

Section 3.16 CUMULATIVE IMPACTS

3.16.1 Introduction

The State Environmental Policy Act (SEPA) requires that agencies address cumulative impacts. According to *Ecology's SEPA Handbook*, an EIS should consider how the impacts of a proposal would contribute to the total impact of development in the region over time (Ecology 1998). In the context of the proposed Wild Horse Wind Power Project, cumulative impacts are identified largely on the basis of significant proposed and reasonably foreseeable future developments and anticipated population growth within Kittitas County.

For the purpose of this analysis, the proposed Desert Claim and Kittitas Valley Wind Power Projects were identified as the only major reasonably foreseeable developments in the area that could, in conjunction with the proposed project, contribute to cumulative impacts. The wind power projects are shown in Figure 3.16-1. The project sites of the Kittitas Valley project and the Desert Claim project are relatively close to each other (within 1.6 miles at the closest point), while the Wild Horse project site is 14 miles from the Desert Claim project site and 21 miles from the Kittitas Valley project site.

Land uses (and associated population growth) within Kittitas County, both current and projected, would also contribute to cumulative impacts. Future land use in the vicinity of the project site is assumed to continue as primarily agriculture. Anticipated population growth within the County would require additional infrastructure, services, and housing.

No other present or reasonably anticipated future projects are expected to contribute to cumulative impacts near the Wild Horse project. Several other wind power projects in the Pacific Northwest are either operating or proposed. The cumulative effects of those wind power projects could be similar in nature to the effects described herein. However, for the purpose of defining the geographic scope of the cumulative study area, the Kittitas Valley project, Desert Claim project, and Wild Horse project in Kittitas County are sufficient for the evaluation of cumulative impacts.

3.16.2 Desert Claim Wind Power Project

On January 28, 2003, Desert Claim Wind Power, a limited liability company wholly owned and managed by enXco, Inc., submitted an application to Kittitas County for permits to build and operate a wind electrical generation facility in the Reecer Creek area, approximately 8 miles north of Ellensburg (Desert Claim Wind Power LLC 2003). A Draft EIS for the Desert Claim project was issued by Kittitas County in December 2003. The Desert Claim project consists of a

maximum of 120 wind turbines, with a total nameplate capacity of 180 megawatts (MW), associated generators, towers, foundations, and pad-mounted transformers on 5,237 acres. The project also includes the following other elements:

- Access roads, control cables, and power collection cables necessary to serve the project;
- One or more substations to convert project-generated electricity to the higher voltage required to interconnect into the regional electric transmission grid;
- An overhead transmission line required to connect the project substation with nearby high-capacity electrical transmission lines; and
- An O&M facility co-located at the project substation site or, alternatively, located in an area zoned for industrial use within or near Ellensburg.

3.16.3 Kittitas Valley Wind Power Project

Sagebrush Power Partners, LLC, a wholly owned subsidiary of Zilkha Renewable Energy, plans to construct, own, and operate a wind electrical generating facility (referred to as Kittitas Valley) in western Kittitas County. The Kittitas Valley project would have between 82 and 150 wind turbine generators, with a total nameplate capacity of between 181.5 to 246 MW. The project site is located on open ridge tops between Ellensburg and Cle Elum, about 12 miles northwest of the City of Ellensburg in Kittitas County, Washington. An Application for Site Certification was submitted to EFSEC in January 2003 and a draft environmental impact statement (DEIS) for the Kittitas Valley project was issued in December 2003. The project spans approximately 5,000 acres, but only 90 acres are expected to be permanently affected. The Kittitas Valley project would interconnect to existing Puget Sound Energy (PSE) and/or Bonneville transmission systems, which traverse the proposed site (Peebles 2003).

3.16.4 Comparison of Wind Power Projects

The basic features of the three wind power projects are summarized below in Table 3.16-1. The summary is based on information gathered from available sources, including the DEIS for the Kittitas Valley project and the DEIS and Development Activities Application submitted to Kittitas County for the Desert Claim project (Desert Claim Wind Power LLC 2003).

The construction schedules for the three projects have not been finalized at this time. However, the most recent preliminary schedules for the Kittitas Valley project and the Wild Horse project indicate that their construction could potentially overlap for a period of about eight months. The proposed construction schedule for the Desert Claim project is not currently known. The cumulative impact analysis presented herein assumes an unlikely worst-case scenario in which all three projects are constructed simultaneously during an 8-month period.

Table 3.16-1. Summary of Proposed Wind Power Project Features in Kittitas County

Feature	Wild Horse ¹	Desert Claim	Kittitas Valley ²
Number of Turbines	136	120	121
Total Nameplate Capacity	204 MW	180 MW	181.5 MW
Project Area Size	8,600 acres	5,237 acres	7,000 acres
Existing Zoning	Agriculture-20 Forest and Range	Agriculture-20 Forest and Range	Agriculture-20 Forest and Range
Construction Duration	12 months	9 months	12 months
Construction Employees	253 people	150 people	253 people
Operational Employees	12–14 people	10 people	12–14 people

Notes:

- 1 Data represent most likely scenario, as defined in Chapter 2.
- 2 Assumes use of 1.5-MW turbines.

Sources: Sagebrush Power Partners LLC 2003a; Desert Claim Wind Power LLC 2003; Weinman 2003; Kittitas County 2003

3.16.5 Population Growth Within Kittitas County

Projected population growth and assumptions for future land use in Kittitas County are based on the Kittitas County Comprehensive Plan (Kittitas County 2000). The forecasted population for the year 2020 is 41,776, an increase of 6,976 people since 2002. This projected population will require additional infrastructure, support services, and housing. Assuming 2.5 people per household, an additional 2,790 housing units will be necessary to support this population increase. According to the Comprehensive Plan, approximately 55% this growth will occur in Kittitas County with the remaining 45% allocated to municipalities (Kittitas County 2000).

3.16.6 Cumulative Impacts

The following sections discuss the potential contribution of the wind power projects and projected County population growth to cumulative impacts in the study area. The discussion is presented by resource topic.

3.16.6.1 Earth Resources

Significant cumulative impacts on soil, topography, and geology resulting from construction of the three proposed wind power projects and future population growth in Kittitas County are not anticipated. The three project sites are not characterized by high geologic hazards. Impacts on earth resources from development of the three wind power projects would be primarily related to localized, temporary erosion impacts from ground disturbance during construction. The impacts on near-surface soils would be within the construction footprint for the respective projects; they would not geographically overlap each other. Consequently, there would not be an interactive effect among any two of the projects nor all three projects. For example, erosion impacts related

to the Desert Claim project would not exacerbate erosion conditions near the Kittitas Valley project. The combined effects of the three projects would not result in a significant cumulative impact on earth resources.

Cuts and fills would be required to construct access roads, tower foundations, transformer pads, and other project facilities. The Wild Horse project would primarily use on-site sources for fill materials. Some granular fill would be imported for use as electrical line trench backfill, but the construction of the Wild Horse project would not significantly affect the availability of off-site fill resources. The specific quantity or source of fill materials required for the Desert Claim project has not been determined at this time. Given the amount of off-site gravel resources that could be imported to the Kittitas Valley project site (approximately 145,000 cubic yards), the cumulative effect on off-site fill resources could be substantial if all projects used off-site sources for fill materials.

Similarly, development associated with population growth within the County would result in localized impacts from ground disturbance and cuts and fills for infrastructure, support services, and housing assuming construction follows prescribed engineering standards and requirements. Future agricultural activities are not anticipated to appreciably affect earth resources.

Cumulative cut-and-fill activities and construction of the three proposed wind power projects could result in a loss in area where Ellensburg Blue agate could potentially be found and a potential reduction in the amount of this resource available for prospecting. Impacts to seismic hazards would not occur from the wind power projects and County-related growth, assuming projects are designed to withstand the seismic risk.

3.16.6.2 Air Quality

Kittitas County is not designated as a non-attainment area for air pollutants of concern, and current air quality problems exist. Development of the Wild Horse project would result in vehicle exhaust and fugitive dust emissions during construction and decommissioning. Similar impacts would be associated with construction of the two other wind power projects. The wind power sites are within predominately agricultural areas where operation of agricultural equipment in cultivated fields and range land and on gravel and dirt roads are common sources of exhaust and dust emissions.

One identifiable difference among the projects is that gravel for construction of the Wild Horse project would be obtained from on-site quarries whereas gravel for the other two wind projects would be transported from off-site sources. The result would be more concentrated emissions at the Wild Horse batch plant location whereas more emissions would occur off-site for the other two wind power projects.

