# Chapter 21 Air Quality

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

This chapter describes existing air quality in the project area, and how the project alternatives could affect air quality. Related information can be found in Chapter 22, Greenhouse Gases.

## 21.1 Affected Environment

The airsheds in the project area are regulated by the Southwest Clean Air Agency (SWCAA) in Washington and the Department of Environmental Quality (ODEQ) in Oregon (SWCAA 2011; ODEQ 2011). Both the SWCAA and ODEQ are delegated by the EPA to implement requirements of the Clean Air Act (CAA) and their own air quality programs. However, the SWCAA, ODEQ, and EPA do not have air quality rules or permitting programs for transmission lines.

Both the SWCAA and the ODEQ operate monitoring stations throughout their respective jurisdictional areas. Based on data collected, the action alternatives are within airsheds that are in "attainment or unclassified" for the national ambient air quality standards (NAAQS) for all pollutants. The pollutants for which the airsheds are "in attainment or unclassified" are carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and particulate matter (PM) including PM 2.5 (less than 2.5 microns in aerodynamic diameter), PM 10 (less than 10 microns in diameter (PM 10), and total suspended particulate. The Portland, Oregon and Vancouver, Washington areas are considered "**maintenance areas**" for carbon monoxide, meaning that, at one time, they were classified as "**non-attainment**," but currently demonstrate compliance with the NAAQS. The Portland and Vancouver metro areas have met the carbon monoxide standard since 1996.

Portions of the West Alternative, (Segment 52 and the Sundial substation site common to all action alternatives), are in the Portland/Vancouver metro area where there are more industrial sources of air pollution and higher levels of traffic congestion that create more air emissions. Longview, Washington is the second most populated portion of the project area (it is crossed by the West and Crossover alternatives and Central Option 2), experiencing moderate amounts of traffic-related air emissions and possible sources of air pollution from lumber mills and yards.

For the remaining portions of the action alternatives, the landscape is rural with few or no sources of industrial air pollution. Local air pollutant emissions in the rural areas are limited primarily to windblown dust from agricultural or logging operations and tailpipe emissions from traffic along highways and local roads.

Since regional visibility can be affected by air quality, some areas within the U.S. have been given elevated visibility status. Congress has required that air quality be preserved, protected, and enhanced in specific areas of national or regional natural, recreational, scenic, or historic value. These areas are defined as Class 1 areas. None of the action alternatives pass through or near the border of any Class 1 areas in Washington or Oregon.

# 21.2 Environmental Consequences

General impacts that would occur for the action alternatives are discussed below. Impacts would be similar for all action alternatives.

## 21.2.1 Impact Levels

Impacts would be **high** where project activities would cause the following:

- A permanent regional reduction in air quality
- A change in air quality that is a likely risk to human health and safety

Impacts would be **moderate** where project activities would cause the following:

- A permanent localized reduction in air quality
- A change in air quality that is a possible, but unlikely risk to human health and safety

Impacts would be **low** where project activities would cause the following:

- A temporary reduction in air quality near construction and vegetation clearing sites
- A change in air quality that is an insignificant or very unlikely risk to human health and safety

**No** impact would occur to air quality if there would be no measureable air emission increase above background levels and there is no increased hazard to human health and safety.

## 21.2.2 Impacts Common to Action Alternatives

### 21.2.2.1 Construction

Air quality impacts created by construction of the transmission line, substations, and access roads would be common to all action alternatives. The primary type of air pollution during construction would be particulate matter (PM), including dust from disturbed soils becoming airborne (fugitive dust) and combustion pollutants from equipment exhaust.

Construction is described in detail in Chapter 3, Project Components and Construction, Operation and Maintenance Activities. Construction activities that could create dust include road building and grading, on-site travel on unpaved surfaces, work area clearing and preparation for tower removal or construction, and blasting for tower footings. Many soils that would be crossed by the project are susceptible to erosion (see Chapter 14, Geology and Soils), and any disruption to these soils from these activities could create fugitive dust. Gravel used as surface material on unpaved access roads would reduce the amount of particulate matter released into the air. Using water on heavily travelled roads may be necessary during dry periods.

Vegetation removal may also emit fugitive dust. The action alternatives cross mostly forested land on proposed new or existing right-of-way. Most existing rights-of-way have been vacant for decades and the vegetation has not been cleared. Scattered among forested areas, the West Alternative contains open patches of land used for agriculture and pasture. The more eastern alternatives have similar open patches of land where acres of timber have been harvested and replanted with young trees. Erosion control measures and reseeding used on disturbed areas would reduce the amount of fugitive dust produced.

After merchantable timber is removed, clearing tall brush and low-growing trees and vegetation would produce debris that would need to be disposed of by lop and scatter, chipping, wood waste recycling, or transported to a landfill. These activities could create particulate matter including fugitive dust. No debris would be burned. Wind-caused erosion of disturbed areas could also contribute to fugitive dust.

Heavy equipment and vehicles, including those with diesel internal combustion engines, would emit pollutants such as carbon monoxide, carbon dioxide, sulfur oxides, PM 2.5, oxides of nitrogen, volatile organic hydrocarbons, aldehydes, and polycyclic aromatic hydrocarbons. All mobile equipment is required to comply with SWCAA, ODEQ, and EPA air quality standards.

The amount of pollutants emitted from construction equipment and vehicles would be comparable to the operation of agricultural and logging equipment in rural areas, and to land development activities in more urban and suburban areas.

Because construction activities would be localized and short-lived, impacts would be **low**. Substation construction would last from 13 to 24 months in one location, but would be localized in a small area; the first two phases of the three-phase substation construction would involve outdoor work with potential to impact air quality (see Chapter 3). Mitigation measures listed in Chapter 3 would be implemented to minimize the impacts that would occur. Under the action alternatives impacts to regional air quality from construction would be **low**.

#### 21.2.2.2 Operation and Maintenance

Transmission line operation would cause limited air emissions. During operation, high electric field strength causes a breakdown of air at the surface of the conductors called corona. Corona is most noticeable when the transmission line is wet from high humidity, fog, or precipitation. Small amounts of ozone and nitrogen oxides are produced as a result of corona. However, studies have shown that the resulting ambient concentrations are generally not detectable above background levels and would not have significant effects on humans, plants, or animals (Arora 1995). Potential emissions would be very small, temporary, and localized.

Maintenance of the transmission line, access roads, and substations would be infrequent and have minimal impact on air quality both locally and regionally. During the life of the project, BPA would perform routine maintenance and inspect transmission lines, make emergency repairs, occasionally access the substations, and manage vegetation to ensure the lines are not compromised. These activities would require maintenance vehicles to travel along paved and unpaved access roads. This would lead to temporary fugitive emissions of dust and exhaust from maintenance vehicles. Unpaved access roads may need additional blading and rocking to repair surface deterioration from vehicles and weather. These activities would be infrequent and temporary.

Impacts during operation and maintenance would be **low** because they would be temporary, can be mitigated, and are not a major influence to air quality on the regional scale. Discharges from corona would also have **no** impact to regional air quality because pollutants would be emitted intermittently and would not be detectable above background levels.

## 21.2.3 Recommended Mitigation Measures

Mitigation measures included as part of the project are identified in Table 3-2. The following additional mitigation measures have been identified to further reduce or eliminate adverse air impacts by the action alternatives. If implemented, these measures would be completed before, during, or immediately after project construction unless otherwise noted.

- Covering material transport vehicles to prevent materials from becoming airborne
- Lopping and scattering cleared vegetation within the right-of-way

## 21.2.4 Unavoidable Impacts

Unavoidable impacts on air quality would include fugitive dust and vehicle emissions.

## 21.2.5 No Action Alternative

Under the No Action Alternative, air emissions for construction, operation, and maintenance of the proposed project would not occur. However, urban traffic emissions and fugitive dust emissions from existing agricultural, forest, and industrial practices would continue. If the No Action Alternative leads to lower system reliability, it is possible that transmission line outages could occur, causing businesses and residents to use emergency generators, if available, or wood-burning stoves. The particulates emitted by these sources would create impacts in areas where they occur. Such emissions would be short-lived and widely dispersed throughout the outage area.

# Chapter 22 Greenhouse Gases

This chapter describes greenhouse gases and how the project alternatives could affect greenhouse gas emissions.

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

## 22.1 Affected Environment

Greenhouse gases (GHGs) are chemical compounds found in the earth's atmosphere that absorb and trap long-wave thermal radiation emitted by the land and ocean, and radiate it back to earth. The resulting retention and build-up of heat in the atmosphere increases temperatures, which causes warming of the planet through a greenhouse-like effect (EIA 2009b). This effect is commonly referred to as "global warming." Global warming has occurred in the past from natural processes, but evidence shows that it has accelerated in the past few centuries, especially since the Industrial Revolution, as a result of increased anthropogenic (caused or produced by humans) emissions of GHGs. For example, atmospheric concentrations of carbon dioxide ($CO_2$), a primary GHG, have continuously increased from about 280 parts per million (ppm) in preindustrial times to 379 ppm in 2005, a 35 percent increase (IPCC 2007). Anthropogenic activities are increasing atmospheric concentrations of GHGs to levels that could increase the earth's temperature up to 7.2°F by the end of the 21st century (EPA 2010b).

The GHGs present in the earth's atmosphere include water vapor ($H_2O$), ozone ($O_3$), $CO_2$, methane ($CH_4$), nitrous oxide ($N_2O$), and trace amounts of fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$) (EPA 2010b). GHGs are emitted into the atmosphere through both natural processes and anthropogenic sources. Along with clouds, water vapor (the most abundant GHG) accounts for the largest percentage of the greenhouse effect. However, water vapor concentrations fluctuate regionally, and human activity does not directly affect water vapor concentrations except at a local scale, such as near irrigated fields. Ozone is not directly emitted by anthropogenic sources, but is instead formed through chemical reactions with other pollutants. Ozone can be emitted by transmission line corona, as described in Chapter 21, Air Quality. The amounts emitted, however, are extremely small, temporary, and localized, and thus do not contribute in a measurable way to global warming (USDOE 2010).

The GHGs emitted from human activities that are typically inventoried in GHG analysis and reporting are $CO_2$, $CH_4$, $N_2O$, and fluorinated gases (EPA 2010b; The Climate Registry 2008). $CO_2$ is the major GHG emitted from anthropogenic sources, and $CO_2$ emissions from the combustion of fossil fuels constitute 81 percent of all U.S. GHG emissions (EPA 2010c; EIA 2009a). $CO_2$ enters the atmosphere primarily through the burning of fossil fuels such as coal, natural gas and oil, as well as from wood or biomass combustion, land use changes, and the manufacturing of cement. Similar to $CO_2$, $CH_4$ is emitted during the production and transport of fossil fuels, but is also released into the atmosphere as emissions from microbes, livestock, agricultural practices, and volcanoes. Atmospheric concentrations of $CH_4$ have increased 148 percent above pre-industrial levels (EPA 2010b). $N_20$ is emitted from agricultural and industrial activities and from the combustion of fossil fuels and solid waste; as well as naturally emitted from the breakdown of nitrogen in soils and the earth's oceans. Atmospheric levels of $N_20$ have increased 18 percent since the beginning of industrial activities (EPA 2010b).

Fluorinated gases, including HFCs, PFCs, and $SF_6$, are synthetic compounds emitted through industrial processes and now are being used to replace ozone-depleting compounds such as chlorofluorocarbons (CFCs) in insulating foams, refrigeration, and air conditioning. The most common use of $SF_6$ is as an electric insulator and interrupter in equipment that transmits and distributes electricity, such as substation equipment like circuit breakers and switches. The EPA requires electric utilities, like BPA, to report $SF_6$ emissions annually including those from equipment installation, use, decommissioning, and disposal (EPA 2008c). Although they are emitted in smaller quantities, fluorinated gases are powerful GHGs that have high global-warming potential (GWP) given their ability to trap considerably more heat than $CO_2$. Atmospheric concentrations of fluorinated gases have been increasing over the last two decades and are expected to continue to increase (EPA 2010b).

Over the last decade, a number of federal and state regulations have required the mandatory inventory and reporting of GHGs from large sources in the United States. In 2009, the EPA issued a rule on the Mandatory Reporting of Greenhouse Gases (EPA 2011b). The rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of **carbon dioxide equivalent** (**$CO_2e$**) to submit annual emissions reports to the EPA. Likewise, Executive Orders 13423 and 13514 require federal agencies to estimate, manage, and reduce GHG emissions by agency-defined target amounts and dates.

In the state of Washington, Executive Orders 07-02 and 09-05 issued by the governor direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce GHG emissions to 1990 levels by 2020 (Ecology 2010b). Similarly, in Oregon, House Bill 3543 (codified at Oregon Revised Statutes [ORS] 468A.205), directs state and local governments, businesses, nonprofit organizations, and individual residents to reduce GHG emissions in Oregon; by 2010, arrest growth of GHG emissions; by 2020 begin to reduce GHG levels to 10 percent below 1990 levels; and by 2050 achieve GHG levels at least 75 percent below 1990 levels (Oregon Global Warming Commission 2010).

Models predict that atmospheric concentrations of all GHGs will continue to increase over the next century, but the extent and rate of change is difficult to predict, especially on a global scale.

# 22.2 Environmental Consequences

General impacts that would occur for the action alternatives are discussed below. Impacts would be similar for all action alternatives.

## 22.2.1 Impact Levels

Impacts would be **high** where project activities would cause the following:

- Estimated GHG emissions exceed 4 million metric tons of $CO_2$ equivalent ($CO_2e$), the approximate GHG emissions from a major industrial combustion source (e.g., a 500-MW coal-fired generation facility)

Impacts would be **moderate** where project activities would cause the following:

- Estimated emissions exceed the annual Mandatory Reporting of Greenhouse Gases threshold outlined by the EPA, or 25,000 metric tons of CO2e, but are below the level of a baseload (500-MW) coal-fired generating facility. Assuming an average emission factor of 2,100 CO2e per megawatt hour (MWh) from coal consumption for electric generation, a 500-MW coal-fired generation facility would emit about 4 million metric tons of CO2e annually (EIA 2000). The annual emission range with a moderate impact would be between 25,000 and 4 million metric tons of CO2e.

Impacts would be **low** where project activities would cause the following:

- Estimated GHG emissions do not exceed the annual Mandatory Reporting of Greenhouse Gases threshold of 25,000 metric tons of CO2e as outlined by the EPA

**No** impact would occur where project activities would not create GHG emissions.

## 22.2.2 Impacts Common to Action Alternatives

Direct GHG emissions from non-generating utility projects, such as transmission line construction and operation and maintenance, are primarily limited to vehicle and equipment emissions, and the impacts to GHG concentrations from these projects typically are low. GHG emission estimates were calculated for each of the action alternatives using currently accepted guidance and methodologies developed by the EPA and Climate Registry, and are described below. Each action alternative would contribute to atmospheric GHG concentrations from the following sources:

- During construction, through the use of gasoline and diesel powered vehicles, including cars, trucks, construction equipment, and helicopters, and through soil-disturbing activities and vegetation removal (e.g., conversion of a forested area to an access road or cleared transmission corridor)
- During operation and maintenance, through the use of gasoline and diesel powered vehicles and helicopters for routine patrols of the transmission line corridor, maintenance project work (e.g., vegetation management, site-specific repairs of roads and transmission line towers), emergency maintenance, and resource review

In general, GHG emissions are inventoried for $CO_2$, $CH_4$, $N_20$, and high-GWP gases in terms of $CO_2e$, which is computed by multiplying the mass of the gas being measured (e.g., $CH_4$) by its estimated GWP (e.g., $CO_2$ =1, $CH_4$ =21, $N_20$ =310). For the proposed project, estimated emissions were calculated for each GHG based on project activities and converted to $CO_2e$ based on the GWP of the GHG emitted. The contributions from each gas were then combined to get the overall estimated $CO_2e$ emissions. These calculations were done for both project construction and project operation and maintenance.

### 22.2.2.1 Construction

Direct GHG emissions would result from construction workers commuting to and from the site, operating construction equipment (e.g., dozers, augers, backhoes, graders, heavy-duty trucks, and front-end loaders), and helicopter operation. To provide a conservative analysis and ensure

that the potential contributions to GHG concentrations from the project are adequately considered, the analysis was based on the following assumptions:

- Emissions were calculated based on a 30-month construction period.
- An average of 45 vehicles (i.e., standard pick-up trucks) per day would be needed to transport all construction personnel, with an average round trip distance of 100 miles per vehicle, per day.
- An average of 2 vehicles (i.e., standard pick-up trucks) per week would be needed to transport BPA staff to the project site, with an average round trip distance of 100 miles per vehicle.
- The fuel economy of a standard pick-up truck was estimated at 18 miles per gallon.
- An average of 2 helicopter round trips per day would be made for 10 months, with an estimated fuel economy of 4 miles per gallon and an average round trip distance of 100 miles.
- An average of 40 pieces of 200-horsepower construction equipment would be operating at full power for 8 hours per day, 5 days per week.

Estimation of GHG emissions from soil disturbance was not included in this analysis. Research has shown that these emissions are short-lived and return to background levels within several hours (Kessavalou et al. 1998; Aalde et al. 2006). Given that the methodology used to estimate vehicle emissions was overestimated, the low levels of GHG emissions from temporary soil disruption that would occur are considered to be accounted for in the overall construction emission rates.

Estimation of biogenic emissions from vegetation removal also was not included in this analysis. There would be no biomass combustion sources related to the project. In addition, while biomass combustion, biomass decay, and other vegetation changes are understood to cause the release of carbon from biogenic origins (i.e., carbon that was recently contained in living organic matter), the long-term effects of these changes are not well understood. Although various governmental agencies and committees, including the Intergovernmental Panel on Climate Change (IPCC), are working on developing a methodology to allow for quantification and reporting of biogenic emissions, an accurate and consistent methodology has yet to be developed. At this time, biogenic emissions related to land management and forestry do not need to be reported, and any direct or indirect emissions resulting from biomass combustion (i.e., biomass electrical generation facilities) should not be included with GHG emission calculations (The Climate Registry 2008). As with project-related soil disturbances, given that the methodology used to estimate vehicle emissions was overestimated, any GHG emissions from biogenic emissions that would occur are considered to be accounted for in the overall construction emission rates.

### 22.2.2.2 Operation and Maintenance

GHG emissions would also occur during operation and maintenance of the line, roads, and substations. Analysis was based on the expected annual occurrence of approximately 60 routine patrols, 160 routine maintenance work visits, 40 emergency maintenance visits, 8 natural resource reviews, and 2 aerial inspections via a helicopter. The helicopter and vehicles would most likely access the transmission line from the Portland or Vancouver metro area. The

average round trip would be about 100 miles. While annual variations would likely occur, operation and maintenance activities were conservatively assumed to be generally consistent over a 50-year period, the effective operating life of a transmission line.

### 22.2.2.3 Summary of GHG Contributions

The assumptions described above were used to estimate the overall GHG emissions for the construction period and the post-construction operation and maintenance activities of the proposed project (see Table 22-1). While all emissions of GHGs can be considered important in that they contribute to global GHG concentrations and climate change, the total estimated $CO_2e$ emissions from the project would be very low compared to emissions from significant industrial combustion sources and other regional sources. While BPA considered the potential emissions from all of the principal inventoried GHGs, $CO_2$ emissions would account for an estimated 27 percent of the total GHG contributions that would be emitted over the life of the project.

**Table 22-1 Estimated Greenhouse Gas Emissions from the Action Alternatives[1]**

| Estimated GHG Emissions of the Action Alternatives | $CO_2$ Emissions (in $CO_2e$ Metric Tons) | $CH_4$ Emissions (in $CO_2e$ Metric Tons) | $N_2O$ Emissions (in $CO_2e$ Metric Tons) | Total $CO_2e$[2] Emissions (in Metric Tons) |
|---|---|---|---|---|
| **During 30-Month Construction Period** | 25,500 | 2,000 | 12,100 | 39,600 |
| **During Annual Operations and Maintenance** | 680 | 190 | 2,700 | 3,600 |
| **Annualized Average Emissions[3] Over 50 Years** | 1,190 | 230 | 3,000 | 4,400 |

Notes:

1. Ozone is not included as $O_3$ emissions from transmission line corona would be small, temporary, and localized.
2. $CH_4$ and $N_2O$ emissions have been converted into units of $CO_2e$ using the IPCC GWP factors of 21 GWP for $CH_4$ and 310 GWP for $N_2O$.
3. Annual averages are based on the assumption that the effective operating life of the transmission line is 50 years.

Sources: EIA 2009, EPA 2011a

To provide context of the relative contribution level these GHG emissions represent, the EPA's mandatory reporting threshold for annual GHG emissions is 25,000 metric tons of $CO_2e$. This threshold is about equal to the amount of $CO_2$ generated by 4,400 passenger vehicles per year. This threshold requires federal reporting of GHG emissions, but does not require any other action (EPA 40 Code of Federal Regulations [CFR] Parts 86, 87, 89 et al.).

Construction would cause an estimated 39,600 metric tons of $CO_2e$ emissions over a 30-month period (see Table 22-1) or 15840 $CO_2e$ metric tons per year during the construction period, which would be roughly equivalent to 2,790 passenger vehicles per year. Operations and maintenance would cause an estimated 3,600 $CO_2e$ per years, which would be roughly equivalent to 630 passenger vehicles a year for all subsequent years of operations and maintenance. Averaging the direct contribution to GHGs over the operating life of the project (50 years) would cause an average annual GHG emissions of about 4,400 metric tons of $C0_2e$ (770 passenger vehicles). Given this relatively low level of annualized emissions, the impact on global GHG concentrations from the project would be **low**.

### 22.2.3 Recommended Mitigation Measures

Mitigation measures included as part of the project are identified in Table 3-2. Mitigation measures related to air emissions in Table 3-2, and such measures in Chapter 21, Air Quality, would help reduce contributions of the action alternatives to greenhouse gases.

### 22.2.4 Unavoidable Impacts

Unavoidable impacts would include slight increases in GHG emissions.

### 22.2.5 No Action Alternative

The No Action Alternative would have **no** GHG impacts because no new transmission lines, towers, access roads, or substations would be constructed. Impacts from operation and maintenance of existing lines and substations would continue unchanged.

# Chapter 23 Intentional Destructive Acts

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

Intentional destructive acts, that is, acts of sabotage, terrorism, vandalism, and theft, sometimes occur at power facilities, including transmission lines and substations. Vandalism and thefts are most common, especially theft of metal and other materials that can be sold. BPA has seen a significant increase in metal theft from its facilities over the past few years. Thefts increase when the price of metal is high on the salvage market. In the last 10 years, BPA has experienced over 200 thefts or burglaries. BPA estimates that the average monetary damage for each crime is $150,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage.

The impacts to the transmission system from vandalism and theft, though expensive, have not generally caused service disruptions to BPA's service area. Stealing equipment from electrical substations, however, can be extremely dangerous. Nationwide, many thieves have been electrocuted while attempting to steal equipment from energized facilities. Recent examples include the July 2011 electrocution death of a man attempting to steal copper from a Duke Energy substation in South Carolina, the August 2011 electrocution death of a man attempting to steal copper from an Entergy substation in Louisiana, the August 2011 severe burning of a woman attempting to steal copper from a Puget Sound Energy substation in Washington, the October 2011 electrocution death of a man attempting to steal copper from a Duke Energy substation in North Carolina, and the December 2011 electrocution death of a man attempting to steal copper from a Memphis Light Gas & Water substation in Tennessee.

Federal and other utilities use physical deterrents such as fencing, cameras, warning signs, rewards, etc., to help deter theft, vandalism, and unauthorized access to facilities. BPA also is in the process of replacing much of its solid copper wire with copper-coated steel wire, posting signage that indicates a trade has been made, and installing surveillance cameras to deter future break-ins. Transmission towers and overhead transmission conductors, however, are mostly on unfenced utility rights-of-way. Although towers are constructed on footings in the ground and are difficult to dislodge, they remain vulnerable to potential vandalism. In an effort to help prevent intentional destructive acts, BPA established a Crime Witness Program that offers up to $25,000 for information that leads to the arrest and conviction of individuals committing crimes against BPA facilities. Anyone having such information can call BPA's Crime Witness Hotline at 1-800-437-2744. The hotline is confidential, and rewards are issued in such a way that the caller remains anonymous.

Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare, though some have occurred. In the past, these acts generally focused on attempts to destroy large steel transmission line towers. For example, in 1999, a large transmission line steel tower in Bend, Oregon, was toppled. In June 2011, at BPA's Alvey Substation near Eugene, Oregon, almost $1 million in damages was incurred when unknown individuals were able to breach a security fence and damage equipment in the substation yard during an attempt to disrupt transmission service.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and other end-users. The effects of these acts would be as varied as those from the occasional sudden storm, accident or blackout, and would depend on the particular configuration of the transmission system in the area. For example, when a storm affects transmission lines, residential customers can lose power for heating, cooking, refrigeration, lighting, etc. and can experience impacts related to those functions unless they have backup generators. Similarly, commercial, industrial and municipal customers can experience impacts when infrastructure such as machinery, traffic signals, light rail, or elevators stops functioning.

In some situations intentional destructive acts would have no noticeable effect on electrical service as power can be rerouted around an area because of redundancies built into the transmission system. In other situations, service could be disrupted in the local area, or, if an intentional destructive act caused damage to a major piece of transmission system equipment or a large part of the transmission system, a much greater area could be left without power.

During scoping, BPA received comments about the increased risk of terrorism to the transmission system and to nearby landowners if a new line is built next to an existing line or lines. BPA also received comments about the increased risk to landowners if a new line is built on new right-of-way in areas where no lines exist now.

It is difficult to predict the likelihood of, and increased risk for, terrorist or sabotage acts from building the project near, next to, or far from existing transmission system facilities. New transmission towers, overhead conductor, and new substation facilities would increase the risk incrementally on BPA's 15,000 circuit-mile transmission system. Placing a new line next to an existing line may increase the risk more than building the line far from existing facilities. However, given the extensive security measures that BPA, public and private utilities, energy resource developers, and federal agencies such as the U.S .Department of Homeland Security have and are continuing to implement to help prevent such acts and protect their facilities, along with the inherent difficulty in significantly affecting such large and well-constructed facilities as transmission towers and substation sites, it is considered extremely remote and unlikely that a significant terrorist or sabotage act would occur. Accordingly, the incremental increase in risk to landowners from the presence of the proposed project would be minimal. If such acts did occur, the problem area would be isolated quickly and electricity rerouted as much as possible to keep the system functioning. In addition, it is expected that federal, state, and local agencies would respond quickly if any such act posing any human or natural resource risks occurs.

