Chapter 28 Consistency with State Substantive Standards

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

BPA is a federal agency subject to state regulation only if there has been a waiver of federal sovereign immunity through federal law, consistent with the supremacy clause of the U.S. Constitution. Certain federal laws, such as the Clean Water Act (CWA) and Clean Air Act (CAA), have provided this waiver of federal sovereign immunity, and BPA's activities thus can be regulated by state entities under these laws. The Federal Land Policy Management Act (FLPMA), 43 USC §1701 et seq., provides a limited waiver of federal sovereign immunity, such that federal agencies including BPA are required to comply with specific substantive provisions for environmental protection that may be identified by states for portions of the federal agency's activities that would be located on federal lands.

Notwithstanding these aspects of federal supremacy, BPA is committed to planning its transmission line projects to be consistent or compatible, to the extent practicable, with state plans and programs, as well as any substantive standards that these plans and programs may contain, even when not required by federal law. To work towards this goal, BPA typically provides project information relevant to state permitting processes to state entities with a potential interest in the project. In designing and carrying out its proposed projects, BPA also strives to meet or exceed the substantive standards and policies of state regulations.

To further memorialize this approach, BPA entered into a series of Memoranda of Understanding (MOUs) and Memoranda of Agreement (MOAs) in the 1980s with individual Pacific Northwest states concerning BPA's activities in each state, including Washington and Oregon (State of Washington and BPA 1983a, 1983b; State of Oregon and BPA 1981). Each MOU called for general cooperation between BPA and each state regarding BPA's activities in that state, and each MOA called for cooperation specifically on the siting of proposed federal transmission facility projects to be located in that state. Each MOA also called for the development of project-specific work plan agreements between BPA and the state for individual BPA transmission line projects to be located in that state.

In the MOU and MOA with the states of Washington and Oregon, the agencies that are designated with the responsibility for entering into and carrying out work plan agreements for each individual BPA transmission line project are Washington EFSEC and the Oregon DOE. Because the project would be located in both Washington and Oregon, BPA has entered into work plan agreements with EFSEC and ODOE for this project. Under these agreements, the state agencies have provided BPA with potentially applicable state substantive standards that they believe should be addressed in this EIS to aid state agency review of the project. It is the objective of BPA, EFSEC, and ODOE that by identifying and considering these standards as early as possible, the project can be designed to be consistent or compatible with these standards to the maximum extent practicable.

The remainder of this chapter identifies those state substantive standards that are potentially applicable to the project, and evaluates the extent to which the project would be consistent with these standards. This discussion is organized by the state agency that has established each standard, with the standards of each agency further organized by resource topic where appropriate. In most cases, BPA believes that implementation of its own design, construction,

and operation standards would serve to meet or exceed the state substantive standards that have been identified. However, in some cases, additional measures may be required to be consistent with a particular state standard. For any state standards where it is likely that consistency cannot be achieved, an explanation is provided.

28.1 Washington EFSEC Standards

Washington EFSEC is the state agency responsible for siting new energy facilities in the state of Washington, including certain thermal power plants, alternative energy facilities, natural gas pipelines, and electrical transmission lines. EFSEC's authority in this area is provided by RCW Chapter 80.50, and is implemented through WAC Title 463.

BPA's transmission lines are not subject to EFSEC's siting jurisdiction except for portions proposed to be located on federal lands administered by the BLM or are part of the National Forest System administered by the U.S. Forest Service. The proposed project would not be located on any such federal land. Nonetheless, BPA will seek to be consistent with EFSEC's substantive standards to the extent practicable.

The following EFSEC substantive standards from WAC Title 463 (WAC 463-26, 463-60, 463-72, and 463-74) are potentially applicable to the project:

28.1.1 Natural Environment—Energy and Natural Resources

- The application shall describe the rate of use and efficiency of consumption of energy and natural resources during both construction and operation of the proposed facility.
- The application shall describe the sources of supply, locations of use, types, amounts, and availability of energy or resources to be used or consumed during construction and operation of the facility.
- The application shall describe all nonrenewable resources that will be used, made inaccessible or unusable by construction and operation of the facility.
- The application shall describe conservation measures and/or renewable resources that will or could be used during construction and operation of the facility.

Consistency: General information on likely use and consumption of energy and natural resources is provided throughout the EIS. However, detailed information regarding the source, locations of use, and rate of use and efficiency of consumption of energy and other resources is beyond the scope of this EIS. Impacts on natural resources are addressed by resource in Chapters 5 through 22. Irreversible or irretrievable commitments of resources (both renewable and nonrenewable resources) are discussed in Chapter 25, Irreversible or Irretrievable Commitment of Resources.

- The application shall describe any scenic resources which may be affected by the facility or discharges from the facility.

Consistency: Chapters 5, 6, and 7 (Land, Recreation, and Visual Resources) describe the project's impact on visual resources including impacts on recreational areas. There would be no discharges from the transmission line but there would be stormwater discharge from the

substations. Through its compliance with the CWA, BPA seeks appropriate certifications and authorizations from state water quality regulatory agencies for its proposed projects. BPA would meet all applicable standards identified through this process to protect water quality. Substation designs would include stormwater detention ponds to control outflow (not required at Sundial Substation). Information concerning the project's potential impacts on water quality is provided in Chapter 15, Water. BPA's CWA compliance activities are described in Chapter 27, Consultation, Permits, and Review Requirements.

28.1.2 Transportation

- **Transportation systems**. The application shall identify all permanent transportation facilities impacted by the construction and operation of the energy facilities, the nature of the impacts, and the methods to mitigate impacts. Such impact identification, description, and mitigation shall, at least, take into account
    - Expected traffic volumes during construction, based on where the work force is expected to reside
    - Access routes for moving heavy loads, construction materials, or equipment
    - Expected traffic volumes during normal operation of the facility
    - For transmission facilities, anticipated maintenance access
    - Consistency with local comprehensive transportation plans
- **Vehicular traffic**. The application shall describe existing roads, estimate volume, types, and routes of vehicular traffic which will arise from construction and operation of the facility. The applicant shall indicate the applicable standards to be utilized in improving existing roads and in constructing new permanent or temporary roads or access, and shall indicate the final disposition of new roads or access and identify who will maintain them.
- **Waterborne, rail, and air traffic**. The application shall describe existing railroads and other transportation facilities and indicate what additional access, if any, will be needed during planned construction and operation. The applicant shall indicate the applicable standards to be utilized in improving existing transportation facilities and in constructing new permanent or temporary access facilities, and shall indicate the final disposition of new access facilities and identify who will maintain them.
- **Parking**. The application shall identify existing and any additional parking areas or facilities which will be needed during construction and operation of the energy facility, and plans for maintenance and runoff control from the parking areas or facilities.
- **Movement/circulation of people and goods**. The application shall describe any change to the current movement or circulation of people or goods caused by construction or operation of the facility. The application shall indicate consideration of multipurpose utilization of rights of way and describe the measures to be employed to utilize, restore, or rehabilitate disturbed areas. The application shall describe the means proposed to ensure safe utilization of those areas under applicant's control where public access will be granted during project construction, operation, abandonment, termination, or when operations cease.
- **Traffic hazards**. The application shall identify all hazards to traffic caused by construction or operation of the facility. Except where security restrictions are imposed by the federal government the applicant shall indicate the manner in which fuels and

waste products are to be transported to and from the facility, including a designation of the specific routes to be utilized.

Consistency: Construction and improvement of the access road system for the project is discussed in Chapter 3, Project Components. Chapter 12, Transportation describes the project's general impacts on transportation resources. The movement or circulation of people or goods in certain areas may be temporarily affected during construction of the project. Potential impacts on water, rail, and air traffic are also addressed in Chapter 12. Road use during construction and operation and maintenance of the line would comply with regional transportation plans. Access roads constructed as part of the project would also be used during maintenance of the transmission line. Fuel would be transported to work sites using the same access roads discussed in Chapters 3 and 12. Staging areas that would be used to store construction materials and vehicles are discussed in Chapter 3.

28.1.3 Socioeconomic

- The application shall include a detailed socioeconomic impact analysis which identifies primary, secondary, and positive as well as negative impacts on the socioeconomic environment in the area potentially affected by the project, with particular attention to the impact of the proposed facility on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and local economy. The study area shall include the area that may be affected by employment within a 1-hour commute distance of the project site. The analysis shall use the most recent data as published by the U.S. Census or state of Washington sources.
- The analysis shall include the following:
    - Population and growth rate data for the most current 10-year period for the county or counties and incorporated cities in the study area
    - Published forecast population figures for the study area for both the construction and operations periods
    - Numbers and percentages describing the race/ethnic composition of the cities and counties in the study area
    - A description of whether or not any minority or low-income populations would be displaced by this project or disproportionately impacted
    - The average annual work force size, total number of employed workers, and the number and percentage of unemployed workers including the year that data are most recently available. Employment numbers and percentage of the total work force should be provided for the primary employment sectors
    - An estimate by month of the average size of the project construction, operational work force by trade, and work force peak periods
    - An analysis of whether or not the locally available work force would be sufficient to meet the anticipated demand for direct workers and an estimate of the number of construction and operation workers that would be hired from outside of the study area if the locally available work force would not meet the demand
    - A list of the required trades for the proposed project construction
    - An estimate of how many direct or indirect operation and maintenance workers (including family members and/or dependents) would temporarily relocate
    - An estimate of how many workers would potentially commute on a daily basis and where they would originate

- The application shall describe the potential impact on housing needs, costs, or availability due to the influx of workers for construction and operation of the facility and include the following:
    - Housing data from the most recent 10-year period that data are available, including the total number of housing units in the study area, number of units occupied, number and percentage of vacant units, median home value, and median gross rent. A description of the available hotels, motels, bed and breakfasts, campgrounds, or other recreational facilities
    - How and where the direct construction and indirect work force would likely be housed. A description of the potential impacts on area hotels, motels, bed and breakfasts, campgrounds, and recreational facilities
    - Whether or not meeting the direct construction and indirect work force's housing needs might constrain the housing market for existing residents and whether or not increased demand could lead to increased median housing values or median gross rents and/or new housing construction. Describe mitigation plans, if needed, to meet shortfalls in housing needs for these direct and indirect work forces
- The application shall have an analysis of the economic factors including the following:
    - The approximate average hourly wage that would likely be paid to construction and operational workers, how these wage levels vary from existing wage levels in the study area, and estimate the expendable income that direct workers would likely spend within the study area
    - How much, and what types, of direct and indirect taxes would be paid during construction and operation of the project, and which jurisdictions would receive those tax revenues
    - The other overall economic benefits (including mitigation measures) and costs of the project on the economies of the county, the study area, and the state, as appropriate, during both the construction and operational periods
- The application shall describe the impacts, relationships, and plans for utilizing or mitigating impacts caused by construction or operation of the facility to the following public facilities and services:
    - Fire
    - Police
    - Schools
    - Parks or other recreational facilities
    - Utilities
    - Maintenance
    - Communications
    - Water/storm water
    - Sewer/solid waste
    - Other governmental services
- The application shall compare local government revenues generated by the project (e.g., property tax, sales tax, business and occupation tax, payroll taxes) with their additional service expenditures resulting from the project; and identify any potential gaps in expenditures and revenues during both construction and operation of the project. This discussion should also address potential temporal gaps in revenues and expenditures.

- To the degree that a project will have a primary or secondary negative impact on any element of the socioeconomic environment, the applicant is encouraged to work with local governments to avoid, minimize, or compensate for the negative impact. The term "local government" is defined to include cities, counties, school districts, fire districts, sewer districts, water districts, irrigation districts, or other special purpose districts.

Consistency: Chapter 11, Socioeconomics provides a detailed discussion of the socioeconomic impacts from the project including impacts on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and the local economy in Cowlitz, Clark, and Multnomah counties.

28.1.4 Land Use and Zoning

- The council shall make a determination as to whether the proposed site is consistent and in compliance with land use plans and zoning ordinances pursuant to RCW 80.50.090 (2).

Consistency: Area-wide and local plan and program consistency is addressed in Chapter 27, Consultation, Permits, and Review Requirements. Potential impacts on land use are addressed in Chapter 5, Land.

28.1.5 Site Restoration and Preservation

- When a site is subject to preservation or restoration pursuant to a plan as defined in WAC 463-72-040 through 463-72-060, the certificate holder shall conduct operations within terms of the plan; shall advise the council of unforeseen problems and other emergent circumstances at the site; and shall provide site monitoring pursuant to an authorized schedule. After approval of an initial site restoration plan pursuant to WAC 463-72-040, a certificate holder shall review its site restoration plan in light of relevant new conditions, technologies, and knowledge, and report to the council the results of its review, at least every 5 years or upon any change in project status. The council may direct the submission of a site preservation or restoration plan at any time during the development, construction, or operating life of a project based upon council's review of the project's status. The council may require such information and take or require such action as is appropriate to protect the environment and all segments of the public against risks or dangers resulting from conditions or activities at the site.

Consistency: Implementation of mitigation measures described in Chapter 3, Project Components, and those suggested at the end of some of the resource chapters, would reduce possible impacts during construction and maintenance and provide site restoration following construction.

28.1.6 Geology and Soils

- The seismicity standard for construction of energy facilities shall be the standards contained in the state building code.

Consistency: BPA would apply seismic standards applicable to transmission line and substation construction in its design specifications for the proposed transmission line (see Chapter 14, Geology and Soils).

28.1.7 Water Quality

- Waste water discharges from projects under [EFSEC's] jurisdiction shall meet the requirements of applicable state water quality standards, Chapter 173-201A WAC, state groundwater quality standards, Chapter 173-200 WAC, state sediment management standards, Chapter 173-204A WAC, requirements of the Federal Water Pollution Control Act as amended (86 Stat 816,33 USC 1251, et seq.) and regulations promulgated thereunder.

Consistency: Through its compliance with the CWA, BPA seeks appropriate certifications and authorizations from state water quality regulatory agencies for its proposed projects. The project's consistency with state water quality standards is confirmed in part through a review of any wetlands fill permit proposed by the Corps. Section 401 of the CWA authorizes Ecology to review and certify proposed dredge and fill permits or other pollutant discharges to waters of the United States on non-federal lands or on federal land, if there has been a waiver of sovereign immunity. Ecology and the ODEQ are authorized to issue a Water Quality Certification under Section 401. BPA would meet all applicable standards identified through this process to protect water quality. Chapter 15, Water provides information on the project's potential effects on water quality, and Chapter 27, Consultation, Review, and Permit Requirements provides more information concerning BPA's CWA compliance activities.

28.1.8 Wetlands

- Wetland impacts shall be avoided wherever possible.
- Where impacts cannot be avoided, the applicant shall be required to take one or more of the following actions (in the following order of preference): Restore wetlands on upland sites that were formerly wetlands; create wetlands on disturbed upland sites; enhance significantly degraded wetlands; and preserve high-quality wetlands that are under imminent threat. Wetland mitigation actions proposed to compensate for project impacts shall not result in a net loss of wetland area except when the lost wetland area provides minimal functions and the mitigation action(s) will clearly result in a significant net gain in wetland functions as determined by a site-specific function assessment.

Consistency: In designing its projects, BPA attempts to avoid identified wetland areas where feasible. If wetlands cannot be avoided, BPA works to minimize potential impacts and compensate appropriately for unavoidable impacts. BPA would act consistently with EFSEC's standards related to wetlands during construction and maintenance of the proposed transmission line. Chapter 16, Wetlands provides information concerning the project's potential impacts on wetlands, and Chapter 27, Consultation, Review, and Permit Requirements provides more information concerning BPA's activities to comply with wetland regulations such as Sections 401 and 404 of the CWA.

28.1.9 Fish and Wildlife

- EFSEC encourages applicants to select sites that avoid impacts to any species on federal or state lists of endangered or threatened species or to priority species and habitats.
- An applicant must demonstrate no net loss of fish and wildlife habitat function and value.

- Restoration and enhancement are preferred over creation of habitats due to the difficulty in successfully creating habitat.
- Mitigation credits and debits shall be based on a scientifically valid measure of habitat function, value, and area.
- The ratios of replacement habitat to impacted habitat shall be greater than 1:1 to compensate for temporal losses, uncertainty of performance, and differences in functions and values.
- Fish and wildlife surveys shall be conducted during all seasons of the year to determine breeding, summer, winter, migratory usage, and habitat condition of the site.

Consistency: In designing its projects, BPA attempts to avoid impacts on fish and wildlife species where possible. Field surveys would be conducted as needed in spring 2013 to confirm the presence and/or absence of listed species in the project area. Potential impacts on ESA-listed species are discussed in Chapters 18, Wildlife and 19, Fish. These chapters also discuss potential effects to state-listed species and priority habitat and species.

28.1.10 Air Quality

- Air emissions from energy facilities shall meet the requirements of applicable state air quality laws and regulations promulgated pursuant to the CAA, Chapter 70.94 RCW, and the Federal Clean Air Act (42 USC 7401 et seq.), and Chapter 463-78 WAC.

Consistency: To the extent that air emissions resulting from construction and maintenance of the transmission line and substation are regulated under state law, the project would comply with these regulations. Because operation of the proposed line would not result in any air emissions, other than maintenance and inspection vehicles and helicopters, there are no applicable standards for project operation (see Chapter 21, Air Quality).

28.1.11 Public Health and Safety

- The provisions of Chapter 173-303 WAC shall apply to the on-site activities, at energy facilities subject to this chapter, which involve the generation, storage, transportation, treatment or disposal of dangerous wastes.
- No person shall cause or permit noise to intrude into the property of another person which noise exceeds the maximum permissible noise levels set forth below in this section.
- The noise limitations established are as set forth in Table 28-1 after any applicable adjustments provided for herein are applied.
- Between the hours of 10:00 p.m. and 7:00 a.m. the applicable noise limitations shall be reduced by 10 dBA for receiving property within Class A environmental designations for noise abatement (EDNAs).
- At any hour of the day or night the applicable noise limitations may be exceeded for any receiving property by no more than: (i) 5 dBA for a total of 15 minutes in any one-hour period; or (ii) 10 dBA for a total of 5 minutes in any one-hour period; or (iii) 15 dBA for a total of 1.5 minutes in any one-hour period.

- Sounds originating from temporary construction sites as a result of construction activity are exempt from these standards, except where such provisions relate to the reception of noise within Class A EDNAs between the hours of 10:00 p.m. and 7:00 a.m.

Table 28-1 Noise Limitations

EDNA[1] of Noise Source	EDNA of Receiving Property (dBA)		
	Class A	**Class B**	**Class C**
Class A	55	57	60
Class B	57	60	65
Class C	60	65	70

Notes:
1. EDNA: environmental designations for noise abatement.

Consistency: BPA would comply with all applicable state regulations concerning the generation, storage, transportation, treatment, or disposal of dangerous wastes during construction and maintenance of the transmission line. BPA also would conduct its construction and maintenance activities for the project in conformance with EFSEC's standards concerning maximum permissible noise levels through using appropriate muffling devices on construction and maintenance equipment and limiting construction and maintenance to daytime and evening hours (see Chapter 9, Noise). Noise impacts during operation of the transmission line and substations would meet federal and state noise guidelines and standards.

28.2 Washington State Department of Natural Resources Standards

The project area includes state lands managed by WDNR. This agency manages uplands for many purposes, including protection of state and federal threatened and endangered species, revenue for school construction, and environmental protection. Lands held in trust to support public beneficiaries generate earnings that help build or remodel public schools and universities. These revenues come from timber harvest on state trust lands, as well as from leases to farmers and ranchers and leases for mineral exploration and wind power generation (WDNR 2009c). WDNR has a few special-use leases in the project area. WDNR also holds conservation easements, and owns lands set aside for genetic reserves and a Natural Preserves Area. BPA would obtain easements and permits as appropriate for any WDNR lands crossed by the project.

The project area includes state trust lands, State Owned Aquatic Lands managed by WDNR and other state and private lands regulated by WDNR. Within the scope, the department has multiple responsibilities ranging from the management, disposition and acquisition of certain public trust lands including aquatic lands and natural areas, to regulation of timber harvest activities and fire protection on non-federal lands. The department collects, analyzes, and distributes scientific data about state plants. The Washington State Geologist is also part of the WDNR and maintains and provides information on geologic hazards throughout the state.

The following WDNR policies are potentially applicable to the project:

28.2.1 Compliance and Cooperation with other State and Federal Laws

- Policy 08-028: The department will comply with SEPA by managing activities on trust agricultural and grazing lands through a phased review process.
- Policy 08-035: The department will actively promote and maintain long-term relationships with public and private organizations that affect the agricultural and grazing program.
- Policy 14-018: The department will utilize the requirements of SEPA to communicate department objectives and outcomes; to consider local, regional and statewide interests and concerns; and to develop and analyze forest management strategies.
- Policy 14-022: in carrying out its management activities, the department will actively communicate and promote collaboration with trust beneficiaries; Tribes; local, state, and federal governments; stakeholders; and the public.
- The department will comply with Chapter 43.21C RCW SEPA and Chapter 197-11 WAC SEPA Rules for all non-exempt proposed actions as defined by the SEPA laws including Chapter 332-41 WAC WDNR SEPA Procedures.

Consistency: BPA is committed to planning its transmission line projects to be consistent or compatible with existing land uses to the extent practicable. Information concerning the project's potential impacts on agriculture and forested lands, and mitigation measures identified to reduce or eliminate impacts on those resources are provided in Chapters 5, Land; 6, Recreation; 11, Socioeconomics; and 17, Vegetation. Information regarding the Farmland Protection Policy Act, which directs federal agencies to identify and quantify adverse impacts on farmlands, can be found in Chapter 27, Consultation, Review, and Permit Requirements.

As described in the introduction to this chapter, BPA is working with Washington EFSEC to help ensure that this EIS is adoptable under SEPA for all state and local agencies. BPA also is working with WDNR directly to ensure WDNR has the information it needs for any required SEPA compliance. This EIS will help with this compliance through its analysis of the impacts of the project to the natural and built environments in Chapters 5 through 22, and the information provided in Appendix A, WDNR Lands Analysis.

28.2.2 Geology and Soils

- Policy 08-029: The department will actively maintain or enhance soil productivity and quality on agricultural and grazing lands.
- The provisions in Chapter 43.92 RCW shall apply to geologic hazards, which include assessment and mapping of seismic, landslide, and tsunami hazards, estimation of potential consequences, and likelihood of occurrence.

Consistency: In designing its projects, BPA attempts to reduce impacts on soil productivity by implementing mitigation measures as listed in Chapter 14, Geology and Soils. Geologic hazards are also taken into account during line and substation design; landslide-susceptible areas are avoided if possible, and towers and substations are designed to withstand seismic hazards. Chapter 14 discusses areas along the routes with landslide or seismic hazards.

28.2.3 Water Quality

- Policy 14-010: The department will assess the potential for significant cumulative impacts of department activities on watershed systems, and develop mitigation strategies as needed.
- Policy 14-011: Statewide, the department will allow for no net loss of acreage and function of wetlands, as defined by state forest practices rules.
- Policy 08-031: The department will maintain or enhance the quality and longevity of water resources originating from, flowing through, or applied on department-managed lands.

Consistency: BPA seeks appropriate certifications and authorizations from state water quality regulatory agencies and will meet all applicable standards identified through this process to protect water quality. Chapter 15, Water includes information concerning the project's potential impacts on water quality and mitigation measures that would reduce those impacts.

28.2.4 Biological Resources

- Policy -008: The department will actively participate with public and private sectors in developing and implementing pest and weed management programs.
- Policy 08-030: The department will maintain and enhance desirable vegetative communities on trust lands used for crop production, grazing, and wildlife habitat when compatible with agricultural and grazing program goals.
- Policy 14-008: The department will defer from harvest old-growth stands (stands 5 acres and larger that originated naturally, before 1850), in order to help meet WDNR's Habitat Conservation Plan (HCP) and regulatory requirements, over forest targets, and social/cultural values.
- When in the best interest of the trust(s), the department will actively seek to transfer old-growth stands and areas containing very large diameter trees of high social or cultural significance out of the trust status, when full market value compensation to the trust(s) is secured. In seeking to transfer such stands out of trust status, the department will immediately prioritize old-growth stands that are not subject to protection under WDNR's HCP or other applicable regulations.
- The department will comply with Title 17 RCW Weeds, Rodents, and Pests.
- The department will comply with Chapter 15.58 RCW Washington Pesticide Control Act.

Consistency: BPA's vegetation management would be guided by its Transmission System Vegetation Management Program EIS (see Chapter 3, Project Components; BPA and USDOE 2002). Resource compensation, right-of-way easements, and land purchased in fee would be negotiated with WDNR. Additionally, BPA works with the county weed boards and landowners on area-wide or site-specific plans for noxious weed control.

28.2.5 Cultural Resources

- Policy 14-016: The department will identify and protect significant historic and archaeological sites, consistent with state and federal law.

- Policy 08-034: The department will, within trust management obligations, protect significant archaeological and cultural resources on agricultural and grazing lands.
- The department will comply with PO06-001 Historical, Cultural, and Archeological sites.

Consistency: As discussed in Chapter 27, Consultation, Review, and Permit Requirements, BPA seeks to comply with all applicable laws and other directives for the management of cultural resources. Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties on all lands affected by proposed projects. Through the evaluation of this project in this EIS (see Chapter 13, Cultural Resources) and compliance with the Section 106 process and other review requirements, BPA will act consistently with WDNR's potentially applicable cultural resource policies.

28.2.6 Land Use and Socioeconomics

- Policy 08-012: The department will sell valuable materials from and lease, permit or contract agricultural and grazing lands for other surface and subsurface uses when in the best interest of the trust beneficiaries. In such cases: Existing agricultural lessees will be compensated by subsequent users for loss when crops or authorized improvements are damaged, when the lease is terminated, or lease renewal negotiation is denied.
- Existing grazing lessees will be compensated by subsequent users for loss when crops or authorized improvements are damaged, when the lease is terminated, or lease renewal negotiation is denied.
- Policy 14-014: When managing public access and recreation use on forested state trust lands, the department will protect trust interests and seek to balance economic, ecological and social concerns. The department will work to control negative effects of designated or dispersed public access and use on forested state trust lands through collaboration with the public, user groups, other landowners, and other agencies and organizations.
- Chapter 332-52 WAC public access and recreation.
- RCW 79.10.120 Multiple uses compatible with financial obligations of trust management.
- RCW 79.10.125 Land open to public for fishing, hunting, and non-consumptive wildlife activities.
- RCW 79.36.440 Right-of-way for public roads.
- RCW 79.36.510 Utility pipe lines, transmission lines, etc.
- RCW 79.36.520 Utility pipe lines, transmission lines, etc. – Procedure to acquire.
- RCW 79.36.530 Utility pipe lines – Appraisal – Certificate – Reversion.
- RCW 79.38.040 Permits for use of roads.

Consistency: As described above, BPA is committed to planning its transmission line projects to be consistent or compatible with existing land uses to the extent practicable. Mitigation measures identified to reduce potential impacts on landowners and their lessees are provided in Chapter 5, Land, and Chapter 11, Socioeconomics.

28.2.7 Fish and Wildlife

- Policy 08-032: The department will recognize the natural resource values of riparian zones and implement management plans to maintain or enhance these zones.
- Policy 08-033: The department will avoid effects on plant and animal species considered endangered. Within trust management obligations, the department will avoid adverse effects on species considered threatened, and consider avoiding or lessening effects on species considered sensitive.
- Policy 14-009: The department will meet the requirements of federal and state laws and contractual requirements that protect endangered, threatened and sensitive species and their habitats.
- Policy 14-011 In Western Washington, the department will maintain or restore salmonid freshwater habitat on department-managed lands and contribute to the conservation of other aquatic and riparian obligate species through implementation of WDNR's HCP.

Consistency: As described above under consistency with EFSEC standards, BPA attempts to avoid impacts on fish and wildlife species where possible. Chapter 18, Wildlife, and Chapter 19, Fish display the listed and proposed species that are either known to occur or have the potential to occur in the project area, and also discuss the project's potential impacts on wildlife and fish, and mitigation measures to minimize those impacts.

