

## **1.6 CUMULATIVE IMPACTS**

Although the environmental impacts of proposed power projects are typically evaluated on an individual basis, the recent number of wind power generation applications in Kittitas County has prompted EFSEC to consider potential cumulative impacts. The Kittitas Valley, Wild Horse, and Desert Claim wind power projects are three similar but independent developments being proposed in Kittitas County that are being permitted through separate processes—Kittitas Valley and Wild Horse through EFSEC and Desert Claim through Kittitas County. 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 is 14 miles from the Desert Claim project and 21 miles from the Kittitas Valley project. SEPA requires consideration of cumulative impacts. A brief description of the Desert Claim and Kittitas Valley projects is provided in Section 3.17, ‘Cumulative Impacts’. Potential cumulative impacts associated with the Kittitas Valley, Wild Horse, and Desert Claim wind power projects are addressed in Section 3.17 for each resource topic, and are summarized below.

### **1.6.1 Earth Resources**

Significant cumulative impacts on soil, topography, and geology resulting from construction of the three proposed wind power projects in Kittitas County are not anticipated. Impacts on earth resources from development of the three wind power projects would generally be confined to localized, temporary erosion impacts from ground disturbance during construction. The intensity of impacts on near-surface soils would be within the construction footprint for the respective project and would not be overlapping in geographic extent and the impacts of the respective projects would not represent the potential for significant cumulative impacts on earth resources.

Cut and fill would be required to construct access roads, tower foundations, transformer pads, and other project facilities. Each project will require large amounts of gravel for road and foundation construction, but because the Wild Horse Project will utilize on-site rock pits to supply gravel, the cumulative impact on local resources will be reduced.

### **1.6.2 Vegetation, Wetlands, Wildlife, and Fisheries**

#### **1.6.2.1 Vegetation**

Implementation of all three proposed wind power projects would result in the loss of vegetation through clearing and ground disturbance, including the potential loss of lithosols, a unique habitat often associated with the shrub-steppe region. The combined figures for the three projects amount to approximately 336 total acres of existing vegetation lost, including approximately 170 acres of shrub-steppe and approximately 100 acres of lithosol habitat. In the context of the three wind power project areas that

collectively cover approximately 17,000 acres, the approximate 2 percent loss of vegetation at each project site would not be considered an adverse cumulative effect. This combined loss of vegetation would similarly not be considered cumulatively adverse in a more regional context. However, the precise regional extent of lithosol habitat is not quantitatively known. Therefore, it is difficult to assess the specific magnitude of cumulative lithosol impacts at the three wind power project sites within the context of the surrounding region.

No federally listed rare plants were identified at either the Kittitas Valley or Wild Horse project sites. One Washington State listed species, hedgehog cactus, was found extensively in lithosolic habitats at the Wild Horse Project site, but less than 10% of the individuals identified during a rare plant survey are considered at risk from direct impact from the Wild Horse Project.

Field surveys of wet meadow habitats at the Desert Claim project site resulted in no findings of Ute ladies'-tresses, an orchid that is federally listed as endangered. No other rare plants protected by either the federal or state governments were found in searches of the areas of likely disturbance in the Desert Claim project area (Kittitas County 2003a). The minimal potential impacts of the proposed wind projects on rare plants would not represent a significant cumulative impact on any species.

#### **1.6.2.2 Wetlands**

Cumulative impacts on wetlands could result from directly filling or grading of wetland systems, as well as from indirect effects caused by stormwater runoff, increased pollutant loading, and water quality degradation, which in turn could result in loss of wetland diversity and reduced wetland functions and values. The Kittitas Valley project would disturb between approximately 135 and 185 square feet of one small potential wetland system at the project site. Construction activities would temporarily disturb approximately 16 acres of wetland area at the Desert Claim site, while the permanent project footprint would overlap with an area estimated at 9 acres.

No wetlands were identified within a 164-foot buffer around the planned locations for Wild Horse Project facilities; therefore, no impacts on wetlands are anticipated for that Project. The collective effects of these projects would be minor as a result of wetland avoidance and/or required mitigation for wetlands that could not be avoided, and are not expected to extend to downstream surface waters or wetlands. Therefore, there would not be a potential for significant cumulative effects on wetland resources.

#### **1.6.2.3 Wildlife**

Some temporary displacement of wintering mule deer and elk is anticipated from winter construction activities in the three wind projects. If tolerance thresholds during wind power project maintenance activities are exceeded, some animals are likely to be displaced and use areas away from the wind project development areas. However,

cumulative impacts on wintering mule deer and elk for all projects are expected to be low.