# Chapter 24 Short-Term Uses versus Long-Term Productivity

NEPA requires that an EIS include a discussion of the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity (42 USC 4332(C)(iv) (see also 40 CFR 1502.16). This chapter discusses whether construction and operation of the proposed project could cause short-term uses of the environment that would affect, either positively or negatively, the long-term productivity of the environment. For the purposes of this chapter, "short term" generally refers to the more immediate period of time during which the proposed project would be constructed, whereas "long term" refers to an indefinite period beyond this timeframe.

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

Short-term uses of the environment associated with the action alternatives are generally the same as the environmental impacts described for each environmental resource in Chapters 5 through 22 of this EIS. These impacts include both temporary and permanent "use" of the physical environment as a result of developing the proposed project and energy and resource use during project construction and maintenance. In considering the affect of these uses on long-term productivity, four main types of long-term productivity are considered: soil productivity, hydrological productivity, biological productivity, and economic productivity.

## 24.1 Soil Productivity

While maintenance of long-term soil productivity is mainly a concern in areas that are in agricultural use, this concern also can arise anywhere that soils provide an economic or ecological benefit. Construction of the project would affect soil productivity through land clearing, grading, and occupation by project facilities. At tower and substation sites and along access roads, project construction would have a long-term negative effect on soil productivity since these soils would be taken out of use for the life of the project or longer if facilities are abandoned and not restored. In areas between tower and substation sites and outside of access roads, the proposed project would not be expected to affect long-term soil productivity since these areas would be restored, either actively or naturally, to general pre-project conditions, and the soils in these areas could be put to other uses in the long term.

## 24.2 Hydrological Productivity

Wetlands, groundwater resources, and floodplains contribute to long-term hydrological productivity by providing filtration, habitat for sensitive species, and essential recharge for agricultural and municipal use. Construction of the project would affect wetlands through land clearing, grading, and occupation by project facilities. At tower and substation sites and along access roads, project construction would have a long-term effect on wetlands unless recovery efforts were made to offset disturbance. Impacts to wetlands would vary depending on which alternative is selected. In areas between towers, wetlands would be permanently converted from forested to non-forested wetlands; altering these wetlands could affect their long-term productivity.

Water bodies and floodplains would lose some productivity in the short term from increased sedimentation from erosion during construction, and increased amounts of pollutants that could enter construction sites from construction equipment and soil-disturbing activities. Culverts placed in streams and drainages for new or improved access roads would cause short-term productivity losses for aquatic species. Where construction requires removing tall-growing riparian vegetation along stream banks, water temperatures could increase, and short- and long-term aquatic species productivity could be affected if the vegetation is not replaced.

Substation and access road sites could contribute to long-term effects to groundwater quality by increasing the potential for pollutant discharge into groundwater.

In areas between tower and substation sites and outside of access roads, the project would not affect long-term floodplain or groundwater productivity since those areas would be restored, either by BPA or through natural recovery, to similar pre-project conditions.

## 24.3 Biological Productivity

Plant communities, fish, and wildlife contribute to biological productivity; their long-term productivity provides an ecological and recreational benefit in sensitive or remote areas. Project construction would affect biological resources through land clearing, grading, and occupation by project components.

During construction, all tall-growing trees and shrubs within the 150-foot-wide right-of-way and substation sites would be permanently removed. In some cases where forest dominates the landscape, danger trees would be removed outside of the 150-foot right-of-way and around substation sites. After construction, natural recovery and vegetation restoration would take place in some areas but in others, vegetation and habitat would be permanently altered. Where danger trees are removed, trees would be allowed to grow back and could recover in the long term (unless removed again at a much later time). However, trees and shrubs within the right-of-way would not be permitted to grow beyond allowable limits during the life of the project. Long-term productivity could be restored if the area is later reclaimed.

Fish habitat would be degraded as construction activities increase erosion and sedimentation, and riparian vegetation is removed. The loss or alteration of stream and riparian habitats from installing culverts at access road crossings could impede water movement, and alter stream and wetland hydrology, although culvert replacements using better designs could improve movement. Impacts to hydrology could result in long-term productivity impacts to fish resources, unless the area is restored.

Transmission line construction would also impact wildlife. Substantial habitat could be permanently lost, altered, and fragmented. The noise and increased human activity related to construction could decrease some wildlife species' breeding success, and in some cases cause direct mortality. At the same time, habitat alteration can encourage the increase of species that can best adapt to the altered habitats, potentially increasing species diversity. Over the long term, species that are highly adaptable or who avoid areas during short-term construction activities could return once construction is complete.

# 24.4 Economic Productivity

Timber production, agriculture, urban and suburban development, and industrial uses can contribute to economic productivity. Transmission line construction and operation could affect the economic productivity of some resources by limiting their long-term revenue potential, but could contribute to long-term revenue potential in sectors that benefit from a reliable transmission system.

Project construction would affect economic productivity through land clearing, grading, and occupation by project components. At tower and substation sites and along access roads, project construction would have a long-term negative effect on land used for agriculture or timber production since those areas would be taken out of use for the life of the project. In areas between tower and substation sites and outside of access roads, the project would not be expected to affect long-term economic productivity for agricultural activities such as grazing or unsupported crops less than four feet at maturity, since these areas would be restored, either actively by BPA or naturally, to pre-project conditions. Crops that exceed height restrictions in the right-of-way could be permanently excluded from production, but could be put to other agricultural uses in the long term. Timber production land would have long-term productivity losses both in the right-of-way and outside of the right-of-way (danger trees), and in areas where transmission line placement limits accessibility (stranded use).

Project components could remove existing urban and suburban uses, such as homes, commercial structures, and industrial facilities. Some areas could be excluded from future types of urban development. These losses could contribute to long-term loss in economic productivity through the loss of jobs and revenue if alternative locations are not available for redevelopment or relocation. In areas between tower and substation sites and outside of access roads, some activities within urban and suburban land use could return to previous uses (recreation), provided those activities do not interfere with the safe operation of the transmission facilities.

The project could create a long-term increase to economic productivity by providing a more reliable transmission system. Increased reliability could create a long-term economic benefit to existing businesses that rely on transmission service for production output. Transmission system reliability could also attract new industrial and commercial business to the area, which would provide a long-term increase in economic productivity through increased revenue and jobs.

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# Chapter 25 Irreversible or Irretrievable Commitment of Resources

NEPA requires that an EIS include a discussion of any irreversible and irretrievable commitments of resources that would be involved in the Proposed Action should it be implemented (42 USC 4332(C)(v) (see also 40 CFR 1502.16). An irreversible commitment of resources occurs when a nonrenewable resource such as minerals or petroleum-based fuels is used for the construction or operation of the project. Because these nonrenewable resources are "used up," or consumed, this use cannot be reversed except possibly over an extremely long period of time (e.g., hundreds of thousands or millions of years), and thus are considered irreversible. An irretrievable commitment of resources, on the other hand, involves the loss of productive use or value of renewable resources such as timber or rangeland for a period of time.

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

Implementation of any of the action alternatives would consume natural and man-made resources for transmission line, substation, and access road construction, operation and maintenance. The following sections describe potential commitments of resources by general resource area. This chapter does not address the No Action Alternative because there would be no project-related irreversible and irretrievable commitments of resources under that alternative.

## 25.1 Project Materials

Materials such as aluminum, steel, other metals, wood, gravel, sand, plastics, and various forms of petroleum products would be consumed during the construction and maintenance of the transmission line, substations, and access roads. Most of these materials are not renewable and could be irreversibly committed if not recycled (metals and glass) or reused (sand and gravel) during maintenance or at the end of the life of the project.

## 25.2 Geology and Soils

Project construction would cause irreversible alterations to topography, particularly during construction of new access roads and at the Castle Rock area substation sites. Vegetation clearing, access road construction, and tower placement would increase soil erosion potential throughout the project area. Long-term impact of soil erosion would be preventable once erodible soils were revegetated and stabilized following construction, however, an irretrievable loss of soil stability and increased soil compaction and landslide potential would occur between construction and revegetation.

## 25.3 Biological Resources

The project would cause an irretrievable removal of natural habitat from access road, tower, and substation sites. Vegetation (including wetlands) removal and conversion along the right-of-way would represent an irreversible commitment of biological resources if areas were not restored after construction or if transmission facilities were retired but not removed. Likewise, if former

low-growing vegetation cover and composition did not recover after construction, an irreversible commitment of resources would occur. Alteration of stream channels and riparian habitat during construction and improvement of access roads, and construction and operation of the transmission line and substations would represent an irreversible commitment of fish habitat and riparian function if areas were not restored after construction or if transmission facilities were retired and removed. Resulting wildlife losses from these permanent alterations and during construction and operation of the project would represent an irretrievable commitment of biological resources.

## 25.4 Cultural Resources

Any loss of cultural resources (archaeological sites, historic trails, structures, cultural landscapes, and traditional cultural properties) would be irreversible, because they are nonrenewable resources. Prior to construction, archaeological sites would be delineated and avoided either by siting towers and roads to avoid sensitive areas, through excavation of sensitive resources before construction, or by using other avoidance measures identified when resource areas are known. Visual elements that alter the character or setting of cultural resource sites could cause an irretrievable reduction in site integrity. The commitment would be irreversible if facilities were retired but not removed.

If existing substations, transmission lines and towers that are eligible for listing on the NRHP are altered or replaced as part of the project, it could cause an irreversible and irretrievable commitment of those resources based on the historic nature of some of BPA's transmission infrastructure.

## 25.5 Land Clearing and Use

The project would commit land for right-of-way clearing, substations, transmission towers, access roads, and construction staging areas. Construction areas that would not be occupied by project facilities could be used for other uses after construction is complete except where portions of the project could create stranded use. Use of these areas for construction would not be an irreversible commitment of resources, but the temporary loss of productive use of these lands for other purposes during construction would be irretrievable. Land used for transmission facilities also would represent an irretrievable property commitment during transmission facilities' operation and maintenance. The commitment would become irreversible if any facilities were retired but not removed, or if after removal some areas of the natural landscape could not be restored to their prior use.

## 25.6 Greenhouse Gases

The project would cause an irretrievable commitment of resources (primarily tall-growing trees and shrubs) available to sequester greenhouse gas emissions that help to minimize the effects of climate change. Should any transmission facilities be retired and removed at a later date, those areas that previously supported carbon sequestering vegetation could be restored. Fuel combustion by construction equipment and the carbon that would not be sequestered from vegetation removal along the right-of-way and access roads would represent an irreversible contribution of greenhouse gas emissions into the atmosphere.

# Chapter 26 Cumulative Impacts

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act require the assessment of cumulative impacts in the decision-making process for proposed federal projects. Cumulative impacts are defined as the impact on the environment which results from the incremental impact of the action 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 (40 CFR 1508.7). As stated in the CEQ handbook, "Considering Cumulative Effects under the National Environmental Policy Act" (CEQ 1997), cumulative impacts should be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful.

This chapter provides an analysis of potential cumulative impacts related to the Proposed Action, that is, the I-5 project. The analysis was accomplished using the following four steps:

**Step 1 - Identify Potentially Affected Resources**

Resources were identified that potentially could be cumulatively affected by the I-5 project when combined with other actions (see Section 26.1, Affected Resources and Resource Boundaries).

**Step 2 - Establish Boundaries**

Spatial (i.e., location) and temporal (i.e., time) boundaries were established for the consideration of other potentially cumulative actions (see Section 26.1, Affected Resources and Resource Boundaries).

**Step 3 - Identify Potentially Cumulative Actions**

Other past, present, and reasonably foreseeable future actions were identified that have contributed, or could contribute, to cumulative impacts on the resources identified in Step 1 (see Section 26.2, Cumulative Actions). These actions fall within the spatial and temporal boundaries established in Step 2.

**Step 4 - Analyze Cumulative Impacts**

For each resource, the actions identified in Step 3 were analyzed in combination with the impacts of the I-5 project. This analysis describes the overall cumulative impact related to each resource and the I-5 project's contribution to this cumulative impact (see Section 26.3, Cumulative Impacts Analysis).

## 26.1 Affected Resources and Resource Boundaries

To identify resources that could be cumulatively affected by the I-5 project and other actions (Step 1), BPA considered a large geographic area within the general vicinity of the project area and the likelihood that various other actions, with a wide range of potential effects on many

resources, have taken or could take place within this area. Accordingly, BPA determined that all of the same resources described in the affected resource chapters in this EIS (see Chapters 5 though 22) should be considered in the cumulative analysis.

BPA then established reasonable boundaries for the consideration of other past, present, and reasonably foreseeable future actions (Step 2). These boundaries are in terms of where the other actions are located (i.e., spatial boundaries), and when in time these actions took place or will take place (i.e., temporal boundaries). Accordingly, for each resource, the spatial boundary is the area where other past, present, and reasonably future actions have, are, or could take place and create cumulative impacts on the affected resource when combined with the impacts of the I-5 project. Appropriate spatial boundaries can vary for each resource; the boundaries identified for this analysis are described by resource (see Section 26.3, Cumulative Impacts Analysis).

The temporal boundary describes how far into the past, and forward into the future, other actions should be considered in the cumulative impact analysis. For the purposes of this analysis, past and present actions that have shaped the landscape since about the first European settlement in the general vicinity (i.e., since about the early to mid 1800s) are considered, to the extent that they have had lasting effects contributing to cumulative impacts. The reasonably foreseeable nature of potential future actions helps define the forward-look temporal boundary. While BPA acknowledges that the proposed project could exist for 50 or more years and could contribute to cumulative impacts during that timeframe, it would be speculative to consider actions beyond what is reasonably foreseeable (see Section 26.2.2, Reasonably Foreseeable Future Actions). Given this limitation, the forward-looking temporal boundary has been established generally at about 10 years following the expected completion of construction of the proposed project, which is a reasonable timeframe by which the reasonably foreseeable future actions identified in Section 26.2.2 likely would be implemented.

# 26.2 Cumulative Actions

After establishing appropriate spatial and temporal boundaries, BPA identified other past, present, and reasonably foreseeable future actions potentially contributing to cumulative effects along with the I-5 project (Step 3). To identify these other actions, BPA used information gathered in the course of developing the analysis of direct impacts related to the I-5 project, and consulted various federal, tribal, state, and local jurisdictions. The following discussion provides more information on how potentially cumulative past, present, and reasonably foreseeable future actions were identified, and describes the cumulative actions that have been identified for the cumulative analysis in this EIS.

## 26.2.1 Past and Present Actions

Past actions relevant to the cumulative analysis in this EIS are those that have previously taken place and are largely complete, but that have lasting effects on one or more resources that also would be affected by the I-5 project. For these past actions, CEQ has issued a guidance memo entitled "Guidance on Consideration of Past Actions in Cumulative Effects Analysis." This guidance states that consideration of past actions is only necessary in so far as it informs agency decision-making. Typically the only types of past actions considered are those that continue to have present effects on the affected resources. In addition, the guidance states that "[a]gencies are not required to list or analyze the effects of individual past actions unless such information is

necessary to describe the cumulative effect of all past actions." Accordingly, agencies are allowed to aggregate the effects of past actions without "delving into the historical details of individual past actions." In this EIS, impacts from past actions are largely captured in the sections of each resource chapter that discuss the affected environment (see Chapters 5 though 22).

Present actions are those that are currently occurring and also result in impacts to the same resources as would be affected by the I-5 project. Present actions generally include on-going land management and use activities (such as farming), and recently completed residential, commercial, and industrial development. Similar to past actions, relevant present actions have largely been captured in Chapters 5 though 22 of this EIS.

The following summarizes some of the more significant past and present actions in the general vicinity of the proposed project that have created cumulative impacts relevant to this analysis:

**Agricultural use**—Beginning with European settlement in the early to mid 1800s, thousands of acres of land were converted from native prairie and floodplain to agriculture and pasture. These uses tend to be located in the flatter, lower elevation areas near the cities of Camas, Vancouver, and the Columbia River crossing. The conversion of undeveloped land to cropland largely stopped in the mid 1900s as most available and agriculturally suitable lands had already been converted. In recent years, as suburban development has expanded, agricultural land has been subdivided for residential development, reducing the amount of agricultural use.

**Timber clearing**—European settlers also cleared native forest from thousands of acres for agricultural and other uses. Much of the tree clearing for agriculture took place on the flatter, lower elevation areas suitable for agriculture. In addition, as communities throughout the Lower Columbia River region were being developed in the late 1800s and early 1900s, nearby foothills and other wooded areas often were partially or fully cleared so trees could be used for houses, barns, fences, and other structures in and near these communities. Some cleared areas were allowed over time to revegetate and have become forested once again, while other areas were subsequently developed for other uses and remain occupied by these uses.

**Timber harvest**—Over the years, large areas of native forest have been converted into timber stands managed for timber harvests. Timber harvest in the Lower Columbia River region began in the 1860s (NMFS and USFWS 2006); however, at that time, the general practice was to clear cut an area rather than actively manage it for ongoing production, as is more the standard practice today. Today, most lands managed for timber harvest in the general vicinity are in Cowlitz County. Additional timber lands are in the eastern part of Clark County. The large tracts of forest under timber harvest management in these counties exist in various age classes across the landscape as harvests are rotated. Most recent timber harvests have been on private timber company lands and state lands managed by WDNR. Federal lands, such as on the Gifford Pinchot National Forest, have supported timber harvest as well. Cowlitz and Clark counties support thousands of acres of timber harvest per year.

**Development of the Portland/Vancouver metro area**—European settlement of the Portland-Vancouver metro area began in the early 1820s with the establishment of Fort Vancouver. Fort Vancouver served as the center of fur trading for the Pacific Northwest for many years. The U.S. military established the Columbia Barracks in 1849. Later called Vancouver Barracks, they served as a military epicenter for the Pacific Northwest until it was abandoned in the mid-nineteenth century. The City of Vancouver incorporated in 1857 and

steadily grew. Vancouver industry was critical to the success of World Wars I and II. During World War I, lumber milled in Vancouver was used to build planes and during World War II, the Kaiser Shipyard produced many ships integral to the war effort. Aluminum smelters across the region, including the Reynolds plant (originally built in 1941 by the federal government and now removed) in the Portland area, produced aluminum also used in the war effort.

The development of Portland began in 1843 as roads were built, forest cleared, and buildings constructed. Portland incorporated in 1851 and development increased rapidly after the Civil War as the shipping industry grew. Portland's shipping industry focused on exporting lumber, fish, and agricultural products to other West Coast cities and the world. By the late 1890s, Portland was the largest city in the Pacific Northwest and currently, is second only to Seattle, Washington for population. Today, the Portland/Vancouver metro area is the 23rd largest metropolitan area in the U.S. and the largest in the general project vicinity. Portland has a mix of commercial, industrial, and residential uses, in addition to large open spaces and public uses. The Portland/Vancouver metro area covers over 191 square miles and will likely expand as adjacent communities develop.

**Development of the Longview/Kelso metro area**—The Longview/Kelso metro area is the second largest populated area in the general project vicinity. European settlement of the Longview/Kelso area began in the late 1840s with establishments of the town of Kelso to the east of the Cowlitz River and the Monticello settlement to the west of the Cowlitz River. While development of Kelso steadily occurred over the years (including incorporation of the City of Kelso in the 1890s), the area around the Monticello settlement consisted largely of sparsely populated wilderness and rural homesteads until the Long-Bell Lumber Company decided in the 1910s to build two lumber mills in the area. Realizing the need for workers for these mills, the Company acquired lands and began development of a planned city to support the mills. Soon afterwards in 1924, the City of Longview was incorporated. Today, the Longview/Kelso area has a highly developed mix of commercial, industrial, and residential uses, and various public uses and open space areas. Combined, the two cities cover about 35 square miles, but various rural residential, commercial, and other uses have been developed in surrounding areas as well.

**Development of other towns and communities**—There are also several smaller towns and communities located in Clark, Cowlitz and Multnomah counties. Clark County has a population of about 350,000 and has several cities and towns, including Battleground, Camas, La Center, Ridgefield, Washougal and Yacolt as well as Vancouver (described above). Clark County's development transitioned from mainly agriculture, lumber and fishing to shipbuilding and aluminum during the World Wars. Today, Clark County's development is a mix of commercial and industrial uses.

Cowlitz County is less populated than Clark County with a population of about 94,000 and has several cities including Castle Rock, Kalama and Woodland, and Longview and Kelso (described above). Cowlitz County's early development focused on timber production and was strongly influenced by the many waterways within and around the county, such as the Columbia, Lewis, Kalama, Coweeman, Toutle and Cowlitz rivers. Today, Cowlitz County still provides lumber for domestic and international use. Tourism in Cowlitz County also expanded with the eruption of Mount St. Helens in 1980.

Multnomah County is Oregon's most populous county and includes the cities of Fairview, Gresham, Maywood Park, Troutdale, Wood Village and Portland (described above). Similar to Clark County, Multnomah County's early development focused on lumber and fishing. Today,

development focuses on manufacturing, transportation, and tourism. Shipping is also a major industry and the Port of Portland exports more wheat than any other U.S. port.

**Rural residential development**—Rural residential development is scattered throughout many portions of the general vicinity. Clark County has several census-designated places. Census-designated places are "closely settled, named, unincorporated communities that generally contain a mixture of residential, commercial, and retail areas similar to those found in incorporated places of similar sizes" (U.S. Census 2012). Census-designated places include Amboy, Brush Prairie, Felida, Hazel Dell, Hockinson Mill Plain, Minnehaha Orchards, and Salmon Creek. These areas tend to have similar characteristics to cities and towns (commercial and residential areas), but lack a municipal government. Other rural areas in Clark County include Chelatchie, Heisson and Sifton.

Cowlitz County also has a few census designated places: Longview Heights, West Longview and West Side Highway. It also has several unincorporated areas, such as Ariel, Carrolls, Lexington, Silver Lake, Toutle and Yale. These areas are marked by a mix of residential and some commercial development.

Multnomah County does not have any census-designated places, but has several unincorporated communities including Bonneville, Corbett, Dunthorpe, Riverwood, Springdale and Warrendale. The development in these communities is mainly residential with some light commercial uses.

**Highway and rail development**—Many interstate and state highways run through the general vicinity including the following: I-5, a major transportation route that extends from the U.S.-Mexico border to the U.S.-Canada border; I-205 in Multnomah and Clark counties; SR 14, 500, 501, 502 and 503, (in Clark County); SR 503, SR 4, 411, 432, and 504 (in Cowlitz County); and I-84 (Multnomah County). In Multnomah County, state highways 26 and 30 run south of the project area. These highways bisect native prairie, forest, riparian areas, and agricultural lands, and in many cases, have facilitated greater urban and industrial development.

Clark and Multnomah counties' railway development expanded with the completion of a railroad bridge connecting Portland and Vancouver in 1908. That same year, the Spokane, Portland and Seattle Railway (SPS) was completed, which brought increased population and development to the Portland/Vancouver metro area. The SPS Railway later became part of the Burlington Northern Santa Fe (BNSF) Railway, which still operates today. Like BNSF, Union Pacific also operates and serves several of the ports including the Port of Portland and Port of Kalama (discussed below). Amtrak also operates the *Coast Starlight*, which stops in Portland, Vancouver, and Kelso-Longview. In addition to these railroads, the Chelatchie Prairie Railroad is the only short line operating in Clark County. Similar to Clark and Multnomah counties, railroad development shaped the settlement of Cowlitz County. The Northern Pacific Railroad created Kalama when it chose its present location as the starting point for its line to Tacoma, Washington. Timber companies, such as Weyerhaeuser, also historically operated railroads in Cowlitz County to transport their products to domestic and world markets. Similar to highways, railroads bisect native prairie, forest, riparian areas, and agricultural lands.

**Ports and Airports—**Urban and commodity development in the lower Columbia River region, as well as throughout the Columbia River basin, has also led to the development of many shipping ports and airports in this area. Shipping ports have been developed along the Columbia River primarily to handle the export of goods such as timber or grains grown or produced in the

region, as well as the import of goods from other countries to destinations in the project vicinity, the Pacific Northwest, and throughout the U.S. (see Table 26-1). These ports typically

**Table 26-1 Existing Port Facilities in the Project Vicinity (River Mile)**

| Name of Port | Location | Primary Uses | Key Features |
|---|---|---|---|
| Longview | Columbia River Mile 66 | Marine Terminals, Industrial Park, Boat Launches | Eight deep draft vessel marine terminal berths; 3,752 feet of docks; ship loader and conveyor systems; harbor cranes; 743-acre industrial park; 500,000 square feet of warehouse space; 3 Port-funded boat launches |
| Kalama | Columbia River Mile 75 | Marine Terminals, Industrial Park, Marina | Six deep draft vessel marine terminal berths; 3,537 feet of docks, 75-acre industrial park; 222 marina moorage slips |
| Woodland | Columbia River Mile 85 | Industrial Parks | 110 acres of industrial park |
| Ridgefield | Columbia River Mile 92 | Boat launches, Industrial Park, Research Park | Two boat/kayak launches; 75-acre industrial park; 30-acre research park |
| Vancouver | Columbia River Mile 104 | Marine Terminals, Industrial Park | Thirteen deep draft vessel marine terminal berths; 370+ acres of marine terminals; ship loader and conveyor systems; harbor cranes; 724,000 square feet of dockside warehousing; 250 acres of dockside open storage; 800 acres of industrial park |
| Portland | Columbia River Mile 104; Willamette River Mile 0.0 to 6.5 | Marine Terminals, Industrial Parks | Four marine terminals; 1,035 acres of marine terminals; ship loader and conveyor systems; harbor cranes; 4,380 acres of industrial parks |
| Camas-Washougal | Columbia River Mile 121.7 | Marina, Industrial Park | 350+ marina moorage slips; marina fueling and guest docks; 430-acre industrial park |

are located next to railroad lines and highways to facilitate the transport of goods, and often include other facilities such as industrial parks and marinas. Airports also have been developed to help ship goods and transport people. These airports have been developed with typical airport infrastructure, such as terminals, runways, hangars, parking structures/lots, and roadways. Portland International Airport, which occupies about 3,000 acres near the I-205 crossing of the Columbia River, is the largest airport in the area. This airport opened in 1940 and serves both civil and military aircraft. There are also several general aviation airfields (e.g., Pearson Field and Grove Field) along with a number of private airfields (e.g., Green Mountain Airport and Goheen Airport near Battleground) that have been developed. These airfields range from a few acres to several hundred acres.

**Transmission lines**—BPA and other utilities have built numerous transmission and distribution lines, substations, and other ancillary facilities (see Section 2.2.1, Transmission Line Route Segments).

