3.19 CUMULATIVE EFFECTS

Cumulative effects are the effects on the environment which result from the incremental impact of the Proposed Action and Action Alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). This section describes the potential cumulative effects on the natural and built environment from the construction and operation of the Proposed Action and Action Alternatives.

3.19.1 Methodology

The analysis of cumulative effects involved a series of steps beginning with the identification of issues or resources appropriate for inclusion in the cumulative effects analysis. This step was followed by defining spatial (geographic) and temporal (time) boundaries appropriate for the analysis of each environmental issue or resource. Next, a range of past, present, and reasonably foreseeable future actions were identified that could have an effect on the issues or resources of concern, within the geographic scope and timeframe established for the cumulative effects analysis. These include both Federal actions and non-Federal (i.e., private) actions.

3.19.1.1 Geographic Scope

The geographic scope of the cumulative effects for each issue or resource was established to help bound the description of the affected environment. In most cases, the geographic scope was based on the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects extended beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the Proposed Action and Action Alternatives. If the Proposed Action and Action Alternatives would have no direct or indirect effects on a particular resource, a cumulative effects analysis was not conducted for that resource.

3.19.1.2 Timeframe of Analysis

For each issue or resource, a timeframe was established for analyzing cumulative effects. The timeframe encompasses the full duration of the anticipated effects. Timeframes, like geographic scope, could vary by resource. These timeframes were based on the duration of the direct and indirect effects of the Proposed Action and Action Alternatives, not strictly the duration of the action itself.

3.19.1.3 Past and Present Actions

The nature and extent of past and present actions in the vicinity of the Proposed Action and Action Alternatives is largely described earlier in this section and in Section 3 Affected Environment for each environmental resource. Past actions that have affected natural and human resources in the Project Area include hunting and gathering by aboriginal peoples; trapping, mining, farming, cattle ranching, and sheep grazing by early Euro American settlers; and wildfire and prescribed fire. Small towns and hamlets have also become established in the Project Area, along with a system of state highways and county roads, and a network of BLM, USFWS, and private access roads.

3.19.1.4 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions include those federal and non-federal activities not yet undertaken, but sufficiently likely to occur, that a Responsible Official of ordinary prudence would take such activities into account in reaching a decision. These federal and non-federal activities that must be taken into account in the analysis of cumulative impact include, but are not limited to, activities for which there are existing decisions, funding, or proposals. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite. The reasonably foreseeable future actions included in the cumulative effects analysis for the North Steens 230-kV Transmission Line Project are described below. They include three wind energy projects similar in size and scale to the Echanis project, a BLM rangeland restoration program, a BLM travel management plan, a BLM ecosystem restoration project, a private wind energy testing and monitoring project, and possible upgrades to existing Harney Electric Cooperative (HEC) transmission lines that would be required if the North Steens Transmission Line is developed to its full 230-kV potential. Each reasonably foreseeable future action is described below.

The West Ridge Wind Project

In July 2008, West Ridge Wind, LLC, a wholly-owned subsidiary of Columbia Energy Partners LLC, applied for a conditional use permit from the Harney County Planning Commission for a 104 MW wind energy project known as the West Ridge Wind Project. West Ridge Wind, LLC formally withdrew the application in January 2009. Although the application was withdrawn and no application for the West Ridge Project is pending before Harney County or the Oregon Energy Facilities Siting Council, this Draft EIS used the proposed layout and environmental studies prepared for the project to determine the cumulative effects of this project together with the Proposed Action.

The West Ridge Wind project would be developed on an 8,360-acre privately-owned site located near Diamond, Oregon in Harney County (Figure 3.19-1). The property within the boundaries of the site is owned by Diamond Valley Ranches, Inc., Diamond Valley Land Co., LCC and Bill Otley. The beginning of the project is approximately 16 miles south on Moon Hill Road. The closest turbine would be approximately 13 miles from the Highway 205, 12 miles from South Diamond Lane, and 2 miles from Steens Mountain Loop Road.

The project would include between 40 and 69 wind turbine towers. Each tower would have a maximum hub height of 80 meters (262 feet) and maximum blade tip height of 121 meters (400 feet). In addition, the project would include four meteorological towers up to 50 meters (approximately 160 feet) tall, aboveground transmission lines, and an O&M building and a substation. The facility would occupy an approximately 14-acre footprint, not including access roads. The portion of the site that would be developed by this project is currently used for seasonal grazing of livestock/pasture.

The East Ridge Wind Project

In July 2008, East Ridge Wind, LLC, a wholly-owned subsidiary of Columbia Energy Partners LLC, applied for a conditional use permit from the Harney County Planning Commission for a 104 MW wind energy project known as the East Ridge Wind Project. East Ridge Wind, LLC formally withdrew the application in January 2009. Although the application was withdrawn and no application for the East Ridge Project is pending before Harney County or the Oregon Energy Facilities Siting Council, this Draft EIS used the proposed layout and environmental studies prepared for the project to determine the cumulative effects of this project together with the proposed action.

The East Ridge Wind Project would be developed on a 5,446-acre privately owned site located near Diamond, Oregon in southern Harney County (Figure 3.19-1). The land within the project site is owned by Otley Bros., Inc. and Kiger Ranch Inc. The site is located approximately 11 miles east of the junction of Highway 205 and

South Diamond Lane, Harney County, Oregon. The closest turbine would be approximately 18 miles from Highway 205 and 12 miles from South Diamond Lane.

Similar to the West Ridge Wind Project, the East Ridge Project would include between 40 and 69 wind turbine towers, each with a maximum hub height of 80 meters (262 feet) and maximum blade tip height of 121 meters (400 feet). In addition, the project would include four meteorological towers up to 50 meters (approximately 160 feet) tall, aboveground transmission lines, and O&M building and a substation. The facility would occupy an approximately 14 acre footprint, not including access roads. The portion of the property dedicated to the project contains land currently used for seasonal grazing of livestock/pasture.

Riddle Mountain Wind Farm

OS Harney, LCC, a subsidiary of Columbia Energy Partners (CEP), plans to develop a 104 megawatt (MW) wind power project on property owned by the State of Oregon in southern Harney County (Figure 3.19-1). The project would include between 40 and 69 wind turbine towers arrayed in multiple strings on two separate projects sites with a combined area of 5,120 acres. The state-owned property on both sites is currently used as summer pasture for cattle. CEP commenced environmental studies on the sites in the spring of 2009.

Five Creeks Rangeland Restoration

The Five Creeks Rangeland Restoration Project is a BLM land management program implemented in October 2006 to reduce hazardous fuels and restore and/or increase system functionality (i.e., capture and storage of water, soil nutrient retention) through the restoration of shrub-steppe, aspen, and riparian communities located within a 73,386-acre area located approximately 50 miles southeast of Burns, Oregon (Figure 3.19-1). Associated benefits of enhancing ecosystem functionality include improvement of sage-grouse, big game, and other Special Status and locally important species habitat, and improved forage for livestock, wild horses, and wildlife.

The project involves various forms of prescribed fire and mechanical treatments within the Project Area to accomplish the following objectives:

- Reintroduce fire to restore and/or maintain natural fire regimes.
- Reduce hazardous fuels within the Project Area, especially within previously treated juniper cuts.
- Move the species composition and structure of big sagebrush-bunchgrass, low sagebrush-bunchgrass, aspen and riparian communities toward pre Euro-American settlement conditions.
- Improve big game, sage-grouse, and other locally important species habitat within the Project Area.
- Increase wild horse and livestock forage.
- Improve watershed health.

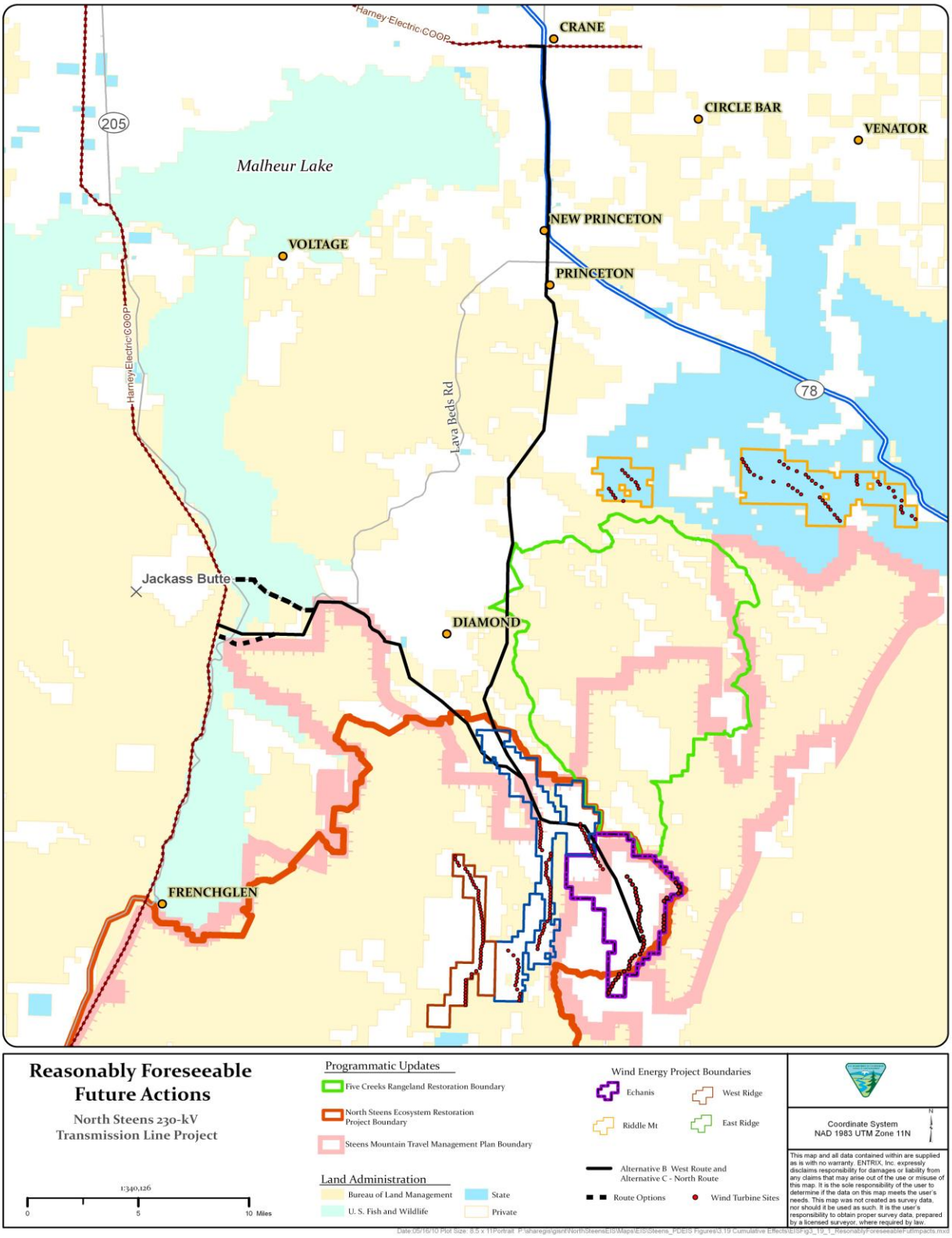

Figure 3.19-1 Reasonably foreseeable future actions

BLM plans to conduct selective juniper cutting of approximately 2,775 acres to help the prescribed fires planned for 2010 to move across the landscape in a mosaic pattern. Fourteen miles of stream treatments including removing juniper from riparian zones, and hand piling slash and clear cutting juniper on canyon sides (to be burned winter 2009). Management activities include treatment of 232 acres surrounding an active sage grouse lek. This treatment would cut and machine pile juniper to remove it from the site, and retain all existing sage brush. The Project Area includes 53,738 acres of public land and 19,648 acres of private land. Approximately 26,075 acres of the area lies in the north end of the Steens Mountain Cooperative Management and Protection Area (CMPA) and encompasses approximately 32,592 acres of the Riddle Mountain and Kiger Herd Management Areas/Areas of Critical Environmental Concern (ACECs). There are no Wilderness or Wilderness Study Areas (WSAs) within the Project Area. Approximately 70 percent of the Project Area has been encroached by juniper.

Steens Mountain Travel Management Plan

The BLM (Burns District Bureau) is actively implementing a Travel Management Plan (TMP) for the Steens Mountain CMPA. The TMP augments the CMPA Transportation Plan, which is part of the Steens Mountain CMPA RMP. The TMP is based on an updated route inventory used to further define the motor vehicle route network within the CMPA. The TMP also provides guidance on maintenance, improvement, and accessibility of these routes. The TMP identifies 555 miles of Base Routes that will remain open to public motorized use as Common Use Routes. Two short roads accessing private lands are no longer available for public travel. Obscure Routes are closed to public access. To carry out grazing permits, authorized permittees may use Permit Routes and Historical Routes within WSAs and on other non-wilderness public lands in the CMPA to the same manner and degree as occurring at passage of the FLPMA on October 21, 1976. Historical Routes can be used as long as their character does not change. Grazing permittees can use Permit and Historical Routes in wilderness for specific activities. Non-motorized trails remain available for hiking and equestrian uses.

North Steens Ecosystem Restoration Project

North Steens Ecosystem Restoration Project (North Steens Project) is a landscape-level project to reduce juniper-related fuel loading and improve ecological health of the area by encouraging a healthy functioning ecosystem through appropriate land uses. This is a multiyear project and each year the extent of implementation will vary depending on variables such as staff limitations, resource considerations, and climatic and operational conditions.

The proposed Project Area is located within the Andrews Resource Area (RA), primarily within the CMPA, and encompasses approximately 336,000 acres of private land and public land administered by the BLM. In 2008, work began on the North Steens Project with the cutting of approximately 1,300 acres of juniper in the Moon Hill Area to prepare for the first phase of prescribed burning. In 2009, BLM thinned juniper on 4,200 acres in the Moon Hill and Tombstone areas. In 2010, BLM expects to have contractors thin juniper on approximately 3,000 to 4,000 acres (based on access and funding) in the Tombstone area including some locations in South Steens Pasture. BLM has flagged the projects on the ground but, due to weather conditions, BLM does not expect to access the areas to implement the project until June (2010). Burning is scheduled to begin in 2011.

Jackass Butte Wind Energy Testing and Monitoring Site

The Jackass Butte Wind Energy Site is located on BLM land west of Highway 205 and southeast of Juniper Park Ranch in Harney County (Figure 3.19-1). Currently, the site has one met tower that is used for wind energy testing and monitoring. There are no plans to further develop this site into a wind farm. The site can be accessed via a Jeep trail that extends east from Forest Service Road 5241.

Harney Electric Cooperative 115-kV Line Upgrade

This project would be undertaken if the North Steens Transmission Line is developed to its full 230-kV capacity. The potential upgrades would apply to approximately 35 miles of the existing Harney Electric Cooperative (HEC) 115-kV line that parallels Highway 205, if Alternative B is selected, and to approximately 20 miles of the existing HEC 115-kV line between the Crane Substation and the BPA Harney Substation, if Alternative C is selected (Figure 3.19-1). If Alternative B – West Route is selected, the existing HEC 115-kV line would be upgraded by replacing existing wood poles with steel poles similar to those described for the North Steens 230-kV Transmission Line Project. The transmission line would be reconfigured to include a 115-kV circuit on one side and a 230-kV circuit on the other side. The 115-kV line would connect to the BPA 115-kV system and the 230-kV line would connect to the PacifiCorp line north of Burns. Currently no route has been identified for the possible extension of the 230-kV line to the PacificCorps line. If Alternative C – North Route is selected, the interconnection to the HEC 115-kV at the Crane Substation would require HEC to upgrade the 20-mile section of existing 115-kV line between the Crane Substation and the BPA Harney Substation. It should also be noted that if Alternative C is selected, HEC would need to upgrade the same 20-mile segment of line with a higher rated 115-kV conductor during Phase 1 to accommodate the additional electricity generated by the Echanis Project. Because most activities related to conductor upgrade would be temporary and would occur within existing HEC ROW, the conductor upgrade was not included as a separate reasonably foreseeable future action in the cumulative effects analysis.

3.19.2 Cumulative Effects Analysis

The Proposed Action and Action Alternatives, in combination with past, present, and reasonably foreseeable actions, could potentially result in cumulative impacts to the natural, physical, and socioeconomic resources described in Sections 3.1 through 3.18 of this Draft EIS. The following analysis describes these potential cumulative impacts, in the order that the resources are presented in Sections 3.1 through 3.18 of this Draft EIS.

3.19.2.1 Geology and Soils

Geographic Scope and Timeframe of Analysis

The Proposed Action, Action Alternatives, and the majority of the impacts of the Proposed Action and Action Alternatives would occur in the Donner und Blitzen Watershed, the Upper Malheur Watershed, and the Harney-Malheur Lakes Watershed. A lesser degree of impacts would occur in the Alvord Lake Watershed. These watersheds comprise the geographic scope of the cumulative effects analysis. The timeframe for the cumulative effects analysis of geology and soils is 40 years (the expected duration of the project).

Existing Geology and Soils and How they have been Affected by Past and Present Actions

Currently, environmental effects to soils (including biological soil crusts) and geology in the three watersheds are due to past and ongoing activities such as ongoing forest management, road maintenance, grazing, and natural events such as wildfires.

Effects of Reasonably Foreseeable Future Actions on Geology and Soils without the Proposed Action

Effects on geology and soils caused by reasonably foreseeable future actions such as the West Ridge Wind Project, the East Ridge Wind Project, and the Riddle Mountain Wind Farm would be similar in nature to

effects of the Proposed Action and Action Alternatives because these projects are similar in scope and in general, are located in a similar environment with similar soil and geology characteristics.

Effects caused by the Five Creeks Rangeland Restoration and North Steens Ecosystem Restoration Project, where prescribed burning is planned, would be different, yet no more substantial in magnitude than the Proposed Action for geology and soils, where soils are exposed following tree and vegetation removal. In *Five Creek Rangeland Restoration Project Environmental Assessment* (BLM, 2006), BLM concluded that "prescribed fire treatments are not expected to have a detrimental effect on soils" and that "prescribed fire deployment does not result in wide-scale compaction or displacement of soil. Surface erosion could slightly accelerate on burned slopes before the first growing season." Over time, however, surface soil erosion is expected to decrease due to increased vegetation cover (BLM, 2006).

Other reasonably foreseeable future actions were reviewed, such as the Steens Mountain Travel Management Plan, Jackass Butte Wind Energy Testing and Monitoring Site, and the Harney County Electric Cooperative 115-kV Line Upgrade. These actions are not expected to affect geology and soils, and therefore would not contribute to cumulative effects.

Cumulative Effects on Geology and Soils from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

In summary, permanent effects of the Proposed Action and Action Alternatives include seismic hazard risk to structures, including landslides triggered by potential seismic events, increased soil erosion caused by larger amounts of runoff due to additional impervious surfaces, and potential destruction of biological soil crusts BSCs (where present in the Project Area). Potential temporary effects during construction include (1) increased soil erosion due to construction activities, including the destruction of BSCs or clearing of vegetation, and (2) potential for hazardous material spills.

In general, the Proposed Action and all reasonably foreseeable future actions are well distributed among the three watersheds present in the region (the Donner Und Blitzen Watershed, the Upper Malhear Watershed, the Harney-Malheur Lakes Watershed) and to a lesser degree, the Alvord Lake Watershed. In theory, impacts to soils, including erosion, would only be cumulative within each individual watershed, since each watershed is essentially a separate drainage basin. The West Ridge Wind Project and the East Ridge Wind Project are both located in the Donner Und Blitzen Watershed. The Riddle Mountain Wind Farm is located in the Upper Malheur Watershed, Harney-Malheur Lakes Watershed, and Alvord Lake Watershed. The Steens Mountain Travel Management Plan is located in the Upper Malheur Watershed, Alvord Lake Watershed, and Donner Und Blitzen Watershed. Additionally, for the Five Creeks Rangeland Restoration and North Steens Ecosystem Restoration Projects, BLM stated that no more than 15 percent of any given watershed would be burned per year, further spreading the potential impacts throughout the various watersheds.