28.2.8 Transportation and Access

Policy 14-020 pertaining to forest roads in WDNR's Policy Manual (WDNR 2005) states the following:

- The department will develop and maintain forest roads to meet trust objectives and Board of Natural Resources policy, including protecting and enhancing the asset value.
- To minimize adverse environmental impacts, the department will rely on the requirements of WDNR's HCP, state forest practices rules and the State Environmental Policy Act, and will minimize the extent of the road network, consistent with other Board of Natural Resources policy.

In response to WDNR's policy and in order to achieve the regulatory requirements under Washington Forest Practices Act, a comprehensive discussion of WDNR standards for roads designed, constructed, maintained, and abandoned on state-managed lands was developed in WDNR's Forest Roads Guidebook (WDNR 2011a). Three general management practices characterize a small portion of the objectives and standards outlined in the Forest Roads Guidebook, but are representative of the considerations WDNR must make when adding a new road to the overall transportation system:

- Build no more new road than is necessary to accomplish and economically conduct harvest and/or management objectives for the basic plan of operations, regardless of whether a road is in sensitive areas or not.
- The protection of sensitive species and areas including, but not limited to, streams and watersheds is vital. Proper logging methods, road locations and construction techniques

must be considered to mitigate a potential increase in erosion from forest areas and sediment delivery to surface water.

- Consider the overall transportation plan for a geographic area. Plan new roads that take into account transportation plans and needs for future sales and access. This will avoid construction of parallel roads or extra lengths of roads to access far corners that will be harvested in the future.

Consistency: Each of the action alternatives crosses some WDNR forested property, where trees would be removed within and outside of planned rights-of-way. Construction of new roads and improvement of existing roads could occur on WDNR property, depending on the alternative and final coordination and negotiation with WDNR. It is BPA's intent to continue to work closely with WDNR to identify existing roads that could be used by BPA for construction and operation and maintenance of the project since many already exist on WDNR land and are used by WDNR mostly for logging. Coordination would also continue to determine trade-offs between identifying new roads that may minimize impacts on environmental resources and improving existing roads. BPA continues to work closely with WDNR to ensure that roads are sited in consideration of all existing and planned uses and environmental resources.

28.2.9 Washington's Forest Practices Act and Rules

WDNR's Forest Practices Program is responsible for the implementation of the state's Forest Practices Act and rules (Chapter 76.09 RCW and Chapter 222 WAC). The rules provide the framework for the protection of public resources on all state and private forest land and are a responsibility of forest landowners, timber owners and operators when conducting forest practices activities.

Consistency: Portions of all alternatives cross state or private lands managed for forest or timber and which are governed under the Forest Practices Act and Rules. Proposed amounts of timber removed on WDNR land is included in Appendix A. Trees would be removed within and outside of existing and planned right-of-way (danger trees and/or safe back line). It is BPA's intent to continue to work closely with WDNR to identify the types and amounts of trees that need to be removed and how placement of right-of-way, towers, and roads might minimize interference with existing and planned timber harvests and practices.

28.2.10 State Owned Aquatic Lands

The following conservation measures are implemented on a case-by-case basis as site-specific conditions warrant. As good stewards of the state's aquatic lands these are the measures that the department currently uses to lessen the impact from development. These measures are currently under review in the development of an Aquatic Lands HCP with an incidental take permit that is anticipated for final adoption in 2012 or later. These measures may change when the Aquatics HCP is finalized and adopted and there may be additional requirements.

- In saltwater systems, treated wood is only allowed as part of above water structural framing and may not be used as decking, pilings or for any other uses. Treated wood is prohibited for all uses in freshwater. During maintenance, existing treated wood timbers and pilings must be replaced with alternative materials, such as untreated wood, steel, concrete, or recycled plastic, or encased in a manner that prevents leaching

of contaminants into surface water. Structural framing in saltwater systems may be replaced with non-creosote treated wood.

- New bulkheads or hard bank armoring will only be allowed on state-owned aquatic land in exceptional circumstances such as those needed to protect infrastructure. Over time, existing bulkheads must be replaced with softer shoreline protection systems. Bulkheads which cannot be replaced with softer shoreline materials due to design or infrastructure protection issues may be considered for replacement, provided that the bulkhead occupies the same footprint, or smaller, than the existing one.
- New fill, or additional placement of fill, will not be allowed on state-owned aquatic lands. Fill may be allowed for sediment remediation, authorized habitat creation or restoration projects. Washed gravel or shell may be applied as a substrate amendment for authorized shellfish aquaculture activities.
- Dredging, including sand and gravel mining, is not allowed on state-owned aquatic lands except where required for navigation for trade and commerce, flood control, or maintenance of water intakes.
- New activities or structures must avoid existing native aquatic vegetation (Protected Vegetation to be provided by WDNR).
- New outfalls must be located at least 16 feet (5 meters) from existing aquatic vegetation (may change subject to site-specific situations).
- Species work windows (see Species Work Windows and Buffers provided by WDNR) must be used for the timing of any construction, operation or maintenance activities, to protect listed and sensitive species and forage fish species in sensitive live history phases (see Listed and Sensitive Species provided by WDNR).
- Lessees and grantees must remove unused, abandoned structures, treated wood, pilings, derelict vessels, and equipment from the lease or easement site. A timeframe for removal will be specified in the authorizing document.
- Lessees shall assess water drainage and runoff patterns, and shall develop and implement a plan to alter them to reduce direct inputs of contaminants and nutrients.

Consistency: The action alternatives cross State Owned Aquatic Lands along the Columbia, Cowlitz, Coweeman, Kalama, Lewis, and Washougal rivers. One new tower would be constructed in the Columbia River (see Chapter 3, Project Components). All other structures would be at least 200 feet from the edge of river banks. No towers, other than the one already described, or new or improved access roads would be placed in rivers. Depending on type and height, riparian vegetation would be removed along the rivers for safe operation of the line and development of access roads to towers. It is BPA's intent to continue to work closely with WDNR to identify the types and amounts of trees that need to be removed and how placement of the right-of-way, towers, and roads might minimize riparian clearing and potential impacts to aquatic species and other aquatic resources and activities.

28.2.11 Public Health and Safety

- The provisions of Chapter 332-24 WAC and Chapter 76.04 RCW shall apply to forest protection measures and operator responsibilities related to fire prevention and fire hazard abatement.

Consistency: BPA is committed to reducing the potential for fire during construction. Chapter 10, Public Health and Safety identifies mitigation measures to minimize potential health and safety risks from fire.

28.3 Washington Department of Fish and Wildlife Standards

WDFW serves as the state's principal agency on species protection and conservation. Legislative mandate RCW 77.04.012 established that wildlife, fish, and shellfish are property of the state and that WDFW is entrusted by and through the Fish and Wildlife Commission to "preserve, protect, perpetuate, and manage the wildlife and food fish, game fish, and shellfish" and "attempt to maximize the public recreational game fishing and hunting opportunities of all citizens."

In 2003, WDFW and a broad range of wind power stakeholders developed the WDFW Wind Power Guidelines (WDFW 2009a) to provide consistent statewide direction for development of land-based wind energy projects still protecting the state's wildlife and habitat. The guidelines were revised in 2009. Although the project is not a wind energy project, guidelines for impact avoidance and minimization that are potentially applicable to the project are included in the sections below.

28.3.1 Wildlife

- Where appropriate, develop in agricultural and other disturbed lands, including using existing transmission corridors and roads where possible.

Consistency: Where feasible, BPA typically considers transmission line alternatives that use existing rights-of-way or are routed across already disturbed areas such as agricultural lands, and attempts to use existing roads where possible. Chapters 2 through 4 discuss alternative development and placement of roads, and Chapter 5 provides information on potential impacts on land uses.

- Avoid high bird and bat aggregation areas, and areas used by sensitive status species.
- Encourage the protection of priority habitats and species.

Consistency: BPA attempts to route transmission lines away from high bird and bat aggregation areas and sensitive species' habitat where possible; however, because new lines most often extend from one specific area to another, route locations can be limited. Chapter 18, Wildlife describes the project's potential impacts on wildlife and mitigation measures identified to minimize those impacts.

- Minimize use of overhead collector lines, unless underground collector lines are not appropriate or feasible due to environmental conditions (e.g., topography, soil conductivity, environmental impacts, etc.).

Consistency: BPA would not construct collector lines for the project. Undergrounding of high-voltage (230- and 500-kV) transmission lines is usually not an option because of the greater environmental impacts and costs of undergrounding. Section 4.7, Alternatives Considered but

Eliminated from Detailed Study, of this EIS provides information on alternatives eliminated from detailed consideration and Appendix D includes the Underground Route Study.

- When overhead lines are used, use designs that avoid and minimize impacts to raptors and other birds (refer to APLIC guidelines regarding adequate conductor spacing and use of perch guards).

Consistency: BPA always designs conductor spacing to comply with Avian Power Line Interaction Committee guidelines (see Section 3.3, Conductors, of this EIS).

- Use tubular towers to reduce the likelihood that birds will perch on towers and to possibly reduce the risk of collision. Avoid use of lattice towers, particularly those with horizontal cross-members.

Consistency: The industry standard design for towers for high-voltage transmission lines is steel lattice towers. This design also minimizes cost. Chapter 3, Project Components provides information on the design of the proposed transmission line.

- Avoid using permanent tower types that employ guy wires. If guy wired towers are approved, encourage the requirement of bird flight diverters on the guy wires.

Consistency: BPA typically does not use guy wires on towers for its high-voltage transmission lines. In the event that guy wires are necessary, BPA would consider placing bird flight diverters on the guy wires if it is compatible with the tower design. Chapter 18 describes the proposed mitigation measures identified to minimize impacts on birds.

- Discourage the use of rodenticides to control rodents burrowing around towers.

Consistency: BPA does not use rodenticides.

- Minimize the use of lights on towers and facilities structures, in accordance with federal, state, and local requirements.

Consistency: BPA typically only uses lights on very tall towers (such as at river crossings) and towers near airports/heliports, in compliance with FAA requirements. Chapter 3 provides a discussion of tower lighting design and potential locations.

- Control noxious weeds in accordance with federal, state, and local laws.
- Encourage the control of detrimental weedy species that invade as a result to disturbance from construction, maintenance and operation.

Consistency: BPA controls weeds in accordance with federal laws, and also follows applicable state and local weed control laws to the extent practicable. Chapter 17, Vegetation discusses proposed mitigation measures to reduce or eliminate the potential for the spread of noxious weeds under the action alternatives.

- Encourage the permitting authority to require a fire protection plan and a complete road siting and management plan that includes vehicle-driving speeds that minimize wildlife mortality.

Consistency: Because BPA is not subject to state or county permitting authorities, this guideline does not apply to the project. However, Chapter 10, Public Health and Safety does include proposed mitigation for the safe operation of vehicles and construction equipment.

- Minimize roads and stream crossings.

Consistency: BPA typically proposes to build or improve the minimum amount of roads needed to access the transmission line and avoid stream crossings where possible. Section 28.2.8, Transportation and Access, provides information on BPA's commitment to work with WDNR on access roads.

28.4 Washington State Department of Ecology Standards

The Washington State Department of Ecology (Ecology) is the state agency responsible for protecting air and water quality in the state of Washington, including management of shorelines and wetland areas and implementation of federal and state water pollution control laws and regulations.

28.4.1 Shorelines and Wetlands

The Coastal Zone Management Program is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management, Coastal Programs Division. Management of the program is delegated to the states participating in the program. In Washington, Ecology administers the program. The Coastal Zone Management Act requires federal development projects and activities directly affecting the coastal zone "shall be conducted in a manner which is, to the maximum extent practicable, consistent with approved state management programs" (Section 307(c)(1), (2)).

A federal agency or applicant for a federal license, permit, or financial assistance is responsible for determining whether the proposed activity may affect any natural resource, land use, or water use in Washington's coastal zone. Ecology will concur with a determination if the federal activity is consistent to the maximum extent practicable with the Washington Coastal Zone Management Program. Consistency with the state program is described below.

The Washington State Shoreline Management Act (the Act) establishes a planning program and regulatory permit system 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. The SMP for Clark County, adopted in 1974, and Cowlitz County, adopted in 1977 regulates land uses affecting shorelines of the state. The proposed transmission facilities would impact state shorelines if the towers or access roads would be located within 200 feet of them or their associated wetlands. Regulations pertaining to utilities are listed in Section 16 of the SMP. Utility services in shoreline areas designated Conservancy, Rural and Urban Environments, shall be permitted subject to the following regulations:

- All utility systems shall be underground when such undergrounding is economically feasible.
- All clearing for installation of maintenance shall be kept to the minimum width necessary.
- Upon completion of the installation of utility systems or of any maintenance, disturbed areas shall be restored as nearly as practical to the pre-existing condition.
- Utilities shall be located above flood levels wherever practical.

Consistency: 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. Towers and access roads 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.

Section 401 consistency with the Clean Water Act for fill or pollutant discharge into waters of the United States including wetlands is a requirement and is discussed in Section 28.1.7, Water Quality, of this chapter.

28.4.2 Water Quality

The following Ecology substantive standards from Chapter 90.48 RCW, Chapter 173-216 WAC, Chapter 173-220 WAC, Chapter 173-200 WAC, and Chapter 173-201A WAC are potentially applicable to the proposed project:

- Proper erosion and sediment control practices must be used on the construction site and adjacent areas to prevent upland sediments from entering surface water. All ground disturbances by construction activities must be stabilized. When appropriate, use native vegetation typical of the site.
- Any operation which would generate a waste discharge or have the potential to impact the quality of state waters, must receive specific prior authorization from Ecology.
- Routine inspections and maintenance of all erosion and sediment control BMPs are recommended both during and after development of the sites.
- A SWPPP for the project site may be required and should be developed by a qualified person(s). Erosion and sediment control measures in the plan must be implemented prior to any clearing, grading, or construction. These control measures must be effective to prevent soil from being carried into surface water by stormwater runoff. Sand, silt, and soil can damage aquatic habitat and are considered pollutants. The plan must be upgraded as necessary during the construction period.
- Proper disposal of construction debris must be in such a manner that debris cannot enter the natural stormwater drainage system or cause water quality degradation of surface waters. Dumpsters and refuse collection containers shall be durable, corrosion resistant, nonabsorbent, water tight, and have close fitting covers. If spillage or leakage

does occur, the waste shall be picked up immediately and returned to the container and the area properly cleaned.

- The operator of a construction site that disturbs one acre or more of total land area, and which has or will have a discharge of stormwater to a surface water or to a storm sewer, must apply for coverage under Ecology's NPDES Construction Stormwater General Permit.

Consistency: Water quality standards are discussed in Chapter 27, Consultation, Review, and Permit Requirements. BPA seeks appropriate certifications and authorizations from state water quality regulatory agencies and will meet all applicable standards identified through this process to protect water quality. Chapters 14, Geology and Soils, and 15, Water, provide information on the project's potential impacts on soils and water quality, and identify mitigation measures that would reduce potential impacts. Section 401 certification of consistency with the Clean Water Act for fill or pollutant discharge of waters of the United States is a requirement and is discussed in Section 28.1.7, Water Quality, and in Chapter 27, Consultation, Review, and Permit Requirements.

28.4.3 Air Quality

Ecology substantive standards from Chapter 42.21A RCW and Chapter 173-400 WAC related to general regulations of air pollution sources establish attainable standards and rules applicable to control or prevention of emissions of air contaminants. Ecology suggests the development of a Fugitive Dust Control Plan (FCDP) to identify project-related fugitive dust sources, implementation procedures for dust abatement, and how dust control measures will comply with applicable provisions outlined in WAC 173-400-040.

Consistency: See Chapter 14, Geology and Soils and Chapter 21, Air Quality for a discussion of dust and air quality impacts and for mitigation measures to control emissions and fugitive dust. BPA will prepare a Fugitive Dust Control Plan.

28.5 Washington State Department of Archaeology and Historic Preservation Standards

The Department of Archaeology and Historic Preservation works with agencies, Tribes, private citizens, and developers to identify and develop protection strategies to ensure that Washington's cultural heritage is not lost. In Washington, archaeological sites and Native American graves are protected from known disturbance by a variety of state laws. Federal law applies to all federal and Native American lands, and Washington state law applies to all other lands. The following state laws on archaeology and historic preservation for the management of cultural resources are potentially applicable to the I-5 Project:

- Indian Graves and Records (RCW 27.44)
- Archaeological Sites and Resources (RCW 27.53)

- Archaeological Excavation and Removal Permit (WAC 25-48)
- Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60)
- Advisory Council on Historic Preservation (WAC 25-12)

Consistency: As discussed in Chapter 13, Cultural Resources, Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. 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 to make an assessment of adverse effects on identified historic properties. BPA would comply with NHPA and all applicable state laws.

28.6 Oregon Department of Energy

The Oregon Department of Energy (ODOE) is the state agency responsible for overseeing the development of large energy facilities in Oregon. A proposed facility must undergo a review process before the Oregon Energy Facility Siting Council (EFSC) that meets the siting standards before being issued a site certificate, which authorizes a developer to construct and operate an energy facility. BPA's transmission lines are not subject to EFSC's siting jurisdiction. Nonetheless, BPA will seek to be consistent with EFSC's substantive standards to the extent practicable.

The following substantive standards from Oregon Administrative Rules (OAR) Chapter 345, Division 22 and Division 24 are potentially applicable to the project:

28.6.1 Soil and Geologic Resources

- The provisions in OAR 345-022-0022 require that applicants consider potential impacts to soil resources.
- The provisions in OAR 345-022-0020 require that applicants design, engineer, and construct proposed facilities to avoid dangers to human safety presented by seismic hazards expected to result from maximum probably ground motion events.

Consistency: BPA would apply seismic standards applicable to transmission line construction in its design specifications for the proposed transmission line (see Chapter 14, Geology and Soils).

28.6.2 Land Use

- The provisions in OAR 345-022-0030 ensure that proposed energy facilities will comply with Oregon's land use planning goals adopted by the Land Conservation and Development Commission (LCDC).
- EFSC must decide whether the proposed energy facility complies with LCDC rules and goals directly applicable to the facility under ORS 197.646(3).

Consistency: BPA is committed to planning its transmission line projects to be consistent or compatible with existing land uses to the extent practicable. Chapter 5, Land provides a discussion of mitigation measures identified to reduce potential impacts on land use and ownership.

28.6.3 Fish and Wildlife Habitat

- The provisions in OAR 345-022-0060 require that proposed facilities comply with habitat mitigation goals and standards of ODFW.
- The provisions in OAR 345-022-0070 require that applicants provide appropriate studies that identify state-listed threatened or endangered species that could be affected by the proposed energy facility. Applicants should consult with the Oregon Department of Agriculture (ODA) and ODFW.

Consistency: In designing its projects, BPA attempts to avoid impacts on fish and wildlife species where possible. Field surveys would be conducted as needed in spring 2013 to confirm the presence and/or absence of listed species in the project area. Potential impacts on ESA-listed species and state-listed species and priority habitat are discussed in Chapter 18, Wildlife and Chapter 19, Fish. These chapters also discuss potential effects to state-listed species and priority habitat and species.

28.6.4 Visual Resources

The provisions in OAR 345-022-0080 (Scenic Resources) protect scenic values that local land use or federal management plans identify as significant or important. Proposed facilities affecting scenic values identified as significant must propose appropriate measures to reduce impacts.

Consistency: Chapter 7, Visual Resources, provides a discussion of impacts on visual resources and mitigation measures to lessen those impacts.

28.6.5 Historic, Cultural, and Archaeological Resources

- The provisions in OAR 345-022-0090 protect public interest in preserving historic, cultural, or archaeologically significant places. Applicants must conduct appropriate surveys to identify and avoid places of potential significance. If the project involves construction on an archaeological site, the applicant may need a permit from the SHPO.

Consistency: As discussed in Chapter 27, Consultation, Review, and Permit Requirements, BPA seeks to comply with all applicable laws and other directives for the management of cultural resources. Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties on all lands affected by proposed projects. Through the evaluation of this project in this EIS (see Chapter 13, Cultural Resources) and compliance with the Section 106 process and other review requirements, BPA will act consistently with ODOE's potentially applicable cultural resource policies.

28.6.6 Recreation

- The provisions in OAR 345-022-0100 require evaluation of potential impact to recreational opportunities at the construction site or in the surrounding area. If significant impact is likely, the Council may require avoidance or mitigation measures to reduce impact to recreational opportunities.

- Impacts to protected state and national areas specified in OAR 345-022-0040 will be sufficiently mitigated to less than significant impact.

Consistency: Chapter 6, Recreation describes impacts on recreation areas in the project and mitigation measures to lessen those impacts.

28.6.7 Socioeconomics

- The provisions in OAR 345-022-0110 require applicants to assess proposed facility needs for water, wastewater disposal, storm water, and solid waste. Expected population increases, impacts to housing, traffic safety, police, and fire protection, heath care and schools must also be analyzed for expected temporary and permanent impacts.

Consistency: Chapter 11, Socioeconomics describes potential impacts on socioeconomics for the project and mitigation measures to lessen those impacts.

28.6.8 Public Health and Safety

- ORS Chapter 467.020 and 467.030 relate to Oregon Department of Environmental Quality (ODEQ) noise regulation for energy facilities. OAR 340-035-0035 establishes noise control regulations for industry and commerce, including energy facilities.
- No person owning or controlling a new industrial or commercial noise source located on a previously unused industrial or commercial site shall cause or permit the operation of that noise source if the noise levels generated or indirectly caused by that noise source increase the ambient statistical noise levels, L10 or L50, by more than 10 dBA in any one hour, or exceed the levels specified in Table 28-1.
- Provisions in OAR 345-022-0120 require applicants to plan to minimize solid waste and wastewater generated during construction and operation of the proposed facility. Applicants must propose methods to handle waste through collection, storage and disposal.
- The applicant should consult with DEQ to list all hazardous materials potentially stored or used at the facility site during construction and operation as well as ensure compliance with Oregon Revised Statutes) (ORS) Chapters 465 and 466 related to use, clean up, and disposal of hazardous materials.

Consistency: BPA would comply with all applicable state regulations concerning the generation, storage, transportation, treatment or disposal of dangerous wastes during construction and maintenance of the proposed transmission line (see Chapter 10, Public Health and Safety). BPA also would conduct project construction activities in conformance with DEQ standards for maximum permissible noise levels using appropriate muffling devices on construction equipment and limiting construction to daytime and evening hours (see Chapter 9, Noise).

28.6.9 Air Quality

- Provisions in OAR 345-024-05000 provide specific standards for base load gas plants, non-base load power plants, and non-generating energy facilities that emit carbon dioxide. The following limitations are in place:
    - Base load gas plants 0.675 lb. CO_2 / kWh
    - Non-base load gas plants 0.675 lb. CO_2 / kWh
    - Non-generating facilities 0.504 lb. CO_2 / horsepower-hour

Consistency: To the extent that air emissions resulting from construction and maintenance of the project are regulated under state law, the project would comply with these regulations (see Chapter 21, Air Quality). Operation of the line and substations would result in annual emissions from vehicles that would be below EPA's mandatory reporting threshold, as described in Chapter 21. There are no applicable air emissions standards for project operation.

28.6.10 Water Resources

- The Oregon Department of State Lands and the U.S. Army Corps of Engineers have a joint application process for issuing permits for work conducted within waters of the State. ODSL will require a removal-fill permit if 50 cubic yards or more of material is removed, filled or altered within a jurisdictional water of the State. The removal-fill permit will be issued separately from the 404 permit issued by the U.S. Army Corps of Engineers.
- A Limited Water Rights permit is required if new water rights are necessary for the project.

Consistency: Through its compliance with the CWA, BPA seeks appropriate certifications and authorizations from state water quality regulatory agencies for its proposed projects. BPA will meet all applicable standards identified through this process to protect water quality from construction and operation of the proposed transmission line. In designing its projects, BPA attempts to avoid identified wetland areas where feasible. If wetlands cannot be avoided, BPA works to minimize potential impacts and compensate appropriately for unavoidable impacts. BPA would act consistently with standards related to wetlands during construction and operation and maintenance of the project. Chapter 15, Water and Chapter 16, Wetlands provide additional information concerning the project's potential impacts on water quality, and Chapter 27, Consultation, Review, and Permit Requirements provides information concerning BPA's CWA compliance activities.

Chapter 29 References

This chapter lists the works cited in this EIS, and other works consulted to prepare this EIS.

29.1 Works Cited

40 Mile Loop Land Trust. 2011. History of the 40-Mile Loop. Accessed February 9, 2011 at http://www.40mileloop.org/history.htm

Aalde, Harald , Patrick Gonzalez, Michael Gytarsky, Thelma Krug, Werner A. Kurz, Rodel D. Lasco, Daniel L. Martino , Brian G. McConkey, Stephen Ogle, Keith Paustian, John Raison, N. H. Ravindranath, Dieter Schoene, Pete Smith, Zoltan Somogyi, Andre van, Amstel, and Louis Verchot. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4, Chapter 2: Generic Methodologies Applicable to Multiple Land Use Categories. Accessed February 28, 2011 at http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf

AirNav. 2011. Airport data. Accessed June 23, 2011 at http://www.airnav.com/airports/

Altman, B., M. Hayes, S. Janes, and R. Forbes. 2001. Wildlife of westside grassland and chaparral habitats. Pages 261-291 in: D. H. Johnson and T. A. O'Neil, Managing Directors. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis. 736 pages.

American Conference of Governmental Industrial Hygienists (ACGIH). 2008. 2008 TLVs and BEIs: Threshold limit values for chemical substances and physical agents and biological exposure indices. American Conference of Governmental Industrial Hygienists, Cincinnati. 251 pages.

American Society of Civil Engineers (ASCE). 2010. Guidelines for electrical transmission line structural loading. C. J. Wong and M. D. Miller (editors). Manuals of Practice (MOP) 74.

Archaeological Investigations Northwest, Inc. (AINW). 2011. Cultural Resource Study of the Proposed I-5 Corridor Reinforcement Project, Lewis, Cowlitz, and Clark Counties, Washington, and Multnomah County, Oregon. Prepared for the Bonneville Power Administration. May 27, 2011.

Arnett, Joseph. Rare plant botanist, Natural Heritage Program, Washington State Department of Natural Resources, Olympia, Washington. February 8, 2011. Personal communication with Josh Wozniak, Herrera Environmental Consultants, Inc., re: rare plant database and search areas.

Arora, R. and W. Mosch. 1995. High voltage insulation engineering, Section 2.2.6.1 Chemical Decomposition of Air by Corona, 1995; pages 133-134.

Association of Bay Area Governments (ABAG). 2010. Modified Mercalli Intensity Scale. Accessed September 16, 2010 at http://www.abag.ca.gov/bayarea/eqmaps/doc/mmi.html

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines. The state of the art in 2006. Edison Electric Institute, Avian Power Line Interaction Committee, and the California Energy Commission, Washington D.C. and Sacramento, California.

Blair, Pam. 2009. Vandalism of the electrical system. Ruralite, June 24, 2009. Accessed August 27, 2010 at http://www.ruralite.org/news/story.php?ID=257

Bonneville Power Administration (BPA), U.S. Department of Energy (USDOE). 1980. A practical handbook for the correction of radio interference from overhead powerlines and facilities. May 1980. Portland, OR.

———. 1986. Electrical and biological effects of transmission lines: a review. DOE/BP 524. January 1986. Bonneville Power Administration, Portland, OR.

———. 1986. Electrical and biological effects of transmission lines: a review. DOE/BP 2938 December 1996 1M. Bonneville Power Administration, Portland, OR.

———. 1987. Access Road Planning and Design Manual. Adopted 1987.

———. 2000a. Transmission System Vegetation Management Program, Final Environmental Impact Statement. DOE/EIS-0285. May 2000.

———. 2000b. Transmission System Vegetation Management Program, Record of Decision. DOE/EIS-0285. July 2000.

