Harborton Reliability Project

Habitat Mitigation Plan

City of Portland Land Use Application Appendix D

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Executive Summary

This Habitat Mitigation Plan documents anticipated direct and indirect effects of Portland General Electric Company's (PGE) Proposed Project on natural resource functions and values, and how PGE intends to mitigate those effects through a combination of measures that address high-priority goals and objectives of regional and Forest Park-specific management plans, strategies, and analyses.

The Harborton Reliability Project (HRP) began in 2017 as a multiphase effort to provide enhanced regional transmission, storage, and distribution capacity to address the key constraints present within the power grid. Phase 1 of the HRP has already been completed. That phase rebuilt the Harborton Substation to allow for restoration of wetlands and wildlife conservation improvements at a former fossil fuel generation site. It also added additional 230 kilovolt (kV) infrastructure to the substation during the rebuild. Another active phase of HRP is rebuilding 115 kV power lines from Harborton Substation along U.S. Highway 30 to better serve industrial and urban customers in Northwest Portland. The next proposed phase, HRP Phase 3 (referred to herein as the "Proposed Project"), involves routing updates to increase transmission capacity and to deliver additional 230 kV power sources into Harborton Substation to support regional growth and electrical reliability.

To meet increasing electricity demands and the associated need for improved transmission capacity, PGE proposes to accomplish the Proposed Project through adjustment of an existing transmission line and installation of a new segment of transmission lines. These improvements would affect forest resources within existing PGE and Bonneville Power Administration (BPA) utility easements or fee-owned property (collectively referred to herein as "Utility ROW"). Unfortunately, there is not a feasible means of achieving the necessary transmission line routing improvements without selectively removing trees within a portion of an existing stand of mature conifer and broadleaf deciduous forest that is surrounded by, and bisected by, BPA and PGE transmission lines. The routing improvements are associated with the necessary reconfiguration of existing transmission corridors that were constructed in Forest Park in 1973 within PGE easements.

The Proposed Project will need to selectively remove tall trees within 4.7 acres of forest habitat to maintain the physical separation between energized wires and underlying/adjacent trees, as required by safety codes, including the Oregon Public Utility Commission (OPUC) regulation 860-024-0016 on Minimum Vegetation Clearance Requirements. However, measures will be taken to minimize soil disturbance, avian impacts, and impacts to the existing shrub understory associated with the Proposed Project. These impact minimization measures will be accomplished through construction site best management practices, seasonal work restrictions, and ongoing avian monitoring to avoid effects on nesting wildlife.

Further, PGE has identified a suite of important site restoration measures and other ecological improvements to enact locally (within the Utility ROW and elsewhere in Forest Park's North Management Unit) to mitigate the long-term loss of forest habitat resource values. PGE also proposes to fund ecological enhancements in other areas of Forest Park to mitigate for short-term habitat impacts. Specifically, PGE proposes to:

- Work with the City of Portland Parks & Recreation Department (PP&R) to create additional/alternate breeding pond habitat areas for a population of northern red-legged frogs that occur in Forest Park and face annual harm while attempting to cross U.S. Highway 30 to their customary breeding habitat.

- Install a mixture of shorter-stature tree species, including Oregon white oaks, an Oregon Conservation Strategy Habitat species. This species is present in the area, and Oak Woodland is identified by the City of Portland (City) as a "desired future condition" habitat in Forest Park (PP&R 2011a).
- Retain up to 10% of cut trees (~35) to place trunks onsite in a fire-safe manner so they may benefit habitat conditions by providing nutrients, slope/streambank stability, nurse logs, habitat niches for wildlife, and flow dispersal.
- Seed disturbed herbaceous areas, including access road edges, with a native seed mix that contains pollinator support species consistent with the Pollinators and Powerlines Project led by the City, BPA, and Metro.
- Remove and control existing populations of noxious weeds within the Proposed Project limits, including Himalayan blackberry (*Rubus armeniacus*), shining geranium (*Geranium lucidum*), English ivy (*Hedera helix*), and Scotch broom (*Cytisus scoparius*), through multiyear site maintenance. This would occur both within the Utility ROW and elsewhere in Forest Park's North Management Unit in coordination with PP&R.
- Offset the loss of stand density and associated carbon sequestration by working with PP&R and conservation partners to site and plant native trees in areas outside of the Utility ROW within the Northern Management Unit of Forest Park and other areas of Portland that have been identified as "heat islands" and that would benefit from native tree establishment.
- In coordination with PP&R, fund stream enhancements to remove a current flow barrier at Newton Road that currently affects a seasonal stream near the Utility ROW.

In the Oregon Department of Forestry (ODF) Climate Change and Carbon Plan, ODF found that without substantial changes and mitigation efforts to limit global warming to less than 1.5°C by 2030, the region is likely to experience high levels of ecosystem degradation and species extinctions (ODF 2021). The plan finds that rising CO_2 levels in the atmosphere are resulting in higher peak summer temperatures that are resulting in increased tree mortality due to drought, wildfire, disease, and pestilence. In general, data indicates that climate issues are stressing our region's evergreen forests. Because of this, long-term planning efforts are underway at ODF to consider adaptive management strategies for the State of Oregon's forest resources to improve climate resiliency while the state pushes business sectors to cut carbon emissions and reduce atmospheric CO_2.

The Oregon Clean Energy Targets bill was passed in 2021 (House Bill 2021). This bill requires PGE and other electricity service suppliers to reduce greenhouse gas emissions from their electricity sales. The targets call for an 80% reduction in emissions by 2030, followed by a 100% reduction by 2040. PGE has taken up the call for reduced emission consistent with these clean energy targets. These reductions are expected to result in a gradual decrease in the current climate warming trends, which would reduce the rate of evergreen forest decline. However, meeting these targets will require substantial investment in PGE's regional transmission system, particularly in the area of North Portland. Without the proposed transmission line improvements, it is not clear how PGE could meet these targets. Letting the grid become unreliable hampers state and city goals for clean power and increased electrification to replace fossil fuel emissions, and exposes customers to potential outages and the company to fines for failing to meet federal reliability standards. This Habitat Mitigation Plan provides a summary of the existing resource values that would be affected by the Proposed Project and further information on the mitigation measures described above that, together, are intended to demonstrate that any long-term

adverse impacts of the proposed action on resource values in Forest Park will be fully mitigated within the Northern Management Unit.

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1. INTRODUCTION

Portland General Electric Company (PGE) has had a utility easement through Forest Park (sometimes referred to as "the Park") since 1971 for its Rivergate-Trojan and Horizon-St Marys-Trojan 230 kV transmission lines, which were completed in 1973. Due to increasing electricity demands and the need for system redundancy (see Section 3, Purpose and Need), PGE is seeking land use approval for proposed reconfiguration of PGE's existing 230 kilovolt (kV) electrical transmission lines in Forest Park west of PGE's Harborton Substation. To meet the purpose and need for the routing improvements, adjustment of an existing transmission line pole and construction of a new 1,400-foot-long segment of transmission line will be required in Forest Park. These activities comprise Phase 3 of the HRP (i.e., the Proposed Project) and need to occur within the existing Utility ROW in Forest Park. Unfortunately, there is no feasible means of achieving the needed reconfigurations without removing trees in a portion of an existing stand of mature conifer and broadleaf deciduous forest that is contained within existing Utility ROW and surrounded and bisected by existing BPA and PGE transmission corridors. The proposed improvements are associated with and tie into powerlines that are presently in Forest Park within Utility ROW.

The term "transmission corridor" is used to denote areas that are proposed to be managed to keep vegetation at safe distances from overhead transmission wires. These are generally 125-feet in width for a 230 kV transmission line and centered on the transmission structures (poles or towers). After evaluating multiple alternatives both outside and inside Forest Park (see Section 4, Alternatives), PGE has determined that the proposed routing improvements in Forest Park present the only practicable design option that achieves the Proposed Project's purpose and need.

The Proposed Project is necessary to avoid service disruptions during periods of peak energy demand. The Proposed Project will replace an existing pole and will complete reconductoring (removing and replacing transmission wire) within the existing PGE transmission corridor. The Proposed Project will also construct a new 1,400 -foot-long segment of transmission line (with two associated steel monopoles) within the existing Utility ROW. To allow for construction access and to mitigate hazardous conditions, selective vegetation removal will be necessary. The vegetation removed will include mature conifer and broadleaf trees. David Evans and Associates, Inc. (DEA) has performed a forest (tree) and natural resources inventory and, based on this data, has worked with PGE's transmission design team and a consulting arborist (Integrated Arboricultural Solutions (IAS)) to identify opportunities for minimizing impacts on trees and other environmental resources.

On June 9, 2002, PGE conducted an Early Assistance Pre-application Conference with multiple City of Portland (City) departments. This included Portland Parks and Recreation (PP&R), which manages Forest Park. The PP&R review highlighted several aspects of the Proposed Project that would require additional planning and detail before approval could be granted. Specifically, PP&R requested a robust mitigation plan and noted that mitigation via in-lieu payment for removed trees will not be sufficient (EA 22-142445). PP&R also requested additional detail on:

- The need for the Proposed Project, including why an alternative, either one that did not affect Forest Park or one that reduced negative effects to Forest Park, is not practicable.
- Why system redundancy is necessary.
- The long-term impacts of the Proposed Project on natural resource values.
- How the Proposed Project conforms to conservation goals in the City's 1995 Forest Park Natural Resource Management Plan (NRMP) as follows:

- Conservation Goal 1: Protect Forest Park's native plant and animal communities, its soil and its water resources while managing the forest ecosystem in order to grow a self-sustaining ancient forest for the enjoyment and benefit of future generations.
- Conservation Goal 2: Design management and restoration efforts to:
  - Maintain and enhance regional biodiversity
  - Provide wildlife habitat and migration opportunities
  - Improve water quality and aquatic habitat
  - Repair damaged and fragmented natural systems.

This Habitat Mitigation Plan was prepared to fulfill the mitigation requirements of the NRMP. Since the time when the Early Assistance (EA) Pre-application Conference summary notes were provided to PGE by the City (EA 22-142445), PGE has conducted additional studies to evaluate alternative means of meeting the Proposed Project's purpose and need. As a result, the Proposed Project design was substantially altered to limit habitat losses to only those necessary to meet the current needs. Nevertheless, the Proposed Project will still require the alteration of approximately 4.7 acres of forest habitat.

City of Portland Ordinance 19134 (which authorized an in-lieu fee program in 2023) acknowledges the difficulties inherent with individual, project-specific mitigation plans. Specifically, City of Portland Zoning Code Title 33.430 (Environmental Zones) typically requires project sponsors to plant trees as the primary source of mitigation to meet the requirements for resource replacement within the affected Forest Park management unit. However, due to the nature of Forest Park and its abundance of forest canopy, revegetation with only trees does not always meet the highest ecological need for the Park. Instead, as stated in Ordinance 19134, "comprehensive restoration over large areas, including the removal of invasive species and revegetation with shrubs and forbs, is mitigation more readily needed in the park."