3.19.2.2 Water Resources (Surface and Groundwater) and Floodplains

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis of water resources consists of the watersheds of the proposed and foreseeable projects: the Donner und Blitzen, Upper Malheur, Harney-Malheur Lakes, and Alvord Lake Watersheds. The temporal scope of analysis is the 40 year life expectancy of the project features.

Existing Water Resources and How they have been Affected by Past and Present Actions

Past and ongoing uses that have affected and continue to affect water resources include irrigation, livestock grazing, and maintenance of roads. Grazing can result in increased sediment delivery to streams due to increased erosion after vegetation is removed or trampled. Irrigation can reduce water quality when return flows contain excess nutrients, pollutants or warmer temperatures.

Effects of Reasonably Foreseeable Future Actions on Water Resources without the Proposed Action

The West Ridge Wind Project and the East Ridge Wind Project are both located in the Donner und Blitzen Watershed. Although the East Ridge Wind Project does not directly cross any water bodies, its Project Area drains into Cucamonga, Kiger, and McCoy creeks. These three creeks are listed by the State of Oregon as impaired for nutrients and sediment under Section 303(d) of the Clean Water Act (See Section 3.2.2.4 Water Quality). The West Ridge Wind Project does not cross any water bodies directly, but its Project Area drains to McCoy, Big Bridge, and Krumbo creeks. Krumbo and McCoy Creeks are listed as impaired for sediment and nutrients by the State of Oregon.

The Riddle Mountain Wind Farm is located in the Upper Malheur Watershed, Harney-Malheur Lakes Watershed, and Alvord Lake Watershed. The Riddle Mountain Wind Farm drains to Standcliff, Buster, and Paul creeks. Paul Creek is listed as impaired by the State of Oregon for temperature.

The effects of the West Ridge Wind Project, the East Ridge Wind Project, and the Riddle Mountain Wind Farm would be similar to those described for the Echanis Wind Energy Project (Section 3.2.3.2). Temporary effects due to construction, including road building, would include increased run-off and sediment delivery to these streams due to cleared vegetation and surface disturbance. If the construction periods occur simultaneously, the creeks that would be affected by more than one project would be especially vulnerable to increased sedimentation. McCoy Creek would be crossed by the Proposed Action and drains the Project Areas for the West Ridge and East Ridge Wind Projects. Cucamonga and Kiger Creeks are crossed by the Proposed Action and drain the West Ridge Wind Project. Permanent effects to water resources would likely include a local reduction of infiltration from the placement of turbine towers.

The Five Creeks Rangeland Restoration and North Steens Ecosystem Restoration Projects overlap geographically with the North Steens Transmission Line Project Area. These three projects are located in the Donner und Blitzen, Harney-Malheur Lakes, Upper Malheur, and Alvord watersheds. Although the elimination of vegetation after controlled burns and juniper removal could temporarily increase sediment delivery to streams before native vegetation can become established, neither project would burn more than 15 percent of any watershed per year. In addition, burns would occur when conditions would reduce the possibility of riparian vegetation loss (BLM, 2007). The Five Creeks Rangeland Restoration and North Steens Ecosystem Restoration Projects would increase vegetation cover in the long run, which is expected to improve water resources.

The Steens Mountain Travel Management Plan is located in the Upper Malheur Watershed, Alvord Lake Watershed, and Donner und Blitzen Watershed. The Steens Mountain Travel Management Plan, Jackass Butte Wind Energy Testing and Monitoring Site, and the Harney County Electric Cooperative 115-kV Line Upgrade would likely have minimal effects to water resources since they do not require construction of any additional facilities.

The effects to water resources of the reasonably foreseeable future actions would likely be similar to those described for the Proposed Action and Action Alternatives. Local loss of groundwater infiltration would occur at impervious surfaces, and construction or improvement of roads may increase sediment delivery to

streams. If reasonably foreseeable future actions use existing access roads, permanent effects would occur only locally.

Cumulative Effects on Water Resources from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Alternative B, the Alternative B route options, and Alternative C occur primarily in the Donner und Blitzen watershed, along with limited portions of the Upper Malheur, Harney-Malheur Lakes, and Alvord Lake watersheds. In summary, permanent effects to water resources due to the Proposed Action and Action Alternatives include increased runoff due to additional impervious surface, resulting in greater flooding or erosion. Potential temporary effects due to construction include (1) increased sediment delivery to streams due to increased erosion from clearing of vegetation, and (2) potential for hazardous material spills.

Cumulative effects to water resources related to Alternative B, the Alternative B route options, and Alternative C in combination with the effects of the West Ridge, East Ridge, and Riddle Creek wind projects would be distributed throughout the watersheds: the Donner und Blitzen, Upper Malheur, Harney-Malheur Lakes, and Alvord Lake. The greatest effects would occur in the Donner und Blitzen watershed, particularly in McCoy Creek, Cucamonga Creek, and Kiger Creek. Although the Five Creeks Rangeland Restoration and North Steens Ecosystem Restoration Projects would also occur within the affected watersheds, both restoration projects would include activities that would result in long-term improvement to watershed ecology and water resources.

3.19.2.3 Vegetation, Noxious Weeds, and Special Status Plants

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for vegetation, noxious weeds, and special status plants was limited to the full extent of the Echanis Project Site and the transmission line alternative right of ways. No direct or indirect effects due to the Proposed Action or Action Alternatives to vegetation, noxious weeds, or special status plants are expected to occur outside of this area.

The timeframe of the analysis extends from the historical past when Euro American settlers began to alter vegetation in the vicinity of the Project by actions such as mining, farming, cattle ranching, and sheep grazing, and extends into the future to include the 40 year operational life of the Echanis Wind Energy Project and the North Steens Transmission Line Project.

Existing Vegetation, Noxious Weeds, and Special Status Plants and How they have been Affected by Past and Present Actions

Vegetation at the Echanis Project Area and along Alternatives B and C (including route options) is primarily big sagebrush steppe, grassland, or juniper woodland, with smaller areas of other vegetation types. Many exotic (non-native) plant species are found within the Project Area. The Exotic Annual Grassland community within the Project Area is dominated by exotic grass species that are common in similar grasslands in lower-elevation eastern Oregon. Exotic weed species occur in other vegetation communities, too, particularly cheatgrass and knapweeds. No federally or state-listed plant species have been found in the surveys that have been conducted to date, but some transmission line alternatives have not yet been surveyed. Two ORNHIC List 3 species were reported in surveys along Alternative B.

Past actions that have affected natural and human resources in the Project Area include hunting and gathering by aboriginal peoples; trapping, mining, farming, cattle ranching, and sheep grazing by early Euro American

settlers; and wildfire and prescribed fire. Small towns and hamlets have also become established in the Project Area, along with a system of state highways and county roads, and a network of BLM, USFWS, and private access roads.

Vegetation in the area is currently subject to the effects of agricultural practices, particularly cattle grazing. In addition, exotic annual grasses and other weed species have been introduced to the region by agriculture and development. Other current actions also include on-going elements of the Five Creeks Rangeland Restoration Project, the Steens Mountain Travel Management Plan, the North Steens Ecosystem Restoration Project, and the Jackass Butte Wind Energy Testing and Monitoring Site.

The Five Creeks Rangeland Restoration Project involves prescribed fire and mechanical treatments within the Project Area to restore or maintain natural fire regimes and to move the species composition and structure of big sagebrush-bunchgrass, low sagebrush-bunchgrass, aspen and riparian communities toward pre Euro-American settlement conditions. This project is intended to result in a reduction in juniper encroachment and an enhancement of other native vegetation types. The North Steens Ecosystem Restoration Project is also intended to result in a reduction in juniper encroachment and an enhancement of other native vegetation types.

The Steens Mountain Travel Management Plan identified 555 miles as Base Routes open to public motorized use and authorized permittees use of Permit Routes and Historical Routes in the same manner and degree as was occurring at passage of the FLPMA. Subsequent to the Decision Record for the TMP, obscure routes were closed to the public for motorized travel. Non-motorized trails remain available for hiking and equestrian uses. Continued use and maintenance of these routes could result in the spread of noxious weeds. The Jackass Butte Wind Energy Site is has one met tower which is used for wind energy testing and monitoring. There are no plans to further develop this site into a wind farm, and no extensive impacts on botanical resources are expected.

Effects of Reasonably Foreseeable Future Actions on Vegetation, Noxious Weeds, and Special Status Plants without the Proposed Action

Reasonably foreseeable future actions near the Project Area include the West Ridge Wind Project, East Ridge Wind Project, Riddle Mountain Wind Farm, the Harney Electric Cooperative 115-kV Line Upgrade Project, and on-going elements of the Five Creeks Rangeland Restoration Project, the Steens Mountain Travel Management Plan, and the Steens North Steens Ecosystem Restoration Project. Most effects on vegetation, noxious weeds, and special status plants would likely be related to road building and maintenance.

Plant surveys at the proposed West Ridge Wind Project site located two ORNHIC-tracked plants. These included a small population of abruptbeak sedge (*Carex abrupta*), an ORNHIC List 2 species. Also documented was sticky Indian paintbrush (*Castilleja viscidula*), which was found throughout the high-elevation (southern) half of the survey area. This species is an ORNHIC List 3 species.

Plant surveys at the proposed East Ridge Wind Project site located an extensive population of sticky Indian paintbrush (*Castilleja viscidula*), a Steen's Mountain endemic and an ORNHIC List 3 species. This plant was found throughout the high-elevation (southernmost) portion of the survey area. Also documented was a small population of Davidson's penstemon (*Penstemon davidsonii* var. *praeteritus*), an ORNHIC List 4 species, was also located at this site.

The Riddle Mountain Wind Farm facility is located on state-owned property currently used as summer pasture for cattle. Effects due to the Harney Electric Cooperative 115-kV Line Upgrade Project would occur within the existing Harney Electric Cooperative ROW. The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project, discussed above, would continue into the future and are expected to result in (1) healthier plant communities that would minimize the potential for the spread of noxious weeds, and (2) positive effects on special-status plant populations from a reduction in juniper

encroachment. The Steens Mountain Travel Management Plan would also continue into the future – continued use and maintenance of these routes could result in the spread of noxious weeds.

Cumulative Effects on Vegetation, Noxious Weeds, and Special Status Plants from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Effects due to the Proposed Action and Action Alternatives include the following:

- Permanent loss or alteration of from 118 to 138 acres of vegetation and agricultural lands from construction of project facilities, new access roads, and string roads and improvement of existing access roads (mitigation measures included);
- Temporary loss or trampling of from 87 to 119 acres of vegetation and agricultural lands during project construction;
- Spread of noxious weeds (mitigation measures included); and
- Noxious weed control (mitigation measures included).

If it is assumed that the West Ridge, East Ridge, and Riddle Mountain wind energy projects would have permanent and temporary effects on native vegetation during construction and operation similar to those anticipated for the Echanis Project, the combined effect of all four projects could potentially permanently displace or alter between 472 to 552 acres of native vegetation and agricultural land (mitigation measures included) and temporarily trample or damage between 348 to 476 acres of native vegetation and agricultural land during project construction.

However, present and reasonably foreseeable effects in this region also include two large restoration projects, the Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project, which will result in the long-term improvement of thousands of acres of native vegetation. In addition, the Steens Mountain Travel Management Plan would protect existing native vegetation by limiting motor vehicle use to designated routes and ensuring that rancher use of Historical Routes does not change the character of those roads.

Exotic plant species, including noxious weeds, have spread into Harney County. The development of additional wind energy projects in the area could increase the spread of noxious weeds and effects from herbicide application. Continued use of roads managed under the Steens Mountain Travel Management Plan would continue the potential for the spread of noxious weeds. However, in implementing the plan BLM would continuing noxious weed control and weed surveys on designated routes to minimize the potential spread of noxious weeds. Through the development of new access roads and facility maintenance, development of the Proposed Action and Action Alternatives would contribute incrementally, although in a relatively negligible way, to these cumulative effects. The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project are expected to result in healthier plant communities that would minimize the potential for the spread of noxious weeds.

Development of other wind energy projects in the area could also affect populations of special-status plant species. While no federally or state-listed plant species or plants designated as sensitive by BLM have been reported from currently-surveyed lands for the Proposed Action and Action Alternatives, there is potential for such species to occur on other lands in the area. However, it is expected that any populations of special-status plant species found in the area of the Proposed Action and Action Alternatives could mostly be avoided by adjustments in pole placement and project routes. Therefore, the Proposed Action and Action Alternatives would not contribute to this cumulative impact, or would contribute incrementally only in a negligible way to this cumulative impact. The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem

Restoration Project would not result in detrimental effects to special-status plant populations and include beneficial effects from the reduction in juniper encroachment.

3.19.2.4 Wetlands and Riparian

Geographic Scope and Timeframe of Analysis

The geographic scope of this cumulative effects analysis include three watersheds: the Donner und Blitzen Watershed, the Upper Malheur Watershed, and the Harney-Malheur Lakes Watershed. Most of the effects on wetland and riparian areas from the Proposed Action and Action Alternatives would occur in the Donner und Blitzen Watershed; however, the Alternative C transmission line route would also affect wetland and riparian areas in the Upper Malheur Watershed and the Harney-Malheur Lakes Watershed.

The timeframe of the analysis extends from the historical past when Euro American settlers began to alter the landscape by actions such as mining, farming, cattle ranching, and sheep grazing, and extends into the future to include the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Wetlands and Riparian Resources and How they have been Affected by Past and Present Actions

The climate in the general area of the project is arid with vegetation typical of the steppe, shrub-steppe, and desert shrub zones of the Basin and Range Province. Wetlands are generally confined to drainage depressions and seeps. Drainages with sufficient water during the year typically have an associated riparian community.

Incremental losses and degradation of wetlands over time have cumulatively depleted wetland resources in the United States. In the Project Area, wetlands were likely previously impacted by construction of existing roads and transmission lines, placement of structures in wetlands, and agricultural activities including grazing.

Currently, environmental effects to wetlands and riparian areas are created due to wetland cut and fill from construction activities, as well as impairment by sedimentation from runoff and erosion. Nationally, impacts to wetlands are subject to existing regulations governing wetland cut and fill promulgated in Section 404 of the Clean Water Act and regulated by the Army Corps of Engineers. Compliance with existing regulations requires that the applicant avoid, minimize and compensate for any wetland losses, reducing present and future wetland impacts in the affected watersheds. Much of the area is currently used for grazing; current grazing practices are designed to reduce impacts to riparian and wetland functions.

Effects of Reasonably Foreseeable Future Actions on Wetlands and Riparian Resources without the Proposed Action

Effects caused by reasonably foreseeable future actions such as the East Ridge Wind Project, the West Ridge Wind Project, and the Riddle Mountain Wind Farm would be similar in nature since these projects are similar in scope and located in ecologically similar areas with similar wetland and riparian characteristics. Effects of these projects would be reduced by siting roads and towers to avoid wetland and riparian areas. For these projects, general corridors would be established through “macrositing,” which would include an optimal configuration to avoid impact to wildlife habitat (including riparian and wetland areas); later, the optimal configuration of the proposed facility would be developed during “micrositing.” Effects caused by wind farm projects in general would include temporary effects from construction activities, indirect effects from aerial transmission lines, and direct effects from road building and placement of structures in wetland or riparian areas.

Effects caused by the Five Creeks Rangeland Restoration Project (BLM, 2006) and North Steens Ecosystem Restoration Project (BLM, 2007a), where prescribed burning is planned, would be similar. These projects would use fire to control juniper encroachment. A goal of the Five Creeks Rangeland Restoration Project (Donner und Blitzen, Harney-Malheur Lakes, Upper Malheur, and Alvord watersheds) is to "maintain, restore, or improve riparian vegetation, habitat diversity, and geomorphic stability to achieve healthy, productive riparian areas and wetlands and associated structure, function, process and process that provide public land values…" (BLM, 2006) Management strategies affecting wetlands and riparian areas be targeted only to such areas showing juniper encroachment, and treatments would be implemented with the intention of avoiding impacts to streams and wetlands (BLM, 2006). Juniper encroachment in riparian areas creates decreased riparian species diversity, and reduces the functional value of riparian areas. Thus, implantation of these actions is likely to improve riparian habitat and function. BLM describes ways riparian areas would be protected during implementation, including "Prescribed burns would be initiated when conditions are conducive to lower intensity burns, which would reduce the potential of losing desired riparian vegetation. Riparian areas with high fuel loading that have the potential to burn very hot would be pretreated by manual reduction to reduce fuel loads. Juniper in riparian areas which are not burned would be cut and burned individually to reduce potential for impacts to riparian habitat quality" (BLM 2006).

Other reasonably foreseeable future actions such as the Steens Mountain Travel Management Plan (BLM, 2007b), Jackass Butte Wind Energy Testing and Monitoring Site, and the Harney County Electric Cooperative 115-kV Line Upgrade are expected to have minimal effects to wetland and riparian resources.

Cumulative Effects on Wetlands and Riparian Resources from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The additional impacts to wetland and riparian resources created by the Proposed Action and Action Alternatives would be minimal, and would be mitigated by actions described in Section 3.4 of this document. Along with the other reasonably foreseeable future actions described above (which also contain minimal effects to wetland and riparian resources), the cumulative effects to these resources would be less than significant. The restoration plans could benefit riparian resources in the future. Therefore, the Proposed Action and Action Alternatives are not expected to significantly contribute to cumulative impacts to wetlands or riparian areas.

3.19.2.5 Fish, Wildlife, and Special Status Animals

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for fish, wildlife, and special status animals extends beyond the Project Area defined for the analysis of direct effects and encompasses the broader geographic region surrounding the Project Area, including the Donner und Blitzen and Harney-Malheur Lake watersheds. The area extends from the upper slopes of Steens Mountain on the south and east, to Jackass Mountain on the west, Malheur Lake and the community of Crane on the north, and extensive state-owned rangelands on the east. The timeframe of the analysis extends from the historical past when Euro American settlers began to alter the landscape by actions such as mining, farming, cattle ranching, and sheep grazing, and extends into the future to include the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Fish, Wildlife, and Special Status Animals and How they have been Affected by Past and Present Actions

The analysis area for cumulative effects includes several distinct ecoregions including High Desert Wetlands found in the MNWR; High Lava Plains vegetated by sagebrush and grasslands; Semiarid Uplands noted for the presence of juniper woodlands; and Partly Forested Mountains that are nearly treeless, except for scattered groves of aspens. Lands within the analysis area are presently, and have been historically used for agriculture and cattle grazing.

Wildlife species present within the area are habitat dependent and are associated with vegetation communities for their food, shelter, courtship and breeding, and development of young. Many species are migratory and change habitat use, or go to similar habitats in different areas, throughout the year. Some species are present within the area during certain seasons, while other species are year-round residents.

Perennial creeks, some with known fisheries flow to Harney and Malheur Lake within the Oregon closed basin, including: Kiger, Cucamonga, McCoy, Booners, Mud, Riddle, and Swamp Creeks. Lower elevation habitat (4,100 – 4,500 feet) is located on relatively flat to rolling terrain near and across the Malheur National Wildlife Refuge (MNWR) where rivers, meadows, wetlands, uplands, and agricultural lands are present. Grasslands and sagebrush are present from approximately 4,500 feet to about 7,500 feet elevation. Juniper woodlands begin at approximately 4,900 feet and are found as high as approximately 7,000 feet. Riparian areas are present along area creeks where some wetlands also are present. Talus slopes are found where steep, eroding mountainsides are present at the upper extent of the area (above 6,500 feet elevation).

