3.4 PLANTS AND ANIMALS

3.4.1 Vegetation

3.4.1.1 Affected Environment

Desert Claim Project Area

Vegetation Types

Vegetation in the project area was mapped according to "vegetation types" (Young et al. 2003). For vegetation mapping, the "project area" included the parcels totaling 5,237 acres on which Desert Claim has landowner permission to develop the project. "Vegetation types" are considered to be generally recognizable assemblages of plant species that occur in a pattern across the landscape. Vegetation types were determined based on visual assessment of dominant plant species. Due to the scale of the aerial photos used for mapping vegetation, fine-scale intermingling in transition areas and small inclusions of one vegetation type within another were not shown. Acreages calculated for each vegetation type may not sum to equal the total project area acreage indicated by tax records (**Table 3.4-1)**.

In addition to the vegetation map that was developed for the project area, a literature review was conducted to gain an understanding of previous work on soils and vegetation in similar habitats. Daubenmire (1970), in particular, is noteworthy for characterization of the vegetative communities of eastern Washington.

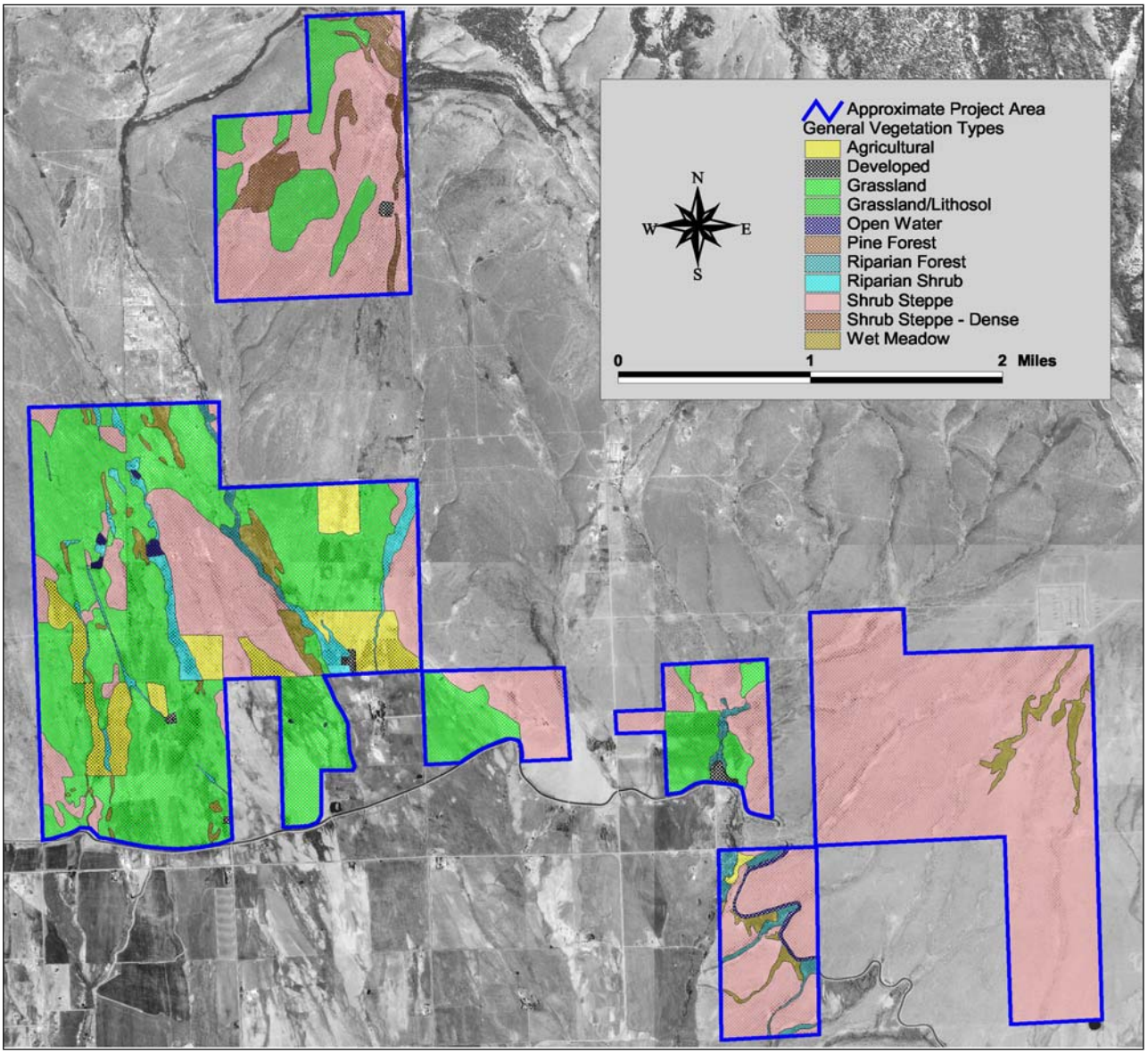
The vegetation in the project area was mapped and classified into 10 types (**Figure 3.4-1**). The primary vegetation type is shrub-steppe, comprising just over half of the project area (53.4 percent), primarily in the eastern and northern parcels. Grasslands are the second most common vegetation type (30.2 percent of the project area), followed by agricultural areas (4.8 percent). For the purposes of the vegetation map, the agricultural areas consisted of those areas where the vegetation is actively managed (e.g., irrigated and/or mowed) for agricultural purposes, however the shrub-steppe and grassland types are also used for agriculture (i.e., cattle grazing). Other vegetation types mapped in the project area include grassland/lithosol (3.8 percent), wet meadow (2.9 percent), riparian shrub (2.1 percent), riparian forest (1.4 percent), pine forest (0.6 percent), open water (0.5 percent) and developed areas (0.3 percent).

The *shrub-steppe* type consists of upland areas dominated by shrubs, primarily bitterbrush (*Purshia tridentata*), rigid sagebrush (*Artemesia rigida*), and big sagebrush (*A. tridentata*) with an understory of mixed grasses and forbs. Rigid sagebrush is found on the ridge-tops and exposed areas. Bitterbrush is also common in these areas, but dominates in the drainages and swales where it is generally denser and larger (up to approximately 6 feet tall). Areas of dense shrub steppe in the northern parcel dominated by mature bitterbrush were mapped separately (**Figure 3.4-1**). Interspersed within the shrub steppe are lithosol habitats (areas of exposed shallow, rocky soils) dominated by Sandberg's bluegrass and scattered rigid sagebrush. These inclusions were too small and numerous to be delineated separately from the shrub steppe at the scale of aerial photography used.

Table 3.4-1
Vegetation Types in the Project Area

Vegetation Type	Approx. Acres	Percent of Project Area	General Habitat Description
Agricultural	252.3	4.8	Agricultural areas are sites used for irrigated hay meadows that are periodically mowed.
Developed	16.5	0.3	Areas where human activity has removed or altered natural vegetation, such as residential homes and farm buildings and yards.
Grassland	1,578.7	30.2	Areas dominated by grass species, primarily bunchgrasses bluebunch wheatgrass, Sandberg's bluegrass, cheatgrass, and bulbous bluegrass.
Grassland/ Lithosol	199.8	3.8	A subset of the grassland habitat type found on exposed ridges in shallow soils (lithosol) in the northern-most parcel. Sparse grasses (Sandberg's bluegrass) dominate, along with scattered forbs and occasional shrubs.
Open Water	23.4	0.5	Areas of open water including natural ponds, stock ponds, and the irrigation canal.
Pine Forest	33.4	0.6	Pine forest dominated by Ponderosa pine found in the higher elevations of the northern most parcel.
Riparian Forest	70.5	1.4	Riparian zones dominated by trees and tall shrubs, located in drainages with perennial or intermittent streams. The dominant species include cottonwoods and various willows. In some locations, the shrub understory is very dense, limiting herbaceous growth.
Riparian Shrub	108.6	2.1	Riparian areas adjacent to streams or irrigation ditches where shrubs are common, but often scattered. Common shrub species include black hawthorn and coyote willow. Various herbaceous species are present in the understory. Weedy species, including and knapweed were often observed.
Shrub Steppe	2,794.5	53.4	Upland areas dominated by shrubs, primarily bitterbrush and rigid sagebrush, with an understory of mixed grasses and forbs. A few weedy species, such as cheatgrass and knapweed, were observed, but weedy species in general were not found over large extents of the area.
Wet Meadow	149.6	2.9	Areas dominated by hydrophytic vegetation, including various sedges, grasses, and rushes and other herbaceous species. These areas appear to be saturated or inundated most of the year, either from leakage from the irrigation canal or stockponds, or due to high groundwater in low spots and swales. Weeds were observed in some of the wet meadows, primarily chicory.
Total[1]	5,227.3	100	

[1] Acreage total based on GIS mapping and tabulation; 10-acre difference from 5,237-acre figure likely associated with roads, other unmapped areas, and digitizing error.



Source: Western Environmental Services, Inc.

Huckell/Weinman Associates, Inc. HWA	**Kittitas County Desert Claim Wind Power Project EIS**	**Figure 3.4-1** **Vegetation Types in the Project Area**

The lithosol was primarily found on exposed sites. Cattle graze in most of the shrub steppe areas and cattle trails were common; however, the shrubs did not appear stressed or in otherwise poor condition due to cattle grazing. Grass species and grass cover were less common than would be expected though, presumably due to livestock grazing. Livestock grazing has been observed to result in a decline in large perennial grasses and an increase in annual cheatgrass in shrub steppe habitat (Daubenmire 1970). A few weedy species, including cheatgrass and knapweed (*Centaurea* sp.), were observed in the shrub-steppe type, but native species dominate.

Grasslands are found primarily in the western portion of the project area. The grasslands are areas dominated by grasses and a variety of forbs. Common species include bluebunch wheatgrass, Sandberg's bluegrass, cheatgrass, bulbous bluegrass (*Poa bulbosa*), and forbs such as lupines (*Lupinus spp*), balsamroots (*Balsamorhiza hookeri* and *B. sagittata*), Hood's phlox (*Phlox hoodii*), and various lomatiums (*Lomatium nudicaule, L. canbyi,* and *L. dissectum*). Soils range from shallow and rocky to moderately deep. The shallow-soiled lithosols are common and are interspersed throughout the grasslands. Sandberg's bluegrass dominates the lithosols and plant cover is sparse. Where larger expanses of lithosol occur, they were mapped separately as Grassland/Lithosol. The grassland vegetation types are primarily used for cattle grazing.

For this project, areas classified as *agricultural* were those areas used for irrigated hay meadows that are routinely cut for hay production. While other lands, primarily shrub steppe and grasslands, are used for agricultural purposes (i.e., cattle production), these areas were not mapped as "agricultural" because they consist primarily of native vegetation that has not been modified for agricultural purposes.

Wet meadows are found scattered throughout the project area in drainages and swales, and along the North Branch Canal and around stock ponds. These areas are dominated by various sedges (*Carex spp.*), grasses, rushes (*Juncus spp.*) and other herbaceous species such as smartweed (*Polygonum lapathifolium*), monkeyflower (*Mimulus guttatus*), and speedwell (*Veronica* sp.). These areas appear to be saturated or inundated most of the year, either from leakage from the canal or stockponds, surface water flow, or high groundwater. Evidence of cattle use was observed; however, these areas did not appear adversely affected by cattle. Weeds were observed in some of the individual wet meadows, primarily chicory (*Cichorium intybus*). See **Section 3.4-2** for more specific information on wetlands.

The *riparian shrub* type consists of riparian areas adjacent to perennial or intermittent streams or irrigation ditches where shrubs are common, but often scattered. Common shrub species include black hawthorn (*Crataegus douglasii*) and coyote willow (*Salix exigua*). Various herbaceous species are also present including grasses such as blue grass (*Poa pretensis*), rushes, and forbs such as curly dock (*Rumex crispus*). Weedy species, including chicory and knapweed, were also observed.

The *riparian forest* type is similar to the riparian shrub type, but the overstory consists of a mix of trees and tall shrubs. The dominant tree and shrub species include cottonwoods (*Populus balsamifera* spp. *trichocarpa*) and various willows (*Salix* spp.). In some locations, the trees and shrub understory are very dense, limiting herbaceous growth. Animal trails were noted through some of these areas, and these areas probably receive use by livestock and wildlife for shade and water.

A small amount of *pine forest* occurs in the upper elevations of the northern most portion of the site. The dominant species in these forests is Ponderosa pine (*Pinus ponderosa*).

Small areas of *open water* are scattered throughout the project area. Included in this mapping unit are natural ponds, stock ponds, and a portion of the North Branch Canal that occurs within the project area.

Developed areas are areas where human activity has removed or altered natural vegetation, such as residential homes, farm buildings, and yards.

The above descriptions characterize the vegetation types observed and mapped within the 5,237-acre project area. Daubenmire (1970) provides a more generalized description of vegetation zones and associations of the eastern Washington shrub steppe based on climate, vegetation structure, and floristics. These vegetation zones and associations represent climax communities, which typically develop over time in the absence of anthropogenic disturbance and may represent the vegetation that would be present in the project area in the absence of past agricultural practices.

The project area is within Daubenmire's *Artemisia tridentata – Agropyron* zone. In an undisturbed condition, this zone is distinguished by big sagebrush (*Artemisia tridentata*) as the principal shrub and bluebunch wheatgrass (*Agropyron [Pseudoroegeneria] spicata*) as the principal grass. In addition to big sagebrush, a number of other shrub species may be present in the *Artemisia tridentata – Agropyron* zone in small numbers; these include rabbitbrushes (*Chrysothamnus* spp. and *Ericameria* spp.), threetip sagebrush (*Artemisia tripartita*), and spiny hopsage (*Grayia spinosa*). Bluebunch wheatgrass is supplemented by variable amounts of needle-and-thread grass (*Hesperostipa comata*), Thurber's needlegrass (*Achnatherum thurberianum*), Cusick's bluegrass (*Poa cusickii*), and bottlebrush (*Elymus elymoides*). A low layer of plants consisting of Sandberg's bluegrass, cheatgrass, and flatspine stickseed (*Lappula occidentalis*) may also be present (Daubenmire 1970). The soils in this zone are mostly loams or stony loams.

Within the steppe region, a variety of habitats occur that have soils sufficiently unusual in physical or chemical properties to develop unique climax communities that are not necessarily associated with a particular vegetation zone. Lithosol (shallow soils) habitats are one such habitat that is found in the project area. Daubenmire (1970) recognizes a variety of lithosolic plant associations. All are typically composed of a uniform layer of Sandberg's bluegrass, over a crust of mosses and lichens, with a low shrub layer above.

Within most of the shrub-steppe region, including the project area, many of the plant communities have been modified due to numerous disturbance factors. Livestock grazing and other agricultural practices have resulted in a shift in plant community composition in the project area from the climax communities described above. Notable in the project area are a low percentage of native grass species and grass cover in general and some non-native species and weedy species throughout much of the project area.

The Washington Department of Fish and Wildlife (WDFW) publishes a Priority Habitats list. The list is a catalog of habitats considered to be priorities for conservation and management. Priority habitats are those habitat types or elements with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type or dominant plant species, a described successional stage, or a specific structural element. Within the south-central WDFW region, which includes Kittitas County, priority habitats include freshwater wetlands, riparian areas, and shrub-steppe habitats; these habitats occur within the project area.

Rare Plants

Review of federal and state lists of rare plant species suggest that 21 species could occur in the project area based on the type of habitats present. The potential occurrence of these species is addressed in more detail in **Exhibit 1** of **Appendix C**. Of the 21 rare plant species, one (Ute ladies'-tresses) is a federally-listed threatened species, with a state ranking of endangered. Five are federal 'species of concern', with state rankings of threatened or sensitive. The remaining 15 are listed at the state level as either sensitive or review species. The WNHP database has records for two state sensitive species in or adjacent to the project area. One historic record (1959) for Piper's daisy includes the western portion of the project area, and one current record (1991) for long-sepal globemallow is located adjacent to the eastern end of the project area.

In the project area, the wet meadows provide potential habitat for the federally-listed Ute ladies'-tresses orchid, which was listed as a threatened species in 1992 (USFWS 1992). This orchid has a close affinity with floodplain areas where the water table is near the surface during the growing season, providing continuous sub-irrigation, and where the vegetation is relatively open and not overly dense (USFWS 1995). Ute ladies' tresses tolerate areas with some disturbance such as flooding, grazing, or haying to reduce overstory cover from competing plants (USFWS 1995). The wet meadow habitats in the project area were searched for Ute ladies'-tresses orchid in early September 2002. No Ute ladies'-tresses were found (Young et al 2003).

Surveys for the other rare plant species were focused on areas of likely disturbance from the proposed project. The field surveys did not locate any federal species of concern or state listed plant species that might occur in the project area (Young et al, 2003).