The in-lieu fee program was designed to allow PP&R a means of collecting funds to plan and implement restoration projects in Forest Park in lieu of applicants taking on this mitigation responsibility themselves. The program provides more restoration options to address the mitigation requirements specified in the FP NRMP for the approval of necessary work within one of several utility easements within Forest Park. The language of the ordinance states: "Due to conditions in Forest Park and the complexity of conducting comprehensive restoration in Forest Park, large-scale mitigation provided to off-set infrastructure maintenance or other development is often unsuccessful and does not meet the goals of the Forest Park Natural Resources Management Plan." Funds generated by the in-lieu fee program are to be utilized to support a total-park mitigation budget and to develop resultant mitigation plans prepared by PP&R. As envisioned in the ordinance, these mitigation plans would include such actions as revegetation of both trees and shrubs, removal of invasive species, and wildfire risk reduction where appropriate. However, the City does not have any overarching prioritization of mitigation actions for the Park or a comprehensive plan for mitigating negative environmental consequences resulting from in-Park utility construction or maintenance.

Attempts to coordinate with PP&R on suitable mitigation were initially unsuccessful because PP&R staff noted that they would be unable to discuss the Proposed Project until applications were submitted. Because of this, the initial Habitat Mitigation Plan submitted as Appendix D to PGE's land use application (City File No. LU 24- 041109 CU EN GW) contained an initial attempt to identify a suite of mitigation measures that, together, would address some of the highest ecological needs for Forest Park based on existing state, regional, and PP&R plans and assessments for the park.

However, since submitting the initial Habitat Mitigation Plan together with the preliminary land use application on May 10, 2024, PP&R reviewed the initial plan and provided thoughtful feedback, including

a suggestion for various sites within Forest Park's North Management Unit (NMU) that are outside of the Utility ROW, but that would provide ecological benefits in the NMU.

While PGE will be responsible for implementing and maintaining any site restoration measures located within Utility ROW, any ecological restoration or enhancement performed outside of the Utility ROW as partial mitigation for the Proposed Project will be managed by PP&R via funds provided by PGE to help mitigate the Proposed Project's effects on environmental resource values in the NMU. As such, substantial coordination was necessary between PGE and PP&R between the initial draft of the Habitat Mitigation Plan and this updated plan. Mitigation measures described in this revised plan are meant to help demonstrate how PGE will meet the goals and strategies of Forest Park's NRMP in coordination with PP&R. However, it should be noted that all proposed mitigation measures located within Forest Park but outside of the Utility ROW will be further refined by PP&R after funding agreements are in place.

This Revised Habitat Mitigation Plan attempts to provide updates on the initial mitigation plan based on the feedback and coordination that has occurred between PGE and PP&R since the initial mitigation plan was submitted on May 10, 2024. Additionally, this plan provides an update to the quantification of anticipated habitat impacts and an updated strategy for mitigation approaches that can compensate for lost habitat resource values. This revised plan includes updates to the compensatory mitigation summary table so that it includes resource replacement ratios that take into account the discrepancy between the ecological value of proposed mitigation measures and the resource values (e.g., mature forest) that they aim to compensate. In conformance with the Forest Park NRMP, the proposed improvements will benefit the ecology of Forest Park's NMU.

2. PROPOSED PROJECT

Specific elements of the Proposed Project include splitting a single transmission line that serves three substations (the three-terminal Horizon-St Marys-Trojan 230 kV line) into three separate lines that terminate at the Harborton Substation. This splitting of the transmission line will create three dedicated transmission lines and thus remove substantial vulnerabilities present within the current three-terminal arrangement.

Upon completion, additional 230 kV power will be delivered to the City of Portland from PGE's bulk power Trojan Substation over upgraded and reconductored 230 kV transmission lines (see **Figure 1**). This will improve reliability for several substations and associated customers in Portland, Beaverton, and Hillsboro. Replacing the current three-terminal line with three 2-terminal lines that terminate at the Harborton Substation will allow for much greater transmission capacity, reliability, outage flexibility for maintenance, and management/distribution of loads to accommodate additional power demands. The Proposed Project will decrease the likelihood of outages and reduce the impact of outages that do occur.

As shown in **Figure 2** and **Figure 3**, within Forest Park, the Proposed Project involves:

- Remove the existing 115 kV St Marys-Wacker line, and then cut the current Horizon-St Marys-Trojan (three-terminal) 230 kV line in Forest Park at existing Tower No. 2997 and use the empty transmission corridor between that tower and the Harborton Substation to route a second line from Trojan into Harborton. This rerouting will require that the existing Transmission Pole No. 2999, which currently supports the Horizon-Trojan No. 1 line, be moved slightly south to allow all crossings into the Harborton Substation to remain within PGE's existing Utility ROW.
- Remove tall trees and construct a new segment of transmission line between the Harborton Substation and existing Tower No. 2996. This segment would be approximately 1,400 feet long

within Forest Park and would utilize existing PGE and Bonneville Power Administration (BPA) Utility ROW. This segment would require two new transmission poles within Forest Park. On the hillslope above U.S. Hwy 30, Steel Pole (SP)-5 would be constructed at the top of the hill to tie the segment into Tower No. 2996, and SP-2 would be constructed at the bottom of the hill to tie the segment into the Harborton Substation (see **Figure 3**).

- String new transmission wire between Harborton Substation and Tower No. 2996 to create new Harborton-St Marys and Harborton-Evergreen 230 kV transmission lines on an existing, shared corridor (shared towers/poles) through Forest Park. This will require the establishment of temporary work areas for construction access, temporary soil storage, line-pulling, and equipment turn-around space.

As a result of this work, the Proposed Project will affect the locations and associated acreages summarized in **Table 1** below.

Table 1. Proposed Project Impact Summary

Project Area/Activity	Impact Area (acres)	Impact in Linear Feet	Permanent Impact?	Temporary Impact?
Construction				
Existing access roads to be used	5.94	16,530	N/A	N/A
Temporary (new) construction/logging access roads	1.21	2,998	No	Yes
Staging area – to remain gravel	2.62	Variable	No	Yes
Staging area – to be revegetated	0.45	Variable	No	Yes
Tall tree removals within existing Utility ROW	0.43	1,200	Yes	No
Tall tree removals to create new transmission corridor	4.25	1,400	Yes	No
Vacated Transmission Corridor to Be Restored to Forest Habitat	0.53	Variable	Yes	No

Figure 1. The Regional Electricity Distribution System, Including the Harborton Substation and Forest Park

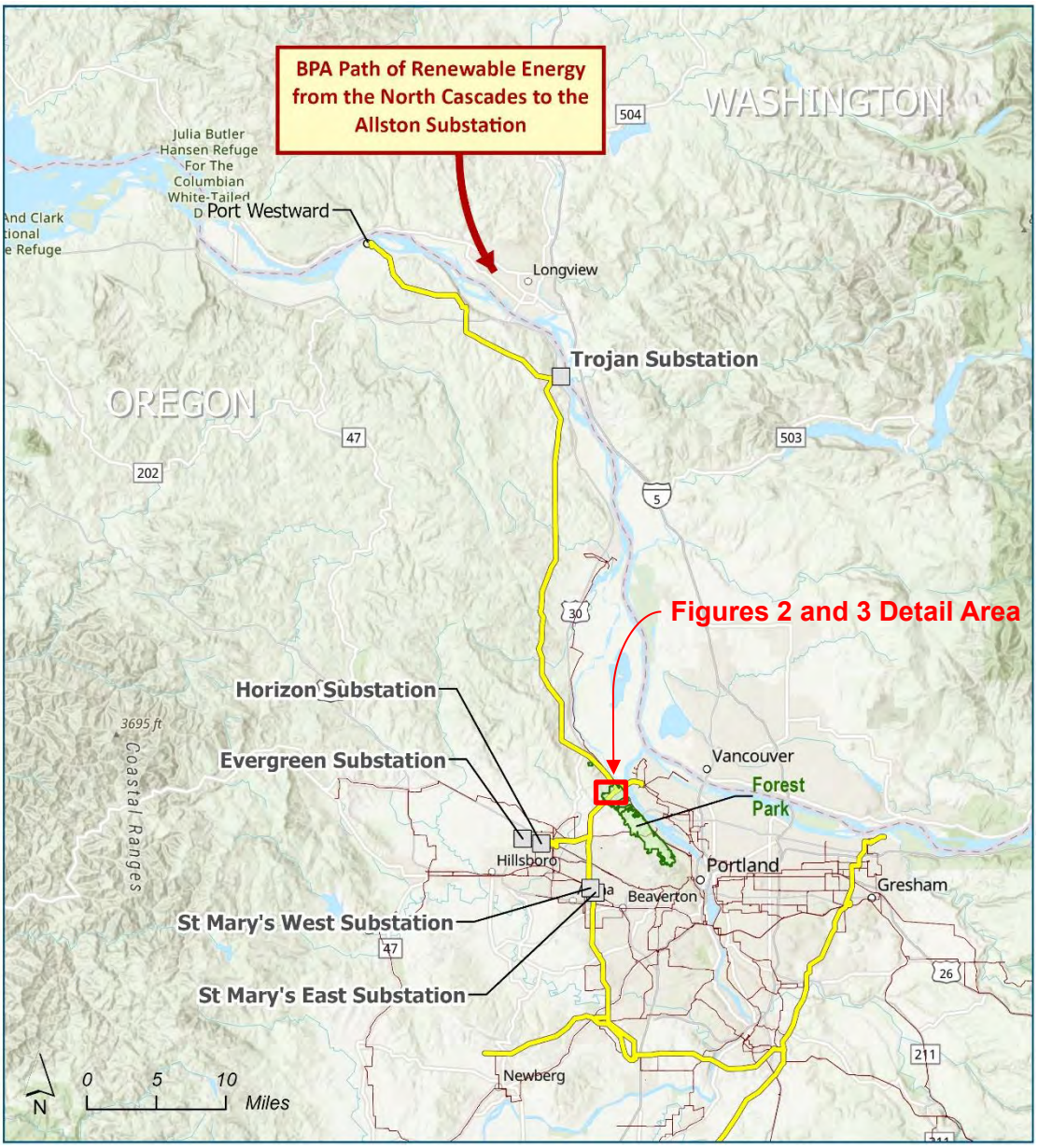


Figure 2. Existing PGE Transmission Routing Configuration in Forest Park Near PGE Harborton Substation