General wildlife present within the area include reptiles, amphibians, mammals, raptors, waterfowl and shorebirds, and a variety of other birds. Badgers, black-tailed jackrabbits, and sagebrush voles are found in grasslands and sagebrush habitats, while golden-mantled ground squirrels and yellow-bellied marmots are associated with talus slopes and rocky areas. Coyotes, porcupines, raccoons, and striped skunks are habitat generalists that forage throughout the various vegetative areas. Other mammal species common to the area include cottontail, Belding's ground squirrel, woodrats, deer mice, and chipmunks. Big game species include mule deer, elk, pronghorn antelope, bighorn sheep, and mountain lion.

The area is within the known range of fourteen species of bats, including big brown bat, hoary bat, silver-haired bat, small-footed myotis, long-eared myotis, little brown bat, and long-legged myotis. Bats are insectivorous and nocturnal and forage over grassland, sagebrush, riparian, and juniper forested areas at all elevations. Some of the species are only present in the area during spring or fall migration (hoary bat, silver-haired bat, and possibly little brown bat), while the other species could be present year-round.

Raptor species are also common in the area primarily in the open habitats, although accipiters (i.e., hawks typically having short rounded wings and a long tail) are present in riparian areas, aspen stands, and juniper woodlands. Ferruginous hawks nest in sagebrush habitats, while other hawks, eagles, and falcons build nests in trees, on cliff faces, or in cavities in cliffs. Bald eagles are known to migrate through the area, and have wintered around Malheur Lake, but are not known to spend the breeding season in or near the area. Golden eagles have been reported in the vicinity during the breeding season.

A number of Endangered, Threatened, Candidate, and Proposed Animal Species also occur in the area, including the greater sage-grouse. In Oregon, sage grouse were historically found in most sagebrush habitats east of the Cascade Mountains, but through European settlement and conversion of sagebrush steppe to agricultural production the species was extirpated from the northern portion of its range in the state. Sage grouse use different sagebrush and riparian habitats throughout the year for courtship (lekking), nesting, brood rearing, and wintering, and rely on suitable habitat during each part of the year for their persistence. Sagebrush steppe habitat is present in a mosaic throughout the area, primarily with grasslands, agricultural areas, and juniper woodlands.

Thirteen special status mammal species may also be found within the area. Special status species include State of Oregon listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and USFWS Animal Species of Concern. These include ten special status bat species, Pygmy rabbit, Preble's shrew, and wolverine. Twenty special status bird species could be present within the area and three special status fish species are known to be present within the area. The northern sagebrush lizard and Columbia spotted frog may also be present in the area.

Effects of Reasonably Foreseeable Future Actions on Fish, Wildlife, and Special Status Animals without the Proposed Action

The three other wind energy projects planned for the region would be similar in size and scope to the Echanis Project, and would occupy similar topography with similar habitat types. Consistent with the general conditions throughout the analysis area, large portions of all three sites are comprised of big sagebrush steppe that is also used for seasonal grazing. The West Ridge and East Ridge sites include areas of juniper woodland, aspen woodland, riparian shrub woodland, and patches of native grassland. Development of wind energy projects on these sites would permanently convert portions of this habitat to facility use, increase habitat fragmentation, and directly displace individual animals from developed areas. Construction of new transmission lines from each wind energy site to the regional grid, construction of new access roads to each site, and construction of new on-site access roads (i.e., string roads), would also result in permanent loss of vegetative cover and further fragment habitat in the area, thereby reducing the size of contiguous sagebrush, juniper, and riparian habitats where new or improved roads divide contiguous cover. The specific locations of new transmission lines and access roads are not known at this time but would likely pass through similar habitats supporting most of the same species of wildlife documented for the Echanis site, and may cross areas with species not found within the Echanis Project area.

Permanent project features at these three sites would directly and indirectly reduce the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species. Noise and human activity associated with operations at each site would displace individuals throughout the year, and during the spring maintenance vehicles could disrupt breeding of some species. Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use on each site.

Operation of the wind turbines would cause mortality to bird species. Raptor species vary in their susceptibility to collision with wind turbines, but red-tailed hawks, American kestrels, and golden eagles are species commonly found during post-construction mortality studies in areas where these raptor species are present. Most bird mortality would likely involve common species of perching birds and songbirds.

These projects overlap elk winter range, bighorn sheep habitat, pronghorn antelope range, and mule deer winter range. Development on the three wind energy project sites would reduce the availability of forage for these big game species. Permanent loss of mule deer winter range, elk winter range, pronghorn antelope range, and bighorn sheep habitat would likely represent only a small fraction of the existing range and habitat for these species within their respective game management units.

Effects on special status species could include possible displacement of wolverines from areas affected by project operations or regular maintenance activities. The risk of mortality to special status bat species, particularly the silver-haired bat and hoary bat, would increase in the vicinity of all operating wind turbines. Greater sage-grouse would be displaced from their summer and winter habitats in the wind development and access road areas during maintenance activities, and would greatly reduce their time spent near access roads, string roads, and wind turbines. The seasonal habitats (wintering, brood rearing, late summer) of sage grouse in the areas of the proposed wind energy project have not been mapped, so estimates for acres of these habitats are not available.

Special status raptor species include bald eagle, golden eagle, northern goshawk, ferruginous hawk, and western burrowing owl. If suitable habitat for these species exists on the proposed wind energy project sites, these species could affected during construction and operation, including ongoing use of access roads. Northern goshawks prefer forested areas and aspen stands that are larger and more densely spaced than found at the three wind energy sites, so are not likely to be present except during spring or fall migrations. Ferruginous hawks are associated with rolling grassland and sagebrush habitats without the steep slopes or juniper forests, so are unlikely to be present in the area except during migrations. Bald eagle are sometimes present in the fall during its southern migration, but the bald eagles' preference for sites near water would make it likely to occur in the immediate area. Golden eagles have been observed in the area, but typically over canyons and away from ridges where turbines would be proposed. Golden eagles have been killed at other wind developments, although the incidence of fatalities is very low.

The anticipated effects on special status birds is expected to be low because these species spend the majority of the time within the vegetative canopy of forested areas and at flight levels below the rotor-swept area. During spring or fall migration these species may be at greater risk of collision with turbines. Mountain quail effects are unstudied, so it is unclear how wind developments would affect this species. Northern sagebrush lizard would be vulnerable to crushing by vehicles from maintenance operations where access roads traverse sagebrush habitat.

The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project would have a beneficial effect on wildlife by controlling and reducing the encroachment of western juniper on both public and private lands in the area. The long term effect of these two projects would be to increase wildlife habitat and species diversity. Use of prescribed fire and/or mechanical cutting would regenerate grasses and forbs, and herbaceous plants including sagebrush and bitterbrush. As these species regenerate, bird diversity and richness would likely increase. Pronghorn antelope, mule deer, and elk would also benefit from the cutting and burning of dense stands of juniper which would convert to grasslands for several years after treatment. The protection and enhancement of mountain mahogany and aspen stands would also benefit many other wildlife species.

The two restoration projects would also have beneficial effects to sage-grouse habitat. The majority of mountain big sagebrush sites within the area are in mid- to late-transition to juniper, which does not offer quality sage-grouse habitat. Prescribed fire and juniper cutting would remove most of the encroaching juniper from these plant communities. Mechanical treatments would immediately benefit sage-grouse and their habitat. This treatment would remove predatory raptor and raven perches while maintaining and invigorating the herbaceous understory. All habitat components for sage-grouse would be improved as a result of the mechanical treatments, especially nesting habitat in big sagebrush communities and brood rearing in low sagebrush communities.

The motor vehicle route network within the Steens Mountain CMPA defined by the Steens Mountain Travel Management Plan (TMP) would have a minimal effect on wildlife because most roads (Historic Routes, wilderness Permit Routes, and grazing administration routes) would be used for brief durations during the year and traveled only a few times. Because of seasonal closures of Steens Loop Road (approximately November 15 to May 15) and most surrounding secondary and primitive roads, the overall effect to wildlife would not be detectable. Although roads are present, without traffic there is no disturbance to wildlife. Any access road improvements across public land within the Steens Mountain CMPA, including access roads to the West Ridge or East Ridge projects, would be subject to the restrictions on new facilities in the Steens Act, the TMP, and the RMP

According to the TMP, elk would avoid main and secondary roads more than primitive roads. Most road miles in the CMPA are primitive roads so habitat use near primitive roads would continue to occur until vehicle use increases late in the summer. Elk would then move to areas with less vehicle traffic, such as the unroaded areas in the Kiger Gorge, Steens Mountain Wilderness, as well as private lands. Once traffic has

decreased, usually by November 15, elk move into areas used prior to hunting season. With seasonal closures, approximately November 15 to May 15 each year, there is no disturbance from traffic in winter ranges for elk.

Mule deer and pronghorn antelope would not necessarily avoid roads on public lands depending on amount of vehicle traffic, vegetation and topographic screening. Deer can be seen at different times of the year near roads and may not leave the area until disturbed. Deer would move out of areas once hunting seasons start and foot traffic increases near roads. Antelope, if close to roads, will usually run but often not far. Antelope will move farther from roads during hunting seasons.

Effects on greater sage-grouse are expected to be nonexistent most of the year. Most breeding and nesting areas are protected by seasonal road closures. Most nesting areas would still be protected since no off-road use is allowed within the CMPA. Brood rearing areas might be affected where roads are near wet meadow areas but would depend on amount of use the road received. Sage-grouse would move away from disturbance but would return to the area once disturbance has ceased.

Wolverine would not be affected by implementation of the TMP since there are no new roads proposed in areas of suitable wolverine habitat or expected increases in vehicle traffic in those areas. Cougars would be affected as traffic increases and would move to more remote areas but could be attracted to areas nearer main roads if prey is present. Cougar populations should not be affected since no new roads are proposed in habitats where cougars bear and raise young. Overall effects to small mammals, migratory birds, reptiles, and amphibians would not be noticeable.

The Jackass Butte Wind Energy Site Testing and Monitoring Site would have little if any effect on wildlife.

If the North Steens 230-kV Transmission Line Project is developed to its full 230-kV capacity, upgrades would need to be made to the existing HEC 115-kV line that parallels Highway 205 (if Alternative B is selected) or to the existing HEC 115-kV line that runs east/west through the community of Crane (if Alternative C is selected). The existing HEC transmission line would be upgraded by replacing existing wood poles with steel poles similar to those described for the North Steens 230-kV Transmission Line Project. All anticipated improvements would occur within existing HEC ROW. Because most improvements and construction activities would occur in areas already disturbed by the existing transmission line and frequented periodically by HEC personnel inspecting the line, the potential effect to wildlife during the construction period would be to cause wildlife to avoid areas of construction while humans are present.

Cumulative Effects on Fish, Wildlife, and Special Status Animals from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Incremental cumulative effects on fish, general wildlife species, big game species, and special status species would result from construction and operation of the transmission line, the Echanis Wind Energy Project, three additional wind developments, and all associated components. Environmental effects would be both permanent (long-term operational effects) and temporary (associated with Project construction). Incremental cumulative effects include habitat loss due to displacement from various permanent project features, such as transmission line poles, access roads, and wind turbine towers. Temporary effects include vegetation damage or reduced water quality due to heavy equipment operation or the transport and storage of construction materials.

ECHANIS PROJECT SITE

Consistent with the general conditions throughout the analysis area, the potential wind development sites are comprised of big sagebrush steppe intermixed with areas of juniper woodland, aspen woodland, and patches of native grassland; much of the site is used for seasonal grazing. Approximately 400 acres of land would be

permanently converted to facility use, including sagebrush habitat, aspen woodlands, riparian habitat, and juniper woodlands, if the additional three projects required the same footprint as Echanis. The loss of habitat from construction of permanent facilities would increase habitat fragmentation and directly displace individuals from developed areas and a buffer around these areas. Construction and improvement of the main access road to the Echanis site and access to other wind developments would cause loss of wildlife habitat.

Permanent project features would directly and indirectly reduce the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species. Noise and human activity associated with operations would displace individuals throughout the year, and during the spring maintenance vehicles could disrupt breeding of some species. Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use on the site.

Operation of the wind turbines would cause mortality to bird and bat species. Certain bat species would be particularly vulnerable because they hunt at altitudes within the rotor-swept area, and could either collide with blades or experience barotrauma from flying very close to the blades. Raptor species, including red-tailed hawks, American kestrels, and golden eagles may be susceptibility to collision with turbine blades if present in the Project Area. Most bird mortality would likely involve common species of perching birds and songbirds.

The four wind development projects overlap elk winter range, bighorn sheep habitat, pronghorn antelope range, and mule deer winter range. Development on the project sites would reduce the availability of forage for these big game species. Permanent loss of mule deer winter range, elk winter range, pronghorn antelope range, and bighorn sheep habitat would represent a small portion of the existing range and habitat for these species within their respective game management units.

Effects on special status species could include possible displacement of wolverines from areas affected by project operations or regular maintenance activities. The risk of mortality to special status bat species, including the silver-haired bat and hoary bat, would increase in the vicinity of all operating wind turbines. Greater sage-grouse would be displaced from their summer and winter habitats in the area during maintenance activities, and would reduce their time spent near access roads, string roads, and wind turbines. The seasonal habitats (wintering, brood rearing, late summer) of sage grouse in the areas of the proposed wind energy project have not been mapped, so estimates for acres of these habitats is not available.

Effects on Preble's shrew would be limited to possible crushing by equipment in areas of construction.

If suitable habitat for special status raptor species such as bald eagle, golden eagle, northern goshawk, ferruginous hawk, and western burrowing owl are present in the project areas, these species could be affected during construction and operation, including ongoing use of access roads.

The anticipated effects on special status birds is expected to be low because these species are likely to spend the majority of the time within the vegetative canopy of forested areas and at flight levels below the rotor-swept area. During spring or fall migration these species may be at greater risk of collision with turbines. Mountain quail effects are unstudied, so it is unclear how wind developments would affect this species.

Northern sagebrush lizard would be vulnerable to crushing by vehicles from maintenance operations where access roads traverse sagebrush habitat.

In order to compensate for the potential loss of habitat on the Echanis site and along the main access road, Echanis, LLC would implement a Habitat Mitigation Plan, under which it would mitigate the habitat impacts from the Project through the use of conservation easements and other offset mechanisms, consistent with guidelines issued by the Oregon Department of Fish and Wildlife. Echanis, LLC has committed to implementing a 2:1 mitigation ratio for Category 2 habitat that is lost. Echanis, LLC would also implement a Wildlife Monitoring and Mitigation Plan, under which it, together with the recommendations of a Technical

Advisory Committee (TAC) comprised of representatives from state and federal agencies and environmental organizations, would monitor wildlife impacts (through post-construction mortality monitoring) and implement additional mitigation measures if impacts exceeded threshold levels identified in the plan. Echanis, LLC would consult with the FWS regarding all pre-construction studies and mitigation measures, to ensure compliance with MBTA and BGEPA. Project area habitat would be categorized in accordance with ODFW's Habitat Mitigation Policy (OAR 635.415) in order to determine appropriate conservation measures to compensate for lost habitat availability to wildlife, and in particular, greater sage-grouse, as developed by a TAC which would proposed a methodology for determining the effect on grouse and other wildlife, and a procedure for setting appropriate mitigation. It can be assumed that other wind energy projects proposed in the analysis area, including West Ridge, East Ridge, and Riddle Mountain would implement similar measures to offset habitat loss.

TRANSMISSION LINE ALTERNATIVES

The transmission line alternatives for Echanis would cross perennial fish bearing streams, including Kiger Creek, Cucamonga Creek, McCoy Creek, and the Donner und Blitzen River (Alternative B, including route options); and Kiger, Swamp, and Riddle Creeks (Alternative C). The transmission lines would not permanently effect fish resources in these rivers and streams because no project features, including transmission line poles, access roads, or the interconnection station would be located in or adjacent to these water bodies. Transmission line poles would be placed approximately 600 to 1,000 feet apart, allowing pole placement to completely avoid fish bearing rivers and streams. Additional transmission lines may be required for the additional wind developments.

Both transmission line alternatives (including route options) would have permanent effects on wildlife from construction and operation of the transmission line, interconnection substation, and access roads. All alternatives would affect habitat, general wildlife, big game, and special status species. The types of habitat permanently lost from construction include: sagebrush habitat, grasslands, juniper woodlands, agricultural lands, wetlands, and developed lands as described in Fish, Wildlife, and Special Status Animal Species section, above. Overland travel roads would affect sagebrush habitat, grassland, and juniper woodlands. New access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats. While no large (thousands of acres) undissected tracts of sagebrush or grassland habitat exists in the Project area, the addition of new roads would provide new access for recreational use, access to livestock grazing grounds, and limit use by some species (some sagebrush obligate birds) that avoid breaks in sagebrush habitats.

The transmission line alternatives would have a small permanent footprint on the ground, affecting primarily grassland and sagebrush habitat used by big game (discussed below), small and medium mammals, reptiles, and birds. Displacement of these habitats by permanent project features would affect these species year-round. Noise and human activity associated with maintenance activities would occur several times each year between spring snowmelt and the summer fire season. Maintenance activities could disrupt breeding of some species. Less mobile or burrowing non-game species would be susceptible to mortality from maintenance vehicles traveling overland through these affected habitats. The transmission poles would serve as perch sites for raptor species, which could prey on smaller birds, mammals, and reptiles.

Birds would be the group of animals most at-risk to injury and mortality from the transmission line, because they are susceptible to collision. Raptors are known to occur along the entire length of Alternative B, while waterfowl and shorebirds would be affected in and near the Malheur NWR. Post-construction monitoring and reporting would be undertaken to determine the effect of the transmission line on birds and to develop mitigation measures.

The transmission line ROW for both Alternatives B (including route options) and C would cross elk winter habitat, mule deer winter range, and antelope winter habitat. Access roads would be widened and built through mule deer winter range. Overland travel would occur through mule deer winter range, antelope

range, and elk winter range. The transmission line would not require vegetative control in any of the antelope range, but in the elk and mule deer winter ranges the junipers and aspens would be periodically cut to control their height within the ROW. Tree removal would be limited to the 150-foot ROW, which would be maintained in an herbaceous or shrub-steppe vegetation state. The existing mosaic of grassland, sagebrush, and juniper habitats in the winter ranges would be permanently altered by vegetation management within the ROW, but the removal of trees is not expected to limit winter range quality. The presence of grassland and sagebrush habitat in winter range is a benefit to big game for forage, and the limited removal of woodland habitat would cause only a negligible loss of cover. Maintenance vehicles traveling along access roads and overland to the transmission line would increase disturbance to big game species. If inspection or maintenance were to occur during winter the additional activity could elevate stress for animals in or near the transmission line corridor at a time when they have a high need to conserve energy. If big game are observed in the Project area from December through March and are displaced by operational activity, then the Project operator would consult with the BLM and ODFW regarding the need for mitigation.

The permanent effects of Alternatives B (including route options) and C for Preble's shrew, California wolverine, and northern sagebrush lizard would be qualitatively the same to the effects described above, but greater in extent. Bats are not known to collide with transmission lines, based on mortality surveys, so would be unlikely to have any effect beyond displacement by permanent Project features.

Alternatives B (including route options) and C would result in a very small permanent loss of potential pygmy rabbit habitat and displacement due to the transmission line poles, access road improvements, and the interconnection station. Maintenance vehicles traveling overland to access the transmission line would have an undetectable chance of causing direct mortality because pygmy rabbits are highly mobile species that would avoid vehicles by taking refuge in sagebrush or burrows. Additional transmission lines could increase the risk of mortality to pygmy rabbits.

