APPENDIX B

HABITAT MAP

Habitat Map

Coyote Crest Wind Energy Project
Pacific and Lewis Counties, Washington

Prepared for
Everpower Renewables

November 2008

TETRA TECH EC, INC.

INTRODUCTION AND METHODS

Everpower, LLC is proposing to develop the Coyote Crest Wind Energy Generation Facility (WRA) in western Oregon, near the town of Pe Ell in Lewis and Grays Harbor Counties, western Washington. TtEC conducted an inventory to determine existing habitats on the project area. The habitat analysis focused on available habitat for documented sensitive species, plant communities and areas of potential concern for large numbers of bird and bat species.

The Habitat Inventory was completed over an approximately 70-square-mile area, which represents the most current understanding and layout of the Project Area. A variety of GIS digital sources were used to categorize habitat within the project area including: Washington Department of Natural Resources Natural Heritage Rare Plant Data, Washington Department of Fish and Wildlife Priority Habitats and Species data (PHS), Weyerhaeuser Stand data, and National Wetlands Inventory data (NWI). Using different types of digital maps can sometimes produce different results, in particular when using remote sensing techniques to categorize habitats (Glenn and Ripple 2004). In order to determine the accuracy of older forest patches within the Coyote Crest project area a biologist ground-truthed these stands for potential spotted owl habitat within and in the vicinity of the project area. Therefore, all patches of forest with a closed canopy and a developed understory (generally older than 40 years) have been verified on the ground.

ENVIRONMENTAL SETTING

The climate in this region is relatively mild and wet with a mean annual precipitation from 35-100 inches (90-254 cm), but can vary locally. Snowfall ranges from rare to regular, but is transitory, depending on the year. Summers are relatively dry and summer fog occurs. Elevation ranges from sea level to a maximum of about 2,490 ft. Topography in the region ranges from relatively flat riverine floodplain valleys to steep mountainous terrain.

RESULTS

Westside Lowland Conifer and Hardwood Forest

The most abundant habitat type on the Coyote Crest WRA is mixed conifer and hardwood forest, dominated by evergreen conifers, deciduous broadleaf trees, or a combination of both. In this habitat type, most stands are dominated Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea sitchensis*), red alder (*Alnus rubra*), or bigleaf maple (*Acer macrophyllum*) or combination of these species. Mammals found in the Westside Lowland Conifer and Hardwood Forest include the Roosevelt elk (*Cervus elaphus roosevelti*), black-tailed deer (*Odocoileus hemionus columbianus*), cougar (*Felis concolor*), black bear (*Ursus Americanus*), and Douglas squirrel (*Tamiasciurus douglasii*). Birds such as the American robin (*Turdus migratorius*), winter wren (*Troglodytes troglodytes*), pileated woodpecker (*Dryocopus pileatus*), golden crowned kinglet (*Regulus satrapa apache Lichtenstein*), junco (*Junco hyemalis*), and raven (*Corvus corax*) are also characteristic of this forest type. Some of the most abundant and broadly distributed bird migrants that breed in this type of forest include Swainson's thrush (*Catharus ustulatus*), Pacific-slope flycatcher (*Empidonax difficilis*), and hermit warbler (*Dendroica occidentalis*).

Land use within the WRA and surrounding 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, depending on harvest regime and

timing. 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 often truncate natural succession prior to old growth forest characteristics develop. Wildlife distribution is related to the types of vegetation available for cover, foraging and nesting. The mixed conifer and hardwood habitat type, therefore, will be described with regard to the types of succession present on the landscape that is controlled by harvest regimes. Due to the present level of data and the cutting of older forests and the re-growth of newer forests, the relative percentages of each stand type are not known.