———. 2002. Transmission System Vegetation Management Program, Final Environmental Impact Statement DOE/EIS-0285. May 2002.

———. 2007. Living and working safely around high-voltage power lines. DOE/BP-3804. 16 pages. Accessed October 2007 at http://www.bpa.gov/corporate/pubs/Public_Service/LivingAndWorking.pd f

———. 2010. Audible noise policy. STD-D-000010. Portland, OR.

———. 2011. LiDAR imagery. Data compiled May to October 2011. Portland, OR.

———. 2012. Geographic Information System Regional Database. Portland, OR. 2010-2012.

Bottemiller, Stephen. Realty Specialist, Bonneville Power Administration, Portland , Oregon. August 1, 2012. Personal communication with Nancy Wittpenn, Bonneville Power Administration, re: Property value study.

Bottemiller, S., J. M. Cahill and J. R. Cowger. 2000. Impacts on residential property values along transmission lines: an update study of three Pacific Northwest metropolitan areas. Right of Way, July/August: pages 18-20, 55.

Bracken, T. D. 1990. The EMDEX project: Technology transfer and occupational measurements, volumes 1-3 interim report. EPRI Report EN-7048 (EPRI EN-7048) Electric Power Research Institute, Palo Alto, CA.

———. 2011. Electrical Effects for the I-5 Corridor Reinforcement Project. Portland, Oregon. October 2011.

Bramble , W. C., R. H. Yahner, and W. R. Byrnes. 1994. Nesting of breeding birds on an electric utility line right-of-way. Journal of Arboriculture 20, pages 124-129.

Bungee Masters, Inc. 2011. Pacific Northwest Bridge. Accessed June 27, 2011 at http://www.bungee.com/bzapp/bungee_masters/bridge.html

Bureau of Land Management (BLM). 1986a. Visual resource inventory. BLM Manual Handbook H-8410-1. U.S. Bureau of Land Management, U.S. Department of the Interior, Washington, D.C. 7 pages.

———. 1986b. Visual resource contrast rating. BLM Manual Handbook H-8431. U.S. Bureau of Land Management, U.S. Department of the Interior, Washington, D.C. 29 pages.

———. 2009. Oregon/Washington Surface Management Ownership. Accessed April 2010 at http://www.blm.gov/or/gis/data-details.php?data=ds000026

Burgess, Phil. Clark County vegetation management, Vancouver, Washington. February 11, 2011. Personal communication with Josh Wozniak, Herrera Environmental Consultants, Inc., re: the extents of noxious weed mapping in Clark County.

Camas Meadows Golf Club. 2010. Camas Meadows golf club. Accessed July 29, 2010 at http://www.camasmeadows.com/sites/courses/layout9.asp?id=538&page=27700

Camp Currie. 2010. J D Currie Youth Camp, Camas, Washington. Accessed July 29, 2010 at http://www.campcurrie.org/

Caplow, F. and J. Miller. 2004. Southwestern Washington prairies: using GIS to find rare plant habitat in historic prairies. Natural Heritage Report 2004-02. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA. 18 pages.

Case, K. E., and R. C. Fair. 2004. Principles of microeconomics. Seventh edition. Prentice Hall. Upper Saddle River, NJ.

Center for Plant Conservation. 2011. Website. Accessed in 2011 at http://www.centerforplantconservation.org

Chalmers, J. A. and F. A. Voorvaart. 2009. High-voltage transmission lines: proximity, visibility, and encumbrances effects. The Appraisal Journal, summer 2009, pages 227-245.

Chalmers, J.A. 2012. High-voltage Transmission Lines and Rural, Western Real Estate Values. The Appraisal Journal, winter 2012, pages 30-45.

Chappell, C. B. and J. Kagan. 2001. Westside oak and dry Douglas-fir forest and woodlands. Pages 26-28 in: D. H. Johnson and T. A. O'Neil, Managing Directors. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis. 736 pages.

CH2MHILL. 2005. Sitewide groundwater monitoring plan (2006 through 2010) at RMC-Troutdale, Memorandum WP No. 68. Prepared for Reynolds Metals Company, Troutdale Facility. October 2005.

City of Camas Parks and Recreation. 2010. Oak Park. Accessed July 29, 2010 at http://www.ci.camas.wa.us/parks/oak.htm

City of Camas. 2007. Park, Recreation and Open Space Plan. Adopted December 17, 2007.

City of Fairview. 2004. City of Fairview Comprehensive Plan. Adopted June 2004.

City of Portland. 2010. "Transient Lodging (Hotel/Motel Tax)." Transient Lodging (Hotel/Motel Tax) Program. Accessed October 8, 2010 at http://www.portlandonline.com/omf/index.cfm?c=29976

City of Portland, Office of Management and Finance. 2011. Overview: Multnomah County Business Income Tax (MCBIT). Accessed September 29, 2011 at http://www.portlandonline.com/omf/index.cfm?a=40627&c=29730

C-Tran. 2011. C-Tran's Fourth Plain Transit Improvement Project. Accessed October 2011 at http://www.c-tran.com/brt_files/templates/brt.php

City of Troutdale. 2006. City of Troutdale Parks Master Plan. Adopted November 14, 2006.

City of Kelso. 1994. Comprehensive Plan for the City of Kelso. Adopted September 2, 1980.

City of Kelso. April 17, 2012. Kelso Municipal Code. Accessed March 2012 at http://www.codepublishing.com/WA/Kelso.

City of Vancouver. 2004. City of Vancouver Transportation Plan. Adopted May 3, 2004.

———. 2009. 2010-2015 Transportation Improvement Program. June 15, 2009.

City of Vancouver, Washington Public Works. 2011. Street Improvement Projects. Accessed October 2011 at http://www.cityofvancouver.us/streetprojects.asp?menuid=10465&submenuid=10530

City of Washougal. March 2006. Accessed March 2012 at www.mrsc.org/mc/washougal/washougal16.pdf

Clark County. 2006. Wetland GIS model results. Digital data compiled in December 2006. Clark County GIS. Obtained in 2008 from Clark County GIS.

———. 2007. Capital Facilities Financial Plan (2007-2012). Supporting document to the 20-year Comprehensive Management Plan, Revised May 2007.

———. 2009a. Critical Aquifer Recharge Areas (CARA) Ordinance GIS data, August 2009.

———. 2009b. Land use data. Digital data compiled in August 2009. Clark County Department of Environmental Services. Obtained in June 2010 from Golder Associates.

———. 2010. Clark County 20-year Comprehensive Growth Management Plan 2004–2024. Adopted September 2007, Amended ORD2008-12-15, Amended ORD2009-12-15, and ORD2009-12-21. January 2010.

———. 2011a. Scenic drive highlights northern Clark County. Accessed February 15, 2011 at http://www.co.clark.wa.us/ScenicDrive.html

———. 2011b. Clark County watersheds. Accessed October 2011 at http://www.clark.wa.gov/water-resources/documents/Stream%20Health%20Report/2010%20report/2010WatershedReport_salcrk.pdf

———. 2011c. Clark County GIS parcels data. Accessed 2011 at http://gis.clark.wa.gov/gishome/

———. 2011d. Clark County GIS park and trail data. Accessed 2011 at http://www.co.cowlitz.wa.us/gis/

Clark County Community Development. 2011. Proposed Developments. Accessed October 2011 at http://www.clark.wa.gov/development/land_use/developments.html

Clark County Community Planning Office. 2010. 20-year comprehensive growth management plan 2004–2024. January. Accessed September 20, 2010 at http://www.co.clark.wa.us/planning/comp_plan/documents/CompPlan_2009-Amendments.pdf

Clark County Public Works. 2011a. Current Projects. Accessed October 2011 at http://www.clark.wa.gov/publicworks/ProjectsMap.html

———. 2011b. Chelatchie Prairie Rail with Trail Project. Maps and Reports. Accessed October 2011 at http://www.clark.wa.gov/publicworks/chelatchie/maps.html

Clary, Justin. City Manager, Ridgefield, Washington. October 7, 27 and 28, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: parks, public works, wastewater treatment, and road projects.

Climate Registry, The. 2008. The Climate Registry General Reporting Protocol Version 1.1. Accessed February 15, 2011 at http://www.theclimateregistry.org/downloads/GRP.pdf

Columbian, The. 2011. Yacolt, Amboy – compiled by The Columbian Archives. Accessed February 10, 2011 at http://www.columbian.com/history/names/yacoltamboy/

Club Green Meadows. 2010. Club Green Meadows. Accessed July 29, 2010 at http://www.clubgreenmeadows.com/

ColumbiaGrid. 2009. Web site. Accessed December 28, 2009 at http://www.columbiagrid.org/I5CRP-overview.cfm

Columbia River Gorge Scenic Area Management Plan. 2007. Adopted 2004 and amended 2007. Accessed July 8, 2011 at http://www.gorgecommission.org/managementplan.cfm?CFID=18424119&CFTOKEN=64315572&jsessionid=c430c02f479ff36879bc31c216b2e2337435

Council on Environmental Quality (CEQ). 1997. Environmental justice guidance under the National Environmental Policy Act. December 10, 1997.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. La Roe. 1979. Classification of wetlands and deepwater habitats of the United States, FWS/OBS-79/31. U.S. Fish and Wildlife Service. Biological Services Program, Washington, DC.

Cowger, J. R. and S. Bottemiller. 1996. Transmission line impact on residential property values: a study of three Pacific Northwest metropolitan areas. Right of Way. September: pages 13-17.

Cowlitz County. 1976. Cowlitz County Comprehensive Plan. Adopted November 1, 1976.

———. 2009. Critical Area Ordinance 19.15. Accessed March 2012 at http://www.co.cowlitz.wa.us/buildplan/planning/critical.html

———. 2010a. About us. Accessed May 11, 2011 at http://www.co.cowlitz.wa.us/aboutus.htm

———. 2010b. Cowlitz County Comprehensive Park Plan update. Prepared by Cowlitz County Park and Recreation Advisory Board. September 2010.

———. 2010c. 2010 Cowlitz County Noxious Weed List. Accessed September 13, 2010 at http://www.co.cowlitz.wa.us/noxiousweeds/Page657.htm

———. 2011. Cowlitz surf your watershed. Accessed October 2011 at http://cfpub.epa.gov/surf/county.cfm?fips_code=53015

Cowlitz County GIS. 2011a. Parcel data. Accessed in 2011 at http://www.co.cowlitz.wa.us/gis/

———. 2011b. Park and trail data. Accessed in 2011at http://gis.clark.wa.gov/gishome/

Cowlitz County Planning Division. November 1, 1976. Comprehensive Plan. Accessed September 30, 2010 at http://www.co.cowlitz.wa.us/buildplan/planning/Comprehensive%20Plan.pdf

Cowlitz Tribe. 2011. Cowlitz Casino Resort. Accessed September 2011 at http://www.cowlitzcasino.com/

Cowlitz-Wahkiakum Council of Governments (CWCOG). 2006. Cowlitz Regional Trails Plan. Prepared for Castle Rock, Kalama, Kelso, Longview, Woodland, Cowlitz County. December 2006.

———. 2009. Metropolitan & Regional Transportation Plan 2008-2028, Draft. October 2009. Prepared for Longview-Kelso-Rainier Metropolitan Planning Organization and Southwest Washington Regional Transportation Planning Organization.

———. 2011a. City of Castle Rock and Castle Rock School District Park and Recreation Plan. Adopted March 23, 2011.

———. 2011b. Metropolitan and Regional Transportation Improvement Programs 2011–2014. Accessed September 2011 at http://www.cwcog.org/download/Final2011RTIPOct2010.pdf

Cristea, N. and J. Janisch. 2007. Modeling the effects of riparian buffer width on effective shade and stream temperature. Washington State Department of Ecology, Publication No. 07-03-028. June 2007.

Cross, T., A. Sheets and B. Strick. 1991. Enterprise Budget: Strawberries, Willamette Valley Region. Oregon State University. Report No. EM 8463. March.

Crowder, M. R. and O. E. Rhodes, Jr. 1999. Avian collisions with power lines: a review. Pages 139-167 in: Proceedings of a workshop on avian interactions with utility and communication structures. Charleston, South Carolina, December 2-3, 1999. Electric Power Research Institute.

David Evans and Associates, Inc. (DEA). 2009. Wetland delineation report prepared for the Port of Portland Phase II, III, and Tract C areas, Troutdale Reynolds Industrial Park. February 2009.

Durshpek, Eugene. Supervisor-Asset Management and GIS, City of Vancouver, Washington Public Works Department, Vancouver, Washington. October 24, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: stormwater, sanitary sewer, water and surface water projects.

EDAW, Inc. and PacifiCorp. 2008. Final Recreation Resource Management Plan, Lewis River Hydroelectric Projects FERC Project Nos. 935, 2071 and 2111. Prepared by: EDAW, Inc. Seattle, Washington and PacifiCorp, Portland, Oregon. June 2008.

eFloras.org. 2011. Website. Accessed in 2011 at http://www.eFloras.org .

Eiken, Chad. Planning Review Manager, City of Vancouver, Washington Community Development Department, Vancouver, Washington. October 28, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: commercial development projects.

Elmendorf, D. W. 2011. Outlook for the economy and the budget. Presentation to the National Economists Club, February 24. Accessed March 16, 2011 at http://www.cbo.gov/ftpdocs/120xx/doc12076/CBO_Presentation_to_NEC_2-24-11.pdf

Energy and Environmental Economics, Inc. 2011. I-5 Corridor Reinforcement Non-Wires Alternatives Screening Study. January 12, 2011.

Environmental Protection Agency (EPA). July 1973. Public health and welfare criteria for noise. Report No. 500/9-73-002, July 27, 1973. U.S. Environmental Protection Agency, Washington, D.C.

———. 1978. Protective noise levels. Condensed version of EPA levels document. Report No. PB82-138827. U.S Environmental Protection Agency, Washington, DC.

———. 1998 (guidelines referenced in economics chapter).

———. 2003. U.S. Environmental Protection Agency green book: criteria pollutants. Accessed July 16, 2010 at http://epa.gov/airquality/greenbk/

———. 2006. Particulate matter. Accessed July 16, 2010 at http://www.epa.gov/oar/particlepollution/

———. 2007. Level III ecoregions of the conterminous United States. Western Ecology Division. Corvallis, OR.

———. 2008a. Clean Air Act.

———. 2008b. Designated sole source aquifers in EPA Region 10 (GIS Data), July 2008.

———. 2008c. Technical support document for process emissions of sulphur hexafluoride (SF6) and PFCs from electric power systems: proposed rule for mandatory reporting of greenhouse gases. Accessed February 22, 2011 at http://www.epa.gov/climatechange/emissions/archived/downloads/tsd/TSD%20Electric%20Power%20Systems%20_EPA%201-29-09.pdf

———. Region 10. 2010a. Bonneville Power Administration Ross Complex. May 2010. Accessed August 26, 2010 at http://yosemite.epa.gov/r10/nplpad.nsf/3069dd18d0f81054882568db0068885e/86c037c25ca8ec80852565920071e3cf!opendocument

———. 2010b. Climate change – science: atmosphere changes. Accessed February 22, 2011 at http://www.epa.gov/climatechange/science/recentac.html

———. 2011a. 2011 Draft U.S. greenhouse gas inventory report. Accessed March 25, 2011 at http://www.epa.gov/climatechange/emissions/usinventoryreport.html

———. 2011b. Climate change – regulatory initiatives: greenhouse gas reporting program. Accessed February 22, 2011 at http://www.epa.gov/climatechange/emissions/ghgrulemaking.html

———. 2011c. Water quality assessment and Total Maximum Daily Loads information. Last updated August 18, 2011. Accessed August 24, 2011 at http://www.epa.gov/waters/ir/index.html

Environmental Systems Research Institute, Inc. (ESRI). 2006. U.S. census block groups. ESRI, Redlands, California, USA. October 1, 2006.

Eto, J., J. Koomey, B. Lehman, N. Martin et al. 2001. Scoping study on trends in the economic value of electricity reliability to the U.S. economy. E.O. Lawrence Berkeley National Laboratory. Report No. LBNL-47911. June 2001.

Federal Aviation Administration (FAA). 2000. Obstruction Marking and Lighting. Advisory Circular AC 70/7460-1K. August 1, 2000. Accessed August 30, 2010 at http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/fs/alaskan/towers/obstruction/media/AC70_7460_1K.pdf

Federal Communications Commission (FCC). 1988. Federal Communications Commission rules and regulations. October 10, 1988, ed. Volume II part 15, 47 CFR, Chapter 1.

Federal Emergency Management Agency (FEMA). 1996. Q3 Flood Data coverage derived from Flood Insurance Rate Maps. Accessed October 2010 at http://www.fema.gov

Federal Highway Administration. 1995. National Scenic Byways, Notice of FHWA interim policy. FHWA docket No. 95-15. Washington, DC, Government Printing Office.

———. 2005. Your rights and benefits as a displaced person. Publication No. FHWA-HEP-05-031. Available at http://www.fhwa.dot.gov/realestate/rights/

Federal Highway Administration, Oregon Department of Transportation, and Washington Department of Transportation. 2011. Columbia River Crossing Draft Environmental Impact Statement. Accessed September 2011 at http://www.columbiarivercrossing.org/ProjectInformation/ResearchAndResults/DraftEIS.aspx

Federal Register Vol. 69, No. 247, p. 77158-77167 (December 27, 2004).

Federal Register Vol. 70, No. 123, p. 37160-37204 (June 28, 2005).

Federal Register Vol. 71, No. 3, p. 834-862 (January 5, 2006).

Federal Register Vol. 75, No. 52, p. 13012-13024 (March 18, 2010).

Fernie, K. J. and S. J. Reynolds. 2005. The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review. Journal of Toxicology and Environmental Health, Part B, Volume 8, pages 127–140.

Fiksdal, A. J. 1975. Slope stability of Clark County: Washington Division of Geology and Earth Resources, open file report 75-10, scale 1:24,000 and 1:62,500 (depending on location).

Florig, H. K. 1992. Containing the costs of the EMF problem. Science. Volume 257, No. 5069, pages 468-492.

Franklin, J. F. and C. T. Dyrness. 1988. Natural vegetation of Oregon and Washington. Oregon State University Press, Corvallis, OR.

Freudenburg, W. R. 1997. Contamination, corrosion and the social order: an overview. Current Sociology. Volume 45, No. 3, pages 19-39.

Gesch, D. B. 2007. The National Elevation Dataset. Maune, D., editor. 2007. Digital elevation model technologies and applications: the DEM Users Manual, 2nd Edition. American Society for Photogrammetry and Remote Sensing. Bethesda, Maryland. Pages 99-118.

Gesch, D., M. Oimoen, S. Greenlee, C. Nelson, M. Steuck, and D. Tyler. 2002. The National Elevation Dataset. Photogrammetric Engineering and Remote Sensing, Volume 68, No. 1, pages 5-11.

Golder Associates, Inc. (Golder). 2011. Summary of zoning and population data in support of the I-5 Corridor Reinforcement Project. Project No. 093-93513-01.01. Redmond, WA. March 18, 2011.

Good, T. P., R. S. Waples, and P. Adams, editors. 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce. NOAA Technical Memorandum, NMFS NWFSC-66. 598 pages.

Green, G. L. 1983. Soil survey of Multnomah County, Oregon. U.S. Department of Agriculture, Soil Conservation Service.

Greenwood, M. J., G. L. Hunt, D. S. Rickman, and G. I. Treyz. 1991. Migration, regional equilibrium, and the estimation of compensating differentials. The American Economic Review, Volume 81, No. 5, pages 1382-1390.

Hand, M. S., J. A. Thacher, D.W. McCollum, and R. P. Berrens. 2008. Intra-regional amenities, wages, and home prices: the role of forests in the Southwest. Land Economics, Volume 84, No. 4, pages 635-651.

Harriman, J. and D. Baker. 2003. Applying integrated resource and environmental management to transmission right-of-way maintenance. Journal of Environmental Planning and Management, Volume 46, No. 2, pages 199–217.

Haynes, R., D. Adams, R. Alig, P. Ince, J. Mills, and X. Zhou. 2007. The 2005 RPA timber assessment update. U.S. Department of Agriculture, Forest Service, Pacific Research Station. Report No. PNW-GTR-699.

Helicopter Association International. 1993. Fly neighborly guide. Page 6. Fly Neighborly Committee.

Hendriksen, Lisa. Manager of Environmental Affairs. Port of Longview, Washington. October 4, 2011 and December 19, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: port development projects.

Hermen, Matt. Associate Planner. Cowlitz-Wahkiakum Council of Governments, Washington. September 28, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: transportation projects.

Herrera Environmental Consultants (Herrera). 2010. Land cover mapping ; Bonneville Power Administration I-5 Corridor Reinforcement Project. Prepared for Golder Associates, Inc., September 2010.

———. 2011a. Wetland delineation report for Casey Road Substation site; Bonneville Power Administration I-5 Corridor Reinforcement Project. Prepared for Golder Associates Inc., May 2011.

———. 2011b. Wetland delineation report for Baxter Creek Substation site; Bonneville Power Administration I-5 Corridor Reinforcement Project. Prepared for Golder Associates Inc., February 2011.

———. 2012. GIS Modeling Methods Used to Update Wetland Boundary Maps and Assess Wetland Functions; Bonneville Power Administration I-5 Corridor Reinforcement Project. Prepared for Golder Associates, Inc., March 2012.

Hickerson, Sabrina. Project Coordinator. PacifiCorp Energy, Portland, Oregon. September 29, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: PacifiCorp Energy projects.

Hillger, Dell. Utilities Manager. Cowlitz County Public Works, Vancouver, Washington. September 30, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: public works projects.

Hoffman, Michael. Construction Management and Inspection, Bonneville Power Administration, Vancouver, Washington. February 28, 2011. Personal communication with Golder Associates, Inc., re: construction logistics.

Houser, Michael. Washington State Architectural Historian, Department of Archaeology & Historic Preservation, Olympia, Washington. June 3, 2011. Personal communication with Golder Associates, Inc., re: the historic listing of Pearson Airfield.

Howard, K. A. 2002. Geologic map of the Battle Ground 7.5-Minute Quadrangle, Clark County, Washington: U.S. Geological Survey Miscellaneous Field Studies Map MF-2395, scale 1:24,000.

Hruby, T. 2004. Washington State wetland rating system for Western Washington—revised. Ecology Publication 04-06-025. Washington State Department of Ecology. August 2004.

Hsu, C.-Y., F.-Y. Ko, C.-W. Li, K. Fann, J.-T. Lue and T. Lue. 2007. Magnetoreception system in honeybees (*Apis mellifera*). PLoS ONE, Issue 4, e395.

Hunting, K. 2002. A roadmap for PIER research on avian power line electrocution in California. Prepared for the California Energy Commission, Public Interest Energy Research Program. Publication No. 500 02 072F.

Hutt, S. 2006. Perspectives on traditional cultural properties. Paper presented at the 2006 Department of Defense Cultural Resources Workshop, Seattle, WA.

Institute of Electrical and Electronics Engineers, Inc. (IEEE). 2002. National Electrical Safety Code. 2002 edition, New York, NY. 287 pages.

———. 2005. IEEE 693-2005. IEEE recommended practices for seismic design of substations.

———. 2007. ANSI/IEEE C2-2007; National Electrical Safety Code.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate change 2007: working group I: the physical science basis. Chapter 2: changes in atmospheric constituents and radioactive forcing: atmospheric carbon dioxide. Accessed February 22, 2011 at http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2.html

International Code Council (ICC). 2009. International Building Code (IBC).

Intertwine Alliance, The. 2010. Portland-Vancouver Bi-State Regional Trails System Plan. Adopted April 2010.

Jackson, T. 2010. Electric transmission lines: is there an impact on rural land values? Right of Way, November, pages 32-35. Available at http://www.irwaonline.org/EWEB/upload/Nov10_Web_Translines.pdf

Jansen, Wendy. Realty Specialist Bonneville Power Administration, Portland, Oregon. October 31, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: flood control projects.

Johnson, Carolyn. Community Development Planner, City of Woodland, Washington. October 21, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: transportation projects.

Johnson, D. H. and T. A. O'Neil. 2001. Wildlife-habitat relationships in Oregon and Washington. Oregon State University Press, Corvallis, OR.

Johnson, Terri. Washington State Department of Natural Resources , Olympia, Washington. September 23, 2010. Personal communication, e-mail to Golder Associates, Inc.

Johnston, Tim. Manager, Substation Engineering, Cowlitz Public Utility District, Washington. October 3, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: public utility district projects.

Julian, J., B. Strik, and W. Yank. 2011. Blueberry Economics: The Costs of Establishing and Producing Blueberries in the Willamette Valley. Oregon State University, Extension Service. Report No. AEB 0022. April.

Karl, T. R., J. M. Melillo, and T. C. Peterson, editors. 2009. Global climate change impacts in the United States. Cambridge University Press.

Kessavalou, A, John W. Doran, Arvin R. Mosier, and Rhae A. Drijber. 1998. Greenhouse gas fluxes following tillage and wetting in a wheat-fallow cropping system. Journal of Environmental Quality Volume 27, pages 1105–1116. Accessed February 22, 2011 at http://ddr.nal.usda.gov/bitstream/10113/16845/1/IND21969617.pdf

Kramer, George. 2010. Corridors of power. The Bonneville Power Administration, Transmission Network, Historic Context Statement. Kramer and Company. Prepared for the Bonneville Power Administration, Portland, Oregon. 122 pages.

LaCommare, K. H. and J. H. Eto. 2004. Understanding the cost of power interruptions to U.S. electricity customers. Ernest Orlando Lawrence Berkeley National Laboratory. Report No. LBNL-55718. September 2004.

Lane, R. C., and William A. Taylor. 1997. Washington's wetland resources: Tacoma, Washington. U.S. Geological Survey. Accessed September 27, 2011 at http://wa.water.usgs.gov/pubs/misc/wetlands/

Lebsack, Glenn. Clark County Vegetation Management, Vancouver, Washington. September 23, 2010. Personal communication with Crystal Elliot, Herrera Environmental Consultants, Inc., re: noxious weed populations in Clark County.

Loft, E. R. and J. W. Menke. 1984. Deer use and habitat characteristics of transmission-line corridors in a Douglas-fir forest. Journal of Wildlife Management, Volume 48, pages 1311-1316.

Longview Timber. 2010. Ownership GIS parcel data. Accessed in 2010 at http://longviewtimber.com/

Loomis, J. 2005. Updated outdoor recreation use values on national forests and other public lands. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Report No. PNW-GTR-658. October 2005.

Lower Columbia Fish Recovery Board (LCFRB). 2004. Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan: Clark, Cowlitz, Lewis, Skamania, and Wahkiakum counties. Salmon Recovery Office. Available at www.nwcouncil.org/fw/subbasinplanning/lowerColumbia/plan/

Malone, Chris. Senior Civil Engineer, City of Vancouver, Washington Public Works Department, Vancouver, Washington. October 24, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: transportation projects.

Marshall, B. K., J. S. Picou, and J. R. Schlichtmann. 2004. Technological disasters, litigation stress, and the use of alternative dispute resolution mechanisms. Law and Policy, Volume 26, No. 2, pages 289-307.

Martin-Lopez, B., C. Montes, and J. Benayas. 2007. The non-economic motives behind the willingness to pay for biodiversity conservation. Biological Conservation, Volume 139, No. 1-2, pages 67-82.

Mattix, Mary. Environmental Program Manager, Port of Vancouver, Washington. October 3, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: port development projects.

McGee, D. A. 1972. Soil survey of Clark County, Washington. U.S. Department of Agriculture, Soil Conservation Service.

McMillan, Jack. Database manager, Washington State Department of Natural Resources Washington Natural Heritage Program, Olympia, Washington. February 9, 2011. Personal communication with Josh Wozniak, Herrera Environmental Consultants, Inc., re: GIS data collection date information.

McNeil, R., J. R. Rodriquez, and H. Ouellet. 1985. Bird mortality at a power transmission line in northeastern Venezuela. Journal of Biology and Conservation, Volume 31, pages 153-165.

