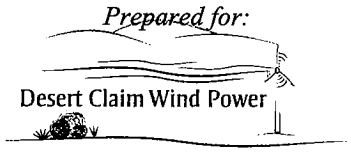
Update on Vegetation and Wildlife Impacts from the New Desert Claim Project Area

January 22, 2009



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INTRODUCTION

Desert Claim Wind Power, LLC, is submitting a revised Application for Site Certification (ASC) to the Washington State Energy Facility Site Evaluation Counsel (EFSEC) for the Desert Claim Wind Power Project (the Project). The Project is a renewable wind energy generation facility that will consist of up to 95 wind turbines and have a nameplate capacity of up to 190 megawatts (MW). The Project will be located within an area of approximately 5,200 acres in unincorporated Kittitas County, approximately 8 miles northwest of Ellensburg, Washington. The current proposal is a modified version of the Project evaluated by Kittitas County in the August 2004 Desert Claim Final Environmental Impact Statement.

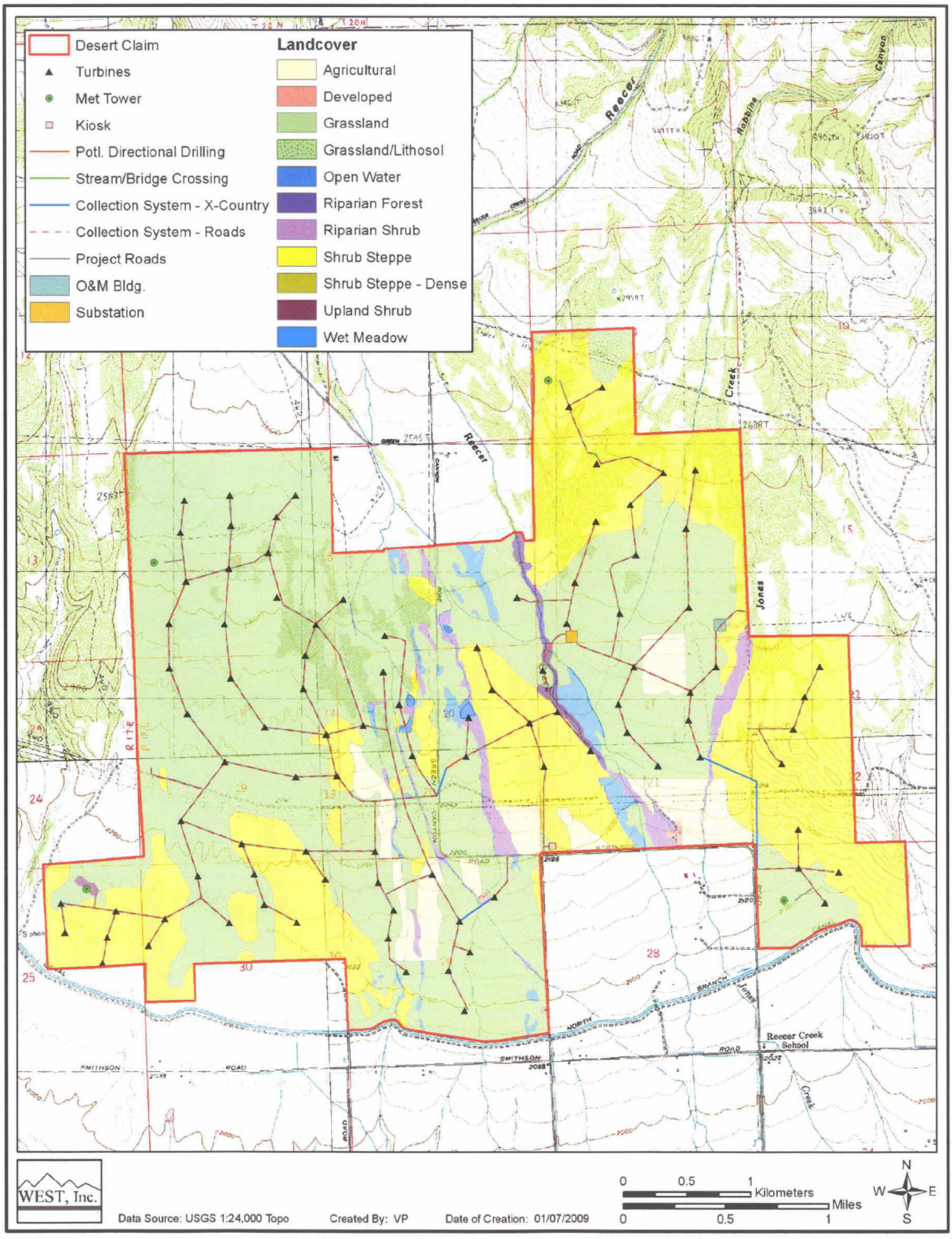
Following Desert Claim's submission of an Application for Site Certification in November 2006, EFSEC retained Golder Associates to review the Application for Site Certification and advise the Council regarding SEPA compliance. (Golder 2007) Golder's report identified three questions related to biological resources: (1) whether, based on new information, the level of potential impacts to birds could be greater than predicted in the County FEIS; (2) whether, based on the methods for analyses, potential impacts to bats could be greater than predicted in the County FEIS, and (3) whether additional information was needed to determine the significance of impacts to vegetation. This report contains updated estimates of impacts to vegetation, birds and bats. Based on this updated information, it concludes that the Desert Claim Project will not result in significant adverse effects on bird and bat populations, and further that the potential cumulative effects of the Desert Claim Project and other wind projects that have been permitted in Kittitas County will not be significant.

PROJECT DESCRIPTION

The revised Project area is a contiguous block of land that significantly overlaps the previous portions of the project area (**Figure 1**). The most significant change in location of the Project is that the areas in the southeast of the original project area have been omitted, and new areas have been added in the east, northeast, and west.

The total capacity for the Project has been revised upward 10 MW for a total of 190 MW. The turbine now proposed to be used is slightly larger than those previously considered. The REpower MM92, a 2.0 MW nameplate capacity turbine, is now being considered for the Project. While this particular turbine was not discussed in the DEIS, another 2-MW turbine (Vestas) was considered in the DEIS. The REpower MM92 has a rotor diameter of 92.5 m (304 ft) and hub height of 78.5 m (258 ft), resulting in a maximum blade reach (blade tip height at highest position) of 124.8 m (~410 ft.). In the DEIS, a maximum turbine envelope with a maximum blade height of 120 m (393ft) was used that covered each of the wind turbine models that were being considered. The maximum blade height of the turbine now being considered is slightly taller (124.8 m) than the reach considered (393 ft) in the DEIS. This results in a larger rotor-swept area (RSA) of 6,717 m^2, compared to 6,050 m^2 in the 2004 DEIS; however, the project footprint is reduced since fewer turbines are now being proposed (95 compared to 120 in the 2004 DEIS).