Greater sage-grouse are known to avoid roads and transmission lines, so effects on this species would be limited primarily to displacement by permanent Project features. Studies have shown that grouse population decreases in areas close to roads and transmission lines (Braun 1998), although nesting has been documented very close to transmission lines (Strickland 2010). Studies in Wyoming have shown that coal-bed natural gas activity is correlated with sharp declines in lek attendance and occupancy status when development occurs within 6.4 kilometers; the displacement was thought to be associated with transmission line presence, greater use of access roads, and industrial noise (Walker et al 2006). Research is currently being conducted to more clearly elucidate the effect of wind developments on grouse throughout the year because of the high level of uncertainty regarding the distance from a Project grouse would be seasonally displaced. It is likely that where suitable sagebrush and riparian habitat occur along transmission lines, grouse would spend less time in those locations to avoid being close to the disturbed areas. The effect of the three additional wind developments would need to be carefully analyzed to determine the extent of displacement that would occur, and whether grouse leks were near areas proposed for development.

Special status raptor species have excellent eyesight and tend not to fly during low light conditions (dusk, inclement weather), which in part explains why raptors generally do not collide with transmission lines or anchoring wires for poles. Raptors are susceptible to electrocution from older power lines that were not designed with the protective measures which would be implemented on Alternative B (RRF 1996). Post-construction monitoring conducted by the Project operator would be conducted to determine what level of raptor mortality is occurring from the transmission line, and whether mitigation measures would be required.

Special status waterfowl are prone to collisions with transmission lines, and where Alternative B (and variations) cross the Malheur NWR it is expected that mortality would take place. Seven species of special status waterbirds occur in the Project Area: western least bittern, white-faced ibis, black tern, trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The Malheur NWR is highly valued waterfowl

habitat and is located along a migratory pathway; and this or any additional transmission lines could have a negative effect on waterfowl without adequate mitigation.

Special status perching bird and songbirds, including woodpecker species would be displaced from their locations of suitable habitat where the transmission lines, transmission poles, and substation are built. The displacement into adjacent habitat would cause an undetectable effect on these species, because of the small Project footprint and because most flight time for these birds would be below the vertical elevation of the transmission lines. An undetectable level of mortality could occur for some of these species from collision with the transmission lines. Post-construction mortality monitoring conducted by the Project operator would identify whether any of these species were being killed from collision with the transmission lines, and if so, consultation with the BLM and FWS would occur to identify whether additional mitigation would be required.

Echanis, LLC would implement a Habitat Mitigation Plan and a Wildlife Monitoring and Mitigation Plan, under which it would mitigate the habitat impacts from the transmission line through the use of conservation easements and other offset mechanisms, consistent with guidelines issued by the Oregon Department of Fish and Wildlife and with oversight by a TAC. Any additional wind developments would be required to develop habitat mitigation plans and wildlife monitoring and mitigation plans, as well as to establish a TAC for each project to monitor and assure adequate mitigation for project effects.

3.19.2.6 Land Uses - Grazing and Realty

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for Land Use extends beyond the Project Area defined for the analysis of direct effects. It includes the broader geographic region surrounding the Project Area and envelopes a larger extent of the landscape to include all or portions of the identified reasonably foreseeable future actions. The region extends from the upper slopes of Steens Mountain on the south and east, to Jackass Mountain on the west, Malheur Lake and the community of Crane on the north, and extensive state-owned rangelands on the east.

The timeframe of the analysis extends from the historical past when Euro American settlers began to alter the landscape by actions such as mining, farming, cattle ranching, and sheep grazing, and extends into the future to include the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Land Use, Grazing, and Realty and How it has been Affected by Past and Present Actions

The southern half of the broader geographic region surrounding the Project Area is generally characterized as high desert with large expanses of sagebrush typical of the Great Basin. Land use in this area is a mix of federal lands managed by BLM and large privately-owned ranches and agricultural fields. Large blocks of lands within this area are used for livestock grazing. The northern half of this region is characterized by a varied landscape of lakes, rivers, marshes, irrigated meadows, sagebrush-grass uplands, alkali flats, lava beds, broad high desert plateaus, valleys, and mountains. Malheur, Mud, and Harney Lakes are located within a closed basin that receives waters from the Blitzen and Silvies Rivers and Silver Creek. The terrain surrounding the lakes is flat to gently rolling. The flat and narrow Blitzen River Valley extends south from the lake region and is bordered by rugged rimrock landscapes. The Blitzen River flows north from Steens Mountain through the Blitzen Valley before entering Malheur Lake. Small ponds, wetlands and sloughs are interspersed among irrigated meadows along the valley floor.

The Malheur National Wildlife Refuge, established in 1908, occupies much of the land within the Blitzen Valley. The refuge manages this land as marshes, riverine, riparian, and irrigated meadows for breeding, nesting and the rearing of migratory birds, as well as other fish and wildlife resources. The refuge area is also rich in cultural resources dating back some 9,000 years, as well more recent historic cultural resources. To provide habitat for migratory birds and other wildlife, a network of low dikes and canals allow water management to maintain a variety of habitats such as marshes and meadows. Similar water regulation and distribution systems extend east through the Diamond Valley and into the Happy Valley creating large productive agricultural lands near the community of Diamond.

Land use in the higher elevations south of Diamond is a mix of federal lands managed by BLM and large privately-owned ranches. The 10,500 acre site where the Echanis Wind Energy Project would be developed is located approximately 12 miles southeast of the community of Diamond. The site is comprised of several large privately owned parcels currently used for livestock grazing.

There are also several small unincorporated communities and rural commercial areas within the broader geographic region, several of which would be directly or indirectly effected by the Project. These include the communities of Princeton, Crane, Diamond, and Frenchglen. These communities and commercial areas provide goods and services to local farmers and ranchers, and visitors.

Effects of Reasonably Foreseeable Future Actions on Land Uses, Grazing, and Realty without the Proposed Action

The three other wind energy projects planned for the region would be similar in size and scope to the Echanis Project. The West Ridge and East Ridge projects would both be located on private land currently used for seasonal grazing of livestock/pasture. The Riddle Mountain project would be developed on State-owned land currently used as summer pasture for cattle. All three projects would involve deployment and operation of 40 to 69 wind turbines on large parcels of between 5,000 and 8,500 acres.

The wind turbines would be arranged in multiple “strings” placed along exposed ridgelines on each site. Each project would include a network of underground power collection lines to connect the turbine strings to new substations located on each site. Access roads to each site would need to be widened, improved, or extended, and portions of these roads would be located on public and private land within either the Andrews RA or the Three Rivers RA. While the West Ridge and East Ridge projects are both located on private land, the entire West Ridge site, and the northern half of the East Ridge site, would be located within the boundaries of the Steens Mountain CMPA. Any facilities related to these projects on public land within the CMPA would be severely prohibited.

Each wind energy project would have its own system of string roads. These roads, together with other project features (wind turbines, access roads, substations, etc.), would convert existing rangeland uses to non-rangeland use. Where such conversion would occur within established grazing allotments, the effect would be to reduce the total amount of land available for livestock grazing.

Each wind energy project would also require a connection to the regional power grid. If the North Steens 230-kV Transmission Line Project is not developed, other similar transmission lines following similar routes would be required in order for these wind energy projects to be constructed and connected to the regional power grid. Development of other transmission lines in similar locations would require new ROW from private land owners and public agencies (including BLM and possibly USFWS) for transmission lines, access roads, interconnection stations, and other related project features.

The two BLM restoration projects actively underway in the region (the Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project) would not result in a conversion of existing land use. The primary goal of both projects is to actively manage encroaching western juniper on both public and

private lands through the use of natural and prescribed fire. Implementation of these two projects would have the beneficial effect of improving forage for livestock in grazing areas, which in turn would improve the viability and sustainability of ranches that hold grazing permits in the region.

The Steens Mountain Travel Management Plan (TMP) defines the motor vehicle route network within the Steens Mountain CMPA, including guidance on maintenance, improvement, and accessibility of these routes. The TMP would not result in land use conversions, but would promote the Steens Mountain CMPA RMP land management objective to provide "reasonable" access to private lands through BLM-managed lands as appropriate to meet resource objectives while providing for private and public access needs.

The Jackass Butte Wind Energy Site Testing and Monitoring Site would have no effect on existing or future land use.

If the North Steens 230-kV transmission line is developed to its full 230-kV capacity, similar upgrades would be required on the existing HEC 115-kV line that parallels Highway 205 (if Alternative B is selected) or to the existing HEC 115-kV line that runs east/west through the community of Crane (if Alternative C is selected). The existing HEC transmission line would be upgraded by replacing existing wood poles with steel poles similar to those described for the North Steens 230-kV Transmission Line Project. All anticipated improvements would occur within existing ROW. Temporary effects on land use from construction activities would include:

- Interruption of uses and activities at proposed laydown areas and pulling/tensioning sites,
- Noise and disruption due to the presence of workers and equipment,
- The visual effects from stockpiled materials and construction equipment,
- The need to exclude livestock from temporary laydown areas and active construction sites.

No effect on grazing livestock is expected from the pulling/tensioning sites because each site would be active for only a day or two during construction.

Cumulative Effects on Land Use, Grazing, and Realty from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The incremental cumulative effect on land use from the Echanis Wind Energy Project and the North Steens 230-kV Transmission Line project would primarily be related to the permanent conversion of public and private rangeland to non rangeland use. Assuming all four wind energy projects planned for the region were constructed and connected to the North Steens Transmission Line (either Alternative B or C), between 550 to 875 acres of public and private land would be affected by easements or ROW grants for the transmission line and transmission line related access roads. In addition, the various components on each wind energy project site, together with onsite and off site access roads, would permanently convert approximately 600 acres of public and private range, grazing, and agricultural land to energy related uses. Where such conversion would occur within established grazing allotments, it can be assumed that the amount of land available for livestock grazing would be reduced by those same amounts. A portion of the loss of grazing land would be offset by BLM management of western juniper on public and private lands within the region that would improve forage for livestock.

3.19.2.7 Recreation

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for recreation is the area in which the Proposed Action and Action Alternatives would be visible. Changes in the visual quality of a recreation site affect the recreation quality of that site. In the 1940s and 1950s, recreational use of the Project Area began to occur. In 1962, Steens Loop Road was completed, which allowed for access to the top of the Steens Mountains. Since then, recreation in the Project Area has been popular.[1] The timeframe for the analysis of cumulative effects begins in the 1940s and concludes with decommissioning of the Proposed Action and Action Alternatives, which are estimated to have a 40-year life.

Existing Recreation and How it has been Affected by Past and Present Actions

Recreational areas in Harney County include Malheur National Wildlife Refuge (MNWR), Steens Mountain Cooperative Management and Protection Area (CMPA), and Diamond Craters Outstanding Natural Area. Recreational activities within these areas include but are not limited to wildlife viewing, wildlife photography, geological sightseeing, camping, hunting, fishing, running, and hiking. In 2009, the CMPA had 113,000 visitors and the MNWR had 63,000 visitors (M Franulovich, pers. comm. 2010) (FWS, 2007).

Effects of Reasonably Foreseeable Future Actions on Recreation without the Proposed Action

If a project directly disturbs recreation areas, restricts access to recreation areas, or reduces the scenic value of recreation sites; it could potentially affect recreation in the Project Area. A visual analysis (Section 3.9 Visual) was conducted to analyze views of the Riddle Mountain Project, the East Ridge Project, and the West Ridge Project from developed recreation sites in the Project Area. If the Echanis Wind Energy Project or transmission lines encompass a large portion of the viewshed from a particular recreational area, it is considered to affect recreationists in that area. Low- to moderate-quality views of wind turbines would exist from areas at and near Fish Lake Campground and Jackman Park Campground. The East Ridge and West Ridge turbines are approximately 4 miles from the Kiger Gorge Overlook and would be visible from the developed recreation sites. KOP 83 is in the vicinity of the Round Barn and at the intersection of Diamond Loop Backcountry Byway and Coontown Road; the Riddle Mountain Project will be visible from this KOP and likely from the Round Barn. The visual analysis for the West Ridge Project and East Ridge Project indicates that from Frenchglen on the High Desert Scenic Byway and Blitzen Valley Auto Tour (Highway 205), the Projects are hard to identify. The turbines are very low on the horizon and small from a distance of approximately 15 miles. The East Ridge and West Ridge Projects would be visible from sections of the Steens Mountain Backcountry Byway. The Riddle Mountain Project would be visible from the East Steens Auto Route. These three projects would be visible from developed recreational areas within the geographic scope of this analysis.

If the construction periods of the East Ridge Project, West Ridge Project, and the Riddle Mountain Project occur simultaneously or overlap, recreational users could temporarily experience increased traffic on access roads or the addition of construction activities to their views. Construction impacts would be temporary and would be similar to the Echanis Project in type and extent. Depending on the preference of the visitor or recreational user and the importance of views for individual recreational experiences, their experiences could either (1) not change, or (2) decrease in quality if the visitor or recreational user prefers a view without

[1] BLM, August 2005, Steens Mountain Wilderness and Wild and Scenic Rivers Plan: Appendix P – Steens Mountain Cooperative Management and Protection Area Resource Management Plan.

turbines. Little to no change is expected in the number of visitors to the area if these three wind project are developed.

The Steens Mountain Travel Management Plan (TMP) closes portions of two roads to private land access and provides guidance on the maintenance, improvement, and accessibility of routes approved for public access in the CMPA. This plan will therefore improve access to public lands and reduce public access on private lands, potentially changing some recreational opportunities. Five Creeks Rangeland Restoration Project and North Steens Ecosystem Restoration Project are intended to improve habitat and vegetation in and around the Project Area, and could therefore either (1) not affect recreational uses, or (2) expand the quantity and variety of vegetation and animal species present in recreational areas, potentially improving the recreational experience. No effects on recreational uses are expected from the Jackass Butte Wind Energy Testing and Monitoring Site because no plans for further development exist. Recreational resources are not expected to be affected by the Harney Electric Cooperative 115-kV Line Upgrade because the upgrade would occur on lines and rights of way that already exist for this purpose.

Cumulative Effects on Recreation from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Visual simulation reveals that the Proposed Action would be visible from the Kiger Wildhorse Viewing Area (KWVA) recreational site, located 3 miles from the Proposed Action. The Proposed Action would cross the Blitzen Valley Auto Tour Route at Highway 205. The Proposed Action would be located 4 miles from Buena Vista Overlook. Additionally, visitors traveling the High Desert Scenic Byway (Highway 205) will see the Proposed Action when it crosses the Byway at KOP 72. For those recreational users using South Diamond Lane, the transmission line would likely be visible near the intersection of South Diamond Lane and Lava Bed Road, and remain visible until near the town of Diamond.

Recreational users at the Buena Vista Overlook would be able to see the South Diamond Lane Route Option. Additionally, recreational users traveling the High Desert Scenic Byway or Highway 205 will see the South Diamond Lane Route Option when it crosses at the intersection of the Byway and South Diamond Lane. Recreationists using the Blitzen Valley Auto Tour Route would see the Hog Wallow Route Option at Highway 205. The Hog Wallow Route Option would be further away compared to the South Diamond Lane Route Option for viewers from the Buena Vista Overlook. The Hog Wallow Route Option would also be visible for recreationists traveling the High Desert Scenic Byway (Highway 205) at one point.

The Alternative C north route would be visible by recreationists traveling the East Steens Auto Route and the Diamond Z-Loop Backcountry Byway for extended periods. These routes have very little traffic. Alternative C is near KWVA and Crane Hot Springs, the Round Barn, the East Steens Auto Route, the Diamond Loop Backcountry Byway, and the Oregon High Desert National Recreation Trail. The transmission line traverses six miles within the CMPA on privately-owned lands and seven miles of its length would be within the Kiger Mustang ACEC.

The incremental effect of the Proposed Action and Action Alternatives on recreation, combined with reasonably foreseeable future actions, would result in the addition of turbines to the area, which would be visible from some recreational areas. Although views from recreational areas would change, the areas themselves would not be affected. Depending on the preference of the visitor or recreational user and the importance of views for their individual recreational experience, recreational experiences could either (1) not change, or (2) decrease in quality if the visitor or recreational user prefers a view without turbines.

3.19.2.8 Public Services

Geographic Scope and Timeframe of Analysis

The geographic scope of this cumulative effects analysis is Harney County, Oregon, the area that would experience the majority of the effects of the Proposed Action and Action Alternatives. The timeframe for the cumulative effects analysis extends from 1889, when Harney County was created and many public services such as the first court house were constructed, through the 40-year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.[2] Any effects on public services attributable to the Proposed Action and Action Alternatives would continue to contribute to cumulative effects until decommissioning.

Existing Public Services and How they have been Affected by Past and Present Actions

Public service providers in the Project Area include the following:

- Fire protection providers including Burns Interagency Fire Zone (BIFZ), which provides range and wildfire protection services for the public lands in Harney County, and Crane Rangeland Fire Protection Association (RFPA), a volunteer-only organization that provides fire protection service to private lands in the Project Area;
- Law enforcement providers including Harney County Sheriff's Office, the Burns Police Department, the Hines Police Department, Oregon State Police, BLM and MNWR's federal law enforcement officers, and the Burns Paiute Reservation police force (HCC, 2009);
- School districts throughout Harney County (HCC, 2009); and
- Harney District Hospital in Burns, which provides health and emergency care (HDH, 2009).

Past and present activities that have affected the provision of public services in Harney County include population in-migration and the incorporation of towns and cities, leading to taxing districts and the formation of public service agencies. Past and continuing fire management activities by BLM, including the Five Creeks Rangeland Restoration Project, are intended to reduce hazardous fuels and restore or increase system functionality, which has potentially decreased the number of calls for forest fire service.

Effects of Reasonably Foreseeable Future Actions on Public Services without the Proposed Action

The Five Creeks Rangeland Restoration Project and North Steens Ecosystem Restoration Project would result in a reduction of hazardous fuels and restoration of the natural fire regime. Therefore, they could potentially decrease the number of calls for fire protection service. These two projects would not likely affect schools, law enforcement, or other government services.

The three wind projects and possibly the HEC 115-kV line Upgrade would represent potential fire hazards, which in turn could result in increases in demand for fire protection. Fire hazards associated with these projects would be similar to those associated with the Echanis Wind Energy Project. These four projects would not likely affect schools, law enforcement, or other government services.

[2] Oregon State, Harney County History, Website (http://arcweb.sos.state.or.us/county/cpharneyhome.html) accessed April 12, 2010.

The Steens Mountain Travel Management Plan (TMP) is not expected to affect public services in the Project Area, with the exception that certain roads would be close to the public. The Jackass Butte Wind Energy Testing and Monitoring Site would not affect public services.

Cumulative Effects on Public Services from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Potential impacts attributable to construction of the Proposed Action and Action Alternatives would arise primarily from the presence of the construction workforce and equipment in the region. During operation, public service effects are based on the size of the operational workforce and indirect employment in the region, as well as the operating requirements of the transmission line.

The Project Area is located in a region susceptible to large-scale wildfires. The two events of most concern are catastrophic failures of the transmission line and wind power equipment, due to fire, including fire caused by lighting strikes. Fire management activities by BLM result in a reduction of hazardous fuels and restoration of the natural fire regime, and are therefore considered positive effects. Cumulative effects from the project in combination with the proposed Riddle Mountain Wind Farm, East Ridge Wind Project, West Ridge Wind Project, and HEC 115-kV line upgrade would be expected to occur if construction or operation of the projects resulted in an increase in the risk of wildfires. Project proponents would likely be required to apply fire protection measures similar to those for the Proposed Action and Action Alternatives. Although the risk of fire would be greater than the risk associated with the Proposed Action alone, the fire management activities combined with fire protection measures would lessen the risk. Fire protection service agencies likely would be able to accommodate the increased demand for service.

Table 3.19-2 shows that the wind projects would result in an estimated 400 construction workers on site (if the projects were constructed at the same time). This increase in the daily population at the site and traffic to and from the site would result in an increase in potential demand for law enforcement services. In terms of law enforcement in areas surrounding recreational uses, new service roads built for construction but not required for maintenance would be closed as appropriate and in coordination with the BLM or USFWS Authorized Officer, which would further limit any increase in demand for law enforcement services.