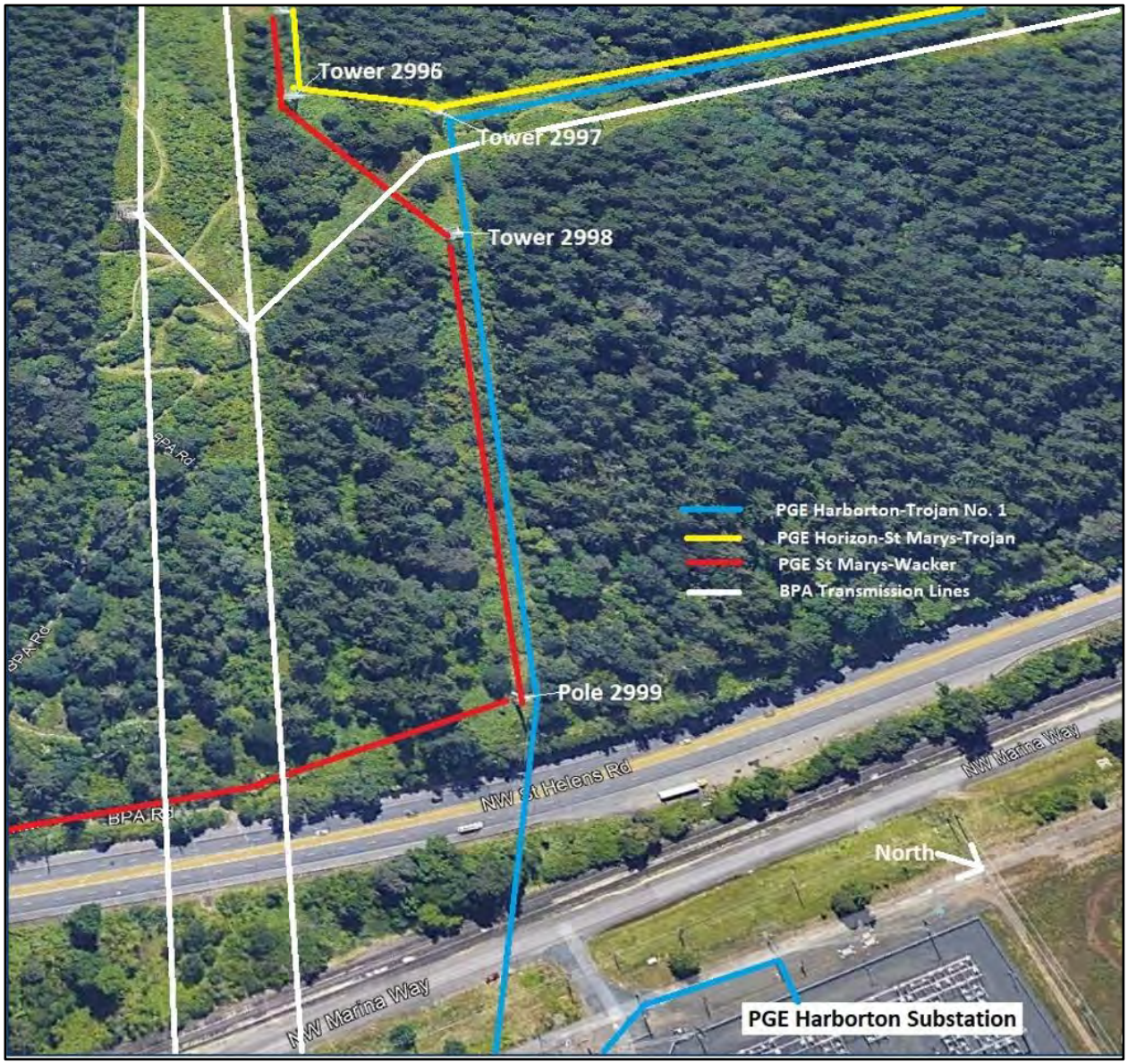
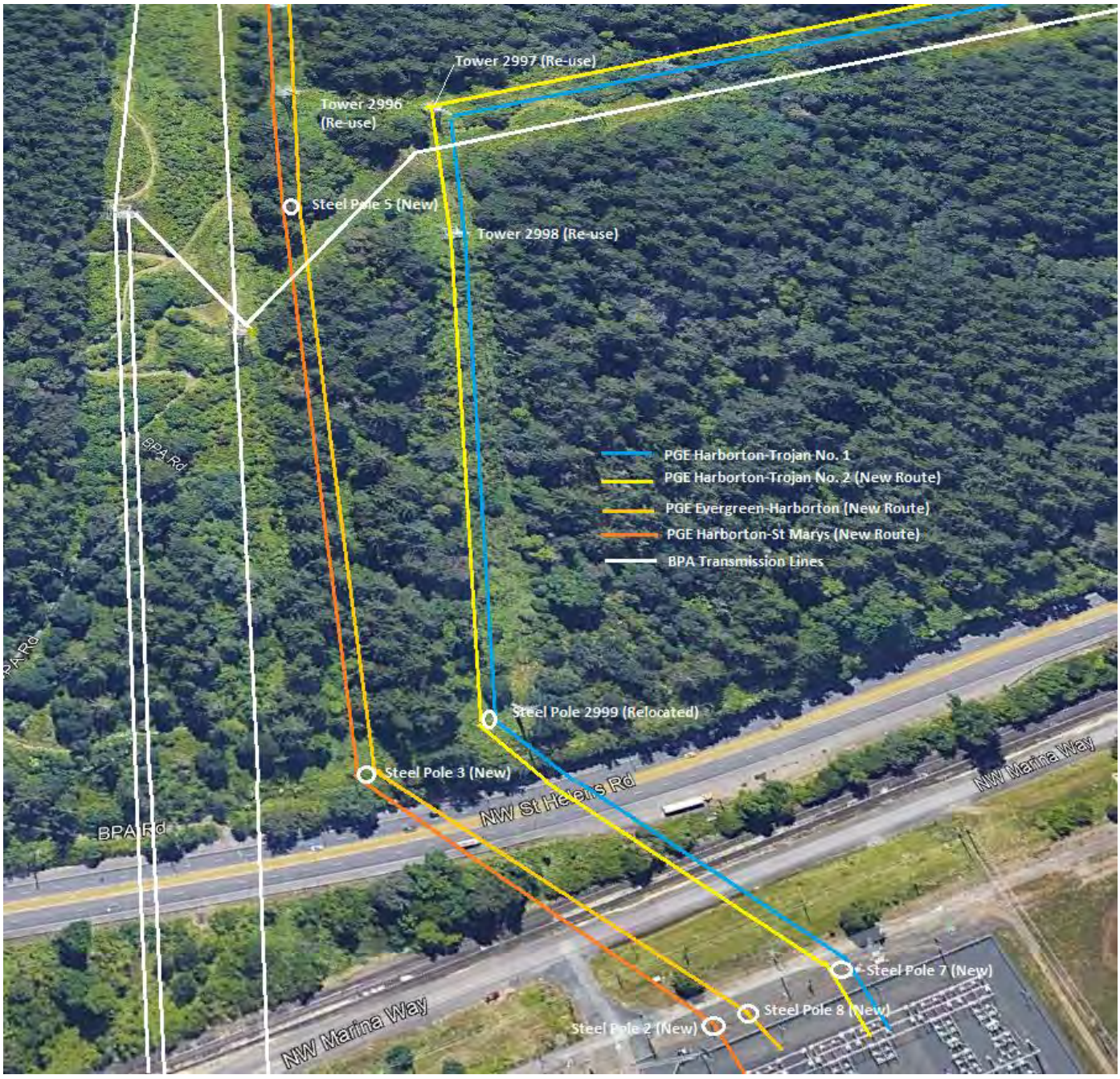


Figure 3. Proposed (Final) PGE 230 kV Transmission Configuration (Approx.)



3. PURPOSE AND NEED

Currently, one of the primary paths for importing power into the Portland Metropolitan region is a three-terminal 230 kV transmission line that connects PGE's Horizon, St Marys, and Trojan substations. The Horizon Substation terminus of the line is in Hillsboro; the St Marys Substation is in Beaverton; and the Trojan Substation is located north of St. Helens, Oregon (see **Figure 1**). The current transmission line passes through Forest Park near PGE's Harborton Substation in northwest Portland but does not connect to the Harborton Substation. This configuration splits incoming power from the Trojan Substation into

two separate lines, resulting in inadequate power delivery to Portland, Beaverton, and Hillsboro under periods of peak power demand. PGE's demand forecasts and planning studies have identified a substantial vulnerability in the system due to this current configuration. If unaddressed, projected future power demands will surpass the current transmission capacity and will result in outages, which can have substantial negative effects on community safety and economic productivity. The Proposed Project's Alternatives Analysis Report (included with PGE's City of Portland land use application as Appendix C) provides additional detail on the Proposed Project's purpose and need.

Another purpose of the Proposed Project is to meet federal (North American Electric Reliability Corporation (NERC)) Standard TPL-001-5, which governs reliable transmission system requirements for U.S. electric utilities. The Proposed Project will help PGE meet the projected power supply demands, remove transmission vulnerabilities, and support a transition away from fossil fuels towards electricity.

PGE creates predictions for energy consumption 10 years into the future because upgrade and modernization projects have a significant time lag between planning and execution. However, the demand for power has surged in recent years, and loads have grown faster than expected, highlighting the vulnerabilities present in the current line configuration. What was identified as a concern in prior planning studies has become urgent in the last year due to these rapidly increasing power demands.

PGE's forecasting methodology is reviewed by the Oregon Public Utility Commission as a part of the Integrated Resource Planning/Clean Energy Plan process and includes input from PGE's Economic Development, Distributed Resource Planning, and Distribution Planning departments. Recently, demand forecasts have increased substantially beyond those foreseen in prior planning efforts. This project increase in demand is due to several factors, including increased use of electrical vehicles, peak summer temperature increases and associated power demands for cooling, increasing adoption of residential air conditioning, and industrial growth in the Portland Metropolitan region. As a result, the Proposed Project improvements are needed as soon as possible to maintain a reliable grid and comply with NERC TPL-001-5.

4. ALTERNATIVES

DEA, in collaboration with E2I (an independent electricity transmission planning expertise firm) prepared an alternatives analysis for the Proposed Project with the goal of identifying any feasible alternatives that would avoid or minimize impacts to Forest Park. The analysis described in the Alternatives Analysis Report (Land Use Application, Appendix C) began by defining specific evaluation criteria tied to the purpose and need. Based on these criteria, multiple alternatives were evaluated and ranked to determine a subset of alternatives warranting further analysis.

The alternatives evaluation identified six alternatives that warranted further assessment. The analysis found that only one alternative met all of the necessary evaluation criteria. Alternatives that would potentially reduce the scale of forest impact had serious drawbacks with regard to public safety, operating risk, and implementation schedule, and/or provided insufficient power supply or reliability. Based on the analysis, a preferred alternative was chosen and is the basis for impacts identified in this Habitat Mitigation Plan.

5. EXISTING CONDITIONS IN THE PROJECT AREA

5.1 INVENTORIED SITE CONDITIONS

The Proposed Project is primarily located within the NMU Unit of Forest Park. It begins outside of Forest Park at PGE's Harborton Substation at 12500 NW Marina Way. From there, it crosses west over U.S. Hwy 30., and through the eastern boundary of the park, continuing generally west through the park to NW Skyline Blvd. The Proposed Project encompasses 16.15 acres of existing access roads, existing transmission corridors, developed areas (i.e., Harborton Substation yard), and undeveloped mature conifer-broadleaf deciduous forest habitat located between existing transmission corridors. This report collectively refers to these areas within the limits of proposed disturbance as the "project site" and refers to the local vicinity of the project site as the "project area." The limits of disturbance for the Proposed Project site boundaries are depicted on land use application Exhibits D through G.