Figure 1
Vegetation Mapping of the revised Desert Claim Wind Power Project



VEGETATION

Existing Project Area Vegetation

Vegetation in the original Project area was mapped according to vegetation types characterized by the dominant plants (Young et al. 2003a). This mapping was updated in fall 2006 and again in fall 2008 based on the revised Project area, the results of vegetation mapping in the surrounding areas, aerial photography and a ground survey. The revised Project area includes parcels totaling 5,200 acres, including a combination of private property and land leased from DNR. Based on the new project area and updated vegetation mapping, habitat acreages in the Project area were revised (**Table 1**).

Vegetation in the Project area was classified into ten types (**Table 1, Figure 2**). The primary vegetation type is grassland, covering over half of the Project area (57.3%), primarily in the western and central parcels. Shrub-steppe is the second most common vegetation type (32.7% of the Project area), followed by agricultural areas (4.7%). 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 (0.6%), riparian shrub (2.1%), wet meadow (1.7%), riparian forest (0.6%), open water (0.2%), and developed (0.1%).

The Project area has been decreased by approximately 37 acres from the previous project area identified in the 2004 FEIS. The descriptions of the different types of vegetation found in the EIS have not changed, but pine forest does not occur in the new Project area.

Table 1
Vegetation Types in the Project Area

Vegetation Type	Approx. Acres[1]	Percent of Project Area	General Habitat Description
Agricultural	245.4	4.7	Agricultural areas are sites used for irrigated hay meadows that are periodically mowed.
Developed	5.9	0.1	Areas where human activity has removed or altered natural vegetation, such as residential homes and farm buildings and yards.
Grassland	2981.9	57.3	Areas dominated by grass species, primarily bunchgrasses bluebunch wheatgrass, Sandberg's bluegrass, cheatgrass, and bulbous bluegrass.
Grassland/ Lithosol	30.7	0.6	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	7.9	0.2	Areas of open water including natural ponds, stock ponds, and the irrigation canal.
Riparian Forest	30.7	0.6	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	109.8	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	1701.7	32.7	Upland areas dominated by shrubs, primarily bitterbrush and rigid sagebrush, with an understory of mixed grasses and forbs. Four acres of hawthorne are also included in this category but are not impacted by planned facilities. 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	86.1	1.7	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	5200	100	

[1] Approximate acreage totals based on GIS mapping and calculations.

Vegetation Impacts

Based on GIS analysis of the latest proposed Project layout, an estimated 86.4 acres of vegetation in the Project area would be permanently occupied by Project facilities and an additional 230.8 acres would be temporarily disturbed (**Table 2**). These calculations do not account for Project facilities that have not yet been sited, including construction staging and storage areas, which would likely add approximately 19.5 acres of disturbed area. Most facilities would be located in grassland and shrub-steppe habitat types. An estimated 23.04 acres of shrub-steppe would be permanently impacted. An estimated 58.12 acres of grassland (including the grassland/lithosol type) would be permanently impacted. In addition, an estimated 2.19 acres of agricultural lands would be permanently impacted, as well as 0.71 acres of riparian forest, 0.30 acres of riparian shrub, 0.21 acres of open water, and 0.18 acres of wet meadow. Desert Claim, working with their wetlands consultant, has adjusted (micro-siting) the layout in the areas of the potential wetlands to avoid impacts to this resource. Of the disturbed areas, the access roads account for most of the permanent impacts to vegetation (71.5 acres).

The total acres of temporary and permanent impact are slightly less with the new layout than the previous layout (see Table 3.4-2, page 3-65 of FEIS).

Rare Plants

There were no known populations of rare plant species within the previous project area. For purpose of this discussion, rare species include federally listed endangered, threatened, proposed, or candidate plant species and Washington State endangered, threatened, sensitive, or review plant species. Given the overlap of the previous project area with the revised Project area, and the similarity between the vegetation types of the revised Project area with the original project area, no Project-related impacts are anticipated to rare plant species with the revised Project.

Table 2
Approximate Acres of Impact by Facility Type

FACILITY	VEGETATION TYPE	APPROXIMATE ACRES OF IMPACT TEMPORARY	PERMANENT
Turbines[a]	Agricultural	1.12	0.11
	Developed	<0.01	0.00
	Grassland	64.29	6.82
	Grassland/Lithosol	<0.01	0.00
	Open Water	0.59	0.09
	Riparian Forest	0.84	0.03
	Riparian Shrub	0.45	0.02
	Shrub Steppe	31.29	3.42
	TOTAL	*98.60*	*10.50*
Access Roads[b]	Agricultural	5.59	2.13
	Grassland	127.03	48.31
	Open Water	0.35	0.13
	Riparian Forest	1.91	0.70
	Riparian Shrub	0.77	0.28
	Shrub Steppe	52.07	19.77
	Wet Meadow	0.48	0.18
	TOTAL	*188.20*	71.50
Collection System	Agricultural	0.09	0.00
Buried Along Project Roads[c]	Grassland	2.10	<0.01
	Open Water	<0.01	0.00
	Riparian Forest	0.03	0.00
	Riparian Shrub	0.01	0.00
	Shrub Steppe	0.86	<0.01
	Wet Meadow	<0.01	0.00
	TOTAL	*3.11*	*<0.10*
Buried Cross-Country	Developed	0.02	0.00
	Grassland	0.35	<0.01
	Riparian Shrub	0.01	0.00
	Shrub Steppe	0.31	<0.01
	TOTAL	*0.69*	*<0.10*
Met Towers	Grassland	*0.30*	*0.07*
	Shrub Steppe	*0.10*	*0.03*
	TOTAL	*0.40*	*0.10*
Construction Staging/Storage		(19.5)	-
Substation	Grassland	2.80	2.00
O&M Facility	Grassland	2.72	1.94
	Shrub Steppe	0.08	0.06
	TOTAL	*2.80*	*2.00*
Kiosk	Grassland	0.19	0.00
	Shrub Steppe	0.81	0.30
	TOTAL	*1.00*	*0.30*
Total		**317.20**	**86.40**

[a] Assumes construction disturbance for each turbine pad and transformer will temporarily affect a 120-ft radius around the tower (~1 acre); area of permanent impact based on a 39-ft radius tower pad (0.11 acre).