Noxious Weeds

During surveys for rare plants species in the project area, all vascular plant species observed were recorded, including several non-native species and noxious weeds (Young et al 2003). Non-native species observations include knapweed (*Centaurea sp.*), chicory (*Cichorium intybus*), thistle (*Cirsium*), blue mustard (*Chorispora tenalla*), tumble mustard (*Sisymbrium altissimum*), filaree (*Erodium cicutarium*), cheatgrass (*Bromus tectorum*), plantain (*Plantago lanceolata*), and ladysthumb (*Polygonum lapathifolium*). Of these non-native species known to occur in the project area, knapweed and thistle are considered noxious in Kittitas County.

Wild Horse (Alternative 1) Site

The Wild Horse site is located within the general shrub-steppe region of central Washington. The area was studied in a similar fashion to the Desert Claim baseline studies, in support of the Zilkha proposal for the Wild Horse Wind Power Project. In an undisturbed condition, this area is usually distinguished by big sagebrush (*Artemisia tridentata*) as the principal shrub and bluebunch wheatgrass (*Agropyron [Pseudoroegeneria] spicata*) as the principal grass. Within the project area, vegetation was mapped according to "vegetation types," based on visual assessment of dominant plant species.

Seven types were mapped in the project area for Alternative 1, including the following:

- *Shrub-steppe* – 5,042 acres (88 percent)
- *Grassland* – 525 acres (9 percent)
- *Grassland/Talus* – 97 acres (1.7 percent)
- *Pine Forest* - 31 acres (0.5 percent)
- *Woody Riparian* – 26 acres (0.4 percent)
- *Talus* – 5.6 acres (0.1 percent)
- *Seasonal Water Body* – 1.7 acres (0.03 percent)

The primary habitat type in the area, shrub-steppe, was broken down and mapped into three sub-categories based on relative spatial density of the shrub layer – dense, moderate, and sparse. In general, areas with a dense shrub layer were found on deep-soiled sites on slopes and dominated by big sagebrush, antelope bitterbrush, or squaw current. Areas with a moderate shrub layer were flat to gently sloping, and typically dominated by big sagebrush or stiff sagebrush. In addition to shrub steppe, lithosol and talus slopes are prevalent in the area, especially along the primary ridgeline of Whiskey Dick Mountain. These areas generally have sparse shrub cover, are found on exposed ridgetops and knolls and were dominated by low-growing bunchgrass, stiff sagebrush or various buckwheats. For the Wild Horse project studies, lithosol was mapped as a soil type as opposed to a vegetation type.

Quality of the vegetation types that would be disturbed by project facilities was determined by comparing the existing plant species and their composition (in terms of percent cover) to climax community composition as reported by the Natural Resources Conservation Service (NRCS) for a given soil type. Results of the assessment show that vegetation quality ranges from "fair" to "good" throughout the project area. Good rangeland is defined as rangeland with 50 to 75 percent of its climax vegetation and fair rangeland has 25 to 50 percent of its climax vegetation. The project area does contain some non-native species and weedy species, however, native species overwhelmingly dominate the project area (Erickson et al., 2003).

A list of 29 rare plant species (including federal and state listed species) potentially occurring in the Wild Horse area was compiled and surveys were conducted in spring 2003 for these species. The survey area included all lands that would be occupied by proposed facilities and a 164-foot (50 meter) buffer. One plant species on the Washington State 'Review' list, hedgehog cactus, was found. Much of the suitable habitat present in the project area (lithosol habitats and sparse shrub-steppe) contained scattered individuals.

Springwood Ranch (Alternative 2) Site

The Springwood Ranch property is situated in the ecotone between open ponderosa pine woodlands, which occur on the eastern edge of the Cascade Range, and the rolling grasslands and shrub steppe of the dry interior Columbia Basin. The property is dominated by grazed grasslands and agricultural lands. Agricultural fields are located along the Yakima River and in the portion of the property that extends onto the Kittitas Valley floor. Alfalfa and hay are the major crops on the site and throughout the Lower County. No known noxious weed management is being conducted on the property.

Major plant communities include coniferous woodlands, deciduous woodlands, grasslands and meadows, shrublands, and wetlands and streams. The Singing Hills, in the northwestern corner of the property, are dominated by open ponderosa pine woodlands (with a minor component of Douglas-fir) and communities

of understory shrubs. Grasses common to the area also occur in the understory of the coniferous stands where there are openings in the canopy. Mixed ponderosa pine and Douglas-fir stands with varying understory shrub communities can be found in north-facing draws of Thorp Prairie as well. There are mixed stands of deciduous forest and shrub communities found at higher elevations in the Singing Hills, on the bluffs above the Yakima River, along the draws extending from Thorp Prairie to the river, along Taneum and Swauk Creeks and along the steeper slopes adjacent to the Taneum Creek corridor.

A few wet meadows are located in depressions in the Singing Hills and along the Yakima River. Some native grass species still persist and sometimes dominate portions of the prairie, whereas big sagebrush dominates the scattered patches of shrub steppe found on the property. Rainfall on the property is sufficient to encourage the growth of grasses over shrub steppe. Deciduous shrub communities also occur along the Yakima River and along Taneum Creek. These communities are interspersed with deciduous woodlands and major shrub species. Noxious weeds such as chicory and spotted knapweed have invaded much of this community. On some rocky slopes, dryland forbs such as wild buckwheat, phlox, balsam-root, asters, and other forbs dominate over the grasses.

DNR's Kittitas County Rare Plant List indicates that 6 plant species of federal concern, 1 federally proposed endangered species, and 32 state-listed plant species may occur in the types of habitats found on the Springwood Ranch property. No on-site survey of the property to identify rare plants has been conducted for this EIS.

3.4.1.2 Impacts of the Proposed Action

Vegetation Types

Impacts to vegetation would include both temporary, construction-related impacts and long-term impacts in those areas where project facilities are permanently located. Temporary impacts include:

- temporary removal of the vegetation
- possible erosion of disturbed soils

Long-term project impacts include:

- replacement of vegetative cover with project facilities
- potential change in the fire frequency of the area (e.g., if shrub-steppe habitats are converted to cheatgrass)
- potential for soil erosion

Based on GIS analysis of the proposed project layout, an estimated 88 acres of vegetation in the project area would be permanently occupied by project facilities and 322 acres would be temporarily disturbed (see **Table 3.4-2**). These calculations do not account for the construction staging/storage areas that have not yet been sited, which would add approximately 20 acres of disturbed area.

Table 3.4-2
Summary of Impacts by Vegetation Type

Project Facility	Habitat Type	Approximate Area of Impact (acres) Temporary	Permanent
Wind Turbine Pads[1]	Agricultural	6.9	0.6
	Grassland	49.5	4.5
	Grassland/Lithosol	6.0	0.5
	Open Water	1.0	0.1
	Pine Forest	0.5	*
	Riparian Forest	0.3	*
	Riparian Shrub	0.7	0.1
	Shrub Steppe	74.0	6.7
	Shrub Steppe – Dense	1.0	0.1
	Wet Meadow	5.7	0.5
Underground Collection System[2]	Agricultural	0.3	*
	Grassland	1.7	0.1
	Grassland/Lithosol	0.2	*
	Open Water	*	*
	Pine Forest	*	*
	Riparian Forest	0.1	*
	Riparian Shrub	0.1	*
	Shrub Steppe	2.7	0.2
	Shrub Steppe - Dense	*	*
	Wet Meadow	0.2	*
Substation[3]	Agricultural	2.0	1.0
	Shrub Steppe	3.6	2.8
Transmission and Above Ground Collection System[4]	Grassland	0.2	*
	Riparian Forest	*	--
	Riparian Shrub	*	--
	Shrub Steppe	0.1	*
Access Roads[5]	Agricultural	7.5	3.2
	Grassland	53.8	22.7
	Grassland/Lithosol	6.0	2.5
	Open Water	0.9	0.3
	Pine Forest	0.1	*
	Riparian Forest	3.3	1.5
	Riparian Shrub	2.8	1.2
	Shrub Steppe	86.7	36.7
	Shrub Steppe - Dense	0.6	0.2
	Wet Meadow	5.3	2.3
Permanent Meteorological Towers	Grassland	0.35	0.04
	Grassland/Lithosol	0.28	0.02
	Riparian Shrub	0.07	--
	Shrub Steppe	0.63	0.04
	Wet Meadow	0.07	--
		322.4	87.9

* Area impacted less than 0.1 acres

[1]Assumes temporary construction disturbance for each turbine pad and transformer in a 130- ft radius around the tower (1.25 acre); permanent impact area based on 120 by 40 ft. crane pad (0.11 acre, or 9% of the temporary disturbance); 120 total turbines

[2]Assumes an 8-foot wide temporary disturbance corridor and 2 feet of permanent disturbance. A 20% factor is applied for temporary disturbance and a 5% factor for permanent disturbance because the underground collection system would be generally located within the access roads.

[3] Assumes substation is located near the proposed location at the northeastern corner of Section 21, T 19 N, R 18E.

[4]Assumes 8-foot wide temporary disturbance corridor for construction of overhead collection line and 8 feet of permanent disturbance with a 5% factor applied since the permanent disturbance would only be associated with the wood poles.

[5]Assumes 50-foot wide temporary disturbance corridor and a 20-foot wide permanent corridor for access roads.

NOTE: The construction staging areas have not yet been sited and the vegetation impacts for these facilities are not included in the table.

Of the disturbed areas, the access roads account for most of the permanent impacts to vegetation (70.6 acres). Most facilities would be located in shrub steppe and grassland habitat types. An estimated 46.7 acres of shrub steppe would be impacted, primarily from access roads (36.9acres) and turbine pads (6.8 acres), as well as from the substation and O&M facility (2.8 acres). An estimated 30.4 acres of grassland (including the grassland/lithosol type) would be impacted, including 25.2 acres from access roads, 4.8 acres from turbine pads and 0.1 acres from the underground collection system. In addition, an estimated 4.8 acres of agricultural lands would be permanently impacted, as well as 1.3 acres of riparian shrub, 1.4 acres of riparian forest, 0.4 acres of open water and 2.8 acres of wet meadow. No permanent impacts would occur in the pine forest vegetation type.

Although three priority habitats occur in the project area (wetlands, riparian areas, and shrub-steppe) and would be affected by the project, the WDFW has developed management recommendations only for riparian habitats. An estimated 3.1 acres of riparian habitat would be permanently impacted and 8.0 acres would be temporarily impacted by the project, primarily due to access roads and the underground and overhead collection systems. The impacts due to the access roads, collection systems and the turbine pads would likely be avoided by micro-siting of each turbine during final project layout. To minimize impacts to riparian habitats, WDFW management recommendations for road and utility crossings of riparian habitat include:

- Roads and utility crossings should be perpendicular, rather than parallel, to streams to minimize riparian vegetation loss and reduce habitat fragmentation.
- Use bridges instead of culverts. If culverts are used, they should be designed to carry a minimum of 100-year peak flow event and allow passages of both juvenile and adult fish.
- Design and construct new roads according to current best management practices.

Impacts to vegetation from the proposed action are not considered significant because they would not result in any of the following:

- The elimination of an entire vegetation type in the project area;
- Loss of at least 10 percent of a priority habitat in the project area; or
- A decrease in species richness resulting from the loss of a plant population in the project area.

If any of the above conditions were to result from the project, it would change the character of the existing vegetation community in the project area. Priority habitats are considered rare and unique by definition. Loss of more than 10 percent of a priority habitat is considered an impact that would presumably increase the risk to the remainder of the priority habitat. The project is not expected to cause any of the above conditions to occur and therefore would not have significant impacts to the vegetation in the project area.

Rare Plants

Due to the absence of known populations within the project area, no project-related impacts are anticipated to rare plant species. These include federally listed endangered, threatened, proposed, or candidate plant species and Washington State endangered, threatened, sensitive, or review plant species.

Noxious Weeds

Most noxious and invasive species are aggressive pioneer species that have a competitive advantage over other species on disturbed sites. Therefore, all areas disturbed by the project are potential habitat for noxious and invasive species, particularly for those species previously observed or known to occur in or near the project area. The introduction of new noxious species from other areas can occur from construction equipment and other vehicles transporting seeds onto the project site. Once established in an area, negative impacts can include one or more of the following, depending on the species, degree of invasion, and control measures:

- loss of wildlife habitat;
- alteration of wetland and riparian functions;
- reduction in livestock forage and crop production;
- displacement of native plant species;
- reduction in plant diversity;
- changes plant community functions;
- increased soil erosion and sedimentation;
- reduction in recreational value and use;
- control and eradication costs to local communities; and/or
- reduction in land value (Sheley et al. 1998).

3.4.1.3 Impacts of the Alternatives

Alternative 1: Wild Horse Site

Vegetation impacts from Alternative 1 would be similar in type to those described for the proposed action and Alternative 2. A portion of the existing vegetation on the site would be temporarily disturbed for construction, while a fraction of that area would be permanently displaced by constructed project features. The undeveloped vegetation types that would be permanently displaced by Alternative 1 project facilities include shrub-steppe (including dense, medium, and sparse) and grassland. Lithosol and talus habitats would also be affected. A total of 104 acres of these vegetation types would be permanently impacted, with the majority (86.9 acres or 84 percent) in shrub-steppe habitat. An additional 294 acres would be temporarily disturbed; 240 acres (82 percent) in shrub-steppe habitats. A breakdown of permanent and temporary impacts by vegetation type is shown in **Table 3.4-3**.

Table 3.4-3
Summary of Impacts by Vegetation Type, Alternative 1

	Impacted Area (acres)	
Vegetation Type	**Permanent**	**Temporary**
Grassland	16.6	53.7
Shrub-steppe Dense	0.8	8.0
Shrub-steppe Medium	62.6	167.1
Shrub-steppe Sparse	23.5	64.8
Talus	0.4	0.3
Woody Riparian	0.0	0.1
Total	104.0	294.0

Due to the absence of any known populations within the project area for Alternative 1, no project-related impacts are anticipated to any federally-listed endangered, threatened, proposed, or candidate plant species. Likewise, no project-related impacts are anticipated for any Washington State endangered, threatened, or sensitive plant species. Limited impacts are anticipated, however, to one species on the Washington State Review list, hedgehog cactus. Ground disturbance related to construction and operation of Alternative 1 could cause direct adverse impacts to individual plants if they are located within the impact footprint. Due to their frequent occurrence in the area and the high likelihood that many more individuals occur in the area adjacent to the impact corridors, Alternative 1 would not be expected to significantly impact the species' viability in the area. Approximately 10 percent of the individuals in the project area are estimated to be directly impacted by Alternative 1. This level of direct impact is not anticipated to jeopardize the continued existence of the local population, or lead to the need for state or federal listing.

Alternative 1 would provide similar opportunities for the introduction or spread of noxious weeds as described for the proposed action.

Alternative 2: Springwood Ranch Site

Vegetation impacts from Alternative 2 would be similar in type to those described for the proposed action and Alternative 1. A portion of the existing vegetation on the site would be temporarily disturbed for construction, while a fraction of that area would be permanently displaced by constructed project features. Grasslands (generally used for grazing now) and shrublands currently dominate the Springwood Ranch site and would be the vegetation communities most affected by Alternative 2. These communities have already been altered from historic conditions. Portions of the small ponderosa pine woodlands in the northwest corner of the site could be affected by clearing for construction of project facilities. Riparian shrub, riparian mixed and deciduous woodlands, and wetlands would be largely protected from development as a result of required shoreline setbacks along rivers and streams, as well as avoidance of adjacent wetlands.

Overall, the extent of vegetation impacts from Alternative 2 would be considerably less than those for the proposed action or Alternative 1, because of the substantial difference in capacity and number of turbines for Alternative 2. The total area of temporary disturbance for Alternative 2 would likely be approximately 110 acres, while approximately 28 to 30 acres of existing vegetation would be removed to accommodate permanent wind energy facilities. Alternative 2 would not result in adverse impacts to shrub-steppe habitat, as this vegetation community is very limited on the site. Alternative 2 would provide similar opportunities for the introduction or spread of noxious weeds, although the degree of risk would be correspondingly less based on the smaller size of the project in this case.

If the identified aspen stands, cliffs and talus areas within the Springwood Ranch site are found to meet the definition of priority habitats, avoidance of development-related impacts to these features would likely be sought. Instream, riparian and freshwater wetland habitats and riparian vegetation would be buffered. Some snags and down woody material might be eliminated by development within the limited woodlands on the site. White oak stands identified by IES (1990) in the northeastern part of the site should be avoided if possible. A white-oak woodland identified in the State priority habitat and species database as a high-quality ecosystem lies off-site and would not be affected by Alternative 2.

Based on information currently available, no impact to either federal or State threatened, endangered, or sensitive plant species would be expected to occur as a result of Alternative 2.

No Action Alternative

Under the No Action Alternative, the existing vegetation conditions would remain generally as they are, subject to ongoing agricultural operations and rural residential development. No impacts are expected to vegetation as a result of the No Action alternative. The existing vegetation communities in the project area would remain and be subjected to existing land management influences such as livestock grazing, other agricultural practices, and rural residential development.