The estimated combined raptor mortality rate for the three wind power projects would be approximately 14 raptor fatalities per year with 361 combined turbines, and 15 raptor fatalities per year with 391 combined turbines. Given the distances between the Wild Horse, Kittitas Valley, and Desert Claim projects, and the typical home ranges of the raptors at risk for collision at the three projects, the same individual breeding raptors that use the Kittitas Valley and Desert Claim project areas are not expected to use the Wild Horse Project area

The cumulative impacts on bald eagle winter habitat from all projects would be small. During project operation, bald eagles that occupy the area near the Yakima River would be at some risk for collision with turbines. Assuming risk of collision is proportional to use, one bald eagle fatality between the Kittitas Valley and Desert Claim projects might occur every two to three years. There was no observed use at the Wild Horse Project area. Based on these estimates, the cumulative effects of this low level of mortality on the increasing winter bald eagle population in the Kittitas Valley and the state of Washington would not be measurable.

It is expected that passerines would make up the largest proportion of bird fatalities for the three projects combined. Based on the mortality estimates from other wind projects studied, combined passerine mortality for the three 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.

Using mortality estimates from other operating 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 bat fatalities. However, the significance of bat mortality from the three projects is hard to predict because there is very 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 observations were during the fall migration period.

Development of the Desert Claim project would result in minor disturbance or displacement impacts on streams and riparian zones in the project area; because none of the affected streams are known to contain fish communities, direct impacts on fish resources from this project are expected to be negligible or nonexistent. The effects of the respective projects would be negligible in three localized areas of Kittitas County and would not extend to downstream waters, therefore there would not be a potential for significant cumulative effects on fishery resources.

#### **1.6.2.4 Fisheries**

No impacts on fish habitat or fish species associated with construction and operation of the Kittitas Valley project are anticipated. Similarly, the Wild Horse Project would not result in adverse impacts on fish or fish habitat on-site or in downstream areas.

### **1.6.3 Water Resources**

Cumulative effects to surface water resources could result from increases in the amount of impervious surfaces that in turn could alter the amount and quality of drainage to area creeks and other water features. However, because the three projects are sufficiently distant from each other and are located in different tributary watersheds, there would not be combined effects 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. Therefore, significant cumulative effects on water resources within the Upper Yakima River basin or the northeastern portion of the Kittitas Valley are not expected, even if all three projects were constructed.

### **1.6.4 Health and Safety**

The potential for exposure to fuel and non-fuel hazardous substances would increase, particularly during the construction period if construction periods were to overlap. However, the effects would be localized in the area of the spill, and would not be likely to result in an adverse cumulative impact.

The greatest fire risk for each project would occur during the construction period, because of the level of activity and the numbers of workers and equipment active at that time. The greatest cumulative fire risk would occur if and when construction schedules for two, or all three, of the projects overlapped. With implementation of strict fire protection and prevention measures, the cumulative risk of potential fires associated with construction of the three proposed wind turbine projects should be minimized.

Certain fire risks specific to wind energy projects would also exist during the operating period for each project. However, specific measures to counteract or manage these risks would be implemented during project operation. For example, the project facilities would be continually monitored, the project areas would be regularly patrolled, and access to the project areas would be limited. Therefore, the concurrent operation of the three proposed wind power projects would not likely pose a cumulatively significant increased fire risk.

Site-specific health and safety concerns associated with wind energy production include the potential for ice to be thrown from rotating blades, blades to disengage and be thrown from the tower, and tower collapse during extreme weather conditions. These potential health and safety impacts from the three projects would be localized in nature and would not be expected to be cumulatively significant.

Potential shadow flicker impacts from the three proposed wind power projects would be limited to the immediate vicinity (approximately 2,000 feet) of the wind turbines within each respective project area. Some residences that are close to turbine locations for the Desert Claim or Kittitas Valley projects would be subject to shadow flicker for varying numbers of hours per year. These impacts would be limited to a number of discrete locations that are well separated from each other, and would not constitute a cumulative impact from these two proposed projects.

The electric and magnetic fields associated with the three proposed wind power projects would be less than those produced by electrical facilities already present in the vicinity of the respective project areas, and would diminish to background levels at distances within which public exposure could occur. Therefore, there would not be cumulative exposure impacts from development of multiple wind energy projects.

### **1.6.5 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 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.

The three proposed wind power projects would provide a combined nameplate capacity of approximately 565 MW of electricity (under the most likely scenario for development of the Kittitas Valley and Wild Horse projects). Assuming long-term operation of the three projects at a typical wind power project capacity factor of 33 percent, combined they would produce approximately 186 average MW of electricity on a long-term basis. That collective energy output would represent a substantial increase in the amount of electricity currently produced within Kittitas County. Operation of the three projects would also cumulatively add to the capacity, production, and availability of renewable energy sources in Washington state and the greater Pacific Northwest, and 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.

### **1.6.6 Land Use and Recreation**

Development of the Wild Horse Project concurrent with the proposed Desert Claim and Kittitas Valley wind projects would result in conversion of approximately 336 acres of open space and rangeland uses in central Kittitas County for wind energy production. In the short-term, proposed wind energy facilities would not collectively disrupt or change the underlying land use pattern of this portion of the county. The three projects would also require either Kittitas County approval for a rezone and Comprehensive Plan amendment, or EFSEC review and governor approval, to allow development of a wind

power facility. Temporary population increases associated with construction workers from all three projects could cumulatively increase demand for and use of local and regional recreation resources during overlapping construction periods, but those are not expected to be significant.