[b] Assumes a 50-ft wide temporary disturbance corridor and a 20-ft wide permanent disturbance corridor. A 115% factor applied to account for increase curves and intersections which are larger than the standard road.

[c] For buried collection system an 5-ft wide temporary disturbance corridor was used with residual permanent impacts diminishing over time through reclamation and an 85% reduction factor applied for temporary disturbance that would occur along roads and within road disturbance.

WILDLIFE

The following sections describe impacts to wildlife, birds and bats, from the revised Project, focusing on anticipated changes to impacts from the previous layout and potential cumulative effects from other wind projects in Kittitas County. In addition, the analysis incorporates new information that has become available since the 2003 impact assessment. When the FEIS was prepared in 2003-2004, biologists typically estimated impacts based on per turbine fatality rates developed from studies at similar projects. Because of large differences in turbine sizes among various projects and the availability of more project data, biologists have now begun to use a different approach. The approach is to standardize data on a per MW basis for predicting fatality impacts. This approach assumes that the mortality rates are proportional to the MW capacity of the turbine, which is nearly equivalent to assuming mortality is proportional to the rotor-swept area of the turbine. This analysis uses the turbine MW nameplate capacity.

Birds

Construction Impacts

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. Habitat impacts are slightly less compared to the 2004 FEIS since the number of turbines has been reduced, thereby reducing the overall footprint of turbine pads and associated facilities. Consequently, potential impacts from construction equipment and disturbance/displacement effects will likely be slightly lower than the previous proposal, due to the smaller number of turbines and less time needed to complete the project. Potential mortality from construction equipment on site is expected to be low and similar to other wind projects. The risk of bird mortality from construction 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. Because less native vegetation will be disturbed with the new Project, the risk of destruction of a nest with eggs or young will be lower. Disturbance-type impacts can be expected to occur if construction activity occurs near an active nest or primary foraging area.

Impacts to Nesting Raptors

Based on the previous avian studies, raptor nest density in the original project area and within a 2-mile buffer of the site for buteos was 0.28 nest/mi^2 (0.11 nest/km^2) and for all raptors was 0.34 nest/mi^2 (0.13 nest/km^2). Raptor nest density around the new proposal, including a 2-mile buffer, for buteos is 0.18 nest/mi^2 (0.07 nest/km^2) and for all raptors is 0.20 nest/mi^2 (0.08 nest/km^2). The best raptor nesting habitat in the Project vicinity is

located along the Wilson creek riparian corridor east of the site and along the numerous 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 experience disturbance or displacement effects to the point that raptors do not return and use those nests. This potential impact will decrease with the new proposal due to the lower nest density in this area. There were only 2 active raptor nests, based on the 2003 survey, within 0.5 mile of the new Project boundary (2 red-tailed hawks). Higher nest densities occurred in the south east area of the original project and that area has been dropped from the Project. Also, Wilson Creek falls outside the 2-mile buffer of the new site. It is unlikely that construction of the new Project will result in significant disturbance or displacement impacts on nesting raptors.

Estimates of Mortality Due to Turbines

Mortality impacts of the proposed Project are projected primarily based on data collected at 11 existing regional wind power facilities (**Table 3**): the Combine Hills project, Oregon (Young et al. 2005), the Klondike I and II projects, Oregon (Johnson et al. 2003, NWC and WEST, 2007); the Vansycle Wind Plant, Oregon (Erickson et al. 2000); the Stateline Wind Project, Washington and Oregon (Erickson et al. 2003a); Hopkins Ridge project, Washington (Young et al. 2007), Nine Canyon Wind Project, Washington, (Erickson et al. 2003b), the Wild Horse project, Washington, (Erickson et al. 2008), Bighorn I, Washington, (Kronner et al. 2008), Leaning Juniper, Oregon (Kronner et al. 2007), and the Condon project (Fishman 2003). Monitoring studies at these projects were all similar in scope and the mortality estimates were adjusted for bird and bat carcass removal and searcher efficiency biases at all projects except Condon.

Based on the avian studies performed by WEST in 2002-2003, use by birds of the Project area is similar to other wind plants studied (**Table 3**). Species diversity of the site was higher than some other studies, but overall avian use estimates were similar. Collision-related impacts (fatalities) would not be expected to exceed what has been observed at other wind projects in the northwest.

Raptors

Compared to other wind projects studied in the region, raptor (defined as buteos, accipiters, eagles, falcons) use for the Desert Claim site was slightly above average, with the equivalent of 0.72 raptors observed for a 20-minute survey. The majority of the raptor sightings were red-tailed hawks during the spring, summer, and fall, and rough-legged hawks during the winter. Raptor mortality for the 11 wind projects listed above in Washington and Oregon has ranged from 0 to 0.15 fatalities per MW per year (**Table 3**), with an average of 0.07 fatalities per MW per year. Considering these mortality results and raptor use estimates at these wind projects, it is estimated that potential raptor mortality at the proposed Project could be higher than average. Using the raptor mortality rates from projects in the region, potential raptor mortality is expected to range from 0 to 29 per year.

Table 3
Avian use estimates and avian fatality estimates for wind power projects in the Columbia Plateau Ecoregion.

Project	Mean annual avian use (#/20-min survey)		Mean annual mortality (#/MW/year)			
	Raptors	All birds	Raptors	All birds	Nocturnal Migrants	Source
Combine Hills, OR	0.60	6.0	0	2.6	0.27	Young et al. 2005
Klondike, I OR	0.47	17.5	0	0.9	0.35	Johnson et al. 2003
Klondike II, OR	0.47	17.5	0.11	3.1	2.11	NWC and WEST, 2007
Vansycle, OR	0.41	13.1	0	1.0	0.32	Erickson et al. 2000
Stateline, WA/OR	0.41	13.1	0.10	2.4	0.78	Erickson et al. 2004, 2007
Hopkins Ridge, WA	0.64	8.7	0.14	1.2	0.46	Young et al. 2007
Nine Canyon, WA	0.26	9.4	0.05	2.8	0.45	Erickson et al. 2003b
Wild Horse, WA	0.40	5.0	0.09	1.6	0.88	Erickson et al. 2008
Bighorn I, WA	0.90	16.6	0.15	2.6	0.57	Kronner et al. 2008
Leaning Juniper, OR	0.52	23.6	0.06	3.2	na	Kronner et al. 2007
Condon, OR	0.37	5.8	0.02[a]	0.05[a]	NR	Fishman Ecological Services 2003
Mean	**0.50**	**12.4**	**0.07**	**2.1**	**0.69**	

[a] not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and it was not used in calculation of the mean values.