The non-local portion of the construction workforce for the wind projects and the HEC 115-kV Upgrade, combined with the Proposed Action and Action Alternatives would not be expected to relocate with their families due to the temporary nature of construction. Therefore, the number of school-aged children in the area is not expected to increase during construction, resulting in no effect to area school districts.

If the wind projects were constructed at the same time, an estimated 40 new permanent employees would be working at the project sites (see Table 3.19-2). The presence of the new employees would result in a slight increase in the potential demand for law enforcement services. Potential in-migration of non-local permanent operations employees (with their families) could result in an increase in demand for public education services. An estimated ten school age children (accompanying the approximately 40 employees) would represent a minimal increase of less than one percent of the Harney County 2009-2010 school year enrollment of 1,290 (ODED, 2010). This increase in enrollment would be less to the extent that new permanent hires already live in Harney County..

During construction of these combined projects, there could be an increased need for emergency and health care services, in the event of an injury accident. During operation, an increased need for emergency and health care services is unlikely because the permanent population increase attributable to project operation is expected to be minimal. The existing available emergency services are expected to be adequate to meet additional demands.

3.19.2.9 Aesthetics/Visual Resources

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis includes the same area noted in the Visual Resource section of this document (See Section 3.10) as well as the area within the viewshed of three wind projects that are reasonably foreseeable future actions by private entities and that lie in close proximity to the proposed Project. This additional area is largely confined to the south and west of the Echanis Wind Energy Project. The timeframe of analysis extends from the historical past when Euro-American settlers began to alter the landscape within these areas into the future to include the 40 year operational life of the Echanis Wind Energy Project and the North Steens Transmission Line Project.

Existing Visual Resources and How they have been Affected by Past and Present Actions

The visual resources included within the cumulative effects analysis area encompass a rich variety of landscapes ranging from rolling agricultural valleys incised by eroded canyons and volcanic uplifts surrounding rugged mountainous terrain. The topography is further distinguished by the dramatic peaks of the Steens and Riddle Mountains. The nearly 10,000 foot peak of Steens Mountain and the surrounding Steens Mountain Cooperative Management and Protection Area divides the project into distinctive areas. To the west of the mountains, the landscape is characterized primarily by valley devoted to livestock grazing and agricultural use, separated by smaller volcanic uplifts. An expansive wetland and the Malheur National Wildlife Refuge separate the community of Frenchglen from the more rugged terrain to the northeast. To the east of the Project Area the peaks of Steens Mountain descend sharply into grazing areas for several large ranches before reaching the Alvord Desert – part of a playa or largely dry lake bed.

The existing visual resource management (VRM) classes within the cumulative effects analysis area are depicted in Figure 3.9-1 and range in classification from VRM Class 1 (Steens Wilderness Area) to VRM Class 4. Areas that do not have a designated VRM class in this figure are typically state or private lands. Much of the area has been historically affected by manmade actions such as ranching and fire. The cumulative effects analysis area for visual resources has been also affected by ongoing BLM management plans and projects including the Five Creeks Rangeland Restoration Project, Steens Mountain Travel Management Plan, and the North Steens Ecosystem Restoration Project. The visual resource analysis conducted for these three projects concluded that project activities would affect visual resources present within the Project Area, but these effects would be consistent with the underlying VRM objectives.

Effects of Reasonably Foreseeable Future Actions on Visual Resources without the Proposed Action

To examine the cumulative effects upon visual resources from the East Ridge, West Ridge, and Riddle Mountain Wind Energy Projects, the BLM's VRM methodology was employed (see Section 3.10 for methodology). KOPs in areas near these wind energy projects were chosen. Like the Echanis Project, these other wind projects are situated on private lands. As shown in Table 3.19-1, visual effects from these other wind energy projects are expected to be low for KOPs 21, 54, 57, 66, 68, and 69. Moderate effects are expected at KOPs 51, 55, 58, 83, and 84. A high impact is anticipated for KOP 85. The moderate effects are largely derived from the introduction of strong vertical elements that move on prominent ridgelines that are white to grey in color within an otherwise motionless natural landscape consisting of low lying vegetation. The high effect is derived from the introduction of strong man made vertical elements in the immediate foreground that would be visually dominant to nearly visually dominant. These effects would be in addition to the visual resource effects discussed in Section 3.10. While these combined effects are moderate to high and would not otherwise meet the BLM visual resource management objectives for VRM Class I, II, and III lands, these wind energy projects, like the Echanis Wind Energy Project, would be located on lands that are

not subject to the BLM's visual resource management objectives. Since they are located on private and state lands, the wind energy projects would be subject to Section 6.02(A)(2) (Scenic Quality) of the Harney County Comprehensive Plan and state Goal 5 rules (OAR 660, division 23). Figures 3.19-2 through 3.19-9 show views of these three projects from the KOPs. KOP locations are shown in Figure 3.19-10.

Table 3.19-1 Project Impacts for the East Ridge, West Ridge, and Riddle Mountain

Key Observation Points & Project	Scenic Quality Rating	Sensitivity Level	Distance Zone	Visual Resource Class	Contrast Rating	Effect
KOP 21 Kiger Wildhorse ACEC; East Ridge Wind Energy Project	C	Moderate	Foreground/ Middle ground	III	Weak	Low
KOP 54 Steens Loop Road; West Ridge Energy Project	C	Moderate		III	Moderate	Low
KOP 51 North Steens Loop at turnout to Juniper Management Area Trail; West Ridge Energy Project	B	Moderate	Foreground/ Middle ground	I/II	High	Moderate
KOP 55 Whorehouse meadows; West Ridge Wind Energy Project	A	High	Foreground/ Middle ground	I/II	Moderate	Moderate
KOP 57 Steens Loop Trail; West Ridge Wind Energy Project	B	Moderate	Foreground/ Middle ground	I/II	Weak	Low
KOP 58 Kiger Gorge Parking Lot; East Ridge Wind Energy Project	A	High	Foreground/ Middle ground	I/II	Moderate	Moderate
KOP 66 Frenchglen Hotel; West Ridge Wind Energy Project	B	High	Distant	II	Weak	Low
KOP 68 Pullout on Blitzen Valley Road near Baca Lake; West and East Ridge Energy Project	C	Moderate	Distant	III	Weak	Low
KOP 69 Krumbo Lane; West and East Ridge Energy Project	C	Moderate	Distant	III	Weak	Low
KOP 83 Base of Riddle Mountain; Riddle Mountain Wind Energy Project	B	Moderate	Foreground/ Middle ground	II	High	Moderate
KOP 84 Middle of Riddle Mountain; Riddle Mountain Wind Energy Project	B	Moderate	Foreground/ Middle ground	II	High	Moderate
KOP 85 Riddle Mountain Lookout; Riddle Mountain Wind Energy Project	B	High	Foreground/ Middle ground	II	High	High

Figure 3.19.-2 KOP 21 View from Kiger Wildhorse Viewing Area. This view is from the Kiger Wildhorse Viewing Area, looking south.

Figure 3.19-3 Proposed view from KOP 21 looking south. The turbines are approximately 2.6 miles away.

Figure 3.19-4 KOP 58 Kiger Gorge parking lot. This view is from the parking lot of the Kiger Gorge viewing area on Steens Mountain, looking north.

Figure 3.19-5 View from KOP 58, looking north. The East and West Ridge Turbines are approximately 4.10 miles away.

Figure 3.19-6 KOP 83, base of Riddle Mountain. The view is provided from Coontown Road, looking east.

Figure 3.19-7 Proposed view from KOP 83, looking east. The Riddle Mountain Wind Energy Project is approximately 4.8 miles away.

Figure 3.19-8 KOP 85, Riddle Mountain Lookout, looking northeast. This view is provided from the Riddle Mountain Lookout. The Riddle Mountain Turbines are approximately 0.50 miles away.

Figure 3.19-8 Proposed view from KOP 85, looking northeast.

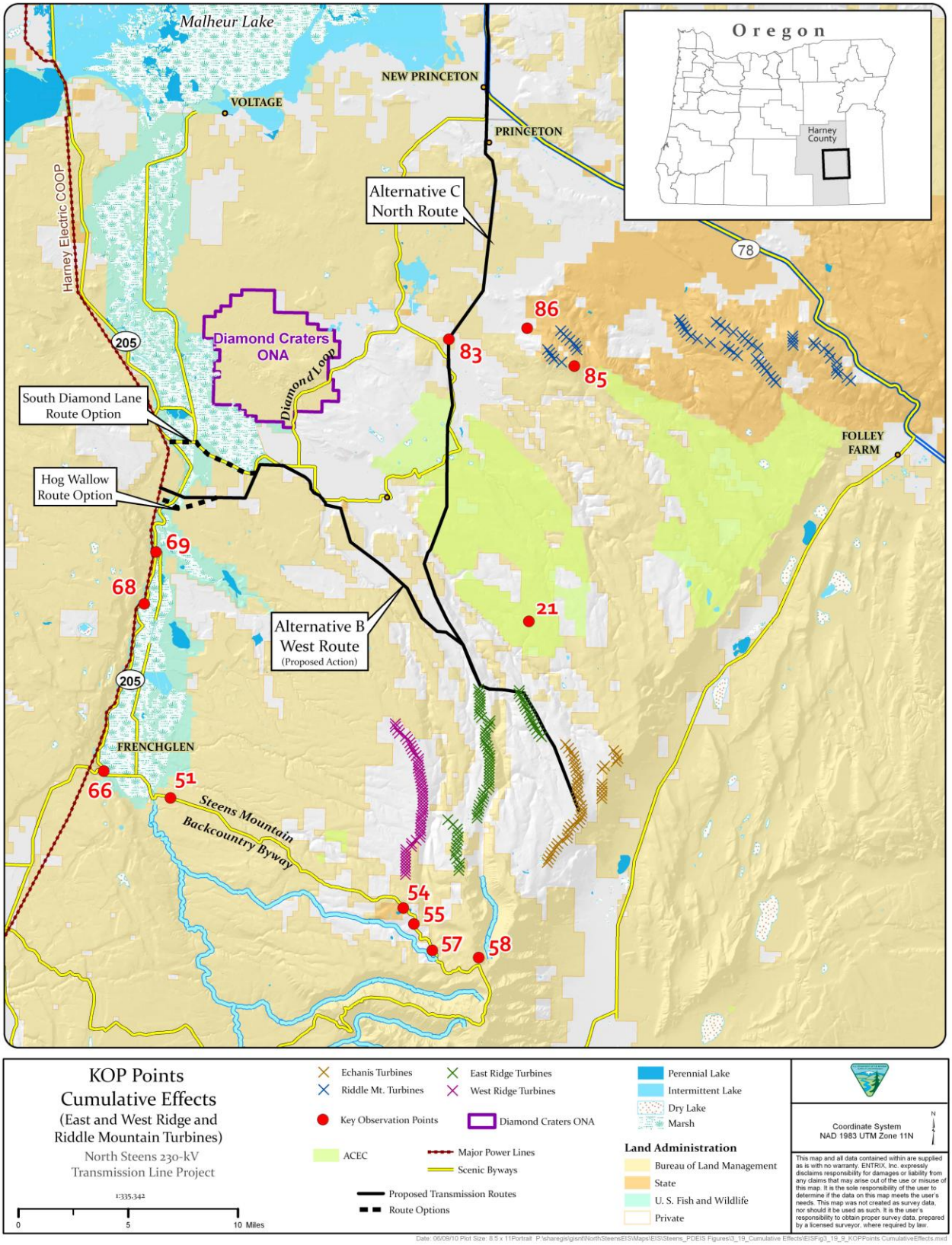

Figure 3.19-10 KOP Points, Cumulative Effects (East and West Ridge and Riddle Mountain Turbines)

Cumulative Effects on Visual Resources from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Overall, when combined with the reasonably foreseeable future actions, the Proposed Action and Action Alternatives would contribute incrementally to the effects upon visual resources located inside and outside of BLM managed lands. Best Management Practices (BMPs) and Project Design Features (PDFs) described in Section 2 and listed in Appendix A are intended to reduce effects from the Proposed Action and Action Alternatives; therefore, cumulative effects are expected to occur but BLM VRM objectives would not apply to lands directly affected by the wind energy projects and therefore, no additional mitigation would be required.

3.19.2.10 Cultural Resources

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for cultural resources includes the boundaries of the Project APE. The timeframe of the analysis for past and present actions and their effects on cultural resources is the prehistoric period to the Euro American settlement period, and extending to the mid-20th century (to 1960, the 50-year cutoff period for NRHP eligibility consideration). The timeframe for reasonably forseeable future actions includes the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Cultural Resources and How they have been Affected by Past and Present Actions

NRHP eligible cultural resources in the Project area or APE have been affected by past and present settlement, occupational, and transportation related activities. Current actions that potentially affect cultural resources include agricultural and cattle grazing uses and related development activities within the Project area.

Effects of Reasonably Foreseeable Future Actions on Cultural Resources without the Proposed Action

NRHP eligible cultural resources in the Project Area could be affected by the proposed Reasonably Foreseeable Future Actions. The proposed Reasonably Foreseeable Future Actions extend from Steens Mountain north to the community of Crane, from Highway 205 in the west to Highway 78 and Alvord Desert in the northeast/east.

If one or more of the proposed three wind energy projects, the West Ridge and East Ridge Wind Projects and the Riddle Mountain Wind Farm Project, is implemented, they would construct transmission lines similar to the North Steens 230-kV Transmission Line in similar locations to connect to the existing Harney Electric Cooperative (HEC) 115-kV lines. The Projects would also have to build similar interconnection stations and access/overland roads. The selection of one or more of the three wind energy projects could have permanent or long-term effects to NRHP eligible cultural resources through direct construction disturbance and/or indirect visual effects. The cultural resources could be affected from the construction of transmission lines, towers, tensioning facilities and access/overland roads, and increased human activity related to maintenance. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. The long-term visual or indirect effects are also likely to occur to traditional cultural properties and other culturally sensitive sites.

The Steens Mountain Travel Management Plan (TMP) is not expected to affect cultural resources in the Project Area, with the exception that certain roads would be close to the public. The Jackass Butte Wind Energy Testing and Monitoring Site would not affect cultural resources.

The HEC 115-kV line upgrades, though they would occur within the existing HEC ROW, could have permanent or long-term effects to NRHP eligible cultural resources through direct construction disturbance and/or indirect visual effects. Important cultural resources could be affected from the construction of transmission lines, towers, tensioning facilities and access/overland roads, and increased human activity related to maintenance. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. The long-term visual or indirect effects are also likely to occur to traditional cultural properties and other culturally sensitive sites.

The Jackass Butte Wind Energy Testing and Monitoring Site would have no adverse effects to NRHP eligible cultural resources within the Project Area. The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project could affect NRHP eligible cultural resources due to landscape/surface level restoration activities and ecosystem enhancements. However, BLM would conduct cultural resource surveys in potentially affected areas before project implementation.

Cumulative Effects on Cultural Resources from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The cumulative effects from construction and operation of the Proposed Action and the Action Alternatives and Reasonably Forseeable Future Actions includes continual and increased disturbance and illegal removal of the area's cultural resources, reduction of the integrity of the area's cultural resources, and the potential to impact previously undiscovered NRHP eligible archaeological resources.

The Proposed Action or Action Alternatives could have adverse effects upon NRHP eligible cultural resources associated with prehistoric hunting and habitation activities as well as historic agricultural and cattle grazing uses and important Euro-American settlement, irrigation and transportation related activities. The Proposed Action or Action Alternatives could also have permanent or long-term effects to NRHP eligible cultural resources through direct construction disturbance or indirect visual effects. These cultural resources could be affected from the construction of transmission lines, towers, tensioning facilities and access roads, and increased human activity related to maintenance. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. Under the Proposed Action or Action Alternatives, long-term visual or indirect effects are also likely to occur to traditional cultural properties and other culturally sensitive sites.

The Proposed Action or Action Alternatives together with the proposed three wind energy projects could have cumulative effects to NRHP eligible cultural resources through direct construction disturbance or indirect visual effects. The cultural resources could be affected from the construction of transmission lines, towers, tensioning facilities and access/overland roads, and increased human activity related to maintenance. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. The long-term visual or indirect effects are also likely to occur to traditional cultural properties and other culturally sensitive sites.

The incremental effect of the addition of the Proposed Action or Action Alternatives on the reasonably foreseeable future actions would not be substantially different from effects of the reasonably foreseeable futures actions alone, except that the risk of effects to archaeological sites and other culturally sensitive sites would be slightly greater.

Effects from the HEC 115-kV line upgrade in combination with the Proposed Action or Action Alternatives could include cumulative effects to NRHP eligible cultural resources through direct construction disturbance

or indirect visual effects. Important cultural resources could be affected from the construction of transmission lines, towers, tensioning facilities and access roads, and increased human activity related to maintenance. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. The long-term visual or indirect effects are also likely to occur to traditional cultural properties and other culturally sensitive sites.

Under the Proposed Action or Action Alternatives, the Jackass Butte Wind Energy Testing and Monitoring Site would have no adverse effects to NRHP eligible cultural resources within the Project Area. The Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project could affect NRHP eligible cultural resources due to landscape/surface level restoration activities and ecosystem enhancements. However, BLM would conduct cultural resource surveys in potentially affected areas before project implementation.

3.19.2.11 Social and Economic Values

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis is defined as Harney County. Cumulative effects are analyzed for both the construction and operational phases of the project. The timeframe of the analysis extends for one year over the construction phase and 20 years over the operational phase. Though the life of the project is expected to be 40 years, the operational phase analysis was conducted using 20 years to provide conservative estimates of the present value of the future revenue stream of operational phase related income and output for the North Steens Transmission Line Project and the four Wind Projects.

Existing Social and Economic Values and How they have been Affected by Past and Present Actions

Past activities that have shaped the social and economic values in the Project area includes in-migration and the establishment of new business. Present-day activities that continue to shape the social and economic make-up of the Project area include rural land uses and a change in unemployment rates and employers in the area. Harney County has been hit hard by the 2008/2009 recession with unemployment rates as high as 17 percent indicating a shift in the employment status of County residents. Employment has shifted away from manufacturing (the industry has faced a staggering loss of 96 percent of its jobs in the County between 2001 and 2009), with the closure of two large manufacturing facilities in the area: Monaco Coach Corporation's plant and the Louisiana-Pacific Corporation lumber mill in Hines that produced laminated veneers.

Effects of Reasonably Foreseeable Future Actions on Social and Economic Values without the Proposed Action

The West Ridge, East Ridge, and Riddle Mountain projects are expected to be of similar size and scale to the Echanis project, and are predicted to have similar effects on the Project Area. These effects would include direct, indirect, and induced jobs and income related to construction activity and to annual operation. The two restoration projects, the wind energy testing site, and the 115-kV line upgrade would result in a relatively small number of jobs, some of which would likely be temporary.

Cumulative Effects on Social and Economic Values from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

To estimate cumulative effects, the Echanis Wind Project is used as a proxy for the effects of the West Ridge, East Ridge, and Riddle Mountain Projects on the Project Area. Together, the four wind projects are referred to as the Wind Projects. For the purpose of analysis, construction of the four Wind Projects is assumed to occur simultaneously. Their operations periods are also assumed to be the same. Total employment effects during the three-month Alternative B transmission line construction is estimated at 130 jobs, while employment effects during the four-month Alternative C transmission line construction is estimated at 320 jobs. A second construction phase to upgrade the transmission line is expected to have similar types of employment effects those presented in the first construction phase. Employment impacts over the assumed operating period are estimated at 15 long-term jobs for Alternative B and 20 long term jobs for Alternative C. Cumulatively, the Wind Projects are expected to create 580 construction phase jobs and 60 long term jobs. Table 3.19-2 summarizes the total employment effects for Alternative B / Alternative C, and the Wind Projects. Direct employment will occur on-site while indirect and induced jobs may occur anywhere within the County. To the extent the Wind Projects require non-local (outside of Harney County) workers, including specialized workers, demand for temporary housing near the Wind Project sites would increase.

