Draft Environmental Impact Statement

EverPower Coyote Crest Wind Park

Lewis County Community Development
2025 NE Kresky Avenue
Chehalis, WA 98532

In Cooperation with

Pacific County, WA
Grays Harbor County, WA

Volume 1: Main Text

July 2010

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FACT SHEET

Project Title Coyote Crest Wind Park

Proposed Action The proposed Coyote Crest Wind Park is a wind energy generation facility with a capacity of up to approximately 120 megawatts (MW). The Project involves the installation of 47 individual wind turbines or wind turbine generators (WTGs) and the associated support facilities needed to develop and operate a commercial-scale wind park. A system of Project roads is needed to provide access to the turbine sites for construction and subsequent long-term operation. Electrical power from the WTGs would be collected by a project power cable system that would deliver the electrical energy to an on-site substation where the power would be transformed to 115 kilovolts (kV) for delivery to the regional power grid. The transmission line would follow or be located near existing Weyerhaeuser Company roads and Grays Harbor Public Utility District (PUD) utility easements in Lewis County and in Grays Harbor County to the existing 115 kV substation at Cedarville, which is interconnected to the Bonneville Power Administration (BPA) transmission system at South Elma, Washington. Additional Project facilities include a permanent operation and maintenance (O&M) facility, temporary construction staging and laydown areas, and permanent meteorological (met) towers.

Grays Harbor PUD has informed Pe Ell North, LLC (the Applicant) that integration of power from the Coyote Crest Wind Park would also require an upgrade of 8 to 9 miles of existing transmission line between the Cedarville Substation and the South Elma Substation, where the PUD system is connected to the BPA transmission system. While this proposed upgrade is considered a connected action needed to allow development of the Coyote Crest Wind Park, Grays Harbor PUD would undertake all actions associated with the upgrade, including any easement or right-of-way actions required.

No Action Alternative Under the No Action Alternative, the Project facilities and associated features described in Section 2.2 would not be constructed. Timber harvest and related activities would likely continue on the Weyerhaeuser and Washington Department of Natural Resources (WDNR) lands in the Project Area. Agricultural activities that are now common in the northern part of the Project Area would also likely continue. Under this alternative, there would be no contribution to new electrical generation from the Coyote Crest Wind Park in response to identified electric power demands in the Pacific Northwest and adjoining regions. The No Action Alternative for the Applicant's proposed action does not include or preclude any specific permitting action that might occur in the future with respect to a similar proposal.

Location of Proposal	The proposed Project includes facilities located in Lewis County, Pacific County, and Grays Harbor County, Washington. The Applicant proposes to develop 44 of the wind turbines and their associated support facilities within an area of approximately 3,240 acres located on the Weyerhaeuser McDonald Tree Farm, under a lease with Weyerhaeuser. The Applicant proposes to locate 3 turbines on 320 acres to be leased from WDNR. Forty-four (44) of the turbines would be located in Lewis County and 3 would be located on Weyerhaeuser land in Pacific County. The proposed Project transmission line would be located in both Lewis County and Grays Harbor County, with approximately 3 miles on Weyerhaeuser land in Lewis County; 2 miles on existing utility easements along Garrard Creek Road in Lewis County, and 6 miles on existing utility easements along Garrard Creek Road and South Bank Road in Grays Harbor County.
Proponent	Pe Ell North, LLC, 70 NW Couch Street, Portland, OR 97209
Date of Implementation	A decision by Lewis County on the Pe Ell North, LLC application is expected in late Summer 2010. If the permit is issued, construction could likely begin within a few months of approval.
Lead Agency	Lewis County
Responsible Official	Fred Chapman, County Building Official Lewis County Community Development Department 2025 NE Kresky Avenue. Chehalis, WA 98532
Contact Persons	Phillip Rupp, Principal Planner Lynn Dietrick, Senior Project Planner Lewis County Community Development Department 2025 NE Kresky Avenue. Chehalis, WA 98532
Required Permits and Approvals	<u>Lewis County</u> Special Use Permit Critical Areas Review Building Permit Right of Way Permit Haul Route Agreement Storm Drainage Approval <u>Grays Harbor County</u> Critical Areas Review Building Permit Right of Way Permit

	Haul Route Agreement Pacific County Conditional Use Permit Critical Areas Review Building Permit State of Washington Agencies Construction Stormwater General Permit Sand and Gravel General Permit – Portable Facilities Hydraulic Project Approval General Order of Approval - Concrete Batch Plants Oversize/Overweight Vehicle Permits Highway Access Permit WDNR Forest Practices Application/Notification Federal Agencies Section 404/Wetlands Permit Notice of Proposed Construction or Alteration (FAA)
EIS Authors	Tetra Tech EC, Inc. Bothell, WA and Portland, OR
Date of DEIS	July 14, 2010
Date DEIS Comments are Due	August 13, 2010
Time and Place of Public Open House/Meeting	July 29, 2010, 3:00 to 6:00 PM Lewis County Courthouse Commissioners Hearing Room 351 NW North Street Chehalis, WA 98532
Cost of DEIS	$50 – paper copy; $2 CD copy
Location of Background Information	Lewis County Community Development Department 2025 NE Kresky Avenue Chehalis, WA 98532

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ACRONYMS AND ABBREVIATIONS

agl	above ground level
APE	Area of Potential Effect
Applicant	Pe Ell North, LLC
BMP	Best Management Practice
BNSF	Burlington Northern & Sante Fe Railway
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMP	Coastal Management Program
CRP	Conservation Reserve Program
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAHP	Department of Archaeology and Historic Preservation
dBA	A-weighted decibels
dbh	diameter at breast height
DEIS	Draft Environmental Impact Statement
DOT	U.S. Department of Transportation
DPS	distinct population segment
DS	Determination of Significance
Ecology	Washington Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EFSEC	Energy Facility Site Evaluation Council
EIS	environmental impact statement
ELF	extremely low frequency
EMF	electrical and magnetic fields
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FC	fecal coliform bacteria
FEIS	Final Environmental Impact Statement

ACRONYMS AND ABBREVIATIONS (CONTINUED)

FPA	Forest sPractices Act
FPAN	Forest Practices Application/Notice
FPARS	Forest Practices Application Review System
GHCC	Grays Harbor County Code
GLO	General Land Office
GMA	Growth Management Act
HCP	Habitat Conservation Plan
Hz	hertz
I-5	Interstate 5
IEC	International Electrotechnical Commission
IFPL	Industrial Fire Precaution Levels
ISO	International Organization for Standards
KOP	key observation point
kV	kilovolt(s)
kW	kilowatt
LCC	Lewis County Code
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{max}	maximum instantaneous sound level during a sound period
met	meteorological
mG	milligauss
min	minute
MMU	Marbled Murrelet Unit
mph	mile per hour
MW	megawatts
NAAQS	national ambient air quality standards
NAIP	National Agriculture Imagery Program
NCASI	National Council of Air and Stream Improvement
NEMA	National Electrical Manufacturers Association
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences

ACRONYMS AND ABBREVIATIONS (CONTINUED)

NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
O&M	operation & maintenance
OSHA	Occupational Health and Safety Administration
PHS	Priority Habitats and Species
Project	Coyote Crest Wind Park
PUD	Public Utility District
RCW	Revised Code of Washington
RMAP	Road Maintenance and Abandonment Plans
ROW	right-of-way
RSA	rotor swept area
SCADA	Supervisory Control and Data Acquisition
SEPA	State Environmental Policy Act
SMP	Shoreline Master Program
SPL	sound pressure level
SR	State Route
SUP	Special Use Permit
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
TES	threatened, endangered, or sensitive
TP	total phosphorus
TSS	total suspended solids
UGA	urban growth boundary
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

ACRONYMS AND ABBREVIATIONS (CONTINUED)

WDNR	Washington Department of Natural Resources
WDOH	Washington Department of Health
WFPA	Washington Forest Practices Act
WNHP	Washington Natural Heritage Program
WRA	wind resource area
WRIA	water resource inventory area
WSDOT	Washington State Department of Transportation
WTG	wind turbine generator

1. SUMMARY

1.1 Introduction

This Draft Environmental Impact Statement (DEIS) was prepared pursuant to Washington State environmental policy (Chapter 43.21C Revised Code of Washington [RCW]) and the State Environmental Policy Act (SEPA) rules (Washington Administrative Code [WAC] Chapter 197-11). Pe Ell North, LLC (the Applicant), a subsidiary of EverPower Wind Holdings, Inc., is proposing to construct and operate a commercial-scale wind energy generation facility called the Coyote Crest Wind Park (Project) in Lewis County, Pacific County, and Grays Harbor County, Washington (see Figure 1-1). While the Project includes proposed facilities in three counties, most of the turbine locations are in Lewis County, and therefore, the first Special Use Permit (SUP) application has been filed for turbines in Lewis County. For that reason, Lewis County has assumed lead agency status pursuant to WAC 197-11-050. Pacific County and Grays Harbor County agree that Lewis County is the appropriate SEPA Lead Agency.

Pursuant to the SEPA rules, Lewis County is conducting an environmental review of the proposed Project. The Project under review consists of approximately 47 wind turbine generators (WTGs) and associated Project support facilities, including an access road system, electrical collection lines, an on-site substation, an operation and maintenance (O&M) facility, and a 115 kilovolt (kV) transmission line from the Project to a point of interconnection on the Grays Harbor County Public Utility District (PUD) electrical system.

SEPA provides a way to identify possible environmental impacts that may result from governmental decisions, such as the decision required by Lewis County on an SUP for the Project. The SEPA process typically begins when an application is submitted to an agency for issuance of a permit to develop a private project. This environmental review was triggered by the Applicant's submittal of an SUP application to Lewis County on September 23, 2009 (EverPower 2009), supplemented by a Variance Application on October 12, 2009. Lewis County issued a Determination of Significance and determined that an environmental impact statement (EIS) is required under RCW 43.21C030 (2)(c).

SEPA requires evaluation of probable significant adverse impacts of a proposal such as a wind farm project. For projects addressed by an EIS, SEPA requires preparation of a draft and final environmental impact statement (DEIS and FEIS, respectively). Public scoping is an integral part of the SEPA process, and is done to assist in identifying key issues for evaluation in the EIS. Lewis County conducted scoping for the Project to obtain public and agency comment on the significant environmental aspects of this Project. The scoping process included a public open house meeting on December 2, 2009, in Chehalis, Washington to obtain comments and address questions about the Project and the SEPA process.

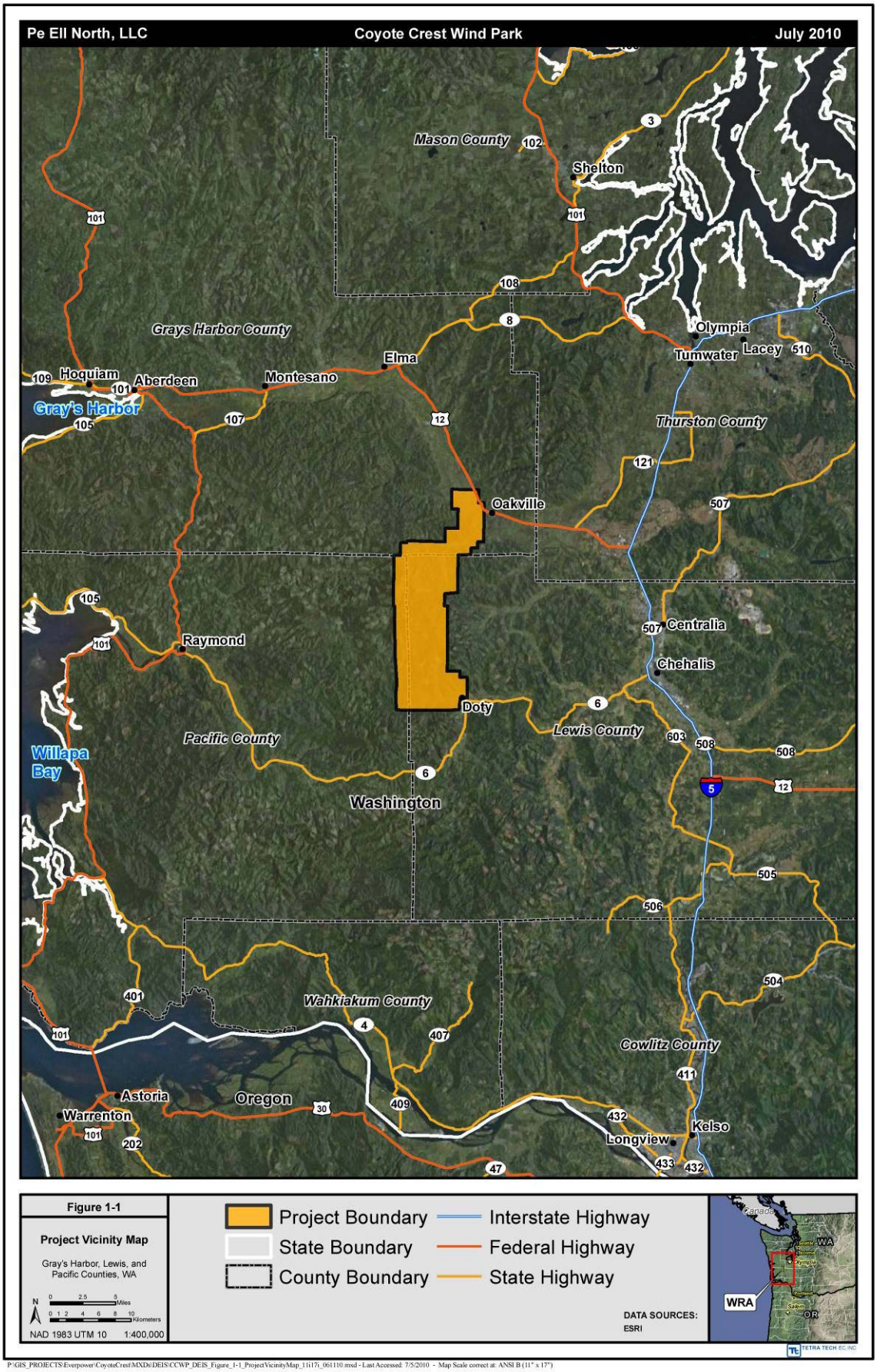
This DEIS analyzes impacts expected from the proposed action and identifies mitigation that would address the impacts identified. The DEIS is circulated for public and agency review and

comment. Chapter 7 provides the distribution list for the DEIS. The DEIS comment period starts on the date the Notice of Availability is issued by Lewis County and ends 30 calendar days thereafter. During the comment period, the public and agencies are invited to an additional public open house meeting, at which time the DEIS authors and Lewis County officials will be available for questions. The FEIS will be prepared after the close of the comment period and will respond to comments submitted during the comment period. Depending on the nature of the comments received, the FEIS may contain clarifications or additional environmental analysis. The analysis contained in the DEIS and the FEIS, collectively, constitutes the required environmental review under Chapter 43.21C RCW and WAC 197-11.

The objective of SEPA is to provide government decision makers (e.g., Lewis County) with information and the authority to impose reasonable conditions to mitigate impacts from a proposed action. If the decision maker determines, through the SEPA evaluation, that a proposal has too many significant unavoidable adverse impacts that cannot be mitigated, the decision maker may have the authority to deny the proposal. SEPA, however, does not require the local government to deny a project simply because it has adverse impacts (or even significant adverse impacts) as compared to the no action alternative. SEPA is intended to ensure that the government's review of a proposed action includes disclosure of and careful consideration of probable significant adverse impacts and the potential to mitigate those impacts through conditions or project modification (e.g., micro-siting final turbine locations, in this instance), before making a decision on the permit. This document provides the analysis required for Lewis County to consider those impacts and mitigation measures.

Once the FEIS is complete, Lewis County will commence the formal SUP application review, taking into consideration the information contained in the DEIS and FEIS, together with evidence and testimony presented by agencies and members of the public during that public hearing process for the SUP.

Chapter 1 provides a summary of the DEIS for the Coyote Crest Wind Park proposed by Pe Ell North, LLC. It briefly describes the regulatory framework for the actions under consideration by Lewis County (Section 1.2), and the applicant's objectives for the proposal (Section 1.3). Chapter 2 of the EIS provides descriptions of the proposed wind power project and the alternatives that are evaluated in the EIS. Chapter 3 documents the affected environment applicable to the Project, the expected environmental impacts of the proposal and the alternatives, and the proposed or possible mitigation measures that would address those impacts. Chapter 4 provides a complete discussion of Project consistency with applicable governmental plans and policies. Chapter 5 reviews the consultation and coordination activities related to the preparation of the EIS. Chapter 6 lists the references cited in the text of the DEIS and Chapter 7 lists the agencies, organizations, and individuals receiving copies of the DEIS. Detailed technical documentation supporting several of the environmental impact analyses is included in the appendices.



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1.2 Regulatory Framework

The Applicant submitted an application to Lewis County Community Development on September 23, 2009, supplemented by a Variance Application on October 12, 2009 for permits necessary to construct and operate a wind energy facility. The majority of the Project would be located in unincorporated Lewis County, approximately 5 miles north of the community of Doty, while several of the Project wind turbines would be located in unincorporated Pacific County. A portion of the project transmission interconnection would be located in Grays Harbor County. While the Project includes proposed facilities in three counties, most of the turbine locations are in Lewis County, and therefore, the first SUP application has been filed for turbines in Lewis County. For that reason, Lewis County has assumed lead agency status pursuant to WAC 197-11-050. Pacific County and Grays Harbor County agree that Lewis County is the appropriate SEPA Lead Agency.

The proposed approval of the Coyote Crest Wind Park by Lewis County is subject to review under SEPA. Lewis County Community Development is the lead agency for the environmental review of the project under SEPA. Lewis County issued a Determination of Significance for the proposed project on November 18, 2009 and announced its intent to prepare a SEPA EIS. In conjunction with the Determination of Significance, Lewis County requested public and agency comments on the scope of the Coyote Crest Wind Park EIS. This Draft EIS is Lewis County's response to the scoping comments.

The DEIS will be available for review by agencies and the public for a 30-day comment period. During this period, Lewis County will hold a public meeting to receive comments on the DEIS. After the formal review period for the DEIS, Lewis County will revise the DEIS as necessary in response to comments and issue a Final EIS. As specified in the SEPA rules (WAC 197-11-460 [5]), Lewis County may not take action on the proposal sooner than 7 days after the FEIS has been issued.

1.3 Project Objectives

The Applicant's objective in proposing the Project is to develop and operate a viable commercial wind energy facility of up to approximately 120 megawatts (MW) in southwest Washington that would contribute to meeting the energy needs of the region. The Applicant would make electricity generated by the Project available to utilities and other wholesale energy suppliers for sale to retail electric customers. In so doing, the Project would help utilities meet energy policy objectives to obtain a share of total electricity supplies from renewable energy sources and reduce greenhouse gas emissions associated with energy production.

1.4 Summary of the Proposal and Alternatives

The proposed Coyote Crest Wind Park is a wind energy generation facility with a capacity of up to approximately 120 MW. The Project involves the installation of 47 individual wind turbines or WTGs and the associated support facilities needed to develop and operate a commercial-scale wind park. (The Applicant plans to install WTGs with a capacity of 2.5 MW each; a project with 47 of these units would have a total capacity of 117.5 MW. For convenience, the round number of 120 MW has been used to describe the upper limit of total Project capacity.) A system of

Project roads is needed to provide access to the turbine sites for construction and subsequent long-term operation. Electrical power from the WTGs would be collected by a project power cable system that would deliver the electrical energy to an on-site substation where the power would be transformed to 115 kV for delivery to the regional power grid. The transmission line would follow or be located near existing Weyerhaeuser roads and within Grays Harbor PUD utility easements in Lewis County and in Grays Harbor County to the existing 115 kV substation at Cedarville, which is interconnected to the Bonneville Power Administration (BPA) transmission system at South Elma, Washington. Additional Project facilities include a permanent O&M facility, temporary construction staging and laydown areas, and permanent meteorological (met) towers.

The alternative evaluated in detail is the No Action Alternative, which assumes a decision by Lewis County not to approve the SUP application for the Coyote Crest Wind Park. Under this alternative, the Project facilities and associated features described in Section 2.2 would not be constructed. Timber harvest and related activities would likely continue on the Weyerhaeuser and Washington Department of Natural Resources (WDNR) lands in the Project Area. Agricultural activities that are now common in the northern part of the Project Area would also likely continue. Under this alternative, there would be no contribution to new electrical generation from the Coyote Crest Wind Park in response to identified electric power demands in the Pacific Northwest and adjoining regions. The No Action Alternative for the Applicant's proposed action does not include or preclude any specific permitting action that might occur in the future with respect to a similar proposal.

Lewis County has determined that there are no reasonable action alternatives to the proposed action that warrant detailed evaluation in the EIS. The SUP application included information about the history of Project development that addresses consideration of a variety of alternative actions, which are also discussed in Section 2.4. Review of these alternatives led the Applicant to identify the specific Project described in Section 2.2 as the optimal configuration of a wind energy project within the geographic search area adopted by the Applicant. Therefore, alternative facility configurations within the Project Area or alternative transmission connections are not evaluated in detail in the EIS, nor are alternative project sites or other energy generation technologies.

1.5 Summary of Environmental Impacts and Mitigation

Table 1-1 summarizes and compares the expected environmental impacts of the proposed Coyote Crest Wind Park and the No Action Alternative. Mitigation measures available to address potential impacts, including measures proposed by the Applicant or required by regulation, are also identified in the table. The information presented in the table is a highly distilled summary of the detailed discussion of impacts and mitigation for the respective elements of the environment provided in Chapter 3.

Table 1-1. Summary of Environmental Impacts and Mitigation

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
Earth Resources		
Proposed Action – Construction	Temporary disturbance of soil and rock on 470 acres from construction clearing, grading and excavation, with potential for erosion, mass wasting and compaction. Standard industry measures and county code requirements relative to geologic hazards would control impacts.	Mitigation measures proposed by the Applicant or required by regulation and considered in the impact analysis include the following: • A Construction Stormwater Pollution Prevention Plan (SWPPP) that satisfies the requirements of the construction general stormwater permit would be implemented. The SWPPP would include Best Management Practices (BMPs) for temporary erosion and sedimentation control measures that would be implemented at the beginning of the construction process and incorporated into the design and contractual requirements, and would identify a regular inspection and maintenance schedule for all erosion control structures. • Heavy equipment and vehicles would only be operated on access roads and within approved construction footprints and off-road construction should be limited during wet conditions. • Potential landslide hazards would be mitigated, consistent with code requirements for critical areas. • A geotechnical engineer licensed in Washington State would be retained to review and approve all grading, erosion, and drainage control plans prior to construction to assist in reducing the landslide and liquefaction risks from and to the Project. • A hazards assessment and geotechnical boring would be completed for proposed wind turbine generator (WTG) locations prior to foundation design, and WTGs would be relocated if necessary to avoid unstable areas. • Construction would comply with the building codes in effect.

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
Proposed Action – Operation and Maintenance (O&M)	Negligible long-term effects on earth resources; on-going O&M activities would occur within the footprint of permanent Project facilities.	Long-term stormwater management and erosion control measures would be inspected to assure that they are functioning adequately.
No Action Alternative	The Project Area would continue to be managed primarily for timber production. Soil disturbance and quarry development associated with timber harvesting would continue near existing levels, as it would also under the Proposed Action.	
Water Resources		
Proposed Action – Construction	Minor temporary impacts to surface water through discharge from disturbed areas of stormwater runoff and sedimentation, along with other potential contaminants. These impacts would be controlled by implementation of the SWPPP, as required by the construction stormwater general permit and the Lewis County stormwater regulations, resulting in maintenance of water quality. No impacts to aquifer recharge areas, wellhead protection areas, existing wells or other groundwater resources expected.	The Applicant would develop and implement a SWPPP that would prescribe the use of BMPs to control impacts. The SWPPP would be based on and comply with the Washington Department of Ecology's *Stormwater Management Manual for Western Washington* and Washington Department of Natural Resources (WDNR) forest practices regulations, and would address the erosion control and water quality conditions of the National Pollution Discharge Elimination System (NPDES) construction stormwater discharge general permit and Lewis County storm drainage approval.
Proposed Action - O&M	The total area of impervious surface that would be created by the Project facilities, including new graveled access roads and the widening of existing roads, is approximately 101 acres. Negligible long-term effects on surface water conditions and flood potential from change in drainage characteristics.	Long-term stormwater management provisions would meet the requirements of the WDNR forest practices regulations and Lewis County stormwater regulations.
No Action Alternative	Minor temporary impacts to water resources identified for the Project would not occur. Ongoing forestry practices on Weyerhaeuser and WDNR lands would presumably continue under the No Action Alternative. Effects from forestry practices and other land uses on water resources would likely continue at levels similar to the present.	

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
Plants		
Proposed Action – Construction	Construction activities would cause removal of tree and shrub species, primarily in areas of commercial timber land. Vegetation communities in these areas undergo harvest on a regular basis, with relatively short rotation periods of approximately 40 years. Consequently, the effect of Project construction in areas that currently support forest stands would be to accelerate the time of harvest for those stands, as opposed to resulting in the clearing of stands that would otherwise remain forested for the foreseeable future. Construction of the proposed Project would involve temporary disturbance impacts on approximately 472 total acres; long-term impacts (i.e., the area of the permanent Project footprint) would remain on approximately 101 acres. A large majority of the temporary and permanent disturbance impacts would occur on lands managed as industrial forest and distributed among clearcuts, new-growth forest and established forest. Construction of the Project could cause direct and indirect effects to threatened, endangered, or sensitive (TES) plant species, if any such species were located within the temporary disturbance area for the Project. Records obtained from the Washington Natural Heritage Program did not indicate the known presence of TES plant species within the Project Area, and the extent of previous disturbance would limit the potential for such species to occur.	The Applicant would coordinate Project clearing operations with Weyerhaeuser and WDNR to avoid or reduce peripheral impacts to adjacent commercial timber stands and other native vegetation and habitats. The Applicant has also proposed to implement the following measures to facilitate restoration of temporarily disturbed areas and avoid, minimize or reduce potential impacts associated with noxious weeds: • Establish standards for site restoration as part of final construction plans • Site restoration and reseeding would occur during the time of the year when seed germination establishment are most likely to be successful. • The construction contractor would be required to clean vehicles prior to bring them into the Project Area from outside areas. • Disturbed areas would be re-vegetated with native species as soon as possible following completion of the corresponding construction task. • If the construction contractor used hay bales for sediment control or other purposes, certification that the hay bales are weed free would be required. • The Applicant would monitor noxious weed conditions and actively control any noxious weeds that have become established at Project facility locations, in consultation with Weyerhaeuser.
Proposed Action – O&M		The Applicant would monitor noxious weed conditions and actively control any noxious weeds that have become established at Project facility locations, in consultation with Weyerhaeuser.

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
No Action Alternative	Ongoing activities within the Project Area, such as commercial timber harvesting, farming and residential development, would continue to affect vegetation communities and have the potential to affect TES plant species. Timber stands that are proposed for clearing to accommodate the Coyote Crest Wind Park would likely be harvested in any event under this alternative, subject to standard Weyerhaeuser harvest scheduling. Ongoing activities would continue to provide opportunities for the spread of noxious weeds in the Project Area, and standard control measures to these risks would continue under the No Action Alternative.	
Wetlands		
Proposed Action - Construction	Because the WTG sites are located along the ridgetop, impacts to wetlands from WTGs and their access roads are not expected. Potential direct or indirect impacts to wetlands adjacent to stream crossings on the main access roads could result from the road and culvert improvements. In these cases, applicable WDNR and Lewis County regulations would require minimizing the areas of disturbance to wetlands during construction. Any wetland features potentially affected are likely to be small in extent, and it is likely that direct and permanent impacts to wetlands could be avoided by relatively minor relocation or re-routing of Project facilities. No direct impacts to wetlands expected from transmission line upgrade activities. Temporary disturbance would occur at 19 pole replacement locations located in stream or wetland buffers; disturbance would be very limited at each site (approximately 30 square feet), and impacts would be minimal.	Wetlands in the lease area within the Project footprint would need to be delineated and mapped prior to final Project layout. Any area of unavoidable wetland impacts associated with culvert replacement would be calculated. The total area is not expected to exceed 0.5 acre, the threshold for being covered under the U.S. Army Corps of Engineers Nationwide Permit #12 for utility projects, which does not require wetland mitigation. Impacts to wetlands and wetland buffers would, however, require mitigation under each County's Critical Areas ordinance or code. For permanent and temporary loss of wetland area as well as loss of wetland function, mitigation would involve wetland restoration, wetland creation, and/or enhancement of existing wetlands within the same watershed of the wetland impact area. No mitigation for wetlands or streams in the existing transmission easements is proposed because no direct or indirect impacts to these features would occur. Because impacts within wetland and stream buffers would be temporary, it is presumed that the transmission line pole replacement would either be determined as an exempt activity or would be allowed under the terms of buffer averaging without the need for mitigation.
Proposed Action – O&M	No measurable impacts to wetlands, waters, or their buffers along the wind park facilities or the transmission line are expected during long-term operations and maintenance of the Project.	

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
No Action Alternative	Impacts to wetlands under the No Action Alternative would likely be roughly equivalent to those of the proposed action. The Project lease areas would continue to be used for industrial forestry, requiring periodic update to existing roads and construction of additional spur roads, resulting in potential impacts to wetlands adjacent to roads. Existing transmission line poles would require replacement at some time in the future, but temporary impacts to wetlands and other waters or their buffers can be avoided or minimized.	
Wildlife		
Proposed Action – Construction	Impacts to wildlife species, birds and bats in particular, are expected to occur from Project construction. Less mobile wildlife species could experience direct mortality. More mobile species would likely be displaced from the site during active construction. Wildlife in the vicinity of the Project infrastructure could also be disturbed by construction activities and noise, and might temporarily move away from the construction site. However, the primary impact to wildlife from construction and operation of the Project would be habitat loss. Logging activity in the Project Area has similar impacts and occurs regularly, indicating that periodic clearing of forest stands is an ongoing and routine occurrence. Impacts to northern spotted owls, marbled murrelets and other special status species during construction are expected to be minimal or low.	Impacts would be minimized by locating the Project in an area already disturbed by existing uses, siting WTGs in coordination with planned harvest units, minimizing the development of new access roads, and limiting physical disturbance to areas within approved construction footprints.
Proposed Action – O&M	Based on pre-construction use levels, the level of raptor and other bird mortality is assumed to be similar to mean rates calculated for existing wind projects in the Northwest, at 0.07 raptors per megawatt (MW) per year and 2.7 birds per MW per year. Although bat activity at Coyote Crest is low compared with other wind farms, some bat mortality is expected given : 1) the presence of bats vulnerable to wind farm fatalities are present, 2) these bats occur on site during the period of highest risk (fall migration) and 3) they are flying at	The applicant has implemented or proposed a number of measures to avoid and minimize potential wildlife effects created by the Project, including: • Detailed pre-construction baseline studies and impact or risk assessments for key species • Project layout and facility design measures to avoid and minimize impacts, such as siting the Project on a previously disturbed landscape, maximizing the use of existing roads, minimizing new clearing and stream crossings, replanting of the wind boxes with low-growing vegetation, minimizing the use of exterior lighting, controlling noxious

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
	heights within the rotor swept area (RSA), where they are at the highest risk. Based on relatively low passage rates detected in monitoring studies, it is assumed that the estimated bat fatalities for the Project are expected to be similar to those for the Pacific Northwest. Deer and elk behavior may be disrupted by the long-tern presence of the Project, or these animals may be attracted by newly replanted areas following construction. No impacts to amphibians, reptiles, or small mammals are expected during the operations phase. No mortality or long-term impacts to northern spotted owls expected. No significant impacts to marbled murrelets expected, based on estimated mortality rate of less than 1 bird per year, or 0.02-0.03 fatalities per year with implementation of seasonal and time of day curtailment options. No or low impacts expected for other special status wildlife species.	weeds, and installing bird diverters on new transmission lines. • Post-construction monitoring a studies, and implementation of an avian and bat protection plan. • Adaptive management of Project operations if warranted based on monitoring results, particularly with respect to potential marbled murrelet impacts.
No Action Alternative	The Project Area would continue to be operated primarily as a commercial forest. The harvest plan for Weyerhaeuser includes the areas of the Project footprint, indicating those stands would still be harvested at some point in the 40 year harvest rotation. Therefore, approximately the same level of on-the-ground permanent impacts to wildlife is expected, whether or not the wind facility is built.	
Air Quality		
Proposed Action – Construction	Impacts to air quality resulting from construction would be temporary and low. The primary sources of air pollution generated by construction would be vehicle exhaust emissions and fugitive dust particles from disturbed soils becoming airborne. The amount of pollutants emitted from construction equipment and vehicles sources would be relatively small, dispersed among multiple locations in and near the Project Area rather than concentrated in a specific location, and would not likely reach significant concentrations at off-site locations. Such short-term emissions are exempt from air quality permitting requirements.	Standard practices to control airborne dust and reduce air emission would be employed during construction. These include: • Watering exposed soil surfaces such as storage yards and construction roadways daily during dry weather. • Surfacing roads with gravel. • Covering construction materials that could be a source of dust when stored. • Limiting vehicle speeds along unpaved roads to 25 mph. • Covering truck beds when transporting dirt/soil. • Shutting down idling equipment when not in use. • Use of well-maintained equipment.

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
	Construction activities that could create dust include clearing, grading and excavation, and transportation of materials and supplies to the site. Standard practices to control airborne dust would be employed during construction.	• All brush disposal and slash burning would be conducted pursuant to Washington State Forest Practices Act regulations.
Proposed Action – O&M	O&M impacts on air quality from the proposed Project would be negligible. Emissions during the operating period would be limited to exhaust emissions and fugitive dust generated by vehicles traveling on project access roads to perform operation and maintenance functions. The volume of operation and maintenance vehicle traffic would be very low; therefore, quantities of potential emissions generated by these vehicles would be very small, intermittent, and localized.	
No Action Alternative	Most of the land in the Project Area would likely remain in its current timber production and agricultural use. Some of the existing agricultural land could potentially be converted to rural residential use, as indicated by recent land use trends. Potential impacts to air quality from such low-intensity development would be negligible.	
Environmental Health		
Proposed Action – Construction	The substantial distances between the Project Area and the closest potentially sensitive noise receptors (at least 2.5 miles) would minimize potential noise impacts from construction activities. Construction noise impacts would be temporary, intermittent and localized; therefore, adverse community noise impacts are not expected. No significant environmental health and safety risks associated with potential for fire, explosion or accidents during Project construction.	Noise impacts avoided through large separation distances from potential receptors. Construction health and safety risks minimized through standard safety practices.
Proposed Action - Operation and Maintenance	The wind turbine acoustic modeling analysis showed that sound levels would attenuate to well below the applicable 70 A-weighted decibels (dBA) nighttime limit prescribed by the Washington Administrative Code (WAC) for Class C land at the Project boundary. The maximum Project boundary line receptor received sound level is expected to	Noise impacts avoided through large separation distances from potential receptors. O&M health and safety risks avoided or minimized through safety systems on Project equipment, standard safety practices, and large separation distances from adjacent developed uses.

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
	be less than 45 dBA. With all noise sensitive receptors located at extended distances from this boundary, Project sound levels would continue to attenuate further; therefore, no compliance issues or noise nuisance conditions would be expected to occur. No significant environmental health and safety risks associated with potential fire and explosions, hazardous material spills, as well as other risks specific to wind turbine generators such as tower collapse and blade throw, ice throw, and electric and magnetic fields.	
No Action Alternative	Existing sound levels from the Project site include forestry and agricultural activities, which would continue in the future with or without the proposed Project. Other noise impacts could occur from future permitted activities in the area. Environmental health hazards associated with timber harvest would continue, which include the risk of fire or accidental spills, but at a slightly lower level than under the Proposed Action.	
Land and Shoreline Use		
Proposed Action – Construction	Temporary construction disturbance would affect commercial forestry activities in the lease areas and existing land uses along the Project transmission line route, the route for the Cedarville-South Elma transmission upgrade, and locations of proposed transportation improvements. Disturbance would primarily involve noise, dust, increased construction-related traffic, and potential road or lane closures. These effects would be localized and temporary. There would be no acquisition or use of private property for construction of the transmission line.	After construction is completed, temporarily disturbed areas would be returned as closely as possible to their original condition.
Proposed Action – O&M	The Project would be compatible with ongoing use of surrounding commercial forest lands. Construction of the new transmission line and upgrading the existing transmission system would not change current land uses, and would be compatible with existing adjacent land uses. No property would be acquired for the new Project	Weyerhauser and WDNR would be compensated for lost forest area and timber production via the lease agreements with the Applicant.

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
	transmission line.	
No Action Alternative	Current land uses, including commercial forestry on Weyerhauser and WDNR lands, would presumably continue in the Project Area. Other future actions in or near the Project Area would be subject to current land use regulations.	
Historic and Cultural Preservation		
Proposed Action – Construction	Direct impacts to cultural resources within the Project footprint could occur as a result of excavation, filling and leveling of native sediments for the construction of roads, crane walks, tower pads, transmission lines, laydown areas and substations. The potential for cultural resources to be present within the Weyerhaeuser lease area is considered minimal given the very steep terrain and the fact that turbines and access roads would be located primarily in areas previously disturbed by logging and related activities. The Project transmission line north of the Weyerhaeuser lease area is also in an area that has been substantially disturbed by development activity, primarily for utility lines and roads. Consequently, construction of Project facilities is unlikely to result in direct impacts to cultural resources. Similarly, the potential for indirect impact is low.	The Applicant intends to avoid cultural resource sites that might be identified at proposed facility locations through the micro-siting process, and through WDNR review of the Forest Practice Application/Notice. Consistent with State requirements, if archaeological artifacts or human remains were discovered, the Applicant would cease excavation or disturbance, notify the appropriate authorities (Department of Archaeology and Historic Preservation, the county, and affected tribes), and develop an appropriate mitigation plan in coordination with agencies and tribes. Other mitigation practices that are commonly implemented for major construction projects include: • Providing cultural resources training for all personnel involved in construction prior to ground-disturbing activities. • Developing an unanticipated discovery plan to guide response in the event that previously unidentified cultural resources are encountered during construction. • Providing an archeological monitor on site during ground-disturbing activities in areas of increased cultural resource probability.
Proposed Action –O&M	Operation and maintenance activities at the Project would occur almost exclusively within the developed footprint of the Project and the potential for impacts to unidentified cultural resources would be low.	
No Action Alternative	Future ground disturbance within the Project Area from timber harvest and related activities would likely continue, although the potential for cultural resources to be present would be low.	
Aesthetics, Light and Glare		
Proposed Action – Construction	Project construction activity would generally be visible only from nearby areas, and would result in localized, temporary, minor visual impacts.	

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
Proposed Action – O&M	The Project wind turbines would be visible from substantial distances and would introduce a distinct, new visual element to the landscape. The visual simulation from Doty represents essentially the maximum degree of effect from the Project on existing views. Given the viewing distance in this scene and the degree of landscape modification already evident in this setting, the addition of several WTGs would introduce only limited additional contrast to the existing view, and the impact of the Project on this view would be minor. The visibility analysis indicates that potential visual impacts in other locations would be from minor to negligible. The transmission line component of the Project would also result in minor to negligible impacts, depending on location.	The Applicant has proposed to use several BMPs to minimize the Project's possible visual impacts. Such proposed BMPs include: • Use existing roads as much as possible to access turbines • To the extent consistent with Federal Aviation Administration (FAA) guidelines, use low-reflectivity, neutral color finishes for the turbines and other Project facilities, to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape; • Restrict exterior lighting on the WTGs to the aviation warning lights required by the FAA, which would be kept to the minimum required number and intensity while still complying with FAA standards; • Use of carefully selected earth-tone, non-reflective finishes, whenever possible, of the O&M building to maximize visual integration into the surrounding landscape; • Restrict outdoor night lighting at the substation and O&M building to the minimum required for safety and security. • Locate the transmission line along existing roads, to the extent practicable, and use wood-pole structures.
No Action Alternative	The landscape within the study area would continue to show substantial modification from forest clearing for tree harvest and road construction, urbanization, and other human activities.	
Transportation		
Proposed Action – Construction	Construction-related traffic should not significantly degrade service conditions on local roads near the Project. The traffic effect that local residents and travelers would most likely experience would be occasional, intermittent delays, detours, or closures needed to construct the roadway and intersection modifications proposed by the Applicant at a few selected locations. The potential for physical damage to roadways would be resolved through haul route agreements or similar means, through which before-construction and after-construction conditions are carefully documented and the wind project developer agrees to repair the damages or fund the cost of repairs.	Construction traffic impacts would be minimized by implementing a construction traffic management plan. Damages to roadways would be repaired through terms of haul route agreements with the local jurisdictions. The Applicant has also proposed to undertake some intersection and roadway modifications to accommodate transportation demands associated with Project construction, as follows: • Along the south approach to the project, add a westbound right turn lane and widen the eastbound shoulder at the intersection of State Route 6 and Stevens Road. • A near 90-degree turn at the Stevens Road and Elk Creek Road intersection would be temporarily widened with gravel to allow for unloaded over-sized trucks and trailers to better negotiate this

Table 1-1. Summary of Environmental Impacts and Mitigation (continued)

Element of the Environment	Expected Environmental Impacts	Mitigation Measures
		intersection. For the same reason, the intersection of Elk Creek Road and C-Line Road would be improved. • At the north approach, the intersection of Garrard Creek Road and Coyote Crest Road would be improved to allow for oversized loads to make the southbound right turn. • A realignment of the roadway centerline is necessary at the intersection of Garrard Creek Road and Brooklyn Road, due to a substandard curve radius. • The Garrard Creek Road and South Bank Road intersection would have similar improvements required in order for the over-sized loads to negotiate the southbound right turn onto Garrard Creek Road. • The PSAP Railroad crossing of Porter Creek Road, immediately west of the intersection with U.S. 12 at Porter (7), may need to be modified to accommodate over-sized trucks and trailers hauling wind turbine components. Specifically, the roadway profile would be analyzed at the crossing to ensure that under-clearance requirements are met for the specialized transport equipment.
Proposed Action – O&M	Transportation-related impacts during the operating period for a wind project are typically minimal, because operating projects generate minimal traffic. Once construction is complete, the operating work force for the Project is estimated at six to eight full-time personnel dedicated to the operations and maintenance of this project. This small work force would generate very few daily trips that would have no effect on local traffic operations. The presence of the Project facilities would not have adverse effects on air transportation.	
No Action Alternative	Conditions on the transportation system would continue to be determined by population growth and other factors that influence traffic patterns, and by construction and maintenance programs for transportation facilities. State and local jurisdictions would continue to maintain and modify their respective portions of the transportation system according to their long-term capital improvement plans.	

1.6 Cumulative Impacts

Section 3.12 of the EIS provides a detailed assessment of potential cumulative impacts associated with the proposed Coyote Crest Wind Park. The assessment describes conditions associated with existing development in the vicinity of the proposed Project, as well as likely conditions related to current and reasonably foreseeable future development planned for the area. In general, urbanized uses in the region have been developed since about the late 19th century along the I-5 corridor and in some locations in the Chehalis River valley. Little urbanized development has occurred in the Project vicinity, with the community of Doty representing the closest area of noticeable urbanized development. Historically, development in the region has been heavily influenced by timber-related industries, such as harvesting and milling, and by farming in the areas suitable for agricultural uses. More recently, some development activity in the region has been associated with tourism and recreation. Industrial forest land occurs within the Project Area and elsewhere throughout most of the region. Timber harvest remains active on Weyerhaeuser, other private and WDNR forest lands in the region, although current harvest levels are considerably lower than they were from approximately the 1960s through the 1980s. Major industrial facilities within the region of interest are concentrated in the Centralia and Chehalis area. Development of large energy facilities has occurred near Centralia, Chehalis and Satsop.

Future development activity within the region of interest is likely to be located within the urban growth areas (UGAs), designated rural development centers and designated industrial areas. Future development in these locations would generally consist of incremental expansion of already urbanized areas, rather than creation of new development in areas that are now largely undisturbed. Future development activity outside of the designated locations would likely be limited in extent and intensity, and would not likely result in notable changes in land use patterns (such as conversion of forested land to urbanized use). Much of the region would continue to experience impacts to environmental resources from ongoing resource-based activities for the foreseeable future. Continued development of urbanized uses would contribute some additional areas of disturbance, although major expected actions of this type have not been identified and these effects would be concentrated in areas that are already urbanized. The proposal to develop the Coyote Crest Wind Park would add only minor and mostly temporary effects on soils to the much more widespread effects from current and continuing activities in the region.

1.7 Significant Unavoidable Adverse Impacts

Significant unavoidable adverse impacts are those impacts that are both significant and cannot be mitigated to a level at which they would be insignificant. The impact analysis documented in Chapter 3 of the EIS identified several types of impacts to various resources that would be unavoidable if the Project were developed. For most resources, the magnitude, extent and/or timing of the impacts are such that the impacts by themselves would be insignificant. In general, this is the case because the Project is proposed for development in a landscape that is already

disturbed and in an area that is separated from urbanized uses. For other resources, proposed or required mitigation measures would result in impacts that are minor and therefore insignificant. While there is some degree of uncertainty associated with impacts to a few specific resources, (as exemplified by ongoing study of marbled murrelet avoidance rates, which will clarify mitigation needs for this species), the impact analysis performed for the DEIS has not identified any significant adverse impacts that could not be avoided or reduced through mitigation.

2. PROPOSED ACTION AND ALTERNATIVES

The Applicant, a subsidiary of EverPower Wind Holdings, Inc., is proposing to construct and operate a commercial-scale wind energy generation facility called the Coyote Crest Wind Park (Project) in Lewis County, Pacific County, and Grays Harbor County, Washington. The proposal to develop the Project is in response to increasing demands for electricity, and the requirement under state law that utilities meet a portion of their customer demand from clean, renewable sources of energy.

The Project is a renewable energy generation facility that would consist of 47 wind turbines with a nameplate capacity of 2.5 MW each. The majority of the Project would be located in unincorporated Lewis County, approximately 5 miles north of the community of Doty, while three of the Project wind turbines would be located in unincorporated Pacific County. A portion of the project transmission interconnection would be located in Grays Harbor County. See Figure 1-1 for a map of the Project Area.

2.1 Existing Project Site Conditions

2.1.1 Physical Setting

The proposed Project is located in a part of the coastal mountain range of Washington known locally as the Doty Hills. Precipitation (primarily rainfall) in this area typically can exceed 80 inches per year. The Project Area spans a broad, north-south oriented ridgeline known as Coyote Crest, which separates the Chehalis River Valley from the coastal areas bordering Grays Harbor and Willapa Bay. The terrain of the Project Area consists primarily of steep hills and drainages, mixed with some areas of rolling topography and flat-bottomed stream valleys. Elevations range from about 2,100 feet along ridgetops in the southern part of the Project Area to approximately 60 feet in the Chehalis River Valley near the northern end of the Project Area.

The Project Area is located in a rural, lightly populated area that is characterized primarily by commercial forestry use. Land in the portion of the Project Area proposed for wind turbine development is commercial timber land characterized by a mix of recently harvested areas and timber stands of varied ages. The northern part of the Project Area, which includes the main access point and the 115 kV transmission line route from the Project to the interconnection point at Cedarville, spans the narrow tributary valley of Garrard Creek and a lightly populated area of the larger Chehalis River Valley.

Low-density, rural residential development occurs in the lower-elevation areas along the main roads in the area. These include South Bank Road and Garrard Creek Road (both accessed via U.S. Highway 12) in the northern part of the Project Area and Elk Creek Road, and Stevens Road (accessed via State Route [SR] 6) in the southern part of the Project Area. Away from the public roads, access within the Project Area is by a network of all-weather logging roads typical of a mountainous area.

2.1.2 Wind Resource

The Applicant has collected several years of regional and Project-specific meteorological data within the Project Area. These data were correlated with 20 years of historical regional data to project an operating pattern for a wind farm at the proposed location. The monitoring data indicate the prevailing winds are primarily from the northwest and west, generally perpendicular to the ridge crest of the Doty Hills. The on-site meteorological data indicate there is a sufficient wind resource to sustain a commercial-scale wind farm of the capacity proposed by the Applicant.

2.1.3 Land Ownership and Use

Lands within the Project Area are predominantly in private ownership, with some parcels owned by the State of Washington and a variety of other public entities. The Applicant proposes to undertake most of the Project development actions through lease agreements with key private and State land owners. Most of the proposed transmission interconnection would be implemented as modifications to existing transmission line facilities located within existing easements held by multiple local government entities. Section 2.1.3 describes the existing use and ownership conditions for the respective portions of the Project Area.

2.1.3.1 Project Lease Areas: Weyerhaeuser McDonald Tree Farm and WDNR Lands

Most of the proposed Project facilities, including a majority (44 of 47) of the WTGs, would be located on commercial forest lands owned by the Weyerhaeuser Company. These lands are within the Weyerhaeuser McDonald Tree Farm, which is managed for sustained-yield timber production. Three additional WTGs are proposed for sites on State-owned land administered by WDNR. Figure 2-1 shows the respective ownerships for this portion of the Project Area.

The Applicant has executed a long-term lease with Weyerhaeuser under which the latter would permit the Applicant to develop wind turbines and associated support facilities. The land area addressed by the Weyerhaeuser lease is approximately 3,240 acres.

The Applicant has a lease pending with WDNR for an area of approximately 320 acres where the Applicant has proposed three WTG locations. WDNR has currently suspended all proposed leases for wind development, and development on these lands is uncertain. If WDNR fails to award the lease, these three turbines would be constructed at suitable alternative locations on Weyerhaeuser property.

The total lease area among the two leases is 3,560 acres.

Portions of the Weyerhaeuser McDonald Tree Farm in the Project Area have recently been harvested and replanted. All lands within the Weyerhaeuser lease area have been cut at least once and several areas are on their third or fourth rotation. The private timber lands owned by Weyerhaeuser are not open to general public use, although some low-intensity outdoor recreational uses such as hunting and road vehicle use occur with the permission of Weyerhaeuser, which retains the right to revoke all use. Access to the McDonald Tree Farm can

be controlled through gates located at the primary entry points on Coyote Crest Road (via Garrad Creek Road) from the north and Elk Creek Road from the south.

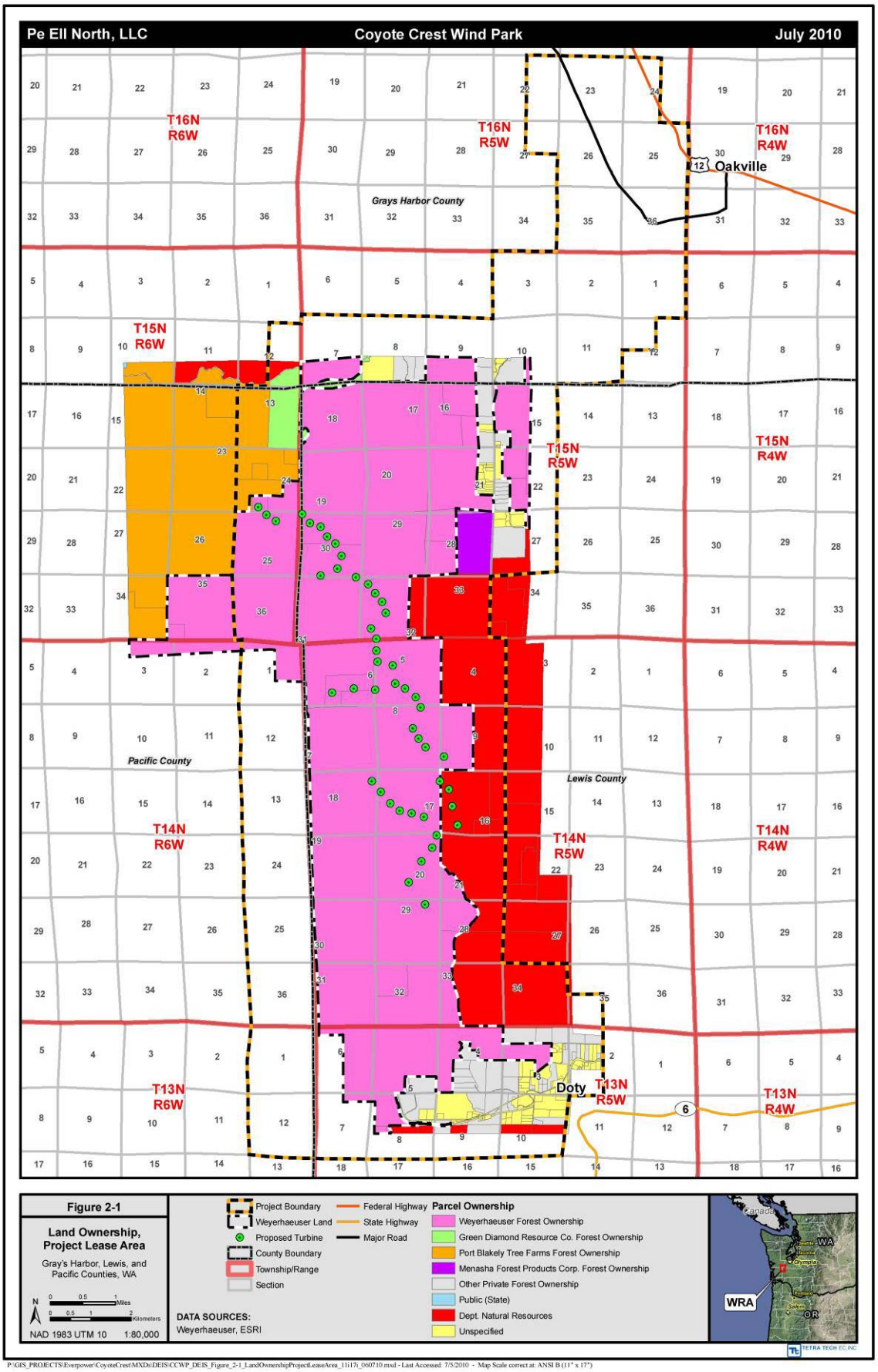
The proposed WDNR lease area has also been extensively harvested. Lands administered by WDNR are generally managed as available for public use, although access may be restricted at times and typically requires travel across privately-owned lands on relatively primitive roads.

2.1.3.2 Project Easement Areas: Transmission Line Route

Project development activities within the northern part of the Project Area would be limited to modification of existing facilities to accommodate delivery of electric power generated at the Project to a connection with the Grays Harbor PUD transmission system at Cedarville. While the exact path of the transmission line on the McDonald tree Farm has not yet been determined, in general it would run from the northern part of the turbine development area across Weyerhaeuser property to Garrard Creek Road near the corners of Sections 21, 22, 27 and 28 in Township 15N, Range 5W. From there the transmission line would follow Garrard Creek Road and then South Bank Road for approximately 8 miles, ending at the existing Cedarville Substation in Grays Harbor County.

Land ownership along the initial part of the transmission line route on the McDonald Tree Farm is shown in Figure 2-1. Figures 2-2a and 2-2b show land ownership within 500 feet of the proposed transmission line route along Garrard Creek Road and South Bank Road to Cedarville. This portion of the transmission line would be located within a Grays Harbor PUD utility easement in which existing electric distribution and transmission lines are located. The utility easement runs parallel to Garrard Creek Road and South Bank Road and is located within the right-of-way (ROW) for the respective roads. The ownerships identified in Figures 2-2a and 2-2b lie adjacent to the easement and ROW.

Grays Harbor PUD has informed the Applicant that integration of power from the Coyote Crest Wind Park would also require an upgrade of 8 to 9 miles of existing transmission line between the Cedarville Substation and the South Elma Substation, where the PUD system is connected to the BPA transmission system. While this proposed upgrade is considered a connected action needed to allow development of the Coyote Crest Wind Park, Grays Harbor PUD would undertake all actions associated with the upgrade, including any easement or ROW actions required. Therefore, a map of land ownership of the route between Cedarville and South Elma is not included in this EIS.



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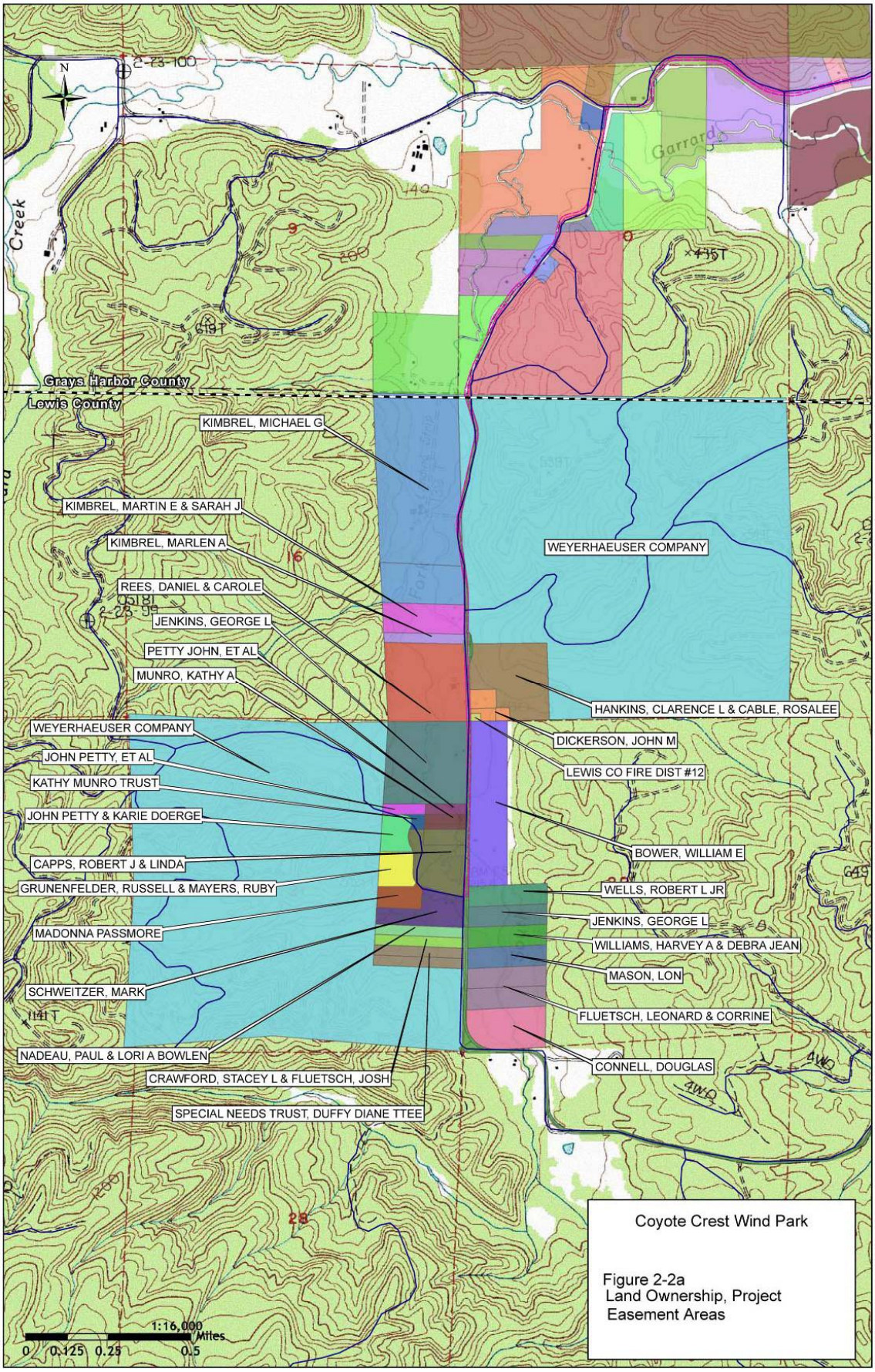
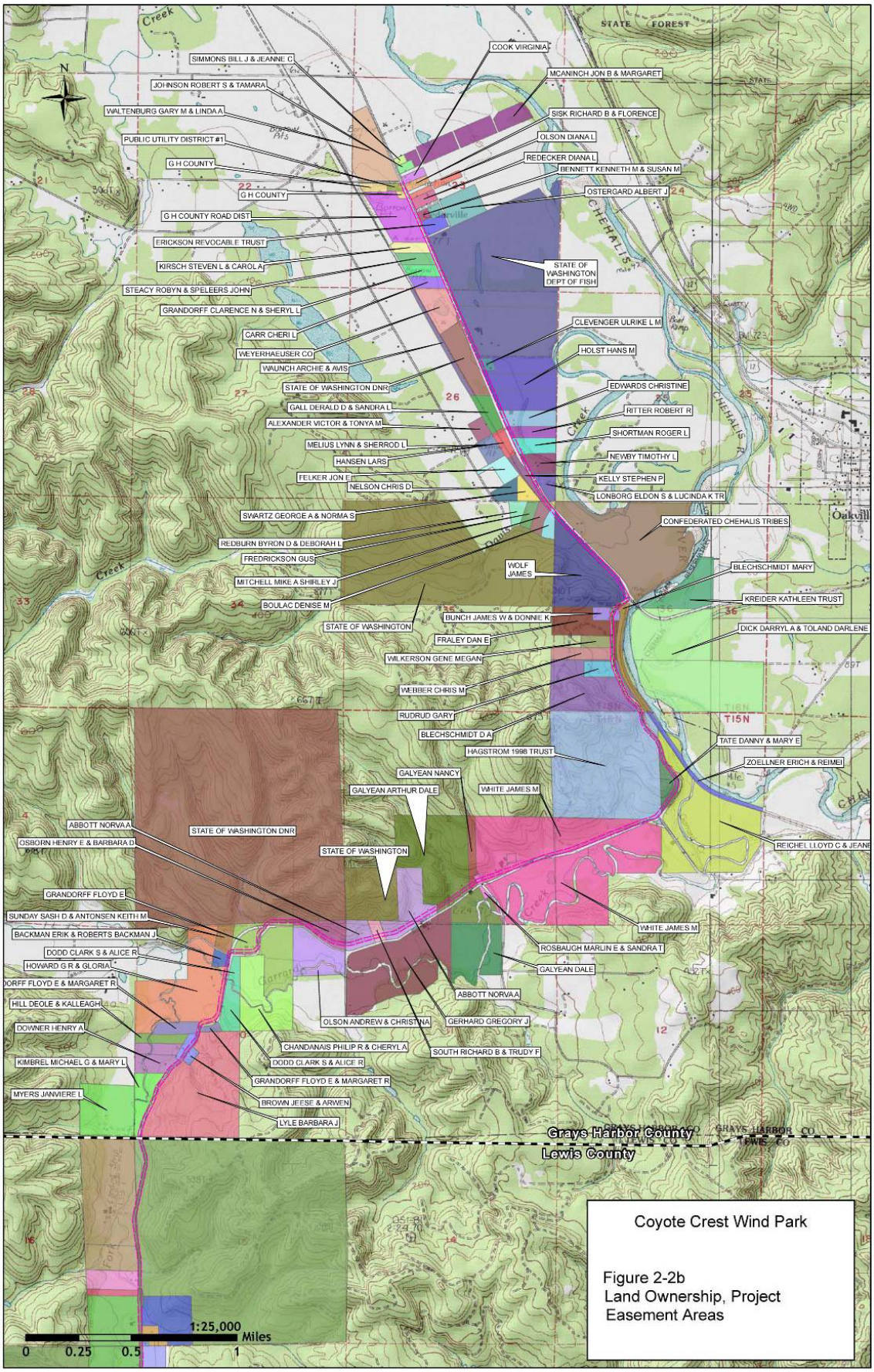

Grays Harbor County
Lewis County
KIMBREL, MICHAEL G
KIMBREL, MARTIN E & SARAH J
KIMBREL, MARLEN A
REES, DANIEL & CAROLE
JENKINS, GEORGE L
PETTY JOHN, ET AL
MUNRO, KATHY A
WEYERHAEUSER COMPANY
JOHN PETTY, ET AL
KATHY MUNRO TRUST
JOHN PETTY & KARIE DOERGE
CAPPS, ROBERT J & LINDA
GRUNENFELDER, RUSSELL & MAYERS, RUBY
MADONNA PASSMORE
SCHWEITZER, MARK
NADEAU, PAUL & LORI A BOWLEN
CRAWFORD, STACEY L & FLUETSCH, JOSH
SPECIAL NEEDS TRUST, DUFFY DIANE TTEE
WEYERHAEUSER COMPANY
HANKINS, CLARENCE L & CABLE, ROSALEE
DICKERSON, JOHN M
LEWIS CO FIRE DIST #12
BOWER, WILLIAM E
WELLS, ROBERT L JR
JENKINS, GEORGE L
WILLIAMS, HARVEY A & DEBRA JEAN
MASON, LON
FLUETSCH, LEONARD & CORRINE
CONNELL, DOUGLAS
Coyote Crest Wind Park
Figure 2-2a
Land Ownership, Project
Easement Areas
1:16,000
Miles
0 0.125 0.25 0.5



Coyote Crest Wind Park

Figure 2-2b
Land Ownership, Project Easement Areas

The transmission line easement areas and the primary access route to the Project are located in lightly populated valley areas along the Chehalis River and Garrard Creek. Small farm or ranch properties and scattered rural residences on large lots occur along the main public roads, such as South Bank Road and Garrard Creek Road. Similar land-use conditions occur along Elk Creek Road, Stevens Road and State Route 6 in and near the southern end of the Project Area.

2.2 Proposed Action

The proposed Coyote Crest Wind Park is a wind energy generation facility with a capacity of approximately 120 MW. The Project involves the installation of 47 individual wind turbines or WTGs and the associated support facilities needed to develop and operate a commercial-scale wind park. A system of Project roads is needed to provide access to the turbine sites for construction and subsequent long-term operation. Electrical power from the WTGs would be collected by a project power cable system that would deliver the electrical energy to an on-site substation where the power would be transformed to 115 kV for delivery to the regional power grid. The transmission line would follow or be located near existing Weyerhaeuser roads and Grays Harbor PUD utility easements in Lewis County and in Grays Harbor County to the existing 115 kV substation at Cedarville, which is interconnected to the BPA transmission system at South Elma, Washington. Additional Project facilities include a permanent O&M facility, temporary construction staging and laydown areas, and permanent met towers.

This section of the EIS provides a detailed description of the proposed action. Section 2.2.1 describes the specific facilities that comprise the Project. Section 2.2.2 discusses the construction process needed to develop the facilities and the anticipated schedule for that work. Section 2.2.3 summarizes the Project operation and maintenance program and Section 2.2.4 reviews general plans for decommissioning the Project at the end of its economic life.

2.2.1 Project Facilities

The proposed Project consists of several types of facilities required for a commercial-scale wind energy facility. They include the wind turbines themselves, a power collection system, a transmission system and substation, access roads, met towers, and an O&M facility. Each component is described below, based on the Project planning information available at this stage and provided in the SUP application. The proposed locations of the Project facilities are indicated in Figure 2-3.

2.2.1.1 Wind Turbine Generators

The proposed Project includes 47 individual WTGs. A WTG refers to the entire structure that produces electrical power. Each WTG consists of several mechanical parts, including three large rotor blades connected at the rotor hub located at the front of the housing unit called the nacelle. Inside the nacelle, the rotor hub is connected to a drive shaft or rotor which is connected to the generator via a gear box. The entire nacelle and rotor hub are mounted atop a tubular tower

which is anchored to a tower foundation. Each of these turbine components is discussed in this section. Figure 2-4 illustrates typical WTG components.

The Applicant proposes to use either the Nordex N90 or the Repower MM 92 turbine, or WTG equipment of similar size and quality, for the Project. Both the Nordex N90 and the Repower MM 92 WTGs have generation capacity in the range of 2 to 2.5 MW and can be mounted on 262.5-foot (80-meter) and 328-foot (100-meter) towers. The total height from the ground to the blade tip point (located at the straight up position) depends on the tower height and would be between 406 and 471 feet (124 and 143.5 meters). The different tower heights would depend on the terrain for each specific tower location. Figure 2-5 includes a diagram of the Nordex N90 WTG with dimensions.

A tower with a hub height of 262.5 to 328 feet makes it possible to use sites which, until recently, were not viable for technical and economic reasons. The high hub height of the Nordex N90 and Repower MM92 machines make them ideal wind turbine machines for forest locations with complex terrain.

Foundations

The WTG would sit atop a steel and concrete foundation designed for the specific subsurface conditions at the individual turbine sites. Foundations would be designed by a registered engineer licensed in the State of Washington who would select the appropriate foundation design for each turbine location based on site-specific geotechnical information, load bearing recommendations of the geotechnical engineer, and specifications of the wind turbine provided by the wind turbine manufacturer. The foundation designs would conform to state and county requirements and standard industry practices. There are two industry standard foundation designs that may be used for the Project depending on the tower location and the geotechnical conditions.

The inverted-T foundation is a spread footing that employs a relatively shallow concrete base with a relatively large diameter. Figure 2-6 illustrates an inverted-T foundation. The base would extend approximately 10 feet below the surface grade and is expected to be between 50 and 65 feet in diameter. The top of the concrete pedestal would extend between 6 and 18 inches above finished grade and be up to 20 feet in diameter. The turbine tower is fastened to the foundation by tensioned anchor bolts that run through the turbine tower base flange down into the concrete base. A layer of grout 2 to 3 inches thick and, depending on the turbine model, possibly a steel ring, are typically located between the turbine tower base flange and the concrete pedestal.

A rock-anchor foundation consists of a cylindrical cap of concrete that rests atop the bedrock layer. Figure 2-7 illustrates a typical rock-anchor foundation employed in an area of bedrock. The concrete cap is typically between 5 and 10 feet thick and can be up to 30 feet in diameter. The top of the concrete cap may extend 6 to 18 inches above finished grade. The concrete cap is anchored to the bedrock by a series of rock bolts 40 to 50 feet in length. Once the rock bolts are tensioned, the conduits in which they are housed are filled with grout. The turbine tower is fastened to the foundation in the same manner as would be done for an inverted-T foundation.