Best management practices (BMPs) would minimize fugitive dust emissions during construction. Because there are strong prevailing winds at the Wild Horse project site and large distances to the facility boundary, it is unlikely fugitive dust concentrations would be detectable downwind of the project. Similar situations are expected at the sites of the Kittitas Valley and Desert Claim projects. Even if all the projects were constructed simultaneously, it is unlikely they would cause local fugitive dust concentrations to approach regulatory limits.

Tailpipe emissions from haul trucks during construction of the Wild Horse project could be significant only when the trucks travel at low speed through towns, where they would travel

close to homes and businesses. Each of the wind power projects would use I-90 for long-distance shipping, but they would use separate county roads to access their project sites from the freeway. Therefore, even if all of the projects were constructed simultaneously, the haul truck emissions would not contribute to cumulative air quality impacts.

The only anticipated cumulative air emissions during operation of the three proposed wind power projects would be from vehicles used for operation and maintenance activities. Given the small number of employees and associated trips anticipated during project operations, no significant cumulative air quality impacts would occur during project operation. Further, the generation of electricity by the three proposed wind power projects would avoid cumulative emissions from other fossil-fuel power plants that might otherwise be operated to produce an equivalent amount of electricity.

Development associated with population growth (6,976 additional people by 2020) in the County would result in an incremental increase in exhaust and dust emission from construction and operation of infrastructure and housing and resultant increases in vehicular traffic. It is not anticipated that the incremental impact would be sufficient for regional air pollutant concentrations to exceed applicable air quality standards.

3.16.6.3 Water Resources

Existing water resource conditions in Kittitas County reflect past activities and current land uses. Significant changes to the natural conditions in the basin have resulted in activities related to agriculture, grazing, and water diversions (EES 2001). Crop production and grazing have modified the existing vegetation in much of the County.

The effects of the Wild Horse project on water resources would be additive to other effects from past, present, and reasonable foreseeable actions in the area. The effects on water resources would be localized and primarily temporary and limited to the project construction period. No groundwater or surface water withdrawals would occur on the site. All water for construction (rock crusher, batch plant, dust control, road construction) would be trucked onto the site and stored in tanks. Water usage during construction would range from 20,000 to a peak of 220,000 gallons per day, whereas daily use during project operation would be less than 1,000 gallons per day. Impacts to water quality would be short term and largely minimized through the use of BMPs to minimize erosion and sediment and adherence to surface water setbacks. Hence, the incremental effects of the Wild Horse project would not substantially change baseline water resource conditions and would not result in significant cumulative impacts at the local or watershed scale.

The Kittitas Valley and Desert Claim projects would involve similar construction activities (except no on-site gravel extraction and concrete batch plants) and project features, similar areas of ground disturbance, similar restoration and mitigation actions, and similar water demands. Neither of the projects would require extensive construction activity or project facilities along or near major streams, however construction of proposed access roads at the Kittitas Valley project site would affect three minor streams. Potential impacts on the affected stream channels related to construction would be short term. For the Desert Claim project, approximately one acre of stream and riparian habitat would be affected by temporary construction activities, with 112 square feet permanently affected by project operations. Because the three projects are sufficiently distant from each other and are located in different tributary watersheds, there would

not be a combined effect from multiple projects on the same stream. The minor, localized effects of each project would occur within the drainages of minor tributaries to the Yakima River and the Columbia River and at a distance of at least several miles upstream from either river.

The groundwater resource impacts of the Desert Claim and Kittitas Valley projects would be similar to those described for the Wild Horse project, except that the Kittitas Valley project would include a domestic groundwater well to serve the operations and maintenance facility for that project. The well is expected to draw less than 1,000 gallons per day.

Specific cumulative impacts on groundwater resources from the three wind power projects would depend on the characteristics of common aquifers to which the three proposed wind power project sites are hydrologically linked. Because the three project sites are sufficiently distant from each other and are located in different tributary watersheds, there would not be a combined effect from multiple projects on the same aquifer.

No significant cumulative effect on water resources is expected from the Wild Horse project. Considering the reported effects of the other proposed wind power projects and their effects on water resources within the Upper Yakima River basin or the northeastern portion of the Kittitas Valley, the Wild Horse project is not anticipated to result in cumulative impacts on water resources on site or downstream of the project, even if all projects were constructed.

Development associated with projected population growth in the County would result in an incremental increase in water demand within urban and rural areas. The projected operational water demand for the three wind projects would have a negligible effect on water quantity conditions for surface water and ground water resources since the projects would have minimal demands for water consumption.

3.16.6.4 Vegetation and Wetlands

Vegetation

Implementation of the three proposed wind power projects would result in the loss of vegetation through clearing and ground disturbance, including the potential loss of lithosols (shallow soils that support unique plant communities) habitats often associated with grassland, low sagebrush, and shrub-steppe vegetation communities.

Construction of the Wild Horse project could temporarily disturb up to 401 acres of existing vegetation with 165 acres permanently displaced by project facilities. It is anticipated that approximately 323 acres of shrub-steppe vegetation would be disturbed under the most likely scenario. Impacts on vegetation from development of the Desert Claim project and/or Kittitas Valley project would be similar to those described for the Wild Horse project and would generally consist of localized impacts on similar vegetation communities. Construction of the Kittitas Valley project could temporarily disturb up to approximately 371 acres of vegetation with up to 118 acres permanently displaced by project facilities. The majority of disturbance (309 acres for most likely scenario) occurs in shrub-steppe and grassland community types. Construction for Desert Claim project would temporarily disturb approximately 311 acres and permanently impact a total of approximately 78 acres.

Collectively, there would be a permanent loss of up to 361 acres of existing vegetation, including approximately 100 acres of lithosols. The remaining areas affected by temporary impacts would

be revegetated through mitigation measures proposed by each of the projects. However, the success of revegetation efforts in shrub-steppe habitat and fragile lithosols is not well documented. Disturbed sites in these areas become readily vulnerable to invasive, non-native plant species (e.g., cheatgrass) that could interfere with successful native plant reestablishment.

Vegetation types at the three sites are not regionally unique (Daubenmire 1970; Franklin and Dyrness 1988; Cassidy et al. 1997; Johnson and O'Neil 2001). Within about 50 miles east and south of the proposed project areas, there are several large areas of protected grassland, shrub-steppe, and sagebrush vegetation communities (e.g., the Colockum, Quilomene, and L.T. Murray wildlife areas and the Yakima Training Center) (WDFW 2003g). For each wind power project, the area of existing vegetation permanently displaced by the project facilities amounts to approximately 2% or less of the respective project areas. The percent loss of approximately 361 acres of existing vegetation in the greater context of the County or region would be much less. Because the precise regional extent of lithosols is not quantitatively known, it is difficult to assess the specific magnitude of cumulative impacts on lithosol habitats at the three wind power project sites within the context of the surrounding region.

No federally listed special-status plants were identified at the Wild Horse project, Kittitas Valley project, or Desert Claim project sites. However, one Washington State listed species (Review status), hedgehog cactus, was found extensively in lithosol habitats at the Wild Horse project site. Fewer than 10% of the individuals identified during the special-status plant survey are considered at risk from direct impact from the Wild Horse project. The potential impacts of the proposed wind projects on special-status plants would not represent a significant cumulative impact on any species' viability in the region.

Development associated with population growth (6,976 additional people by 2020) would result in an incremental reduction in native plant communities and cultivated lands in the County. The development is scheduled to occur within rural and designated municipal Urban Growth Areas. In addition, an unknown level of conversion of native plant communities to cultivated agriculture is likely to occur in the Kittitas Valley and in the vicinity of the Wild Horse project site.

The proposed projects and future residential development within the County will create the potential for the introduction of or the spread of noxious weeds into cultivated and native plant communities. The degree of collective impact associated with the proposed projects would be minimized or reduced through control measures implemented or required by Kittitas County, EFSEC, WDNR, WDFW, and private landowners, and the wind project developers and owners. It is unlikely there would be a significant increase in risk of noxious weed infestation, assuming that existing control programs remain active and that weed control is required for all future development within the County.

Wetlands

The effects of the Wild Horse project on wetlands would be additive to other effects from past, present, and reasonably foreseeable future actions. Cumulative impacts of the three proposed wind power projects on wetlands would result from directly filling or grading wetland systems, as well as from indirect effects caused by stormwater runoff, increased pollutant loading, and water quality degradation, which in turn would result in loss of wetland diversity and reduced wetland functions and values. No wetlands were identified within or near any of the planned locations for Wild Horse project facilities; therefore, no impacts on wetlands are anticipated for

the Wild Horse project. The Kittitas Valley project would disturb between 135 and 185 square feet of one potential wetland system at the Kittitas Valley project site (Based on current plans for the proposed Desert Claim project, construction activities would permanently impact 9 acres of wetland area, with an additional 7 acres of temporary disturbance. Final “micro-siting” for project facilities would be used to avoid some of the wetland areas. To the extent that avoidance of wetland areas is not feasible, mitigation would be developed to enhance or replace wetland areas in accordance with the federal and local jurisdictions (Kittitas County 2003).