Under the No Action alternative, no impacts to rare plant species would occur as a result of wind power development at the project area. Existing threats to rare plant species (i.e., from agricultural practices or rural residential development) would continue.

Noxious weeds could be introduced or spread through existing land use practices (e.g., agriculture, housing developments, road, etc). The degree of impact may be minimized or reduced through control measures implemented by Kittitas County and individual landowners.

3.4.1.4 Cumulative Impacts

Cumulative impacts for all elements of the environment are addressed in **Chapter 4**.

3.4.1.5 Mitigation Measures

Vegetation Types

During project construction, Best Management Practices would be employed to reduce peripheral impacts to adjacent native vegetation and habitats and to minimize the construction footprint. In addition, the project proponent would coordinate with the WDFW to mitigate for impacts to shrub steppe and grassland habitat. WDFW (2003) mitigation guidelines are expected to consist of acquisition of replacement habitat at a 2:1 ratio for permanent impacts to shrub steppe, a 1:1 ratio for permanent impacts to grassland, a 0.5:1 ratio for temporary impacts to shrub steppe and a 0.1:1 ratio for temporary impacts to grassland. Alternately, the project proponent could elect to contribute funds to a WDFW program to protect and manage shrub steppe vegetation, as outlined in the guidelines. To the greatest extent possible, mitigation for shrub steppe and grassland impacts would occur within the project area. The project proponent would also follow the management recommendations listed above for roads and utility crossings of riparian habitat to the greatest extent possible.

WDFW also identified several site reclamation or restoration measures that might further reduce vegetation impacts. A detailed reclamation and site restoration plan will be developed in consultation with the TAC and incorporated into the overall mitigation plan. The following measures could be incorporated into the mitigation plan to facilitate restoration of temporarily disturbed areas in the project:

- To the extent possible, construction should be timed to correspond with the late spring through fall period when soil moisture is lowest to prevent damage to soils and plants in temporary disturbance areas and thus facilitating reclamation efforts in these areas.
- Standards for site restoration should be established to evaluate success of reclamation measures and site restoration. The standards should be based on undisturbed reference areas of the different vegetation types within the project boundaries. The post construction restoration or

reclamation plan for the temporarily disturbed areas should include provisions for continuing active restoration until site stability or the reference standards are achieved.

- Site reclamation and reseeding should occur during the time of year when seed germination and establishment is most likely to be successful, or the next suitable planting period following disturbance. Temporary erosion control measures should be incorporated during reseeding to facilitate establishment of new seedlings.

Rare Plants

Due to the absence of known populations of rare plant species within the project area, no impacts are likely to occur and no mitigation measures are warranted.

Noxious Weeds

To avoid, minimize, or reduce the impacts of noxious weeds, the following mitigation measures should be implemented:

- The contractor should be required to clean construction vehicles prior to bringing them in to the project area from outside areas.
- Disturbed areas should be revegetated as quickly as possible with native species.
- Revegetation seed mixes and monitoring should be developed in consultation with WDFW, Kittitas County Weed Control Board, and other interested agencies.
- If hay is used for sediment control or other purposes, hay bales should be certified weed free.
- Noxious weeds that have established themselves as a result of the project should be actively controlled in consultation with the Kittitas County Weed Control Board.

3.4.1.6 Significant Unavoidable Adverse Impacts

There would be approximately 88 acres (less than 2 percent of the project area) of unavoidable displacement of existing vegetation in the project area. These impacts are not considered significant because they would not result in elimination of an entire vegetation type in the project area, loss of 10 percent or more of a priority habitat in the project area, or a decrease in species richness resulting from the loss of a plant population in the project area. No significant unavoidable adverse impacts to rare plants from construction, operation or decommissioning of the proposed project are expected. Similarly, the project is not expected to result in significant unavoidable adverse impacts related to potential introduction or spread of noxious weeds.

3.4.2 Wetlands

Affected Environment

Ecology & Environment, Inc. conducted a detailed wetland survey of the Desert Claim project area in June 2003. Wetland features within the area were identified and evaluated, and wetland boundaries were delineated. **Appendix B** provides detailed documentation of the methods used for the survey and the results compiled from the field records and subsequent analysis.

Project Area Wetland Features

Seventy-six (76) wetlands were delineated as wetland features within the study area. The wetlands were characterized by vegetation, soils and hydrology, as indicated in **Table 3.4-4**. **Figure 3.3-1**, a map of local hydrologic features, indicates the locations of wetlands in the project area (see **Section 3.3**).

Most of the wetlands identified were palustrine or fresh water emergent wetlands (National Wetland Inventory [NWI] code PEM) or palustrine scrub-shrub wetlands (PSS). Some were riparian wetland communities that are located around streams and other bodies of water where groundwater is close to the soil surface. The wetlands support a variety of emergent vegetation and willow shrubs.

Table 3.4-4
Summary of Wetlands in the Project Area

NWI Classification	Number of Wetlands by Hydrology			Total Number by NWI Classification
	Artificial Lower Quality Wetlands	Natural – Medium Quality Wetlands	Combination – Medium-Low Quality Wetlands	
PEM	53	9	7	69
PFO	2	1		3
PSS	3		1	4
Total Number	58	10	8	76

Palustrine Emergent Wetlands

Palustrine wetlands include all non-tidal wetlands which have a salinity due to ocean derived salts below 0.5 ppt. Palustrine emergent (PEM) wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens, that are present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. Sixty-nine of the total 76 wetlands in the project area exhibited characteristics of PEM wetlands.

Several stock ponds were also identified during the surveys. Those stock ponds with associated wetland vegetation outside the defined pond bed and bank were delineated as PEM wetland features. If the vegetation was confined to the pond banks, the feature was considered an isolated, non-jurisdictional surface water feature.

Vegetation in these wetlands consisted primarily of the following hydrophytic vegetation: Baltic rush (*Juncus balticus*), spike rush (*Eleocharis palustris*), slough sedge (*Carex obnupta*), red fescue (*Festuca rubra*), and monkey flower (*Mimulus guttatus*). These species constituted 80 to 100 percent of the vegetative cover and were present in many of the wetlands. Other dominant vegetation found in delineated wetland areas included Forget-me-nots (*Myosotis laxa*), White clover (*Trifolium repens*), and Iris (*Iris missouriensis*). These species constituted 50 percent or lower vegetative cover, but were present in a majority of the wetlands.

Palustrine Scrub-Shrub Wetlands

Palustrine scrub-shrub (PSS) wetlands are non-tidal, freshwater wetlands that are dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions. Four wetlands in the project area exhibited characteristics of PSS wetlands (FW-04, JPW-18, LD-01, and TWM-02). Willows (*Salix lucida* and *Salix exigua*) dominated the shrub layer in these wetlands. Two PEM wetlands also had portions within the wetland boundary that could be classified as PSS wetlands (LW-01 and LW-02). Cottonwoods (*Populus sp*.), willows, and nootka rose (*Rosa nutkana*) plants dominated these shrubby areas. Vegetation in the herbaceous layer of the PSS wetlands consisted of the following hydrophytic vegetation: bulrush (*Scirpus microcarpus*), spike rush, rushes (*Juncus sp*.) and sedges (*Carex sp.*).

Palustrine Forested Wetlands

Palustrine forested (PFO) wetlands are nontidal, freshwater wetlands that are characterized by woody vegetation that is 6 m tall or taller. Three PFO wetlands were delineated in the project area (Wetlands FW-03, NW-04, and MSW-05). Tall willow (*Salix nigra* and *Salix lucida*) and black hawthorn (*Crataegus douglasii*) trees dominated the tree layer in these wetlands. Vegetation in the herbaceous layer was dominated by the following hydrophytic vegetation: common horsetail (*Equisetum arvense)*, spike rush, grasses and rushes *(Juncus balticus)*. Willows were also present in the shrub layer of MSW-05. NW-04 had some open water dominated by duck weed (Lemna minor).

The majority of wetlands in the study area contained hydric soil indicators, such as gleyed and low-chroma colors, and reducing conditions, such as mottling.

Upland Areas

Nine areas delineated within the project area were determined to be non-wetland areas based on unmet wetland criteria such as non-hydric soils. Most of these areas did not support hydric vegetation and were sampled to determine the boundaries of other wetland areas. These areas are considered upland because they do not meet one of the three criteria for delineating wetlands.

Wetland Habitat Quality

While no wetlands in the project area support fisheries or other protected species, some wetlands were hydrologically connected to perennial streams such as Reecer Creek and/or associated riparian corridors. Wetlands JPW-06, JPW-12, JPW-15, JPW-20, JPW-21, and JPW-22, which are located on the western portion of the project area, are saturated wetlands adjacent to Reecer Creek. Wetland JPW-06 receives water from both an irrigation ditch and Reecer Creek. Other wetlands are also located along Green Canyon Creek, and the other perennial streams listed in table 6.2-1. Leaks from the North Branch Irrigation Canal also contribute water to wetlands on the western portion of the property south of the canal. Wetland JPW-17 receives water from the intermittent Jones Creek.

While the above wetlands were connected to perennial streams, many of the remaining wetlands delineated within the project area are fed by artificial irrigation. Numerous irrigation ditches flow from the North Branch Irrigation Canal across the properties to supply water to agricultural fields and/or grazing areas. During the delineation, it was noted where artificial irrigation supplied the only hydrology for the wet areas.

Development of the proposed project would require submittal of a Joint Aquatic Resource Permits Application (JARPA) for coordinated review of permits needed for project activities affecting aquatic resources such as stream channels and wetlands. It is conceivable that the agencies reviewing the JARPA documentation (the U.S. Army Corps of Engineers, Washington Department of Fish and Wildlife, Washington Department of Ecology and Kittitas County) would determine that some or all of the irrigation-fed wetlands are not jurisdictional wetlands.

The Kittitas County Critical Area Ornidance (KCCAO) defines wetlands into four categories (Section 17A.02.310), using the Department of Ecology wetland rating system. Category I, II, III and IV wetlands are classified according to the presence of protected species, high-quality plant communities, wetland functions and the level of hydrologic isolation. Category I or II wetlands provide documented habitat or contain federal or state listed or priority species, significant functions that may not be adequately replicated through creation or restoration, or high habitat value. No wetlands in the project area are known to provide habitat for federally listed species or significant functions or habitat value. Wetlands in the project area exhibit features characteristic of Category III or IV wetlands, which provide a moderate to low level of functions, have been disturbed by surrounding land-use activities, and provide less wetland vegetation diversity.

Wild Horse (Alternative 1) Site

Field surveys conducted in support of Zilkha's proposal for the Wild Horse project indicated that no wetlands (as defined by the U.S. Army Corps of Engineers) occur in areas that would be occupied by Alternative 1 project facilities or a 164-foot (50 meter) buffer around each facility.

Springwood Ranch (Alternative 2) Site

NWI maps (USFWS, 1987) identify 20 wetlands on the Springwood Ranch property that are classified as palustrine emergent, forested, open water and scrub-shrub systems, as well as riverine upper perennial habitats. Wetlands are found along the Yakima River, Taneum Creek, the eastern and northern slopes of Thorp Prairie, and along the valley floor in the southeast portion of the property. The wetlands are each less than 3 acres in size, with the exception of two larger wetlands of 8 acres each. Most are associated with irrigation channels or excavated ponds.

Approximately seven of the on-site wetlands are located on the western portion of the site, where wind turbines could be located (see Figure 4-2 in MountainStar DEIS, Vol. III, App. F, p.4-31). These identified wetlands are each less than 3 acres in area.

3.4.2.2 Impacts of the Proposed Action

Project activities would result in impacts to wetlands if they caused any of the following conditions:

- Disturbance to vegetation, soils, and hydrology as a result of vehicular traffic;
- Clearing of vegetation and soils, and the potential for increased erosion;
- Alteration of contours and subsequent hydrologic changes;
- Soil compaction from construction equipment;
- Buffer encroachment;
- Permanent filling-in of wetlands for turbine towers, transformers, or other above ground facilities;
- Permanent conversion of forested wetlands to emergent or scrub-shrub wetlands; and
- Permanent conversion of wetlands to roads.

As discussed in **Section 3.4.2.1**, 76 areas within the project area were identified as meeting all three wetland parameters. The wetlands delineated were identified as palustrine, emergent or scrub-shrub wetlands that support hydrophytic vegetation. Expected wetland impacts have been identified by comparing wetland locations mapped from the field survey results against the graphical layouts for the project systems documented in **Chapter 2**. Temporary wetland impacts were assumed to occur where the envelope of construction disturbance around various types of project facilities overlapped with mapped wetland area. Similarly, permanent wetland impacts were assumed to occur where the permanent footprint for various types of project facilities overlapped with mapped wetland area. The analysis method allows the areas of project facility overlap with wetland features to been calculated in terms of square feet or hundredths of an acre, but that level of detail should not be interpreted as the true level of precision embodied in current project plans.

The analysis indicated that the proposed construction areas would temporarily affect a total area calculated at 17.1 acres (based on the assumed dimensions for construction disturbance around tower foundations, around other project facilities such as the substation, and along access road and power collection alignments). The permanent footprint of the project facilities, including the turbines, permanent access roads, and the substation, would overlap with a wetland area calculated at 3.2 acres. **Table 3.4-5** provides a list of the individual wetlands within the project area that coincide at least partially with areas of construction disturbance and/or permanent project facilities. For each affected wetland, the table identifies (a) the total wetland acreage that would be temporarily affected by construction and (b) the wetland acreage that would be occupied by permanent project facilities. Field data sheets, photographs and other supporting documentation are included in **Appendix B**.

The activities associated with construction that might have a potential adverse impact on wetlands include: the temporary clearance of wetland vegetation, exposure of soil, and changes to contours and hydrology during construction; and the potential filling in or conversion of wetlands for permanent facilities. Temporary disturbance and filling in of wetlands could potentially affect the quality of wetlands and the overall wetland habitat in the project area.

Following installation of the wind power facilities, original contours and drainage patterns would be restored around the turbines, roads, and substations, thereby minimizing loss of wetland area or hydrological functions or associated impacts on wildlife habitat within the temporary disturbance zone. As such, it is assumed that all functions and values of emergent wetlands within the construction disturbance areas would be restored.

Table 3.4-5
Calculated Wetland Impacts

Property Legal Description/ Wetland ID	Temporary Impacts (acres)					Permanent Impacts (acres)				
	Turbines	Roads	Power Collection System	Substation	Total	Turbines	Roads	Power Collection System	Substation	Total
T19N R18E Sec 17 SE 1/4 ; T19N R18E Sec 20 E ½; T19N R18E Sec 21										
JPW-03	0.59	0.72	0.00	0.00	1.31	0.06	0.27	0.00	0.00	0.33
JPW-04	1.13	0.78	0.00	0.00	1.91	0.11	0.30	0.00	0.00	0.41
JPW-06	0.54	0.18	0.00	0.00	0.71	0.05	0.05	0.00	0.00	0.10
JPW-07	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
JPW-09	0.50	0.06	0.01	0.00	0.56	0.05	0.02	0.00	0.00	0.06
JPW-13	1.26	0.46	0.00	0.00	1.72	0.11	0.17	0.00	0.00	0.28
JPW-15	0.91	0.05	0.00	0.00	0.96	0.07	0.00	0.00	0.00	0.07
JPW-16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JPW-17	0.00	0.25	0.00	0.00	0.25	0.00	0.10	0.00	0.00	0.10
JPW-18	0.00	0.02	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.01
JPW-20	1.14	0.96	0.00	0.00	2.10	0.11	0.36	0.00	0.00	0.48
JPW-21	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
JPW-22	0.66	0.26	0.00	0.00	0.92	0.04	0.10	0.00	0.00	0.15
T19N R18E Sec 35 E ½										
LW-01	0.80	0.98	0.00	0.00	1.78	0.11	0.39	0.00	0.00	0.50
LW-02	0.00	0.09	0.00	0.00	0.09	0.00	0.03	0.00	0.00	0.03
T19N R18E Sec 28; T19N R18E Sec 27 N ½										
NW-03	0.01	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
NW-1B-07	0.33	0.29	0.00	0.00	0.63	0.00	0.12	0.00	0.00	0.12
T19N R18E Sec 25; T19N R19E Sec 30 W ½; T19N R19E Sec 31 W ½										
TMW-01	1.11	0.11	0.00	0.00	1.22	0.06	0.01	0.00	0.00	0.08
TMW-05	0.00	0.02	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.01
T19N R18E Sec 4 SE ¼; T19N R18E Sec 9; T19N R18E Sec 17 SW 1/4; T19N R18E Sec 20 W ½; T19N R18E Sec 29										
WC-02	0.00	0.07	0.00	0.00	0.08	0.00	0.02	0.00	0.00	0.02
WW-01	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00
WNW-01	0.80	0.00	0.00	0.00	0.84	0.10	0.00	0.00	0.00	0.10
WW-06	0.25	0.17	0.00	0.00	0.47	0.03	0.09	0.00	0.00	0.12
WW-07	0.96	0.12	0.00	0.00	1.09	0.11	0.04	0.00	0.00	0.15
WW-08	0.06	0.05	0.00	0.00	0.12	0.02	0.02	0.00	0.00	0.04
WW-09	0.01	0.08	0.00	0.00	0.10	0.00	0.01	0.00	0.00	0.01
WW-10	0.00	0.03	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.01
WW-13	0.00	0.15	0.00	0.00	0.18	0.00	0.05	0.00	0.00	0.05
Total Acreage	11.10	5.94	0.02	0.00	17.06	1.04	2.19	0.00	0.00	3.23

Table Notes:
This table only lists wetlands that have the potential to be impacted by construction or operation. For all other wetlands, there would be no impacts.