**Power generation development**—Power generation facilities include hydroelectric dams, and natural gas, coal, and biomass plants. The hydroelectric generation facilities located along the Lewis River, which follows the Clark and Cowlitz county line, were developed in the 1930s and 1950s. These facilities created three main water impoundments—Lake Merwin, Yale Lake, and Swift Reservoir, which inundated lands, forested areas, and habitats along the Lewis River. Most natural gas-fired facilities in the region have been developed in the last two decades as gas supply pipelines have been extended through the area, although some were developed in the 1970s. Examples include PGE's 516-MW Beaver and 410-MW Port Westward facilities near Clatskanie, Oregon; Clark Public Utilities' 248-MW River Road facility near Vancouver; and Puget Sound Energy's 319-MW Mint Farm facility in Longview. These gas facilities have generally converted open areas into industrial uses with air and water emissions. The primary coal and biomass generation facilities are those owned by Weyerhaeuser and Longview Fiber at their paper pulp mill facilities near Longview. Georgia-Pacific also operates a biomass generation facility near Camas. Development of generation facilities at these locations typically involved expansions of existing developed industrial uses that created incremental increases in air and water emissions.

## 26.2.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions are those actions that are likely to occur and affect the same resources as the I-5 project. For a future action to be considered reasonably foreseeable, there must be a level of certainty that it will occur. This level of certainty is typically met by the submission of a formal project proposal or application to the appropriate jurisdiction, approval of such a proposal or application, inclusion of the future action in a formal planning document, or other similar evidence. For future actions in the proposal stage, the future action also must be sufficiently defined in terms of location, size, design, and other relevant features to permit meaningful consideration in the cumulative analysis.

BPA contacted various entities, including government agencies, ports and public utilities, throughout the general vicinity to identify reasonably foreseeable future actions. Several entities provided project proposal lists or directed BPA to their planning documents, such as capital facility or transportation plans, which list reasonably foreseeable future actions. BPA staff also searched Ecology's State Environmental Policy Act (SEPA) Register, which provided a current list of all projects requiring NEPA and/or SEPA review.

Table 26-2 lists information about the reasonably foreseeable projects considered in the cumulative impact analysis, based on currently available information. The table provides a brief description of each of these projects, identifies the entity (or entities) that proposed the project and/or is primarily responsible for reviewing and approving the project, provides general location information for each project, and notes the current status (i.e., proposed, approved, or under construction) of each project. The projects in Table 26-2 are generally sorted by the primary involved entity in the following order: federal government, Tribes, state agencies, county and local agencies, ports, and utilities. The general location of each project is also shown on Map 26-1, which is keyed to the Map IDs identified in Table 26-2.

While Table 26-2 identifies specific reasonably foreseeable future actions that are known at this time, BPA acknowledges that other future actions and development likely will be proposed over time. Given the level of development and land management practices already in place, new development will continue as population growth and demand for resources increase. The regional road and highway system likely will expand as commercial and residential development encroaches into what are now rural areas. Further development of utility infrastructure such as natural gas pipelines, electrical distribution lines, telecommunications, and cell towers likely will be ongoing. Marine terminals, ports, and commercial/industrial districts will be further developed to meet market demands for products and services.

## Table 26-2 Reasonably Foreseeable Future Actions

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| ***Federal*** | | | | |
| **Columbia River Crossing Project:** Bridge, transit and highway improvement | US Federal Highway Administration/ Washington State Department of Transportation (WSDOT) and Oregon Department of Transportation (ODOT) | Vancouver, WA and Portland, OR | 119 | Approved |
| **Sandy River Delta Section 536 Ecosystem Restoration Project:** Remove a dam and restore fish access to the main channel of the Sandy River | U.S. Army Corps of Engineers, U.S. Forest Service, and Portland Water Bureau | Multnomah County, OR | 174 | Proposed |
| ***Tribal*** | | | | |
| **Cowlitz Casino Resort:** Construct casino on 152 acres at La Center's I-5 interchange in Clark County, Washington | Cowlitz Tribe | La Center, WA | 91 | Approved |
| ***Washington State*** | | | | |
| **Columbia River Dredging:** Dredging of up to 3.1 million cubic yards of material from the Columbia River over a period of 10 years | Department of Ecology/Weyerhaeuser NR Company | Near Longview, WA | 62 | Approved |
| **Soil Remediation:** Excavate 3,652 cubic yards of soil contaminated with wood preservative products from three locations within Port of Ridgefield property | Department of Ecology/Port of Ridgefield | Ridgefield, WA | 94 | Approved |
| **Timber Harvests:** Several WDNR and other timber owner harvests throughout eastern Cowlitz County | Department of Natural Resources/Individuals | Various locations throughout Cowlitz County, WA | 74 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Timber Harvests:** Several WDNR and other timber owner harvests throughout eastern Clark County | Department of Natural Resources/Individuals | Various locations throughout Clark County, WA | 105 | Approved |
| **Surface Mining Reclamation:** Continued mining of rock from quarry; use will increase from 3.5 acres to 27.5 acres | Department of Natural Resources | SE of Battle Ground, WA | 107 | Approved |
| **I-5 - SR 432 Talley Way Interchange:** Improve the I-5 interchange at SR 432 and the adjacent SR 432 interchange at Talley Way | WSDOT/Cowlitz-Wahkiakum Council of Governments, cities of Kelso and Longview, Port of Longview, and Cowlitz County | Kelso, WA | 17 | Under Construction |
| **I-5/Dike Access Road and Burlington Northern Railroad Bridge:** Replace expansion joints at both ends of Burlington Northern Railroad Bridge | WSDOT | Woodland, WA | 84 | Approved |
| **I-5/E Fork Lewis River Bridge to Todd Road Vicinity:** Paving Improvements to I-5 at the East Fork of the Lewis River Bridge near Todd Road | WSDOT | Woodland, WA | 85 | Approved |
| **I-5 - Reconstruct Interchange at NE 134th (Salmon Creek Interchange Project):** Construct a new I-5 interchange at NE 139th Street, improve the I-205 northbound off-ramp to NE 134th Street, and construct other local road improvements | WSDOT/Clark County Public Works Department | Salmon Creek area of Vancouver, WA | 114 | Under Construction |
| **SR 14 - Camas-Washougal Widening and Interchange:** Improve State Route 14 between the NW Sixth Avenue interchange in Camas, WA and Sixth Street in Washougal, WA | WSDOT/Port of Camas-Washougal, the cities of Camas and Washougal, and Clark County Department of Public Works | Camas, WA and Washougal, WA | 164 | Under Construction |
| **SR 500 - St. Johns Boulevard Interchange:** Construct freeway style interchange at intersection of State Route 500 and St. Johns Boulevard | WSDOT | Vancouver, WA | 120 | Under Construction |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **I-5 - SR 501 Ridgefield Interchange:** Replace the existing I-5 interchange at SR 501 with new bridge, widen SR 501and improve SR 501/56th Place and Pioneer Street/65th Avenue intersections | WSDOT/City of Ridgefield and Port of Ridgefield | Ridgefield, WA | 95 | Under Construction |
| **SR 502 - Widening From I-5 to Battle Ground:** Widen SR 502 from I-5 east into the City of Battle Ground | WSDOT | near Battleground, WA | 108 | Under Construction |
| **SR 503 - 4th Plain/SR 500 Intersection:** Improve the SR 503/SR 500 intersection at Fourth Plain Road | WSDOT | Vancouver, WA | 121 | Under Construction |
| **I-205 - Mill Plain Interchange to NE 18th Street:** Construct new I-205 northbound off-ramp and southbound on-ramp at NE 18th Street | **WSDOT/City of Vancouver** | Vancouver, WA | 122 | Under Construction |
| ***Cowlitz County*** | | | | |
| **Residential Development:** Lexington Heights parcel D planned lot development (40 residential lots) | Cowlitz County Planning Division/Private Lenders Group and Individual | Longview, WA | 63 | Approved |
| **Residential Development:** at Lexington Heights divide 5 lots on 28 acres into 23 single family residential lots and two lots into 150 multifamily apartments | Cowlitz County Planning Division/Individual | Longview, WA | 64 | Approved |
| **Commercial Development:** construct 100,000 sq-ft mini-storage facility on 5.21 acres; 750 sq-ft of office space; 51 parking spaces, utilities, stormwater facility, signage, lighting, fencing | Cowlitz County Planning Division/Woodford CRE and Individual | Kelso, WA | 18 | Approved |
| **Subdivision Development:** develop 27 lots on 6.27 acres | Cowlitz County Planning Division/Crown Royal Subdivision, Olsen Engineering Inc, and Riverview Community Bank | Longview, WA | 65 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Single Family Home Development:** construct single family home and outbuildings on 3.16 acres | Cowlitz County Planning Division/Individual | Longview, WA | 66 | Approved |
| **Utility Transmission Construction:** install a 1.178 mile long, secondary 115 KV power transmission line at the existing Longview Fiber Plant Site; install 15 transmission wooden power poles and replace 14 poles | Cowlitz County Planning Division/SWP Environmental Services | Longview, WA | 67 | Approved |
| **Park Restoration:** Harry Gardner Park Restoration on 14.9 acres | Cowlitz County Planning Division/Cowlitz County | Castle Rock, WA | 4 | Proposed |
| **Recreational Development:** construct a zip line and trails over 23 acres | Cowlitz County Planning Division/Kiddigan Investment, LLC | Goat Island (Silver Lake), WA | 2 | Approved |
| **Short Subdivisions, Urban Subdivisions, and Rural Subdivisions:** various applications for subdivisions throughout Cowlitz County, WA | Cowlitz County Planning Division | Cowlitz County, WA | 75 | Proposed |
| **Private Roads:** various applications for private roads throughout Cowlitz County, WA | Cowlitz County Planning Division | Cowlitz County, WA | 76 | Proposed |
| **Private Bridge Replacement** | Cowlitz County Planning Division/Longview Timberlands, LLC | Kelso, WA | 19 | Approved |
| **Road Improvement:** improve one mile of South Silver Lake Road and remove unoccupied house | Cowlitz County Public Works | Between Silverlake, WA and Castle Rock, W | 3 | Approved |
| **Detention Structure Improvement:** improve Lexington Detention Structure by raising the earthen dam | Cowlitz County Public Works | Near Lexington area of Cowlitz Co, WA | 16 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Recreational Development:** expand and renovate existing BMX track on 2 acres | City of Castle Rock Public Works Department | Castle Rock, WA | 5 | Approved |
| **Cowlitz Street West Reconstruction Phase I:** improve parking and stormwater system; design street and install underground utilities and reconstruct road and construct sidewalks | City of Castle Rock | Castle Rock, WA | 6 | Proposed |
| **River Front Trail NE Extension and Improvement:** extend River Front Trail from Shintaffer Street to Huntington Railroad Bridge; improve trail near Shintaffer Street and provide improved access to the Cowlitz River | City of Castle Rock | Castle Rock, WA | 7 | Proposed |
| **Front Street North Reconstruction:** multi-phase project widening Front Street North between Huntington and Shintaffer St NW | City of Castle Rock | Castle Rock, WA | 8 | Proposed |
| **Dougherty Drive Reconstruction:** widen Dougherty Drive to 3 lanes, resurface, and add curb, gutter, sidewalk and street lighting | City of Castle Rock | Castle Rock, WA | 9 | Proposed |
| **Roake Avenue SE Sidewalk Installation:** install new sidewalk along Roake Avenue from Elementary School to "B" Street SE | City of Castle Rock | Castle Rock, WA | 10 | Proposed |
| **"C" Street Sidewalk Installation:** install new sidewalk along "C" Street from Huntington Avenue to Kirby Avenue SE | City of Castle Rock | Castle Rock, WA | 11 | Proposed |
| **Easement Sidewalk Installation:** install new sidewalk along Easement from Roake Avenue to Allen Avenue SE | City of Castle Rock | Castle Rock, WA | 12 | Proposed |
| **Cowlitz River Pedestrian Bridge at SR 411:** construct new pedestrian bridge over the Cowlitz River at SR 411 | City of Castle Rock | Castle Rock, WA | 13 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Overlay Huntington Avenue S:** overlay Huntington Avenue S from Front Avenue S to I-5 | City of Castle Rock | Castle Rock, WA | 14 | Proposed |
| **Stormwater Treatment Project:** route stormwater to treatment system; install gravity pipe, pump station, pressurized pipe, ditches, and treatment wet pond | City of Kalama/RSG Forest Products | Kalama, WA | 78 | Approved |
| **Subdivision Construction:** subdivide 8.29 acres into 30 residential lots; construct a new road, sewer, water main and storm sewer | City of Kalama/Individuals | Kalama, WA | 79 | Approved |
| **Commercial Development:** develop three commercial buildings on 1.89 acres | City of Kelso Community Development Department/Kelso Highlander Group, LLC | Kelso, WA | 23 | Approved |
| **Reservoir Construction:** construct 2 million gallon concrete reservoir on 1 acre next to an existing reservoir | City of Kelso Community Development Department | Kelso, WA | 24 | Approved |
| **Cowlitz River Bike/Pedestrian Path:** construct Cowlitz River Bike/Pedestrian Path from Yew Street to Coweeman River | City of Kelso | Kelso, WA | 25 | Under Construction |
| **Yew Street Reconstruction:** rehabilitate sidewalk, storm system and roadway on Yew Street between S Pacific Avenue and 7th Avenue | City of Kelso | Kelso, WA | 26 | Under Construction |
| **West Main Street Realignment:** realign West Main Street from SR 4 to SR 411 | City of Kelso | Kelso, WA | 27 | Under Construction |
| **BNSF Railroad Pedestrian Crossing:** provide grade separated crossing of Burlington Northern Santa Fe Railroad for pedestrians on Allen Street | City of Kelso | Kelso, WA | 28 | Under Construction |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **14th Avenue and Broadway Intersection Improvement:** improve pedestrian facilities, street and signal at 14th Avenue and Broadway intersection | City of Kelso | Kelso, WA | 29 | Under Construction |
| **Sidewalk Installation:** install sidewalks on Redpath Street | City of Kelso | Kelso, WA | 30 | Proposed |
| **Bridge Repair:** repair Kelso Drive Bridge | City of Kelso | Kelso, WA | 31 | Proposed |
| **Riverfront Park Pedestrian Access:** construct pedestrian crossing of railroad tracks from 1st Avenue to Cowlitz River Pedestrian Path | City of Kelso | Kelso, WA | 32 | Proposed |
| **Ross Avenue Widening:** Widen Ross Avenue, construct curb & gutter, sidewalk and drainage from Redpath Street to Division Street (Phase I) and Division Street to Barnes Street (Phase 2) | City of Kelso | Kelso, WA | 33 | Proposed |
| **Bridge Replacement or Repair:** repair or replace Talley Way Bridge | City of Kelso | Kelso, WA | 34 | Proposed |
| **Allen Street Sidewalk Installation:** install sidewalks on Allen Street from Swanson Road to Crescent Avenue | City of Kelso | Kelso, WA | 35 | Proposed |
| **Harris Street Guardrail Installation:** install guardrail along south side of Harris Street | City of Kelso | Kelso, WA | 36 | Proposed |
| **Intersection Reconfiguration:** reconfigure intersection of Grade Street/5th Avenue/Oak Street | City of Kelso | Kelso, WA | 37 | Proposed |
| **Kelso Drive Resurfacing:** resurface Kelso Drive from "S" Curves to SR 432 | City of Kelso | Kelso, WA | 38 | Under Construction |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **N Kelso Avenue Crosswalk Improvement:** install flashing crosswalk N Kelso Avenue crosswalk | City of Kelso | Kelso, WA | 39 | Under Construction |
| **Corduroy Road Reconstruction:** reconstruct Corduroy Road from Allen Street to Harris Street including new sidewalks, curb and gutter and drainage system | City of Kelso | Kelso, WA | 40 | Proposed |
| **North Pacific Avenue Reconstruction:** widen N Pacific Avenue from Redpath Street to Barnes Street and construct curb and gutter, sidewalks and storm drainage | City of Kelso | Kelso, WA | 41 | Proposed |
| **Seventh Avenue and Walnut Street Improvements:** widen roads, install curb and gutter, sidewalks and drainage system and overlay existing pavement | City of Kelso | Kelso, WA | 42 | Proposed |
| **Kelso Drive/Carrolls Road Intersection Improvements:** realign intersection and install left turn lane | City of Kelso | Kelso, WA | 43 | Proposed |
| **South Pacific Avenue Widening:** widen South Pacific Avenue from Yew Street to Willow Street (Phase 1) and Willow Street to Hazel Street (Phase 2) and construct curb and gutter, sidewalk and drainage | City of Kelso | Kelso, WA | 44 | Proposed |
| **Coweeman River Bike/Pedestrian Path:** install bike/pedestrian path along top of Coweeman Dike from Allen Street to Grade Street | City of Kelso | Kelso, WA | 45 | Proposed |
| **Old Highway 99 Resurfacing:** resurface Old Highway 99 from SR 432 to Kelso, WA City Limits | City of Kelso | Kelso, WA | 46 | Proposed |
| **Long Avenue Improvements:** add second northbound lane to Long Avenue | City of Kelso | Kelso, WA | 47 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Sunrise Street Resurfacing:** resurface Sunrise Street from Jones Road to Burcham Street and construct sidewalks and handicap ramp | City of Kelso | Kelso, WA | 48 | Proposed |
| **Talley Way Improvements:** widen Talley Way from Coweeman River to Colorado Street and construct curb and gutter, drainage system and sidewalk | City of Kelso | Kelso, WA | 49 | Proposed |
| **Carroll Road Improvements:** widen Carroll Road from Kelso Drive to Kelso, WA City Limits and install drainage, replace guardrails and sidewalks, and overlay roadway | City of Kelso | Kelso, WA | 50 | Proposed |
| **Mill Street Widening:** widen Mill Street between South Pacific Avenue and 13th Avenue, replace existing sidewalks as needed and install new handicap ramps | City of Kelso | Kelso, WA | 51 | Proposed |
| **13th Avenue Reconstruction:** reconstruct 13th Avenue from Colorado Street to Grade Street and install curb/gutter, sidewalks, illumination, and 13th/Grade Traffic Signal | City of Kelso | Kelso, WA | 52 | Proposed |
| **Building Replacement:** demolish apartment complex and garages; construct a new building and parking structure | City of Longview Community Development Department/Lower Columbia College | Longview, WA | 53 | Approved |
| **Groundwater Supply and Treatment Facility:** construct site improvements for the construction of the new groundwater supply and treatment plant in Mint Farm Industrial Park and associated transmission main | City of Longview Public Works Department | Longview, WA | 54 | Approved |
| **Levee Modification:** fill in two driveway cuts in the Cowlitz River Levee | City of Longview Community Development Department/Consolidated Diking District #1 | Longview, WA | 55 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Civic Center Circle:** safety improvements from 16th Avenue and Louisiana to 17th Avenue and Larch Street | City of Longview | Longview, WA | 56 | Under Construction |
| **Signal and Pedestrian Facilities Modification in the 15th Avenue Corridor:** modify signal at 15th/Olympia Water/Hudson Street and improve pedestrian facilities between Douglas and Hemlock Streets | City of Longview | Longview, WA | 57 | Under Construction |
| **Crosswalk Improvements:** improve crosswalks at 28th Avenue and Washington Way | City of Longview | Longview, WA | 58 | Under Construction |
| **Crosswalk Installation at 30th Avenue:** install crosswalk at 30th Avenue from Pine to Pennsylvania Avenue | City of Longview | Longview, WA | 59 | Under Construction |
| **Columbia Heights Road Improvements:** improve Columbia Heights Road between Upper Maplewood and Fishers Lane and improve Columbia Heights and Fishers Lane intersection | City of Longview | Longview, WA | 60 | Under Construction |
| **Commercial Development:** construct Les Schwab Tire Center on 1.7 acres | City of Woodland/Brothers Chumbley LLC | Woodland, WA | 86 | Approved |
| **Scott Avenue Crossing Project:** construct an east/west arterial connecting the Port of Woodland and industrial areas to the City of Woodland and I-5 over multiple phases | City of Woodland | Woodland, WA | 87 | Proposed |
| ***Clark County*** | | | | |
| **Recreational Development:** develop 500 acres for bungee jumping from Canopy Creek Bridge and zip line tours | Clark County Department of Community Development/Bungee.Com | Clark County near Chelatchie, WA | 89 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Wetland Rehabilitation/Restoration:** establish a wetland mitigation bank on 110 acres | Clark County Department of Community Development/EFL Mitigation Partners, LLC | La Center, WA | 92 | Approved |
| **Subdivision Development:** develop 0.81 acre for ten single family lots | Clark County Department of Community Development/Green Gable Homes | Vancouver, WA | 123 | Approved |
| **Commercial Development:** construct community health hospice facility | Clark County Department of Community Development/Sterling Design, Inc. | Vancouver, WA | 124 | Approved |
| **Recreational Development:** relocate 15 acre golf driving range | Clark County Department of Community Development/Design Associates | Vancouver, WA | 125 | Approved |
| **Parking Lot Construction:** construct 155 parking spaces on 13.5 acre parcel that includes a wetland | Clark County Department of Community Development/Nlight Photonics Corporation | Vancouver, WA | 126 | Approved |
| **Utility Construction:** install an in-line inspection launcher facility for an existing 20 inch natural gas transmission pipeline on 2.54 acres | Clark County Department of Community Development/Northwest Pipeline GP | Washougal, WA | 168 | Approved |
| **Radio Antennae Installation:** install radio antennae and base on 0.55 acre | Clark County Department of Community Development/Sprint Spectrum LP, Sprint Nextel, and Stephen B Meadows & Assoc, Inc. | Brush Prairie, WA | 111 | Approved |
| **Subdivision Development:** divide 2.44 acres into 12 single family homes | Clark County Department of Community Development/Sterling Design, Inc. | Vancouver, WA | 127 | Approved |
| **Dock Construction and Ramp Replacement:** enlarge dock and replace ramp within 100-year floodplain of Columbia River | Clark County Department of Community Development/Individual | Vancouver, WA | 128 | Approved |
| **Building Conversion and Construction:** construct a storage/shop building and convert a single family dwelling into an office | Clark County Department of Community Development/Individual | Vancouver, WA | 129 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Commercial Development:** divide 1.94 acres into three lots for commercial development | Clark County Department of Community Development/Venia Holdings, Inc. | Vancouver, WA | 130 | Approved |
| **Cell Tower Construction:** construct 150 foot cell tower and associated ground equipment, within a 30 foot by 45-foot fenced area | Clark County Department of Community Development, Verizon Wireless, LLC | Brush Prairie, WA | 112 | Approved |
| **School Construction:** construct and operate an 8,000 square foot nursery/preschool on approximately one acre | Clark County Department of Community Development/LJS Investors, LLC | Vancouver, WA | 131 | Approved |
| **Subdivision Development:** divide 4.86 acres into 32 single family residential lots | Clark County Department of Community Development/Thousand Hills Holdings, LLC | Vancouver, WA | 132 | Approved |
| **Stormwater Facility Expansion:** expand and reconfigure storm water facility | Clark County Department of Environmental Services | Vancouver, WA | 133 | Approved |
| **Wetland Rehabilitation:** rehabilitate existing wetland in the headwaters area of the St. Johns Sub-Basin area of Burnt Bridge Creek | Clark County Department of Environmental Services | Vancouver, WA | 134 | Approved |
| **Stormwater Facility Retrofit:** combine two stormwater facilities and replace bio-swale/infiltration basins with large rain garden | Clark County Department of Environmental Services | near Five Corners area of Vancouver, WA | 117 | Approved |
| **Stormwater Facility Expansion:** expand and reconfigure three storm water facilities to create one facility | Clark County Department of Environmental Services | Salmon Creek area of Vancouver, WA | 115 | Approved |
| **Wetland Mitigation Project:** mitigate wetlands on 4.35 acres | Clark County Department of Environmental Services | North of Riveridge area of Vancouver, WA | 163 | Approved |
| **Stormwater Facility Expansion:** construct a wetland stormwater treatment facility | Clark County Department of Environmental Services | Vancouver near Sunnyside-Walnut Grove, WA | 118 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Rain Garden Installation:** replace bioswale stormwater facilities with rain gardens | Clark County Department of Environmental Services | near Brush Prairie, WA | 113 | Approved |
| **Waterline Installation:** install eight-inch waterline to subdivision | Clark County Department of Environmental Services/Individuals | Vancouver, WA | 135 | Approved |
| **Park Development:** develop 5.6 acres into neighborhood park | Clark County Department Public Works | Vancouver, WA | 136 | Approved |
| **Road construction:** improve roadway, bike lanes, sidewalk, drainage and stormwater facilities | Clark County Department of Public Works | Vancouver, WA | 137 | Approved |
| **Bridge repair and stream stabilization:** repair Dayton Bridge, install scour protection and bank stabilization | Clark County Department of Public Works | Amboy, WA | 90 | Approved |
| **Chelatchie Prairie Rail with Trail Project:** construct initial one-mile segment starting from Battle Ground Lake State Park | Clark County Department of Public Works | near Battleground, WA | 109 | Under Construction |
| **Road, Bridge, Bicycle and Pedestrian Improvements:** improve various roads, bridges, and bicycle and pedestrian facilities throughout Clark County | Clark County Department of Public Works | Various locations throughout Clark County, WA | 106 | Proposed |
| **Fourth Plain Transit Improvement Project:** improve Fourth Plain Boulevard's capacity for buses and add bike and pedestrian facilities | C-Tran | Vancouver, WA | 139 | Proposed |
| **Modify School Sporting Facilities:** convert grass field into turf, resurface tennis courts, add soccer field and parking, hardscape pedestrian paths | Battleground School District No. 119 | Vancouver, WA | 140 | Approved |
| **Road Improvement and storm water facilities:** improve roads and build storm water and sewer facilities | City of Battleground | Battleground, WA | 110 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Road and Stormwater Facility Construction:** construct and expand roadways including associated storm water facilities | City of Camas Public Works | Camas, WA | 165 | Approved |
| **Office Building Construction:** construct two office buildings on 11.1 acres | City of Camas Planning Division/Fisher Creek Campus, LLC | Camas, WA | 166 | Approved |
| **Park Development:** construct park center, restroom facilities and parking facilities | City of Ridgefield | Ridgefield, WA | 96 | Approved |
| **Park improvements, acquisitions, and construction projects:** improve, acquire land for and construct various park sites throughout the City of Ridgefield | City of Ridgefield | Ridgefield, WA | 97 | Proposed |
| **Public Works Operations/Police Facility:** renovate existing building and acquire additional land for construction of a new operations facility that includes space for Police Department expansion | City of Ridgefield | Ridgefield, WA | 98 | Proposed |
| **New City Hall Planning and Design:** develop space needs analysis for new City Hall building | City of Ridgefield | Ridgefield, WA | 99 | Proposed |
| **Portable Buildings Procurement:** purchase stand alone portable buildings for City staff expansion | City of Ridgefield | Ridgefield, WA | 100 | Proposed |
| **Upgrade or Modify Wastewater Treatment Plant:** determine whether to connect to Salmon Creek Treatment Plant or upgrade existing wastewater treatment plant | City of Ridgefield | Ridgefield, WA | 101 | Proposed |
| **Main Street Road Improvements:** construct bridge, grade and pave Main Street, and install traffic signals | City of Ridgefield/Port of Ridgefield | Ridgefield, WA | 102 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Water Source, Storage, Transmission and Distribution Improvements:** improve water source, storage, transmission and distribution systems throughout City of Ridgefield | City of Ridgefield | Ridgefield, WA | 103 | Proposed |
| **Road Improvements:** complete mobility, safety and general improvements to roads in and around the City of Ridgefield | City of Ridgefield | Ridgefield, WA | 104 | Proposed |
| **Commercial development:** construct 6,900 square-foot building with 42 parking spaces | City of Vancouver/America Tire's | Vancouver, WA | 142 | Approved |
| **Commercial development:** construct 51,833 square-foot office building and add 70 parking stalls | City of Vancouver/Columbia Tech Center LLC | Vancouver, WA | 143 | Approved |
| **Commercial development:** construct six industrial buildings totaling 35,616 square feet | City of Vancouver/Delta Management | Vancouver, WA | 144 | Approved |
| **Commercial development:** construct 18,000 square-foot office building and 59 parking stalls | City of Vancouver/Individual | Vancouver, WA | 145 | Approved |
| **High school construction:** construct High School and 97 parking spaces | City of Vancouver/LSW Architects for Evergreen Public Schools | Vancouver, WA | 146 | Approved |
| **Building construction:** construct 26,267 square-foot building for Vancouver School District Maintenance Department and 180-190 parking spaces | City of Vancouver/LSW Architects for Vancouver Public Schools | Vancouver, WA | 147 | Approved |
| **Commercial development:** construct three office buildings totaling 231,400 square-feet with parking for 575 | City of Vancouver/Prematic Services Corporation | Vancouver, WA | 148 | Approved |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Building demolition; electrical building and silo construction:** demolish 343,000 square-foot storage building, construct a 375 square-foot electrical building and construct three 92 foot outside diameter concrete silos | City of Vancouver/United Grain Corporation | Vancouver, WA | 149 | Approved |
| **Sand removal and transport:** remove 116,000 cubic-yards of sand from 18.7 acres and transport to another site | City of Vancouver/Farwest Steel | Vancouver, WA | 150 | Approved |
| **Sewer line installation:** install 1,372 feet of new sewer line | City of Vancouver | Vancouver, WA | 151 | Approved |
| **Water transmission main installation:** install 12,800 feet of potable water transmission main pipe | City of Vancouver | Vancouver, WA | 152 | Approved |
| **Road Improvements:** improve various roads throughout the City of Vancouver, WA | City of Vancouver | Vancouver, WA | 153 | Proposed |
| **Commercial development:** proposed Wal-Mart Shopping Center on south side of NE Fourth Plain Boulevard, east of 140th Avenue in Vancouver, WA | City of Vancouver Community Development | Vancouver, WA | 154 | Proposed |
| **Chinook Neighborhood Park Development (North Salmon Creek):** develop park to include playground equipment, trails, picnic tables, landscaping, a sports court, and benches | Vancouver-Clark Parks and Recreation | Salmon Creek area of Vancouver, WA | 116 | Approved |
| **Burnt Bridge Creek Build Out with Roundabout:** improve roads between NE 137th and NE 162nd Avenue and Burnt Bridge Creek and NE Fourth Plain Boulevard | City of Vancouver Public Works | Vancouver, WA | 155 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Stormwater Capital Improvement Program (SCIP) Projects:** various SCIP projects throughout the City of Vancouver to install sanitary sewers for residential homes | City of Vancouver Public Works | Vancouver, WA | 156 | Proposed or Under Construction |
| **Sanitary Sewer Projects:** various sanitary sewer projects throughout the City of Vancouver, WA | City of Vancouver Public Works | Vancouver, WA | 157 | Proposed or Under Construction |
| **Water Projects:** various water facility/transmission line improvements and upgrades throughout the City of Vancouver, WA | City of Vancouver Public Works | Vancouver, WA | 158 | Proposed or Under Construction |
| **Surface Water Projects:** **n**umerous projects to improve surface water quality throughout the City of Vancouver, WA | City of Vancouver Public Works | Vancouver, WA | 159 | Proposed or Under Construction |
| **Install pedestrian trail:** install 3,463 foot pedestrian trail with two pedestrian bridges | City of Washougal | Washougal, WA | 169 | Approved |
| ***Multnomah County*** | | | | |
| USS Ranger, Chinook Landing Marine Park: Develop this retired U.S. aircraft carrier as an aircraft carrier museum, with a conference center, and event venue at Chinook Landing Marine Park. | Metro/City of Fairview | Fairview, OR | 172 | Proposed |
| 40-Mile Loop Trail undeveloped section; A planned segment of the 40-Mile Loop Trail about 6 miles long through the Reynolds Industrial Park that connects the Marine Drive portion of the trail with the Reynolds portion of the trail. | 40-Mile Loop Land Trust | Fairview and Troutdale, OR | 173 | Proposed |
| ***Lewis County*** | | | | |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Sewer System Upgrade Project:** complete design of sewer system upgrades | City of Vader | Vader WA | 1 | Proposed |
| ***Ports*** | | | | |
| Dock improvement and replacement: improve one dock and replace another | Port of Camas-Washougal | Washougal, WA | 170 | Approved |
| Kalama Energy Center: construct a new 346-MW natural gas-fired power plant on a 20-acre site at the Port | Port of Kalama/Energy Northwest | Kalama, WA | 77 | Approved |
| Rail line development: develop rail lines within Port of Longview boundaries | Port of Longview | Port of Longview, WA | 69 | Proposed |
| Waterfront development: develop waterfront property within Port of Longview boundaries | Port of Longview | Port of Longview, WA | 70 | Proposed |
| Industrial facility and infrastructure development: develop industrial facility and infrastructure development on Port of Longview's Barlow Point property | Port of Longview | Barlow Point property owned by Port of Longview, WA | 71 | Proposed |
| Columbia River Dredging: request for approval of several dredging events, 10 year authorization to conduct annual maintenance dredging and to deposit dredged sediment at river mile 62 or 56 | Port of Longview | Port of Longview, WA and Main stem Columbia River between Rivermile 66 and 67 | 72 | Approved |
| Site preparation and road construction: regrade site for use as a motocross track and sand drag strip; construct a 3,500 ft, 20 ft wide maintenance access road | Port of Longview | Longview, WA | 61 | Approved |
| Planning Phase 11 Troutdale Industrial Park: redevelop lands surrounding the Troutdale Airport including road and utility improvements | Port of Portland | Troutdale, Oregon | 171 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| West Vancouver Freight Access Rail Project: expand rail line and access | Port of Vancouver | Vancouver, WA | 160 | Approved |
| Warehouse Remodel: remodel 169,000 square-foot warehouse and support office | Port of Vancouver | Vancouver, WA | 161 | Approved |
| Terminal 5 Bulk Potash Handling Facility: construct potash storage and shipping facility at Terminal 5 | Port of Vancouver | Vancouver, WA | 162 | Approved |
| Troutdale Energy Center Project: construct a 653 MW natural gas-fired power plant | Troutdale Energy Center, LLC. | Port of Portland property in Troutdale, OR | 175 | Proposed |
| ***Utilities*** | | | | |
| **Water Transmission and Service Facilities:** install water transmission and service facilities to connect Meadow Glade Reservoir to Battle Ground intertie water main | Clark Public Utilities | Vancouver, WA | 138 | Approved |
| **Substation Construction:** construct Enterprise 115-kV substation | Clark Public Utilities | near La Center, WA | 93 | Approved |
| **Construct New Substation:** along West Side Highway in Lexington to replace the existing John Street substation | Cowlitz Public Utility District | Lexington, Cowlitz County, WA | 15 | Proposed |
| **Construct Transmission Line:** construct 0.5 mile transmission line along Ocean Beach Highway to connect Baker's Corner Substation to BPA's Longview-Lexington 115-kV Line | Cowlitz Public Utility District | Longview, WA | 68 | Proposed |
| **Construct Transmission Line:** construct a new transmission line in Kelso in 2013; placement is dependent on the route selected for the BPA I-5 Corridor Reinforcement Project | Cowlitz Public Utility District | Kelso, WA | 20 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Rebuild and Upgrade Substation:** rebuild and upgrade the East Kelso Substation | Cowlitz Public Utility District | Kelso, WA | 21 | Proposed |
| **Rebuild and Upgrade Substation:** rebuild and upgrade the West Kelso Substation | Cowlitz Public Utility District | Kelso, WA | 22 | Proposed |
| **Construct Transmission Line:** construct a new 230-kV transmission line from BPA's Longview Substation to the proposed Natural Gas Generation Facility at the Port of Kalama; project is dependent on Energy Northwest building the Natural Gas Generation Facility | Cowlitz Public Utility District | Longview, WA to Kalama, WA | 73 | Proposed |
| **Speelyai Creek Fish Hatchery Repair and Upgrade:** upgrade and repair Speelyai Creek Fish Hatchery; replace kokanee fish trap with precast concrete trap | PacifiCorp Energy | Ariel, WA | 82 | Approved |
| **Recreational Development:** upgrade Cresap Bay campsites and make shoreline universally accessible | PacifiCorp Energy | East end of Lake Merwin near Yale, WA | 80 | Approved |
| **Construct Fish Release Pond:** construct a fish release pond on the shore of the Lewis River including an intake pipe for water circulation and release pipe to release fish | PacifiCorp Energy | Woodland, WA | 88 | Approved |
| **Construction for Lewis River Fish Passage Projects:** construct adult fish collection facilities at Merwin Dam and transport them upstream of Swift Dam to spawn; collect smolts at Swift Dam by floating surface collector and transport downstream to release facility | PacifiCorp Energy | Various locations along Lewis River, Cowlitz County, WA | 83 | Under Construction |
| **Hatchery Maintenance and Improvements:** complete ongoing maintenance and improvements at Lewis River Fish Hatchery | PacifiCorp Energy | Lewis River Fish Hatchery, Cowlitz County, WA | 83 | Proposed |

