the Project may have on big game winter range and big game movements. It is anticipated that the mitigation (exclusion of livestock from springs) and elimination of grazing on the mitigation parcel will improve big game habitat. Controlled access and controlled hunting on the site will allow WDFW to properly manage the herds, should eliminate the potential for creating a refuge for big game, and minimize stress to big game in the winter. The level and effect of disturbance impacts to big game from maintenance operations is not known, and may or may not be significant.