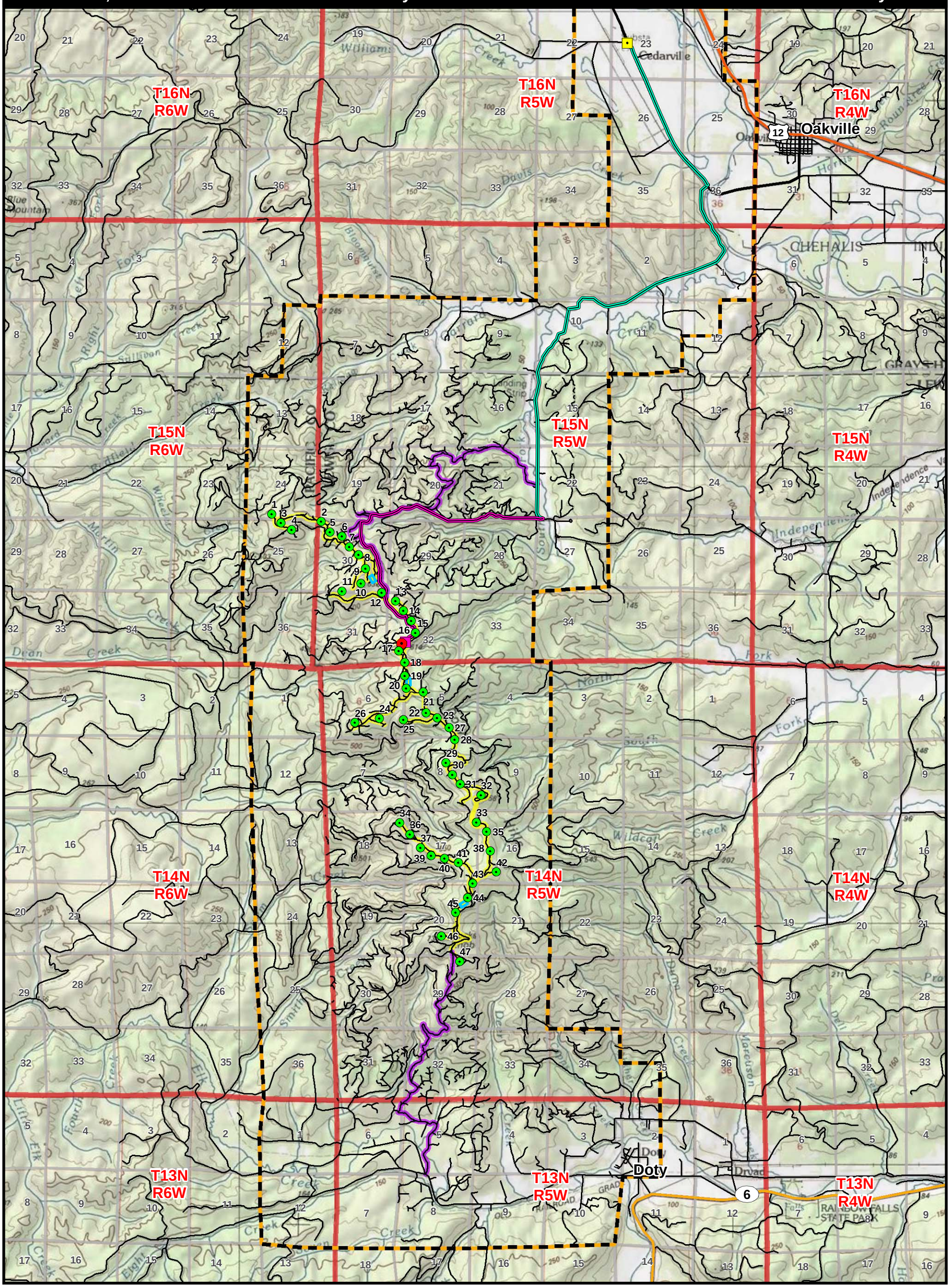


Figure 2-3

Proposed Project Layout

Gray's Harbor, Lewis, and Pacific Counties, WA

N

0 0.5 1 Miles

0 1 2 Kilometers

NAD 1983 UTM 10 1:80,000

- Project Boundary
- Proposed Turbine
- Proposed O&M Facility
- Proposed Collection Substation
- Proposed Staging Area
- Cedarville Substation

Proposed Transmission

- Coyote Crest Interconnection Line 115kV
- Coyote Crest 115kV GH PUD Easement

- Proposed Facilities Access Route
- Proposed Turbine Access Route
- Federal Highway
- State Highway
- Major Road
- Existing Minor Road

DATA SOURCES:
Weyerhaeuser, ESRI

TETRA TECH EC,INC

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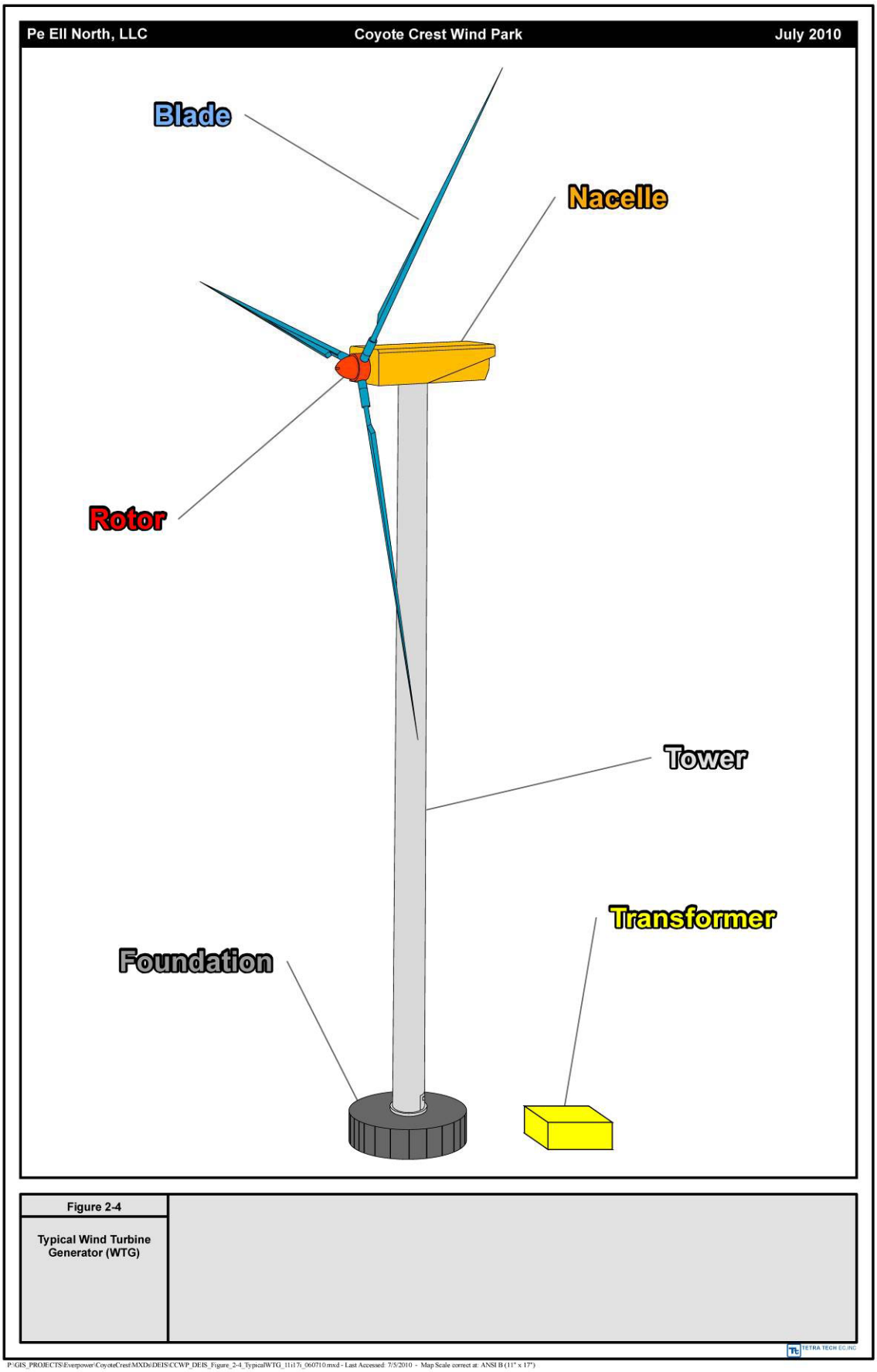


Figure 2-4

Typical Wind Turbine Generator (WTG)

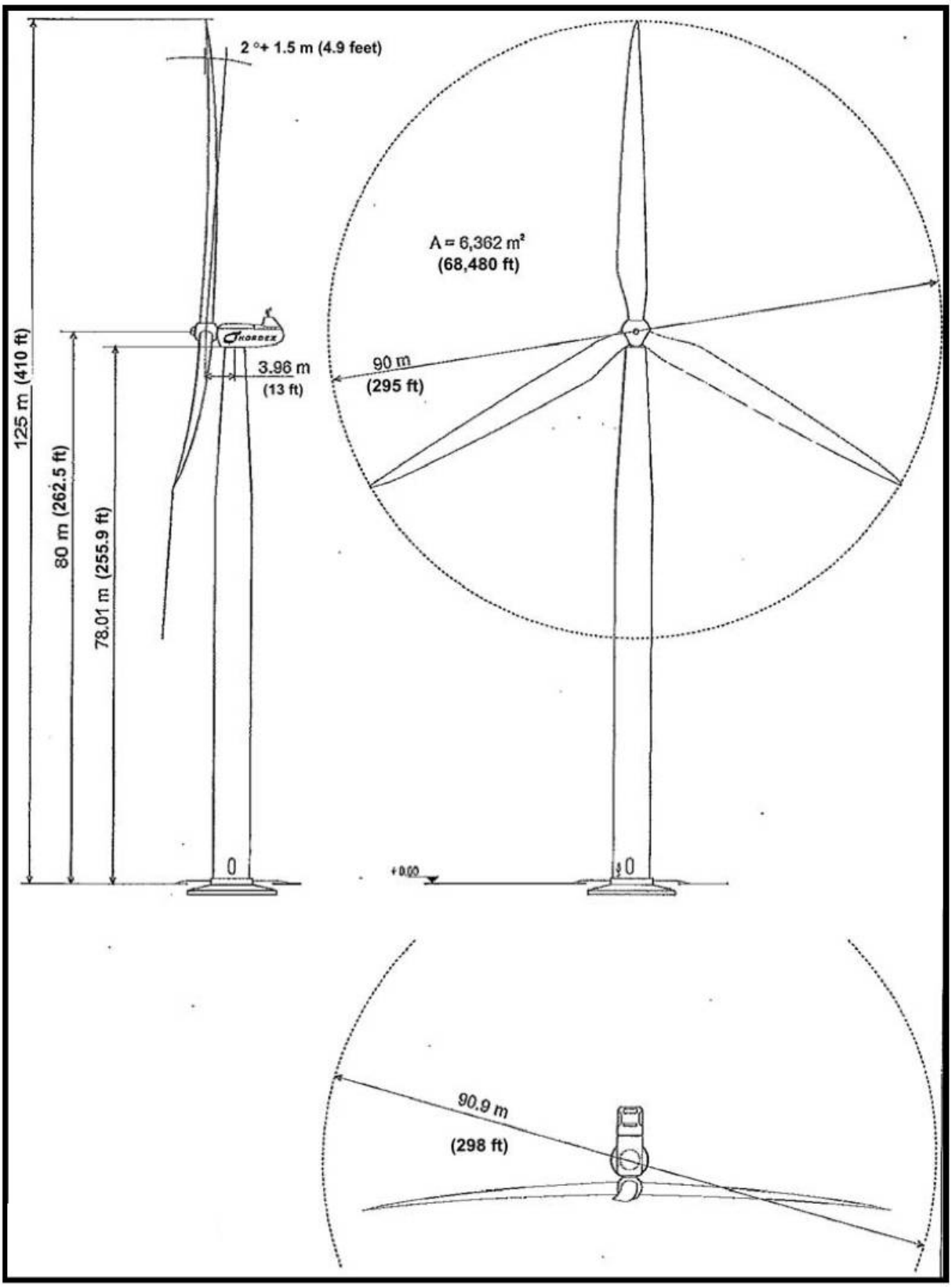


Figure 2-5.
Nordex N90 WTG Dimensions

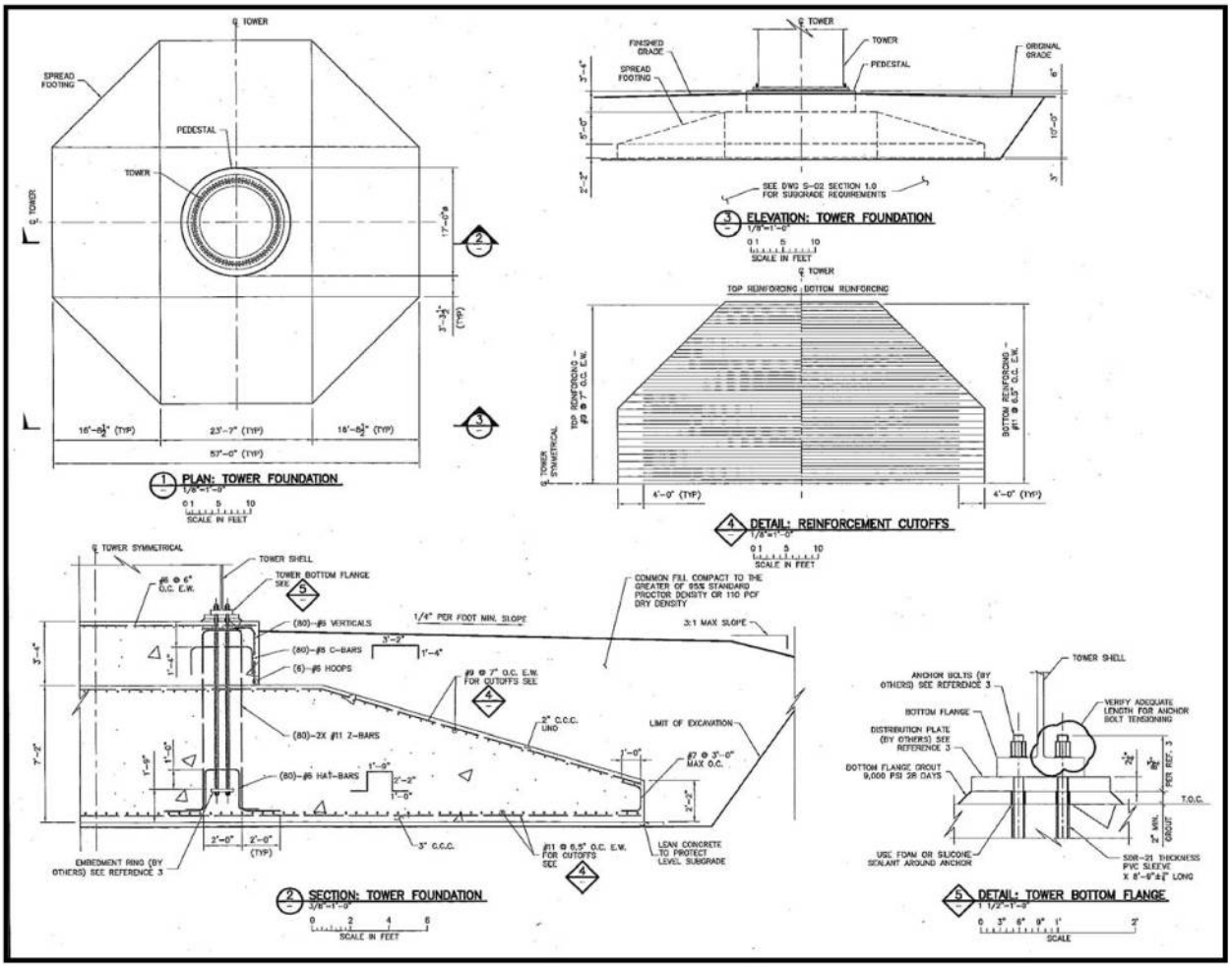
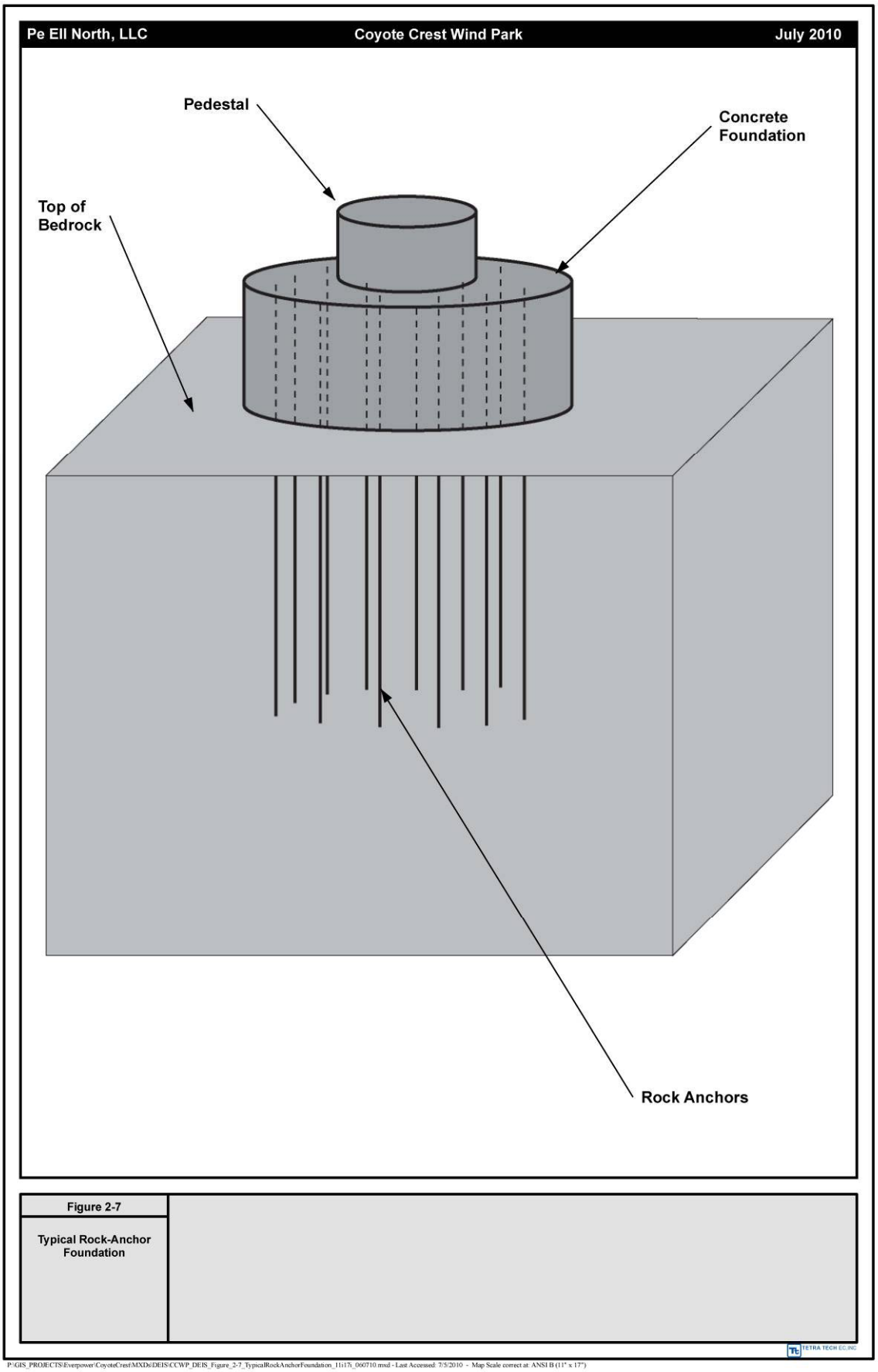


Figure 2-6.
Typical Inverted-T Foundation


Pe Ell North, LLC
Coyote Crest Wind Park
July 2010
Pedestal
Concrete Foundation
Top of Bedrock
Rock Anchors
Figure 2-7
Typical Rock-Anchor Foundation
TETRA TECH EC, INC
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Towers

Tubular steel towers would support the nacelle, rotor hub, and blades. The purpose of the tower structure is to position the turbine blades high enough to intercept the consistently strong winds. Winds closer to the surface have slower speeds due to ground interference, trees and surface roughness. The higher hub heights also minimize the effects of wind turbulence that may be created by trees and terrain. Each tower would be designed to place the hub height between 262.5 feet (80 meters) and 328 feet (100 meters) depending on the terrain and final design of the equipment configuration. The towers would have a diameter of 14 to 16 feet at the base, would weigh approximately 160 tons, and would consist of four tapering sections. The towers are constructed of heavy, rolled steel, with a smooth exterior surface which would be painted a white or off-white color.

A locked steel door would provide secured access to the tower base. A computerized control cabinet is located inside the tower. Power and control cables and a steel ladder and platform system would extend within the tower interior from the base access door to the nacelle. The access ladder would provide maintenance crews access to the nacelle.

Nacelle and Rotors

The nacelle is the housing that covers the operating mechanism of the turbine. Typical nacelle dimensions are approximately 35 feet long, 10 feet wide, and 13 feet high. The exterior surface is typically constructed of fiberglass lined with sound-absorbing foam. The generator, gear box, and associated control equipment for the turbine are housed inside the nacelle. See Figure 2-8 for an illustration of a typical nacelle and rotor assembly. The nacelle is accessed through the internal tower ladder system. The majority of the servicing of the machinery would be conducted from within the nacelle to protect the equipment and operator from weather.

The rotor assembly for each turbine includes three blades that are attached to the front of the nacelle at the hub. The rotor sweep of the blades would be 295.2 feet (90 meters), making it possible to exploit the maximum amount of energy from the wind flowing through the hub height area. The Project would use an upwind turbine design with the nacelle turning into the wind to place the nacelle and tower behind the blades. The blades would be composed of laminated fiberglass and aluminum composite and would have a smooth outer surface. Each blade is fabricated in the factory and transported to the site separately. At the site, the blade is bolted to the rotor hub, and a crane is used to lift the nacelle and assembled rotor hub into place.

In addition to the generator and gear box, other equipment included inside the nacelle would include electrical motors used to turn the nacelle into the wind and control the pitch of the rotor blades, and an automatic braking system. The pitch of the blades is controlled by a computer that would rotate the blades on their axis to maintain an optimum angle to the wind to maximize the generation output at a given wind speed. The minimum cut-in speed is 6.7 miles per hour (mph) (3 meters per second) and the safety cut-out speed is 56 mph (25 meters per second). At wind speeds above the maximum safety threshold, the blades would rotate into a feathered

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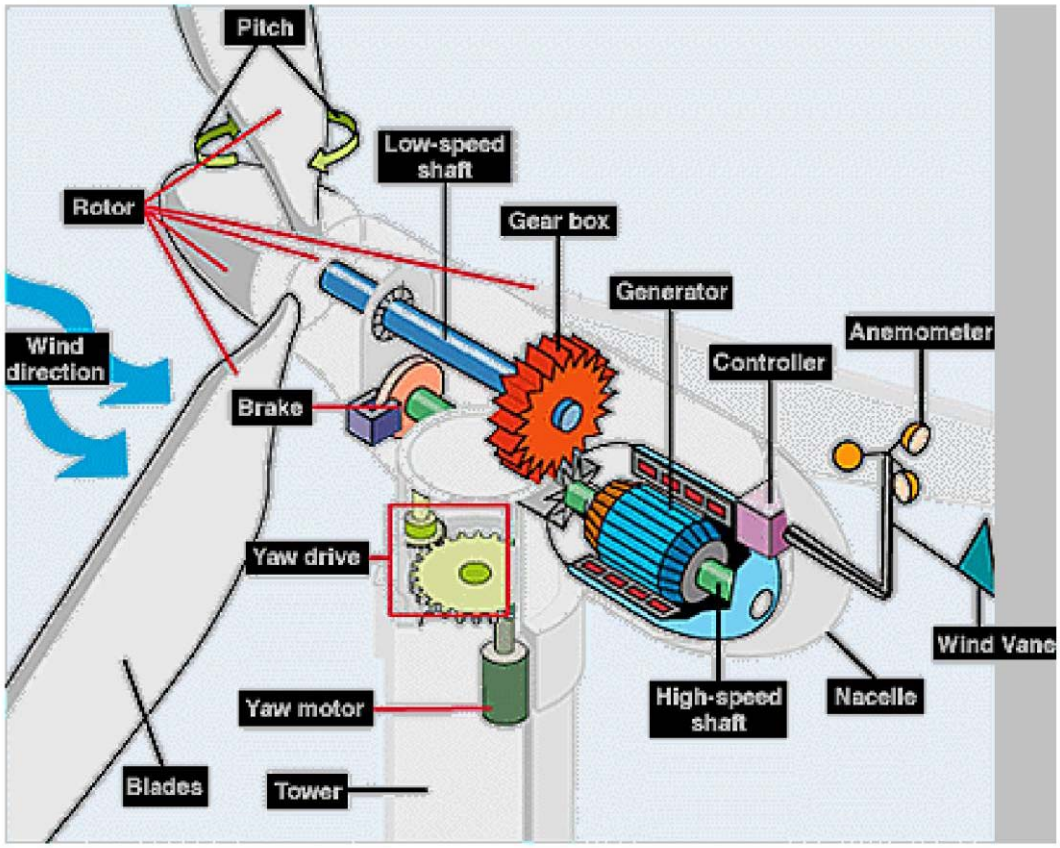

Figure 2-8

Typical Nacelle and Rotor Assembly

TETRA TECH EC, INC

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position and the braking system would stop the rotor from turning. After 10 minutes and when speeds reduce to below 56 mph, the blades would rotate their pitch into the wind and start turning again.

Turbine Locations

The 47 WTGs would be distributed within the Project Area as shown in Figure 2-3. The WTG placement plan was determined using computerized modeling of the topographic features, wind resource considerations from metrological data collected in the Project Area, long-term weather data, environmental considerations such as stream set-back requirements, and property ownership set-back criteria. The objective of the WTG placement is to provide optimum exposure to the wind from all primary wind directions, with emphasis on exposure to the prevailing northwesterly wind direction. Sufficient spacing was established between WTGs to minimize energy loss created by turbulence between and among turbines.

Final WTG locations might differ slightly from the locations indicated in Figure 2-3. Standard practice in the wind industry is to finalize WTG locations shortly before construction, through a process known as micro-siting. WTG locations for the Project would be micro-sited within 300 feet of each of the proposed locations to better accommodate specific site conditions during construction and to avoid environmental features, geotechnical conditions, or conflicts with Weyerhaeuser cable logging stations that become apparent during construction activities.

Typically, layouts incorporate safety zones designed to protect adjacent uses from any rare incidences such as blade throw, ice throw, and tower collapse. The WTG locations are over 500 feet from the nearest lease area boundary and there are no buildings or improvements, other than roads, within 1,000 feet of the facilities. Safety setbacks are not required because of the relative isolation of the site. Logging activities are expected to continue in the immediate vicinity of the WTG locations. Weyerhaeuser and the Applicant have established a 300-foot safety zone surrounding each WTG location inside of which close coordination would be required of ongoing forestry operations.

2.2.1.2 Project Electrical System

The Project's electrical system would consist of three primary components: the power collection system from each WTG, a Project substation to which all power collection system cables would connect, and a 115 kV transmission line from the Project to the Grays Harbor PUD Cedarville Substation. The function of the electrical system would be to collect the electricity produced by the Project turbines and convert it to higher voltage electricity to be fed into the regional power grid for delivery to purchasers.

Power Collection System

The generator housed in the nacelle of each turbine would produce electricity at 660 volts. Low-voltage cables located inside of the tower would carry the electricity from the nacelle through the tower to a transformer mounted on a concrete pad adjacent to the base of the tower. The

transformer pad would be 8 to 10 feet square and 2 feet thick. The transformer, located on the pad, would be within a fully enclosed cabinet approximately 5 feet high. The transformer would raise the voltage from 660 volts to the collection system voltage of 34.5 kV.

Electricity would be transmitted from the WTG transformer into a 34.5 kV power cable installed as part of the power collection system. Wherever possible, these cables would be located underground. The network of power collection cables would connect the turbines to the Project substation. Underground cables would be installed in excavated trenches or directly plowed into the earth at a depth of 4 feet below the ground surface. Whenever possible, multiple circuits would be co-located in common trenches, and the trenches would be located within access road corridors. Junction boxes that merge multiple incoming cables into one outgoing line would be installed at various locations within the Project Area to facilitate the collection of the power from the turbines. Each 34.5 kV circuit would carry up to 25 MW of power. Several circuits would be required to evacuate power from all WTGs to the substation. All buried power cable routes would be clearly marked and built to International Electric Code standards.

The power collection cables would be placed on overhead wood-pole structures where site-specific physical conditions (i.e., a stream crossing, steep and/or rocky terrain) would not allow for the cables to be placed underground. The power collection system has been configured to follow the Project road system as much as possible.

Substation

An electrical substation would be needed in the Project Area to provide a further increase in voltage from the 34.5 kV power collection system to the 115 kV voltage used to convey Project power to the regional transmission grid. The proposed location of the Project substation is shown in Figure 2-3, near the southwest corner of Section 32 T 15N, R 5W. This location is near the intersection of the northern access road and the WTG area. The Applicant has also identified a potential alternate substation site near the southernmost WTG locations, in Section 20, T 14N, R 5W.

A large 34.5/115 kV power transformer would be located within the Project substation, along with disconnect switches and communication equipment. The transformer would raise the voltage from 34.5 kV to 115 kV to meet the voltage of the receiving Grays Harbor PUD electric transmission system and Cedarville Substation. In addition to the transformer, disconnect switches and metering relays, the substation would have a small metering and operating building that would house the power generation control and relaying equipment, station batteries, and the on-site Supervisory Control and Data Acquisition (SCADA) System, which would communicate operations information with the transmission control information system. The entire substation area would be cleared, graded, covered with gravel and surrounded by a chain-link fence. The completed substation would occupy up to approximately 2 acres. The substation would be designed to meet the standards of the National Electric Safety Code and the interconnection requirements of Grays Harbor PUD and BPA. A 1-acre maintenance yard and vehicle shelter

would be constructed adjacent to the substation and would store spare parts, road maintenance vehicles, and fire-fighting equipment.

Transmission Interconnection

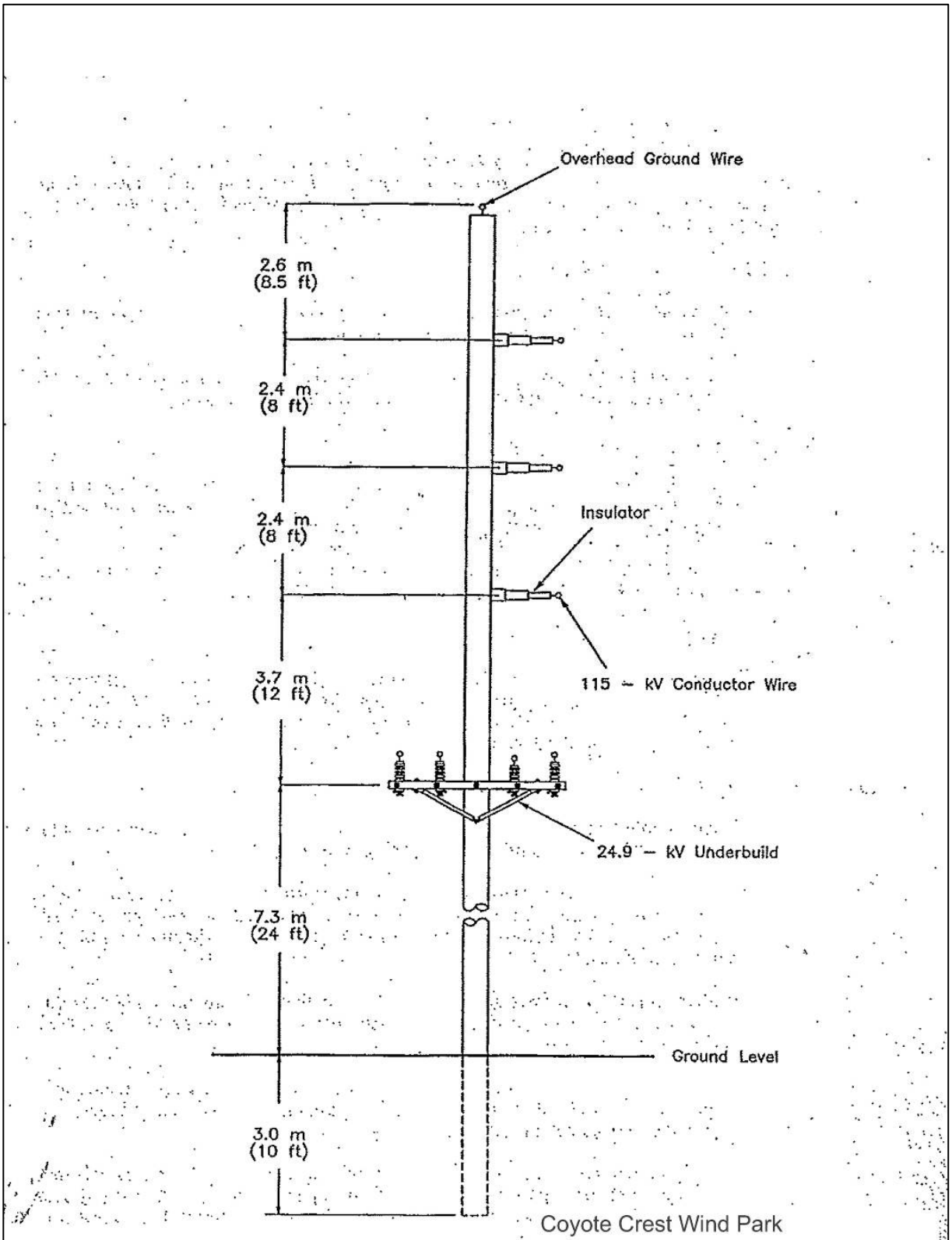
An overhead 115 kV transmission line would be constructed from the Project substation to the existing Grays Harbor PUD Cedarville Substation. The line would have sufficient transmission capacity to evacuate all of the power from the Project Area. The proposed route for this line consists of three segments: 3.3 miles of transmission line on Weyerhaeuser property, 2 miles of transmission line along Garrard Creek Road in Lewis County utilizing Grays Harbor PUD easements, and 6.3 miles of transmission line along Garrard Creek Road and South Bank Road in Grays Harbor County utilizing Grays Harbor PUD easements.

The 115 kV transmission line would be designed as a single-pole configuration with three conductor wires and a static wire. The single-pole design would allow the line to follow along existing road rights-of-way and utility easements. Poles would be approximately 100 to 300 feet apart, depending on site-specific conditions. Figure 2-9 illustrates a typical 115 kV transmission line pole design. Figure 2-10 shows a 115 kV transmission line pole typical of existing structures along South Bank Road and is representative of the style of the structures proposed for the Project transmission line. Figure 2-11 shows a cross section of the transmission corridor through the Weyerhaeuser McDonald Tree Farm, where a cleared area averaging approximately 75 feet wide would be required to ensure reliability of the transmission line.

The Project 115 kV transmission line would connect with the Grays Harbor PUD transmission system at the existing Grays Harbor PUD Cedarville Substation in Grays Harbor County. This existing facility would be expanded to allow for additional disconnect and interconnection switch gear. The proposed location for the interconnection substation is on Grays Harbor PUD land and is shown in Figure 2-12 at the intersection of South Bank Road and Lewis Road in Grays Harbor County.

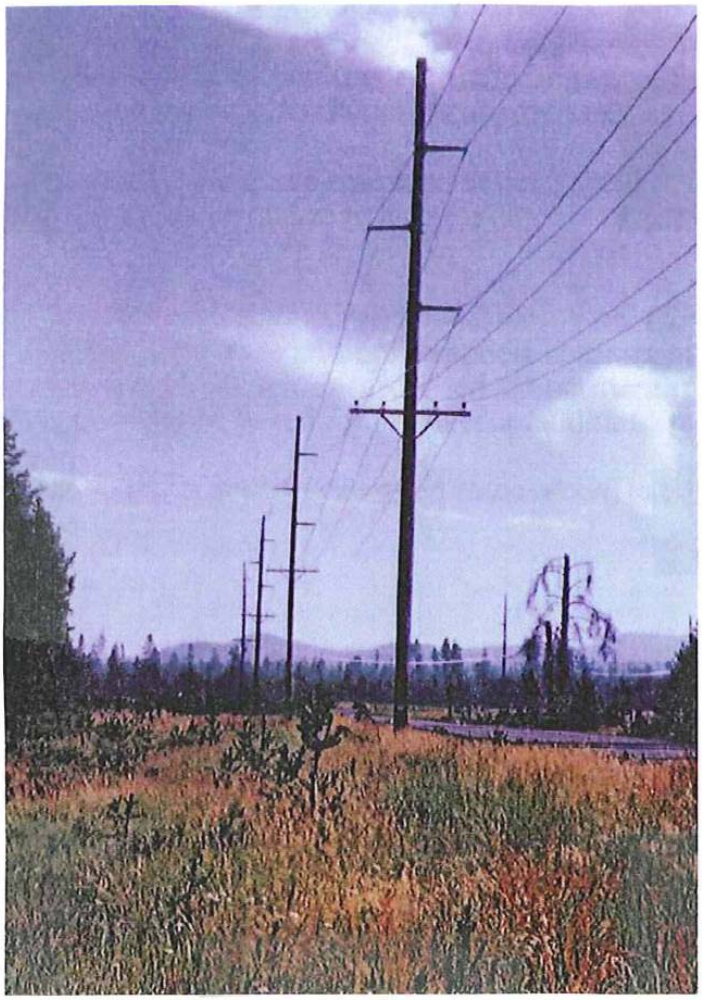
Associated Grays Harbor PUD Action: Cedarville-South Elma Transmission Upgrade

The Applicant and Grays Harbor PUD have agreed that the point of electrical interconnection for the Coyote Crest Wind Park would be the existing Grays Harbor PUD South Elma Substation. To fully integrate power from the Project into the regional electrical system, it must be deliverable to the BPA transmission system, which feeds the South Elma Substation. The Cedarville Substation is connected with the BPA system via a single-circuit 115 kV transmission line from Cedarville to South Elma approximately 8 miles to the north (see Figure 2-13). In addition to the transmission line component of the proposed action, an upgrade of the Cedarville-South Elma 115 kV line would be needed to deliver power from the proposed Project to the BPA system.



Coyote Crest Wind Park

Figure 2-9
Typical 115 kV Transmission Line Pole Design



Coyote Crest Wind Park

Figure 2-10
Photograph of 115 kV Transmission Line Pole Typical of Existing Structures along South Bank Road

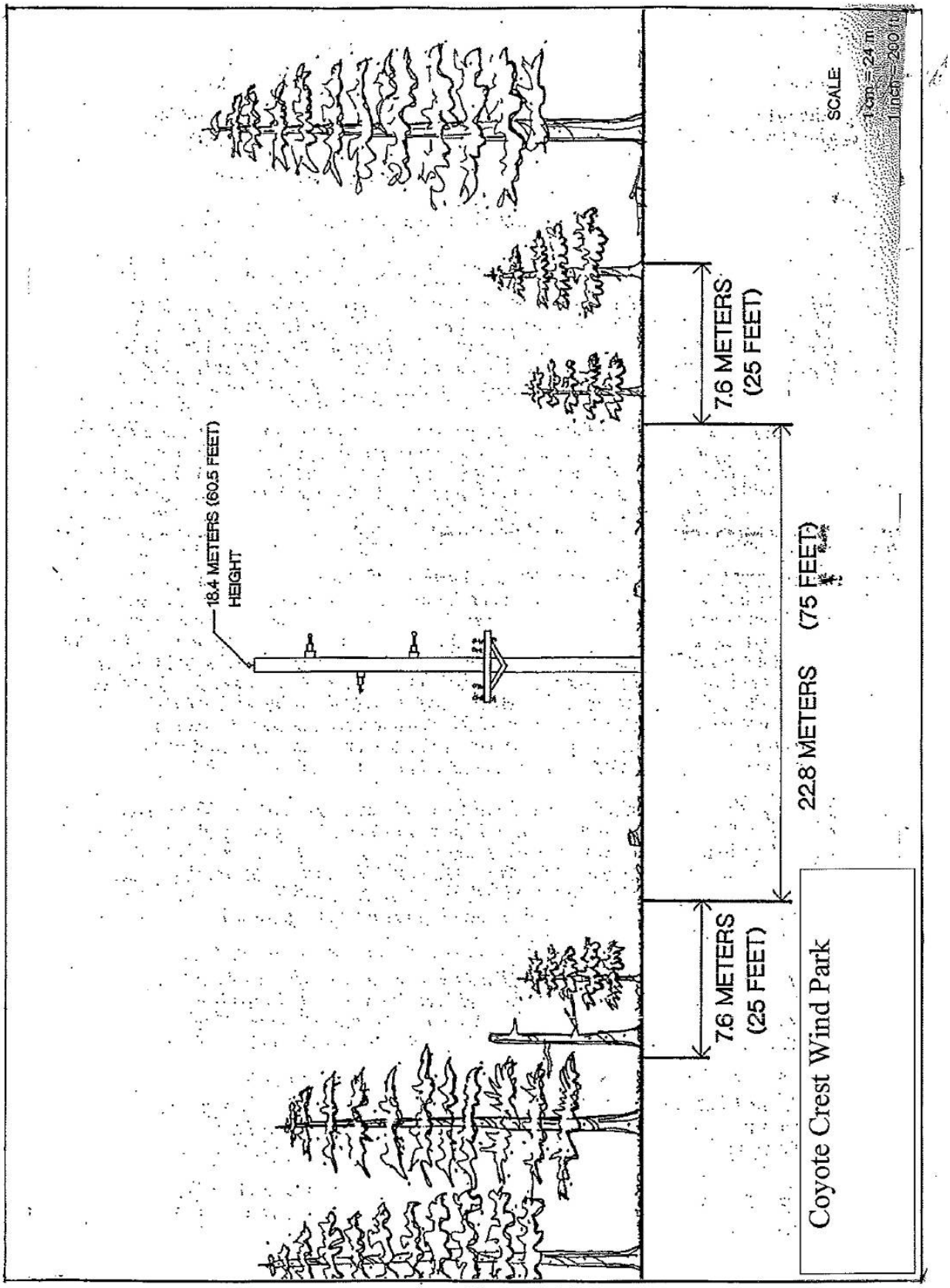
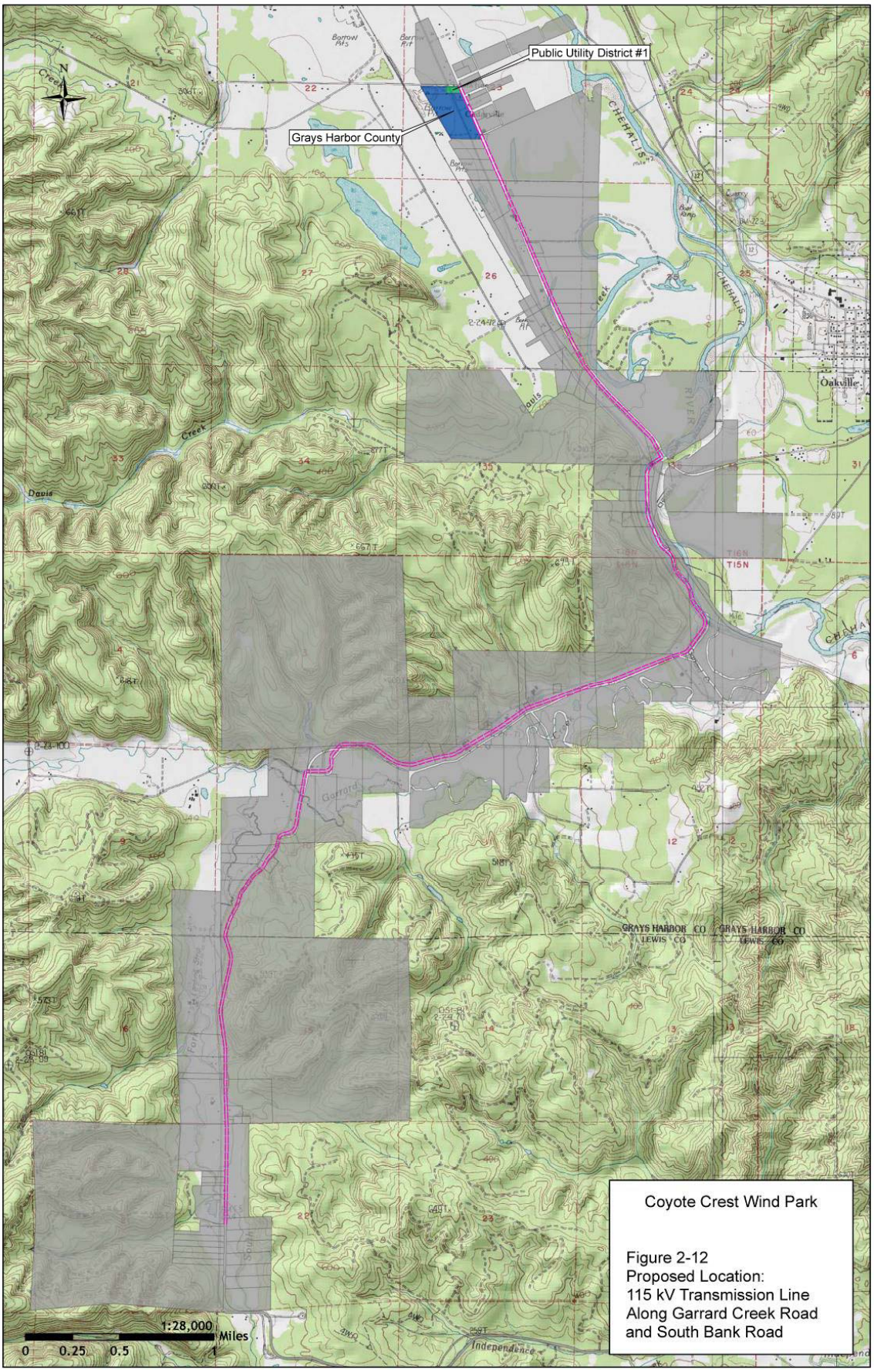
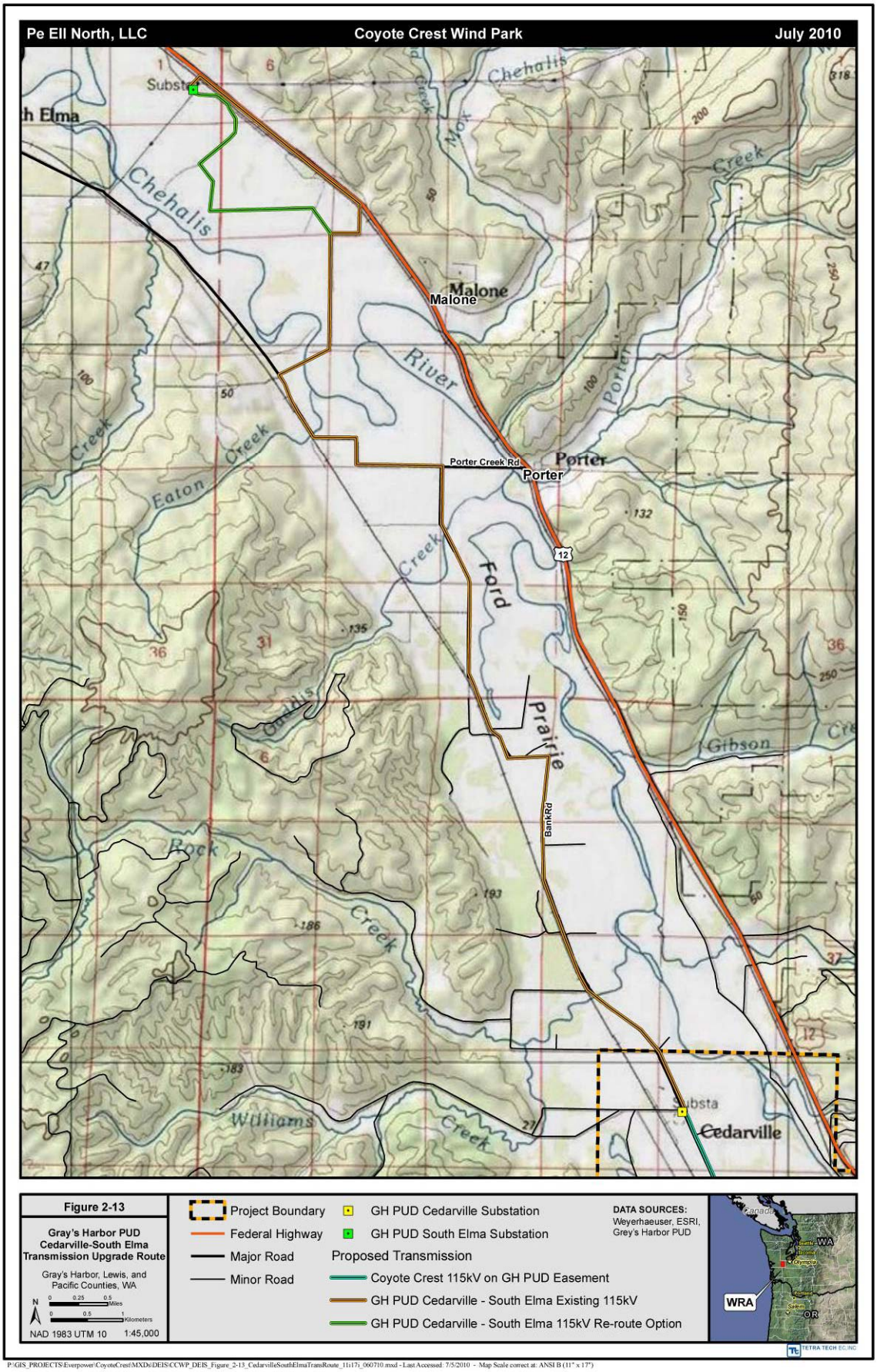


Figure 2-11
Cross-Section of Transmission Corridor Through Weyerhaeuser McDonald Tree Farm



Coyote Crest Wind Park

Figure 2-12
Proposed Location:
115 kV Transmission Line
Along Garrard Creek Road
and South Bank Road



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The Cedarville-South Elma 115 kV transmission line is located within an existing Grays Harbor PUD ROW and is covered under the PUD's franchise agreement. The line runs north from the Cedarville Substation for approximately 8 miles. For most of this distance the transmission easement runs parallel to South Bank Road. At a point approximately 1.5 miles southwest of Malone and 2 miles southeast of the South Elma Substation, the existing line angles to the northeast across the Chehalis River to Dunlap Road. The line continues to the north for approximately 1 mile along the west side of Dunlap Road, and crosses the Puget Sound and Pacific Railroad tracks and U.S. Highway 12 near the intersection with South Blockhouse Road. From that point the line runs parallel to U.S. 12 along the north side of the highway for approximately 1.5 miles, then angles southwest to cross the highway and North Blockhouse Road, and finally loops into South Elma Substation from the west.

Grays Harbor PUD has informed the Applicant that in order to interconnect Project power with the Grays Harbor PUD system it will be necessary to upgrade the existing single-circuit line with a double-circuit 115 kV line following the existing alignment in most locations. This would require replacing all of the existing poles and hardware with a similar number of poles supporting hardware capable of structurally handling the two 115 kV circuits. Grays Harbor PUD has proposed to develop a new route and obtain private easements for approximately the last 1.5 miles into the South Elma substation. Instead of following parallel to Dunlap Road, U.S. 12 and North Blockhouse Road into the substation, the re-route segment would angle generally northwest from Dunlap Road across farm fields to the substation. This new route segment would avoid congested conditions near the substation associated with the highway, railroad line and multiple BPA transmission lines passing near South Elma Substation.

Grays Harbor PUD would undertake all actions needed to accomplish the expanded transmission line capacity from Cedarville to South Elma. That would include easement acquisition, project design, procurement, permitting, construction, and operation.

2.2.1.3 Meteorological Towers

Three temporary meteorological towers are currently installed in the Project Area and have been used to assess the wind energy potential of the Coyote Crest site. Project development typically involves the use of several meteorological towers during the exploration and design phase of the project. These temporary meteorological towers are only a few feet in diameter and are considerably smaller than wind turbine towers. They are constructed of triangular tubular aluminum sections approximately 14 inches on a side and are secured by multiple guy wires that extend up to 110 feet from the tower base. These towers are approximately 262 feet (80 meters) in height and have several anemometer and other weather instrument booms at the 148 feet (45 meter) and 262 feet (80 meter) heights.

Permanent meteorological towers are also standard features of completed utility-scale wind projects. Instruments on the met towers are used to provide the project control system with accurate real-time wind speed and wind direction information. The permanent met towers

proposed for use at the Project are also 262 feet (80 meters) in height and have concrete foundations, anchors, and guy wires. Figure 2-14 shows a typical permanent meteorological tower.

2.2.1.4 Access Roads

Project access requirements include (1) an adequate road system for transporting turbine components and construction materials to the Project site and (2) an adequate on-site road system for short-term access to construction sites and long-term access for operation of the Project facilities. Access to the Project Area would involve use of a mix of public and private roads. Developing the road system needed for construction and operation would include a combination of existing road segments, modifications to existing roads to meet Project access needs, and construction of some segments of new roads.

Access to the Weyerhaeuser McDonald Tree Farm is currently provided from the north and the south by use of existing public roads. The approach to the north end of the Tree Farm is via Garrard Creek Road, which intersects South Bank Road approximately 2 miles southwest of Oakville. U.S. Highway 12 is the primary access route to Oakville. Coyote Crest Road, which Lewis County considers to be a private road, travels west from the Garrard Creek Road in Section 21, T15N, R5W and becomes the Weyerhaeuser C-Line road within one-half mile of Garrard Creek Road. From that point, the network of Weyerhaeuser roads provides continuous access to and through the proposed turbine development area and on to the south end of the Tree Farm. The approach to the south end of the Tree Farm is from Elk Creek Road, another county road that extends to the west from Doty. SR 6 is the primary access route to Doty.

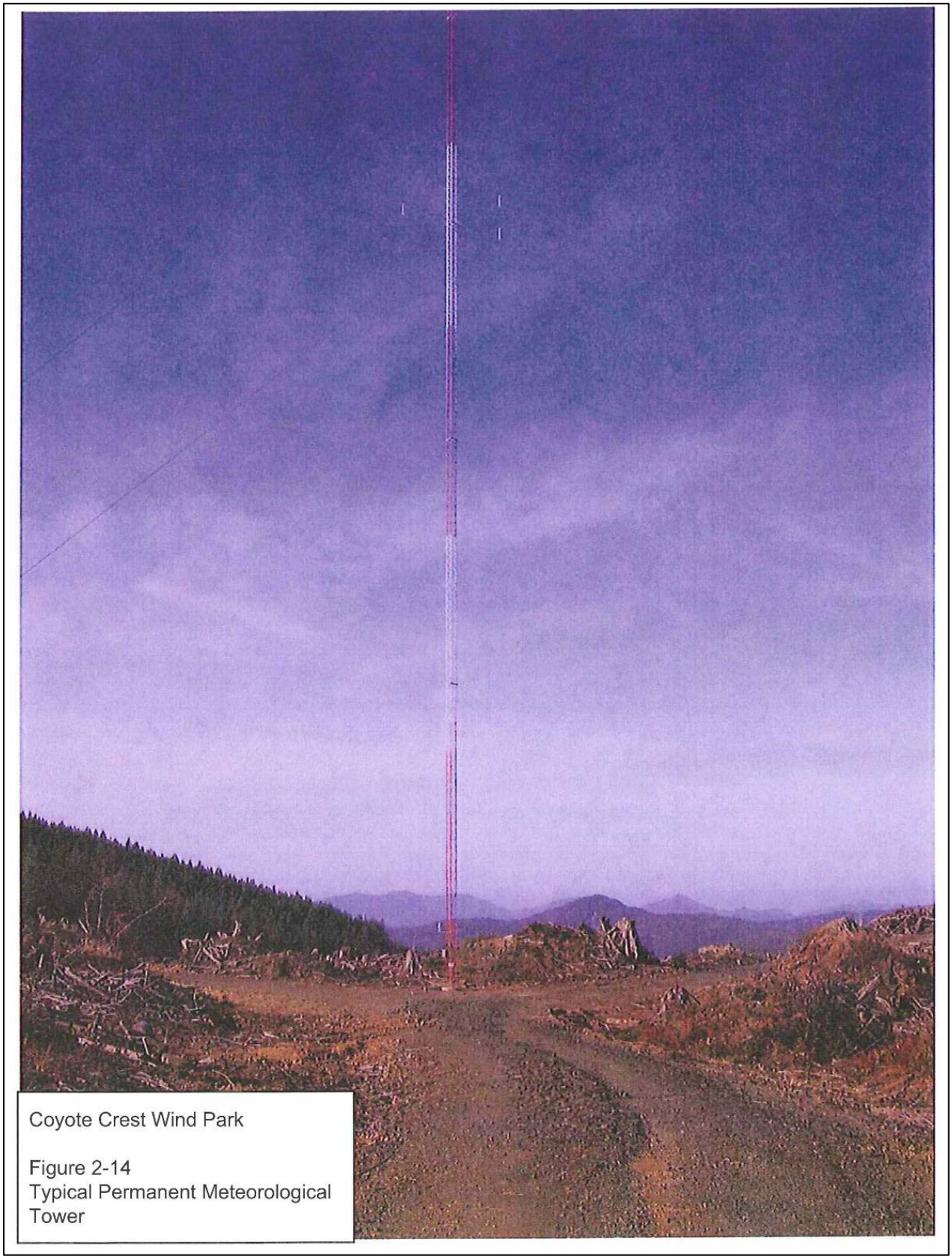
The Applicant's transport plan for the Project is that all major equipment such as large erection cranes, crane booms, wind turbine tower segments, blades, and nacelles would be transported into the Project Area via Garrard Creek Road to Coyote Crest Road.

The Coyote Crest/Weyerhaeuser C-Line road has a consistent grade and has been identified as the route that would require the fewest significant road improvements to allow access for these oversized and extra-long loads. Equipment mobilization and construction material deliveries that can utilize a standard logging road would generally utilize the southern approach on the Elk Creek Road via Doty, as would construction crews.

The WTG construction area is spread over several miles. Developing access to the WTG sites would involve numerous improvements to the Weyerhaeuser road system and to access the three proposed sites in the WDNR lease area. Two types of road improvements would be made on the Weyerhaeuser and WDNR lands associated with the development of the Project:

- Widening and realignment of existing primary access roads into the Project Area; and
- Construction of a new crane and utility corridor road to each wind turbine location.

Each road type has different functions and design specifications.



Coyote Crest Wind Park

Figure 2-14
Typical Permanent Meteorological Tower

Weyerhaeuser Main Access Road Improvements

Weyerhaeuser maintains an extensive system of all-weather gravel roads throughout the McDonald Tree Farm. This road system would be used as much as possible for access the WTG sites, to minimize needs for new road construction. The Project design criteria are for the main access roads in the McDonald Tree Farm to be single-lane roads with inter-visible turnouts, a 16-foot travel surface width for straight sections and up to a 20-foot travel surface width for curved sections. Widening and realignment of some segments of existing Weyerhaeuser roads would be required to accommodate the long loads associated with a WTG, some of which are in excess of 160 feet in length. Based on an engineering analysis of the Weyerhaeuser road system, the Applicant has identified 41 specific locations at which curves and/or intersections on the road system would need to be modified to accommodate Project construction needs. This planning information is preliminary, as the road design specifications required to accommodate the turbine components will not be known for certain until the Applicant selects a turbine model and executes an agreement with the turbine supplier. It is possible that the transportation requirements for a specific turbine model would differ from the specifications for gradients, curve radius and other design factors applied in the preliminary road layout, and might require incremental changes to the extent of road system modifications.

The access route to the northern portion of the turbine development area via Garrard Creek Road would include use of the following existing private roads owned by Weyerhaeuser Company:

- Coyote Crest Road/C-Line Road, approximately 2.6 miles;
- Road #723, approximately 2.8 miles; and
- Road #720, approximately 0.5 mile.

The access route to the southern portion of the turbine development area via Elk Creek Road would include use the following existing private roads owned by Weyerhaeuser Company:

- Road #7010, approximately 0.8 mile;
- Road #7011, approximately 1 mile; and
- Road #9200, approximately 2.5 miles to the Project site.

Gravel for road improvements would be supplied from existing rock sources within Weyerhaeuser's McDonald Tree Farm or other existing quarries in Lewis and Grays Harbor counties.

Project Crane and Utility Corridor Roads

Access needs for the WTG construction sites are based on the operating requirements of the equipment used to assemble the WTGs. Crawler tractor cranes of a size sufficient to erect WTGs typically require a 20- to 40-foot wide cleared "walking" area. Typical rubber-tired cranes used to assist in erecting WTG facilities require a 16- to 20-foot operating road surface. Standard practice in the industry is to transport main erection crane components to the

construction area, assemble the crane, and to walk the crane between WTG sites as much as possible to minimize crane disassembly and reassembly requirements.

Within the turbine development area a central turbine construction road would be designed with a 40-foot wide tractor walking path to allow safe movement of the turbine assembly crane used during the initial construction period. The central turbine construction road would follow the existing Weyerhaeuser #9000 and #720 roads to the extent practical. The turbine construction road would be designed to allow the erection crane and other specialized equipment-handling tractors access to each WTG location and to move between turbine locations. The crane road alignments would also be used as much as possible for the location of utility corridors bearing the power collection cables and communication lines. The crane roadway would be finished with a standard 16-foot gravel road surface along the center line of the crane path. The crane path and utility corridor would be replanted upon completion of the construction and the finished 16-foot all-weather gravel maintenance road would allow maintenance and operations access to each wind turbine site.

The proposed crane and utility corridor road system is shown in Figure 2-15. The preliminary design assumes that the maximum road width of 40 feet would be constructed. Depending on site-specific conditions, the actual road width could be as narrow as 16 to 20 feet (a typical single-lane logging road width), although additional cleared area on either side might be required. Final road designs would depend on detailed plans and profiles, topographic mapping and crane configuration requirements.

Figure 2-16 shows a typical cross-section of the crane and utility corridor to each turbine location, as well as the cut and fill requirements for the assumed worst case scenario. Although Figure 2-16 depicts cut slopes of 2-to-1 and fill slopes of 1-to-2, the general rock soil profile indicates that typical cut slopes in the Project Area are 1-to-1 and typical fill slopes are 1-to-1½. Final road design would depend on the result of site-specific geotechnical studies and the road width requirements for the crane equipment selected to erect the WTG facilities.

Access to WDNR Lease Lands

Assuming the WDNR lease or ROW is approved, access to the three WTGs located on WDNR lands in Section 16, T 14 N, R 5W would be via Weyerhaeuser Roads #9400 and #9000. The WDNR lease area is accessible from WDNR Road #9470, which is currently not connected to the Weyerhaeuser road system. A 2,000-foot extension of WDNR Road #9470 would be constructed to access WTG #43. The proposed crane and utility corridor road would follow the general ridgeline between wind turbines. Altogether, approximately 1.2 miles of the central crane access road would be constructed on the WDNR lease following the Road #9470 ROW. This would include approximately 0.5 mile of new road to connect with Weyerhaeuser roads, and approximately 0.75 mile of road rebuilt from existing logging roads. The new road would be isolated with a gate near turbine #38. These new and improved roads on WDNR land would create a continuous road loop connecting turbine sites on WDNR property to those on

Weyerhaeuser property. If the WDNR lease or ROW is not approved, the Applicant would improve Weyerhaeuser #9000 Road, located between WTGs #31 and #40, to serve as the central access road.

Transmission Line Access

Access to the location of the 115 kV transmission line from the Project to the Cedarville Substation would be from several private and public roads. Construction of the 4.3-mile segment of the 115 kV line would use access from existing Weyerhaeuser logging roads. The transmission line would follow existing Grays Harbor PUD easements along Garrard Creek Road and South Bank Road to Cedarville Substation. These roads provide sufficient direct access for the proposed transmission line construction actions, and for subsequent operation and maintenance needs.

Grays Harbor PUD Cedarville-South Elma Transmission Upgrade Access

As discussed above, as a connected action Grays Harbor PUD would upgrade the existing 115 kV transmission line that runs north from the Cedarville Substation to the South Elma Substation to accommodate the Coyote Crest interconnection. As is the case for the proposed Project transmission line to Cedarville, the Cedarville-South Elma line is generally located parallel to existing roads that would provide direct access for the upgrade action. As part of this action Grays Harbor PUD would upgrade approximately 1 mile of the route with a new double-circuit line on a re-routed alignment into South Elma Substation, construction access for this segment would require equipment travel along local secondary roads and across farm fields. It is assumed that this option would not include construction of a permanent access road within the easement to facilitate long-term O&M of this segment of the line.

Public Road Improvements

As discussed at the beginning of Section 2.2.1.4, there are two primary approaches to the Project Area: the southern approach, via Elk Creek Road near Doty, Washington, and the northern approach, via Garrard Creek Road in northwest Lewis County. All major equipment, such as wind turbine tower segments, blades, and nacelles, would be transported into the Project Area via the northern approach road. Secondary equipment, construction materials, crews, and other vehicles would generally approach the Project Area via both the northern and southern approach roads.

Several improvements to public roads are proposed to accommodate the truck traffic associated with the construction process, particularly delivery of wind turbine towers, blades, and nacelles. Detailed plans for these improvements and the connections to county roads would be prepared following detailed topographic mapping of turbine locations and a detailed evaluation of road requirements.

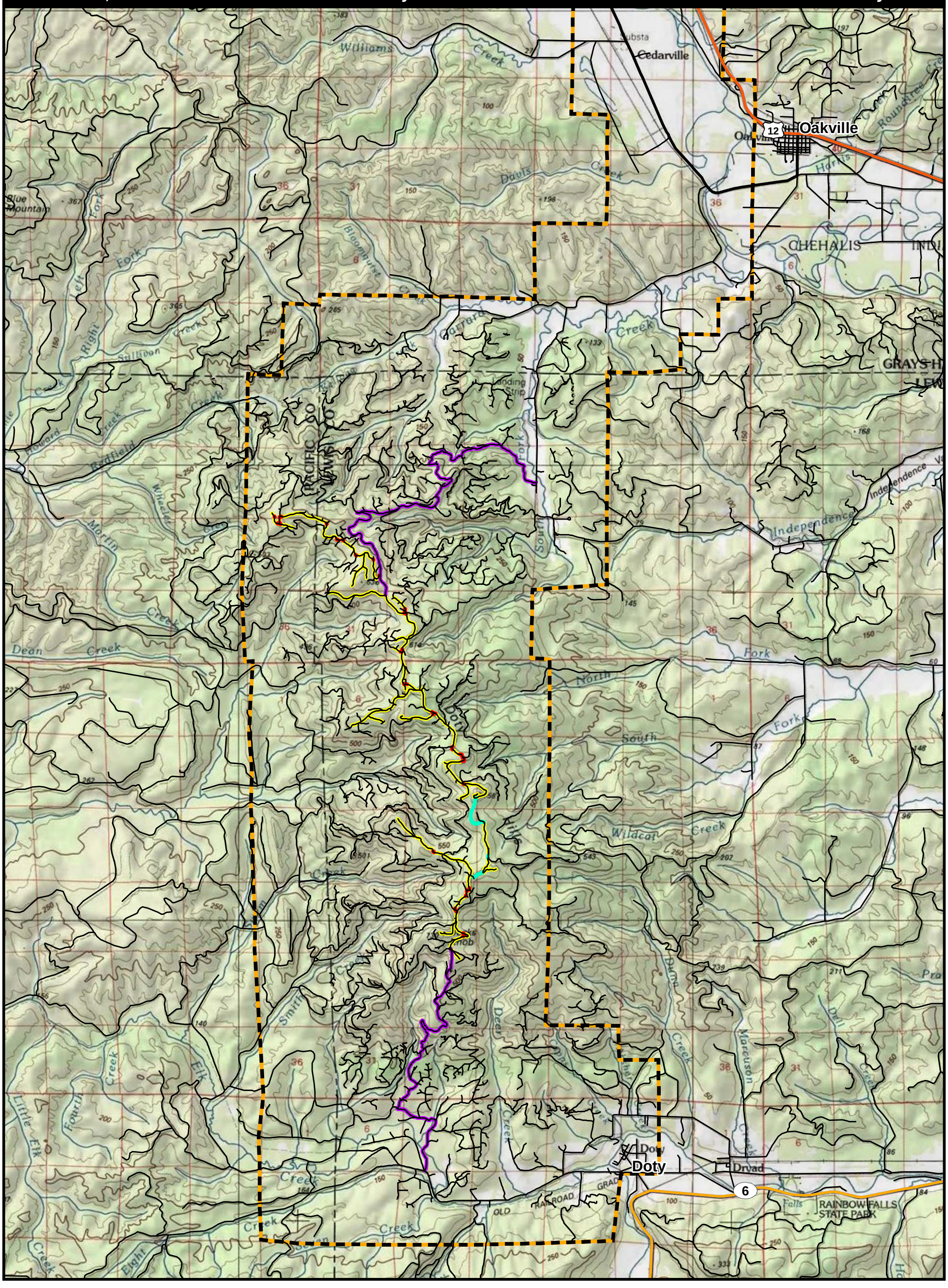


Figure 2-15

Proposed Crane and Utility Corridor Road System

Gray's Harbor, Lewis, and Pacific Counties, WA

N

0 0.5 1 Miles

0 1 2 Kilometers

NAD 1983 UTM 10 1:80,000

- Project Boundary
- Federal Highway
- State Highway
- Major Road
- Existing Minor Road
- Proposed Facilities Access Route
- Proposed Facilities Access Route Turn Realignment
- Proposed Turbine Access Route Existing Road
- Proposed Turbine Access Route New Road
- Proposed Turbine Access Route Turn Realignment

DATA SOURCES: Weyerhaeuser, ESRI, Grey's Harbor PUD

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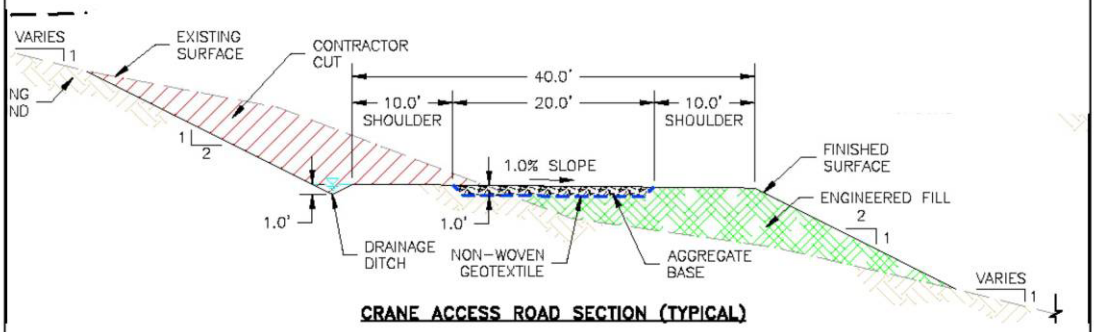

Figure 2-16

Crane and Utility Corridor Typical Cross Section

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Southern Approach: SR 6 would provide primary access to the Doty area from I-5 near Chehalis, Washington. Lewis County roads that would be used to access the Project Area from the south include Stevens Road and Elk Creek road near Doty. Minor roadway improvements are proposed to facilitate Project-related traffic at the following intersections:

- Improve the Stevens Road intersection with SR 6 by installing a right-turn lane from westbound SR 6 onto Stevens Road and widening the eastbound shoulder of SR 6 at this location, and
- Improve the Elk Creek Road intersection with Stevens Road in Doty by widening both shoulders of Elk Creek Road.

Northern Approach: The northern approach would be used for all oversized and heavy loads. Loads would include turbine tower segments, blades, hubs, and nacelles for all WTGs. The equipment would be delivered by truck from Interstate 5 (I-5) via U.S. Highway 12 to Porter Creek Road and then south on South Bank Road to Garrard Creek Road. Access to the Project Area from Garrard Creek Road would be via Coyote Crest Road, which is also designated as Weyerhaeuser C-Line Road.

Improvements to intersections of the following county roads are proposed to accommodate the turning radius for equipment loads:

- Minor widening at the intersection of Garrard Creek Road and Brooklyn Road
- Minor widening at the intersection of Coyote Crest Road / C-Line Road and Garrard Creek Road.

2.2.1.5 Operation and Maintenance Facility

The proposed Project facilities would include a permanent building to support ongoing O&M activities. The O&M building would include an enclosed bay for storage of equipment and parts, a workshop, an office and control center for monitoring and operations of the facility, a restroom and kitchen facilities, and a parking area for vehicles. The enclosed space needed for the O&M building is approximately 5,500 square feet. See Figure 2-17 for a general plan and profile of the O&M facility, which the Applicant plans to locate at the Project substation.

2.2.1.6 Safety and Control Systems

The Project would include a communication and control system for monitoring and controlling the turbines. The communication and control system would use fiber-optic communication lines that would run parallel to the power collection system cables. Each turbine would be equipped with a rotor control and braking system which would respond automatically to the set controller conditions for cut-out speeds and can be operated by the operational control center in the O&M facility.

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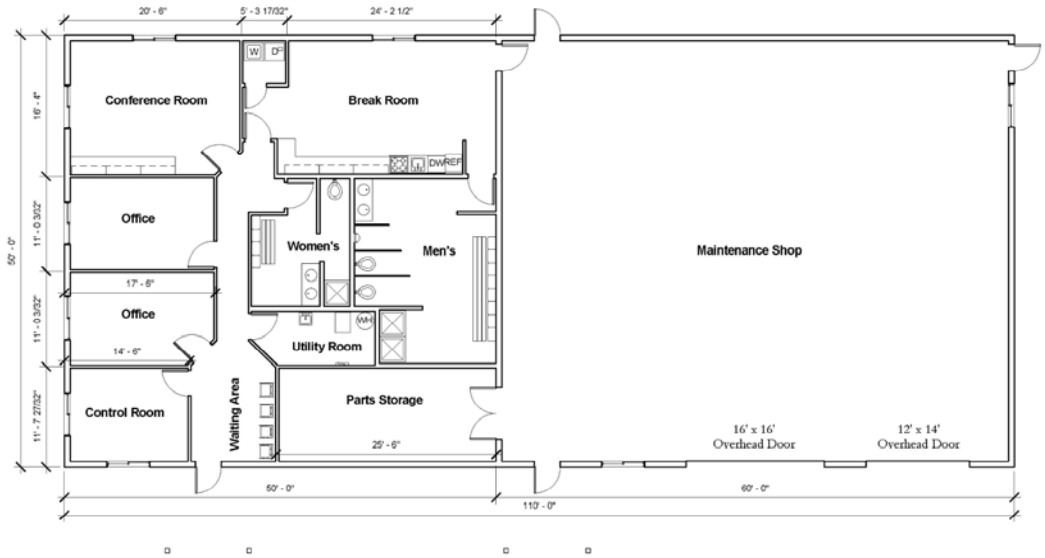

Figure 2-17

General Plan and Profile of the Operations and Maintenance Facility

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Aircraft safety lighting would be installed on the exterior of some nacelles to comply with the Federal Aviation Administration (FAA) rules for structure lighting. See Figure 2-18 for a diagram of a typical nacelle with FAA lighting. Based on current FAA guidance and practice, the Applicant anticipates that approximately 30 percent of the 47 WTGs would be equipped with synchronized, low–intensity, flashing red lights (L-864) for nighttime use.

Each wind turbine, including rotor blades, would be equipped with lightning protection systems which would be connected to an underground grounding arrangement to facilitate the flow of lightning energy safely to the ground. All equipment, cables and structures comprising the wind turbines would be connected to a metallic grounding system.

The 115 kV transmission line poles and wire would have a lightning protection grounding system including a metallic grounding wire for each pole and a static wire paralleling the conductor wires.

The WTG towers would have locked access doors. The substation would be fenced and locked to prevent unauthorized entry.

2.2.2 Construction Process

Construction of wind energy projects typically requires 12 months, depending on the size of the project, terrain, and weather conditions. Construction is usually planned for low-wind months, and some projects may require up to 18 to 24 months if high winds and winter weather occur. Construction of the Coyote Crest Project could take place over approximately a 15 month period, with breaks for inclement winter weather. Under such a scenario, the first phase of construction would involve clearing, grubbing, and construction of road improvements; the second phase would involve construction of approximately 40 WTGs and the transmission line; and the third phase would involve construction of the remaining 7 WTGs.

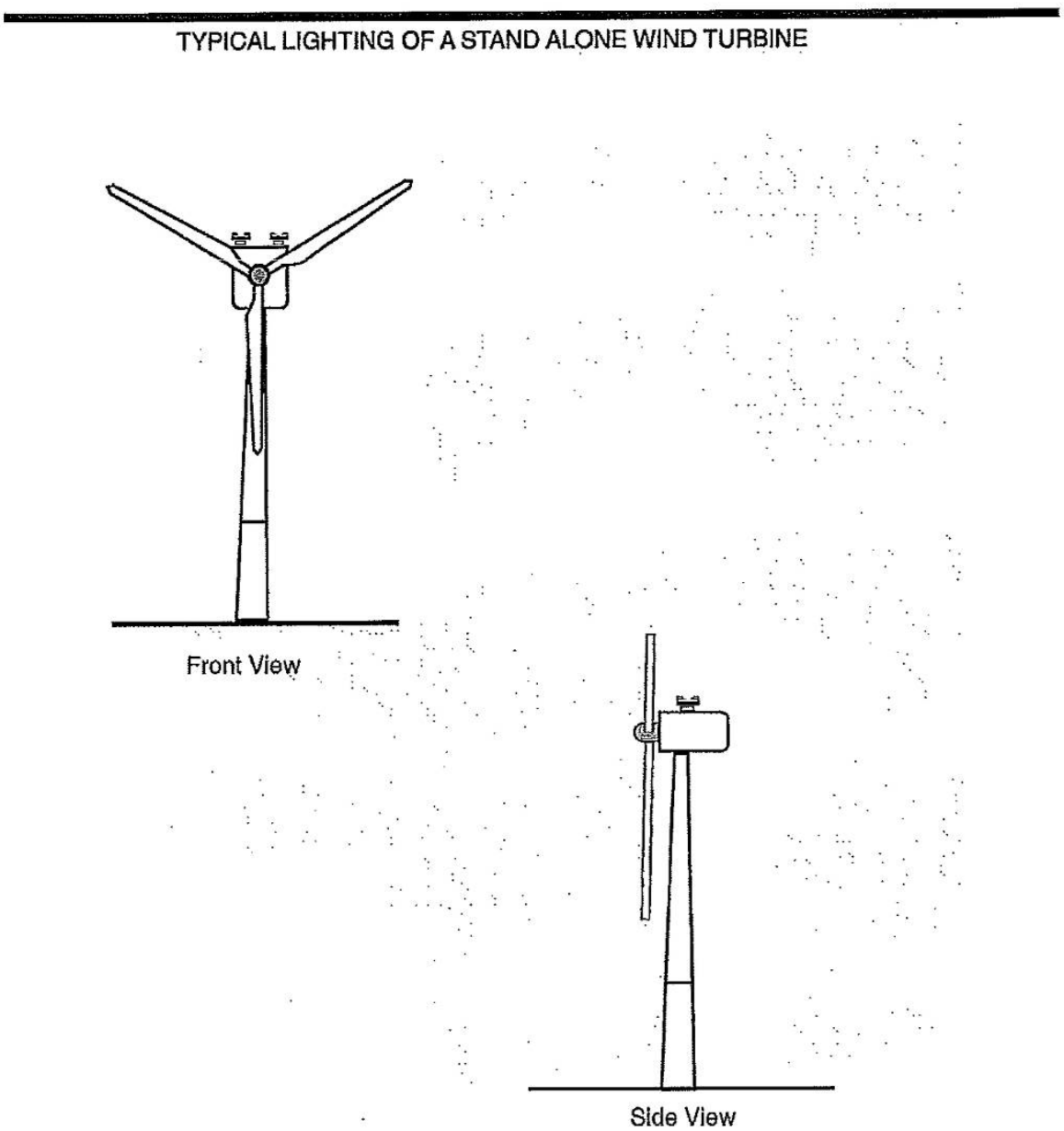
Construction activities for the Project would involve standard timber clearing, road construction methods used for logging operations in the Weyerhaeuser tree farms, and wind turbine construction procedures typically used for wind projects.

The following describes the general sequence of the construction and the procedures to be used for construction of the various Project components.

2.2.2.1 General Construction Sequence

The primary tasks in the construction process include:

- Establish site access;
- Survey and stake Project clearing requirements;
- Clearing and grubbing of construction areas, including installation of erosion and sediment control measures;
- Perform site grading;



Coyote Crest Wind Park

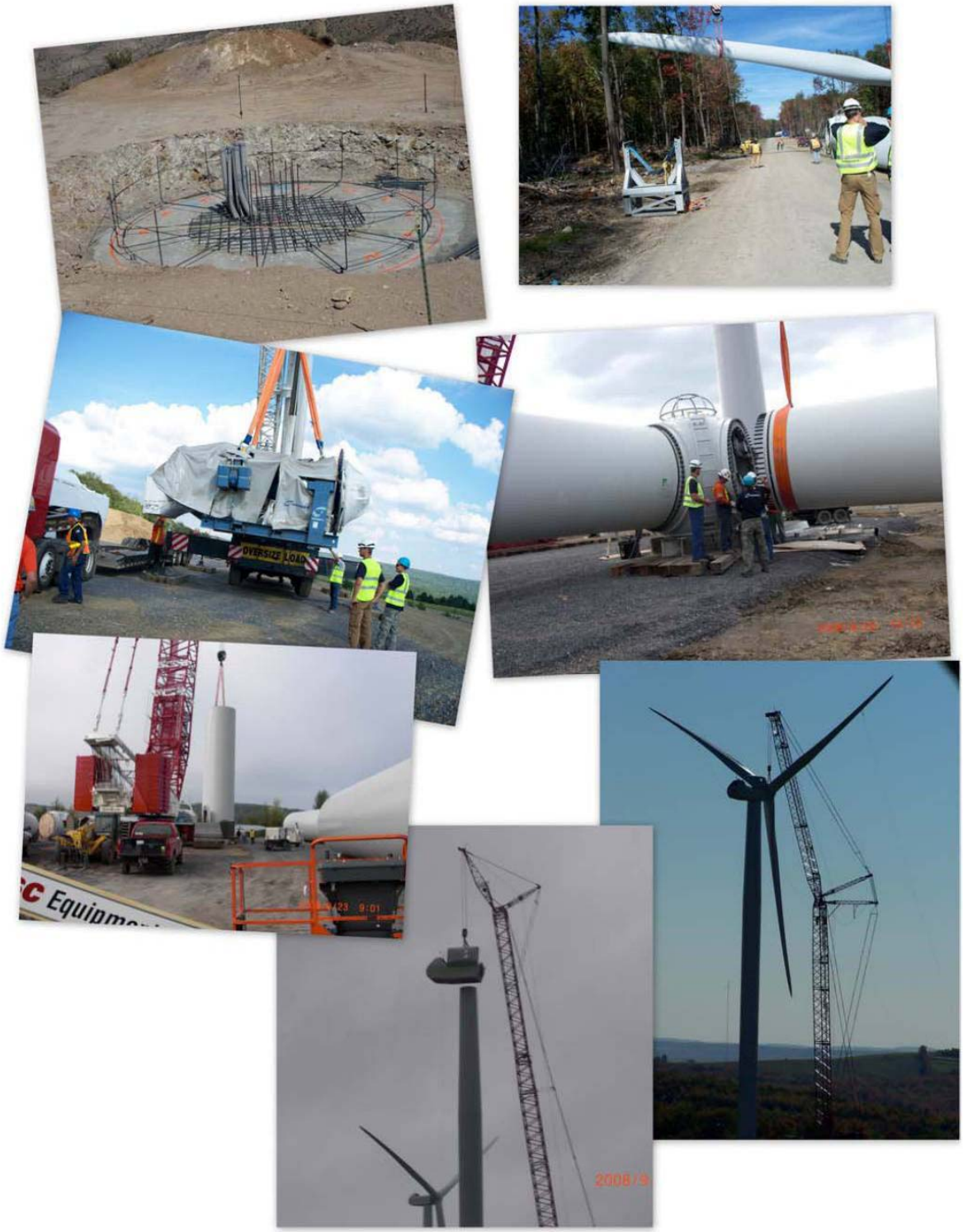
Figure 2-18
Typical Nacelle with FAA Lighting

- Survey and stake Project facilities, road, and transmission line;
- Construct Project access roads and turbine pads;
- Excavate and pour tower foundations;
- Excavate underground utility trenches;
- Place the underground power collection and communication cables in trenches;
- Construct the 115 kV transmission line to the BPA substation;
- Construct the Project substation;
- Construct the Project O&M facility;
- Transport tower sections to turbine locations and assemble towers;
- Transport nacelles, rotors, and blades to the turbine locations;
- Assemble and lift nacelles, rotors, and other turbine equipment onto the towers;
- Install permanent meteorological towers (as necessary);
- Install safety and control system;
- Start up and test all project systems;
- Commence commercial operations; and
- Conduct final site grading and reclamation and clean-up.