Forest Park is on the eastern edge of the Western Hemlock Vegetation Zone, which is the most extensive vegetation zone in western Oregon and Washington (PP&R 2011a). Although not the climax species, Douglas fir (*Pseudotsuga menziesii*) often dominates forests in this zone, even in old-growth stands. Forest Park has a significant history of disturbance by fires, logging, and development. The project area, and most other areas of Forest Park, is typical of second-growth Douglas fir forest in the region (PP&R 2011a). Ninety-nine percent of Forest Park is forested, with three-quarters of the Park composed of mixed conifer-deciduous forest, and one-quarter dominated by conifers. Oregon white oak (*Quercus garryana*) and other species more typical of the Willamette Valley Vegetation Zone are also present, but these species account for less than 1% of forest cover within Forest Park.

The areas that the Proposed Project will impact are located in Resource Site FP2 per the 2022 Natural Resources Inventory Report (PBS 2020 and 2022). In 2022, the Portland Bureau of Planning and Sustainability published the findings of extensive natural resource inventories conducted throughout the city, including Forest Park (BPS, 2020 and BPS, 2022). These investigations included field surveys, remote sensing, and modeling. The effort updated stream centerlines, riparian corridors, Special Habitat Areas, wetlands, and vegetation patches. The entirety of Forest Park is considered a Special Habitat Area. Data collected by ODFW during stream habitat surveys in 2019 and 2020 were also used to characterize habitats in the city. The intermittent stream at the Project site was not surveyed by ODFW.

Resource Site FP2 is a 118.7-acre site, which is primarily Open Space and Rural/Forest, but also contains 14.1 acres of residential zoning along Harborton, Creston, and Mountain View Roads. Resource Site FP2 has the following characteristics:

- Riparian Corridor Habitat Rating: High
- Wildlife Classification: High
- Habitat Conservation Area value: High
- Riparian corridor functions provided: microclimate and shade; stream flow moderation and water storage; bank function and sediment, pollution and nutrient control; large wood and channel dynamics; organic inputs, food web and nutrient cycling; and riparian wildlife movement corridor.
- Wildlife habitat functions provided: interior area; food and water; resting, denning, nesting and rearing; movement and migration; reduction of noise, light and vibration; and habitat patches that support special status fish and wildlife species.

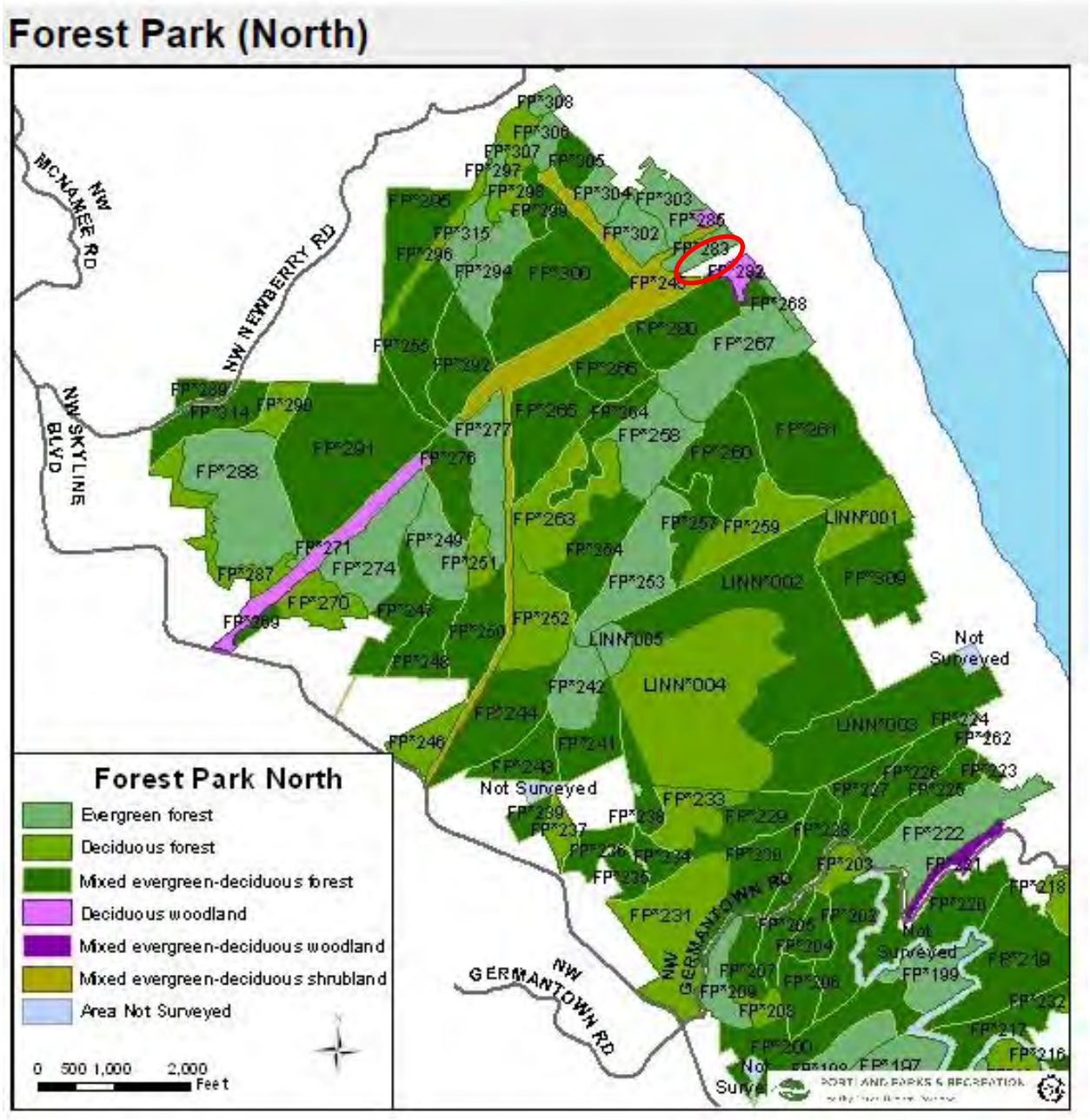
- Natural resource features:
    - Forested Acres (wooded with canopy closure >60%): 82.2
    - Woodland acres (wooded with canopy closure <60%): 24.9
    - Stream Miles: 1.6
    - Steep slopes (>25%): 111.5 acres
    - Percent impervious: 2.4%

The report describes Resource Site FP2 as:

> "The vegetative community is predominantly second growth forest with representative stands of each seral stage of the western hemlock upland forest community. Structural diversity of the forest is generally high, though certain areas along the power line right-of-way and Newton Road lack development of multi-layered canopies. The conifer-topping hardwood and mid-aged conifer stages of forest succession are widespread; climax species such as western hemlock, western red cedar and pacific yew are well established. Forest cover protects watershed resources, serves as habitat for wildlife and provides open space, scenic and recreational resources. Snags, downed logs and woody debris found at the site are critical structural and functional components of the watershed ecosystem. English ivy has spread into the maples and firs near Highway 30.
>
> This resource site includes some Oregon white oak woodland/mixed forest, which is an infrequent habitat type in the city. It includes species such as *Viburnum ellipticum* [common Viburnum] and *Toxicodendron diversilobum* [poison oak] as dominant shrub layer components, as well as numerous less common herbaceous species. Other rare plant species found within the site include *Cirsium brevistylum*/Indian thistle, *Cirsium edule*/Edible thistle, *Clarkia amoena*/Farewell-to-spring (PP&R City Nature staff observations, using "Urbanizing Flora of Portland, Oregon 1806-2008".)
>
> This site provides food, water and cover habitat for a broad range of birds including Oregon junco, rufous hummingbird, bushtit, Steller's jay and American robin. The site provides feeding and breeding habitat for red-tailed hawk. Osprey nest nearby and use tall trees in the resource area for perching. Interspersion with surrounding habitat allows for free migration of wildlife to and from the site and increases the site's value as habitat.
>
> The site includes free-flowing seasonal creeks that feed wetland areas northeast of Highway 30."

Between 2003 and 2008, PP&R completed vegetation surveys of its natural area parklands. As part of these surveys, Forest Park was divided into 315 individual vegetation units, each with an average size of 17 acres. The Proposed Project is located primarily in two units (246 and 283), and a small portion of existing access road crosses through a third unit (282). **Figure 4** shows these vegetation units, and **Table 2** provides details on each of the units as recorded by PP&R investigators (PP&R 2023).

Figure 4. Vegetation Units in Forest Park



Note: The red oval indicates the general location of the Harborton Reliability Project in Forest Park.

Table 2. Characterization of Management Units that Would Be Affected by the Proposed Project

Unit #	Location	Size of Unit (acres)	Classification	Ecological Health	Dominant Species (10% or greater coverage)	Invasives	Primary Management Concerns	Notes
246	North/east half of the Utility ROW	9.64	Deciduous forest	Fair	Bigleaf maple, sword fern, Pacific waterleaf	Holly, reed canarygrass, Himalayan blackberry	Invasives, Domestic Animals, Yard Debris, Utility Infrastructure	Flat-topped unit including BPA and PGE Utility ROW. Unit most weedy along BPA roads, includig proposed pull-out areas. Some weeds in unit interior. Shrub layer very sparse, but a few individuals of many species. Understory very open.
282	Oak woodland at north end of the Utility ROW	3.85	Deciduous woodland	Fair	Oregon white oak, Oregon viburnum, snowberry	Scotch broom, Himalayan blackberry	Invasives, Soil Compaction, Utility Infrastructure, Mountain Bike Impact, Informal Trails	Unit is between Harborton and Germantown Road off of U.S. Hwy 30. Scotch broom is invading (apparently) from Hwy 30 and up into unit. Remove Scotch broom and Himalayan blackberry to preserve oak woodland. Unique ecosystem of Oregon viburnum and oregon white oak. Stand is doing well with the exception of the blackberry and scotch broom beginning to take hold.
283	Primary location of forest impacts in the Utility ROW	6.38	Evergreen forest	Fair	Douglas fir, sword fern, vine maple	English ivy, holly, oxeye daisy	Invasives, Litter, Homeless Camp, Informal Trails	Unit sits between 2 transmission corridors. Clothing, sleeping bags, coolers, and other items strewn about the unit from recent homeless camps. Invasives dominate the edges of unit along U.S. Hwy 30 and along transmission corridors. Unit is moderately steep slope running down to U.S. Hwy 30 Stream running through unit is a deep channel, suggesting the force of water during the winter months. Total percentage of non-native cover is 5%.