Table 3.19-2 Socioeconomic Employment Effects

	Construction Phase (Up to 1 Year)	Operations Phase (Annually for 20 Years)
Alternative B / Alternative C		
Direct	100 / 260	15 / 15
Indirect	15 / 35	0 / 5
Induced	15 / 25	0 / 0
Total	**130 / 320**	**15 / 20**
Wind Projects		
Direct	400	40
Indirect	120	0
Induced	60	20
Total	**580**	**60**

Note: Figures may not sum to total due to rounding

Income earned due to transmission line construction is expected to be approximately $3.5 million for Alternative B and $7.0 million for Alternative C. To the extent workers originate from Harney County, this income would remain within the County. A second construction phase to upgrade the transmission line is expected to have similar types of income effects as those presented here. Long-term annual income during the operations phase is expected to increase by an estimated $0.7 million for Alternative B and $0.8 million for Alternative C. Table 3.19-3 also presents the total income effect in terms of present value, which represents the value in today's dollars of all Project-related income that would accrue during construction and twenty years of operations.[3] In present value terms, county income over the life of the Projects would increase by approximately $13.7 million for Alternative B versus $18.1 million for Alternative C. Cumulatively, the Wind Projects are estimated to create $20 million in construction related income and $5.2

[3] Present value is calculated using a three percent discount rate.

million in annual operations related income resulting in a present value of $94.5 million over the life of the Projects[4].

Table 3.19-3 Socioeconomic Income Effects

	Construction	Operations	Present Value
Alternative B / Alternative C			
Direct	$2,580,000 / $5,040,000	$590,000 / $590,000	$10,960 / $13,340,000
Indirect	$630,000 / $1,280,000	$70,000 / $140,000	$1,610,000 / $3,240,000
Induced	$330,000 / $630,000	$60,000 / $60,000	$1,120,000 / $1,500,000
Total	**$3,540,000 / $6,950,000**	**$710,000 / $790,000**	**$13,690,000 / $18,090,000**
Wind Projects			
Direct	$14,000,000	$4,800,000	$82,920,000
Indirect	$4,120,000	$0	$4,120,000
Induced	$1,880,000	$400,000	$7,480,000
Total	**$20,000,000**	**$5,200,000**	**$94,520,000**

Note: Figures may not sum to total due to rounding

There are both direct and indirect local tax effects from wind power projects. Direct taxes are collected locally from local taxpayers and remain in the local area to support budgets for local entities. Indirect taxes are collected by entities outside of the local area, usually the state and Federal government. Some of the state tax revenue returns to the local area as support for state agency activities and some may return as state/Federal support for local entities. Local direct effects include real estate and personal property taxes while indirect effects include sales and income taxes. No indirect effects are quantified in this study. Oregon does not have a sales tax, so no sales tax revenue will be collected from the Project. The Projects will employ Oregon state residents increasing tax revenue collected by the Federal and state governments. Income and business taxes generated by the Projects are collected at the state/Federal level and are expected to have limited indirect effect on the County. The County receives only a portion of state/federally collected tax revenue and the income/business taxes resulting from the Wind Projects would not have a measurable effect on the total state/federal collected tax revenue and thus the portion allocated to the County. Harney County residents employed by the Wind Projects will pay local taxes to taxing districts, increasing tax revenue to local schools and other types of districts. Non-local residents employed by the Wind Projects will pay local taxes to special taxing districts within their county, increasing tax revenue for those districts.

3.19.2.12 Wild Horses and Burros

Geographic Scope and Timeframe of Analysis

The area included in the cumulative effects analysis for Wild Horses and Burros, and Areas of Critical Environmental Concern (ACEC) includes two Herd Management Areas (HMA), the Warm Springs and the Kiger; each crossed by different transmission line alternatives. Both HMAs are within the Three Rivers Resource Area (RA); the Kiger HMA is encompassed by the slightly larger Kiger Mustang ACEC.

[4] Note the present value figure for the cumulative Wind Projects assumes all wind projects are constructed and operated on the same time frame as the Echanis Wind Project.

The timeframe for the analysis extends from 1979 when the Warm Springs Herd Management Area Plan (HMP) was first prepared (including 1996 when the Riddle Mountain and Kiger Wild Horse Herd Management Area Plan was prepared), and extends 40 years into the future to include the operational life span of both the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Herd Management Areas and Areas of Critical Environmental Concern and How they have been Affected by Past and Present Actions

The northern boundary of the Warm Springs HMA is located approximately twenty miles southwest of Burns, west of Highway 205, and extends to the south and east to encompass approximately 474,501 acres of gently rolling sage covered hills and rim rocks with small valleys in between. The area is fenced on all four sides and a division fence divides the area into two units, East and West. The herd AML established as a range from 111 to 202 horses and individuals range in size from 14 to 15 hands high and 1,000 to 1,200 pounds and the animals in the HMA survive on a diet of bluebunch wheat grass and Idaho Fescue within the sagebrush vegetation zone. It is also the only HMA in the Burns District where burros are present (currently about 20 individuals).

Historically, it is not known how long horses have grazed in the Warm Springs HMA. However, it is known that horses have been produced in the area by local rangers since the turn of the century. It is not known how long burros have been in the area or how they got here. Burros occur only in the western unit of the Warm Springs HMA. Horses have moved into the herd area from Sunset Valley, the Lakeview District of BLM, as well as the Andrews RA of the Burns district because of increased pressure due to roundups in these areas. This contributes to the increasing number of horses over the years.

The Kiger HMA is located approximately 45 air miles southeast of Burns, Oregon, and 2 miles east of Diamond. The HMA covers approximately 26,874 acres of rugged, high desert country with extremely rocky surfaces divided by deep canyons, rim rocks and plateaus. Some areas are open playa flats while others are dominated by scattered to thick western juniper cover that has an understory of sagebrush and bunchgrass. Water sources include perennial streams, natural ponds and springs. The wild horses in the Kiger HMA exhibit Spanish Mustang characteristics and are thought to be one of the most pure herds of Spanish Mustangs existing in the wild today. The herd size ranges from 51 to 82 horses, and increases at a rate of approximate 20 percent per year. Animal sizes range from 13 to 15 hands high and 750 to 1,000 pounds.

In 1996, the Three Rivers Resource Management Plan (RMP) designated the Kiger and Riddle Mountain HMAs as the Kiger Mustang Area of Critical Environmental Concern (ACEC). This formal designation was in recognition of the area's special historic value in perpetuating and protecting the dun factor colors and conformation characteristics of the wild horses present in the Kiger and Riddle Mountain HMAs. The Kiger Mustang ACEC is open to livestock grazing, camping, plant and rock collection, and other low-impact recreational pursuits. It is also open to fire suppression activities; however, prescribed burning and vegetation treatment are restricted activities. Off Highway Vehicle (OHV) use is limited to existing roads and trails. The ACEC is designated as a "right-of-way avoidance area" in the Three Rivers RMP. The RMP encourages right-of-way proponents to consider alternative routes and locations to avoid the Kiger ACEC if possible and to analyze options through the NEPA process. If no alternatives exist, the plan requires BLM to insist on stringent mitigation measures to protect the ACEC and its purpose.

Effects of Reasonably Foreseeable Future Actions on Herd Management Areas and Areas of Critical Environmental Concern without the Proposed Action

Neither the Echanis Project, nor any of the other three wind energy projects planned for the analysis area, would be located on land designated as HMAs or ACEC. While access roads to the other three wind energy projects would likely not cross land designated HMA or ACEC, if the North Steens 230-kV Transmission

Line Project is not developed, other transmission lines, similar to the North Steens transmission line and constructed along similar routes, would be constructed to serve these projects. Development of needed transmission lines would require new ROW from private land owners and public agencies, including BLM and USFWS, to accommodate transmission lines, access roads, interconnection stations, and other related project features. Some of these project features could affect the Kiger and Warm Springs HMAs or the Kiger Mustang ACEC.

Of the two BLM restoration projects actively underway in the region, only the Five Creeks Rangeland Restoration Project would affect lands designated HMA or ACEC. The Five Creeks project area overlaps approximately the eastern two-thirds of the Kiger HMA and the Kiger Mustang ACEC. The primary goal of the Five Creeks project is to actively manage encroaching western juniper on both public and private lands through the use of natural and prescribed fire. Implementation of this project would improve forage for wild horses, which in turn would improve the viability and sustainability of the herd.

The Steens Mountain Travel Management Plan (TMP) includes provisions for maintaining an adequate roadway network within the portions of the Kiger HMA and the Kiger Mustang ACEC where access by BLM personnel is required. The BLM Wild Horse program relies on an adequate road network in these areas to maintain existing water sources, monitor HMAs and to conduct periodic horse gatherings. When routes are closed or fall under disrepair it becomes difficult to obtain accurate monitoring data. Most BLM operated horse traps are located along primitive maintenance level 2 roads. These roads need to be in suitable condition to move horses out of the HMA using large trucks and trailers. Maintenance of these roads is typically necessary prior to initiating a gathering operation. The Steens Mountain TMP is therefore an important program to ensuring the ongoing success of herd management activities within the Kiger HMA and the Kiger Mustang ACEC.

The Jackass Butte Wind Energy Site Testing and Monitoring Site would have little if any effect on land designated as HMAs or ACEC.

If the North Steens 230-kV transmission line is developed to its full 230-kV capacity, upgrades would need to be made to the existing HEC 115-kV line that parallels Highway 205 (if Alternative B is selected) or to the existing HEC 115-kV line that runs east/west through the community of Crane (if Alternative C is selected). The existing HEC transmission line would be upgraded by replacing existing wood poles with steel poles similar to those described for the North Steens 230-kV Transmission Line Project. All anticipated improvements would occur within existing HEC ROW within the Warms Springs HMA.

Temporary effects on wild horses within the Warm Springs HMA could include noise and increased human activity during installation of the transmission line poles, clearing and grading of any required new access roads, vehicle operation in areas where overland vehicle travel would occur, and use of temporary laydown areas and tensioning sites. Increased human activity during periods of construction and maintenance could cause wild horses to avoid these areas while humans are present. However, these effects would likely be minimal because most recorded horse observations are located one to three miles west of where construction activities would occur.

Cumulative Effects on Herd Management Areas and Areas of Critical Environmental Concern from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The incremental cumulative effect on the lands within the Warm Springs HMA and the Kiger HMA/Kiger Mustang ACEC due to the Proposed Action or Action Alternatives would result primarily from construction and operation of the transmission line and access roads, including periodic maintenance inspections and repairs. Permanent effects include loss of vegetation consumed by wild horses or used as refuge (i.e. juniper

treed) from various permanent project features, including transmission line poles, access roads, or interconnection stations. Temporary effects include vegetation damage or increased risk of fire due to heavy equipment operation or the transport and storage of construction materials. Construction, operation and maintenance of the transmission line would not affect the long term viability or management of the horse herds, in either the Warm Spring or Kiger HMA because the transmission line would not be located in areas frequented by wild horses.

3.19.2.13 Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers

Geographic Scope and Timeframe of Analysis

Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects and any resulting visual and audible degradation of the resource values that is the focus of this analysis.

The geographic scope for the cumulative effects analysis includes the same area noted in the Wilderness, Wilderness Study Areas (WSAs), and Wild and Scenic Rivers (WSRs) section of this document (Section 3.15) as well as an area that includes a five mile radius around three proposed wind energy projects: East Ridge, West Ridge, and Riddle Mountain Wind Energy Projects (see Figures 3.6.2.14-1, 3.6.2.14-2, 3.6.2.14-3, 3.15-1, and 3.15-2). The five mile radius consists of an area subject to foreground to middleground views of these projects as defined by the BLM's VRM methodology and is the zone where changes are more noticeable and are more likely to trigger public concern (BLM Manual 8410). It is used in this section to understand the cumulative visual effects to the resource values contained within the Steens Mountain Wilderness, WSAs, and WSRs.

The timeframe of analysis extends from the historical past when Euro-American settlers began to alter the landscape within these areas into the future to include the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers and How they have been Affected by Past and Present Actions

The Steens Mountain Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers are all located on public lands managed by the BLM. Most of these areas are largely devoid of manmade influences and retain wilderness characteristics, but they also convey prehistoric and historic influences upon the landscape. Cycles of fire (dating to the prehistoric period) as well as ranching and grazing have left their physical imprint over time upon all of the areas considered in this analysis, but human-made elements in these areas are minimal. Since the passage of the Steens Act in 2000, the Steens Mountain Wilderness has been managed so as not to impair its preservation as wilderness. Its characteristics and values include the area's natural condition, its plentiful opportunities for solitude, access to primitive and unconfined recreation, and supplemental values that include (among other things) features of scenic importance.

The area of analysis for this section includes all or part of six Wilderness areas or WSAs: the Steens Mountain Wilderness, the Bridge Creek WSA, High Steens WSA, Lower Stonehouse WSA, Sheepshead Mountains WSA, and Stonehouse WSA. WSAs are managed consistent with the BLM's WSA Interim Management Policy (USDI 1995), Federal Land Policy and Management Act (FLPMA), as well as the Wilderness Act of 1964. Like the Steens Mountain Wilderness, the WSAs are managed so as not to impair its preservation as wilderness. The degrees of naturalness in these WSAs range from having an outstanding natural condition (High Steens WSA) to a relatively natural condition (Lower Stonehouse WSA). Most of the WSAs offer outstanding opportunities for solitude as well as primitive and unconfined recreation, and exhibit

special features that include scenic qualities that generally enhance and contribute to the wilderness values in each of the WSAs.

Two WSRs – Donner und Blitzen (Fish Creek segment and Little Blitzen segment) WSR and the Kiger Creek WSR are also located in the cumulative effects analysis area. These WSRs are managed by the Steens Mountain Wilderness and Wild and Scenic Rivers Plan (BLM 2005). Wild and Scenic Rivers are managed by the BLM to conserve the rivers Free-Flowing Characteristics, Outstandingly Remarkable Values (ORVs), and Wild Classification. Both of these areas exhibit exceptional scenic values that include a variety of landforms, varying vegetation patterns that change with canyon elevations, and viewsheds that are largely untouched and in a natural condition. Opportunities for primitive recreation, fishing, and scenic viewing are plentiful.

Implemented beginning in October 2006, the Five Creeks Rangeland Restoration Project does not affect the Steens Mountain Wilderness or any WSAs or WSRs included in this analysis. The North Steens Ecosystem Restoration Project began implementation in July 2007 and is a landscape-level project to reduce juniper-related fuel loading and improve ecological health of the area by encouraging a healthy functioning ecosystem through appropriate land uses. The project area for this project does not include the Steens Mountain Wilderness. This project does affect the vegetation of the Bridge Creek WSA, High Steens WSA, and Lower Stonehouse WSA. With this project, the treatments within WSRs would be minimal in scale and nature and would require site specific NEPA analysis.

The Steens Mountain Travel Management Plan (BLM 2007) is currently being implemented by the Burns District Bureau of the BLM. This plan authorizes grazing permittees to use Permit Routes and Historical Routes within the Steens Mountain Wilderness and WSAs in the same manner and degree as occurring at passage of the FLPMA on October 21, 1976. No changes to any WSR river segment's free-flowing quality, wild character or ORVs are expected as a result of the plan.

The Jackass Butte Wind Energy Testing and Monitoring Site and the Harney County Cooperative 115-kV Line Upgrade are not located in the geographic analysis area for this section and therefore would not have effects upon the Steens Mountain Wilderness, WSAs, and WSRs.

Effects of Reasonably Foreseeable Future Actions on Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers without the Proposed Action

As reasonably foreseeable future actions, the East Ridge, West Ridge and Riddle Mountain Wind Energy Projects would have effects to the Steens Mountain Wilderness, WSAs, and WSRs. All three projects would involve deployment and operation of 40-69 wind turbines arranged in multiple "strings" placed along exposed ridgelines on each site. Each project would require underground power collections lines, substations, new or improved access roads. None of the facilities would be located within the Steens Mountain Wilderness, WSAs, or WSRs.

The effects from these three projects on the Steens Mountain Wilderness, WSAs, and WSRs are largely visual and auditory as they may be seen and/or heard from areas within these land classifications. More specifically, the three projects would affect scenic resource values associated with WSRs as well as wilderness values of solitude and scenery associated with the Steens Mountain Wilderness Area and WSAs. To identify visual effects, GIS viewshed maps were prepared (See Figures 3.19-11, 3.19-12, 3.19-13). In addition to these maps, the table below describes the acreage and percentage of overall land designation that will have views of each of the three projects. In general, the wilderness values specific to the affected areas listed in Table 3.19-4, would be diminished by these three projects, individually and, in some cases collectively.