The first few months of construction activity would involve clearing and grubbing of the Project facilities and transmission line route. This would be followed by civil and electrical construction including construction of the Project access roads and tower foundations. Once the access roads and pad site excavation has been advanced and completed for half of the tower locations, the installation of the power collection system, communications lines, and Project substation would be initiated and follow the road and pad construction through the project. Turbines would be erected as Project access roads and tower foundations are completed. Installation of nacelles, rotors, and associated equipment would be the final task of major construction activity for each turbine. Photos of the turbine construction process are shown in Figure 2-19. The Applicant expects to begin commercial operations within 4 months after the commissioning of the first wind turbine and completion of the transmission line interconnection.

2.2.2.2 Construction Equipment and Space Requirements

Construction of the Project would require the use of various types of construction equipment. The type of equipment used in constructing wind energy projects is similar to most major construction efforts, with the exception of the large-capacity crane use to install the top tower sections, nacelle, and rotor. During construction, the project schedule is focused on minimizing the on-site time required for the large-capacity crane due to their high operating costs.



Coyote Crest Wind Park

Figure 2-19
Construction Process

Conventional earthmoving equipment such as excavators, bulldozers, graders, dump trucks, and cement trucks are the first pieces of equipment at the site and are used to construct the access roads and foundations, and install power cabling. During the installation of this infrastructure, turbine and tower components are delivered to the site and staged near the foundations. Upon completing assembly of the turbines, electrical and communication connections are made and turbine testing begins. Once the turbines are commissioned, energy production can begin.

Table 2-1 summarizes the types and functions of construction equipment that are typically used in the construction of commercial wind energy projects. Construction activities would require temporary disturbance of a larger area than would be occupied by the permanent Project facilities. Table 2-2 identifies the estimated area that would be cleared and disturbed in construction and within the permanent footprint of the various Project components.

Table 2-1. Typical Construction Equipment for Wind Energy Projects

Equipment	Use
Cranes	Erect WTGs
D9 Bulldozers	Move earth and handle bulk material
Graders	Grade surfaces
Scrapers	Move and remove earth over short distances to create a flat surface such as a road
Dump trucks	Remove earth and bulk material, import gravel
Tree Faller/Buncher	Cut and stack trees
Self Loading Log Truck	Remove logs from construction area
Track Hoes	Excavation of foundations
Backhoes	Excavation of power cable trench
Trencher/Cable Layer	Installation of power cables

Table 2-2. Estimated Area of Construction Disturbance and Permanent Facilities

Project Feature	Temporary Construction Disturbance (acres)	Permanent Project Footprint (acres)
Wind Turbine and Crane Pads	96[1/]	14[2/]
WTG Wind Box Clearing	261[3/]	0[4/]
Internal Power Collection System	0[5/]	0[6/]
Project Substation	4	2
115 kV Transmission Line, Lease Area	51[/7]	38[/8]
115 kV Transmission Line, Easement Area	0.1[9/]	0.1[10/]
Permanent Met Towers	3	0.2
Project O&M Facility	3	2
Staging/Storage Areas	9[11/]	0
New Crane/Turbine Access Roads	3.5[12/]	3.5[13/]
Facility Access Road Turn Realignment	1.9[14/]	1.9[15/]
Crane/Turbine Access Road Widening	38[16/]	38[17/]
Crane/Turbine Access Road Turn Realignment	1.38	1.38
Total Area	472.0	100.7

[1/] Based on clearing allowed under terms of Weyerhaeuser lease of up to 90 acres for 44 turbines or 2.05 acres per turbine; equates to approximately 300-foot square area around base of each turbine; 47 turbines total.
[2/] Based on 60-foot square area (3600 sf) centered on turbine base and approx. 9200 sf crane pad; 12,800 sf or 0.3 acre per turbine; 47 turbines total
[3/] Based on clearing allowed under terms of Weyerhaeuser lease of up to 254 acres for 44 turbines or 5.5 acres per turbine (area is in addition to wind turbine and crane pad area); assumes wind box area currently in trees; 47 turbines total
[4/] Based on availability of balance of wind box for low-growing vegetation
[5/] 9.5 total miles of trenching to be done to house 20 miles of cable, some of which overlaps. 100 percent of disturbance would be within road corridors and is taken into account in the acreage impact for crane roads.
[6/] Based on no surface occupancy from underground cables; cables located within crane roads.
[7/] Based on average clearing width of 100 feet along 4.7 miles of route within McDonald Tree Farm.
[8/] Based on average clearing width of 75 feet along 4.7 miles of route within McDonald Tree Farm, since some of the clearing necessary for the transmission line would already be cleared for the road.
[9/] Disturbance within transmission easement would be due to pole replacement. Assumes 4 ft x 4 ft disturbance area for each pole, average span length of 250 ft or 21 poles per mile and 8.8 miles of easement route; raw result (0.06 acres) rounded upward.
[10/] Permanent impacts would actually just be pole base area, but larger temporary impact figure used.
[11/] Based on three staging areas, each 3 acres in size, for temporary use only during construction.
[12/] Based on average 40-foot clearing width along 0.7 miles of new crane road; includes 30% contingency
[13/] Temporary and permanent impacts treated the same.
[14/] Based on preliminary road layout; average clearing area for 19 turns to be realigned, each consisting of .4 acre, and including 30% contingency.
[15/] All turn realignment area assumed to be permanent.
[16/] Based on preliminary road layout; average additional clearing width of 20 feet along 16 miles of existing crane/turbine access road in the lease area, including 30% contingency.
[17/] Temporary and permanent impacts treated the same.

2.2.2.3 Construction Work Force

The Applicant estimates that approximately 95 people would likely be employed during Project construction. Some of these workers would be employees of the Applicant, but most would work for various construction contractors and equipment vendors who would provide construction goods and services to the Project. The size of the construction work force present at any given time would vary with the scheduled task in the construction process. Peak construction work force would most likely occur during the turbine foundation and electrical power collection system construction. Based on the nature and sequence of construction activity,

the peak work force would not likely exceed 75 workers at any given time. Work efforts involving surveying, clearing and grubbing, road construction, foundation excavation and construction, batch plant operations, and site restoration are likely to utilize local firms. Transmission line and substation construction, turbine assembly and erection, instrument and control system installation, and start up and testing require specialized skills that are less likely to be available locally but are available in the general region.

2.2.2.4 Water Supply and Sewage Disposal

There are no existing wells within 500 feet of the proposed location for the Project substation. Construction water supply for the concrete batch plant, road construction and dust abatement would come from Weyerhaeuser's existing water sources used to support the timber operations of the McDonald Tree Farm or from an existing well along Garrard Creek Road. Bottled water would be provided by contractors for the construction work force.

Portable toilets would be provided by contractors working on the Project during the construction phase. These portable toilets would be serviced regularly and the sanitary effluent trucked off site for disposal by the contractor.

2.2.2.5 Erosion and Sedimentation Control

Erosion and sedimentation control measures would be incorporated into the Project design and the terms of the construction contract(s), and thereby implemented from the beginning of the construction process. Erosion and sedimentation control would be standard practice during the active construction, restoration, and cleanup stages of the construction process. The Applicant would develop and implement a Stormwater Pollution Prevention Plan (SWPPP) to guide these control efforts. This design-level plan would prescribe the use of Best Management Practices (BMPs) that are standard features of such plans. The Project SWPPP would be based on and comply with the Washington Department of Ecology's (Ecology's) *Stormwater Management Manual for Western Washington* (2004), the WDNR Forest Practices Application/Notice (FPAN), the WDNR Road Maintenance and Abandonment Plans (RMAP), and any stipulations of the Hydraulic Project Approvals obtained from the Washington Department of Fish and Wildlife (WDFW). The Project SWPPP would also address the erosion control and water quality conditions of the National Pollution Discharge Elimination System (NPDES) construction stormwater general permit and the Lewis County stormwater regulations (Lewis County Code [LCC] Chapter 15.45).

Based on applicable standards, the SWPPP would include using coverings for exposed soils (soil stabilizers approved by WDNR and Weyerhaeuser), stormwater detention ponds, sediment control basins and traps, drainage culverts, and other well-established measures typical of a forest management area. Surface run-off would be directed away from cut and fill slopes and other disturbed areas and into ditches leading to natural drainage features. Exposed areas would be re-vegetated as soon as possible following completion of the corresponding construction task.

(The Lewis County stormwater regulations (LCC Chapter 15.45) also require submittal and approval of plans for long-term stormwater management. In general, measures for long-term control of stormwater runoff would be similar to those described above, and would be designed to address runoff from the permanent impervious surfaces created by the Project. Facilities for long-term stormwater management would be installed and tested near the end of the Project construction process.)

2.2.2.6 Clearing and Grubbing

Prior to clearing activities, sensitive habitat areas and other protected locations within the Project Area (if any are identified) would be delineated, defined in contracting documents, and marked in the field, pursuant to consultations with the WDFW and Weyerhaeuser.

Following the pre-construction process, construction activity for the Project would start with clearing of timber and stumps from roads, turbine pads, the substation site and the transmission line route within the Weyerhaeuser lease area. The Washington Forest Practices Act (WFPA; Title 222 WAC) and its corresponding rules regulate all harvesting and forest practices, including road construction and maintenance, brush control, and reforestation related to the installation of the capital improvements associated with the Project. The construction areas would be cleared of timber and, when necessary, stumps and other brush. The merchantable timber would be removed from the site and delivered to local log processing facilities. Logging slash, stumps, and other organic materials would be piled and disposed through standard practices employed by Weyerhaeuser and WDNR, and may include spreading out for natural desiccation, burning, or transportation to fiber markets.

2.2.2.7 Roads and Turbine Pads

The heavy construction activity for the Project would start with construction of access roads and turbine pads. Existing Weyerhaeuser logging roads would provide the primary access into the Project Area. These existing road segments would be improved as necessary to accommodate the design standards for the hauling of major equipment into the area. Improvements could include grading to modify the road profile, filling in low spots, widening turns, replacing culverts and applying new gravel to the road surface. Scheduling of improvements to the existing Weyerhaeuser road system would be coordinated with Weyerhaeuser to minimize disruption of ongoing timber harvesting activities.

New gravel roads would be constructed in areas where existing roads could not be used for access to the turbine locations. These roads would vary in width from 16-foot travel surface widths for straight sections and 20-foot travel surface for curved sections. New road segments would include the standard drainage requirements specified by Weyerhaeuser for its roads and installed to comply with WDNR regulations. Temporary disturbance and clearing along the turbine access roads would be approximately 35 to 50 feet wide under typical circumstances, with wider clearing areas needed to accommodate cuts and fills as appropriate to construct and

stabilize roads on slopes. The crane access roads would consist of a 32- to 40-foot-wide crane walking path with a 16-foot-wide permanent road surface in the center. The crane access roads allow for the crane to walk from turbine to turbine to minimize disassembly, reloading, and reassembly of the crane. The temporary disturbance areas adjacent to the roads would also accommodate the trenching for the Project utility lines. See Figure 2-20, which illustrates a three-circuit Project utility line trench.

Temporary clearing around the turbine pads for construction needs is assumed to occupy approximately 2.05 acres (about 300-by-300-foot) area with a radius of approximately 130 feet around the tower foundation. A typical tower foundation and turbine pad for a 262 to 328 feet (80- to 100-meter) tower would involve the construction of a 1-acre assembly area, which is cleared and leveled to a maximum grade of 5 percent. The turbine foundation and crane pad area would be constructed near the center of this cleared area. The large clearing area allows for assembly and crane maneuvering of the assembled hub and blades free of obstructions. See Figures 2-21 and 2-22 for typical crane pad and foundation layouts. The different layouts reflect the options available to safely park and operate the crane to off-load and assemble the turbines, given variations in topography and site requirements.

Under the terms of the lease with Weyerhaeuser, the Applicant would be allowed to clear tall-growing vegetation within a “wind box” around each turbine. The function of the wind boxes would be to eliminate trees that would cause drag or friction and disrupt the flow of wind around

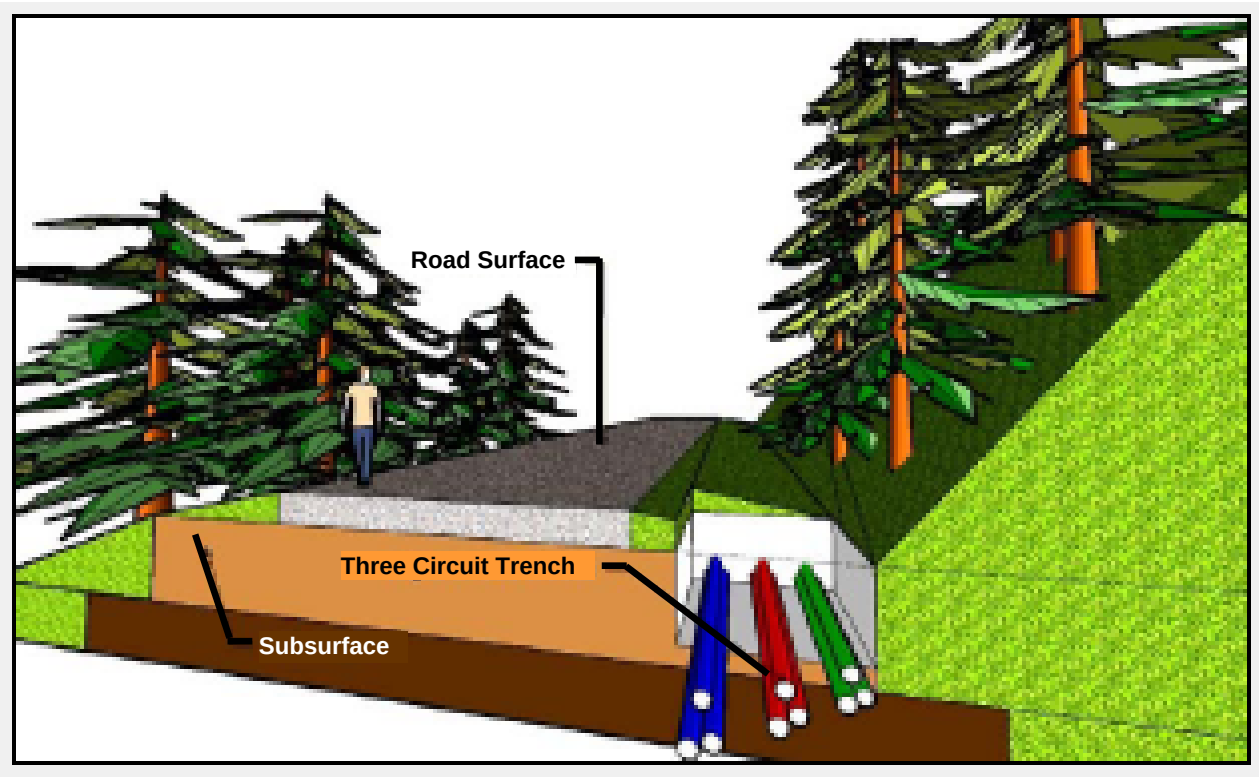
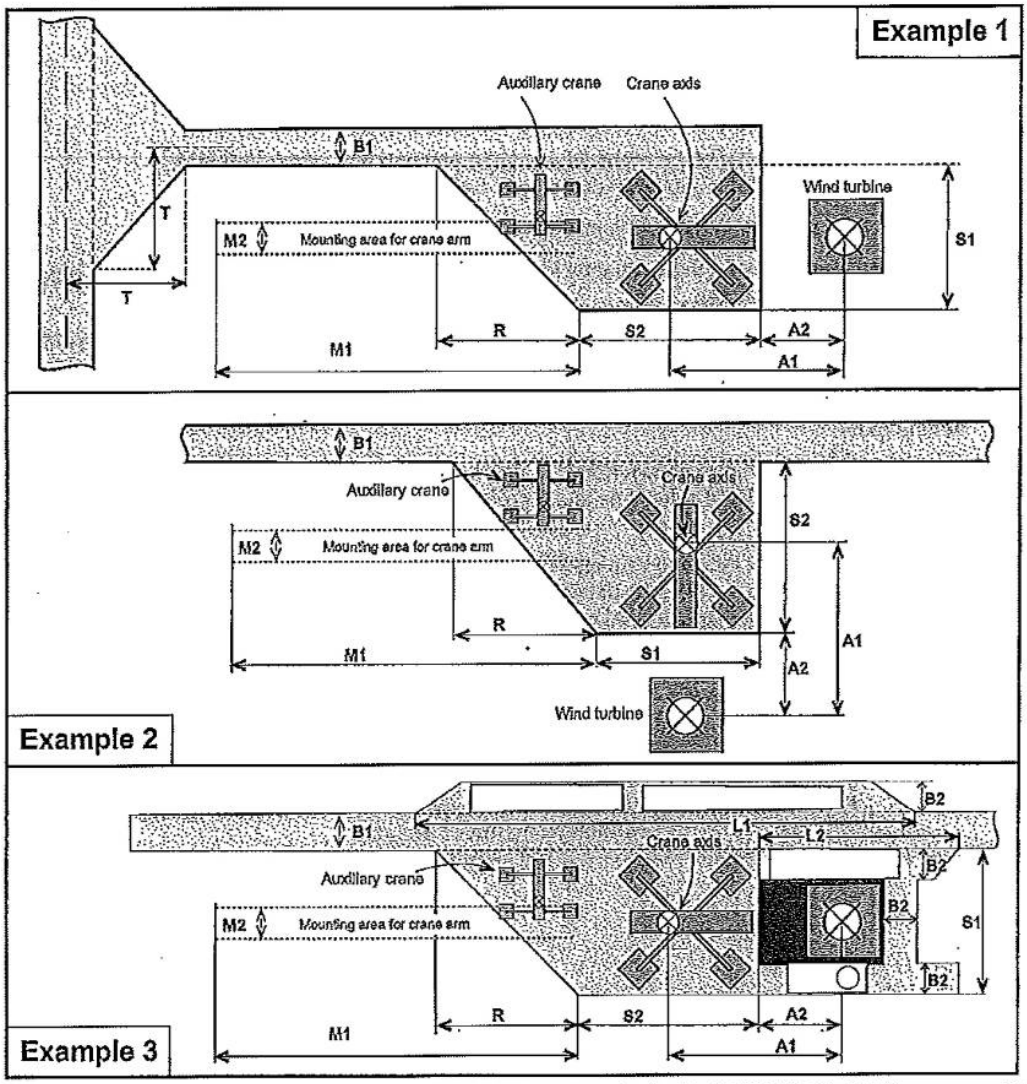


Figure 2-20. Three-Circuit Trench along Roadway

Example for crane area for erection

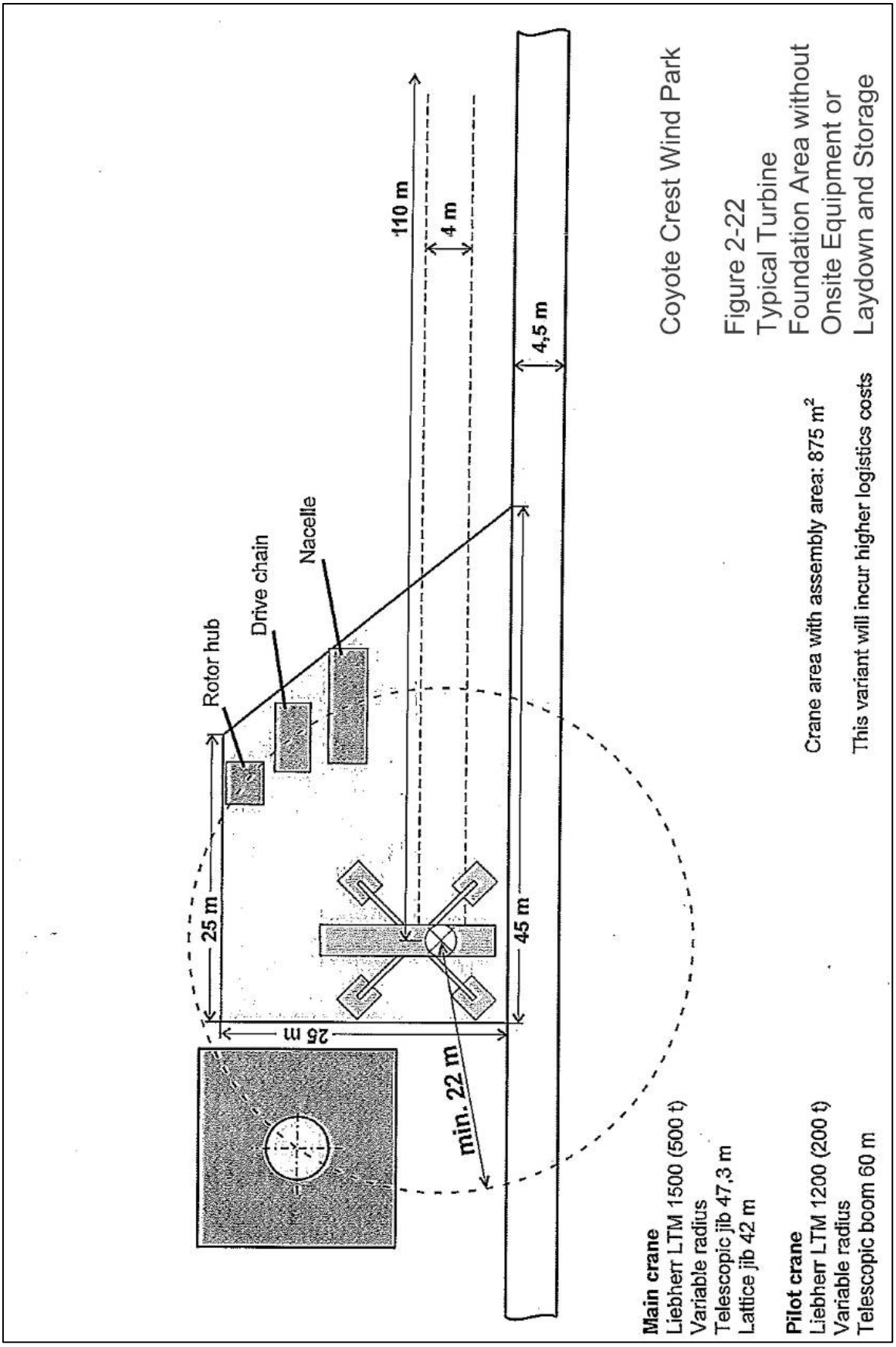


	Hub height	60 m	80 m	100 m	105 m	120 m
R	Length of shunting area	18 m	18 m	18 m	15 m	20 m
B1	Width of access road	4.5 m	4.5 m	4.5 m	4.5 m	4.5 m
B2	Width of storage area	4 m	4 m	4 m		
L1	Length of storage area for tower	55 m	62 m	56 m*		
L2	Length of storage area for tower	21 m	24 m	21 m		
S1	Width of crane area	18 m	18 m	22 m	30 m	22 m
S2	Length of crane area	22 m	22 m	25 m	30 m	28 m
A1	Distance crane centre - centre of turbine	22 m	22 m	30 m	30 m	32 m
A2	Distance crane area - centre of turbine	11 m	11 m	11 m	13 m	22 m
M1	Length of area necessary for crane jib assembly	110 m	110 m	125 m	125 m	134 m
M2	Width assembly space for crane jib	4 m	4 m	4 m	6 m	4 m
T	Delta of entrance bend to be used	25 m	25 m	25 m	25 m	25 m

* Storage area 2 x B2

Coyote Crest Wind Park

Figure 2-21
Typical Turbine Foundation Area with Onsite Equipment Laydown and Storage


Rotor hub
Drive chain
Nacelle
25 m
25 m
min. 22 m
45 m
110 m
4 m
4,5 m
Main crane
Liebherr LTM 1500 (500 t)
Variable radius
Telescopic jib 47,3 m
Lattice jib 42 m
Pilot crane
Liebherr LTM 1200 (200 t)
Variable radius
Telescopic boom 60 m
Crane area with assembly area: 875 m²
This variant will incur higher logistics costs
Coyote Crest Wind Park
Figure 2-22
Typical Turbine
Foundation Area without
Onsite Equipment or
Laydown and Storage

the turbine. The areas within the wind boxes could be replanted with lower-growing vegetation, such as Christmas trees, for long-term use by Weyerhaeuser. The lease allows the Applicant to clear up to 254 acres for the wind boxes, which would equate to an average of 5.5 acres per turbine for the 44 turbines proposed on Weyerhaeuser land. The wind box clearing is in addition to 90 acres of clearing permitted for the turbine and crane pads. Altogether, the Weyerhaeuser lease permits a maximum total disturbed area for turbines and wind boxes of 344 acres.

Once grading for the roads and pads in a given sector of the Project has been completed, fill materials such as crushed rock and sand needed for the road and pad bases and road surfaces would be hauled to the Project Area, deposited, graded, and compacted as needed. Native materials from the Project Area would be used to the greatest extent possible to meet the fill material needs and to achieve a cut-and-fill balance with the Project Area. Existing Weyerhaeuser rock sources would be utilized to provide the majority of the rock needed for compacted fills and road base. Quantities of filling and grading for the Project have not yet been estimated because they depend on the final design of the project foundations and site-specific geotechnical reports. Typical wind projects of this size involve approximately 300,000 cubic yards of material excavation and fill.

2.2.2.8 Staging Areas

Temporary laydown or staging areas would be established in the Project Area to support various construction functions. These include temporary storage of tower sections, nacelles, and other turbine components at each turbine location. Construction of the wind turbines would require the construction of a crane pad adjacent to each WTG. The turbine crane pad is a permanent parking area needed for the construction and long-term maintenance and eventual decommissioning of the turbine equipment. During construction, temporary crane parking areas and equipment laydown areas would be planned and laid out according the site-specific conditions of each WTG site.

The crane parking area must be level for the crane to operate and lift the heavy components of the WTG into place. The crane requires a minimum of 72 feet of setback from the WTG to operate with minimum constraints. Also, an area of approximately 250 feet in diameter around each WTG must be cleared of all trees to allow for swinging of equipment and lifting of the equipment to the top of the tower. In general, the areas where the WTGs are to be located have already been harvested or are currently planned to be harvested. During WTG construction operations, log harvesting would be suspended in the immediate vicinity of the Coyote Crest Project to reduce operational conflicts.

Figure 2-21 illustrates a typical turbine foundation area and crane parking area with onsite equipment laydown and storage. Typically, each turbine foundation area and crane pad parking area would require 2 acres of clearing for cut and fill, foundation area, and lay down area for the assembly of the rotor and tower. However, in some areas, topographic conditions may constrain the area available for full equipment laydown adjacent to the WTG foundation, as shown in

Figure 2-22, which illustrates a typical turbine foundation area without onsite equipment laydown and storage.

Other temporary storage areas would be required throughout the Project Area for storage of other equipment and supplies for the installation of the underground cables and overhead transmission lines; parking of construction vehicles and equipment; parking of construction workers' personal vehicles; and the installation of portable fuel tanks surrounded by earth berms for spill control, rock crushers, and concrete batch plants. Actual staging area locations and dimensions have not been yet determined. One or more staging areas approximately 3 acres in size would be located as needed near existing roads and on previously disturbed log landing areas. These temporary staging areas would be located on Weyerhaeuser lands.

Each turbine site would have a permanent operations area of 0.3 acres, which would include the turbine foundation and a permanent crane parking pad for long-term maintenance requirements. The remaining area would be replanted upon completion of construction.

2.2.2.9 Concrete Supply

The Applicant would contract with one or more construction companies to install the wind turbine tower foundations and pads and the substation pads. These facilities would require sizable volumes of concrete. The Applicant anticipates that one or more temporary concrete batch plants would be located within the Project Area to meet concrete supply needs. The contractor would be responsible for obtaining any environmental permits required to develop these temporary facilities.

The batch plant would involve a portable mixing plant that could be moved to different locations within the Project Area. The batch plant(s) would be set up in temporary staging areas or existing Weyerhaeuser rock pits. A diesel generator would likely be used to power the batch plant and any associated rock crusher. Typically these types of facilities require approximately 3 acres: 1 acre for the batch plant facility itself, 1 acre for raw material stockpiles, and 1 acre for parking, equipment storage, and a settling pond for site drainage control.

Portable concrete batch plants, defined as concrete plants that operate at a site for less than 1 year, are permitted under the State of Washington's Sand and Gravel General NPDES Permit. The general permit specifies discharge limits and requires the operator to develop plans for monitoring, stormwater pollution prevention planning, erosion and sediment control, and spill prevention and control. Best Management Practices for concrete truck washout requires a settling pond to be built to catch the wash-down runoff and stormwater runoff. A portable water storage tank would be located at the plant to store water from off-site sources used to operate the batch plant.

2.2.2.10 Turbine Foundations

Once the Project roads are constructed, excavation would begin for turbine foundations. Typically either inverted-T or rock-anchor type foundations are used (see Section 2.2.1.1), with selection of the turbine foundation design to be based on the site-specific geotechnical conditions. Construction of the turbine foundation usually takes 3 to 5 days, depending on the amount of rock that must be excavated. Foundation construction activities are expected to occur for approximately 6 to 8 months during the Project's construction process.

The inverted-T foundation (Figure 2-6) requires a circular excavation approximately 8 feet deep and 90 feet in diameter. Following excavation, a layer of compacted fill is placed at the bottom of the hole and an octagonal-shaped, reinforced-concrete (concrete poured over steel rebar) footing up to 4 feet deep is poured on top of the fill. A 4-foot-deep reinforced-concrete pedestal is then poured on top of the footing, and the footing and pedestal are covered with compacted backfill and topsoil. Steel anchor bolts extending through the pedestal to near the base of the footing would be used in a subsequent step to fix the tower to the foundation.

The rock anchor foundation (Figure 2-7) requires a foundation base and drilled rock-bolt anchors ranging from 25 to 35 feet deep (depending on site-specific subsurface conditions) and approximately 18 feet in diameter. A cylindrical, corrugated metal form approximately 16 feet in diameter would be inserted in the hole, and another cylindrical corrugated form several feet smaller in diameter would be placed inside the larger form. The space between the two forms would be filled with reinforced concrete and two rings of anchor bolts, and the space inside the inner metal form would be filled with compacted backfill.

If bedrock is encountered at any WTG location, rock anchors would likely be used to secure the base of the foundation, regardless of which foundation design is used. Use of explosives (blasting) might be required for installation of rock anchors. The number of WTG locations where bedrock is likely to occur has not been estimated.

The Applicant would engage a geotechnical specialist to prepare a geotechnical report for the Project that would be used to determine the appropriate foundation design for each turbine location. The Applicant would also engage a licensed civil engineer during construction to inspect each foundation pour and prepare a quality assurance report for each foundation.

2.2.2.11 Collection System

The power collection system for the Project would be installed using underground cable except where it is not feasible to do so and it is necessary to avoid sensitive environmental features, in which case the power collection cable would be placed on poles adjacent to the road system. The underground cable would be located within the disturbance area for construction of the Project road system to the maximum extent possible. Several miles of 34.5 kV underground power cable would be installed to connect the turbine locations to a centralized substation and step-up transformer. Each 34.5 kV power cable would be capable of transferring a maximum of

25 MW of power. Several cable runs would be required to collect the entire Project output of approximately 120 MW. Underground cable would be installed using either a trenching or plowed-in method. The trenching method requires excavating a trench approximately 3 to 5 feet wide and approximately 4 to 5 feet deep, laying the electrical cables in a part of the trench, partially backfilling the trench, laying parallel communication cables, and backfilling the entire trench. Under the plowed method, the power collection and communication cables would be installed without the need to excavate an open trench; instead, the cables would be directly plowed into the ground. In either case, topsoil would be replaced on the surface of the disturbed area and would be reseeded with an appropriate mix of native plants. In certain areas, the underground cables may be encased in concrete to provide additional protection and stability in the ground.

Overhead 34.5 kV collector lines would be located adjacent to the project roads. Overheard collection cables would be mounted on wooden poles approximately 37 feet in height. Construction of these facilities would require heavy equipment access within a corridor approximately 8 to 12 feet wide along each overhead line, plus a temporary laydown and work area around the base of each pole. The poles would be placed in holes excavated by augur and minimal or no clearing and grading would be required for constructing overhead lines.

2.2.2.12 Transmission Connection

Developing the Project transmission interconnection would require constructing an overhead transmission line from the Project substation to the existing Grays Harbor PUD transmission line near Cedarville, which is the planned reception point for power generated by the Project (Figures 2-3 and 2-13). The transmission interconnection would utilize a three-circuit 115 kV line design, supported on wood-pole structures approximately 76 feet in height. The majority of these structures would be single-pole structures. Occasionally at key angle points and spans, an H-frame structure would be employed to improve the structural integrity of the line.

The exact path of the transmission line within the McDonald Tree Farm has not yet been determined, but generally it would run from the northern part of the turbine development area across Weyerhaeuser property to Garrard Creek Road. The transmission line would then follow the Grays Harbor PUD easement to Cedarville Substation along Garrard Creek Road and South Bank Road. Construction approach would vary for each segment of the transmission line.

The segment of the 115 kV line on Weyerhaeuser property would follow a designated 100-foot-wide transmission line easement which would parallel and be accessed from C-Line Road system, generally within 100 feet of the road. Final design of the route would take into consideration Weyerhaeuser harvesting plans and the route would be located to the extent practicable to minimize impacts to planned harvesting areas. The initial phase of transmission line construction on the Weyerhaeuser property would involve clearing of trees from the 100-foot easement. This would generally be accomplished with conventional logging equipment from the C-Line road. In some areas, such as where structures are located adjacent to the

existing road and the configuration of the structure places the conductive wires on the road side of the structure, the clearing area could be as narrow as 50 feet. In some areas of more mature tree stands, additional feathering of the trees along the Weyerhaeuser easement might occur. Feathering of the transmission line corridor would consist of topping of trees and/or complete removal of large trees that could pose a danger if they were to fall and hit the transmission line.

Feathering would be permitted over the life of the project to maintain the transmission line corridor, which would pass through several of Weyerhaeuser's planned tree growing and harvesting units.

On the Weyerhaeuser property and along the Coyote Crest road easement the transmission line structures would be placed as close to the road as safe design would allow. This would minimize construction of access trails to each structure. These poles would be approximately 60 to 76 feet above ground. H-frame structures would be used at specific angle points in the line where greater strength would be required. The exact location of each structure would be based on a detailed plan and profile engineering design of the route.

Along Garrard Creek Road and South Bank Road to the Cedarville Substation, the transmission line structures would be placed within the existing Grays Harbor PUD easement. Existing structures for distribution power would be replaced by the new single wood-pole structures. The transmission line in this area would have an under-build component consisting of a second string of wires underneath the 115 kV wire to carry the lower voltage distribution power along the existing easement. Construction access for this segment of the transmission line would be from the county roads and involve using utility boom trucks parked along the county road or next to each transmission pole. The existing poles would not be removed until the lower-voltage power line has been transferred to the new structures.

Transmission construction activities would include the following construction steps:

- Clearing and grubbing of the Weyerhaeuser easement area using conventional logging equipment;
- Construction of short spur road trails to each tower as needed with a small dozer;
- Layout of the poles and insulators using pole handling truck and trailer with a self-loader crane;
- Drilling of the hole and placement of the wood pole with a large truck mounted auger to drill the hole for the pole;
- Setting the pole with a small crane or boom crane from a utility truck;
- Placement of concrete around the pole base with a typical redi-mix truck;
- Manual installation of the insulators and ground wires;
- Stringing of the conductor wires;

- Transfer of the lower voltage wire to the new structures; and
- Removal of old poles and rehabilitation of the easement areas.

Standard industry construction practices would be used to construct this facility, including surveying, preparing the ROW, hauling materials, assembling and erecting structures, stringing ground wire and conductor, and cleanup and restoration. A licensed surveyor would survey the transmission line route and stake structure locations. Holes for the transmission structures would be drilled or augured, typically to a depth of 4 to 6 feet and a width of 2 feet. Construction materials would be hauled by truck to the route and the structures would be assembled on site. Conductor stringing equipment would be placed at designated pulling stations along the route at angle points and areas with sufficient access. Stringing would use a stringing rope and drum pulley system from a truck holding the spool of conductor wire parked on the county road when space is available. Cleanup and restoration of disturbed areas would occur following stringing and testing of the line. Excess topsoil would be tamped around poles or spread on the ROW, and disturbed areas would be reseeded with native plants or agricultural crops, depending on the adjacent use.

2.2.2.13 Grays Harbor PUD Action: Cedarville-South Elma Transmission Upgrade

Construction activity for the upgrade of the Cedarville-South Elma 115 kV line by Grays Harbor PUD would be similar to the construction practices described above for the proposed action. Because this line predominantly runs parallel to existing public roads, construction access would generally be as described for the Project transmission line segments along Garrard Creek Road and South Bank Road. Construction access across farm fields would be needed for a short segment of line northwest of Dunlap Road.

2.2.2.14 Substation and Operation and Maintenance Facility

The Project substation would be constructed while the electrical system components are being installed. Construction activities would include clearing and grading the substation site, which would occupy up to 2 acres; constructing concrete pads for transformers, the control building and other equipment; installing the electrical equipment; assembling the control building; covering the remainder of the site with gravel; and constructing a chain-link fence around the perimeter of the substation site.

The Project O&M facility (Figure 2-17) would be constructed on a 2-acre site located adjacent to the Project substation. It would involve conventional building construction techniques including site clearing and grading; construction of a concrete pad for the building, framing, and finishing the building; installing electrical wiring and plumbing; and constructing a septic system and drain field.

2.2.2.15 Turbine Equipment

Following foundation construction, the WTG crane pad would be constructed next to the foundation. This pad would be an engineered parking pad with sufficient rock base to hold the crane and the associated outriggers in a stable position for lifting the heavy equipment. The WTG parts, including the tower segments, nacelles, rotors, and other components, would be delivered to the tower locations. Once a sufficient number of tower foundations are in place and finished, the first turbine towers, nacelles, and blades would be brought to the Project Area for placement. The turbine components would be transported to the Project Area by truck and trailer. The towers would have three to four sections, each approximately 70 to 90 feet long. The actual size of each segment would depend on which turbine supplier is selected. The tower segments would be delivered by trailers, each carrying one tower section.

Large cranes would lift the multiple tower sections into place. The bottom section would be bolted to the circular ring(s) of anchor bolts on the foundation pedestal, and the upper sections would be sequentially bolted in place. A typical construction sequence would involve a smaller crane working in advance of the larger crane. This smaller crane would place the lower segments of the WTG tower on the foundation and move to the next site. The larger crane would be assembled on site and would be used to hoist the upper tower segments and nacelle. The nacelle and rotor would be hoisted to the top of the tower by the large crane and bolted to the tower. The rotor hub and blades would be assembled on the ground, and this entire assembly would be lifted by crane and secured to the nacelle.

Upon completion of assembly for one WTG, the large crane would then travel under its own power to the next tower site. If this is not possible due to difficult terrain, then the crane would be partially disassembled and moved to the next location. To the extent possible, the crane road system between WTG locations would be constructed with sufficient cleared width to allow a crawler crane to travel between WTG sites. It is anticipated that up to six crane assembly and mobilizations would be required to assemble all 47 WTG facilities. See Figure 2-19 for photographs of a WTG being constructed and a hub and blade assembly being hoisted.

2.2.2.16 Final Grading and Restoration

Final grading of disturbed surfaces within the Project Area would occur following completion of the heavy construction activities, and any additional gravel needed would be placed on the Project access roads. Installation of BMPs for long-term stormwater management would occur during this stage of construction. All areas temporarily disturbed by Project construction would be restored to their original condition and reseeded with native vegetation. Areas subject to construction activity would be inspected for presence of noxious weeds and treated as necessary, and all long-term stormwater management and erosion control measures would be inspected to ensure that they are functioning adequately. A final site cleanup would be made before shifting responsibility for the Project Area from the construction contractor to the Project operations and maintenance crew, including collection and disposal of all construction debris and other waste

materials that could not be reused. County roads would be restored to their pre-Project condition.

2.2.2.17 Testing

Following completion of construction activities on the first group of wind turbines, approximately 1 month of testing would occur before commercial operations begin. Testing would involve inspections of the mechanical, electrical, and communication systems to ensure they are working properly and performing according to their respective specifications. The testing process would include checks of each wind turbine and the overall Project control system. Technicians qualified for the specific systems would perform all inspections.

2.2.2.18 Transportation and Access Management

The existing transportation network servicing the proposed Coyote Crest Wind Park includes several state, county, and private roads. The transportation route area impacted by the Project is bounded by I-5 to the east, SR 6 to the south, and U.S. 12 to the north, and includes several roads maintained by Lewis County and Grays Harbor County as well as private roads maintained by Weyerhaeuser. Specific information on the characteristics of the transportation network is provided in Section 3.11.

The Applicant has identified the most logical route to/from I-5 that would be used during construction of the Project for the transport of materials including major equipment and oversize loads. This route involves delivery of equipment and materials via I-5 to U.S.12, west on U.S. 12 to Porter Creek Road, west on Porter Creek Road to South Bank Road, south on South Bank Road to Garrard Creek Road, and west and south on Garrard Creek Road to the primary project access point at Coyote Crest Road, a private road maintained by Weyerhaeuser. This route has been designated as the northern access route.

The Applicant has also identified a secondary route to/from I-5 that would be used during construction for the transport of materials that do not involve oversized loads, work crews and other construction related equipment and materials. This route involves the delivery of equipment and materials via I-5 to SR 6, west on SR 6 to Stevens Road and into the community of Doty, and then west on Elk Creek Road to the entry into the Weyerhaeuser McDonald Tree Farm and the 9000 Road system. This route has been designated as the southern access route.

Trucks would be used to deliver construction equipment and materials to Project construction sites. The wind turbines, towers, transformers, and other large equipment would be transported to the site using semi-trucks and lowboy transporters designed for heavy loads (i.e., multiple axles). Each wind turbine unit would consist of four tower sections, the nacelle, hub assembly, three rotor blades, and a controller. The range of load sizes of these components and truck requirements are summarized in Table 2-3. Several of these loads would have a gross vehicle weight upwards of 105,500 pounds, which exceeds the Washington State Department of Transportation (WSDOT) size and load limit. Because all loads transported on WSDOT rights-

Table 2-3. Size of WTG Components and Truck Requirements

Maximum Height	16.4 feet
Maximum Width	16.4 feet
Maximum Load per Axle	17 tons
Maximum Weight	182 tons
Maximum Length	177 feet

of-way must be within the legal size and load limits or must have valid oversize and/or overweight permits, all trucks would be required to obtain WSDOT permits for oversized loads. The trucks would deliver the equipment to the Project Area either to a designated central lay-down area or to the individual WTG sites.

Tower components would be transported in three to four segments. Each tower segment would be approximately 66 to 75 feet long, with one segment per truck. Blades would be transported two at a time on one truck. The nacelles and associated components would require two additional truck loads per turbine. Therefore, each turbine would require 14 truck trips (7 inbound, 7 outbound) for delivery of turbine components. Delivery of turbine components for the entire Project (47 WTGs) would require 658 loads (329 inbound, 329 outbound). The frequency and duration of the truck trips would depend on the specific construction schedule and delivery schedule set by the Applicant and the construction contractor.

Construction-related traffic would include deliveries by truck of Project equipment and construction materials such as concrete and steel. Truck deliveries are anticipated to occur between 8 a.m. and 4:30 p.m. on weekdays. In total, 4,800 heavy-duty truck deliveries are expected during the 24-month construction period, with 50 trucks per day or 100 daily truck trips (inbound and outbound) anticipated during peak construction. It is anticipated that truck deliveries would include:

- Major equipment (e.g., tower sections, nacelles, blades);
- Gravel for site access roads, O&M facility area, and substation;
- Water trucks for road wetting during compaction and for dust control;
- Construction equipment delivery and pickup;
- Concrete and reinforcing steel;
- Mechanical equipment;
- Electrical equipment and material (transformers, cable, etc.);
- Miscellaneous steel, roofing, and siding;
- Construction consumables; and
- Contractor mobilization and demobilization.

It is anticipated that during periods of peak construction activity, there would be from 60 to 75 workers on site, and as many as 95 workers in total would be employed during construction of the Project. This work force could generate as many as 80 inbound trips during the morning peak hours and 80 outbound trips during the afternoon peak hours.

2.2.3 Operation and Maintenance

Once construction and testing of Project facilities are completed, the Applicant would initiate long-term operation and maintenance of the wind park. The Project is expected to have an operating life of at least 20 years. Experience in the wind industry indicates that technical advances in wind energy equipment often result in replacement of wind turbines at a specific project with new equipment (a process termed repowering), resulting in an extension of the operating period of the project. The following discussion summarizes the operation and maintenance functions that would be undertaken at the Project and their characteristics.

2.2.3.1 Operation and Maintenance Functions

The Applicant intends to operate and maintain the Project once constructed. Long-term operations and maintenance activities for the Project would include the following functions:

- Round-the-clock operations monitoring of the Project electrical output and performance of the individual WTGs, and management of the instrument, control, and safety systems;
- Controlling turbine operations and power output to meet scheduled deliveries and implementation of scheduled outages for regular or periodic maintenance;
- Performance of periodic and routine testing and maintenance of the turbines;
- On-site repairs of Project equipment as needed in response to malfunctions or scheduled maintenance;
- Patrolling the Project Area to ensure security and monitor on-site conditions including inspections of equipment, monitoring of re-vegetation and wildlife, and discouraging unauthorized use; and
- Periodic maintenance of Project access roads.

2.2.3.2 Work Force

The Project would employ six to eight full-time staff for long-term O&M. Periodically, specialized contractors would be used to assist in the maintenance of the Project turbines, transmission line, and substation. The operations center would be staffed 24 hours a day, 365 days a year.

2.2.3.3 Water Supply and Sewage Disposal

Water consumption for the operations and maintenance facility would be considerably less than 5,000 gallons per day. Domestic water for the O&M facility at this location would be provided

by development of an exempt well (i.e., a well that is exempt from the need for a groundwater right under the Washington water code, because the consumption rate is less than 5,000 gallons per day). Bottled water would be supplied to the operations and control center.

Restroom and kitchen facilities at the O&M building would drain to an on-site septic system. A Lewis County septic system permit would be obtained for the site.

2.2.3.4 Safety Measures

The WTGs are designed to operate automatically and independently, and are continuously monitored by a control system called the SCADA. The SCADA would monitor the operations and output of each turbine. Each turbine would be equipped with monitors that communicate real-time operating conditions through communications lines to the O&M office. Alarm systems would be triggered if operational characteristics fall outside of set limits. Each turbine would have automatic braking systems to shut down the rotor in the event of malfunctions or excessive wind speeds. Much of the site operation is handled remotely from the O&M office via the use of computers and a high-speed communication network between the turbines. Generally, projects are staffed with one operator for every 10 to 20 WTGs, depending on the project and turbine size. Operators are specially trained and apply both electrical and mechanical skills to address turbine faults, troubleshoot operation problems, and perform repairs. Much of the work is performed inside the turbines, which involves a significant amount of climbing.

Hazardous materials are those listed in the U.S. Environmental Protection Agency (EPA) Consolidated List of Chemical Subject to Reporting under Title III of the Superfund Amendments and Reauthorization Act of 1986. Construction, operation, and decommissioning of the Project require minimal use of some hazardous materials. Types of hazardous materials that may be present include fuels, lubricants, cleaning solvents, paints, pesticides, and explosives. The Applicant would comply with all applicable federal and state regulations regarding notices to federal and local emergency response authorities, including the maintenance of appropriate chains of custody forms. The turbines would use synthetic oil as a lubricant in the gearboxes and hydraulic fluid for the blade pitch actuators. Each turbine would contain lubricating oil. Turbine oil would be tested regularly and replaced as needed. All oil supplies would be kept at the maintenance facility in dry covered storage areas. All waste oil and fluids collected during maintenance would be placed in appropriately marked barrels and transferred off site to an approved waste facility.

Secondary containment would be used for materials storage and dispensing areas (fueling stations for off-road construction equipment), as well as waste storage areas to prevent impacts from leaks or spills. Additionally, fluid-containing transformers may also be installed within secondary containment features, or be designed in such a way that their outer cases serve as containment devices. To ensure timely response to accidental leaks or spills, appropriate spill containment and recovery equipment would be maintained in the Project Area.

The Applicant would implement standard safety plans for the Project which are tailored to the specifics of the Project site requirements. The safety plans include key components that are specific to wind energy facilities such as fire safety and emergency tower rescue programs. These programs define hazards that could be present, prescribe procedures to be followed by operations and maintenance personnel, identify equipment needed to implement the programs and specify applicable training requirements.

The Project would also incorporate into its safety plans the standard operating procedures specified by Weyerhaeuser for road travel, construction operations and wild fire. Emergency evacuation procedures and forest fire safety procedures would be incorporated into all construction and operations programs.

2.2.3.5 Access Management

Management of access within the Project Area during the operating period for the Project would be according to provisions of the Applicant's lease agreements with Weyerhaeuser and WDNR. In general, the Applicant would be responsible for controlling access within the 3,560 acres subject to leases. The underlying land owners, Weyerhaeuser and the State of Washington, would remain responsible for managing overall access to the McDonald Tree Farm and the WDNR lands in the Project Area.

As described in Section 2.2.2, fencing would be used to control unauthorized access to the Project substation and O&M facility. No other Project facilities would be fenced. Locked doors to the turbine tower bases and other design features would prevent unauthorized access to the turbines. Beyond these physical measures, access management would consist of appropriate signage on the Project facilities and regular patrolling of the Project Area by the O&M staff.

Long-term management of access to the Weyerhaeuser McDonald Tree Farm and the WDNR lands in the Project Area would presumably be the same as at present. As discussed in Section 2.1.3.1, the Weyerhaeuser lands are not open to general public use, although Weyerhaeuser currently permits some low-intensity outdoor recreational uses. Access to the McDonald Tree Farm can be controlled through gates located at the primary entry points on Coyote Crest Road (via Garrard Creek Road) from the north and Elk Creek Road from the south. Lands administered by WDNR are generally managed as available for public use, although access may be restricted at times.

2.2.3.6 Expected Operating Patterns

The WTGs would not operate during all hours of the year because the wind does not blow at sufficient speeds to operate the turbines all the time. The Applicant has collected several years of regional and Project-specific meteorological data within the Project Area. Based on these data, the Applicant expects the Project to operate approximately 30 percent of the time. On an average basis, this would represent typically approximately 2,600 operating hours per year.

Each turbine would require 40 to 50 hours of scheduled mechanical and electrical maintenance per year. Routine maintenance would occur every 6 months and an annual inspection and any major maintenance would be scheduled for the summer when wind power generation is at its seasonal low. Long-term monitoring of the project would also require periodic visits by consulting scientists involved in biological monitoring, meteorological station maintenance, and vegetation control.

2.2.3.7 Distribution of Project Power

The Applicant currently has not executed a power purchase agreement for electricity generated by the Coyote Crest Wind Park. Based on current and expected market conditions for renewable energy supplies, the Applicant anticipates that Project power would be sold to one or more utilities serving retail customers in Washington and/or Oregon. Power from the Project would be delivered to the BPA regional system via the Grays Harbor PUD system. A number of public and investor-owned utilities in the Northwest are connected with the BPA system and would be able to obtain power from Coyote Crest.

2.2.4 Decommissioning and Site Restoration

At the time the Applicant decides to terminate operation of the Project, the Project would be decommissioned. A specific plan for decommissioning would be prepared at that time. In general, decommissioning the Project would involve the following:

- Removal of the wind turbine nacelles, blades, towers, and other facilities.
- Removal of foundations to below grade so that forestry operations can resume.
- Cutting off and securing underground cables in place.
- Removal of transformers and other substation equipment and recycle or reuse these materials to the extent practical. Remove gravel for reuse in another area of the tree farm. Area beneath the removed substation would be scarified and then replanted so forestry operations can resume.
- Demolishing the O&M building using conventional equipment. Recyclable and reusable materials would be reused or sold as scrap to the extent practical. Other materials would be transferred to an appropriate waste facility in accordance with all federal, state, and local laws. Areas beneath the removed O&M facilities would be scarified and then replanted so that forestry operations can resume.
- Allowing roads associated with forestry operations to be left in place for ongoing forestry operations.

Overhead transmission line wire cables would be removed and recycled or used at another site for power transmission lines. Poles would be removed and recycled or used at another site.

2.3 No Action Alternative

The SEPA Rules require lead agencies to evaluate the No Action Alternative for a proposal and compare it to the other alternatives (WAC 197-11-440[5]). The No Action Alternative in this case assumes a decision by Lewis County not to approve the SUP application for the Coyote Crest Wind Park. Under the No Action Alternative, the Project facilities and associated features described in Section 2.2 would not be constructed. Likewise, the environmental impacts of the proposed action as described in Chapter 3 of this EIS would not occur.

Under the No Action Alternative, future environmental conditions within the Project Area would be determined by existing uses in the area that would continue, and by any new uses that might occur under current or future zoning and related regulations. Most of the Project Area is currently zoned for forest-related uses, while the northern area in and near the Chehalis River Valley has extensive agricultural zoning and small urbanized areas with primarily residential zoning. The current zoning designations would likely continue in much the same form for the foreseeable future. Timber harvest and related activities would likely continue on the Weyerhaeuser and WDNR lands in the Project Area, along with the environmental conditions associated with those activities. Agricultural activities that are now common in the northern part of the Project Area would also likely continue. Expansion of urbanized uses would likely be limited, and generally confined to the existing areas of development along the main public roads in the area.

The No Action Alternative evaluated in this EIS is specific to the Applicant's Coyote Crest proposal and does not apply to any other current or potential future proposals for energy generation. Under this alternative, there would be no contribution to new electrical generation from the Coyote Crest Wind Park in response to identified electric power demands in the Pacific Northwest and adjoining regions. Other proposals for energy generation projects, using wind or other energy resources and involving sites in Lewis County or elsewhere in the region, could be pursued in response to those demands. The No Action Alternative for the Applicant's proposed action does not include or preclude any specific permitting action that might occur in the future with respect to a similar proposal.

2.4 Alternatives Not Evaluated in Detail

The SEPA Rules provide for the consideration of reasonable alternatives to a proposed action (WAC 197-11-440[5]). Reasonable alternatives are defined as actions that could feasibly attain or approximate the objectives for a proposal, but at a lower environmental cost or decreased level of environmental degradation. The Rules also specify that use of the term "reasonable" is intended to limit the number and range of alternatives evaluated in an EIS, and to limit the amount of detailed analysis of alternatives to be included in the document.

Given the circumstances applicable to the Applicant's proposal, Lewis County has determined that there are no reasonable alternatives to the proposed action that warrant detailed evaluation in the EIS. In the SUP application, the Applicant included information about the history of Project

development that addresses consideration of a variety of alternative actions. Review of these alternatives led the Applicant to identify the specific Project described in Section 2.2 as the optimal configuration of a wind energy project within the geographic search area adopted by the Applicant. The Applicant and Lewis County have identified specific components of the planned Project, such as routes for transporting equipment and materials to the Project, for which practicable alternatives exist; such alternatives are identified in Section 2.2 and are discussed in the environmental analysis documented in Chapter 3.

Aside from those specific cases, Lewis County has not identified other alternatives to the proposal that should be evaluated in detail in the EIS. Reasoning for this determination is summarized in the following discussion.

2.4.1 Alternative Configurations at the Proposed Site

The proposed configuration of the Project facilities is based on the Applicant's evaluation of on-site and regional historical meteorological data and corresponding optimization of turbine capacity and locations. The proposed WTG sites are generally along the top of the Coyote Crest ridgetop, where they are ideally positioned to catch the prevailing winds. As described in Section 2.2, there are no issues relating to on-site property considerations or compatibility with adjacent uses that would suggest an alternative WTG configuration should be evaluated. Similarly, to the extent that relatively sensitive environmental resources are present within the Project Area, the analysis documented in Chapter 3 indicates that the proposed configuration involves facility locations that avoid such resources. In addition, if future site-specific inspections prior to construction indicate that there are features present at facility locations that should be avoided; such adjustments can be made through micro-siting. Therefore, alternative facility configurations within the Project Area would not result in reduced environmental impacts and do not need to be evaluated in detail in the EIS.

2.4.2 Alternative Transmission Connections

The Applicant considered multiple possible transmission interconnection options in developing its proposal fir the Project. Other plausible interconnection possibilities include a route southeast from the Project Area via Doty to existing transmission facilities in the SR 6 corridor, southwest from the Project Area to facilities on the SR 6 corridor in Pacific County, or eastward via Lincoln Creek or Independence Creek to facilities in the I-5 corridor west of Chehalis. Through consideration of engineering requirements for such routes and the availability of capacity on existing transmission facilities, the Applicant determined that such options were either not available or would require more extensive use of new construction to transmit power from the Project. The proposed transmission interconnection has the advantage of relying on replacement in kind of existing facilities within existing easements along most of the route. Consequently, alternative transmission connections would not result in reduced environmental impacts and do not need to be evaluated in detail in the EIS.

2.4.3 Alternative Project Sites

The Applicant evaluated eight large properties in southwest Washington for wind energy potential before settling on Coyote Crest as the area with the best potential. Locations in the remainder of the region therefore represent alternative sites that are not considered in detail in the EIS. Moreover, the SEPA Rules indicate that alternative sites need not be considered in this instance. When a proposal (such as the Applicant's) is for a private project on a specific site and does not require a rezone, the lead agency shall be required to evaluate only the no action alternative plus other reasonable alternatives for achieving the project's objectives on the same site (WAC-197-11-440[6]). Because a rezone is not required to issue an SUP for the proposed action, it is not necessary to evaluate alternative sites in the EIS.

2.4.4 Alternative Generation Technologies

The Applicant's objective for the proposal is to develop a commercial-scale wind energy facility, based on the wind resource present in the Project Area; therefore, it is not necessary to consider projects that use energy generation technologies other than wind energy. The Applicant proposes to use wind turbines with a three-bladed, horizontal-axis, upwind design, which is the current standard within the wind industry. The Applicant proposes to use individual turbines with a capacity in the range of 2 to 2.5 MW, and has the demonstrated expertise to select a turbine capacity and a specific turbine model that would be best suited to the proposed site. Use of turbines with a smaller unit capacity would require development of a larger number of turbines and a greater overall area of disturbance to achieve approximately the same project capacity. Based on these considerations, it is not necessary to evaluate the use of different turbine designs or different turbine sizes in the EIS.

3. AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS, AND MITIGATION MEASURES

3.1 Earth Resources

This section describes existing earth resources in the vicinity of the Proposed Action and identifies potential impacts from Project construction and operations, including erosion, compaction, and mass wasting. Mitigation measures are identified for potential impacts.

3.1.1 Affected Environment

3.1.1.1 Summary of Geologic Conditions

The Project Area (Figure 1-1) is situated along a generally north-south oriented ridge line known as Coyote Crest and the Doty Hills, which separates the Chehalis River valley from the coastal areas to the west. The terrain within the Project Area is a broad high ridgeline with elevations from 2,100 feet at the southern turbine locations, 2,000 in the center area, and 1,800 feet in the northern turbine area.

Within the Project Area, the geology consists of Tertiary basalt flows and marine sedimentary rocks, and Quaternary alluvium, glacial deposits, and mass-wasting deposits. The ridges where the turbines would be located, however, consist only of basalt. The bedrock is generally covered by soil and organic material, except where exposed in road cuts and quarries.

Soils in the project area are mostly loams of varying texture, ranging from clay loams to very cobbly loams. Loams are rich soils that are composed of clay, silt, sand, and organic material. Clays exist within the Project Area, but only along the Chehalis River and its floodplain near Doty to the south and Oakville and Cedarville to the northeast of the turbine area.

3.1.1.2 Critical Areas / Geologic Hazard Areas

Geologically hazardous areas are areas that, because of their susceptibility to erosion, sliding, earthquake, or other geological events, are not suited to the siting of commercial, residential, or industrial development. The respective codes or ordinances for Lewis, Grays Harbor, and Pacific counties all regulate critical areas, including several types of features that are defined as geologically hazardous areas. With some variation among the counties, these can include critical areas based on erosion, landslide, seismic mine and volcanic hazards, as well as channel migration zone hazards in Lewis County. Figures 3-1 and 3-2 are maps addressing the distribution of potential erosion and landslide hazard areas in and near the Project Area.

Erosion Hazard

Identification of critical areas based on erosion hazard differs somewhat among the three counties. In Lewis County, erosion hazard areas include areas of severe or moderate erosion hazard as detailed in the Soil Survey of Lewis County. Grays Harbor County defines erosion hazard areas as areas designated as *highly erodible* in the WDNR Forest Practices Application

Review System (FPARS). Pacific County defines erosion hazard areas based on the Soil Survey of Grays Harbor County Areas, Pacific County, and Wahkiakum County.

Because of the differences in defining erosion hazard areas and the complexity of addressing these site-specific factors on an area-wide basis, it is not practicable to present a map that specifically identifies all areas within the three counties that meet the respective erosion hazard are definitions. In addition, Grays Harbor County approved changes to its critical areas regulations in early June 2010; as such, current maps of critical areas were not yet available from the county at the time of DEIS publication. For the purpose of representing the approximate distribution of potential erosion hazards, Figure 3-1 depicts areas having slight, moderate and severe erosion hazard based on soil unit characteristics identified in the most recent Natural Resource Conservation Service (NRCS) soil surveys. These ratings are based on soil erosion factors, slope, and rock fragment characteristics for various soil types, and reflect the potential for soil loss from unsurfaced roads and trails. Under this system, a "severe" rating indicates that enough erosion is expected that roads require erosion control measures and frequent maintenance.

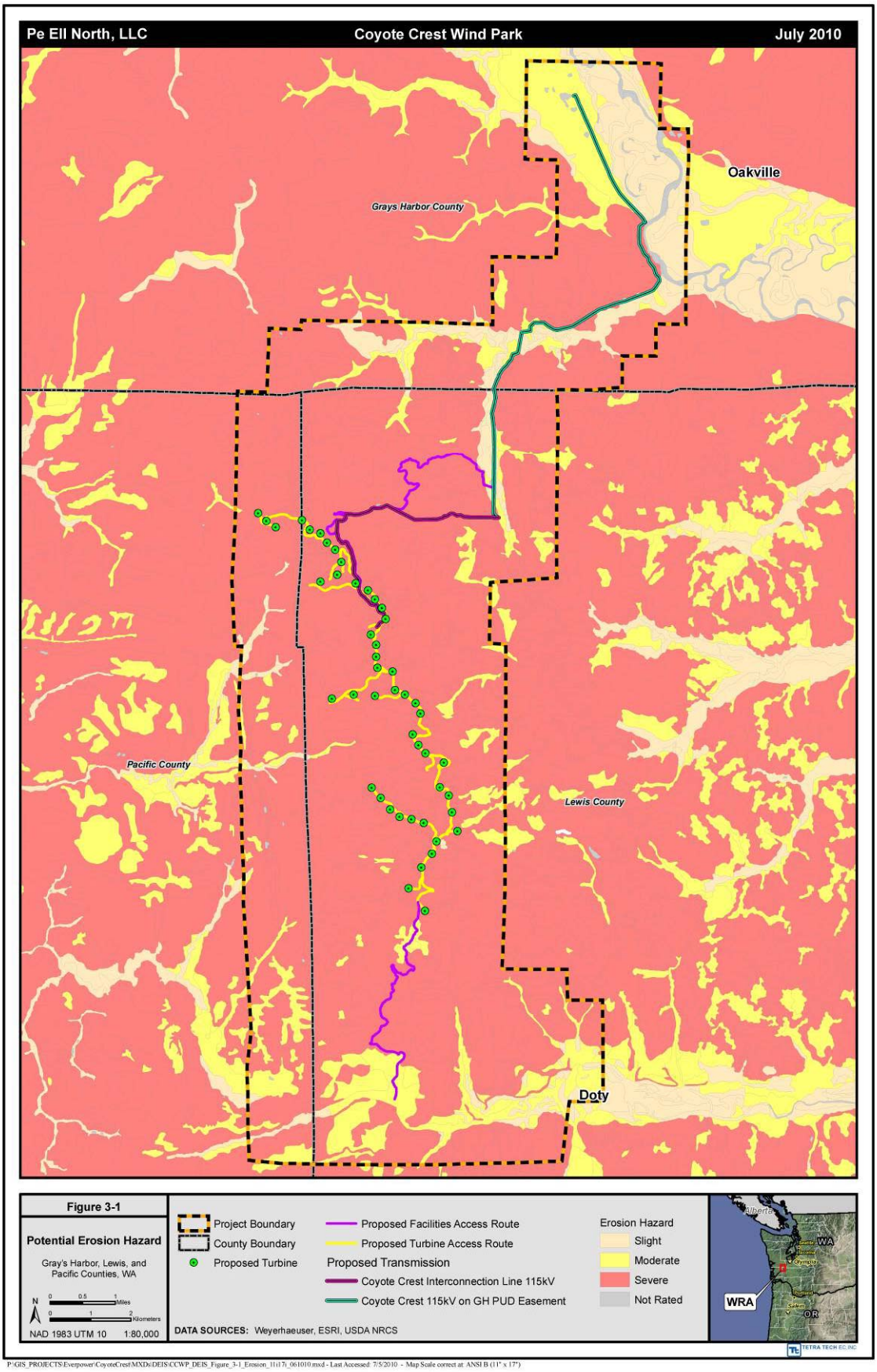
Landslide Hazard

County critical area regulations pertaining to landslide hazards are similar to the treatment of erosion hazards. Landslide hazard areas as defined in the Lewis County code include existing landslides, certain slopes over 35 percent (if other specific instability factors are present), slopes over 80 percent that are subject to rockfall, and other site specific conditions. Landslide hazards in Grays Harbor County include areas identified in the FPARS as having moderate or high slope instability and slopes greater than 40 percent. Landslide hazard areas in Pacific County are defined to include existing landslides, certain slopes over 40 percent (if other specific instability factors are present), slopes over 80 percent that are subject to rockfall, and other site specific conditions.

Given the various types of conditions that can create a landslide hazard if present at a specific location, conclusive determination of whether a landslide hazard exists at a location (such as a WTG site) requires evaluation of subsurface conditions at that specific site. Figure 3-2 provides a general indication of where landslide hazards are more likely to occur, however, based on available WDNR mapping of known landslide locations and the distribution of slope classes that are consistent with provisions of the Lewis, Grays Harbor and Pacific county codes. Landslide deposits are mapped north of Garrard Creek and in the South Fork Garrard Creek drainage, and the upper headwaters of the Fall River, South Fork Lincoln Creek, Deer Creek, and Wildcat Creek. Areas with slopes above 35 or 40 percent are quite extensive within the Project Area.

Mine Hazard

There are no known mine hazards within the Project Area. Steep slopes associated with active or inactive quarries are easily identified and can be avoided as appropriate in Project planning and development.



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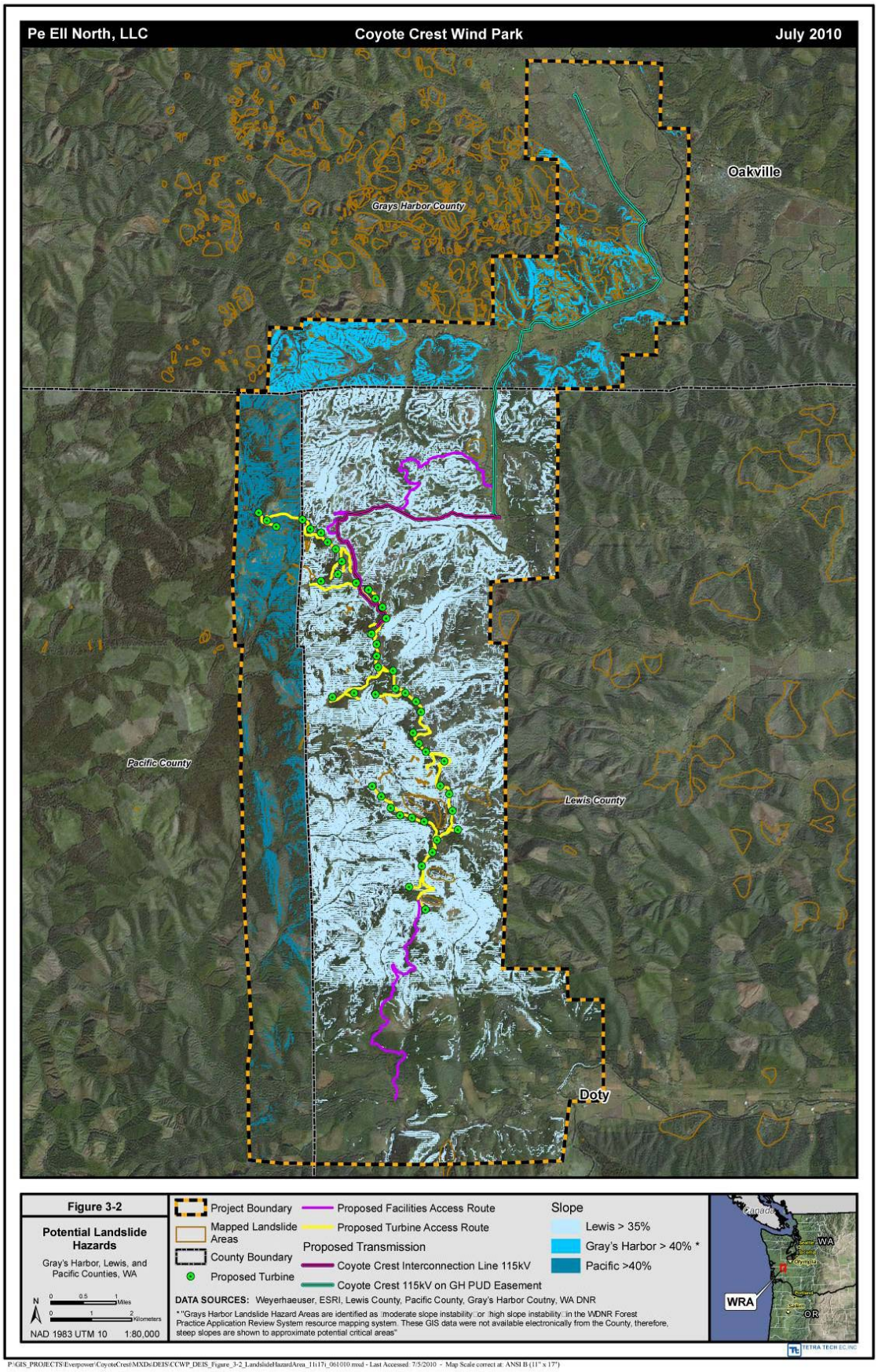

Pe Ell North, LLC
Coyote Crest Wind Park
July 2010
Oakville
Grays Harbor County
Pacific County
Lewis County
Doty
Figure 3-2
Potential Landslide Hazards
Gray's Harbor, Lewis, and Pacific Counties, WA
NAD 1983 UTM 10
1:80,000
Project Boundary
Mapped Landslide Areas
County Boundary
Proposed Turbine
Proposed Facilities Access Route
Proposed Turbine Access Route
Proposed Transmission
Coyote Crest Interconnection Line 115kV
Coyote Crest 115kV on GH PUD Easement
Slope
Lewis > 35%
Gray's Harbor > 40% *
Pacific >40%
DATA SOURCES: Weyerhaeuser, ESRI, Lewis County, Pacific County, Gray's Harbor Coutny, WA DNR
* "Grays Harbor Landslide Hazard Areas are identified as :moderate slope instability: or :high slope instability: in the WDNR Forest Practice Application Review System resource mapping system. These GIS data were not available electronically from the County, therefore, steep slopes are shown to approximate potential critical areas"
Canada
WA
WRA
OR
TETRA TECH EC, INC
P:\GIS_PROJECTS\Evenpower\CoyoteCrest\MXDs\DEIS\CCWP_DEIS_Figure_3-2_LandslideHazardArea_11x17(_061010.mxd - Last Accessed: 7/5/2010 - Map Scale correct at: ANSI B (11" x 17")

Seismic Hazard

All of the Project Area is susceptible to some risk from seismic activity, as are the areas surrounding the Project. Seismic design category D1 applies throughout the Project Area. No known geologic faults occur within the Project Area (USGS 2010a). Due to the site elevation and the distance from the coast, there is no tsunami hazard. Most of the area is not susceptible to liquefaction due to the presence of bedrock. Liquefaction susceptibility is *low* on the mapped landslide deposits and *moderate to high* in some alluvial valleys.

Volcanic Hazard

There are no significant volcanic hazards in the Project Area. The nearest volcanoes are Mt. St. Helens (about 60 miles southeast), Mt. Rainier (about 73 miles east), and Mt. Adams (about 90 miles southwest). Within the Project Area, the risks of volcanic-induced debris flow, mudflow, flooding, lava flows, pyroclastic flows, and volcanic ashfall deposits are non-existent to extremely minimal.

Channel Migration Zones

In addition to the above hazards, Lewis County regulates development within channel migration zones under its geological hazard regulations. A channel migration zone is the area within which a river channel migrates over time. Where human-made structures such as roads or levees exist, are expected to be maintained over time, and limit what would be the naturally occurring channel migration zone, areas outside of the structure are not considered to be within the channel migration zone. No Project components are located within identified channel migration zones in Lewis County. Only the transmission line would potentially be located within the channel migration zone of the Chehalis River in Grays Harbor County.

3.1.2 Impacts of the Proposed Action

The first stage of construction would involve disturbance to soil and rock associated with clearing, grubbing, and access road improvements and construction. This would include widening and realignment of existing access roads and construction of new crane and utility corridor roads to each wind the turbine location, although existing roads would be used to the extent possible. Conventional earthmoving equipment such as excavators, bulldozers, and graders would be used for earthmoving to improve and construct the access roads and prepare the sites. The Project would result in about 44.8 acres of temporary and permanent disturbance associated with road construction and operation (Table 2-2).

Following access improvements, the WTGs, substation, underground collection system, and transmission line would be constructed. Temporary clearing around the turbine pads would disturb up to 5.5 acres to accommodate a wind box around each turbine. This area includes about 2 acres for each turbine and crane pad. A total of approximately 96 acres would be cleared and leveled to a maximum 5 percent grade for turbine and crane pads construction.

Temporary disturbance for each wind box would vary per turbine depending on the location; the additional area to be cleared for these features is estimated at up to 261 acres. Most of the area

would be replanted with short and slow growing trees. The permanent Project footprint turbine and crane pads would be 14 acres. Construction of the substation would disturb about 4 acres of soil. The entire substation area would be cleared, graded, and covered with gravel. Approximately 2 acres of soil would be permanently converted to gravel surface. One hundred percent of the underground collection system would be installed within the access roads, thus reducing new soil disturbance. Following cable installation, the trench would then be backfilled and restored to near original grade. Minimal earth disturbance would result from auguring the holes for installation of the transmission line poles.

Additional soil disturbance would occur during construction at transmission line stringing equipment pulling stations, met towers, O&M facilities, and parking, staging and storing areas. The extent of temporary construction and permanent operational impacts for all Project components are displayed in Table 2-2. In total, the extent of temporary and permanent soil (or rock) disturbance would be about 472 and 101 acres, respectively.

Fill materials such as crushed rock and sand needed for the road and pad bases and road surfaces would primarily come from existing rock sources within the Project Area. It is estimated about 300,000 cubic yards of material excavation and fill would be required for a project of this size, to be determined during final design following detailed investigations and engineering.

3.1.2.1 Erosion

As shown on Figure 3-1, soils throughout most of the Project Area have a severe erosion risk. Clearing of vegetation and soil disturbance would expose soils to erosion by water and wind. Impacts from project disturbance would be greatest during and immediately after construction until revegetation, drainage, and erosion controls are well established. Construction-related soil erosion is typically caused by falling and flowing water, including the direct impact of falling rain drops, sheet erosion caused by unconfined runoff, and rill and gully erosion by concentrated runoff (Ecology 2004). Limiting site disturbance is the single most effective method for reducing erosion (Ecology 2004). Vegetation removal would be limited to the extent possible during construction, thus preserving vegetative cover to shield the soil from the elements, slowing runoff velocity and increasing infiltration time, and holding soils in place. Temporary erosion control measures would be maintained until vegetation reestablished and/or permanent erosion control measures were in place.

Mitigation measures proposed for construction would reduce soil disturbance and erosion (see Section 3.1.4). Soil erosion would be reduced by implementing a SWPPP as required by Ecology's Construction Stormwater General NPDES permit. The Applicant would also implement BMPs that would include covering exposed soils, managing runoff, and re-vegetating temporarily disturbed soils as soon as possible following construction.

Project construction would need to comply with the applicable county critical area regulations pertaining to erosion hazards because nearly all of the affected soils are susceptible to erosion.

For example, the development standards in the Lewis County Code (17.35.920) prescribe actions that are similar to those discussed for the SWPPP, such as minimizing ground disturbance and preserving undergrowth wherever feasible. The code requires that clearing, grading and other construction activities not aggravate or result in slope instability or surface sloughing. Demonstrating compliance with the requirements would require site-specific review of final plans for Project facilities relative to severe or moderate erosion hazard areas identified in the 1987 Lewis County soil survey. Similar review and documentation would be required to meet the applicable critical area regulations for Pacific and Grays Harbor counties.