A more recent analysis of results from multiple projects (**Figure 4**), including numerous studies in the Columbia Plateau region, suggests that there is a correlation between raptor use and raptor mortality. The relationship between raptor use (standardized to 20-minute surveys) and raptor mortality (adjusted for site-specific estimates of carcass removal and searcher efficiency) was plotted (**Figure 4**) for 13 wind projects studied since 2002. A strong relationship is apparent in this analysis. Two California projects (High Winds and Diablo Winds) have very high raptor use, and much higher raptor mortality than Pacific Northwest and Mid-west projects (**Figure 4**). Raptor use in this analysis does not include vultures. Raptor use at Desert Claim was analyzed to include just the first 20 minutes of surveys (Young et al. 2003) and to exclude turkey vultures so that it could be accurately compared to the regression.

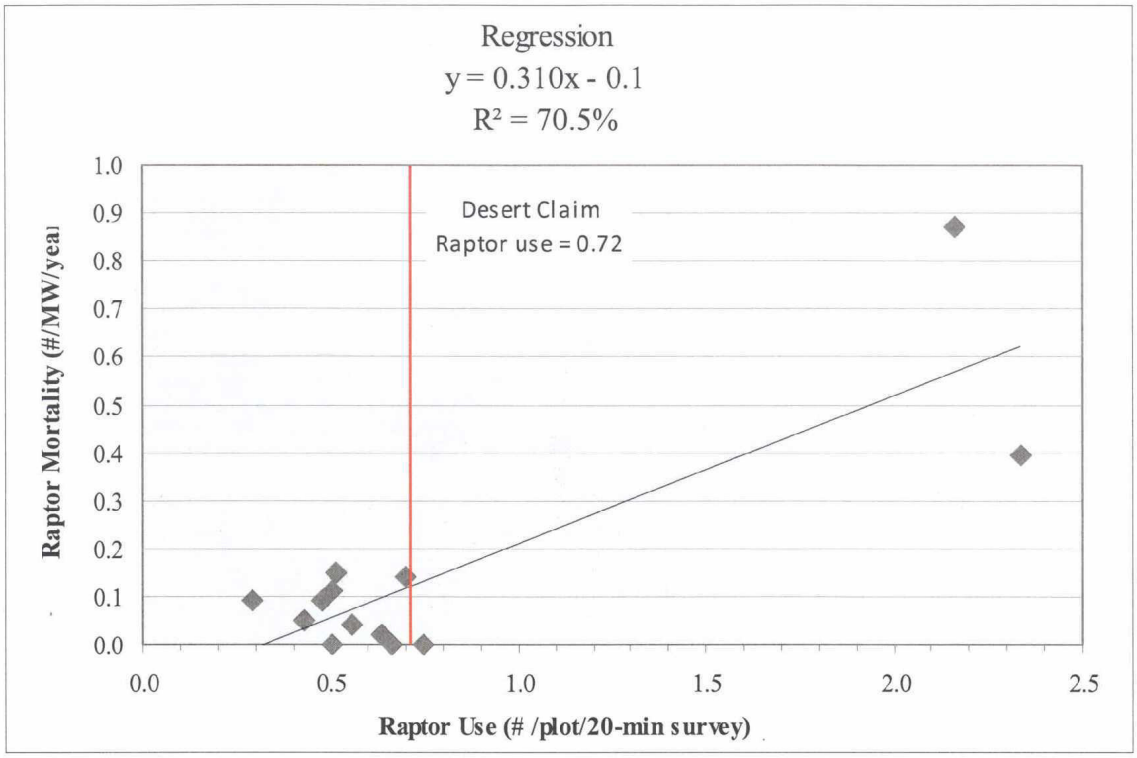


Figure 4. Relationship between raptor use and mortality for 13 wind projects studied since 2002.

Data sources:

Study and Location	Raptor Use	Source	Raptor Mortality	Source
Buffalo Ridge, MN	0.64	Erickson et al. 2002	0.02	Johnson et al. 2000
Combine Hills, OR	0.75	Young et al. 2003c	0.00	Young et al. 2005
Diablo Winds, CA	2.16	WEST 2006a	0.87	WEST 2006a
Foote Creek Rim, WY	0.55	Erickson et al. 2002	0.04	Young et al. 2003b
High Winds, CA	2.34	Kerlinger et al. 2005	0.39	Kerlinger et al. 2006
Hopkins Ridge, WA	0.70	Young et al. 2003d	0.14	Young et al. 2007
Klondike II, OR	0.50	Johnson 2004	0.11	NWC and WEST 2007
Klondike, OR	0.50	Johnson et al. 2002	0.00	Johnson et al. 2003
Stateline, WA/OR	0.48	Erickson et al. 2002	0.09	Erickson et al. 2002
Vansycle, OR	0.66	WCIA and WEST 1997	0.00	Erickson et al. 2002
Big Horn, WA	0.51	Kronner et al. 2008a	0.15	Kronner et al. 2008b
Wild Horse, WA	0.29	Erickson et al. 2003c	0.09	Erickson et al. 2008
Nine Canyon, WA	0.43	Erickson et al. 2002	0.05	Erickson et al. 2003b

Using this method, estimated raptor use for Desert Claim (0.72/survey) yields a prediction of 0.12 raptor fatalities/MW/year from this regression model, or 23 raptors for the entire project, which is in the range predicted based solely on fatality rates at the other regional projects (Table 3).