Turbines

For purposes of calculating temporary impacts, it is assumed that construction crews would require an operating area measuring 130 feet in radius around the base of each turbine. This factor translates into a total area of temporary construction disturbance of approximately 1.25 acres per turbine. Construction crews would use this area for constructing the tower foundations and storing topsoil, cleared vegetation and onsite supplies. Each wind turbine and associated tower is 12 feet in diameter. Permanent wetland impacts associated with turbine locations coinciding with wetland boundaries were calculated using a rectangular zone of permanent disturbance at each turbine location, measuring 120 feet long by 40 feet wide or 0.11 acres for each of the subject proposed turbine points; this corresponds to the area of the

crane pad that would need to be constructed at each turbine location. Pad-mounted transformers would also be installed at the base of each turbine. This includes the impacts from the pad-mounted transformers. The turbine towers and transformers would be permanent, impermeable, above ground facilities.

The assumed envelope of construction disturbance around the proposed turbine locations overlaps with the mapped boundaries of 18 wetlands. Wetlands within the temporary disturbance zone could be impacted by the clearance of vegetation and soil, alteration of contours and therefore hydrology, compaction from construction equipment, and vehicular traffic. A total of 12.5 acres of wetland area would be temporarily affected by construction disturbance for the turbines. For 14 of the 18 wetlands, map analysis indicates that the permanent footprint of the turbine pad itself would extend into the mapped wetland area. The permanent project facilities would displace a total wetland area estimated at 1.2 acres. Foundations placed within wetland areas would result in permanent filling-in of the feature in this area and loss of the wetland function in this area.

One turbine location in T19N R18E Section 20 is currently sited within a stock pond. This stock pond is the largest within the project area, so it is anticipated that the turbine would be re-located to avoid impacting the stock pond. Alternatively, it might be feasible and efficient to construct a replacement stock pond.

Access Roads

Each project access road is anticipated to be approximately 15 feet in width with a 2-foot shoulder on each side, and 20 feet plus shoulders on the curves. As such, permanent impacts to wetlands located coincident within the road system layout were calculated using a 19-foot road width, plus a 15 percent overall increase to account for curves and intersections to non-project roads. Within the permanent road footprint, the surface of the road would be cleared of vegetation and graded to a safe slope. For purposes of calculating temporary impacts, it was assumed that construction activity would occur within a 15-foot area on either side of the road alignment, for a total construction disturbance width of 50 feet, plus a 15 percent overall increase to account for curves and intersections to non-project roads. Construction crews would use this area for grading, widening, or otherwise improving existing or creating new roads. Cleared vegetation, soil, rocks and onsite supplies would be stored in the temporary disturbance zone. Where possible, existing roads would be improved to accommodate project access needs, rather than constructing new roads. As such, the 50-foot construction disturbance width might not be used to its entirety and impact calculations for areas of disturbance may overstate the actual extent of impact to some degree.

The assumed disturbance envelope for the access road layout overlaps the mapped boundaries for 25 wetlands, for which the area of temporary construction impact was calculated at 6.5 acres. Wetlands within the temporary disturbance zone could be impacted by the clearance of vegetation and soil and potential subsequent erosion, as well as compaction from construction equipment and vehicular traffic. The map analysis indicated that 2.4 acres of wetland area would be occupied by permanent access roads. Permanent roads placed within wetlands areas would result in conversion of wetland areas to roads.

Substation

The proposed substation in the northeastern corner of Section 21 would be approximately 300 feet by 300 feet in size or approximately 2.1 acres. During construction an extra 50 feet would be utilized on all sides for construction activities and storage. No wetlands are located within proximity of the proposed substation.

Power Collection System

The power collection system would be installed underground where reasonably possible within the project area. Wherever possible, the power collection cable would be installed adjacent to existing access roads, to minimize the extent of disturbance. The modified layout indicates there would be collection system crossings of 7 wetlands. While there would be no permanent above ground facilities associated with this collection system, there would be temporary impacts to wetlands from soil compaction, vegetation clearing or operation activities.

Construction crews would use a 10-foot wide area centered on the collection system for digging the trench and installing the underground cables. Therefore, a corridor of 10 feet was used for temporary impacts calculations on those areas outside of the access road blueprint. Map analysis indicates that a total area estimated at 0.02 acres would be within the temporary disturbance zone associated with the underground collections system. Wetlands within the temporary disturbance zone would be disturbed by the clearance of vegetation and soil and potential subsequent erosion, as well as compaction from construction equipment and vehicular traffic.

Other Project Elements

The O&M facility would be co-located with the project substation, which is not located near wetlands and would have no wetland impacts. The internal project communication lines would be installed in the same trench or furrow as the power collection cables, and would have no incremental impacts on wetlands. The five proposed permanent meteorological towers for the project would be free-standing structures with a narrow base and small permanent footprint of several feet square, with a surrounding temporary disturbance zone with a radius of approximately 50 feet. None of these facility locations are near wetlands, and construction of the met towers would have no temporary or long-term impacts on wetlands. The project visitor facilities, which would consist of a small roadside turnout and an information kiosk, would be constructed at an appropriate site along Smithson Road that would avoid impacts to wetlands. and the specific locations of the construction staging areas have not yet been determined, but it is assumed these facilities would be located so as to avoid impacts to wetlands. Consequently, all project impacts to wetlands would be associated with the turbines, access roads and power collection system.

Summary of Wetland Impacts

Determination of total wetland impacts for the modified project layout involved aggregating the calculated wetland impacts for the turbines, access roads and power collection system. As indicated by the entries in **Table 3.4-5**, the total area of temporary wetland impacts from construction disturbance has been calculated at 17.1 acres. The permanent footprint of the project as modified would displace existing wetland area estimated at approximately 3.2 acres. Required mitigation for these wetland impacts is discussed in **Section 3.4.2.5**.

Virtually all of the temporary and permanent wetland impact would occur in Category III wetlands. Of the 76 wetlands present onsite, 70 are Category III (average value) wetlands and 6 are Category IV (less than average value) wetlands. Twenty-eight wetlands would be affected by the project. Only one Category IV wetland, NW-03, would experience temporary impacts to 0.03 acre; there would be no permanent impacts to this Category IV wetland. The rest of the temporary impacts (17.03 acres) and all of the permanent impacts (3.2 acres) would occur in Category III wetlands.

3.4.2.3 Impacts of the Alternatives

Alternative 1: Wild Horse Site

No wetlands (as defined by the U.S. Army Corps of Engineers) occur in areas that would be occupied by Alternative 1 project facilities or a 164-foot (50 meter) buffer around each facility. Therefore, no wetland impacts would be expected for this alternative.

Alternative 2: Springwood Ranch Site

Development of a wind energy project on the Springwood Ranch property could affect existing wetland habitats, primarily as a result of access road and collection cable routes through or near wetland areas. All or portions of 7 of the identified 20 wetlands on the site (Wetlands 1, 2, 4, 5, 6, 7 and 10) occur in areas along the Yakima River and likely would not be disturbed by construction activities. Similarly, all or portions of eight of the identified wetlands (Wetlands 11, 12, 15, 16, 17, 18, 19 and 20) are in the southern part of the site, in which no wind turbines would be located. The remaining wetlands lie in the northern and western portions of the site and would be subject to temporary disturbance by construction activity or displacement by permanent project facilities. Careful micro-siting might be able to avoid some potential wetland impacts. Wetlands 4, 6, 9, and 15 traverse nearly the entire width of the Springwood Ranch property, however, and required access roads and construction circulation patterns would likely result in some direct impacts to these wetlands and their buffers. The total area of potential wetland impact cannot be determined, due to the conceptual nature of the site plan for Alternative 2 and the general nature of the existing information on wetland locations and characteristics.

Potential indirect impacts to wetlands would be similar to those described for the proposed action. Increased impervious surfaces could result in increased water level fluctuations and pollution and sediment loading to retained wetlands. Loss of pervious surfaces could result in decreased water levels to wetlands that rely on groundwater discharge. The net change in impervious surface cover would be quite small in relation to the total area of the site, however, and it is unlikely that indirect impacts to wetlands would be significant. Application of construction BMPs and careful site planning could minimize or avoid some of the potential indirect impacts to wetlands.

No Action Alternative

Under the No Action Alternative, the proposed wind power facility would not be constructed. As such, the No Action Alternative would result in no new predictable impacts to wetlands within the project area. Past and current effects to wetlands from existing land uses would continue for the foreseeable future. Additional land use conversion and low-intensity residential development would be possible over the long term, and could result in additional direct and indirect impacts to wetlands.

3.4.2.4 Cumulative Impacts

Cumulative impacts for all elements of the environment are addressed in **Chapter 4**.

3.4.2.5 Mitigation Measures

The applicant proposes to conduct a micro-site analysis for the turbines and project access roads during the JARPA and Critical Areas review process to avoid and/or minimize impacts to water bodies and/or wetlands. In addition, the area of temporary construction disturbance, which has been calculated as a 130-foot radius around each turbine, would be shifted to the extent possible to avoid construction impacts in wetlands. The project access road system would be designed to use existing roads where possible.

Any work adjacent to wetlands would adhere to applicable federal and state regulations and would be addressed in the Washington Department of Ecology Stormwater Construction Discharge Permit, Stormwater Pollution Prevention Plan (SWPPP), and Temporary Erosion and Sedimentation Control Plan (TESCP). Other measures to reduce or control impacts include compliance with applicable requirements of KCCAO regulations (Title 17A), the State Water Code (RCW chapter 90.03), and the State Water Pollution Control Act (RCW chapter 90.48).

Furthermore, if wetland communities were disturbed during construction, the following measures would be implemented:

- Site conditions would be restored and disturbed areas revegetated, as appropriate.
- Areas requiring revegetation would be identified by a qualified restoration ecologist in conjunction with landowners and interested agencies; and
- If needed, a revegetation plan would be developed for wetland and riparian communities. The revegetation plan would include mitigation requirements, design specifications, an implementation plan, maintenance requirements, and a monitoring program.

Temporary impacts would be restored, and permanent impacts replaced through wetland creation or enhancement in accordance with the Kittitas County Critical Area Ordinance (KCCAO Section 17A.04.050, Ord. 94-22 (part), 1994). Wetland creation, restoration, and enhancement ratios based on the wetland categories are summarized in **Table 3.4-6**. These ratios are general guidelines that are adjusted up or down based on the likelihood of success of the proposed mitigation and the expected length of time needed to for the wetlands to reach maturity.

Table 3.4-6
Wetland Mitigation Ratios

Wetland Category	Creation and Restoration	Enhancement*
Category I (all types)	6:1	12:1
Category II or III		
▪ Forested	3:1	6:1
▪ Scrub/Shrub	2:1	4:1
▪ Emergent	2:1	4:1
Category IV	1.25:1	2.5:1

* For wetland enhancement, the ratios are doubled. Enhancement as compensation for wetland losses results in a net loss of wetland area and the net gain in wetland function from enhancement is usually less than from creation or restoration.
Taken from Washington State Department of Ecology, How Ecology Regulates Wetlands, March 1998, Publication No. 97-112.

If turbine and road locations cannot be shifted through the micro-siting analysis to avoid permanent impacts to wetlands, a specific mitigation plan would be developed in conjunction with the U.S. Army Corps of Engineers, Department of Ecology and Kittitas County. Replacement ratios are determined by the quality of the wetland impacted, or the wetland category. The actual replacement, enhancement or creation ratio would be determined during the permitting process with those same parties, which would take into account the wetland function, acreage, category and location. Through this required mitigation process, all permanent project impacts to wetlands would be mitigated through avoidance of wetland areas, enhancement of existing wetlands to improve their function and value, restoration of affected wetland areas, and/or creation of replacement wetland habitat.

Because essentially all of the identified impacts would occur in Category III wetlands, the applicable mitigation ratios would be 2:1 for wetland creation and restoration and 4:1 for wetland enhancement; none of the forested wetlands in the project area would be affected. If the calculated permanent wetland impacts could not be avoided and mitigation occurred in the form of wetland creation/restoration, the mitigation plan would address the creation and/or restoration of approximately 6.4 acres of wetlands.

3.4.2.6 Significant Unavoidable Adverse Impacts

With appropriate mitigation, all potential temporary and permanent wetland impacts identified in **Section 3.4.2.2** would be avoided, counteracted through restoration, or offset through provision of compensatory wetland enhancement or development at the appropriate ratios. Therefore, no significant unavoidable adverse impacts to wetlands are expected as a result of the proposed project.

3.4.3 Wildlife

3.4.3.1 Affected Environment

The U.S. Fish and Wildlife Service (USFWS) has the primary responsibility for compliance with federal wildlife laws including the Endangered Species Act (ESA), Fish and Wildlife Coordination Act, Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act (MBTA). The Washington Department of Fish and Wildlife (WDFW) is responsible for protecting and perpetuating state fish and wildlife resources. WDFW has identified those fish and wildlife resources that are a priority for management and conservation. These records are maintained in a priority habitats and species database (PHS) and are defined geospatially and by status. *Priority habitats* are habitat types with unique or significant value to a diverse assemblage of species. A priority habitat may consist of a unique vegetation type or dominant plant species, a described seral (successional ecological community) stage or a specific structural element. *Priority species* are fish and wildlife species requiring efforts to ensure their perpetuation because of their low numbers (e.g., State Endangered, Threatened, Sensitive and Candidate Species), sensitivity to habitat alteration, tendency to form vulnerable aggregations, or because they have commercial, recreational or tribal importance (Washington Department of Fish and Wildlife 1996; Knutson and Naef 1997). In Washington, state-listed animal species are not specifically protected by statute or regulation, but are listed to assist with agency wildlife management efforts and decision-making.

Desert Claim Project Area

The study area for the Desert Claim EIS is located in the extreme west central region of the Columbia Basin physiographic province and immediately adjacent to the southeastern reach of the Northern

Cascades province. This land platform consists of incised rivers, extensive plateaus and ridges, and basaltic outcrops and cliffs (Lasmanis 1991). The study area historically was a transition zone between grassland/shrub-steppe and coniferous vegetation zones, dissected by small streams and patches of deciduous trees and shrubs (Franklin and Dyrness 1988). While coniferous forest still remains to the north, agriculture and livestock grazing have converted the lower-elevation valley to a land-use mosaic of grazed shrub-steppe, pastures, and hay and crop fields. The study area primarily consists of grassland and shrub-steppe habitats ranging from poor to moderate quality for wildlife. The majority of the riparian areas reflect channelized or ditched streams for irrigation purposes.

Information about wildlife populations and species of state or federal status potentially occurring in the study area were obtained from WDFW and USFWS. These agencies were also an integral component to the preparation and augmentation of the final study plan and protocols used in the 2002-03 avian baseline surveys. The overall objectives of the baseline avian studies conducted at the Desert Claim site were twofold: 1) to gather information that could be used to describe or predict potential impacts from the wind plant; and 2) to gather information that could be used to assist in design of a wind plant that would reduce or minimize risk to wildlife resources. The surveys included: (1) fixed-point counts to estimate temporal and spatial use of the study area by birds, game species, and other wildlife (March 2002 through March 2003)); (2) incidental wildlife observations recorded while traveling between point counts; (3) aerial raptor nest surveys documenting nest locations and activity (May and June 2002)); and (4) winter bald eagle driving surveys (2002 and 2003). A summary of results from these surveys is presented here and supplemented with information from the WDFW PHS database and GAP analysis program (GAP 1999). The GAP project is based on 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. Detailed results of the baseline studies are presented in a technical report (Young et al. 2003a) included as **Exhibit 2** to **Appendix C**.

Birds

A full description of the study design and analysis, results, tables and figures, and maps of avian-use (raptors), are provided in the final report (Young et al. 2003a). From the fixed-point surveys, avian-use estimates of the study area by species and groups were standardized by calculating the number of detections per survey (30 minutes) to a fixed plot (800 m radius). Frequency of occurrence was calculated as the percent of surveys where a particular species was observed, and species composition was the mean use for a species divided by the total use for all species and multiplied by 100 to provide percent composition. A relative exposure index was calculated as the product of the mean relative use for a species times the proportion of all observations of that species flying times the proportion of all flight height observations of that species within the rotor-swept area.