Operation and maintenance activities could increase erosion potential along the project corridor. Maintenance would involve various sized vehicles and equipment traveling on graveled access roads. However, anticipated erosion rates are expected to remain at or near current levels, once revegetation has occurred.

3.1.2.2 Landslide Hazards

While the construction of roads has the potential to cause mass wasting along hillsides, road grades would be varied depending on the erosion potential of the soil and roads would be graveled where needed for dust abatement, stability, bearing loads, and use in all seasons. Road design would take slopes, soil types, bedrock, and other factors into account based on site specific information. No landslides were identified at the proposed turbine locations. While most of the mapped landslides shown on Figure 3-2 would not likely be impacted by the Project, preliminary analysis identified mapped landslide deposits along one wind turbine access road in Lewis County and along the proposed transmission line route in Grays Harbor County. Geotechnical investigations would be conducted to support appropriate design and construction measures in areas along the wind turbine access road to account for slope stability. While the placement of transmission line structures on mapped landslides in Grays Harbor County would not likely affect slope stability, there is the potential for future landslide activity to affect operation of the transmission line in this area.

WDNR FPARS mapping in Grays Harbor County and the widespread distribution of steep slopes throughout the Project Areaindicate that landslide hazards may also be encountered at other specific locations. The turbines and access roads would generally be located along ridges, however, and thereby would generally avoid steep slopes. Some portions of the interconnection line and access roads would cross these slopes (Figure 3-2).

Project construction would need to comply with the applicable critical area regulations pertaining to landslide hazards in each county. The Lewis County Code (17.35.920) defines landslide hazards based on nine criteria that may apply at a site, including sets of physical conditions that may apply to a site or areas that have been mapped as landslide hazards in specified area-wide geologic studies. For example, areas potentially unstable as a result of rapid stream incision and streambank erosion are defined as landslide hazard areas. The code prescribes standards based on actions that are similar to those discussed above for erosion. In general, the standards can be

summarized as requiring that clearing, grading and other construction activities not aggravate or result in slope instability or surface sloughing. Demonstrating compliance with the requirements would require site-specific review of final plans for Project facilities relative to the various types of landslide hazard areas identified in the respective codes for each county.

To mitigate potential landslide hazards as a result of construction, the Applicant would use setback distances for structures, infiltration systems, and detention ponds, where appropriate and feasible.

3.1.2.3 Seismic Hazard

All of the Project Area is susceptible to some risk from seismic activity. Due to the site elevation, most of the area, including all turbine locations, is not susceptible to liquefaction due to the presence of bedrock. Moderate liquefaction risks associated with mapped landslide deposits crossed by project access roads would need to be addressed in geotechnical investigations conducted to support appropriate design and construction measures.

3.1.2.4 Compaction

Soil compaction occurs when soil particles are pressed together by equipment operation or vehicle traffic. When soils are compacted, the pore spaces between soil particles are reduced, thus restricting infiltration and deep rooting, and reducing the amount of available water that is important for plant growth. When infiltration is reduced, runoff may occur and lead to erosion, nutrient loss, and potential water quality problems (NRCS 1996, 2004). Soil water content influences compaction such that the risk is greatest when soils are moist or wet; dry soils are much more resistant to compaction than moist or wet soils (NRCS 1996, 2004). Other factors affecting compaction include the pressure exerted upon the soils (from heavy equipment or vehicles), soil characteristics (organic matter content, clay content and type, and texture), and the number of passes by equipment or vehicle traffic (NRCS 1996).

Soil compaction would occur if heavy equipment or repeated vehicle traffic operating off of access roads pressed soil particles together, especially if the soils are moist or wet. To limit soil compaction, heavy equipment and vehicles should only be operated on access roads and within approved construction footprints and off-road construction should be limited during wet conditions.

3.1.3 Impacts of the No Action Alternative

Implementation of the No Action Alternative would maintain the status quo; the Project Area would be primarily managed for continued timber production. Soil disturbance and quarry development associated with timber harvesting would continue near existing levels, as it would also under the Proposed Action.

3.1.4 Mitigation

Mitigation measures proposed by the Applicant to reduce or avoid effects to earth resources include some common industry standards or those required by regulations. These Applicant-developed mitigation measures were considered in the impact analysis and include the following:

- Erosion and sedimentation control measures would be implemented at the beginning of the construction process and would be incorporated into the design and contractual requirements;
- Long-term storm-water management and erosion control measures would be inspected to assure that they are functioning adequately.
- A Construction SWPPP that satisfies the requirements of the NPDES General Permit for Stormwater Discharges Associated with Construction Activities would be implemented. The SWPPP would include BMPs recommended by Ecology's (2004) *Stormwater Management Manual for Western Washington* and consistent with the Lewis County stormwater regulations. The Construction SWPPP would include measures for temporary erosion and sedimentation control, and would identify a regular inspection and maintenance schedule for all erosion control structures. The construction SWPPP would also include the required WDNR FPA/N and RMAP.
- Heavy equipment and vehicles would only be operated on access roads and within approved construction footprints and off-road construction should be limited during wet conditions.
- Potential landslide hazards would be avoided by using setback distances for structures, infiltration systems, and detention ponds, where appropriate and feasible.
- A geotechnical engineer licensed in Washington State would be retained to review and approve all grading, erosion, and drainage control plans prior to construction to assist in reducing the landslide and liquefaction risks from and to the Project.
- A hazards assessment and geotechnical boring would be completed for proposed WTG locations prior to foundation design. If necessary, WTGs would be relocated to avoid unstable areas.
- The building code in effect in Lewis County, whether the Uniform Building Code of 1997 or the International Building Code of 2000, would be complied with when construction commences.

3.1.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts would occur to earth resources. Clearing of soils, soil erosion and compaction, and soil and rock excavation would occur, but the detrimental impacts would be limited by the mitigation measures identified in Section 3.1.4. Demonstration

of compliance with county development standards relative to geologically hazardous areas would be required, indicating that adverse impacts based on geologic hazards would be avoided.

3.2 Water Resources

This section identifies existing water resources in the Project Area and summarizes their characteristics, describes potential effects to these resources from Project construction and operation, and discusses mitigation measures applicable to those impacts.

3.2.1 Affected Environment

The affected environment addressed in this section includes the Project Area encompassing the proposed locations of the WTGs, access roads, other support facilities, and transmission line up to the Cedarville substation as well as the area along the route of the associated Cedarville-South Elma transmission line upgrade.

3.2.1.1 Surface Water

Most of the Project Area is located in water resource inventory area (WRIA) 23 – Upper Chehalis, with some proposed turbines located on the ridge border with WRIA 24 – Willapa to the west. The northernmost area associated with the Cedarville-South Elma transmission line upgrade is located in WRIA 22 – Lower Chehalis (from Porter to South Elma).

Within WRIA 23, the Project Area lies within the southwest portion of the Chehalis River basin. The Chehalis River basin is divided up into sections, with the southern basin encompassing the eastern side of the Project Area including the transmission line up to the town of Porter, which is south of the South Elma substation.

Most of the proposed turbines locations are on the central ridge of the Project Area. This ridge is the western border of the southern basin. The streams on the east side of the ridge flow into the Chehalis River. The U.S. Geological Survey (USGS) gauging station on the Chehalis River located at river mile 101.8 is 1.3 miles south of Doty and 1.6 miles upstream from Elk Creek at 301.1 feet above sea level in Lewis County. The upper basin of the Chehalis River drains 113 square miles. The average discharge for the 2008 water year was 832 cubic feet per second (cfs) (USGS 2010b).

The USGS gauging station on the Chehalis River located at river mile 33.3 is 30 feet downstream from Porter Creek and 0.1 miles west of Porter at 23.64 feet above sea level in Grays Harbor County. The lower basin of the Chehalis River drains 1,294 square miles. The average discharge for the 2008 water year was 4,097 cfs (USGS 2010b).

The streams in the Project Area are primarily fed by rainwater. Annual precipitation for Doty is 51.9 inches per year (based on 6 complete years of data collected from 1978 to 1994 [World Climate 2010]).

Within WRIA 24, the northwestern portion of the Project lies within the North River subbasin; this is part of the Southwest Washington River Basin that runs into Willapa Bay. The nearest creek to the proposed turbines and access road within the North River Basin is Wheeler Creek.

Project Area Surface Water Features

There are 21 streams identified within the Project Area. All streams within the Project Area are characterized as having perennial flow and are listed in Table 3-1. Streams in the Project Area are identified in Figure 3-3. Perennial streams normally have flow throughout the year. There are eight streams along the Cedarville-South Elma transmission route. These streams all have perennial flow except for one of the unnamed streams which is intermittent. Intermittent streams normally go dry.

Table 3-1. Streams in the Project Area and Cedarville-South Elma Action Area

Project Area		Cedarville-South Elma Action Area
Capps Creek	Garrard Creek	Gaddis Creek
Absher Creek	Harris Creek	Delezene Creek
Bloomquist Creek	Kellogg Creek	Eaton Creek
Capps Creek	Nine Creek	Chehalis River
Chehalis River	North Fork Lincoln Creek	Rock Creek
Davis Creek	Redfield Creek	3 unnamed waterbodies
Deer Creek	Seven Creek	
Dunn Creek	South Fork Garrard Creek	
Eight Creek	Swem Creek	
Elk Creek	Wheeler Creek	
Fall River		

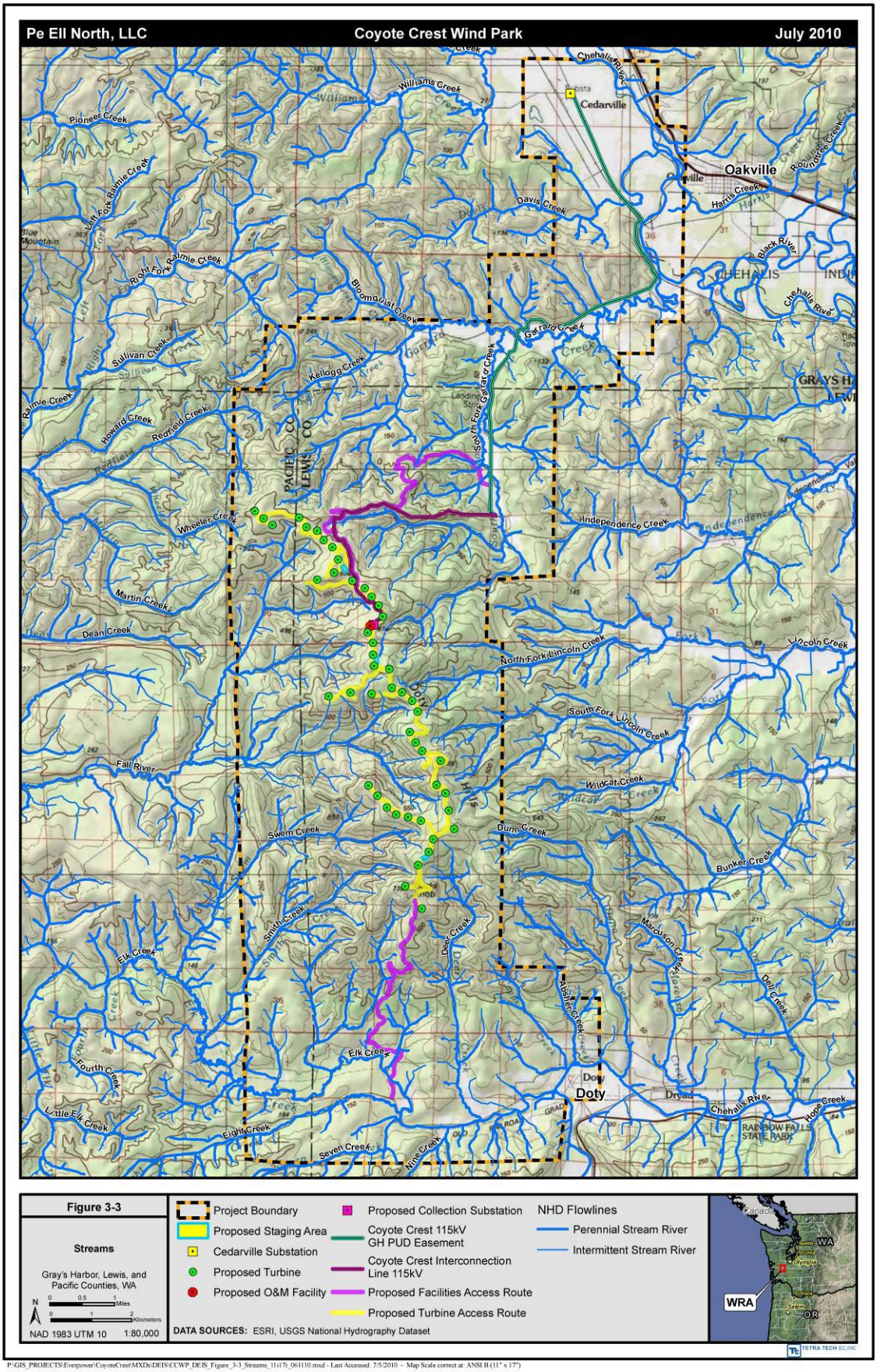
Wetlands are discussed in Section 3.4. Fish bearing streams are discussed in Section 3.5.

Surface Water Quality

Section 303(d) of the federal Clean Water Act requires Washington State to periodically prepare a list (commonly known as the 303(d) list) of all surface waters in the state for which beneficial uses, such as drinking, recreation, aquatic habitat, and industrial use, are impaired by pollutants.

This list encompasses water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next 2 years (Ecology 2009).

Ecology completed and submitted Washington State's Water Quality Assessment for 2006/2008 to the EPA in June 2008, as an "integrated report" to meet the Clean Water Act requirements of sections 305(b) and 303(d). EPA approved the Water Quality Assessment in January 2009. Review of this list indicates that Elk Creek, which is crossed by an existing access road, is listed on Ecology's 303(d) list as category 5 for dissolved oxygen not meeting the criterion (Ecology 2009).



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There were no segments of the Chehalis River within the vicinity of proposed Project facilities that were included in the 2009 303(d) list. However, three segments downstream of the southern portion of the Project Area are listed: one segment for turbidity in water near the town of Claquato, and two segments near Centralia for dioxin and polychlorinated biphenyls in tissue, respectively. The Upper Chehalis headwaters in the Willapa Hills (which includes Elk Creek at the southern end of the Project Area) have an annual runoff of 3-5 cfs per square mile, with a winter average runoff (Winter is December through March) of 7-10 cfs per square mile and a summer runoff (July through September) of less than 1 cfs per square mile (Envirovision 2000).

Five water quality monitoring stations on the mainstem of the Chehalis River are monitored by Ecology. As part of a Level 1 Assessment completed for the Chehalis Basin Partnership in 2000 (Envirovision 2000), a trend analysis of pollution indicators including total phosphorus (TP), total suspended solids (TSS), and fecal coliform bacteria (FC) was completed using data from three stations on the mainstem of the Chehalis River to evaluate loading from the late 1970s, 80s, and 90s. The upstream location was in Doty, the middle station was in Porter, and the downstream station was in Montesano.

The load of TP, TSS, and FC was higher during the wet season and there was a general increase with distance downstream which indicates that there are mostly nonpoint sources in the basin. The wet season load for both TP and TSS were at the same level in the Doty and Montesano stations in the 1980s and 1990s, which indicates a significant nonpoint pollutant load in the upstream portion of the basin. Because FC bacteria did not display this tendency further points to logging practices as a likely nonpoint source during those monitoring years (Envirovision 2000).

3.2.1.2 Ground Water

The Project Area lies within the Puget-Willamette Trough Regional Aquifer System, which occurs in pre-Miocene rocks. Aquifers in pre-Miocene rocks consist of un-differentiated volcanic rocks, undifferentiated consolidated sedimentary rocks, and undifferentiated igneous and metamorphic rocks (Whitehead 1994).

In western Washington west of the Cascade Range, the consolidated sedimentary rocks are of marine origin that may contain saltwater. It is possible that the saltwater can move upward through faults and can either mix with the freshwater in overlying aquifers or discharge to the land surface as springs. Such discharge can adversely affect the quality of water in the surficial aquifers that contain freshwater (Whitehead 1994).

The aquifers in all rock types of the pre-Miocene rocks generally yield only from 1 to 100 gallons per minute of water to wells. In all rock types, but especially in igneous and metamorphic rocks, yields of wells tend to decrease as depth increases and open spaces become fewer, smaller, or are filled with secondary minerals; for example, there generally are few open

spaces in igneous and metamorphic rocks below a depth of about 300 to 400 feet (Whitehead 1994).

3.2.1.3 Critical Areas

Frequently Flooded Areas

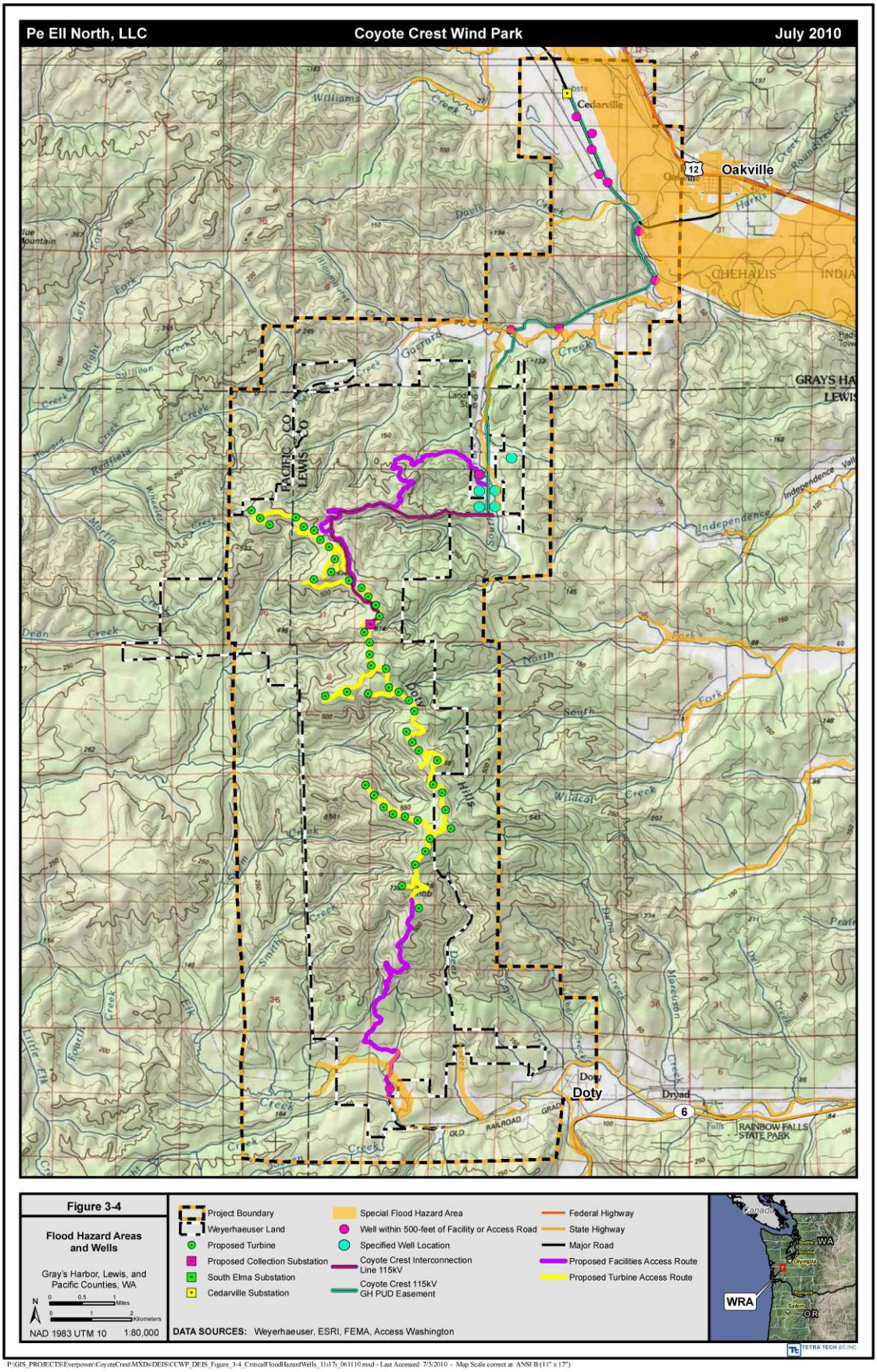
Frequently flooded areas are regulated by each of the counties under their respective critical areas regulations and are generally those areas within the 100-year frequency floodplain (Zone A hazard area), as designated by the current Federal Emergency Management Agency flood hazard maps or the National Flood Insurance Program Flood Insurance Rate Maps.

The floodplains of Elk Creek and an unnamed stream in Section Township 13N Range 5W Section 5 in Lewis County; and Garrard Creek and the Chehalis River in Grays Harbor County are designated as Zone A flood hazard areas subject to 100-year flooding. Figure 3-4 shows the flood hazard areas in the vicinity of the Project. There are no Zone A hazard areas within the portion of the Project Area in Pacific County. Virtually all of the proposed Project transmission line route within Grays Harbor County lies within these floodplain areas, as does most of the route for the Cedarville-South Elma 115 kV line that Grays Harbor PUD would upgrade to accommodate the Project interconnection.

Aquifer Recharge Areas

The respective codes for Lewis, Pacific and Grays Harbor counties regulate critical areas, including critical aquifer recharge areas. Lewis County (2009) maps (Figure 3-5) indicate that a small area along the South Fork of Garrard Creek is identified as a Category I Severe Aquifer Sensitivity Area, and most of this creek valley is identified as a Category II Moderate Aquifer Sensitivity Area. The WTG locations are located in a Category III Slight sensitivity Area. Category I areas have highly permeable soils that provide rapid recharge with little protection, Category II areas have aquifers present and have surface soils that encourage runoff but slow water entry into the ground, and Category III areas are those areas of low ground water availability with geological formations that do not provide abundant ground water (LCC 17.35.850).

A current map of Grays Harbor County critical aquifer recharge areas is not available at this time. Grays Harbor County Code (GHCC 18.06.145) utilizes Federal and State documents to assist in identification of critical aquifer recharge areas, including a Washington Department of Health (WDOH) wellhead protection program guidance document. Grays Harbor County regulates construction around wellheads as well as WDOH wellhead protection areas. Lewis County code also requires setbacks from wells in primary forest resource lands. The locations of wells in the Project Area are shown in Figure 3-4. Wells are located along the transmission line route, northern facilities access route, and southern facilities access route.



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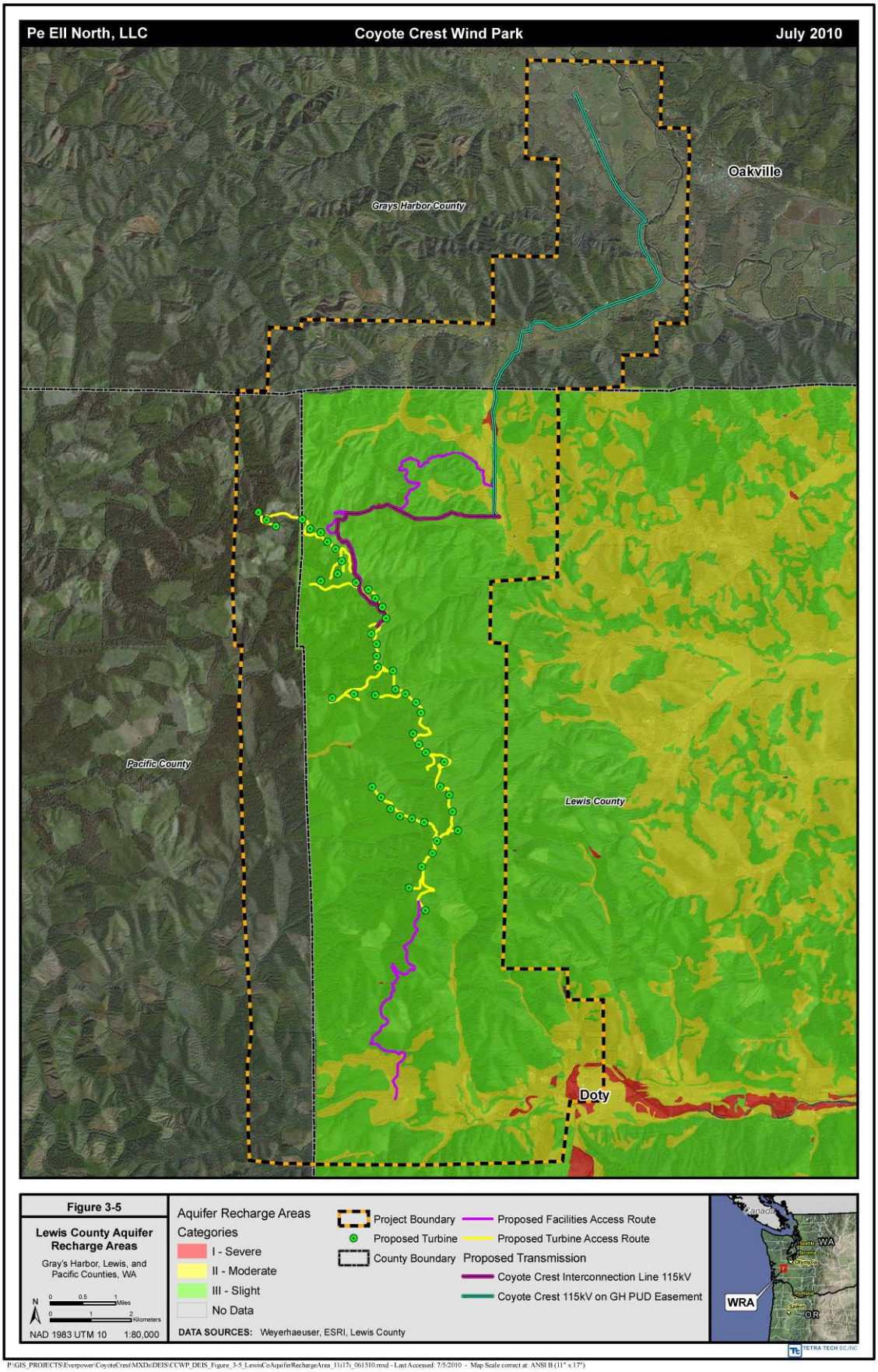

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Maps available from the WDOH, Office of Drinking Water (2010), were reviewed to identify any wellhead protection areas that could be affected by the proposed action and associated action. There is one wellhead protection zone near the Cedarville-South Elma transmission upgrade route, near Malone in T17N, R5W, S20. There are no wellhead projection zones in the turbine construction zone of the Project Area.

3.2.2 Impacts of the Proposed Action

3.2.2.1 Surface Water

The primary potential impact to water resources would be the introduction of sediment into waterbodies through soil erosion and transport as a result of construction of the Project components and use of the existing access roads. Construction of the proposed action would disturb approximately 472 acres (Table 2-2) that could increase surface erosion that may enter stream channels. During construction, stormwater and sedimentation, along with other potential contaminants, would be controlled by implementation of the SWPPP, as required by the construction stormwater general permit and the Lewis County stormwater regulations. Long-term control of stormwater runoff from Project impervious surfaces would be accomplished through permanent facilities similar to those defined in the SWPPP.

There are no proposed Project access roads that would cross streams. All proposed access roads are built on ridges to access WTG sites. The existing main access roads would need to be widened in places to accommodate construction traffic. There are places where existing roads would be upgraded at stream crossings. Some culverts may need to be replaced to adequately accommodate the streamflow to pass water and protect the roadbed from erosion, as well as maintain the natural drainage pattern. Where new culverts were necessary, they would be installed pursuant to the WDNR RMAP requirements for stormwater management.

Flood Hazards

The southern proposed facility access road would utilize existing roads within the flood hazard areas associated with Elk Creek in Lewis County. The use of existing roads through these floodplains would have no effect on the floodplains or flood storage. There would be no increased risk of flood damage.

Additionally, selected segments of the proposed Project transmission line route along Garrard Creek and South Bank Roads would be situated in or near flood hazard areas in Lewis County and Grays Harbor County. The Chehalis River has flooded in the recent past due to heavy rainfall. The associated Cedarville-South Elma transmission line upgrade would involve activity where the line crosses the Chehalis River near the South Elma substation. Replacement of transmission poles used for existing distribution and transmission facilities in these locations would not have a measurable effect on flood storage displacement by structures within the floodplain and would not aggravate existing flood hazards. Existing wood transmission poles would be replaced with new poles of similar diameter and somewhat greater height; the proposed

line would likely have somewhat longer average spans, and therefore might involve fewer poles than are currently present. Post construction, the permanent project footprint from the transmission line outside of the McDonald Tree Farm is less than 0.1 acre. Access to the transmission line would be from existing public and private roadways that would not need upgrades. No new access roads would be built for the transmission line upgrade; therefore the area of impervious surface would not significantly change with the new transmission line poles.

The same condition would apply to the 115 kV Cedarville –South Elma transmission line upgrade that the Grays Harbor PUD would undertake. The existing facility has pole structures that are located within the floodplain and a crossing of the Chehalis River. Similar to the Project transmission line, the upgrade action would involve either replacing the existing hardware and selected poles or replacing all of the poles with taller poles to accommodate a double-circuit line. In either case, flood storage displacement from the pole structures would be minimal and would not increase from the current condition. Therefore, adverse impacts based on changes relative to flood hazards would not occur as a result of the Project.

The total area of permanent Project footprint that would be created by the Project facilities, including new graveled access roads and the widening of existing roads, is approximately 101 acres, or less than 0.2 percent of the upper Chehalis River subbasin. Therefore, the operation of the Project would have negligible effects on runoff that contributes to flooding.

Aquifer Recharge Areas

Under Lewis County and Grays Harbor County development regulations, utility lines and facilities and regional transmission facilities are allowed in aquifer recharge areas, subject to the protective policies and mitigation requirements established in the respective codes. The low-intensity activity associated with replacing transmission line poles under the proposed action would have no impact on aquifer recharge areas.

3.2.2.2 Groundwater

Groundwater may be encountered during Project excavations, but due to the low yield of the aquifer, it would not be in sufficient quantities to affect surface resources (such as by causing erosion or increased runoff). If groundwater is encountered, it could be pumped from the excavation at a controlled rate to re-infiltrate into the soil at a nearby upland site. No wellhead protection area or source water protection area would be affected either during construction or operation of the Project.

Surface water and groundwater could be contaminated by spills of fuel, oils, hydraulic fluid, or other substances. Requirements of the construction stormwater general permit would mandate use of spill prevention and control measures. By adhering to the conditions of the construction stormwater general permit, the Lewis County storm drainage approval, and the site-specific SWPPP that would be prepared for the Project, impacts to water resources would be avoided for the proposed action.

3.2.3 Impacts of the No Action Alternative

There would be no new transmission line, transmission line upgrade, WTGs, or associated facilities constructed under the No Action Alternative, and the minor impacts to water resources identified for the Project would not occur. Ongoing forestry practices on Weyerhaeuser and WDNR lands would presumably continue under the No Action Alternative. Effects from forestry practices and other land uses on water resources would likely continue at levels similar to the present.

3.2.4 Mitigation

Erosion and sedimentation control would be standard practice during the active construction, restoration, and cleanup stages of the construction process. The proposed location of the WTGs avoids any direct impact to streams or stream buffers. However, locations of transmission poles may be within stream buffers. Any work associated with the transmission line, which may be adjacent to streams (or wetlands), would adhere to the applicable laws, including federal and state regulations. The proposed action would utilize the existing Weyerhaeuser road system. The anticipated road improvements and new access spur roads to each WTG site would not require any new stream crossings or any modification of existing stream crossings. Where new culverts were necessary, they would be installed pursuant to the WDNR RMAP and Lewis County requirements for stormwater control. Culverts would be maintained to allow for unobstructed passage for water, including prompt remove of any blockages, to protect roadbeds and prevent sedimentation of downstream waterbodies. Water and sediment control measures would be places at all waterbodies either crossed by access roads or otherwise impacted by surface disturbance.

The Applicant would develop and implement a SWPPP. This design level plan would prescribe the use of BMPs that are standard features of such plans. The Project SWPPP would be based on and comply with Ecology's (2004) *Stormwater Management Manual for Western Washington*, the WDNR FPAN, the WDNR RMAP, and any stipulations of the WDFW Hydraulic Project Approval, as applicable. The Project SWPPP would also address the erosion control and water quality conditions of the NPDES construction stormwater discharge general permit and Lewis County storm drainage approval.

The construction stormwater permit and SWPPP would incorporate requirements of the Lewis County regulations on stormwater management. Based on applicable standards, the SWPPP would include using coverings for exposed soils (soil stabilizers approved by WDNR and Weyerhaeuser), stormwater detention ponds, sediment control basins and traps, drainage culverts, and other well established measures typical of a forest management area. Surface run-off would be directed away from cut and fill slopes and other disturbed areas and into ditches to natural drainage features. Exposed areas would be re-vegetated as soon as possible following completion of the corresponding construction task. All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function in accordance with BMP specifications. It is presumed

that by implementing BMPs during construction and operation, water quality standards would be met.

Expansion of existing roads and new road segments would include the standard long-term drainage requirements specified by Weyerhaeuser for its roads and installed to comply with WDNR regulations.

Project construction staging areas would not be located within 100 feet of drainages or any other body of water to reduce the potential contamination from spills. The Applicant would use BMPs to control the use and disposal of waste materials during and following Project construction, including implementation of a spill prevention, containment and control plan. The Applicant would store hazardous materials, such as lubricants, in approved containers and storage facilities. The Applicant would avoid storing, transferring, or mixing of oils, fuels, or other hazardous materials where accidental spills could enter surface or groundwater. Maintenance, fueling, and repair of heavy equipment and vehicles shall be conducted using spill prevention and control measures. On-site fueling tanks shall include secondary containment. Fuel tank and truck storage as well as vehicle fueling shall be at least 100 feet from all streams, dry or flowing. Contaminated surfaces shall be cleaned immediately following any spill incident. The Applicant would provide on-call spill response services either through a contract with a qualified environmental remediation services firm or with qualified in-house personnel.

3.2.5 Significant Unavoidable Adverse Impacts

Construction of the Project would unavoidably result in temporary erosion and the potential for sediment contribution to downslope tributary drainages, and the risk of accidental spills of petroleum products. Implementing stormwater BMPs would avoid or minimize effects to water quality. With the mitigation proposed by the Applicant and required by applicable permit conditions, impacts to water resources and aquatic systems would be limited. Based on the temporary duration and limited extent of the potential impacts to water resources, these impacts would not be significant.

3.3 Plants

This section describes the vegetation communities, including threatened, endangered, and special-status plant species (threatened, endangered, or sensitive [TES] plant species) in the Project Area and assesses the potential impacts on these resources due to construction and operation of the proposed Project. This section also describes mitigation measures considered to address the impacts identified.

3.3.1 Affected Environment

The Project Area lies primarily within the Puget Trough and Northwest Coast Ecoregions (WBC 2010). Prior to human modification, the Puget Trough Ecoregion was dominated by mixed coniferous forests, with areas of riparian habitat, oak woodland, and prairies (WBC 2010). This

ecoregion has been substantially altered by urban development. Managed forests and agriculture have also substantially changed the historic vegetation in this ecoregion.

The climate in this region is relatively mild and wet, with a mean annual precipitation between 35-100 inches (rainfall typically exceeds 80 inches per year in the Project Area). Snowfall ranges from rare to regular, but is transitory, depending on the year. Summers are relatively dry. Topography in the region ranges from relatively flat riverine floodplain valleys to steep mountainous terrain.

The Project Area is in a rural and unpopulated section of Lewis, Grays Harbor and Pacific Counties that is characterized primarily by commercial forestry use. The dominant land use throughout most of the Project Area is commercial forest lands that are intensively managed for timber production. Forty-four of the 47 proposed WTG locations are on the Weyerhaeuser Company's McDonald Tree Farm, which is managed for sustained-yield timber production. Land in the tree farm is characterized by large recent harvest units (generally 50 to 100 acres) within a matrix of various age stands of timber. The average harvest rotation for the units is 40 years. The area is characterized primarily by second- or third-growth forest, and most of the land has been cut at least once and several areas are on their third or fourth rotation.

Harvesting is managed in compliance with the WFPA administered by WDNR. Forest practices are actions related to growing, harvesting, and processing timber, including road construction, road maintenance, forest thinning, salvage harvesting, reforestation and other silvicultural and environmental practices. The WFPA and its corresponding rules regulate these activities on State and private timber lands in the state of Washington.

Three proposed WTG locations are on WDNR land adjacent to the tree farm. The proposed WDNR lease area has also been extensively harvested and is managed in compliance with the WFPA.

Approximately 30 percent of the proposed WTG sites are located on existing cable logging landings. In general, Project facilities have been located in areas where road and log landing infrastructure has already been constructed, and in areas that have already been harvested or are currently planned to be harvested.

The proposed transmission line route is located in the lightly populated area of the Chehalis River valley. Rural residential development occurs along the main county roads and includes scattered farm or ranch properties and residences. The proposed Project transmission line extends for approximately 12.6 miles from the Project substation to the Cedarville area. The exact path of the transmission line on Weyerhaeuser property has not yet been determined, but generally it would run for 3.3 miles in the northeastern corner of the Project Area to Garrard Creek Road and then 8.3 miles following public ROWs along Grays Harbor PUD utility easements ending at the Cedarville Substation in Grays Harbor County. Elevations along the proposed transmission line route range from approximately 30 to 600 feet.

3.3.1.1 Vegetation Communities

In 2008, a habitat inventory and mapping report was completed for the Project Area. This habitat analysis focused on inventorying available habitat for TES species, vegetation communities, and areas of potential concern for large numbers of bird and bat species. Geographic information systems (GIS) databases used to help categorize habitat within the Project Area included: Washington Natural Heritage Program's (WNHP's) Rare Plant data, WDFW Priority Habitats and Species data (PHS) and National Wetlands Inventory data (NWI). This report was based on Project facility locations as provided in 2008. The layout for the proposed transmission line route was not known at this time and, thus, this area was not included in the inventory and mapping report.

Vegetation communities mapped within the project area include westside lowland conifer and hardwood forest (primarily managed as industrial forest), riparian, wetlands, and agricultural and developed land. These vegetation communities are briefly described below.

Westside Lowland Conifer and Hardwood Forest/ Industrial Forest

The most abundant vegetation community in the Project Area is westside lowland mixed conifer and hardwood forest. Dominant species in this community are Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*).

All of the lowland conifer and hardwood forest areas on the McDonald Tree Farm and the WDNR lease area are managed for commercial forestry use. Clearcut logging and commercial forestry have resulted in a less diverse forest structure. Harvest rotations in these areas often truncate natural succession before old-growth forest characteristics can develop. As much of the Project Area lies within commercial timber lands, the structure of the mixed conifer and hardwood forests varies across the landscape depending on harvest regime and time since last harvest. This vegetation community type can be further categorized recent clearcuts, new-growth forest, and established forest based on the harvest regime and the time since the last harvest.

Recent clearcuts have generally been harvested within the past 5 years. They contain abundant slash, bare ground, planting seedlings and regeneration of native species such as red elderberry (*Sambucus racemosa*) and swordfern (*Polystichum munitum*). Pesticide application and soil scarification represses generation of other vegetation; consequently little structural complexity remains.

New-growth forest consists of sapling and pole vegetation. These areas are characterized by dense stands of deciduous and coniferous trees 6 to 10 feet in height.

Established forest consists of stands characterized by a closed tree canopy. However, vegetation in the understory of these established forests varies depending on the time since last harvest. Initially, these established forests consist of a sparse understory and trees are typically small,

with a single-stored canopy dominated primarily by Douglas-fir, western hemlock and western red cedar and/or broadleaf deciduous trees, such as bigleaf maple and red alder. Sitka spruce and grand fir (*Abies grandis*) are a minor component in this stage of succession. Eventually, if left undisturbed, these established forests consist of a closed canopy with an open understory. These areas are characterized by conifer stands that have become large enough (or have been thinned), such that the understory of shrubs and ferns has begun to develop. Typical understory species in these areas include swordfern, Oregon grape (*Mahonia aquifolium*), and vine maple (*Acer circinatum*).

Riparian

Riparian vegetation communities are found next to streams within the Project Area. By regulation, riparian vegetation buffers are protected during timber harvest on private forestland. Red alder, black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), and bigleaf maple are the most dominant tree species. Devil's club (*Oplopanax horridum*) and salmonberry (*Rubus spectabilis*) are common shrub species in the understory of these communities. The area for the proposed transmission line in the northern portion of the Project Area encompasses portions of the Garrard Creek and Chehalis River floodplains. This area includes riparian and wetland vegetation communities. The floodplains of these rivers are characterized in some areas by open shrub/grasslands. Common shrub species in these areas include snowberry (*Symphoricarpos albus*) and serviceberry (*Amelanchier alnifolia*).

Wetlands

Wetlands observed in the Project Area (see Section 3.4) include palustrine emergent, palustrine forested, palustrine scrub-shrub, riverine, and freshwater ponds. Numerous forested, emergent, and scrub-shrub wetlands occur in floodplains in the area proposed for construction of the transmission line. The dominant herbaceous species in emergent wetlands is reed canarygrass (*Phalaris arundinacea*). Red alder and Oregon ash (*Fraxinus latifolia*) are common trees in forested wetlands and salmonberry, willow (*Salix* spp.), and red osier dogwood (*Cornus sericea*) were common scrub-shrub species. Further information on wetlands observed in the Project Area can be found in Section 3.4: Wetlands.

Open Grasslands/Upland Pastures

In some localized areas of the Chehalis River floodplain, open grasslands with shrub species snowberry and serviceberry occur. These areas potentially host white-top aster (*Sericocarpus rigidus*), a federal species of concern and state-listed sensitive plant species known to occur in the local area (WNHP 2001a).

Agriculture and Developed Areas

The larger creek and river valleys in the Project Area, particularly along the proposed transmission line route, have largely been converted to agricultural fields and pasture lands, or are occupied by houses, other structures and roads.

3.3.1.2 TES Plant Species

A search of the U.S. Fish and Wildlife Service (USFWS) and WNHP databases identified two federally-listed threatened plant species (Kincaid's sulfur lupine and Nelson's checker-mallow) with the potential to occur in the Project Area. Seven federal species of concern also have the potential to occur in the Project Area based on the types of habitats present. Additionally, 14 state-listed endangered, threatened, or sensitive species (TES plant species) have the potential to occur in the Project Area. Table 3-2 lists the federal and state listed plant species, as well as species of concern, that have the potential to occur in the Project Area, based on habitat requirements, and assesses their likelihood of occurring in the Project Area.

The closest known occurrence of a TES plant species to the project area are two occurrences the federal species of concern white-top aster, and historic occurrences of great polemonium (*Polemonium carneum*), a state-listed threatened species, and pink fawn-lily (*Erythronium revolutum*), a state-listed sensitive species. Historic occurrences of great polemonium and pink fawn-lily were mapped near Pe Ell and Oakville respectively. Two known occurrences of white-top aster occur in the Project Area. One occurrence overlaps with the northern most section of the proposed transmission line route. The other is approximately 1,600 feet from the proposed transmission line. These occurrences were located within 1 mile of Cedarville in distinct prairie fragments. A patch of Oregon Ash Woodland, a WDFW priority habitat, has also been mapped as occurring approximately 2,500 feet from the proposed transmission line route in the vicinity of the white-top aster occurrences.

Surveys for TES plant species have not been conducted in the Project Area. When Project facility locations have been finalized, areas of potential impact can be specifically identified and habitats within these areas that may support TES plants can be surveyed.

3.3.1.3 Noxious Weeds

Noxious weeds are non-native plant species designated as noxious by federal, state, or county governments. They are highly destructive, competitive, and/or difficult to control and cause ecological and economic damage. Noxious weeds can reduce crop yields, displace native species, and destroy native plant and animal habitat. Construction and maintenance of the Project could affect the spread of noxious weeds within and adjacent to the Project Area. Ground disturbance due to construction and maintenance of the Project could increase the potential for introduction and spread of noxious weeds in the Project Area. Noxious weed seeds can also be spread by construction equipment and personnel. Surveys for noxious weeds have not yet been conducted in the Project Area.

Table 3-2. Federal TES Plant Species that May Occur in the Project Area

Species	Flowering Period	USFWS Status[1/]	State Status[2/]	Habitat Requirements Information[3/]	Potential to Occur in Project Area
Carex macrochaeta (large-awn sedge)	mid-May to July		T	Moist or wet, open places – frequently near the coasts. Also found in seepage areas, around waterfalls, wet meadows, and along streams and lakes.	Low; predominantly found growing on the coast.
Cimicifuga elata var. *elata* (tall bugbane)	late May – early August	SC	S	Edges of mixed, mature, or old growth stands of mesic coniferous or mixed coniferous-deciduous forest. Elevation from sea level to 3,000 feet with most occurrences at or below 600 feet.	Low to moderate; some potential habitat exists in the Project Area.
Delphinium leucophaeum (pale larkspur)	May - June	SC	E	Undisturbed sites on dry bluffs, open ground, and moist lowland meadows in the Western Hemlock Zone. Primarily restricted to roadside ditches and fencerows. Elevation 125 to 200 feet.	Low to moderate; some potential habitat exists in the Project Area.
Dodecatheon austrofrigidum (frigid shootingstar)	June	SC	E	Open or shaded vernally moist areas; on open rocky surfaces, under overhanging cliffs and in rock crevices on basalt slopes along rivers and ridges. Elevation (in WA) 1800-3800 ft.	Low; little potential habitat exists in the Project Area.
Erythronium revolutum (pink fawn-lily)	April –May		S	Moist mineral soils in open or moderately shaded areas. Swampy western red cedar-lodgepole pine forests, Sitka spruce-western hemlock forests in the duff layer, and in shaded river bottoms of mixed conifer-hardwood or pure hardwood thickets.	Low to moderate; some potential habitat exist and this species is historically known from the vicinity of Project Area.
Euonymus occidentalis (western wahoo)	May – June		T	Shaded, moist draws and ravines, primarily in wooded/forested areas, although sometimes found in grassy areas.	Moderate; some potential habitat exists in the Project Area.
Filipendula occidentalis (queen-of-the-forest)	June – July	SC	T	Bedrock crevices that have water seeping over the rock surface much of the year. Usually found near the high water mark of rivers and streams.	Low to moderate; some potential habitat exists in Project Area.
Githopsis specularioides (common blue-cup)	mid-April - mid-June		S	Open places at lower elevations, such as thin soils over bedrock outcrops, talus slopes, and gravelly prairies. Open habitats within forested landscape and transition zone between forested and non-forested regions. Elevation 200 to 2500 feet.	Low to moderate; some potential habitat exists in the Project Area.
Isoetes nuttallii (Nuttall's quillwort)	mid-April – early June		S	Wet ground or seepages and in mud near vernal pools at low to middle elevations.	Low; little potential habitat exists in the Project Area.

Table 3-2 Federal TES Plant Species that May Occur in the Project Area (continued)

Species	Flowering Period	USFWS Status[1/]	State Status[2/]	Habitat Requirements Information[3/]	Potential to Occur in Project Area
Lathyrus holochlorus (thin-leaved peavine)	May-July	SC	E	Primarily found in the prairie-oak woodland ecotone along roadsides or fencerows in grasslands, partially cleared land, or climbing in low scrubby vegetation.	Low to moderate; some potential habitat exists in the Project Area.
Lathyrus vestitus ssp. *bolanderi*	May-June		E	Dry, open to wooded areas, on roadsides, near or within historic prairies. Elevation 200-300 feet	Low. Historically known from Lewis County; however, no currently known populations remain.
Lupinus sulphureus ssp. *kincaidii* (Kincaid's sulfur lupine)	April - June	LT	E	Native upland prairies and open oak woodlands on mesic to slightly xeric soils. Regionally endemic from Douglas County, OR to Lewis County, WA	Low; little potential habitat exists in Project Area.
Lycopodiella inundata (bog clubmoss)	Identifiable year round		S	Sphagnum bogs, wet sandy places, wetlands adjunct to lakes and swampy ground.	Low; little, if any potential habitat exists in Project Area.
Meconella oregano (white meconella)	late March – early April	SC	T	Open grassland; or occasionally within a forest/grassland mosaic on gradual to 100% slopes. Associated trees include Douglas fir, ponderosa pine, and Garry oak. Found in areas that are wet to moist in spring, but dry out by early summer. Elevation 100-450 ft.	Low to moderate; some potential habitat exists in the Project Area.
Montia diffusa (branching montia)	April – July		S	Moist forests in lowland and lower montane zones. Usually found in open fir woodlands, although has been found in areas disturbed by logging activity.	Moderate; although only historically known from Grays Harbor and Lewis Counties, it is often found in areas where timber harvest occurs.
Poa laxiflora loose-flowered bluegrass	May – June		T	Moist woods to rocky open slopes. Occurs mainly in moist, shaded habitats along upper margins of sea beaches and in open meadows along river banks. Sea level to lower elevations in the mountains.	Low; little habitat exists in Project Area.
Polemonium carneum (great polemonium)	May – August		T	Woody thickets, open and moist forests, prairie edges, roadsides and along fence lines. Elevation 200 to 2,000 feet	Moderate; potential habitat exists in Project Area. Historically known from vicinity of Project Area.

Table 3-2 Federal TES Plant Species that May Occur in the Project Area (continued)

Species	Flowering Period	USFWS Status[1/]	State Status[2/]	Habitat Requirements Information[3/]	Potential to Occur in Project Area
Potentilla breweri Brewer's cinquefoil	June-August		T	Moist meadows and stream banks to open exposed slopes in alpine to mid-montane areas. In Washington, found at 5300 feet.	Low; elevation of known occurrences higher than elevations of Project Area.
Ranunculus cooleyae (Cooley's buttercup)	July – Mid August		S	Facultative wetland species in western Washington. Found in montane gravelly alluvial slopes. Talus slopes, stream outlets and edges of receding snowfields.	Low; although some potential habitat occurs in the Project Area, the known occurrence of this species in Grays Harbor County is from northern Grays Harbor County.
Sericocarpus rigidus (Aster curtus) (white-top aster)	Shoots emerge in April; Flowering July-August	SC	S	Open grassland habitats of in the Willamette Valley-Puget Trough lowlands. Usually found in gravelly, glacial outwash soils. Elevation 100-550 feet.	Moderate to High; known to occur in the Project Area near the northern most area of the proposed transmission line route.
Sidalcea hirtipes hairy-stemmed checker-mallow	early-June-mid-July		E	Prairie fragments along fencerows and in openings along drainages.	Moderate; some potential habitat exists in Project Area.
Sidalcea nelsoniana (Nelson's checker-mallow)	mid-May – September	LT	E	Along streams, meadows, and other relatively open areas. Generally found where prairie or grassland remnants persist, including disturbed areas such as roadside ditches and along fencerows. Often found in habitats that undergo periodic flooding or soil saturation.	Moderate; some potential habitat exists in Project Area.
Trillium parviflorum small-flowered trillium	late-March – mid-May		S	Moist areas dominated by hardwoods such as Oregon ash or red alder. Substrate moist alluvial soil covered with humus. Elevation 25-700 feet.	Low to moderate; small amounts of potential habitat exist in the Project Area.

Notes:
1/ USFWS Classification: FT=Listed as Threatened, likely to become endangered (USFWS 2009a).
2/ State Status: WNHP (2010a) provides the following explanation of state status:
E = Endangered taxa are at critically low levels or their habitats have been degraded or depleted to a significant degree presenting the danger of becoming extinct or extirpated from Washington within the foreseeable future if factors contributing to their decline continue.
T = Threatened are likely to become Endangered in Washington within the foreseeable future if factors contributing to population decline or habitat degradation or loss continue.
S = Sensitive taxa are vulnerable or declining and could become Endangered or Threatened in the state without active management or removal of threats.
R = Review taxa are either R1 = Taxon in need of additional field work before a status can be assigned, or R2 = Taxon with unresolved taxonomic questions.
3/ Habitat requirements are primarily from the WNHP Field Guide to Selected Rare Plants (WNHP 2010b)

3.3.2 Impacts of the Proposed Action

Construction and operations and maintenance of the proposed Project could cause temporary and long-term impacts to vegetation communities and TES plant species, and could facilitate the introduction and spread of noxious weeds in the Project Area. Temporary impacts would generally occur due to clearing and related ground disturbance for construction of the proposed Project. Impacts are considered temporary if they disturb vegetation, but would not prevent reestablishment to a preconstruction vegetation community within several years. Temporary impacts include:

- temporary removal of vegetation,
- alteration of habitat, and
- potential spread of noxious weeds.

Construction-related impacts to vegetation in agricultural, prairie, and herbaceous wetland plant communities, assuming mitigation measures are implemented, would be considered short-term because the vegetation would generally be reestablished within 3 years.

Long-term vegetation impacts are impacts that prevent the reestablishment of a vegetation community similar to the preconstruction community. Long-term impacts would occur in those areas where Project facilities are permanently located.

Construction activities that cause removal of tree and shrub species in forested and shrub communities would also be considered long-term impacts because of the time required for reestablishment of a vegetation community similar to those existing prior to construction. However, many of the areas that would be cleared for construction of the proposed Project are located in commercial timber land. As described above, forest communities in these areas undergo harvest on a regular basis, with relatively short rotation periods of approximately 40 years. Consequently, the effect of Project construction in areas that currently support forest stands would be to accelerate the time of harvest for those stands, as opposed to resulting in the clearing of stands that would otherwise remain forested for the foreseeable future.

3.3.2.1 Vegetation Communities

Construction of the proposed Project would involve temporarily disturbance impacts on approximately 472 total acres; most of that acreage currently has some form of vegetative cover. Long-term impacts (i.e., the area of the permanent Project footprint) would remain on approximately 101 acres (See Section 2.2 Table 2-2).

A large majority of temporary disturbance impacts due to the proposed Project would occur on lands managed as industrial forest. Among those areas, 190.6 acres (40 percent) would be in clearcuts, 27.7 acres (6 percent) in new-growth forest and 252.1 acres (53 percent) in established forest. Existing vegetation in clearcut areas would not have to be cleared; however, tall trees and shrubs would not be allowed to grow near the turbines during the lease term. The majority of the proposed transmission line route lies on an existing utility easement that has already been cleared

and developed for electric transmission or distribution line use. Additionally, the utility easements that would be used for most of the route overlap with existing county road rights-of-way that are cleared periodically. Table 3-3 summarizes the temporary construction impacts that would occur, distributed by vegetation community type in the Project Area.

The proportional distribution of permanent impacts by vegetation type is similar to that for temporary disturbance. Again, a large majority of the permanent impacts would occur on lands managed as industrial forest, with 41 acres (41 percent) of the permanent footprint in clearcuts, 10.5 acres (10 percent) in new-growth forest and 58.5 acres (48 percent) in established forest. Table 3-4 summarizes the permanent impacts by vegetation community type in the Project Area.

Table 3-3. Temporary Construction Impacts by Vegetation Community (in acres)

	Westside Lowland Conifer and Hardwood Forest / Industrial Forest					
Project Component	**Clearcut**	**New Growth Forest**	**Established Forest**	**Riparian**	**Agriculture/ Developed[1/]**	**Total**
Wind Turbines	138	10	205			**357**
Project Substation, O&M Facility	6.3		0.6			**7**
Access Roads	19.1	1.7	23.9	0.1		**44.8**
Transmission Line	16	10.9	22.6	1.5	0.1	**51**
Met Towers	2	1				**3**
Staging Areas	9					**9**
Total	**190.6**	**27.7**	**252.1**	**1.6**	**0.1**	**472**

Note:
1/ Only nominal impacts would occur from installation of new transmission poles in the existing Grays Harbor PUD utility easement; these maintained ROW areas have been classified as Agriculture/Developed areas.

Table 3-4. Permanent Project Footprint by Vegetation Community (acres)

	Westside Lowland Conifer and Hardwood Forest / Industrial Forest					
Project Component	**Clearcut**	**New Growth Forest**	**Established Forest**	**Riparian**	**Agriculture/ Developed**	**Total**
Wind Turbines	5.7	0.6	7.4			**14**
Project Substation, O&M Facility	3.9		0.1			**4**
Access Roads	19.1	1.7	23.9	0.1		**44.8**
Transmission Line	12.1	8.2	16.6	1.1	0.1	**38**
Met Towers	0.1	0.1				**0.2**
Staging Areas						**0**
Total	**41**	**10.5**	**48**	**1.2**	**0.1**	**101**

Note:
1/ The minimal permanent footprint of the transmission line is shown as the same acreage as the temporary disturbance for this facility.

3.3.2.2 TES Plant Species

Construction of the proposed Project could cause direct and indirect effects to TES plant species, if any such species were located within the temporary disturbance area for the Project. Potential direct impacts include:

- removal of individuals or populations of TES plant species;
- removal or degradation of TES plant species habitat; and
- increased potential for noxious weed colonization which could displace TES plant species populations.

Potential indirect project impacts to TES plant species include:

- the potential spread or introduction of noxious weeds outside the immediate construction area which could impact TES plant populations; and
- habitat fragmentation

Habitat fragmentation can restrict species migration and can leave TES plant populations more susceptible to encroachment by non-native and noxious weed species.

Records obtained from the WHNP did not indicate the known presence of TES plant species within the Project Area. Site-specific surveys for TES plant species have not yet been conducted in the Project Area. Surveys for TES plant species would be conducted in areas of potential habitat within the disturbance footprint during appropriate seasons. Impacts and level of effect to TES plant species and their habitat could be assessed following completion of these surveys.

3.3.2.3 Noxious Weeds

Noxious and invasive plant species, in general, are aggressive opportunistic species that often invade and have a competitive advantage over other species on disturbed sites. Ground disturbance and disturbance to intact vegetation communities, such as could occur during construction and operation of the proposed Project, increase the risk of noxious weed introduction and spread. The abundance and diversity of non-native and noxious weed species tends to be highest near road edges. Movement of vehicles, such as construction and maintenance equipment, can facilitate the introduction and spread of existing and new weed species. Construction of access roads and the movement of construction equipment and other vehicles along these roads would increase the potential for the spread of noxious weeds in the Project Area.

Depending on the species, degree of invasion, and control measures implemented, negative impacts of noxious weeds can include the following:

- Loss of wildlife habitat;
- Alteration of wetland and riparian functions;

- Displacement of native plant species;
- Reduction in plant diversity
- Changes in vegetation community functions;
- Increased soil erosion and sedimentation; and/or
- Control and eradication costs to local communities.

The potential introduction and spread of noxious weeds is essentially an unavoidable by-product of ground-disturbing activity in a major construction project. The standard approach in such cases is to minimize the risk of actual noxious weed impacts through control plans and associated mitigation measures. Mitigation measures applicable to this issue are described in Section 3.3.4.

3.3.3 Impacts of the No Action Alternative

Under the No Action Alternative, construction of the proposed Project would not occur and the potential impacts to vegetation communities and TES plant species described above would not occur. Current ongoing activities within the Project Area, such as commercial timber harvesting, farming and residential development, would continue to affect vegetation communities and have the potential to affect TES plant species under this alternative. Timber stands within the McDonald Tree Farm that are proposed for clearing to accommodate the Coyote Crest Wind Park would likely be harvested in any event under this alternative, subject to standard Weyerhaeuser harvest scheduling. Ongoing activities would continue to provide opportunities for the spread of noxious weeds in the Project Area, and standard control measures to these risks would continue under the No Action Alternative.

3.3.4 Mitigation

3.3.4.1 Vegetation Communities

The Applicant would coordinate Project clearing operations with Weyerhaeuser and WDNR to avoid or reduce peripheral impacts to adjacent commercial timber stands and other native vegetation and habitats. The Applicant has also proposed to implement the following measures to facilitate restoration of temporarily disturbed areas and avoid, minimize or reduce potential impacts associated with noxious weeds:

- Establish standards for site restoration as part of final construction plans. The standards would incorporate forest management criteria established by Weyerhaeuser and WDNR. The post-construction restoration and/or reclamation plan for temporarily disturbed areas would include provisions for continuing active restoration until site stability is achieved or the reference standards are met.
- Site restoration and reseeding would occur during the time of the year when seed germination establishment are most likely to be successful.

- The construction contractor would be required to clean vehicles prior to bring them into the Project Area from outside areas.
- Disturbed areas would be re-vegetated with native species as soon as possible following completion of the corresponding construction task.
- If the construction contractor used hay bales for sediment control or other purposes, certification that the hay bales are weed free would be required.
- The Applicant would monitor noxious weed conditions and actively control any noxious weeds that have become established at Project facility locations, in consultation with Weyerhaeuser.

In addition, potential impacts to native vegetation in the Project Area could be reduced if specific measures to avoid introduction of non-native seed into areas where non-native species are not yet well established were implemented.

3.3.4.2 TES Plant Species

Site-specific surveys for TES plant species have not yet been conducted in the Project Area; however, WTGs would primarily be sited within existing cutting units that have been disturbed by logging operations over the past 40 years, indicating the potential for TES species to occur at these sites is quite low. Completion of TES surveys within suitable habitats in the proposed disturbance areas would allow for identification of mitigation measures to eliminate or reduce adverse impacts on TES plant species that might be present.

3.3.4.3 Noxious Weeds

Measures proposed by the Applicant to minimize the potential for introduction and spread of noxious weeds are identified in Section 3.3.4.1. Additional specifications that could be incorporated to meet vegetation objectives include the following:

- Follow all federal, state, and county noxious weed control regulations and guidelines.
- Clean all equipment before entering the project area and when leaving discrete patches of noxious weeds.
- Develop revegetation seed mixes and monitoring plans in consultation with WDFW, WDNR, Grays Harbor, Pacific, and Lewis County Weed Control Boards, and other interested agencies.
- Ensure application of herbicides is according to labeled rates and recommendations to ensure protection of surface water, ecological integrity, and public health and safety.

3.3.5 Significant Unavoidable Adverse Impacts

Project construction would result in unavoidable impacts to vegetation resources. These unavoidable impacts would include short-term vegetation degradation and soil compaction from

construction (primarily) and maintenance activities and long-term loss of vegetation communities due to construction of permanent project facilities (including new transmission line towers) and new access roads. Approximately, 101 acres would be permanently occupied by Project facilities. The vegetation impacts are not considered significant because they would occur almost exclusively in areas that are already disturbed by commercial timber activities, are located near existing Weyerhaeuser roads and/or are located in existing Grays Harbor PUD utility easements. In addition, priority habitats and sensitive vegetation communities have not been identified within the Project disturbance footprint and impacts to such resources are not expected to occur. While Project activities would also create a risk of noxious weed introduction and spread, proposed mitigation measures would reduce the risk of such that significant adverse impacts are not expected. Therefore, significant unavoidable adverse impacts to vegetation have not been identified.

3.4 Wetlands

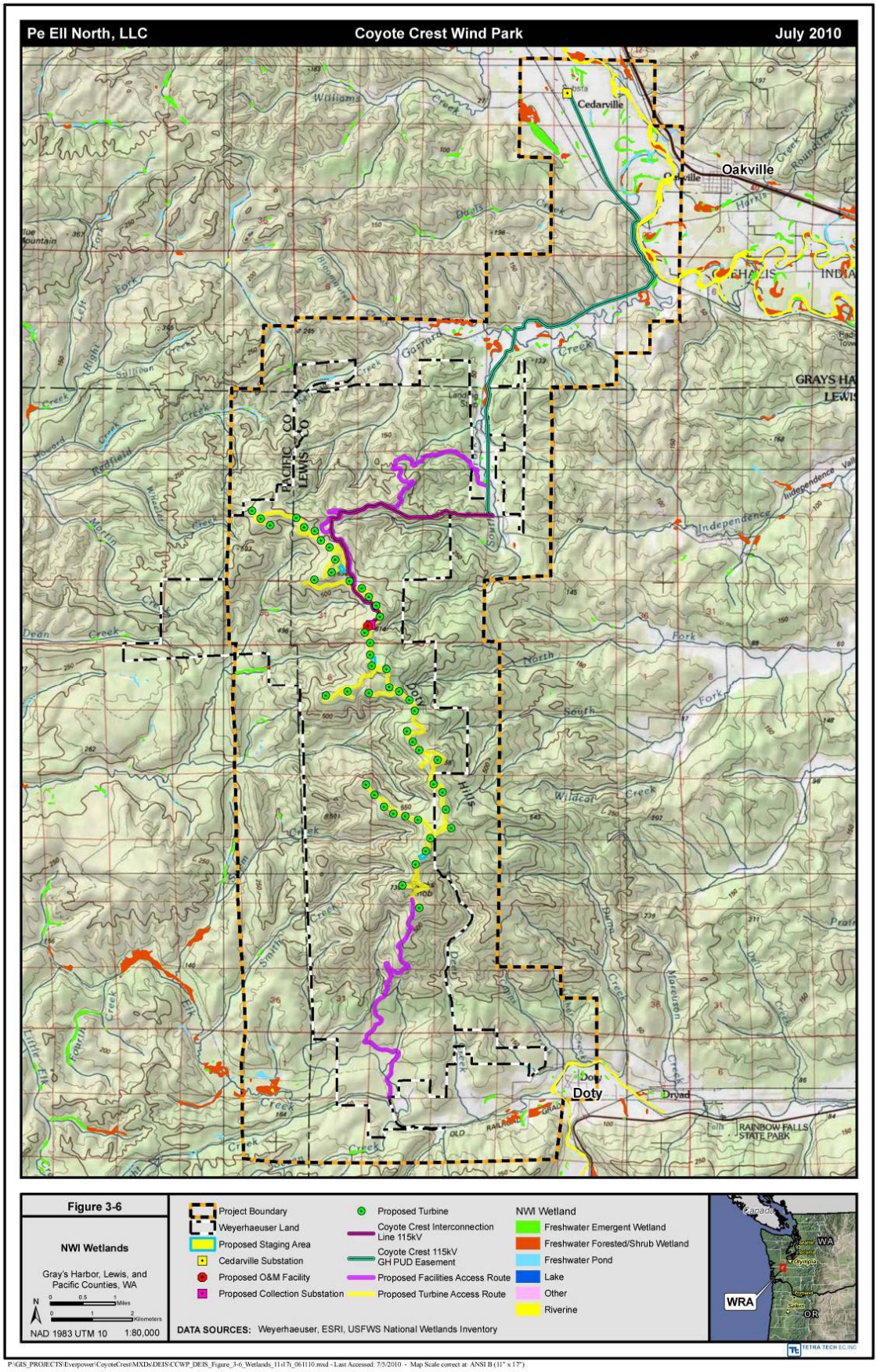
3.4.1 Affected Environment

Wetlands that could potentially be affected by the proposed Project Action are limited in extent and appear to occur primarily in low areas outside the proposed Project facility locations. The characteristics and potential effects to these resources are presented below. Based on the physical conditions in different sectors of the Project Area, the information is subdivided between the Project lease area on the Weyerhaeuser McDonald Tree Farm and the WDNR lands and the Project easement area involving the proposed transmission line route along county roads between the lease area and Cedarville.

3.4.1.1 Project Lease Area

The Project lease area component of the affected environment addressed in this section includes the Weyerhaeuser and WDNR lease lands that encompass the proposed locations of the WTGs, access roads, other support facilities. This area includes the proposed Project transmission line corridor within the McDonald Tree Farm.

The Project Area is situated within the southwest portion of the Chehalis River basin. Most of the proposed turbines locations are on the central ridge of the Project Area. A desktop review of wetlands revealed a lack of wetlands and few areas of hydric soils mapped on the ridges. Information sources used to assess the presence of wetlands include the NWI (USFWS 1981) (Figure 3-6), the NRCS county soil surveys (NRCS 1986, 1987, used to prepare Figures 3-7a, b, and c) and hydric soils lists (NRCS 2001, used to prepare Figure 3-7d), and aerial photos. The streams on the east side of the ridge drain to the Chehalis River. The streams on the west side of the ridge drain west and southwest to perennial streams, Fall River and Martin Creek. A few wetlands are associated with the streams at the lowest elevations of the project including a tributary to Fall River in the south end of the Project Lease Area. Tributaries to the South Fork Garrard Creek drain the site on the north end. The classification of a stream is important for



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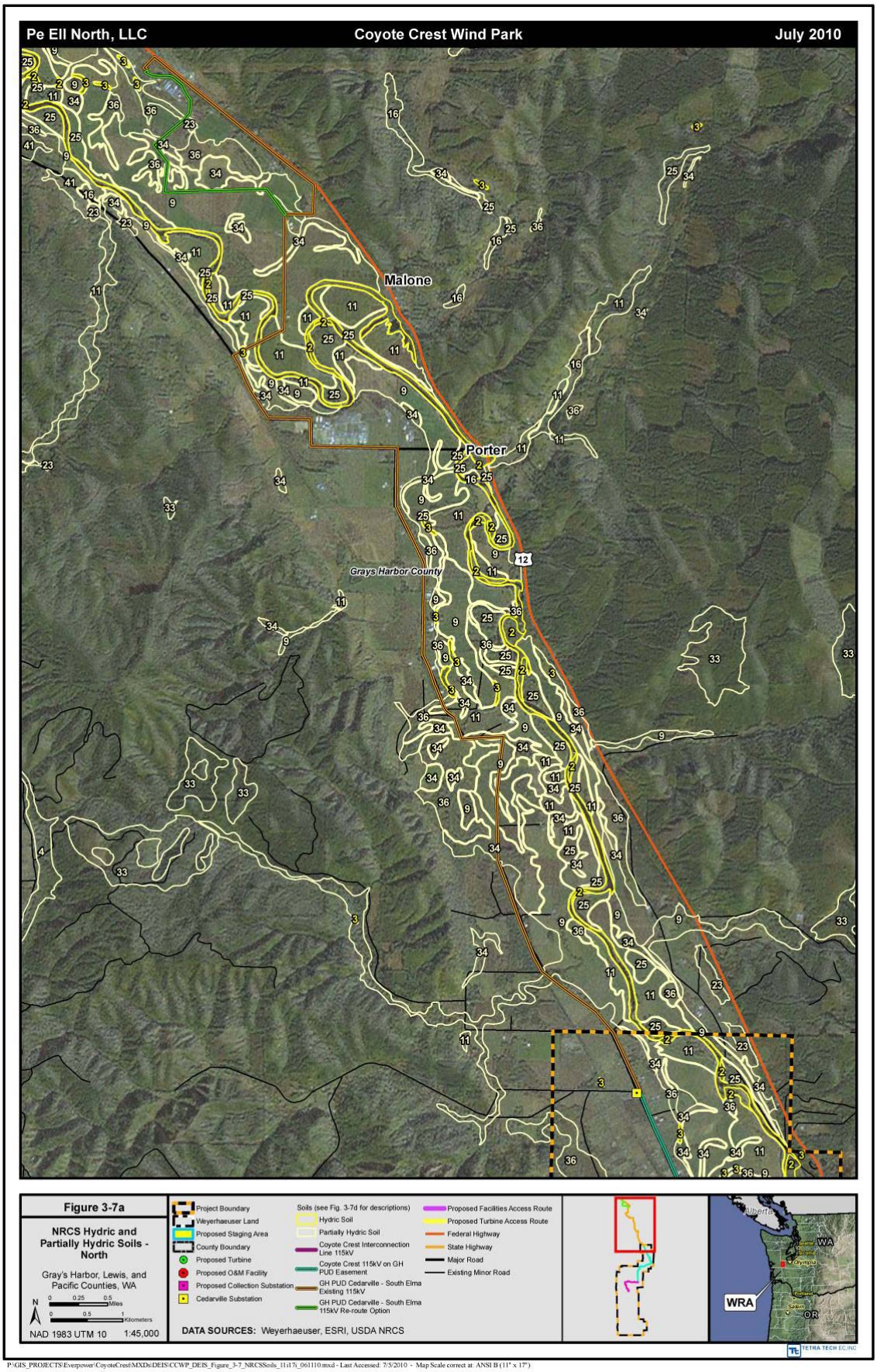
Pe Ell North, LLC
Coyote Crest Wind Park
July 2010
Malone
Porter
Grays Harbor County
12
Figure 3-7a
NRCS Hydric and Partially Hydric Soils - North
Gray's Harbor, Lewis, and Pacific Counties, WA
NAD 1983 UTM 10
1:45,000
Project Boundary
Weyerhaeuser Land
Proposed Staging Area
County Boundary
Proposed Turbine
Proposed O&M Facility
Proposed Collection Substation
Cedarville Substation
Soils (see Fig. 3-7d for descriptions)
Hydric Soil
Partially Hydric Soil
Coyote Crest Interconnection Line 115kV
Coyote Crest 115kV on GH PUD Easement
GH PUD Cedarville - South Elma Existing 115kV
GH PUD Cedarville - South Elma 115kV Re-route Option
Proposed Facilities Access Route
Proposed Turbine Access Route
Federal Highway
State Highway
Major Road
Existing Minor Road
DATA SOURCES: Weyerhaeuser, ESRI, USDA NRCS
WRA
WA
OR
TETRA TECH EC, INC
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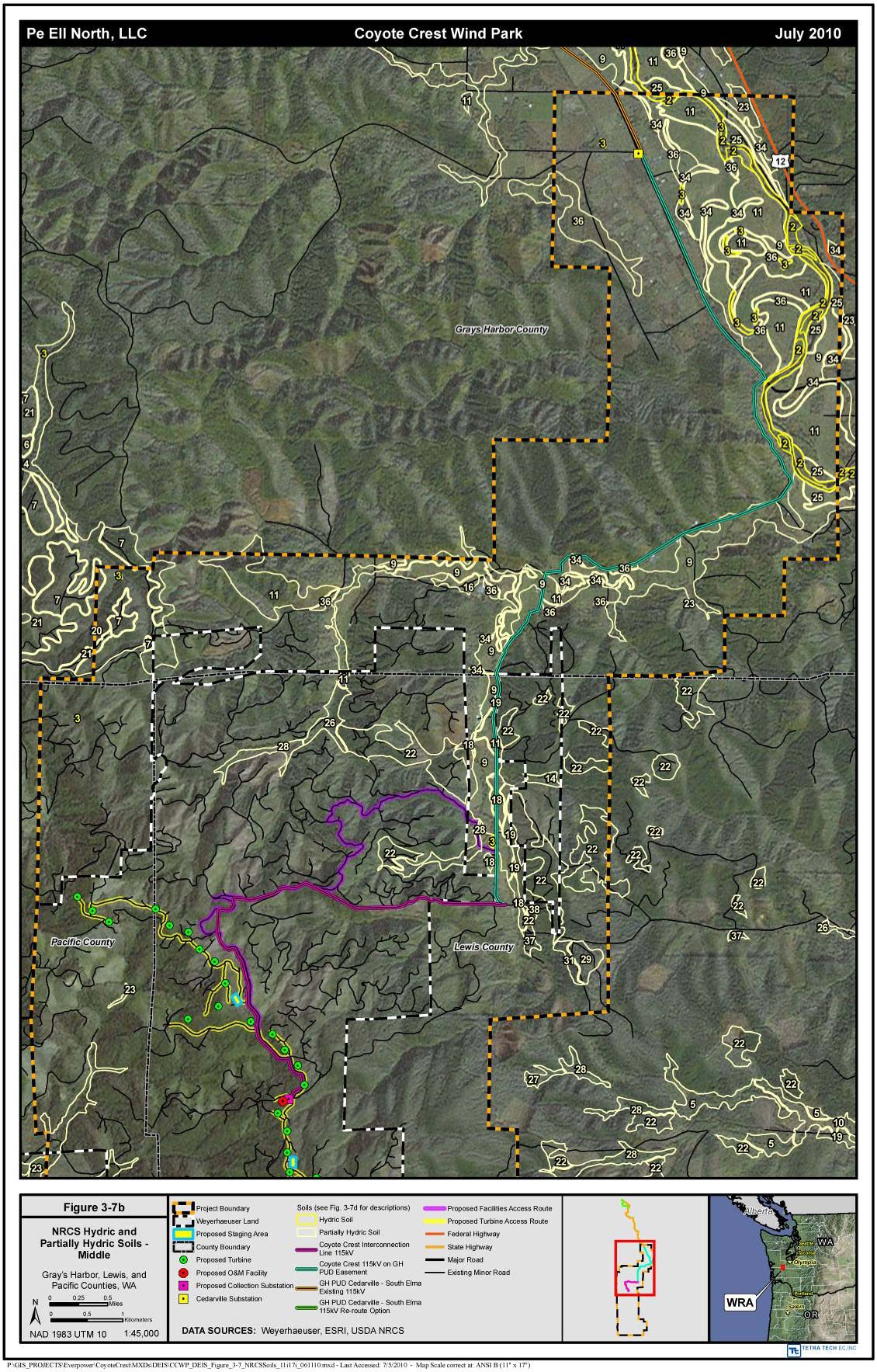

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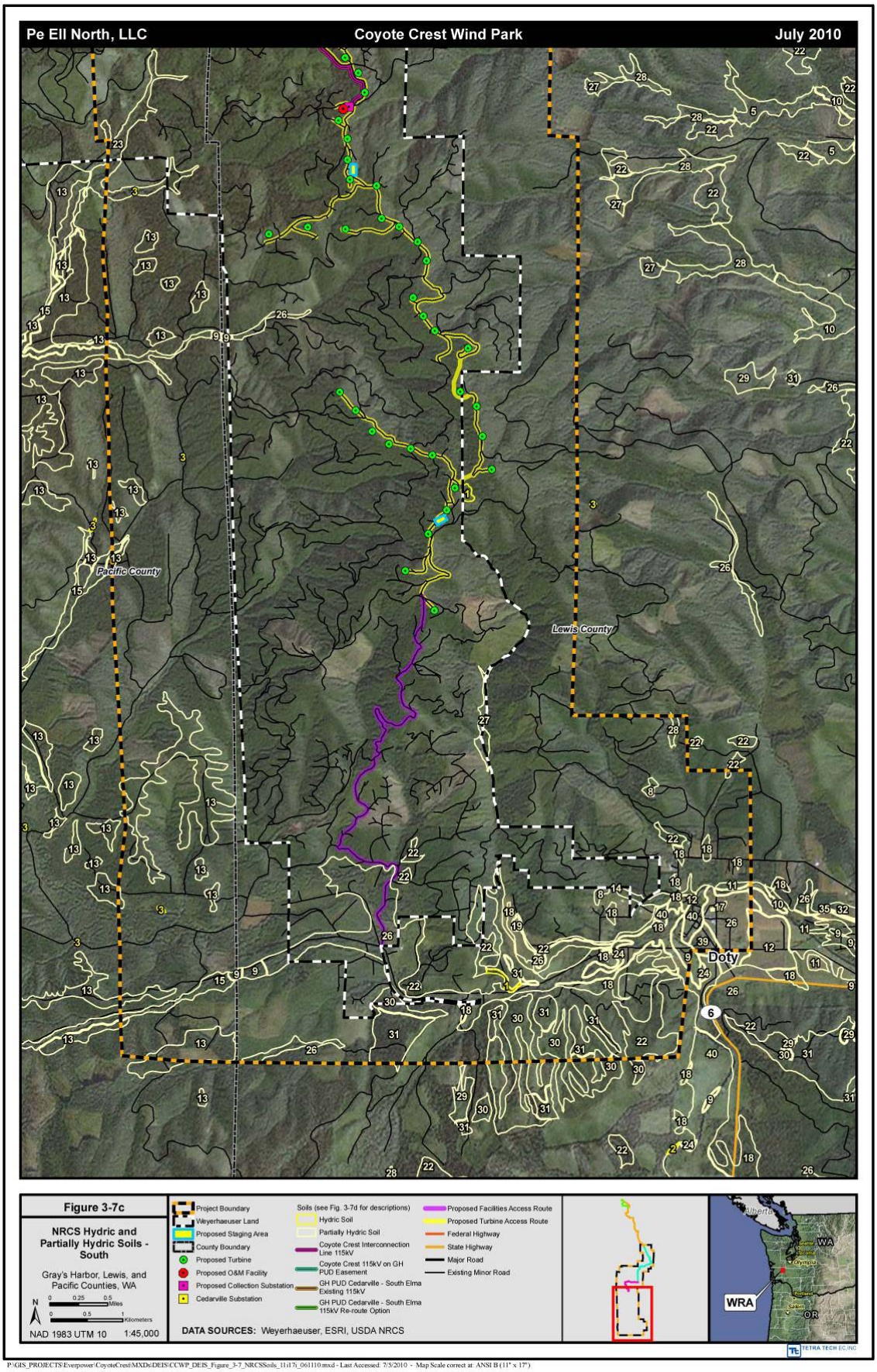

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Pe Ell North, LLC **Coyote Crest Wind Park** **July 2010**

ID	Soil Description	Hydric Rating
1	Andaquepts, level	Hydric
2	Riverwash	Hydric
3	Water	Hydric
4	Aabab silt loam	Partially Hydric
5	Alvor silty clay loam	Partially Hydric
6	Astoria silt loam, 3 to 8 percent slopes	Partially Hydric
7	Astoria silt loam, 8 to 30 percent slopes	Partially Hydric
8	Centralia loam, 0 to 8 percent slopes	Partially Hydric
9	Chehalis silt loam	Partially Hydric
10	Chehalis silty clay	Partially Hydric
11	Cloquato silt loam	Partially Hydric
12	Doty silt loam	Partially Hydric
13	Elochoman silt loam, 1 to 8 percent slopes	Partially Hydric
14	Galvin silt loam, 8 to 15 percent slopes	Partially Hydric
15	Grehalem silt loam	Partially Hydric
16	Humptulips silt loam	Partially Hydric
17	Klaber silt loam	Partially Hydric
18	Lacamas silt loam, 0 to 3 percent slopes	Partially Hydric
19	Lacamas silt loam, 3 to 8 percent slopes	Partially Hydric
20	Lytell silt loam, 30 to 65 percent slopes	Partially Hydric
21	Lytell silt loam, 8 to 30 percent slopes	Partially Hydric
22	Melbourne loam, 15 to 30 percent slopes	Partially Hydric
23	Nemah silty clay loam	Partially Hydric
24	Newberg fine sandy loam	Partially Hydric
25	Newberg silt loam	Partially Hydric
26	Olequa silt loam, 0 to 5 percent slopes	Partially Hydric
27	Olequa silt loam, 15 to 30 percent slopes	Partially Hydric
28	Olequa silt loam, 5 to 15 percent slopes	Partially Hydric
29	Olympic silty clay loam, 0 to 8 percent slopes	Partially Hydric
30	Olympic silty clay loam, 15 to 30 percent slopes	Partially Hydric
31	Olympic silty clay loam, 8 to 15 percent slopes	Partially Hydric
32	Prather silty clay loam, 0 to 5 percent slopes	Partially Hydric
33	Raught silt loam, 5 to 30 percent slopes	Partially Hydric
34	Rennie silty clay loam	Partially Hydric
35	Salkum silty clay loam, 15 to 30 percent slopes	Partially Hydric
36	Salzer silty clay	Partially Hydric
37	Scamman silty clay loam, 0 to 5 percent slopes	Partially Hydric
38	Scamman silty clay loam, 5 to 15 percent slopes	Partially Hydric
39	Winston gravelly loam, 0 to 8 percent slopes	Partially Hydric
40	Winston loam, 0 to 8 percent slopes	Partially Hydric
41	Wishkah silty clay loam	Partially Hydric

Figure 3-7d

NRCS Soils Index - Hydric and Partially Hydric Soils

Gray's Harbor, Lewis, and Pacific Counties, WA

DATA SOURCES: USDA NRCS

TETRA TECH EC, INC

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determining the category of its adjacent wetlands. Wetland category is an indicator for determining federal and/or local jurisdiction. See Section 3.4.1.2 for a description of wetlands within the Project easement area.