These estimates would not result in any population level consequences (e.g., within the Kittitas Valley, within the Columbia Plateau, or some larger population) for the species likely to be impacted. For example, most fatalities are likely to be red-tailed hawks and American kestrels, and these two species are the most common raptor in the Kittitas Valley, as well as in the Columbia Plateau and nationally. Based on results data from the USGS Breeding Bird Survey (BBS) routes in the Columbia Plateau over the past 20 years (Sauer et al. 2006), the breeding populations for these two species in the Columbia Plateau is approximately 5,890 kestrels and 7,035 red-tailed hawks in the ecoregion (see Cumulative and Population Level Impacts below). Based on the estimated raptor fatality rate above of 23 raptors, and assuming that half are kestrels (12 individuals) and half are red-tailed hawks (12 individuals), then 0.20% of the kestrel population and 0.17% of the red-tail population would be directly impacted by the Project on an annual basis.

Passerines

Passerines have been the most abundant fatalities at other wind projects studied, often composing more than 80 percent of total avian mortality. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of avian observations on-site, it is expected that passerines would make up the largest proportion of fatalities. As with raptor fatality estimates, biologists now generally estimate passerine mortality for wind projects on a per MW rather than a per turbine basis. Considering the available data from existing regional wind projects and the fact that passerines make up approximately 70% of bird fatalities at wind projects in the Pacific Northwest (**Table 4**), it is estimated that potential passerine mortality at the proposed Project would be approximately 1.47 birds per MW per year. This would result in approximately 280 passerine fatalities per year at the Project if 190 MW are constructed. The range of mortality rates from northwest projects (Table 3), leads to an estimate of between approximately 50 to 400 passerine fatalities would occur annually at the project.

Table 4
Percent composition of avian fatalities by species group for existing Columbia Plateau Ecoregion (WA, OR) wind-energy facilities.

Species	Number of Fatalities	Percent Composition
Passerines	461	69.5
Upland gamebirds	96	14.5
Raptors	57	8.6
Doves/pigeons	21	3.2
Waterbirds/waterfowl/shorebirds	11	1.7
Other birds[a]	17	2.6
Totals	**663**	**100**

[a] woodpeckers, nighthawks, swifts

Waterfowl

Little waterfowl mortality has been documented at other wind plants. The most common waterfowl species observed in the Project area were mallard, Canada goose, and northern pintail, and were seen mainly in winter. A variety of other waterfowl species were seen incidentally in the study area. Waterfowl mortality could be expected, likely composed mostly of mallards; however, the total number of anticipated fatalities is low. While mallards were seen year round, the majority of waterfowl use was during winter and in the western portions of the original project area. Potential impacts to waterfowl would not be expected to change based on the new proposal because the portion of the original project not included in the current proposal was primarily shrub-steppe vegetation which had little waterfowl use.

All Avian Mortality

The range of bird mortality for the 10 regional wind projects listed above where fatality counts were adjusted for bias (searcher efficiency, carcass removal) is approximately 0.9 to 3.2 birds per MW per year for all birds with an average of 2.1 birds per MW per year (**Table 3**). Using this range, avian mortality at the proposed Project would be approximately 171 to 608 birds per year if 190 MW are built. Since the total MW has increased by 10 MW, this approach yields a slightly higher avian mortality estimate for the new Project than would have been predicted for the original project proposal.

Carcass searches at other wind projects have found avian fatalities associated with guyed met towers but not with un-guyed towers. As currently planned, the proposed Project would have 4 permanent un-guyed met towers. Based on the result of the above studies, no avian fatalities are expected that would be associated with the met towers.

Cumulative and Population Level Impacts

In addition to the proposed Desert Claim project, another wind project, the Wild Horse Wind Farm, has been constructed in Kittitas County, and two more, Kittitas Valley Wind Project and Vantage Wind Project, have been permitted. The Wild Horse project has

been monitored for fatalities for one year in 2007 (Erickson et al. 2008). Results of this monitoring study were included in the estimation of potential project impacts above (see Table 3). For cumulative impacts, it is assumed that all four projects are constructed.

Raptors

Based on the updated mortality analysis herein, developed using recent information on wind project impacts, the estimated range of raptor mortality would be from 0 to 29 raptors per year for the Desert Claim Project. Provided all four of the Kittitas County wind projects are eventually constructed, and raptor mortality is similar for each project, the total estimated annual raptor mortality for the County due to wind turbines would range from approximately 0 to 116. In 2007, raptor mortality at the Wild Horse project was estimated at 0.09 per MW. The total raptor mortality for the project was estimated at 20 for the year. Because the Desert Claim, Kittitas Valley, and Vantage projects are smaller in size than the Wild Horse project, the total cumulative annual impact to raptors is not expected to be greater than 80 for all four projects.

In order to determine if this predicted mortality would be considered significant, it was assumed that raptors within the Columbia Plateau physiographic region (ecoregion) would be the populations most likely affected. While local populations of raptors are somewhat difficult to define, birds within the Columbia Plateau ecoregion may easily intermix without any major geographic or topographic barrier, so more local populations (e.g. Kittitas Valley) are not isolated or separated from the larger regional population.

The two species expected to compose a majority of the raptor fatalities based on their relative abundance (observed use of the site; see Young et al. 2003a) and mortality at other regional wind projects are American kestrel and red-tailed hawk. Five of the six raptor fatalities observed at Wild Horse were American kestrel or red-tailed hawks. These two species were among the three most common raptors observed during the baseline studies for all four wind projects in Kittitas County based on use estimates, and they are one of the most common raptors observed during BBS surveys (Sauer et al. 2006) and Christmas bird counts in Kittitas County (National Audubon Society 2006). These two species are also the two most commonly reported raptor fatalities at modern wind projects (see Erickson et al. 2001, 2002) and account for more than 63% of the raptor fatalities recorded at the regional wind projects studied (Table 5).

Table 5

Number and species composition of bird fatalities found at the existing Columbia Plateau Ecoregion wind-energy facilities.