Meekin, T., and R. Birtchet. 1963. Mayfield Dam project: Cowlitz River progress reports. July-December 1961; January-June 1962. Washington State Department of Fisheries.

Melzer, R. Transmission Line Design, Volt Workplace Solutions, Vancouver, Washington. March 30, 2010. Personal communication, email to Stacy Mason and Nathan Mullen (both Bonneville Power Administration), regarding Big Eddy-Knight airport impacts.

Metro. 2011. Clark County, Oregon Metro – Regional Land Information System (RLIS). Database. Published 1990 and updated periodically through May 2011. Accessed July 21, 2011 at http://www.oregonmetro.gov/index.cfm/go/by.web/id/593.

Montgomery, D.R., B.D. Collins, J.M. Buffington, and T. Abbe. 2003. Geomorphic effects of wood in rivers. Pages 21-47 in Gregory, Stan V., Boyer, Kathryn L., Gurnell, Angela M., eds., The ecology and management of wood in world rivers. American Fisheries Society Symposium 37.

Multnomah County. 2011. Property ID Number R624218. Property Records. Accessed June 21, 2011 at http://www.multcoproptax.org/default.asp

———. 2007. Comprehensive Plans. Accessed September 20, 2010 at http://www2.co.multnomah.or.us/Public/EntryPoint?ct=cfc5eeeda60e0110VgnVCM1000003bc614acRCRD&cpsextcurrchannel=1

———. 2011. Comprehensive Framework Plan. Available at http://www2.co.multnomah.or.us/Community_Services/LUT-Planning/urban/framewrk/nav/fp_index.html

Multnomah County Weed Control Program (MCWCP). 2011. Multnomah County noxious weed list. Multnomah County Weed Control Program agency website. Accessed July 25, 2011 at http://www.oregon.gov/ODA/PLANT/WEEDS/multnomah.shtml

National Agriculture Imagining Program. 2009. 1 meter Digital Ortho Photo Image.

National Environmental Policy Act (NEPA). 1969. 42 USC Sections 4321-4345.

National Institute of Environmental Health Sciences (NIEHS). 2002. EMF electric and magnetic fields associated with the use of electric power: questions and answers. Research Triangle Park, NC: National Institute of Environmental Health Sciences of the U.S. National Institutes of Health.

National Marine Fisheries Service (NMFS). 1998. Conclusions regarding the updated status of Puget Sound, Lower Columbia River, Upper Willamette River, and Upper Columbia River ESUs of spring-run west coast Chinook salmon. Memorandum dated 23 December 1998 to U. Varanasi and W. Stelle, Northwest Fisheries Science Center, and W. Hogarth, Southwest Fisheries Science Center, from M. Schiewe, Northwest Fisheries Science Center, Seattle, WA.

———. 2009. ESA status of West Coast salmon and steelhead.

———. 2012. Proposed ESA Recovery Plan for Lower Columbia River Coho Salmon, Lower Columbia River Chinook Salmon, Columbia River Chum Salmon, and Lower Columbia River Steelhead. Northwest Region. Portland, Oregon. Available at http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Willamette-Lower-Columbia/LC/upload/LC-plan.pdf

National Marine Fisheries Service and U.S. Fish and Wildlife Service (NMFS and USFWS). 2006. Appendix A: Lower Columbia Regional Summary. Final Environmental Impact Statement for the Washington State Forest Practices Habitat Conservation Plan.

National Park Service (NPS). 2006. Oregon National Historic Trail. October 31, 2006. Accessed January 11, 2010 at http://www.nps.gov/oreg/historyculture/index.htm

———. 2009. Lewis & Clark National Historic Trail. May 15, 2009. Accessed September 11, 2010 at http://www.nps.gov/lecl/index.htm

National Scenic Byways Program. 2009. Historic Columbia River Highway. Last revised: 2009. Accessed September 3, 2009 at http://www.byways.org/explore/byways/2141/stories/47046

Natural Resources Conservation Service (NRCS). 1996. Soil Quality Resource Concerns: Compaction. April 1996.

———. 2004. Understanding soil risks and hazards. Edited by Gary B. Muckel. Lincoln, NE.

———. 2009a. National soil survey handbook, Title 430 VI. Accessed February 10, 201 at http://soils.usda.gov/technical/handbook

———. 2009b. Digital soil survey. Digital data compiled in September 2009. Obtained in June 2010.

———. 2009c. Soil Survey Geographic (SSURGO) database for Cowlitz County, Washington (wa015). U.S. Department of Agriculture, Natural Resources Conservation Service, Fort Worth, Texas. Published September 22, 2009.

———. 2010a. Soil Survey Geographic (SSURGO) Database for Clark County Area, Washington. Accessed March 26, 2010 at http://soildatamart.nrcs.usda.gov

———. 2010b. Soil Survey Geographic (SSURGO) Database for Cowlitz County Area, Washington. Accessed March 26, 2010 at http://soildatamart.nrcs.usda.gov

———. 2010c. Soil Survey Geographic (SSURGO) Database for Multnomah County Area, Washington. Accessed March 26, 2010 at http://soildatamart.nrcs.usda.gov .

Natural Resource Conservation Service (NRCS) Soil Survey Staff. 2009. Soil Survey Geographic (SSURGO) Database for Cowlitz County, Washington; Clark County, Washington; and Multnomah County, Oregon. Last Updated: September 22, 2009. Accessed March 17, 2010 at http://soildatamart.nrcs.usda.gov

National Oceanic & Atmospheric Administration (NOAA). 2010a. National Climatic Data Center (NCDC). Available at http://www.ncdc.noaa.gov/oa/ncdc.html

———. 2010b. NOAA Critical Habitat Data. Accessed July 20, 2010 at http://www.nwr.noaa.gov/Salmon-Habitat/Critical-Habitat/CH-GIS-Data.cfm

———. 2011. Species of Concern. Accessed July, 2011 at http://www.nmfs.noaa.gov/pr/species/concern/#list

Nature Conservancy, The. 2010. Willamette Basin ownership and conservation opportunity areas including the Sandy River Basin. Accessed September 23, 2011 at http://www.dfw.state.or.us/conservationstrategy/docs/532_BellWVrefmap.pdf

NatureServe. 2012. NatureServe Explorer: An online encyclopedia of life—Habitat and Species Information. Accessed May–June, 2012 at http://www.natureserve.org/explorer/

North American Electric Reliability Corporation (NERC). 2010. Web site. Accessed July 16 and 27, 2010 at http://www.nerc.com

Nielsen, Jill. City Clerk, City of Vader, Vader, Washington. October 5, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: building projects.

Niemi, E., E. Whitelaw, and A. Johnston. 1999. The sky did not fall: The Pacific Northwest's response to logging reductions. ECONorthwest Inc., Eugene, OR.

Nye, Don. Secretary, Cowlitz County Department of Building and Planning, Washington. October 5, 2011 and November 17, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: building projects.

Oregon Biodiversity Information Center (ORBIC). 2010. ORBIC, Portland State University, Institute for Natural Resources, Portland, Oregon. Accessed October 15, 2010 at http://orbic.pdx.edu/index.html

Oregon Department of Agriculture (ODA). 2011a. Noxious weed policy and classification system. Noxious Weed Control Program, Salem, OR. Accessed February 2, 2011 at http://www.oregon.gov/ODA/PLANT/WEEDS/docs/weed_policy.pdf?ga=t

———. 2011b. Noxious weed mapping in Oregon. ODA, Plant Division. Available at http://www.weedmapper.org/

Oregon Department of Environmental Quality (ODEQ) Water Quality Division. 2007. Drinking Water Source Areas (GIS Data).

———. 2011. Website. Accessed June 2, 2011 at www.deq.state.or.us

Oregon Department of Fish and Wildlife (ODFW). 2006. The Oregon Conservation Strategy. February 2006. Available at http://www.dfw.state.or.us/conservationstrategy/contents.asp

———. 2008. Oregon Department of Fish and Wildlife sensitive species: frequently asked questions and sensitive species list. Available at http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp

———. 2011. Living with Wildlife: Western Pond Turtle. Accessed September 20, 2012 at http://www.dfw.state.or.us/wildlife/living_with/docs/turtles.pdf.

Oregon Department of Forestry. 2009. 2009 Western Oregon timber harvest. 2009 Timber Harvest Reports. Accessed September 9, 2010 at http://www.oregon.gov/ODF/STATE_FORESTS/FRP/docs/west.xls

Oregon Department of Revenue. 2009. Oregon property tax statistics, Fiscal Year 2008-2009. Report No. 150-303-405 (Rev 7-09). Accessed September 30, 2010 at http://www.oregon.gov/DOR/STATS/docs/303-405-09/303-405-09.pdf

———. 2011. Oregon personal income tax statistics: characteristics of filers, 2011 edition, tax year 2009. Report No. 150-101-406 (Rev. 4-11). Accessed June 14, 2011 at http://www.oregon.gov/DOR/STATS/docs/101_406_11/101-406-11.pdf

Oregon Global Warming Commission. 2010. Web site. Accessed February 22, 2011 at www.keeporegoncool.org

Oregon Metro – Regional Land Information System (RLIS). 2011a. Taxlots. Accessed September 2011 at http://www.oregonmetro.gov/index.cfm/go/by.web/id=593

———. 2011b. Parks and Trails. Accessed September 2011 at http://www.oregonmetro.gov/index.cfm/go/by.web/id=593

Oregon Natural Heritage Advisory Council. 2010. Oregon Natural Areas Plan. Oregon Biodiversity Information Center, Institute for Natural Resources – Portland. Portland State University, Portland, OR. 198 pages.

Oregon Office of Economic Analysis. 2004. Forecasts of Oregon's county populations and components of change, 2000-2040. April 2004. Accessed June 1, 2010 at http://oregon.gov/DAS/OEA/demographic.shtml#Long_Term_County_Forecast

Oregon State University (OSU). 2010. Rare plants of Multnomah County, Oregon and Plant Atlas. Oregon Flora Project, Oregon State University, Department of Botany and Plant Pathology, Corvallis, Oregon. Accessed October 15, 2010 at http://www.oregonflora.org/rareplants/index.php

Oregon Tourism Commission. 2010. Oregon travel impacts 1991-2009p. Dean Runyan Associates, Inc. April. Accessed September 29, 2010 at http://www.deanrunyan.com/doc_library/ORImp.pdf

Oregon Water Resources Department. 2010. Water Rights Database. Accessed October 2010 at http://www.wrd.state.or.us/OWRD/WR/wris.shtml

O'Sullivan, A. and S. M. Sheffrin. 2001. Microeconomics principles and tools. Second edition. Prentice Hall. Upper Saddle River, New Jersey: Prentice Hall.

Ozbun, Terry L., Nicholas J. Smits, Michele Punke, Jonathan R. Held, Ron L. Adams, Andrea Blaser, Judith A. Chapman, John L. Fagan and Jo Reese. 2011. Cultural resource inventory of the proposed I-5 Corridor Reinforcement Project, Cowlitz and Clark counties, Washington and Multnomah County, Oregon. Archaeological Investigations Northwest. Prepared for the Bonneville Power Administration, Portland, OR. 65 pages.

Pacific Northwest Christmas Tree Association. 2012. Export of Pacific Northwest Trees. *Facts at a Glance.* Accessed October 1, 2012 at http://www.pnwcta.org/news-events/facts-at-a-glance/and personal communication with staff at Pacific Northwest Christmas Tree Association, October 1, 2012.

Pacific Northwest Waterways Association. Columbia Snake River System facts. Accessed August 30, 2010 at http://www.pnwa.net/new/Articles/CSRSFactSheet.pdf

PacifiCorp. 2011. Outdoor recreation – Washington – Lewis River. Accessed February 7, 2011 at http://www.pacificorp.com/about/or/washington.html

Palmer, S. P., S. L. Magsino, E. L. Bilderback, J. L. Poelstra, D. S. Folger, R. A. Niggemann. 2004. Liquefaction susceptibility and site class maps of Washington State by county. Washington Division of Geology and Earth Resources, Open File Report 2004-20, scale 1:100,000.

Parker, Patricia L., and Thomas F. King. 1998. Guidelines for evaluating and documenting traditional cultural properties. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, Washington, D.C.

Port of Camas-Washougal. 2011. Marina Park. Accessed February 22, 2011 at http://portcw.com/index.php/recreation/marina_park/

Port of Portland. 2011. Land available: Troutdale Reynolds Industrial Park (TRIP). Accessed June 21, 2011 at https://secure.portofportland.com/PDFPOP/Prp_Trip_LandAvailable.pdf

Pringle, R. F., and R. L. Evans. 2006. Soil survey of Cowlitz County, Washington. U.S. Department of Agriculture, Natural Resources Conservation Service.

Puget Sound Partnership (PSP). 2009. Puget Sound Partnership ecosystem status and trends, a 2009 supplement to the state of the sound reporting. November 2009. Accessed October 6, 2010 at http://www.psp.wa.gov/downloads/2009_tech_memos/Ecosystem_status_and_trends_tech_memo_2009_06_11_FINAL.pdf

Quinn, T. P., and N. P. Peterson. 1996. The influence of habitat complexity and fish size on over-winter survival and growth of individually marked juvenile coho salmon (*Oncorhynchus kisutch*) in Big Beef Creek, Washington. Canadian Journal of Fisheries and Aquatic Sciences, Volume 53, pages 1555-1564.

RailsNW. 2011. Chelatchie Prairie Railroad – The history of the CPRR. Accessed February 10, 2011 at http://www.railsnw.com/Tours/chelatchie_prairie_railroad/chelatchie_prairie_railroad-history.htm

Richardson, L., and J. Loomis. 2009. The total economic value of threatened, endangered and rare species: an updated meta-analysis. Ecological Economics, Volume 68, No. 5, pages 1535-1548.

Rieman, B. E., and J. D. McIntyre. 1995. Occurrence of bull trout in naturally fragmented habitat patches of varied size. Transactions of the American Fisheries Society, Volume 124, pages 285-296.

Ritchie, L. A. and D. A. Gill. 2004. Social capital theory as an integrating theoretical framework in technological disaster research. The Evaluation Center, Western Michigan University, and Social Science Research Center, Mississippi State University.

Rogers, Jodi. Permit Specialist, City of Troutdale, Troutdale, Oregon. October 3 and 5, 2011. Personal communication with Jill Leary, Bonneville Power Administration, re: building projects.

Rosenberger, R. and J. Loomis. 2001. Benefit transfer of outdoor recreation use values: a technical document supporting the Forest Service Strategic Plan (2000 Revision). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. General Technical Report No. RMRS-GTR-72. Fort Collins, CO. Accessed September 30, 2010 at http://www.fs.fed.us/rm/pubs/rmrs_gtr72.pdf

Row, C, H. F. Kaiser, and J. Sessions. 1981. Discount rates for long-term forest service investments. Journal of Forestry. 79(6): 367-369.

Scott, W. E., R. M. Iverson, J. W. Vallance, and W. Hildreth. 1995. Volcano hazards in the Mount Adams region, Washington. U.S. Geological Survey Open-File Report 95-492.

Scott, W. E., T. C. Pierson, S. P. Schilling, J. E. Costa, C. A. Gardner, J. W. Vallance, and J. J. Major. 1997. Volcano Hazards in the Mount Hood Region, Oregon: U.S. Geological Survey Open-File Report 97-89.

Seattle Audubon Society (SAS). 2012. Bird web. Seattle Audubon Society. Accessed June 12, 2010 at http://birdweb.org/birdweb/bird_details.aspx?id=55

Southwest Clean Air Agency web site (SWCAA). Accessed June 2, 2011 at www.swcleanair.org

Southwest Washington Regional Transportation Council (SWRTC). 2008. Metropolitan Transportation Plan for Clark County. Updated December 2007. Amended July 2008.

———. 2010. Congestion Management Process, 2009 Monitoring Report. Published May 2010.

Sprague, Webb, and Emily Picha. 2010. Population dynamics of Portland-Vancouver MSA. Metropolitan Knowledge Network. Portland State University. Accessed March 9, 2011 at http://mkn.research.pdx.edu/2010/05/population-dynamics/

State of Oregon, Bonneville Power Administration (BPA), Department of Energy (USDOE). 1981. Memorandum of Understanding between State of Oregon and BPA, DOE: Transmission Facility Siting.

State of Washington, Bonneville Power Administration (BPA), Department of Energy (USDOE). 1983a. Memorandum of Agreement between State of Washington and BPA, DOE: transmission facility siting. July 7, 1983.

———. 1983b. Memorandum of Understanding between State of Washington and BPA, DOE: transmission facility siting. November 17, 1983b.

Saunders, Steve. Asset and Property Management Division Manager, Washington Department of Natural Resources, Olympia, Washington. June 28, 2010, September 21, 2010, and March 26, 2012. Personal communication with Tom Souhlas, ECONorthwest, re: Washington trust timberland.

Thalheimer, E. 1996. Construction noise control program and mitigation strategy for the Central Artery/Tunnel Project. ASA/INCE Noise Control Conference. Seattle, WA.

Thompkins, Ed. Natural Resource Specialist, Bonneville Power Administration, Vancouver, Washington. February 25, 2011. Personal communication with Golder Associates, Inc., re: vegetation management.

Thompson, J. S., and L. Rothfus. 1969. Biological observations of salmonids passing Hayfield Dam. Washington State Department of Fisheries, Research Division. 57 p.

Topinka, L. 1997. Eruption summary – May 18, 1980 eruption of Mount St. Helens. Accessed August 24, 2010 at http://vulcan.wr.usgs.gov/Volcanoes/MSH/May18/summary_may18_eruption.html

Tri-Met. 2011. Payroll and self-employment tax information. Accessed September 30, 2011 at http://trimet.org/taxinfo/

U.S. Bureau of Economic Analysis. 2010a. Table CA25N, Total employment by industry by NAICS Industry, 2008. April 2010. Accessed May 24, 2010 at http://www.bea.gov/regional/reis/default.cfm?selTable=CA25 .

———. 2010b. Table CA1-3, Personal income, population, per capita personal income, 2008. April 2010. Accessed August 20, 2010 at http://www.bea.gov/regional/reis/default.cfm?selTable=CA1-3

U.S. Census Bureau. 2000a. Census 2000 Summary File 1, Detailed Table P4. Accessed January 19, 2011 at http://factfinder.census.gov/

———. 2000b. Census 2000 Summary File 3, Detailed Table P87. Accessed January 19, 2011 at http://factfinder.census.gov/

———. 2000c. Census 2000 Summary File 3. Detailed Table P53. Accessed January 19, 2011 at http://factfinder.census.gov/

———. 2009a. "Table 6a: Rental vacancy rates for the 75 largest metropolitan areas: 1986-2004" and "Table 6. Rental vacancy rates for the 75 largest metropolitan areas: 2005-present." Housing Vacancies and Homeownership (CPS/HVS), Annual Statistics 2009. Accessed August 26, 2010 at http://www.census.gov/hhes/www/housing/hvs/annual09/ann09ind.html

———. 2009b. 2010 Census Data Products: United States at a Glance (Version 1.0). September 23, 2009. Accessed October 18, 2010 at http://www.census.gov/population/www/cen2010/glance/index.html

———. 2010. "Table 4. Annual estimates of housing units for counties in Washington and Oregon: April 1, 2000 to July 1, 2009 (HU-EST2009-04-53 and 41). Accessed February 23, 2011 at http://www.census.gov/popest/housing/tables/

———. 2011. DP-1. Profile of general population and housing characteristics: 2010. Accessed June 20, 2011 at http://factfinder2.census.gov/faces/nav/jsf/pages/

U.S. Department of Agriculture (USDA). 2009a. 2007 census of agriculture, Washington, state and county data. Volume 1, Geographic Area Series, Part 47, AC-07-A-47. National Agricultural Statistics Service. Updated December 2009. Accessed September 9, 2010 at

http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Washington/wav1.pdf

———. 2009b. 2007 census of agriculture, Oregon, state and county data. Volume 1, Geographic Area Series, Part 37. AC-07-A-47. Updated December 2009. Accessed September 9, 2010 at http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Oregon/wav1.pdf

———. 2011a. Conservation reserve program. Updated April 1, 2011. Accessed May 24, 2011 at http://www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp .

———. 2011b. Summary of active and expiring CRP cropland acres by county, CRP - monthly contracts report. Updated April 2011. Accessed May 24, 2011 at https://arcticocean.sc.egov.usda.gov/CRPReport/monthly_report.do?method=displayReport&report=March-2011-ActiveAndExpiredCRPAcresByCounty-53

———. 2011c. Service Center Agencies watershed boundary data. Accessed 2011 at http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/ngmc/?cid=nrcs143_021630

U.S. Department of Agriculture, National Agricultural Statistics Service (USDA NASS). 2009a. 2007 Census of Agriculture, Washington, State and County Data. Volume 1, Geographic Area Series, Part 47. AC-07-A-47. February. Updated December 2009. Accessed September 9, 2010 at http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Washington/wav1.pdf

———. 2009b. 2007 Census of Agriculture, Oregon, State and County Data. Volume 1, Geographic Area Series, Part 37. AC-07-A-47. February. Updated December 2009. Accessed September 9, 2010 at http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/Oregon/wav1.pdf

U.S. Department of Energy (USDOE). 1980. A practical handbook for the correction of radio interference from overhead powerlines and facilities. Portland, OR.

U.S. Department of Energy (USDOE) and Bonneville Power Administration (BPA). 1986. Electrical and Biological Effects of Transmission Lines: A Review. (DOE/BP 524 January 1986) Portland, OR.

———. 1996. Electrical and Biological Effects of Transmission Lines: A Review. (DOE/BP 2938 December 1996 M) Portland, OR.

U.S. Department of Energy (USDOE) and Bureau of Land Management (BLM), U.S. Department of Interior (DOI). 2010. Draft Programmatic Environmental Impact Statement for solar energy development in six Southwestern states. Accessed February 22, 2011 at http://solareis.anl.gov/index.cfm

U.S. Department of Labor, Bureau of Labor Statistics. 2009. Occupational injuries, illnesses, and fatalities: industry data. Accessed February 23, 2011 at http://www.bls.gov/data/#injuries

U.S. Energy Information Administration (EIA). 2000. Carbon dioxide emissions from the generation of electric power in the United States. Accessed February 28, 2011 at http://www.eia.gov/cneaf/electricity/page/co2_report/co2emiss.pdf

———. 2009a. Emissions of greenhouse gases report. DOE/EIA-0573(2008). Accessed February 22, 2011 at http://www.eia.doe.gov/oiaf/1605/ggrpt/

———. 2009b. Energy and the environment, greenhouse gases basics. Accessed February 22, 2011 at http://tonto.eia.doe.gov/energyexplained/index.cfm?page=environment_about_ghg

U.S. Fish and Wildlife Service (USFWS). 1983. Columbian White-Tailed Deer Recovery Plan. Accessed: May 29, 2012 at: http://ecos.fws.gov/docs/recovery_plan/830614.pdf

———. 1997. Recovery plan for the marbled murrelet: Washington, Oregon and California populations. Region 1. U.S. Fish and Wildlife Service. Accessed January 12, 2012 at http://ecos.fws.gov/docs/recovery_plan/970924.pdf

———. 2008a. Final Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). Region 1, USFWS, Portland, Oregon. Accessed January 18, 2012 at http://ecos.fws.gov/docs/recovery_plan/NSO%20Final%20Rec%20Plan%20051408_1.pdf

———. 2008b. Bull trout (*Salvelinus confluentus*) 5-year review: summary and evaluation. Available at http://ecos.fws.gov/docs/five_year_review/doc1907.pdf

———. 2010a. National Wetlands Inventory (NWI) maps. Digital data compiled in January 2010. Obtained in June 2010.

———. 2010b. U.S. Fish and Wildlife Service species lists for Cowlitz County and Clark County. Updated November 1, 2007. Accessed September 10, 2010 at http://www.fws.gov/wafwo/speciesmap.html

———. 2010c. Listed and proposed endangered and threatened species and critical habitat; candidate species; and species of concern in Multnomah County, Oregon. Accessed October 16, 2010 at http://www.fws.gov/oregonfwo/Species/Lists/Documents/County/MULTNOMAH%20COUNTY.pdf

———. 2010d. USFWS Critical Habitat Data. Accessed September 20, 2010 at http://www.fws.gov/pacific/bulltrout/Index.cfm#maps

———. 2011a. Federally Listed, Proposed, Candidate Species and Species of Concern under the jurisdiction of the Fish and Wildlife Service which may occur within Multnomah County, Oregon. Updated August 6, 2011. Accessed August 8, 2011 at http://www.fws.gov/oregonfwo/Species/Lists/Documents/County/MULTNOMAH%20COUNTY.pdf

———. 2011b. Species Profile. Updated November 28, 2011. Accessed November 28, 2011 at http://ecos.fws.gov/speciesProfile/

———. 2011c. Listing and Critical Habitat: Critical Habitat. USFWS. Accessed February 1, 2012 at http://www.fws.gov/endangered/what-we-do/critical-habitats.html

U.S. Forest Service (USFS). 1993. Areas of old-growth forests in California, Oregon, and Washington. PNW-RB-197 December 1993. Accessed October 2011 at http://www.fs.fed.us/r5/rsl/publications/oldgrowth/old-growth-ca-or-wa.pdf

———. 1996. Status of the interior Columbia basin: summary of scientific findings. Pacific Northwest Research Station, General Technical Report PNW-GTR-385, Portland, OR. 144 pages.

———. 2010. "Forest Inventory Data Online." Forest Inventory and Analysis National Program. Accessed August 19, 2010 at http://fia.fs.fed.us/tools-data/default.asp

U.S. Geological Survey (USGS). 1995. Digital raster graphic of topographic maps. Color orthoimage. Horizontal resolution: 2.4 meters. August 1995. Accessed August 2010 at http://rocky2.ess.washington.edu/data/raster/drgclip/index.html

———. 2006. Quaternary fault and fold database for the United States. Accessed August 23, 2010 at http://earthquake.usgs.gov/regional/qfaults/

———. 2009. Geographic Names Information System: Non-Populated Place. Database. Accessed in 2011 at http://www.ecy.wa.gov/services/gis/data/geonames/gnis.htm.

———. 2010. 2008 United States National Seismic Hazard Maps. Accessed September 15, 2010 at http://earthquake.usgs.gov/hazards/products/conterminous/2008/

———. 2011. National Land Cover Dataset (NLCD). Based on 2006 satellite imagery. U.S. Geological Survey, Sioux Falls, SD.

U.S. Forest Service (USFS) – Gifford Pinchot National Forest. July 2010. Fire & Aviation. Accessed August 27, 2010 at http://www.fs.fed.us/gpnf/fire/index.shtml

U.S. Office of Management and Budget. 2011. Circular A-94 Appendix C. Retrieved July 6, 2011. Accessed at http://www.whitehouse.gov/omb/circulars_a094/a94_appx-c/ .

Vancouver-Clark Parks and Recreation Department (VCPRD). 2007. Comprehensive Parks, Recreation, & Open Space Plan. May 2007.

———. 2010. Vancouver-Clark Parks & Recreation Department parks and trails. Accessed August 31, 2010 at http://www.cityofvancouver.us/parks-recreation/parks_trails/index.asp

———. 2011. Greater Clark Parks District. Chinook Neighborhood Park (North Salmon Creek). Accessed October 2011 at http://www.clarkparks.org/projects/chinook.htm

Vanselow, Glenn. Pacific Northwest Waterways Association; the Columbia Snake River System-System operations and infrastructure. Accessed August 30, 2010 at http://onlinepubs.trb.org/onlinepubs/archive/conferences/JM/Session3Vanselow.pdf

Velazquez, Angelica. Cowlitz County Weed Board Coordinator, Washington. February 7, 2011. Personal Communication with Josh Wozniak, Herrera Environmental Consultants, Inc., re: the extent of noxious weed mapping in Cowlitz County.

von Winterfeldt, D., T. Eppel, J. Adams, R. Neutra, and V. DelPizzo. 2004. Managing Potential Health Risks from Electric Powerlines: A Decisions Analysis Caught in Controversy. Risk Analysis, Volume 24, No. 6, pages 1487-1502.