| Project | Lead Agency/Applicant | Location | Map ID[1] (see Map 26-1) | Status[2] |
|---|---|---|---|---|
| **Hatchery Maintenance and Improvements:** complete ongoing maintenance and improvements at Merwin Fish Hatchery | PacifiCorp Energy | Merwin Fish Hatchery, Cowlitz County, WA | 81 | Proposed |

Notes:

1. The Map ID for each project reflects the numeric identifiers for projects shown on Map 26-1. Project 141 was discovered to be a duplicate and was deleted from this table.

2. Proposed = project has been formally proposed, but has not been approved by appropriate authorizing agency; Approved = project has been approved by appropriate authorizing agency, but construction is not underway; Under Construction = project has been approved and construction is underway.

Sources: City of Vancouver 2011; Clark County Community Development 2011; Clark County Public Works 2011a, 2011b; Clary 2011Cowlitz Tribe 2011; Cowlitz-Wahkiakum Council of Governments 2011b; C-Tran 2001; Durshpek 2011; Ecology 2011c; Eiken 2011; FHA 2011; Hendriksen 2011; Hermen 2011; Hickerson 2011; Hillger 2011; Jansen 2011; Johnson 2011; Johnston 2011; Malon 2011; Mattiz 2011; Nielsen 2011; Nye 2011; Rogers 2011; Vancouver-Clark Parks and Recreation 2011; WSDOT 2011

# 26.3 Cumulative Impacts Analysis

This section provides the analysis, by resource, of the cumulative impacts of past, present, and reasonably foreseeable future actions described in Section 26.2, Cumulative Actions, in combination with the potential impacts of the I-5 project (Step 4). The following analysis describes these potential cumulative impacts in the order that the affected resources are presented in Chapters 5 through 22 of this EIS. For some resources, cumulative impacts would be approximately the same across all action alternatives. For other resources, cumulative impacts would vary by alternative. For these resources, general cumulative impacts are discussed, along with potential cumulative impacts specific to one or more alternatives.

## 26.3.1 Land

The spatial boundary for the following analysis consists of the general vicinity of the proposed project, and more broadly the three counties that would be crossed by the project (Cowlitz, Clark, and Multnomah counties).

Land use has incrementally changed due to cumulative past and present development, and this trend would be expected to continue with the cumulative future development identified in Section 26.2.2, Reasonably Foreseeable Future Actions. Past and present actions have cumulatively established the current land use patterns in Cowlitz, Clark, and Multnomah counties. These actions have created many land uses (see Section 26.2.1, Past and Present Actions). Urbanized use is expanding with population and economic growth, generally on the periphery of already established developed areas, and there is no evidence of any shift in trends. In addition, many of the reasonably foreseeable commercial uses identified in Table 26-2, such as office buildings, retail locations, and associated parking lots, are proposed as "infill" development on currently vacant land designated for commercial use by local land use planning documents. Assuming these trends continue, land would continue to be converted from rural to developed uses, and urban uses would continue to be intensified within already developed areas.

Land use also has been cumulatively affected by development of transportation and utility infrastructure. WDNR, in particular, has expressed concern over the cumulative impact of past, present, and reasonably foreseeable future infrastructure development on state trust lands that it manages or owns (see Appendix A for more information on WDNR lands in the project area). In addition to numerous roads, railroads, pipelines, and transmission lines, development of energy projects and port development has occurred and is expected to continue, such as the activities proposed for Longview and Kalama.

Because transmission lines typically have relatively small footprints and, other than the transmission structures, span other land uses, the proposed project would not be expected to cumulatively contribute to any changes in existing land use in areas outside of the transmission line right-of-way. For instance, adjacent agricultural areas would still be used for agriculture, timber areas would remain as timber areas, and residential areas would continue to be residential. The proposed project would, however, cumulatively add to the presence of developed uses and the on-going development of utility-related land uses. From a strictly land use perspective, the overall contribution of the West Alternative to this cumulative impact could be considered less than the other three alternatives since the West Alternative would largely follow existing transmission lines within an existing right-of-way, while the Crossover Alternative

would require entirely new transmission right-of-way for over half its length, and the East and Central alternatives would require entirely new transmission right-of-way for almost their full length. The West Alternative thus could be considered less of a contrast with established adjoining uses as compared to the other three alternatives.

Since all action alternatives pass through currently forested areas, the project also would contribute to the cumulative reduction of undeveloped forested uses by removing trees from the transmission line right-of-way and access roads. The East Alternative would have the greatest contribution to this cumulative impact, followed closely by the Central Alternative, then the Crossover Alternative, and finally the West Alternative. Furthermore, areas occupied by the proposed transmission towers, access roads, and other facilities would not be available for timber harvest, agricultural, or other uses during the life of the line, and the presence of these facilities could affect the ability of landowners to further develop these portions of their properties for other uses in the future. Regardless of the action alternative selected, BPA would obtain transmission easements for operation of the proposed project on private lands, and would obtain right-of-way grants to cross state lands.

Overall, because the proposed project would introduce a new utility facility and would remove the sites of proposed towers, access roads, and substations from other uses, the proposed project would contribute incrementally, though in a relatively minor way, to potential cumulative land use impacts. The proposed project's incremental contribution to potential cumulative impacts to land ownership would also be minor given the relatively small amount of land BPA would purchase.

## 26.3.2 Recreation

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

There are many recreational areas—mainly parks, trails, and golf courses –in the project area (see Chapter 6, Recreation). There are also dispersed authorized and non-authorized recreational uses, such as hunting, target practice, hiking, biking and ATV use, occurring predominately in the eastern and northern portions of the project area. While some past and present actions have increased recreational access and opportunities, some recreational-related actions have introduced human uses and development in otherwise natural areas and viewsheds, which can be viewed as having diminished the recreational experience for some recreational users.

Similarly, some of the reasonably foreseeable actions in Table 26-2, such as park acquisitions and improvements in the City of Ridgefield and development of bicycle and hiking trails throughout Clark County, would cumulatively increase opportunities for recreation in the general vicinity. However, other reasonably foreseeable actions, such as timber harvests on WDNR and private lands, could cumulatively reduce opportunities for recreation or interfere with recreational experiences, particularly for dispersed recreation.

In general, the project would not contribute to cumulative impacts to recreational use in the vicinity because the transmission line would have a relatively small footprint and, other than the transmission towers, would span other land uses such as recreation. The action alternatives also generally avoid established recreational sites, but depending on the alternative, cross a mix

of parks, trails, and golf courses. In addition, in some urban and suburban settings, transmission line rights-of-way provide recreational opportunities as a form of informal linear "park" for walking, hiking, and jogging.

However, the project could contribute to cumulative impacts on the recreational experience in areas where it would introduce a developed utility feature to a more natural landscape, where people seeking a more natural experience could be pursuing recreational pursuits such as hiking, hunting, or camping. Development of new access roads and improvements to existing access roads also may increase access by motorized users to some areas difficult to access or inaccessible to these users, which could also contribute to cumulative impacts on the recreational experience of non-motorized users in these areas. Because the West Alternative would be developed generally along an existing transmission corridor and through several already developed areas, it would contribute the least from among the action alternatives to this potential cumulative impact. The Central and East alternatives, with their similar lengths of required new right-of-way and amounts of forested and other undeveloped lands that would be affected, would have the greatest contribution to this cumulative impact. Because the Crossover Alternative uses existing right-of-way for its northern portion and new right-of-way for most of its southern portion, its contribution to this cumulative impact would fall between the contributions of the other action alternatives. The actual extent of the project's contribution to cumulative impacts on the recreational experience would depend on the proximity of recreational users to the new line and their sensitivity to its presence in the landscape, among other factors.

For these reasons, the project would contribute incrementally, though in a relatively minor way, to potential cumulative impacts on recreational uses, generally through potential contributions to cumulative impacts on dispersed recreational experiences in the area.

### 26.3.3 Visual Resources

The spatial boundary for the following analysis consists of the viewsheds in the general vicinity of the proposed transmission line routes and substations from which the cumulative actions identified in Section 26.2, Cumulative Actions, could be seen in combination with the proposed project.

Past and present development and land management activities have cumulatively changed the visual landscape and visual features by introducing man-made elements and altering natural forms. These changes include urbanization along the Columbia River; rural residential development, agriculture, timber clearing and harvest, development of hydroelectric facilities along the Lewis River; and the development of area roads and utility infrastructure. Reasonably foreseeable future actions involving development and resource use would continue this trend. Reasonably foreseeable residential development likely would further encroach into open spaces that are currently considered to have intrinsic scenic value. As new residents move into the area and greater numbers of sensitive viewers perceive cumulative changes in the landscape, existing and new developments may be received more negatively.

The cumulative visual effect of the proposed project in combination with other past, present, and reasonably foreseeable actions would be highly dependent on viewpoint locations, the extent of existing visual modification that is already visible from a particular location, and the sensitivities of viewers. The area near the West Alternative, with its existing transmission lines and greater urban and suburban development, has already had more cumulative visual

modifications than areas near the other action alternatives. Thus the incremental cumulative visual modifications of adding the West Alternative in or adjacent to existing transmission corridors would be less than adding it to areas with no existing lines. However, the West Alternative also has the greatest number of viewers who would see the new line. The cumulative impact of the views of the additional right-of-way on the greater number of viewers is tempered somewhat by the existing developed landscape, where residents in the urban and suburban areas of the alternative are more accustomed to seeing a transmission line than the rural residents near the East Central and Crossover alternatives, although there are far fewer residents near those alternatives.

Overall, due to its location generally along an existing transmission corridor and through several already developed areas, the West Alternative would contribute incrementally, though in a relatively minor way, to potential cumulative visual impacts in the area. Similarly, the Crossover Alternative, in the portion that uses existing right-of-way, would also contribute incrementally to cumulative impacts. Because the East and Central alternatives and portions of the Crossover Alternative would pass through previously undeveloped areas and require new cleared rights-of-way, these alternatives would have the potential to have a relatively high level of contribution to cumulative visual impacts from vantage points along these routes.

## 26.3.4 Electric and Magnetic Fields

The spatial boundary for the consideration of cumulative electric and magnetic field (EMF) levels is fairly narrowly defined due to the rapid drop-off in EMF levels over distance that would occur from the proposed transmissions line. In general, EMF levels from a 500-kV transmission line drop off to barely detectable levels at a distance of approximately 300 feet from the centerline of the transmission line (see Chapter 8, Electric and Magnetic Fields). Therefore, only cumulative actions within this distance with the potential to result in combined EMF levels are considered to be within the spatial boundary for the cumulative EMF analysis.

EMF levels in the vicinity have cumulatively increased over time as a normal part of urbanization and electrical use. Cumulative EMF levels vary greatly throughout the area, depending on proximity to existing EMF-generating sources. In general, existing cumulative EMF levels are expected to be higher along the West Alternative than along other alternatives since the West Alternative would generally follow already existing high-voltage transmission lines that currently generate EMF. This would also be true of the portion of the Crossover Alternative that would use existing right-of-way.

The proposed new line and substations would introduce new or additional sources of EMF along new or existing right-of-way, which could incrementally increase cumulative EMF levels in these areas, depending on the location and line configurations. In areas where no transmission lines currently exist and new right-of-way would be established, cumulative EMF levels would be expected to increase. Where the proposed line would be built along existing right-of-way any change in EMF levels would depend on the configuration of the new line in relation to any existing lines. Overall in these situations, however, only slight increases, or possibly even decreases, in cumulative levels would be expected. Relative increases in exposure would depend on the amount of existing EMF, the amount of EMF increase with the project, and the number of persons accessing the immediate project area.

## 26.3.5 Noise

The spatial boundary for the cumulative noise analysis consists of the immediate area of the proposed transmission line routes and substations where noise from the proposed project could be heard in combination with noise from the cumulative actions identified in Section 26.2, Cumulative Actions.

Cumulative noise impacts occur when actions are undertaken simultaneously and relatively close to each other. Past and present actions in the immediate project area only have the potential to have a combined cumulative noise effect with the proposed project to the extent that they are continuing to generate or result in noise today. Typical examples of such past and present actions are existing area highways and major thoroughfares (with their traffic-generated noise), existing railroads (with noise from trains and road crossing equipment), existing industrial or commercial facilities (with noise from ongoing operations), and existing power generation plants (also with noise from ongoing operations). In addition, other present actions that could combine with the proposed project to cause cumulative noise impacts generally include any long-term highway construction or improvement projects, on-going commercial or residential building construction projects, and on-going timber harvest activities in the immediate project area.

These past and present actions have cumulatively created increased ambient noise levels, although these cumulative increases are location dependent. In urban areas and near freeways, ambient noise levels from cumulative actions are typically higher, while in forested and rural areas, they are typically lower. However, even within each of these different areas, there can be significant differences in noise levels, depending on how many actual noise generation resources are present.

Reasonably foreseeable future actions that could contribute to cumulatively-increased noise levels include new commercial and residential development, on-going road maintenance activities, and construction and installation of utilities and other similar infrastructure.

The proposed project's contribution to cumulative noise levels in the immediate project area would primarily occur during construction. When construction is occurring at a particular location, noise from construction activities would temporarily add to noise from other activities in the immediate area, such as from traffic on area roads, commercial/industrial activities, and railroad operations. The project thus could contribute incremental, short-term adverse cumulative noise impacts at any given location along the transmission line route. Once the line is built, corona-generated noise from the transmission line also could contribute incrementally, though in a relatively minor way, to cumulative noise impacts in areas near the line and substations.

## 26.3.6 Public Health and Safety

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

A number of past, present, and reasonably foreseeable actions in Cowlitz, Clark, and Multnomah counties have and could cumulatively contribute to public health and safety impacts, such as increased risk of traffic accidents, fire risk, immediate risks from accidental releases of

hazardous or toxic materials, longer-term risks from such materials in the environment from past activities and disposal, and worker safety risks. In addition, there is an increased risk of many types of extremely rare yet potentially catastrophic events, such as pipeline explosions, bridge collapse, downed power lines, and train derailments that could occur at some point. These cumulative impacts reflect that development, urbanization, and modern society inherently bring increased levels of potential risk to human health and safety.

Given the many safety precautions that would be taken during construction, the proposed project would not significantly contribute to cumulative public health and safety risks or impacts. As discussed in Chapter 10, Public Health and Safety, workers constructing the project would be highly trained in working with and around high-voltage transmission lines, and would work to ensure that all safety protocols are followed. Workers also would follow current hazardous and toxic materials handling, transport, use, and storage regulations and would not contribute to cumulative soils or groundwater contamination issues at previously contaminated sites. In the event of a spill, all materials and exposed soils would be removed and restored. In addition, the line would be designed to minimize the potential for safety issues during its lifespan.

Even with safety measures in place for the project, there is the potential for unintended or accidental risks to public health and safety to arise. The proposed project could slightly increase the overall cumulative risk of injury to the public that could occur during construction vehicle traffic and congestion and also increase the risk of fire in construction areas. In addition, for action alternatives that would be partially located in areas with ongoing timber harvest practices (mainly the East and Central alternatives and part of the Crossover Alternative), construction would contribute to health and safety risks from tree felling and use of roads through the area from these practices. Overall, because of this increased potential for accidents, the proposed project would contribute incrementally, though in a relatively minor way, to potential cumulative public health and safety impacts.

### 26.3.7 Socioeconomics

The spatial boundary for the consideration of cumulative socioeconomic impacts consists of the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties), although it is possible that the proposed project also could contribute to cumulative effects on employment and income in surrounding counties within the same regional labor market, such as the Seattle-Tacoma-Olympia Economic Area and the Portland-Vancouver-Beaverton Economic Area.

The analysis of socioeconomic effects contained in Chapter 11 of this EIS largely takes into account past and present actions in the region that have had a cumulative effect on socioeconomic considerations such as population, employment, income, housing, property values, and public services. Accordingly, the cumulative past and present actions have set the baseline for socioeconomics within the counties where the proposed project would be located. Reasonably foreseeable future actions are identified in Table 26-2. Future actions that could contribute to cumulative socioeconomic impacts include those that would generate employment or income, increase demand for housing and public services, result in population changes, or impact property values. Typical examples include residential construction, commercial and industrial/utility construction, port improvements, major road projects, and increased timber harvest activities.

The action alternatives would not change population or the need for permanent housing, and thus would not contribute to cumulative impacts related to these socioeconomic considerations (see Chapter 11, Socioeconomics). However, there likely would be a need for temporary lodging for construction workers during construction for any workers not hired from the local area. Several of the reasonably foreseeable future actions in Table 26-2, such as the Columbia River Crossing Project, commercial development in the City of Vancouver, and the Kalama Energy Center, involve significant construction activities that could also involve construction workers from outside the local area. These reasonably foreseeable construction activities could cumulatively increase the demand for temporary housing and occupancy rate in the area. These impacts would be cumulatively beneficial as they would increase lodging-related revenue and other ancillary businesses such as restaurants, grocery stores, laundromats, gas stations, and other businesses necessary to support temporary construction workers.