The Project lease area is characterized as an industrial forest of mixed hardwood and conifer managed for clearcut logging. Section 3.3 provides a full description of vegetative community characteristics. In general, the established forest stands consist of a sparse understory and trees are typically small, with a single-storied canopy dominated primarily by Douglas fir, western hemlock and western red cedar and/or broadleaf deciduous trees, such as bigleaf maple and red alder. Sitka spruce and grand fir are a minor component in this stage of succession. Later successional forest stands have understory dominated by swordfern, Oregon grape, and vine maple. The areas in an early successional stage are typically dominated by abundant slash, bare ground, planting seedlings and regeneration of native species such as red elderberry (*Sambucus racemosa*) and sword fern (*Polystichum munitum*).

Riparian vegetation communities are found next to streams within the Project Area and are dominated by red alder, black cottonwood, and bigleaf maple. Devil's club and salmonberry are common shrub species in the understory of these communities. Riparian areas often have saturated soils and meet the definition of a wetland.

Hydric soils are soils that are saturated, flooded, or ponded long enough during the growing season to develop anoxic conditions in the upper part of the soil profile. Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. The definition of hydric soils is based on general soil properties that are associated with wetness. Soil units mapped as hydric soils are strong indicators of the presence of wetlands, although more specific information, such as information about the depth and duration of the water table, is needed to determine whether a specific soil unit is actually hydric. If soils are wet enough for a long enough period of time to be considered hydric, they are likely to exhibit certain properties that can easily be observed in the field.

The majority of soils within the lease area are classified as Haplumbrepts (Western Brown Forest Soils), characterized by nonhydric soils with a thick surface horizon with clay loam textures and high organic content. As shown in Figures 3-7b and 3-7c, the NRCS mapping indicates only one small area of hydric soils, located on WDNR land and not within the Project development footprint. The NRCS mapping also indicates the presence of several partially hydric soil units within the northern and southern ends of the lease area. The existing roads that comprise the initial segments of the northern and southern main facilities access routes (connecting with Garrard Creek Road and Elk Creek Road, respectively), cross through areas of partially hydric soils.

The area of the proposed Project disturbance footprint within the lease area has not been inventoried for the presence of wetlands. Standard practice is to investigate areas to be

developed for the presence of wetlands and conduct a formal delineation for any wetlands that would be subject to disturbance from the development activity. In the absence of sit-specific information on wetlands in the lease area, potential impacts to wetlands in this area are based on the available information concerning the possible occurrence of wetlands and their likely character.

3.4.1.2 Project Easement Area

The proposed Coyote Crest Wind Park would require the replacement of poles along a segment of existing transmission or distribution line extending for approximately 8 miles along Garrard Creek Road and South Bank Road. The study area corridor for this effort comprises the area within a 100-foot-wide road ROW. Wetlands and other waters were surveyed within the ROW and their locations estimated if they were abutting the ROW. The proposed transmission line segment occurs within the watershed between the eastern edge of the Coast Range and the Chehalis River at about 100 to 150 feet in elevation. This area is characterized by a geology and topography shaped by glaciers. Substrates consist of glacial deposits in the form of till and outwash. Soils in this area often have gravelly surface and/or subsurface layers.

The linear Project corridor includes a mix of upland pastures, woodlots, small farms, and numerous wetlands. The Chehalis River, a major drainage with an extensive floodplain, runs east of and adjacent to the Project corridor. While native species are common, especially in off-site low-lying areas, the roadside areas typically include several non-native invasive species such as Himalayan blackberry (Rubus discolor) due to disturbances from road construction and maintenance activities and adjacent farms and residences. Non-native reed canarygrass (*Phalaris arundinacea*) dominates the emergent wetlands but is also common in upland swales and ditches and along road banks where it may comprise over 95 to 100 percent of the vegetative cover. Typical native species within the uplands include bigleaf maple, Douglas-fir, and snowberry. Typical native species within the wetlands include willow species (*Salix* spp.), Douglas' spirea (*Spiraea douglasii*), and redosier dogwood. Red alder is dominant in both the area's uplands and wetlands.

Five ephemeral (temporary flowing), five intermittent (seasonally flowing), and three perennial (flowing all year) streams cross the project corridor. Perennial streams, Garrard Creek and South Fork Garrard Creek, meander across the valley generally northward and eventually eastward to drain to the Chehalis River. South Fork Garrard Creek crosses the Project corridor four times. Davis Creek, another perennial creek, drains west to east to the Chehalis River crossing under South Bank Road via a culvert. The Chehalis River and reaches of the south and main stems of Garrard Creek within the project corridor are mapped by StreamNet, the Pacific States Marine Fisheries Commission interactive website, as containing Coho salmon (*Oncorhynchus kisutch*) (StreamNet 2003). In addition, Davis Creek and the Chehalis River are mapped as containing winter steelhead (*Oncorhynchus mykiss*). Neither of these salmonid species is state or federal-listed as threatened or endangered (USFWS 2009b). However, they are listed by the WDFW as

"Priority Species" with special recommendations for protections and conservation (WDFW 2008a). Of the 13 streams delineated in or adjacent to the project corridor, all are regulated as Critical Areas by Grays Harbor and Lewis Counties (Lewis County 2010; Grays Harbor 2010). Eight of the delineated streams meet the definition of "waters of the U.S." and are, therefore, assumed to be jurisdictional by the U.S. Army Corps of Engineers (USACE).

A total of 11 wetlands were delineated within or adjacent to the Project corridor in the easement area. The wetland report is included in Appendix A. The floodplain of the Chehalis River supports numerous wetlands, some of which abut portions of the northern half of the project corridor. The hydrogeomorphology classifications of the wetlands within the project corridor include four Riverine, four Depressional, one Flats, and two Slope wetlands. The Cowardin classification (a plant community and hydrology based classification) of these wetlands range from Riverine to Palustrine emergent, forested and scrub/shrub. Most of the wetlands sustain seasonal inundation with surface drying in summer. Of the 11 wetlands delineated within the project corridor, all are regulated as "waters of the state" by Ecology via Grays Harbor and Lewis County's Critical Areas codes. Six of the delineated wetlands meet the definition of "waters of the U.S." and are therefore, assumed to be jurisdictional by the USACE.

The wetlands within and adjacent to the Project corridor were rated for capacity to provide wetland function according to the Washington State Wetland Rating System for Western Washington (Hruby 2006), a system providing scores from I to IV. Eight wetlands rated moderately low to low (III and IV) due to function disturbance from construction of Garrard Creek and South Bank Roads, grazing, and dominance of non-native invasive species. Three wetlands rated moderately high to high (II and I). These wetlands provide flood control, water quality function, a dominance of native plants and riparian community for quality wildlife habitat, and wildlife corridors. Each wetland is prescribed a protective buffer ranging from 17 to 68 feet in width with the highest rated wetlands receiving the widest buffers.

The streams were typed according to each county's Critical Areas codes which have adopted the WDNR stream typing system. Each stream type is prescribed a protective buffer width with larger streams receiving a wider buffer per each county's code. Nine of the streams require only a 17-foot-wide buffer; three require buffers ranging from 68 to 75 feet. South Fork Garrard Creek requires a 68-foot buffer where it crosses the project in Grays Harbor County and a150-foot buffer where it crosses in Lewis County.

Figure 3-7a indicates the potential presence of wetland areas, as represented by areas of hydric and partially hydric soils, along the route of the Cedarville-South Elma transmission upgrade proposed by the Grays Harbor PUD. The existing 115 kV line along this route crosses or skirts along the edge of several partially hydric soil units, particularly in an approximate 6-mile long area south of Porter and near the crossing of the Chehalis River. The proposed re-route segment into the South Elma Substation also crosses partially hydric soil units in approximately five

locations. Wetland and stream conditions in this area are likely similar to those present within the Chehalis River Valley portion of the proposed Project transmission interconnection.

3.4.2 Impacts of the Proposed Action

3.4.2.1 Project Lease Area

The proposed Project footprint within the lease area has not been inventoried for wetlands. Consequently, a comprehensive review of specific impacts to wetlands based on the proposed layout cannot be presented. Because the WTG sites are located along the ridgetop, impacts to wetlands from these Project facilities and the roads needed to access them are not expected. None of the new proposed Project access roads would cross streams and thus, stream-associated wetlands would be avoided. Wetland meadows and seeps exist within the lease area, however, and it is possible that proposed access roads would cross these features.

The existing main access roads would need to be widened and realigned in places to accommodate construction traffic. There are also places where existing roads would be upgraded at stream crossings. Potential direct impacts to wetlands adjacent to these streams could result from the road and culvert improvements. In these cases, applicable regulations would require efforts to minimize the areas of disturbance to the adjacent wetlands during construction. New culverts would be installed where necessary for stormwater control, pursuant to the WDNR RMAP and Lewis County stormwater regulations.

Where wetlands are present within and near the Project disturbance footprint, these features would need to be delineated and mapped by a qualified professional prior to development of a final layout for the Project. Any wetland features potentially affected are likely to be small in extent, and it is likely that direct and permanent impacts to wetlands could be avoided by relatively minor relocation or re-routing of Project facilities.

If the Project resulted in impacts to wetlands, the primary potential temporary impact would be the introduction of sediment through soil erosion and transport as a result of construction of the Project facilities, removal of vegetation that would otherwise trap sediments, and use of the existing access roads. The vegetation assessment presented in Section 3.3 identified a total of 1.6 acres of riparian vegetation community subject to impact from proposed facilities. Disturbance in these areas could cause sediment to be introduced directly into wetlands during periods of overbank flooding in the riparian areas. For this reason, stormwater and sedimentation, along with other potential contaminants, would need to be controlled by implementation of the SWPPP, as required by the construction stormwater general permit and Lewis County stormwater approval. As discussed in Section 3.2, implementation of control measures prescribed in the SWPPP is presumed to provide compliance with water quality standards.

3.4.2.2 Project Easement Area

No wetlands or other waters (in this case streams) are proposed for direct impacts (soil removal or fill, vegetation removal) from the pole replacement activities. However, several of the poles to be replaced are located within county-designated wetland and stream protective buffers for which utility work is an allowed activity provided the terms of the Critical Areas codes for each county are followed. Temporary disturbance to the wetland and stream buffers from pole replacement activities would take place within the gravel road shoulders (i.e., previously disturbed buffers) or within the upland slopes between the road and wetland/water feature.

A total of 33 poles are proposed for replacement in the utility corridor. Of these, 19 poles are within the buffers of 4 streams and 8 wetlands, including one auxiliary pole. An auger would drill a larger hole in the same location as the existing pole to accommodate the larger pole. This would create a soil disturbance of an approximate 3-foot diameter around each pole. If guy wires are required, an auger would drill holes for each guy wire. With overall equipment activity and setting poles on the ground, there may be up to 30 feet of disturbance at a pole placement site. However, wherever possible, the poles would be removed by equipment sitting on the asphalt road and reaching over to the pole locations, thus eliminating the need to disturb soil beyond the auger hole.

In general, potential wetland impacts along the Cedarville-South Elma transmission upgrade route would be similar to those described above for the Project transmission interconnection. It is possible that some poles located in wetlands or wetland buffers would need to be replaced, with limited impacts as described above. Identification of expected impacts in the proposed re-route section south of the substation would depend upon comparison of site-specific facility plans and confirmation of the presence of wetland areas within the partially hydric soil units that have been mapped. It is expected that pole locations would be selected to span or skirt wetland areas to the extent possible, thereby minimizing direct or indirect impacts in wetlands or their buffers.

No measurable impacts to wetlands, waters, or their buffers along the transmission line or the Cedarville-South Elma upgrade are expected during operations and maintenance of the transmission line.

3.4.3 Impacts of the No Action Alternative

Impacts to wetlands in the Project lease area under the No Action Alternative would likely be roughly equivalent to those of the proposed action. In the absence of the proposed action, the land would be continued to be used for industrial forestry. This would require periodic update to existing roads, much as the proposed action would require, and the construction of additional spur roads to future timber harvest units in the areas where turbines and access roads are proposed. This could result in wetland impacts as described above.

No impacts to wetlands and other waters within the existing easement areas are expected from the No Action Alternative. In the absence of the proposed action, the existing transmission line

poles would require replacement at some time in the future as they naturally deteriorated, but impacts to wetlands and other waters can be expected to be avoided then as now. Impacts in buffers would also be expected to be minimized for future pole replacement in the same way as they would for this proposed pole replacement.

3.4.4 Mitigation

3.4.4.1 Project Lease Area

Wetlands in the lease area within the Project footprint would need to be delineated and mapped prior to final Project layout. The area of unavoidable wetland impacts associated with culvert replacement would be calculated. The total area is not expected to exceed 0.5 acre, the threshold for being covered under the USACE Nationwide Permit #12 for utility projects, which does not require wetland mitigation. Impacts to wetland and wetland buffers would, however, require mitigation under each County's Critical Areas ordinance or code. For permanent and temporary loss of wetland area as well as loss of wetland function, mitigation would involve wetland restoration, wetland creation, and/or enhancement of existing wetlands within the same watershed of the wetland impact area.

3.4.4.2 Project Easement Area

No mitigation for wetlands or streams in the existing easements is proposed because no direct or indirect impacts to these features would occur. Care would be taken to minimize temporary disturbances in the wetland and stream buffers (i.e., uplands) caused by parking of vehicles and equipment. The ground at all disturbance sites would be restored to the original contours and BMPs for erosion and sediment control would be employed during and after construction as required by the Critical Areas codes, thus there would be no significant change in the existing project footprint.

The Lewis County Critical Areas code provides an extensive set of rules and exemptions for impacts within wetland and stream buffers. The code considers utility corridor activity as a low-intensity use for which smaller wetland and stream buffers are required than for high-intensity activities. For reasonable uses of a parcel, the code also allows the width of buffers to be averaged, where reducing the width of the impact portion of the buffer while increasing the width of another portion (Chapter 17.35A.681) would result in an existing pole location to be outside the buffer. Mitigation is required for permanent alteration to wetlands, streams and their buffers (Chapter 17.35A.690). Because the proposed impacts within wetland and stream buffers within Lewis County would be temporary, it is presumed that the transmission line pole replacement would either be determined as an exempt activity by Lewis County or would be allowed under the terms of buffer averaging without the need for mitigation.

3.4.5 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are expected to result from construction and operation of the proposed Project. Within the Project lease area, impacts would be limited to

wetlands at areas of road widening and adjacent to streams proposed for culvert replacement. Impacts would be limited to the area necessary to extract and replace the culvert and restore the site to preconstruction conditions. Where road widening is proposed for an area with adjacent wetlands, effort would be made to widen the road on the upland side to avoid the wetlands. Indirect impacts to the wetlands and streams would be minimized by employing construction BMPs for erosion and sediment control and completing post-construction site restoration in wetland and stream buffers.

No adverse impacts to wetlands or streams would result from the proposed transmission line pole replacement activity or by future operations and maintenance of this portion of the Project transmission line. Impacts within wetland and stream buffers would occur in road shoulders and adjacent uplands and thus would not be significant. Disturbance minimization, construction BMPs for erosion and sediment control, and post-construction site restoration in wetland and stream buffers would prevent adverse indirect impacts to the wetlands and streams.

3.5 Wildlife

This section describes the wildlife species either known to occur or potentially occurring in the Project Area. Results from studies conducted on the Project are summarized in this section, in order to characterize the existing wildlife. In addition, this section describes potential impacts to wildlife from the construction and operation of the Project.

In order to establish baseline information about wildlife use of the site and to evaluate the potential impacts from construction and operation of the Project, the Applicant contracted for a number of wildlife studies including:

- Habitat mapping (Appendix B),
- Diurnal avian point counts (Appendix C),
- Nocturnal radar surveys of bird and bat migration Spring 2008 (Appendix D),
- Nocturnal radar surveys of bird and bat migration Fall 2008 (Appendix E),
- Nocturnal acoustic monitoring of bats (Appendix F),
- Northern spotted owl surveys (Appendix G), and
- Nocturnal breeding season radar surveys of marbled murrelets (Appendix H).

Timing, methods and results for these studies are discussed below for the respective species.

Lewis, Grays Harbor, and Pacific Counties have critical area ordinances that designate areas for protection. The Lewis County Code defines critical areas as all wetlands, frequently flooded areas, aquifer recharge areas, fish and wildlife habitat conservation areas, and geologically hazardous areas. Fish and wildlife habitat conservation areas are further defined as:

- Areas with which TES species have a primary association, including areas with which "priority species" as defined by the WDFW have a primary association;
- "Priority habitats" as identified by WDFW. Priority habitats are areas with one or more of the following attributes pertaining to state species listed as endangered or threatened: comparatively high wildlife density, high wildlife species richness, significant wildlife species richness, significant wildlife breeding habitat, significant wildlife seasonal ranges, significant movement corridors for wildlife, limited availability, and/or high vulnerability;
- Naturally-occurring ponds under 20 acres and their submerged aquatic beds that provide fish or wildlife habitat;
- Lakes, ponds, streams, and rivers planted with game fish;
- Habitats and species of local importance;
- Waters of the state; and
- State natural area preserves and natural resource conservation areas.

All of these critical areas pertain to this wildlife section, excluding the wetland areas (waters of the state). Elk wintering habitat is considered a critical area; however, habitat continuity is needed for elk wintering areas, and it can be interrupted by subdivisions and major road and highway construction. In addition, Lewis County adopts the WDFW recommendations for Washington's PHS, for habitat protection and buffer creation and maintenance for listed species.

3.5.1 Affected Environment

The Project is located in southwestern Washington in the Coast Range physiographic region (Figure 1-1, USGS 2003). The climate is influenced by the proximity of the Project to the Pacific Ocean, producing seasonally frequent fog and drizzle, high annual precipitation ranging from 35 to 100 inches, and dry summer conditions. Topography in the region ranges from relatively flat riverine floodplain valleys to steep, mountainous terrain. A prominent north/south ridge running the length of the Project Area divides the site into two main drainages. The land in the Project Area is predominantly owned by Weyerhaeuser and intensively managed as industrial forest for timber production. Photographs of typical habitats around proposed wind turbine sites are shown in (Appendix I). The commercial timber lands within the Project Area are characterized by harvest units (50 to 100 acres in size) with a matrix of various age stands of timber with an average rotation of 40 years. Portions of the Weyerhaeuser McDonald Tree Farm in the Project Area have recently been harvested and replanted. All project-related lands have been cut at least once and several areas are on their third or fourth rotation. The WDNR lease area has also been extensively harvested.

Habitat types in the Project Area were mapped by Tetra Tech EC, Inc. (Appendix B). Vegetation on the site is described in detail in Section 3.3, Plants, and is summarized here to

describe habitats of the site. The wildlife species associated with the habitat types on site are primarily those associated with young-age westside mixed conifer and hardwood forests dominated by Douglas fir trees, with some wetland and riparian dependent species also occurring. Each habitat type in the Project Area provides varying degrees of foraging and breeding opportunities for different species. The low-lying riparian areas and wetlands provide stop-over and wintering habitat for migrating waterfowl. Within the forest land, clearcuts provide open areas and young vegetation for some migratory songbirds and ground-foraging birds. The young, uniform-age stands of closed-canopy forest that would be affected by the Project provide limited structural complexity and dead wood for woodpeckers and cavity-nesting birds and conifer seeds for foraging. Riparian areas made up of red alder stands or conifer species provide protected travel corridors as well as foraging, roosting and breeding habitats for a variety of bird species; these areas would not be altered by the Project.

The primary habitat type in the Project Area is westside mixed conifer and hardwood forest, which consists of evergreen conifers, deciduous broadleaf trees, or a combination of both. In this habitat type, most stands are dominated by Douglas-fir, western hemlock, western red cedar, Sitka spruce, red alder, and bigleaf maple or combination of these species. Riparian areas with mixed conifer and hardwood tree species have been maintained in the Project Area, particularly where salmon-bearing streams are present. Red alder stands remain both in riparian areas and in isolated stands across the Project Area. Under the WFPA, forestry actions near fish habitat streams (type S and F) that are perennial (type Np) are required to maintain a 50-foot riparian management zone and a 30-foot equipment limitation zone. Harvesting in the buffer is permitted if certain basal area requirements and tree counts are met.

The northern portion of the Project Area encompasses portions of the Garrard Creek and Chehalis River floodplains, with open pastures, agricultural land, remnant prairie/grasslands (Stinson 2005), freshwater emergent and riverine habitats (Figure 3-6). Oregon ash habitats occur in the northern portion of the Project and are associated with black cottonwood (*Populus balsamifera*), red alder, white alder (*Alnus rhombifolia*), bigleaf maple, Oregon white oak (*Quercus garryana*), and various willows. Oregon ash and slough sedge (*Carex obnupta*) occur in the northern project area in the Chehalis floodplain where soils are saturated for most of the growing season.

Land use within and near the Project Area is characterized primarily by second- or third-growth commercial forestland intensively managed for timber production. The structure of the mixed conifer and hardwood forests varies across the landscape, with recent clearcuts, sapling pole regeneration, closed canopy forest and closed canopy forest with open understory comprising the stand types within the Project Area. Clearcut logging and industrial forestry have resulted in less forest structure and diversity for wildlife. The dominant species in these managed forests is typically Douglas-fir, and harvest rotations of 40 years prevent development of old-growth forest characteristics.

3.5.1.1 Species Occurrence

Bird Use and Migration

Birds have been identified as a group potentially at risk of mortality at wind farms because of collisions with wind turbines and power lines and displacement due to the presence of the associated structures. The Project Area is located in the Pacific flyway, one of the main north-south migratory routes followed by a variety of bird species. The Pacific flyway extends from the arctic regions of Alaska and Canada to South America and is bounded on the west by the Pacific Ocean. The Project Area is 22 miles from the coast at Grays Harbor and 25 miles from the coast at Willapa Bay, Figure 1-1) where numerous shorebirds and waterfowl stop over during migration and winter (Page et al. 1999). Although there are some known migration corridors in Oregon and Washington for diurnally active migratory waterfowl and raptors, little is know about the nocturnal migratory pathways of passerines and bats and bird use of the Project Area.

In order to provide baseline information on nocturnal bird and bat migration, a radar and night-vision study was conducted in spring and fall 2008 (see Appendices D and E). In addition, avian point count studies (Appendix C) were conducted to identify potential ecological impacts on diurnally active birds, associated with building and operating the Project.

The nocturnal radar and visual studies of bird and bat migration were conducted for 6 hours a night in a 45-night period in spring (April 15-May 29, 2008) and 61-night period in fall (August 15- October 14) during the peak of bird and bat spring migration. It was not possible to separate migratory bird targets from migratory bat targets in the radar study due to similar flight speeds; therefore, these two groups were recorded together and termed targets. The night-vision surveys were conducted during every night of radar sampling to assess relative numbers and proportions of birds and bats flying at low altitudes ($\leq$ 150 meters above ground level [agl]) to distinguish between birds and bats at lower altitudes. Passage rates during the radar study were not corrected for detectability (the probability that a bird or bat will be detected, with increasing distance from the observer), and therefore should be considered an index of the actual number of birds and bats passing through the area.

In the radar study, 55 percent of targets were traveling in a northerly direction (in spring), and 83 percent of targets were traveling in a southerly direction (in fall), indicating that migration was occurring during the study. In the spring, passage rates and flight altitudes increased under favorable migratory conditions (tailwinds) and passage rates decreased with western crosswinds. In the fall, flight heights increased while passage rates decreased with a tailwind, and no strong association was found between fog and flight altitudes. In both spring and fall, visual observations confirmed the dominance of passerines (~58 percent of all birds and bats in spring; ~55 percent of all birds and bats in fall) and to a lesser degree waterfowl (~21 percent of all birds and bats in spring; 18 percent of all birds and bats in fall). Despite the large among-night variation in mean flight altitudes during both spring and fall migration, mean flight altitudes were always above the proposed turbine heights. The mean flight altitudes (452 meters in

spring; 454 meters in fall) were ~ 330 meters higher than the height of the proposed turbines (~125 meters). A turbine passage rate index (number of birds and bats passing within the area occupied by each turbine each night) was 1.8-17.4 nocturnal migrants/turbine/day in spring and 1.7-15.9 nocturnal migrants/turbine/day in the fall. The percentage of targets passing within the proposed rotor swept area (RSA) was 12.3 percent in spring and 10 percent in fall.

Diurnal avian point-count studies (see Appendix C) were conducted to collect information on bird species, mean use, spatial distribution and flight heights to identify risk of bird mortality on the Project. The 6 diurnal avian point-count locations were surveyed 41 times between fall 2007 and fall 2008 resulting in 239 total 20-min surveys. In fall 2007, 8 surveys out of 14 potential surveys were conducted, winter 2007-2008 7 out of 17 potential surveys were conducted, spring 2008 10 out of 12 potential surveys were conducted, summer 8 out of 8 surveys were conducted and fall 2008 8 out of 9 potential surveys were conducted. Although weekly surveys were attempted in all seasons, weather conditions limited access to both the Project and specific point count locations during both the winter and spring seasons.

A total of 2,806 birds distributed among 61 identified species and 8 unidentified species were observed within the Project. Overall mean bird use within the Project was 11.74 birds/20 minutes (min) and ranged from 0 to 185 birds/20 min point count. Overall mean bird use ranged from a low of 5.46 birds/20 min during the fall 2008 season to a high of 26.54 birds/20 min during the fall 2007 season. Federally- or state-listed bird species and species of concern observed during the avian point counts are discussed in the Special Status Species section below.

Songbirds had the highest mean use out of all species groups observed (9.38 birds/20 min). The most commonly observed species overall were the pine siskin (*Carduelis pinus*; 3.71 birds/20 min), red crossbill (*Loxia curvirostra*; 1.17 birds/20 min), evening grosbeak (*Coccothraustes vespertinus*; 0.62 birds/20 min), dark-eyed junco (*Junco hyemalis;*0.56 birds/20 min), cedar waxwing (*Bombycilla cedrorum*; 0.49 birds/20 min), and common raven *(Corvus corax*; 0.50 birds/20 min).

The top species, the pine siskin, accounted for 39.2 percent of individuals in this songbird group. Among crows and allies, the second highest species group overall (0.78 birds/20 min), the most commonly observed species was the common raven (0.50 birds/20 min). For seasonal surveys, songbirds, and crows and allies were the top species groups observed in the winter, spring, summer and fall 2008. In the fall 2007, however, waterfowl were the second highest species group; the Canada goose (*Branta Canadensis*) had the highest mean use (4.79 birds/20 min) within that category with 5 flocks of up to 70 individuals observed flying through the area.

Non-raptor mean use was highest in the fall 2007 season (26.36 birds/20 min). The species that contributed to high mean use in fall 2007 were the pine siskin (10.44 birds/20 min) and Canada goose (4.79 birds/20 min). This mean use is more than 1.5 times higher than the mean use for winter (15.46 birds/20 min), the next highest season.

Overall mean use for raptors was low at 0.15 birds/20 min. The raptors with the highest use of the Project Area were the turkey vulture (*Cathartes aura*; 0.7 birds/20 min), red-tailed hawk (0.3 birds/20 min), and northern harrier (*Circus cyaneus*; 0.2 birds/20 min). Mean use for each other raptor species was 0.01 birds/20 min including sharp-shinned hawk (*Accipiter striatus*), merlin (*Falco columbarius*), Cooper's hawk (*Accipiter cooperii*), northern pygmy-owl (*Glaucidium gnoma*), bald eagle (*Haliaeetus leucocephalus*) and unidentified accipiter hawk, all of which had only one individual observed over the course of the five seasons surveyed. Raptor mean use is low for the Project Area; observed changes in raptor use between the seasons are as expected based on migratory tendencies of these species. Mean use was highest in the summer season (0.21 birds/20 min); comprised of only turkey vultures and red-tailed hawks. Mean use was second highest in fall 2007 followed by spring 2008 (0.19 and 0.15 birds/20 min, respectively), with the greatest diversity of raptor species observed in these seasons. Winter had the lowest raptor mean use of all seasons (0.06 birds/20 min).

Comparing non-raptor and raptor bird use rates to existing wind energy facilities with publicly available data throughout the country, non-raptor use ranked moderate in the first fall season, winter and summer, and low in the spring and second fall season. Raptor use ranked low for all seasons (see Appendix C).

Flying non-raptors demonstrated a propensity for flying below the RSA. For individuals flying within the RSA, however, seasonal variation exists. Fall 2007 and fall 2008 demonstrated the highest proportion of individuals flying within the RSA (28.9 percent and 41.0 percent, respectively. This proportion was highest during fall 2008 (41 percent) and fall 2007 (28.9 percent); and in the 10 percent to 20 percent range for the other seasons. Species contributing to the percent of individuals utilizing the RSA include the American robin (*Turdus migratorius*), red crossbill, American goldfinch (*Spinus tristis*), western bluebird (*Sialia mexicana*), tree swallow (*Tachycineta bicolor*), and band-tailed pigeon (*Patagioenas fasciata*), with the percent of each of these species flying within the RSA varying by season. Caution should be used when interpreting these data, because 12 weekly surveys (out of 29) were missed due to winter and spring weather conditions.

Raptors utilized the RSA across the seasons, but raptors flew within the RSA more frequently in the summer (77.8 percent), fall 2008 (60.0 percent), and winter (50 percent). In these seasons, turkey vultures and red-tailed hawks contributed to the percentages of raptors flying within the RSA, however it should be noted that these percentages are driven by low numbers of individual raptors (between 1 and 6) flying within the RSA for each season.

Species distribution was consistent throughout the WRA for most bird species. Pine siskins, red crossbills, and dark-eyed juncos, the most commonly observed species, were observed at all point count locations in all seasons. The available habitat at point count locations H, I, J, K and L is similar: areas of clear-cut forest along a ridge-top with limited vegetative regrowth near the center of the 800-m circle, and various aged tree stands covering portions of the circle. Point M

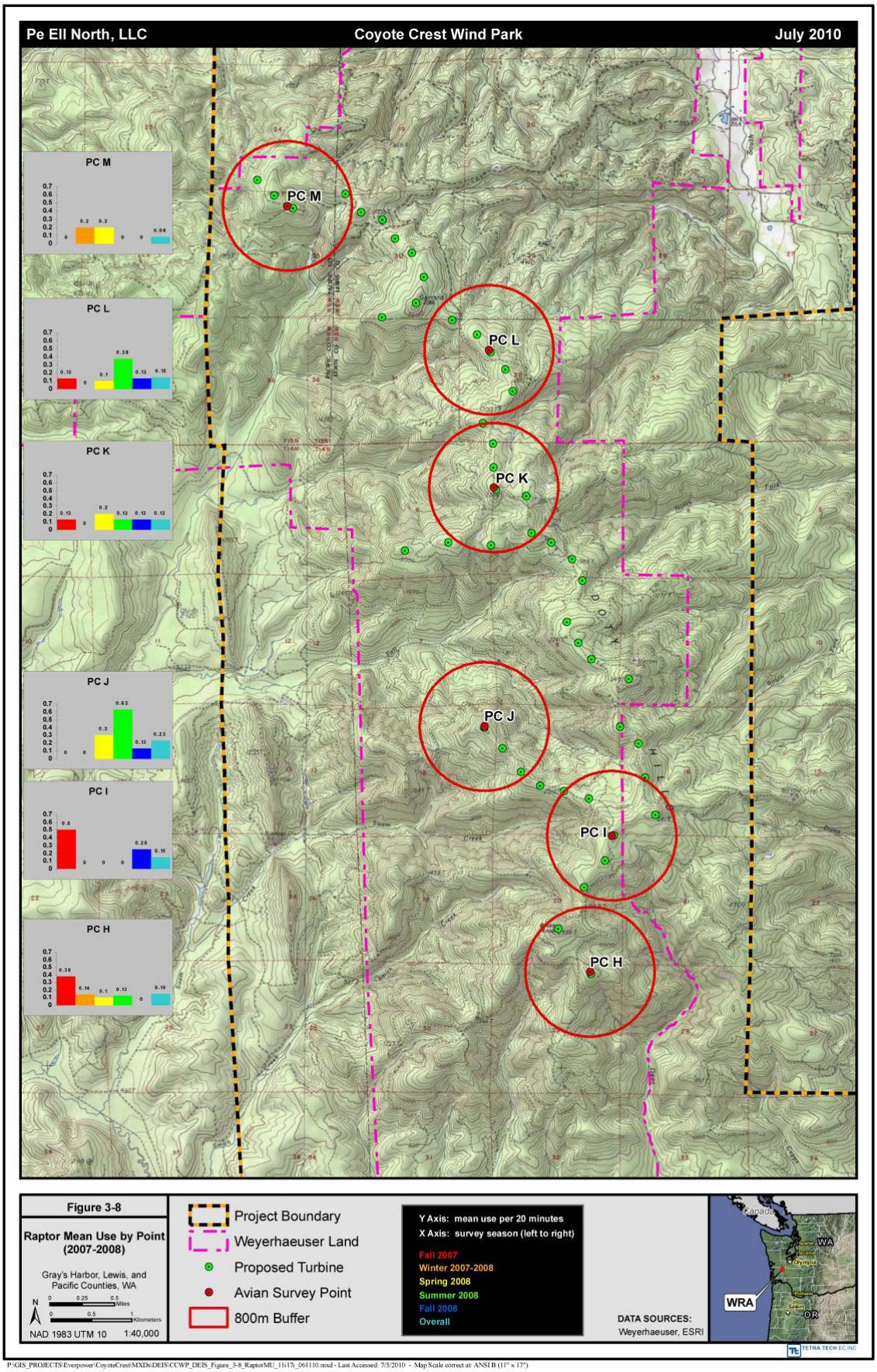
is the exception; it encompasses younger and older stands of mixed coniferous forest on all sides. Overall mean use per point count location over 5 seasons ranged from a high of 14.46 birds/20 min at point L to a low of 7.95 birds/20 min at point K. Although the overall mean use for point M was the second lowest (9.36 birds/20 min), the observations at this point demonstrate the greatest variety of species both overall and seasonally. Point J, with its prominent topographical features, had the highest overall raptor mean use (0.23 birds/20 min, which is still regarded as low as it is less than 1 bird/20 min), however raptor observations occurred at each point count location throughout the 5 seasons showing no unique patterns of distribution. Turkey vultures were observed at all points, northern harriers were observed at points H and I, and only in fall 2007, and red-tailed hawks were observed at points H,I J, M. Mean use by season and point count location results are displayed in Figure 3-8 and Figure 3-9.

Biologists documented 23 species and a total of 811 birds as incidental observations. Red-winged blackbirds had the highest number of individuals observed (a flock of 620 birds), followed by the dark-eyed junco (46 individuals). Biologists documented 7 incidental species that were not detected during spring point count surveys – the red-winged blackbird, ruffed grouse, barred owl, American kestrel, wild turkey, hermit thrush, and brown creeper (in order of most to least observed).

Bats

Eleven species of bats are known to occur in the Washington Coast Range. Of these, two species (Keen's myotis [*Myotis keenii]*; and Townsend big-eared bat *[Corynorhinus townsendii]*) are listed as state candidate species and three species (western long-eared myotis *[M. evotis]*; fringed myotis *[M. thysanodes]*; and the long-legged myotis *[M. volans]*) are also listed as state monitor species by WDFW (2009a). These five species are discussed in the Special Status Species section below. The remaining six species (California myotis *[M. Californicus]*; little brown myotis *[M. lucifugus]*; Yuma myotis *[M. Yumanensis]*; big brown bat *[Eptesicus fuscus]*; silver-haired bat *[Lasionycteris noctivagans]*; and hoary bat *[L. cinereus]*) are not given special status in Washington. Two of these species without special status are of increasing concern (silver-haired bat and hoary bat), however, particularly with respect to wind development, because these species consistently comprise a high proportion of recorded fatalities at wind-energy facilities in the U.S. (Arnett et al. 2008).

The potential for bats to occur in the Project Area is based on the availability of foraging areas with prey insects, roost trees and water sources. The second-generation and younger forests that predominate in the Project Area provide little bat roosting habitat, but may offer suitable commuting or foraging opportunities. Riparian areas in the Project Area potentially provide roosting and foraging habitat for both resident and migrating bats. Riparian buffer strips in the Project Area are in general a significant element of the landscape and possess some of the largest roost trees. The Chehalis River and its tributaries are a potential water source for bats as well as a landscape feature that may serve as a flyway. Although bats tend to follow linear landscape



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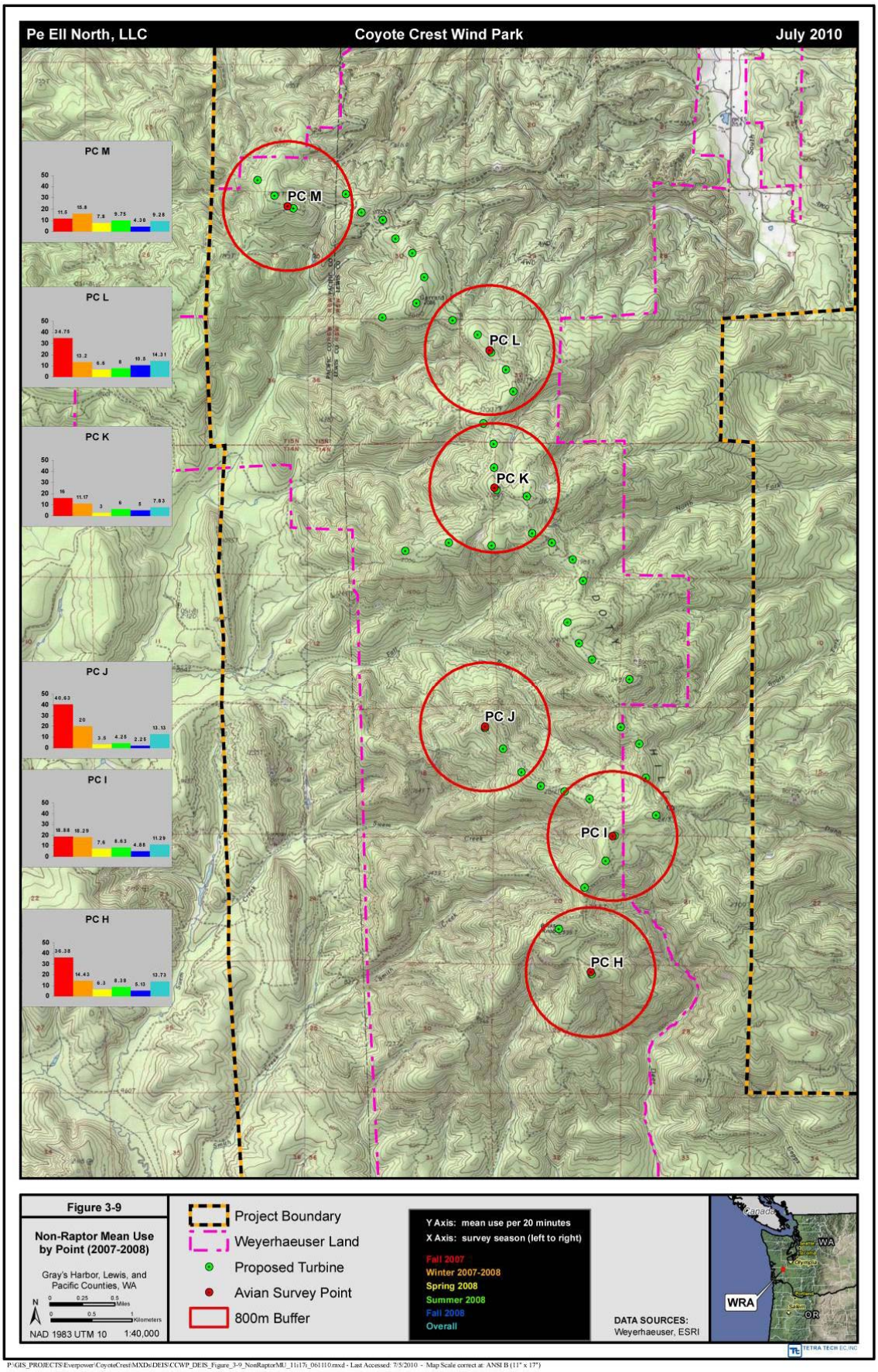

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features such as riparian areas when commuting between roosting and foraging areas, little is know about their actual flyways, particularly during migration. Proposed turbine locations are on the Coyote Crest ridgetop and are not in riparian areas.

Two studies were conducted in the Project Area to determine the potential impacts on bat species due to the construction and operation of the wind farm (Appendices D, E, and F). The goal of the radar migration study was to collect information on the migration characteristics of nocturnally migrating birds and bats during spring and fall migration. The bat acoustic study was conducted to collect information on activity levels of bats at different elevations and locations in the Project, particularly during spring and fall migration.

The radar migration study did not distinguish between birds and bats; therefore the general results of the combined species groups are described in the above bird section. Birds and bats could be distinguished at lower altitudes during the visual surveys. Similar numbers of large (hoary, big brown and silver-haired bats) and small bats (Myotis spp.) were observed at the Project during the visual surveys in spring, although the overall number of bats observed was low. In fall, twice the number large bats than small bats were observed (total of 35 bats). The proportion of birds versus bats flying below ~150 meters agl (within the proposed RSA), was 87 percent birds and 13 percent bats in spring, and 89 percent birds and 11 percent bats in the fall. Bat passage rates tended to be higher at the Project in late May rather than earlier in the season in both the spring radar study and acoustic study. In fall, passage rates peaked in late August in the visual observations. The acoustic study recorded more variable fall peaks that are discussed further below.

The acoustic monitoring study was conducted during a 216-night period between April 15 and November 17, 2008 at two altitudes (1.5 meters or about 5 feet and 50 meters or about 164 feet) at two met towers in the spring and three met towers in the fall. The species that were detected were placed in phonic groupings that possessed similar call characteristics. Species and species groupings that were recorded included big brown/silver haired bats, hoary bats, California myotis/Yuma myotis bats, western long-eared/keen's/fringed myotis bats, and long-legged/little brown bats.

Total bat passes across the Project Area was 1,414 (spring=20, fall=1,394). A bat pass is an index of relative activity but may not correlate to individual numbers of bats (e.g., 100 bat passes may be a single bat recorded 100 different times, or 100 bats each recording a single pass). The tree bat phonic group (big brown/silver-haired, hoary and unidentified low-frequency bats) represented 63.7 percent (n=897) of total passes recorded. Mean peak activity for all bats occurred in late September, with smaller peaks in mid-July and mid-August. Bat activity began to decline in October. Bats were present on site until mid-November. Mean activity for migratory tree-roosting bats varied during fall with higher levels of activity occurring from mid-August through September. The majority of bat passes occurred between 2 to 7 hours after sunset at 1.5-meter detector height and throughout the night at 50-meter detector height.

Mean bat activity (passes per detector per night) was 0.9 across the study area and was lower in spring (0.08) than in fall (1.7). For migratory tree-roosting bats, the mean activity was 0.9 and

activity was also lower in the spring (0.03) than in the fall (1.1). Peak activity for all species at both heights generally occurred 1 hour past sunset and remained relatively high between 2 and 7 hours at the detectors at 1.5 meter (5 feet). Activity at the 50-meter (164–foot) high detectors remained constant throughout the night. Mean activity for bats across all detectors was higher at 1.5 meter (2.7 passes per detector per night) than at 50 meters (0.7 per detector per night). Most bat phonic groups were detected more frequently at 1.5 meters; however, activity of hoary bats was slightly higher at 50 meters. *Myotis* species were rarely detected at the 50-meter detectors.

The highest activity of all bats in the Project Area was at the Pe Ell North 3 met tower. Pe Ell North 1 and Pe Ell North 2 had similar activity rates throughout the study. Differences between the three locations are likely attributed to differences in landscape features and climate conditions between towers. Pe Ell North 3 was located in a more sheltered, potentially warmer, area than the other two met towers and may offer more protection and insects for flying bats.

Fish

The Project Area is located in two watersheds, the Upper Chehalis watershed and the Willapa Bay watershed. Coyote Crest, which runs diagonally through the Project Area and is where the wind turbines would be located, is the dividing line between the two watersheds. On the west side of the ridge, creeks drain to Fall River and into Willapa Bay, and from the south, west and north of the project, creeks drain to the Chehalis River which empties into Grays Harbor. Within the Project are several drainage systems where anadromous and resident fish are known to occur. Garrard Creek, South Fork Creek, Kellog Creek, Ek Creek, Smith Creek and Swem Creek are all anadromous fish-bearing streams within the Project Area. The mainstem of the Chehalis River is located within the transmission line corridor to the north of the Project, which contains a diversity of anadramous and resident fish species (Table 3-5). The salmonid species in these fish

Table 3-5. Sensitive Migratory and Resident Fish Species Occurring In or Near the Project Area

Species	Federal Status[1/]	State Status[2/]	Occurrence
Chinook Salmon (*Oncorhynchus tshawytscha*)	Washington Coast ESU-listing not warranted	None	Elk Creek, Chehalis Mainstem
Coho Salmon (*O. Kisutch*)	Southwest Washington ESU-Undetermined	None	Kellog Creek, South Fork Creek
Chum Salmon (*O. Keta*)	Pacific Coast ESU- listing not warranted	None	Black River, Chehalis Mainstem
Steelhead (*O. mykiss*)	Southwest Washington ESU-Listing not warranted	None	Garrard Creek, South Fork Creek, Chehalis Mainstem
Bull Trout (*Salvelinus confluentus*)	None	State Candidate	Chehalis Mainstem
Pacific Lamprey (*Lampetra tridentata*)	Animal Species of Concern[3/]	None	Dunn Creek

Notes:
1/ Source for federal listings, USFWS 2009b
2/ Source for state listings, WDFW 2009a
3/ Species of concern are those species whose conservation status is of concern to USFWS, bur more information is needed.

bearing streams include chinook salmon, winter steelhead trout, chum salmon, and coho salmon. Resident bull trout, a state candidate species, are also present in the mainstem of the Chehalis. Spawning and rearing habitat for coho, steehead and Chinook is located within the Project (Figure 3-10).

WDFW PHS data indicate that pacific lamprey, riffle sculpin, and reticulate sculpin have all been observed in Dunn Creek, to the southeast, just outside the project boundary. Additionally, WDFW data indicate that fish species in the project area may also include coastal cutthroat trout in the upper tributaries of Fall River and the Chehalis River (Figure 3-10).

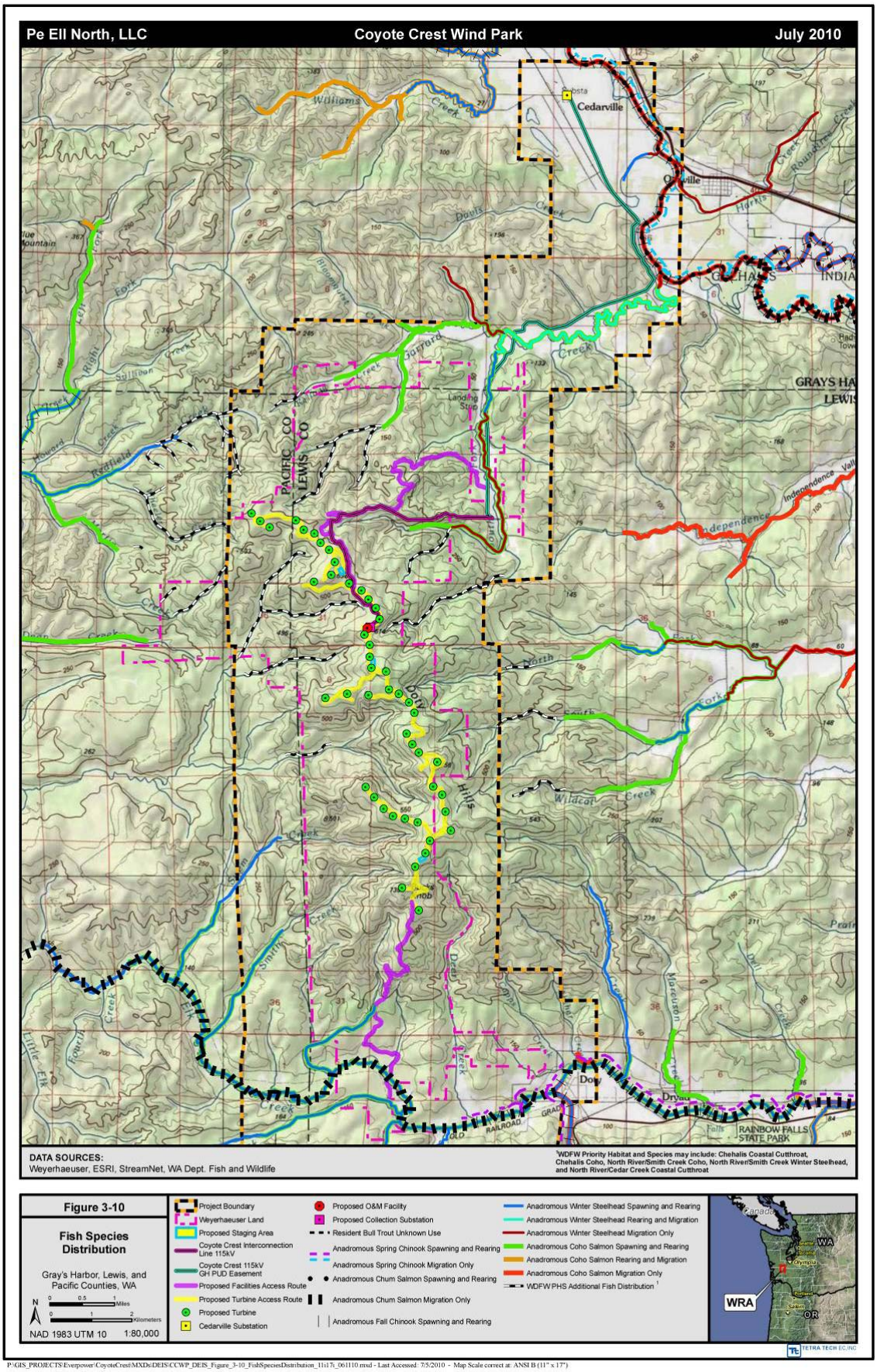
Other Wildlife

The Project Area is located within habitats designated by WDFW as winter range for the Willapa Hills herd of Roosevelt elk (*Cervus elaphus roosevelti*), a hunted game species in Washington (Figure 3-11; WDFW 2007). Ideal elk habitat includes productive grasslands, meadows, or clearcuts, interspersed with closed-canopy forests. Year-round ranges for Roosevelt elk are usually 1,500 to 4,000 acres, and are generally found where the climate is less severe and where food and cover are readily available. Very little is known about the Willapa Hills elk herd but the current population is estimated to be 7, 600 animals and the population range objective is 7,200 to 8,800 animals (WDFW 2008b). The limiting factors for the Willapa Hills population are thought to be loss of habitat and direct mortality resulting from legal and illegal hunting.

Several species of large and medium-sized mammals may occur in the Project Area including the mountain lion (*Puma concolor*), bobcat (*Felis rufus*), black-tailed deer (*Odocoileus hemionus columbianus*), black bear (*Ursus americanus*), coyote (*Canis latrans*), and raccoon (*Procyon lotor*). Smaller species include a variety of mice and shrews, tree and flying squirrels. WDFW PHS records show wild turkey and cavity-nesting ducks were located in the southeastern portion of the Project Area and east of the Project boundary. Several species of stream amphibians have been documented in stream surveys west of the Project Area (WDFW 2007), such as the red-legged frog. Red-legged frogs frequently spend time away from water, outside of the breeding season, and are often found along streams adjacent to woodlands (Leonard et al. 1993) where they are most likely to occur in the Project Area. Special status amphibian species that were observed near the Project are discussed in the Special Status Species section below.

Special Status Species

Federal- and state-protected species potentially occurring in or near the Project Area were determined by reviewing the Western Washington Fish and Wildlife Office list of proposed endangered, threatened species and critical habitat in Lewis, Pacific and Gray's Harbor Counties, and the WDFW species of concern list (WDFW 2009a). The WDFW species of concern list includes endangered, threatened, candidate, and sensitive species. Species occurrence information was gathered from multiple sources, including published literature, pre-project assessment studies on the Project Area, research-oriented studies on the Project Area, WDFW


Pe Ell North, LLC
Coyote Crest Wind Park
July 2010
Cedarville
GRAYS HA
LEWIS
PACIFIC CO
LEWIS CO
Independence
RAINBOW FALLS STATE PARK
DATA SOURCES:
Weyerhaeuser, ESRI, StreamNet, WA Dept. Fish and Wildlife
[1]WDFW Priority Habitat and Species may include: Chehalis Coastal Cutthroat, Chehalis Coho, North River/Smith Creek Coho, North River/Smith Creek Winter Steelhead, and North River/Cedar Creek Coastal Cutthroat
Figure 3-10
Fish Species Distribution
Gray's Harbor, Lewis, and Pacific Counties, WA
NAD 1983 UTM 10
1:80,000
Project Boundary
Weyerhaeuser Land
Proposed Staging Area
Coyote Crest Interconnection Line 115kV
Coyote Crest 115kV GH PUD Easement
Proposed Facilities Access Route
Proposed Turbine Access Route
Proposed Turbine
Cedarville Substation
Proposed O&M Facility
Proposed Collection Substation
Resident Bull Trout Unknown Use
Anadromous Spring Chinook Spawning and Rearing
Anadromous Spring Chinook Migration Only
Anadromous Chum Salmon Spawning and Rearing
Anadromous Chum Salmon Migration Only
Anadromous Fall Chinook Spawning and Rearing
Anadromous Winter Steelhead Spawning and Rearing
Anadromous Winter Steelhead Rearing and Migration
Anadromous Winter Steelhead Migration Only
Anadromous Coho Salmon Spawning and Rearing
Anadromous Coho Salmon Rearing and Migration
Anadromous Coho Salmon Migration Only
WDFW PHS Additional Fish Distribution [1]
WRA
WA
OR
TETRA TECH EC, INC
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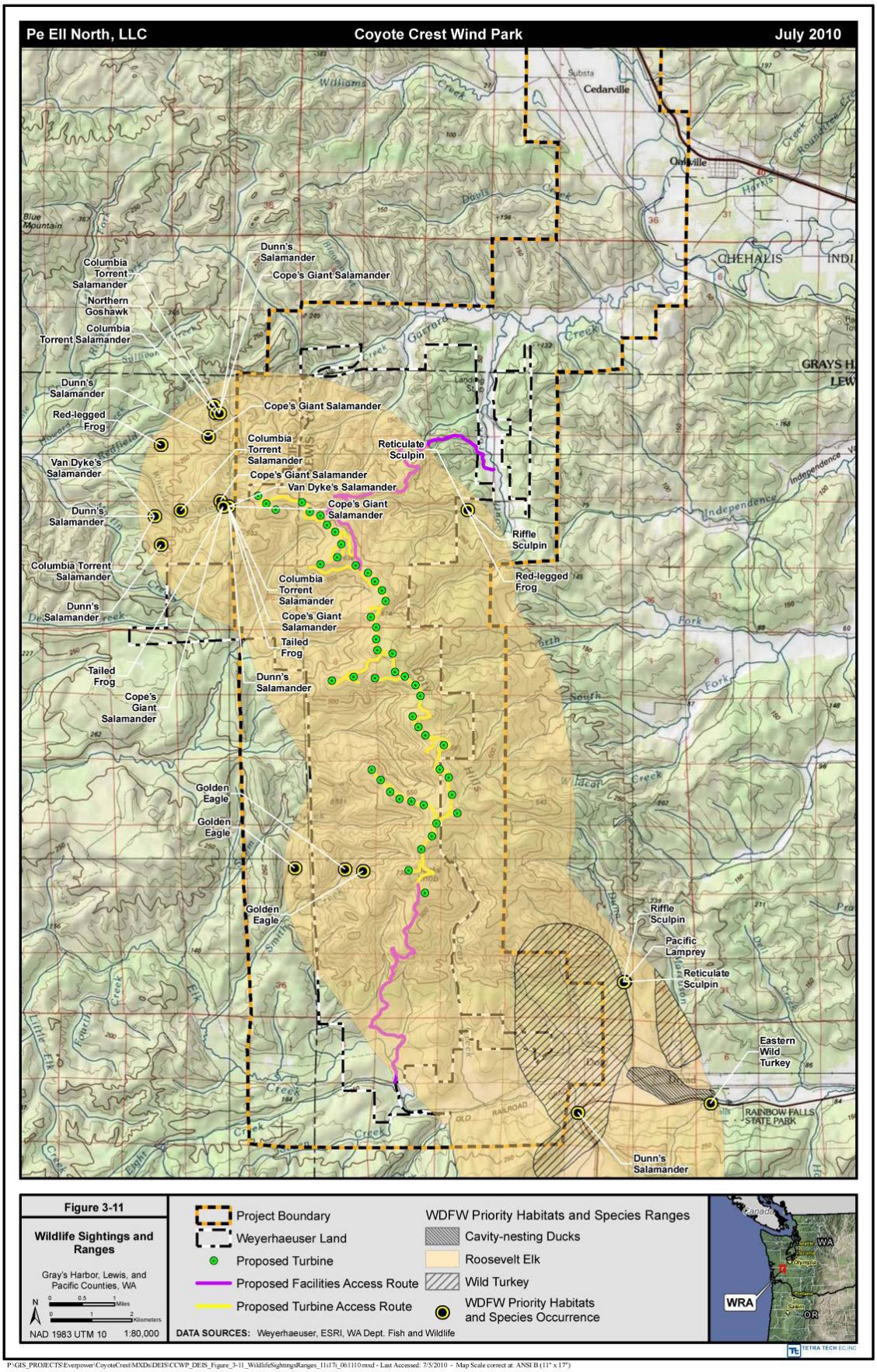

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Priority Habitats and Species records for the Project Area and a 5-mile buffer (requested through Weyerhaeuser in 2007), Weyerhaeuser stand data, and 2009 National Agriculture Imagery Program (NAIP) aerial photography.

Threatened and Endangered Species

Federally threatened, endangered or candidate wildlife species occurring in Lewis, Pacific and Grays Harbor include the northern spotted owl, marbled murrelet, bull trout (Coastal-Puget Sound distinct population segment [DPS]), Oregon silverspot butterfly (*Speyeria zerene hippolyta*), brown pelican (*Pelecanus occidentalis*), short-tailed albatross (*Phoebastria albatrus*, outer coast), western snowy plover (*Charadrius alexandrinus nivosus*), streaked horned lark (*Eremophila alpestris strigata*), and yellow-billed cuckoo (*Coccyzus americanus*; USFWS 2010). Based on the habitats present in the Project Area and the types of habitats associated with these species, only the spotted owl, marbled murrelet and bull trout have the potential to occur within the Project Area.

The Endangered Species Act (ESA) defines critical habitat for threatened or endangered species as specific area (s) within the geographic range of a species where physical or biological features are found that are essential to the conservation of the species and which may require special management consideration or protection (USFWS 2008a). Critical habitat is a specific geographic area designated by the USFWS for a particular species' recovery. Under the ESA, it is unlawful to adversely modify designated critical habitat. Northern spotted owl critical habitat is not located within the vicinity of the project area. Critical habitat for marbled murrelet is located to the northeast and south of the Project Area but does not overlap Project features. Resident bull trout are known to use the Chehalis River mainstem, near the proposed transmission line corridor, however, critical habitat for this species is located outside the Project Area, to the north.

Spotted Owl

The northern spotted owl (*Strix occidentalis caurina*) is a forest raptor primarily found in mature and old-growth dominated forests of the Pacific Northwest (USFWS 2008). This species was listed as threatened by USFWS (1990) and is listed as endangered in Washington by WDFW. In general, northern spotted owl populations show strong declines in the northern portion of their range (Canada, Washington, and parts of Oregon), while populations in the southern portions of their range are generally stable. Declines in Washington appear to be driven by decreased adult survival (USFWS 2008). Threats to this species include harvesting of old growth and mature forest and land conversion (resulting in the loss of owl habitat and listing of the species), competition with barred owls, disease and predation (USFWS 2008).

Within the general vicinity of the Project, WDFW (2007) reports four spotted owl site centers, three of which contain resident territorial single owls, and one of which is single with status unknown. The four site centers are in Dunn Creek (last recorded observation in 1994), Moss Creek-North River (last recorded observation in 1995), Seven Creek and Shields Creek-Chehalis

River (last recorded observation in 1994; WDFW 2007). In addition, there are another three site centers that are within 2.7 miles of the Project (the median annual home range of a northern spotted owl) that all have pair or reproductive pair status. The National Council of Air and Stream Improvement (NCASI) had attached a radio transmitter to a male spotted owl at a site center adjacent to the survey area. The radio tagged male spotted owl had moved from its original location and was residing in an area near the Seven Creek site center, within the Project Area, during the 2008 survey season. This spotted owl was found dead by NCASI during the season (D. Rock, NCASI, personal communication as reported in Appendix G).

Biota Pacific (see Appendix G) conducted a habitat evaluation and 1 year of protocol level surveys to determine if the northern spotted owl and potential habitat for this species occurs in the Project Area. As part of the habitat evaluation, forest stands were reviewed for their potential to support spotted owl foraging, roosting, and nesting, using best professional judgment. Stands having characteristics that were determined to have a reasonable opportunity for spotted owl use were included for survey and are referred to as surveyable habitat. In general, surveyable habitat included conifer-dominated stands having a closed canopy (>50 percent), dominants and co-dominants having a minimum mean diameter at breast height (dbh) of 10 inches, and an area below the live crown that would allow for spotted owl movement. Very small stands (< 3 acres) generally were within 300 feet of other surveyable habitat, to be included in the survey. Stands more than 0.25-mile from other suitable habitat generally were at least 10 acres, to be included in the survey. Determinations of surveyable habitat were made by biologists with more than 10 years of experience surveying for spotted owls. Surveyable habitat should not be assumed to meet the definition of suitable habitat in the Washington Forest Practice Rules (WAC 222-16).

Survey station setup and operation were consistent with the first year of a 2-year survey described in the guidelines provided in the USFWS *Protocol for Surveying Proposed Management Activities that may Impact Northern Spotted Owls* (USFWS 1992a). Survey stations were placed up to 0.5 mile apart to cover all surveyable habitat within the study area. Three complete survey visits spanning the breeding season were conduced in 2008, with one in the month of June. A total of 309 survey stations were used to cover the habitat surveyed in 2008.

In the habitat review of the Project Area and buffer, state lands were more consistently found to be suitable for survey than private lands. On the WDNR land, the tree size was often larger than on private timber lands and an understory was developing. A total of 15,108 acres of habitat were classified as surveyable land. An additional 480 acres of potential habitat were not accessible and therefore not completely reviewed in the field.

No spotted owls were detected during three complete survey visits conducted from May 19 to August 14, 2008. A contact call from an unknown Strix species was heard on visit 3. No owls were located during the follow-up visit. Single barred owls were heard during two of the three visits in sections 9, 1, 28 and 31. Two great horned owls were also heard during the surveys.

Due to the death of the lone male radiotagged by NCASI and lack of observations, a second year of surveys was not conducted.

Marbled Murrelet

The marbled murrelet (*Brachyramphus marmoratus*) is a seabird that nests in large trees in old-growth coastal forests throughout most its range (Nelson 1997). Marbled murrelets nest as far as 50 miles inland in mature coniferous forests, usually 120 to 150 feet above ground. From at-sea surveys, population estimates currently place the number of murrelets in Washington at around 9,800 birds. The Washington, Oregon, and California population of the marbled murrelet was listed as a federally threatened species in 1992, primarily due to loss and fragmentation of nesting habitat and mortality associated with oil spills and gill-net fishing (USFWS 1992b, 1997). This species is also a WDFW threatened species (WDFW 2009a). The greatest threat identified to marbled murrelets in Washington, Oregon, California, British Columbia, and Alaska is the loss of habitat containing quality nesting sites, primarily older forests, as well as an increase in forest fragmentation which is thought to increase predation and decrease nesting success. The 2009 USFWS 5-year status review found that marbled murrelets in Washington may be highly vulnerable, in localized areas, from wind energy projects. This includes direct mortality from strikes, as well as loss of habitat and fragmentation. The 2008 population estimate of about 18,000 birds represents a decline of about 26 percent across Washington, Oregon, and California since 2004 (USFWS 2009a).

In 2008, WDNR reviewed agency-managed forests in southwest Washington and the Olympic Peninsula to develop a long-term conservation strategy for the marbled murrelet in compliance with the Habitat Conservation Plan (HCP; Raphael et al. 2008). The Science Team that assessed WDNR-managed lands developed biological goals for the for the Long-Term Conservation Strategy to manage forest habitat to contribute to 1) a stable or increasing population; 2) an increasing geographic distribution; and 3) a population that is resilient to disturbance.

Within the Southwest Washington Analysis Unit, the two geographic planning blocks, Chehalis and Pe Ell, were identified as specific “marbled murrelet management areas” (Marbled Murrelet Units [MMUs]). Parts of these sites are recommended to be managed for with the goal of creating high quality nesting habitat. These two sites also ranked as medium-priority sites for conservation emphasis. The Chehalis MMU is northwest of the project area and the Pe Ell MMU is southwest of the Project. Although the two occupied marbled murrelet sites in the Chehalis MMUs are within 2 miles of the Project Area, they are located to the west, and therefore birds commuting between these nests and ocean foraging areas are very unlikely to fly over the Coyote Crest Project. The WDNR land that is within the Project Area (Lincoln Geographic Planning Block) is ranked lowest priority for the Southwest Washington Analysis Unit, and therefore is not recommended for conservation emphasis by the WDNR.

Currently, there are no known nesting locations of marbled murrelets in the Project Area (M. Rochelle, Weyerhaeuser, pers.comm; WDFW unpubl. database as reported in Cooper and Mabee

2010). The nearest known occupied marbled murrelet stand to the east of the Project is located ~ 60 km (about 38 miles) from the eastern side of the Project Area (WDFW unpubl. database as reported in Appendix H). There are private timber stands within 10 km (6 miles) to the east of the Project Area that based on stand inventory information may potentially contain marbled murrelet nesting platforms. However, field inspections on these private timber stands have not been conducted to confirm the presence of murrelet stand characteristics and the presence of nesting platforms. Additionally, no marbled murrelets have been detected or observed in these stands (Weyerhaeuser, unpubl. data as reported in Appendix H). Although marbled murrelets are not known to occur in the Project Area, there is still some collision potential because the proposed turbines would be located on a ridge that lies between the Pacific Ocean and potential marbled murrelet nesting habitat. Additionally, marbled murrelets typically fly at high speeds in low light conditions at night or around sunrise and sunset in the forests where they nest, and may therefore be at risk of collision with turbines.

To determine flight behaviors of marbled murrelets passing over the Project that would then be vulnerable to collision with wind turbines, a radar study was conducted at five locations within the Project Area. Radar observations were conducted for two days in both June and July 2008-2009 at each of five sites, and occurred during the morning activity period for marbled murrelets (i.e., from 105 minutes before sunrise to 75 minutes after sunrise). The five stations combined provided north-to-south radar coverage of nearly the entire approximately10-kilometer-long ridge system where turbines are proposed. Flight speed, flight signature, timing of movements and flight directions were the variables used to help distinguish marbled murrelet “targets” from other species.

A total of 26 marbled murrelet-like targets were observed during the study, for an average marbled murrelet count (i.e., the number of pre-sunrise landward or seaward targets) of 0.78 targets per day. The flight altitudes of three targets (the only targets in which flight height data was taken) were 154 meters (505 feet), 353 meters (1,158 feet) and 364 meters (1,194 feet) agl, all above the maximum height of the turbines. The average estimated exposure rate (the potential number of collision fatalities of murrelets with the proposed wind turbines) was 0.00046-0.00644 murrelet passes per turbine per day. The estimates for collision fatality for the entire year (breeding and non-breeding seasons) ranged from 0.03-0.05 murrelets per year under an assumption of 99 percent avoidance of turbines, 0.14-0.27 murrelets per year assuming 95 percent avoidance, and 0.29-0.54 murrelets per year assuming 90 percent avoidance.

Other Special Status Species

Other special status species that may occur in the Project Area are listed in Table 3-6.

Table 3-6. Other Special Status Species Potentially Occurring in the Project Area

Group/Species	Status	Potential Occurrence in the Project Area
Birds		
Raptors		
Bald eagle (*Haliaeetus leucocephalus*)	SS	One documented occurrence in the Project Area during the avian point count surveys. The species was observed in spring and may occur in the Project Area as a transient. No documented breeding records within 2 miles of the Project Area.
Northern goshawk (*Accipiter gentiles*)	FSC, SC	One adult goshawk was documented as occurring near the Project Area in PHS data in 1996. No northern goshawks were observed during five seasons of bird surveys.
Peregrine falcon (*Falco peregrinus*)	FSC	There is potential for this species to pass through the Project Area in migration. No peregrine falcons were observed during five seasons of bird surveys.
Golden eagle (*Aquila chrysaetos*)	SC	Three observations of a golden eagle nest on the Project Area were made between 1985 and 2004 by WDFW. In the 2004 observation, the golden eagle nest moved west to a new location. In the notice of application, determination of significance and scoping letter for the Project, WDFW mentions the PHS data for golden eagles as a concern. No individuals were observed during the point count surveys.
Merlin (*Falco columbarius*)	SC	One observation of a merlin was recorded in the avian point count surveys, as an incidental observation. This species is likely a rare migrant through the Project Area and is not likely to breed within the Project Area. No impacts to migrating merlins are anticipated.
Other birds		
Pileated woodpecker *(Dryocopus pileatus)*	SC	One individual of this species was documented in avian point counts. This species' flight heights are usually below the turbine rotor swept height and therefore the collision risk to this species is low.
Purple martin *(Progne subis)*	SC	The range of this species overlaps the Project Area. No individuals were observed during avian point count surveys. Therefore, while the potential exists for migrating individuals to collide with turbines, the overall risk is considered low.
Vaux's swift *(Chaetura vauxi)*	SSC	The range of this species overlaps the Project Area. No individuals were observed during avian point count surveys. Therefore, while the potential exists for migrating individuals to collide with turbines, the overall risk is considered low.

Table 3-6. Other Special Status Species Potentially Occurring in the Project Area (continued)

Group/Species	Status	Potential Occurrence in the Project Area
Waterfowl and Waterbirds		
Sandhill crane *(Grus Canadensis)*	SE	One sandhill crane flock was documented during the avian point count surveys. Sand hill crane flocks documented in PHS data from concurrent eagle nest surveys (1977-1985).
Cavity nesting ducks		Documented breeding habitat exists in the southeastern corner of the Project Area (PHS data), where facility impacts are not expected. As a result, impacts are not expected to this habitat or species.
Amphibians and Reptiles		
Columbia torrent salamander *(Rhyacotriton kezeri)*	FSC, SMS	This species was documented near the Project Area, in stream surveys, and may occur in the Project Area in streams with intact riparian buffers (PHS data). No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.
Tailed frog (*Ascaphus truei*)	FSC, SMS	This species was documented near the Project Area, in stream surveys, and may occur in the Project Area in streams with intact riparian buffers (PHS data). No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.
Van Dyke's salamander (*Plethodon vandykei*)	FSC, SC	This species was documented near the Project Area, in stream surveys, and may occur in the Project Area in streams with intact riparian buffers (PHS data). No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.
Western toad *(Bufo boreas)*	FSC	The Project occurs within the potential range for the species. No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.
Dunn's salamander (*Plethodon dunni*)	SC	This species was documented near the Project Area, in stream surveys, and may occur in the Project Area in streams with intact riparian buffers (PHS data). No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.
Cope's giant salamander (*Dicamptodon copei*)	SMS	This species was documented near the Project Area, in stream surveys, and may occur in the Project Area in streams with intact riparian buffers (PHS data). No impacts to wetlands or springs from the Project are anticipated, and therefore no impacts to this species are expected.