Walkowiak, John. Washington Department of Revenue Forest Tax and Audit Manager, Olympia, Washington. November 17, 2010. Personal Communication with Mark Teply, Cramer Fish Sciences, re: acreage of timber harvest in study area.

Ward, B. R. and P. A. Slaney. 1988. Life history and smolt-to-adult survival of the Keogh River Steelhead trout (*Salmo gairdneri*) and the relationship to smolt size. Canadian Journal of Fisheries and Aquatic Sciences, Volume 45, pages 1110-1122.

Warren, D. 2009. Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 2008. Res. Bull. PNW-RB-258. Portland, Oregon.

Washington Administrative Code (WAC). Title 173 WAC, chapter 173-60. Maximum environmental noise levels. Washington Department of Commerce. 2009. Washington State county travel impacts 1991–2008. Dean Runyan Associates, Inc. September. Accessed September 29, 2010 at http://www.deanrunyan.com/doc_library/WACoImp.pdf

Washington Department of Fish and Wildlife (WDFW). 1997. Lower Columbia steelhead conservation initiative. June. Draft no. 1. Washington Department of Fish and Wildlife, Olympia. 115 pages.

———. 2001. Priority habitats and species maps and database: Accessed at http://wdfw.wa.gov/conservation/phs/maps_data/

———. 2002. Species of Concern in Washington State. Accessed at http://www.wa.gov/wdfw/diversity/soc/soc.htm

———. 2005. Living with Wildlife—Elk. Accessed May 31, 2012 at: http://wdfw.wa.gov/living/elk.pdf

———. 2006. Fish and wildlife planner – a newsletter for Washington's professional planning community. Washington Department of Fish and Wildlife, Olympia, WA. July 2006.

———. 2006. Washington State Elk Herd Plan—Mount St. Helens Elk Herd. Olympia, WA: Wildlife Management Program. Accessed May 27, 2012 at http://wdfw.wa.gov/publications/00771/wdfw00771.pdf

———. 2008. Priority habitats and species list. Washington Department of Fish and Wildlife. Accessed January 25, 2011 at http://wdfw.wa.gov/publications/00165/wdfw00165.pdf

———. 2009a. Washington Department of Fish and Wildlife wind power guidelines. Accessed June 2010 at http://wdfw.wa.gov/publications/pub.php?id=00294

———. 2009b. Washington State Recovery Plan for the Western Pond Turtle. Accessed January 6, 2012 at http://wdfw.wa.gov/publications/pub.php?id=00398

———. 2009c. Priority habitats and species list. Washington Department of Fish and Wildlife. Accessed January 25, 2010 and May 29, 2012 at http://wdfw.wa.gov/conservation/phs/

———. 2010a. Washington state species of concern lists. Accessed September 14, 2010 and July 1, 2011 at http://wdfw.wa.gov/conservation/endangered/lists/search.php?searchby=All&orderby=AnimalType,%20CommonName%20ASC

———. 2010b. Priority habitats and species GIS layers. Olympia, WA.

———. 2010c. Salmon and Steelhead Habitat Inventory and Assessment Program data. Accessed July 19, 2010 at http://wdfw.wa.gov/mapping/salmonscape/sshiap/index.html

———. 2012. Priority Habitats and Species (PHS) on the Web. Accessed July 27, 2012 at http://wdfw.wa.gov/mapping/phs/disclaimer.html

Washington Department of Fish and Wildlife, Olympia, Washington. November 16, 2011. Personal communication with Judith Hillis, Golder Associates, Inc., re: priority habitat database.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Washington Department of Fish and Wildlife, Olympia, 212 p. and 5 regional volumes. Accessed at http://wdfw.wa.gov/publications/pub.php?id=00194

Washington Department of Revenue. 2005. Homeowner's guide to property taxes. December 2005. Accessed October 6, 2010 at http://dor.wa.gov/docs/Pubs/Prop_Tax/HomeOwn.pdf

———. 2010a. Tax statistics 2010. September 2010. Accessed February 23, 2011 at http://dor.wa.gov/Content/AboutUs/StatisticsAndReports/2010/Tax_Statistics_2010/default.aspx

———. 2010b. Local sales and use tax rates and changes. Accessed September 30, 2010 at http://dor.wa.gov/docs/forms/excstx/locsalusetx/localslsuseflyer_quarterly.pdf

———. 2010c. A comparison of county assessor statistics, 2009 county comparison. August 2010. Accessed September 30, 2010 at http://dor.wa.gov/Docs/Reports/2009/Property_Tax_Statistics_2009/CountyComparisonReport2009.pdf

———. 2010d. Washington State Scenic and Recreational Highways Strategic Plan. Adopted November 2010.

Washington Forest Practice Board (WaFPB). 2011. Watershed Analysis Manual. Appendix D-Riparian Function. Available at http://www.dnr.wa.gov/Publications/fp_wsa_manual_appd.pdf

Washington Natural Heritage Information System (WNHIP). 2011. A Partial List of Animals in Washington. Accessed January 17, 2012 at http://www1.dnr.wa.gov/nhp/refdesk/lists/animal_ranks.html

Washington Natural Heritage Program (WNHP). 2010. Rare and imperiled species and plant communities for the study area. Digital data compiled in June 2010. Washington State Department of Natural Resources, Natural Heritage Program. Accessed August 2010 at http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html .

———. 2011a. List of Vascular Plants Tracked by the Washington Natural Heritage Program. Accessed November 29, 2011 at http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.htmlhttp://www.dnr.wa.gov/researchscience/topics/naturalheritage/pages/amp_nh.aspx

———. 2011b. Washington Natural Heritage Program. Website. Accessed July 25, 2011 at http://www.dnr.wa.gov/researchscience/topics/naturalheritage/pages/amp_nh.aspx

Washington State Department of Agriculture. 2009. Crop Distribution Sections. Perry Beale, Crop Mapping Coordinator. Accessed September 30, 2010 at http://agr.wa.gov/PestFert/NatResources/AgLandUse.aspx

Washington State Department of Commerce. 2009. Washington State county travel impacts 1991-2008. Dean Runyan Associates, Inc. September 2009. Accessed September 29, 2010 at http://www.deanrunyan.com/doc_library/WACoImp.pdf

Washington State Department of Ecology (Ecology). 2004. Stormwater management manual for Eastern Washington. Washington State Department of Ecology. Olympia, WA.

———. 2009. Assessment of water quality for the Section 4 303(d) list. Washington State Department of Ecology, Water Quality Program Policy. Revised January 2009.

———. 2010a. Washington water rights database and wells database. Accessed October 2010 at http://www.ecy.wa.gov/programs/wr/wrhome.html

———. 2010b. Regional haze. Accessed January 11, 2010 at http://www.ecy.wa.gov/programs/air/globalwarm_RegHaze/regional_haze.html

———. 2011a. Lacamas Creek fecal coliform, temperature, dissolved oxygen, and pH total maximum daily load water quality study design (Quality Assurance Project Plan). Ecology Publication No. 11-03-102. Accessed August 24, 2011 at http://www.ecy.wa.gov/pubs/1103102.pdf

———. 2011b. Water quality improvement project East Fork Lewis River area: multi-parameter. Last updated February 2011. Accessed August 24, 2011 at http://www.ecy.wa.gov/programs/wq/tmdl/EForkLewis/index.html

———. 2011c. State Environmental Policy Act Register. Accessed September and October for Clark and Cowlitz Counties, 2011 at https://fortress.wa.gov/ecy/separ/Register/ShowRegisterTable.aspx

———. 2011d. Water resource inventory areas. Accessed 2011 at http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm

———. 2011e. Salmon Creek temperature total maximum daily load Water Quality Improvement Report and Implementation Plan. Ecology Publication No. 11-10-044. Accessed July 11, 2012 at https://fortress.wa.gov/ecy/publications/publications/1110044.pdf

Washington State Department of Licensing. 2010. Fuel licenses: motor vehicle fuel or special fuel. Accessed October 8, 2010 at http://www.dol.wa.gov/vehicleregistration/ftmotorspecial.html

Washington State Department of Health (WDOH), Office of Drinking Water. 2010. Source Wells and Wellhead Protection Datasets (GIS Data). Accessed October 2010 at http://www.doh.wa.gov/ehp/DW/sw/default.htm

Washington State Department of Natural Resources (WDNR). 2005. Oaks and Grasslands of the Puget Trough Ecoregion. Washington State Department of Natural Resources, Natural Heritage Program. Available at http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html

———. 2008. Untilled grasslands and oak dominated or co-dominated canopies. Digital data compiled by Golder Associates, Inc. March 2008. Washington State Department of Natural Resources, Natural Heritage Program.

———. 2009a. 2009 Annual Report. Olympia, WA. Available at http://www.dnr.wa.gov/Publications/em_annualreport09.pdf

———. 2009b. "Westside Volumes of Harvested Trees by Ownership and Counties." Washington Timber Harvest 2009. Accessed September 7, 2010 at http://www.dnr.wa.gov/Publications/obe_watimber_harvest_report_2009.pdf

———. 2009c. Leasing state trust lands for agriculture. Accessed November 11, 2009 at http://www.dnr.wa.gov/BusinessPermits/Topics/LandLeasing/Pages/psl_leasing_agriculture_lands

———. 2009d Natural Heritage Program data. Washington State Department of Natural Resources, Natural Heritage Program. Available at http://www.dnr.wa.gov/researchscience/topics/naturalheritage/pages/amp_nh.aspx

———. 2010a. Western Yacolt Burn Forest Recreation Plan. August 2010.

———. 2010b. Fire information and prevention. Accessed August 27, 2010 at http://www.dnr.wa.gov/RecreationEducation/FirePreventionAssistance/Pages/Home.aspx

———. 2010c. Cadastrel Jurisdiction Boundaries. Accessed August 19, 2010 at http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html

———. 2010d. Priority habitat and species information and GIS layers for the project study area. WDFW. Olympia, Washington.

———. 2010e. Rare plant species list by county. Updated February 2009. Accessed August 15, 2010 at http://www1.dnr.wa.gov/nhp/refdesk/lists/plantsxco/countyindex.html

———. 2010f. Ownership parcels. Accessed 2010 at http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html

———. 2010g. Hydrography. Accessed July 20, 2010 at http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html

———. 2011a. Forest roads guidebook 2011 Edition.

———. 2011b. Watershed Administrative Unit Data. Accessed 2011 at http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html

Washington State Department of Transportation (WSDOT). 2011. Agency Projects. Accessed September and October for Clark and Cowlitz Counties, 2011 at http://www.wsdot.wa.gov/Projects/

Washington State Division of Geology and Earth Resources (DGER). 2009. Landslides of Washington State at 1:24,000 scale, Version 2.0 GIS shapefile. April 2009.

Washington State Office of Financial Management (OFM). 2007. Final projections of the total resident population for growth management. October 2007. Accessed June 1, 2010 at http://www.ofm.wa.gov/pop/gma/projections07.asp

———. 2011. April 1, 2011 Population of Cities, Towns and Counties Used for Allocation of Selected State Revenues. State of Washington. June 2011. Accessed March 22, 2012 at http://www.ofm.wa.gov/pop/april1/finalpop.pdf

Washington State Noxious Weed Control Board (WSNWCB). 2010. Washington State Noxious Weed Control Board noxious weed information. Accessed August 24, 2010 at http://www.nwcb.wa.gov/index.htm

Washington State Tourism. 2011. Discover Washington State scenic byways. Accessed February 14, 2011 at http://www.experiencewa.com/scenic-byways.aspx

Washington, State of. 1975. Washington Administrative Code, Chapter 173-60 WAC Maximum Environmental Noise Levels. Department of Ecology, Olympia, WA.

Washington Wildlife and Recreation Coalition (WWRC). 2010. Washougal Oaks NAP/NRCA 04. Accessed September 16, 2010 at http://wildliferecreation.org/wwrp-projects/projects/Washougal_Oaks_NAPNRCA_1

Wegmann, K. W. 2006. Digital landslide inventory for the Cowlitz County urban corridor, Washington. Washington Division of Geology and Earth Resources, Report of Investigations 35, Version 1.0, May 2006.

Western Electricity Coordinating Council (WECC). 2009. Web site. Accessed December 28, 2009 at http://www.wecc.biz/About/Pages/default.aspx

Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and R. Parker. 1996. Weeds of the West. Western Society of Weed Scientists, Newark, CA.

Williams, J. C. 2011. The economic outlook. Presentation to the State of the West Symposium. Federal Reserve Bank of San Francisco. February 4, 2011. Accessed February 23, 2011 at http://www.frbsf.org/economics/speeches/2011/john_williams0204.php

Wilma, David. 2003. Yacolt Burn, largest forest fire in recorded state history, rages from September 11 to 13, 1902. HistoryLink. February 14, 2003. Accessed August 27, 2010 at http://www.historylink.org/index.cfm?DisplayPage=output.cfm&file_id=5196

Wolfe, E. W., and T. C. Pierson. 1995. Volcanic-hazard zonation for Mount St. Helens, Washington, 1995. U.S. Geological Survey Open-File Report 95-497.

Wolverton, M. L. and S. C. Bottemiller. 2003. Further analysis of transmission line impact on residential property values. The Appraisal Journal, July 2003.

Woodland Fish and Wildlife (WFF). 1997. Wildlife on white oaks woodlands. Accessed September 15, 2010 at http://www.woodlandfishandwildlife.org/pubs/whiteoak.pdf

Wydoski, R. S., and R. R. Whitney. 2003. Inland fishes of Washington, 2nd edition. American Fisheries Society, Bethesda, MD and University of Washington Press, Seattle, WA.

Xerces. 2012. The Xerxes Society for Invertebrate Conservation: Freshwater mussels: California floater (*Anodonta californiensis*) / Winged floater (*Anodonta nuttalliana*). Accessed May 15, 2012 at http://www.xerces.org/california-and-winged-floaters/

29.2 Additional Works Consulted

Albers, P. H. 1998. An annotated bibliography on petroleum pollution. Version 2007. USGS Patuxent Wildlife Research Center, Laurel, MD. Accessed Jan 5, 2011 at http://www.pwrc.usgs.gov/infobase/topbibs/petroleum.pdf

America Trauma Society. 2009. 2009 Maps of trauma center access. Accessed September 13, 2010 at http://tramah.cml.upenn.edu/CML.TraumaCenters.Web/

Anderson, P. G., B. R. Taylor, and G.C. Balch. 1996. Quantifying the effects of sediment release on fish and their habitats. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2346. 110 pages plus 3 appendices.

Anthony, J. L., E. B. Cummins, and C. W. Thompson. 2003. Terrestrial surveys of marbled murrelets in the pacific coastal region of the western Olympic peninsula and southwest Washington 2001-2002. Accessed September 17, 2010 at http://www.darrp.noaa.gov/northwest/tenyo/pdf/ten-mmfnl0203.pdf

Anthony, R. G., R. L. Knight, G. T. Allen, B. R. McClelland, and J. I. Hodges. 1982. Habitat used by nesting and roosting bald eagles in the Pacific Northwest. Transactions of the North American Wildlife Natural Resources Conference 47, pages 3323-342.

Arkoosh, M. R., L. Johnson, P. A. Rossignol, and T. K. Collier. 2004. Predicting the impact of perturbations on salmon (*Oncorhynchus* spp.) communities: implications for monitoring, Canadian Journal of Fisheries and Aquatic Sciences 61, pages 1166-1175.

Association of Washington Counties. 2009. Local business (B&O) tax rates, effective January 1, 2010. Accessed September 30, 2010 at http://www.awcnet.org/documents/botaxrates.pdf

Aukema, J. E. and A. B. Carey. 2008. Effects of variable-density thinning on understory diversity and heterogeneity in young Douglas-fir forests. Res. Pap. PNW-RP-575. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 20 pages.

Bahr, M. and J. Stallcup Sr. 2003. OSHA: Stallcup's construction regulations simplified. Quincy, MA. National Fire Protection Association.

Beechie, T. J. and T. H. Sibley. 1997. Relationships between channel characteristics, woody debris, and fish habitat in Northwestern Washington streams. Transactions of the American Fisheries Society 126, pages 217-229.

Beschta, R. L., Bilby, R. E., Brown, G. W., Holtby, L. B., and Hofstra, T. D. 1987. Stream temperature and aquatic habitat: fisheries and forestry interactions. Pages 191-232 in Salo, E. O, Cundy, T. W. (editors), Streamside Management: Forestry and Fisheries Interactions. University of Washington, Institute of Forest Resources Contribution 57.

Bettinger, P., J. Siry, K. Boston, D. Grebner. 2009. Forest Management and Planning. Elsevier Inc.

Bilby, R. E., and P. A. Bisson. 1998. Function and distribution of large woody debris. Pages 324-346 in R. J. Naiman and R. E. Bilby (editors), River Ecology and Management: Lessons from the Pacific Coastal Ecoregion, Springer-Verlag, New York, NY.

Bilby, R. E., K. Sullivan and S. H. Duncan. 1989. The generation and fate of road-surface sediment in forested watersheds in Southwestern Washington. Forest Science Volume 35, No. 2, pages 453-468.

Bisson, P. A., G. H. Reeves, R. E. Bilby, and R. J. Naiman. 1997. Watershed management and pacific salmon: desired future conditions. Pages 447-474 in D. J. Stouder, P. A. Bisson, and R. J. Naiman (editors), Pacific Salmon and Their Ecosystems: Status and Future Options, Chapman & Hall, New York.

Bisson, P. A., Bilby, R. E., Bryant, M. D., Dolloff, C. A., Grette, G. B., House, R. A., Murphy, M. L., Koski, K. V., and Sedell, J. R. 1987. Large woody debris in forested streams in the Pacific Northwest: past, present, future. Pages 143-190 in E. O. Salo and T. D. Cundy (editors), Streamside Management: Forestry and Fisheries Interactions, University of Washington College of Forest Resources, Seattle, WA.

Bjornn, T. C. and D. W. Reiser. 1991. Habitat requirements of salmonids in streams. Pages 83-138 n Meehan, W. R. (editor), Influences of Forest and Rangeland Management of Salmonid Fishes and their Habitats. American Fisheries Society, Bethesda, MD.

Booth, D. B. 1990. Stream-channel incision following drainage-basin urbanization. Water Resources Bulletin 26(3), pages 407–417.

Booth, D. E. 1999. Spatial patterns in the economic development of the mountain west. Growth and Change 30(3), pages 384-405.

Bureau of Land Management (BLM). 2010. Oregon/Washington; Fossils (Paleontological). Accessed August 24, 2010 at http://www.blm.gov/or/resources/heritage/paleo.php

Cedarholm, C. J., L. M. Reid, and E. O. Salo. 1981. Cumulative effects of logging road sediment on salmonid populations of the Clearwater River, Jefferson County, Washington. Pages 38-74, in Proceedings of Conference on Salmon Spawning Gravel: A Renewable Resource in the Pacific Northwest? Report 19. Washington State University, Water Research Center, Pullman, WA.

Chamberlin, T. W., R. D. Harr, and F. H. Everest. 1991. Timber harvesting, silviculture, and watershed processes. Pages 181-206, in W. R. Meehan (editor), Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society, Special Publication No. 19. Bethesda, MD.

Chavas, J-P. 1999. Ecosystem valuation under uncertainty and irreversibility. Ecosystems 3, pages 11-15.

City of Camas. 2004. City of Camas Comprehensive Plan. March 2004.

City of Kelso. 1994. Comprehensive Plan for the City of Kelso. Adopted September 2, 1980. Chapter Updates 1987 and 1992. Update of Maps 1994.

City of Longview. 2006. City of Longview 2006 Comprehensive Plan, City of Longview, Washington. Prepared for The City of Longview, Washington, Community Development. Prepared by Jones and Stokes, Cowlitz-Wahkiakum Council of Governments, and E. D. Hovee & Company. December 2006.

City of Troutdale. 1999. Troutdale Comprehensive Land Use Plan. Adopted September 27, 1990. Ordinance No. 558-O, as amended through December 1998.

City of Washougal. 2003. City of Washougal Updated Comprehensive Plan. February 2003.

Clark County. 2010. 2010 Clark County noxious weed list. Provided by Clark County Department of Environmental Services, Vegetation Management on September 13, 2010.

Clark County, Auditor's Office. 2010. Statement of revenues, expenditures, and changes in fund balances, governmental funds. In Comprehensive Annual Financial Report, Fiscal Year Ended December 31, 2009. Accessed September 10, 2010 at http://www.co.clark.wa.us/auditor/financial/documents/35_2009cafr_RevExpGovtal.pdf
Coe, D. 2006. Sediment production and delivery from forest roads in the Sierra Nevada, California. Master Thesis. Department of Forest, Rangeland, and Watershed Stewardship, Colorado State University, Fort Collins, CO.

Cowlitz County. 2010. 2010-2015 Transportation Improvement Program. Cowlitz County Department of Public Works.

Cowlitz County Planning Division. 2010. Fishing. Accessed February 14, 2011 at http://www.visitmtsthelens.com/things_to_do/fishing-in-cowlitz-county-washington.html

Cowlitz County Tourism Bureau. 2010. Where to stay. Accessed September 14, 2010 at http://www.visitmtsthelens.com/where-to-stay-cowlitz-county.html

Cowlitz County Assessor's Office. 2010. Cowlitz county parcel search. Search results for Account Nos. R014512, R014513, R015697 and R016139. Accessed September 28, 2010 at http://www.cowlitzinfo.net/applications/cowlitzassessorparcelsearch

Cowlitz County Auditor's Office. 2010. Statement of revenues, expenditures, and changes in fund balances, governmental funds. Page 16 in Comprehensive Annual Financial Report, Fiscal Year Ended December 31, 2009.

Deller, S. C., T-H Tsai, D. W. Marcouiller, and D. B. K. English. 2001. The role of amenities and quality of life in rural economic growth American Journal of Agricultural Economics 83(2), pages 352–365.

ECONorthwest. 2009. Fiscal Year 2008 large-cost fire independent review. Large-Cost Fire Independent Review Panel. U.S. Secretary of Agriculture. June 19.

Environmental Laboratory. 1987. Corps of engineers wetlands delineation manual. Technical Report Y-87-1. U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

Environmental Protection Agency (EPA). 2007. CO2 emissions from fossil fuel combustion report. Accessed June, 2010 at http://www.epa.gov/climatechange/emissions/downloads/CO2FFC_2007.pdf

———. 2010. Reynolds metals. EPA Region 10. Accessed August 26, 2010 at http://yosemite.epa.gov/r10/nplpad.nsf/88d393e4946e3c478825631200672c95/862ad0015befb92385256594006b98cb?OpenDocument

Environmental Protection Agency (EPA), Office of the Administrator. 2000. Guidelines for Preparing Economic Analyses. Report No. EPA 240-R-00-003. September. Accessed September 29, 2010 at http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html/$file/Guidelines.pdf

Evarts, R. C. 2004a. Geologic map of the Ariel Quadrangle, Clark and Cowlitz counties, Washington: U.S. Geological Survey scientific investigations map 2826, scale 1:24,000.

———. 2004b. Geologic map of the Woodland Quadrangle, Clark and Cowlitz counties, Washington: U.S. Geological Survey scientific investigations map 2827, scale 1:24,000.

———. 2005. Geologic map of the Amboy Quadrangle, Clark and Cowlitz counties, Washington: U.S. Geological Survey scientific investigations map 2855, scale 1:24,000.

———. 2006a. Geologic map of the Lacamas Creek Quadrangle, Clark County, Washington: U.S. Geological Survey scientific investigations map 2924, scale 1:24,000.

———. 2006b. Geologic map of the Yacolt Quadrangle, Clark County, Washington: U.S. Geological Survey scientific investigations map 2901, scale 1:24,000.

Evarts, R. C., and J. E. O'Connor. 2008. Geologic map of the Camas Quadrangle, Clark County, Washington, and Multnomah County, Oregon: U.S. Geological Survey scientific investigations map 3017, scale 1:24,000.

Exponent. 2009. Update of EMF research – 2009. Prepared for Bonneville Power Administration, Portland, OR.

Exponent. 2012. Research on Extremely Low Frequency Electric and Magnetic Fields and Health. Prepared for Bonneville Power Administration, Portland, OR. 107 pages.

Fisher, A. C. 2000. Reflections on irreversibility: environmental science and environmental economics. University of California, Berkeley, Department of Agricultural and Resource Economics Working Paper No. 910. Accessed October 8, 2010 at http://ageconsearch.umn.edu/bitstream/6860/2/wp000910.pdf

Furniss, M. J., T. D. Roelofs, and C. S. Yee. 1991. Road construction and maintenance. Pages 297-323 in W. R. Meehan (editor), Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. American Fisheries Society Special Publication No. 19.

GeoEngineers. 2010. Phase I general route characterization and geologic hazard assessment; I-5 Corridor 500-kV transmission line Oregon/Washington. Prepared for HDR Engineering, Inc., April 8, 2010.

Godt, J. W. 1997. Landslide overview map of the conterminous United States; digital compilation of landslide overview map of the conterminous United States by D. H. Radbruch-Hall, R. B. Colton, W. E. Davies, I. Lucchitta, B. A. Skipp, and D. J. Varnes, 1982, U.S. Geological Survey Open-File Report 97-289.

Grant, G. E., F. J. Swanson, and M. G. Wolman. 1990. Pattern and origin of stepped-bed morphology in high-gradient streams, western Cascades, Oregon. Geological Society of America Bulletin 102, pages 340-352.

Grant, G. E., S. L. Lewis, F. J. Swanson, J. H. Cissel, and J. J. McDonnell. 2008. Effects of forest practices on peak flows and consequent channel response: a state-of-science report for western Oregon and Washington. Gen. Tech. Rep. PNW-GTR-760. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 76 pages.

Grant, J. W. A., S. O. Steingrimsson, E. R. Keeley, and R. A. Cunjak. 1998. Implications of territory size for the measurement and prediction of salmonid abundance in streams. Canadian Journal of Fisheries and Aquatic Sciences 55, pages 181–190.

Gregory, S. V., F. J. Swanson, W. A. McKee, and K. W. Cummins. An ecosystem perspective of riparian zones. BioScience 41(8).

Guria, J., J. Leung, M. Jones-Lee, and G. Loomes. 2005. The willingness to accept value of statistical life relative to the willingness to pay value: evidence and policy implications." Environmental and Resource Economics 32, pages 113-127.

Harr, R. D. 1981. Some characteristics and consequences of snowmelt during rainfall in western Oregon. Journal of Hydrology 53, pages 277-304.

Hitchcock, C. L. and A. Cronquist. 1987. Flora of the Pacific Northwest. 6th printing. University of Washington Press, Seattle, WA.

Hoblitt, R. P., J. S. Walder, C. L. Driedger, K. M. Scott, P. T. Pringle, and J. W. Vallance. 1998. Report: Volcano Hazards from Mount Rainier, Washington, Revised 1998: U.S. Geological Survey Open-File Report 98-428.

Horenstein, H., R. Hart, T. Gearty, V. Goldberg. 2001. Photography. Prentice Hall, Upper Saddle River, NJ. Page 75.

Hussen, A. M. 2004. Principles of Environmental Economics, 2nd edition. Routledge.

ICF/Jones & Stokes. Addressing Climate Change in NEPA and CEQA Documents, Climate Change Focus Group, ICF/Jones & Stokes, updated August 2007.

Johnson, K. P. and J. R. Kort. 2004. 2004 redefinition of the BEA economic areas. Survey of Current Business 84(11), pages 68-75.

Johnson, S. L. and J. A. Jones. 2000. Stream temperature response to forest harvest and debris flows in western Cascades, Oregon. Canadian Journal of Fisheries and Aquatic Sciences 57(supplement 2), pages 30-39.