The employment created would be temporary jobs that would last only through project construction (see Chapter 11). The project could also result in some minor indirect and incidental employment creation, primarily in the service industry. If construction coincides with construction-related activities from other reasonably foreseeable future actions, such as those described above, this would increase the number and/or duration of temporary construction jobs, which would increase the cumulative need for temporary construction workers in the area. Perhaps the most significant reasonably foreseeable future action in the three counties over the same time frame is the Columbia River Crossing Project, which could compete with the proposed project for the steelworker labor market. If the pool of available construction workers is limited locally, it will result in construction workers traveling from other areas to work sites. The impact of hiring local workers, though preferable for many reasons, would reduce the benefits described above for temporary lodging needs. Nonetheless, the proposed project, along with the reasonably foreseeable future actions, would have beneficial impact on employment in the area. When combined with indirect spending from increased employment, construction jobs could also assist in lowering the overall unemployment rates, at least temporarily, for the three counties.

While beneficial, local project-related expenditures, employment, and construction-related earnings would be relatively small relative to the total amount of economic activity in the affected counties, and would, as a result, make a small positive contribution to cumulative impacts on the local economy for the duration of construction. Other reasonably foreseeable projects would make similar positive, yet relatively small contributions to the local economy, although some local communities and immediate areas where construction of these projects is taking place may see a more significant beneficial impact on the local economy. The proposed project would also generate sales tax in the affected counties as workers purchase goods and services, and this would likely be the case with other construction projects in the affected counties. Overall, the cumulative actions combined with the proposed project would have a beneficial cumulative effect on the local economy.

Cumulative effects on property values are difficult to estimate and location specific. Some cumulative projects could have a detrimental effect on property values, while others could serve to increase such values. In addition, it is difficult to distinguish and isolate the effect on property values from a particular project from the myriad of other factors that can affect property values, such as overall market conditions, potential buyer preferences, and local economic conditions. Nonetheless, as discussed in Chapter 11, the proposed project would not have a statistically significant effect on property values, and thus would make only minor

contributions to any cumulative effect on property values with the other cumulative actions identified in Section 26.2, Cumulative Actions.

The proposed project would not cause significant demands on public services or facilities. During construction, public services such as police, fire, and medical facilities, would be needed only in cases of emergency, which would likely be the case with other construction projects that could potentially coincide with the proposed project. In addition, the proposed project would not have a noticeable adverse impact on local landfill resources or their ability to handle other current or future waste streams. Therefore, the proposed project would not contribute to cumulative impacts to public services or facilities.

### 26.3.8 Transportation

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Past actions that have cumulatively affected transportation include the development of highways, local roads and railroads; construction and operation of Columbia River dams and locks; construction and operation of various airstrips; and traffic from residential and commercial development. Present transportation-related actions in the vicinity include ongoing road maintenance projects, and transportation of freight by railroad, barge, and aircraft. Reasonably foreseeable future actions that could affect transportation include ongoing road maintenance activities, continuing residential development (particularly in more rural areas), commercial development and ongoing logging activities that would generate increased traffic volumes on local roads.

Reasonably foreseeable future actions with cumulative impacts to transportation would include any large new construction projects (e.g., the Columbia River Crossing Project) that would increase traffic on the same roads used in connection with the proposed project that is not already accounted for in existing traffic and road infrastructure, and residential, commercial, and industrial development that would increase the number of originating trips using area roads. Furthermore, while ongoing and reasonably foreseeable road improvement projects ultimately would have an overall beneficial cumulative effect by accommodating greater traffic volume and providing additional options for travel routes, these projects would contribute to adverse cumulative traffic effects during their construction phases due to road and lane closures, detours, and speed limitations. Since most road construction projects usually occur in the spring through fall months due to weather, it is likely that road construction projects, along with construction-related traffic from the proposed project, would have a cumulative effect on roadways. Although this cumulative effect would be temporary, it could be viewed as significant to local motorists.

In general, traffic associated with operation and maintenance of the proposed transmission line and substations would not cumulatively affect transportation along any of the action alternatives over the life of the project because this traffic would normally require a few maintenance and inspection vehicles a few times a year and helicopters twice a year. If infrequent line repair is needed, larger vehicles such as flatbed trucks or a crane could be required to bring in equipment and repair or replacement parts. Larger vehicles may also be used infrequently to transport equipment to a substation. Using these larger vehicles

potentially could cause minor disruptions to local traffic for brief periods, which could contribute to temporary and minor cumulative impacts for all action alternatives.

Reasonably foreseeable future actions in the vicinity of the project that involve road improvements, along with the proposed project, also would cumulatively increase the number of improved access roads in the regional landscape. This project's contribution to this cumulative impact would be greatest for the East and Central alternatives, where there are currently relatively fewer improved roads. This increase would likely provide for greater ease of access to portions of the project area, which may prove beneficial to the owners of land where the new access roads would be located. However, it is likely that more road maintenance activities would be required, as well as greater efforts to control noxious weeds. Because BPA would work with landowners and others to ensure that safe vehicle and equipment access across BPA's easements is provided, the proposed project would not contribute to any cumulative property access impacts. Overall, however, the proposed project would contribute incrementally, though in a relatively minor way, to potential cumulative transportation-related impacts.

## 26.3.9 Cultural Resources

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Cultural resources have been and are being cumulatively affected because of past and present development and activities. These cumulative impacts include disturbance of cultural sites, reduction of the cultural integrity of certain sites, and removal of cultural artifacts. Past actions that have affected cultural resources include construction and operation of hydroelectric facilities, agricultural activities, timber harvest activities, highway and railroad construction, construction and operation of existing transmission lines, and commercial, industrial, and residential development. Present and ongoing activities add to these impacts. These continued forms of development, including construction of this project within the viewshed of ethnographic resources, may negatively affect the use of these areas by local area Tribes. Continued conversion of native vegetation to agricultural land, timber harvest land, or development decreases the amount of land Tribes can use for native plant gathering.

During construction of the proposed project, there is also the potential to affect undiscovered archaeological resources. Mitigation measures would lessen or avoid the potential for impacts on archaeological resources (see Table 3-2). However, the project may still contribute incrementally to the adverse cumulative impact on cultural resources in the area.

## 26.3.10 Geology and Soils

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Past and present actions have cumulatively affected soil resources, resulted in soil erosion and compaction, and in some cases altered topography. These activities include logging, agriculture, urbanization, and recreational use (e.g., off-road vehicle use). These activities are likely to continue to occur in the future. Reasonably foreseeable logging, agriculture, and residential and

other development would contribute to cumulative soil erosion and compaction in the area, and development projects in particular may alter the topography. However, increased regulation and the use of BMPs have reduced the severity of erosion from these activities such that erosion volumes and rates would be lower than what occurred from similar types of activities in the past. In addition, while the construction of these reasonably foreseeable actions would cause cumulative near-term increases in erosion, as disturbed areas stabilize, there is likely to be only a minor long-term cumulative contribution to erosion. Development of urbanized uses may also incidentally reduce long-term cumulative soil erosion potential by covering the soil with impervious surfaces, such as roads, houses, and buildings.

The project's contribution to cumulative soil erosion impacts would be the greatest during construction from construction-related soil disturbance and grading, but would diminish over time as vegetation becomes reestablished and disturbed areas stabilize. Nonetheless, continuing long-term authorized and unauthorized use of transmission line rights-of-way or access roads during the life of the project would result in incremental contributions to cumulative soil erosion near project facilities. The project also would temporarily contribute to soil compaction in areas where temporary construction work would occur, such as within rights-of-way and staging areas, and would permanently (i.e., for the life of the project) contribute to cumulative soil compaction due to permanently compacted soil under tower footings, substation foundations, and access roads. In some areas, temporary compaction would be remedied by BPA after construction is complete, and in other areas, it would diminish over time as plants, animals, and weather reworked the soil. Overall, however, the project and other ongoing and reasonably foreseeable activities would cause a cumulative increase in permanent soil compaction.

Past, present, and future actions can also contribute to cumulative landslide risk by placing development on unstable slopes without taking adequate slope stabilization measures, and by increasing downslope risks from landslides. BPA is coordinating with state geologists to identify known and potential landslide risks in the project area. BPA would work to site its proposed facilities away from known landslide areas where possible, and to design any facilities in landslide areas that cannot be avoided to minimize the potential for exposing these facilities to landslides or increasing landslide risk. Thus, the proposed project would not contribute to any cumulative increases in landslide risk from ongoing and reasonably foreseeable cumulative actions.

The project would result in minor alterations to topography within the right-of-way from grading and construction of towers and roads. These effects would be localized and limited to the construction footprint of the transmission line. Soil erosion would largely be mitigated by implementation of BMPs during and following construction. Most soil compaction would be temporary; permanent soil compaction would be limited to areas under tower footings, substation foundations, and access roads. The project thus would contribute incrementally, though in a relatively minor way, to cumulative impacts related to geology and soils.

## 26.3.11 Water

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

The three major watersheds crossed by the project (Cowlitz, Lewis, and Salmon/Washougal) and their waters have been cumulatively affected by agriculture, urbanization, timber harvest, and many other activities over the past 150 years. These uses are likely to continue in these watersheds into the foreseeable future. Timber harvest has been a dominant activity that has cumulatively affected water resources in the watersheds crossed by the project, and dam installation on the bigger rivers, agricultural uses, and urbanization have contributed as well. Historic timber harvest practices have cumulatively affected water quality from tree removal and clearing activities that disturb soils, and from ongoing use of unpaved access roads that crisscross lands primarily in the northern and eastern portions of the project area. These activities increase sediment delivery to streams, thereby cumulatively affecting their water quality. In addition, agricultural uses and urbanization have cumulatively affected water quality by increasing sediment delivery to streams through soil disturbance and contributing contaminants from ongoing activities and accidental releases.

Historic timber harvest practices, agricultural uses, and urbanization also have cumulatively removed thousands of acres of riparian vegetation important for the long-term health of water resources in the Lower Columbia River region. In urban and agricultural areas, riparian vegetation is now thin or nonexistent (NMFS and USFWS 2006), and the state of riparian vegetation in these areas is not expected to improve in the foreseeable future.

A variety of causes have also led to cumulative water quality impairment of river and stream segments in the lowlands near the Columbia River. Many of these river and stream segments are on the Washington State 303(d) list for water temperature (see Chapter 15, Water). Debris torrent damage, recent harvest, naturally wide channels, and lack of conifer regeneration are possible explanations for these temperature exceedances (NMFS and USFWS 2006).

Reasonably foreseeable future projects involving construction in and near project area waters would contribute to the cumulative impact on these waters. However, BMPs and other mitigation measures also would be put in place to minimize the impacts of these projects, which would create less comparative contribution to cumulative impacts on project area waters than historically occurred from similar actions. In addition, reasonably foreseeable future actions aimed at improving water quality, such as the stormwater and wastewater facility development and improvement projects identified for many cities and towns throughout the area, would incrementally reduce overall cumulative impacts on water resources (see Table 26-2).

The proposed project would contribute to cumulative water resource impacts by increasing sediment delivery to streams from construction activities and ongoing use of unpaved roads. The proposed project also could lead to cumulatively increased water temperature along some streams crossed by the transmission line from decreased riparian shade where trees would need to be cleared for the new line. In terms of the number of new river and steam crossings by the proposed transmission line right-of-way and by proposed new access roads outside of this right-of-way, the contribution to these cumulative impacts would be greatest from the Central (about 301) and Crossover alternatives (about 297), since these alternatives would require the most new stream crossings from among the action alternatives. The West Alternative would contribute the least to this cumulative impact since it would have the fewest new stream crossings (about 219). The East Alternative (about 277) would have similar but fewer new stream crossings than the Central and Crossover alternatives. While these contributions would be small in comparison to other historic, on-going, and future activities affecting water resources such as timber harvests and agricultural uses, the proposed project would

nonetheless contribute incrementally, though in a relatively minor way, to cumulative impacts to water resources.

## 26.3.12 Wetlands

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Cumulative impacts on wetlands have primarily resulted from past and present land development and land management practices including agricultural and timber harvest, urbanization, road construction and maintenance, and utility transmission. These impacts have been occurring since the area was settled and have increased over time in area and rate of development as populations increased and demand for resources such as crops and timber increased. It is likely that hundreds, if not thousands, of acres of wetlands have been cumulatively affected, through a combination of direct fill of these areas to make them more suitable for developed uses, activities within these areas that have reduced their functions and values, and unintentional and intentional releases of contaminants and pollutants to and through these areas. These impacts have also cumulatively affected the ability of regional wetlands to provide habitat, water retention and discharge, stream baseflow, flood and erosion control, and water quality improvement.

Wetlands continue to be impacted by development and land management practices (e.g., residential, commercial, and road development, timber harvest) that affect wetland loss or degrade functions and values, including filling wetland areas. Future projects, such as land development, agriculture, timber harvest, and additional transmission, pipeline, or other linear development, also could affect wetlands, depending on the presence or absence of wetlands in the areas in which these projects would take place. However, these impacts would be less than from similar actions that have historically occurred because of current wetland-related laws and regulations that require avoidance, minimization, and compensation (in that order of preference) for impacts to wetland resources. This “no net loss” approach serves to greatly reduce the overall cumulative impact on wetlands from any proposed development.

The proposed project would contribute to cumulative wetland impacts both by filling wetland areas for transmission line towers and access roads, and by construction activities and vegetation clearing of these areas for the transmission line right-of-way. The contribution to these cumulative impacts may be greatest from the West Alternative, since this alternative would potentially impact the greatest acreage of wetlands (about 154 acres, which includes clearing and fill) from among the action alternatives (see Chapter 16, Wetlands), but potentially could impact the lowest quality wetlands in terms of functions and values. Functional value of wetlands cannot be determined until wetland delineations are completed in the field. This acreage includes about 38 acres of direct wetland fill, which would be the greatest amount of such fill from among the action alternatives. The Central and East alternatives may have the least contribution to this cumulative impact since they each would potentially impact the fewest acreage of wetlands (about 105 acres for Central and 106 acres for East), and also would have the least amount of direct wetland fill (about 20 acres for Central and 22 acres for East). At the same time, the wetlands along these alternatives could be much higher in quality with higher functions and values. The Crossover Alternative, with about 114 acres of potential impacts to wetlands (of that, 26 acres of direct wetland fill), would be in between. Wetland delineations in the field would help determine wetland extent, values, and function.

Although a mitigation plan would be developed to compensate for project impacts to wetlands and efforts would be made to ensure the success of this mitigation, the long-term full effectiveness of this mitigation is uncertain, and all action alternatives thus would contribute to the cumulative reduction in the amount of wetlands in the project area. Overall, due to their general avoidance and minimization of impacts on wetlands, the Central and East alternatives would contribute incrementally, though in a relatively minor way, to potential cumulative wetland impacts in the project area. Because of the greater acreage of wetlands potentially affected by the West and Crossover alternatives, these alternatives would have a relatively high level of contribution to cumulative wetland impacts in the project area. At the same time, wetlands along the East and Central alternatives may provide higher function and values than wetlands along the West and Crossover alternatives.

## 26.3.13 Vegetation

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Past and present actions have resulted in extensive cumulative changes to native plant communities. From the mid 1800s to the present, timber harvests and population growth have converted large tracts of native plant communities, such as mature forests, prairies, and wetlands (see Section 26.3.12, Wetlands), to managed forests, agriculture, and/or urban/suburban areas. The ongoing loss of forests (particularly mature forest, forested riparian areas, and forested wetlands), herbaceous wetlands, prairies, and a number of specific special-status plant habitats are of significant concern in western Washington. Ongoing development and timber production activities are expected to continue and could cause continuing cumulative loss and degradation of forest and other native plant habitats.

The proposed project would also affect native plant habitats, particularly the Central, East, and Crossover alternatives, where new rights-of-way for the transmission line and access roads would be established and cleared. Specific to forest habitat—including forest, mature forest, and production forest, the East Alternative, followed closely by the Central Alternative, would have the greatest contribution to the cumulative loss of forest habitat because of vegetation clearing (see Chapter 17, Vegetation). Because it largely follows existing transmission corridors and would be located generally in more urbanized areas, the West Alternative would contribute the least to this cumulative impact. The contribution of the Crossover Alternative to this cumulative impact would be in between. Although the East and Central alternatives would have the greatest contribution to the cumulative loss of forest habitat, the loss is more production forest, which is of lower quality than forest and mature forest. The proposed project would contribute incrementally to potential cumulative impacts on forests and other native plant habitats.

Ongoing and future development and timber production activities also likely could create continuing cumulative impacts on special-status plant habitats. Of the action alternatives, however, only the West Alternative would permanently affect more than 0.5 acre of documented special-status plant habitats, about 12–46 acres of the Lacamas Prairie Natural Area—including a portion of the last documented wet prairie in Washington and WNHP Oregon white oak woodland priority ecosystem—lost to towers and access roads (see Chapter 17).

Only the West Alternative would potentially affect a federally listed species—Bradshaw's lomatium—by removing from 0.08–4 acres of a documented occurrence and buffer area (depending on whether an option is chosen). To the extent that the project would potentially affect federally listed plant species, and impacts to them are determined to be unavoidable, BPA would take measures to ensure compliance with ESA requirements.

Other special-status plant species would be avoided to the extent possible, but unavoidable impacts may occur. As a result, the proposed project may add cumulatively to adverse impacts on special-status plant species resulting from other past, present, or reasonably foreseeable actions.

Past and present activities, such as development, agriculture, and road construction have introduced and spread noxious weeds into native plant habitats. These weeds would continue to spread as a result of ongoing and reasonably foreseeable future actions, and construction of the project would contribute to this cumulative impact, particularly in the Central, East, and Crossover alternatives where new right-of-way for the transmission line and access roads would create fresh avenues for weed dispersal into native habitats. Operation and maintenance activities would also contribute to this cumulative impact (see Chapter 17). The potential contribution to the spread of weeds on the state noxious weed list would be minimized by project-related mitigation measures such as spraying, reseeding, and revegetation. These measures would not address weeds not included on the state noxious lists unless they happen to be within listed weed populations being treated. With mitigation measures, the project would only contribute minor cumulative impacts from the spread of non-native weeds.

## 26.3.14 Wildlife

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Past and present actions have caused the cumulative loss and degradation of wildlife habitat, including special-status habitats—primarily WDFW priority habitats—that support a wide diversity of species. Clearing and converting land for agricultural use, urban development, utility infrastructure, roads, and other uses by past and present actions have caused the cumulative loss of wildlife habitat. These uses have also led to cumulatively increased wildlife disturbance from human activity, increased habitat fragmentation, increased wildlife mortality from roads, and the spread of non-native weeds, such as reed canarygrass, that reduce habitat diversity. In addition, timber harvest activities have converted large tracts of old-growth/mature forest habitat to managed forests, which has also led to increased disturbance from human activity, habitat fragmentation, and reduced habitat diversity. This habitat loss and degradation have caused the cumulative displacement of wildlife species, including special-status wildlife species such as northern spotted owl and western pond turtle. Wildlife species also have been cumulatively affected by hunting and trapping activities, and by incidental harm and killing from other human activities in the area.

Reasonably foreseeable future actions involving development in previously undeveloped areas would incrementally add to cumulative wildlife impacts, both through reduction of potential habitat, and disturbance and mortality of wildlife species in and around the sites of these actions. Timber production areas would continue to be managed under a cyclical harvest schedule, with similar impacts to wildlife habitat and species as described above.

The proposed project would contribute to cumulative wildlife impacts through the permanent loss of wildlife habitat where project facilities such as transmission towers, access roads, and substations would be located; loss, alteration, or degradation of wildlife habitat from vegetation clearing within the transmission line right-of-way; disturbance and mortality of wildlife species during project construction; and bird mortality due to collisions with the proposed transmission line (see Chapter 18, Wildlife). All action alternatives would contribute incrementally to the impacts that past, present, and reasonably foreseeable future timber production, urbanization, utility infrastructure, roads, and agricultural and other uses have had on wildlife species and habitat. The Central and East alternatives would contribute more to cumulative impacts on wildlife habitat in general since they would affect a greater total amount of habitat. However, most of this habitat is production forest, the loss of which is considered a lower impact since the habitat is common in the area. It also holds less value for wildlife than native forest or old-growth/mature forest since it already has or will be disturbed and degraded by logging.

The West Alternative, followed by the Crossover Alternative, would contribute more to cumulative impacts on bird species and WDFW priority habitats. Along the West Alternative, the combination of parallel transmission lines set at different heights and the occurrence along the right-of-way of three WDFW waterfowl concentration priority areas, one WDFW wood duck priority area, one WDFW Woodland Cavity Nesting Duck Priority Area, and about twice as much wetland habitat as the other action alternatives, would increase the risk of bird mortality through collisions with transmission lines. It would also contribute more to cumulative impacts on WDFW priority habitats, including riparian areas, wetlands, old-growth/mature forest, westside prairie, and Oregon white oak woodlands, since it would remove substantially more combined acres of these important wildlife habitats than the other action alternatives, followed closely by the Crossover Alternative (see Section 26.3.12, Wetlands). However, the East Alternative would remove substantially more documented WDFW snag and log priority habitat (i.e., WDFW snag-rich areas) than the other action alternatives, and the Crossover Alternative would remove almost twice as much old-growth/mature forest.

Only three federally listed species–northern spotted owl, marbled murrelet, and Columbian white-tailed deer—are documented in the study area (see Chapter 18, Wildlife), and of these, only the northern spotted owl is documented within 1 mile of any of the action alternatives. No known northern spotted owl nests would be affected by the action alternatives, so the proposed project would not contribute to cumulative reductions of any such nests. The new transmission line right-of-way and proposed access roads outside of this right-of-way under all action alternatives would, however, pass through potentially suitable northern spotted owl habitat, and the Central, East, and Crossover alternatives would pass through documented northern spotted owl circles. Construction activities could disturb any spotted owls present in these areas during construction, and tree clearing and the presence of the proposed project would add to the cumulative removal of potential spotted owl habitat in the area. The contribution to these cumulative impacts would be greatest from the East Alternative, which would pass through about 25 miles of potential habitat and remove about 220 acres of habitat from within four documented northern spotted owl circles. This would be followed by the Crossover Alternative (about 19 miles of potential habitat and 70 acres from one circle), the Central Alternative (about 13 miles of potential habitat and 4 acres from one circle), and finally the West Alternative (about 4.5 miles of potential habitat and only coming within about 0.4 mile of one circle).

Similar to the northern spotted owl, no known marbled murrelet nests would be affected by any of the action alternatives for the proposed project, so the proposed project would not

contribute to cumulative reductions of any such nests. The new transmission line right-of-way and access roads outside this right-of-way under all action alternatives would pass through the eastern extent of the Western Washington Coast Range Conservation Zone, or Conservation Zone 2, for marbled murrelet (marbled murrelet conservation zone). However, the proposed project is east of the typical range of the marbled murrelet, and only small pockets of old-growth/mature forest occur in this portion of the project area. Therefore, the proposed project would contribute in a relatively minor way to the cumulative reduction of habitat within a marbled murrelet conservation zone, with the West and Crossover alternatives having the greatest reductions in suitable old-growth/mature forest habitat within the conservation zone. As with vegetation, to the extent that the project would potentially affect federally listed wildlife species and impacts to them are determined to be unavoidable, BPA would take measures to ensure compliance with ESA requirements.

Other special-status species or species groups, including federal species of concern, state-listed species, WDFW priority species, and WDFW priority areas, would be avoided to the extent possible, but unavoidable impacts may occur. As a result, the proposed project may add cumulatively to adverse impacts caused by other past, present, or reasonably foreseeable actions on special-status species or species groups.

## 26.3.15 Fish

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Past and present actions that have cumulatively affected fish include agricultural and timber harvest practices and other human development, especially in floodplains. These actions have caused the loss of streamside riparian cover and function, the loss of large woody debris sources, and the addition of sediment into streams. In addition, development of the hydroelectric system on the Lewis and Columbia rivers has cumulatively affected both downstream and upstream fish survival, as has industrial and other development along these rivers that have adversely affect fish habitat. Fish harvest in the Columbia River, its tributaries and the ocean, has further reduced overall populations of fish species. In recent years, however, the cumulative adverse effect on fish from these factors has appeared to lessen with better passage conditions, directed harvest management, and fish habitat restoration and improvements.

Reasonably foreseeable future actions that could cumulative impact fish include actions that would remove shade vegetation in riparian areas along rivers or streams and actions that degrade water quality in project area rivers or streams from soil erosion or other discharges. These future actions include forest harvests, residential and commercial development (especially in floodplains, conversion of forest land to open space or agriculture, and increasing widths of existing or creation of new rights-of way for roads and transmission lines). Construction by PacifiCorp of fish passage facilities and other improvements on the Lewis River, on the other hand, would serve to cumulatively improve conditions for fish in project area waterways (see Table 26-2). In addition, regulations and management practices are being implemented to mitigate or restore natural stream functions. In particular, riparian conservation regulations and guidelines maintained in habitat conservation planning and in shoreline and forest harvest planning would likely result in a greater degree of riparian function.

These regulations and guidelines are intended to protect forested riparian areas, and actively manage them to restore their functions.

The project, regardless of the action alternative, would remove forested vegetation in riparian areas along the transmission line right-of-way and access roads, and these areas would be managed by restricting the height of future vegetation growth. Forested riparian areas along streams provide both shade for cooling and the potential for large woody debris recruitment, which are needed for high quality fish habitat which benefit fish.

The project would contribute to a cumulative reduction in riparian area function and add to the cumulative amount of riparian forest removed in the project area, to an extent largely dependent on the number of forested fishbearing rivers and streams crossed by a particular alternative (see Chapter 19, Fish). Accordingly, the Central Alternative would have the greatest contribution to this cumulative impact since it would cross 68 forested fishbearing rivers and streams and would permanently remove more highly functioning shade vegetation and large wood debris potential at these locations. The Crossover and East alternatives would follow with similar, but slightly less, levels of contribution (55 and 52, respectively) to this cumulative impact since it would cross fewer fishbearing rivers and streams. The West Alternative would have the least contribution to cumulative impacts (47) on fish.

Construction activities would also place towers and roads in floodplains and expose soil that could cause erosion and sediment delivery into rivers and streams. These effects are minor, causing a small estimated average percent reduction in the production of affected fish populations (less than 0.2 percent) (see Chapter 19, Fish). The project would have negligible incremental contributions to cumulative impacts on fish, including listed species.

## 26.3.16 Air Quality

The spatial boundary for the following analysis consists of the general vicinity of the proposed transmission line routes and substations, and more broadly the three counties that would be crossed by these routes (Cowlitz, Clark, and Multnomah counties).