Table 3.4-7 presents a summary of the fixed-point surveys by bird group (e.g., waterfowl), species, total number of individuals seen, mean use, percent composition, frequency of occurrence, and relative exposure index. Passerines comprised 48 percent of all groups observed and 72 percent of the total number of birds observed. Raptors comprised approximately 23 percent of all groups but only 5 percent of all birds observed. Waterfowl comprised only 3 percent of all groups but 13 percent of all birds observed, corvids (magpies, crows, and ravens) comprised approximately 14 percent of all groups and 5 percent of all birds observed, and other birds (upland gamebirds, shorebirds, doves, and other non-passerine species) comprised approximately 12 percent of all groups and 5 percent of all birds observed.

Table 3.4-7
Avian Species Observed On-Site Between March 2002 and March 2003

Group/Species	Total Observations	Average Use	Percent Composition	Frequency of Occurrence	Exposure Index
Waterfowl/Waterbirds	**532**	**2.605**	**11.38**	**12.08**	
Canada goose	32	0.160	0.70	1.02	0.065
mallard	492	2.399	10.48	8.98	2.194
northern pintail	4	0.019	0.08	0.46	0.019
great blue heron	4	0.028	0.12	2.08	0.014
Shorebirds	**84**	**0.576**	**2.52**	**22.45**	
killdeer	64	0.438	1.91	21.76	0.092
common snipe	20	0.139	0.61	9.03	0.097
Corvids	**193**	**1.102**	**4.82**	**46.57**	
American crow	8	0.044	0.19	3.01	0.000
black-billed magpie	100	0.572	2.50	30.32	0.064
common raven	85	0.487	2.13	25.23	0.149
Upland Gamebirds	**94**	**0.549**	**2.40**	**13.06**	
California quail	84	0.494	2.16	10.05	0.000
gray partridge	7	0.037	0.16	1.16	0.000
ring-necked pheasant	3	0.019	0.08	1.85	0.000
Doves					
mourning dove	5	0.035	0.15	2.78	0.000
Raptors	**193**	**1.151**	**5.03**	**58.61**	
Accipiters	9	*0.057*	*0.25*	*5.05*	
sharp-shinned hawk	3	0.021	0.16	3.66	0.014
Cooper's hawk	6	0.037	0.09	1.39	0.012
Buteos	*96*	*0.563*	*2.46*	*36.34*	
red-tailed hawk	60	0.370	1.62	29.54	0.212
rough-legged hawk	34	0.193	0.84	13.52	0.078
Eagles	*14*	*0.054*	*0.23*	*3.89*	
bald eagle	13	0.049	0.21	3.43	0.026
golden eagle	1	0.005	0.02	0.46	0.005
Falcons	*26*	*0.178*	0.78	14.12	
American kestrel	23	0.162	0.71	12.50	0.049
prairie falcon	3	0.016	0.07	1.62	0.011
Other Raptors					
great-horned owl	7	0.045	0.20	4.49	0.000
northern harrier	23	0.142	0.62	11.44	0.019

Table 3.4-7
Avian Species Observed On-Site Between March 2002 and March 2003

Group/Species	Total Observations	Average Use	Percent Composition	Frequency of Occurrence	Exposure Index
turkey vulture	18	0.111	0.49	9.03	0.068
Passerines	**2875**	**16.774**	**73.29**	**79.17**	
American goldfinch	127	0.662	2.89	10.51	0.073
American pipit	11	0.076	0.33	1.39	0.076
American robin	535	3.214	14.04	22.73	1.340
bank swallow	4	0.037	0.16	1.85	0.019
barn swallow	26	0.192	0.84	4.63	0.059
black-capped chickadee	19	0.097	0.42	4.26	0.000
Brewer's blackbird	109	0.833	3.64	14.12	0.145
Brewer's sparrow	3	0.021	0.09	1.39	0.000
Bullock's oriole	8	0.067	0.29	4.86	0.000
cedar waxwing	27	0.192	0.84	4.40	0.036
chipping sparrow	1	0.007	0.03	0.69	0.000
dark-eyed junco	115	0.584	2.55	4.21	0.000
eastern kingbird	6	0.044	0.19	4.40	0.007
European starling	1210	6.464	28.24	16.02	3.830
golden-crowned kinglet	4	0.028	0.12	0.69	0.000
gray-crowned rosy finch	9	0.063	0.27	1.39	0.063
horned lark	53	0.321	1.40	14.68	0.024
house finch	78	0.431	1.88	1.02	0.000
house wren	1	0.007	0.03	0.69	0.000
lark sparrow	2	0.014	0.06	0.69	0.000
Lincoln's sparrow	1	0.007	0.03	0.69	0.000
mountain bluebird	13	0.093	0.40	4.17	0.000
Nashville Warbler	3	0.021	0.09	0.69	0.000
northern shrike	10	0.052	0.23	5.23	0.000
orange-crowned warbler	2	0.014	0.06	0.69	0.000
red-winged blackbird	49	0.329	1.44	4.86	0.020
ruby-crowned kinglet	3	0.019	0.08	1.16	0.000
sage thrasher	13	0.097	0.42	8.10	0.000
savannah sparrow	8	0.056	0.24	1.39	0.000
song sparrow	3	0.021	0.09	2.08	0.000
spotted towhee	10	0.065	0.28	3.24	0.000
tree swallow	7	0.053	0.23	3.01	0.000
unidentified empidonax	2	0.014	0.06	0.69	0.000
unidentified finch	127	0.604	2.64	1.16	0.571
unidentified passerine	3	0.017	0.07	0.56	0.017
unidentified swallow	4	0.028	0.12	1.39	0.021
varied thrush	1	0.006	0.02	0.56	0.000
vesper sparrow	64	0.479	2.09	20.37	0.000
violet-green swallow	2	0.014	0.06	0.69	0.014
western kingbird	11	0.086	0.37	3.70	0.047
western meadowlark	159	1.127	4.93	38.89	0.007
western tanager	4	0.030	0.13	1.66	0.000

Table 3.4-7
Avian Species Observed On-Site Between March 2002 and March 2003

Group/Species	Total Observations	Average Use	Percent Composition	Frequency of Occurrence	Exposure Index
white-crowned sparrow	14	0.097	0.42	2.08	0.000
winter wren	1	0.005	0.02	0.46	0.000
yellow-rumped warbler	13	0.090	0.39	1.39	0.000
Other Birds					
common nighthawk	1	0.007	0.03	0.69	0.007
downy woodpecker	1	0.007	0.03	0.69	0.000
northern flicker	13	0.074	0.32	6.94	0.000
unid'd. hummingbird	1	0.007	0.03	0.69	0.000
Total	**3992**				

Source: Young et al 2003a (see **Appendix C**)

Use of the study area varied among bird groups across seasons. For spring, based on use, the four most abundant species in the study area were American robin (4.58 detections/30-minute survey), western meadowlark (2.66 detections/survey), European starling (2.13 detections), and Brewer's blackbird (1.36). Together these species comprised approximately 52 percent of the total bird use during the spring. During the summer, the four most abundant species were European starling (2.37 detections/survey), Brewer's blackbird (2.22), western meadowlark (1.02), and American goldfinch (0.56). These species comprised approximately 49 percent of the total bird use during the summer. In the fall, the four most abundant species were European starling (5.81 detections/survey), American robin (3.76), California quail (0.93), and Western meadowlark (0.87), which comprised more than 62 percent of the total bird use. In the winter, the four most abundant species were European starling (13.45), mallard (6.74), American robin (3.73), and unidentified finch (1.82). These species comprised more than 72 percent of the total bird use for the winter. Overall seasons, European starling was the most common bird observed with 6.46 detections per survey, followed by American robin (3.21), mallard (2.40), and western meadowlark (1.13). These four species comprised more than 57 percent of all bird use of the site for the year.

Only two species, western meadowlark (38.9 percent of surveys) and black-billed magpie (30.3%) were observed in more than or roughly one-third (33%) of the surveys. Five other species, red-tailed hawk (29.5%), common raven (25.2%), American robin (22.7%), killdeer (21.8%) and vesper sparrow (20.4%) were observed in approximately one-quarter (25%) of the surveys. Together, these seven species made up approximately 30 percent of all bird use (29.2%). In contrast, European starling alone made up 28.2 percent of all bird use at the site but was only observed in 16 percent of the surveys. The high bird use for starling was due to the majority of observations being large flocks. Eight other species, European starling (16.0%), horned lark (14.68%), Brewer's blackbird (14.1%), rough legged hawk (13.5%), American kestrel (12.5%), northern harrier (11.4%), American goldfinch (10.5%), and California quail (10.1%) were observed in more than 10 percent of the surveys. The majority of species were observed in less than 5 percent of the surveys.

Bald eagle was the only federally listed species observed in the study area (see threatened and endangered species section). Four Washington State candidate species, golden eagle, sage thrasher, loggerhead shrike, and northern goshawk, were also recorded during the study (addressed in threatened and endangered

species appendix). A single golden eagle and numerous sage thrashers were observed during the point count surveys. The northern goshawk and loggerhead shrike were observed during bald eagle roadside surveys. The PHS database contains records of long-billed curlews, northern goshawks and golden eagles within 2 miles of the study area.

Raptor Nests

Two aerial surveys for raptor nests were conducted within the study area plus a 2-mile radius buffer. The total area searched was approximately 52 square miles (134 km^2). A total of 29 raptor or large stick nests were located, 18 of which were classified as active raptor nests during the first survey (**Table 3.4-8**). Nest density for buteos, red-tailed hawk and unidentified buteo was 0.28 nest/mi^2 (0.11 nest/km^2). Nest density for all raptors located, buteos and owls, was approximately 0.34 nest/mi^2 (0.13 nest/km^2). The PHS database contains records of northern goshawks and golden eagles within 2 miles of the study area.

Table 3.4-8
Raptor and Large Bird Nests Located in The Raptor Nest Survey Area (Study Area Plus Area Within a 2-Mile Radius Buffer).

Species	Number Active Nests	Number of Nests Which Produced Young	Total Young Observed (young per successful nest)
Red-tailed hawk	12	8	18 (2.25)
Unknown buteo	3	0	unk
Great horned owl	3	2	7 (2.3)
Inactive nests	11	N/A	N/A

Mammals

Eight species of mammals were recorded in the study area; mule deer, elk, porcupine, raccoon, long-tailed weasel, yellow-bellied marmot, least chipmunk, and coyote (Young et al. 2003a). Big game issues are addressed below. Other species of mammals that may occur in the study area include California ground squirrel, deer mouse, Great Basin pocket mouse, western harvest mouse, vole species, northern pocket gopher, bushy-tailed woodrat, Nuttall's cottontail, striped skunk, badger, bobcat, muskrat, beaver, and a variety of bat species. One historic gray wolf observation, located approximately 1.5 miles to the northeast of the northern boundary of the study area, is recorded in the PHS database. One whitetail jackrabbit PHS record exists about 3 miles east of the study area. All other relevant PHS records (gray wolf, grizzly bear, wolverine, fisher, western gray squirrel) occur much farther to the north in the Wenatchee National Forest.

Factors influencing the possible occupancy of the study area by bat species include the presence of suitable forage and roost sites, and/or the area's location with respect to a migratory pathway. Attributes of these factors vary among species. Fourteen bat species have the potential to occur in the region of the study area (based upon predicted distributions from GAP). The likelihood of such occurrences, based upon species locality records and habitat affinity, is summarized in **Table 3.4-9**. Results from more intensive inventories of the Hanford Site's Arid Lands Ecology Reserve (ALE), located in the northwest region of Benton County, were also reviewed.

Table 3.4-9
Bat Species Potentially Occurring on or Near the Study Area

Common and 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; records in adjacent N Yakima county and ALE	GAP 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; records near Yakima, along Columbia river of E Kittitas county, and on ALE	GAP 1999; England 2000; West *et al.*, 1998, 1999
long-eared myotis *Myotis evotis*	Primarily forested habitats and edges, juniper woodland, mixed conifers, riparian areas; roosts snags, crevices, bridges, buildings, mines	Possible; record(s) in S Douglas county	GAP 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; records in adjacent S Chelan county and on ALE	GAP 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	Unlikely; no records from adjacent counties, few records in state, not documented on ALE	GAP 1999; England, 2000; TNC, 1999
long-legged myotis *Myotis volans*	Coniferous and mixed forests, riparian areas; roosts caves, crevices, buildings, mines	Possible; records from S Douglas county and on ALE	GAP 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; records from near Yakima, N Yakima county, W Grant near Columbia river, and on ALE	GAP 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	GAP 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	GAP 1999; England, 2000; West *et al.*, 1998, 1999
western pipistrelle *Pipistrellus hesperus*	Primarily desert lowlands; desert shrublands; canyons; roosts under rocks, crevices and possibly in sagebrush	Unlikely; core habitat and records restricted to Columbia and Snake river ecosystems	GAP 1999; England, 2000; West *et al.*, 1998, 1999

Table 3.4-9
Bat Species Potentially Occurring on or Near the Study Area

Common and Scientific Name	Typical Habitat	Expected Occurrence in Project Area	Occurrence Documentation
big brown bat *Eptesicus fuscus*	Generally deciduous forests; buildings; roosts in buildings, trees, crevices; hibernates in caves, mines	Possible; records in NE and S Kittitas county, and adjacent counties and ALE	GAP 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; core habitat restricted to Columbia and Okanogan river ecosystems	GAP 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	GAP 1999; England, 2000; TNC, 1999
pallid bat *Antrozous pallidus*	Generally occurs in arid regions, desert scrub habitats; roosts in cliff faces, buildings, but seldom in caves or mines	Unlikely due to lack of suitable habitat; records restricted to Columbia river system	GAP 1999; England, 2000; West *et al.*, 1998, 1999

Reptiles and Amphibians

Twenty-seven species of reptiles and amphibians occur in Kittitas County, however this number also represents records from the Cascade foothills, Wenatchee Mountains, and the Columbia basin. Two species of reptiles were recorded in the study area (short-horned lizard and western terrestrial garter snake). The study area of the intermontane Kittitas Valley (valley) may also harbor the common garter snake, Great Basin gopher snake, western yellow-bellied racer, rubber boa, northern Pacific rattlesnake, northwestern fence lizard, and western skink. Although in the peripheral zone of the species core habitat, a record of the sharptail snake does exist along the Yakima River in the western part of the valley. The nightsnake, sagebrush lizard, and side-blotched lizard, all likely occur out of the valley to the east in the arid, low-elevation habitats adjacent to the Columbia River.

The Columbia spotted frog and Pacific treefrog may occur in the study area. A record of the Great Basin spadefoot toad exists in the valley; however, this species is probably restricted to the sandy habitats of the Yakima River floodplain. The western toad and long-toed salamander are unlikely to occur in the study area based upon the predicted distribution of their peripheral zone, however these species do have patchy records in other regions of the county where isolated suitable habitats occur. Therefore, these species may exist in the canyons and ravines to the north of the study area.

Big Game

Mule deer was the only species of big game commonly observed in the project area (Young et al. 2003a). Observations occurred during all seasons, however there was an increase during winter. Mule deer were somewhat evenly distributed over the study area, exhibiting some affinity toward sagebrush steppe. The majority of the study area is within the Ellensburg mule deer winter range; the Dry Creek mule deer wintering concentration area is about 1.5 miles to the southwest, and the Dunning mule deer wintering

concentration area is about 1 mile northeast of study area. During March 2002 and March 2003, two groups of elk were observed incidentally (one group per year) between Johnson and Reecer Canyons within the Quilomene elk migration corridor. No elk were observed within the study area, although increased levels of scat during early spring were noted near an avian fixed-point location in the Currier Creek riparian area.

Threatened and Endangered Species

The potential occurrence of threatened, endangered and sensitive wildlife species in the Desert Claim project area is discussed in detail in **Appendix C, Exhibit 1**.

Wild Horse (Alternative 1) Site

The Wild Horse site is also located within the general shrub-steppe region of central Washington. In an undisturbed condition, this area is usually distinguished by big sagebrush as the principal shrub and bluebunch wheatgrass as the principal grass. A baseline study similar to that conducted for the Desert Claim project area has also been performed for the Wild Horse site. The following discussion is based primarily on the report from that study (Erickson et al. 2003).

Many of the bird species observed at the project site are typical of shrub-steppe and grassland-steppe habitats (Erickson et al. 2003). Small passerine species such as horned lark, western meadowlark, vesper sparrow, Brewer's sparrow, and sage thrasher were commonly observed on the site. Other small passerine bird species commonly observed were mountain bluebird and American robin. European starlings, gray-crowned rosy finches and snow buntings (winter) were observed less frequently, but in large groups. Common ravens were also frequently observed on site. The most commonly observed raptors were red-tailed hawk, American kestrel, golden eagle, and northern harrier, with infrequent or single observations of prairie falcon, sharp-shinned hawks, rough-legged hawk, merlin and bald eagle. Very few active raptor nests were observed within the project site, and no nests were found within ½ mile of proposed turbines.

Sage grouse have historically been observed on the Wild Horse site during the spring and winter, although apparently no leks have been confirmed. Surveys conducted in 2003 did not confirm any lek activity.