Kahneman, D., J. L. Knetsch, and R. H. Thaler. 1991. Anomalies: the endowment effect, loss aversion, and status quo bias. The Journal of Economic Perspectives 5(1), pages 193-206.

Katoomba Group. 2010. Ecosystem Marketplace. Accessed September 30, 2010 http://ecosystemmarketplace.com/

Korte, A. and L. H. MacDonald. 2007. Measuring and predicting road sediment production and watershed-scale sediment delivery. Hydrology Days 2007. Colorado State University, Fort Collins, CO.

Lamberti, G. A., S. V. Gregory, L. R. Ashkenas, R. C. Wildman, and A. D. Steinman. 1989. Influence of channel geomorphology on retention of dissolved and particulate matter in a Cascade mountain stream. USDA Forest Service Gen. Tech. Rep. PSW-110. 39 pages.

Lantz, R. L. 1971. Influence of water temperature on fish survival, growth, and behavior. Pages 182-193 in J. T. Krygier and Hall, J. D. (editors), Forest Land Uses and Stream Environment. Oregon State University Extension, Corvallis, OR.

Lewis River Golf Course. 2011. The history and evolution of Lewis River. Accessed February 9, 2011 at http://www.lewisrivergolf.com/golf/proto/lewisrivergolf/index.htm

Li, H. W., G. A. Lamberti, T. N. Pearsons, C. K. Tait, J. L. Li, and J. C. Buckhouse. 1994. Cumulative effects of riparian disturbances along high desert trout streams of the John Day Basin, Oregon. Transactions of the American Fisheries Society 123, pages 627-640.

Lisle, T. E. 1986. Effects of woody debris on anadromous salmonid habitat, Prince of Wales Island, southeast Alaska. North American Journal of Fisheries Management 6, pages 538-550.

Luce, C. H. and T. A. Black. 2001. Spatial and temporal patterns in erosion from forest roads. Pages 165-178 in M. S. Wigmosta and S. J. Burges (editors), Influence of Urban and Forest Land Uses on the Hydrologic-Geomorphic Responses of Watersheds, American Geophysical Union, Washington, D.C.

Marshall, D. B. 1988. The marbled murrelet joins the old-growth forest conflict. American Birds 42, pages 202-212.

McGranahan, D. A. 2008. Landscape influence on recent rural migration in the U.S. Landscape and Urban Planning 85, pages 228–240.

Mitsch, W. J and J. G. Gosselink. 2000. Wetlands, 3rd Edition. John Wiley & Sons, Inc., New York, NY.

Moen. 1977. St. Helens and Washougal Mining Districts of the Southern Cascades of Washington. Washington State Department of Natural Resources, Division of Geology and Earth Resources, Information Circular 60. 71 pages.

Multnomah County, Department of County Management. 2010. Statement of revenues, expenditures, and changes in fund balances, governmental funds. Page 33 in Comprehensive Annual Financial Report, Fiscal Year Ended June 30, 2009.

Murphy, M. L. and W. R. Meehan. 1991. Stream ecosystems. Pages 17-46 in W. R. Meehan (editor), Influences of Forest and Rangeland Management on Salmonid Fishes and their Habitats. American Fisheries Society, Special Publication Number 19. Bethesda, MD.

Naiman, R .J., T. J. Beechie, L. E. Benda, D. R. Berg, P. A. Bisson, L. H. MacDonald, M. D. O'Conner, P. L. Olson, and E. A. Steel. 1992. Fundamental elements of ecologically healthy watersheds in the Pacific Northwest coastal ecoregion. Pages 127-188 in R J. Naiman (editor), Watershed Management: Balancing Sustainability and Environmental Change. Springer-Verlag, New York, NY.

National Oceanic and Atmospheric Administration (NOAA) National Data Centers. Web site. Accessed August 27, 2010 at http://ols.nndc.noaa.gov/plolstore/plsql/olstore.prodspecific?prodnum= C00095-PUB-A0001

Natural Resources Conservation Service (NRCS). 1999. American elk. Fish and wildlife habitat management leaflet. Prepared in consultation with Rocky Mountain Elk Foundation, Missoula, MT.

———. 2010. National hydric soils list for the state of Washington. U.S. Department of pasture and croplands, Natural Resources Conservation Service. Accessed July 21, 2010 at http://soils.usda.gov/use/hydric/lists/state.html

Nelson, E. J. and D.B. Booth. 2002. Sediment sources in an urbanizing, mixed land-use watershed. Journal of Hydrology 264, pages 51-68.

Nelson, S. K. and T. E. Hamer. 1995. Nest success and the effects of predation on marbled murrelets. Pages 89-97 in C.J. Ralph, G.L. Hunt, Jr., M.G. Raphael, and L.F. Piatt (editors),

Ecology and Conservation of the Marbled Murrelet. USDA Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-152. Albany, CA. 420 pages.

Newcombe, C. P. and J. O. T. Jensen. 1996. Channel suspended sediment and fisheries: A synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management 16, pages 693-727.

Nisqually Multimedia. 2010. The Oregonian front page, Tuesday, November 6, 1962 [Scan of Oregonian front page]. Accessed October 4, 2010 at http://nisquallyquake.wordpress.com/2010/02/05/the-portland-earthquake-on-november-5-1962/

Norris, L. A., H. W. Lorz and S. V. Gregory. 1991. Forest chemicals. American Fishery Society Special Publication 19, pages 207-296.

Office of Management and Budget (OMB). 2003. Circular A-4 to the heads of executive agencies and establishments regarding regulatory analysis. Sent September 17, 2003. Accessed September 29, 2010 at http://www.whitehouse.gov/omb/circulars_a004_a-4/

Oregon Department of Agriculture (ODA). 2010. Oregon listed plants. Oregon Department of Agriculture, Plant Division, Native Plant Conservation Program. Updated November 17, 2008. Accessed October 15, 2010 at http://www.oregon.gov/ODA/PLANT/CONSERVATION/statelist.shtml

Oregon Department of Environmental Quality. 2004. Portland Area Carbon Monoxide Plan; Oregon State Implementation Plan. Volume 2, Section 4.58, Attachment 3.1. December 10.

———. 2007. Portland-Vancouver Air Quality Maintenance Area (Oregon Portion) and Salem-Keizer Ozone Maintenance Plan, adopted by the Environmental Quality Commission February 22, 2007.

———. 2009. 2009 Oregon Air Quality Data Summaries. June 2010 (10-AQ-009).

Oregon Department of Fish and Wildlife (ODFW). 2010. Threatened, endangered, and candidate fish and wildlife species in Oregon. Accessed March 2, 2010 at http://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_species.asp

Oregon Department of Geology and Mineral Industries (DOGAMI). 2010. List of existing mining permits (Excel spreadsheet; updated 08-09-2010). Accessed August 24, 2010 at http://www.oregongeology.org/sub/mlr/mlrhome.htm

Oregon Department of Revenue. 2009a. Oregon income tax, part-year resident/nonresident. Accessed September 30, 2010 at http://www.oregon.gov/DOR/PERTAX/docs/2009Forms/101-045-09.pdf

———. 2009b. State of Oregon lodging tax: frequently asked questions. Document No. 150-604-401. March. Accessed October 8, 2010 at http://www.oregon.gov/DOR/BUS/docs/604-401.pdf

———. 2010. "Where do the taxes go?" Property taxes: timber taxes. Accessed September 20, 2010 at http://www.oregon.gov/DOR/TIMBER/tax-receipts.shtml

Oregon Department of Transportation, Fuels Tax Group. 2010. Current Oregon fuel tax rates. Accessed October 8, 2010 at http://www.oregon.gov/ODOT/CS/FTG/current_ft_rates.shtml

Oregon Parks and Recreation Department. 2008. Outdoor Recreation in Oregon: The Changing Face of the Future: The 2008-2012 Oregon Statewide Comprehensive Outdoor Recreation Plan. February. Accessed September 30, 2010 at http://egov.oregon.gov/OPRD/PLANS/docs/scorp/2008_Scorp_Final_Web.pdf

Oregonian, The. 1949. Front page of The Oregonian, April 14, 1949. Accessed October 4, 2010 at http://nl.newsbank.com/nl-search/we/Archives/

PacifiCorp. 1999. Final Technical Report for Terrestrial Resources. Yale Hydroelectric Project FERC Project No. 2071. Prepared by EDAW, Inc. Seattle, WA.

———. 2010. Habitat protection. Accessed October at http://www.pacificorp.com/env/ec/hp.html

Paine, D. P. and D. W. Hann. 1982. Maximum crown-width equations for southwestern Oregon tree species. Forest Research Lab Research Paper 46. School of Forestry, Oregon State University. Corvallis, OR. 25 pages.

Personius, S. F. (compiler). 2002. Fault number 880, Lacamas Lake fault: in Quaternary fault and fold database of the United States. Accessed August 23, 2010 at http://earthquake.usgs.gov/regional/qfaults/

Pfauth, M and M. Sytsma. 2004. Integrated aquatic vegetation management plan for Blue Lake Fairview, OR. Prepared for Oregon Department of Environmental Quality, Metro Regional Authority and Interlachen Homeowners Association. 68 pages.

Phillips, W. M. 1987a. Geologic map of the Mount St. Helens Quadrangle, Washington. Washington Division of Geology and Earth Resources, Open File Report 87-4, scale 1:100,000.

———. 1987b. Geologic map of the Vancouver Quadrangle, Washington and Oregon. Washington Division of Geology and Earth Resources, Open File Report 87-10, scale 1:100,000.

Portland State University, Population Research Center. 2010. 2009 Population Report. March. Accessed August 16, 2010 at http://www.pdx.edu/sites/www.pdx.edu.prc/files/media_assets/PopRpt09b.pdf

Power Engineers. 2011. I-5 Transmission Corridor Project Underground Route Study. Prepared for Bonneville Power Administration, Portland, OR. 115 pages.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. Physiological effects on coho salmon and steelhead of exposure to suspended solids. Transactions of the American Fisheries Society 116, pages 737-744.

Reid, L. M., Dunne, T. 1984. Sediment production from forest road surfaces. Water Resources Research 20, pages 1753-1761.

Robertson, S. J., W. B. McGill, H. B. Missicotte, and P. M. Rutherford. 2007. Petroleum hydrocarbon contamination in boreal forest soils: a mycorrhizal ecosystems perspective. Biological Reviews 82, pages 213-240.

Rocchio, J. and R. Crawford. 2008. Field Guide to Washington's Ecological Systems. Washington State Department of Natural Resources. Draft – February 7, 2008. 240 pages.

Samuelson, P. A. and W. D. Nordhaus. 2005. Economics, 18th edition. Boston: McGraw-Hill Irwin.

Sanders, T. A. 1999. Habitat availability, dietary mineral supplement, and estimating abundance of band-tailed pigeons in western Oregon. Ph.D. dissertation, Oregon State University, Corvallis, OR.

Seattle Audubon Society (SAS). 2010. Bird web. Seattle Audubon Society. Accessed September 15, 2010 at http://birdweb.org/birdweb/bird_details.aspx?id=55. .

Sigler, J. W., T. C. Bjornn, and F. H. Everest. 1984. Effects of chronic turbidity on density and growth of steelheads and coho salmon. Transactions of the American Fisheries Society 113, pages 142-150.

Slovic, P. 1991. Beyond numbers: A broader perspective on risk perception and risk communication. Pages 48-65 in D. Mayo and R. Hollander (editors), Acceptable Evidence: Science and Values in Risk Management. New York: Oxford University Press.

Smith Travel Research. 2010. Hotel/Motel Census Database. Data retrieved for Hotels and Motels in Cowlitz, Clark, and Multnomah Counties on September 17, 2010.

Stateparks.com. 2010. Columbian white-tailed deer national wildlife refuge. Accessed September 17, 2010 at http://www.stateparks.com/columbian_whitetailed_deer.html

Soil Conservation Service (USDA Soil Conservation Service). 1994. National Food Security Act Manual. Title 180. Washington, D.C.

Southwest Clean Air Agency. 2006. Supplement to the Washington State Implementation Plan for the Vancouver Portion of the Portland-Vancouver AQMA Ozone Maintenance Plan, November 2, 2006, Southwest Clean Air Agency, Vancouver, WA.

Southwest Clean Air Agency . 2007. Supplement to the Washington State Implementation Plan, Vancouver Air Quality Maintenance Area Second 10-year Carbon Monoxide Maintenance Plan, March 1, 2007, Southwest Clean Air Agency, Vancouver, WA.

Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR.

Stehr, C. M., T. L. Linbo, D. H. Baldwin, N. L. Scholz, J. P. Incardona. 2009. Evaluating the effects of forestry herbicides on fish development using rapid phenotypic screens. North American Journal of Fisheries Management 29(4), pages 975-984.

Stinson, D. W., J. W. Watson, and K. R. McAllister. 2007. Washington State Status Report for the Bald Eagle. Olympia, WA: Washington Department of Fish and Wildlife, Olympia. 86 pp. Accessed May 17, 2012 at http://www.fws.gov/oregonfwo/Species/Data/BaldEagle/.

Stover, C. W., and J. L. Coffman. 1993. Seismicity of the United States, 1568-1989 (Revised). U.S. Geological Survey Professional Paper 1527, United States Government Printing Office, WA.

Sullivan, K., T. E. Lisle, C. A. Dolloff, G. E. Grant, and L. M. Reid. 1987. Stream channels: the link between forests and fishes. Pages 39-97 in Salo, E. O and T. W. Cundy (editors). Streamside Management: Forestry and Fishery Interactions. University of Washington, Institute of Forest Resources, Seattle, WA.

Suttle, K. B., M. E. Power, J. M. Levin, and C. McNee. 2004. How fine sediment in riverbeds impairs growth and survival of juvenile salmonids. Ecological Applications 14, pages 969-974.

Swanson, F. J., R. J. Janda, and D. N. Swanston. 1982. Sediment budgets and routing in forested drainage basins: U.S. Forest Service General Technical Report PNW-141.

Tacoma Power. 2004. Cowlitz River Fisheries and Habitat Management Plan (FHMP). Cowlitz River Project, FERC No. 2016. Tacoma, WA. 299 pages.

The Washington State Transportation Commission and the Washington State Department of Transportation (WSTC and WSDOT). 2006. Washington Transportation Plan 2007-2026. Prepared for Governor Christine Gregoire and the Washington State Legislature. November 14, 2006.

Thomas, J. W. E. D. Forsman, J. B. Lint, E. G. Meslow, B. R. Noon, and J. Verner. 1990. A conservation strategy for the Northern spotted owl: a report of the Interagency Scientific Committee to address the conservation of the Northern spotted owl. U.S. Forest Service, U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service. Portland, OR. 427 pages.

Tu M., C. Hurd, and J. M. Randall. 2001. Weed Control Methods Handbook. Accessed at http://www.invasive.org/gist/handbook.html

Urie, D. H. 1971. Estimated groundwater yield following strip cutting in pine plantations. Water Resources Research 7, pages 1497-1510.

U.S. Bureau of Economic Analysis. 2010. Table CA05N, personal income and detailed earnings by NAICS industry, 2008. April. Accessed August 20, 2010 at http://www.bea.gov/regional/reis/default.cfm?selTable=CA05

U.S. Census Bureau. 2008. Average family size, United States. 2006-2008 American community survey 3-year estimates. Accessed October 8, 2010 at http://factfinder.census.gov/

———. 2000d. American FactFinder help: Subject characteristic: Poverty status in 1999. Accessed January 13, 2011 at http://factfinder.census.gov/servlet/MetadataBrowserServlet?type=subject&id=POVERTYSF3&dsspName=DEC_2000_SF3&back=update&_lang=en

———. 2010a. Table B03002 Hispanic or Latino origin by race, total population, 2006-2008 American community survey 3-year estimates. [Data retrieved for Cowlitz, Clark, and Multnomah Counties individually.] Accessed June 2, 2010 at http://factfinder.census.gov

———. 2011. Poverty definitions. Accessed January 13, 2011 at http://www.census.gov/hhes/www/poverty/methods/definitions.html

U.S. Department of Agriculture (USDA). 2009. Aerial photographs of Clark County and Cowlitz County. Color orthoimage. Horizontal resolution: 1 meter. U.S. Department of Agriculture, Farm Service Agency, Aerial Photography Field Office. Publication date: November 2009. Accessed January 2010 at http://gis.ess.washington.edu/data/raster/doqs_naip.html

U.S. Department of Labor, Bureau of Labor Statistics. 2009a. Metropolitan and nonmetropolitan area occupational employment and wage estimates. [Data retrieved for Seattle-Tacoma-Bellevue MSA, Portland-Vancouver-Beaverton MSA, and Olympia MSA individually.] Accessed May 26, 2010 at http://www.bls.gov/oes/current/oessrcma.htm

———. 2009b. Occupational injuries and illnesses and fatal injuries profiles. Accessed September 30, 2010 at http://data.bls.gov:8080/GQT/servlet/InitialPage

U.S. Department of Transportation. 2009. Memorandum to secretarial officers, Re: Treatment of the economic value of a statistical life in departmental analyses–2009 Annual Revision. Accessed September 30, 2010 at http://ostpxweb.dot.gov/policy/reports/VSL%20Guidance%20031809%20a.pdf

U.S. Fish and Wildlife Service (USFWS). 2005. U.S. Fish and Wildlife Service Endangered Species Act fact sheet: Habitat conservation plans, Section 10 of the Endangered Species Act. Created December 2005. Accessed April 20, 2011 at http://www.fws.gov/midwest/endangered/permits/hcp/hcp_wofactsheet.html

———. 2010a. 2010 Draft Revised Recovery Plan for the Northern Spotted Owl (*Strix occidentalis caurina*). Portland, OR.

———. 2010b. Listed and proposed endangered and threatened species and critical habitat; candidate species; and species of concern in Cowlitz and Clark Counties, Washington (revised November 1, 2007) as prepared by the U.S. Fish and Wildlife Service Western Washington Fish and Wildlife Office. Accessed September 13, 2010 at http://www.fws.gov/wafwo/speciesmap.html

———. 2010c. Recovery Plan for the Prairie Species of Western Oregon and Southwestern Washington. Portland, OR. 241 pages.

U.S. Geological Survey (USGS). 2003 National atlas of the United States. Updated March 5, 2003. Accessed February 11, 2011 at http://nationalatlas.gov

———. 2010a. Earthquake Search: Accessed July 21, 2010 at http://earthquake.usgs.gov/earthquakes/eqarchives/epic/

———. 2010b. Volcanic ash: Effects and mitigation strategies. Accessed September 17, 2010 at http://volcanoes.usgs.gov/ash/power/index.php

Vias, A. C. 1999. Jobs follow people in the rural Rocky Mountain West. Rural Development Perspectives 14(2), pages 14-23.

Wade, G. 2000. Salmon and Steelhead Habitat Limiting Factors, Water Resource Inventory Area 27. Washington State Conservation Commission. January 19.

Waltert, F. and F. Schlapfer. 2007. The role of landscape amenities in regional development: A survey of migration, regional economic and hedonic pricing studies. Working Paper No. 0710. University of Zurich. August.

Warren, D. 2009. Production, prices, employment, and trade in Northwest forest industries, all quarters 2008. USDA Pacific Northwest Research Station, Resource Bulletin PNW-RB-258, Portland, OR.

Washington Department of Fish and Wildlife (WDFW). 1995. Management recommendations for Washington's priority species – Volume I: Invertebrates. Accessed at http://wdfw.wa.gov/publications/00024/wdfw00024.pdf

———. 1997. Management recommendations for Washington's priority species – Volume III: Reptiles. Accessed at http://wdfw.wa.gov/publications/00026/wdfw00026.pdf

———. 2000. Management recommendations for Washington's priority species – Volume IV: Birds. Accessed at http://wdfw.wa.gov/publications/00026/wdfw00026.pdf

———. 2004. Management recommendations for Washington's priority species – Volume V: Mammals. Accessed at http://wdfw.wa.gov/publications/00026/wdfw00026.pdf

———. 2008. Washington Department of Fish and Wildlife priority habitat and species list. Olympia, WA. 176 pages.

———. 2009. 2008-09 Private lands access, cooperators and acres. Accessed August 30, 2010 at http://wdfw.wa.gov/hunting/hunting_access/private_lands/

———. 2010. Landscape planning for Washington's wildlife. Appendix B - Species and development database. Accessed September 16, 2010 at http://wdfw.wa.gov/publications/00023/app_b_species_development_database.xls

———. 2011. PHS on the Web: Frequently Asked Questions. Accessed November 17, 2011 at http://wdfw.wa.gov/mapping/phs/

———. 2012. Conservation—Game Management. Accessed May 27, 2012 at http://wdfw.wa.gov/conservation/game/

Washington Department of Revenue. 2009a. Table 17A–local sales and use tax distributions: Amounts for all local taxing districts in each county–Fiscal Year 2009." Tax Statistics 2009. September. Accessed September 30, 2010 at http://dor.wa.gov/Docs/Reports/2009/Tax_Statistics_2009/Table17.pdf

———. 2009b. Table 25–Property tax levy rates by county; Countywide average rates per $1,000 assessed value by year due, 2005-2009. Tax Statistics 2009. September. Accessed

September 30, 2010 at http://dor.wa.gov/Docs/Reports/2009/Tax_Statistics_2009/Table25.pdf

———. 2009c. Table 28–Property tax collections by county for Calendar Year 2008. Tax Statistics 2009. September. Accessed September 30, 2010 at http://dor.wa.gov/Docs/Reports/2009/Tax_Statistics_2009/Table28.pdf

———. 2009d. Table 20–Timber excise tax distributions by county; Fiscal Year 2006-2009. September. Accessed September 30, 2010 at http://dor.wa.gov/Docs/Reports/2009/Tax_Statistics_2009/Table20.pdf

———. 2010a. Local sales and use tax rates and changes. Accessed September 30, 2010 at http://dor.wa.gov/docs/forms/excstx/locsalusetx/ localslsuseflyer_quarterly.pdf

———. 2010b. Business and occupation tax classifications. Accessed September 30, 2010 at http://dor.wa.gov/Content/FindTaxesAndRates/BAndOTax/BandOrates.aspx

———. 2010c. Public utility tax. Accessed September 30, 2010 at http://dor.wa.gov/content/findtaxesandrates/othertaxes/tax_pubutil.aspx

———. 2010d. Lodging information rates and changes: Effective July 1 – September 30, 2010. Accessed October 8, 2010 at http://dor.wa.gov/Docs/forms/ExcsTx/Lodging/LodgingFlyer_10_Q2.pdf

Washington State Department of Ecology (Ecology). 1992. Washington's wetlands: Olympia, WA. Washington State Department of Ecology publication 92-105, 12 pages as cited in Washington's Wetland Resources. Accessed September 8, 2010 at http://wa.water.usgs.gov/pubs/misc/wetlands/

———. 2005a. Stormwater management manual for Western Washington. April 2005. Five volumes. Accessed at http://www.ecy.wa.gov/pubs/0510030.pdf

———. 2005b. Wetlands in Washington State. Chapter 2 Volume 1 – A synthesis of the science. Department of Ecology State of Washington. Accessed January 25, 2011 at http://www.ecy.wa.gov/programs/sea/wetlands/bas/volume1final.html

———. 2008. Strategic Plan for the Department of Natural Resources 2009-2011 Biennium. August.

Washington State Department of Natural Resources (WDNR). 1997. Final Habitat Conservation Plan. September. Accessed at http://www.dnr.wa.gov/ResearchScience/Topics/TrustLandsHCP/Pages/trust_lands_hcp_report.aspx

———. 2006. Hydrography data. Digital data compiled in March 2006. Washington State Department of Natural Resources. Obtained in June 2010 from Golder Associates.

Washington State Department of Transportation (WSDOT). 2008a. Washington State public use airports by ownership, classification and location. July 22, 2008.

———. 2008b. 2008 Washington State collision data summary. Accessed at http://www.wsdot.wa.gov/mapsdata/collision/pdf/Washington_State_Collision_Data_Summary_2008.pdf

———. 2009a. 2009 annual traffic report. In cooperation with the United States Department of Transportation Federal Highway Administration.

———. 2009b. Peak hour report, Year 2009. In cooperation with the United States Department of Transportation Federal Highway Administration.

———. 2010. Aggregate source approval. Accessed September 1, 2010 at http://www.wsdot.wa.gov/biz/mats/asa/ASASearch.cfm

Washington State Department of Wildlife. Undated. Washington wetlands – Time is running out: Olympia, Washington, Washington State Department of Wildlife, 11 pages. Accessed September 8, 2010 at http://wa.water.usgs.gov/pubs/misc/wetlands/

Washington State Recreation and Conservation Office. 2008. Defining and measuring success: The role of state government in outdoor recreation, a state comprehensive outdoor recreation planning document. June. Accessed September 30, 2010 at http://www.mrsc.org/GovDocs/W3ParksRec.pdf

Washington State Office of Financial Management. 2009a. Small area estimate program (SAEP), estimates of total population for Census 2000 Census Designated Places. October 5. Accessed May 20, 2010 at http://www.ofm.wa.gov/pop/smallarea/default.asp

———. 2009b. April 1 intercensal population estimates for the state, counties, and cities and towns for 1968 to 2000 and postcensal population estimates for 2000 through 2009, State of Washington. Developed February 2003, revised June 2009. Accessed May 21, 2010 at http://www.ofm.wa.gov/pop/april1/cociseries/default.asp

Washington, State of. 1998. Lower Columbia Steelhead Conservation Initiative (LCSCI). Olympia, WA. Draft of March 10, 1998.

Weber, D. D., D. J. Maynard, W. D. Gronlund, and V. Konchin. 1981. Avoidance reactions of migrating adult salmon to petroleum hydrocarbons. Canadian Journal of Fisheries and Aquatic Sciences 38, pages 779-781.

Western Regional Climate Center. 2010. Accessed August 27, 2010 at http://www.wrcc.dri.edu/

Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and R. Parker. 1996. Weeds of the West. Western Society of Weed Scientists, Newark, CA.

Wieczorek, G. F. 1996. Landslide triggering mechanisms. Pages 76-90 in Turner, A. K., Schuster, R. L. (editors). 1996. Landslides: Investigation and Mitigation: Transportation Research Board, Special Report 247.

Wilcove, D. and L. Chen. 1998. Management costs for endangered species. Conservation Biology 12(6), pages 1405-1407.

Wilson, D., P. Cook, L. Hutley, S. Tickell, and P. Jolly. 2006. Effect of land use on estimates of evapotranspiration and recharge in the Daly River catchment. Northern Territory Department of Natural Resources the Environment and the Arts, Technical Report No. 17/2006D.

Wyoming Game and Fish Department (WGFD). 2010. Rocky mountain elk. Habitat extension bulletin No. 27. Accessed September 14, 2010 at http://gf.state.wy.us/downloads/pdf/habitat/Bulletin%20No.%2027.pdf

Zenner, E. K. 2000. Do residual trees increase structural complexity in Pacific Northwest coniferous forests? Ecological Applications 10, pages 800-810.

Ziemer, R. R., and T. E. Lisle. 1998. Chapter 3. Hydrology. Pages 43-68 in Naiman, Robert J., and Robert E. Bilby (editors), River Ecology and Management: Lessons from the Pacific Coastal Ecoregion. Springer-Verlag, NY.

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Nancy Wittpenn – Environmental Protection Specialist, BPA. Environmental lead, responsible for EIS coordination and development. Education: B.S. Geology; M.S. Marine Geophysics. Years of experience: 23.

Marian Wolcott – Realty Officer, BPA. Responsible for property value analysis. Education: B.S. Forest Management. Years of experience: 36.

Josh Wozniak – Senior Scientist, Herrera Environmental Consultants. Contributor to vegetation and wildlife resource analyses and EIS chapters. Education: M.S. Genetics. Years of experience: 14.

Nicole Zehntbauer – GIS Professional, CIBER, Inc. Responsible for GIS support. Education: B.A. Geography. Years of Experience: 19.