Species	Number of Fatalities	Percent Composition
horned lark	206	31.1
golden-crowned kinglet	43	6.5
ring-necked pheasant	37	5.6
gray partridge	36	5.4
American kestrel	22	3.3
chukar	22	3.3
western meadowlark	21	3.2
unidentified passerine	19	2.9
dark-eyed junco	18	2.7
European starling	17	2.6
white-crowned sparrow	17	2.6
mourning dove	16	2.4
Red-tailed hawk	14	2.1
ruby-crowned kinglet	9	1.4
unidentified bird	9	1.4
yellow-rumped warbler	9	1.4
short-eared owl	7	1.1
winter wren	7	1.1
house wren	6	0.9
unidentified kinglet	6	0.9
black-billed magpie	5	0.8
Brewer's sparrow	5	0.8
golden-crowned sparrow	5	0.8
rock dove	5	0.8
Townsend's warbler	5	0.8
unidentified sparrow	5	0.8
American robin	4	0.6
Canada goose	4	0.6
common nighthawk	4	0.6
ferruginous hawk	4	0.6
northern flicker	4	0.6
rock pigeon	4	0.6
red-breasted nuthatch	3	0.5
song sparrow	3	0.5
Swainson's hawk	3	0.5
white-throated swift	3	0.5
Cassin's vireo	2	0.3
house finch	2	0.3
Macgillivray's warbler	2	0.3
mallard	2	0.3
sage thrasher	2	0.3
savannah sparrow	2	0.3
vesper sparrow	2	0.3
American coot	1	0.2
American goldfinch	1	0.2

Species	Number of Fatalities	Percent Composition
American pipit	1	0.2
barn owl	1	0.2
black-throated sparrow	1	0.2
brown-headed cowbird	1	0.2
bufflehead	1	0.2
chipping sparrow	1	0.2
common raven	1	0.2
Cooper's hawk	1	0.2
downy woodpecker	1	0.2
grasshopper sparrow	1	0.2
gray catbird	1	0.2
great blue heron	1	0.2
great horned owl	1	0.2
hairy woodpecker	1	0.2
house sparrow	1	0.2
killdeer	1	0.2
Lewis's woodpecker	1	0.2
long-eared owl	1	0.2
mountain bluebird	1	0.2
northern harrier	1	0.2
Orange-crowned warbler	1	0.2
red-shafted flicker	1	0.2
red-winged blackbird	1	0.2
rough-legged hawk	1	0.2
sage sparrow	1	0.2
Spotted towhee	1	0.2
Swainson's thrush	1	0.2
Townsend's solitaire	1	0.2
unidentified accipiter	1	0.2
unidentified *Empidonax*	1	0.2
unidentified partridge	1	0.2
unidentified thrush	1	0.2
varied thrush	1	0.2
Vaux's swift	1	0.2
warbling vireo	1	0.2
western grebe	1	0.2
western kingbird	1	0.2
western tanager	1	0.2
Williamson's sapsucker	1	0.2
yellow warbler	1	0.2
Totals (77 species)	**663**	**100.0**

Based on results data from the USGS Breeding Bird Survey (BBS) routes in the Columbia Plateau over the past 20 years, the breeding populations for these two species in the Columbia Plateau is approximately 5,890 kestrels and 7,035 red-tailed hawks breeding individuals in the ecoregion. Cade (1982) estimated North American breeding population of American kestrels at greater than 1.2 million pairs. Estimates of total red-

tailed hawk populations have been reported between 300,000 and 1,000,000 in the U.S. (Preston and Beane 1993).

Given the size of the regional population of the American kestrel and red-tailed hawk, neither the estimated Project impact nor estimated cumulative impact of the four wind projects in Kittitas County will be significant at the Columbia Plateau population level. It is expected that the natural variability of the local population is likely to be much greater than the number of fatalities predicted. There may be occasional fatalities of other raptor species, but they would even fewer than kestrels or red-tailed hawks and not result in significant population effects.

Other Birds

Passerines have been the most abundant avian fatality at wind projects studied (see Erickson et al. 2000, 2001, 2002, Johnson et al. 2002, Young et al. 2003b, 2005, 2007), often representing more than 80% of the avian fatalities. For projects in the Columbia Plateau ecoregion on average approximately 70% of the avian fatalities have been passerines (**Table 4**). Both migrant and resident passerine fatalities have been observed, with migrants generally making up 20-30% of the avian fatalities.

For most studies that have occurred in agricultural settings, a few common species make up the majority of bird observations and fatalities at the site, however, a variety of other species, including migrants, have been recorded as fatalities but typically in low numbers and frequency. The majority of avian deaths (70%) due to wind power facilities in the Columbia Plateau region were of common passerines in mixed agriculture and grassland habitat (see **Table 5**). Horned larks are the most common fatality at most of the projects studied. For example at the Stateline, Combine Hills, Nine Canyon I, horned larks were 39%, 41%, and 47% of all avian fatalities, respectively and a much higher percentage of the passerine fatalities. At Wild Horse, horned lark was also the most common avian fatality (14% or all birds; 20% of passerines) despite the lack of cultivated agriculture at the site which tends to increase horned lark numbers. Other shrub-steppe and open country passerines such as western meadowlarks and European starling were also found regularly. For example, European starling made up 18% of the fatalities at the Hopkins Ridge project (Young et al. 2007).

The expected number of fatalities from Desert Claim alone or in combination with the other wind projects in Kittitas County would not be significant to the regional populations, in general simply because the regional populations are so large. For example, over all passerines recorded during the regional monitoring studies, horned lark made up over half (51%) of the fatalities. Assuming this pattern holds for the projects in Kittitas County, it is expected that on average there would be 190 horned lark fatalities per year for Desert Claim and approximately 635 horned lark fatalities for all four projects. This compares to an estimated regional population of approximately 111,000 horned larks based on the BBS results for the Columbia Plateau ecoregion (Saur et al. 2006). Natural variation in the horned lark population is likely substantially higher than the estimated impacts. Impacts to other bird species are expected to be less based on the results of the other monitoring studies (see **Table 5**) and comprise a much smaller percentage of the pool of fatalities from Columbia Plateau wind projects. These small

impacts would be to individuals and would not result in a significant impact to specific species or general populations.

Bats

Research at other wind projects indicates that the primary impact to bats appears to be risk of collision for fall migratory species with hoary bat (*Lasiurus cinereus*) and silver-haired bats (*Lasionycteris noctivagans*) being the most prevalent Pacific Northwest fatalities (**Table 6**; Johnson 2005). Sparse information exists regarding bat populations in the region; however, non-migratory and resident bat populations do not appear to be negatively impacted by wind turbines (see Johnson 2005). The regional monitoring studies have found very little impact to resident bats with very low numbers of resident bat species (little brown bats, big brown bats) being observed fatalities (**Table 6**).

Table 6
Number and species composition of bat fatalities found at Columbia Plateau regional wind projects.