5.2 EXISTING WILDLIFE

Forest Park is home to 104 avian, more than 50 mammalian, 8 reptile, 11 amphibian, 4 fish, and hundreds of invertebrate species; most are native (PP&R 2012; FCP 2013). There are 10 bird, 11 mammal, 3 amphibian, and 2 fish species that are documented to occur in Forest Park that have a special status designation and of these, northern spotted owl (*Strix occidentalis caurina*), coho salmon (*Oncorhynchus kisutch),* and steelhead trout (*Oncorhynchus mykiss*) are federally listed on the Endangered Species List (see **Table 3**). The Forest Park Desired Future Conditions Report (PP&R 2011a) provides habitat associations for selected species in the Park. **Table 3** notes the utilization of mixed conifer forests and disturbance corridors (the two main habitat types in the project area) by Special Status Species (PP&R 2011a).

Fish species are rare in the Park. Of the eight mapped streams in the greater Forest Park area, only two are known to be fish-bearing within the boundaries of the Park (Miller Creek and Balch Creek). Miller Creek is more than one-half mile north from the project site, while Balch Creek is located approximately 5.5 miles to the southeast. Due to a lack of perennial flowing water in the proposed work areas and the lack of any in-stream work (i.e., culvert replacement will be restricted to the summertime, when the channel is dry), the Proposed Project will have no effect on fish species.

Based on a review of literature and wildlife habitat observations conducted by DEA in 2023, birds and mammals tend to use a wide range of habitats throughout the Park and should be able to move into adjacent habitat areas to avoid most effects of Proposed Project construction. Therefore, the species most likely to be affected by the Proposed Project are those that are largely sedentary, or restricted to any specialized habitats that will be affected by the Proposed Project. These include amphibians and reptiles, nesting birds, and sedentary mammals (burrowing rodents, bats). The following sections describe the existing wildlife most likely to be affected.

5.2.1 Invertebrates

There is no detailed data available regarding invertebrate occupation or density in Forest Park aside from pollinators in the utility corridors (see Section 9.2). Construction activities are not expected to negatively affect invertebrate species on a population scale. Conservation measures, including plantings in the utility corridor after construction, could have long-term positive effects on pollinators, including rare bees and butterflies (see Section 9.2).

Table 3. Special Status Species in Forest Park

Common Name	Binomial	NatureServe Rank[1]	Federal[2]	ODFW[3]	Terrestrial Ecology Enhancement Strategy Species	Association with Mixed Conifer Forest[4]	Association with Disturbance Corridors
Bald eagle	*Haliaeetus leucocephalus*	S4B,S4N			Yes	N/A	Feeding
Band-tailed pigeon	*Patagioenas fasciata*	S3B			Yes	Breeding, Feeding	Feeding
Chipping sparrow	*Spizella passerina*	S4B		S	Yes	Breeding, Feeding	Breeding, Feeding
Golden-crowned kinglet	*Regulus satrapa*	S3			Yes	Not provided	
Lewis's woodpecker	*Melanerpes lewis*	S2B,S2?N		SC	Yes	Not provided	
Merlin	*Falco columbarius*	SHB			Yes	N/A	Feeding
Mountain quail	*Oreortyx pictus*	S3S4		S	Yes	Not provided	
Northern spotted owl	*Strix occidentalis caurina*	S1S2	LT	LT		Not provided	
Olive-sided flycatcher	*Contopus cooperi*	S2S3B		S/SC	Yes	Feeding	Feeding
Pine grosbeak	*Pinicola enucleator*	S2?				Not provided	
California myotis	*Myotis californicus*	S3		S	Yes	N/A	Breeding, Feeding
Fringed myotis	*Myotis thysanodes*	S2		S	Yes	Not provided	
Hoary bat	*Lasiurus cinereus*	S3		S	Yes	N/A	N/A
Long-eared myotis	*Myotis evotis*	S4				Not provided	
Long-legged myotis	*Myotis volans*	S3		S	Yes	Breeding, Feeding	Feeding
Silver-haired bat	*Lasionycteris noctivagans*	S3S4		S	Yes	Feeding	Feeding
Yuma myotis	*Myotis yumanensis*	S3			Yes	Breeding	Breeding, Feeding
Camas pocket gopher	*Thomomys bulbivorus*	S3S4			Yes	Not provided	
Red tree vole	*Arborimus longicaudus*	S3		S	Yes	N/A	N/A
White-footed vole	*Arborimus albipes*	S3S4			Yes	Breeding, Feeding	Breeding, Feeding
Pacific marten	*Martes caurina*	S3S4		S	Yes	Not provided	
Northern red-legged frog	*Rana aurora*	S3S4		S	Yes	General association	N/A
Clouded salamander	*Aneides ferreus*	S3S4		S	Yes	Not provided	
Oregon slender salamander	*Batrachoseps wrighti*	S3	SOC	S	Yes	Not provided	
Coastal cutthroat trout (Southwestern Washington/Columbia River Evolutionarily Significant Unit (ESU))	*Oncorhynchus clarkii pop. 2*	S2		S		N/A	
Coho salmon	*Oncorhynchus kisutch*	S2	LT	LE		N/A	
Steelhead (Upper Willamette River ESU, winter run)	*Oncorhynchus mykiss pop. 33*	S2	LT	S		N/A	

[1]S1 = Critically imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently secure; B = Breeding population, N = Non-breeding population, SHB = breeding population assumed extinct in the state; ? = ranking is uncertain.
[2]LT = listed, threatened, SOC = species of concern.
[3]S = Sensitive, SC = Sensitive Critical (ODFW = Oregon Department of Fish and Wildlife).
[4]N/A = No association with that habitat type. If the species did not have special status in 2011, it was not included in PP&R 2011, and is listed as “Not provided.”

5.2.2 Nesting Birds

Special status birds known to nest in the habitat types to be affected by the Proposed Project include: Band-tailed pigeon and Chipping sparrow (see **Table 3**). Bald eagles and woodpeckers could potentially nest in the project area as well as other bird species without any special status designation. Bird foraging will also likely be disrupted briefly during Proposed Project construction. According to BES (2022), bird species closely associated with oak woodlands include: acorn woodpecker, band-tailed pigeon, western wood-pewee, Hutton's vireo, white-breasted nuthatch, black-throated gray warbler, chipping sparrow, Bullock's oriole, and western bluebird. Those closely associated with interior forests (especially late-successional, but also other mature forests) include: band-tailed pigeon, pileated woodpecker, olive-sided flycatcher, Hammond's flycatcher, Pacific-slope flycatcher, brown creeper, golden-crowned kinglet, Pacific wren, Swainson's thrush, varied thrush, black-throated gray warbler, Townsend's warbler, hermit warbler, Wilson's warbler (BES 2022).

PGE conducts breeding bird and nest surveys of its properties. While surveying the Harborton property in February 2024, a PGE avian biologist noted a potential old, decayed bald eagle nest that is present but inactive, and eagles have not been recently observed on the property. No eagle nests have been documented within the project site. The nearest known bald eagle nest is located more than 660 feet to the northwest of the project site in Forest Park and is referred to by the City's independent bald eagle monitoring efforts as "Harborton 1," this nest site was visited by PGE in coordination with David Leal of the U.S. Fish and Wildlife Service (USFWS) in spring of 2023. No eagle activity was noted in the vicinity of this historical nest site in 2023. However, recent monitoring by Andrew Bidwell, a biologist with PGE, conducted in March 2024, noted incubation activity by a pair of bald eagles at the Harborton 1 nest site. The site will be monitored to determine whether the nest becomes active again in 2025, prior to construction. However, if the nest is occupied in the future during construction, it would be far enough from construction activities and obscured sufficiently by forest vegetation to be consistent with the USFWS guidelines for working near bald eagles (USFWS 2007). During PGE's ongoing bald eagle surveys, no communal roosts or foraging by bald eagles has been noted in Forest Park within the project site.

5.2.3 Amphibians

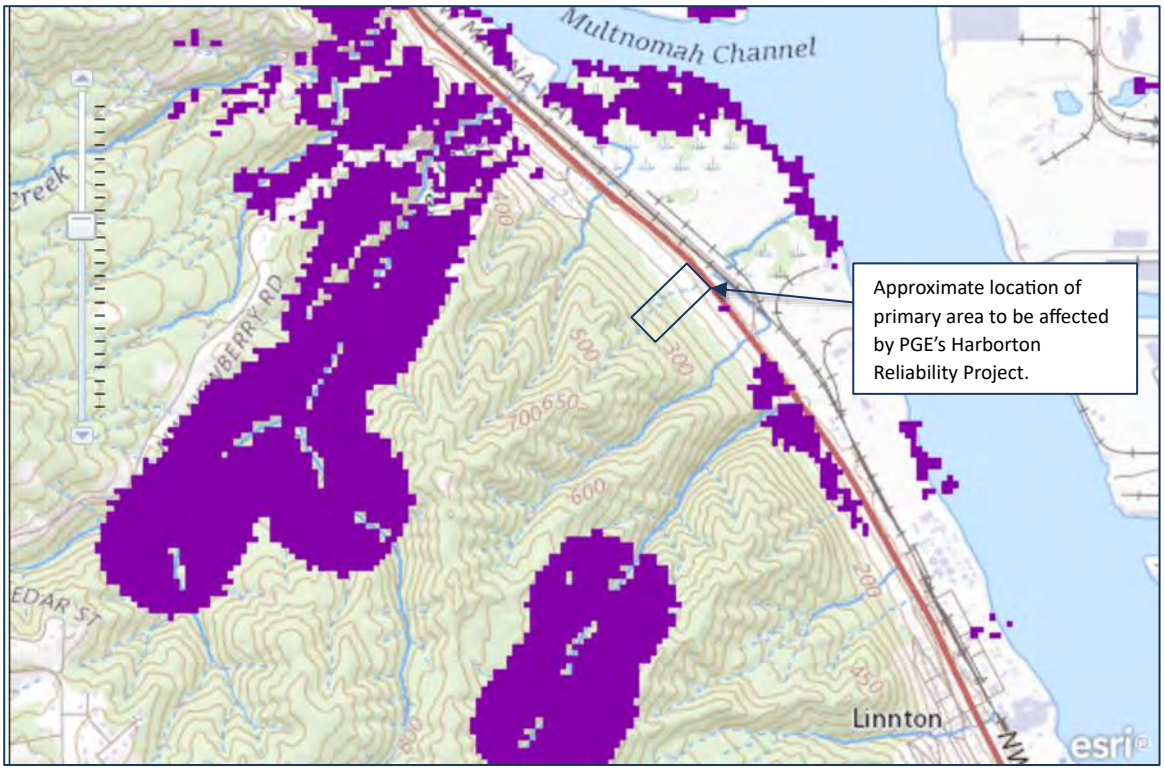
Many of the amphibians present in Forest Park breed either in perennial flowing water or ponds (neither of which are present in the project area). Some amphibians, including two salamander species that occur in Forest Park, are terrestrial breeders (which lay their eggs underground or in rotting logs): ensatina salamanders and Western red-backed salamanders (FPC 2013). The prevalence of these species in the project area is unknown. Amphibian species of concern in Forest Park include Northern red-legged frog, Clouded salamander, and Oregon slender salamander. It is not definitively known whether Oregon slender salamander or clouded salamander actually occur or breed in the Park (FPC 2013). For clouded salamander, the availability of microhabitat features, namely large logs, that meet temperature and moisture requirements is believed to be a key limiting factor. Oregon slender salamanders are often associated with large-diameter, decaying Douglas fir logs and bark debris mounds at the base of snags. They may also occur in talus and lava fields that retain moisture, and areas with mixed coniferous and deciduous duff over mineral and organic soils (Oregon Conservation Strategy 2016).