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Chapter 31 Agencies, Organizations, and Persons Receiving this EIS

The project mailing list contains tribes; local, state, regional, and federal agencies; utilities; public officials; interest groups; businesses; special districts; libraries; colleges/universities; the media; and about 15,200 potentially interested or affected landowners. They have directly received or have been given instructions on how to receive all project information made available so far, and they will have an opportunity to review the draft and final EIS. Specific entities (other than private persons and landowners) receiving notification of the availability of this EIS are listed below by category.

31.1 Federal Agencies

US Army Corps of Engineers

USDA Forest Service

USDA Natural Resource Conservation Service

US Department of Agriculture

US Department of Energy

US Department of the Interior

USDOI Bureau of Indian Affairs

USDOI Bureau of Land Management

USDOI Fish and Wildlife Service

USDOI National Park Service

USDOC NOAA National Marine Fisheries Service

US Environmental Protection Agency

USFW Columbia River Fisheries Program Office

31.2 Tribes or Tribal Groups

Confederated Tribes and Bands of the Yakama Nation

Confederated Tribes of Chehalis

Confederated Tribes of Grande Ronde

Confederated Tribes of the Umatilla Indian Reservation

Confederated Tribes of the Warm Springs Reservation

Cowlitz Indian Tribe

Nez Perce Tribe

Quinault Indian Nation

31.3 State Agencies, Oregon

Department of Agriculture

Department of Energy

Department of Environmental Quality

Department of Fish and Wildlife

Department of Forestry

Department of Land Conservation and Development

Department of Parks and Recreation

Department of State Lands

Department of Transportation

Governor's Natural Resources Office

Public Utilities Commission

31.4 State Agencies, Washington

Department of Agriculture
Department of Archaeology and Historic Preservation
Department of Commerce
Department of Ecology
Department of Fish and Wildlife
Department of Natural Resources
Department of Public Lands
Department of Transportation
DNR Natural Heritage Program
DNR Office of Commissioner of Public Lands
DNR Water Resources Program
Economic Development Commission
Energy Facility Site Evaluation Council
Governor's Office of Indian Affairs
Governor's Office of Regulatory Assistance
Office of Recreation and Conservation
Washington State Library, Government Publications
Washington State Parks and Recreation Commission
WDFW Renewable Energy Section

31.5 Public Officials, Oregon

US Representative Earl Blumenauer
US Representative Suzanne Bonamici
US Senator Jeff Merkley
US Representative Kurt Schrader
US Senator Ron Wyden
Governor John Kitzhaber
State Senator Laurie Monnes Anderson
State Representative Jules Bailey
State Senator Ginny Burdick
State Representative Michael Dembrow
State Senator Richard Devlin
State Senator Jackie Dingfelder
State Representative Lew Frederick
State Representative Chris Garrett
State Representative Mitch Greenlick
State Senator Mark Hass
State Senator Elizabeth Steiner Hayward
State Senator Betsy Johnson
State Representative Mark Johnson
State Representative Alissa Keny-Guyer
State Representative Tina Kotek
State Representative Greg Matthews
State Senator Rod Monroe
State Representative Mary Nolan
State Representative Tobias Read
State Senator Diane Rosenbaum
State Representative Mike Schaufler
State Senator Chip Shields
State Representative Jefferson Smith
State Senator Chuck Thompson
State Representative Carolyn Tomei
State Representative Matthew Wand
State Representative Brad Witt

31.6 Public Officials, Washington

US Representative Jaime Herrera Beutler
US Senator Maria Cantwell
US Senator Patty Murray
Governor Christine Gregoire
State Senator Don Benton
State Representative Brian Blake
State Representative Bruce Chandler
State Senator Brian Hatfield
State Representative Paul Harris
State Senator Jim Honeyford
State Representative Jim Moeller State
State Representative Ed Orcutt
State Senator Ann Rivers
State Representative Liz Pike

State Senator Craig Pridemore
State Representative Tim Probst
State Representative Dean Takko
State Representative David Taylor
State Representative Sharon Wylie

31.7 Regional Government

Metro

31.8 Local Governments, Oregon

City of Fairview
City of Portland
City of Troutdale
City of Wood Village
Multnomah County

31.9 Local Governments, Washington

City of Battle Ground
City of Camas
City of Castle Rock
City of Kalama
City of Kelso
City of La Center
City of Longview
City of Ridgefield
City of Vancouver
City of Washougal
City of Woodland
Clark County
Cowlitz County
Town of Yacolt

31.10 Businesses

Advanced Electric, Inc.
Anderson Lodge
Braack Motorsports, Inc.
Cedar Falls Tree Farm
Chestnut Farms
Christison Family Farm
Coldwell Banker Barbara Sue Seal Properties
Columbia Pacific Firestop
Detemple Farm, LLC
Dew, Inc.
Elliot Consultants
Endpoint Services
Energy Expert Services, Inc.
Fielding Farms
Friberg Properties, LLC
Heaton Gulch, LLC
Holten-Andersen Per Company
Horne Family Tree Farm, LLC
Johnston Dairy, LLC
Keller Williams Realty
Kimbal Logan Real Estate
KRG, Inc.
Kwik Center, LLC
Lake Merwin Campers Hideaway
Longview Fibre
Mills Family, LLC
Milwaukie Lumber Company
Pomeroy Plowman Ranch, LTD
Port of Camas-Washougal
Port of Longview
Port of Portland
Port of Ridgefield
Port of Vancouver
Port of Woodland
Premier Realty

Rashford Tree Farm & Investments Company
Regional Services, Inc.
Remax Equity Group Realtors
Royal Ridges Retreat
Salal Flat, Inc.
Sanpe, Inc.
Sharp Microelectronics
Sierra Pacific Industries
Weyerhaeuser Company
Wildlife Services Company, Inc.

31.11 Utilities

City of Centralia Public Works, Centralia City Light
Clark Public Utilities
Clark Public Utilities District No. 1
Clatskanie Public Utilities District
Columbia River Public Utilities District
ColumbiaGrid
Cowlitz County Public Utilities District
Forest Grove Light and Power
Iberdrola Renewables, Inc.
Lewis County Public Utilities District No. 1
McMinnville Water and Light
Pacific County Public Utilities District No. 2
PacifiCorp
Portland General Electric Company
Puget Sound Energy, Inc.
Salem Electric Company
Wahkiakum County Public Utilities District No. 1
West Oregon Electric Cooperative, Inc.

31.12 Interest Groups

31.12.1 Neighborhood Associations

Andresen St. John Neighborhood Association
Benton Street Neighborhood Association
Central Northeast Neighbors Coalition Office
Columbia Shores Neighborhood Association
Concerned Citizens of Hockinson Neighborhood
Creekside Acres Homeowners Association Daybreak Neighborhood Association
East Fork Frontier Neighborhood Association
East Fork Hills Rural Association
East Minnehaha Neighborhood Association
East Portland Neighborhood Coalition Office
Enterprise Paradise Point Neighborhood Association
Evergreen Terrace Neighborhood Association
Fairgrounds Neighborhood Association
Felida Neighborhood Association
Fern Prairie Neighborhood Association
Forest Hills Neighborhood Association
Forest Home Neighborhood
Goot Park One Stop Neighborhood Association
Greater Brush Prairie Neighborhood Association
Green Meadows Neighborhood Association
Heritage Neighborhood Association
Hillside Terrace Neighborhood Association
Holly Hills Neighborhood Association
Lacamas Shores Neighborhood Association
Lacamas View Neighborhood Association
Lake Pointe Neighborhood Association
Lincoln Neighborhood Association
Maple Tree Neighborhood Association
Meadow Glade Neighborhood Association
Mountain View Neighborhood Association

Neighborhood Associations of Clark County
Neighbors West Northwest Coalition Office
North Fork Lewis Neighborhood Association
North Portland Neighborhood Services, Coalition Office
North Salmon Creek Neighborhood Association
Northeast Coalition of Neighborhoods
Northeast Hazel Dell Neighborhood Association
Pleasant Highlands Neighborhood Association
Ridgefield Junction Neighborhood Association
Roads End Neighborhood Association
Sherwood Hills Neighborhood Association
Shumway Neighborhood Association
Sifton Neighborhood Association
South Salmon Creek Neighborhood Association
Southeast Uplift Neighborhood Services, Coalition Office
Southwest Neighborhoods, Inc., Coalition Office
Sunnyside Neighborhood Association
Tidland Heights Neighborhood Association
Truman Neighborhood Association
Washougal River Neighborhood Association
West Hazel Dell Neighborhood Association
Wooded Ridge Neighborhood Association

31.12.2 Homeowners Associations

Alderspur Road Association
Applewood Hills Homeowners Association
Balsom Estates
Black Hawk Estates
Camas Rivers Edge Homeowners Association
Columbia Summit Estates Homeowners Association
Crown Park Homeowners Association
Deer Creek Homeowners Association
Forest Hills Homeowners Association
Highvalley Homeowners Association
Hillshire Homeowners Association
Ivy Glen Homeowners Association
Kaskillah Road Association
Kaskillah Subdivision
Knight's Pointe Homeowners Association
Lacamas Creek Communities
Lacamas Northshore Development
Lacamas Summit Homeowners Association
Lacamas View Homeowners Association
Lacamas Woods Homeowners Association
Lake Heights Homeowners Association
Lake Pointe Homeowners Association
LakeRidge Homeowners Association
Lakespur Homeowners Association
MeadowRidge Homeowners Association
Meadows North Homeowners Association
Oak Park Homeowners Association
Oak Ridge Estates Homeowners Association
Oregon Apollo Alliance
Parker Estates Homeowners Association
Peerywood Homeowners Association
Prune Hill Park Homeowners Association
Prune Hill Summit Homeowners Association
Renaissance Summit Homeowners Association
Ridge Homeowners Association
Shelborne Homeowners Association
Shiloh Heights Homeowners Association
Skyview Homeowners Association
Stoddard Road Association
Stoney Meadows Homeowners Association
Summer Hills Homeowners Association
Summit Hills Homeowners Association
Summit Oaks Homeowners Association
Thomas Estates Homeowners Association
Triple Creek Homeowners Association
View Ridge Estates Homeowners Association

Vineyards Homeowners Association

Waterleaf Homeowners Association, Management Group

Willow Creek Homeowners Association

Winchester Hills Homeowners Association

Wooded Ridge Homeowners Association

31.12.3 Environmental and Outdoor Recreation

1000 Friends of Oregon

40-Mile Loop Land Trust

Audubon Society of Portland

Audubon Washington

Blue Mountain Audubon Society

Bonneville Conservation Restoration and Renewal Team

Cascade Land Conservancy

Columbia Land Trust

Columbia Riverkeeper

Cougar Area Trail Seekers

Environment Oregon

Fish First

Freshwater Trust

Friends of the Columbia Gorge

Friends of the Cowlitz

Friends of the East Fork Lewis River

Friends of the Ridgefield National Wildlife Refuge

Future Wise

Gifford Pinchot Task Force

Lower Columbia River Estuary Partnership

Mazamas

Nature Conservancy Oregon, Main Office

Nature Conservancy Washington, Washington Field Office

Northwest Energy Coalition

Oregon Environmental Council

Oregon League of Conservation Voters

Oregon Natural Desert Association

Oregon Wild

Pacific Environmental Advocacy Center, Northwest Environmental Defense Center

Pistons Wild Outdoor Recreational Vehicle Club

Save Our Scenic Area

Sierra Club, Oregon Chapter

The Mountaineers

Vancouver Audubon Society

Washington Environmental Council

Washington Trails Association

Washington Wildlife Federation

Western Environmental Law Center

Willapa Hills Audubon Society

31.12.4 Community

A Better Way for BPA

Another Way BPA

Citizens Against the Towers

Clark County Citizens United, Inc.

Cowlitz Pomona Grange #7

Lelooska Foundation

Yale Valley Coalition

31.12.5 Schools and Universities

Battle Ground Public Schools

Camas School District

Covington Middle School

Green Mountain School District No. 103

Hockinson School District

Vancouver School District

31.12.6 Governmental Councils and Committees

Affiliated Tribe of Northwest Indians

Clark Regional Wastewater District

Columbia River Economic Development Council

County of Cowlitz, Economic Development Council

Cowlitz County Cemetery District 3

Cowlitz-Wahkiakum Council of Governments

East Multnomah Soil and Water Conservation District

Interagency Committee for Outdoor Recreation

Longview Parks & Recreation Department

Office of Oregon State Trust for Public Lands

Oregon Association of Conservation Districts

Trust for Public Lands, Northwest Regional Office

Trust for Public Lands, Oregon Field Office

Washington Association of Conservation Districts, Southwest Area

Washington Association of Sewer & Water District

West Multnomah Soil and Water Conservation District

31.12.7 Business and Industry

AFL-CIO Oregon

AFL-CIO Washington State Labor Council

Cascadia Center

Columbia Meadows

International Brotherhood of Electrical Workers, Local 46

International Brotherhood of Electrical Workers, Local 48

Oregon Farm Bureau Federation

Oregon Forest Industries Council

Oregon Rural Action

Oregon Small Woodlands Association

Pacific Northwest Economic Region

Thomas Foley & Associates, Renewable Northwest Project

Washington Apollo Alliance

Washington Association of Wheat Growers

Washington Farm Bureau

Washington Farm Forestry Association

31.13 Media

31.13.1 Newspapers

Camas-Washougal Post Record

Mount St. Helens Valley Bugler

The Columbian

The Daily News

The Gresham Outlook Online

The Oregonian

The Reflector

31.13.2 Television

KATU

KGW

KLTV

KOIN

KOPB

KPAM

KPTV

31.13.3 Radio Stations

KEX

KOPB

KXL

31.14 Libraries

31.14.1 University Repository Libraries

Evergreen State College

Lewis and Clark College (Paul L. Boley Law Library)

Linfield College

Oregon State University

Pacific University Library

Portland State University (Branford P. Millar Library)

University of Washington

Western Oregon University

31.14.2 Public Libraries

Battle Ground Community Library

Camas Public Library

Castle Rock Public Library

La Center Community Library

Longview Public Library

Multnomah County Central Library

Troutdale Library

Vancouver Cascade Park Library

Vancouver Community Main Library

Yacolt Library Express

Yacolt Town Hall

Chapter 32 Glossary and Acronyms

32.1 Glossary

access roads – Roads constructed to each tower site first to build the tower and line, and later to maintain and repair it.

agriculture – Land cover category used in the land analysis of this EIS. The agriculture category represents large tracts of herbaceous vegetation or plowed areas associated with agricultural activities. These include pasture, crops, and orchards. These areas often coincide with the rural land cover type, but were digitized separately when it was appropriate to isolate building clusters/compounds as discreet polygons during the digitizing process.

albedo – Solar reflectivity of the earth's surface.

alluvial fan deposits – Sediment deposited in alluvial fans; alluvial fans are a low, outspread, relatively flat to gently sloping mass of loose rock material deposited by streams at the place where the stream issues from a narrow valley upon a plain or broad valley.

alluvium – A general term for clay, silt, sand, and gravel deposited by a stream or other body of running water.

ambient – Surrounding natural conditions or environment of a given place at a given time.

amperes (A) – A unit of measurement of electric current produced in a circuit by 1 volt acting through a resistance of 1 ohm, which is the rate electrons flow in a wire.

anadromous fish – Fish that hatch and rear in fresh water, migrate to the ocean (salt water) to grow and mature, and migrate back to fresh water to spawn and reproduce.

anthropogenic – Caused or produced by humans.

aquatic bed – Vegetation community with submerged and floating-leaved aquatic plants.

archaeological resources – Any material remains of human life or activities that are at least 100 years of age, and are of archaeological interest.

archaeology – The scientific study of material remains (artifacts, e.g., stone tools, fish hooks) of past human life and activities.

area of potential effect (APE) – The area that may be affected by the proposed project, including direct and indirect impacts.

attenuation – Reduction of the size, strength, or density of something, such as a signal or noise source.

bedrock – A general term for the rock, usually solid, that underlies soil or other unconsolidated, superficial material.

Best Management Practices (BMPs) – Practices or combination of practices that are employed to ensure development is conducted in an environmentally responsible manner, protecting sensitive receptors such as wildlife, air quality and landscapes.

blackout – The disconnection of the source of electricity from all electrical loads (users) in a certain geographical area.

blasting – The controlled use of explosives to excavate or remove rock.

brownout – A partial reduction of electrical voltages that causes lights to dim and motor-driven devices to lose efficiency.

candidate species – Federal or Washington State listing status of a plant or wildlife species. under the ESA as determined by the USFWS. Candidate species are those species (or subspecies, variety, or evolutionarily significant units of a species) for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA. Candidate species receive no statutory protection under the ESA. However, the USFWS encourages cooperative conservation efforts for these species to prevent further decline and possibly eliminate the need for listing in the future.

capital – The stock of resources used to produce other goods and services now and in the future. Natural capital refers to the stock of natural resources—e.g., water, air, soil—that yield a flow of ecosystem goods and services. Social capital refers to the stock of human relationships, shared norms and values, and other connections that yield benefits through social cohesion and cooperation.

capacitance – The arrangement of conductors that stores energy in the form of an electric charge when potential differences exist between conductors.

capacity – The maximum load that a generator, piece of equipment, substation, transmission line, or system can carry under existing service conditions.

channel avulsions – The rapid abandonment of a river channel and the formation of a new river channel. Avulsions occur from channel slopes that are much lower than the slope that the river could travel if it took a new course.

Class A weeds – Non-native noxious weeds whose distribution is still limited in Washington State, as designated by the WSNWCB. Eradication of all Class A plants is required by law; eradicating existing infestations and preventing new infestations are the highest priorities.

Class B weeds – Non-native noxious weeds whose distribution is limited to portions of Washington State, as designated by the WSNWCB. Species are designated for control in state regions where they are not yet widespread; in these areas prevention of new infestations is the primary goal. In regions where a Class B species is already abundant, control is decided at the local level and containment is the goal.

Class C weeds – Non-native noxious weed species that are either already widespread in Washington or are of special interest to the agricultural industry, as designated by the WSNWCB. Class C status allows a county to enforce control if it is beneficial to that

county; other counties may choose to provide education or technical support for the removal or control of these weeds.

Clean Water Act (CWA) – A federal law intended to protect water quality and to maintain the physical and biological integrity of the nation's waters.

coffer dam – Temporary dam placed in front of or around a facility to isolate it from streamflow for construction purposes. Diversion coffer dams divert a river into a pipe, channel, or tunnel.

community park – A community park is a minimum of 10 to 25 acres in size, serves the broad community, and includes facilities for active and passive recreation.

compaction (soils) – Compression of soil pores from rolling, tamping, or use of heavy equipment on soil. Soils become hardened, difficult to cultivate, and impermeable to air and water.

concrete shaft footings – Used at river crossings or in areas where the tower must sustain a higher load and requires additional support. Concrete shaft footings can be built on solid bedrock or in soils unfavorable for grillage footings. Concrete shaft footings are engineered columns of concrete reinforced by steel rods about 4 to 10 feet in diameter. Footing depth depends on site-specific engineering requirements.

conditional firm transmission service – Long-term transmission service that BPA may be able to provide when there is not enough firm transmission service, but conditional firm service has constraints that give BPA additional curtailment rights when granting the service. This service has a lower priority than firm service, but is a higher priority than non-firm service.

conductors – The wires that carry the electrical current on the transmission line.

control house – The substation building that contains electrical panels, meters, relays and other equipment needed to control the transmission line operation.

corona – Corona occurs in regions of high electric field strength on conductors, insulators, and hardware when sufficient energy is imparted to charged particles to cause ionization (molecular breakdown) of the air.

counterpoise – A buried wire system connected to the footings of towers or poles supporting a transmission line. Used to establish a low-resistance path to earth, usually for lightning protection.

Critical Aquifer Recharge Area (CARA) – Area designated by the Washington Administrative Code that is determined to have a critical recharging effect on aquifers used for potable water (as defined by WAC 365-190-030[2]).

Critical Habitat – An area or areas designated by USFWS as essential for the conservation of a federally listed species.

cultural resources – Nonrenewable resources associated with human occupation or activity related to history, architecture, archaeology, engineering, and culture.

cumulative impacts – Impacts created by the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions.

current – The flow of electric charge through a wire.

culvert – A corrugated metal or concrete pipe used to carry or divert runoff water from a drainage; usually installed under roads to prevent washouts or erosion.

cut-and-fill – Process of constructing road or canal whereby the amount of materials from cuts roughly matches the amount of fill needed to make nearby embankments.

danger tree – A tree that occurs adjacent to the cleared right-of-way and is hazardous to the transmission line. These trees are removed to prevent any such tree from falling on to or otherwise interfering with a conductor. A tree would be identified as a danger tree if it could fall into, bend into, or grow into the conductor or close enough to cause a "flashover" of current from the conductor. Further, a swing-into danger tree is one that is likely to experience contact or "flashover" from the swing displacement of the conductor. See Transmission Line Maintenance Standards and Guides Section VII.B.1.

dead-end towers – Heavy towers designed for use where the transmission line loads the tower primarily in tension (pull) rather than compression (downward push), such as in turning large angles along a line or bringing a line into a substation.

debris flow – Rapid movement of water-charged mixtures of soil, rock, and organic debris down steep stream channels.

decibel (dB) – A unit of sound measurement. In general, a sound doubles in perceived loudness for every increase of 10 decibels.

decrease – Where bolded in Chapter 11, Socioeconomics this term reflects decreases in the amount or value of a resource, as defined in Section 11.2.1.

demand side management – The strategies that focus on influencing when and how customers use electricity, with an emphasis on reducing or leveling load peaks, such as conservation measures and rate incentives for shifting peak loads, and energy storage schemes for reducing, redistributing, shifting, or shaping electrical loads.

distinct population units – the smallest division of a taxonomic species permitted to be protected under the U.S. Endangered Species Act.

distributed generation – Placing small amounts of generation located on a distribution system for the purpose of meeting local peak loads, and/or displacing the need to build/upgrade larger-scale, centralized generation facilities.

dewatering – To divert or remove water from an excavated area, stream or river channel to construct or rebuild dams and related hydroelectric facilities.

digitize – The process in GIS by which aerial photographs (and other geospatial data) are used as references to “draw” polygons encompassing features of interest (or vegetation types in the case of this study), to characterize different geographic areas in a visual way so that they can be easily classified on a map.

double-circuit – Two separate electrical circuits (for alternating current, each circuit consists of three separate conductors or bundles of conductors) on the same transmission towers.

drain dip – A wide, shallow depression placed in a road surface to divert water off the road into a stable drainage to prevent erosion.

electric and magnetic fields (EMF) – The two kinds of fields (electric and magnetic) produced around the electric wire or conductor when an electric transmission line or any electric wiring is in operation.

emergent – Vegetation that is rooted below water but grows above the surface.

emigration – In fish, emigration is movement out of natal (i.e., birth place) and or rearing areas toward the ocean.

encroachment – Land use along a powerline right-of-way that may not be compatible or allowed within the existing right-of-way, depending on existing easements and land use agreements. Examples of encroachments are tall-growing landscaped vegetation; unauthorized recreation; storage of RVs, cars and boats; buildings such as garages or sheds; and fences through tower legs.

endangered species – A federal or state listing of a plant or wildlife species. Under federal listing (as determined by the USFWS under the ESA), these species (or subspecies, variety, or evolutionarily significant units of a species) are determined to be in danger of extinction through all or a significant portion of their range. The ESA protects endangered species and their habitats by prohibiting "take" (harassment, disturbance, removal, hunting, etc.) of listed animals or plants, except under Federal permit. The ESA also regulates the designation of "critical habitat" for listed species, which may include areas not currently occupied by the species but essential to its conservation. Under state listing (by the WDFW), these species are defined as a species native to the state that is seriously threatened with extinction throughout all or a significant portion of its range throughout the state.

ephemeral stream – A stream that only exists for a short period of time during or following precipitation or snowmelt. EPA also defines ephemeral streams as having channels that are above the groundwater reservoir at all times (see intermittent stream).

estuarine – Related to the wide lower course of a river where it flows into the sea. Estuaries experience tidal flows and their water is a changing mixture of fresh and salt.

ethnography (ethnographic, adj.) – The branch of anthropology that deals with the scientific description of specific human cultures.

evapotranspiration – The transport of water into the atmosphere from surfaces, including soil (soil evaporation), and from vegetation (transpiration). Other contributors to evapotranspiration may include evaporation from wet canopy surface (wet-canopy evaporation), and evaporation from vegetation-covered water surface in wetlands.

evolutionarily significant unit – Population of a species that is considered distinct for purposes of conservation. Delineating ESUs is important when considering conservation actions.

experiential – Relating to, derived from, or providing experience.

Farmland of Statewide Importance – Land, in addition to prime farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Unlike prime farmland, criteria for defining and delineating this land are determined by the appropriate state agency or agencies. Farmland of statewide importance typically includes land that is nearly prime farmland and could economically produce high yields of crops.

fault – A discrete surface or zone of discrete surfaces separating two rock masses across which one mass has slid past the other.

federally listed – Species listed as threatened or endangered by the USFWS.

fiber optic cable – Special wire installed on the transmission line that is used for communication between one location and another. Fiber optic technology uses light pulses instead of radio or electrical signals to transmit messages.

firm transmission service – Transmission service that is reserved or scheduled for a specific term (usually a year or longer) that is of the same priority as that of BPA's use of the transmission system.

fish window – A period of calendar time suggested by state or federal fisheries agencies where in-water construction work is preferred; and where such work is prohibited before or after such period.

fish-bearing stream – Streams that are known to be used by fish, or meet the physical criteria to be potentially used by fish. Fish streams may or may not have flowing water all year; they may be perennial or seasonal.

flashover – A disruptive discharge through the air around or over the surface of an insulator produced by the application of a voltage of sufficient magnitude to cause the breakdown path to become ionized and result in an electric arc or fault. A flashover can be caused by lightning surges on a transmission line.

floodplain hydraulic roughness – The presence of anything in the floodplain that could slow the flow of water through the floodplain. A mowed pasture would be low in hydraulic roughness compared to a forested floodplain. Tall grass would provide more roughness than mowed grass or sparse vegetation.

floodplains – Areas adjacent to rivers and streams that might be flooded during high water; those that have a 1 percent chance of being flooded in a given year are 100-year floodplains.

footings – An assembly of metal in the ground at each of the four tower corners.

forb – A broadleaf non-woody plant that is not a grass, sedge, or rush.

foreground and middle-ground view – The area visible from a travel route, use area, or other observation point to a distance of 3 to 5 miles. The outer boundary of this zone is

defined as the point where the texture and form of individual plants are no longer apparent in the landscape.

freshet – A sudden rise or overflow of a stream resulting from a heavy rain or melting snow.

fry – In trout and salmon, this is an early life history stage, after fertilized eggs hatch and deplete their yolk-sac, when juveniles emerge from their redd to actively search for food.

fugitive dust – Any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of people.

functions and values – The special benefits provided by wetlands that are considered valuable to society and to the environment, and are the result of the inherent and unique natural characteristics of wetlands, such as protecting and improving water quality and providing habitat for fish and wildlife.

gauss – A unit of magnetic induction.

generation redispatch – Management of generation patterns to overcome cut plane or outage problems.

genetic reserve – Conservation area intended to maintain and protect the genetic diversity and integrity of a target species.

glacial till – Till or glacial till is unsorted glacial sediment. Glacial drift is a general term for the coarsely graded and extremely heterogeneous sediments of glacial origin. Glacial till is that part of glacial drift which was deposited directly by the glacier.

grillage footings – Used for dead-end towers. They consist of a 15-foot by 15-foot assembly of steel I-beams that have been welded together and buried 14 to 16 feet deep for each tower foot.

ground wire – A protective wire strung above the conductors on a transmission line to shield the conductors from lightning; also called shield wire or overhead ground wire.

habitat fragmentation – A process by which human development divides a habitat into smaller areas, hindering the spread or movement of plants and animals from one area to another and increasing the vulnerability of the habitat to disturbance.

hazardous substance – Hazardous substances are substances that are considered severely harmful to human health and the environment and include hazardous substances as defined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

hazardous waste – Hazardous waste is defined under the Resource Conservation and Recovery Act (RCRA) as a solid waste (or combination of solid wastes) that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may do the following: (1) cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating illness, or (2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

herbaceous balds – Patchy grass and forb areas located on shallow soils over bedrock often on steep slopes that are commonly fringed by forest or woodland. Dominant flora includes herbaceous vegetation, dwarf shrubs, mosses, and lichens.

high impact – This rating represents conditions unique to each resource. It is defined in each chapter's section on impact levels.

historic properties – Are a subset of cultural resources that are eligible for inclusion in the National Register of Historic Places.

historic resources – Are defined as extant buildings, structures and objects that are at least 50 years old.

historic-period sites – Sites from after the arrival of Europeans.