Development associated with population growth may result in an incremental reduction in wetlands in the County. The development is scheduled to occur within rural and designated municipal Urban Growth Areas. Development affecting wetland resources will be subject to wetland regulations. Wetland impacts of both the Kittitas Valley project and the Desert Claim project would be minimized through avoidance and mitigated as required by federal and local regulations for wetlands that would not be avoided. Because the collective effects of these projects are not expected to extend to downstream surface waters or wetlands, no significant cumulative impact on wetland resources are expected.

3.16.6.5 Wildlife

Following is a summary of the wildlife cumulative impacts analysis prepared for the Kittitas Valley, Desert Claim, and the Wild Horse Wind projects (WEST Inc. 2003). In addition to the three wind projects discussed below, development associated with population growth within the County would result in localized and incremental impacts to wildlife resources associated with the construction of infrastructure, support services, and housing. These impacts would include the reduction of habitat for the variety of species and an incremental reduction in populations of species occupying habitats at the wind energy sites and areas of anticipated future population growth.

Big Game

The Kittitas Valley and Wild Horse Project sites, and most of Desert Claim project site are located in mule deer winter range (WDFW Priority Habitats database). The Wild Horse project and the northern portion of the Desert Claim project also are located in elk winter range. The Kittitas Valley project is not located in elk winter range. A defined elk migration corridor crosses the northern portion of the Desert Claim project and is adjacent to the Wild Horse project site.

Temporary displacement of wintering mule deer and elk is anticipated from winter construction activities of the three wind power projects. These temporary impacts may be greater if construction occurs simultaneously on two or all three of the projects because of the larger area subject to disturbance. The Wild Horse project area is located southeast of the mapped Quilomene elk migratory corridor. Impacts on wintering mule deer and elk would be minimized at the Wild Horse site by limiting construction activities to only survey and design work during winter, with heavy construction such as road and foundation construction and blasting occurring between April 15 and November 15, outside of the critical wintering period. However, any disturbance from surveying or other activities could result in migrating elk avoiding areas close to the project and traveling farther to the north. Given that the project is located to the southeast of this movement corridor, the maximum increase in distances needed to travel is estimated to be less than 1 mile.

The same effect would be anticipated for the Desert Claim project. The northernmost region of the project area overlaps approximately 320 acres of the south edge of the Quilomene elk migration corridor. If this area of the Desert Claim project influences elk use 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. The maximum increase in travel distances would be less than 1 mile. The corridor, as mapped within the WDFW PHS database, is approximately 2 miles wide (north to south measurement) where the Desert Claim project is located.

During the construction period, deer would likely be temporarily displaced from the three project sites due to the influx of humans and construction equipment and associated noise and disturbance. Temporary loss of habitat from project construction would be considered a minor impact because of the vast expanse of suitable habitat for mule deer near the proposed projects. Some tolerance of construction and operations activities by mule deer is expected at the Kittitas Valley and Desert Claim projects, considering the amount of existing residential development and the existing roads and disturbance (e.g., gravel quarry) in the vicinity of those two projects. The Wild Horse project is located in a relatively undeveloped area used primarily for livestock grazing and recreation (hunting) creating seasonal increases in the level of human activity in this area. Cumulative impacts on winter big game during construction may occur if more than one project is constructed during the same winter.

Approximately 300 acres of mule deer winter range would be permanently lost due to the three projects, which is <2% of vegetation at the project sites, and much less than 0.5% of the winter range located near the project sites. Mitigation of permanent loss of habitat at Wild Horse and the Kittitas Valley sites meet or exceed the WDFW mitigation guidelines. Mitigation parcels determined for those two sites are located in mule deer winter range.

Human activity levels from operation and maintenance at the Kittitas Valley and Desert Claim projects are not expected to significantly differ from current human activity levels. Human activity levels from operation and maintenance at the Wild Horse site would occur at a low level year-round. While operational impacts on wintering mule deer and elk at the Wild Horse site may be greater than under existing conditions, cumulative impacts for all three wind power projects are expected to be low.

Birds

Based on the estimated levels of raptor use within the three project study areas, raptor mortality is expected to be slightly higher compared to other new wind generation projects with similar turbine types. Under the three projects, the estimated combined raptor mortality rate at all three project sites with combined turbines ranging from 361 to 391 turbines (depending on the final configuration of each project), would result in approximately 15 raptor fatalities per year. The same breeding raptors that use the Kittitas Valley and Desert Claim project areas are not expected to use the Wild Horse project area because the Wild Horse project is approximately 20 miles from the Kittitas Valley project and 13 miles from the Desert Claim project. Typical home-ranges of the raptors considered at risk is considerably less than those distances. Section 3.5, "Wildlife," of this document further addresses avian use at the Wild Horse project area.

Red-tailed hawks, American kestrels, and northern harriers and rough-legged hawks are expected to be the raptor species with the highest risk of mortality across the projects. The mortality risk

associated with other raptor species such as turkey vulture, golden eagle, and prairie falcon is expected to be much lower than the risk for red-tailed hawks and American kestrel because of their less frequent use of the sites. Recent published data for new wind energy projects in the West indicate there have been few northern harrier fatalities recorded at these wind power sites, and no bald eagle or rough-legged hawk fatalities have been observed (Erickson et al. 2000). Golden eagle use of the three proposed project areas is low relative to other wind sites, and mortality is also expected to be low.

Based on other studies and available information, Bald Eagles occupy the Kittitas Valley from approximately late December to early April. The number of bald eagles in the valley appears to increase from late December to approximately mid- February. They are not the most common raptor in the area, but their numbers appear to be increasing with the overall recovery of the species in Washington and North America.

Cumulative impacts on bald eagles could include the loss of winter habitat and fatalities at the Kittitas Valley and Desert Claim projects. The Wild Horse project is not expected to contribute to either one of these impacts because the site does not provide good roosting or foraging opportunities (winter habitat) and observed use of the site appeared to be incidental, with no patterns of regular use by bald eagles. None of the projects would contribute to the loss of roosting habitat or foraging areas, and the cumulative impact on bald eagle winter habitat from the three proposed wind power projects would be small.

To date, no bald eagle fatalities have been reported from wind power projects in the United States, and fatalities at the three wind power projects are expected to low. Some risk does occur due to roosting and foraging areas nearby the Kittitas Valley and Desert Claim project sites. Assuming risk of collision is proportional to use, one bald eagle fatality across these two projects may occur every two to three years. The probability of bald eagles foraging within the project sites would be reduced through implementation of a mitigation measure requiring all animal carcasses to be removed from the site when found. The cumulative effect of this low level of mortality on the increasing bald eagle winter population in the Kittitas Valley and the state of Washington would not be measurable.

Passerines (perching birds and songbirds such as finches, warblers, sparrows, blackbirds, and jays) represent the most abundant avian fatalities at wind projects (see Johnson et al. 2002; Young et al. 2003b; Erickson et al. 2000, 2001, 2002). Since passerines represent the vast majority of the avian observations at the three project sites, it is expected that this group of birds would make up the largest proportion of fatalities for the three projects the same breeding raptors that use the Kittitas Valley and Desert Claim project areas are not expected to use the Wild Horse project area.. Passerine species most common and most at risk, include the European starling, American robin, horned lark, cliff swallow, American goldfinch, Brewer's blackbird, American pipit, and vesper sparrow. Based on the mortality estimates from other wind projects studied, combined passerine mortality for the three proposed projects would range from 430 to 740 fatalities per year. This level of mortality is not expected to have any population-level consequences for individual species because of the expected low fatality rates for most species and the high population sizes of the common passerine species such as European starling, American robin, horned lark, American pipit, and western meadowlark. A few of the species observed at these projects have documented declining populations in the Columbia Plateau including Brewer's blackbird, Brewer's sparrow, horned lark, loggerhead shrike, western meadowlark, mourning dove and killdeer. Many of these species are very common and widely

distributed (e.g., western meadowlark, horned lark), but nevertheless have shown apparent declines in abundance from BBS data (Sauer 1999). Of these species, horned lark and western meadowlark appear to have the highest collision risks. Increased risk of mortality for these species may contribute to declines in local populations.