The potential for bats to occur is based on key habitat elements such as food sources, water, and roost sites. Due to the dominant vegetation type and terrain, potential roost structures such as trees or talus slopes are limited within the Wild Horse site. Trees exist near the "the Pines" area near Government Springs and within the riparian corridors along Whiskey Dick and Skookumchuck Creeks. The various springs within the area may be used as foraging and watering areas. There are some talus slopes and rocky outcrops scattered throughout the site that could also provide roosting opportunities for bats.

Little is known about bat species distribution, but several species of bats could occur in the Wild Horse 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. California bat, small-footed myotis, little brown bat, long-legged myotis, Yuma myotis, western pipistrelle, big brown bat, pallid bat, hoary bat, and silver-haired bat have all been documented on the nearby ALE Reserve (TNC 1999). Both hoary bats and silver-haired bats, two common fatalities at other wind plants, are expected to migrate through the study area. Other mammals that likely exist within the Wild Horse site include, badger, coyote, pocket gopher, Paiute ground squirrels and other small mammals such as rabbits, voles and mice.

The Wild Horse site 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 site is approximately ½ mile (0.80km) from the Colockum elk calving area. The Quilomene elk winter range is approximately 83,000 acres in size and winters approximately 1500-2000 elk. The Quilomene mule deer winter range is approximately 40,000 acres in size and winters approximately 700-800 deer. The site 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 Wild Horse site, and extends to the east towards the Columbia River. The site is also not located within the Quilomene primary elk 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 green up with fall and winter rains, while mule deer likely utilize more shrub species in the 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 other seasons and some individuals are likely year-round residents. 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 historically been allowed on the Wild Horse lands.

Twenty-seven species of reptiles and amphibians occur in Kittitas County and could potentially be present in the Wild Horse area depending on habitat preferences. Short-horned lizards were commonly observed within the project area (Erickson et al 2003). Other reptiles that may likely occur on the site include snakes such as the yellow-bellied racer and rattlesnakes. Amphibian and aquatic reptile habitat is minimal within the area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable wetlands and during fall dispersal of juveniles; however, there are no known amphibian migration corridors in the area.

Springwood Ranch (Alternative 2) Site

Baseline studies comparable to those reported for the Desert Claim and Wild Horse sites have not been conducted for the Springwood Ranch site. The following discussion is based on existing published information (primarily the MountainStar Resort EIS [Kittitas County, 1999] and existing data sources such as the WDFW PHS database. In general, animals adapted to open grasslands, or the ecotone between forest and grasslands, would be expected to occur on the Springwood Ranch site. The open, grass-dominated habitats that form the bulk of the site limit its use by forest wildlife. Animals dependent on extensive forest cover would not occur on this site.

Reptiles and Amphibians

The site is most likely host to several species of lizards, snakes, toads, frogs, and salamanders. Short-horned lizards, western skink, and western fence lizards could be found in most habitats on the site, and Northern alligator lizards may be found in the forests or forest openings habitat. Several garter snake species, ringneck snake, rubber boa, gopher snake, yellow-bellied racer, western rattlesnake and possibly sharp-tailed snake may also be found on site based on habitats present. Amphibians require wetlands or aquatic habitats for their occurrence and would be far more limited than reptiles. Bullfrogs, spotted frog, western toad, Pacific tree frogs, and rough-skinned newts are likely the most common amphibians in the area.

Birds

A wide variety of bird species are likely to inhabit the site. The vegetation distribution for the site suggests the overall bird community at the site is likely very similar to that of the Desert Claim project area. Of the raptor species, a large number of bald eagles, few golden eagles, red-tailed hawks, rough-legged hawks, northern harriers, turkey vultures, American kestrels, owls (most likely short-eared), and falcons have been observed on the site. Of game bird species, ring-necked pheasant, California quail, chukar, gray partridge, mallards, and green-winged teal have all been observed. Crow, raven, black-billed magpie, meadowlarks, black birds, starlings, house sparrows and great blue herons were also determined to be present.

Mammals

A number of mammal species are likely to use the habitats found on the site. The Joe Watt/Robinson sub-herd of the Yakima elk herd can be found to the south of this area, and some elk activity has been detected along the Yakima River and the John Wayne Trail on the property. An elk fence along the south side of I-90 largely prevents the animals from crossing the highway. A small herd of deer was noted using the bluffs on the south side of the Yakima River, as well as the flats off the property on the east. Several species of bats are also likely to use the site, similar to the Wild Horse and Desert Claim sites.

Endangered, Threatened, and Sensitive Wildlife Species

Neither the federally listed gray wolf nor the northern spotted owl are likely to occur within the site due to the lack of suitable habitats. Bald eagle has been observed using the Springwood Ranch site during the winter and is a relatively abundant winter resident of the Yakima River riparian corridor east of the site.

Federally listed Species of Concern which could occur in suitable habitats on the site include the tailed frog, Columbia spotted frog, northern goshawk, western burrowing owl, olive-sided flycatcher, loggerhead shrike, Townsend's big eared bat, and five species of *Myotis* bats. The sage grouse, northern sagebrush lizard, and Larch Mountain salamander are unlikely to occur on the Springwood Ranch site due to the lack of suitable habitat.

Merriam's shrew, ferruginous hawks, flammulated owls, pileated woodpeckers, Lewis' woodpeckers, white-headed woodpeckers, and black-backed woodpeckers could also occur in suitable habitats on the Springwood Ranch site. Golden eagles possibly occur in small numbers in the area and could potentially nest on cliffs or in trees along the Yakima River nearby. The striped whipsnake, Vaux's swift, sage thrasher, and sage sparrow are unlikely to occur on the Springwood Ranch site due to the lack of suitable habitat.

Nine priority species potentially use suitable habitats on the Springwood Ranch site: sharp-tailed snakes, great blue herons, cavity nesting ducks, osprey, great gray owls, western bluebirds, big brown bats, pallid bats, and Rocky Mountain mule deer. Turkey vultures have been observed foraging over the Springwood Ranch site.

3.4.3.2 Impacts of the Proposed Action

Impacts to Birds from Construction and Operation

Impacts for the proposed project are projected primarily based on data collected at existing wind power facilities – the Vansycle Wind Plant (Erickson *et al*. 2000), the Foote Creek Rim Wind Plant (Young *et al*. 2003b), the Buffalo Ridge Wind Plant (Johnson *et al.* 2000a), and the more recently studied Klondike (Johnson *et al.* 2003) and Stateline (Erickson et al. 2003) Wind Plants, where mortality estimates have been made for all birds and adjusted for scavenging and searcher efficiency. An extensive post-construction study of two wind plants on Buffalo Ridge (MN) with 350 total turbines was conducted from 1996 through 1999. Total annual mortality was estimated to average approximately 2.8 birds per turbine. Based on a three-year study at Foote Creek Rim (WY), the total annual mortality associated with 69 turbines was estimated to be approximately 1.5 birds per turbine per year. At the Vansycle Wind Project (OR), total estimated mortality for 38 turbines was approximately 0.6 birds per turbine per year. Based on one year of study, estimates from the Klondike Wind Plant (OR) were 1.42 birds per turbine per year, and estimates for the Stateline Wind Plant (WA/OR) for all birds was 1.7 birds per turbine per year based on the first 18 months of study.

Wind plant construction could affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance/displacement effects from construction and human occupation of the area. Potential mortality from construction equipment on site is expected to be quite low and similar to other wind projects. 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 might move to areas with less disturbance, however, breeding effort might be affected and foraging opportunities altered during the life of the construction.

Risk of Turbine Collision

Those species with the highest exposure indices for the proposed project were European starling, mallard, and American robin (**Table 3.4-8**). European starling was the most abundant species observed and was observed flying in the zone of risk about two-thirds of the time. Mallards were observed flying in the zone of risk most of the time. American robins, while observed flying in the zone of risk less than half the time, were one of the most common species on site (Young et al. 2003a). Monitoring studies at other wind plants have found fatalities represented by these species, but not in high numbers (see Erickson *et al.* 2001). European starling, a non-native species, is not protected and there is little or no concern over potential fatalities of this species. Potential impacts to bald eagles, which were observed foraging in the project area, are addressed in a subsequent discussion specific to threatened and endangered species. There have been no reported bald eagle fatalities at any wind plants in the U.S.

Based on the avian studies, use by birds of the project area is similar to other wind plants studied. The species diversity of the site was higher than some other wind resource areas, but overall avian use estimates were similar. Collision related impacts (fatalities) would not be expected to exceed what has been observed at other wind plants in the northwest. Impacts would be considered significant if they substantially exceeded the level of mortality (based on post construction monitoring) of individual bird (or bat – see below) species at similar wind plants in the northwest (e.g., Vansycle, Stateline, Klondike, Nine Canyon wind plants).

Waterfowl

Very little waterfowl mortality has been documented at other wind plants. The Klondike Wind Plant had relatively high use by Canada goose and two fatalities were found in the first year of monitoring. The Buffalo Ridge Wind Plant also had relatively high waterfowl use, but with few fatalities. The most common waterfowl species observed in the project area was mallard, although Canada goose and northern pintail were also seen in winter, and a variety of other species were seen incidentally in the study area. Waterfowl mortality could be expected, likely comprised mostly of mallards, however the total number of fatalities anticipated is low. While mallards were seen year round, the majority of waterfowl use was during winter. Based on wind monitoring data from the site, the winter months are the least windy and therefore the turbines would be operating less than in the spring, summer, and fall. For example, on average during the months of December, January, and February, the percent of hours when turbines would be operating at 100 percent capacity is approximately 14.9 percent. In contrast, during the months of June, July, and August the percent of hours of 100 percent operation would be approximately 45.5 percent, on average. Based on this, winter birds in the project area would presumably be at less risk of collision with a turning turbine blade.

Passerines

Passerines have been the most abundant avian fatalities at other wind plants studied (see Johnson *et al.* 2000a, Young *et al.* 2003b, Erickson *et al.* 2000), often comprising more than 80 percent 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 on-site, it is expected that passerines would make up the largest proportion of fatalities. Common species such as European starling, western meadowlarks, and American robin (all confirmed fatalities at other wind plants) would be most at risk. Nocturnal migrating species might also be affected, but would not be expected in large numbers based on data collected at other wind plants (i.e., no large [> 50 birds] mortality events have been documented (Erickson *et al.* 2001).

Raptors

Compared to other wind plants that have been studied, raptor use for the Desert Claim site is above average, with slightly more than one raptor (1.15) observed each survey. The majority of the raptor sightings were red-tailed hawks during the spring, summer, and fall, and rough-legged hawks during the winter. For comparison, raptor use was generally lower at several existing wind plants studied with the same methods. For example, raptor use at the Vansycle Wind Plant was 0.55, 0.49 at the Condon Wind Plant (OR), 0.90 at the Stateline Wind Plant, 0.70 at the Klondike Wind Plant, 0.74 at the Buffalo Ridge Wind Plant, and 1.10 at the Foote Creek Rim Wind Plant. However, raptor mortality at other newer generation wind plants is very low. The estimate of raptor mortality at the Foote Creek Rim Wind Plant is approximately 0.03 raptors per turbine per year based on a three-year study of 69 turbines. No raptor mortality was observed at the Vansycle Wind Plant or the Klondike Wind Plant during the first years of study. During a four-year study, 0.001 raptors per turbine per year were found at the Buffalo Ridge Wind Plant (Erickson *et al.* 2001). Raptor mortality at the Stateline wind project is one of the highest observed and is approximately 0.05 raptors per turbine per year based on an 18 month study.

Considering mortality results and raptor use estimates at these wind plants, it is estimated that potential raptor mortality at the proposed project would be approximately that of the Foote Creek Rim Wind Plant, or approximately 0.03 raptors per turbine per year. The Foote Creek Rim wind plant is the most similar to

the Desert Claim site in terms of raptor use and it also has some similar topographic features. Using the Foote Creek Rim raptor mortality rate, a range of approximately 3 to 4 raptor fatalities could occur per year at the Desert Claim wind project if 120 turbines are constructed.

Raptor Nesting

Nest density for buteos (red-tailed hawk) within 2 miles of the EIS study area was 0.28 nest/mi^2 (0.11 nest/km^2), and 0.34 nest/km^2 (0.13 nest/km^2) for all raptors (buteos, owls). These densities are similar to the Stateline Wind Plant, 0.20 nest/mi^2 (0.08 nest/km^2), and the Combine Hills Wind Plant (Umatilla County, Oregon), 0.24 nest/mi^2 (0.09 nest/km^2) (Young *et al.* 2002).

Good raptor nesting habitat is located along the Wilson Creek riparian corridor east of the site and along the numerous power transmission lines within the project area. Nests closer to proposed turbines within the site are more likely to be affected by project activities, and may promote displacement effects such that raptors do not return and use nests. However, this potential impact is considered low because of the primary species involved (red-tailed hawk), proximity of proposed wind turbines to power lines, and being located more than one mile from the Wilson Creek riparian area.

Estimated Mortality

Actual levels of mortality that would result from the proposed project are unknown and could be higher or lower depending on patterns of movements through the area. The bird mortality rate for the proposed project is expected to be in the middle of the range, approximately 1.2 to 1.8 birds per turbine per year. If these estimates were applied to the proposed project, the range of potential bird mortality would be expected to fall between approximately 140 and 220 birds per year if 120 turbines are constructed. Because of the high use and diversity estimates by passerines in the study area, passerine fatalities are expected to comprise the majority of the avian mortality for the project.

Carcass searches at Foote Creek Rim have found passerine casualties associated with guyed met towers. Based on searches of five permanent guyed met towers at Foote Creek Rim over a three-year period, it was estimated that these towers resulted in approximately 8.0 avian casualties per tower per year, the vast majority of which were passerines. During searches of a freestanding met tower at the Klondike Wind Plant (OR), no avian fatalities were found after one-year of study. No avian fatalities were found during searches of a free-standing met tower at the Nine Canyon wind plant in Benton County, Washington, during the first year of operation (Erickson et al. 2003). As currently planned, the proposed project would have 5 permanent free-standing met towers. Based on the result of the above studies, no avian fatalities are expected that would be associated with these met towers.

Impacts to Mammals from Construction and Operation

Direct impacts to ground-dwelling mammals occurring on site would include fatalities from construction activities for turbine pads, roads, batch plant, substation, lay down areas, O&M facility, underground utilities, overhead power lines, and other facility development. Indirect impacts from these activities that would potentially affect mammals include loss of habitat important for inhabitance, foraging, and reproduction. However, mammals are expected to repopulate impact areas after construction activities cease and reclamation is complete. Some small mammal fatalities can be expected from O&M vehicle traffic. Overall, impacts are expected to be low and not significant.

Some comments submitted during scoping for the EIS expressed concern that the project might result in declines in the raptor population that would lead to an increase in the population of rodents that are prey species for raptors. Because certain rodents such as deer mice are carriers of hantavirus, which is an airborne pathogen that can be contracted by humans, the concern was that this indirect impact on rodents could result in increased risk of human exposure to hantavirus. The impact analysis for raptors (see previous discussion) determined that the Desert Claim project could have a low mortality rate for raptors. The level of raptor mortality associated with the project would not have a measurable effect on the raptor population. Consequently, there is no basis to assume there would be a corresponding increase in the rodent population or more widespread exposure to hantavirus. In addition, rodent populations are highly dynamic and annual fluctuations in populations are closely associated with habitat conditions and resources rather than predator populations.

Bat research at other wind plants indicates that migratory bat species are at risk of collision with wind turbines primarily during the fall season (see review in Johnson *et al.* 2003b; Erickson et al. 2003, Young et al. 2003). Most bat fatalities found at wind plants have been tree-dwelling bats, with hoary and silver-haired bats being the most prevalent Pacific Northwest fatalities. Although bat fatalities have typically been few in number, in some cases they have exceeded the number of avian fatalities (Johnson et al. 2003). During construction, impacts to bats and bat habitat on the EIS site are unlikely. Hoary and silver-haired bats may use forested habitats to the north and may migrate through the project area. If so, bat fatalities are anticipated during facility operation and would likely have an estimated mortality range similar to, or lower than, what was presented for birds. The WDFW has no data for bats in the project area (L. Stream, personal communication), and sparse information exists regarding bat populations in the region (**Table 3.4-9**). However, non-migratory and migratory resident bat populations do not appear to be negatively impacted by wind turbines (Johnson *et al.* 2003b, Johnson 2003, Gruver 2002). Additionally, hoary and silver-haired bats are broadly distributed in North American, occurring coast to coast, with the hoary bat having the largest distribution of any North American bat.

Impacts to Reptiles and Amphibians from Construction and Operation

Aquatic or moist habitats for amphibians and reptiles are restricted to a few riparian, wetland, and pond areas within the EIS study area. Impacts to these areas are not anticipated, and effective erosion and sedimentation prevention methods are expected in adjacent development locations. No herpetofaunal migration corridors are known to be present. As with ground-dwelling mammals, fatalities to snakes and lizards that are in burrows during construction are expected. If construction occurs during non-winter months, aboveground fatalities of the short-horned lizard are expected due to the slow moving nature of this species. Impacts from habitat loss to terrestrial reptiles are anticipated to be localized and temporary considering the vast adjacent area that is undeveloped shrub-steppe, and the eventual reclamation of areas disturbed only during initial construction activities. Again, some reptile fatalities can be expected from O&M vehicle traffic, but likely will mostly be garter snake species associated with varying hydroperiods of irrigation ditches and canals. Overall, impacts are expected to be low and not significant.