Holocene – The epoch between about 10,000 years ago and the present.

hydric soil – Soil that is saturated, flooded, or inundated long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic (water loving) vegetation.

hydrogeomorphic – A wetland classification indentifying wetlands according to their position within the landscape (e.g., slope, riverine) and the functions they perform as a result of that landscape position.

hydrology – The science of the properties, distribution, and circulation of water.

Hydrologically immature – In forest, areas with less than 10 percent total crown closure and/or more than 75 percent of the tree crown in hardwoods. Non-forested areas are also considered hydrologically immature.

hydrophytic (vegetation) – Describes plants that have adapted to living in aquatic environments. These plants require special adaptations for living submerged in water, or at the water's surface.

hydrology – Hydrology addresses properties, distribution, and circulation of water.

igneous – Rocks or minerals that solidified from molten or partly material (i.e., magma).

impedance – A characteristic of an electric circuit that determines its hindrance to the flow of electricity. The higher the impedance, the lower the current.

increase – Where bolded in Chapter 11, Socioeconomics this term reflects increases in the amount or value of a resource, as defined in Section 11.2.1.

intermittent stream – A stream where portions flow continuously only at certain types of year, for example when receiving water from a spring, groundwater source, or surface-water source such as melting snow. At low flow there may be dry segments alternating with flowing segments.

jumper – A short length of conductor connecting two points in a circuit usually at a tower.

juvenile – A young fish that has not reached sexual maturity.

kilovolt – One thousand volts (see Volt).

lahar – A mudflow composed chiefly of volcanic materials including mud, rocks, and water, on the flanks of a volcano.

larvae – An early life history stage of some fish during which they grow for a certain period of time before metamorphosing into adults.

liquefaction – The transformation of a solid soil to a liquid state, typically as the result of earthquake shaking.

List A – Designation by the ODA for noxious weeds recommended for eradication or intensive control when and where found.

List B – Designation by the ODA for noxious weeds recommended for intensive control on a site-specific, case-by-case basis at the state, county, or regional levels.

List T – Designation by the ODA for noxious weeds recognized as priority species for prevention and control.

lithic – Made of stone.

lithospheric plate – A segment of the Earth's crust (lithosphere), which adjoins other plates along zones of seismic activity.

litterfall – The transport of leaves, bark, twigs, and other forms of dead organic material and constituent nutrients from trees, shrubs, and other plants to the top layer of soil or to bodies of water.

load – The amount of electric power or energy delivered or required at any specified point or points on a system. Load originates primarily at the energy-consuming equipment of customers.

load curtailment – A temporary reduction in electric power delivery under emergency conditions, taken after all possible load management measures have been tried.

long-range view – The area visible from a travel route, use area, or other observation point to a distance of greater than 5 miles. Also called the background distance zone.

low impact – This rating represents conditions unique to each resource. It is defined in each chapter's section on impact levels.

low-income population – Groups of people identified using the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living close to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect (CEQ 1997).

maintenance area – Geographic area that has a history of non-attainment, but now consistently meets the National Ambient Air Quality Standard (NAAQS). See attainment.

mass wasting – The downward movement of rock debris.

megawatt (MW) – One million watts, or one thousand kilowatts; an electrical unit of power.

mesic (vegetation) – Type of habitat with a moderate or well-balanced supply of moisture.

microclimate – A local atmospheric zone where the climate differs from the surrounding area (for example, south-facing slopes or areas adjacent to water bodies).

micropiles – Steel rods used to strengthen and stabilize the foundation of a building or structure.

middle-ground view – See foreground and middle-ground view.

Milligauss (mG) – A unit used to measure magnetic field strength; one-thousandth of a gauss.

mine tailings – The materials (e.g., ground rock) left over after the desired minerals have been removed.

mini park – A mini park is generally 0.25 acre in size, in close proximity to a neighborhood, and serves people within the immediate neighborhood (Cowlitz County 2010b).

minority – Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (CEQ 1997).

minority population – Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living close to one another, or a dispersed/transient set of individuals (such as migrant workers or Native American), where either type of group experiences common conditions of environmental exposure or effect. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ 1997).

moderate impact – This rating represents conditions unique to each resource. It is defined in each chapter's section on impact levels.

motorized trail – A recreation trail that is open to some or all of the following uses: four-wheel drive vehicles, all-terrain vehicles, and motorcycles. These trails are often open to non-motorized uses as well.

multi-component sites – Where both pre-contact and historic-period cultural materials are present.

myth-time stories – These are stories that detail creation beliefs for the tribes and therefore hold religious significance.

neighborhood park – A neighborhood park is a minimum of 5 acres in size and primarily serves residents within one-half mile of the park (Cowlitz County 2010).

Natural Area Preserve (NAP) – As defined by Washington State legislature's Natural Areas Preserve Act in 1972, these areas are designated to preserve the best remaining examples of many ecological communities including rare plant and animal habitat, and are to be used for education, scientific research, and to maintain Washington's native biological diversity.

Natural Resources Conservation Area (NRCA) – As defined by the Natural Resources Conservation Area program established by the Washington State legislature , these areas are established to protect outstanding examples of native ecosystems, habitat for endangered, threatened and sensitive plants and animals, and scenic landscapes. They are to be used for conservation purposes.

no impact – This rating represents conditions unique to each resource. It is defined in each resource chapter's section on impact levels, but generally indicates that current and future conditions would not be affected by the project.

non-attainment – An area that does not meet air quality standards set by the Clean Air Act for specified localities and periods.

non-firm transmission service – Transmission service that is not guaranteed to be available and is only available after commitments for firm and conditional service have been met.

non-motorized trail – A recreation trail typically open to horseback riding, mountain biking, and hiking.

non-wires measures − Non-transmission alternatives to transmission line construction that may include pricing strategies, demand reducing strategies, and strategic placement of generators.

northern spotted owl circles – The area around a documented northern spotted owl nest (activity center) that delineates the main home range or foraging area of the breeding pair. The circular area has a radius of 0.7 mile.

noxious weed – A non-native and invasive plant species designated by state law for some level of management.

open space – Land cover category used in the land analysis of this EIS. It contains areas that have not been developed and have the potential to be used for both production and non-production forest, and non-forested uses such as rural residential, agriculture, or recreation. For this EIS, this category includes area managed for commercial forest production by private companies much smaller than those included in the forest production category.

overload – Moving too much current flow over transmission facilities. Equipment has safeguards: in the event of system overload, switches will disconnect sensitive equipment from the flow of electricity.

palustrine – Relates to a system of inland, non-tidal wetlands characterized by the presence of trees, shrubs, and emergent. Palustrine wetlands range from permanently saturated or flooded land (as in marshes, swamps, and lake shores) to land that is wet only seasonally a class of wetland that is a freshwater wetland classification system.

peat – An unconsolidated deposit of plant remains in a water-saturated environment, such as a bog. Peat is an early stage in the development of coal.

pentachlorophenol (PCP) – Pentachlorophenol is an organochlorine compound used as a wood preservative, pesticide, and disinfectant. First produced in the 1930s, it is marketed under many trade names. People may be exposed to PCP in occupational settings through the inhalation of contaminated workplace air and dermal contact or with wood products treated with PCP. Also, general population exposure may occur through contact with contaminated environment media, particularly in the vicinity of wood treatment facilities and hazardous wastes sites.

perennial stream – A stream or portion of a stream that flows year-round and is considered permanent.

plate footings – Used for suspension towers. They consist of a 4-foot by 4-foot steel plate buried about 11 feet deep for each tower foot.

Pleistocene – The epoch between about 2.6 million years and the present.

polychlorinated biphenyls (PCBs) – Polychlorinated biphenyls are a class of organic compounds. PCBs were widely used for many applications, especially as dielectric fluids in transformers, capacitors, and coolants. Due to PCB's toxicity and classification as a persistent organic pollutant, PCB production was banned by the United States Congress in 1979.

polycyclic aromatic hydrocarbons (PAHs) – Polycyclic aromatic hydrocarbons, also known as poly-aromatic hydrocarbons or polynuclear aromatic hydrocarbons are potent atmospheric pollutants. PAHs occur in oil, coal, and tar deposits, and are produced as byproducts of fuel burning (whether fossil fuel or biomass). As a pollutant, they are of concern because some compounds have been identified as carcinogenic, mutagenic, and teratogenic (can cause birth defects).

power circuit breakers – A switching device that can automatically interrupt power flow on a transmission line at the time of a fault.

pre-contact – Resources that date to before direct or indirect contact between Euro-Americans and Native Americans.

Priority Area – A designation under WDFW's Priority Habitats and Species list to indicate areas where species are considered a priority only within known limiting habitats (e.g., breeding areas) or within areas that support a relatively high number of individuals (e.g., regular large concentrations, rookeries, etc.).

priority habitat – A WDFW designation of habitat types with unique or significant value to many species. It may be described by a unique vegetation type or by a dominant plant species that is of primary importance to fish and wildlife (e.g., oak woodlands). A priority habitat may also be described by a successional stage (e.g., old growth or mature forest), or by a specific habitat feature of key value to fish and wildlife (e.g., talus slopes, caves, snags).

priority species – Under the WDFW, priority species are fish and wildlife species requiring protective measures or management actions to ensure their survival. A species identified and mapped as priority species fit one or more of the following criteria:

Criterion 1. State-Listed and Candidate Species.

Criterion 2. Vulnerable Aggregations (species or groups of animals susceptible to significant population declines, within a specific area or statewide, by virtue of their inclination to aggregate. Examples include heron rookeries, seabird concentrations, marine mammal haulouts, shellfish beds, and fish spawning and rearing areas.

Criterion 3. Species of Recreational, Commercial, and/or Tribal Importance whose biological or ecological characteristics make them vulnerable to decline in Washington or that are dependent on habitats that are highly vulnerable or are in limited availability.

Prime Farmland – Land that has the best physical and chemical characteristics for producing items such as food, feed, forage, fiber and oilseed crops, which have not already been targeted for urban development or water storage (Code of Federal Regulations [CFR] 730-733 section 657.5). The NRCS identifies soil mapping units within Washington State that qualify as prime based on specific soil criteria. Soil mapping units may be classified as prime farmland under current conditions or as prime farmland given that certain qualifying conditions exist on the site (e.g., "prime farmland if irrigated," "prime farmland when protected from flooding," etc.). In such cases, if the qualifying conditions do not exist, then the unit is considered "not prime."

pro forma open access tariff – This tariff defines the terms and conditions of point-to-point and network integration transmission services offered by BPA. Tariffs are schedules detailing utility rates, rules and regulations, and terms of service filed for approval with a regulatory agency. Usually relative to retail, end-use customer service.

protective relay – A safety measure designed to calculate operating conditions on an electrical circuit and to trip circuit breakers when a fault is detected.

pyroclastic flow – A hot flow composed of a mixture of gases and particles.

reach – A section of a river or stream between two defined points.

red flag —cultural resources to which potential effects are considered difficult or impossible to avoid

redd – A nest of fish eggs covered with gravel.

residual soil – A soil formed from, or resting on, consolidated rock of the same kind as that from which it was formed, and in the same location.

riffle – A stretch of shallow stream habitat with moderate to fast current and turbulent flow.

right-of-way – An easement for a certain purpose over the land of another, such as a strip of land used for a road, electric transmission line, pipeline, etc.

riparian – The three-dimensional zones of direct physical and biotic interactions between terrestrial and aquatic ecosystems located along rivers, creeks and lakes; boundaries of the riparian zone extend landward to the limits of flooding and upward into the canopy of streamside vegetation.

rip-rap – A loose assemblage of broken stones erected in water or on soft ground as a foundation.

river mile – Distance from a river mouth or other known locality to a specific site.

rural – Land cover category used in the land analysis of this EIS. The rural land cover category includes areas characterized by a diverse suite of land uses and features that are typical in rural areas. These range from agricultural uses to diffuse/low density residential development. In terms of development density criteria, the rural land cover type included those areas with approximately ≤1 residence per acre.

rural centers – Distinct areas of smaller lot patterns with residential development, small-scale business that provides convenience shopping and services to nearby rural residents, have access to arterial roadways, and are surrounded by protected rural landscapes of generally open land used for agriculture, forestry, large lot residential, recreational and environmental protection purposes.

safety backline (safe backline) – A "buffer" strip outside the edge of the right-of-way to assure reliability. It is created by cutting a strip of trees alongside the right-of-way, including trees tall enough to hit the conductor adjacent to the right-of-way. When an existing stand of trees next to the right-of-way is found to be so highly compromised that it is unstable as a whole, all trees from outside the right-of-way from the last tree tall enough to hit a conductor to the edge of the right-of-way would be removed.

salmonid – Fish belonging to the family of salmonidae, including salmon, trout, char, whitefish, and allied freshwater and anadromous fish.

scenic quality– A rating of the overall appeal of a view that is categorized as High, Medium, or Low, which is determined based on several key factors (BLM 1986). The key factors include landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. With a maximum possible score of 32, values are totaled with results of 19 or more ranked “High”, 12 to 18 ranked “Medium”, and 11 or less ranked “Low”.

scrub-shrub – Woody vegetation less than 20 feet tall.

sediment – Fragmental material that originates from the weathering of rocks.

sedimentary – Rocks or deposits formed by the deposition of sediment.

sensitive species – Washington or Oregon state listing of a fish or wildlife species. In Washington, the WDFW lists native species as sensitive if they are vulnerable or declining and likely to become endangered or threatened throughout a significant portion of its range within the state without cooperative management or removal of threats (WAC 232-12-297). In Oregon, the ODFW for fish and wildlife species, subspecies, or populations facing one or more threats to their populations or habitats (OAR 635-100-040). The Oregon listing is used to encourage voluntary actions that will improve species status, and contains the sub-categories "Critical" (imperiled with extirpation from a specific area of the state) and "Vulnerable" (facing one or more threats to populations or habitats).

sensitivity levels – In reference to visual resources, sensitivity is an evaluation of the viewer and as a way of ranking public concern.

series compensation – The use of devices such as capacitors or voltage regulators to improve performance of an electric system with respect to some specified characteristic. Such devices are used to increase capacity.

shrub – The shrubland cover category includes those areas dominated by shrub species or saplings, with greater than or equal to 30 percent aerial cover of these vegetation types.

single-circuit – One electrical circuit that consists of three separate conductors or bundles of conductors on one tower.

single-circuit tower – A tower that can support only one transmission line.

snags – Standing dead or dying trees. These occur as a result of age, disease, lighting, fire, animal damage, too much shade, and other factors. They are important to wildlife in both natural and landscaped settings.

snubs – Trenches about 8 feet deep by 4 feet wide by 12 feet long used to tie off the conductor after it is pulled through the towers and before it is strung under tension.

sock line – Thick rope placed in travelers (small wheels hung from the towers) by hand or by helicopter to help string conductor from dead-end to dead-end.

soil – Unconsolidated sediment that overlies bedrock.

sole source aquifer – An underground water source that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water.

source wells – Group A wells (Washington's specific designation for public water systems regulated by the federal SDWA) and Group B wells (Washington's designation for public water systems smaller than the minimum cut-off defined by the SDWA).

spacer damper – A mechanical device attached to each subconductor of a conductor bundle both to damp vibrations and to prevent physical contact of subconductors.

spans – The horizontal distance between two adjacent towers.

special-status vegetation resource – Vegetation resources receiving special protections or considerations under state or federal regulations, including rare plants (federally or state-listed), WDFW priority habitats, and WNHP high quality native plant communities.

spread footings – Rock anchors required for footings when a suspension tower is built on solid bedrock located less than two feet below the surface. Six-inch-diameter holes are drilled into the bedrock about 11 feet deep and steel anchor rods are secured within the hole with concrete. The approximate size of each column is 4 feet in diameter and 20-30 feet tall.

stranded use – Permanently limited access to agricultural or forest production areas.

stratovolcano – A volcano that is comprised of alternating layers of lava and pyroclastic deposits.

subduction – The process of one lithospheric plate descending beneath another.

subsidence – The gradual or rapid lowering of the ground surface from compressing, drying out, or lowering the groundwater table of subsidence susceptible soils.

substation – The site containing the terminal switching and transformation equipment needed to distribute power from a transmission line. These non-generating electrical power stations serve to transform voltages to higher or lower levels, and serve as a delivery point to individual customers such as utilities or large industries.

substation dead-end towers – Towers within the substation where incoming or outgoing transmission lines end; typically these are the tallest structures within the substation.

substation rock surfacing – A 3-inch or more layer of rock, selected for its insulating properties, which is placed on the ground within the substation to protect operation and maintenance personnel from danger during substation electrical failures.

substrate – An underlying layer upon which other materials exist or are placed.

suspension tower – A tower designed to support conductors strung along a virtually straight line with only small turning or descending or ascending angles.

switches – Devices that mechanically disconnect or isolate equipment. Usually located on both sides of circuit breakers.

talus – A sloping mass of coarse rock fragments accumulated at the base of a cliff or slope.

tectonic – The process and dynamics of lithospheric plate movement.

tensioner – A device used to pull the conductors to the correct sag so that proper ground clearance is maintained.

timber production – Land cover category used in the land analysis of this EIS. Forest production areas are within land owned or managed by timber companies (Weyerhaeuser, Longview Timber, and Sierra Pacific), utilities (PacifiCorp), or the state (WDNR) and are primarily used for timber production. These areas are mostly forested (some with

mature forests and forested wetlands), cleared, or have been replanted. There are also existing access roads within these areas that were built for hauling cut timber.

thermal plant – A type of electric generating station or power plant, such as gas, coal, and nuclear plants, in which the source of energy for the prime mover is heat.

threatened species – Federal or Washington State listing status of a plant or wildlife species. Under federal listing (as determined by the USFWS under the ESA) these species (or subspecies, variety, or evolutionarily significant unit of a species) are considered likely to become endangered within the foreseeable future. The ESA protects threatened species and their habitats by prohibiting "take" (harassment, disturbance, removal, hunting, etc.) of listed animals or plants, except under Federal permit. The ESA also regulates the designation of "critical habitat" for listed species, which may include areas not currently occupied by the species but essential to its conservation. Under Washington State listing (as determined by the WDFW) these species are native to the state and are likely to become endangered in the foreseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats (WAC 232-12-297).

toxic substance – A toxic substance is any chemical or mixture that may be harmful to the environment and to human health if inhaled, swallowed, or absorbed through the skin. A toxic substance would also include any chemical or substance regulated by the Toxic Substances Control Act regulations (40 CFR Parts 700 through 766).

Traditional Cultural Property (TCP) – A property or place that is eligible for inclusion on the National Register of Historic Places because of its association with cultural practices and beliefs that are rooted in the history of a community, and are important to maintaining the continuity of that community's traditional beliefs and practices.

transfer capability – Amount of electric power that can be transferred over the interconnected transmission network in a reliable manner at a given time.

transpiration – Loss of water vapor from parts of plants.

triple-circuit – The placing of three separate electrical circuits on the same tower.

turbidity – The extent to which water is muddy or cloudy due to the presence of suspended matter.

unconsolidated – A soil or sediment that is loosely aggregated or uncemented.

urban/suburban – Land cover category used in the land analysis of this EIS. The urban/suburban land cover category includes high to mid-density development and infrastructure associated with urban and suburban environments, including roads, commercial buildings, and residences and associated landscaping, and associated impervious surfaces (e.g., parking lots).

vegetation type – A category representing the general vegetation conditions in a given area.

viewshed – The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

volt – The international system unit of electric potential and electromotive force.

voltage – The driving force that causes a current to flow in an electrical circuit.

water bar – A diagonal channel across a road surface that diverts surface water off the road into a stable drainway. By constructing a series of water bars at intervals along a road, the volume of erosive water flowing down the road is reduced.

water right – A legal authorization to use a certain amount of public water for a designated purpose.

water wells – Exempt and non-exempt wells in the State of Washington's Department of Ecology well database.

Water Resource Inventory Area (WRIA) – The State of Washington's Department of Ecology and other natural resources agencies have divided the state into 62 "Water Resource Inventory Areas" or "WRIAs" to delineate the state's major watersheds.

watershed – An area draining into a river, lake, or waterbody.

Watershed Administrative Unit (WAU) – Used by the Timber/Fish/Wildlife cooperators as the boundaries for watershed analysis studies and other natural resources management purposes on state and privately owned lands. WAU represents the administrative boundaries of 846 units. The boundaries are mainly along drainage divides (ridges), with some along rivers and other WDNR management boundaries.

wellfield – Tract of land that contains a number of existing or proposed wells for supplying water as specified in the wellfield protection maps.

wellhead protection areas – Surface and subsurface zones surrounding a well or wellfield supplying a public water system that are protected areas designed to reduce the risk of contamination of water supply wells associated with spills and discharges of contaminants.

wetland – An area of land where soil is saturated with moisture either permanently or seasonally. Indicators of wetland include the type of vegetation, soil characteristics, and hydrology of the area.

wetland plant communities – An assemblage of plants adapted to wetlands (areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; 33 CFR 328.3, 40 CFR 230.3).

woody debris – Materials left over from cutting, harvesting, natural breakage or falling, such as limbs or branches of a tree.

yearling – A fish that is one year old.

yolk sacs – A membranous sac attached to an embryo, providing early nourishment in the form of yolk in bony fishes, sharks, reptiles, birds, and primitive mammals.

32.2 Acronyms

µm	micrometers
A	Amperes
ACGIH	American Conference of Governmental Hygienists
ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
ADPA	Archaeological Data Preservation Act
AINW	Archaeological Investigations Northwest, Inc.
AOC	Administrative Order of Consent
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
ARPA	Archaeological Resources Protection Act
ATV	all-terrain vehicle
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BNSF	Burlington Northern Santa Fe Railway Company
BPA	Bonneville Power Administration
CAA	Clean Air Act
CAO	Critical Area Ordinance
CARA	critical aquifer recharge areas
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	methane

CMP	comprehensive management plan
COA	Conservation Opportunity Area
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalents
Corps	United States Army Corps of Engineers
CRP	Conservation Reserve Program
C-TRAN	Transportation Benefit Authority
CUBS	community urban bus service
CUSV	Current Use Special Valuation
CWA	Clean Water Act
CWCOG	Cowlitz-Wahkiakum Council of Governments
DAHP	Department of Archaeology and Historic Preservations
dBA	decibel (A-weighted)
DC	double-circuit
DEQ	Department of Environmental Quality
DGER	Division of Geology and Earth Resources
DNR	Washington State Department of Natural Resources
DOE	United States Department of Energy
DSL	Oregon Department of State Lands
DT	danger tree
Ecology	Washington State Department of Ecology
EDNA	environmental designations for noise abatement
EFH	essential fish habitat
EFSC	(Oregon) Energy Facility Siting Council
EFSEC	(Washington) Energy Facility Site Evaluation Council
EIA	Energy Information Administration

EIS	environmental impact statement
EMF	electromagnetic fields
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute, Inc.
ESU	evolutionarily significant unit
F	Fahrenheit
FAA	Federal Aviation Administration
FCDP	Federal Land Policy and Management Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FIRM	Flood Insurance Rate Map
FLMPA	Federal Land Policy Management Act
FR	Federal Register
GHG	greenhouse gas
GIS	geographic information system
GMA	Growth Management Act
Gorge	Columbia River Gorge
GWP	global warming potential
H_2O	water
HBC	Hudson's Bay Company
HCP	habitat conservation plan
HFC	hydrofluorocarbons

HVAC	high voltage alternating current
HVDC	high voltage direct current
HVED	high voltage extruded dielectric
I	Interstate
ICBEMP	Interior Columbia Ecosystem Management Project
IPCC	International Panel on Climate Change
JCTRA	Jones Creek Trail Riders Association
kV	kilovolt
kV/m	kilovolts per meter
kWh	kilowatt hours
L_{50}	audible noise level exceeded 50 percent of the time during foul weather
LCDC	(Oregon) Land Conservation and Development Commission
L_{dn}	day-night noise level
L_{eq}	equivalent sound level
MAP	Mitigation Action Plan
MCCFP	Multnomah County Comprehensive Framework Plan
MCL	maximum contaminant level
Metro	Metropolitan Service District
Mg/L	milligram per liter
MOA	Memoranda of Agreement
MOU	Memoranda of Understanding
msl	mean sea level
MW	megawatt
MWh	megawatt hour
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards

NAGPRA	Native American Graves Protection and Repatriation Act
NAP	Natural Area Preserve
NC	no change from the action alternative
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHD	National Hydrographic Dataset
NHD	National Hydrographic Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Data
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	NOAA National Marine Fisheries Service
NOS	network open season
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park System
NRCA	Natural Resources Conservation Area
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	National Scenic Area
NWI	National Wetland Inventory
NWPCC	Northwest Power and Conservation Council
O_3	ozone
OAR	Oregon Administrative Rules
OASIS	Open-Access Same-Time Information System

OATT	Open Access Transmission Tariff
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OHWM	ordinary high water mark
ORBIC	Oregon Biodiversity Information Center
ORS	Oregon Revised Statutes
ORV	off-road vehicle
ORWAP	Oregon Rapid Wetland Assessment Protocol
OSU	Oregon State University
PAB	palustrine aquatic bed
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCP	pentachlorophenol
PDX	Portland International Airport
PEM	palustrine emergent
PEP	Permission to Enter Property
PFC	perfluorocarbons
PFO	palustrine forested
PGA	peak ground acceleration
PGE	Portland General Electric
PHS	Priority Habitats and Species
PM	particulate matter
PM10	particulate matter smaller than 10 µm

PM2.5	particulate matter smaller than 2.5 µm
PO	policy
POW	palustrine open water
ppm	parts per million
PSS	palustrine scrub-shrub
PUD	Clark Public Utility District
RA	Risk Assessment
RAS	remedial action scheme
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI/FS	remediation investigation/feasibility study
RM	river mile
RMC	Reynolds Metals Company
ROD	Record of Decision
RV	recreational vehicle
SBL	safety backline
SC	single-circuit
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SF_6	sulphur hexafluoride
SHA	site hazard assessment
SHPO	State Historic Preservation Office (or Officer)
SMA	Special Management Area (in National Scenic Area)
SMP	shoreline master program
SOA	South of Allston
SPCC	Spill Prevention, Control, and Countermeasure (plan)

SPS	Spokane, Portland, and Seattle
SR	State Route
SWCAA	Southwest Clean Air Agency
SWPPP	Stormwater Pollution Prevention Plan
TC	triple-circuit
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Office (or Officer)
TMDL	total maximum daily load
TSCA	Toxic Substances Control Act
TSD	treatment, storage, and disposal
U.S.	United States
UAO	unilateral order
UNOS	Urban Natural Open Space
USA	unconsolidated sedimentary aquifer
USC	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VCPRD	Vancouver-Clark Parks and Recreation Department
V/m	volts per meter
VRM	visual resource management
WAC	Washington Administrative Code
WARM	Washington ranking method
WAU	Watershed Administrative Unit

WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WECC	Western Electricity Coordinating Council
WNHP	Washington Natural Heritage Program
WRIA	Water Resource Inventory Area
WSDA	Washington State Department of Agriculture
WSDOT	Washington State Department of Transportation
WSU	Washington State University
XLPE	polyethylene

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Chapter 33 Index

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

R

S

T

U

V

W

Y

Z

Page intentionally left blank