Other Wildlife

Construction of the three wind power projects would reduce foraging and breeding habitat for wildlife such as badger, coyote, pocket gophers, rabbits, mice, and voles. Impacts to reptiles and amphibians would also occur

Bat fatalities are likely to occur at all three Kittitas County wind power projects. Research at other wind projects indicates that migratory bat species are at risk of collision with wind turbines, primarily during the fall migration season. Most bat fatalities observed at wind projects have been tree-dwelling migratory bats, particularly hoary and silver-haired bats. Although no specific surveys for bats were conducted, both hoary bats and silver-haired bats may use the forested habitats near the three project sites and likely migrate through the three project areas. Using mortality estimates from other wind projects (one to two bat fatalities per turbine per year), total annual bat mortality for all three wind power projects in Kittitas County is expected to range from 361 to 782. The significance of bat mortality from the three projects is hard to predict because there is little information available regarding the size of bat populations. Studies suggest, however, that resident bats do not appear to be significantly affected by wind turbines (Johnson et al. 2003; Gruver 2002) because nearly all mortality is observed during the fall migration period. Significant cumulative adverse impacts on resident bat populations are not expected.

3.16.6.6 Fisheries

No fish-bearing habitat occurs within 1 mile of any proposed facility or construction location for the Wild Horse project, and therefore no impacts on fish habitat, fish species or riparian zones associated with construction and operation of the project are anticipated. BMPs to minimize erosion and sediment would be implemented to minimize potential impacts to surface water. Hence, the project would not contribute to cumulative impacts (Section 3.6, "Fisheries," contains further information on the lack of fisheries impacts). Studies conducted for the Kittitas Valley project did not identify any fish-bearing habitat within 0.5 mile of any proposed facility or construction location, or any impacts on fish habitat or fish species associated with construction and operation of the Kittitas Valley project. Construction of access roads at the Kittitas Valley project site would affect three streams and their associated riparian habitat for a total disturbance ranging from 1,041 to 1,245 square feet. Potential impacts on the stream channels are expected to be short term and negligible assuming BMPs are properly implemented (see Section 3.2 of the Kittitas Valley Draft EIS).

The Desert Claim project would result in disturbance or displacement impacts on streams and riparian zones in the project area however none of the streams contain fish and the potential downstream effects would be negligible. The Desert Claim project would temporarily affect approximately 41,645 square feet of stream and riparian habitat and permanently remove 112 square feet by project operations. If relocation of facilities to avoid these areas is not feasible,

mitigation would be developed to enhance or replace riparian areas affected by the project (Kittitas County 2003).

Development associated with population growth may result in an incremental impact to fish habitat in the County. Development scheduled to occur within rural and designated municipal Urban Growth Areas would result in increased impervious surface area and resultant modification to stream flows. Development affecting stream resources will be subject to critical areas regulations. No cumulative impacts would occur from the Wild Horse or Kittitas Valley projects and the Desert Claim project would be minimized through avoidance and mitigation as required by federal and local regulations.

No significant cumulative effect on fishery resources is expected from any of the projects.

3.16.6.7 Energy and Natural Resources

When combined with other planned wind projects in the region, construction activity associated with the Wild Horse project would contribute to local energy and natural resource demands. The combined demands of the three projects for fuel and construction materials would cumulatively contribute to the local and regional demand for, and irreversible expenditures of, nonrenewable resources on a temporary basis. Types of nonrenewable resources include diesel fuel and gasoline to operate construction vehicles and equipment, as well as steel and concrete required to build wind power facilities. The single largest demand would be for sand and gravel resources. Overall, based on the timing of construction for the three projects and the incremental resource demands associated with the projects, the combined effects of the three projects is not expected to result in significant cumulative impacts on energy and natural resources.

Similarly, development associated with population growth within the County would result in demand for energy and natural resources for the construction of infrastructure, support services, and housing. These impacts would include the use of petroleum products, wood, steel, and sand and gravel.

The three proposed wind power projects would provide a combined nameplate capacity of 565 MW of electricity (under the middle scenario for the Kittitas Valley). Assuming long-term operation of the three projects at a net capacity of 33%, the Wild Horse, Desert Claim, and Kittitas Valley projects would produce approximately 186 average MW of electricity on a long-term basis. Two proposed hydroelectric projects (Easton Diversion and Kachess to be developed by Symbiotics, LLC), would generate 6.2 MW of electricity Northwest Power Planning Council 2004). The collective energy output from those five projects of 532.7 MW, would represent the first electrical generating facilities in Kittitas County. Operation of the three wind and two hydroelectric projects would also cumulatively add to the capacity, production, and availability of renewable energy sources in Washington State and the greater Pacific Northwest. The projects would provide a sustainable, renewable source of electric power supply to supplement the region's existing hydroelectric, nuclear, and coal or gas-fired power projects, although it would represent a relatively small addition to the total regional electricity supply. Utilities receiving the wind energy would be able to diversify their energy resource portfolios and stabilize a portion of their long-term energy supply costs. Power produced by the wind projects would also be responsive to the identified needs of regional utility providers, including Avista, PSE and Pacific Power.

3.16.6.8 Noise

Construction noise would be temporary in nature, and would primarily be from operation of construction equipment and vehicles. Construction equipment installing the WTGs and support facilities would not be discernible at any off-site homes. Traffic noise impacts caused by haul trucks traveling through the town of Kittitas would also be temporary and localized. Haul trucks from the Kittitas Valley and Desert Claim projects would not travel through the town of Kittitas, so they would not contribute to any cumulative traffic noise impacts.

Operation of the WTGs for the Wild Horse project (by itself) would not affect noise levels at any residences or other permanent receptors. Given the distances that separate the Wild Horse project from the Kittitas Valley and Desert Claim projects, Wild Horse project operations would not contribute to cumulative noise impacts in the region.

Operation of the three wind generation projects would reduce the need to operate fossil fuel power plants elsewhere in the region. Thus, operation of the three wind generation projects could provide a net noise reduction at homes near the locations where fossil fuel power plants might otherwise be built.

Development associated with population growth within the County would be expected to result in localized and incremental increases in the sources of noise and background noise levels. Short-term increases in noise levels would occur with construction of infrastructure, and housing. Longer-term noise increases would occur as development occurs in urbanizing areas. These noise increases would be confined to specific locations.

3.16.6.9 Land Use

Much of the following land use cumulative analysis was derived from chapter 4 of the Desert Claim Wind Power Project Draft EIS (Kittitas County 2003).

The three wind power projects would be located on approximately 17,966 acres used primarily for agricultural activities (grazing and rangeland). Based on the Kittitas Comprehensive Plan (Kittitas County 2000) the zoning designations for the Wild Horse site are Forest and Range, and a mixture of Forest and Range and Ag-20 for the Kittitas Valley and Desert Claim projects. The area potentially affected by the three projects represents approximately 4% of the Ag-20 and Forest and Range zoned land in the County. Some dispersed rural residential uses are located adjacent to Desert Claim and Kittitas Valley sites.

Existing uses and activities would not be displaced by proposed wind power facilities, but would collectively result in the long-term conversion of approximately 330 acres of agricultural land as a result of construction of the wind power facilities. Agricultural activities would continue on the remainder of the sites and the proposed wind energy facilities would collectively disrupt or change the underlying rural land use pattern of this portion of the County.

Individually or collectively, the proposed projects would not likely attract supporting uses or generate spin-off development and the relatively low number of full-time employees (30 to 42) would not create cumulative demand for services or create pressure to change or convert existing land uses.

The proposed wind turbines would cause visual impact and would become the dominant visual features from some view locations (see Section 3.16.6.9 below for the cumulative visual analysis).

Residential development in the vicinity of the Wild Horse site is less likely to occur than at Kittitas Valley and Desert Claim sites because of the relatively remote location. It is possible that the Kittitas Valley and Desert Claim proposals could cumulatively discourage residential uses in the vicinity of the projects, thereby having the effect of reducing pressure to convert agricultural lands to residential uses.

The three wind energy projects would require either County approval for a rezone and Comprehensive Plan amendment, or EFSEC review and Governor approval. These permitting processes, and the underlying land use regulations, are designed to prevent incompatible uses and the degradation of agricultural land in particular.

3.16.6.10 Visual Resources

The cumulative effect of the Wild Horse project would occur in the context of landscape modifications associated with past, current, and future land uses in the project vicinity. The local landscape at the Wild Horse site has some evidence of change resulting from agricultural practices, but less than do the Kittitas Valley and Desert Claim sites which include more intensive agricultural practices, infrastructure facilities, and rural residential development.

Figure 3.16-1 shows the locations of the proposed Kittitas Valley, Desert Claim, and Wild Horse projects around the Kittitas Valley. As this map indicates, the Kittitas Valley and Desert Claim projects are relatively close to each other (within 1.6 miles at the closest point), while the Wild Horse project site is 14 miles from the Desert Claim project and 21 miles from the Kittitas Valley project sites.