Northern red-legged frogs are an Oregon Conservation Strategy species, Oregon state-listed "Sensitive" species, and a federal Species of Concern. Breeding populations of these frogs travel annually from the Forest Park area north of the project site to ponds in PGE's Harborton Natural Area site, which is located on the east side of Marina Way and north of PGE's Harborton Substation.

The northern red-legged frog is dependent on multiple habitat types to complete its life cycle and is highly motivated to travel between them, often disregarding barriers such as roads during annual migrations. Each year, hundreds of these frogs migrate down through the Park and across U.S. Hwy 30 (Samara Group 2022). This highway crossing results in numerous annual frog mortalities. The preservation of connectivity pathways between habitat types is essential to the long-term viability of these populations. Currently, volunteers capture and shuttle frogs across U.S. Hwy 30. However, this is difficult work that must be completed at night, and many migrating frogs can be missed, resulting in roadkill.

The presence and density of northern red-legged frogs at the project site is unknown. Modeling conducted by the United States Geological Survey (USGS) indicates that the project site is not among the areas in the Park most likely to be inhabited by northern red-legged frogs (see **Figure 5**). This dataset represents a species habitat distribution map for northern red-legged frog based on 2001 ground conditions. This habitat map was created by applying a deductive habitat model to remotely sensed data layers within the species' known range.

Figure 5. Habitat Suitable for Northern Red-legged Frog (purple polygons) *(Source:USGS 2018)*



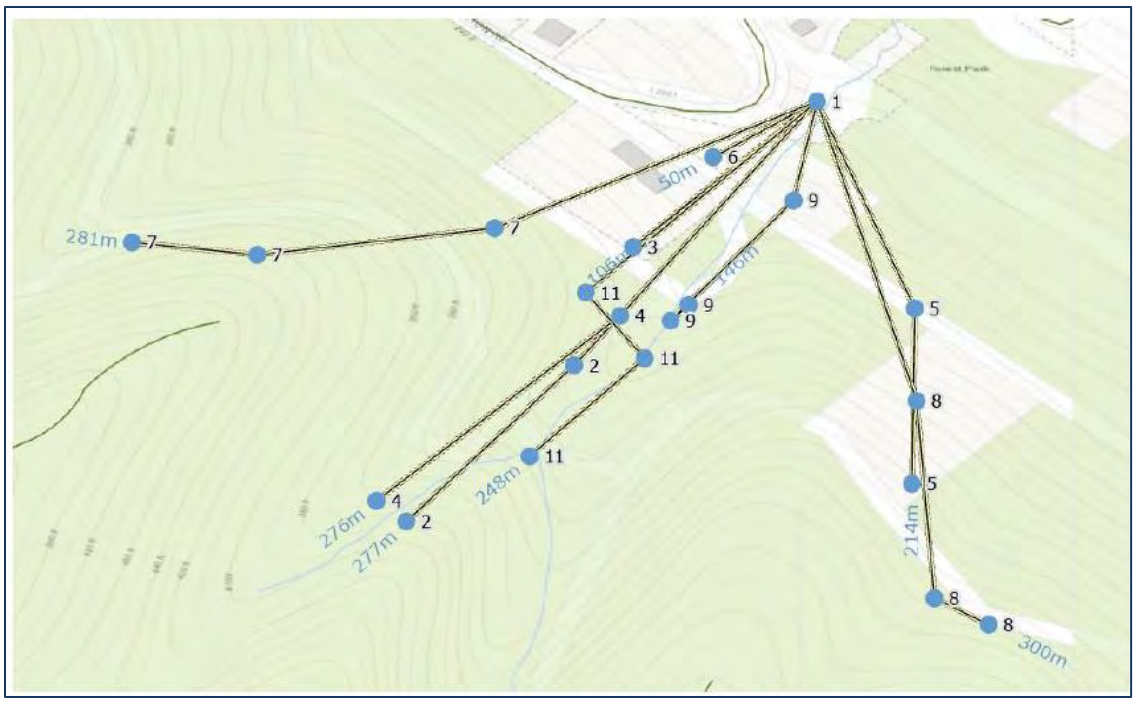
Temple (2020) conducted a study of habitat associations and movement patterns on northern red-legged frog, including in Forest Park. The study found that the most significant factors affecting habitat quality were the presence or visibility of water and structural elements such as downed wood and duff/thatch ground cover depth as well as root hollows (Temple 2020). The vegetation cover was also significant in predicting frog presence. Species movement is highly dependent on cover, moisture, and temperature changes, with the most movement taking place at night during rainfall. The highest habitat scoring sites in Forest Park had a stream present within the survey area and duff/thatch layer as ground cover. The lowest scoring zones did not have presence of a water source, had lower levels of downed wood, and

had no visibility of duff/thatch layer ground cover. Frog presence was observed at locations with sword fern (*Polystichum munitum*) low-lying herbaceous vegetation, and hiding spaces such as root hollows and duff layer in Forest Park.

Northern red-legged frog radio telemetry tracking in Forest Park found that they primarily breed at the ponds in PGE's Harborton Natural Area site across U.S. Hwy 30 from Forest Park (Temple 2020). PGE has been monitoring northern red-legged frog egg masses in its Harborton Natural Area mitigation site, where this breeding occurs. Since the mitigation site was restored in 2019, egg mass counts have generally increased; however, annual counts are highly variable (ranging from 170 to 1,400 over the last 10 years) and not always correlated well with the number of frogs shuttled to the site by volunteers (ranging from 200 to almost 2,000 over same time period).

After breeding, migrating frogs move upslope along a partially piped stream and into the forest interior (Temple 2020). Their movements are staggered, and groups of frogs typically migrate at night when temperatures are above 6 C° and there is enough moisture on the ground to cross paved roads. Fifteen frogs were tracked in 2018 and eleven in 2019. Frogs were all tracked from a single release point approximately 980 meters west and upslope from the breeding ponds on PGE property. Individual frogs were tracked for 2 to 28 days. Average movement was approximately 61 meters per week. Maximum moved distance from release site was 275 meters. Although the Temple study was by no means a comprehensive inventory of migrating frogs, it showed that most tracked frogs traveled through stream corridors (either surface or underground), and none of the tracked frogs accessed the project site. Figure **6** illustrates frog movements from a single release site. Point #1 is approximately 300 meters upslope from the breeding wetlands at PGE's Harborton Natural Area mitigation site. Tracks 5 and 8 shown in **Figure 6** are along underground seeps/springs.

Figure 6. Radio-tagged Northern Red-legged Frog Movements *(Source: Temple 2020)*



Very little downed wood was observed within the project site during habitat surveys conducted by DEA in 2023. This, together with the dense shrub layer present in the existing transmission corridor, may limit use of the project site by this species.

5.2.4 Reptiles

According to FPC (2013), "common garter snake and the northwest garter snake occur and breed in the Park. The rubber boa has not been reported in Forest Park but may be present, as the Park has many habitats similar to those that the rubber boa inhabits. Only one lizard—the northern alligator lizard—has been sighted in the Park, in the 1990s. Reptile studies within Forest Park and the surrounding ecosystem have been insufficient to accurately determine the presence/absence and abundance of these species."

Proposed Project activities would affect any reptiles present in most areas that will be impacted; however, there is not enough data available to accurately quantify those effects.

5.2.5 Mammals

Special status mammal species in Forest Park include seven species of bat, one carnivore (Pacific marten), and three rodents (see **Table 3**). Pacific marten are wide-ranging and should be able to avoid disturbances caused by the Proposed Project. Red tree voles are restricted to old-growth Douglas fir, which is not present in or near the project site; red tree voles will not be affected by the Proposed Project. White-footed voles are generally found to be associated with alder and hazel (NatureServe 2023). Little is known about their biology, and their abundance and distribution in the Park are unknown.

Camas pocket gopher are restricted to the Willamette Valley and are found in early seral plant communities or cultivated croplands that mimic early seral situations. Therefore, they may be found in disturbed portions of transmission corridor that mimic early seral plant communities but are unlikely to be present in the forested areas that would be affected by the Proposed Project.

Any of the bat species known to occur in Forest Park could forage in areas that would be affected by the Proposed Project. However, foraging habitat is not known to be limiting to bat populations, and foraging or dispersing bats should be able to easily avoid construction activities. Two bat species are known to breed in coniferous forest in Forest Park: long-legged myotis and Yuma myotis; whereas, the breeding status of long-eared myotis and fringed myotis are unknown (see **Table 3**). Long-legged myotis are vulnerable to habitat loss, including reductions in late-successional conifer forests; hollow trees; large, newly dead snags; and riparian areas (ODFW 2023). Yuma myotis are closely associated with water (rivers, streams, ponds, and lakes). Roosting sites include buildings, bridges, cliff crevices, caves, mines, and trees, especially when located near water (WDFW 2023). Fringed myotis require forest habitat. They use large snags and rock features for day, night, and maternity roosts, and caves and mines for hibernacula (ODFW 2023). Long-eared myotis occupy a wide range of rocky and forested habitats over a broad elevation gradient. Summer day roosts include abandoned buildings, bridges, hollow trees, stumps, under loose bark, and rock fissures (Swenson and Shanks 1979). Silver-haired bats could use Forest Park for breeding and feeding, but are especially closely associated with old-growth forest. They form maternity colonies almost exclusively in tree cavities or small hollows of large dead/dying trees. They feed mainly in disturbed areas, such as small clearings, along roadways, and near water courses, sometimes at tree-top level. Their diet consists of a wide variety of small to medium-sized flying insects, which they often catch over small bodies of water within forested areas (Ober and Hayes, 2008). Due to a lack of perennial water at the Project location, silver-haired bats are probably less likely to be affected by the Project than other bat species. California myotis maternal colonies are often found under the bark of large trees or snags or in tree cavities. Females most frequently roost under loose bark in trees or snags in intermediate stages of decay.