Table 3-6. Other Special Status Species Potentially Occurring in the Project Area (continued)

Group/Species	Status	Potential Occurrence in the Project Area
Invertebrates		
Valley silverspot *(Speyeria zerene)*	FSC, SC	Range for this species overlaps the Project Area. No records for this species occur in the Project Area, but the potential exists for it to occur if its host plant, the western blue violet, *Viola adunca*, is present.
Fish		
Coastal cutthroat trout *(Oncorhynchus clarki clarki)*	Southwest Washington DPS – FSC	Documented in the PHS data as potentially occurring in the upper reaches of headwater streams in the Project Area. No impacts to springs or headwater streams from the Project are anticipated, and therefore no impacts to this species are expected.
Pacific lamprey *(Lampetra tridentata)*	FSC	Documented in the PHS data as occurring near the Project Area in streams to the southeast. No impacts to streams from the Project are anticipated, and therefore no impacts to this species are expected.
Mammals		
Keen's myotis *(Myotis keenii)*	SC	Potentially documented during the bat acoustic surveys, part of a phonic group with multiple species. Habitat and range are in the Project Area, this species may occur on site.
Townsends big-eared bat (*Corynorhinus townsendii*)	SC	Not documented during the acoustic bat surveys. Unknown if occurs in the Project Area.
Fringed myotis (*Myotis thysanodes*)	FSC	Potentially documented during the bat acoustic surveys, part of a phonic group with multiple species. Habitat and range are in the Project Area, this species may occur on site.
Western pocket gopher *(Thomomys mazama)*	ST	The range for this species overlaps the Project Area. Habitat requirements for this species are open meadow, grassland or prairie with friable soils. Potential for this species may occur in remnant south Puget Sound grasslands along the Chehalis.
Wolverine (Gulo gulo)	FSC	Project Area occurs within the potential range of this species. This species is typically found in higher elevation habitats than are found in the Project Area, therefore there is a low likelihood of occurrence.
Marten *(Martes Americana)*	SMS	Project Area occurs within the potential range of this species. This species is associated with mature and old-growth forests, which are lacking on the Project Area. There is a low likelihood of occurrence for the marten in the Project Area.

Notes:
FSC – Federal Species of Concern
SE – State Endangered
ST – State Threatened
SC – State Candidate
SS – State Sensitive
SSC – State Species of Concern
SMS – State Monitor Species

3.5.2 Impacts of the Proposed Action

Potential effects of wind facility development may be direct (e.g., turbine collision resulting in mortality) or indirect (e.g., displacement from territory) and may have cumulative effects. Habitat loss can be further divided into temporary and permanent impacts. Temporary effects are those areas of disturbance during the active construction of the Project that would either return naturally to pre-construction levels (such as noise) or would be returned to a pre-construction state through other actions (such as revegetation of the "wind box" with low growing vegetation). The permanent effects are those that areas that would be impacted for the life of the Project. Indirect effects are those that may be a result of other impacts, such as the introduction of invasive species or avoidance of turbines or other facilities. Tables 3-3 and 3-4 provide acreages of various habitats temporarily and permanently disturbed or lost to the Project, respectively.

3.5.2.1 Construction Impacts

Impacts to wildlife species, birds and bats in particular, are expected to occur from Project construction. Less mobile wildlife species that are not able to move away from construction activities during clearing and site preparation for the turbines, substation and roads could experience direct mortality. More mobile species would likely be displaced from the site during active construction. Wildlife in the vicinity of the Project infrastructure could also be disturbed by construction activities and noise, and might move away from the construction site. However, the primary impact to wildlife from construction and operation of the Project would be habitat loss. Logging activity in the Project Area has similar impacts and occurs regularly, indicating that periodic clearing of forest stands is an ongoing and routine occurrence.

Birds

Construction of the Project has the potential to affect birds through the direct loss of habitat from vegetation clearing, potential fatalities from construction equipment and displacement or disturbance from the construction area. Construction activity for the Project would start with clearing of trees and stumps from roads, turbine pads, and the substation site and transmission line route. The types of vegetation that would be removed or disturbed by Project construction are further discussed in Section 3.3. The potential for mortality of bird species may occur when vegetation is cleared that contains bird nests with young or eggs still in the nest. There is also the potential for collision mortality of birds as construction crews drive on site between locations. There would be numerous equipment deliveries over the construction period, increasing the truck traffic on designated roads; however, due to heavy loads these trucks are not expected to be moving at high speeds. The equipment used to erect wind turbines is generally slow moving (e.g., cranes) and is not expected to cause direct mortality for birds.

The noise and activity associated with construction crews and equipment may displace birds from the immediate area. Numerous equipment deliveries would occur (see Section 3.7) over the course of the construction, creating noise and dust disturbance for birds. The increased road

traffic disturbance may alter bird foraging behavior or disrupt breeding birds in the area. If similar habitats are in the vicinity, however, birds would likely move to areas with less disturbance. The construction of the Project is expected to last for one year, and disturbance effects would therefore be limited in duration. If raptor nests are located within the Project Area, the breeding of these species could be disturbed by construction activities. Weyerhaeuser would be modifying their current timber management plan to account for the Project footprint and would remove vegetation for the Project facilities consistent with forest management guidelines.

Bats

Given the timing of expected construction (diurnal) and the period of bat activity (nocturnal), construction related direct mortalities to bats are not expected to occur. The construction of the Project may impact bats, particularly tree bats, by removing roost trees during the vegetation clearing of turbine pads and the transmission line route, if large trees or stumps are removed. The acres of established forest (where potential roost tree sites would be located on the Project, if they exist) that would be temporarily and permanently disturbed are given in Tables 3-3 and 3-4. Clearcuts and new growth forests would have little roost availability, but would have potential for foraging and traveling. Bats would likely abandon day roosts if disturbed and seek suitable roosts elsewhere. The removal of vegetation may impact bat foraging areas, due to the change in vegetation structure and insect abundance. Riparian areas, a favored foraging habitat for bats, are not impacted by turbine construction but 1.6 acres would be temporarily disturbed and 1.2 acres permanently removed due to access roads and the transmission line. The Project Area is in an industrial tree farm, however, and changes in vegetation structure are common.

Forested ridges in the eastern United States are locations of especially high risk for bat fatality. One of the explanations for these high fatalities attributes them to habitat changes resulting from clearing the forest for the turbines (Arnett 2005; Cryan and Barclay 2009). The small forest openings that were cleared for facilities potentially created niches for insect prey that attract bats in to the area of the turbines. It is unknown at this time if areas of high risk in the eastern United States equate to the same level of risk in these habitats in the Pacific Northwest. The management regime for the forest within the Project Area, and the lack of small forest clearings created by the turbine locations and facilities, could reduce the potential for high levels of bat fatalities within the Project Area. The pattern of bat fatalities in the eastern United States coincided with nights when winds were low, often after passage of a frontal weather system. On some of these nights, the valleys filled with fog and the hilltops where the turbines and clearings were located were above the fog. The spring radar migration study (see Appendix D) did not find any relationship between fog and flight heights of migrants; however, the effect of these weather features on bat migration and activity are not currently known.

Fish

Water quality and water quantity alterations are the potential sources of impacts to fish or aquatic habitat associated with construction of the Project. Construction of the Project could potentially affect fish-bearing streams through erosion and sedimentation. The construction phase, in which

stormwater runoff potential is at its highest, is when large quantities of soil may be disturbed during the alteration of roads, the construction of turbine foundations and the construction of Project facilities. In addition, precipitation events, particularly during the winter season could increase rates of runoff and sedimentation to streams. Sediment that is delivered to streams could carry excess nutrients and chemicals which can impair stream water quality, potentially leading to reduced dissolved oxygen levels. Reduced oxygen in streams and impaired water quality negatively impact the health of fish and aquatic species.

The turbines would be constructed on the Coyote Crest ridge, which largely avoids the stream drainages that would contain fish species. Roads along Coyote Crest cross four fish-bearing streams that are tributaries to South Fork of Garrard Creek (see Figure 3-10). A total of 1.9 acres of riparian habitat would be temporarily disturbed and 1.2 acres permanently lost to road improvements and the transmission line. These localized disturbances would be undertaken by Weyerhaeuser, and would be regulated under the forest practices requirements applicable their previous management plans. Erosion and sedimentation control measures would be implemented at the beginning of the construction process and would be incorporated into the design and contractual requirements to minimize sediment from the Project from entering headwater systems and streams. Erosion and sedimentation control would be standard practice during the active construction, restoration, and cleanup stages of the construction process. The Applicant would develop and implement a SWPPP. This design level plan would prescribe the use of BMPs that are standard features of such plans. The Project SWPPP would be based on and comply with Ecology's (2004) *Stormwater Management Manual for Western Washington*, the WDNR FPAN, the WDNR RMAP, any stipulations of the WDFW Hydraulic Project Approvals, and Lewis County stormwater regulations.

Other Wildlife

During the construction period, it is expected that big game species might be temporarily displaced from the site due to the presence of humans, heavy construction equipment, and associated disturbance (e.g., noise, blasting). The black-tailed deer and Roosevelt elk that occur in the Project Area may avoid areas with large machinery and human traffic. These disturbance impacts, however, are likely to decrease over time following completion of each phase of the Project. Displaced elk that have moved into areas away from the construction activity disturbance would likely return to the area once construction has been completed, especially if the revegetation of disturbed areas includes plant species palatable to elk and deer. If the construction schedule is completed in the fall, wintering Roosevelt elk would not incur impacts from construction activities.

Construction of the Project could affect other mammals that are likely to occur in the Project Area, including mountain lion, black bear, bobcat, coyote, mice, voles, and moles either by direct mortality from construction vehicles or loss of habitat from forest clearing. Earth moving during construction of the turbine pads, road alignments and other wind facilities would also cause mortality of ground dwelling animals if burrows are crushed. These impacts to underground

burrows could be permanent; however, these animals are expected to relocate to temporarily disturbed or undisturbed areas. Mountain lions and black bear, which have large home ranges, may avoid the construction area, therefore reducing their effective foraging range. Road and other wind facility construction would result in the loss of foraging and breeding habitat for other small mammals totaling 252.1 acres of temporary and 48 acres of permanent disturbance to established forest. These habitats, however, would all be cleared during logging, under Weyerhaeuser's timber management plan, at some point in the harvest rotation.

Impacts to amphibians in the Project Area from road and facility construction may occur through loss of habitat and water quality or quality changes in streams, or direct mortality from construction vehicles. A diversity of stream breeding or stream-associated amphibians likely occur in the Project Area, where stream buffers exist, based on stream surveys on adjacent lands (Figure 3-11). A total of 1.9 acres of riparian habitat would be temporarily disturbed and 1.2 acres permanently lost to road improvements and the transmission line. Construction can cause increased sediment loading in streams and higher levels of harmful nutrient inputs, thereby negatively affecting aquatic life. Because compliance with permits would be upheld throughout construction and best management practices would be applied during construction of the Project, impacts to amphibians in streams are not expected to occur with the construction of the Project. With increased vehicle activity, some individual amphibian and reptile fatalities can be expected from construction vehicle traffic.

Special Status Species

Northern Spotted Owl

No northern spotted owls are known to occur within 2 miles of the Project Area. Although potential habitat for spotted owls occurs on the Project Area, it is not currently occupied by this species (Biota Pacific 2010). The short harvest rotation on Weyerhaeuser industrial land likely does not create ideal suitable habitat conditions and areas that approach these stand characteristics may be harvested prior to occupation by northern spotted owls.

If owls occurred in the area, potential adverse effects to the northern spotted owl could include 1) noise and human-related disturbances, and 2) habitat loss. Habitat loss and modification, whether to nesting, roosting or foraging habitats, due to forest clear-cutting has been the most significant factor causing declines of the northern spotted owl (USFWS 1992). Habitat losses and habitat fragmentation have direct impacts that can affect survival and reproduction of northern spotted owls.

Increased human activity and excessive noise levels within close proximity to northern spotted owls could influence the following disturbance behaviors: 1) flushing from the nest site; 2) interruption of foraging activities; 3) premature fledging of juveniles; and/or 4) disruption of roosting activities and displacement. Northern spotted owls disturbed at a roost site are likely capable of moving away from disturbance without a significant disruption of behavior, however this may expose them to greater predation risks. For the spotted owl, flush frequency tends to

increase with decreased distance from noise disturbance (Delaney et al. 1999). Delaney et al. (1999) tested flush frequency of Mexican spotted owls from proximity to chainsaw and helicopter noises. No spotted owl flushes were recorded when noise stimuli was > 105 m away, and owls returned to pre-disturbance behavior within 10-15 minutes. The type of disturbance may influence flush frequency of this species, and noise disturbance from wind farm construction activity has not been tested.

Construction activity on the Project would be limited to the daytime hours, and is not likely to effect nocturnal foraging behavior. The potential for negative impacts is primarily restricted to daytime foraging activity and active nest site breeding behavior. Late in the breeding season, potential effects from disturbance decline because juvenile northern spotted owls are becoming more capable of moving away from disturbances.

In the Project Area and 2.7 mile buffer, northern spotted owls were not detected in the surveys conducted in 2008 (see Appendix G), in areas suitable for spotted owls. The absence of detections indicates that northern spotted owls are not present on the Project Area and therefore are not within sifficient proximity to be disrupted by construction noises and activity. The noise disturbance associated with logging is common in the Project Area, due to commercial forestry, and the construction noise associated with the Project is not expected to cause further impacts to this species.

Northern spotted owl declines have been linked to the removal and degradation of available suitable habitat (UFWS 1992). The removal of these suitable structural components and vegetation can potentially have adverse effects on northern spotted owl populations, such as displacement from established breeding areas, increased density of northern spotted owls in smaller, fragmented areas of suitable habitat, and reduced reproductive success (USFWS 2008). A small portion of the 252.1 acres of temporary and 48 acres of permanent disturbance in established forest is potential habitat for spotted owls, although it is not currently occupied by individuals of this species. These areas are also subject to continued forest harvesting and are unlikely to include suitable northern spotted owl habitat in the future.

Marbled Murrelet

The 2009 5-year status review for marbled murrelets evaluated recent studies on disturbance and found mixed results (USFWS 2009c). In one of these recent studies, Hebert and Golightly (2006) conclude that noise disturbance lasting 10 to 15 minutes, at a distance greater than 82 feet (25 meters) from the marbled murrelet nest does not appear to induce long-term behavioral changes. All seven nests examined in the Herbert study, however, that had incubating adults exposed to the sound of an operating chainsaw failed to produce a fledgling (Hebert and Golightly 2006 as cited in USFWS 2009c). Vehicular traffic noise appeared to have little or no effect on murrelet nesting success (Hebert and Golightly 2006, Golightly et al. 2009 as cited in USFWS 2009c). However, because nests in this study were located farther from paved roads

than random sites, paved roads are possibly an indicator of disturbance or predatory activities regardless of disturbance levels (Golightly et al. 2009 as cited in USFWS 2009c).

Nesting is not expected in the Project Area, but noise associated with vegetation clearing, construction, increased predator activity in the vicinity of human presence and increased vehicle traffic in the Project Area could disturb nesting murrelets and negatively affect productivity. In the 2004 5-year review for marbled murrelet (USFWS 2004), USFWS found nest failure rates due to predation was high in both real and artificial nests. Potential nest trees for marbled murrelets are not known to occur on the Project Area, and breeding of this species has not been documented. The nearest known occupied nest trees to the transmission line and Project Area are 2 miles from the Project boundary (Chehalis MMU) and 4 miles from the nearest turbine; therefore, disturbance impacts are unlikely to have an effect on this species.

If nest trees or potential nest trees are identified during stand evaluation prior to timber clearing, habitat removal would not occur until after the entire breeding season (after September 15). Removing habitat after the entire breeding season would eliminate any direct impact to individual murrelets or nestlings.

Other Special Status Species

Golden and Bald Eagles

Potential impacts to the golden eagle during construction of Project facilities pertain to disturbance that would cause avoidance. Although golden eagle nests were monitored in the Project Area until 2004, it is unknown if breeding for this species still occurs on site. Breeding nearby is unlikely given the fact that no golden eagles were observed during the avian point count surveys that spanned five seasons, and if a resident pair was present they would likely have been observed at least once during these surveys. One bald eagle was observed on site; although there are no documented records of breeding within 2 miles of the Project Area. Impacts to these species due to construction disturbance are considered low given the lack of known golden eagles and low number of bald eagles on the Project Area.

Northern Goshawk

One record from 1996 of a northern goshawk occurs outside the Project Area, where larger trees and habitat for this species exist. Although no individuals of this species were observed in the bird surveys, the potential exists for this species to occur in the Project Area, while foraging or migrating. Overall use of the Project Area by breeding northern goshawks is low and impacts to this species are not anticipated.

Peregrine Falcon

This species was not observed in the Project Area during the avian point count surveys. No known eyries are located within 5 miles of the Project Area. In addition, cliff habitat for this species does not occur in the Project Area. Use of the Project Area is likely rare, and no construction impacts to peregrine falcons are expected.

Sandhill Crane

One sandhill crane flock was observed during point count surveys and other flocks likely pass over the Project Area during migration. Habitat for sandhill cranes in the tree farm is lacking. Wetland areas and agricultural fields in the Chehalis floodplain may be stopover habitat for this species during migration. Approximately 0.1 acre of agricultural habitat will be removed as a result of the Project. There are no known concentrations of sandhill cranes within 5 miles of the Project Area. Overall mean use for this species was low, and disturbance impacts are unlikely.

Other Birds

The merlin and pileated woodpecker are state candidate species and the western bluebird and turkey vulture are both state monitor species. Turkey vultures are had the highest mean use; however they tend to fly at high altitudes during the day and are unlikely to be disturbed by construction activities. The merlin, pileated woodpecker and western bluebird may be disturbed by construction activities during the breeding season, or are at risk of mortality due to the potential destruction of a nest with eggs or nestlings. The disturbance to established forest (252.1 acres of temporary, 48 acres of permanent) and riparian areas (1.9 acres of temporary, 1.2 acres permanent) are most likely to affect these species if construction activities are near to a foraging area or active nest. Breeding and foraging may be affected for the period of construction (2 years).

Bats (Keen's Myotis and Fringed Myotis)

Keen's myotis has one of the most limited geographic distributions of any species of bat in North America. Keen's myotis and fringed myotis roost in trees in the summer and could be disturbed by construction activities, if roosting in trees close to the construction activities. Both Keen's myotis and fringed myotis use trees for roosting that have early signs of defects and decay (Keinath 2004; Boland et al. 2009), which does not characterize the types of stands on the Project Area where construction activity would take place (252.1 acres of temporary, 48 acres of permanent disturbance in established forest usually less than 50 years old). Bats would likely abandon day roosts if disturbed and seek suitable roosts elsewhere.

Amphibians

Numerous special status stream breeding amphibians (Dunn's salamander *[Plethodon dunni]*, Cope's giant salamander *[Dicamptodon copei]*, Columbia torrent salamander *[Rhyacotriton kezeri]*, tailed frog *[Ascaphus truei]*, and Van Dyke's salamander *[Plethodon vandykei]*) occur in older forests to the northwest of the Project Area, where stream surveys have been conducted. Riparian buffers are not required on seasonal headwater streams, which are habitats where these species are typically found. Industrial forest use may have eliminated these species from many of the headwater systems in the Project Area. Where these species continue to persist, ground-disturbing activities could cause mortalities including 1.9 acres of temporary and 1.2 acres of permanent riparian area disturbance. However, given that construction is limited largely to ridgetops and not in stream corridors, impacts to these species are unlikely.

3.5.2.2 Operations and Maintenance Impacts

Birds

Birds have been identified as a group potentially at risk because of collisions with wind turbines and power lines and displacement due to the presence of the associated structures (Erickson et al. 2005; Drewitt and Langston 2006; Arnett et al. 2007a). Specifically, migrant passerines (e.g., songbirds) are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007b). In fact, at newer generation wind energy facilities outside of California, approximately 80 percent of documented mortalities have been songbirds, of which 50 percent are often nocturnal migrants (Erickson et al. 2001; Drewitt and Langston 2006; Johnson et al. 2007; Strickland and Morrison 2008). Pine siskins and red crossbills had the highest mean use and encounter rates of all bird species recorded in the Project Area. Declining population trends have been identified for the pine siskin in Washington (Sauer et al. 2008), however, both species have annual fluctuations in population size, due to irruptive tendencies, making population trends difficult to estimate. Additionally, there are little available data directly linking these two species to mortality events at wind energy facilities, perhaps due to the lack of wind facilities in forested mountains in the Pacific Northwest. There is potential for some mortality of these species to occur, given the flight height behaviors and high mean use of these two species.

Raptor mortality at newer-generation wind projects has been low relative to older wind farms (Erickson et al. 2002); a number of mortality monitoring studies at newer-generation wind projects have found fewer raptor fatalities than at older farms, although there is substantial regional variation (e.g., Johnson et al. 2002; Erickson et al. 2004; Kerns and Kerlinger 2004; Jain et al. 2007). Although raptor mortality is reduced at newer-generation facilities, mortality may not be entirely eliminated.

Raptor use in the Project Area was low (overall mean 0.15 birds/20 min; ranging from 0.21 in the summer to 0.19 in the spring), compared to other wind farm studies and raptor mortality is therefore expected to be low (Appendix B). For the raptor with the highest encounter rate, the turkey vulture, the encounter risk (0.05 birds flying within the RSA/20 min) was still comparatively low. In Washington, the turkey vulture is a state-monitored species, although the overall population is considered stable (Sauer et al. 2008). Although some collision related mortality of turkey vultures may occur, due to the low mean use and encounter rate, mortalities are likely to be rare. For the red-tailed hawk, the five-season encounter rate was 0.01 birds flying within the RSA/20 min. Mortality of red-tailed hawks due to collisions with wind turbines has been documented at multiple sites (Johnson et al. 2002; Erikson et al. 2004; Erickson 2007) and may therefore occur in the Project Area. Overall red-tailed hawk mean use and encounter rates were low, indicating low mortality. Other raptor species such as merlin, Cooper's hawk, bald eagle, sharp-shinned hawk, northern pygmy owl, and northern harrier had low mean use and encounter rates. Each of these species had encounter rates of < 0.02 birds flying within the RSA/20 min over the course of five seasons.

Despite the proximity to the ocean, few shorebirds and waterfowl were observed during the diurnal point count surveys, likely because much of their migration occurs at night. These night-vision surveys could see to a ceiling of approximately 150 meters (492 feet), and within that zone waterfowl comprised 21 percent of all birds and bats in spring and 18 percent of all birds and bats in fall. Whether waterfowl comprised a higher or lower proportion of migrants at higher altitudes is unknown. Waterfowl and cranes were observed only in the diurnal point counts in the fall season of 2007, along with flocks of Canada geese and one flock of sandhill cranes. The encounter rate for sandhill cranes was 0 birds flying within the RSA/20 min, while the Canada goose had an overall encounter rate of 0.48 birds flying within the RSA/20 min. Sandhill cranes are an endangered species in Washington State and are discussed in the Special Status Species section. Geese are not known for a propensity to fly into turbines, and typically have a lower mortality rate than would be expected based on encounter rate (Erickson et al. 2002; Jain 2005).

Comparison-based fatality estimates for birds in the Project Area is difficult because constructed wind farms in similar habitats in the Pacific Northwest with mortality estimates do not exist. The regional mortality estimates for birds in the Pacific Northwest is 2.7 birds per MW per year (minimum 0.9 to maximum 2.0 birds per MW per year; NWCC 2004). Mortality estimates for raptors in the Northwest is 0.07 raptors per MW per year (minimum 0.00 to maximum 0.9 raptors per MW per year). The Project ranked low in raptor use compared with other raptor use rates reported at existing wind energy sites with publicly available data throughout the country (see Appendix C), and was comparable (i.e., mid-range) of these sites for non-raptors. Although the Pacific Northwest mortality estimates are largely based on wind farms east of the cascades, the pre-construction mean use was comparable between these sites and the Project. Therefore, in the absence of wind farms in similar habitats, it is assumed that the level of bird and raptor mortality in these studies can be expected at the Project. Some additional mortality may occur from birds colliding with met tower guy wires; this specific source of mortality has not been studied well (Erickson et al. 2002), and has not been factored into the mortality estimates.

In addition to mortality associated with wind farms, some bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in grasslands enrolled in the Conservation Reserve Program (CRP) and containing turbines than in CRP grasslands without turbines. It was suggested that the reduced density may be due to avoidance of turbine noise and maintenance activities, and reduced habitat quality due to the presence of access roads and large gravel pads surrounding the turbines (Leddy et al. 1999). Reduced abundance of grassland songbirds was found within 50 m of a turbine pad for a wind farm in Washington and Oregon, but the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (WEST and NWC 2004). Recent research at two sites in North and South Dakota (Shaffer and Johnson, unpublished data) suggests that certain grassland songbird species (2 of 4 studied) may avoid

turbines by as much as 200 meters (656 feet) but these results have not been finalized nor verified at additional sites. None of these studies have addressed whether or not these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent. Avoidance of turbines by bird species has not been well studied, particularly in forested habitats, and implications from these impacts to bird populations in the Project Area are not well understood.

Bats

Wind energy is one of the fastest-growing sectors of the energy industry (NRC 2007) and has led to an unexpected level of bat mortality (Kunz et al. 2007, Table 1). For most North American bat species, there are large gaps in knowledge in which significant aspects of their natural history is not currently known. An assessment of bats, particularly in relation to factors contributing to wind turbine mortality, involves uncertainty due to these unknowns. From the current state of knowledge, bat species that have the highest risk of fatalities at wind facilities are tree foliage, or tree cavity roosting, migratory bats (Kunz et al. 2007, Table 1). Migratory tree bats travel long distances and may travel at altitudes similar to those of the wind turbine blades, increasing the risk of collision. In addition, bats appear to be attracted to turbines, which expose them to different, and largely unknown, risks than birds.

There appears to be a seasonal trend with bat fatalities at wind facilities, with most mortality occurring in the late summer and early autumn, which coincides with fall migration (Johnson 2005); however, this may be also be an artifact of intensive fatality searches during this time (Kunz et al. 2007). There are geographic differences in fatalities, with the highest fatalities reported in the eastern United States where facilities are located along forested ridges. However, relatively large numbers of fatalities have also been reported from the agricultural regions of northern Iowa (Jain 2005) and the mixed-grass prairie of north-central Oklahoma (Piorkowski 2006).

Higher levels of activity were recorded for species considered vulnerable to wind development (hoary, big brown/silver-haired bats, and unidentified low frequency bats) between mid-August and late September, suggesting migration is likely occurring through the Project Area at this time. In Washington and Oregon, activity and fatality typically peak between mid-August and September (Kerlinger et al. 2006). In addition, the hoary bat was more active at the higher elevations where it may be at higher risk of collision with turbines than other bat species observed in the study.

In the spring, mean flight altitudes from the radar study were lower than at other sites in the Pacific Northwest (i.e., 506-579 meters [1,660 to 1,899 feet] at the Stateline and Vansycle wind farm sites, respectively) although these are eastside habitats and are not a direct comparison to other forested sites west of the Cascade Range. In the Project Area, 12 percent of targets were flying below the proposed maximum turbine height (i.e., <125 meters [410 feet]). This percentage is lower than from Stateline and Vansycle (19 and 15 percent, respectively).

In the fall, mean flight altitudes were again lower than other sites in the Pacific Northwest (Stateline 647 meters [2,122 feet] agl, Vansycle 606 meters (1,988 feet] ag, and Cotterel Mt 565 meters [1,853 feet] agl), with the caveat that these sites are all east of the Cascades. Flight altitudes were more similar to California forested wind farm sites (Bear River 329 meters [1,079 feet] agl and Hatchet Ridge 468 meters [1,535 feet] agl). Ten percent of targets were flying below the proposed maximum turbine height (i.e., <125 meters [410 feet]). This percentage is higher than those from other studies in the Pacific Northwest (Stateline 3 percent, Vansycle 9 percent, Cotterel Mountain 3 percent, and similar to California sites (Bear River 11 percent, Hatchet Ridge 8 percent).

Overall bat activity varied by season, with fewer bat passes recorded in spring than fall. The high elevations of the Project Area combined with low spring temperatures likely contributed to low prey densities and low bat activity early in the season. Overall acoustic bat activity recorded in the Project Area was lower than other locations in the spring. In the fall, overall bat activity was low, but within the range of results from other acoustic studies conducted in the Pacific Northwest and across the U.S. (see Appendix 4a and 4b of Appendix F of this DEIS). The radar study's visual observations were able to differentiate the proportion of birds versus bats below ~150 m [492 feet] agl, where 87 percent of identifiable targets were birds and 13 percent were bats, indicating that the number of migrating bats was comparatively low.

Although bat activity is low compared with other wind farms, some bat mortality is expected given : 1) the presence of bats vulnerable to wind farm fatalities are present, 2) these bats occur on site during the period of highest risk (fall migration) and 3) they are flying at heights within the RSA, where they are at the highest risk.

There is a lack of information relating pre-construction activity patterns of bats to post-construction fatality of bats. Although some studies have shown a positive correlation between total number of bat calls per night and the estimated fatalities per turbine per year, there are numerous confounding factors that limit the potential inferences from these reports (Kunz et al. 2007). Additionally, comparison-based fatality estimates for bats at the Project is difficult because constructed wind farms in similar habitats in the Pacific Northwest with mortality estimates do not exist. The regional estimates for bat fatalities in the Northwest are 1.7 bats per MW per year. It is currently not known if the Project Area shares habitat similarities (forested ridgetop) with eastern sites and therefore with eastern mortality estimates, which average bat fatalities of 32 bats per MW per year. The low passage rates from both the acoustic study and the migration study indicate that although the Project Area is forested and mountainous, the volume of migrants that pass over the Washington Coast Range may be lower than the eastern United States. Therefore, it is assumed that the estimated bat fatalities for the Project are expected to be similar to those for the Pacific Northwest (NWCC 2004).

Other species

Few studies have been conducted on the effects of wind facilities on big game such as Roosevelt elk and black-tailed deer. Pronghorn, mule deer and elk all occurred on the Foote Creek Rim

Wind Farm post-construction, but little analysis could be made given the low numbers of animals (Johnson et al. 2000). A study involving Rocky Mountain elk found no evidence of adverse effects of a wind farm on home range and dietary quality (Walter et al. 2006). Although some disturbance and loss of habitat were evident, Walter et al. (2006) found that elk did not leave the wind farm during the 2-year study and they crossed the wind farm's access roads. Elk range continues through the length of the Project Area, and may be disrupted if behavioral effects occur from the presence of the wind farm. Elk may be able to avoid the influence of the wind farm if they are not traveling on the ridgetop, and are following forested corridors. The lack of knowledge of potential impacts of wind energy development on big game increases the difficulty in predicting effects of the Project on elk and deer in the Project Area. Conversely, newly replanted vegetation in temporarily disturbed areas may be palatable and attract elk.

If elk and deer were not displaced from the Project Area due to disturbance from the operating wind farm or maintenance activities, continued hunting on the Project Area would manage herds to prevent populations from increasing dramatically. The Project Area currently receives some recreational use by hunters and all-terrain vehicle riders which would continue at the discretion of the applicant.

No impacts to amphibians, reptiles or small mammals are expected during the operations phase, although some collision-related mortality could occur during maintenance activities. Given the current heavy logging traffic on roads within the Project Area, maintenance activities for the Project would not increase traffic loads measurably, once construction is complete.

Special Status Species

Spotted Owl

Northern spotted owls fly to a perch and wait for prey, staying below the forest canopy (Forsman et al. 1984; Carey et al. 1989; Guetterman et al. 1991). For this reason, turbine-related mortality of the northern spotted owl is not expected to occur during the operation of turbines in the Project Area. The potential for operations related disturbance (i.e., avoidance of the wind turbines) is also unlikely given that surveys did not detect northern spotted owl on the Project Area where they may be disturbed by turbine operation or maintenance activities.

Marbled Murrelet

Although no marbled murrelet nesting locations are known on site, the Project Area is located between known occupied habitat to the east, and the ocean. There is the potential for turbine-related mortality of this species given their flight paths over the Project Area. While this potential can never be zero, studies indicate it is extremely low in the Project Area. To assess the number of marbled murrelets that could be killed by turbines over the course of the breeding season and year, radar data and other similar studies were used to determine an overall fatality rate (Appendix H).

The estimated fatality rate of marbled murrelets is the product of 1) the exposure rate (the number of birds that may fly within the airspace occupied by a turbine); 2) the fatality probability (the probability of a fatal collision with a portion of the structure while the airspace is occupied by a turbine); and 3) the avoidance probability (the probability that a bird will detect and avoid entering the airspace containing the turbine).

To calculate the exposure rate of marbled murrelets, daily movement rates from sampling stations were combined with a number of assumptions. The movement rates recorded during the sampling period (summer 2008 and 2009) were assumed to be the average peak-season rates in an average year. Then, because movement rates of marbled murrelets are lower in April, May and August than during the peak activity period (June-July), movement rates were adjusted to calculate average rate across the entire 150-day breeding season. Data from Appendix H were used to calculate the revised movement rates, based on passage rates in low season months on the Olympic Peninsula. In addition, evening rates were accounted for by averaging all rates for studies that had data for evening flights (accounting for 28 percent of morning flights). Non-breeding season movement rates were accounted for using radar data from another ridgeline in southwestern Washington (Hamer Environmental 2009 as reported in Cooper and Mabee 2010). This study found that average nonbreeding movement rates were 52 percent of summer rates. Finally, the number of targets was corrected for average marbled murrelet flock size which was equal to1.5 individuals/target.

To estimate the fatality probability portion of the fatality rate formula is derived as the product of: 1) the probability of encountering an active operating turbine, 2) the probability of dying if it collides with the turbine; and 3) the probability of colliding with the turbine if the bird enters the airspace occupied by either of these structures (i.e., are there gaps big enough for birds to fly through the structure without hitting any part of it.) The first probability was calculated by assessing wind speed data on the Project Area to estimate the average proportion of time (~84 percent) and the average rotational speed (13.6 rotations per minute) that the turbines would be spinning during peak movement hours in the breeding season. The second probability (of being killed) was estimated at 100 percent. The third probability (of striking the structure) was calculated both from the front/back of the turbine and from the side, since they may incur different collision probabilities.

Finally, the avoidance probability could not be derived from previous studies, since no previous studies involving wind turbines exist. A review of nocturnally active seabird species, however, suggested avoidance rates may be greater than 90 percent (Winkelman 1995; Dirksen et al. 1998; Desholm and Kahlert 2005; Desholm et al. 2006; Chamberlain et al. 2006; and Day et al. in prep as reported in Appendix H). The approach was therefore a range of avoidance rates (90, 95, and 99 percent) that have been observed for other nocturnally active species. As marbled murrelet flight behavior becomes available, these data can be modified to reflect new information.

The maximum fatality estimate across the entire Project Area and 150-day breeding season for marbled murrelet ranged from 0.02-0.03 murrelets/year under an assumption of 99 percent avoidance, 0.09-0.16 murrelets/year assuming 95 percent avoidance, and 0.17-0.32 murrelets/year under an assumption of 90 percent avoidance The fatality estimates for the entire year, both breeding and non-breeding seasons, ranged from 0.03-0.05 murrelets/year under an assumption of 99 percent avoidance, 0.14-0.27 murrelets/year assuming 95 percent avoidance, and 0.29-0.54 murrelets/year assuming 90 percent avoidance.

Three marbled murrelets in the radar study had recorded flight heights, all of which were above the expected turbine RSA (154 meters, 353 meters, and 364 meters; see Appendix H). A sample size of three birds is not adequate to determine definitively if marbled murrelet flight heights are consistently above the proposed turbine heights (125-145 meters). However, if this pattern persisted across the population, turbine collision risk would be reduced.

For both the breeding season and full year, less than one marbled murrelet fatality is expected due to the operation of the Project. Even with what is considered a low avoidance rate for seabirds (90 percent avoidance) the estimate is less than one bird per year. These estimates indicate that there would not be significant impacts to this species. However, options under consideration to reduce the number of potential marbled murrelet collision fatalities further are a 2-month or a 3-month curtailment (turbine shut down) in the morning operation (3 hours) of turbines.

If an assumption is made that no marbled murrelets would collide with the turbines when the turbines are shut down, the fatality model estimates that a 2-month (June-July) curtailment of all turbines during the morning activity period could reduce the number of annual fatalities to a range of 0.02-0.03 fatalities/year under 99 percent avoidance, 0.09-0.17 fatalities/year under 95 percent avoidance and 0.18-0.34 fatalities/year under 90 percent avoidance. A 3-month (June, July, and August) curtailment of all turbines during the morning activity period could reduce the number of annual fatalities to a range of 0.02-0.03 fatalities/year under 99 percent avoidance, 0.08-0.15 fatalities/year under 95 percent avoidance and 0.16-0.30 fatalities/year under 90 percent avoidance.

Other Special Status Species

Bald and Golden Eagles

No golden eagles were observed during the avian point count surveys that spanned five seasons. One bald eagle was observed in the Project Area during surveys; however, no documented breeding records within 2 miles of the Project Area occur. Impacts to these species due to turbine operation are considered low given the lack of known golden eagles and low number of bald eagles at the Project. If the golden eagle nest in the Project Area is active, this species could be at higher risk of mortality.

Northern Goshawk

One record from 1996 of a northern goshawk occurs outside the Project Area, where larger trees and habitat for this species exist. Although no individuals of this species were observed in the bird surveys, the potential exists for this species to occur in the Project Area, while foraging or migrating. Overall use of the Project Area by breeding northern goshawks is low and impacts to this species are not anticipated.

Peregrine Falcon

This species was not observed in the Project Area during the avian point count surveys. No known eyries are located within 5 miles of the Project Area. In addition, cliff habitat for this species does not occur in the Project Area. Use of the Project Area is likely rare and therefore no construction impacts to peregrine falcons are expected.

Sandhill Cranes

Sandhill cranes are not known to collide with wind turbines, although they may migrate through the site. Overall mean use and encounter risk for this species was low and overall collision risk for this species is also low. Sandhill cranes have been known to collide with transmission lines. The Chehalis River floodplain may serve as stopover habitat for this species, a portion of which is occupied by the proposed transmission line. Bird diverters on the transmission lines would minimize collision risk to this species from new power lines.

Other Birds

Western bluebirds were observed flying within the RSA, however, their encounter rate and risk of collision mortality was low due to low mean use on site (0.06 birds/20 min flying within the RSA over 5 seasons). Canada geese were documented migrating over the Project Area and have been found as fatalities at other wind farms (Erickson et al. 2004; Jain et al. 2007). Turkey vultures, a Washington state monitor species, are occasionally electrocuted by utility lines (Kirk and Mossman 1998); however, collisions with utility lines are rare because of bird's slow, maneuverable flight (McNeil et al. 1985). Additionally, there has been a low incidence of dead turkey vultures found during mortality studies conducted at wind farms (Orloff and Flannery 1992, Kerns and Kerlinger 2004, Kerlinger et al. 2005). One merlin was observed flying within the RSA, however, their encounter rate and risk of collision mortality is low due to low mean use on site (0.02 birds/20 min flying within the RSA over 5 seasons). The pileated woodpecker tends to fly below the RSA, under the canopy, and is at low risk of collision with turbines.

Bats (Keen's Myotis and Fringed Myotis)

Keen's myotis and fringed myotis, if they occur on the Project Area, are vulnerable to collision with wind turbines. These species' grouping (Keen's myotis, fringed myotis and western long-eared myotis) was most only recorded at a low altitude (1.5 meters); however, it is not known if the turbines attract bats to higher elevations where they are at increased risk.

3.5.3 Impacts of the No Action Alternative

Under the No Action Alternative, the Project would not be constructed or operated and the impacts discussed in Section 3.5.2 would not occur. The Project Area would continue to be operated primarily as a commercial forest. The harvest plan for Weyerhaeuser includes the areas of the Project footprint; therefore, if the Project was not built, those stands would still be harvested at some point in the 40 year harvest rotation. Therefore, approximately the same level of on-the-ground permanent impacts to wildlife is expected, whether or not the wind facility is built.

3.5.4 Mitigation

The applicant has proposed a number of measures to avoid and minimize potential wildlife effects created by the Project, as described below:

Pre-project Assessment

The Applicant has actively worked to reduce impacts to plants and wildlife during the design and development phase of the Project. The applicant conducted a biological site screening analysis, in an effort to minimize and avoid potential biologically diverse areas or areas with threatened and endangered species. In 2007, the Applicant assessed seven potential wind energy sites in Western Oregon and Washington. The purpose of the site screening was to compare biological characteristics between sites, and select the site with the least biological value. Two sites in Washington had marbled murrelet and spotted owls within a few miles of proposed facilities and four projects had potentially robust bat populations with sensitive species occurring. The remaining site in the screening without major biological issues was the current Project location.

Baseline Studies

In order to determine the species occurring on and over the Project Area, as well as their behavior in flight, multiple studies were conducted on site. The purpose of these baseline studies was to understand the biological constraints on site in order to avoid these areas or minimize impacts. In addition, the surveys provide pre-construction data for the wind farm that could then be used to compare with post-construction mortality data. In addition to the standard avian point counts, radar surveys for bird and bat migration, bat acoustic studies, northern spotted owl protocol level surveys and marbled murrelet radar studies and fatality modeling were conducted. These surveys allow for a greater understanding of current conditions and potential impacts to species that occur on the Project Area. The results of the studies have been incorporated into the proposed design, operation and mitigation for the Project.

Project Design

In the design phase of the Project, particular choices were made about the layout of facilities to avoid further environmental impacts. The following are avoidance and minimization measures incorporated into the pre-project assessment for the design of the Project.

- The Project was developed on an industrial forest, a disturbed landscape

- The current road layout maximized the use of existing roads, rather than constructing many new roads.
- The original transmission line route considered was routed through an area that would require extensive clearing to create a new transmission line corridor rather than following an existing line since none existed.
- Minimizing road and stream crossings
- Replanting the "wind box" with low-growing trees and vegetation to minimize erosion and increase vegetative cover for wildlife while not interfering with energy production by the turbines.

Other BMPs that would be incorporated into the design include:

- Minimizing the use of lights on towers and facilities structures, in accordance with federal, state, and local requirements;
- Controlling noxious weeds with a weed management plan; and
- Installing bird diverters on new transmission line wires (consistent with Avian Power Line Interaction Committee standards).

Post-construction Avian Monitoring Plan and Studies

Post-construction monitoring would be prescribed in a mitigation and monitoring plan. It would include searches for bird and bat fatalities and radar surveys during the marbled murrelet nesting season. In addition, a third year of pre-construction murrelet radar surveys is proposed for 2010, prior to construction of the Project. A monitoring protocol is in preparation for review and comment by the USFWS and WDFW, and is included here as Appendix H. All carcasses or injured animals would be recorded and reported to contact persons at USFWS and WDFW. Injured animals would be transported to rehabilitation centers. Duration of post-construction fatality monitoring would be determined in consultation with WDFW.

WDFW Guidelines

Wind developers and WDFW commonly use the Washington Wind Power Siting Guidelines (WDFW 2009b) to negotiate acreage-based habitat mitigation levels for wind projects. Under the Guidelines (Section 8.2), conversion of Commercial Forest Lands is classified as a forestry use. The Guidelines state that "commercial forests are defined and regulated under the Forest Practices Act (FPA) [Chapter 76.09 RCW]," and that "wind project developers should consult with WDFW when an FPA conversion is anticipated," and "are encouraged to minimize conversion." The Project Area is made of up commercial forest land regulated by the WFPA and is therefore classified under the Guidelines as Commercial Forest Lands. As suggested by the Guidelines, the Applicant is currently in discussions with WDFW. Additionally, the Applicant has designed the Coyote Crest Project to minimize conversion of commercial forest lands by allowing for co-location of wind and timber harvesting facilities. All areas except WTG

foundations, crane parking areas, and roads would remain available to Weyerhaeuser for continued timber growth. However, even some of the areas occupied by Project facilities may remain in commercial forest use, as the crane parking areas can be used for log landings and the crane roads would be used for commercial timber hauling. Therefore, mitigation plans for the Project are consistent with the WDFW Guidelines.

Monitoring and Adaptive Management

In continued due diligence to avoid collision fatalities during Project operation (and in support of WDFW's wind sighting guidelines research-oriented studies and operational monitoring), radar surveys of marbled murrelets would continue during construction and post-construction phases. In addition, in order to increase sample size of observations, the radar surveys would continue both on the Project Area, and at Graylands, another wind facility on the Washington coast. The rates of marbled murrelet passage are higher at Graylands and provide a second site for data collection. The combination of the two sites would provide data on behavioral effects of turbines on the flight paths and foraging behaviors of marbled murrelets. If the monitoring data indicate that murrelet targets would pass through the rotor swept area of the turbines as proposed for this Project, the Applicant is prepared to conduct 2- month seasonal shutdowns or curtailments of turbines to reduce collision risk to marbled murrelets, as appropriate. An option currently under consideration is to curtail all turbines for 3 hours each morning (from 4:30 a.m. to 7:30 a.m.) during the months of June and July. The Applicant would donate funding to a land trust for preservation of marbled murrelet nesting habitat much closer to the ocean than the Coyote Crest site.

3.5.5 Significant Unavoidable Adverse Impacts

The analysis identified several types of unavoidable impacts to wildlife for the construction and operation phases of the Project. When combined with mitigation, no significant unavoidable adverse impacts are anticipated for birds, bats, other wildlife or special status species. Mitigation provisions in the WDFW wind power guidelines recommend consultation for mitigation associated with wind farm development of Commercial Forest Lands, which has been in process. It is anticipated that the ongoing marbled murrelet study to determine avoidance rates will clarify mitigation needs for this species.

3.6 Air Quality

The proposed Project would not involve the combustion of fossil fuels to generate electricity. Therefore, there would be no air quality impacts from the operation of the Project to generate wind power. Any air quality impacts would be related to vehicle emissions and fugitive dust associated with construction of the project, or to maintenance activities throughout the life of the project.

Wind turbines do not produce air emissions during operation, and therefore are not subject to the new source permitting process through Ecology. Washington regulates what are known as "fugitive" air emissions, which consist of pollutants that are not emitted through a chimney,

smokestack, or similar facility. Blowing dust from construction sites, unpaved roads and tilled agricultural fields represents common sources of fugitive air emissions. Wind energy plants are not included in the facilities for which review and permitting of fugitive emissions are required (WAC 173-400-040). Nevertheless, the Washington rules require owners and operators of fugitive dust sources to take reasonable measures to prevent dust from becoming airborne and to minimize emissions.

Under the provisions of the Clean Air Act, government entities must maintain levels of the pollutants of concern below the national ambient air quality standards (NAAQS).

3.6.1 Affected Environment

Lewis County is not currently designated as non-attainment for any of the pollutants of concern listed in the Clean Air Act (EPA 2010a). Conversely, Lewis County is in attainment for all criteria pollutants (ozone, particle pollution, sulfur dioxide, carbon monoxide, and nitrogen dioxide) with no unhealthy days from 2000 to 2006 (EPA 2010b). Because of the sparse population and rural nature of most the County, existing sources of air pollution in the vicinity of the Project are minimal.

Based on observations of existing uses in the local area, two sources of air pollution in the western part of Lewis County are fugitive dust and vehicle emissions. Fugitive dust and combustion emissions are generated in such environments by agricultural activities, vehicles traveling on dirt roads, construction, timber harvesting, and other activities that disturb the soils and utilize combustion engines.

3.6.2 Impacts of the Proposed Action

Impacts to air quality would be considered high if the proposed Project created noticeable or measurable emissions of criteria pollutants that exceed NAAQS. Impacts would be considered moderate if the proposed Project created noticeable or measurable emissions of criteria pollutants that would exceed NAAQS, and which could be partially mitigated with standard control practices. Impacts to air quality would be considered low if the proposed Project created small or negligible amounts of noticeable or measurable emissions of criteria pollutants which did not exceed NAAQS and could be mitigated through standard control practices (EPA 2010b).

Overall impacts to air quality resulting from construction of the proposed Project would be low. The primary sources of air pollution generated by construction would be vehicle exhaust emissions and fugitive dust particles from disturbed soils becoming airborne.

Sources of vehicle exhaust emissions would include heavy construction equipment operating on the site, trucks delivering construction materials and Project components to the site, and vehicles used by construction workers to access the site. The amount of pollutants emitted from these sources would be relatively small, given the size of the construction work force and equipment fleet, and similar to other equipment commonly used for agriculture, transportation and construction in Lewis County. The emissions would generally be dispersed among multiple

locations in and near the project area at any given time, rather than concentrated in a specific location, and would not likely reach significant concentrations at off-site locations. Such short-term emissions are exempt from air quality permitting requirements.

Similarly, review or permitting of fugitive emissions is not required for wind energy facilities. Construction activities that could create dust include clearing and grading for road improvements and turbine pads, clearing work areas around all types of project facilities, and underground utility cable trenching or plowing. As discussed in Section 2.2.2.2, project construction would temporarily disturb approximately 472 acres within the project area for project elements, including turbine pads, power collection system roads, trenching and staging areas. Transportation of materials and supplies would also produce dust emissions. Standard practices to control airborne dust would be employed during construction and are discussed below in Section 3.6.4.

Construction activities for the Project are scheduled to take approximately 15 months, with breaks for inclement winter weather, although much of the ground-disturbing activity and equipment operation would be concentrated within a several-month portion of each phase of the construction period. Given the relatively low magnitude, localized extent and temporary duration of the emissions, air quality impacts associated with project construction would not be significant; there is no basis to assume that these emissions would exceed the NAAQS.

Operation and maintenance impacts on air quality from the proposed Project would be negligible. Emissions during the operating period would be limited to exhaust emissions and fugitive dust generated by vehicles traveling on project access roads to perform operation and maintenance functions. Areas disturbed in construction and not occupied by permanent project facilities would be revegetated and would not be sources of blowing dust. All permanent access roads would have gravel surfaces, further reducing the potential for dust. The volume of operation and maintenance vehicle traffic would be very low; therefore, quantities of potential emissions generated by these vehicles would be very small, intermittent, and localized.

3.6.3 Impacts of the No Action Alternative

Under the No Action Alternative, most of the land in the Project Area would likely remain in its current timber production and agricultural use. Some of the existing agricultural land could potentially be converted to rural residential use over the next 30 years, as indicated by recent land use trends. Potential impacts to air quality from such low-intensity development would be negligible.

3.6.4 Mitigation

Standard practices to control airborne dust and reduce air emission would be employed during construction. These include:

- Watering exposed soil surfaces such as storage yards and construction roadways daily during dry weather, especially when blowing dust is visible.

- Road areas that might be exposed to heavy use for prolonged periods would be covered with gravel.
- Covering construction materials that could be a source of dust when stored.
- Limiting vehicle speeds along unpaved roads to 25 miles per hour (mph).
- Covering truck beds when transporting dirt/soil.
- Shutting down idling equipment when not in use.
- Use of well-maintained equipment.
- All brush disposal and slash burning would be conducted pursuant to WFPA regulations.

3.6.5 Significant Unavoidable Adverse Impacts

Vehicle and fugitive dust emissions during construction are the only likely impacts to air quality associated with the proposed Project. Both impacts would be temporary, limited to the expected 2- or 3-year period, with breaks for inclement winter weather, and would be minor in the context of other timber harvesting and agricultural activities in the project vicinity. With application of the standard control measures typically used in large construction projects, air quality impacts during construction would be insignificant. Project operations and maintenance activities would produce minimal air pollutants and would result in insignificant impacts to air quality.

3.7 Environmental Health

This section describes existing environmental health and safety hazards in the vicinity of the Proposed Action and identifies potential environmental health risks from Project construction and operations, including noise and other risks such as fire and explosion, hazardous spills, mechanical hazards, and electrical hazards. Mitigation measures are identified for potential impacts.

3.7.1 Noise

In accordance with SEPA rules, Lewis County has completed a noise impact assessment for the proposed Project. This section provides background information on noise terminology and descriptors and addresses the potential noise impacts associated with the construction and operation of the Project wind turbines, substation and transmission line.

3.7.1.1 Affected Environment

Acoustic Terminology and Descriptors

Sound is described as a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Sound energy is characterized by the properties of sound waves, which are frequency, wavelength, period, amplitude, and velocity. Noise is defined as unwanted sound and the point at which sound becomes noise is a highly subjective determination, largely dependent on the magnitude or intensity of noise, duration of the noise,

proximity of noise-sensitive land use to noise source, time of day the incidence noise occurs with higher sensitivities expected during the quieter overnight periods.

The range of frequencies that humans hear can span from 20 to 20,000 hertz (Hz); however, humans have varying sensitivities to noise at different frequencies; that is, some frequencies sound louder than other frequencies, even though the energy content is the same. The amplitude of a sound wave is measured in terms of its sound pressure level (SPL) where a logarithmic decibel scale is used. To reflect the sensitivity of the human ear across the audio spectrum, the SPL readings are given in what is termed the "A-weighted scale", denoting that a standard weighting system that accounts for human hearing response is being used. The measurements used for the "A-weighted scale" are decibels, and are designated as dBA.

Humans live in a broad range of sound pressure levels. A level of 0 dBA is the least perceptible sound by a human. A change of 3 dBA represents a physical doubling of SPLs, but is barely perceptible as a change. Most individuals would notice a change of 5 dBA and perceive an increase of 10 dBA as a doubling of sound level. Typically, conversation is in the range of 50 to 60 dBA. Sources such as loud equipment and trucks passing by on a busy road are responsible for noise levels of approximately 85 dBA, which is also the threshold that hearing protection may be required in the workplace. Very quiet environments, such as a still night in a remote setting may fall below 40 dBA. The acoustic environment can be degraded by the presence of unwanted sound. For the most part, noise is a nuisance that detracts from the enjoyment of a quiet atmosphere. In severe cases noise can cause sleep disturbance, anxiety, and consequent health effects. From another perspective, noise can also damage the natural environment by alarming wildlife and disturbing habitat. Impulse or irregular noises are most disruptive, while responses to steady noise are reduced to varying degrees of acclimatization.

To take into account sound fluctuations, environmental noise is commonly described in terms of equivalent sound level (L_{eq}). The Leq value, conventionally expressed in dBA, is the energy-averaged, A-weighted sound level for the measured time period. It is defined as the steady, continuous sound level, over a specified time, which has the same acoustic energy as the actual varying sound levels over that same time. Another common noise descriptor used when assessing environmental noise is the day-night sound level (L_{dn}), which is calculated by averaging the 24-hour hourly L_{eq} levels at a given location and adding 10 dB to noise emitted during the nighttime period (10:00 p.m. – 7:00 a.m.) to account for the increased sensitivity of people to noise occurring at night. The L_{max} is the maximum instantaneous sound level as measured during a specified time period. It can also be used to quantify the time varying maximum instantaneous sound pressure level as generated by a piece of equipment or an activity, or a manufacturer maximum source level emission level. The noise impact assessment conducted for the proposed Project was evaluated against criteria based on the abovementioned noise descriptors. Further details pertaining to these criteria are provided in the subsequent section of the assessment.

Existing Acoustic Environment

The Project Area is within Lewis, Pacific, and Grays Harbor counties and is largely rural and unpopulated. Project wind turbines would be constructed on Weyerhaeuser and WDNR lands. The Project transmission line route passes through the Weyerhaeuser ownership to Garrard Creek Road and would follow this to the lightly populated area of the Chehalis River Valley. Residential development along the main county roads is comprised of dwellings on farm or ranch properties with other scattered residences along side roads like Elk Creek Road, Stevens Road, SR 6, and Garrard Creek Road.

The closest potential noise receptors to the Project are the rural residences located near the intersection of Gerrard Creek Road and Coyote Crest Road. This intersection is approximately 2.6 miles from the nearest proposed WTG locations, represented by turbines 12-15. Near the south end of the Project, small private parcels along Elk Creek Road are approximately 2.9 miles from the closest turbine.

Variations in acoustic environment are due in part to existing land uses, population density, and proximity to transportation corridors. As the Project Area is composed largely of industrial forest and rural land use, ambient sound levels are expected to be relatively low. Principal contributors to the existing acoustic environment likely include timber harvesting operations, motor vehicle traffic, all-terrain vehicles, periodic aircraft flyovers, and natural sounds such as birds, insects, and leaf rustle during elevated wind conditions within the forested section of the Project Area. In the Chehalis River Valley other noise sources associated with agricultural activity such as mobile farming equipment and farming activities such as plowing and irrigation would contribute to the existing acoustic environment. Normal daily activity patterns result in sound levels that are typically quieter during the night than during the daytime, except during periods when evening and nighttime insect noise dominate in warmer seasons.

In areas with elevated background sound levels, sound may be obscured through a mechanism referred to as acoustic masking. Seasonal effects such as cricket chirping, certain farming activities, as well as wind-generated ambient noise as airflow interacts with foliage and cropland, contribute to this masking effect. The Project Area is heavily forested, which would contribute to this masking effect substantially. Wintertime defoliate conditions typically have lower background sound levels due to lower wind masking effects and reduced outdoor activities in colder climates. Conversely, people also typically exhibit lower sensitivities to outdoor sound levels since more time is spent indoors during colder seasons.

Regulatory Framework

The WAC provides the applicable noise standards for the State of Washington, including Lewis and Pacific counties. Neither county has promulgated independent state-approved noise standards pursuant to WAC 173-60-110.

While the WAC noise criteria are the controlling regulatory standard for the Project other sources have developed noise guidelines that may be relevant. These include EPA noise

guidelines, the U.S. Occupational Health and Safety Administration's (OSHA) regulations, and the U.S. Department of Transportation (DOT) construction and vibration guidelines. The EPA noise guidelines were included in this assessment to further assist in the identification of the potential for adverse noise impacts in the Project Area. The OSHA regulations describe worker health and safety limits for noise exposure. The DOT guidelines provide additional data related to construction noise and vibration. The latter two items are not specifically applicable to the EIS noise assessment and are not discussed further.

Washington Administrative Code

Environmental noise limits have been established by the Washington Administrative Code (WAC 173-60). WAC 173-60 establishes limits on sounds crossing property boundaries based on the Environmental Designation for Noise Abatement (EDNA) of the sound source and the receiving properties.

- Class A EDNA – Lands where people reside and sleep. They typically include residential property; multiple family living accommodations; recreational facilities with overnight accommodations such as camps, parks, camping facilities, and resorts; and community service facilities including orphanages, homes for the aged, hospitals, and health and correctional facilities.
- Class B EDNA – Lands involving uses requiring protection against noise interference with speech. These typically would include commercial living accommodations; commercial dining establishments; motor vehicle services; retail services; banks and office buildings; recreation and entertainment property not used for human habitation such as theaters, stadiums, fairgrounds, and amusement parks; and community service facilities not used for human habitation (e.g., educational, religious, governmental, cultural and recreational facilities).
- Class C EDNA –Lands involving economic activities of a nature that noise levels higher than those experienced in other areas are normally to be anticipated. Typical Class A EDNA uses generally are not permitted in such areas. Typically, Class C EDNA include storage, warehouse, and distribution facilities; industrial property used for the production and fabrication of durable and nondurable man-made goods; and agricultural and silvicultural property used for the production of crops, wood products, or livestock.

The WAC does maintain flexibility for interpretation in the classification of the appropriate EDNA on both the State and local level. For example, the Washington Energy Facility Site Evaluation Council (EFSEC) in previous wind energy siting decisions has identified and defined different land use types within single contiguous properties, dissecting properties into separate EDNAs. For instance, on a single contiguous property, residences, structures and immediate yards were classified as Class A receivers, whereas agricultural portions of the land surrounding the residences, structures and immediate yards were considered Class C receivers. Between the hours of 10:00 pm and 7:00 am the noise limitations are reduced by 10 dBA for receiving

property within Class A EDNAs. WAC 173.60.050 exempts temporary construction noise from the State noise limits.

The noise level limits by EDNA classifications are presented in Table 3-7. The WAC allows these limits to be exceeded for certain periods of time: 5 dBA for no more than 15 minutes in any hour, 10 dBA for no more than 5 minutes of any hour, and 15 dBA for no more than 1.5 minutes of any hour and are commonly presented as Ln statistical sound levels as shown in Table 3-8.

Table 3-7. Washington State Environmental Noise Limits

EDNA of Source Property	EDNA of Receiving Property		
	Class A Land Day/Night	Class B Land	Class C Land
Class A Land	55/45	57	60
Class B Land	57/47	60	65
Class C Land	60/50	65	70

Source: WAC 173-60-040.

Table 3-8. L_n Environmental Noise Limits for Class C Sources

EDNA of Source Property	Statistical Sound Level Limits			
	LN 25	LN 8.3	LN 2.5	LMAX
Class A Land	60/50	65/55	70/60	75/65
Class B Land	65	70	75	80
Class C Land	70	75	80	85

Source: WAC 173-60-040 (b) and (c)

Table 3-7 shows a maximum noise limit of 70 dBA for a Class C noise source and a Class C receiving property, which is what the land within and surrounding the Project boundary is classified as due to the commercial forestry activities conducted at the Weyerhaeuser McDonald Tree Farm. The WAC regulatory limits are absolute and independent of the existing acoustic environment; therefore, a baseline noise survey is not requisite to determine conformance.

U.S. Environmental Protection Agency Noise Guidelines

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA 1974). This report represents the only published study that includes a large database of community reaction to noise to which a proposed project can be readily compared. This publication evaluates the effects of environmental noise with respect to health and safety, and provides information for state and local governments to use in developing their own ambient noise standards.

For outdoor residential areas and other locations in which “quiet” is a basis for use, the recommended EPA guideline is an L_{dn} of 55 dBA. Provided that Project operations met this criteria level, adjacent noise sensitive receptors would regard the noise levels as generally

acceptable. The EPA also suggests an L_{eq} of 70 dBA (24-hour) limit to avoid adverse effects on public health and safety at publicly accessible property lines or extents of work areas where extended public exposure is possible. The EPA criteria results are summarized in Table 3-9, which identifies levels of environmental noise below which there is no evidence that the general population would be at risk to EPA identified health effects.

Table 3-9. Summary of EPA Noise Levels

Location	Level	Effect
All public accessible areas with prolonged exposure	70 dBA $L_{eq\ (24h)}$	Safety/hearing loss concerns
Outdoor at residential structure and other NSAs where a large amount of time is spent	55 dBA L_{dn}	Protection against annoyance and activity interference
Outdoor areas where limited amounts of time are spent, i.e., park areas, school yards, golf courses, etc.	55 dBA $L_{eq\ (24h)}$	
Indoor residential areas	45 dBA L_{dn}	
Indoor non-residential areas	45 dBA $L_{eq\ (24h)}$	

3.7.1.2 Impacts of the Proposed Action

This section presents the potential noise impacts of construction and operation of the Project and identifies mitigation measures that are available if and as necessary to control noise levels.

Construction

Project construction is expected to take 15 months to complete; however, depending on weather conditions it may extend for up to 24 months. Project construction activities are described in detail in Section 2.2.3.

Various construction phases would require a number of different pieces of construction equipment. Table 3-10 shows a representative grouping of construction equipment for key construction phases and the resulting approximate received sound level at 1,000 feet.

The sound levels resulting from construction activities vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers. During construction there would be temporary increases in sound levels near active areas of construction and along roadways used for construction vehicles. The increases in noise levels would depend on the type of equipment being used, and the amount of time it is in use.

The substantial distances between the Project Area and the closest potentially sensitive receptors (at least 2.5 miles) would minimize potential noise impacts from construction activities. Construction noise impacts would be temporary, intermittent and localized; therefore, adverse community noise impacts are not expected.

Table 3-10. Representative Maximum Construction Noise Levels by Construction Phase

Phase No.	Construction Phase	Construction Equipment	Number of Equipment	Maximum Equipment Noise Level at 50 feet, dBA	Composite Noise Level at 1000 feet, dBA
1	Site Clearing and Preparation	Scraper	2	87	58.1
		Grader	2	85	
		Roller	1	85	
		Front End Loader	2	80	
		Bulldozer	2	85	
		Tree Buncher	2	85	
2	Site Excavation and Foundation Work	Excavator	1	85	55.1
		Backhoe	1	80	
		Compactor	1	80	
		Trencher	1	77	
		Concrete Batch Plant	2	83	
		Concrete Pump	2	82	
3	Transmission Line and Support Facility Construction	Grader	1	85	54.2
		Truck	2	84	
		Wire Tensioner	1	80	
		Wire Puller	1	78	
		Drum Puller	2	74	
4	Wind Turbine Installation	Truck/trailer	1	88	54.6
		Small Crane	1	83	
		Large Crane	1	65	
5	Site Reclamation	Bulldozer	2	85	55.3
		Backhoe	2	80	
		Roller	1	85	
		Truck	2	84	

Sources: Bolt, Beranek & Newman 1977; DOT 2006

Blasting

During foundation work, if bedrock is encountered at any wind turbine location, rock anchors would likely be used to secure the base of the foundation, regardless of which foundation design is used. Use of explosives (blasting) may be required for installation of rock anchors. Geotechnical studies have not been completed at this stage of the permitting process; therefore, the need to conduct blasting is currently unknown.

Blasting creates a sudden and intense airborne noise potential as well as local ground vibration. Modern blasting techniques include electronically controlled ignition of multiple small explosive charges in an area of rock. The detonations are timed so that the energy from individual detonations destructively interferes with each other, which is called wave canceling. As a result, very little of the kinetic energy is wasted as ground vibration and audible noise. Impulse (instantaneous) noise from blasts could reach up to 140 dBA at the blast location attenuating to approximately 90 dBA at a distance of 500 feet from the blast.

Blasting is a relatively short duration event as compared to rock removal methods such as using track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and/or rotary rock drills. Though noise generated during blasting can be audible at a considerable distance from the construction site, given the substantial distance to the closest receptors, blasting noise levels are not expected to be a significant noise impact.

Operation

An operational noise assessment was conducted for the Coyote Crest Wind Park inclusive of the Project wind turbines, electrical substations and transmission line. An acoustic modeling analysis was completed to determine received sound levels from wind turbine operation within and in close proximity to the Project site boundary. Electrical substation and transmission line noise were dealt with in a semi-qualitative manner in this assessment. This is a practical approach to evaluate operational noise due to the sizeable separation distance between Project components and noise sensitive receptors.

Wind Turbine Operation

While sound generated by an operating wind turbine is comprised of both aerodynamic and mechanical sound, the dominant sound component from utility scale wind turbines is aerodynamic. Aerodynamic sound refers to the sound produced from air flow and its interaction with the wind turbine's tower structure and rotor blades when they are in motion. Due to the improved design of wind turbine mechanical components and the use of improved noise damping materials within the nacelle, mechanical sound would likely only be emitted during upset conditions.

Wind energy projects, in comparison to other conventional energy projects, are somewhat unique in that the sound generated by each individual wind turbine would increase as the wind speed across the site increases, up to a certain maximum sound level under elevated wind conditions (i.e., greater than approximately 26 feet [8 meters] per second). Wind turbine sound is negligible when the rotor is at rest, increases as the rotor tip speed increases, and is generally constant once rated power output and full rotational speed is reached. As an offset, as wind speeds increase, the background ambient sound levels likely would continue to increase, resulting in acoustic masking effects (Rogers et al. 2006).

The Nordex N90 2500 kilowatt (kW) wind turbine was considered in the operational assessment as it is the preferred wind turbine model for the Project. Sound power data according to wind speed ranging from cut-in to full rated power was obtained directly from the manufacturer. These data were measured according to the International Electrotechnical Commission (IEC) standard 61400-11: Wind turbines – Part 11: Acoustic noise measurement techniques (IEC 2002), which was developed to ensure consistent and comparable sound emission data of utility-scale wind turbines between manufacturers. These data are inclusive of both mechanical and aerodynamic source components. Wind turbines can be somewhat directional, radiating more sound in some directions than others. The IEC test measurement protocol requires that sound

measurements are made for the maximum downwind directional location when reporting apparent sound power levels. Thus, worst-case wind turbine directivity and sound generating efficiencies are reported in the sound source data and used in the acoustic model calibration. A summary of sound power data for the selected Nordex N90 wind turbine correlated by wind speed at a height of 10 meters (33 feet) above grade are presented in Table 3-11.

Table 3-11. Broadband Sound Power Levels (dBA) Correlated with Wind Speed

	Wind Turbine L_{max} Sound Power Level (L_W) at Reference Wind Speed									
10-meter Wind Speed	3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
Nordex N90	95.0	99.0	102.5	105.5	106.5	107.0	107.0	107.0	107.0	107.0

Source: Nordex SE 2007

The acoustic modeling analysis was conducted using DataKustic GmbH's CadnaA, the computer-aided noise abatement program (v 3.7.123). CadnaA is a comprehensive three-dimensional acoustic software model that conforms to the International Organization for Standards (ISO) standard ISO 9613-2, *Attenuation of Sound during Propagation Outdoors*. The engineering methods specified in this standard consist of 1/1 octave band algorithms that incorporate the following (DataKustik 2008):

- Geometric spreading wave divergence,
- Reflection from surfaces,
- Atmospheric absorption,
- Screening by topography and obstacles,
- Terrain complexity and ground effects,
- Source directivity factors,
- Height of both sources and receptors,
- Seasonal foliage effects, and
- Meteorological conditions including the effects of wind and atmospheric inversions.

Site-specific topographical information was imported into the acoustic model using the official USGS digital elevation dataset. Review of the terrain data revealed that the Project was proposed to be constructed in an area with variable terrain elevation. To account for the impact of the varying terrain on received sound levels, each wind turbine was modeled as a point source at multiple heights extending from the bottom to the top of the rotor swept area. If the rotor of a wind turbine is within the line of sight of a receptor, the sound generated by its operation is not fully shielded by terrain features (or other obstacles); therefore, by representing the Project wind turbines in this way as opposed to a single elevated point source is a conservative measure to prevent received sound levels from being underestimated.

The ISO 9613-2 standard accounts for ground absorption rates by assigning a numerical coefficient of 0 for acoustically hard, reflective surfaces and 1 for absorptive surfaces and soft ground. If the ground is pavement or hard-packed dirt, typically found in industrial complexes, or for sound traveling over bodies of water, the absorption coefficient is defined as G=0 to account for reduced sound attenuation. In contrast, ground covered in snow (common in this region during the winter season), vegetation, including suburban lawns, livestock and agricultural fields (both fallow with bare soil and planted with crops), would be acoustically absorptive and aid in sound attenuation, i.e., G=1.0. For the acoustic modeling analysis, a conservative ground absorption rate was selected, accounting for a semi-reflective ground surface. Additional sound attenuation through foliage and diffraction around and over existing anthropogenic structures were disregarded for all modeling scenarios. The results are therefore representative of worst-case scenario: a snow-covered, defoliate winter landscape.

Meteorological factors that can influence sound propagation include (in approximate order of increasing importance) humidity, precipitation, temperature, atmospheric stability, turbulence, wind speed and direction. The ISO 9613-2 standard calculates received sound pressure levels for meteorological conditions favorable to propagation, i.e., downwind sound propagation or what might occur typically during a moderate atmospheric ground level inversion. Though a physical impracticality, the ISO 9613-2 standard simulates omnidirectional downwind propagation and worst-case wind turbine source directivity factors. For receptors located between discrete wind turbine locations or wind turbine groupings, the acoustic model may result in the over-prediction of received sound level results. In addition, the acoustic modeling algorithms essentially assume laminar atmospheric conditions, in which neighboring layers of air do not mix but flow at different velocities. This conservative assumption does not take into consideration turbulent eddies that form when winds change speed or direction, which can interfere with the sound wave propagation path and increase attenuation effects. Conversely, there may be anomalous meteorological conditions from time to time that would aid in the long range propagation of sound, potentially causing Project sound levels to increase, specifically at points of reception located further away from wind turbines. Anomalous meteorological conditions may include well-developed moderate ground-based temperature inversion, such as commonly occurs at night and wind gradients, which may occur at anytime.

Typically, a noise impact assessment presents received sound levels at discrete receptor locations resulting from a range of operational scenarios. With no noise sensitive receptors (i.e., residences) nearby, calculations were completed using a 50 meter by 50 meter (164 foot by 164 foot) receiver grid over the Project Area with a receiver height of 1.5 meters (5 feet) above grade (the approximate height of ears of a standing person). Acoustic modeling assumed concurrent and continuous operation of all wind turbines for the following three operational conditions to show the full range of future expected sound levels resulting from the Project:

- *Wind Turbines at Cut-in Wind Speed:* The cut-in wind speed at hub height is the lowest wind speed at which a wind turbine begins producing usable power. The rated sound

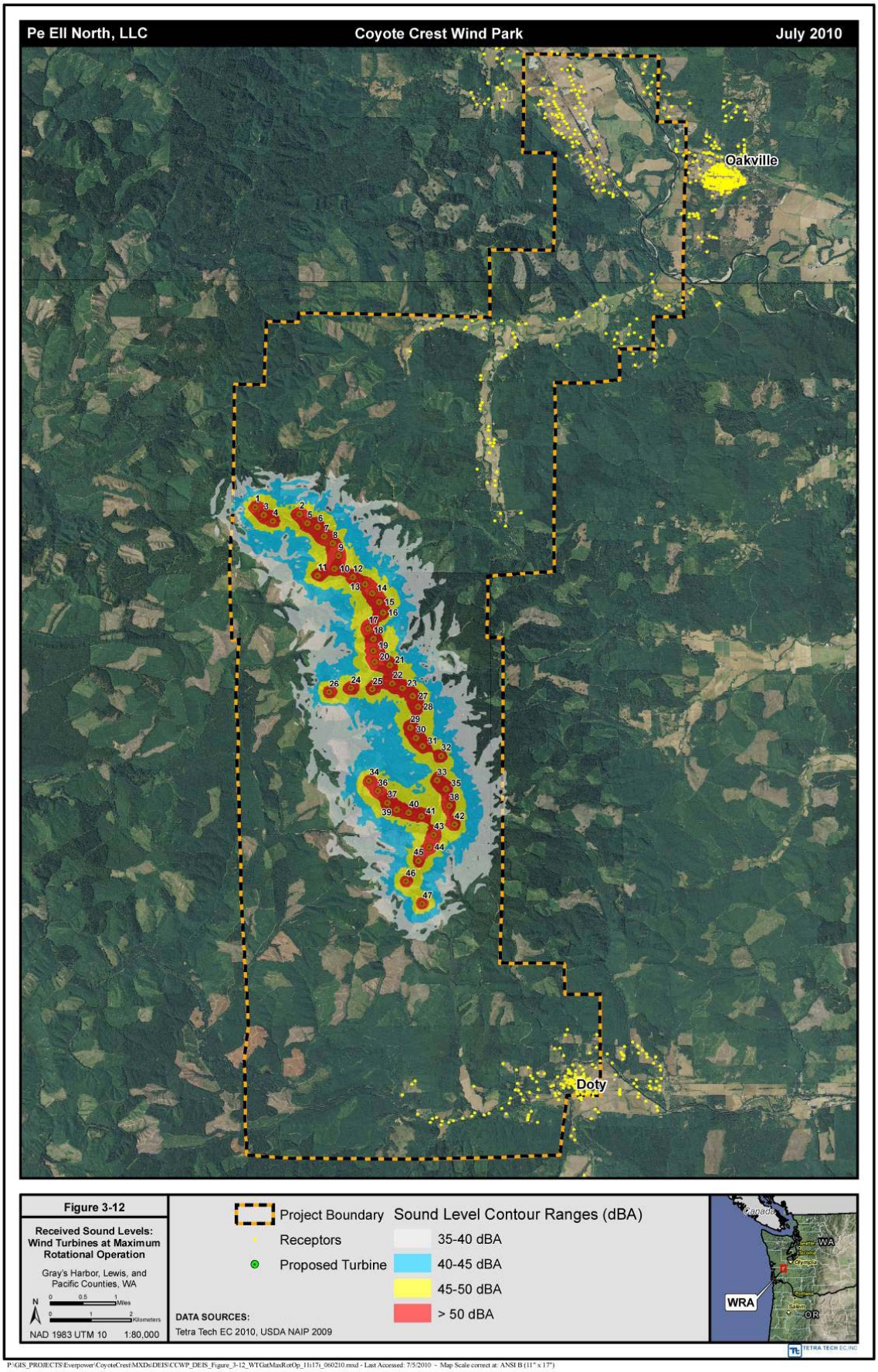
power level for the Nordex N90 is 95.0 dBA at a cut-in wind speed of 3 m/s. Though wind turbines generate less noise under these conditions, there is the potential for increased audibility due to the lower ambient levels and therefore reduced masking as compared to sound levels generated under maximum rotational operation scenario.