Because the Wild Horse project would be located so far from the other two projects and in an entirely different portion of the landscape it would have limited potential to be seen in the same view as the other two projects. There may be some locations near the Kittitas Valley and Desert Claim project sites from which there is an unobstructed line of sight toward Whiskey Dick Mountain and the Wild Horse project site. However, because of the large distances involved (21 miles from the Kittitas Valley project and 14 miles from the Desert Claim project), the Wild Horse turbines would be barely (if at all) detectable and would have essentially no effect on the view from those locations.

There may also be some viewpoints in or near Kittitas Valley from which all three projects would be visible. One example is a segment of I-90 as it enters the Kittitas Basin near the Elk Heights interchange. The eastbound view in this instance includes the northern margin of the valley (with large portions of both the Kittitas Valley and Desert Claim project areas) and Whiskey Dick Mountain in the distant background. In this case, the Kittitas Valley and Desert Claim turbines would be 2 to 10 miles away, while the Wild Horse project would be so far away as to be an insignificant background feature (Kittitas County 2003).

In addressing the potential cumulative visual impacts of multiple wind power projects, it is most important to consider the Desert Claim and Kittitas Valley projects together because of their proximity. Should both the Kittitas Valley and Desert Claim projects be built, the visual

consequences would include approximately 240 wind turbines (120 for each project) on the valley floor and adjacent slopes in the north-central portion of the Kittitas Basin.

An extensive visual impact analysis was conducted for the Kittitas Valley and Desert Claim projects and presented in the Draft EISs for those projects. The visual analyses in those documents were examined to identify the extent to which there are viewpoints from which both projects could be seen in foreground to middle ground views. Because of topographic conditions, there are no areas where the Kittitas Valley project could be seen in the foreground and the Desert Claim project in the middle ground or background. However, there are a number of locations where the Desert Claim project could be seen in the foreground to middle ground and the Kittitas Valley project could be seen in the middle ground to background.

Figure 3.16-2 in the Kittitas Valley Wind Power Project EIS shows the locations of two viewpoints selected to simulate the cumulative visual impacts of the Kittitas Valley and Desert Claim Wind Power projects. These two viewpoints are representative examples of the combined effects of both projects on views from these areas.

Viewpoint 1 is located on Reecer Creek Road at a point slightly west of the Kittitas County Fire District Station No. 2. Figure 3.16-3 in the Kittitas Valley Wind Power Project EIS illustrates the existing view from Viewpoint 1 on Reecer Creek Road, looking northwest. Simulated views of the Kittitas Valley project, Desert Claim project, and combined (cumulative) scenario with both projects are shown in Figures 3.16-4, 3.16-5, and 3.16-6, respectively (Kittitas Valley Wind Power Project EIS). All views are shown from Viewpoint 1 on Reecer Creek Road looking northwest. The Kittitas Valley project would be seen in the middle ground to background zones, whereas the Desert Claim project would be much more prominent, seen in the near middle ground zone. The addition of the Kittitas Valley project in the middle ground to background zones of the view with the Desert Claim project in the near middle ground would not substantially increase the effect that the Desert Claim project alone would have on the visual character and quality of the view.

Viewpoint 2 is located just outside of the National Forest boundary where the view expands sufficiently to allow substantial portions of both the Kittitas Valley and Desert Claim projects. Figure 3.16-7 in the Kittitas Valley Wind Power Project EIS shows the existing view from outside the Wenatchee National Forest, looking south. Figure 3.16-8 in the Kittitas Valley Wind Power Project EIS is a simulation from this viewpoint that illustrates what the Kittitas Valley would look like with development of both projects. The view in this figure is also looking south from outside the Wenatchee National Forest. Both projects would be located in the background zone of this view, but would substantially alter the existing visual character and quality of the Kittitas Valley from this viewpoint.

The preceding discussion addresses the potential for cumulative visual impacts from specific viewpoints or localized areas. The overall effect of multiple wind energy projects on the regional landscape and the experience of viewers when considered over time and at multiple locations is also a consideration. For example, drivers passing through Kittitas County on I-90 would likely notice a major wind development (the Wild Horse project) for a time in the stretch of highway east of the Columbia River and again in the eastern end of the Kittitas Valley (primarily around the community of Kittitas), and could subsequently view a more extensive area of wind turbines to the north and west of Ellensburg (the Desert Claim and Kittitas Valley projects). Travelers would be likely to recall having seen a collection of wind turbines a few minutes before seeing

more wind turbines. This progressive realization could leave the impression with some viewers that wind turbines are plentiful in Kittitas Valley.

This type of impression would also occur for residents of and frequent visitors to the local area. While residents of Ellensburg, for example, might not see turbines from one or more of the wind projects on a daily basis, they would likely experience repetitive views of wind turbines through their local travels over a period of weeks, months, or years. Consequently, some local residents and frequent visitors might perceive a substantial change to the overall character of the Kittitas Valley landscape, and such a response would be more likely with the development of multiple wind projects (Kittitas County 2003).

The development of the three proposed wind power projects would also cumulatively contribute to increased nighttime lighting in the Kittitas Valley. At present, the proposed wind power project sites and surrounding areas are relatively dark at night. Proposed flashing red lights required by the FAA on the tops of a certain number of turbine towers would be most noticeable in the areas within a mile of each project.

Development associated with population growth within the County would result in both localized and landscape-scale changes in visual resources. These changes will occur from the changes in land use with the construction of infrastructure, support services, and housing to support the population increases.

3.16.6.11 Population, Housing, and Economics

Cumulative impacts on population, housing, and employment must be considered when two or more large projects (wind power generating or otherwise) are proposed in the same general area with similar construction schedules. For example, if built at the same time, the construction workforce for the Kittitas Valley, Desert Claim, and Wild Horse projects would be drawn from similar labor pools and create a demand for the same temporary housing.

Cumulative population and housing impacts would likely be limited to a project radius of approximately 75 miles (as a general rule, it is considered unlikely that construction workers would commute more than 75 miles to work). Furthermore, due to the relatively small area of potential effect, and the differing contexts within which the projects would be built, cumulative impacts would need to be evaluated on a project-specific basis.

The proposed projects could contribute to increases in temporary and permanent job opportunities and populations in the region. Peak construction of each project could employ about 165 workers, for a combined peak total of 500 workers. These estimates are based on the experience of the applicants at other facilities. The number of construction workers who would reside within or outside Kittitas County cannot be precisely predicted. Using the same assumptions in Section 3.11, "Population, Housing, and Economics," of this Application and based on the Stateline Wind Project in nearby Walla Walla County for purposes of analysis, it is assumed that 30 to 50% of all workers would be local (i.e., already residing within reasonable commuting distance, defined as Kittitas or Yakima Counties) and the remainder would come from outside this localized area (e.g., Benton or King Counties). If conservatively 30% of wind facility workers are assumed to be local, 115 non-local workers would be employed by each project, or a cumulative total of 345. The actual mix of local and non-local would depend on the

availability and residence of construction workers with the particular skills needed for wind facilities, and competition from other concurrent construction projects in the region.

The majority of cumulative population and housing impacts would be temporary and would occur during construction. It is likely that some non-local construction workers would choose to live in housing located in Ellensburg or Yakima, both located within a reasonable commuting distance of the project sites.

The workforce analysis conducted for the Wild Horse project suggests that there is a sufficient labor supply available to complete both the Kittitas Valley and Wild Horse projects within the same time frame. If the Desert Claim project were also to be constructed simultaneously, the local workforce supply might be strained. The result may be to draw more workers from outside of the project area, thus potentially affecting local population and housing. Assuming that all three projects could be constructed simultaneously, temporary population increases resulting from construction work forces could result in cumulative effects to the local housing supply. Temporary housing would be needed for those workers that would re-locate to the Ellensburg area during construction of these projects. There were more than 1,700 vacant housing units in Kittitas County in 2000 categorized as “seasonal, recreational, or occasional use” units. In addition, more than 40% of the county’s total housing stock is rental housing, with a vacancy rate (per 2000 census data) of almost 7%. Motels/hotels, RV parks, and other transient lodging establishments in the Ellensburg and Cle Elum/Roslyn area could provide temporary lodging for wind power project construction workers. Therefore, it appears that the study area has an adequate supply of temporary housing to accommodate the potential cumulative increase in construction workers from outside the area. Vacancy rates for temporary housing could decrease for a period of a few months, however.

Over their life times, each wind power project is estimated to employ between 10 and 14 fulltime workers for operations and maintenance; cumulative operations employment would be between 30 and 42. These estimates are based on the applicants’ experience with other projects, which suggests that about half of the operations workers could be local residents. However, even if all were assumed to come from outside the area, the cumulative housing impact from a population increase of this size would not be considered significant. Projected population growth in the county (6,976 additional people by 2020) would increase the demand for housing, infrastructure, and support services. The estimated number of fulltime workers for the three projects (30 to 42) would represent less than 1% of the anticipated population growth in the county.