Recent Clearcuts

Recent clearcuts are recently cut forests, usually less than 5 years old, which contain abundant slash, bare ground, planted seedlings, and some regeneration of native species such as blue elderberry (*Sambucus cerulean*) and sword fern (*Polystichum munitum*). Regeneration of other vegetation is repressed due to pesticide application and soil scarification and consequently little structural complexity remains. The extremes of light, heat and moisture loss restricts the range of many forest associated species from these areas. The open habitat and young vegetation does provide habitat for some migratory bird species and ground foraging birds such as song sparrow (*Melospiza melodia*). Roosevelt elk range overlaps the WRA (WDFW PHS 2007) and smaller clearcuts with re-growth of conifers provide potential forage for this species.

Sapling and Pole Vegetation

Both deciduous and coniferous trees, when they grow to approximately two to three meters high, form a dense vegetation layer in this early succession from forest clearcut. This habitat tends to attract bird species such as willow flycatchers (*Empidonax traillii*), black headed grosbeak (*Pheucticus melanocephalus*), warblers and an open field hunting raptor, the American kestrel (*Falco sparverius*).

Closed canopy forest

This stage of forest succession after a clearcut is associated with a closed tree canopy and a sparse understory due to a lack of light on the forest floor. The trees are typically smaller with single-storied canopies, and may be dominated by conifers, broadleaf trees, or both. Forest in this is mainly closed canopy even-aged mixed conifer forest made up of Douglas-fir, western hemlock, western red cedar with minor components of sitka spruce and grand fir (*Abies grandis*). Birds that can be associated with these dense shaded forests are Golden crowned- kinglets and winter wren.

Closed canopy forest with an open understory

When trees within the closed canopy conifer dominated stands become large enough, or are thinned, the understory of shrubs and ferns such as swordfern (*Polystichum munitum*), Oregon grape (*Mahonia aquifolium*), vine maple (*Acer circinatum*) begins to develop and allows for greater habitat complexity. Increased ground cover benefits birds that nest of forage on the ground. For birds nesting and feeding in shrub and mid-story tree foliage habitat, variety increases as a result of the vertical layering of vegetation. This increase in the structural complexity of vegetation increases the availability and diversity of the niches that birds and other species use.

Older forests with an open understory are likely to provide the most heterogeneous forage and cover and are therefore most likely to support a higher diversity of wildlife. Closed canopy conifer dominated stands of large trees with an area below the live crown allow for spotted owl movement may provide habitat for this species. Other wildlife associated with this habitat includes cavity nesting species such as Vaux's swifts (*Chaetura vauxi*) and brown creepers

(*Certhia americana*) that use dead standing wood for nesting, roosting or foraging. Conifer seeds also provide forage for pine siskin, evening grosbeak (*Coccothraustes vespertinus*) and red crossbill (*Loxia curvirostra*). Large raptors, such as red-tailed hawks (*Buteo jamaicensis*), are also associated with these older forests where nesting structure such as large trees occur. Amphibians are most often associated with closed canopy forests, along with small mice and shrews.

Red alder stands

Red alder stands are maintained both in riparian areas and in isolated patches across the WRA. Red Alder is a fast growing pioneer species that is successful in after typical logging disturbance due to the species' ability to establish abundantly on scarified soils. Salmonberry (*Rubus spectabilis*) often forms a thick understory in alder stands due to the species ability to colonize after soil disturbance, such as that associated with logging. Alder forest stands provide nesting and foraging species associated with alder stands include downy woodpecker (*Picoides pubescens*), house wren (*Troglodytes aedon*), black-capped chickadee (*Poecile atricapillus*) and American goldfinch (*Carduelis tristis*).

Riparian

During timber harvesting on private forestland, buffers of trees and vegetation next to streams are protected. This habitat occurs in linear strips within the WRA, and includes small patches of Herbaceous Wetlands. Open water habitat is often adjacent to these riparian wetlands. This habitat is characterized by wetland hydrology or soils, periodic riverine flooding, or perennial flowing freshwater. Most often this habitat is either a tall deciduous broadleaf shrubland, woodland or forest, Red alder is the most widespread tree species. Other deciduous broadleaf trees that commonly dominate or co-dominate include devil's-club (*Oplopanax horridum*), salmonberry and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) in the lower elevation floodplains, and bigleaf maple.