Many past actions have contributed to cumulative air quality impacts through emissions of air pollutants as part of ongoing operations and/or through fugitive emissions (e.g., vehicular-related emissions and construction-related dust generation). However, only those actions still occurring are contributors to current cumulative air quality impacts in the area; those past actions that have ceased do not currently contribute to these impacts. On-going actions include agricultural uses, timber harvests, the burning of wood and fossil fuels in residential and commercial/industrial uses, road construction and maintenance, other transportation infrastructure improvements, and vehicle use.

Many of the reasonably foreseeable future actions would be expected to contribute to these cumulative air quality impacts (see Table 26-2). Future projects involving construction activities on vacant land likely would generate PM10 emissions in the form of windblown dust. Proposed power generation and industrial facilities would be new sources of air pollutants, both from facility operations and from ancillary activities such as vehicle use and materials storage. The actual contribution from these future actions would depend on the level and amount of emission control methods and technologies employed.

The action alternatives would contribute to cumulative air quality in generally the same manner and amounts, so cumulative impacts on air quality would be similar among all action alternatives. Air emissions from the action alternatives would occur primarily during construction, from airborne dust generated by construction activities and from emissions from construction vehicles and heavy equipment. These emissions would temporarily and locally contribute to cumulative impacts on air quality in the immediate vicinity of construction activities, but would not be expected to have a noticeable effect on overall regional cumulative air quality. In addition, after construction, ongoing operation of the proposed project would not result in a measurable contribution to cumulative air quality impacts in the region. Ongoing emissions from corona discharge from the proposed transmission line may generate small quantities of ozone and nitrogen oxide emissions near the line, and periodic vehicle trips for inspection and repair would emit small amounts of carbon monoxide, sulfur oxides, and other pollutants, but these emission levels would be indistinguishable from background concentrations and would not contribute to cumulative impacts.

## 26.3.17 Greenhouse Gases

Greenhouse gas (GHG) concentrations in the atmosphere and corresponding climate change occurring over the past 50 years have been significantly affected by anthropogenic contributions. GHG emissions have largely originated from the burning of fossil fuels, volcanic eruptions and other natural activity, and the clearing of forests around the world from many and varied sources during this time, and for a significant period before that (Karl et al. 2009). Therefore, unlike the cumulative impacts analyses for other resources, the global nature of GHG concentrations makes it impossible to define a spatial boundary short of global or to catalogue past, present, and reasonably foreseeable future actions for this resource.

Any action where fossil fuels have been, or are being burned contributes to GHG concentrations. Examples of such actions include home heating, automobile and other vehicle use, electricity generation, and processing and manufacturing of goods, among others. In the project vicinity, past development and land management activities have affected air quality and contributed to greenhouse gases. Population growth, increases in commercial/industrial development, energy facilities, and expanded transportation infrastructure have all increased emissions.

Actions that cause soil disturbance, vegetation loss or burn biomass can also increase concentrations. Vegetation can affect concentrations in two ways. First, if vegetation is removed prior to maturation, the carbon storing potential is lost and $CO_2$ can no longer be sequestered in that vegetation. Second, if that biomass is burned, it will release all the carbon it has sequestered back into the atmosphere as $CO_2$. These actions have occurred in the past, are likely still occurring, and will continue to occur in the future.

In analyzing the project's cumulative impact, global, national, and regional GHG emissions were considered. In 2006, the United States Energy Information Administration (EIA) estimated global GHG emissions at 29,017,000,000 metric tons of $CO_2$ equivalent (EIA 2009a). In 2008, total U.S. GHG emissions were estimated at 6,956,800,000 metric tons of $CO_2$ equivalent. Overall, total U.S. emissions have risen by about 14 percent from 1990 to 2008. In 2007, the four states within BPA's service territory emitted an estimated 180,060,000 metric tons of $CO_2$ (see Table 26-3). Oregon and Washington, combined, emitted an estimated 127,080,000 metric tons of $CO_2$ (see Table 26-3).

**Table 26-3 Estimated Annual $CO_2$ Emissions for Each State in BPA's Service Territory**

| State | CO2 Emissions (metric tons) |
|---|---|
| Idaho | 16,280,000 |
| Montana | 37,700,000 |
| Oregon | 43,520,000 |
| Washington | 82,560,000 |
| **Total** | **180,060,000** |
| Source: EPA 2007 | |

One evaluation has concluded that, as a result of increased GHG concentrations, the earth's temperature has increased by about 1.5 degrees F over the last century (Karl et al. 2009). Models predict that the warming of the planet will continue and the planet could be as much as 11.5 degrees F warmer by 2100 with the current level of GHG emissions. The effects of increased temperatures include sea level rise due to shrinking ice caps and glaciers, changes in biodiversity as species try to move into more optimal temperature ranges, lengthening of growing seasons, and thawing of permafrost (Karl et al. 2009).

In the Northwest, statistical data indicates that the annual average temperature also has risen about 1.5 degrees F over the past century, with some areas experiencing increases up to 4 degrees F. Many experts believe that this temperature rise is a major contributing factor to the 25 percent reduction in average snowpack in the Northwest over the past 40 to 70 years. A continued decline in snowpack in the mountains will decrease the amount of water available during the warm season. A 25- to 30-day shift in the timing of runoff has been observed in some places, and the trend is expected to continue as the region's average temperature is projected to rise another 3 to 10 degrees F in the 21st century (Karl et al. 2009).

Any addition to GHG emissions could contribute to long-term effects on climate change. However, when compared to the regional, national, and global rates, the GHG emissions estimated for the proposed project are negligible (see Chapter 22, Greenhouse Gases).

## 26.3.18 Climate

No impacts on climate from the transmission line have been identified. As a result, there are no cumulative impacts on climate from the project. Climate would have low impacts on the transmission line project. Impacts are dependent on terrain and the varying climate at different elevations. These impacts are temporary and not cumulative in nature, and there would be no cumulative impacts from climate for the project.

# Chapter 27 Consultation, Review, and Permit Requirements

This chapter addresses federal statutes, implementing regulations, and Executive Orders (EOs) and other consultation, review, and permit requirements that are potentially applicable to the project. This EIS is being sent to Tribes; federal agencies; and regional, state, and local governments as part of the consultation process for this project.

Words in **bold** and acronyms are defined in Chapter 32, Glossary and Acronyms.

## 27.1 National Environmental Policy Act

This EIS has been prepared by BPA pursuant to regulations implementing the NEPA (42 USC 4321 et seq.), which requires federal agencies to assess, consider, and disclose the impacts that their actions may have on the environment. BPA has assessed the potential environmental impacts of the project in this EIS, has made this EIS available for public comment, and will consider the potential impacts and public comments when making decisions regarding the project.

## 27.2 Endangered Species Act of 1973

The ESA of 1973 (16 USC 1536) as amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife and plants, and the preservation of the ecosystems on which they depend. The ESA is administered by the USFWS for wildlife, plants, and freshwater species and by NOAA Fisheries for marine and anadromous species. The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. It also specifies prohibited actions and exceptions. Section 7 of the ESA requires federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize endangered or threatened species or their critical habitats. A federal agency also is required to consult with the USFWS and/or NOAA Fisheries if it is proposing an action that may affect listed species or their designated critical habitat. If listed species or designated critical habitat are present and could be affected by the Proposed Action, Section 7 requires that the federal agency prepare a biological assessment (BA) to analyze the potential effects of the action on listed species and critical habitat and make an effect determination for each species. USFWS or NOAA Fisheries review the BA and, if they conclude that the action may adversely affect a listed species or their habitat, issue a biological opinion, which includes a take statement and a list of reasonable and prudent alternatives to follow during construction. If USFWS or NOAA Fisheries find that the project may affect, but is not likely to adversely affect a listed species or their habitat, they will issue a letter of concurrence.

BPA reviewed the federal lists of the threatened and endangered plant, wildlife, and fish species that may occur in Cowlitz and Clark counties, Washington and Multnomah County, Oregon. From these lists and other database information provided by WDFW and WDNR, BPA determined that six federally protected threatened or endangered plant species could occur in the project area: golden paintbrush, Pacific fleabane, Willamette Valley daisy, water howellia, Bradshaw's lomatium, Nelson's checker-mallow, and Kincaid's lupine. BPA determined that three federally protected threatened or endangered wildlife species could occur in the project area: marbled murrelet, spotted owl, and Columbian white-tailed deer. BPA also determined that eight federally protected fish species—bull trout, coho salmon, Chinook salmon, chum salmon,

steelhead, eulachon, green sturgeon, and sockeye salmon – could occur in the project area. Many evolutionary significant units of these species occur solely along their migration route in the Columbia River; others include spawning and rearing use in Columbia River tributaries.

The assessment of potential occurrences of threatened and endangered plant, animal, and fish species and their habitats, and potential impacts to these species from the project, are discussed in Chapter 17, Vegetation; Chapter 18, Wildlife; and Chapter 19, Fish. As discussed in these chapters, the proposed project could cause impacts to protected plant, wildlife, and fish species and their critical habitat.

Bradshaw's lomatium is the only plant species that currently has been documented to occur within a 2-mile-wide corridor of the West Alternative and Options and Crossover Option 1. If avoidance is not possible, impacts could occur to this species from project activities. No critical habitat for federally listed plant species is currently designated in the study area.

While suitable habitat may occur along all the action alternatives, the Columbian white-tailed deer is not known to occur nor is it likely to occur in the study area. The northern spotted owl is the only wildlife species that currently has been documented to occur within a 2-mile-wide corridor of the Central, East, and Crossover alternatives. Low impacts would occur to the spotted owl for the West Alternative because potential habitat conducive to the owl that would be removed would be of marginal quality, and no documented northern spotted owl circles would be affected. Impacts from the Central, East, and Crossover alternatives would be moderate since habitat would be removed from within documented northern spotted owl circles: the East and Crossover alternatives would also affect some high quality potential habitat. While there is one documented occurrence of the marbled murrelet about 3 miles northeast of the Casey Road Substation site, and the northern portions of all four action alternatives cross through the Western Washington Coast Range Conservation Zone for marbled murrelet, the western-most portions of the action alternatives are at the furthest eastern edge of the species' range, where nesting is less likely to occur. In addition, only a small amount of the habitat that would be removed within the conservation zone is suitable old-growth/mature forest habitat. Impacts from loss of potential habitat within the conservation zone would be low. Similar to plants, no critical habitat for federally listed wildlife species is currently designated in the study area.

Project impacts to hydrology, sediment delivery, riparian, and floodplains in watersheds, including alteration of riparian habitat through loss of streambank stability, large woody debris recruitment, stream shade, and nutrients, affect the productivity of fish habitat. The project would clear forested vegetation along about 2 to 3 miles of fish-bearing streams, including critical habitat for fish. Loss of riparian function would be greatest along the Central Alternative and options and least along the West Alternative and options. The West Alternative and options also would have the lowest impact on fish compared to other alternatives. This alternative includes a high number of stream crossings, although impacts to fish habitat at many of these crossings would be low because riparian vegetation has already been removed. The Crossover Alternative and options would have the highest impact on fish. Many of the streams crossed would require riparian clearing in highly-functional riparian zones. While none of the alternatives and options would cause a substantial risk to listed species, additional impacts will further degrade the state of ESA-listed species from current levels. No critical habitat for fish species is crossed by the action alternatives.

BPA is consulting with USFWS and NOAA Fisheries under Section 7 of the ESA regarding these species. Field surveys would be conducted as needed in spring 2013 to confirm the presence and/or absence of listed species in the project area and to aid in Section 7 consultation.

# 27.3 Fish and Wildlife Conservation Act of 1980

This federal act (16 USC §§ 2901 et seq.) encourages federal agencies to conserve and promote the conservation of nongame fish and wildlife species and their habitats. A separate act, the Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires federal agencies undertaking projects on water resources to consult with the USFWS and the state agency responsible for fish and wildlife resources.

The proposed project could cause impacts on nongame species (see Section 27.2, Endangered Species Act of 1973). BPA is consulting and coordinating with federal and state agencies responsible for the management of these species. Mitigation designed to avoid and minimize impacts to fish and wildlife and their habitats is identified in Chapter 18, Wildlife and Chapter 19, Fish.

# 27.4 Magnuson-Stevens Fishery Conservation and Management Act

Under Section 305(b)(4) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), the fisheries division of NOAA Fisheries is required to provide essential fish habitat (EFH) conservation and enhancement recommendations to federal and state agencies for actions that adversely affect EFH. EFH includes all streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon that has been designated EFH.

Wherever possible, NOAA Fisheries uses existing interagency coordination processes to fulfill EFH consultations with federal agencies. EFH occurs in the Columbia River and its tributaries throughout the project area. As discussed in Chapter 19, Fish, the proposed project could cause impacts on waters and substrate necessary to fish species covered under EFH—salmon stocks—for spawning, breeding, feeding, and growth to maturity. Mitigation designed to avoid and minimize impacts to fish and their habitats is identified in Chapter 19, Fish. BPA will continue to coordinate and consult with NOAA Fisheries to ensure appropriate mitigation measures would be used to minimize impacts to EFH.

# 27.5 Migratory Bird Treaty Act of 1918

This act implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds (16 USC 703-712, July 3, 1918, as amended through 1989). Under the act, taking, killing, or possessing migratory birds, their eggs, or nests is unlawful. Most species of birds are classified as migratory under the act, except for upland and non-native birds such as pheasant, chukar, gray partridge, house sparrow, and European starling.

The project may impact migratory birds through increased potential for power line collisions, loss of habitat, potential disruption of navigational mechanisms by EMF, and potential disruption of

breeding if temporary construction activities occur during the breeding season. Potential impacts on migratory birds and mitigation measures are discussed in Chapter 18, Wildlife. In accordance with the Memorandum of Understanding signed in 2006 between the USFWS and the USDOE, BPA will consult with the USFWS to ensure appropriate mitigation measures would be implemented to minimize the risk of bird mortality and help promote the conservation of migratory bird populations.

## 27.6 Bald and Golden Eagle Protection Act of 1940

The Bald and Golden Eagle Protection Act of 1940 prohibits the taking or possessing of and commerce in bald and golden eagles, with limited exceptions (16 USC 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978). The Act only covers intentional acts or acts in "wanton disregard" of the safety of bald or golden eagles. Because eagles use portions of the project area for foraging, perching, roosting, and nesting, there is a possibility some eagles could be killed. However, because the Bald Eagle and Golden Eagle Protection Act only covers intentional acts, or acts in "wanton disregard" of the safety of bald or golden eagles, this project is not subject to this act.

## 27.7 Federal Noxious Weed Act

This federal act, as amended in 2009, directs federal agencies to manage undesirable plant species on federal lands when management programs for those species are in place on state or private land in the same area (7 USC § 2814) (1990). Undesirable plant species are defined as those that are classified as undesirable, noxious, harmful, exotic, injurious, or poisonous, pursuant to state or federal law. A noxious weed list (7 CFR 360.200) is developed by the Secretary of Agriculture, which lists noxious weeds (as defined by the Plant Protection Act) that are subject to restrictions on interstate movement (7 USC § 7712).

Construction and maintenance activities would create some risk of spreading undesirable plant species in the project area in Cowlitz and Clark counties, Washington and Multnomah County, Oregon. If privately or state-managed undesirable plant species are found or spread during project construction or maintenance, BPA will coordinate with the state, county, and landowners regarding their control or eradication (BPA 2000a). Pre- and post-construction surveys would also be conducted for undesirable plant species included on the federal noxious weed lists and included on Oregon and Washington state and county lists. See Chapter 17, Vegetation, for a discussion of species, impacts, and mitigation measures.

## 27.8 Clean Air Act

The Clean Air Act as revised in 1990 (PL 101-542, 42 USC §7401) requires EPA and the states to carry out programs intended to ensure attainment of National Ambient Air Quality Standards. The EPA is authorized to establish air quality standards for six "criteria" air pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter ($PM_{2.5}$, $PM_{10}$), and sulfur dioxide. The EPA uses these six criteria pollutants as indicators of air quality. The EPA has established NAAQS for each criteria pollutant, which defines the maximum legally allowable concentration. If the standard for a pollutant is exceeded, adverse effects on human health may occur. When

an area exceeds these standards, it is designated as a nonattainment area. Pollution control measures are mandated for federal actions in nonattainment areas.

A nonattainment area can be listed for any one, or more, of the criteria pollutants. An area that was once a nonattainment area, but has since improved its air quality enough so that it now meets the EPA established air quality standards, is upgraded to a maintenance area designation. Maintenance areas also have pollution controls imposed on them, but because the air quality is not as poor as in nonattainment areas, the control standards are not as strict. All other areas not listed by the EPA for air quality degradation are considered attainment areas. The General Conformity Requirements of the Code of Federal Regulations require that federal actions do not interfere with state programs to improve air quality in nonattainment areas. There are no nonattainment areas in the project area.

Of the six criteria air pollutants, particulate matter (PM) is the main concern for transmission line, substation, and access road construction activities. $PM_{10}$ are particles with an aerodynamic diameter smaller than 10 micrometers (µm) and include: "dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires, and natural windblown dust" (EPA 2003). $PM_{2.5}$ are "fine particles" with an aerodynamic diameter smaller than 2.5 µm. $PM_{2.5}$ particles can be "directly emitted from sources such as forest fires or they can form when gases emitted from power plants, industry and automobiles react in the air" (EPA 2006).

In the project area, authority for ensuring compliance with the Clean Air Act is delegated to the Washington Department of Ecology, Southwest Region and the Oregon DEQ. Each agency has regulations requiring all industrial activities (including construction projects) to minimize windblown fugitive dust. RCW Chapter 70.94 (Washington Clean Air Act) and WAC Chapter 173-400 (general regulations for air pollution sources); and ORS Chapter 468a (Oregon air quality statutes) and OAR Divisions 200-268 (Oregon air quality rules) require owners and operators of fugitive dust sources to prevent fugitive dust from becoming airborne and to maintain and operate sources to minimize emissions. Air quality impacts from fugitive dust and emissions of the project are discussed in Chapter 21, Air Quality.

# 27.9 Greenhouse Gases

Executive Orders 13423 and 13514 require federal agencies to measure, manage, and reduce greenhouse gas emissions by agency-defined target amounts and dates (The White House 2009). BPA is currently developing a Sustainability Action Plan, which addresses managing and reducing greenhouse gas emissions by the agency. The project would remove carbon sequesters (trees and other vegetation) and generate emissions of gases (such as carbon dioxide) that contribute to global warming. Construction of the project would produce an estimated 39,600 metric tons in greenhouse gas emissions over the course of 30 months, and operation and maintenance of the line would produce an estimated 3,600 metric tons per year. The project is estimated to produce an annualized average of 4,400 metric tons of greenhouse gas over the life of the project. See Chapter 22, Greenhouse Gases, for the complete analysis and discussion.

# 27.10 Clean Water Act

Section 404 of the Federal Clean Water Act (CWA) (33 USC §§ 1251 et seq.) is administered by the U.S. Army Corps of Engineers (Corps), and regulates the discharge of dredged or fill material

into waters of the United States, including wetlands and streams. Because BPA would be placing fill into wetlands and streams to construct the project, a Section 404 permit would be required.

As part of the project coordination, BPA is working with the Corps to comply with the CWA Section 404(b)(1) guidelines established by the EPA (40 CFR Part 230, Section 40(b)(1)). The purpose of the guidelines is to restore and maintain the chemical, physical and biological integrity of waters of the U.S. through the control of discharges of dredged or fill material. These guidelines prohibit discharges of dredged or fill material into waters of the U.S. if there is a practicable alternative to the proposed project that would have less adverse impact on the aquatic ecosystem, including wetlands, and that does not have other significant environmental consequences (40 CFR 230.10(a)). An alternative is considered "practicable" if it is "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR 230.10(a)(2)).

When an activity is proposed to occur in a special aquatic site (i.e., wetland fill) and it is not water dependent, the CWA regulations also presume that practicable alternatives that do not involve special aquatic sites are available, and that these alternatives would have less adverse impact on the aquatic ecosystem. Both of these presumptions must be clearly analyzed as a prerequisite to complying with the guidelines, and thus to potential permit issuance. BPA is preparing a Section 404(b)(1) alternatives analysis evaluation to provide the Corps with the necessary information regarding the availability of practicable alternatives to the proposed project and to identify the least environmentally damaging practicable alternative.

The CWA also requires that applicants take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the U.S. To offset impacts that are unavoidable, the Corps requires applicants to provide compensatory mitigation to ensure that an activity complies with Section 404(b)(1) guidelines. The process of incorporating all appropriate and practicable measures to avoid, minimize and, finally, compensate for impacts to aquatic resources caused by permit actions, is referred to as mitigation sequencing. As discussed in Chapter 16, Wetlands, constructing towers and roads for the project would require the filling of up to 38 acres of wetlands. BPA is therefore coordinating with the Corp to prepare a mitigation plan in accordance with the Federal *Compensatory Mitigation for Losses of Aquatic Resources Final Rule* (33 CFR Parts 332, April 10, 2008). In both Washington and Oregon, compensatory mitigation options, in order priority, include mitigation banks, in-lieu fee programs, and permittee-responsible compensatory mitigation. The Corps describes mitigation banking as "the restoration, creation, enhancement, or preservation of wetlands to compensate for unavoidable wetland losses in advance of development actions. Banking typically involves the consolidation of small, fragmented wetland mitigation projects into one large contiguous site. Units of restored, created, enhanced or preserved wetlands are expressed as 'credits,' which may subsequently be withdrawn to offset 'debits' incurred at a project development site."

The mitigation plan is intended to address requirements of both Section 401 and Section 404 of the CWA, and would be prepared in accordance with the EPA, Corps, and Ecology interagency guidance on wetland mitigation in *Washington State, Wetland Mitigation in Washington State: Part 1—Agency Policies and Guidance* (March 2006) and *Wetland Mitigation in Washington State: Part 2—Developing Mitigation Plans* (March 2006).

CWA provisions relating to water quality are also implemented by state water quality agencies. Section 401 of the CWA requires applicants for Section 404 permits to obtain a Water Quality Certification from the certifying State agency, which is the Washington Department of Ecology

(Ecology) in Washington, and the Oregon Department of Environmental Quality (ODEQ) in Oregon. Ecology reviews applications under the requirements of RCW 90.48, and ODEQ reviews applications under Oregon Administrative Rules (OAR) 340 Divisions 41, 42, and 45. Application for and granting of a construction stormwater permit fulfills many of the application requirements for a Section 401 certification. For Sections 404 and 401 verification and approval in Washington, project information would be submitted jointly to the Corps and Ecology using the Joint Aquatic Resources Permit Application. In Oregon, applications are submitted jointly to the Corps and ODEQ using the Joint Permit Application. The Corps Section 404 permit is issued only after the affected state certifies that existing water quality standards would not be violated.

Section 402 of the CWA addresses requirements for National Pollutant Discharge Elimination System (NPDES) permits. Section 402 requires an entity to obtain a permit for discharges of pollutants into navigable waters of the state. In Washington, NPDES construction stormwater permits require notification to Ecology in advance of ground disturbing activities of 1 acre or more. Stormwater controls must be developed to address during and post-construction erosion control, treatment and discharge of dewatering water (if any), and other construction-related activities that could affect receiving water quality. These controls must be documented in a Stormwater Pollution Prevention Plan. The SWPPP is developed during final project design, adapted by the contractor before construction, and revised on site as necessary. A copy of the SWPPP is maintained on site during construction and is a basis for environmental compliance inspection during construction. The BMPs specified in the SWPPP must be inspected periodically by a state-certified inspector. Sampling and analysis of stormwater runoff is required to demonstrate compliance with discharge limits.

In Oregon, NPDES stormwater regulations also require the notification of ODEQ for ground disturbance activities greater than 1 acre. State regulations require the use of BMPs for control of erosion, stormwater discharges, and non-stormwater discharges to waters of the state. The BMPs, including depiction of structural BMPs on grading plans and in specifications, must be documented in an Erosion and Sediment Control Plan. This plan must be adhered to or appropriately modified during construction. If sufficient quantities of hydrocarbons or other regulated liquids are maintained on site, a SPCC plan could also be required.

Section 303(d) of the CWA requires states, territories, and authorized Tribes to develop lists of impaired waters. These are waters where technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by states. Thirteen streams located in the Cowlitz, Lewis, and Salmon-Washougal Water Resource Inventory Areas (WRIAs) that would be crossed by or potentially impacted by the project are on the 303(d) list including Ostrander Creek, South Fork of Ostrander Creek, Riley Creek, Lockwood, East Fork Lewis River, Salmon Creek, Mason Creek, Dwyer Creek, Arkansas Creek, Monahan Creek, Delameter Creek, Lacamas Creek, and Coweeman River. Most of these streams are listed for elevated water temperature. Riley Creek and Lacamas Creek are listed for elevated levels of fecal coliform, and Dwyer Creek and Lacamas Creek are listed for low levels of dissolved oxygen. No streams listed as impaired on Oregon's 303(d) list are crossed by the project.

Section 303d requires that states establish priority rankings for waters on the lists and the development of Total Maximum Daily Loads (TMDLs) for streams. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards. The TMDL implementation plans for three of these creeks are under development and one has EPA approval on the TMDL and implementation plan, as described below. There are no TMDLs currently under development for Ostrander Creek, South Fork of Ostrander Creek,

Arkansas Creek, Delameter Creek, Monahan Creek, Riley Creek, Mason Creek, and Coweeman River (EPA 2011c).

The TMDL for the East Fork Lewis River is currently being developed by Ecology. Ecology is currently analyzing and modeling temperature data, developing fecal coliform and temperature load allocations, and drafting a study report to support development of the water cleanup plan (Ecology 2011b).

Dwyer Creek is within the study area of the Lacamas Creek TMDL, which is currently being developed by Ecology. The Lacamas Creek Quality Assurance Project Plan was prepared in February 2011 (Ecology 2011a). This technical study is part of the four- to five-year process of monitoring, determining required pollution reductions, and developing a detailed clean-up plan.

The TMDL and implementation plan for Salmon Creek have been approved by the EPA (Ecology 2011e).

If sufficient quantities of hydrocarbons or other regulated liquids are maintained on site, an SPCC plan could also be required according to state regulations (40 CFR 112). The plan must be adhered to during construction.

See Chapter 15, Water, and Chapter 16, Wetlands, for analysis and discussion of impacts and mitigation measures.

## 27.11 Floodplains and Wetlands (Executive Orders 11988 and 11990)

The U.S. Department of Energy mandates that impacts to floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Executive Orders 11988 and 11990, along with the *Compliance with Floodplain/Wetlands Environmental Review Requirements* (10 CFR 1022.12).