Employment Income and County Revenues

The three wind power projects would increase retail sales and overall economic activity in the area, as well as employment opportunities for residents of Kittitas County. The three projects would also substantially increase the amount of annual property tax revenue to the county. Estimated direct, indirect, and induced income generated by the three wind power proposals is shown below for the construction and operation phases. These estimates are based on analyses of jobs, income, wages, and similar economic impacts prepared for each proposal and included in the corresponding EISs or application materials.

In general, the analyses indicate that the projects cumulatively would generate substantial income for the local economy and residents, almost \$16 million during the construction period and approximately \$5.3 million annually thereafter (see Tables 3.16-2 and 3.16-3). The direct

impact figures for the construction phase primarily represent local labor income assumed to be paid to construction workers. The indirect and induced impacts reflect the local income effect from local construction purchases and the re-spending of those dollars within the local economy. The direct impacts for the operations phase (Table 3.16-3) include local labor income to operations employees and annual lease payments to landowners (which have been estimated at \$4,500 per turbine per year).

Table 3.16-2. Cumulative Income Impacts Generated by Construction Employment in Kittitas County (2002\$) for Kittitas Valley, Desert Claim, and Wild Horse Wind Power Projects

	Desert Claim	Kittitas Valley ¹	Wild Horse ²	Cumulative Total
Direct	\$ 3,333,000	\$ 4,577,100	\$ 4,577,100	\$ 12,487,200
Indirect	\$ 433,000	\$ 518,100	\$ 518,100	\$ 1,469,200
Induced	\$ 502,000	\$ 701,800	\$ 701,800	\$ 1,905,600
Total	\$ 4,268,000	\$ 5,797,000	\$ 5,797,000	\$ 15,862,000

Notes:

¹ Assumes 121 turbines.

² Estimated to be the same as the Kittitas Valley project.

Sources: ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c; Kittitas County 2003.

Table 3.16-3. Annual Cumulative Income Impacts in Kittitas County during Operations (2002\$) for Kittitas Valley, Desert Claim, and Wild Horse Wind Power Projects

	Desert Claim	Kittitas Valley ¹	Wild Horse ²	Cumulative Total
Direct	\$1,041,000	\$ 1,489,400	\$ 1,489,400	\$ 4,019,800
Indirect	\$124,000	\$ 59,400	\$ 59,400	\$ 242,800
Induced	\$168,000	\$ 436,700	\$ 436,700	\$ 1,041,400
Total	\$1,333,000	\$ 1,985,500	\$ 1,985,500	\$ 5,304,000

Notes:

¹ Assumes 121 turbines.

² Estimated to be the same as the Kittitas Valley project.

Sources: ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c; Kittitas County 2003.

It is possible for some large projects to increase the demand for labor sufficiently to place upward pressure on wages in certain sectors of the construction industry. However, it is expected that contractors for the three proposed wind power projects would have access to a large construction labor pool from a geographic area that includes Seattle and Yakima. Thus, the effect on construction wages and income would not likely be significant.

The Kittitas Valley, Desert Claim, and Wild Horse proposals have each prepared analyses that estimate the fiscal (i.e., governmental cost and revenue) impacts of the individual project. Each project analysis also considered indirect and induced economic impacts (quantitatively or qualitatively) as well as direct fiscal impacts. Although the studies were performed at different times and/or were organized differently, refined information is now available for some of the

proposals. As such, they provide a reasonable overview and estimate of the fiscal effects of each wind power proposal. The reader should consult the respective analyses to obtain greater detail about economic and fiscal issues.

Cumulative fiscal impacts, as summarized here, are considered to be the simple addition of the direct costs and revenues of each project. There is no synergistic effect assumed from multiple projects in terms of direct revenues; such an effect could occur, however, in terms of indirect or induced economic effects (e.g., additional jobs, income, spending, etc.). For purposes of estimating cumulative impacts, each project is assumed to be approximately the same size (+/- 120 turbines), and the value of each turbine is assumed to be assessed at approximately \$765,000. (This value is slightly higher than the value of \$750,000 used in the ECONorthwest report [ECONorthwest 2002, as amended by Sagebrush Power Partners LLC 2003c] that evaluated the Kittitas Valley project, which was updated to apply to the three proposed wind power projects.) Therefore, each project would have an initial assessed value of over \$90 million and the combined assessed value for all three projects would be over \$270 million. The combined value of the three projects would represent an increase of more than 10% over the current assessed valuation for all real and personal property in Kittitas County of approximately \$2.5 billion (Kittitas County 2003).

The estimated potential property tax revenues in the first operational year would be more than \$3.8 million, and more than \$1 million for each project. (Revenues for Wild Horse are assumed to be the same as for the middle scenario for the Kittitas Valley, 121 turbines.) Differences in methodology used among the three projects (in this case, primarily the applied tax levy rate) results in different revenue estimates for projects with similar capital characteristics. The allocation of this potential property tax revenue to various government agencies/funds and special districts is shown in Table 3.16-4.

Because the value of the turbines would depreciate over time, property tax revenues would also decline over their 30-year lifetime. Depreciation schedules applicable to the projects are not available at this time.

Current statewide legal limitations on property taxes would likely result in actual tax revenues lower than those indicated in Table 3.16-4. Initiative 747 limits the growth of local government property tax revenues to 1% per year, although the I-747 cap does not apply to the assessed value of new construction. Because the total assessed valuation for Kittitas County would increase substantially (over 10%) with inclusion of the value of the wind power projects, the tax rates levied against the total assessed valuation base might need to be reduced to stay within the I-747 limit. In that event, actual revenues derived from the projects would be less than indicated in Table 3.16-4, although taxpayers would benefit from the reduced levy rate. On balance, the actual effect of the projects on property taxes would likely be some combination of increased revenues and decreased levy rates (Kittitas County 2003).

The three proposals could also generate some costs for public services (e.g., fire protection, law enforcement, road maintenance) that might not be covered by mitigation requirements. To the extent that this occurred, it would reduce the fiscal benefits that would otherwise be associated with the projects. These potential service costs have not been quantified but are estimated to be minor, both individually and cumulatively. Expected cumulative revenues are projected to be significantly higher than estimated costs for the projects and would result in a substantial benefit (a surplus of revenues relative to costs) for the affected local jurisdictions (Kittitas County 2003).

Table 3.16-4. Cumulative Potential Property Tax Revenues in Kittitas County with Wind Projects (First Operational Year)

	Desert Claim	Kittitas Valley	Wild Horse	Cumulative Total
Local Schools	\$ 375,700	\$ 407,000	\$ 407,000	\$ 1,189,700
State	\$ 264,800	\$ 376,200	\$ 376,200	\$ 1,017,200
Road District	\$ 149,700	\$ 135,300	\$ 135,300	\$ 420,300
Fire Districts	\$ 132,700	\$ 80,300	\$ 80,300	\$ 293,300
County Government	\$ 123,100	\$ 168,300	\$ 168,300	\$ 459,700
Hospital District/Other Local Services ¹	\$ 40,800	\$ 63,800	\$ 63,800	\$ 168,400
Local Communities ²	NA	\$ 112,200	\$ 112,200	\$ 224,400
Total	\$ 1,086,800	\$ 1,343,100	\$ 1,343,100	\$ 3,773,000

Notes: Numbers rounded; NA = not available; revenue estimates based on assessed valuation calculated for each project and multiplied by levy rate of 1.18 for Desert Claim and 1.35 for Kittitas Valley and Wild Horse.

¹ "Other local services" included for Kittitas Valley and Wild Horse, not for Desert Claim.

² This category of revenue was not estimated for Desert Claim.

Source: Kittitas County 2003.

3.16.6.12 Public Services and Utilities/Recreation

Cumulative impacts on public services would result from development of the three wind power projects. Concurrent development of the three projects could create significant additional demand for law enforcement, fire protection, and emergency medical service response during both construction and operations and maintenance phases. The level of impact would depend on the timing of concurrent construction activities as well as the availability of emergency response resources at the time of an incident.

For example, calls for law enforcement service could increase during the construction phase because of traffic accidents and construction site theft or vandalism. The cumulative potential number of increased calls has not been quantified but is not anticipated to be significant. All three wind power project applicants would provide on-site security for their respective projects. Impacts during project operations could result from calls for service in connection with vandalism or trespass but would not be expected to be cumulatively significant. The three proposed projects would increase the risk of fire and the potential need for emergency medical services from accidents during both construction and operation. The western portion of the Desert Claim project area is included within Kittitas County Fire District 2, while the remainder is not within an existing fire district service area (Kittitas County 2003). Most of the Kittitas Valley project area is outside existing fire district boundaries, although Fire District 1 serves a portion of the site. No part of the Wild Horse site is within a rural fire district. The Applicant intends to contract with the appropriate rural fire district to obtain required fire protection services. For all three projects, such contracts would extend coverage to areas not presently served by a fire district. If a fire service contract does not cover the actual costs of extending

service to a project, there could be a gap between the time service is provided and the realization of project-generated property tax revenues. Successful implementation of emergency response and fire prevention and risk mitigation plans would minimize potential significant cumulative impacts.