- *Wind Turbines at Full Rotational Wind Speed:* This scenario represents the worst case in terms of noise generation by the wind turbines. At wind speeds at hub height above full rotational speeds, the noise generated by Project wind turbines should remain somewhat constant while ambient levels continue to increase due to wind generated noise. For this analysis, acoustic modeling was limited to downwind propagation conditions at the maximum wind turbine blade rotational speed, with a rated sound power of 107.0 dBA for the Nordex N90. The sound level contour map representing this modeling scenario is presented in Figure 3-12.
- *Wind Turbines at Full Rotational Wind Speed during Anomalous Meteorological Conditions:* This scenario considers anomalous meteorological conditions, including effects of low level jet streams and atmospheric inversions which can be more conducive to long range sound propagation. Though expected to be somewhat infrequent, this additional acoustic modeling scenario was included to provide a further level of additional conservatism in the calculations.

The resultant sound contour plots are independent of the existing acoustic environment, i.e., the plots represent Project-generated sound levels only. Results of the wind turbine acoustic modeling analysis show that sound levels would attenuate to well below the applicable 70 dBA nighttime limit prescribed by the WAC for Class C land at the Project boundary. The maximum Project boundary line receptor received sound level is expected to be less than 45 dBA. With all noise sensitive receptors located at extended distances from this boundary, Project sound levels would continue to attenuate further; therefore, no compliance issues or noise nuisance conditions would be expected to occur and compliance with the WAC for Class A land has been adequately demonstrated.

Electrical Substation

In addition to the existing Cedarville and South Elma substations, a new electrical substation footprint would occupy approximately 2 acres within the Project Area. There are three main sound sources associated with a transformer: core noise, load noise and noise generated by the operation of the cooling equipment. The core is the principal noise source, dominating in the intermediate frequency range between 100 and 600 Hz. The load noise is primarily caused by the load current in the transformer's conducting coils (or windings), and the main frequency of this sound is twice the supply frequency; 100 Hz for 50 Hz transformers and 120 Hz for 60 Hz transformers. The cooling equipment (fans and pumps) noise typically dominates the very low and very high frequency ends of the sound spectrum; however, cooling equipment sound is comparatively lower and considered secondary to the sound produced by the core and load. The



P:\GIS_PROJECTS\Everpower\CoyoteCrest\MXDs\DEIS\CCWP_DEIS_Figure_3-12_WTGatMaxRotOp_11x17i_060210.mxd - Last Accessed: 7/5/2010 - Map Scale correct at: ANSI B (11" x 17")

substation designed for the Project would conform to all relevant National Electrical Manufacturers Association (NEMA) standards (NEMA Standards TR1-1993 [R2000]).

Few complaints from nearby residents are expected regarding substations with transformers less than 10 MVA capacities, except in urban areas with little or no buffer distance attenuation between the source and receiver locations. In very quiet rural areas where the nighttime ambient acoustic environment can reach levels of 20 to 25 dBA under calm or low level wind conditions, the sound generated from the transformers of this size may be periodically audible at distances of half a mile or greater. The Project substation would use one large 34.5/115 kV power transformer, which is a relatively low capacity and there are no noise sensitive receptors located near the substation; therefore, noise impacts associated with normal substation operation are expected to be negligible. During substation operation, general maintenance would be required to attend to on-site component repairs. Noise produced from substation maintenance activities would be similar to construction phase levels but only on a very short-term and infrequent basis.

Transmission Lines

Transmission lines have the potential to emit environmental noise under certain operating and environmental conditions. Transmission line noise (also called corona noise) is caused by the partial electrical breakdown of the insulating properties of air around the electrical conductors and overhead power lines. When audible, corona-generated noise is often described as a crackling or hissing sound when high humidity, fog, or rain occur. This noise increases with the voltage of the line, undersized conductors, irregularities on the conductor surface caused either by age or moisture, or wet ambient meteorological conditions.

Modern transmission lines, such as those used for the Project, are designed, constructed and maintained so that during dry conditions they would operate below the corona inception voltage; that is, the line would generate a minimum of corona-related noise. During dry weather conditions, noise from the proposed transmission lines would be generally indistinguishable from background sound levels at locations beyond the edge of the ROW. During rainfall events, the noise level at the edge of the ROW is expected to remain low. The impact of corona noise during Project operations is not expected to be significant.

3.7.1.3 Impacts of the No Action Alternative

Under the No Action Alternative, the Coyote Crest Wind Park would not be constructed and no wind energy would be produced from the Project Area. No construction or operation-related noise would be generated. Existing sound levels from the site include forestry and agricultural activities, which would continue in the future with or without the proposed Project. Other noise impacts could occur from future permitted activities in the area.

3.7.1.4 Mitigation

The impact analysis indicated that no noise sensitive receptors would be adversely affected by noise levels produced during Project construction and operation. Therefore, no noise mitigation measures are needed, and the Applicant has not proposed any noise mitigation measures.

3.7.1.5 Significant Unavoidable Adverse Impacts

The findings of this noise impact assessment showed that existing noise sensitive receptors are not located close to Project facilities and that the operation of the Project would result in noise levels that are well below those required under the state noise regulations. Therefore, the Project would not result in adverse noise impacts.

3.7.2 Other Environmental Health Risks

This section describes existing environmental health and safety risks in the vicinity of the Proposed Action such as fire and explosion, hazardous spills, mechanical hazards, and electrical hazards.

3.7.2.1 Affected Environment

The Project Area is located in a rural and lightly populated section of Lewis, Grays Harbor, and Pacific counties that is characterized primarily by commercial forestry use. The land use in the general Project Area is primarily commercial timber lands, including land owned by the Weyerhaeuser Company and public lands managed by WDNR. All timber harvest activities are managed in compliance with the WFPA administered by WDNR. Environmental health impacts associated with ongoing timber harvest include the potential for fires or spills of hazardous materials (primarily fuels, lubricants, and hydraulic fluids).

A review of Ecology facilities information revealed no sites of concern at proposed WTG locations. Several facilities exist within the Project Area that would not be affected by the Project: these include a leaking underground storage tank that was cleaned up in 1998; and permitted underground storage tanks, hazardous waste generators, dairy farms, quarries, and various enforcement and non-enforcement action sites.

Generally, fire season runs from April 15 to October 15. Activities on private and state timber lands are regulated by the WDNR using Industrial Fire Precaution Levels (IFPL), a four-level regulation system. The IFPL regulates work in the woods during the fire season by prohibiting or restricting certain operations when fire danger is elevated. Rarely, when very extreme fire weather conditions exist, WDNR may issue an order restricting all access by all people to all activities on private and public lands.

Natural and human caused forest fires have occurred within the Project Area in the past and are expected to occur in the future. Over the past 37 years, about 53 fires have been recorded, most of which are caused by human activities such as debris burning, logging activities, smoking, recreation, arson, fireworks, and electrical fences (WDNR 2008, 2010a). Four natural, lightning

caused fires also occurred over this period, each less than 0.1 acre in size (WDNR 2008, 2010a). Overall, the average fire size was less than 1.6 acre and most fires were controlled within 24 hours (WDNR 2008, 2010a).

3.7.2.2 Impacts of the Proposed Action

Environmental health and safety risks associated with the Project include potential fire and explosions, hazardous material spills, as well as other risks specific to wind turbine generators such as tower collapse and blade throw, ice throw, and electric and magnetic fields.

Fire and Explosion

The greatest fire risk for the Project would occur during the construction period, because of the level of activity and the number of workers and equipment that would be working in the area. Construction activities that could ignite an unintentional fire include the use of chainsaws, vehicles, and heavy equipment for site clearing and grading and hot work. During construction, the Applicant would minimize fire hazards and the consequences of any fire that might occur by preventing exposure or reducing the risk by implementing mitigation measures. Mitigation measures are discussed in Section 3.7.2.4.

The risk of unintentional fire or explosion resulting from mechanical or human causes during operations is very low but could occur. During operations, the Applicant would continue to operate under the fire safety plan and provide regular turbine maintenance, including review of real-time and stored temperature sensor readings that would be used to highlight developing problems and facilitate prevention of equipment-caused fire.

As noted above, fires have occurred within the Project Area in the past from sources unrelated to the Project and can be expected to occur in the future. The Project would not likely increase or decrease the occurrence of these fires. Fires caused by lightning do not occur often within the Project Area and have been relatively small (about 0.1 acre or less). Each wind turbine, including rotor blades, would be equipped with lightning protection systems which would be connected to an underground grounding arrangement to facilitate the flow of lightning energy safely to the ground. All equipment, cables and structures comprising the wind turbines would be connected to a metallic grounding system. The 115 kV transmission line poles and wire would also have a lightning protection grounding system. Therefore, with the use of lightning protection, the construction and operation of the Project would not significantly increase the risk of fire or explosion.

Hazardous Material Spills

Construction of the Project would require the use of hazardous materials including fuels, lubricants, cleaning solvents, paints, pesticides, and possibly explosives. The potential for exposure to fuel and non-fuel hazardous substances would increase during construction; however, the effects would be localized in the area of the spill and the Applicant would clean-up the spill according to applicable regulations. All hazardous materials would be stored in

approved containers and storage facilities to prevent leakage. During the construction period, diesel fuel would be transported into the site at least twice a week to fuel construction equipment. All waste oil and fluids collected during maintenance would be placed in appropriately marked barrels and transferred off-site to an approved waste facility. To reduce the risk of hazardous material spills or industrial wastes, all material storage and dispensing areas would be equipped with secondary containment features. To further mitigate adverse impacts and ensure timely response to accidental leaks or spills, appropriate spill containment and recovery equipment would be maintained in the Project Area.

During operations, the turbines would require synthetic oil as a lubricant in the gearboxes and hydraulic fluid for the blade pitch actuators. Turbine oil would be tested regularly and replaced as needed, generally less than once per year and sometimes only once every five years. The Applicant would store all hazardous materials used during operations, such as lubricants, in secured facilities. Additionally, fluid-containing transformers would include secondary containment. Spill response services would be provided through a contract with a qualified environmental remediation services firm or with qualified in-house personnel.

Mechanical Hazards

Structural Failure

Structural failure could include complete collapse of the tower and/or blade throw, both of which are very rare and would likely be the result of human error, lighting strike, or manufacturing defects (Garrad Hassan Canada, Inc. 2007). The Applicant would use turbines equipped with multiple safety systems as standard equipment, including rotor speed controlled by a redundant pitch control system, an automatic backup disk brake system, multiple temperature sensors and a control system that would shut a turbine down and take it off-line if an overheat or over-speed condition is detected. The Applicant would use turbines designed to meet the requirements of the IEC's 61400-1 Standard, which is sufficient to assure that the fatigue stresses in the turbine blade would not be exceeded under expected operating conditions.

In the unlikely event of WTG structural failure, the risk to the public would be minimal because the Project configuration would include over 500 feet of safety zone setback from the nearest Project boundary and there are no buildings or improvements, other than roads, within 1,000 feet of the facilities. This, combined with private access roads, the remoteness of the site, and access restriction, would ensure adequate and reasonable protection from tower collapse and blade throw that may be associated with the Project. Further, with modern blade design and manufacturing, even in the rare event of blade failure, the damaged blade would likely remain attached to the turbine (Garrad Hassan Canada, Inc. 2007). Within the Project Area, where access would be limited, Weyerhaeuser would continue to harvest timber, but a 300-foot safety zone would be established surrounding each WTG inside which close coordination between the Applicant and Weyerhaeuser would be required and signage would warn timber operators of the WTG operations.

Ice Hazards

Ice can form on wind turbine towers and rotor blades when environmental conditions (temperature and humidity) are suitable. Moving rotor blades are subject to heavier buildups of ice than stationary blades, and sudden release of ice from rotor blades can create an ice throw hazard. The ice throw hazard area extends perpendicular to the wind direction and downwind from the turbine. Garrad Hassan Canada Inc. (2007) evaluated ice throw hazards and concluded that beyond a critical distance of about 220 meters (722 feet) from a turbine there is a negligible risk of injury from ice throw. Because of the significant distances from the proposed tower locations to permanent residences and public roads, and restricted site access, the Project would result in no additional risk to the public due to ice throw.

Additionally, ice build up on the blades of an operating turbine can cause vibration due to mass and aerodynamic imbalance (Garrad Hassan Canada, Inc. 2007). The turbines would be remotely monitored to detect excess vibration and would be shut down if vibrations exceed a pre-set level to prevent ice caused structural failures.

Electrical Hazards

Electrical hazards associated with the Project facilities would be mitigated by using qualified personnel, preparing detailed safety plans, trimming vegetation to avoid contact with collection and interconnection lines, restricting site access, providing safety training to all workers, clearly marking the location of buried collection system lines, and providing cardiopulmonary resuscitation and tower rescue training to select workers. Additionally all new Project collection system cables and interconnection transmission lines would be constructed and operated to in accordance with the National Electric Safety Code.

Electrocution

Electrocution could occur in the case of accident/human error or deliberate tampering by unauthorized persons (trespass or vandalism). To prevent electrocution by accident or error, all Project electrical components and infrastructure would be installed by qualified professionals in accordance with applicable standards and regulations, the buried collection system would be well marked, and safety training would be provided to construction and operational workers. To prevent electrocution as a result of unauthorized activities, site access would be restricted by gated and locked private access roads, substation yards, and access to the WTGs would be secured as well. The Applicant would also coordinate on-site security with both Weyerhaeuser and the Lewis County Sheriff's Office.

Electric and Magnetic Fields

Electricity would be delivered from the site using above ground transmission lines. The current within the transmission line would be alternating at 60 cycles per second (Hz) putting fields generated by this electrical energy in the extremely low frequency (ELF) range. Electric and magnetic fields (EMF) exist wherever electricity is generated, transmitted or distributed, or used in electrical appliances. EMF is as common in the human environment as the devices that emit

them, such as electric shavers, televisions, and transmission lines (World Health Organization 2007). Over the past few decades, significant debate has occurred regarding the potential adverse health effects associated with electrical equipment, including transmission lines. Following a 6-year investigation, the National Institute of Environmental Health Sciences (NIEHS 1999) concluded that the scientific evidence suggesting that ELF-EMF exposures pose any health risk is weak and does not warrant regulatory concern. Continued EMF research since that time has not prompted any significant change to the NIEHS recommendation (BPA 2009).

The magnetic field along a typical 115 kV transmission line right of way, at 100 feet from the conductor, is less than 2 milligauss (mG) during average use. This level is less than 14 percent of the magnetic field (6 inches from the device) from a video display terminal (14 mG) and less than 1 percent of the 300 mG magnetic field of a hair dryer or vacuum cleaner (NIEHS 2002). Because the evidence suggesting that EMF poses a significant health risk is weak (NIEHS 1999), there is limited access to the site, and the proposed transmission lines would primarily follow existing transmission line ROWs, the Project is not expected to result in any EMF-related health effects.

Lightning Strike

The frequency of lightning strikes occurring in the Project Area is not likely to be effected by the construction and operation of the proposed wind energy park. Effects of lightning are more of an issue in terms of damage to the project facilities. Lightning protection systems for wind turbines have developed significantly over the past decade, leading to a significant reduction in events where lightning causes structural damage (Garrad Hassan Canada, Inc. 2007). Each wind turbine, including rotor blades, would be equipped with a grounding system system that would safely facilitate the flow of lightning energy. All equipment, cables and structures comprising the wind turbines would be connected to a metallic grounding system.

The 115 kV transmission line poles and wire would also have a lightning protection grounding system including metallic grounding wire for each pole structure.

3.7.2.3 Impacts of the No Action Alternative

Implementation of the No Action Alternative would maintain the status quo; the Project Area would be primarily managed for continued timber production. Environmental Health hazards associated with timber harvest would continue, which include the risk of fire or accidental spills, but at a slightly lower level than under the Proposed Action.

3.7.2.4 Mitigation

Mitigation measures have been proposed by the Applicant to prevent the exposure to the risks or reduce environmental health hazards. Most of these are common industry standards or would be required by regulations. These mitigation measures were considered in the impact analysis and include:

- Incorporating the Weyerhaeuser Fire and Safety Plan;
- Conducting fire safety training with employees and contractors;
- Maintaining fire suppressant equipment within the Project Area;
- Using mufflers and spark arrestors on all construction equipment and provide designated parking areas for workers;
- Requiring construction shut-downs when necessary due to dry weather conditions;
- Maintaining a fire watch during fire season;
- Prohibiting or limit “hot work” (e.g., welding, brazing, grinding, and burning) when fire risks are elevated;
- Prohibiting smoking outside of vehicles and buildings;
- Prohibiting warming fires during the fire season or other dry periods;
- Requiring operating equipment to have fire extinguishers and other fire fighting tools as specified in the Weyerhaeuser Fire Plan and WDNR fire season rules;
- Storing flammable liquids according to 1997 Uniform Fire Code;
- Maintaining a standard forest lands fire fighting water tanker on site during operations.
- Entering into a Fire Services Agreement with Lewis County Fire Protection District Nos. 11 and 16;
- Incorporating emergency evacuation procedures and forest fire safety procedures into all construction and operations programs;
- Storing all hazardous in approved containers and storage facilities to prevent leakage;
- Transferring all waste oil and fluids off-site to an approved waste facility;
- Providing secondary containment for all hazardous liquid storage and dispensing areas;
- Maintaining spill containment and recovery equipment in the Project Area;
- Providing secondary containment for fluid-containing transformers;
- Providing spill response services through a contract with a qualified environmental remediation services firm or with qualified in-house personnel;

- Providing safety training to all personnel;
- Training select personnel in cardiopulmonary resuscitation and tower rescue;
- Constructing and operating all new Project collection system cables and interconnection transmission lines in accordance with the National Electric Safety Code;
- Clearly marking the location of buried collection system lines;
- Restricting access to the Project Area by gated and locked private access roads, and substation yards;
- Securing access to the WTGs;
- Coordinating on-site security with both Weyerhaeuser and the Lewis County Sheriff's Office; and
- Providing lighting protection for each wind turbine, including rotor blades.

3.7.2.5 Significant Unavoidable Adverse Impacts

Considering the minimal impact of the Project on environmental health and the mitigation measures that would be included by the Applicant, no significant unavoidable adverse impacts would occur.

3.8 Land and Shoreline Use

This section describes existing land use in the Coyote Crest Wind Park Project Area. It also evaluates potential impacts on land use that would occur with construction and operation of the proposed Project, and identifies mitigation measures designed to limit or reduce those impacts. Consistency with relevant plans and regulations is also discussed.

3.8.1 Affected Environment

3.8.1.1 Land Use

The Project Area is located in a rural and lightly populated area of Lewis, Pacific, and Grays Harbor counties (Figure 1-1). The portion of the Project Area proposed for wind turbine development (lease area) is situated along a long north-south oriented ridge line known as Coyote Crest and the Doty Hills which separates the Chehalis Valley from the coastal areas of Grays Harbor and Willapa Bays. The terrain within this area is a broad high ridgeline with elevations from 2,100 feet at the southern turbine locations, 2,000 in the center area, and 1,800 feet in the northern turbine area. The northern part of the Project Area, which includes the main access point and the 115 kV transmission line route from the Project to the interconnection point at Cedarville, spans the narrow tributary valley of Garrard Creek and a lightly populated area of the larger Chehalis River Valley.

The majority of the Project would be located in unincorporated Lewis County, approximately 5 miles north of the community of Doty. A small portion of the Project would be located in the northeastern corner of unincorporated Pacific County. The proposed Project transmission line and the associated transmission line upgrade would be located primarily in unincorporated Grays Harbor County. The Project would be located on lands owned by and leased from Weyerhaeuser Company and WDNR (Figure 2-1). The total Project lease area is 3,560 acres. Approximately 3,240 acres of the Project Area are located within Weyerhaeuser's McDonald Tree Farm, and another 320 acres of the Project Area are administered by WDNR.

Land use in the Project lease area is commercial forestry, with lands along the transmission line corridor in agricultural and rural residential land uses. The commercial timber lands within the lease area are characterized by harvest units (50 to 100 acres in size) with a matrix of various age stands of timber with an average rotation of 40 years. The Weyerhaeuser McDonald Tree Farm is managed for sustained-yield timber production. The harvesting program employs several different types of harvesting systems and is managed in compliance with the WFPA administered by WDNR. Portions of the McDonald Tree Farm in the Project lease area have recently been harvested and replanted. The private timber lands owned by Weyerhaeuser are not open to general public use, although some low-intensity outdoor recreational uses such as hunting and road vehicle use occur with the permission of Weyerhaeuser.

Forest lands managed by WDNR are adjacent to and immediately east of the McDonald Tree Farm. These WDNR lands are used for commercial forestry timber production, habitat, and recreation such as hunting. The WDNR lease area has been extensively harvested. Only 320 acres (the west half of Section16 T. 14N, R. 5W) of WDNR lands would be included in the Project Area and used for wind energy development.

Operations on the McDonald Tree Farm and WDNR leases are subject to the WFPA. Weyerhaeuser manages the McDonald Tree Farm on a sustainable forestry basis. The entire tree farm has been inventoried and classified into a series of timber management units. These timber management units take into consideration the age of the stand of trees, the type of trees, slope, and environmental considerations. Harvest management planning evaluates these management areas for scheduled harvesting approximately every 40 years depending on the growth in each stand. The majority of the Project Area has been harvested once and several areas have been harvested several times.

While the exact path of the transmission line has not yet been determined, in general it would run from the northern part of the turbine development area across Weyerhaeuser property to Garrard Creek Road near the corners of Sections 21, 22, 27 and 28 in Township 15N, Range 5W. From there the transmission line would follow Garrard Creek Road and then South Bank Road for approximately 8 miles through a lightly populated area of the Chehalis River Valley, ending at the existing Cedarville Substation in Grays Harbor County. The Project Area depicted in

Figure 1-1 includes an area of approximately 1 mile on either side of the preliminary transmission line route.

The transmission line would follow existing Weyerhaeuser roads and Grays Harbor PUD utility easements in Lewis County and Grays Harbor County to the Cedarville substation, which is interconnected to the BPA power line at South Elma. Most of the proposed transmission interconnection would be implemented as modifications to existing transmission line facilities located within PUD easements that run parallel to Garrard Creek Road and South Bank Road, and are located within the ROW for the respective roads.

The transmission line easement areas and the primary access route to the Project are located in lightly populated valley areas along the Chehalis River and Garrard Creek. Small farm or ranch properties and scattered rural residences on large lots occur along the main public roads, such as South Bank Road and Garrard Creek Road. Similar land-use conditions occur along Elk Creek Road, Stevens Road and State Route 6 in and near the southern end of the Project Area.

There are no residences within the vicinity of the WTG areas and along the possible transmission line route on Weyerhaeuser land. There are seven residences located along the possible transmission line route along Coyote Crest Road and 18 residences along the transmission line route following Garrard Creek Road to the Lewis County Boundary with Grays Harbor County. Residences along the transmission line route along South Bank Road in Grays Harbor County have not been quantified, but this area is characterized by similar agricultural and rural residential land uses as along Garrard Creek Road in Lewis County. Figure 2-1 shows ownership within 1 mile of the WTG facilities. Figures 2-2a and 2-2b show land ownership within 500 feet of the proposed transmission line route along Garrard Creek Road and South Bank Road to Cedarville. The ownerships identified in Figures 2-2a and b lie adjacent to the easement and ROW.

Grays Harbor PUD would upgrade 8 to 9 miles of existing transmission line between the Cedarville Substation and the South Elma Substation, where the PUD system is connected to the BPA transmission system. The PUD has not finalized the specifics of this connected action (see Section 2.2.1.2), but would be responsible for any necessary easement or ROW actions to complete this upgrade. Detailed land use information for this associated is not included in this EIS.

3.8.1.2 Shoreline Use

The proposed Project transmission line and the associated transmission line upgrade would be located in proximity to the Chehalis River in Grays Harbor County. The transmission line along Garrard Creek Road would be as close as approximately 300 feet from the river where the road turns northward toward Oakville. South Bank Road crosses the river in this vicinity, but the transmission line remains on the west side of the river. The transmission line follows South Bank Road in a northwestern direction toward the Cedarville Substation. Between the river

crossing and Cedarville, South Bank Road and the transmission line are between 0.2 and 1.0 mile from the river.

Development within the Chehalis River floodplain is subject to the Washington State Shoreline Management Act and Grays Harbor County's shoreline management regulations. These regulations are discussed in Sections 4.2 and 4.4.

3.8.1.3 Zoning

Land in the Lewis County portion of the Project Area is zoned as Forest Resource Lands (Figure 3-13), the Pacific County portion of the Project Area is zoned as Commercial Forest, and land along the proposed Project transmission line corridor in Grays Harbor County is zoned as Agricultural-2. Compliance of the Project with the three counties' zoning regulations is discussed in Sections 4.3 to 4.5.

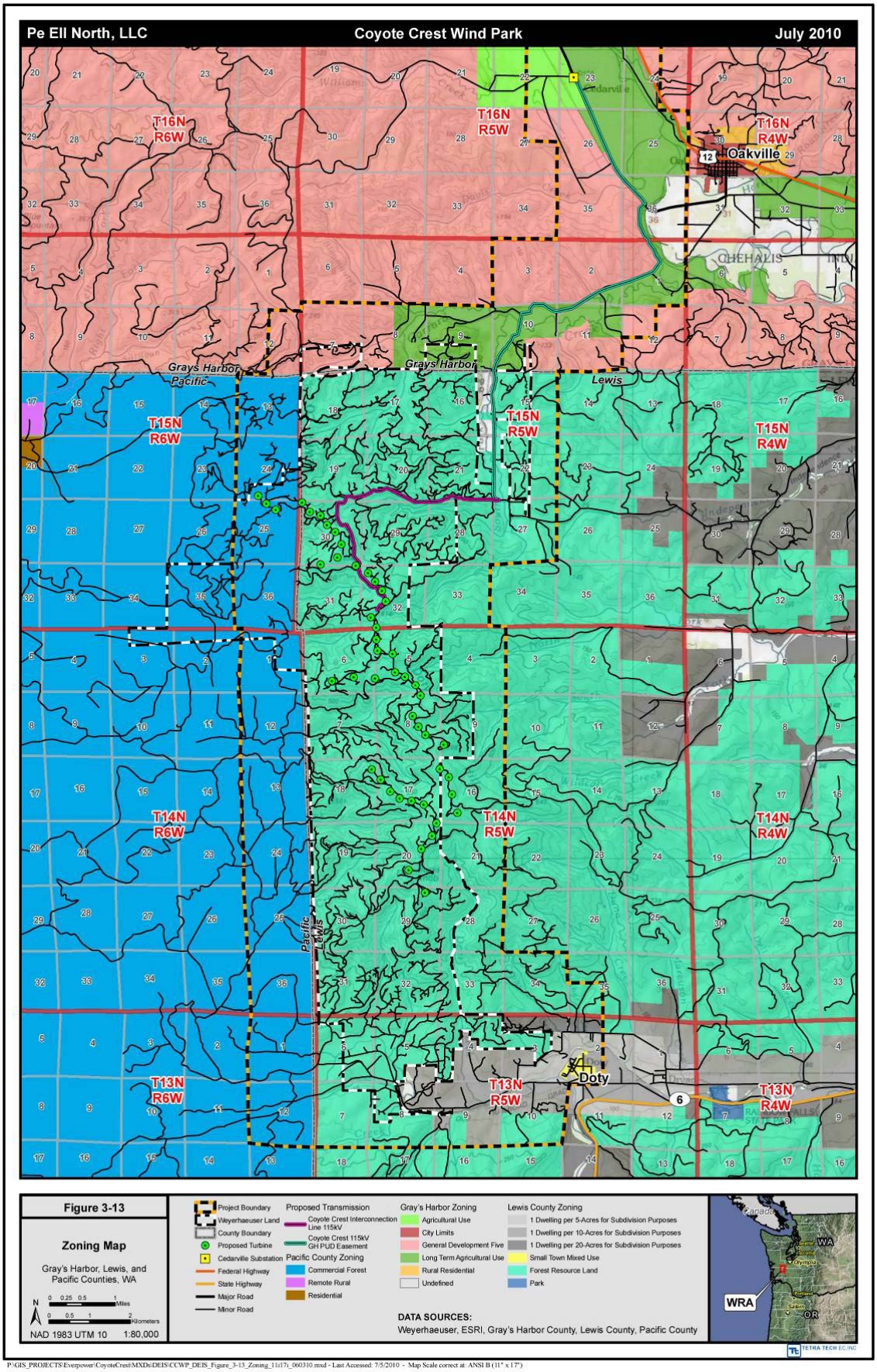
3.8.2 Impacts of the Proposed Action

Potential direct impacts of the proposed Project would include long-term conversion of commercial forestry land to wind energy uses, as well as temporary disturbance to forestry lands and possible temporary suspension of timber harvesting in portions of the Project Area during construction activities. The permanent footprint of the project would remove approximately 105 acres from commercial forestry uses for the life of the project (at least 20 years). The remaining portions within the Project Area would remain in active commercial forestry use. Indirect land use impacts are not anticipated, because the Project is not expected to affect regional growth, overall land use patterns, or offsite land uses.

3.8.2.1 Construction Impacts

During the construction period, 472 acres of land would be temporarily disturbed for construction of wind energy and transmission line facilities. Land disturbance would result from construction of Project facilities, including WTGs, electrical collection lines, an on-site substation, an O&M facility, permanent met towers, a 115 kV transmission line, and any necessary road improvements. Construction activities would require temporary disturbance of a larger area than would be occupied by the permanent Project facilities. Table 2-2 identifies the estimated area that would be cleared and disturbed in the construction footprint of the various Project components.

Most of the proposed Project facilities, including a majority (44 of 47) of the WTGs, would be located on lands within Weyerhauser's McDonald Tree Farm. Three additional WTGs are proposed for sites on WDNR land. Weyerhauser and WDNR land would be converted from commercial forestry uses to wind energy turbines and associated facilities. Forest lands would be cleared for construction of each WTG, the power collection system (both underground and above ground power cables), substation, operation and maintenance facility, meteorological


Pe Ell North, LLC
Coyote Crest Wind Park
July 2010
T16N R6W
T16N R5W
T16N R4W
Oakville
CHEHALIS
Grays Harbor
Pacific
Grays Harbor
Lewis
T15N R6W
T15N R5W
T15N R4W
T14N R6W
T14N R5W
T14N R4W
Pacific
Lewis
T13N R6W
T13N R5W
T13N R4W
Doty
Figure 3-13
Zoning Map
Gray's Harbor, Lewis, and Pacific Counties, WA
NAD 1983 UTM 10
1:80,000
Project Boundary
Weyerhaeuser Land
County Boundary
Proposed Turbine
Cedarville Substation
Federal Highway
State Highway
Major Road
Minor Road
Proposed Transmission
Coyote Crest Interconnection Line 115kV
Coyote Crest 115kV GH PUD Easement
Pacific County Zoning
Commercial Forest
Remote Rural
Residential
Gray's Harbor Zoning
Agricultural Use
City Limits
General Development Five
Long Term Agricultural Use
Rural Residential
Undefined
Lewis County Zoning
1 Dwelling per 5-Acres for Subdivision Purposes
1 Dwelling per 10-Acres for Subdivision Purposes
1 Dwelling per 20-Acres for Subdivision Purposes
Small Town Mixed Use
Forest Resource Land
Park
DATA SOURCES:
Weyerhaeuser, ESRI, Gray's Harbor County, Lewis County, Pacific County
WRA
WA
OR
TETRA TECH EC, INC.
P:\GIS_PROJECTS\Everpower\CoyoteCrest\MXDs\DEIS\CCWP_DEIS_Figure_3-13_Zoning_11x17t_060310.mxd - Last Accessed: 7/5/2010 - Map Scale correct at ANSI B (11" x 17")

towers, and any necessary access road improvements on Weyerhauser or WDNR land. Up to 90 acres of Weyerhaeuser land may be cleared for turbine pads and laydown, or approximately 2 acres per turbine. Up to 261 additional acres of Weyerhaeuser and WDNR land, or approximately 5.5 acres per turbine, may be logged for wind boxes and then replanted with a shorter tree (Christmas trees, for example). The maximum possible total disturbed area for the turbine pads and wind boxes on Weyerhaeuser land is 344 acres. Clearing activities for the Project are subject to WDNR regulations under the WFPA. An FPAN permit must be obtained for activities on forest lands involving harvesting, road construction, rock pits, and installation or change of culverts and/or bridges.

Temporary land disturbance impacts would coincide with the construction period. Commercial forestry activities within the Project Area would continue during construction. However, log harvesting would be suspended in portions of the Project Area on an intermittent basis during the construction period to reduce operational conflicts with installation of the WTGs and other Project facilities. Upon completion of construction, all temporarily disturbed areas would be restored to their original condition.

Lands along the Project transmission route corridor would be disturbed for construction of the new transmission line and associated transmission system upgrade to South Elma. All construction activities for the new transmission line would take place on Weyerhaeuser lands (except for a short segment across private lands between the McDonald Tree Farm and Garrard Creek Road), along existing road rights-of-way, and within existing utility easements. There would be no acquisition or use of private property for construction of the transmission line. Temporary, indirect impacts during the construction phase would include construction noise, dust, increased construction-related traffic, and potential road or lane closures where the utility easement follows local roadways. See Section 2.2 for more discussion of the proposed transmission line route.

Several improvements to public roads are proposed to accommodate the truck traffic associated with the construction process. Minor roadway improvements are proposed to facilitate Project-related traffic at the intersection of Stevens Road with SR 6, the intersection of Elk Creek Road with Stevens Road in Doty, the intersection of Garrard Creek Road and Brooklyn Road, and the intersection of Coyote Crest Road / C-Line Road and Garrard Creek Road. Road improvements at these locations could have temporary construction-related impacts including noise, dust, traffic delays, and road or lane closures.

Expansion of the Cedarville Substation would occur on Grays Harbor PUD lands. Temporary land disturbance impacts around this facility would coincide with the construction period. Upon completion of construction, all temporarily disturbed areas would be restored to their original condition.

The associated transmission system upgrade from Cedarville to the South Elma Substation would have similar construction-related impacts to the new Project transmission line. Pre-construction conditions would be restored after completion of the transmission line upgrade.

3.8.2.2 Operation and Maintenance Impacts

The completed Project would result in the long-term conversion of 101 acres for WTGs, transmission line, new roads, and support facilities (Table 2-2). The footprint of the wind turbines (14 acres) would no longer be available for commercial forestry use during the life of the Project. However, the Project has been designed to be compatible with ongoing use of surrounding commercial forest lands. The WTGs have been sited to allow log harvesting operations to occur in the same area over the life of the Project. In general, the areas where WTGs are to be located have already been harvested or are currently planned to be harvested. Logging activities are expected to continue outside of the wind boxes in the immediate vicinity of the WTG locations. WTGs would be located in areas where road and logging infrastructure have already been constructed. Project operations would use this existing infrastructure while not interfering with its use for timber operations.

The WTG locations are over 500 feet from the nearest lease boundary and there are no buildings or improvements, other than roads, within 1,000 feet of the facilities. Safety set-backs are not required because of the relative isolation of the site. Weyerhaeuser and the Applicant have established a 300-foot safety zone surrounding each WTG location inside of which close coordination would be required of ongoing forestry operations.

The new transmission line structures and corridor would occupy approximately 38 acres of Weyerhauser land. The Project transmission line and associated transmission system upgrade would occur along existing road rights-of-way and within utility easements where transmission structures already occupy the easement. Therefore, construction of the new transmission line and upgrading the existing transmission system would not change current land uses, and would be compatible with existing adjacent land uses. No property would be acquired for the new transmission line.

Long-term operation and maintenance of the wind park over the operating life of the Project (at least 20 years) would require periodic access to Project facilities. Operations and maintenance activities for the Project would include routine testing and maintenance of the WTGs; on-site repairs of Project equipment as needed; patrolling the Project Area to ensure security and monitor on-site conditions; and periodic maintenance of Project access roads. Access to the WTGs and associated facilities within the Project Area would be via the Weyerhaeuser McDonald Tree Farm roads. Periodic operations and maintenance activities would also be conducted in the transmission line corridor. Increases in local traffic for these routine activities would be minimal. Operation and maintenance of the Project would be compatible with existing land uses in the Project Area.

3.8.3 Impacts of the No Action Alternative

Under the No Action Alternative, the Project would not be constructed and existing land uses in the Project Area would not be affected by the proposed Project. Current land uses, including commercial forestry on Weyerhaeuser and WDNR lands, would presumably continue in the Project Area. Other future actions in or near the Project Area would be subject to current land use regulations.

3.8.4 Mitigation

After construction is completed, temporarily disturbed areas would be returned as closely as possible to their original condition.

Weyerhaeuser and WDNR would be compensated for lost forest area and timber production via the lease agreements with the Applicant.

3.8.5 Significant Unavoidable Adverse Impacts

The long-term conversion of approximately 101 acres of land owned by Weyerhaeuser and WDNR from commercial forestry uses to wind energy development would be an unavoidable impact of the Project. These acres would be removed from commercial timber production for the life of the project (at minimum, 20 years). However, this reduction represents a very small percentage of the commercial forest land owned by Weyerhaeuser and WDNR. The proposed reduction timber harvest in the lease area would have a minimal impact on commercial forestry operations during construction, and no impact during project operation is anticipated, given the abundance of commercial forest land in the Project Area and the surrounding vicinity. Therefore, no significant unavoidable adverse impacts to local land uses are expected to result from the Project construction, operations, and maintenance.

3.9 Historic and Cultural Preservation

This section describes prehistoric and historic cultural resources in the vicinity of the Coyote Crest Wind Project, legal parameters for protection of those resources, and the potential for adverse impacts by the construction, operation and eventual decommissioning of the Project, as well as cumulative effects. Cultural resources include previously documented prehistoric and historic sites, as well as any new sites discovered during field surveys, and Traditional Cultural Properties (TCPs). TCPs comprise historic, spiritual, ritual or other sites rooted in local history that are important to maintaining cultural identity in the living community (National Park Service (36 Code of Federal Regulations [CFR] 60.4).

3.9.1 Affected Environment

3.9.1.1 Regulatory Framework

The State of Washington addresses cultural resources in Chapter 27 of the RCW. Section 53 defines archaeological resources, establishes the requirement of a government-issued permit prior to the disturbance of any archaeological site, creates the Department of Archaeology and

Historic Preservation (DAHP), and establishes penalties for failure to comply with preservation laws. Chapter 27 also stipulates that it is unlawful for a person, firm, corporation, agency or institution of the state to knowingly disturb or deface any historic or prehistoric human burials.

Section 44 of Chapter 27 of the RCW establishes laws to protect prehistoric and historic human burials. Unlawful disturbance of Native American human remains is a class C felony: prosecution as well as a civil action from the affected Native American Tribe may result. The *Abandoned and Historic Cemeteries and Historic Graves Act* (RCW 68.60.040 and RCW 68.60.050T) establishes protection for historic cemeteries and graves. Persons disturbing historic graves are subject to prosecution.

SEPA requires that consideration be given to protecting significant historic, archaeological, and traditional cultural sites from damage or loss during development, and that potential impacts to cultural resources be considered during the environmental review process

The Washington Heritage Register lists historic structures, districts, buildings, sites and objects that have been identified as being significant in local or regional state history. The Register is governed by several state laws including Senate Bill 363, RCW 27.34.200 and 25-12 WAC. All structures and sites within the state that are included on the National Register are automatically included on the Washington Heritage Roster.

The National Historic Preservation Act (NHPA) (16 USC 470) and its implementing regulations outline the responsibilities of federal agencies to preserve and protect historic properties. Under Section 106, the NHPA requires that federal agencies take into account the effects of their actions on historic properties. Because no federal nexus has been identified for the Project, Section 106 requirements are not applicable.

3.9.1.2 Area of Potential Effect

The affected environment for cultural resources is formally defined as the Area of Potential Effect (APE). The APE for archaeological (often referred to as “prehistoric”) resources includes an area extending 1 mile in all directions from the proposed locations of wind turbines and their supporting infrastructure. For above-ground historical resources the APE includes an area extending 1.5 miles in all directions from the turbines and related facilities. This wider analysis area addresses potential visual impacts to any historic structures in the vicinity that might be eligible for inclusion on the National Register of Historic Places (National Register).

3.9.1.3 Archaeological/Ethnographic Context

While the northwest coast of North America has probably been occupied since shortly after the retreat of the last Holocene glaciers, definitive evidence in the form of artifacts is limited to perhaps the last 5,000 years (Carlson 1990). Little cultural material from the distant past has survived in the mild coastal climate, thus most information on the original residents of the

Northwest comes from the ethnographic period, beginning with European entry to the region in the late eighteenth century.

Hajda (1990) defined the drainage of the Chehalis River between the confluence of the Newaukum River and the South Fork Chehalis downstream to the West Fork Chehalis as the traditional home of the Upper Chehalis people, one of four groups belonging to the Southwestern Coast Salish language cluster. The Project Area is located in the southwest portion of this area.

Subsistence and culture among all Coast Salish peoples was largely centered on the annual runs of anadromous fish, with each group's territory centered on a major salmon stream (Hajda 1990). For the inland Upper Chehalis, three species, Chinook, coho and chum provided fresh fish in distinct and (usually) predictable seasons. Other protein sources included large and small game. Camas and wapato were primary plant foods that were actively cultivated in some instances; other roots, berries and acorns were also consumed (Cole and Darling 1990). The Chehalis people were "semi-sedentary village dwellers" who traveled from their permanent winter homes to temporary camps to harvest various foods and materials as they became available.

Before the arrival of Europeans, old growth stands of immense Douglas fir and western red cedar dominated the landscape of southwest Washington. Cedar, in particular, was a vital resource for native peoples, supplying planks for houses, canoes for mobility (essential in an area where dense vegetation often limited overland travel), split wood for containers, and bark for baskets, mats and clothing (Hajda 1990).

The earliest contacts between Coast Salish peoples and Europeans occurred in the late 18th century as Spanish and English explorers landed along the coast (Hajda 1990). Fur trappers were present in Chehalis territory by the 1820s. Establishment of the Hudson Bay Company's Fort Nisqually on Puget Sound in 1833 led to increased traffic through Chehalis territory (Hajda 1990). Contact with Europeans resulted almost immediately in the spread of contagious disease. Pandemic levels of infection and mortality from smallpox, measles, influenza and malaria caused devastating declines among the native population within a decade of initial contact. By 1850, more than 90 percent of the population in the interior valleys of southwest Washington had perished (Boyd 1990).

3.9.1.4 Historic Context

The native de-population of inland valleys facilitated settlement by Euro-Americans. Treaties enacted in the 1840s and 1850s allowed Americans to claim lands in the territory of the Upper Chehalis, despite the fact that the Upper Chehalis did not participate in the treaties (Hajda 1990). A small group of Americans led by Michael Simmons explored the area around Chehalis and Centralia in 1844. Members of the group returned with their families to initiate the first settlement in the area (Citizens of Centralia 1977). In 1852, George Washington, a free black man, settled at the confluence of the Skookumchuck and Chehalis rivers. Eventually Washington would divide his lands and sell plots that form the core of Centralia.

A 640-acre parcel claimed by the Saunders family in 1851 led to establishment of Saundersville. The town name was later changed to "Chehalis," an Indian word meaning "shifting and shining sands" (HistoryLink.org).

A reservation of approximately 4,200 acres was established for the Upper Chehalis near Oakville in 1864. The tribe became a confederation, establishing an autonomous government in 1939. In 1963 the Indian Claims Commission awarded compensation in the amount of $754,380 for approximately 840,000 acres of land deemed to have been originally in Indian ownership (Ruby and Brown 1986).

The Northern Pacific Railroad established a depot at Chehalis in 1873. The rail connection opened markets for Chehalis farmers and merchants, accelerating growth of both Chehalis and Centralia (HistoryLink.org).

The expansion of railroads was not limited to long-distance routes; traces of railroad grades and decaying trestles in many drainages attest to the widespread use of railroad logging in the early 20th century. Large-scale commercial timber harvest began with Frederick Weyerhaeuser's purchase of 900,000 acres of southwest Washington forest from Northern Pacific in 1900 (HistoryLink.org). Timber harvest and reforestation continue on Weyerhaeuser lands within the Project Area. Along with timber, agriculture remains a major contributor to the local economy.

3.9.1.5 Previous Cultural Resources Studies

A search of Washington DAHP records in February, 2010 included review of previous cultural resource inventories, known archaeological site and isolate forms, historic cemeteries records, and above-ground historic resource records applicable to the Project Area. DAHP records review was supplemented by an online search of General Land Office (GLO) maps (U.S. Surveyor General 1856, 1857, 1876 and 1893) and inspection of USGS 7.5-minute quadrangle maps.

Investigations in the Chehalis Valley

Flooding on the Chehalis and its tributaries in both the prehistoric and historic periods has shaped the landscape of the valley floor. Many archaeological sites are buried beneath several feet of flood sediments. Early settlers and modern residents alike struggled (and still struggle) with periodic inundations. Herbel and Schalk (2002) conducted surveys in association with the latest of many flood prevention studies.

Their report provides a comprehensive summary of archaeological investigations in the Chehalis Valley from the 1950s to 2002. Most work up until that time had been associated with construction of highways and flood control facilities. Site types recorded in the various studies included lithic scatters, camp sites, hunting locales and burial sites.

Recent investigations conducted in the Chehalis area continue to yield sites and artifacts. Punke (2008), Kopperl (2007) and Earley (2005) reported on surveys conducted in advance of

construction in the I-5 corridor. These surveys resulted in discovery of some important sites in areas that had experienced significant prior disturbance.

Investigations in the Project Vicinity

The majority of the Project Area has been in private ownership since the mid-1800s, and cultural resource surveys have not been conducted on these lands. Archaeological resources that may occur in the Project Area include camp sites, hunting blinds, root grounds (natural and cultivated) and burials. Historic resources that might be expected to occur in this area include the remains of logging infrastructure (primarily railroad grades and trestles) and houses, barns, and other outbuildings associated with 19th and early 20th century Euro-American settlement. The 1876 GLO map for Township 16N, Range 5 W (U.S. Surveyor General 1876) shows platted parcels on the west side of the Chehalis and the Chehalis Reservation on the east bank. Several residences along Garrard Creek Road are noted on the 1876 map of Township 15N, Range 5W. Most of Township 14N, Range 5 W is labeled simply as "Mountainous."

Surveys have been conducted in recent years in association with bridge and road repair projects, and for timber sales and a quarry expansion project on nearby WDNR lands. Relevant surveys are summarized below:

> Brooklyn Road Bridge Replacement Cultural Resources Assessment, Grays Harbor County, Washington (Boggs et al. 2009). Federal funding of this project, located within the Project Area necessitated compliance with NHPA Section 106. Paragon Research Associates conducted a literature review and field investigations prior to removal of the existing bridge. No archaeological resources were encountered. The bridge itself did not possess characteristics that would warrant listing on the National Register. No further cultural resources work was deemed necessary.
>
> Backflip Pole Timber Sale Units 3 and 4, Cultural Resources Survey. Stilson (2009) reported on archival research and field surveys conducted for this timber sale located in T13N, R5W, Sections 21 and 22, approximately 2 miles south of the Coyote Crest project boundary. No cultural materials were observed.
>
> Ceadarville Quarry Pit Expansion. WDNR proposed to expand a quarry on State lands in T16N, R5W Section 25, at the northern end of the Project Area. One historic property (a concrete foundation and associated trash scatter) was noted within the survey boundaries. WDNR cultural resources staff concluded that the site was not eligible for inclusion on either the Washington or National Register.
>
> Mallard Mania Timber sale. WDNR recentlty completed a cultural resource survey for a timber sale that slightly overlaps the eastern edge of the Project Area. Results are not yet documented, although WDNR staff indicated that an old railroad grade was the only cultural feature identified.

3.9.1.6 Known Cultural Resources

Review of reports from nearby sites provides insight into the type of cultural sites that might be expected to occur within the Coyote Crest Project Area itself. For example, several archaeological sites are known from the vicinity of Doty, a small community at the south end of the Project Area. Sites 45LE 84-89 are located within 1 mile of each other, and may represent a single large settlement or a number of smaller camps on level land near the Chehalis River (Welch n.d.) Artifacts recovered from test probes and limited excavations are evidence for a wide spectrum of activities at these sites. Two additional prehistoric sites, 45GH30 and 45GH33, are present just outside the northern boundary of the Project Area, in this instance on the floodplain near the proposed location for the Project transmission line. Historic sites, consisting primarily of railroad features, are present on Weyerhaeuser lands within the Project Area (Acosta 2010; Christopherson 2009a, 2009b; Ferguson 2009; Smith 2009). Known sites near and with relevance to the Project Area are listed in Table 3-12.

Table 3-12. Recorded Cultural Resources Sites Within and Near the Coyote Crest Wind Park Project Area

Site Number	Location	Relation to Project Area boundary	Site Type	NRHP/Washington State Register Eligibile?
45LE84	T13N, R5W, Sect. 11	1 mile south	Prehistoric: open camp	YES
45LE85	T13N, R5W, Sect. 11	1 mile south	Prehistoric: open camp	YES
45LE86	T13N, R5W, Sect. 2	Within	Prehistoric: open camp	YES
45LE87	T13N, R5W, Sect. 2	Within	Native American burial, age unknown	UNK
45LE88	T13N, R5W, Sect. 2	1/4 mile east	Prehistoric: open camp, workshop	YES
45LE89	T13N, R5W, Sect. 2	Within	Prehistoric: open camp	YES
45LE699	T14N, R5W, Sect. 34	At eastern boundary	Historic: remains of concrete structure/railroad	NO
45GH30	T16N, R5W, Sect. 25	Within	Prehistoric: open camp	YES
45GH33	T15N, R5W, Sect 6	1/2 mi. north	Prehistoric: open camp	YES
45GH45	T15N, R5W, Sect 6	1/2 mi. north	Historic: surface artifacts	UNK
45GH167	T16N, R5W, Sect. 17-18	Within	Historic: railroad trestles	UNK
16-5W-26-1	T16N, R5W, Sect. 26	Within	Historic: agricultural outbuilding	NO

No TCPs were noted in the research of site records. TCPs could be associated with prehistoric sites, however, particularly near burials. The Chehalis Tribe would be consulted as part of the SEPA review, and may have additional information about the presence of TCPs.

3.9.2 Impacts of the Proposed Action

3.9.2.1 Construction Impacts

Direct impacts to cultural resources within the Project footprint could occur as a result of excavation, filling and leveling of native sediments for the construction of roads, crane walks, tower pads, transmission lines, laydown areas and substations. Such activities can impact both surface and subsurface cultural resources, if resources are present. The likelihood that cultural resources would be present in a given area is largely based on whether landscape characteristics in the area would have been conducive to human use and habitation. Another key factor is the extent and intensity of development activity that might have destroyed or damaged cultural resources that were present at one time. The potential for cultural resources to be present within the Weyerhaeuser lease area is considered minimal given the very steep terrain and the fact that turbines and access roads would be located primarily in areas previously disturbed by logging and related activities. Prehistoric sites would be most likely to occur at the forest/floodplain interface and on the Chehalis River valley floor, as indicated by the distribution of known sites. While the Project transmission line north of the Weyerhaeuser lease area is predominantly in such interface and valley-floor settings, it is also in an area that has been substantially disturbed by development activity, primarily for utility lines and roads. Consequently, construction of Project facilities is unlikely to result in direct impacts to cultural resources.

Indirect impacts to cultural resources can occur when a development action results in increased access or human use in the area. Construction activity for the Project would result in a substantial increase in vehicle traffic and human presence during the construction period, a change that can be associated with an increased risk of artifact theft or vandalism of sites. Following the reasoning described above, however, the potential for this type of indirect impact is low because the potential for the presence of cultural resources in areas where most ground-disturbing activities would occur is low.

3.9.2.2 Operations and Maintenance Impacts

O&M activities at the Project would occur almost exclusively within the developed footprint of the Project and would be unlikely to require ground-disturbing activities. As noted above, even If such activities occurred in areas not previously disturbed, the potential for impacts to unidentified cultural resources would be low.

3.9.2.3 Decommissioning Impacts

Decommissioning or repowering of the Project should not impact cultural resources, as activities associated with decommissioning would remain within previously disturbed areas. Should any

decommissioning activities cause ground disturbance in areas not previously disturbed, the potential for cultural resources to be present would be low.

3.9.2.4 Impacts of the No Action Alternative

Should the Coyote Crest project not be permitted, Project activities with the potential for adverse effects to cultural resources would not occur. Future ground disturbance within the Project Area from timber harvest and related activities would likely continue, although the potential for cultural resources to be present would be low.

3.9.3 Mitigation

State Regulations

The SUP application indicates that the Applicant intends to avoid cultural resource sites that might be identified at proposed facility locations through the micro-siting process, and through WDNR review of the FPAN. Consistent with State requirements, if archaeological artifacts or human remains were discovered, the Applicant would cease excavation or disturbance, notify the appropriate authorities (DAHP, the county, and affected tribes), and develop an appropriate mitigation plan in coordination with agencies and tribes.

If areas that have not yet been reviewed for cultural resources are proposed for construction, for example, due to micro-siting of facilities for environmental or project-related reasons, DAHP recommends that project developers perform and document such review in a report submitted to the DAHP prior to disturbing the area, and wait for a response from DAHP before activity begins (personal communication, G. Kaehler, Washington DAHP, pers. comm., August 2, 2009).

Requirements under applicable state and federal laws and regulations governing cultural resource protection include the following:

- Upon the discovery of previously unrecorded cultural resources all work within 200 feet of the discovery must stop and DAHP must be notified within 24 hours of the find.
- Should human remains be encountered during any phase of the Project, work within 200 feet of the discovery must cease, and local law enforcement personnel and the appropriate county coroner must be notified in the most expeditious manner possible (Chapters 27.44, 68.50, and 68.60 RCW). If the remains are determined to be associated with an archaeological site, the environmental manager, in consultation with DAHP and the Chehalis Tribe, would take action to protect the area of the find from further disturbance until a treatment plan is agreed upon by all involved parties.

Other mitigation practices that are commonly implemented in conjunction with major construction projects include the following:

- Provide cultural resources training for all personnel involved in construction prior to ground-disturbing activities. The purpose of such training is to instruct personnel on the sensitivity of cultural resources and how to respond if they are encountered.

- Develop an unanticipated discovery plan to guide response in the event that previously unidentified cultural resources are encountered during construction.
- Provide an archeological monitor on site during ground-disturbing activities in areas of increased cultural resource probability.

3.9.4 Significant Unavoidable Adverse Impacts

Based on the low potential for the presence of cultural resources within the Project footprint and the extent of past disturbance in that area, it is unlikely that the proposed action would result in significant impacts to cultural resources. In the unlikely event that NRHP-eligible resources were encountered and avoidance was impracticable, measures to minimize or mitigate for any resulting impacts to the resource would be required, consistent with Washington State statues. With mitigation required for any unexpected discoveries, significant unavoidable adverse impacts would not occur.

3.10 Aesthetics, Light and Glare

This section describes the existing aesthetic conditions in the Project Area, including visual resources and existing sources of light and glare. Impacts expected as a result of the proposed action are identified, based on the methodology and analysis presented in Section 3.10.2 regarding the type and degree of change the Project would likely have on the landscape. Mitigation measures to address the potential impacts are also discussed.

3.10.1 Affected Environment

Part of the coastal mountain range of Washington, the proposed Project is located in an area known locally as the Doty Hills. The terrain of the Project Area consists of steep hills and drainages mixed with rolling topography and flat-bottomed valleys. Elevations range from about 2,100 feet along ridgetops in the southern part of the Project Area to approximately 60 feet in the Chehalis River valley near the northern end of the Project Area.

The landscape in most of the Project Area, including the core area in which wind turbine development is proposed, is characterized by steep hills forested with conifer or mixed conifer-deciduous stands. The landscape in this area has been substantially modified by commercial logging activities, resulting in a mosaic of recent clear-cut sites mixed with timber stands of varied ages that creates a notable patchwork appearance. The industrial forest land in this portion of the Project Area is served by a relatively dense network of logging roads that create additional visual contrast, particularly in the recently harvested areas.

The landscape in the southeastern and northeastern parts of the Project Area shows considerably less rugged terrain and more varied land cover than in the remainder of the area. Several creek valleys converge near Doty and flow into the Chehalis River, forming a relatively open valley-bottom area with small farms, rural residences and the community of Doty. To the north the forks of Garrard Creek flow through a relatively narrow, pastoral valley before joining and flowing into the broad, flat Chehalis River Valley near Oakville. The floodplain along the river

is extensive and includes numerous river meanders and oxbow lakes, as well as pasture and other agricultural uses.

Rural residential development occurs along the main roads in the area including dwellings on farm or ranch properties and scattered residences on large lots along Elk Creek Road, Stevens Road, State Route 6, Garrard Creek Road and South Bank Road. The nearest town is Doty, which lies approximately 3 miles from the southernmost WTG site and about 3.5 miles from the southern Project access point. The nearest populated area to the north of the Project Area is the town of Oakville, which is about 5.5 miles to the northeast of the Project's northern access point on Garrard Creek Road. The community of Oakville is about 8 miles from the nearest WTG site.

Few developed recreation areas or designated scenic areas are located in the vicinity of the Project. Rainbow Falls State Park, located near the southeast corner of the Project Area approximately 2 miles east of Doty, is the closest such site. Several WDFW water access sites are located along the Chehalis River between Rochester and South Elma. Small public parks or informal use areas can be found in communities along the major roads, such as Pe Ell, Oakville, Chehalis Village and Rochester.

Existing sources of light and glare in and near the Project Area are limited, and are found mostly within the small communities located in the valley areas, such as Doty and Oakville. Minimal light and glare occurs within the McDonald Tree Farm, as vehicle traffic is quite limited and there are no buildings with exterior lights. The Applicant's temporary met towers are equipped with red aviation safety lights for nighttime use.

Light and glare sources increase in density and variety with travel through the larger valleys toward the concentration of urbanized activity within the I-5 corridor. Typical sources of light and glare include large vehicle traffic volumes; exterior lighting for commercial, residential and industrial uses; and warning lights on numerous communications structures.

3.10.2 Impacts of the Proposed Action

The special use permit application documents a visual resource assessment prepared for the Applicant. This assessment included a viewshed analysis to determine the visibility of the Project turbines within the surrounding area, selection of key observation points (KOPs) representative of locations of interest within the study area, and photographic simulations of the appearance of the Project from KOPs with a clear view of the Project. This assessment from the application provided the primary basis for the impact analysis presented below.

3.10.2.1 Project Elements

The 47 proposed WTGs would be placed along the Coyote Crest ridge top, extending from a point approximately 3 miles to the north of the community of Doty to a point approximately 8 miles to the southwest of the town of Oakville (Figure 2-3).

The Applicant proposes to use WTGs with either a 262 or 328 foot (80 or 100 meter) tower height. The maximum blade height would therefore be 407 or 471 feet (124 or 143.5 meters), respectively. The monopole towers themselves would be about 13 to 16 feet (4 to 5 meters) in diameter at the base, tapering upwards. Constructed of heavy, rolled steel, the exterior would have a smooth surface, and would be painted with non-reflective paint so as to prevent any glare caused by sunlight reflecting off of the tower or blades.

A network of access roads would connect the WTGs and with main north and south access routes into the turbine development area. Additional Project facilities would include a permanent, single-story building to support ongoing O&M activities. An electrical substation required for the project would cover up to approximately 2 acres and would be surrounded by a chain-link fence. A 115 kV transmission line would be routed from the Project Area through the McDonald Tree Farm to Garrard Creek Road and would follow Garrard Creek Road and South Bank Road to Cedarville. The proposed transmission line would be supported on single wood pole structures, similar to those already in place in the area from Garrard Creek Road to Cedarville. Associated with the Project is an upgrade of 8 to 9 miles of transmission line between the Cedarville substation and the South Elma substation. The proposed upgrade would involve re-conductoring an existing 115 kV line or creating a double-circuit along an existing route (Figure 2-13).

3.10.2.2 Visibility Analysis

The Applicant conducted a visibility analysis to identify locations within the surrounding area from which the Project would be visible. The analysis was done to support the Applicant's goal to locate the WTGs such that they would have minimal visual impact on the surrounding area. The first step in this process was to conduct a computer analysis of three-dimensional terrain data along with WTG locations and heights (using the maximum WTG height of 471 feet) to identify which locations have a direct line of sight to each WTG location. Because of the viewing conditions specific to the Project, the visibility analysis considered only the characteristics of the WTGs. Human activity within the McDonald Tree Farm and within close viewing distance of the Project facilities is quite limited; with their substantial height and the complex terrain in the area, only the turbines would be visible from locations where people would likely be present.

The visibility analysis results were originally documented in a map identifying how many WTGs would be visible from each location within a 15-mile radius of the Project, within a roughly 180-degree arc north, east and south of the Project. The results indicated that many of the project turbines would be visible throughout much this area. Many turbines would also be visible from nearby areas to the west in Pacific County, but there would be minimal potential viewers present in these undeveloped areas. Consequently, subsequent analysis for the application focused on areas to the north, east, and south of the Project.

Figure 3-14 shows the visibility analysis results for the area within a 20-mile radius in all directions from the Project. A general pattern evident from the map is that hilly terrain would

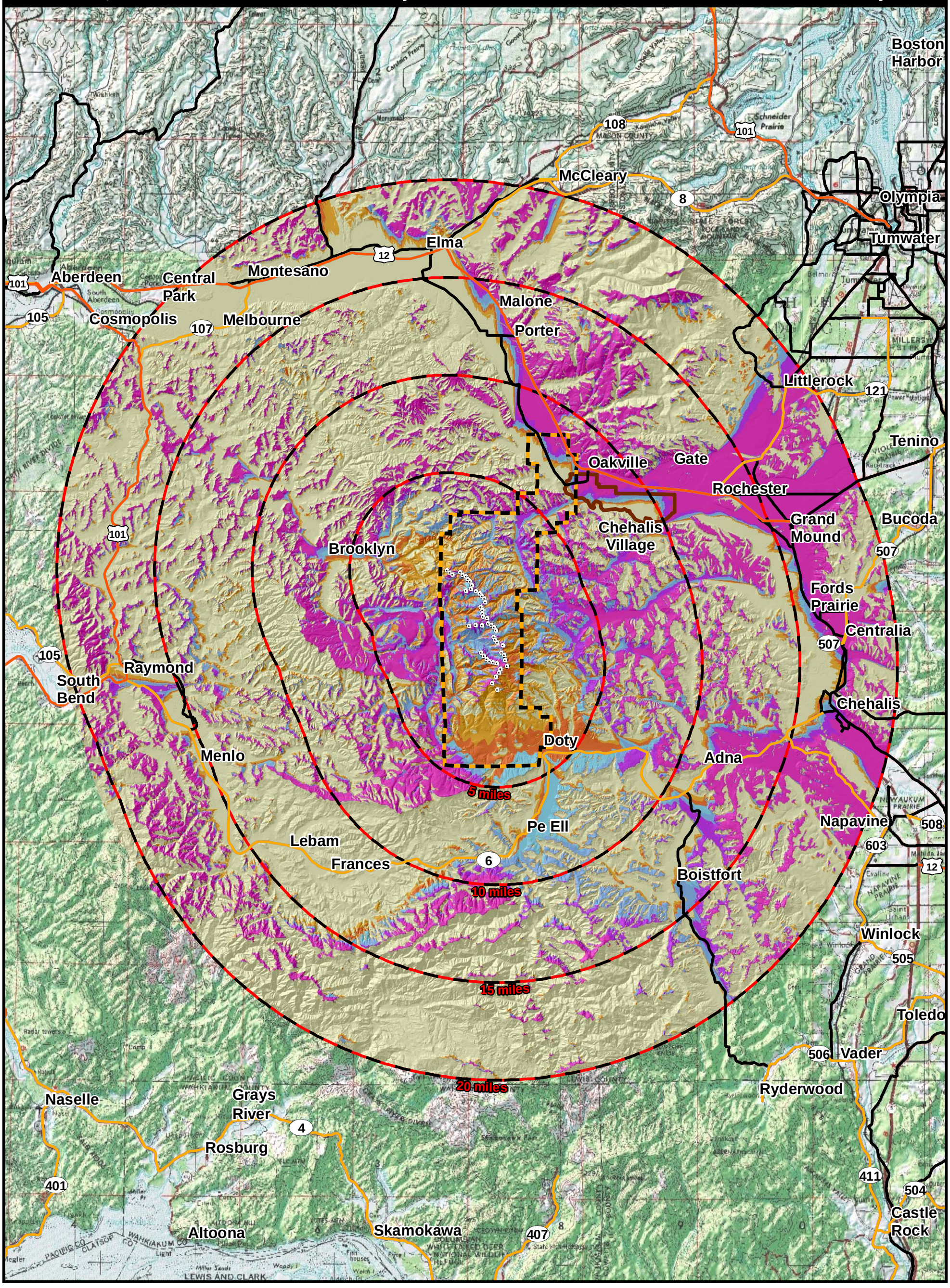


Figure 3-14

Project Visibility Map

Gray's Harbor, Lewis, and Pacific Counties, WA

N

0 0.5 1 2 3 4 5 Miles

0 1.5 3 6 Kilometers

NAD 1983 UTM 10 1:300,000

Project Boundary

Proposed Turbine

Proposed Turbines Incremental Radius

Chehalis Indian Reservation

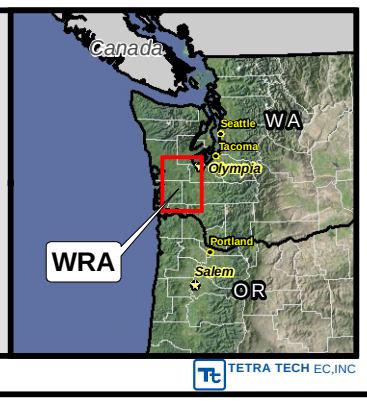
Number of Visible Turbines *

- 0
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 35
- 35 - 47

DATA SOURCES:

Weyerhaeuser, ESRI, USGS

* Turbine visibility calculated with a viewing height of 6 feet (1.82m) and turbine maximum blade tip height (MBTH) of 471 feet (143.5m).



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block views of the Project turbines for the majority of the area within a 20-mile radius. Nevertheless, the analysis also indicates widespread visibility of many Project WTGs from much of the I-5 and U.S. 12 corridors (although at considerable viewing distances of more than 15 miles). For the lands surrounding the turbine development area and between the Project and I-5, the analysis indicated a complex pattern of highly variable visibility, based primarily on the view-blocking effects of hilly terrain. For example, some locations within the Garrard Creek valley would likely have views of up to about two thirds of the WTGs, while other locations a short distance away would be totally blocked from view. In general, the lightly inhabited areas closest to the Project would typically have views of 10 or fewer turbines, which would be seen at distances of about 2 to 4 miles. While many of the more heavily populated areas of the region would be able to see most or all of the Project turbines, these views would be at distances of 7 miles or more.

The Applicant reviewed the original viewshed results to select four KOPs for more specific use in the analysis. The field of view of an observer is indicated from each key observation point. The four potential key observation points selected are Chehalis Village (on the Chehalis Indian Reservation south of U.S. Highway 12, between Oakville and Rochester), Chehalis, Doty, and Pe Ell. They were selected as key observation points because they are populated locations within approximately 15 miles of the WTG locations, from which the potential for significant views of the Project would be of interest for impact analysis. Fifteen miles is typically considered the maximum distance at which WTGs would be distinguishable with the naked eye.

3.10.2.3 Visual Impact Assessment

Further analysis identified the community of Doty as the only key observation point with significantly observable views of the proposed WTGs. Photographs were taken from Doty, and a visual simulation was prepared to further represent how the Project would appear to viewers in Doty (Figure 3-15). In the Doty simulation, six turbines in the southern part of the Project Area are visible along the ridge above Doty in this view. The simulation indicates that the blades and most of the towers would be visible, but the tower bases are blocked by topography and/or trees. While the turbines are evident, at a distance of more than 4 miles they are far enough away so as to not dominate the view. Because the turbines have a light colored and non-reflective finish (consistent with FAA marking guidelines), they do not stand out against the backdrop of the sky with the lighting and sky conditions present for this photograph. Under other lighting and sky conditions (for example, earlier in the day with a cloudless sky) the turbines would be more distinct, but given the distance and the view blockage of the lower parts of the turbines, the turbines still would not stand out sharply.

The simulation from Doty represents approximately the greatest degree of visual contrast that would result from the Project in a location that would be accessible to many viewers. Rural residents in the area just west of Doty and travelers along parts of Elk Creek Road would experience similar views. Some turbines would be visible from numerous locations closer than

Doty, but in those locations (mostly on the McDonald Tree Farm) very few viewers would be present. Locations in the Garrard Creek valley from which parts of the Project would be visible are roughly 3 to 4 miles distant and would experience a view similar to that indicated in the Doty simulation. The WTGs would be much less distinct to viewers in other locations, such as Oakville, because those locations are at a much greater distance from the Project.

Based on the discussion above, the Doty simulation represents essentially the maximum degree of effect from the Project on existing views. Given the viewing distance in this scene and the degree of landscape modification already evident in this setting, the addition of several WTGs would introduce only limited additional contrast to the existing view. While some Doty residents would have rather prolonged views of the turbines, consideration of the full viewing context indicates the impact of the Project on this view would be minor. Applying this conclusion in conjunction with the visibility results indicates that potential visual impacts in other locations would be from minor to negligible.

New and modified access roads required for construction and maintenance of the Project would require additional forest clearing, grading, and construction of gravel roadway surfaces. The new road segments would have the same appearance as the existing logging roads. These road features would be visible only at relatively close distances and by people traveling within the Project Area, and therefore would have minimal visual impact.

As mentioned above, the O&M building and substation also would not be visible from any of the key observation points or other locations with significant public exposure. Again, these facilities would be visible only at relatively close distances and by people traveling within the Project Area, and would have minimal visual impact.

The transmission line component of the Project would result in a brief, transitory view of a cleared swath coming down from the Weyerhaeuser C-Line Road for travelers on Garrard Creek Road. Because this change would be seen briefly and by few viewers, the impact in this location would be minor. For the transmission line segments along Garrard Creek Road and South Bank Road, and the Grays Harbor PUD upgrade from Cedarville to South Elma, the visual change introduced as a result of the Project would be to replace existing wood-pole structures with very similar structures that are somewhat larger and supporting more or larger hardware. The magnitude of this change would be quite small, and likely not noticeable to many viewers. Therefore, visual impacts from the transmission components of the proposed action would be minor at most.

Light and Glare

Standards for marking and lighting wind turbines and other tall structures are set forth in FAA Advisory Circular 70/7460 -1K. FAA “obstruction lighting” for wind facilities generally require one red blinking nighttime light, which federal studies show is easier for pilots to see. Under the recommendations, nacelles at the ends of WTG rows would be lit, with the remaining nacelles lit

Figure 3-15. Visual Simulation from Doty

at half-mile intervals. In areas with less air traffic, the white paint typically used for WTGs is sufficient for day time marking when combined with a 24-hour blinking red light. Requirements for lighting and marking are specified in a formal FAA Determination of No Hazard to Air Navigation; this determination by the FAA would occur after the Applicant files notices of construction for specific turbine and met tower locations.

Aviation safety lights installed on Project WTGs would be visible to varying degrees within the surrounding area. Because the lights would be installed on the nacelles, the visibility of the Project at night would be less extensive than during the day (for which visibility is calculated based on blade-tip height). Some viewers would consider the addition of the red lights to be a new type of intrusion in a rural setting without extensive existing light sources.

Safety and security lighting would be included at both the substation and O&M building.

Glare (light reflecting off of the surface of a WTG) would be prevented outright by the painting of the WTGs, transmission line poles and other Project facilities with non-reflective paint. Such paint finishes have been shown to effectively eliminate glare, so glare is not considered to be a potential impact in this analysis.

In summary, the proposed Project includes a number of components that would introduce new sources of visual contrast into the existing setting. Most of those changes would be visible only within a short distance and would be seen by very few viewers. Visibility of the WTGs would be the most noticeable change from the existing visual conditions in the study area. Based on consideration of viewing distance, viewer numbers and sensitivity, and the existing visual context, the visual impacts of the proposed action would be insignificant.

3.10.3 Impacts of the No Action Alternative

If the Project is not constructed, the WTGs and associated facilities would not be constructed and the visual impacts associated with these features would not occur. The landscape within the study area would continue to show substantial modification from forest clearing for tree harvest and road construction, urbanization, and other human activities.

3.10.4 Mitigation

The analysis described above indicated that visual impacts for the key observation points and other locations surrounding the Project Area would be minor to minimal. The Applicant has identified proposed BMPs that are essentially standard practice within the wind industry and are intended to mitigate, to the extent feasible, a minor yet unavoidable impact.

One consideration identified in the scoping process was to evaluate whether alternative locations for specific wind turbines would reduce the visibility of the Project while still satisfying the Applicant's objectives. The turbine locations that the Applicant has proposed were selected because they are ridgetop sites that would provide the best wind energy yield and optimize overall energy production from the Project. Placement of the proposed turbines along the ridgeline would also generally maximize their visibility. The visibility of virtually any proposed

turbine could be reduced to a degree by shifting it to a point at a lower elevation. There would be practical limits to relocating turbines in this manner, however, because energy production would decrease as any given turbine was moved away from the optimum location. More importantly, the results of the visibility analysis indicated that moving a relatively small number of turbines would provide limited benefits in terms of reduced visibility. Among all locations within the study area from which the Project would be visible, the typical condition is that 10 to 15 or more turbines would be visible, and in many areas 40 or more turbines would be visible. Expressed in different terms, the Project does not represent a case in which a small number of "sore thumb" turbines are the dominant visible features of the Project, indicating that the visibility could be reduced substantially by relocating these turbines. Based on the limited visual impact level identified for the Project as proposed, relocating turbines to reduce their visibility is not considered to be a viable mitigation option.

The Applicant has proposed to use several BMPs to minimize the Project's possible visual impacts. BMPs would be incorporated into the design of the Project to ensure an attractive appearance and good integration into its landscape setting. Such proposed BMPs include:

- Use existing roads as much as possible to access turbines
- To the extent consistent with FAA guidelines, use low-reflectivity, neutral color finishes for the turbines and other Project facilities, to minimize contrast with the sky backdrop and to minimize the reflections that can call attention to structures in the landscape;
- Restrict exterior lighting on the WTGs to the aviation warning lights required by the FAA, which would be kept to the minimum required number and intensity while still complying with FAA standards;
- Use of carefully selected earth-tone, non-reflective finishes, whenever possible, of the O&M building to maximize visual integration into the surrounding landscape;
- Restrict outdoor night lighting at the substation and O&M building to the minimum required for safety and security. Sensors and switches would be used to keep lighting turned off when not required, and all lights would be hooded and directed to minimize backscatter and offsite light trespass; and

Other measures that are commonly applied at wind projects and could be considered in this case include the following:

- Implement active dust suppression measures during the construction period to minimize the creation of dust plumes;
- Locate the transmission line along existing roads, to the extent practicable, and use wood-pole structures.

3.10.5 Significant Unavoidable Adverse Impacts

The Project facilities would be visible from long distances and would create unavoidable adverse aesthetic impacts in some locations by introducing a distinct, new visual element to the landscape. Based primarily on consideration of the substantial distances at which the WTGs would be visible to the general public and the landscape context in which the WTGs would be seen, these impacts are not considered to be significant.

3.11 Transportation

3.11.1 Affected Environment

The transportation system relevant to the Coyote Crest Project primarily consists of the road network serving western Lewis County and adjacent areas, because all or most of the equipment and material needed for Project development would likely be transported by truck. The road network includes interstate, federal and state highways, secondary roads maintained by local governments, and special-purpose roads on private lands. The EIS analysis also considers rail and air transport facilities as they might relate to the Project.