There are 16 FEMA-designated 100-year flood inundation zones (or floodplains) crossed by the project, including Leckler Creek, Cowlitz River, Coweeman River, Kalama River, Little Kalama River, Lewis River, East Fork of Lewis River, Salmon Creek, Burnt Bridge Creek, Little Washougal River, Washougal River, Lacamas Creek, Ostrander Creek, Speelyai Creek, Canyon Creek, and Columbia River. Up to 10 towers and about a mile of new and improved access roads for the East Alternative to 32 towers and 6 miles of roads for the West Alternative would be constructed in these floodplains.

The action alternatives cross wetlands that could be permanently filled by the construction of substations, towers, and roads. Acres estimated to be filled would be 38 acres, West Alternative; 20 acres, Central Alternative; 22 acres, East Alternative; and 26 acres, Crossover Alternative. Additional clearing of scrub-shrub wetlands (but no fill) within the 150-foot right-of-way is estimated to be 62 acres for the West Alternative; 16 acres, Central Alternative; 23 acres, East Alternative; and 35 acres, Crossover Alternative. Clearing of forested wetlands is estimated to be about 54 acres for the West Alternative; 69 acres, Central Alternative; 61 acres, East Alternative; and 53 acres, Crossover Alternative. Clearing in scrub-shrub and forested wetlands would convert these wetlands to emergent wetlands.

As described above, BPA would work with the Corps in the Seattle and Portland Districts to develop appropriate compensatory mitigation. Ecology, DSL, and potentially affected counties and cities may also be involved to identify appropriate mitigation for impacted wetlands.

Impacts on and mitigation for streams, floodplains, and wetlands are discussed in Chapter 15, Water and Chapter 16, Wetlands. Mitigation included in the project design for these resources is also presented in Table 3-2.

# 27.12 Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbors Act of 1899 (33 USC § 403) regulates all work in or affecting navigable waters of the United States. This regulation is administered by the Corps, and addressed structures or work that affect the course, location, condition or capacity of navigable waterways. Several navigable waters are located within the project area, including the Cowlitz River, Columbia River, and select reaches of other rivers.

In-water work could be required for the construction of one tower to support the transmission line crossing at the Columbia River. The project also would require conductors that would span the navigable waters of the Columbia River, a "water of the United States" as defined in the Rivers and Harbors Act and a navigable water as described by the Corps. Pursuant to the implementing regulations for Section 10, Section 10 permits are required for power transmission lines crossing navigable waters of the United States unless those lines are part of a water power project subject to the regulatory authorities of the U.S. Department of Energy under the Federal Power Act of 1920 (33 CFR §322). Therefore, a Section 10 permit would be required for this project.

# 27.13 Coastal Zone Management Act

The Coastal Zone Management Act was passed in 1972 to encourage the appropriate development and protection of the nation's coastal and shoreline resources. The Washington Coastal Zone Management Program defines the state's coastal zone to include 15 counties with marine shorelines. Clark and Cowlitz counties are not considered part of the coastal zone. Oregon's program generally defines the coastal zone to include those counties west of the coastal mountain range, between the Washington and California borders. Multnomah County is not considered part of the coastal zone.

# 27.14 Hazardous Materials

## 27.14.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (42 USC §6901 et seq. [1976], regulations under 40 CFR 240-271), as amended, provides a program for managing and controlling hazardous waste by regulating generators and transporters of hazardous waste, and owners and operators of hazardous waste treatment, storage, and disposal (TSD) facilities. Under RCRA regulations, hazardous waste is tracked by manifest from its point of generation until it reaches a TSD facility ("cradle to grave"). Generators, transporters, and operators of TSD facilities are required to notify the EPA or authorized state agency of hazardous waste activities and are each issued an EPA identification number. Each TSD facility owner or operator is required to have a permit

issued by the EPA or the state. Both Washington and Oregon are authorized by the EPA to regulate hazardous waste activities in their respective states.

Paint from surfaces coated before 1978, such as on existing river crossing towers, would be assumed to contain lead or other heavy metals unless laboratory analysis proves otherwise. A lead abatement plan would be implemented that would cover removal and disposal of any paint chips in accordance with all federal, state and local environmental and safety standards.

Small amounts of hazardous wastes may be generated by the project (such as paint products, motor and lubricating oils, herbicides, or solvents) during construction or operation and maintenance. These materials would be transported and disposed according to RCRA and state regulations.

## 27.14.2 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) (15 USC §2601 et seq. [1976], regulations under 40 CFR 700-799) is intended to protect human health and the environment from toxic chemicals. Section 6 of the Act regulates the use, storage, and disposal of PCBs. BPA adopted guidelines to ensure that PCBs are not introduced into the environment. Equipment used for this project will not contain PCBs. Any equipment removed that may have PCBs will be handled according to the disposal provisions of the TSCA regulation.

## 27.14.3 Federal Insecticide, Fungicide and Rodenticide Act

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (77 USC §136 et seq. [1996], and regulations under 40 CFR 162-180) registers and regulates pesticides. BPA limits it use of herbicides (a kind of pesticide) and uses herbicides only under controlled circumstances. Herbicides are used on transmission line rights-of-way and in substation yards to control vegetation, including noxious weeds. When BPA uses herbicides, the date, dose, and chemical used are recorded and reported to state regulatory agencies. Herbicide containers are disposed of according to RCRA and state regulations.

# 27.15 Cultural Resources

Preserving cultural resources allows Americans to have an understanding and appreciation of their origins and history. A cultural resource is an object, structure, building, site or district that provides irreplaceable evidence of natural or human history of national, state or local significance. Cultural resources include National Landmarks, archeological sites, properties of traditional religious and cultural importance to a Native American Tribe (also known as Traditional Cultural Properties), and other properties listed (or eligible for listing) on the National Register of Historic Places. American Indian Tribes have rights under specific laws, as well as the opportunity to voice concerns about issues under these laws when their aboriginal territory falls within a proposed project area.

Laws and other directives for the management of cultural resources include the following:

- National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq.), as amended, inclusive of Section 106

- Executive Order 13007 Indian Sacred Sites
- American Indian Religious Freedom Act of 1978 (PL 95-341, 92 Stat. 469, 42 USC 1996, 1996a)
- Antiquities Act of 1906 (16 USC 431-433)
- Historic Sites Act of 1935 (16 USC 461-467)
- Archaeological Data Preservation Act (ADPA) of 1974 (16 USC 469 a-c)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 USC 470 et seq.), as amended
- Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq.)

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. Historic properties are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. If a federal agency plans to undertake a type of activity that could affect historic properties, it must consult with the appropriate State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO) to make an assessment of the property and to assess adverse effects on identified historic properties. The NHPA specifies that Traditional Cultural Properties or TCPs may be determined to be eligible for inclusion on the National Register of Historic Places. In carrying out its responsibilities under Section 106, a federal agency is required to consult with any Native American Tribe that attaches religious or cultural significance to any such properties. NAGPRA requires consultation with appropriate Native American Tribal authorities before the excavation of human remains or cultural items (including funerary objects, sacred objects, and cultural patrimony) on federal lands or for projects that receive federal funding. NAGPRA recognizes Native American ownership interests in some human remains and cultural items found on federal lands and makes illegal the sale or purchase of Native American human remains, whether or not they derive from federal or Indian land. Repatriation, on request, to the culturally affiliated Tribe is required for human remains.

Executive Order 13007 addresses "Indian sacred sites" on federal and tribal land. "Sacred site" means any specific, discrete, narrowly delineated location on federal land that is identified by a Tribe, or a Tribal individual determined to be any appropriately authoritative representative of a Native American religion. The site is sacred by virtue of its established religious significance to, or ceremonial use by, a Native American religion, provided that the Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site. This order calls on agencies to do what they can to avoid physical damage to such sites, accommodate access to and ceremonial use of Tribal sacred sites, facilitate consultation with appropriate Native American Tribes and religious leaders, and expedite resolution of disputes relating to agency action on federal lands. The American Indian Religious Freedom Act protects and preserves to American Indians their inherent right of freedom to believe, express, and exercise traditional religions.

Background research within the project's area of potential effect identified the presence of historic and archaeological resources, and ethnographic resources that may be eligible. Cultural resources are discussed in Chapter 13, Cultural Resources. Surveys completed before construction would confirm cultural resources sites that could be impacted if they could not be

avoided. If, during construction, previously unidentified cultural resources are found that would be adversely affected by the project, BPA would follow all required procedures set forth in the NHPA, NAGPRA, ARPA, and the American Indian Religious Freedom Act. Also, if some sites cannot be avoided, BPA will consult with federal and state agency landowners and the Washington or Oregon SHPO to determine if those sites are eligible for a listing under the NRHP. If they are, then in consultation with the appropriate federal and state agency landowners, SHPO, or the affected Tribe's THPO, effects will be evaluated and appropriate mitigation applied.

# 27.16 Tribal Consultation

In addition to the laws and directives mentioned above, the federal government has a general trust responsibility with Tribal governments. BPA recognizes that trust responsibility derives from the historical relationship between the federal government and the Tribes as expressed in treaties, statutes, Executive Orders, and federal Indian case law.

BPA's Tribal Policy follows the principles set forth in the Department of Energy's American Indian Policy (USDOE Order No. 1230.2—Apr. 8, 1992). BPA fully respects Tribal law, and recognizes Tribal governments as sovereigns. BPA will consult with Tribal governments to assure that Tribal rights and concerns are considered prior to BPA taking actions, making decisions, or implementing programs that may affect Tribal resources. BPA recognizes that Tribal interests are not limited to cultural resources but may also include fish, wildlife, water resources and wetlands, vegetation, health, socioeconomic impacts, noise, and visual resources. BPA also recognizes that Tribes may have specific rights reserved under treaties, such as fishing, hunting, gathering and grazing rights. The Corps, as a federal permitting agency, may also conduct tribal consultation as part of their permit review process.

Throughout the EIS process, BPA has worked to involve and consult with Tribes and relevant agencies in the project area. These included the Confederated Tribes of Chehalis, Cowlitz Indian Tribe, Quinault Tribe of Quinault Reservation, Confederated Tribes of Grande Ronde, Confederated Tribes of the Warm Springs Reservation, Confederated Tribes of the Umatilla Indian Reservation, Nez Perce Tribe, and the Confederated Tribes and Bands of the Yakama Nation. BPA has reached out to its tribal counterparts to share and gather information, to coordinate project activities where appropriate, to address tribal concerns, and to invite further consultation. No Tribe has requested formal government-to-government consultation meetings to date.

# 27.17 Federal Aviation Administration

As part of the transmission line design process, BPA would comply with FAA procedures. According to FAR 49 CFR Part 77.13, the FAA requires BPA to submit its designs for FAA approval if a proposed structure is taller than 200 feet from the ground or water surface where the line crosses a body of water, if a conductor is 200 feet above the ground or water surface where the line crosses a body of water, or if any part of the proposed transmission line or its structure are within a prescribed distance of an airport. According to FAR 49 CFR Part 77.17, BPA must submit Form 7460-1 (Notice of Proposed Construction or Alteration) for a preliminary transmission line design and receive conditional approval at least 30 days before construction. The FAA would then conduct its own study of the project and make recommendations to BPA for airway marking and lighting. General BPA policy is to follow FAA recommendations (see Chapter 12,

Transportation). BPA will coordinate with the FAA concerning the proposed project and to provide information to the FAA to aid in its review process.

# 27.18 National Trails System Act

The National Trails System Act of 1968 (16 USC §§ 1241–1251) established a National Trails System with the purpose of promoting the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation. The Act and its subsequent amendments have created a network of national scenic, historic, and recreational trails throughout the United States. The project area contains two national trails: the Lewis and Clark National Historic Trail, and the Oregon National Historic Trail, both administered by the National Park Service (NPS). BPA would work with the NPS as required to minimize impacts to these trails.

# 27.19 Lewis and Clark National Historic Trail

This approximately 3,700-mile-long trail was established under the National Trails System Act through an act of Congress in 1978, and is administered by the NPS as a component of the National Park System (NPS 2009). The primary purpose of this trail is to commemorate the Lewis and Clark Expedition of 1804-06. Generally tracing the courses of the Missouri and Columbia rivers, the Lewis and Clark National Historic Trail stretches through 11 states from a point near St. Louis, Missouri to where the Columbia River drains into the Pacific Ocean. From about Richland, Washington westward, the trail generally follows the Columbia River to the Pacific Ocean.

A Comprehensive Management Plan (CMP) was prepared for the Lewis and Clark National Historic Trail in 1982, and the NPS is currently in the process of developing a new CMP. The 1982 CMP recommends various trail sites, segments, and routes. In the project area, the Columbia River and its shores are considered a water trail, and U.S. Highway 197, Washington SR 14, and various local roads on the north side of the Columbia River are considered a motor route. The CMP also identifies various campsites and portage points of the Lewis and Clark Expedition along the Columbia River in the project area. All action alternatives would cross over the Columbia River and the trail.

# 27.20 Oregon National Historic Trail

This approximately 2,170-mile-long trail was established under the National Trails System Act through an act of Congress in 1978, and is administered by the NPS as a component of the National Park System (NPS 2006). The purposes of this trail are to (1) identify, preserve, and interpret the sites, route, and history of the trail, and (2) commemorate the westward movement of emigrants to the Oregon County. The Oregon National Historic Trail extends approximately from Kansas City, Missouri to the Portland, Oregon vicinity.

A CMP was prepared for the Oregon National Historic Trail in 1999, and a long-range interpretative plan was finalized for the trail in 2010. These plans cover not only the Oregon National Historic Trail, but also the California, Mormon Pioneer, and Pony Express National Historic Trails as well. The action alternatives cross the Columbia River and would likely be visible near the Oregon National Historic Trail mile marker at the Sandy River Bridge, south of the Columbia River near Troutdale, Oregon.

# 27.21 Noise Control Act

The Noise Control Act of 1972 as amended (42 USC §4901 et seq.) sets forth a broad goal of protecting all people from noise that jeopardizes their health or welfare. It places principal authority for regulating noise control with states and local governments. Noise standards applicable to the project are established under Chapter 70.107 RCW for the state of Washington, as described in WAC 173-60-049 and WAC 173-60-050; and ORS Chapter 467 (Noise Control) and the OAR Division 35 (Noise Control Regulations) for the state of Oregon. The regulations are administered by Ecology and ODEQ. Responsibility for enforcement of applicable regulations is assigned to local governments in both states.

The allowable noise levels under state law, potential noise impacts from the project, and proposed mitigation are described in Chapter 9, Noise.

# 27.22 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states that each federal agency shall identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Minority populations are considered members of the following groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic Origin; or Hispanic if the minority population of the affected area exceeds 50 percent, or is meaningfully greater than the minority population in the project area. Populations are considered low income if 20 percent or more of residents are below the poverty level.

The order further stipulates that the agencies conduct their programs and activities in a manner that does not exclude persons from participation in, deny persons the benefits of, or subject persons to discrimination because of their race, color, or national origin. An analysis of the project area shows that none of the action alternatives contain minority populations that are disproportionate to populations living elsewhere in the affected counties. The West Alternative crosses one block group that contains a low-income population that is disproportionate to populations living elsewhere in the affected counties. When compared to the alternative as a whole, none of the impacts from this project on low-income or minority populations would be disproportionate (see Chapter 11, Socioeconomics). Therefore, none of the impacts from this project on low-income or minority populations are disproportionate. BPA has considered all input from persons or groups regardless of race, income status, or other social and economic characteristics.

# 27.23 Federal Communications Commission Regulations

Federal Communications Commission regulations require that transmission lines be operated so that radio and televisions reception would not be seriously degraded or repeatedly interrupted. Further, Federal Communications Commission regulations require that the operators of these devices mitigate such interference.

BPA would comply with Federal Communications Commission requirements relating to radio and television interference from the proposed transmission line if any such interference occurs. None of the action alternatives are expected to increase electromagnetic interference above acceptable limits and applicable guidelines for avoiding interference or above those of other BPA 500-kV lines; however, complaints about electromagnetic interference would be investigated and measures would be taken under BPA's mitigation program to restore reception to the same or better quality (see Chapter 8, Electric and Magnetic Fields).

# 27.24 Farmland Protection Policy Act

The Farmland Protection Policy Act (7 USC §§ 4201 et seq.) directs federal agencies to identify the quantity of farmland converted by federal programs, to identify and consider the adverse impacts of federal programs on farmland preservation, to consider alternative actions that could lessen adverse impacts, and to assure that the federal programs are compatible with state and local plans and programs. The Act's purpose is to minimize the number of federal programs that contribute to the unnecessary and irreversible conversion of agricultural land to nonagricultural uses. Three types of farmland are recognized by the Act: prime farmlands, unique farmlands, and farmland of statewide or local importance.

The substations, towers, and new and improved access roads would permanently occupy about 203 acres of both prime farmland and farmland of statewide importance along the West Alternative, 257 acres along the Central Alternative, 277 acres along the East Alternative, and 232 acres along the Crossover Alternative. Impacts and mitigation measures for reducing impacts to farmland, as well as how the project options compare to the alternatives with respect to agricultural lands, are discussed in Chapter 5, Land.

# 27.25 National Scenic Byways Program

The National Scenic Byways Program designates scenic and historic roads as All-American Roads and National Scenic Highways based on their scenic, historic, recreational, cultural, archeological, or natural intrinsic qualities (National Scenic Byways Program 2009). If these roadways no longer possess the intrinsic qualities that supported their designation or they are not maintained in accordance with their corridor management plan, they can be de-designated (Federal Highway Administration 1995). The management and protection of these scenic byways is carried out by the state departments of transportation under the Washington Scenic and Recreational Highways Strategic Plan (RCW 47.39) and the Oregon Scenic Byway Program (OAR 734-032).

One highway in the project area, SR 14 in Washington, is designated as a National Scenic Byway according to the National Scenic Byways Program. It is also designated as a Washington State Scenic Byway. See Chapter 6, Recreation and Chapter 7, Visual Resources, for a discussion of visual impacts along this scenic byway.

# 27.26 State, Area-Wide, and Local Plan and Program Consistency

The project would be located primarily in three counties in two states: Cowlitz and Clark counties in Washington, and Multnomah County in Oregon. Depending on the action alternative, from about 67 to 79 miles of the proposed project's rights-of-way are located in the state of

Washington. In addition to unincorporated county areas, the rights-of-way for the action alternatives pass through the cities of Kelso, Vancouver, Camas, and Washougal. In addition, an about 0.7-mile portion of the proposed project would be located in the state of Oregon under all action alternatives. The Oregon portion would consist of the crossing of the Columbia River and the portion located in unincorporated Multnomah County and the cities of Troutdale and Fairview.

Council on Environmental Quality (CEQ) regulations for implementing NEPA require EISs to discuss possible conflicts and inconsistencies of a proposed action with approved state and local plans and laws. The project would be undertaken solely by BPA, which is a federal entity. Pursuant to the federal supremacy clause of the U.S. Constitution, BPA is not obligated to apply for local development or use permits in such circumstances. Therefore, BPA would not make formal application to any of the local jurisdictions for permits such as conditional use permits or shoreline development permits. However, BPA is committed to planning the project to meet or exceed the substantive standards and policies of state and local land use plans and programs to the extent practicable. BPA would apply for county shoreline permits if the provisions of the CWA apply, such as for discharges into waters of the United States. See Chapter 28, Consistency with State Substantive Standards, for a discussion of state standards potentially applicable to the project.

The following sections discuss possible conflicts or inconsistencies of the proposed project with state, county, and city land use plans and programs. Washington State does not have a specific land use plan and the Oregon Statewide Planning Goals are accounted for in the Multnomah County Comprehensive Plan Goals.

## 27.26.1 Washington and Oregon Statewide Plans and Programs

### 27.26.1.1 Transportation Plans

According to RCW Chapter 46.44 (*Size, Weight, Load*) and the ORS Chapter 818 (*Vehicle Limits*), oversized or overweight vehicles would need transportation permits to travel on highways and local public roads in each state.

The construction contractors would consult with the WSDOT and the Oregon Department of Transportation (ODOT). Necessary transportation permits for oversized or overweight vehicles used for project construction and maintenance would be secured as required. Where oversized or overweight loads would be transported on state roads or highways, construction contractors would consult with WSDOT and ODOT to obtain the necessary transportation permits. Where these loads would be transported on local roads, construction contractors would consult with the applicable county or city transportation agency to obtain any required transportation permits.

### 27.26.1.2 Washington State Shoreline Management Act

The Washington State Shoreline Management Act (the Act) establishes a planning program and regulatory permit process initiated at the local level under state guidance. Ecology is designated as the lead state agency, and local governments exercise primary authority for implementing the Act. Each local government's master program consists of a shoreline inventory and a "shoreline

master program" (SMP) to regulate shoreline uses for Shorelines of the State, including Shorelines of Significance (Chapter 173-18 WAC). The SMP for Clark County, adopted in 1974, and Cowlitz County, adopted in 1977, regulate land uses affecting these shorelines within the county, but outside the jurisdictions of the local cities. Project facilities could impact state shorelines if they were located within 200 feet of the ordinary high water mark (OHWM) within the 100-year floodplain, or within associated wetlands.

Shoreline uses are regulated under Shoreline Management Districts designated as Natural, Conservancy, Rural and Urban Environments, each with its own goals and objectives. Regulations set forth by Clark and Cowlitz counties in their SMPs to regulate utilities within the shoreline management districts are as follows:

## Clark County

- Stream crossing shall be accomplished in conformance with the Department of Fisheries and Game hydraulic project criteria.
- Shoreline banks shall be restored to pre-project configuration, replanted with native species and maintained until new vegetation is established.
- Appropriation of state surface and ground waters and proposals to discharge wastes into these waters shall be in conformance with regulations administered by the Department of Ecology.
- Use limitations in shoreline environments: Urban, Rural and Conservancy – Permitted Use; Natural – Prohibited Use

## Cowlitz County

- NATURAL DISTRICT
    - Utility systems, such as permanent electric lines, pipelines, sewer trunk lines, water main lines, and similar facilities shall be prohibited on natural shorelines, except where unavoidably necessary to cross a body of water.
- CONSERVANCY DISTRICT
    - Utility systems, such as permanent electric lines, pipelines, sewer trunk lines, water main lines, and similar facilities shall be permitted on conservancy shorelines.
    - Any person proposing to install or construct a utility system shall apply for a permit.
    - A permit may be granted subject to the following regulations:
        - All such utility systems shall be underground unless such undergrounding would not be feasible.
        - Where such utility systems occupy shoreline areas, clearing necessary for installation or maintenance shall be kept to the minimum width necessary to prevent interference by trees and other vegetation with the proposed transmission facilities.
        - Upon completion of installation of such utility systems or of any maintenance project which disrupts the environment, the disturbed area shall be regraded to compatibility with the natural terrain and replanted

to prevent erosion and provide an attractive, harmonious vegetation cover.

- Utility hookup linkages to shoreline use facilities shall be underground where feasible.

- RURAL DISTRICT
  - Regulations Nos. 2, 3, and 4 under conservancy district shall apply to rural shorelines.
- URBAN DISTRICT
  - Regulations Nos. 2 and 3 under conservancy district shall apply to urban shorelines.
  - Utility hookup linkages to shoreline-use activities shall be underground where feasible

The action alternatives would also cross Kelso, Vancouver, Camas, and Washougal. Kelso has adopted the Cowlitz County SMP in its entirety (18.08.010). Vancouver, Camas, Washougal (and other cities in Washington), and Clark County have created a coalition to update their programs to become more consistent across the region. Although the project would cross Washougal, no alternative crosses a shoreline of the state under their jurisdiction. Vancouver and Camas regulate transmission utilities within their shorelines as follows:

## Vancouver

- In shoreline areas, utilities shall be placed underground unless demonstrated to be infeasible. Further, such lines shall utilize existing rights-of-way, corridors or bridge crossings whenever possible. Proposals for new corridors in shoreline areas involving water crossings shall fully substantiate the infeasibility of existing routes.
- Transmission and distribution facilities shall cross shoreline jurisdiction by the shortest and most direct route feasible, unless another route would cause less environmental damage.
- Construction of utilities under water or in adjacent wetlands shall be timed to avoid fish migratory and spawning periods and subject to other conditions of an approved Critical Areas Permit. Filling in shoreline jurisdictions for utility facility or line development purposes is prohibited. Permitted crossings shall utilize the least environmentally damaging techniques and all disturbances shall be mitigated.
- Utility development shall, through coordination with government agencies, provide for compatible multiple use of sites and rights-of-way. Such uses include shorelines access points, trails and other forms of recreation and transportation systems, providing such uses will not unduly interfere with utility operations or endanger public health and safety.
- Utility facilities shall be located and designed so as not to require shoreline protection works. Clearing of vegetation for the installation or maintenance of utilities shall be avoided, and where unavoidable kept to a minimum. Upon project completion any disturbed areas shall be restored as nearly as possible to their pre-project conditions, including replanting with appropriate native species and maintenance care until the newly planted vegetation is established. Such clearing in critical areas or buffers shall also be subject to the conditions of an approved Critical Areas Permit.

## Camas

- Utility development shall, through coordination with local government agencies, provide for compatible, multiple use of sites and rights-of-way. Such uses include shoreline access points, trail systems, and other forms of recreation and transportation, provided such uses will not unduly interfere with utility operations, endanger public health and safety, or create a significant and disproportionate liability for the owner.
- Utility lines shall utilize existing rights-of-way, corridors, and/or bridge crossings whenever possible and shall avoid duplication and construction of new or parallel corridors in all shoreline areas. Proposals for new corridors or water crossings must fully substantiate the unfeasibility of existing routes.
- New utility lines including electricity, communications, and fuel lines shall be located underground in established residential areas, except where the presence of bedrock or other obstructions make such placement infeasible. Existing above ground lines shall be moved underground in established residential areas during normal replacement processes.
- New transmission and distribution facilities shall cross areas of shoreline jurisdiction by the shortest, most direct route feasible, unless such route would cause significant environmental damage.
- Utility developments shall be located and designated so as to avoid or minimize the use of any structural or artificial shore defense or flood protection works.
- Where major facilities must be placed in a shoreline area, the location and design shall be chosen so as to minimize obstruction of scenic views.
- Utility development shall utilize required setback areas to provide screening of facilities from water bodies and adjacent properties.
- Construction of utilizes under water or in adjacent wetlands shall be timed to avoid fish migratory and spawning periods.
- Landfilling in shoreline jurisdiction for utility facilities or line development purposes is a conditional use. Permitted crossings of wetlands or water bodies shall utilize pier or open pile techniques.
- Clearing of vegetation for the installation or maintenance of utilities shall be kept to a minimum. Upon project completion any disturbed areas in recreational or scenic areas shall be restored to their pre-project condition.