Increased permanent worker populations required to operate the three proposed wind power facilities could contribute to increased cumulative demands for school services in central and eastern Kittitas County. The combined operations work force of the three projects would be 30 to 42 workers. If all of these workers were hired from outside the local area and all or most of those were located in a school district with capacity limitations, there could be adverse impacts on school services. These circumstances, however, are considered unlikely because local residents would probably fill a portion of the operations jobs, and it is unlikely that all of the in-migrants would have school age children or would locate in the same school district. Therefore, no significant cumulative adverse impacts on schools are anticipated from project operation.

Cumulative impacts on utility service providers would consist primarily of cumulative increases in the demand for solid waste disposal services. However, this cumulative increased demand would be limited to project construction and is not anticipated to be significant with respect to either collection capability or the capacity of the County's construction and demolition waste disposal site.

No long-term cumulative impacts on regional water and wastewater treatment plants are anticipated because water and wastewater demands would be limited to temporary needs generated during construction activities and those from operations and maintenance staff. It is anticipated that long-term cumulative water and wastewater needs would be met through project-specific water wells and septic tanks, and would therefore not burden the region's treatment processes. The combined effects of the three projects would not result in a significant cumulative impact.

Because no individual impacts are anticipated from each project, no cumulative impacts on telecommunications are anticipated. Based on the distances between the respective project facilities, there does not appear to be a potential for significant cumulative interference impacts on radio and television reception in the areas near the proposed wind power projects (Kittitas County 2003).

Temporary population increases associated with Kittitas Valley, Desert Claim, and Wild Horse project construction workers could cumulatively increase demand for and use of local and regional recreation resources during overlapping construction periods. Peak construction of each project could employ approximately 165 workers, or a combined total of about 500 workers. Increased demand would be most anticipated for off-site regional resources that could provide temporary accommodations for transient construction workers, such as campgrounds. It is possible that access to heavily used recreational resources throughout Kittitas Valley and central and eastern Kittitas County could be limited during peak recreation use months, such as during the summer. The exact nature and extent of cumulative demands for recreational resources would depend upon the timing of the three construction projects. It is anticipated that upon construction completion, the permanent population increase associated with these three wind power projects (between 30 to 42 workers) would not result in substantial cumulative demands for recreation resources.

The proposed wind energy projects would result in the maintenance of existing recreational activities with the project areas. Existing recreational activities within the project areas would, with permission of the landowners, continue to be available on privately owned lands. Controlled hunting on WDFW-managed lands on the Wild Horse project would be allowed based on a management plan developed by WDFW and the applicant. Public access to all project areas, to the extent it currently exists, would be maintained. Some access interruptions or temporary congestion might occur during project construction, particularly in the Desert Claim and Kittitas Valley project areas. The impacts of these three projects, in association with general population growth in the county, would not result in significant cumulative impacts to recreation.

Cumulative Impacts on Utility Grid

In order to be interconnected to either the BPA or PSE grids, the projects would require interconnection and transmission agreements that comply with FERC (Federal Energy Regulatory Commission) and NERC (National Electric Reliability Council) standards. The interconnection and transmission agreements ensure the safe and reliable delivery of power from the project to the grid.

In order to gain access to the grid, every type of power project wishing to access the grid must apply for access under the utility's OATT (Open Access Transmission Tariff). Under the OATT both a detailed System Impact Study (SIS) and a Facility Study (FS) need to be performed by the interconnecting host utility. The detailed SIS engineering work performed examines the impacts on the grid of injecting power from the project including the power injected from other projects. The Facility Study examines the costs and schedule requirements to construct the interconnection facilities to allow for the injection of power from the project. The main purpose of the rigorous SIS is to determine the requirements for the interconnection facilities to provide adequate system protection, grid stability and to ensure that overall reliability is maintained. All three projects are currently under study (i.e. SIS and FS) by both BPA and PSE.

3.16.6.13 Cultural Resources

The proposed project, in conjunction with other proposed or planned projects, including the Desert Claim and Kittitas Valley projects, would result in ground disturbance that could potentially impact identified and unidentified prehistoric and/or historic sites, as well as cause impacts on traditional cultural properties. Cultural resource surveys have been conducted at each of the project sites. Direct and indirect impacts to cultural resources within the Wild Horse project area would occur within the context of comparable impacts from past and ongoing land uses in the vicinity. Agricultural activities, irrigation development, construction of roads and power transmission lines, and rural residential development have no doubt disturbed or destroyed cultural resources that existed in the project vicinity at one time, and have altered the historic setting for the resources that remain. A summary of known resources identified in the wind projects cumulative study area is summarized below.

As identified in Section 3.13, "Cultural Resources," of this document, cultural sites in or near the Wild Horse project area include six previously recorded archaeological and historical sites and three previously unrecorded archaeological sites. Subsequently, five additional previously unrecorded archaeological sites (rock features) were documented at the Wild Horse project, as well as one historical property. Two previously unrecorded archaeological sites (lithic scatters)

were documented for the Kittitas Valley project. None of these cultural sites would be disturbed by proposed construction, although visible evidence of project facilities would indirectly affect the setting for three of the sites (Kittitas County 2003). Currently, archaeological monitoring along the Schultz-Wautoma transmission line project has identified sensitive cultural resources within the project's area of potential effect. Cultural resource information gathered during this phase of archaeological monitoring along the Schultz-Wautoma transmission line project will be incorporated into the FEIS.

The density of cultural resources in the Desert Claim project area appears to be considerably greater than in the Kittitas Valley or Wild Horse areas. A field survey of the Desert Claim project area identified 13 previously unrecorded prehistoric sites and 18 previously unrecorded historic sites (as well as one recorded historical site), along with more numerous prehistoric and historic isolates. Potential direct and indirect impacts on those cultural resources could generally be avoided or reduced through final turbine "micro-siting" and other mitigation measures. Therefore, the combined effects of the three proposed wind power projects on cultural resources appear to be the possible disturbance of a small number of sites and the alteration of the visual setting for up to 35 to 40 cultural sites (Kittitas County 2003).

During consultations between EFSEC and the Yakama Nation regarding the Kittitas Valley project, tribal representatives expressed concern about the cumulative effect wind power projects could have on tribal lands. Concerns raised on past wind projects include how wind power developments may affect the cultural and spiritual practices of the Yakama People, particularly projects located on sacred lands that could affect sacred foods and medicines (Benton County and Bonneville 2003). The Yakama Nation submitted a comment letter to EFSEC on the Kittitas Valley DEIS raising concerns regarding potential impacts on several resources including cultural, bird migration, lithosol degradation and riparian zones. Efforts to bring together wind power facility applicants, state and federal government agencies, and tribal representatives to discuss these and other issues of concern are ongoing. The Confederated Tribes of the Colville Reservation (CCT) expressed potential concerns about Traditional Cultural Properties for the Wild Horse project (CCT 2004). The Applicant and EFSEC met with CCT on February 19, 2004 and the Applicant is responding to CCT's concerns.

While impacts from these and other projects in Kittitas County could result in a net cumulative loss of cultural resource values in the region, implementation of mitigation programs in each individual project should help to limit project-specific impacts, therefore reducing overall cumulative impacts on cultural resources.

3.16.6.14 Transportation

If two or more large projects were constructed on similar or the same schedules, such as the Kittitas Valley, Desert Claim, and Wild Horse projects, commuting construction workers and construction supply and material deliveries could contribute to added congestion on the same local roads and highways. For example, the Kittitas Valley and Desert Claim sites are less than 5 miles apart by surface road, increasing the likelihood that construction workers and delivery trucks at both sites could use common routes.

Planned transportation improvement projects could also reduce capacity on local roads, making the burden of additional commuter traffic difficult to absorb. Some temporary cumulative

impacts on the local road and highway network would result from the combined construction activities.

The Applicant has prepared a cumulative traffic impact analysis of construction traffic from the Kittitas Valley and Wild Horse projects, which is summarized below. It is followed by a discussion of the possible added construction traffic effects of the Desert Claim project.

Kittitas Valley and Wild Horse Wind Power Projects

There are two transporter routes for the Wild Horse project. Both routes begin in the City of Seattle and continue east on I-90. These routes overlap with the entire I-90 segment of the Kittitas Valley project transporter route and continue on to the towns of Kittitas (Exit 115) and Vantage (Exit 136).