Riparian habitat that connects forest uplands with wetlands and is mainly composed of deciduous trees is likely to harbor the highest diversity of wildlife habitats on the WRA. Forested riparian habitat has an abundance of snags, which are critical to many cavity-nesting and insectivorous birds. Riparian habitat forms natural corridors that are important travel routes between feeding and breeding areas and seasonal ranges. Some myotis bats use the riparian corridors for foraging habitat and travel corridors but roost upslope. These corridors also provide protected dispersal routes for young birds. In shaded reaches, amphibians such as the pacific giant salamander (*Dicamptodon tenebrosus*) and red-legged frog (*Rana aurora*) are associated with stream banks and cool, fast flowing streams. Salmon, steelhead and trout species use the larger riverine systems for migration and spawn in the upper tributaries of unblocked gravel bed streams.

Agricultural

The broad river valleys have largely been converted to agricultural habitat, or are occupied by houses, roads and pasture lands. Habitat elements such as shelterbelts and field borders provide structure in these altered landscapes and may function as corridors for wildlife. Ephemeral or farmed wetlands in the broad floodplain provide stop-over and wintering habitat for migratory waterfowl in the Pacific Flyway. Most wildlife species using agricultural habitat are either seasonal migrants or use the areas on combination with adjacent forest habitats.

Herbaceous Wetlands

The transmission line in the northern portion of the WRA encompasses portions of the Gerrard Creek and Chehalis River floodplains, with freshwater emergent and riverine habitats. In areas of

the floodplain, open grasslands with shrub species snowberry (*Symphoricarpos albus*) and serviceberry (*Amelanchier alnifolia*) potentially host rare wetland plant species such as Roemer's fescue (*Festuca idahoensis var. roemeri*) and white topped aster (*Aster curtus*) (WDNR 2008). Oregon ash (*Fraxinus latifolia*) habitats occur in the northern portion of the WRA and are associated with black cottonwood, 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. The wet habitats, structural diversity, flowering and fruiting trees provide habitat for foraging birds and other wildlife.

References

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

Glenn, E. M., and W. J. Ripple. 2004. On Using Digital Maps to Assess Wildlife Habitat. *Wildlife Society Bulletin*, Vol. 32, No. 3 (Autumn, 2004), pp. 852-860

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

Washington Department of Fish and Wildlife, Priority habitats and Species (WDFW PHS). 2007. Need citation here

Washington State Department of Natural Resources (WDNR). 2008 GIS data from Washington Natural Heritage Program for Coyote Crest WRA.

http://www1.dnr.wa.gov/nhp/refdesk/gis/wnhpgis.html

Coyote Crest Habitat Survey

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

November 6, 2008

everpower

1:80,000

NAD 83 UTM Zone 10 North

0 1 2

Miles

Project Facilities

- Project Boundary
- Turbines
- Proposed T-Line

Water Bodies

- Perennial Stream
- Intermittent Stream

Roads

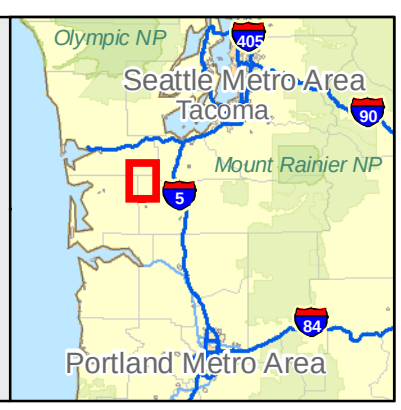
- Interstate
- Highway
- Major Road
- Local Road

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Freshwater Pond
- Other
- Riverine

Habitat Type

- Floodplain
- Mature Forest
- Other Industrial Forest
- Weyerhaeuser Industrial Forest
- Recently Harvested
- Alder Stands



TETRA TECH EC,INC

P:\GIS_PROJECTS\Everpower\PeEllNorth_CoyoteCrest\maps\Habitat_Maps\Everpower_Coyote_Crest_Habitat_Survey_Report_Map_110608.mxd - Last Accessed: 11/6/2008 - Map Scale correct at: Tabloid (11" x 17")