The action alternatives would cross the Columbia River, Lewis River, East Fork Lewis River, Coweeman River, Cowlitz River, Washougal River, Kalama River, and many other creeks and streams, and wetlands identified in Chapter 15, Water and Chapter 16, Wetlands. Project facilities would be placed as far from the water's edge as feasible to avoid floodplains. Clearing would be kept to a minimum; however, all tall-growing vegetation in the right-of-way would need to be removed for safe operation of the line. Exceptions to this would be in deep canyons or draws. Disturbed areas would be reseeded. Chapters 15 and 16 discuss mitigation measures identified to reduce potential impacts on water and wetlands. BPA would use these measures to meet or exceed shoreline regulations to the extent practicable.

### 27.26.1.3 Oregon Removal-Fill Law

Oregon's Removal-Fill Law (ORS 196.795-990) protects “Waters of the state" which are defined as "natural waterways including all tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands and other bodies of water in this state, navigable and non-navigable, including that portion of the Pacific Ocean that is in the boundaries of this state." The law applies to all landowners, whether private individuals or public agencies. In Oregon, the DSL also requires a permit for removal, fill, or alteration involving 50 cubic yards or more of material in any water of the state, including wetlands. For the portion of the project that would be located in Oregon, BPA would work with DSL to ensure consistency with these Oregon state requirements. See Chapter 15, Water, and Chapter 16, Wetlands, for analysis and discussion of impacts and mitigation measures related to these requirements.

### 27.26.1.4 Washington State Parks and Recreation Commission Land Use Plans

The project does not cross any state parks that have a comprehensive land use plan developed specifically for the park.

## 27.26.2 Washington Local Plans and Programs

### 27.26.2.1 Critical Area Ordinances

All cities and counties in Washington must adopt critical areas regulations, as defined by the Growth Management Act (RCW 36.70A.060). The Critical Area Ordinance (CAO) describes the categories of critical areas in the city or county, setback and buffer distances, mitigation requirements for unavoidable impacts, and guidance for reducing or mitigating hazards to public health and safety in geologically hazardous areas. Critical areas include: wetlands, critical fish/wildlife habitat conservation areas, geologically hazardous areas, aquifer recharge areas, and frequently flooded areas.

Cowlitz County and the City of Kelso’s CAOs exempt the “Installation, construction or replacement of utility lines in an improved right-of-way, not including electric substations.” Other new construction would have to adhere to the provisions of the ordinance (Cowlitz County, 2009; City of Kelso, 2012).

Clark County most recently updated their CAO in July 2007. Utilities are not addressed in the aquifer recharge areas and frequently flooded areas sections of the CAO. Utilities are addressed in the following sections:

- Geologically Hazardous Areas: Exempt from provisions of ordinance if in an improved right-of-way.
- Habitat Conservation Areas: Allowed in any area if clearing is done as minimally as possible and the placement of the utilities are in a location where no practical alternative exists.
- Wetlands: Ordinance does not preclude or deny a development proposal for a linear facility provided that no practical alternative exists that has less impact to a wetland or buffer; or if the ordinance hinders providing utilities to the public.

The City of Vancouver and the City of Camas' CAOs do not address transmission lines or utility systems specifically. Project developers need to obtain permits and adhere to the provisions of the ordinance in all CAO categories.

The City of Washougal's CAO exempts the construction of new utility facilities and lines from the provisions of their CAO when they are located "within the improved portion of the public right-of-way or recorded easement, or a city-authorized private roadway except those private activities that alter a wetland or watercourse, such as culverts or bridges" (City of Washougal, 2006).

BPA has incorporated some of the standards and guidance from the CAOs in analyzing and proposing mitigation for impacts on potentially critical areas. See Sections 14.2.8, 15.2.8, 16.2.8, 17.2.8, 18.2.8, and 19.2.8 for mitigation measures. BPA would use these measures to meet or exceed critical area ordinance requirements to the extent practicable.

## 27.26.2.2 Cowlitz County Comprehensive Plan

The County Comprehensive Plan was adopted by the Board of County Commissioners on November 1, 1976 and is a statement of policies and goals that guides growth and development throughout the county. The purpose of the Plan is to manage the county's growth in an orderly, positive, and constructive fashion. All other development ordinances, including land use, zoning, subdivision, and environmental regulations, must be in compliance with and consistent with the Comprehensive Plan. Applicable sections of Cowlitz County's Code are Title 18 Land Use and Development and Title 19 Environmental Protection. The Plan also provides guidelines for siting substations and utility corridors. The county is currently in the process of updating its Comprehensive Plan, which is expected to be completed in 2012. The following goals and policies are relevant to the project.

### Guidelines for Siting Power Substations

Power substations are facilities which are a necessary part of economic growth in the county. Since they are potential nuisances in terms of noise, aesthetics, and safety, they need to be carefully located. The following goals and policies insist on good design and proper location, in furtherance of the goals of this Plan.

Goal:

A. Power substation should be designed and located to minimize conflicts with adjacent land uses and the environment.

Policies:

1. Encourage the location of power substations in non-residential areas due to nuisances that are part of such facilities such as noises which interfere with home entertainment equipment.

2. Screening and landscaping are encouraged in power substation design in order to enhance their appearance and make them compatible with the community in which they are located.

3. Cowlitz PUD power substations planning should be coordinated with the County's long-range plans.

4. Power substations should be planned for location in industrial areas as much as possible.

In most cases, the design, construction, and placement of the proposed transmission line would be consistent with these goals. However, there are a few instances in which the project may be inconsistent.

Regarding Policies 1 and 4, the design, construction, and placement of substations for the project would be consistent with the Plan. BPA considers many factors when siting proposed new substations (see Chapter 2, Facility Siting, Route Segments, and Action Alternatives) and works to avoid or minimize potential impacts to the extent practicable. BPA would conduct its construction activities for the proposed line in conformance with EFSEC's standards concerning maximum permissible noise levels by using appropriate muffling devices on construction equipment and limiting construction to daytime and evening hours (see Chapter 9, Noise). Noise impacts during the operation of the proposed line would be negligible, and the substations would meet state noise standards (see Chapter 9).

Regarding Policy 2, the substations would not be screened or landscaped.

Regarding Policy 3, Cowlitz County is a cooperating agency in this NEPA process. They will provide knowledge, information and expertise to BPA about their long-range plans.

## Guidelines for Siting Utility Corridors

Utility corridors in Cowlitz County already occupy 5,062 acres of valuable development and forest lands. Timber production is the backbone of the economy of Cowlitz County. As each new corridor is constructed through the county, more valuable timberland is taken out of production. Utility corridors are also ideal environments for the growth of noxious weeds. The following goals and policies provide planning and development guidelines for the construction of major utility lines in the county.

### Goal:

A. Major intra-county and intra-state utility trunk lines should be designed and constructed to minimize environmental problems. Efficient use of existing utilities should be maximized before new utilities are constructed in new or expanded corridors.

### Policies:

1. Encourage all required corridor expansion to minimize impact on adjacent land uses.

2. Encourage utilization of corridor areas for agriculture and small tree production.

3. All expansion of utility corridors should adhere to the County's long-range plans.

4. The design, construction, and maintenance of major utility lines should be developed in a manner that minimizes environment problems.

5. The following guidelines should be adhered to in the development of the new utility lines and pipelines in Cowlitz County:

    a. Establish double or triple deck lines on which small corridors would be used.

    b. Establish common or jointly used corridors and place utility lines closer together.

    c. Utility companies seeking new rights-of-way in Cowlitz County should make arrangements, where practical, to use existing rights-of-way.

6. Establish a noxious weed control program. All utility companies shall be responsible for the control of noxious weeds on their rights-of-way.

In most cases, the design, construction, and placement of the proposed transmission line would be consistent with these goals. However, there are a few instances in which the project may be inconsistent.

Regarding Policy 1, when siting the line, BPA considers impacts to people, plants and animals, land uses, farms and other businesses, and important local, cultural and regional features. BPA looks for ways to site new transmission facilities to avoid or minimize these potential impacts to the extent practicable.

The project would be consistent with Policy 2 because BPA would work with individual landowners to enter into a written agreement regarding compatible uses of the land in the right-of-way. Most crops less than 4 feet high could be grown safely under the transmission line. Small tree production would not be an allowable use within the proposed right-of-way.

Cowlitz County is a cooperating agency in this process. They will provide knowledge, information and expertise to BPA about their long-range plans.

Regarding Policy 4, BPA is required by NEPA to address the potential environmental consequences of its proposal and take action to protect, restore and enhance the environment during and after construction. Preparation of this EIS assists in meeting those requirements.

Regarding Policy 5, BPA has taken several steps to reduce congestion on the transmission system without building new lines. BPA has upgraded many facilities to maximize the use of existing transmission lines. A new 500-kV transmission line would increase the 500-kV transmission capacity in the southwest Washington/northwest Oregon area and allow BPA to provide for local load growth, maintain reliable power, and accommodate requests for long-term, firm transmission service. These new facilities would eliminate a transmission capacity constraint for this area, provide an additional electrical pathway, and increase system capacity (see Chapter 1, Purpose of and Need for Action).

BPA would be consistent with Policy 6 because noxious weed control is part of BPA's vegetation maintenance program. BPA works with the county weed boards and landowners on area-wide plans for noxious weed control.

### 27.26.2.3 Cowlitz County Zoning Ordinance

The project area crosses 10 Cowlitz County zoning districts. Utility facilities are not expressly prohibited in any of the zoning districts that fall within the project area (see Table 27-1).

### 27.26.2.4 City of Kelso Comprehensive Plan

The City of Kelso is in Cowlitz County. The West Alternative crosses the City of Kelso on Segment 9. The City's Comprehensive Plan was last updated in 1994. It provides goals, objectives, and policies that will guide the city's future growth. Policy 9 states that "Utilities shall be placed underground where and when possible." Regarding this policy, BPA considered undergrounding the transmission line and eliminated it from further consideration (see Section 4.7.7, Undergrounding the Transmission Line).

### 27.26.2.5 City of Kelso Zoning Ordinance

The City of Kelso Municipal Code does not directly address transmission lines or corridors.

### 27.26.2.6 Clark County Comprehensive Plan

Clark County is subject to the planning provisions of the state GMA. The GMA requires Clark County and each city within the county to adopt a comprehensive plan, and includes 13 planning goals that guide the development of each jurisdiction's plan. Goal 12, Public Facilities and Services, is intended to ensure that those public facilities and services necessary to support development shall be adequate to serve the development, without decreasing current services levels. Each comprehensive plan must include eight mandatory elements, one of which is a utilities element addressing current and future availability of utilities and services. Clark County and each of the cities within the county have adopted a comprehensive plan as required by the GMA, and therefore each of these jurisdictions has policies in place generally supporting infrastructure development. These policies are intended to be general and to provide a vision and guidance for development of local regulations implementing these policies; therefore none of the jurisdictions affected by the project have comprehensive plan policies specific to transmission line corridors in place. Clark County and the City of Camas do have specific standards for development of electrical transmission infrastructure in their local codes (see Section 27.26.2.7, Clark County Zoning Code, and Section 27.26.2.11, City of Camas Zoning Code).

**Table 27-1 Local Zoning Codes and Project Consistency**

| General Zoning Types | Zoning Codes by Jurisdiction[1] and Project Consistency | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Cowlitz County | Kelso | Clark County | Vancouver | Camas | Washougal | Troutdale | Fairview |
| | Consistency: all zones allow with a special use permit[2] | Consistency: code does not address utilities | Consistency: permitted in any zoning district | Consistency: see individual codes | Consistency: all zones allow with a conditional use permit[2] (see text for special provisions) | Consistency: code does not address utilities | Consistency: see individual codes[3] | Consistency: see individual codes |
| Forest | FR | -- | FR-80, FR-40, GLSA-80, GLSA-40, GSSA-20, GSFF, GSNFF, GSAG, GSW-40, GSW-20 | -- | -- | -- | -- | -- |
| Agricultural | AG-38, AG, AG-I | -- | AG-WL, AG-20 | -- | -- | -- | -- | -- |
| Rural Undeveloped | UZ (unzoned) | -- | GOS, GPR | -- | -- | -- | -- | -- |
| Urban Reserve | -- | -- | UR-40, UR-20, UR-10 | -- | -- | -- | -- | -- |
| Preserved Open Space | -- | OPN | GSOS, Water, P/WL | P, P/OS, GW, NA: not addressed | P/OS | P/OS | OS: minor, permitted; major, conditional | R/CSP: conditional |
| Single Family Residential | RR-1, RR-2, RR-5, UR, SR | RSF-5, RSF-10, RSF-15 | RC-1, RC-2.5, R1-20, R1-10, R1-7.5, R1-6, R1-5, UH-10, Moratorium (with comprehensive plan designation of SFH, SFM, or SFL) | R-2 LDR, R-4 LDR, R-6 LDR, R-9 LDR-Utility corridor permitted | R-20, R-15, R-12, R-10, R-7.5, R-6, R-5 | R1-5, R1-7.5, R1-10, R1-15 | R-20, R-10, R-7, R-5, R-4: minor, permitted; major, conditional | R, R-7.5, R-10, R/MH, VSF: not addressed |
| Rural Residential | AG | -- | R-20, R-10, R-5, GR-5 | -- | -- | -- | -- | -- |
| Multi-Family Residential | MF | RMF | R-12, R-18, R-22, R-30, R-43, Moratorium (with comprehensive plan designation of MFL) | R-10 MDR, R-12 MDR, R-18 MDR, R-22 MDR, R-30 HDR, R-35 HDR: basic utilities permitted; utility corridor conditional use | MF-10, MF-18, MF-24 | AR-16, AR-22, TC-WV | A-2: minor, permitted; major, conditional | R/MF, R/TOZ, VTH, VA: not addressed |
| Neighborhood Commercial | C-1 | CNH, CSR | C-2, CR-1 | CN, CC: utility corridor conditional use | NC, CC | CC, CV | NC,CC: minor, permitted; major, conditional | NC, TCC, CC, R/MF, VC: not addressed |
| General Commercial | C-2 | CTC, CWK, CMR | GC, CL, C-3, Moratorium (with comprehensive plan designation of COM) | CG: utility corridor permitted | RC, DC | CH | GC,CBD: minor, permitted; major, conditional | -- |
| Mixed Use | -- | -- | MX, OR-15, OR-18, OR-22, OR-30, OR-43, U | CX, WX, MX: utility corridor conditional use | MX | MX, TC-EV, TC-C, IP | MO/H:minor, permitted; major, conditional | VMU: not addressed |
| Light Industrial | ML | ILM | ML, BP, OC, UH-40, UH-20, Moratorium (with comprehensive plan designation of LI/BP) | IL, OCI: utility corridor permitted | LI, LI/BP | LI | LI, IP: minor, permitted; major, conditional | LI, GI, VO, AH: permitted |
| Heavy Industrial | MH | IGM | MH, A | IH: utility corridor permitted | HI | HI | GI, UPAGI: permitted | -- |

Notes:

1. The project is located within an area designated as an urban reserve in Multnomah County. Therefore, the zoning districts for the City of Troutdale and City of Fairview apply within the area of analysis and Multnomah County's zoning districts do not apply.
2. As a federal entity, BPA is not obligated to apply for local development or use permits and would not make formal application to any local jurisdictions for permits. However, BPA is committed to planning the project to meet or exceed the substantive standards and policies of state and local land use plans and programs to the extent practicable.
3. Project elements may be covered by both the Utility Facility Major and Utility Facility Minor code categories.

Source: Golder 2011

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Clark County's 20-year Comprehensive Plan was last adopted in September 2007, and amended in 2010, and plans for growth from 2004 through 2024. The Plan also includes the Community Framework Plan.

## 27.26.2.7 Clark County Zoning Code

Title 40 of the Clark County Code is the Unified Development Code. It includes Subtitle 40.2 of the County's Code that covers Land Use Districts, Chapter 40.46, which implements the policies and procedures set forth by the Shoreline Management Act of 1971, and Chapter 40.260.240, which regulates the development of transmission lines and substations.

Section 40.260.240 of the Clark County Code discusses utilities other than wireless communications facilities, as follows:

A. The erection, construction, reconstruction, alteration and maintenance of underground or aboveground transmission and distribution systems, including poles, towers, wires, mains, drains, sewers, in-ground sewage pumping facilities, pipes, conduits, cables, antennas, fire alarm boxes, police call boxes, traffic signals and other similar equipment, which does not require aboveground enclosed buildings as defined by Section 40.100.070, shall be permitted in any zoning district. Utility transmission lines, poles, and towers may exceed the height limitations otherwise provided for in this title. This section does not apply to wireless communications facilities as defined in Section 40.260.250(C).

B. The erection, construction, reconstruction or alteration of utility substation facilities, as defined in Section 40.100.070, shall be permitted in any zoning district, subject to site plan approval pursuant to Section 40.520.040.

C. Utilities installed under properties owned by Clark County and properties that are or will be dedicated to the county for road rights-of-way may require a utility permit pursuant to Chapter 12.20A and Chapter 13.12A.

The project is consistent with this section of the Clark County Code.

## 27.26.2.8 City of Vancouver Comprehensive Plan

The City of Vancouver is in Clark County. The West Alternative crosses Vancouver on portions of segments 9 and 25. The City's Comprehensive Plan was last updated in 2004 and plans for growth from 2003 through 2023. The plan contains policy direction relating to growth and development, environmentally sensitive areas, historic places, public services, and other issues. Plan policies are implemented through subarea plans and provisions of the Vancouver Municipal Code and other local standards.

## 27.26.2.9 City of Vancouver Zoning Code

Title 20 is the Land Use and Development Code, which became effective on March 11, 2004 and contains regulations to manage the community's growth in a manner that ensures efficient use of land, preserves natural resources, and encourages good design. The action alternatives cross eight zoning districts (see Table 27-1).

## 27.26.2.10 City of Camas Comprehensive Plan

The City of Camas is in Clark County. All action alternatives cross the city of Camas on Segment 52. The City's Comprehensive Plan was originally adopted in 1994 and was updated in March 2004 to guide development in Camas for the next 20 years. The Comprehensive Plan for the City of Camas provides policies to direct public and private decisions affecting future growth and development and provides guidelines for making decisions on growth, land use, transportation, public facilities and services, parks, and open space. Comprehensive Plan policies are implemented through the provisions of the City of Camas Municipal Code and other local regulations. Title 17 of the City's Municipal Code is the City of Camas Land Development Code, which provides the rules, regulations, requirements, and standards for development of land in the city. The City of Camas Comprehensive Plan does not specifically address power line utility corridors.

## 27.26.2.11 City of Camas Zoning Code

Title 18 is the zoning code of the City of Camas, which defines city zoning districts, permitted uses in those districts, and standards for those uses. The action alternatives cross eight zoning districts. While the City of Camas Comprehensive Plan does not specifically address power line utility corridors, the City of Camas Municipal Code provides standards for electrical transmission and distribution facilities in Title 8, Section 52. The applicable provisions are as follows:

8.52.050 Electrical transmission facilities—conditional use permit.

A. Permit Required. No person, firm, corporation, or other entity shall construct, install, erect or cause to be constructed, installed or erected any electrical transmission facility without first obtaining a conditional use permit from the city.

B. Application. An application for a conditional use permit under this chapter shall be on a form provided by the public works director, and shall include the name and address of the applicant, the nature of the proposed electrical transmission facility, the location of the proposed electrical transmission facility, the existing facility's boundary, the proposed method of construction, installation or erection of the electrical transmission facility, and such other information as may be required by the public works director.

C. Overhead Transmission Usage. All electrical transmission lines shall be installed underground in all zones except the manufacturing district and light industrial/country technical district, unless the city council finds that exposure to electrical magnetic fields and adverse impact to land value and aesthetics can be reasonably mitigated by prudent avoidance measures. Use of overhead power should consider, among other factors, facility size, location, setback, topography, scheduling, cost, sensitive lands, land value and proximity to children and schools.

D. SEPA. All applications shall be accompanied with a SEPA checklist and, to the extent required, any impact studies.

E. Fee. All applications shall be accompanied by a fee of four hundred dollars.

Regarding Provisions A, B, and E, BPA is not obligated to apply for conditional use permits, therefore BPA would not make a formal application to the county.

Regarding Provision C, BPA considered undergrounding the transmission line and eliminated it from further consideration (see Section 4.7.7, Undergrounding the Transmission Line). The project would not be consistent with Provision C.

Regarding Provision D, the project would be designed to meet the standards set forth by the City of Camas insofar as is feasible and is adoptable under SEPA. This EIS does analyze the significant impacts of the proposal to the SEPA-defined natural and built environment. The project would, therefore, be generally consistent with the municipal code 8.52.050.

8.52.060 Provisions applicable to all electrical transmission facilities.

A. Prudent Avoidance Measures. All electrical transmission facilities shall be designed, constructed, and operated using prudent avoidance measures to minimize exposure to electromagnetic fields, to preserve land values, and to satisfy the other requirements of this chapter. Further, the applicants shall identify the four mG magnetic field line associated with the proposed installation. The mG contour line shall be identified as the line coinciding with normal winter loading which shall be further defined as being eighty percent of the line's rated peak capacity.

B. Noise Levels. Noise levels generated by electric transmission facilities shall comply with Washington State law as set forth in WAC 173-60.

The project would be generally consistent with Provision A. When BPA builds new high-voltage 500-kV transmission lines, the agency uses “EMF-mitigation” techniques to keep EMF exposure as low as reasonably achievable while maintaining system reliability. See Chapter 8, Electric and Magnetic Fields, for expected average and maximum fields along the action alternatives.

Regarding Provision B, BPA would conduct its construction activities for the proposed line in conformance with EFSEC’s standards concerning maximum permissible noise levels through using appropriate muffling devices on construction equipment and limiting construction to daytime and evening hours (see Chapter 9, Noise). Noise impacts during the operation of the proposed line would be negligible, and the substations would meet state noise standards (see Chapter 9).

8.52.070 Setbacks for child intensive locations. Special consideration shall be given to facilities where children assemble. Such areas shall include but not be limited to schools, churches, day cares and playgrounds. Such areas shall be set back in accordance with the following:

A. One hundred feet from edge of easement for fifty to one hundred thirty-three kilovolt line;

B. One hundred fifty feet from edge of easement for two hundred twenty to two hundred thirty kilovolt line;

C. Three hundred fifty feet from edge of easement for five hundred to five hundred fifty kilovolt line.

Child-intensive locations are avoided if possible. Since structures are not allowed to be within the right-of-way for safety reasons, BPA looks to avoid structures in the siting process so they need not be removed.

### 27.26.2.12 City of Washougal Comprehensive Plan

The City of Washougal is in Clark County. All action alternatives cross the city of Washougal on Segment 52. The City adopted its Comprehensive Plan in 1994 and updated it in 2003. The City's Plan is intended to accommodate growth over the next 20 years and provide for future growth in a manner that is compatible with both the current character of Washougal and with the goals specified in the GMA. The City's Comprehensive Plan has one statement about power line utility corridors as follows: "A main BPA transmission line corridor runs north/south through the southernmost portion of the city…" The Comprehensive Plan has no goals, policies or objectives addressing power line utility corridors.

### 27.26.2.13 City of Washougal Zoning Code

Title 15 of the City's Municipal Code is the building code of the city. Title 16 contains environmental regulations, and Title 18 is the zoning code. Although the action alternatives cross several zoning districts, the zoning code does not address transmission lines or utilities.

## 27.26.3 Oregon Local Plans and Programs

### 27.26.3.1 Oregon Critical Areas Ordinance

Counties and cities in Oregon do not have critical areas ordinances that would address potential geologic hazards or other environmental concerns, such as wetlands, in the project area. There are no specific plans or program consistency requirements for floodplains and wetlands protection requirements, or guidelines. Current Oregon building codes are specified in ORS 455.010 through 455.895. Geologic hazard regulations are overseen by the Oregon Department of Land Conservation and Development, as defined in ORS 660.015.

### 27.26.3.2 Multnomah County Comprehensive Plan

All action alternatives cross a small portion of unincorporated Multnomah County after crossing the Columbia River into Oregon. The Multnomah County Comprehensive Framework Plan (MCCFP) Summary is the County's land-use mission statement. It describes the policies that guide decisions made by the Land Use Planning Division as well as the relationship between Multnomah County land use decisions and the policies adopted by the Metro Council and statewide planning agencies. The MCCFP does not address power line utility corridors or substations. Policy 37 simply states that adequate utilities must be available for proposed development.

### 27.26.3.3 Multnomah County Zoning Code

Chapter 29 of Volume 1 of the Multnomah County Code contains building regulations. Volume 2 of the Multnomah County Code contains Land Use Ordinances. The project is located within an area designated as an urban reserve in Multnomah County. Therefore, the zoning districts for the cities of Troutdale and Fairview apply within the area of analysis and Multnomah County's zoning districts do not apply (see Sections 27.26.3.5, City of Troutdale Zoning Code and 27.26.3.6, City of Fairview Comprehensive Plan).

### 27.26.3.4 City of Troutdale Comprehensive Plan

The City of Troutdale is in Multnomah County. All action alternatives cross the city of Troutdale at the Sundial substation site. The Troutdale Comprehensive Land Use Plan was adopted on September 27, 1990 and amended in December 1998. The Plan contains a set of maps, policies, and implementing measures affecting land use within city boundaries. Plan policies define the direction, quantity, and quality of future development and redevelopment. The policies serve as a guide for both public officials and the general public in the use of zoning powers, subdivision regulations, the design and construction of streets, and other improvements. Implementing measures, such as zoning and development ordinances, are specific approaches or techniques for implementing plan policies. They delineate criteria and standards for development addressed within the broad outlines of the Comprehensive Plan. The Comprehensive Plan does not address power line utility corridors or substations.

### 27.26.3.5 City of Troutdale Zoning Code

Chapter 3 of the Troutdale Development Code contains the zoning districts, Chapter 4 contains the zoning district overlays, and Chapter 6 covers conditional uses. The action alternatives cross nine zoning districts (see Table 27-1).

### 27.26.3.6 City of Fairview Comprehensive Plan

The City of Fairview is in Multnomah County. All action alternatives cross the city of Troutdale at the Sundial substation site. The City of Fairview Comprehensive Land Use Plan was revised in June 2004. Its contents were guided by the City of Fairview Visioning Document 2022 adopted in 2002. The Visioning Document creates an image of what the community should look like in 2022, and acts as a tool for planning future growth and ongoing development in the Fairview urban area. The City of Fairview Comprehensive Land Use Plan is a formally adopted plan that was structured to recognize guidance from the Visioning Document while meeting its obligations to the Statewide Land Use Goals and Regional Growth Management Plan. The Comprehensive Plan does not address power line utility corridors or substations.

### 27.26.3.7 City of Fairview Zoning Code

The City of Fairview's zoning code is found in Chapter 19 of its municipal code. The action alternatives cross six zoning districts (see Table 27-1).

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