Impacts to Big Game from Construction and Operation

The study area is within habitats designated by WDFW as winter range for mule deer. The majority of the project area is within the Ellensburg mule deer winter range. Two high-density deer wintering areas –the Dry Creek and Dunning mule deer wintering concentration areas (each overwintering approximately 200 deer) – occur within 1.5 miles of the project,. The Quilomene elk migration corridor is an important spring pathway that encroaches upon the project's north boundary in T19R18 Sec. 4 and 9.

The WDFW has expressed concern over the potential effects of wind project construction and operations on wintering big game. Winter is a crucial time period for survival of many big game species. For example, deer cannot maintain body condition during winter because of reduced forage availability and increased costs of thermogenesis (Reeve and Lindzey 1991). Therefore, as deer expend more energy, body condition gradually declines throughout winter (Short 1981). Unnecessary energy expenditures may reduce body condition to a critical point determining winter survival, especially for fawns (Wood 1988). Overwinter fawn survival may decrease in response to human activity or other disturbances (Stephenson *et al.* 1996). Facility infrastructure may fragment suitable habitat, creating patches that effectively decrease the winter range available for big game. Habitat fragmentation 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). An associated WDFW concern is that habitat fragmentation and/or the physical construction and operations of the wind facility may displace big game and promote damage to agricultural crops within the project area and associated laterals. In contrast, if facility operations do not displace big game and hunting is not allowed, the WDFW is concerned that agricultural damage will occur and the project area will provide a big game sanctuary from hunters. No agricultural damage has occurred in the project area since the early to mid-1990's, which has been attributed to the allowance of hunting initiated at that time (R. Essman, personal communication).

There is limited information regarding wind plant effects on big game species. The Foote Creek Rim Wind Plant, Wyoming, appeared to have no effect on pronghorn (Johnson *et al.* 2000b). Pronghorn occurred in the area in low numbers and continued to use the wind plant area following construction. The potential effects of wind plant development on mule deer are even less well known. While Rost and Bailey (1979) showed that wintering mule deer in Colorado avoided a well-used road by 200 meters, Wisdom et al (2002) report that traffic and roads did not appear to be an important factor in spring distribution of mule deer in Oregon, and that selection of areas near roads with medium-level traffic occurred.

During the construction period, deer would likely be temporarily displaced from the project site due to the influx of humans and heavy construction equipment and associated noise and disturbance. Temporary loss of habitat from project construction is considered a minor impact due to vegetation reclamation and the vast expanse of suitable habitat for mule deer in the region. Once construction is complete, it is expected that deer would become habituated to wind turbines and again occupy areas within the wind plant. There will be intermittent disturbances from vehicle and human traffic during regular operations and maintenance (O&M) of the facility and also from turbine noise output and shadow flicker of moving blades. It is unknown if the level of traffic associated with O&M activities of the wind plant will reach mule deer tolerance thresholds. However, if at times thresholds are surpassed, it is expected that mule deer will be resilient and seek remote areas of nearby ravines or riparian areas. Should the facility eventually result in a sanctuary for deer due to reduced hunting pressure, seasonal use of the wind plant by big game may increase. Due to the current matrix of roads and increasing residential development, hunting in surrounding areas, and limited areas of hay production on the project site, it is expected that the wind facility will have little impact on the area's agricultural damage claims. In any event, should the facility result in a redistribution of deer in the area, it is likely that, over time, deer would become habituated to noise, human disturbance, and shadow flicker associated with the operating wind plant and repopulate areas within the project.

Van Dyke and Klein (1996) report that wintering elk shifted use of core areas out of view of human related activities associated with an oil well and access road. During spring, Wisdom et al. (2000) suggest

that elk habitat selection may be negatively related to traffic and other human disturbance. However, Van Dyke and Klein (1996) concluded that if drilling activities occupy a relatively small amount of elk home ranges, elk are able to compensate by shifting areas of use within home ranges. The northernmost region of the project area overlaps approximately 320 acres of the southern edge of the Quilomene elk migration corridor. It is unknown to what extent this area is used by elk, or whether or not all of the project's acreage is within view. If this area of the project influences use by elk during construction or continued O&M activities, it is expected that elk would shift their path to the north without migratory hindrance due to the large size of the corridor.

Impacts to Threatened and Endangered Wildlife Species from Construction and Operation

Potential impacts from the Desert Claim project on threatened, endangered and sensitive wildlife species are addressed in detail in **Appendix C, Exhibit 1**. The analysis determined that the project would have no effect for most of the species listed as potentially occurring in or near the project area. Resource information indicated that gray wolf, northern spotted owl, western sage grouse, and western yellow-billed cuckoo are not likely to occur in the project area and that essential habitat for these species is lacking within the project area. For the majority of the state listed species, available information also indicates that they are unlikely to occur in the project area. Of the remaining state or federally listed species, bald eagle (federal and state threatened) and golden eagle, northern goshawk, loggerhead shrike, and sage thrasher (all state candidate species) were documented on or near the site and were considered in detail in the analysis. In addition, the WDFW provided information that indicated that due to diversion of water from First Creek into Green Canyon and eventually to the Reecer Creek subbasin, steelhead could possibly occur in Reecer Creek which flows through the western half of the project area (personal communication, B. Renfrow, WDFW, Ellensburg, Washington, January 16, 2004; see discussion in **Section 3.4.4**).

Based on species population factors and/or habitat use, the level of risk associated with the project for all five of the avian species was considered to be either low or very low. For bald eagle, project construction activity would be at least 3 miles from the Yakima River riparian corridor and would be unlikely to cause any temporary disturbance and habitat loss to eagles occurring along the river. Temporary loss of potential roosting habitat (scattered patches of trees) due to construction disturbance would be for the short duration of the construction period (9-12 months) and would affect only a minor portion of available roosting habitat. While bald eagles flying within the project area would have some exposure to turbine mortality, there have been no documented bald eagle fatalities at wind energy plants. Any mortality that might occur over the project life would be at a very low level and would not have a measurable effect on the bald eagle population. Operation of the project should have minimal disturbance effect on bald eagles, based primarily on their relatively low use of the project area (see Youn et al. 2003a).

There would be little potential for direct or indirect effects from construction of the wind plant (mortality, disturbance or displacement effects) on golden eagles; given the current use of golden eagles of the proposed wind project site, mortality for this species due to the project is expected to be nearly zero. Northern goshawks appear to be a rare migrant or transient through the project area, and there is little potential for direct or indirect impacts on goshawks from construction or operation of the wind plant. The loggerhead shrike and sage thrasher are possible breeding residents in the study area and were observed in low numbers during the spring and summer. Development of the project facilities would result in the loss of a small amount (approximately 38 acres) of shrub steppe vegetation type, which is considered breeding (nesting, foraging, loafing) habitat for sage thrashers and loggerhead shrikes. Short-term (due to construction activity) mortality effects from the project on these species are considered unlikely to occur.

Loggerhead shrikes and sage thrashers in the area might be at risk of collision with turbines; however, due to the low level of use of the project area by these species, mortality impacts are not expected to be substantial.

3.4.3.3 Impacts of the Alternatives

Alternative 1: Wild Horse Site

Some impacts to wildlife species, in particular avian and bat species, are expected to occur from Alternative 1. These would include direct impacts such as mortality and 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 and operation impacts are discussed, and would likely be very similar to the impacts of the Desert Claim project because of the similar vegetation types and avian species at these sites.

Birds

Construction: Wind plant 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. Potential mortality from construction equipment on site is expected to be quite low and similar to the other two projects. 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 might move to areas with less disturbance, however, breeding effort may be affected and foraging opportunities altered during the life of the construction. No disturbance or displacement impacts to raptor nests are anticipated, since no active raptor nests were identified within ½ mile (0.80km) of Alternative 1 facilities.

Operations: The most probable impact to birds resulting from Alternative 1 is direct mortality or injury due to collisions with the turbines or guy wires of temporary or permanent meteorological towers. Most of the fatalities would likely involve resident songbirds such as horned lark, vesper sparrow, and western meadowlark, and other common species such as European starlings. 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 low (Erickson *et al.* 2001). Waterfowl and other waterbird (e.g., gulls) mortality is estimated to be low, given the low use of the project area by these groups. Raptor mortality is expected to be similar to, or lower, than the Foote Creek Rim Wind Project (0.03 raptor fatalities per turbine per year).

Based on the available information, it is probable that some disturbance or displacement effects might 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.

No impacts to federal endangered, threatened or sensitive status bird species from Alternative 1 are anticipated. A single bald eagle was observed on the Wild Horse site, but use by this species was so low that no impacts are expected. Some mortality of state sensitive species such as sage thrasher and loggerhead shrike might occur during the life of the project.

Bats

Some mortality of migratory bats, in particular hoary and silver-haired bats, would be anticipated during operation of Alternative 1.

Other Mammals

Other mammals that likely exist within the Wild Horse site include, badger, coyote, pocket gopher, Pauite ground squirrels and other small mammals such as rabbits, voles and mice. Construction of Alternative 1 might 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 would result in loss of foraging and breeding habitat for small mammals. Ground-dwelling mammals would lose the use of the permanently impacted areas; however, due to their abundance and prolific breeding abilities 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

Construction impacts to reptiles and amphibians on site would be loss of habitat and mortality occurring in construction zones. Provided best management practices are employed on site and compliance with applicable permits regarding runoff and sediment control is 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 in the development areas. 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 underground burrows for cover or during periods of winter dormancy. Excavation for turbine pads, roads or other 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.

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.

Alternative 2: Springwood Ranch Site

Developing a wind plant on the Springwood Ranch property would result in impacts on wildlife and habitat similar to those described for the Desert Claim site. Wildlife species displacement or disturbance by this alternative would be similar in type to those from the proposed action, but smaller in magnitude because of the smaller project footprint for Alternative 2. Development within the deciduous and coniferous woodlands on the site would likely eliminate snags and down woody material from within these habitats on site. Forest wildlife species would be affected to a greater degree than under the proposed action, while grassland wildlife would be affected to a similar extent. Affected species would include raptors, small mammals, magpies, crows, sparrows, meadowlarks and some reptiles. Effects to

riparian and wetland species would likely be similar to the proposed development because similar development buffers would apply. Impacts on local populations of large game animals would be similar due to similar types of suitable deer and elk habitat and disturbance from development. Disturbance from human activity would adversely affect wildlife and habitat generally as described for the Desert Claim proposal.

Deer and Elk

The development of the Springwood Ranch site would have little direct impact on elk, as there is little use of the site by elk and the riparian areas along the Yakima River and Taneum Creek would be protected by existing regulations. Deer use of the site appears to be similar to use of the Desert Claim site, and impacts from Alternative 2 would likely include disturbance and displacement impacts from construction activity. Indirect impacts associated with human activities could reduce the suitability of the retained habitat but it is likely that deer would become habituated to a wind plant at this site, especially if there were reduced hunting pressure on the site after construction.

Endangered, Threatened, and Sensitive Wildlife

Increased disturbance of winter concentrations of bald eagles could occur along the Yakima River and bald eagles in the area would be subjected to similar risk factors associated with wind plants as the Desert Claim site. Habitat loss could affect other state-listed species or species of concern, such as loggerhead shrikes, western bluebirds and sage thrashers. Most other endangered, threatened or sensitive wildlife species are not expected to be affected by development of this site because they are either unlikely to occur on the site or are present there very rarely.

No Action Alternative

Under the no action alternative the proposed Desert Claim Wind Power Project and all associated features would not be constructed. There would be no environmental impacts from the wind power facility. Production of a comparable amount of electric power could occur through other technologies, such as natural gas, which could have significant environmental impacts on the wildlife habitat and wildlife. The location of any such alternative generation is uncertain, and would not necessarily be within Kittitas County or Washington State. Land conversion in the area for residential development could also have significant impacts in the form of habitat loss and displacement of wildlife, especially big game from important wintering areas.

3.4.3.4 Cumulative Impacts

Cumulative impacts for all elements of the environment are addressed in **Chapter 4**.

3.4.3.5 Mitigation Measures

Mitigation and monitoring measures that have been implemented at other, newer-generation wind plants, in particular those in the Washington and Oregon region, represent possible mitigation measures for the Desert Claim project.

Technical Advisory Committee

A Technical Advisory Committee (TAC) could be formed to implement and evaluate a mitigation and monitoring program and determine the need for further studies or mitigation measures once the project is operational. The TAC would be composed of representatives from Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Kittitas County, landowners, the project owner/developer and other affected interests such as conservations groups (e.g., Kittitas Audubon Society). The role of the TAC would be to determine and coordinate appropriate mitigation measures, monitor impacts to wildlife and vegetation, and address issues that arise regarding wildlife impacts during project operation.

Mitigation Actions

The primary impacts associated with the project are expected to be loss of shrub steppe habitat, fatalities of birds, and potential displacement effects on mule deer. The following are potential mitigation measures for these impacts:

- The overall design of the wind plant would minimize perching opportunities for raptors and other birds, for example, tubular towers would be used for the turbines and met towers and use of overhead powerlines in the project would be minimized.
- Sensitive wildlife areas such as the riparian corridors and raptor nest sites could be mapped, flagged, and/or identified to all contractors working on-site and could be designated as no disturbance zones during the construction phase.
- During project construction, best management practices could be employed to reduce peripheral impacts to adjacent native vegetation and habitats and to minimize the construction footprint.
- A site management plan could be developed to, at a minimum, identify sensitive wildlife areas (e.g., raptor nests), provide adequate on-site waste disposal, and establish fire management and erosion control procedures.
- Raptor nests within ½ mile of construction areas could be monitored for activity prior to construction to determine the need for construction timing restrictions around active nests.
- All power and communication lines on-site could be buried underground where feasible.
- All overhead power line poles could be equipped with anti perching devices.
- Permanent met towers on-site will be free standing structures with no guy wires minimizing the potential for avian collisions.
- The modified turbine layout does not have turbines within 50 meters of the rim edge of steep slopes within the E1/2 of Sections 26 and 35, T19N, R18E, which showed higher than normal use by raptors during the baseline studies (see Young et al. 2003).
- Construction could take place primarily during the summer months, minimizing disturbance to wintering big game from construction activities

In addition to the above mitigation measure it is anticipated that other measures will be developed durin consultation with the USFWS about potential impacts to bald eagles. Appendix C, Exhibit 1 identifies several conservation measures that are likely to be implemented to minimize impacts to bald eagles.

Monitoring

A post-construction monitoring study is typically implemented to quantify project impacts to avian and bat species and assess the need for additional mitigation measures, for example unanticipated big game

issues. The post-construction monitoring plan would be developed in coordination with the TAC. The monitoring plan for the project would, at a minimum, contain the following components:

- One year of standardized fatality monitoring involving carcass searches, scavenger removal trials, and searcher efficiency trials.
- A standardized procedure for O&M personnel instructing how to report incidental fatalities or injured birds for the life of the project.

The protocol for the fatality monitoring study would be similar to protocols used at other, newer-generation wind plants in northeastern Oregon and southeastern Washington. In addition, consideration could be given to developing, in cooperation with other industry participants, a focused monitoring study that addresses a specific question regarding impacts from wind plants. For example:

- Investigate effects of different turbine lighting schemes on avian mortality.
- Investigate the impact of the facility on wintering mule deer.
- Investigate whether wind turbines attract migrating bats.
- Investigate mechanisms for deterring migrating bats from turbines.

Such a study would be intended to provide information useful for future wind power planning and permitting, but would not affect mitigation requirements for the Desert Claim project.

3.4.3.6 Significant Unavoidable Adverse Impacts

Due to the relative lack of knowledge regarding migratory routes, population levels and trends, and reproductive patterns, it is difficult to assess with certainty any large-scale adverse impacts of wind plants on bat species such as hoary and silver-haired bats. Fatalities of these species occur at existing wind plants and are likely at the proposed wind project, unless the cause of their vulnerability to turbines is identified and possibly mitigated for; fatalities are currently unavoidable. Bat mortality at the proposed project area is expected to be insignificant at the local scale. However, it is unknown if cumulative impacts of all three Kittitas wind projects, in synergy with other wind plants in the Pacific Northwest and North America, could be a significant population sink to species such as hoary and silver-haired bats.

3.4.4 Fish

3.4.4.1 Affected Environment

Desert Claim Project Area

The affected environment considered for fish includes surface waters in the project area and receiving waters downstream of the area. As described in **Section 3.3, Water Resources**, 19 streams are present within the project area and immediate vicinity. There are 5 streams onsite classified as Type 3 waters; all others are classified as either Type 4 or Type 5 waters, using Washington's interim water typing system (WAC 222-16-031, see **Table 3.3-1**). Type 3 waters flow year round and have moderate to slight fish, wildlife, or human use. Type 4 waters flow year round while Type 5 waters are seasonal. Both Type 4 waters and Type 5 waters are considered non-fish habitat streams.