### **1.6.7 Socioeconomics**

The proposed projects could contribute to increases in temporary and permanent job opportunities and populations in the region. The majority of cumulative population and housing impacts would be temporary and would occur during construction. Assuming that all three projects are constructed simultaneously, temporary population increases resulting from construction work forces could result in cumulative effects to the local housing supply. However, 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.

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 significantly increase the amount of annual property tax revenue to the affected taxing districts in Kittitas County..

### **1.6.8 Cultural Resources**

Constructing the three proposed wind power 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 of the Kittitas Valley and Wild Horse wind power projects have been conducted and no direct impacts to cultural resource sites are anticipated. Tribal representatives of the Yakama Nation have expressed concern about the cumulative effect wind power projects. Efforts to bring together wind farm applicants, government agencies, and tribal representatives to discuss these and other issues of concern are ongoing.

### **1.6.9 Visual Resources**

There are a number of locations in the Kittitas Valley 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. Because the Wild Horse Project is located far from the other two projects and in an entirely different portion of the landscape, it has limited potential to be seen in the same view as the other two projects. Travelers on Interstate 90 (I-90), however, 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. The development of the three proposed wind power projects would also cumulatively contribute to increased nighttime lighting in the Kittitas Valley.

### **1.6.10 Transportation**

If construction occurs simultaneously for the Kittitas Valley and Wild Horse projects, the segment of I-90 immediately west of Exit 106 (to US 97) may temporarily carry construction traffic for both projects. The combined construction traffic volumes of both the Kittitas Valley and Wild Horse projects during the PM peak would cause this segment of I-90 to operate at level-of-service (LOS) B. This is acceptable by county and State standards, and it is anticipated that the LOS would return to background conditions (LOS A) once the projects are completed.

With the addition of the Desert Claim project, the total peak-hour trips if all three proposed projects were under construction simultaneously would result in an operating condition that is still within the numerical range for LOS B. Therefore, the additive 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. However, if turbine components or offsite gravel materials were delivered to multiple projects at the same time, there could be increased delays or additional detours within the area near the Desert Claim and Kittitas Valley projects.

Development of multiple wind farms in the Kittitas Valley area would likely result in a larger total number of tourists visiting wind project facilities, relative to the level of activity with a single project. However, the tourist traffic would likely be localized to the individual areas around the projects and would not likely be additive or 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).

### **1.6.11 Air Quality**

Gravel needed for construction of the Kittitas Valley and Desert Claim projects would likely be transported from offsite sources. This activity could result in a temporary increase in localized cumulative air quality impacts on travel routes shared by the two projects, but not at a broader, countywide level. This potential impact would be greatest if construction activities for the Kittitas Valley and Desert Claim projects overlapped and occurred during periods of peak winds.

The air emissions from contemporaneous construction of multiple wind projects would be additive in terms of their contribution to total regional pollutant loads. However, it is not anticipated that the incremental impact of the aggregated air emissions from construction of multiple wind power projects would be sufficient for regional air pollutant concentrations to temporarily exceed the applicable air quality standards.

No significant aggregated air pollutant concentrations that would exceed national or Washington State ambient air quality standards are anticipated. In addition, the generation of electricity through the three proposed wind power projects would avoid cumulative emissions of regulated pollutants from other fossil fuelled sources of power that would have otherwise been built or operated to produce an equivalent amount of electricity.

### **1.6.12 Noise**

Construction noise generated by the three wind power projects would be temporary in nature, and would primarily be from operation of construction equipment and vehicles. The magnitude of this temporary cumulative impact would depend upon the timing of construction activities but any adverse effects would be limited to the area immediately surrounding each construction site.

The Kittitas Valley and Desert Claim projects are a sufficient distance apart that residents near the Desert Claim project would not also experience elevated noise levels from operation of Kittitas Valley project facilities, and vice versa. Noise modeling results for both projects indicate that receptors located between the two projects would be unlikely to experience noticeable increases in noise levels as a combined effect of project operations. Given the distances that separate the Wild Horse Project from the Desert Claim and Kittitas Valley sites, Wild Horse Project operations would not contribute to cumulative noise impacts in the region.

### **1.6.13 Public Services and Utilities**

Concurrent development of the three projects could create 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.

Increased permanent worker populations required to operate the three proposed wind farms could contribute to increased cumulative demands for school services in central and eastern Kittitas County. However, local residents would likely fill a portion of the operations jobs and it is unlikely that all of the in-migrants 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 increased demand 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.

No significant cumulative impacts on electricity or telecommunications are anticipated. Based on the distances between residences and the respective project facilities, there does not appear to be a potential for cumulatively significant interference impacts on radio and television reception in the areas near the proposed wind power projects.