Species	Number of Fatalities	Percent Composition
Silver-haired bat	163	48.4
Hoary bat	152	45.1
Unidentified bat	8	2.7
Little brown bat	8	2.4
Big brown bat	5	1.5
Totals (4 species)	337	100

Fatality estimates for ten regional wind projects studied have ranged from 0.39 to 2.46 bats per MW per year with an average of 1.18 bats per MW per year (**Table 7**). In these studies more than 90% of the bat fatalities have been hoary and silver-haired bats (**Table 6**). Bat mortality at the Desert Claim Project is not expected to greatly exceed the other regional wind projects studied. It had been speculated that bat mortality could be higher due to the proximity of forests to the north and west, and some projects in other parts of the country have shown that risk to bats may be greater in forested environments (e.g. Kerns and Kerlinger 2004; Nicholson 2003). However, the revised Project area is farther away from forested habitat to the north and west than it was in the 2004 FEIS, and other wind projects in the region are in similar proximity to forests without resulting high bat mortality.

Using a per MW basis, bat mortality at the site may be approximately 0.4 – 2.5 bats per MW per year or between 76 and 475 total bats per year if 190 MW are constructed which is a similar estimate to the previous proposed project. On a cumulative basis for the four wind projects proposed or constructed in Kittitas County, and provided a total of 755

MW are constructed, between 302 and 1888 bat deaths could occur in Kittitas County annually.

Table 7
Mean bat mortality estimates based on fatality studies at regional wind projects.

Project Name [state]	No. Bats /turbine/year	Bats per MW[1]	Reference
Stateline [OR/WA]	0.95	1.44	Erickson et al. 2004, 2007
Vansycle [OR]	0.74	1.12	Erickson et al. 2000
Klondike [OR]	1.16	0.77	Johnson et al. 2003
Klondike II [OR]	0.63	0.41	NWC and WEST, Inc. 2007
Hopkins Ridge [WA]	1.13	0.63	Young et al 2007
Wild Horse [WA]	0.70	0.39	Erickson et al. 2008
Nine Canyon [WA]	3.21	2.46	Erickson et al. 2003b
Leaning Juniper [OR]	1.28	0.86	Kronner et al. 2007
Big Horn I [WA]	2.85	1.90	Kronner et al. 2008
Combine Hills [OR]	1.88	1.88	Young et al. 2005
Average	**1.46**	**1.18**	

[1] Most reports do not provide number per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

Provided bat mortality at the Desert Claim project is similar to the other Columbia Plateau wind projects, impacts to resident and non-migratory species will be minor and not significant. This low level of mortality impacts for *Myotis* species and big brown bat would be to individuals and not populations, are not considered significant, and would likely be less than natural levels of variation in mortality for these species. This would also hold true for the cumulative impact from all three wind projects.

Unlike with birds, there is little information available about populations of bat species. For most species that are not threatened or endangered and have large geographic distributions, very little is known about potential numbers that exist. Results of monitoring studies across the U.S. and Canada have found similar trends in impacts such as risk to bats from wind turbines is unequal across species and across seasons. The majority of bat fatalities at wind projects in the U.S. and Canada have been tree/forest dwelling long-distance migrant species found in the late summer and fall periods. Species in the *Lasiurus* genus, hoary bat in the west and red bat (*L. borealis*) in the east, and silver-haired bats are the most abundant fatalities found at wind projects. Numerous studies across the U.S. and Canada have shown this trend (see Johnson 2005). The highest mortality occurs during what is believed to be the post-breeding dispersal and fall migration period for bats from roughly late-July through September. Numerous studies across the U.S. and Canada have also shown this trend (see Johnson 2005). Much lower mortality rates, and particular in the Columbia Plateau ecoregion, occur in the spring and summer.

Hoary bats and silver-haired bats generally occupy forested or treed habitats during the breeding season, habitat distinctly lacking and localized throughout the Columbia Plateau ecoregion, but adjacent to the wind projects proposed in Kittitas County. Monitoring of the nearby Wild Horse wind project did not suggest that the nearby forest influenced bat mortality. The impacts to bats at Wild Horse were similar to the other Columbia Plateau wind projects and were on the low end of the range of bat mortality (see **Table 7**).

The significance of the impact on hoary and silver-haired bat populations is difficult to determine, as there is very little information available regarding the overall population size and distribution of the bats potentially affected. Hoary bat and silver-haired bats are two of the most widely distributed bat species in North America (Shump and Shump 1982; Kunz 1982) and it is likely that, due to the size of the species ranges, that they have fairly large population sizes. Unlike many bird species that may have multiple clutches of multiple young per year, hoary bats and silver-haired bats typically raise only one or two young per year and only breed once per year (Shump and Shump 1982; Kunz 1982). Bats tend to live longer than birds; however, and may have a longer breeding lifespan. The impact of the loss of breeding individuals to populations such as these may have greater consequences, and the long-term consequences of mortality on long-lived, low-fecundity species such as bats are generally unknown.

If bat mortality at Desert Claim is similar to the Wild Horse wind project, it is not expected to be significant. Total bat mortality at Wild Horse was estimated at 89 individuals for 2007 (Erickson et al. 2008). Provided the Desert Claim, Kittitas Valley, and Vantage projects have similar or less impacts than Wild Horse, due to their smaller sizes, there would be less than 356 total bat fatalities per year in Kittitas County due to wind turbines. Due to the migratory status of hoary and silver-haired bats, this mortality impact would be primarily on populations from surrounding mountainous/forested ecoregions and from more northern regions (e.g., Canada) during the fall migration. Given that this impact would be primarily on wide ranging migratory species, the populations potentially affected are likely to be very large. Under the assumption that hoary and silver-haired bat populations are large and stable, this level of mortality is not likely to be greater than background mortality for these species. However, this assessment must be qualified by the lack of information on the species population sizes, status, and dynamics.

Other Wildlife

Small Mammals

Impacts to ground-dwelling mammals occurring on site would include fatalities from construction activities, loss of habitat, and disturbance or displacement. The incremental change in these types of impacts from the new proposal over the previous proposal is difficult to estimate; however, it is expected that the overall impacts would be less due to the smaller project size. Small mammals are expected to repopulate impact areas after construction activities cease and reclamation is complete, and they may re-colonize areas quicker due to the smaller project. Some small mammal fatalities can be expected from

O&M vehicle traffic, but because the Project would be smaller overall, these impacts would be less.