WDFW habitats and species maps and the StreamNet database (WDFW 2003) indicate there are no fish-bearing streams in the project area. These sources also show that water bodies in the project area,

including wetlands, streams, irrigation canals and several ponds, do not contain any "priority fish species," as defined by the WDFW. No survey information was available for these waters. Subsequent to the Draft EIS, however, WDFW provided anecdotal information to Kittitas County and the applicant that steelhead trout (the anadromous form of rainbow trout) had been observed in First Creek and it was possible that juvenile steelhead could be diverted to project-area streams through irrigation facilities (see discussion of threatened and endangered species below).

Aquatic fauna observed during field visits to the project area included crayfish. In addition, lamprey amoecetes may inhabit portions of the project area. If any fish species were present in these other water bodies, they would most likely be introduced warm-water fish that would not be subject to federal or state regulations. According to the WDFW, priority habitats in the project area include riparian areas located along streams. These areas are described in **Section 3.4.3**.

The majority of the project area streams drain into fish-bearing streams and/or priority fish-bearing streams. Priority fish are defined as any federal or state listed threatened, endangered, or candidate species, or any special status species of concern.

Downstream from the project area, Reecer Creek and Currier Creek contain resident fish and priority resident fish, including rainbow trout. Upstream from the project area, Reecer Creek contains westslope cutthroat trout, a priority resident fish. Priority anadromous fish are located downstream from the project area in the lower 1.0-mile (spring chinook) and the lower 2.6-miles (summer steelhead) of Reecer Creek, and throughout the Yakima River (spring chinook and summer steelhead) in the area below Reecer Creek. In addition, there have been a few observations of bull trout, a priority resident fish, in the Yakima River.

The project area is within the Middle Columbia River Evolutionarily Significant Unit (ESU). In this ESU, spring chinook is not warranted for threatened or endangered listing at this time, and the summer steelhead is listed by NOAA Fisheries as a federal threatened species. The bull trout in the Yakima River is listed by the USFWS as a federal threatened species.

The Middle Columbia River population of steelhead includes those individuals that use the Yakima River. The steelhead that use the Yakima River spawn in the summer and are referred to as summer steelhead. Individual steelhead from the Middle Columbia River ESU are known to utilize the Yakima River and also Reecer Creek south (downstream) of the project (WDFW PHS 2002). Due to water diversions for irrigation and the intermittent nature of many of the streams in the project area, it has commonly been believed that steelhead using the lower reaches of Reecer Creek would not occur within the project area.

According to recent information from the WDFW, however, a radio-tagged steelhead was observed to have spawned in First Creek north of the project area (personal communication, B. Renfrow, WDFW, Ellensburg, Washington, January 16, 2004). Water in First Creek is diverted via an unscreened diversion facility into a ditch that winds over a low pass into Green Canyon and intercepts a few other small streams (see map in **Appendix C, Exhibit 1**). Fish in First Creek can be transferred via the ditch to the canal in Green Canyon and other small tributaries, and eventually into the Reecer Creek sub-basin. Because an adult steelhead spawned in First Creek, it is possible for juvenile steelhead to occur in the ditch and move down to the Reecer Creek drainage above the North Branch Canal and through the Desert Claim project area. Streams and interconnected channels in the Reecer Creek sub-basin could therefore be rearing habitat for juvenile steelhead.

Wild Horse (Alternative 1) Site

Based on available information, no fish occur in the Wild Horse area. The nearest fishery is located along Quilomene Creek approximately 1 mile (1.6 km) to the north of the site. The lower ends of Whiskey Dick, the North Fork of Whiskey Dick and Skookumchuck Creeks contain rainbow trout, and summer steelhead is identified along the lower end of Whiskey Dick Creek as well. These fisheries are more than 5 miles to the east of the project area for Alternative 1.

Springwood Ranch (Alternative 2) Site

The Springwood Ranch site borders the southwest side of the Yakima River. Land uses in the basin include ranching and farming. The river in this area is for the most part within a moderately confined canyon with banks extending up to several hundred feet above the river surface. A few small floodplains exist; however, they are currently on the other side of the river from the site. Taneum Creek crosses the southern portion of the site.

Fish Habitat and Species Present

The Yakima River, in the vicinity of the Springwood Ranch site, supports only one run of anadromous salmonid, the spring chinook salmon. Steelhead trout, although rare in the upper Yakima River system, and Pacific lamprey are present. Resident rainbow and cutthroat trout are common to the area, and the eastern brook trout is likely present. Bull trout have been reported within the project area near the mouth of Swauk Creek. Other common species in the area include sculpin, mountain whitefish and dace.

Channel morphology in the Yakima River between Manastash and Swauk Creek consists primarily of long runs with occasional deep pools. Large boulders provide some cover; however, large woody debris frequency is low. Overall cover protecting the river is rated poor. Side-channels are present and offer off-channel rearing opportunities, but can dry up in the late summer and fall as flows drop. Rip-rap placed along the margins where the railroad approaches the river impairs habitat quality along the south shoreline. Spawning habitat is present, but the impact of high irrigation flows on summer habitat quality is considered to be a major problem for survival of juvenile steelhead.

Resident trout and anadromous fish species have historically used lower Taneum Creek for spawning and rearing. More recent surveys have found rainbow and cutthroat trout, eastern brook trout, steelhead and spring chinook salmon in the river. Spring chinook juveniles were observed in the creek, indicating that spawning adults may be present. The fish are generally confined to the lower 1 mile of the stream.

Lower Taneum Creek is contained in a low-gradient channel with good gravel and rubble available for spawning. The riparian area has been degraded by adjacent land use in many areas, but in others a combination of scrub brush and willow is present. This changes to deciduous and conifer canopy in the upper basin. Upstream fish migration has in the past been hindered by irrigation diversions. Water withdrawals have degraded habitat value in the lower basin by reducing the size of the stream, influencing water temperature and hindering upstream migration. The creek is listed under the Clean Water Act as an impaired water body because of inadequate instream flows and the resulting damage to fish runs.

Threatened, Endangered, Sensitive and Other Priority Fish Species

The Columbia River district population segment of bull trout is listed as a threatened species under the Endangered Species Act. The mid-Columbia River evolutionarily significant unit of steelhead trout is listed as a threatened species. Bull trout and steelhead trout populations in the Yakima River are included in this determination. The Springwood Ranch area does not currently support any other known populations of fish species listed as endangered or threatened under the ESA. The PHS list (WDFW, 1997) includes two fish species that potentially occur within the Alternative 2 project boundaries. The bull trout and steelhead trout are listed as candidate species, and considered vulnerable to significant population declines.

3.4.4.2 Impacts of the Proposed Action

The impact assessment on fish is based on evaluation of the turbine layout provided in the Desert Claim application and displayed in **Section 2.2** of the EIS. However, the applicant intends to conduct subsequent micro-siting of turbines, roads, interconnection lines and other project features to avoid impacts to streams and associated fish habitat.

Potential impact mechanisms that could harm downstream fish populations include erosion/sedimentation and loss of riparian cover. Sediments can bury fish eggs and reduce foraging ability, while loss of riparian cover can increase water temperatures (due to reduced shading) and reduce potential nutrient and food contributions. The proposed project would be considered to result in a significant impact to fish if:

- A population of a threatened, endangered, or other sensitive species would be affected by a reduction in numbers; alteration in behavior, reproduction or survival; or a loss or disturbance of habitat;
- There would be a substantial adverse effect on a species, natural community, or habitat that is recognized as biologically significant in local, state, or federal policies, statutes, or regulations; or
- There would be any impedance of fish migration routes that lasts for a period that significantly disrupts migration.

Table 3.4-10 provides a summary of potential temporary (construction) and permanent (operations) impacts to fisheries resources. Impacts are discussed below for the project area and for downstream areas.

Table 3.4-10
Potential Impacts to Fishery Resources

Waterbody	Temporary Impact Level	Permanent Impact Level	Mitigation
On-site streams	Low	Low	Best Management Practices prescribed by required construction permits (see mitigation)
Currier Creek	Low	Low	Same
Reecer Creek	Low	Low	Same
Yakima River	None	None	None; no adverse impacts expected

Within Project Area

Activities associated with project construction were evaluated for potential adverse effects on streams and potential fish habitat. Possible impact sources include disturbance of bed and banks of ephemeral, intermittent, and perennial streams; removal of riparian areas adjacent to the stream banks; and the potential filling in and relocation of portions of ephemeral or intermittent streams. Impact mechanisms considered included road crossings in headwater streams that drain into fish-bearing streams, and potential tower placement in streams or sensitive riparian areas.

As discussed in **Section 3.3**, seven stream segments are overlapped by currently planned locations for construction disturbance around wind turbines. In addition, the turbine locations and construction zones would disturb riparian areas along Reecer Creek and Jones Creek. A total of about 0.25 acres of riparian habitat could be affected by temporary construction disturbance, while an estimated 0.03 acres of stream and riparian habitat would be permanently displaced by wind turbine pads and associated facilities. The project access roads also cross 16 streams (8 of which are crossed at least twice) and 2 of the 3 priority riparian areas. If relocation of facilities to avoid these areas were not feasible, mitigation would be developed to enhance or replace riparian areas. Based on the extremely small area of temporary and permanent impacts, construction effects resulting in temporary or permanent displacement of fish habitat would be negligible.

Other potential effects on fisheries would be associated with installing culverts at stream crossings. Construction time would be minimized when installing the culvert at the road to minimize impacts and maintain normal stream flow. Runoff from construction activities near waterbodies could also result in indirect impacts, although this effect would be relatively minor and would be controlled by implementation of erosion and sediment controls. Therefore, with appropriate mitigation, the proposed project is expected to have only temporary impacts on stream resources.

None of the streams in the project area are known to contain fish communities, although it is conceivable that juvenile steelhead may be present in some waters (as discussed in **Section 3.4.4.1**). Consequently, potential adverse impacts to fish are expected to be minor, and limited to downstream impacts. However, the possible presence of juvenile steelhead in some waters presents a situation that would likely require specific coordination and mitigation measures. Based on the modified layout, project access roads would cross Reecer Creek, tributaries to Reecer Creek or other interconnected waterways from the Green Canyon channel in multiple locations, and steelhead could occur in any of these waters. Construction at these stream crossings could affect juvenile steelhead directly though mortality or indirectly through reduced habitat conditions from water quality degradation (sediment, fuel/oils contamination) or blockage if the crossing did not allow fish passage. Impacts to streams and waterways would be minimized or avoided by the use of Best Management Practices (BMPs) for construction and operation, appropriate and adequate site management practices, and erosion control measures; however, the in-stream construction required to place culverts and road fill would result in some temporary, localized sedimentation from disturbance of stream bottoms and stream banks, and the placement of fill material. Because the crossings (culverts) would be designed to allow continual water flow and fish passage during low water conditions, long-term impacts to fish movement would be minimized.

Downstream of Project Area

Potential adverse impacts of the proposed action upon fisheries resources that may be present in downstream areas were also considered. The federally threatened summer steelhead is located in Reecer Creek and in the Yakima River downstream from Reecer Creek. Some erosion and sedimentation is expected to occur downstream due to construction of the project. The effect on fish, including special-status species listed in **Appendix C**, would not be significant, however, because the proposed action must meet a series of regulatory requirements prior to construction. These include a Kittitas County Critical Area Review, Washington State Hydraulic Project Approval, a National Pollutions Discharge Elimination System (NPDES) permit, and Section 404/wetland permits (or collectively through a Joint Aquatic Resource Permit Application, or JARPA). Best Management Practices, as listed in **Section 3.1.5**, would be applied as a condition of such permits. These regulations, together with the fact that most construction would occur during dry periods, would adequately protect downstream fisheries from potential effects associated with project construction.

3.4.4.3 Impacts of the Alternatives

Alternative 1: Wild Horse Site

Provided best management practices are employed on site and compliance with applicable permits regarding runoff and sediment control is maintained, no fish should be affected by construction or operation of the project under Alternative 1.

Alternative 2: Springwood Ranch Site

Alternative 2 could pose a higher risk of adverse impact to fish-bearing waters than the proposed action, because the Yakima River and Taneum Creek support important fish habitat and are located close to wind energy development that would occur under Alternative 2. The potential for greater construction-related impacts, primarily delivery of sediment to fish habitat, would exist even though required shoreline setbacks would avoid construction disturbance close to the streams. The temporary disturbance area and permanent footprint of Alternative 2 would be smaller than for the proposed action, so there would be less overall exposure of soil to erosion under Alternative 2. As discussed in **Section 3.3**, however, some of the turbine locations are near the top of steep slopes above the Yakima River or Taneum Creek that have been identified as high erosion and/or landslide hazard areas. These physical conditions represent localized concerns for potential impacts to fish habitat from construction disturbance, and might warrant site-specific mitigation measures in addition to the standard BMPs.

Development of Alternative 2 could affect habitat in the Yakima River and Taneum Creek used by bull trout and steelhead trout. The types of impacts possible would primarily involve delivery of sediment or other pollutants from construction areas to these water bodies, particularly if construction occurred in or near areas of high erosion or landslide hazard. While standard construction BMPs might be sufficient to avoid or minimize such impacts, site-specific evaluation of construction plans and protective measures might be required.

No Action Alternative

Under the No-Action Alternative, the proposed wind power facility would not be constructed. As such, the No-Action Alternative would result in no foreseeable new impacts to wetlands or streams and any fish habitat they might support. Existing and future land uses, including agricultural activities and low-intensity residential development, would continue to have direct and indirect effects on fish habitat in the project vicinity.

3.4.4.4 Cumulative Impacts

Cumulative impacts for all elements of the environment are addressed in **Chapter 4**.

3.4.4.5 Mitigation Measures

Mitigation measures discussed in **Section 3.3.5** for surface water could also be implemented to minimize impacts to fish resources. Turbine and project access road locations would be evaluated during the Critical Areas review process, and micro-site analysis would be conducted to identify opportunities to avoid and/or minimize impacts to water bodies and/or wetlands and associated fisheries resources downstream from the project area.

The project would be designed to use existing roads where possible. The current road layout was determined to have the least impact upon stream resources. All crossings would be created with appropriately-sized culverts. The optional use of oversized culverts buried below the normal water line would allow a natural stream bottom to form inside the culvert, further minimizing habitat effects. Any work adjacent to streams would adhere to applicable federal and state regulations and would be addressed in detailed project plans.

Best Management Practices (BMPs) would be initiated to minimize impacts to fisheries resources located downstream from the project area. BMPs would be initiated to retain sediment from disturbed areas and minimize areas of disturbance. In addition, most of the streams are intermittent and therefore are likely to be dry during construction. Mitigation measures would include replacement of any riparian or wetland areas impacted by the project. Consequently, no adverse impacts to summer steelhead are expected as a result of the project.

Unavoidable impacts from these activities, such as clearing and grubbing of tree and shrub species, would also be minimized. The construction footprint at all stream or water channel crossing should be strictly minimized to avoid peripheral impacts to stream habitat. BMPs would include establishment of sediment retention basins and installation of erosion control devices (i.e. silt fence, covering of disturbed soils). Mitigation measures would include replanting of native species in areas that were disturbed as a result of the project. However, in certain areas, tree and shrub replacements would require more than 1 year to attain existing size. Consequently, disturbance of riparian areas would be an unavoidable impact, but mitigation measures would provide for long-term recovery.

Furthermore, if stream communities were disturbed during construction, the following measures would be implemented to avoid adverse impacts to downstream fish communities:

- Construction geotextile and sediment retention systems would be used for soils stabilization at road crossings, riparian areas, and within or along streambanks.

- Construction equipment refueling stations should be a minimum of 100 feet from any drainage, stream, irrigation channel or riparian area.
- Appropriately sized culverts would be used at all stream crossings, and all stream and channel crossings should be designed to allow continual water flow and ensure fish passage under all conditions.
- Native trees, shrubs, and erosion control grasses would be used in all disturbed riparian areas.

NOAA Fisheries, USFWS, and WDFW would be consulted prior to project construction regarding the possible presence of juvenile steelhead in project-area waters. The consultation process could result in the identification of additional mitigation measures beyond those listed above.

3.4.4.6 Significant Unavoidable Adverse Impacts

With appropriate mitigation, as required by the existing regulatory framework, potential impacts to fish habitat and/or fish populations would be minor and temporary. The extent of temporary disturbance of stream beds and banks that represent possible fish habitat would be minimized during construction, best management practices would be used to control erosion and sedimentation from disturbed areas, and the disturbed areas would be restored following construction. Road crossings at streams would be designed to maintain stream flow and fish passage at all times, preventing possible flow-related impacts to fish over the long term. Therefore, no significant unavoidable adverse impacts to fish resources are expected as a result of the proposed project.