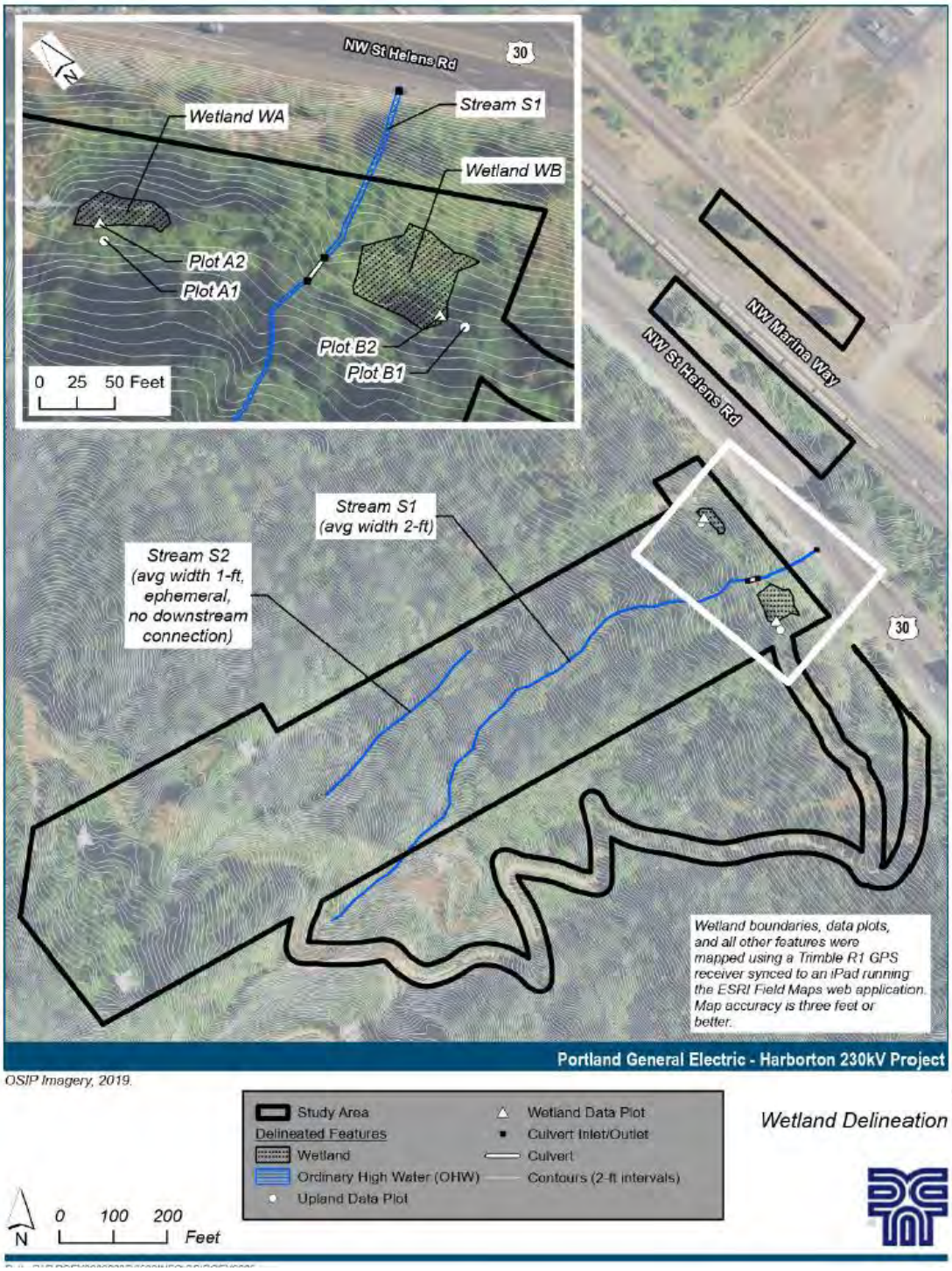
It is possible that a few bats, especially fringed myotis and long-eared myotis (given their habitat requirements) could have roosting sites disturbed by Proposed Project activities. Many bat species rely on snags for roosting and maternal colonies but like foraging bats, both species are expected to be able to relocate to other areas of the Park given that there are no especially unique bat habitats in the project area. A Stand Trajectory Assessment was proposed in 2011, which would, in part, have documented the prevalence of snags and down wood in Forest Park. However, to our knowledge, this project was not completed. Without an inventory of snags in Forest Park, assessing the potential negative effects of snag losses due to the Project are difficult to quantify.

Other mammals in Forest Park, including moles and other burrowing species, may be affected by the Proposed Project, but are expected to be able to move into adjacent habitats following disturbance. Larger mammals with more extensive ranges (i.e., deer, elk, coyotes) could be briefly inconvenienced by Proposed Project activities but are not expected to be appreciably affected in any way that could affect survival or reproduction.

5.3 WETLANDS AND WATERS

DEA conducted a wetland delineation field study at the project site in a specific study area associated with the proposed vegetation removal in Forest Park (see **Figure 7**). The field study identified two wetlands, one intermittent stream, and one ephemeral discontinuous drainage in the Proposed Project's study area (see **Figure 7**). The wetlands were documented in a wetland delineation report that was reviewed and approved by the Oregon Department of State Lands (DSL) in 2024 (DSL File No. WD2023-0584). The following discussion summarizes the aquatic features identified within the project site.

Figure 7. Wetlands and Waters Delineated in Forest Park for the Proposed Project



Wetland A

Wetland A is an isolated palustrine emergent (Cowardin class) slope (Hydrogeomorphic (HGM) class) wetland. The wetland is situated in a hillside cut along a dirt/vegetated access road. Vegetation in

Wetland A is periodically mowed and is dominated by reed canarygrass (*Phalaris arundinacea*). Hydrology is provided by seepage emanating from the roadcut, with a high water table and saturation to the surface observed during a March 1, 2023 site visit. Hydric soil indicator "redox dark surface (F6)" was observed. The wetland boundary was based on a rise in topography and change in plant community, soil conditions, and hydrology indicators.

Wetland B

Wetland B is an isolated palustrine emergent (Cowardin class) slope (HGM class) wetland. It is near Stream 1 but does not have a surface water connection to it. The wetland is situated along a hillside cut along a dirt/vegetated access road and extends a bit downslope of the road, where seepage infiltrates into deeper soils. Vegetation in Wetland B is periodically mowed and is dominated by reed canarygrass and curly dock (*Rumex crispus*). Western redcedar (*Thuja plicata*) and Himalayan blackberry (*Rubus armeniacus*) were also recorded as dominants, albeit with low cover. Hydrology is provided by seepage emanating from the roadcut, with a high water table and saturation to the surface observed during the March 1, 2023, site visit. The wetland boundary was based on a rise in topography that correlated with a change in plant community, wetland/upland soil conditions, and wetland hydrology indicators.

Stream 1

Stream 1 is an intermittent flowing stream and is a tributary to the Willamette River. A few inches of flow were observed during the March 1, 2023, site visit, was entirely dry during a June 13, 2024 site visit. The stream is presumed to be dry every summer until the onset of fall rains. The stream runs through a V-shaped ravine bordered by native upland forest dominated by Douglas fir, grand fir (*Abies grandis*), western redcedar, and bigleaf maple (*Acer macrophyllum*). Near the boundary of Forest Park, the stream cascades over a cliff wall above U.S. Hwy 30. Flow is captured in a roadside ditch and routed through a series of culverts beneath U.S. Hwy 30, a railroad, and Marina Way to combine with other flow in a channel that drains to the river through the Harborton Substation Wetland (described below) at the south side of PGE's Harborton property. There is no channel or obvious location of discharge on the banks of the Willamette River. The average stream width within the Proposed Project's study area was 2 feet as measured at the ordinary high water (OHW) line, which was determined based on the presence/absence of scour and lack of vegetation along the channel. Typical depth below OHW was 1 foot to 2 feet; however, south of the access road culvert crossing, the stream is downcut several feet. Substrates were a mix of cobble, gravel, and silt.

Stream 2

Stream 2 is an ephemeral drainage with no direct surface connection to downstream waters. It starts in a V-shaped ravine, but the lower end of the channel infiltrates into the hillside, where the channel gradient becomes less steep and evidence of scour and defined channel are no longer present. Flow was not observed in the channel bottom, but surface water was noted in a few locations. Average channel width was 1 foot and depth was 1 inch to 2 inches. However, clear signs of a channel were not always evident along the entirety of the delineated drainage; water appeared to surface only in discontinuous low points within the ravine. The channel is bordered by similar upland vegetation, as described for Stream 1, to the north and south. The vegetation at the downstream, east end of the channel is made up of shrubs within the maintained transmission corridor. Shrubs included red elderberry (*Sambucus racemose*), salmonberry (*Rubus spectablis*), and invasive Himalayan blackberry.

The area proposed for tree removal contains an incised, intermittent stream with a narrow band of riparian vegetation. Where this stream crosses an existing utility access road above and parallel to Hwy

30, the stream was placed in a wooden culvert that has disintegrated into a highly incised, open channel across a portion of the road. This condition presents a hazard for recreational use of the site. Within Forest Park, the lower end of this stream channel crosses through an area of dense Himalayan blackberry with English ivy (*Hedera helix*). Both of these species are considered "noxious" weeds by the Oregon Department of Agriculture (ODA). At two locations where seasonal groundwater flows close to the surface, it seeps across PGE's maintenance access road, resulting in two wetlands that have formed on the road. These wetlands contain dense reed canarygrass, which ODA also lists as a noxious weed.

Harborton Substation Wetland

The PGE Harborton Substation property (tax map 2N1W34 – lot 101) contains a wetland area southeast of the substation. This wetland receives water from Stream 1 in Forest Park (described above) and from other sources that drain to the wetland via ditches along Highway 30. Water seeps into the wetland from the west through coarse rock beneath a former railroad berm. The wetland was delineated for a separate PGE project in 2020. The wetland contains a seasonally inundated depressional area dominated by reed canary grass, a non-native noxious weed. When full, this depression drains northeast through a swale towards the Willamette River. Fish access from the river into the wetland is restricted by a squashed culvert in the maintenance road that crosses the swale near its outlet to the river. The wetland is surrounded by a black cottonwood (*Populus trichocarpa*) forest to the east and fill slopes to the north and west. Because the wetland is hydrologically connected to the Willamette River, the Willamette Greenway setback (50-foot buffer) was applied to the wetland boundary in the land use exhibit maps. The Greenway setback within PGE's tax lot includes fill slopes above the wetland that contain a mix of Himalayan blackberry (noxious weed) and native shrubs with a native overstory containing cottonwood and big-leaf maple trees.

5.4 TREES

DEA conducted a tree inventory of the project area throughout the spring of 2023. This initial inventory layer was amended by an additional tree survey conducted for access roads and associated proposed turnouts in the winter of 2023/2024 by IAS. The results of the full inventory of trees is provided in Exhibit C (Overall Site Plan and Tree Table) and Appendix B (Arborist Report/Tree Protection Plan). Within the project area in Forest Park, 1038 trees were surveyed. Observed species, their associated counts, and percentage of all trees inventoried are provided in

Table 4. Tree sizes varied substantially, but in general the forest is composed of mature trees having an average diameter of approximately 17 inches at breast height.

Table 4. Project Area Tree Inventory Summary

Tree Species	Count	Percent
Bigleaf Maple (Acer marcrophyllum)	306	30.09%
Black cherry (Prunus serotina)	2	0.20%
Cascara (Frangula purshiana)	4	0.39%
Common Hazel (C. avellana)*	26	2.56%
Douglas Fir (Pseudotsuga menziesii)	430	42.28%
English Hawthorn (Crataegus monogyna)	1	0.10%
English Holly (Ilex aquifolium)	2	0.20%
Grand Fir (Abies grandis)	2	0.20%
Hemlock (Tsuga heterophylla)	2	0.20%
Oregon White Oak (Quercus garryana)	42	4.13%
Unknown dead trees	9	0.88%
Pacific Dogwood (Cornus nuttatlii)	2	0.20%
Pacific Yew (Taxus brevifolia)	2	0.20%
Red Alder (Alnus rubrum)	70	6.88%
Scouller Willow (Salix scouleriana)	19	1.87%
Spruce (Picea spp.)	2	0.20%
Sweet Cherry (P. avium)*	25	2.46%
Western Red Cedar (Thuja plicata)	71	6.98%
Total Trees	**1017**	**100.00%**

Note: Trees in bold are non-native species.