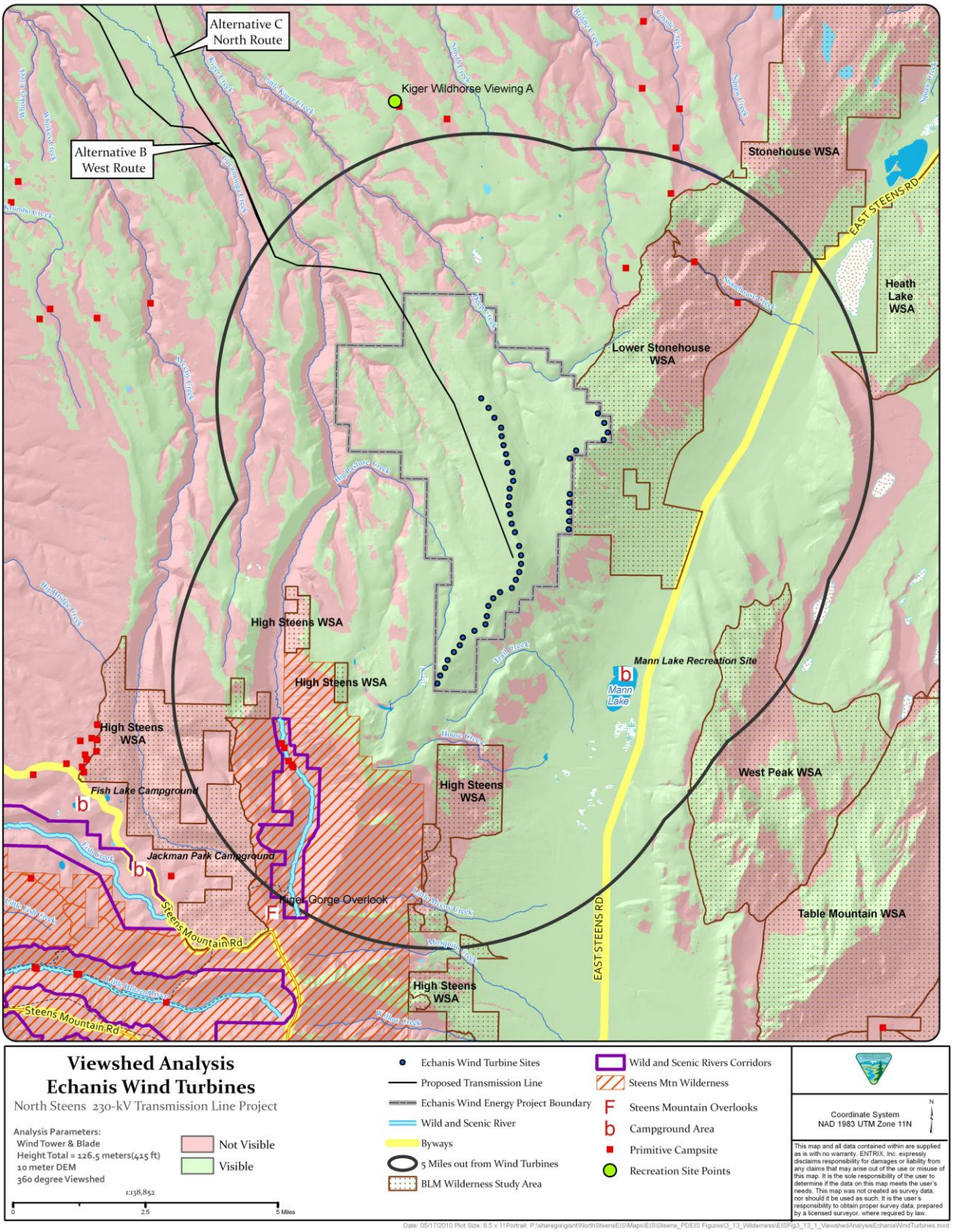

Figure 3.19-11 Viewshed Analysis Echanis Wind Turbines

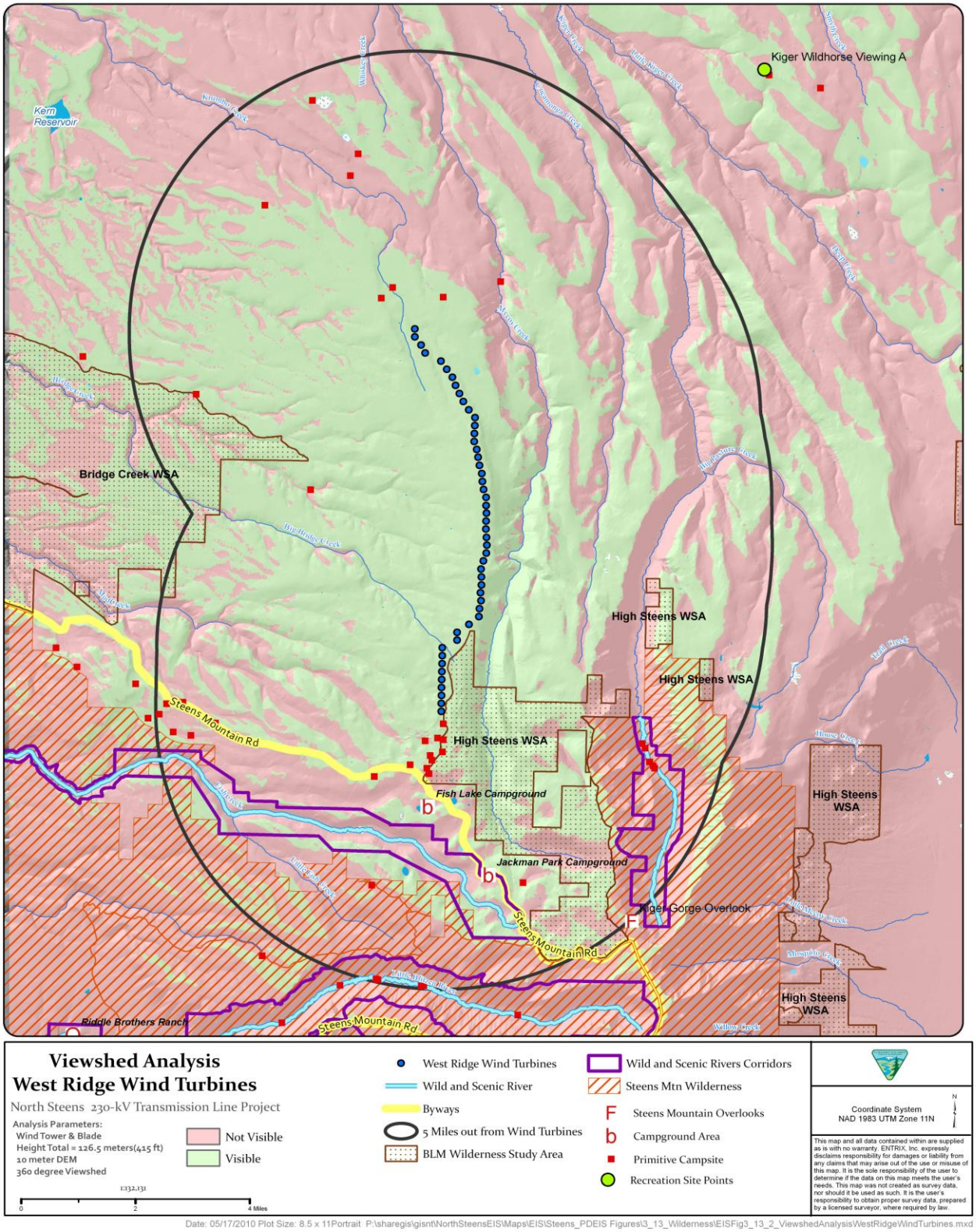

Figure 3.19-12 Viewshed Analysis West Ridge Wind Trubies

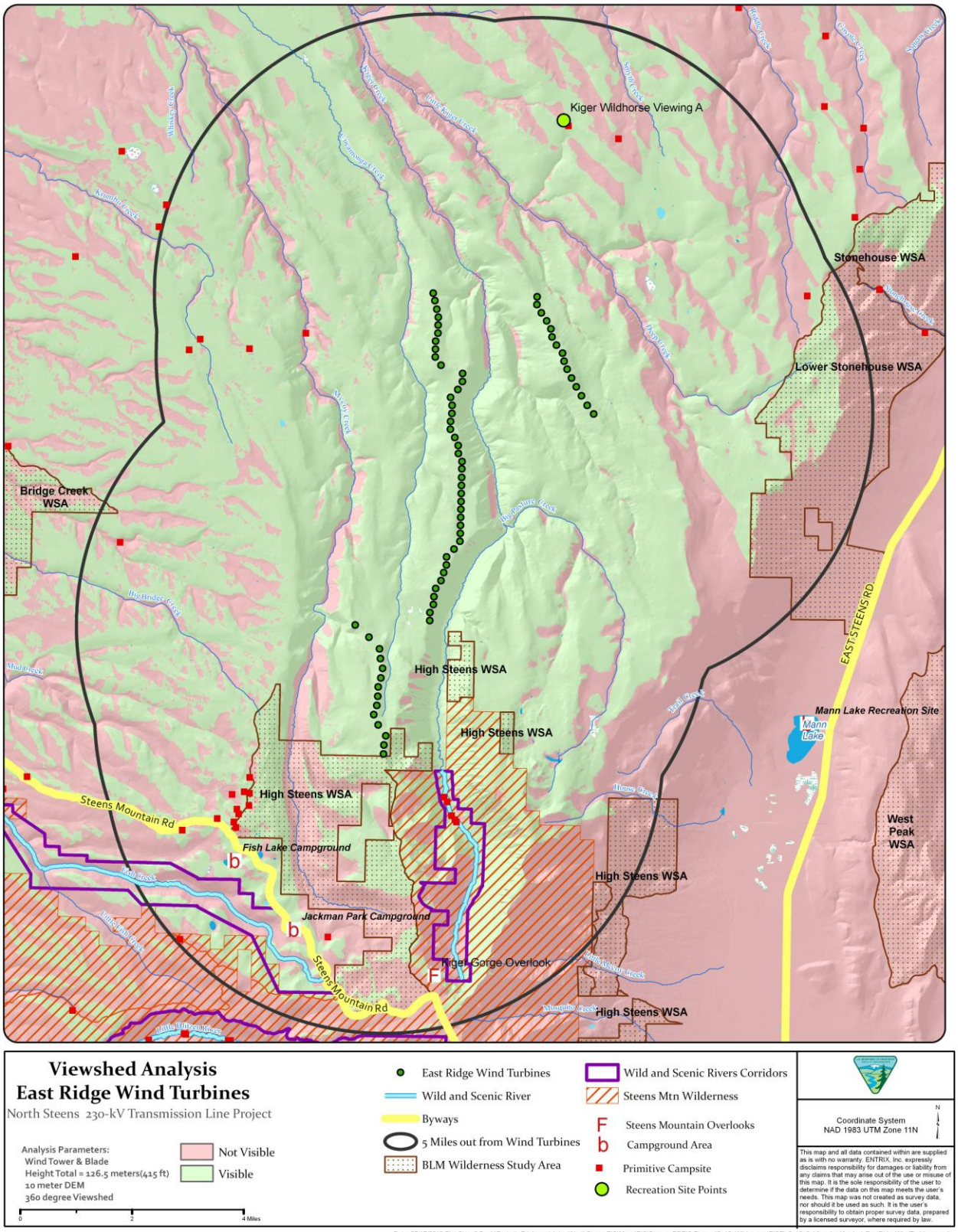

Figure 3.19-13 Viewshed Analysis East Ridge Wind Turbines

Table 3.19-4 Acres of WSRs, WSAs, and the Steens Mountain Wilderness with Views of East Ridge, West Ridge, and Riddle Mountain Wind Energy Projects

Names of WSA, WSR, or Wilderness Area	Acres with Views of East Ridge Wind Energy Project	Acres with Views of West Ridge Wind Energy Project	Acres with Views of Riddle Mountain Wind Energy Project
Steens Mountain Wilderness	4740.9 (2.8%)	2294 (1.3%)	N/A
Bridge Creek WSA	15.8 (0.1%)	1086.4 (7.6%)	N/A
High Steens WSA	3057.9 (21.7%)	3897.5 (27.7%)	N/A
Lower Stonehouse WSA	1514.74 (20.3%)	N/A	N/A
Sheepshead Mountains WSA	N/A	N/A	900.8 (1.7%)
Stonehouse WSA	N/A	N/A	1546.3 (6.8%)
Donner und Blitzen – Fish Creek WSR	604.2(15.6%)	661.8 (17.1%)	N/A
Kiger Creek WSR	622.7 (37.9%)	1 (<0.0 %)	N/A
TOTAL	**10,556.2**	**7940.7**	**2447.1**

Assumptions: 10 DEM; wind tower and blade height total = 126 meters (415 ft); transmission tower heights = 24 meters (80 ft); 360 degree viewshed.

Auditory effects from noise generated during the operation of the East Ridge and West Ridge Wind Energy Projects would also affect wilderness values of solitude and primitive and unconfined recreation in the Steens Mountain and High Steens WSA. Due to the close proximity of these two projects, the areas within these respective land classifications that are within 1.75 miles of these two projects would experience noise that does not exceed the level where mitigation is required for sensitive receptors (36 dBA). The sense of solitude in these areas would be diminished by project operations. In addition, some opportunities for primitive and unconfined recreation located near the West Ridge Wind Energy Project would be diminished as visitors seek alternative primitive campsites that feature less noise.

Cumulative Effects on Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The incremental cumulative effect on the Steens Mountain Wilderness, Wilderness Study Areas, and Wild and Scenic Rivers from Echanis Winder Energy Project and North Steens 230-kV Transmission Line Project would primarily be related to visual and auditory effects to wilderness values of solitude and primitive and unconfined recreation within the Steens Mountain Wilderness and WSAs and scenic resource values of WSRs. Assuming all four wind energy projects planned for the region were constructed and connected to the North Steens Transmission line, the cumulative effects from these projects would permanently diminish these values in the areas noted in Table 3.19-5 and further described in Section 3.13 and Figures 3.19-11, 3.19 -12, 3.19-13, 3.13-4, and 3.13-5.

Table 3.19-5 Acres of WSRs, WSAs, and the Steens Mountain Wilderness with Views of the Proposed East Ridge, West Ridge, Riddle Mountain Wind Energy Projects, and the Echanis Wind Farm and Transmission Line

Names of WSA, WSR, or Wilderness Area	Acres with Views of Echanis Wind Energy Project (% of total WSA, WSR, or Wilderness Area acreage)	Acres with Views of Transmission Line (% of total WSA, WSR, or Wilderness Area acreage)	Acres with Views of East Ridge Wind Energy Project (% of total WSA, WSR, or Wilderness Area acreage)	Acres with Views of West Ridge Wind Energy Project (% of total WSA, WSR, or Wilderness Area acreage)	Acres with Views of Riddle Mountain Wind Energy Project (% of total WSA, WSR, or Wilderness Area acreage)
Steens Mountain Wilderness	668 (0.4%)	822 (0.5%)	4740.9 (2.8%)	2294 (1.3%)	N/A
Bridge Creek WSA	N/A	N/A	15.8 (0.1%)	1086.4 (7.6%)	N/A
High Steens WSA	942.2 (6.6%)	183.0 (1.3%)	3057.9 (21.7%)	3897.5 (27.7%)	N/A
Lower Stonehouse WSA	4646.1 (62.4%)	342.5 (4.6%	1514.7 (20.3%)	N/A	N/A
Sheepshead Mountains WSA	N/A	N/A	N/A	N/A	900.8 (1.7%)
Stonehouse WSA	756.6 (3.4%)	N/A	N/A	N/A	1546.3 (6.8%)
Heath Lake WSA	64.7 (0.3%)	N/A	N/A	N/A	N/A
West Peak WSA	1261.5 (14.7%)	N/A	N/A	N/A	N/A
Donner und Blitzen – Fish Creek WSR	N/A	N/A	604.2 (15.6%)	661.8 (17.1%)	N/A
Kiger Creek WSR	N/A	37.9 (2.7%)	622.7 (43.9%)	1 (<.00%)	N/A
TOTAL Affected Acres	**8330.1**	**1385.4**	**10,556.2**	**7940.7**	**2447.1**

Assumptions: 10 DEM; wind tower and blade height total = 126 meters (415 ft); transmission tower heights = 24 meters (80 ft); 360 degree viewshed.

3.19.2.14 Transportation

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for Transportation includes the network of state highways, county roads, private roads, and BLM and USFWS service roads located in the broader geographic region surrounding the Project Area. The timeframe of the analysis extends from the early 1900s when the first major county roads were built and extends through the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Transportation Network and How it has been Affected by Past and Present Actions

The existing network of state highways and county roads in the region is not substantially different from the network that existed in 1914 when the State Legislature first adopted a statewide highway plan that included a proposed east-west route that would extend through the town of Burns. Surface improvements and road widening occurred in the 1930s and additional upgrades occurred in the post-war years from 1944 to 1950. By that time, the basic network was in place and included the routes that would become known as US Highways 20 and 395, State Highways 205 and 78, and the county roads South Diamond Lane and Lava Beds

Road. Traffic volumes on most highways and roads in the rural portions of the region are low and notable delay at unsignalized intersections is uncommon. Accident rates on certain segments of the network are higher than other rural roadways in the State, most likely due to weather related conditions (ODOT, 2010).

Effects of Reasonably Foreseeable Future Actions on Transportation without the Proposed Action

Development of the other three wind energy projects planned for the region would effect transportation primarily during the construction phase when workers would travel to each site in private vehicles and building materials and turbine components would be hauled to each site using special oversized trucks. Depending on the points of origin and destination, workers traveling to each site and trucks hauling construction equipment and project components would use Highways 20, 205, or 78. Vehicles using Highway 20 would travel through the Cities of Burns and Hines and travel south on Highway 205 to South Diamond Lane to access the West or East Ridge sites. Vehicles using Highway 78 to access the same sites would travel to New Princeton and use Lava Beds Road and South Diamond Lane to connect to access roads to each site. Vehicles traveling to the Steens Mountain site would likely access roads directly off of Highway 78.

Construction activities at each site would likely last 9 to 12 months. During this time workers would travel to and from the site each day using private vehicles. Each workday there would be an increase in traffic in the region due to the presence of construction workers and the delivery of project components and supplies. Increased traffic volumes would be expected during the morning and evening commute times on Highways 205 and 78, South Diamond Lane, and Lava Beds Road (for West and East Ridge projects). Highway 78 and possibly Lava Beds Road would provide connections to the Riddle Mountain project. The daily commute patterns of construction workers would likely have a noticeable effect on turning movements on affected roads, especially if construction of more than one project were to occur at the same time.

The specialized trucks used to transport wind turbine components would use state highways and county roads to access each site. Trucks would travel on Highway 20 through the Cities of Burns and Hines to access Highway 205 or 78. From Burns, trucks would travel south on Highway 205 to South Diamond Lane to access roads to the West and East Ridge project sites. Highway 78 would likely provide the primary connection to access roads to the Riddle Mountain project. Road improvements may be required at certain locations to accommodate the required turning radius of the specialized trucks. Bridges on rural roads that may have existing load limits may need to be improved or replaced to remove restrictive load limits. During peak construction activity, a large number of specialized trucks (up to five per hour) could be hauling oversize loads at relatively low speed on two-lane rural roads. This could increase the risk of traffic accidents, especially if construction of more than one project were to occur at the same time.

Each project would require access roads large enough to accommodate specialized trucks. Access roads would need to be widened, improved, or extended, and portions of these roads would be located on public and private land within either the Andrews RA or the Three Rivers RA. While the West Ridge and East Ridge projects are both located on private land, the entire West Ridge site, and the northern half of the East Ridge site, would be located within the boundaries of the Steens Mountain CMPA. Any facilities related to these projects proposed on public land within the CMPA would be prohibited in accordance with the provisions in the Steens Act.

The two BLM restoration projects actively underway in the region (the Five Creeks Rangeland Restoration Project and the North Steens Ecosystem Restoration Project) would not result in effects on the transportation system except for possible temporary restrictions on road use during prescribed burns.

The Steens Mountain Travel Management Plan (TMP) augments the CMPA Transportation Plan (which is part of the Steens Mountain CMPA RMP) using an updated route inventory to further define the motor

vehicle route network within the CMPA. The TMP provides guidance on maintenance, improvement, and accessibility of these routes. Objectives for developing the TMP included how best to manage travel in the CMPA while protecting resources including wilderness characteristics, providing for "reasonable" access to private lands, providing for sustainable livestock grazing, providing recreation opportunities, and otherwise meeting RMP land management objectives. The TMP would apply to proposed improvements to existing access roads to provide access for the specialized trucks hauling oversized loads to the West and East Ridge project sites. Any access road improvements across public land within the Steens Mountain CMPA would be prohibited in accordance with the provisions in the Steens Act.

The Jackass Butte Wind Energy Site Testing and Monitoring Site would not have an effect on transportation.

Potential effects on transportation that could occur if upgrades are made to the HEC 115-kV line that parallels Highway 205 (if Alternative B is selected) or to the existing HEC 115-kV line that runs east/west through the community of Crane (if Alternative C is selected) would include workers traveling to and from the Project site each workday using private vehicles. This would slightly increase traffic on local roads in and around the areas of construction. Additional traffic related effects would include trucks hauling construction materials, components, and supplies to temporary laydown areas and tensioning sites. Trucks hauling materials and components would use Highway 205 to travel to and from most access roads, laydown areas, and tensioning sites for upgrades to the HEC 115-kV line that parallels Highway 205. Trucks would likely use Highways 20 and 78 for upgrades the HEC 115-kV line that runs east/west through the community of Crane. While the disruption to existing traffic patterns would likely be limited to construction traffic entering and leaving state highways and county roads, additional truck traffic could increase the risk of traffic accidents, especially if upgrades to the HEC line were conducted at the same time work is occurring in the region on multiple wind energy projects at the same time.

Cumulative Effects on Transportation from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

The incremental cumulative effect on transportation from the Echanis Wind Energy Project and North Steens 230-kV Transmission Line project would primarily be related to the temporary effects on the transportation network during construction. Assuming all four wind energy projects planned for the region were constructed at the same time, along with the North Steens Transmission Line (either Alternative B or C), during peak activity as many as 200 truck trips per day could be traveling state highways and county roads within the region. Most of these truck trips would be the specialized trucks hauling oversize loads of turbine components to each site. These trucks would likely travel Highway 20 through the Cities of Burns and Hines to connect to Highways 205 and 78. Highway 205 between Burns and South Diamond Lane would experience a notable increase in truck traffic, as would Highway 78 between Burns and East Steens Road. Trucks traveling on state highways and county roads could increase the risk of traffic accidents, especially when hauling oversize loads at relatively low speed on two-lane rural roads.

In addition, a substantial number of miles of new and improved access roads would be developed across public and private lands with the Three Rivers and Andrews RAs. Assuming each wind energy project requires approximately 20 miles of new or improved on-and off-site access roads, in addition to the approximately 30 miles of new, improved and overland roads required by either transmission line route alternative, over 100 miles of new access road could be constructed within the region. Any access road improvements across public land within the Steens Mountain CMPA would be prohibited in accordance with the provisions in the Steens Act.