3.11.1.1 Road Network

The Applicant has identified two routes that would be used to meet Project transportation needs. The routes that would be used to access the Project from the north and the south (see Figures 1-1 and 2-15) are outlined as follows:

North Approach

- I-5 from either the Port of Vancouver or Port of Longview north to U.S. Highway 12 at Grand Mound, in Thurston County
- U.S. Highway 12 from I-5 at Grand Mound west to Porter Creek Road, at Porter in Grays Harbor County
- Porter Creek Road from U.S. Highway 12 west to South Bank Road
- South Bank Road from Porter Creek Road south to Garrard Creek Road, southwest of Oakville in Grays Harbor County
- Garrard Creek Road from South Bank Road/Oakville Road south and west to Lewis County Line
- Garrard Creek Road from Grays Harbor County Line south to Coyote Crest Road (also known as Weyerhaeuser “C Line Road”), in Lewis County

South Approach

- I-5, from either Vancouver or Longview to Chehalis, in Lewis County
- SR 6, from Chehalis west to Stevens Road at Doty, in Lewis County
- Stevens Road from SR 6 west to Elk Creek Road, in Lewis County

- Elk Creek Road from Stevens Road west to Weyerhaeuser C-Line Road (northwest of Dokter Road), in Lewis County

Characteristics of these public roads are summarized as follows:

- I-5 is a multi-lane freeway that is the major north-south traffic artery in the state of Washington, linking Chehalis, Centralia and other Lewis County communities with Portland and Seattle. I-5 is maintained by WSDOT. Most of the route between U.S. 12 and SR 6 is a four-lane divided roadway with two northbound lanes and two southbound lanes. Exits to U.S. 12 and SR 6 are via 12-foot-wide travel surfaces with 6-foot shoulders, and have sufficient turning radius to accommodate all oversize loads that would be associated with the Project. The posted speed limits on I-5 are 70 mph in general and 60 mph in larger urban areas.
- U.S. 12 is a two-lane, roadway that connects Lewis County with Grays Harbor County to the west and provides access east over the Cascade Mountains. The highway has 4- to 8-foot wide asphalt shoulders between I-5 and Satsop. This is a federal highway that is maintained by WSDOT. The posted speeds range from 35 mph to 65 mph. U.S. 12 provides access to Porter Creek Road.
- Porter Creek Road is a two-lane, paved county road maintained by Grays Harbor County. There is an at-grade railroad crossing at the intersection of Porter Creek Road and U.S. 12, and a bridge over the Chehalis River just west of the railroad crossing.
- South Bank Road is a two-lane, paved county road maintained by Grays Harbor County. It serves an area of scattered rural residences and agricultural uses on the west side of the Chehalis River Valley.
- Garrard Creek Road is a two-lane, paved county road maintained by Grays Harbor County and Lewis County within their respective jurisdictions. This road has 2-foot-wide gravel shoulders and provides access to Coyote Crest Road, which is the major access route for logging equipment and materials into and out of the north end of the McDonald Tree Farm. The posted speed limit is 50 mph.
- SR 6 is a two-lane, east-west state highway that is a major connection between the I-5 corridor and the Pacific Coast. The roadway has 2- to 4-foot-wide asphalt shoulders between I-5 and Pe Ell. The posted speeds range from 35 mph to 60 mph. SR 6 provides access to Stevens Road.
- Stevens Road is a two-lane paved county road with gravel shoulders and is the major access route to the community of Doty. This road also is a primary access for logging equipment entering the McDonald Tree Farm from the south. Speed limits are 25 mph.
- Elk Creek Road is a two-lane paved county road with gravel shoulders and is accessed via Stevens Road in the community of Doty. Elk Creek road is the main access route into

the McDonald Tree Farm which is located at the end of the county paved road. Speed limits range from 30 mph to 40 mph.

Existing traffic volumes vary considerably among the roadways in this network. I-5 carries by far the highest volumes, followed in order by U.S. 12 and SR 6. Traffic volumes on the county roads within the study area are relatively low and well within the capacity of the road network.

3.11.1.2 Rail Transportation

The north-south main line of the Burlington Northern & Santa Fe Railway (BNSF) passes through Lewis County within the I-5 corridor. It is the only main rail line in the county and carries freight and passenger service. The Puget Sound and Pacific Railroad operates a line connecting the Port of Grays Harbor to the Union Pacific Railroad and BNSF interchanges near Centralia, and primarily serves industrial customers. This line crosses Porter Creek Road at its intersection with US Highway 12 at Porter.

3.11.1.3 Air Transportation

There are 4 public airports and 19 private airstrips in Lewis County (Lewis County 2008). The Chehalis-Centralia Airport, a general aviation facility located west of Chehalis, is the closest public airport to the Coyote Crest site. A small, private airfield with a grass surface is located west of Garrard Creek Road approximately 1 to 2 miles north of the intersection with the Coyote Crest Road.

3.11.2 Impacts of the Proposed Action

Potential impacts of the proposed action on the transportation system would primarily be associated with the construction activity for the Project. Evaluation of those impacts is based on the Project transportation plans described in the SUP application.

3.11.2.1 Construction Impacts

Traffic volumes generated by transport of wind turbine components to the site, delivery of construction materials, and travel by construction workers would have several types of possible effects on the local roadway network and its users. Some of the effects would be based on the volume of new activity, while some would be based on the physical characteristics of the Project-related transportation uses.

Project Traffic Generation

The construction phase of this project could span 2 or up to 3 years in duration. Project-related traffic volumes would vary during the construction period based on the nature of the work taking place at a given time.

In total, approximately 4,800 heavy-duty truck loads are expected during the construction of the Project. Assuming construction lasts for 2 years (24 months), that total volume would equate to an average of 50 trucks or 100 truck trips per day. Given the component dimensions and typical

practice for shipping turbine components, each turbine would require 14 truck trips (7 inbound and 7 outbound). Therefore, delivery needs for 47 turbines would require 658 total trips by over-sized loads. Half of these trips (329) would be in-bound loads using the north approach, and the other half unloaded, out-bound trips using the southern route. Turbine component deliveries would likely be concentrated over a period of several months, rather than distributed evenly throughout the construction period. The specific pattern for these trips would depend on the construction schedule and delivery schedule determined by the Applicant and the construction contractor.

Delivery of construction materials such as concrete, steel, gravel, electrical transformers, and cable would make up most of the remainder) approximately 4,000 to 4,200) of the total number of trips. These heavy-duty trips are anticipated to be made on weekdays between the hours of 8:00 AM and 4:30 PM, and would be distributed throughout the day.

In addition to the turbine component and construction material deliveries, the construction work force would generate increased traffic on the local road system. The construction work force is expected to number up to 95 workers, with a peak of as many as 60 to 75 personnel on-site at any one time. Commuting activity by the construction work force could generate up to 80 trips each way. These trips would be concentrated near the morning and evening peak hours; arrival times on site would likely be in the 7:00 a.m. hour, while most of the departures would likely occur in the 5:00 p.m. hour. Any overtime worked by the crews would likely occur earlier than 7:00 a.m. and later than 5:00 p.m. Construction workers would be able to access the Project site from both the north and south approaches.

Effect on Traffic Operations

Project-related construction traffic is not expected to significantly diminish the level of service on roadways in or near the Project Area. The greatest potential for noticeable effects would be on the roads with the lowest existing traffic volumes and capacities, specifically the county roads closest to the Project site. Points of maximum impact at the north approach would be the intersection of Garrard Creek Road and Coyote Crest Road, as well as at Garrard Creek Road and South Bank Road. On the south approach, the route along Elk Creek Road and Stevens Road, from C-Line Road to SR 6, would experience the most effect. Because truck deliveries would be distributed throughout the day, the daily average of 100 truck delivery trips (inbound and outbound) would represent about 10 to 15 trips per hour. With the planned one-way flow pattern for these deliveries, a specific intersection or road segment near the Project would receive only 5 to 8 additional trips per hour, on average. Additional traffic at such volumes, even if the traffic is slow-moving trucks, should not significantly degrade service conditions on these local roads. Beyond those locations, traffic would disperse into the local and/or regional transportation network, and volume-related impacts would be negligible.

The traffic effect that local residents and travelers would most likely experience would be occasional, intermittent delays, detours, or closures needed to construct the roadway and

intersection modifications proposed by the Applicant at a few selected locations, such as the intersection of Garrard Creek Road and Coyote Crest Road. The modifications planned for these locations are modest in scope, indicating that service disruptions at any given location would likely be short in duration, on the order of several days or up to 1 or 2 weeks.

Effect on Roadways

Because of the size and weight of many delivery loads for wind projects, particularly shipments of turbine components, physical damage to roadways on the transport route is a common concern. Physical damage issues are typically resolved through haul route agreements or similar means, through which before-construction and after-construction conditions are carefully documented and the wind project developer agrees to repair the damages or fund the cost of repairs. See Section 3.11.4 for additional discussion.

Effect on Other Transportation Facilities

It is possible, but considered unlikely, that rail transport would be used to deliver Project turbine components to a point near the project area. Railroads are capable of transporting turbine components, and there would not be adverse effects on the railroad in that event.

3.11.2.2 Operation Impacts

Transportation-related impacts during the operating period for a wind project are typically minimal, because operating projects generate minimal traffic. Once construction is complete, the operating work force for the Project is estimated at six to eight full-time personnel dedicated to the operations and maintenance of this project. This small work force would generate very few daily trips that would have no effect on local traffic operations.

Similarly, physical demands on the local transportation system would essentially end once construction was completed. Oversized truck and trailer loads would be required during Project operation only in the event of a mechanical failure, such as if the blades on a wind turbine needed to be replaced. Occurrences such as this are expected to be rare and isolated.

Scoping input for the EIS identified a concern over potential effects of the Project on the small private airfield located near Garrard Creek Road north of the Project site. The wind turbines should have no influence on aircraft operations at this location, as the turbines would be situated at a much higher elevation, approximately 2 miles to the west, and generally parallel to the north-south direction of travel required for aircraft operations at this site. Similarly, the transmission line along Garrard Creek Road would have a parallel orientation, and the structures would represent only a minor increase in height relative to the existing line that would be upgraded.

An evaluation of the proposed Project by an aviation consultant similarly concluded that the wind turbines would not represent obstacles that would interfere with operations from a private airfield located near Garrard Creek Road (Aviation Systems, Inc. 2009). Similarly, the aviation analysis determined that the Project would not adversely affect operations at the nearest public

airport; elements of the national airspace system such as minimum vectoring altitudes or en-route low-altitude airways; or military airspace.

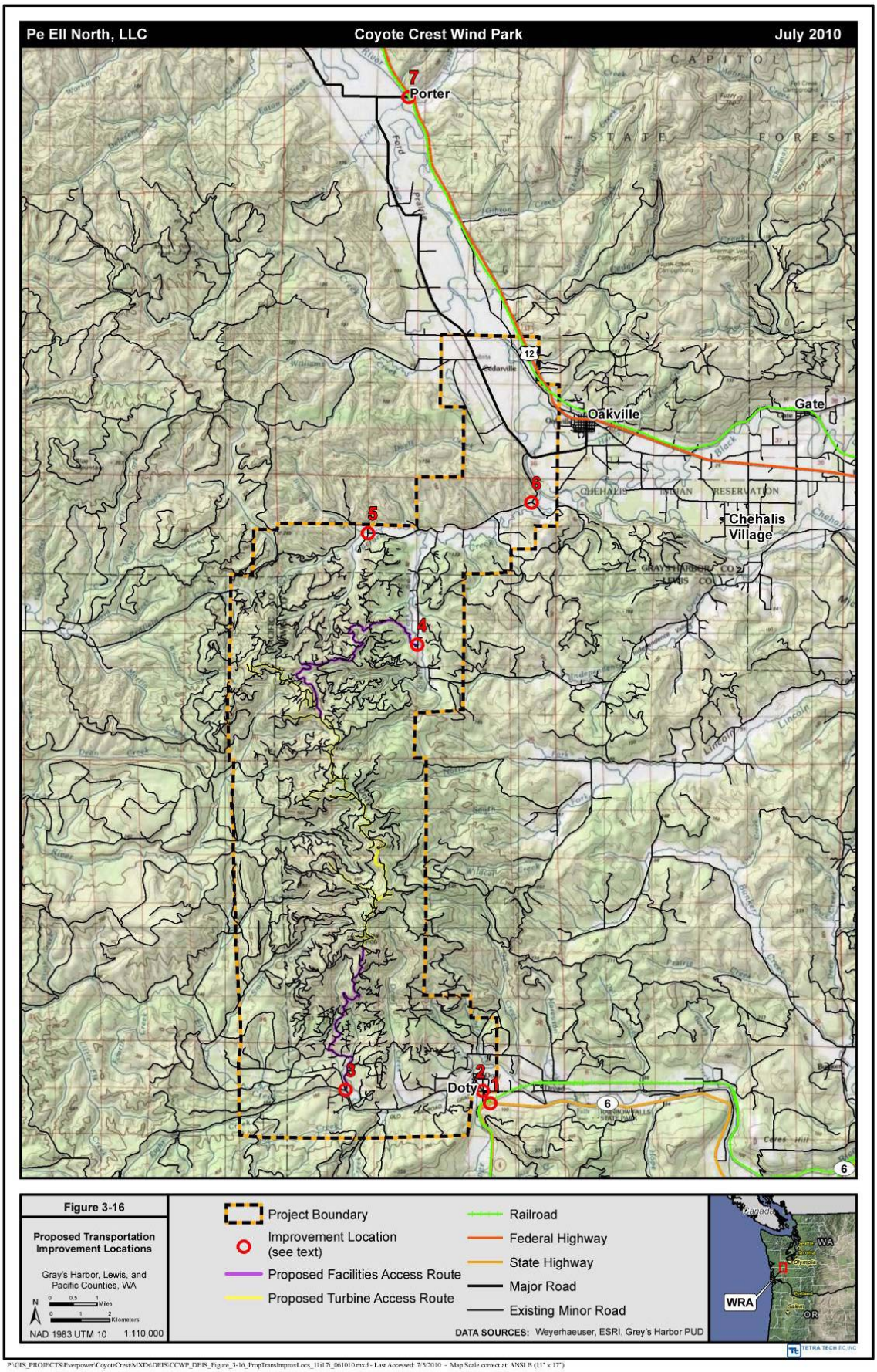
3.11.3 Impacts of the No Action Alternative

If the Coyote Crest Wind Park is not approved, the minor impacts to the existing transportation system and its users discussed in Section 3.11.2 would not occur. Conditions on the transportation system would continue to be determined by population growth and other factors that influence traffic patterns, and by construction and maintenance programs for transportation facilities. State and local jurisdictions would continue to maintain and modify their respective portions of the transportation system according to their long-term capital improvement plans.

3.11.4 Mitigation

The applicant has proposed to undertake some intersection and roadway modifications to accommodate transportation demands associated with Project construction. These are described in Section 2.2.1.4. For convenience, they are sequentially numbered 1 through 7 on Figure 3-16 and summarized below as follows:

- Along the south approach to the project, the Applicant has proposed to add a westbound right turn lane and widen the eastbound shoulder at the intersection of SR 6 and Stevens Road (1). This would improve traffic movement and enhance safety at this intersection that provides access to Doty.
- A near 90-degree turn at the Stevens Road and Elk Creek Road intersection (2) would be temporarily widened with gravel to allow for unloaded over-sized trucks and trailers (after having delivered wind turbine components to either a central lay-down area or to individual WTG sites) to better negotiate this intersection. For the same reason, the intersection of Elk Creek Road and C-Line Road (3) would be improved.
- At the north approach, the intersection of Garrard Creek Road and Coyote Crest Road (4) would be improved to allow for oversized loads to make the southbound right turn.
- A realignment of the roadway centerline is necessary at the intersection of Garrard Creek Road and Brooklyn Road (5), due to a substandard curve radius.
- The Garrard Creek Road and South Bank Road intersection (6) would have similar improvements required in order for the over-sized loads to negotiate the southbound right turn onto Garrard Creek Road.
- The PSAP Railroad crossing of Porter Creek Road, immediately west of the intersection with U.S. 12 at Porter (7), may need to be modified to accommodate over-sized trucks and trailers hauling wind turbine components. Specifically, the roadway profile would be analyzed at the crossing to ensure that under-clearance requirements are met for the specialized transport equipment.



P:\GIS_PROJECTS\Everpower\CoyoteCrest\MXDs\DEIS\CCWP_DEIS_Figure_3-16_PropTransImprovLocs_11x17i_061010.mxd - Last Accessed: 7/5/2010 - Map Scale correct at: ANSI B (11" x 17")

Ancillary facilities such as street lighting, guardrails, sign posts, etc., at any of these intersections may need to be temporarily or permanently relocated as a result of the improvements. The Applicant would work with the various jurisdictions to determine applicable needs on a case-by-case basis. In addition, traffic management to accommodate any delays, detours, or closures would be coordinated with the appropriate jurisdiction(s) in order to minimize inconvenience to the public wherever possible.

Beyond the proposed roadway and intersection improvements discussed above, two key mitigation provisions for potential transportation impacts would be implemented. One would be the development and execution of one or more haul route agreements between the Applicant and local jurisdictions to formalize terms for meeting the respective transportation needs of the parties. The haul route agreement(s) would define plans for movement of equipment and materials to the Project site and establish terms and procedures for restoring any roadway damages. A key part of this effort would be to document existing pavement conditions on the transport routes via video and/or still photography prior to Project construction and again following completion of construction. Any damage to the roadways caused by Project-related traffic would be repaired by the Applicant.

The Applicant would also meet with each jurisdiction in the engineering design stage to review the structural condition and any load-limit restrictions for bridges and culverts to be crossed with permitted over-sized and over-weight loads. Any deficiencies would be determined, and solutions proposed to each applicable jurisdiction, in order to provide for safe transport of the construction materials and equipment, as well as to protect the public investments in existing infrastructure.

The other key measure would be the development of a Construction Traffic Management Plan. The plan would be prepared in coordination with affected jurisdictions and would define provisions for scheduling deliveries and roadway improvements, flagging, notifications, site-specific traffic control, and other measures intended to minimize the disruptions to local traffic as a result of Project construction activity. In conjunction with this plan, the Applicant would also coordinate access plans with Weyerhaeuser to minimize conflicts with harvesting operations.

3.11.5 Significant Unavoidable Adverse Impacts

Project-related construction activity would result in some unavoidable impacts on the local transportation system, primarily through additional traffic demand on the existing roadway network and physical damages caused by large numbers of heavy loads. The traffic demands would be temporary in duration and of variable intensity over the length of the construction period. Based on the traffic volumes anticipated and their distribution, construction traffic is not expected to have a major effect on traffic operations. Nevertheless, a Construction Traffic Management Plan would be developed and implemented to minimize the effects of Project construction on local residents and roadway users. In addition, any damages to the roadway

system would be identified and repaired through the terms of haul route agreements with affected local jurisdictions. With these mitigation measures, along with proposed improvements to address potential needs at specific intersections and roadway curves, the temporary impacts to transportation during the construction period would be insignificant. No transportation impacts resulting from operation of the Project have been identified. Therefore, the Project would not result in significant unavoidable adverse impacts to transportation.

3.12 Cumulative Impacts

The range of impacts to be addressed in an EIS includes direct, indirect and cumulative impacts (WAC 197-11-060, 792). Cumulative impacts are the environmental impacts created by the incremental impacts of a proposed action when added to the impacts of other past, present and reasonably foreseeable actions. The impacts of multiple actions could be minor individually, but they could be significant collectively over a period of time.

The *SEPA Handbook* (Ecology 1998) advises EIS lead agencies to consider how the impacts of a proposal would contribute to the overall impacts of development over time within a suitably defined region. Consequently, this section of the EIS describes conditions associated with existing development in the vicinity of the proposed Project, as well as conditions related to current and reasonably foreseeable future development planned for the area. Potential cumulative impacts also are analyzed and described. The past, present, and reasonably foreseeable future actions provide the context in which to assess the cumulative impacts of these actions in combination with the Coyote Crest Wind Park.

3.12.1 Existing Development

The loosely-defined area of interest for consideration of cumulative impacts generally includes the northwestern portion of Lewis County, the southwestern corner of Thurston County, the southeastern part of Grays Harbor County, and the northeastern corner of Pacific County. The nature and extent of existing development in the vicinity of the proposed project is largely described earlier in this chapter in the “Affected Environment” sections for each environmental resource. In general, urbanized uses have been developed since about the late 19th century along the I-5 corridor and in some locations in the Chehalis River valley. Little urbanized development has occurred in the project vicinity, with the community of Doty representing the closest area of noticeable urbanized development. These uses range from single-family residential to large-scale industrial and commercial uses in Centralia, Chehalis and adjacent areas.

For Lewis County as a whole (including the majority of the county that lies outside of the region of interest for assessing cumulative impacts), approximately 98 percent of the total land area consists of open space or remote rural areas used for forestry, agricultural or mineral purposes (Lewis County 2008). Urban areas and rural areas that have been designated for more intensive development account for the remaining 2 percent of the county, by area. The region of interest for the Coyote Crest project has a similar predominance of remote, rural lands that are in resource-based land uses. Virtually all of the Pacific County portion of the region is forested and

designated as commercial forest land of long-term significance (Pacific County 1998), with the exception of the small unincorporated community of Brooklyn. The Grays Harbor County and Thurston County portions of the region includes relatively small areas of urbanized development in and near the communities of Elma, Malone, Porter, Oakville and Rochester, and is otherwise dominated by agricultural uses in the Chehalis River Valley surrounded by forest land.

Historically, development in the region has been heavily influenced by timber-related industries, such as harvesting and milling, and by farming in the areas suitable for agricultural uses. More recently, some development activity in the region has been associated with tourism and recreation. Due to continuing population growth and other factors, development is expected to continue into the future.

Industrial forest land occurs within the Project Area and elsewhere throughout most of the region. Timber harvest remains active on Weyerhaeuser, other private and WDNR forest lands in the region, although current harvest levels are considerably lower than they were from approximately the 1960s through the 1980s. Wood products manufacturing continues to be a significant industry in the region. For example, more than a dozen large wood processing facilities remain active in Lewis County (Lewis County 2008).Harvest activities on state and private timber lands are regulated under the state's Forest Practices Act; the forest practices rules were modified substantially through passage of the 1999 Salmon Recovery Act (ESHB 2091, more commonly known as the "Forests and Fish Law"). The intent of the 1999 rules changes was to provide improved protection for riparian habitat and aquatic and riparian-dependent species on non-federal forest lands.

Agricultural production in the area dates back to the early Hudson Bay Company operations in the 19th century. By market value, the leading current agricultural products are poultry and eggs, dairy products, and livestock (primarily cattle and calves; Lewis County 2008). Animal products have historically supported some level of food processing activity. Agricultural resource land uses primarily include family farms, many of which are currently in hay or pasture for livestock. Some farms are used for growing Christmas trees.

Major industrial facilities within the region of interest are concentrated in the Centralia and Chehalis area. They include two master-planned industrial parks developed and operated by the Port of Centralia and another developed and operated by the Port of Chehalis, with a combined area of approximately 1,800 acres among the three facilities. The TransAlta Corporation (2010) operates the Centralia Coal Plant at a site northeast of Centralia; the facility is a 1,376 MW coal-fired electric generating plant that began operation in 1971 and is one of the largest electric power resources in Washington. Until November 2006 coal for the plant was produced from a strip mine adjacent to the plant. The former mine occupies approximately 4,000 acres, and the site is now being reclaimed. TransAlta also operates the Centralia Gas Plant (also known as the Big Hanaford Plant), a 248 MW, gas-fired, combined-cycle generation facility opened in 2002, at the same location as the Centralia Coal Plant.

Development of large energy facilities has also occurred at two other locations in the region. The Chehalis Generation Facility, a 520 MW gas-fired, combined-cycle plant operated by PacifiCorp, was completed in 2003 at a site in the Chehalis Industrial Park south of Chehalis and east of I-5 (Washington EFSEC 2010). The Satsop Combustion Turbine Project began operation in 2008 at a site near Satsop in southeastern Grays Harbor County (Washington EFSEC 2010). This gas-fired, combustion turbine plant has a current capacity of 650 MW and was developed on a 20-acre site within the Satsop Redevelopment Park. In October 2009 the plant owner submitted a request to EFSEC to increase the capacity to approximately 1,300 MW. The Satsop Redevelopment Park is the former construction site for Satsop Nuclear project (also known as Washington Nuclear Plants 3 and 5), for which the Washington Public Power Supply System began construction in the 1970s. The nuclear plants were not completed, although the cooling towers were constructed and remain visible in the surrounding area; the site certificate for this project was amended in 1996 to allow construction of the gas turbine project.

3.12.2 Reasonably Foreseeable Future Development

Reasonably foreseeable future development, as considered in this analysis, includes development actions within the region of interest that are currently underway, formally proposed or planned, or considered highly likely to occur. In the latter case, actions can be identified as highly likely to occur based on authoritative information available to the agencies with respective land-use jurisdictions over those actions. For the Coyote Crest Wind Energy Park EIS, those jurisdictions are primarily Lewis, Pacific, and Grays Harbor counties. Reasonably foreseeable future development includes both individual projects that are major or noteworthy, such as a large energy facility or an industrial park, and the collective effect of ongoing, small-scale development actions. The location, size and character of both types of development actions are shaped by the land use plans and development regulations of the respective jurisdictions.

Based on existing development patterns and the distribution of land within the region by county, future development activity within Lewis County is likely to have greatest relevance for considering potential cumulative impacts of the Coyote Crest project. The current Lewis County (2008) Comprehensive Plan establishes an overall land use goal to encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner. Under the policies and designations identified in the plan, future development would be concentrated in existing UGAs and in unincorporated UGAs or existing rural centers that have been designated for more intensive development. The existing UGAs within the region in Lewis County include Centralia, Chehalis, and Pe Ell. Future development in Centralia and Chehalis is expected to include new residential, commercial and industrial land uses, according to the designations adopted through the respective city comprehensive plans. A modest amount of commercial growth is expected in Pe Ell, along with additional single-family residential uses.

The plan defines small towns, crossroad commercial areas and freeway commercial areas as types of rural areas in which some intensive development, such as neighborhood-scale commercial uses, would be permitted outside of UGAs to support needs for the community and

the traveling public. The unincorporated community of Doty is designated as a "Category II" small town, with corresponding limitations specified for residential, commercial and industrial uses. The plan identifies 11 crossroad commercial areas, of which only Curtis is within the region of interest, and 4 freeway commercial areas that are outside the region.

In the Comprehensive Plan, a goal of Lewis County (2008) is to promote development of industrial and technical jobs. To support that goal, the plan designates two Major Industrial Development areas that are not associated with UGAs. Those are the 1,000-acre Centralia Steam Plant site (see above) and another 1,000-acre site located at the interchange of I-5 and U.S. 12 between Meier Road and Military Road. In addition, 2,000 acres adjoining the Centralia Steam Plant site are designated as Industrial Land Bank reserve, to help address long-term future needs for industrial land. Finally, the plan identifies 11 additional specific rural properties as potential areas for future industrial development. These sites are generally in or near the I-5 corridor.

Lewis County is currently engaged in a planning process for the South County Subarea Plan, which is intended to shape future development in and around the Winlock, Toledo, and Vader communities in the southern part of the county. This planning area is outside the region of interest for the Coyote Crest cumulative impact analysis and the potential influence of the plan is not considered in detail.

In summary, future development activity within the Lewis County portion of the region of interest is likely to be located within the UGAs, designated rural development centers and industrial areas discussed above. Future development in these locations would generally consist of incremental expansion of already urbanized areas, rather than creation of new development in areas that are now largely undisturbed. Future development activity outside of the designated locations would likely be limited in extent and intensity, and would not likely result in notable changes in land use patterns (such as conversion of forested land to urbanized use).

A similar pattern is expected for future development in southeastern Grays Harbor County and southwestern Thurston County. Development activity would likely occur primarily within the existing communities of Elma, Malone, Porter, Oakville, and Rochester, while forestry and agriculture would likely continue to be the dominant uses in terms of acreage. Independent plans for these communities, which are somewhat dated, indicate that Oakville anticipated little or no expansion of public facilities and slow growth, while the Elma plan anticipated moderately high growth along with continued conservation of high-valued farmlands (Grays Harbor County 1982). Little future development activity is expected in the Pacific County portion of the region, as the community of Brooklyn is not designated as an area for more intensive rural development and the remaining area is commercial forest land.

Available information indicates that notable specific proposed, planned or likely development actions within the region of interest are limited in number and scope. While the Industrial Park at TransAlta has been the focus of a highly visible recent Lewis County planning action, that effort involved plan amendments to accommodate the industrial land bank discussed above, as

opposed to specific development activities at the site. Several entities are undertaking studies or construction actions related to mitigation of flood damages in existing developed areas. The USACE is building or modifying a series of levees along the Skookumchuck River to address recent flooding problems in areas of Centralia and Chehalis and some segments of I-5. The Lewis County PUD has proposed to construct water storage dams on the Upper Chehalis and the South Fork of the Chehalis River to provide flood storage to protect downstream areas, and TransAlta has proposed modifications to Skookumchuck Dam to allow increased capacity for flood storage. An expansion of the capacity of the Satsop Combustion Turbine Project may be approved by Washington EFSEC; if so, this would have a very limited effect on land use and habitat distribution within the area of the plant.

3.12.3 Cumulative Impacts of the Proposed Action

3.12.3.1 Earth Resources

Past and present development activities within the region of interest have resulted in cumulative impacts to geology and soils, primarily through increased ground disturbance, compaction and erosion. In some instances ground-disturbing activities have contributed to geologic hazards, such as by triggering landslides.

The principal past and ongoing activities that affect soils in the vicinity of the proposed project are related to timber production. The entire project area is managed for timber production, as is much of the surrounding land within the region. A network of existing logging roads covers the forested landscape and facilitates timber harvest. In addition to areas affected by timber production, extensive areas have experienced ground disturbance from agricultural activities. Urbanized uses have influenced geology and soil conditions in approximately only 2 percent of the region.

Much of the region would continue to experience impacts to geology and soils from ongoing resource-based activities for the foreseeable future. Continued development of urbanized uses would contribute some additional areas of disturbance, although major expected actions of this type have not been identified and theses effects would be concentrated in areas that are already urbanized. The proposal to develop the Coyote Crest Wind Energy Park would add only minor and mostly temporary effects on soils to the much more widespread effects from current and continuing activities in the region.

3.12.3.2 Water Resources

Past and present development activities within the region of interest consist primarily of ground disturbance and erosion are related to timber production. The entire Project Area and much of the surrounding land are managed for timber production. To facilitate timber harvest, a network of existing logging roads covers the forested landscape. There also are extensive areas with ground disturbance from agricultural activities and urbanized uses along the transmission line route. These activities have resulted in cumulative impacts to water resources, such as

sedimentation to nearby streams, which has influenced water quality in several streams in the region such as Elk Creek and the Chehalis River, which have segments listed on Ecology's 303(d) list.

Impacts to water resources would continue in the region from ongoing resource-based activities and continued development of urbanized uses for the foreseeable future. Major expected urbanized development has not been identified. Development of the Coyote Crest Wind Park would add only minor and mostly temporary effects on water resources to the much more widespread effects from current and continuing activities in the region.

3.12.3.3 Plants

As described above, existing environmental conditions in the vicinity of the proposed Project reflect extensive changes brought about due to human occupation and development in the area, including commercial timber harvesting, agricultural conversion, mineral extraction, road construction and small amounts of residential, tourism, and recreational development. These activities have resulted in cumulative impacts to vegetation, through ground disturbance, removal and conversion of vegetation communities, introduction of noxious weeds and removal of TES plant species.

Ongoing forestry and agricultural operations are expected to continue into the reasonably foreseeable future. Impacts of these activities would overlap temporally and spatially with the effects of the proposed action. Construction of the proposed Project would result in the additional or accelerated removal or conversion of vegetation communities, removal of TES plant species, and introduction and spread of noxious weeds. Most of these impacts would occur on land already altered by timber harvest and/or on existing county road and utility rights-of-way. Thus, the proposed Project would result in a minimal contribution to cumulative effects on vegetation communities in the Project Area.

3.12.3.4 Wetlands

No direct impacts to wetlands, streams, and buffers would result from the transmission line component of the Project. The proposal would only cause temporary buffer impacts that would be mitigated by disturbance minimization, construction BMPs for erosion and sediment control, and site restoration following construction. Therefore, no cumulative impacts are expected from the pole replacement activity.

3.12.3.5 Wildlife

Past and present development activities within the region of interest have resulted in cumulative impacts to wildlife and fish, primarily through forest removal, erosion, and road development. The timber management regime currently occurring in the Project Area has removed potential habitat for sensitive species (i.e., mature and old growth forests) and has therefore reduced the potential occurrence of these species.

The principal past and ongoing activities that affect wildlife in the vicinity of the proposed Project are related to timber production. The entire Project Area is managed for timber production, as is much of the surrounding land within the region. A network of existing logging roads covers the forested landscape and facilitates timber harvest which fragments remaining habitat. In addition to areas affected by timber production, extensive areas in the lowland areas have experienced loss of riparian, wetland and south Puget Sound prairie from agricultural activities. The region where the Project is located is largely rural and urbanized uses have had little influence on wildlife habitat (approximately 2 percent of the region).

In addition to logging impacts, two potential wind farms in Southwest Washington are in the development stage, in areas within the range of breeding and foraging marbled murrelets (Radar Ridge and Graylands). If these wind farms experience collision mortality of marbled murrelets, the additional loss of individuals in the breeding population could introduce cumulative impacts from the Project.

Much of the region would continue to experience impacts to wildlife and fish species and habitats from ongoing resource-based activities for the foreseeable future. Continued development of urbanized uses would contribute some additional areas of disturbance, although major expected actions of this type have not been identified and these effects would be concentrated in areas that are already urbanized. The proposal to develop the Coyote Crest Wind Park would add mostly minor and temporary effects on wildlife to the much more widespread effects from current and continuing activities in the region.

3.12.3.6 Air

Past and present development activities within the region of interest consist primarily of ground disturbance and vehicle emissions related to timber production. The entire project area and much of the surrounding land is managed for timber production. To facilitate timber harvest, a network of existing logging roads covers the forested landscape. There also are extensive areas with ground disturbance from agricultural activities and urbanized uses along the transmission line route. These activities have intermittently resulted in cumulative impacts to air quality as fugitive dust.

Impacts to air quality would continue in the region from ongoing resource-based activities and continued development of urbanized uses for the foreseeable future. Major expected urbanized development has not been identified. Development of the Coyote Crest Wind Park would add only minor and mostly temporary effects on air quality to the much more widespread effects from current and continuing activities in the region.

3.12.3.7 Environmental Health

The principal past and ongoing activities that affect environmental health and safety in the vicinity of the Project are related to timber production. The entire project area is managed for timber production on WDNR and private lands, as is much of the surrounding land within the region.

Noise

Past and present activities within the region of interest have resulted in cumulative impacts to noise receptors, primarily through forestry and urban development activities. In the assessment of cumulative noise impacts, the potential for future development in Lewis, Pacific, and Grays Harbor counties would be mainly located within UGAs and in unincorporated UGAs or existing rural centers that have been designated for more intensive development. For instance, existing UGAs within the region in Lewis County include Centralia, Chelais, and Pe Ell. Development is not expected in rural areas that are now largely undisturbed and would be characterized as having low existing ambient sound levels. A similar or lesser level of development is projected for Grays Harbor and Pacific counties. With UGAs located far away from the Project Area, the Project is not expected to contribute to cumulative sound levels and increase existing ambient conditions at existing noise sensitive receptors.

Other Environmental Health Risks

Past and present activities within the region have resulted in cumulative impacts to environmental health and safety, primarily through increased fire activity in forested areas and a wide variety of urbanized activities in developed areas. Nearly all fires within the Project Area have been human caused, mostly the result of debris burning. The region would continue to experience fires from ongoing human use and development activities for the foreseeable future.

Over time, continued development of urbanized uses would contribute some additional hazardous material released through unanticipated accidents, although these would not likely overlap the areas where releases from this project would occur and theses effects would likely be localized and cleaned up. The proposal to develop the Coyote Crest Wind Park would only slightly increase the risk of environmental health and safety impacts, such as increased fire activity or hazardous material spills, but this increase would mostly occur during construction and would be minor compared to the much more widespread effects from current and continuing activities in the region.

3.12.3.8 Land and Shoreline Use

The region of interest for the Coyote Crest project has a predominance of remote, rural lands that are in resource-based land uses, including commercial forestry and agriculture. Past and present development activities within the region of interest have resulted in cumulative impacts to land and shoreline use, including limited increases in urban development. This development ranges from single-family residential lands in small communities such as Doty to large-scale industrial and commercial uses in Centralia, Chehalis, and adjacent areas.

The principal past and ongoing activities that affect land use in the vicinity of the proposed project are related to commercial forestry and agriculture. The majority of the Project Area is managed for timber production, as is much of the surrounding land within the region. In addition to the extensive areas dedicated to commercial forest lands in the vicinity, areas in the lower elevations and river valleys are characterized by agricultural and rural residential land uses.

Urban land uses make up a very small percentage (approximately only 2 percent) of the region of interest.

Based on adopted Comprehensive Plan and zoning designations, the region will continue to be defined by resource-based land uses for the foreseeable future. Limited ongoing development of urbanized uses will continue, but theses effects would be concentrated in UGAs, designated rural development centers, and industrial areas as discussed in Section 3.13.2 above. The proposal to develop the Coyote Crest Wind Energy Park would introduce a utility-scale wind energy project into an area dedicated to commercial forestry land uses. However, this Project represents a very small percentage of the commercial forest land in the region of interest. The Project would have a minimal impact on commercial forestry operations, given the abundance of commercial forest land in the Project Area and the surrounding vicinity, and would have no impact on regional agricultural lands. The proposed wind energy facilities would not collectively change overall land use patterns, affect regional growth, or impact offsite land uses. Therefore, no significant cumulative impacts to land and shoreline use are expected to result from construction, operations, and maintenance of the proposed Project.

3.12.3.9 Historic and Cultural Preservation

Past and present activities within the region of interest have resulted in cumulative impacts to cultural resources, primarily through forestry, agriculture and urban development activities. Most of these impacts have likely occurred in areas where prehistoric and historic use was concentrated, such as in floodplain areas, and in areas where urbanized development has been concentrated. The potential for future development in Lewis, Pacific, and Grays Harbor counties would be mainly located within UGAs and in unincorporated UGAs or existing rural centers that have been designated for more intensive development. Substantial development is not expected in rural areas that are now relatively undisturbed. Although past, present and future timber harvest, agricultural and urbanized activities by other entities will add to cultural resource impacts within the region, the proposed Project would not likely add measurably to those effects. Construction and operation of the Project would occur in areas that have already been disturbed through previous activity, and where the potential for discovery of intact cultural resources is expected to be low.

3.12.3.10 Aesthetics, Light and Glare

Past and present urbanized development and resource-based activity within the region surrounding the proposed Project has substantially changed the landscape by introducing human-made features and altering natural landforms and vegetation. Throughout most of the region the greatest change in the landscape has resulted from timber harvest and related activities, resulting in a current pattern of extensive harvested areas and road systems. In the larger river valleys of the region, changes to visual resources have resulted primarily from urban development. The visible aspects of Project construction that involve land clearing and roads would be consistent with the existing visual conditions in the commercial forest areas of the region, and likely would

not be noticed as an identifiable change. With their ridgeline location, the completed wind turbines would have a noticeable visual presence for a number of miles around the Project, except in areas where topography would block the view. Views of the Project would occur primarily at background viewing distances, resulting in a minor overall degree of visual contrast and impact level. Nevertheless, the Project would add a new and distinctive visual element to the existing landscape, and thereby contribute to cumulative aesthetic impacts from other past, present and future sources of change.

3.12.3.11 Transportation

The transportation system within the region of interest has evolved over time in response to needs that have changed with land uses and the overall level of development in the region. Past and current land uses have created needs for transporting logs and agricultural products, while urban development has led to development of dense street networks within urban centers and major highways linking those areas and providing connections to urban areas outside the region. Population growth and urbanized development will continue to affect the transportation systems within the region, primarily through demands for additional capacity to move more people and goods. The proposed Project would contribute to those demands through the various types of transportation needs that would occur during the construction period. Those needs would require only limited additions to the transportation system, such as modifications to public roads in a few locations and new spur roads to some turbine sites. In addition, the transportation effects of the Project would be quite short-term and transitory. Consequently, the Project would not contribute to long-term cumulative effects to transportation systems within the region.

4. CONSISTENCY WITH PLANS AND POLICIES

4.1 Federal

4.1.1 Clean Water Act

The Clean Water Act (CWA) employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

Section 303(d) of the CWA requires Washington State to periodically prepare a list (commonly known as the 303(d) list) of all surface waters in the state for which beneficial uses, such as drinking, recreation, aquatic habitat, and industrial use, are impaired by pollutants. This list encompasses water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next 2 years (Ecology 2009). Ecology completed and submitted Washington State's Water Quality Assessment for 2006/2008 to the EPA in June 2008, as an "integrated report" to meet the Clean Water Act requirements of sections 305(b) and 303(d). EPA approved the Water Quality Assessment in January 2009. There were no segments of the Chehalis River within the vicinity of proposed Project facilities that were included in the 2009 303(d) list.

As discussed in Section 3.2, the Applicant would develop and implement a SWPPP to address the erosion control and water quality conditions of the CWA's NPDES construction stormwater discharge general permit. The Project SWPPP would be based on and comply with Ecology's (2004) *Stormwater Management Manual for Western Washington*, the WDNR FPAN, the WDNR RMAP, any stipulations of the WDFW Hydraulic Project Approval, and Lewis County stormwater approval, as applicable. These provisions would ensure compliance with the CWA.

4.1.2 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) was enacted in 1972 to encourage coastal states to develop comprehensive programs to manage and balance competing uses of, and impacts to, coastal resources. The CZMA emphasizes the role of state decision-making regarding the coastal zone. Federal consistency requires that federal agency actions or activities that have reasonably foreseeable effects on the coastal zone be consistent with the policies of a coastal state's approved Coastal Management Program (CMP). In addition, CZMA requires compliance with the following state laws: Shoreline Management Act, CWA, Clean Air Act, SEPA, Oceans Resource Management Act, and compliance with the EFSEC, if applicable.

The proposed Project is not located in the coastal zone. However, some Project facilities would be located in Pacific County and Grays Harbor County, both of which are coastal counties. The

Project to date does not involve an identified federal action for which consistency with the CZMA would be required. Ecology is charged with determining consistency with the CZMA program, the agency relies heavily on the local agency shoreline permitting process for this purpose. See further discussion of the Shoreline Management Act in Section 4.2 and discussion of the Project's compliance with shoreline management requirements in Grays Harbor County (Section 4.4) and Pacific County (Section 4.5).

4.1.3 Endangered Species Act (16 USC 1536)

The ESA requires the protection and recovery of threatened and endangered species. ESA is administered by the National Oceanic and Atmospheric Administration (NOAA) Fisheries for species with ocean habitats or for anadromous fish species, and by the USFWS for all other species. NOAA Fisheries and USFWS designate critical habitat for species which are identified as threatened or endangered or listed as potentially threatened or endangered. Section 7 of the ESA requires federal agencies to assess the effect of their proposed actions on listed species and consult with NOAA Fisheries and/or USFWS, as applicable. Section 9 makes it unlawful to "take" endangered species. Take is defined as to include harm, harassment, and habitat modification or degradation. Section 10 enables interested parties to obtain a regulatory certainty (i.e., a take permit) in exchange for voluntary measures that conserve protected animals. "Incidental take" or "enhancement of survival" permits otherwise lawful activities that might unintentionally harm a species to proceed under a habitat conservation plan, candidate conservation agreement, or a safe harbor agreement.

Sections 3.3 and 3.5 of the DEIS address the known or potential occurrence of species listed under the ESA within the Project Area and the potential effects of the Project on those species. Based on Project characteristics relative to habitat conditions and occurrence information, the key species are the northern spotted owl and the marbled murrelet. Study programs and coordination activities associated with these species are discussed in detail in Section 3.5.

4.1.4 Bald and Golden Eagle Protection Act (16 USC 668)

The Bald and Golden Eagle Protection Act protects bald eagles and golden eagles and imposes prohibitions on any "taking" of these species. Take is defined in the act as actions to pursue, shoot, shoot at, poison, would, kill, capture, trap, collect, molest or disturb these species. In late 2009 the USFWS announced the development of a program to issue incidental take permits under the act; rules, procedures and application requirements for the permit program had not been issued as of March 2010. Section 3.5 discusses use of the Project Area by bald and golden eagles. Minimal use of the area by these species has been observed and the potential for impact is considered low.

4.1.5 Migratory Bird Treaty Act (16 USC 703-712)

The Migratory Bird Treaty Act prohibits mortality of a wide range of avian species. The act, which is administered by the USFWS, includes no provisions for permitting incidental take. The USFWS has issued guidelines for wind power development that include recommendations for

avoiding impacts to species protected under the Migratory Bird Treaty Act. In the absence of incidental take provisions, the USFWS has practiced prosecutorial discretion with respect to responsible wind developers taking actions to minimize avian impacts. Section 3.5 provides detailed information about efforts to study avian resources in the Project Area and minimize impacts to avian species.

4.1.6 National Historic Preservation Act (16 USC 470)

The NHPA and its implementing regulations at 36 CFR outline the responsibilities of federal agencies to preserve and protect historic properties. Under Section 106, the NHPA requires that federal agencies take into account the effects of their actions on historic properties. As there is no federal nexus involved in the Project, compliance Section 106 requirements is not applicable to this review process.

4.2 Washington State

4.2.1 State Environmental Policy Act (RCW 43.21C)

SEPA provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal would affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified. SEPA applies to decisions by every state and local agency within Washington State, including state agencies, counties, cities, ports, and special districts (such as a school or water district).

This EIS was prepared pursuant to Washington State environmental policy (Chapter 43.21C RCW) and Ecology's SEPA rules (WAC Chapter 197-11). While the Project includes proposed facilities in three counties, Lewis County has assumed lead agency status pursuant to WAC 197-11-050. Pacific County and Grays Harbor County agree that Lewis County is the appropriate SEPA Lead Agency for the Project. Pursuant to the SEPA rules, Lewis County is conducting an environmental review of the proposed Project.

SEPA provides a way to identify possible environmental impacts that may result from governmental decisions, such as a decision by Lewis County on an SUP for the Project. The SEPA process typically begins when an application is submitted to an agency for issuance of a permit to develop a private project. This environmental review was triggered by the Applicant's submittal of an SUP application to Lewis County on September 23, 2009, supplemented by a Variance Application on October 12, 2009. Lewis County issued a Determination of Significance and determined that an EIS is required under RCW 43.21C030 (2)(c).

Public scoping is an integral part of the SEPA process, and is done to assist in identifying key issues for evaluation in the EIS. Lewis County conducted scoping for the Project to obtain

public and agency comment on the significant environmental aspects of this Project. The scoping process included a public open house meeting on December 2, 2009, in Chehalis, Washington to obtain comments and address questions about the Project and the SEPA process.

SEPA requires evaluation of probable significant adverse impacts of a proposal such as a wind farm. For projects addressed by an EIS, SEPA requires preparation of a draft and final environmental impact statement (DEIS and FEIS, respectively). This DEIS analyzes impacts expected from the proposed action and identifies mitigation that would address the impacts identified. The DEIS is circulated for public and agency review and comment. The DEIS comment period starts on the date the Notice of Availability is issued and typically ends 30 calendar days thereafter. The FEIS is prepared after the close of the comment period and responds to comments submitted during the comment period. The analysis contained in the DEIS and the FEIS, collectively, constitutes the required environmental review under Chapter 43.21C RCW and WAC 197-11.

4.2.2 Growth Management Act

The Growth Management Act (GMA; Chapter 36.70A RCW) contains a comprehensive framework for managing growth and coordinating land use planning and infrastructure. Urban and rapidly growing local government jurisdictions are subject to GMA. Some of the relevant goals of the GMA are to: (1) reduce the inappropriate conversion of undeveloped land into sprawling, low density development, (2) encourage economic development that is consistent with adopted comprehensive plans, (3) maintain and enhance natural resource-based economies, and (4) support the economic development of public facilities and services necessary to support development.

The GMA requires county and city governments to manage Washington's growth by preparing comprehensive plans and implementing them through adoption of zoning controls and development regulations, designating urban growth areas, and identifying and protecting critical areas and natural resource lands. Lewis and Pacific County have adopted comprehensive plans to be fully compliant with the GMA, while Grays Harbor County has only conducted GMA planning for Critical Areas and Natural Resource Lands. In Lewis, Pacific, and Grays Harbor County areas of the Project, the lands on which the Project would be sited are designated in their respective adopted and approved comprehensive plans as Forest Resource Lands, Forest of Long-Term Significance, and Agricultural, respectively. The Project would be built on land zoned Forest Resource Lands, Commercial Forest, and Agriculture-2, respectively. If the proposed Project is found to be consistent with local government comprehensive plans and zoning ordinances, it would also be consistent with the requirements of the GMA.

4.2.3 Shoreline Management Act

The Shoreline Management Act (Chapter 90.58 RCW) regulates development within 200 feet of "shorelines of the state" including marine shorelines, streams with a mean annual flow greater than 20 cubic feet per second, and lakes of 20 acres or more in size (as well as to the edge of

wetlands associated with these water features). Ecology regulates shorelines of the state through local agencies (Chapter 173-22 WAC). Each county or city in the state has developed a Shoreline Master Program (SMP) specifying restrictions that may apply to a given water body and outlining steps necessary to obtain approval for alteration or development. The Project would be subject to the rules and regulations established in each county's SMP, if applicable. Please refer to Sections 4.3 through 4.5 for specific discussion.

4.2.4 Forest Practices Act

The WFPA and its corresponding rules are administered by WDNR. Forest practices are actions related to growing, harvesting, and processing timber, including road construction, road maintenance, forest thinning, salvage harvesting, reforestation and other silvicultural and environmental practices. The WFPA and its corresponding rules regulate these activities on state and private timber lands in the state of Washington. An FPAN permit must be obtained for activities on forest lands involving harvesting, road construction, rock pits, and installation or change of culverts and/or bridges.

The Weyerhaeuser McDonald Tree Farm is managed for sustained-yield timber production. The harvesting program employs several different types of harvesting systems and is managed in compliance with the WFPA. The WFPA would regulate all harvesting and forest practices, including road construction and maintenance, brush control, and reforestation related to the installation of the capital improvements associated with the Project.

4.2.5 Indian Sites and Resources Act (RCW 27.53); Indian Graves and Records Act (27.44)

The State of Washington addresses cultural resources in Chapter 27 of the RCW. The Indian Sites and Resources Act (Section 53) defines archaeological resources, establishes the requirement of a government-issued permit prior to the disturbance of any archaeological site, creates the DAHP, and establishes penalties for failure to comply with preservation laws.

The Indian Graves and Records Act (Section 44) establishes laws to protect prehistoric and historic human burials and prohibits knowingly disturbing a Native American or historic grave. Unlawful disturbance of Native American human remains is a class C felony; prosecution as well as a civil action from the affected Native American Tribe may result. The Abandoned and Historic Cemeteries and Historic Graves Act (RCW 68.60.040 and RCW 68.60.050T) establishes protection for historic cemeteries and graves. Persons disturbing historic graves are subject to prosecution.

Section 3.9 discusses existing information about cultural resources in the Project Area and potential impacts from the Project. Ground-disturbing activities, especially during Project construction, have the potential for adverse impacts to cultural resources that may be present on site. These activities would be subject to the provisions of RCW 27.

4.3 Lewis County

4.3.1 Comprehensive Plan

The Lewis County Comprehensive Plan, a product of the state-wide requirements for growth management planning (Chapter 36.70A RCW), identifies a vision of the future for the county; long-term goals, policies, and land use patterns that put that vision into operation; and the foundation for allocating and providing for the management of growth in the county over a 20 year period. The vision of the future encompasses the issues for natural resource lands, critical areas, the mandatory comprehensive plan elements (land use, rural, housing, transportation, utilities, capital facilities), UGAs, and the siting of essential public facilities, and enables the community leaders to direct economic development, plan for housing, business centers and open space/parks, and provide adequate public services and capital facilities as growth occurs.

Over three-quarters of the land in Lewis County is in federal, state, and private resource land uses. This includes 38 percent in federal and state ownership, primarily for timber and recreational uses. Another 37 percent, which is privately owned resource lands, is primarily large tracts of property devoted to mineral, agricultural and forestry uses. Only 1 percent of the land lies within urban areas, with much of that committed to ROWs and public uses, or constrained by critical areas. An additional 1 percent of the land is classified as a "Rural Area of More Intense Development", which includes small towns in unincorporated areas, crossroads, and commercial and subdivision enclaves. Twenty-three percent of the land is considered remote rural, much of which is characterized by steep slopes, wetlands and hydric soils. Over 98 percent of Lewis County is open space or remote rural areas and less than 2 percent is available for urban or more intense rural development.

Lewis County has designated the general location and types of land uses suitable in the various areas of the county. The Comprehensive Plan includes land use sub-elements for urban growth areas, rural areas, natural resource lands (including forest lands), and natural environment. The Plan's Natural Resource Lands sub-element includes the following goals and policies that are applicable to the proposed Project. The consistency of the proposed Project with the Plan is discussed for each goal and policy.

NR GOAL *Maintain agricultural, commercial timber production, mineral resource extraction lands and their ancillary uses.*

Objective NR 1 *Identify and conserve resource lands supporting agriculture, forest, and mineral extractive industries.*

The Project Area is located within the County's designated Forest Land/Forest Resource Lands. These are areas primarily useful for growing trees, including Christmas trees subject to the excise tax imposed under RCW 84.33.100 through 84.33.140, for commercial purposes, and that has long-term commercial significance for growing trees commercially (Land Use Element p. 4-54).

Policy NR 1.2 *The County should protect the interests of land-owners who wish to continue the practice of management of natural resources.*

The proposed Project would be developed on commercial forestry land. The Project would be developed at a very low density across large tracts of land, and would result in minimal permanent disturbance to the land. Timber harvesting activities would continue during project operation. Commercial forestry land would not be taken out of timber production, with the exception of areas where permanent wind energy facilities would be sited. The presence of the Project would generate additional income to the landowners through lease payments.

Policy NR 1.8 *The County encourages the multiple use of forestland. Multiple use management acknowledges the primary use and provides for other compatible uses. These uses may include air and water quality, fauna, flora and their habitats, viewsheds, watersheds and dispersed recreation.*

The Project has been designed to be compatible with ongoing use of surrounding commercial forest lands. The WTGs have been sited to allow log harvesting operations to occur in the same area over the life of the Project. Logging activities are expected to continue in the immediate vicinity of the WTG locations.

Policy NR 1.12 *Land Use activities within or adjacent to Natural Resource Land uses should be sited and designed to minimize conflicts with resource management and other activities on natural resource land.*

The Weyerhaeuser McDonald Tree Farm is managed for sustained-yield timber production. The harvesting program employs several different types of harvesting systems and is managed in compliance with the WFPA administered by WDNR. Clearing activities for the Project are subject to WDNR regulations under the FPA. An FPAN permit would be obtained for Project activities on forest lands involving harvesting, road construction, rock pits, and installation or change of culverts and/or bridges. Final Project design would evaluate sites for all WTGs and associated facilities to avoid impacts to critical areas, such as wetlands and primary habitats, and cultural resources. The construction and operation of the Project would adhere to the mitigation measures discussed under each resource heading in this EIS.

The comprehensive plan's Capital Facilities and Utilities Element includes the following goal and policies applicable to the Project:

U GOAL 1 *Ensure that necessary and adequate utilities to support development in Lewis County are provided.*

POLICY U 1.5 *Encourage the development of alternative energy generation facilities.*

The proposed action is to construct and operate a commercial-scale renewable energy generation facility that would consist of 47 wind turbines with a capacity of 2.5 MW each. The proposal to develop the Project is in response to increasing demands for electricity, and the requirement

under State law that utilities meet a portion of their customer demand from clean, renewable sources of energy. The Applicant would make electricity generated by the Project available to utilities and other wholesale energy suppliers for sale to retail electric customers. In so doing, the Project would help utilities meet energy policy objectives to obtain a share of total electricity supplies from renewable energy sources and reduce greenhouse gas emissions associated with energy production.

POLICY U 1.6 *Coordinate land use and facility planning to allow siting and construction of utility distribution lines within new rights of way or where roads which are being constructed or reconstructed in existing right of way.*

The proposed Project transmission line would be sited and constructed within existing utility easements along the ROWs of Garrard Creek Road and South Bank Road. The proposed transmission line structures would replace existing distribution or transmission line facilities in the same location.

4.3.2 Zoning

Land in the Lewis County portion of the Project Area is zoned as Forest Resource Lands (Figure 3-13). The Lewis County definition of Forest Resource Lands is "land primarily useful for growing trees, including Christmas trees subject to the excise tax imposed under RCW 84.33.100 through 84.33.140, for commercial purposes, and that has long-term commercial significance for growing trees commercially" (Lewis County Code 17.30.140). The intent of this designation is to maintain and enhance resource-based industries, encourage the conservation of productive forest lands, and discourage incompatible uses. Primary land uses within this designation include the growing and harvesting of timber, forest products, and associated management activities in accordance with the WFPA (Lewis County Code 17.30.440-450). Accessory uses allowed in Forest Resource Lands include utility substations and transmission lines. Incidental uses in Forest Resource Lands are defined as uses which may provide supplementary income without detracting from the overall productivity of the forestry activity. These uses include "erection, construction, alteration, and maintenance of gas, electric, water, or communication and public utility facilities." Wind energy facilities are not specifically identified as a permitted use in this section; therefore, these facilities are subject to a special use permit.

In addition to designating uses, the Lewis County zoning regulations address criteria for approving special uses and identify supplemental requirements for land use approvals. Lewis County and the Applicant identified the Special Uses Criteria of LCC 17.115.030(7) as an applicable provision in the Wind Project Proposed Findings, and the Applicant is proposing to permit the Project as a special use under this provision. This provision requires that "residential, recreational, and other non-resource uses permitted under Chapter 17.30 LCC, Resource Lands…shall demonstrate that the use does not adversely affect the overall productivity of the total resource parcel for the intended resource use by reason of the non-resource activity proposed." The Project would comply with this provision, as only a small portion of the Project

Area would be permanently developed with wind turbines and associated infrastructure, and the overall productivity of the McDonald Tree Farm would not be diminished.

The Project would comply with the applicable Supplemental Requirements established in LCC 17.145, except LCC 17.145.030 as described below. The Project would meet the appropriate industrial setbacks as required in LCC 17.145.020(c), and would ensure that the noise requirements in LCC 145.050 are met (as required by LCC 17.115.020(1)). The road construction, stormwater, and development standards defined in LCC 17.145.080(1), (3), and (5) would be met. The Project would meet the electrical substation requirements included in LCC 17.145.100. The majority of the Project's wind turbines meet the height requirements included in LCC 145.030(3). The Applicant has submitted a variance request to Lewis County to achieve full compliance with these height requirements.

4.3.3 Shoreline Management

The Lewis County SMP was first adopted in 1974 and was last updated in 1998. This document sets forth policies, rules, and regulations for the development of the shorelines within the county. The South Fork of Garrard Creek is listed in the SMP. This creek is within the Project Area. Construction of the Project transmission line may might involve activity within the 200-foot SMP buffer. See Section 3.2 – Water Resources for more detail on project impacts to Garrard Creek. If the transmission line is to be located within the shoreline buffer, construction activities would require a shoreline substantial development permit to be consistent with the County's shoreline regulations.

4.3.4 Critical Areas

Lewis County has adopted regulations for protecting critical areas and human health and safety as required by the GMA of 1990. Lewis County Code Chapter 17.35 includes minimum critical areas designations and protection standards, consistent with the requirements of Chapter 36.70A RCW. The county's critical areas regulations identify, classify, and designate protection measures for wetlands, fisheries habitat, wildlife habitat, frequently flooded areas, aquifer recharge areas, and geologically hazardous areas, including erosion and landslide hazard areas.

Geologic hazards and any impacts of the proposed Project on these geologic hazard areas are described in Section 3.1, Earth Resources. Fisheries habitat, frequently flooded areas, aquifer recharge areas, and any impacts of the proposed Project on these resources are discussed in Section 3.2, Water Resources. Wetlands within the Project Area and any impacts of the proposed Project on wetland resources are identified in Section 3.4. Wildlife habitat in the Project Area and any impacts of the proposed Project on wildlife habitat are discussed in Section 3.5, Wildlife.

4.4 Grays Harbor County

4.4.1 Comprehensive Plan

Grays Harbor County is not required to plan under the GMA. Nevertheless, the county recognizes the importance of comprehensive planning and has conducted county-wide long-rage planning efforts that incorporate those aspects of the GMA that are relevant to local needs and circumstances. The first land use planning study for the County was completed in 1961 and serves as the original basis for the County's Comprehensive Land Use Plan. The original Comprehensive Plan consisted of four reports, including population trends, land use analysis and economic base data, the comprehensive plan, and a summary. The Agricultural Element of the Comprehensive Plan and a Rural Lands Study were completed in 1981 and 1982, respectively. The County's Interim Resource Lands and Critical Areas Designation was adopted in 1992.

The Project would be located in an area of the county designated by the Comprehensive Plan as Agricultural. This designation includes both cropland and grazing land, mostly in the eastern part of the county. Grays Harbor County first designated agricultural land in the late 1960s by adopting comprehensive land use maps and designating an agriculture zone. In September 1969 the county adopted Comprehensive Zoning Ordinance #38, which regulates land uses within the agricultural zoning district.

The Agricultural Element of the Comprehensive Plan contains adopted goals, objectives, and policies to guide the use and future development of the agricultural lands. The following goals, objectives, and policies are relevant to the proposed Project:

5.4.1 Goal *To conserve and protect agricultural lands from incompatible development and to encourage the continued economic viability of agriculture.*

5.4.2 Objectives

1. To ensure County policies, programs, and ordinances especially zoning and capital improvement programs will promote a land use pattern beneficial to agricultural activities and support the goals and objectives of this plan.

2. To ensure that there are adequate land and water resources for continued agricultural development.

3. To protect agricultural operations from the adverse impacts associated with non-agricultural development.

4. To keep agricultural land from being converted to non-agricultural uses.

5. To provide flexibility to accommodate the diversity of agricultural uses while assuring adequate protection for each type of use.

5.4.3 Policies

4. Lands and land uses adjacent to planned agricultural areas should be of a rural or low density nature in order to separate agricultural uses from incompatible and more intense residential, commercial, and industrial development.

The northern part of the Project Area, which includes the 115 kV transmission line route from the Project to the interconnection point at Cedarville, spans the narrow tributary valley of Garrard Creek and a lightly populated area of the larger Chehalis River Valley. The proposed transmission line route would follow Garrard Creek Road and South Bank Road to Cedarville. This portion of the transmission line would be located within a Grays Harbor PUD utility easement in which existing electric distribution and transmission lines are located. Adjacent land uses are agricultural and rural residential lands. The proposed transmission line would replace the existing transmission line structures and would be located within an existing easement dedicated to utility use, and would therefore not be incompatible with adjacent agricultural land uses.

7. Non-agricultural commercial and industrial uses should not be allowed in farming areas unless:

a. No other practicable alternative site is available;

b. The uses will only convert the least suitable agricultural land in the area; and

c. Would not negatively directly or indirectly impact adjacent agricultural activities.

The proposed transmission line would replace an existing distribution or transmission line similar in size within existing utility easements. No agricultural land would be converted for construction and operation of the transmission line. Temporary indirect impacts to agricultural activities would be minor and may include brief, intermittent delays from construction traffic, noise, and dust. There would be no direct or permanent indirect impacts to adjacent agricultural activities.

9. Roads and other capital facilities in agricultural areas should primarily service agricultural and other compatible rural activities; changes in these facilities that would negatively impact agricultural activities or encourage new residential development should not be allowed.

Project-related construction activities would require improvements to local roads to accommodate the truck traffic associated with the construction process. Detailed plans for these improvements and the connections to county roads would be prepared following a detailed evaluation of road requirements. Temporary indirect impacts to agricultural activities would be

minor and may include construction traffic, noise, and dust. These road improvements would not have any direct or permanent impacts agricultural activities or encourage new residential development.

4.4.2 Zoning

According to the Grays Harbor County Comprehensive Zoning Code (Title 17), zoning districts and their schedule of regulations do not affect uses and related activities on streets and their rights-of-way, rail tracts and their rights-of-way, and utility conduits and their rights-of-way (Grays Harbor County Code 17.04.070(C)). Therefore, the proposed Project transmission line would not be subject to Grays Harbor County zoning regulations. However, the following discussion is provided for informational purposes, consistent with the level of information analyzed for the proposed Project in Lewis and Pacific counties.

Land along the proposed Project transmission line corridor in Grays Harbor County is zoned as Agricultural-2. The primary purpose of this district is to encourage the conservation and protection of agricultural lands and to reserve areas for use by large commercial farms. The establishment of this district recognizes the importance of the agricultural industry in Grays Harbor County and provides protection for those soils and areas most suitable for commercial agriculture (GHCC 17.16.010). In this zone, public utility and service structures must be located and constructed in such places and in such manner that they would not segment land of any one farm and would not interfere with agriculture activities by limiting or interfering with the access of fields or the effectiveness and efficiency of the farmer and farm equipment (GHCC 17.16.040). As stated above, the proposed Project transmission line would replace an existing transmission line similar in size within existing utility easements. No agricultural land would be segmented or converted for construction and operation of the transmission line. Temporary indirect impacts to agricultural activities would be minor and may include construction traffic, noise, and dust. There would be no direct or permanent indirect impacts to adjacent agricultural activities.

4.4.3 Shoreline Management

The Grays Harbor County Shorelines Management Master Program was adopted in 1974 and was last updated in 1998. This document sets forth policies, rules, and regulations for the development of the shorelines within the county. Garrard Creek and the Chehalis River within the Project Area are subject to the provisions of the SMP. Construction of the proposed Project transmission line might occur within the 200-foot SMP buffer. See Section 3.2, Water Resources, for more detail on project impacts to Garrard Creek and the Chehalis River. If the transmission line is to be located within the shoreline buffer, construction activities would require a shoreline substantial development permit to be consistent with the County's shoreline regulations.

4.4.4 Critical Areas

Grays Harbor County originally adopted Interim Resource Lands and Critical Area Designations in 1992. These designations included geologically hazardous areas (including erosion hazard and landslide hazard areas) and wetlands. Areas of seismic risk had already been adopted by the county through the adoption of the Uniform Building Code. Frequently flooded areas had been designated and mapped by the Flood Insurance Rates Map. At the time of adoption, certain designations such as mine and volcanic hazard areas, aquifer recharge areas, and fish and wildlife habitat were reserved for future consideration.

Grays Harbor County prepared a draft critical areas ordinance in 2008 to identify critical protection areas and to supplement the existing development regulations contained in Grays Harbor County Code. Critical protection areas were identified for geologically hazardous areas, frequently flooded areas, wetland areas, fish and wildlife habitat conservation areas, and critical aquifer recharge areas. The county included best available science in the preparation of development regulations to protect the existing function and values of critical protection areas, especially anadromous fisheries. Grays Harbor County adopted code amendments addressing critical areas in June 2010.

Geologic hazards and any impacts of the proposed Project on these geologic hazard areas are described in Section 3.1, Earth Resources. Fisheries habitat, frequently flooded areas, aquifer recharge areas, and any impacts of the proposed Project on these resources are discussed in Section 3.2, Water Resources. Wetlands within the Project Area and any impacts of the proposed Project on wetland resources are identified in Section 3.4. Wildlife habitat in the Project Area and any impacts of the proposed Project on wildlife habitat are discussed in Section 3.5, Wildlife.

4.5 Pacific County

4.5.1 Comprehensive Plan

The Pacific County Comprehensive Plan was adopted in 1998, setting forth goals and policies to protect the health, welfare, safety and quality of life of the county's residents. Prior to 1998, a majority of the County was not covered under a Comprehensive Plan, and prior to 2004, a majority of the County was unzoned. There have been a few minor amendments to the Plan since 1998, and new development regulations were adopted in 2004.

The Comprehensive Plan contains five primary elements mandated by State law: land use, housing, capital facilities, utilities and transportation. The Comprehensive Plan also contains a rural element, critical areas and resource lands element, and a public facilities element, as well as implementation programs that identify actions and projects to carry out the Plan's goals and policies. Development regulations are adopted and implemented to carry out the goals and policies of the Comprehensive Plan.

Pacific County began a review and update of its comprehensive plan and development regulations in 2009 to ensure compliance with the GMA's periodic review requirements.

The Project Area is located within the County's designated Forest Land of Long-Term Commercial Significance. The purpose of this designation is to conserve forest lands of long-term commercial significance; maintain and enhance resource-based industries; discourage residential encroachment and other incompatible development from long-term forest lands; and promote and protect forestry and its dependent community through the enhancement, protection and perpetuation of the ability of private and public landowners to grow and harvest timber. The economy of Pacific County is greatly influenced by the timber industry, as over 70 percent of the land area is forested, with much of that land under the control of a few timber companies. Forest Land of Long-Term Commercial Significance has been assessed pursuant to Chapter 84.33 RCW and Chapter 84.34 RCW. Forest Land of Long-Term Commercial Significance typically contains large parcels. Most parcels are thousands of acres and nearly all parcels are over 40 acres. Development pressure surrounding this forest land is not intense.

Pacific County Ordinance No. 147 – Critical Areas and Resource Lands, and the corresponding language in the county's Comprehensive Plan were adopted to maintain and enhance natural resource-based industries, including productive timber, agricultural, and fishing industries. Continued implementation of Ordinance No. 147 would encourage the conservation of productive forest lands and productive agricultural lands, and discourage incompatible uses.

The Comprehensive Plan includes the following goal and policies applicable to the proposed Project:

GOAL R-3 *Forest land of long-term commercial significance should be conserved in order to maintain a viable forestry industry for long-term economic use while protecting environmental values.*

Policy R-3.3 *The primary land use activities in forest land of long-term commercial significance should be commercial forest management, agriculture, mineral extraction, accessory uses, wildlife habitat enhancement programs, and other non-forest related economic activities relying on forest land.*

The primary land use in the Project Area is commercial forestry. The Project would develop three WTGs on forest lands in Pacific County. Timber harvesting activities would continue during project operation. Commercial forestry land would not be taken out of timber production, with the exception of limited areas where permanent wind energy facilities would be sited.

Policy R-3.4 *Land use activities within or adjacent to forest land of long-term commercial significance should be sited and designed to minimize conflicts with forest management, and other activities on forest land.*

The Project has been designed to be compatible with ongoing use of surrounding commercial forest lands. The WTGs have been sited to allow log harvesting operations to occur in the same area over the life of the Project. Logging activities are expected to continue in the immediate vicinity of the WTG locations.

Policy R-3.5 *The County discourages the establishment or expansion of utility local improvement districts, or sewer, water or public utility districts on forest lands of long-term commercial significance which result in the imposition of assessments, rates, or charges on designated forest land.*

The Project would involve development of commercial-scale wind energy facilities on commercial forest land leased from Weyerhaeuser. The Project would not create a utility district.

Policy R-3.8 *Subject to any state or local regulation of critical areas, the County encourages the multiple economic use of forest land for a variety of natural resource and other land use activities particularly suited for forest lands because of physical and topographical characteristics; remoteness from populated areas; availability of water supplies; the quality of the forest environment; or where the efficient provision of statewide or regional utilities, energy generating and/or transmission facilities, or public facilities require access across or use of such forest lands.*

The Project would be co-located with commercial timber operations on Weyerhaeuser land. Project operations would not interfere with ongoing timber harvest operations. Final Project design would evaluate sites for all WTGs and associated facilities to avoid impacts to critical areas, such as wetlands and primary habitats, and cultural resources. The construction and operation of the Project would adhere to the mitigation measures discussed under each resource heading in this EIS.

The Comprehensive Plan's Utilities Element contains the following applicable goals and policies:

Goal U-2 *Negative impacts associated with the siting, development, and operation of utility services and facilities on adjacent properties and the natural environment should be minimized.*

Policy U-2.3 *The County should work cooperatively with surrounding municipalities in the planning and development of multi-jurisdictional utility facility additions and improvements.*

The Project would be located in Pacific, Lewis, and Grays Harbor counties. While the Project includes proposed facilities in three counties, most of the WTG locations are in Lewis County. Therefore, the three counties have agreed that Lewis County will act as the lead agency for the

SEPA review of the Project pursuant to WAC 197-11-050. The SEPA process requires evaluation of probable significant adverse impacts of a proposed development such as this Project. This DEIS analyses any environmental impacts and recommends mitigation for those impacts.

4.5.2 Zoning

The Pacific County portion of the Project Area is zoned as Commercial Forest by Pacific County (Figure 3-13). The intent of the Commercial Forest District is to provide for and encourage the long-term productivity, commercial management, and sustained use of forest resources. The Commercial Forestry district provides for uses that are compatible with forestry activities while maintaining water quality and soil productivity. This district is characterized by lands which are relatively remote from residential areas, have a very limited infrastructure base or limited access to public infrastructure, and have a history of being used for the production of timber or other natural resource development and extraction. Major utility facilities are a conditional use in the Commercial Forest zone.

4.5.3 Shoreline Management

The Project Area does not include any shorelines that are subject to the County's Shoreline Management Master Program.

4.5.4 Critical Areas

Pacific County adopted the Critical Areas and Resources Lands Ordinance No. 147 in 1999 and amended the ordinance in 2000. Regulated critical areas include all wetlands, frequently flooded areas, aquifer recharge areas, fish and wildlife habitat conservation areas, geologically hazardous areas, shellfish areas, and kelp, eelgrass, herring and smelt spawning areas. All proposed development activities have to be reviewed by Pacific County to assess potential impacts, if any, to critical areas and resources lands identified in Ordinance 147. Prior to Pacific County issuing a permit, the Department of Community Development must review or assess all development activities that require a building permit, shorelines permit, road approach permit, or any type of grading and/or filling activities.

Geologic hazards and any impacts of the proposed Project on these geologic hazard areas are described in Section 3.1, Earth Resources. Fisheries habitat, frequently flooded areas, aquifer recharge areas, and any impacts of the proposed Project on these resources are discussed in Section 3.2, Water Resources. Wetlands within the Project Area and any impacts of the proposed Project on wetland resources are identified in Section 3.4. Wildlife habitat in the Project Area and any impacts of the proposed Project on wildlife habitat are discussed in Section 3.5, Wildlife.

5. CONSULTATION AND COORDINATION

This chapter includes information on public involvement activities and coordination with agencies, tribes and other organizations that has occurred to date in the preparation of the Coyote Crest Wind Park DEIS.

5.1 Public Involvement

Public involvement is a process by which interested and affected individuals, organizations, agencies, Indian tribes and governmental entities are consulted and included in the decision-making process. Through this process, members of the local community and other parties potentially affected by the proposed action have been given an opportunity to voice concerns, identify issues, suggest approaches to the EIS analysis, and express their opinions. Formal opportunities for public involvement in the Coyote Crest Wind Park environmental review process included a scoping comment period and a public open house. Lewis County received and maintained records of public comment of various forms (e.g., letters and telephone comments) throughout the scoping process. The activities described below are those conducted or sponsored by Lewis County specifically in support of the SEPA process for the County's review of the Coyote Crest proposal.

The Applicant submitted an application for development of a wind energy facility to Lewis County on September 23, 2009, supplemented by a Variance Application on October 12, 2009. In response, the County determined that the proposal would be likely to have a significant adverse effect on the environment and that an EIS would be required under SEPA (RCW 43.21C.030 [2][c]) and the Lewis County SEPA ordinance. On November 18, 2009 Lewis County issued a Determination of Significance/Scoping Notice documenting this finding and requesting comments on the scope of the EIS. The notice identified the proposed scope of the EIS, the time and place for a public meeting to obtain input, and a date for submittal of written comments. The Determination of Significance/Scoping Notice was published in multiple local newspapers and in Ecology's SEPA Register. The Determination of Significance/Scoping Notice was also distributed directly to Lewis County's mailing list for the Coyote Crest project, which includes adjacent property owners and interested agencies, organizations and individuals.

The Determination of Significance and request for scoping comments informed interested parties that comments on alternatives, probable significant adverse impacts and licenses and approvals that may be required must be received by December 21, 2010. To facilitate public input in determining the scope of the EIS, Lewis County held a public scoping meeting in Chehalis on December 3, 2010. Lewis County received comments on the scope of the EIS in letter form and as written comments recorded on comment forms submitted at the scoping meeting. Lewis County reviewed the entire body of scoping comments, identified the comments with respect to the topic or environmental issue addressed, and grouped the comments by similar topic area. The input from the scoping process was used to guide the development of the DEIS.

5.2 Agency Consultation

As the lead agency under SEPA, Lewis County has the responsibility for the development of this DEIS. The Planning Division of Lewis County Community Development directed the preparation of the EIS. The Planning Division coordinated with other branches of Lewis County government as necessary during the EIS process. In cooperation with Pacific County and Grays Harbor County, Lewis County also created a tri-county steering committee to coordinate the review of the proposed action under SEPA.

Lewis County has lead jurisdiction over the environmental review and land use approval processes for the proposal. Other agencies or entities will have jurisdiction over other permits that would be required to construct and operate the project, and/or have expertise concerning elements of the environment addressed in the EIS. Consequently, Lewis County is coordinating with these entities in the development of the EIS documentation.

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7. DISTRIBUTION OF THE DRAFT EIS

Federal Agencies and Officials

Bonneville Power Administration
Environmental Protection Agency, Region 10
Federal Aviation Administration, Southern Regional Office
Federal Communications Commission
U.S. Army Corps of Engineers - Seattle District
U.S. Department of the Interior, Bureau of Indian Affairs
U.S. Department of the Interior, Fish and Wildlife Service
U.S. Department of the Interior, Office of Environmental Policy and Compliance

Indian Tribes

Confederated Tribes of the Chehalis Reservation

Washington State Agencies and Officials

Office of the Governor, Executive Policy Advisor
Washington Department of Archaeology and Historic Preservation
Washington Department of Commerce, Energy Policy Division
Washington Department of Ecology
Washington Department of Fish and Wildlife
Washington Department of Natural Resources
Washington State Department of Transportation, Southwest Region
Washington State Parks and Recreation Commission
Washington State Patrol

Local Government Agencies and Officials

City of Centralia
City of Chehalis
City of Oakville
Grays Harbor County Fire Protection District 1
Grays Harbor County, Public Services Department
Grays Harbor Public Utility District
Lewis County Fire District 11
Lewis County Fire District 16
Lewis County Public Utility District
Pacific County Department of Community Development
Pe Ell School District
Riverside Fire Authority
Town of Pe Ell

Libraries

Centralia Timberland Library
Chehalis Timberland Library (Vernetta Smith)
Elma Timberland Library
Oakville Timberland Library

Media

The East County Journal (Morton)
The Chronicle (Centralia)
The Vidette (Montesano)

Organizations and Individuals

Doty General Store
Port Blakely Tree Farms
Weyerhaeuser Company
Weyerhaeuser Company Mineral Resources