The primary route used to transport equipment to the Kittitas Valley site begins in the City of Seattle and continues east on I-90 to US 97 (Exit 106) in Ellensburg. In the vicinity of the project, I-90 is classified as a rural-interstate, according to the WSDOT road classification system. The segment of I-90 immediately west of Exit 106 carries an ADT volume (in both directions) of 22,000 vehicles, with an estimated 21% trucks (WSDOT 2001).

In the event that construction occurs simultaneously for the Kittitas Valley and Wild Horse projects, the segment of I-90 immediately west of Exit 106 may temporarily carry construction traffic for both projects. This is the only roadway that may potentially be affected by combined construction traffic.

To analyze the combined effects, base year (2001) traffic volumes on this I-90 segment were forecast to the year 2004 using a 2% growth factor. This 2% growth factor is based on historical ADT levels and background growth in the Cle Elum and Ellensburg area due to large nearby capital projects. The growth on this roadway is considered reasonable because of the area's rural nature. This growth resulted in a background 2004 ADT of 23,320 vehicles (Table 3.16-5). Peak-hour traffic volumes in one direction were estimated at 1,210 vehicles for 2001 and 1,283 vehicles for 2004, based on a standard 10% peak-hour factor and a 55% directional factor to the respective ADT levels for two-direction traffic in each year.

Methodology from the Highway Capacity Manual (HCM) (Transportation Research Board 2000) is typically used to determine the LOS for a roadway. LOS A represents free flowing conditions (the equivalent of 11 or fewer passenger cars per lane mile for a freeway), while LOS F represents extremely congested conditions (more than 45 passenger cars per lane mile). Applying the HCM methodology for a freeway to the baseline conditions for the segment of I-90 west of Exit 106 indicates this roadway segment would function at LOS A under the baseline condition in both 2001 and 2004.

The estimated construction traffic volumes for the Kittitas Valley and Wild Horse projects were then added to the 2004 background traffic volumes to achieve a combined peak-hour directional volume. As a worst case, the Kittitas Valley project is estimated to generate 149 heavy construction trips and 20 light duty delivery truck trips traveling on I-90, for a total of 169 peak-hour trips (middle scenario). The Wild Horse project is estimated to have 143 heavy construction trips and 15 light duty delivery truck trips for a total of 158 peak-hour trips traveling on Transporter Route 1. Transporter Route 2 of the Wild Horse project is estimated to carry six heavy construction trips in the peak hour.

The combined construction traffic for the Kittitas Valley and Wild Horse projects would result in a total maximum peak-hour volume of 1,616 vehicles (Table 3.16-6). The combined volume was then analyzed for LOS. Based on the most current HCM guidance for freeway segments, with the estimated combined baseline and construction traffic volumes during the PM peak hour, this segment of I-90 would continue to operate at LOS B during the construction period. By state standards, the LOS threshold for rural highways is LOS C. Therefore, while the combined construction traffic for the Kittitas Valley and WHWP projects could result in a temporary decrease in LOS on I-90, there would not be a significant impact on traffic operations.

Table 3.16-5. Existing and Future Daily and Peak-Hour Traffic Volumes and LOS without Project

Roadway	Daily			Estimated Directional Peak Hour without Project		
	2001	2004	2001	LOS	2004	LOS
I-90 (west of US 97)	22,000	23,320	1,210 (10.1 cars/lane mile)	A	1,283 (10.7 cars/lane mile)	A

Source: Kittitas County 2003

Table 3.16-6. Total PM Peak Hour and LOS for Combined Construction Impacts on the Roadways from the Kittitas Valley and Wild Horse Wind Power Projects

Roadway	2004 PM Peak ¹	Kittitas Valley		Wild Horse	Total PM Peak ¹	LOS
		Transporter Route 1 ¹	Transporter Route 1 ¹	Transporter Route 2 ¹		
I-90 (west of US 97)	1,283	169	158	6	1,616 (13.4 cars/lane mile)	B

¹ Directional volumes

Sources: Kittitas County 2003.

Desert Claim Wind Power Project

Peak-hour construction trips for the Desert Claim project have not yet been estimated, although total turbine delivery trips and potential concrete delivery trips are identified. Assuming that the volume of construction trips for the Desert Claim project would be similar to the volumes estimated for the Kittitas Valley and Wild Horse projects (based on the similar size of the projects), total peak-hour trips shown in Table 3.16-6 would be increased by approximately 120 to 140 trips. Applying a mid-range factor of 130 trips, the total peak-hour trips in 2004 if all three proposed projects were under construction simultaneously would be close to 1,750. This corresponds to an equivalent of 14.7 passenger cars per lane mile, an operating condition that is still within the numerical range for LOS B. Therefore, the added effect of the potential Desert Claim construction traffic would not result in a significant cumulative impact on the operating condition for I-90 during the construction period (Kittitas County 2003).

Aside from the increased traffic on I-90, there would be relatively little combined construction traffic effects on other roadways because of the geographic separation of the three projects. Cumulative increases in general construction traffic volumes would likely be restricted to roadways in the area around the intersection of I-90 and US 97, and would be associated primarily with the Kittitas Valley and Desert Claim projects. If turbine components or off-site gravel materials were being delivered to multiple projects at the same time, there could be increased delays or additional detours within the area near the Kittitas Valley and Desert Claim projects. Additional vehicle delay could affect segments of US 97 and Smithson Road. The potential for delay could be reduced if the contractors for the different projects coordinated the delivery of turbine components to avoid a situation in which a number of transporters were traveling at the same time on a given road segment.

Cumulative Tourist Traffic

Development of multiple wind power projects in the Kittitas Valley area would likely result in a larger total number of tourists visiting these facilities compared to conditions if just one project were built. However, with the geographic separation of the proposed projects, roads adjacent to the Wild Horse project (for example) would not likely experience substantially more tourist traffic because one or two other projects were developed. In fact, the presence of additional wind power projects could result in spreading tourists over a larger portion of the valley, with fewer tourist visits to a single project than might otherwise be expected. Tourist interest in multiple wind projects would likely result in an increase in the amount of traffic on local roads near the respective project areas. The tourist traffic would likely be localized to the individual areas around the projects and would not likely be cumulative (i.e., it is likely that most tourists interested in wind energy would visit any one of the projects but would not visit two or all three projects).

Aircraft operations in the Kittitas Valley are centered at Bowers Field. Airspace over and near the Yakima Training Center is restricted by military operations in that area. Development of the Given its location, the proposed Desert Claim project would represent a cumulative addition to natural and constructed features within the Bowers Field airspace. Twenty-seven of the proposed turbines would intrude into the protected airspace for Bowers Field. The Kittitas Valley and Wild Horse projects would not present potential conflicts with air traffic operations at Bowers Field or other facilities and there would be no cumulative significant impacts to air transportation resulting from development of those projects.

3.16.6.15 Health and Safety

Construction and operation of the Wild Horse project would add to the existing health and safety risks such as existing mechanical hazards (agricultural machinery, motor vehicles, etc.) that currently exist in the project vicinity and Kittitas Valley. The Wild Horse project would introduce new hazards such as blade throw and ice throw

The primary health and safety risk associated with the Wild Horse Wind Power project is wildfire. The risk of fire would be a concern during construction, operation, and decommissioning. The degree to which the project-specific fire risk would contribute to the cumulative fire risk in the general geographic area would depend on which development scenario was selected and the extent to which the identified mitigation measures were implemented.

Construction and decommissioning timing, relative to the other wind power projects and other development in the area, would also be a factor influencing the degree of the cumulative fire risk. Simultaneous construction of projects, for example, would raise the cumulative fire risk and increase the potential burden on emergency response organizations. The presence of turbine towers where now there are none, would likely increase the probability of lightning strikes and, despite the grounding systems that the wind power projects would employ, provide an increased likelihood of fire. The rate, extent, and direction of spread would be governed by the location of the fire, available fuel, temperature, wind speed and direction, presence/absence of fire breaks, and response time and capability of on-site personnel and emergency responders.

Project towers would also increase the chance of impact by low-flying aircraft. Such a collision could result in a fire. Appropriate marking and lighting of the towers would lessen the probability of occurrence. However, the probabilities would be proportional to the number of wind power projects and, thus, the number of towers constructed.

The other health and safety risks of release or potential release of hazardous materials, tower collapse, blade throw, ice or blade fragment throw, shadow flicker, EMF, electric shock, terrorism, sabotage, or vandalism would result in either localized impacts or have no discernable impacts due to the Wild Horse Wind Power project. Thus, they would not contribute to cumulative health and safety effects in the general geographic area.