3.19.2.15 Public Health and Safety

Geographic Scope and Timeframe for Analysis

Public health and safety issues related to construction and operation of wind projects and transmission lines in Harney County include fire hazards and the presence of hazardous materials. The geographic scope of the cumulative effects analysis for public health and safety includes a 150-foot wide corridor along the route alternatives (i.e., 75 feet on each side of the ROW centerline), in addition to the access roads, interconnection stations, substation, and the Echanis Wind Energy Project. The timeframe of the analysis extends from the historical past when Euro American settlers began to introduce hazardous materials and unnatural sources of fire and extends into the future, to include the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Public Health and Safety and How it has been Affected by Past and Present Actions

The Project Area is located in a region susceptible to large-scale wildfires. Past and continuing fire management activities by BLM, including the Five Creeks Rangeland Restoration Project, are intended to reduce hazardous fuels and restore or increase system functionality. Prescribed burns have reintroduced fire to the natural landscape to restore and/or maintain natural fire regimes.

Existing and past land use activities are potential indicators of hazardous materials storage and use. The Proposed Action and Action Alternatives would be located in a rural area that is designated as Farm & Ranch Use under the Harney County Land Use Planning Zones. Unknown contamination could have resulted from farms that commonly have old or inactive underground storage tanks or from pesticide-laden runoff from agricultural properties. However, given the Project Area remains largely undeveloped, it is unlikely a notable amount of environmental contamination is present along the route alternatives.

Effects of Reasonably Foreseeable Future Actions on Public Health and Safety without the Proposed Action

Fire management activities by BLM (the two restoration projects) would result in reduction of hazardous fuels and restoration of the natural fire regime and are therefore considered positive effects. The fire hazards that have the potential to occur from the proposed wind projects are the same as those that could occur related to the Echanis Wind Energy Project. In addition, identical fire hazards would be associated with the HEC 115-kV line upgrade. No fire hazards would be associated with the Transportation Management Plan.

The same potential for environmental contamination from a hazardous materials spill, or encountering hazardous materials during construction, exists for the proposed wind projects as for the Echanis Wind Energy Project. In addition, identical hazardous materials effects would be associated with the HEC 115-kV line upgrade and the construction and operation of any transmission lines associated with the proposed wind projects as for the proposed North Steens 230-kV Transmission Line. The two restoration projects, the transportation management plan, and the wind test site would not affect hazardous materials.

Cumulative Effects on Public Health and Safety from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

A record search of the Oregon Department of Environmental Quality's Environmental Cleanup Site Information (ECSI) database reveals 52 sites with known or potential contamination from hazardous materials located within Harney County (DEQ, 2010). Of these, four sites would be located within one mile of the proposed transmission line under Alternative C:

- Anderson Valley Supply, Crane (Site ID: 5186).
- Crane Bulk Plant, Crane (Site ID: 2779).
- Crane Disposal, Crane (Site ID: 5187).
- Crane Gas Station (Site ID: 3109).

These sites would be located north of the Project Area within the community of Crane. None of these sites would be disturbed by the Proposed Action, Action Alternatives, of the RFFAs.

Cumulative effects from the project and the proposed Riddle Mountain Wind Farm, East Ridge Wind Project, West Ridge Wind Project, and HEC 115-kV line upgrade would be expected to occur if construction and operation of the projects resulted in an increase in the risk of wildfires or an increase in environmental contamination from improper use, storage, and disposal of hazardous materials. However, the project proponents would likely apply the same fire protection measures and project design features specified in the Section 2 Appendix to the proposed Riddle Mountain Wind Farm, East Ridge Wind Project, West Ridge Wind Project, and HEC 115-kV line upgrade. Therefore, the cumulative fire hazards and cumulative effects from potential hazardous material spills associated with these projects would be minimized.

In addition, cumulative effects from the Proposed Action or Action Alternatives, the Riddle Mountain Wind Farm, East Ridge Wind Project, West Ridge Wind Project, and HEC 115-kV line upgrade would be expected to occur if construction resulted in significant volumes of contaminated soil requiring off-site treatment that, as a combined volume, exceeded the capacity of available treatment facilities. However, based on the rural character of the Project Area, it is not anticipated that significant quantities of contaminated soil would be discovered during construction of the proposed projects; therefore, cumulatively effects related to hazardous materials discovery are unlikely to occur.

3.19.2.16 Air Quality

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis of air quality and climate change extends beyond the Project Area defined for the analysis of direct effects. It includes the broader geographic region, i.e., eastern Oregon, western Idaho, and northern Nevada, surrounding the Project Area and encompasses a larger extent of the airshed to include all or portions of the identified reasonably foreseeable future actions. In addition to the regional airshed generally affected by criteria emissions, world climate is cumulatively affected by greenhouse gas emissions.

The timeframe of the analysis extends from 2007 through the 40 year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project. For greenhouse gas emissions, the timeframe extends beyond 100 years in the earth's atmosphere.

Existing Air Quality and How it has been Affected by Past and Present Actions

The Proposed Action and Alternative Actions are located in Harney County in southeastern Oregon at the northwestern extremity of the Great Basin. While sparsely populated, it is the largest county by land area in the state and is currently in attainment for all national ambient air quality standards (NAAQS) except $PM_{2.5}$ for which it is unclassified, pending EPA certification of three years of federal reference data collected during 2007, 2008, and 2009 (DEQ, 2008b). Historically and presently, generation of fugitive dust from unpaved road use and agricultural operations and smoke from residential and agricultural wood burning affects ambient PM_{10} and $PM_{2.5}$ concentrations, along with occasional wildfires and prescribed burns. Due to the

semi-arid climate which reduces precipitation capture (washout), PM_{10} and $PM_{2.5}$ emissions can have a noticeable impact on ambient air quality in the region, more so than gaseous pollutants (i.e., VOC, NO_X, CO, SO_2) which are more readily dispersed.

Effects of Reasonably Foreseeable Future Actions on Air Quality without the Proposed Action

Each of the three potential wind farm projects (West, East, Riddle) are about the same size (104 MW) as the Proposed Action (105 MW), therefore, each would have about the same air quality and greenhouse gas impacts from construction as the Proposed Action. Like the Proposed Action, operational emissions from any of these projects would be *de minimis* (minimal). Due to construction resource constraints (i.e., capital, labor, equipment, materials), it is unlikely that all three projects would be built simultaneously with the Proposed Action, or with each other, in the foreseeable future. Since construction emissions are temporary and permanently cease upon completion of work, it is also unlikely that emissions from one project would overlap (combine) with emissions from another project to create a net cumulative impact in the region. This, against the background of overall good air quality (i.e., attainment), would preclude any significant degradation of ambient air quality in the region due to cumulative effects of wind farm and transmission line construction.

Unlike criteria emissions which generally have a temporal impact on regional air quality, greenhouse gas emissions tend to accumulate in the atmosphere over time due to their long half-lives. The three potential wind farm projects would emit about the same amount of GHGs as the Proposed Action during construction. The HEC 115-kV line upgrade, if undertaken, would also add to this total, however, the aggregated proportion of Oregon's GHG inventory would remain about 0.005 percent due to its relatively small incremental contribution, which is not cumulatively substantial.

For the Jackass Butte site, there are currently no development plans, therefore, no potential for cumulative construction-related emissions of criteria pollutants or GHGs. Site maintenance emissions (vehicle traffic) are *de minimis*, both now and into the foreseeable future. For the HEC 115-kV line upgrade, construction activities and resultant criteria emissions would be similar to those of the transmission line portion of the Proposed Action.

The two land management projects, Five Creeks Rangeland Restoration and the North Steens Ecosystem Restoration Project would emit VOC, NO_X, CO, SO_2, PM_{10} and $PM_{2.5}$ caused by mechanical removal and burning of invasive vegetation (juniper) planned for the 2010 and 2011 timeframe and perhaps thereafter. The use of diesel- and gasoline-powered equipment and vehicles would result in emissions of combustion byproducts and fugitive dust. Prescribed burning would emit noticeable quantities of VOC, PM_{10}, and $PM_{2.5}$ in the form of wood smoke. Due to the aromatic nature of juniper, the smoke would have a distinctive odor and, depending wind conditions, could disperse over wide area with resulting impacts on visibility and aesthetics in an otherwise fairly "pristine" area. The BLM would coordinate with the DEQ to determine prescribed "burn days" with predicted favorable wind conditions to mitigate the cumulative effects of smoke (i.e., through dispersion) in the region. The two land management projects would also cause emissions of greenhouse gases due to motor fuel combustion and prescribed burning. These GHGs would also accumulate in the atmosphere, however, they would nevertheless represent a small fraction of Oregon's GHG inventory and thus should not be cumulatively substantial.

The Steens Mountain Travel Management Plan focuses on multi-modal forms of travel within the planning area, including on-highway vehicles (e.g., 4-wheel drives), off-highway vehicles (OHVs, e.g., all-terrain vehicles or ATVs), mountain bikers, equestrians, and hikers. Operation of on- and off-highway motorized vehicles results in emissions of VOC, NO_X, CO, SO_2, PM_{10} and $PM_{2.5}$ in the form of engine exhaust and fugitive dust. To a very negligible degree, non-motorized travel also generates fugitive dust during dry weather. In comparison to the overall inventory of mobile-source emissions within the state and region, the managed (i.e., limited) use of motor vehicles in the planning area results in *de minimis* emissions.

Cumulative Effects on Air Quality from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

For the Proposed Action or Alternatives, actual construction is expected to require about 6 months of planned work activities; construction could be distributed over a 10 month or longer period if work stoppages are required as a result of inclement weather or other factors. Extending the schedule to 12 months would not affect cumulative daily or annual emissions because maximum daily emissions (pounds per day) and total emissions (tons per year) would remain unchanged. Construction would likely occur sometime during the 2012 to 2017 timeframe contingent upon permitting, acquisition, and financing issues. Temporary effects to local air quality could result from engine exhaust and fugitive dust emissions caused by operation of offroad construction equipment and onroad vehicles. All construction emissions would be temporary and would permanently cease upon completion of work.

Due to the generally similar nature and magnitude of Alternatives B and C, overall cumulative effects of these Alternatives would be substantially similar, as discussed below.

In the highly improbable scenario that all four wind farm construction projects should somehow occur simultaneously, no criteria pollutant (PSD) thresholds identified in Section 3.18 would be exceeded except for fugitive dust PM_{10}. More realistically, if any two projects were built at the same time, no thresholds would be exceeded for any pollutant, and cumulative effects would not be substantial with respect to PSD thresholds.

In terms of GHG, the net cumulative effect if all four wind projects were built over the course of several years would be about four times the amount of greenhouse gases as emitted by construction of the Proposed Action or Action Alternatives, or about 3,400 tons CO_2 equivalents, which is about 0.005 percent of Oregon's 67.5 million metric tonnes of CO_2 equivalents emitted annually (DEQ 2009a). Such a small percentage is well within the estimation error of the GHG inventory and thus not cumulatively substantial. The HEC 115-kV line upgrade would add to this total, however, its relatively small incremental contribution in combination with the other project would not represent a cumulative impact. The Jackass Butte site and the HEC 115-kV line upgrade, would not contribute to cumulative effects.

Prescribed burning related to the Five Creeks Rangeland Restoration and the North Steens Ecosystem Restoration Project would likely occur in the future, possibly concurrent with the Proposed Action or Action Alternatives. The magnitude and extent of the potential cumulative air impacts would depend on the timing, extent, and design of prescribed burning activities. The two restoration projects would also cause GHG emissions to accumulate in the atmosphere. However, these emissions would represent a small fraction of Oregon's GHG inventory and therefore should not be cumulatively substantial when combined with the Proposed Action and Action Alternatives.

The Steens Mountain Travel Management Plan is related to *de minimis* emissions, meaning that the plan would not contribute to cumulative impacts.

3.19.2.17 Noise

Geographic Scope and Timeframe of Analysis

The geographic scope for the cumulative effects analysis for noise extends beyond the Project Area as defined for the analysis of direct effects. It includes the broader geographic region surrounding the Project Area, and envelopes a larger extent of the landscape to include all or portions of the identified reasonably foreseeable future actions.

The timeframe of the analysis extends from the historical past when Euro American settlers began to alter noise conditions in the area by actions such as mining, farming, cattle ranching, and sheep grazing, and extends into the future to include the 40-year operational life of the Echanis Wind Energy project and the North Steens Transmission Line Project.

Existing Noise and How it has been Affected by Past and Present Actions

Implementation of past and present actions in the vicinity of the Project area has not resulted in lasting noise effects. The Project vicinity continues to enjoy relatively low noise levels on a continual basis. The Proposed Action area is located in rural agricultural and wilderness environments with limited, dispersed noise sources. It is estimated the existing ambient noise level in the Project area is in the range of 26 to 35 dBA (wilderness area) (OAR 2009, EPA 1978).

Effects of Reasonably Foreseeable Future Actions on Noise without the Proposed Action

Each of the three potential wind farm projects (West, East, and Riddle) are about the same size (104 MW) as the Proposed Action (105 MW), therefore, each would have about the same noise effects from construction and operation as the Proposed Action. Project construction noise effects would be localized, temporary, and short-term. Nonetheless, these temporary activities would result in noise levels for nearby receptors above the OEQC L_{10} (intrusive noise) and L_{50} (median noise) standards for daytime, and at times above the L_1 (annoying noise) standard for daytime. The noise effects resulting from operation of each of these projects would likely be minor or not noticeable given the spatial distances between the Project Area and noise sensitive receptors.

Cumulative Effects on Noise from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Project construction noise effects would be localized, temporary, and short-term. Nonetheless, these temporary activities would result in noise levels for nearby receptors above the OEQC L_{10} (intrusive noise) and L_{50} (median noise) standards for daytime, and at times above the L_1 (annoying noise) standard for daytime. The noise effects resulting from operation of the transmission line and wind turbines would be minor or not noticeable given the spatial distances between the Project area and noise sensitive receptors.

Cumulative noise effects typically occur when noise receptors are exposed to noise from sources at approximately the same time. Consequently, cumulative effects on noise levels resulting from construction and operation of the Project and any future noise producing projects in the area would depend upon noise levels associated with those projects in the context of ambient noise levels at that time. For the reasonably foreseeable future actions, there could be cumulative noise effects if these actions are undertaken simultaneously and in relative close relation to each other.

3.19.2.18 Energy

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis is the 150-foot wide corridor as identified by the Echanis Project transmission alternatives and any additional transmission infrastructure required to connect the East Ridge, West Ridge, and Riddle Mountain Wind Projects to the Proposed Action and Action Alternatives. The timeframe for the cumulative effects analysis begins in the early 1950s when HEC was

established and extends over the operational life of the transmission line and Echanis Wind Energy Project, which is estimated to be 40 years after installation.[5]

Existing Energy Conditions and How they have been Affected by Past and Present Actions

Past actions that have affected energy conditions and production in the area include the renewable portfolio standard (RPS), which was passed in 2005 in Oregon. The RPS requires the largest utilities in Oregon to provide 25 percent of their retail sales of electricity from newer, clean, renewable sources of energy by 2025. Intermediate goals for these large utilities are 5 percent by 2011, 15 percent by 2015, and 20 percent by 2020. Smaller utilities (those providing between 1.5 and 3 percent) are required to provide 10 percent of their retail sales from clean, renewable power sources by 2025, and the smallest utilities (those providing less than 1.5 percent) must provide 5 percent of their retail sales from clean, renewable power sources by 2025. Eligible resources include wind, solar photovoltaic and solar thermal, wave, tidal, and ocean thermal, geothermal, some categories of hydropower, and some biomass and biomass byproducts (ODE, 2009). Of these, wind is by far the largest and fastest growing in Oregon.

Present actions affecting energy in the Project Area include nearby transmission lines and energy generating facilities. HEC currently operates the existing 115-kilovolt (kV) transmission line near Diamond Junction, Oregon. BPA's transmission system currently has 21 wind energy generating facilities (with over 2,200 MW) interconnected, and those numbers are increasing quickly. BPA is currently developing programs to approach the challenges of providing transmission services to additional wind energy generating resources (BPA, 2009).

Effects of Reasonably Foreseeable Future Actions on Energy without the Proposed Action

Reasonable and foreseeable future actions that are likely to affect energy generation in the Project Area include the construction of the East Ridge, West Ridge, and Riddle Mountain Projects. These three other wind energy projects are expected to each contribute the same generating capacity as the Echanis project. As stated above, HEC currently operates the existing 115-kilovolt (kV) transmission line near Diamond Junction, Oregon, to which the proposed line is planned to connect. Further, HEC will take ownership, assuming all responsibility for operations and maintenance, of the proposed transmission line once it becomes operational. The addition of the four proposed wind energy projects would require the North Steens transmission line to be developed to its full 230-kV capacity, which in turn would require the current HEC 115-kV line to be reconfigured to include a 230-kV circuit on one side and a 115-kV circuit on the other.

The remaining reasonable and foreseeable future actions include the Five Creeks Rangeland Restoration, Steens Mountain Travel Management Plan, North Steens Ecosystem Restoration Project, Jackass Butte Wind Energy Testing and Monitoring Site, and the Harney Electric Cooperative 115-kV Line Upgrade and would not affect energy resources in the Project Area.

Cumulative Effects on Energy from Reasonably Foreseeable Future Actions, including the Proposed Action and Action Alternatives

Electricity transmission in Harney County is primarily provided by HEC and BPA. The four wind energy projects would produce peak power during winter months, which would be beneficial to the integrated transmission and power system.[6] While adding these resources to the power grid would increase the amount

[5] Manta, Harney Electric CO-OP, Website (http://www.manta.com/c/mmb63sj/harney-electric-co-op) accessed April 13, 2010.

[6] Ramsayer, Kate, 2008, *Oregon Runs Faster to Catch the Wind*, The Seattle Times, August 12, http:///seattletimes.nwsource.com/htms/businesstechnology/2008106953_windpower12.html, accessed December 8, 2009.

of energy without capacity into the system, the energy variability would occur at times that would compliment the Columbia Gorge projects, potentially benefitting the balancing required by BPA.

The West Route under Alternative B, including either South Diamond Lane or Hog Hollow option, would provide a direct route to the HEC 115-kV transmission line, which would interconnect the proposed line to the BPA integration point. The power would then be able to be transmitted through the BPA transmission system to Southern California Edison (SCE). The existing HEC 115-kV line would remain operational during the first phase of the proposed line, during which it would carry one three phase circuit.

Together, East Ridge, West Ridge, Riddle Mountain, and the Echanis Project would require the North Steens Transmission Line Project to be developed to its full 230-kV capacity, which in turn would require the existing HEC 115-kV line to be reconfigured for approximately 35 miles between the interconnection station and the BPA Harney substation to include a 230-kV circuit on one side and a 115-kV circuit on the other. The additional segment of transmission line required to connect the Riddle Mountain Project to the North Steens transmission line under Alternative B would be longer than the segment required under Alternative C.

The combined effects of East Ridge, West Ridge, Riddle Mountain, and the Echanis Project under Alternative C North Route would be the same as discussed in Alternative B, with the exception that the Alternative C route is longer than the Proposed Action (Alternative B) and therefore would be subject to a larger potential energy loss compared to the shorter route. Energy is lost through transmission lines due to resistance (line loss). Line losses decrease with higher voltage and increase with higher distance and higher loads. Together, East Ridge, West Ridge, Riddle Mountain, and the Echanis Project would require the existing HEC 115-kV line to be reconfigured for approximately 20 miles between the interconnection station in Crane and the BPA Harney substation to accommodate development of the line to its full 230-kV capacity.

Combined, the four wind energy projects and the HEC 115-kV Upgrade will contribute approximately 416 megawatts of wind energy production, which would provide enough power for approximately 124,000 homes annually.

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