A comment submitted during scoping for the original 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. Overall, the total rodent population in the area is likely a function of environmental conditions and not controlled by predators. The small impacts to raptors anticipated from the project would not have a noticeable or measurable affect the rodent population.

Reptiles and Amphibians

Aquatic or moist habitats for amphibians and reptiles are generally restricted to the riparian, wetland, and pond areas within the study area. Substantial impacts to these areas are not anticipated due to regulatory requirements to minimize impacts, and erosion and sedimentation prevention methods will be used in adjacent upland construction areas. Due to the overall reduction in the project size, impacts to these habitats will decrease and thus the potential for impacts to aquatic wildlife will decrease.

As with ground-dwelling mammals, snakes and lizards that occupy upland areas may experience fatalities due to construction activity. Due to the overall reduction in project size, the potential for and magnitude of this impact will be less than the previous proposal. Some reptile fatalities can be expected from O&M vehicle traffic, but again, because the project would be smaller overall with fewer roads, these impacts would be less.

Big Game

The new Project area is within the Ellensburg mule deer winter range and two high-density deer wintering areas occur within 1.5 miles of the project. Also, the Quilomene elk migration corridor is an important spring pathway that is north of the project. Project construction and operation could result in disturbance or displacement impacts to big game, including deer wintering in the area, which, during very severe winters, could result in mortality impacts due to animals being forced into marginal habitat that does not sustain them over winter. Overall these types of impacts from the new proposal are expected to be less because of the smaller project area. There will be less overall road and turbine strings that could fragment habitat or create barriers to movement. Also the new Project area is concentrated more around existing infrastructure (e.g., transmission lines, local roads) than the previous proposal, which reduces the amount of additional habitat fragmentation that would occur from the project. The smaller Project should result in less displacement or less potential for displacement to adjoining cropland, reducing the possibility that crop damage claims in the project vicinity may change.

The northernmost section of the Project area is near the southern edge of the Quilomene elk migration corridor. It is unknown to what extent this area is used by elk, or if the new Project is within view of the migration corridor. If this area of the Project influences spring elk movement, it is expected that elk will shift their path to the north without migratory hindrance due to the large size of the corridor. There is no change in this potential impact from the previous proposal, as the same northern project section was included in both project layouts.

Temporary loss of habitat from Project construction is a relatively minor impact due to expected vegetation reclamation and the large 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 occupy areas within the wind plant. There will also be intermittent disturbances from vehicle and human traffic during regular O&M activities, and also from turbine noise and shadow flicker of moving blades. If deer tolerance thresholds are exceeded by these disturbances, it is expected that mule deer will seek remote areas of nearby ravines or forests. Should the facility eventually result in a sanctuary for big game due to reduced hunting pressure, seasonal use of the wind plant by big game may increase. However, the new proposal is smaller and would not create as large of a sanctuary area.

Threatened and Endangered Species

The previous environmental impact analysis determined that the original project would have no effect on the majority of the State or Federally listed threatened or endangered species potentially occurring in or near the Project area. One federally threatened species, steelhead, could occur in the Project area and therefore may be at risk of adverse impacts from the Project. At the time of the original Environmental Impact Statement, bald eagle was a federally threatened species and Washington State sensitive species. Bald eagle was removed from the list of threatened species in 2007 but remains a state sensitive species.

Bald eagles occur in the Project area during the winter from approximately late December to early April. There is no evidence that bald eagles breed in the Project area or nearby although the Yakima River riparian corridor provides suitable breeding habitat. Potential impacts to bald eagles identified in the previous analysis included disturbance or displacement during the winter season, potential loss of roosting and foraging habitat, and potential mortality due to turbine collisions. The new proposal which is smaller in size and with fewer turbines generally will have less potential impact to bald eagles than the original proposal. The Project will not affect the Yakima River riparian corridor or bald eagle roost sites and habitat along the Yakima River. Temporary loss of potential isolated roosting habitat (scattered patches of trees) due to construction disturbance would be for the short duration of the construction period (9-12 months), most of which will be outside the winter season and would affect even less of the available roosting habitat than the original proposal. During avian studies at the site, bald eagles were observed using the Wilson Creek riparian corridor and Wilson Creek Canyon to the northeast of the original project area. While no roosts were found in this area, the current

proposal is greater than 3 miles from this area, further reducing the possibility of disturbance impacts at roost sites. Wintering bald eagles forage throughout the surrounding area on carrion, livestock by-products, and fish in the Yakima River. To the extent that carrion or livestock by-products occur on site, bald eagles may forage on the site. Cattle operations in the Project area are considered independent of the wind project and the Project is not expected to reduce foraging opportunities for bald eagles. Bald eagles flying within the Project area would have some exposure to turbine-caused mortality; however, there have been no documented bald eagle fatalities at wind plants and the number of turbines proposed is less resulting in less over all collision risk. The Project also occupies a smaller overall area resulting in less potential to disrupt normal movement patterns of wintering eagles in the valley. 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 Young et al. 2003a) and the fact that the bald eagle occupation period overlaps the least windy time of year.

For steelhead trout, the WDFW provided information indicating that due to diversion of water from First Creek into Green Canyon and eventually to the Reecer Creek sub-basin, steelhead could possibly occur in Reecer Creek which flows through the Project area. Also, the Columbia River district population segment of bull trout is listed as a threatened species under the Endangered Species Act and potentially occurs downstream in the Yakima River. Due to steelhead occurring within the Project area, and the potential for downstream impacts (see the Desert Claim FEIS) the Project has the potential to adversely affect these species. The Reecer Creek drainage where steelhead potentially occur is within the new proposal Project area. Potential impacts to steelhead from the new proposal are not expected to change over the original proposal. In essence, the portion of the original proposal that could potentially affect steelhead was the western sections around Reecer Creek. These sections are still included in the new proposed Project so potential impacts to steelhead remain.

State listed wildlife that may occur in the Project area include golden eagle, northern goshawk, sage thrasher, and loggerhead shrike. The initial environmental impact analysis determined that potential impacts to these species would be minimal and include the basic impacts discussed for birds (mortality, disturbance/displacement, and possible loss of habitat). The current proposal, which has fewer turbines and occupies a smaller area, may further reduce the potential for these impacts. For example, loggerhead shrike and sage thrasher are possible breeding residents in the study area and would occupy shrub-steppe vegetation. The new proposal reduces impact to shrub-steppe by approximately 26 acres thus reducing the potential for impacts to these species.

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