Tree conditions were variable with the majority of trees listed as having a health rating of “fair” (64%), followed by “good” (23%), “dead” (7%), “poor” (4%), and “very poor” (2%). Additional tree surveys occurred at the Harborton Substation property for areas where temporary construction access will be necessary to perform wiring modifications that are needed as part of the Proposed Project. These additional survey efforts tagged 141 trees, which consist primarily of mature black cottonwood (*Populus balsamifera*) and lesser amounts of red alder, willows, and bigleaf maple.

5.5 FUNCTIONS AND VALUES

Natural systems such as wetlands or forests provide both ecological functions and values to humanity. *Functions* are ecological processes such as carbon sequestering and water infiltration, while *values* are the benefits that humans (rather than other organisms) derive from natural systems. Values include things such as water quality improvement, aesthetics, or flood retention specific to a location. A particular function can have a different value in two different circumstances. For instance, a watershed that functions well for retaining stormwater has much higher value in a basin that has a high degree of impervious surface than it does in a natural basin, where many of the watersheds retain floodwater well. **Table 5** presents some examples of the functions and finer-scale metrics on which the societal values of forests can be assessed.

Table 5. Examples of Forest Functions and Values

Function	Values
Hydrology	Flood abatement
	Base-flow support
	Hydrograph moderation
Water quality	Nutrient filtering
	Nutrient retention and removal
	Water temperature moderation
Habitat	Direct habitat (snags for nesting, production of food resources)
	Indirect habitat enhancements (down wood that retains gravel and creates habitat complexity in streams)
Societal	Aesthetics
	Spiritual
	Supply of cultural products
	Resources (timber, firewood, foraged products, wild game)

The habitat characteristics identified for Resource Site FP2 per the 2022 Natural Resources Inventory Report (PBS 2020 and 2022) could also be considered functions. These include the provision of interior forest area habitat; food and water; resting, denning, nesting and rearing; movement and migration; and reduction of noise, light and vibration.

6. DESIRED FUTURE CONDITION AND MANAGEMENT OBJECTIVES

PP&R and others have prepared many documents that prescribe the management goals, objectives, and desired future conditions in Forest Park. The following sections outline selected documents relevant to the Proposed Project and their details.

6.1 NATURAL RESOURCES MANAGEMENT PLAN (PP&R 1995)

Any proposed mitigation must meet specific conservation goals:

Goal 1: Protect Forest Park's native plant and animal communities, its soil and its water resources while managing the forest ecosystem in order to grow a self-sustaining ancient forest for the enjoyment and benefit of future generations.

Goal 2: Design management and restoration efforts to:

- Maintain and enhance regional biodiversity.
- Provide wildlife habitat and migration opportunities.
- Improve water quality and aquatic habitat.
- Repair damaged and fragmented natural systems.

6.2 FOREST PARK ECOLOGICAL PRESCRIPTION GOALS (PP&R 2011b)

In developing ecological prescriptions for restoration activities in Forest Park, the City of Portland noted the following overarching goals:

- Protected Air and Water Quality
- A Forest with Structural Complexity
- Floristic Native Biodiversity

- Intact Native Plant and Animal Communities
- Reduction of Catastrophic Fire Risk

6.3 OREGON CONSERVATION STRATEGY "RECOMMENDED CONSERVATION ACTIONS" (COA ID: 058)

The Oregon Conservation Strategy identifies various Conservation Opportunity Areas (COAs) throughout the State of Oregon, including COA ID 058: Forest Park (ODFW 2023). The recommended conservation actions identified by the strategy include:

- Address fish and wildlife movement barriers (roads, culverts, fences).
- Foster forest succession to old growth.
- Improve stream buffer vegetation and width.
- Increase channel complexity and fish habitats.
- Maintain and expand existing Oregon white oak habitat.
- Manage for future habitat complexity.
- Manage public access and recreation to protect fish and wildlife.
- Protect and improve headwater streams and riparian habitat.
- Protect and improve water quality.
- Remove invasive vegetation plants in particular English ivy.

6.4 FOREST PARK WILDLIFE REPORT (DESCHLER 2012)

Applicable to the Proposed Project, Deschler (2012) stated that oak stands are Terrestrial Ecology Enhancement Strategy (TEES) Special Status Habitats that need to be "surveyed systematically in the appropriate seasons, especially late winter and spring". These habitats may attract wildlife species that occur nowhere else in the Park. Oak stands may harbor southern alligator lizards, white-breasted nuthatches, western gray squirrels, and some special-status woodpecker species. The report also notes that:

> Powerline corridor maintenance activities by regional utility companies sometimes result in extensive removal of shrubs and trees, as well as soil compaction. Recent shrub damage along the BPA Road in Forest Park in 2012 is an example. Shrub habitat is relatively uncommon and important in the Park, and wildlife species that use it are often localized breeders. The removal of shrubs during powerline corridor maintenance reduces breeding habitat for sparrows, thrushes, and warblers, and razes flowering plants that are important to hummingbirds, moths, bees, and other pollinators. In some cases, PP&R has worked successfully with utility partners such as Kinder Morgan to analyze and modify right-of-way maintenance activities such as tree cutting, and thereby substantially reduce habitat losses. Habitat losses have also been mitigated by topping rather than cutting down some trees, leaving branchless boles standing to become snags, an especially valuable wildlife habitat component (Deschler 2012).

6.5 DESIRED FUTURE CONDITION FOR FOREST PARK (PP&R 2011b)

According to the 2011(b) report by PP&R, the Desired Future Condition (DFC) for Forest Park includes:

- A mosaic of evergreen-dominated and mixed deciduous forest;
- Oak woodlands along portions of the Park's eastern edge; and
- A diversity of native shrubs and open meadows within the disturbance corridors.

The DFC combines the recommendations from the NRMP and the Federal Emergency Management Agency (FEMA) Wildfire Study (Trout Mountain Forestry and Moore Iacofano Goltsman, Inc. 2009) to move toward old-growth forest and to reduce fire risk at key interfaces.

6.5.1 Ecological Goals

Ecological goals are the foundation of ecosystem management. These goals inform the management strategy for parks and open spaces. Associated with each ecological community (or "alliance") is a management strategy identified to be critical to achieving the DFC for Forest Park. The ecological goals for Forest Park are as follows:

1. **Protected Air and Water Quality**
2. **A Forest with Structural Complexity**: Vertically (canopy, midstory and understory, snags, and downed wood) and landscape-scale (mosaic of habitat types, natural gaps).
3. **Floristic Native Biodiversity** with increased habitat opportunities for target wildlife species and avian, terrestrial, and aquatic native wildlife corridors (within and surrounding Forest Park).
4. **Intact Native Plant and Animal Communities** with minimal disturbance from non-native species and invasive species populations controlled through management.
5. **Reduction of Catastrophic Fire Risk**

6.5.2 Forest Alliances

The DFC Report for Forest Park (PP&R 2011b) categorized "alliances" within the Park. These are habitat associations with their own goals and desired future conditions. Alliances applicable to this mitigation plan are detailed below.

6.5.2.1 Oregon White Oak Woodland Alliance

This alliance is characterized by a relatively open canopy of Oregon white oak found at lower elevations of the tree line where they transition upslope into forests dominated by Douglas fir. Historically, fire maintained this habitat type. Fire suppression near urban areas has resulted in the encroachment of Douglas fir into oak woodlands. The oak woodland habitat type is now found only in small, isolated pockets throughout the Willamette Valley. The majority of remnant oak populations are found primarily at or below 300 feet throughout Portland, likely reflecting a transition zone between the wetlands and riparian areas that lined the Willamette River and the conifer forests that dominated the higher slopes and crests of the Tualatin Mountain Range. In Forest Park, the remaining oak woodlands are found along the eastern boundary of the Park.

Shrubs associated with this alliance include poison oak (*Toxicodendron diversilobum*), oceanspray (*Holodiscus discolor*), snowberry (*Symphoricarpos albus*), serviceberry (*Amelanchier alnifolia*), vine maple (*Acer circinatum*), cascara (*Rhamnus purshiana*), and western hazelnut (*Corylus cornuta*). Sword fern, bracken fern (*Pteridium aquilinum*), and a variety of native grasses are often associated with the relatively open ground cover of this alliance. In Forest Park, species that are not common throughout the Portland Metro area such as western black haw (*Viburnum ellipticum*), western alum root (*Heuchera micrantha*), and low snowberry (*Symphoricarpos mollis*) are found associated with oak woodlands.

Regional and state planning efforts have identified oak woodland as an important habitat type. The Oregon Conservation Strategy has identified this habitat type as a Strategy Habitat for the Willamette

Valley. Oaks provide important structural habitat for wildlife. The acorns that are produced are important for winter survival and are utilized by a variety of species, including California quail (*Callipepla californica*), varied thrush (*Ixoreus naevius*), acorn woodpeckers (*Melanerpes formicivorus*), Douglas tree squirrel (*Tamiasciurus douglasii*), black-tailed deer (*Odocoileus hemionus columbianus*), and mice. Additionally, researchers in the Willamette Valley found a greater abundance of breeding neotropical migrants in Oregon oak woodlands than in coniferous forests. In the absence of fire, selective removal of Douglas fir can help maintain this unique and biologically important habitat composition. While the current composition along the eastern edge of Forest Park is dominated by the Douglas fir-bigleaf maple alliance, there are pockets of remnant oak woodlands remaining, particularly near the eastern boundary of the park. Per the DFC report, these remnant oak woodlands "must be assessed and **prioritized for conifer removal** to improve and maintain their habitat quality and composition".

6.5.2.2 Riparian Corridors and Aquatic Habitat Alliance

This alliance is associated with generally narrow strips of vegetation along streams that flow through other vegetation alliance types within Forest Park. The riparian corridor alliance is generally managed for aquatic habitat and to provide improved water quality conditions, including cool water with limited turbidity. Riparian corridors with native vegetation and intact streambanks prevent increased sediment loads and habitat for a variety of amphibians and macroinvertebrates and, in some areas outside of the project site, fish habitat. Aquatic habitats are critical for maintaining and improving populations of aquatic wildlife. Characteristic native species in this alliance observed near the project site by DEA during fieldwork in 2023 include salmonberry, red-osier dogwood (*Cornus sericea*), willows (*Salix spp.*), snowberry, and roses (*Rosa nutkana* and *R. pisocarpas*). These species are found along streambanks and streamside terraces. Non-native Himalayan blackberry is also very common in this alliance.

6.5.2.3 Shrubland/Grassland Alliance

This alliance is associated with the permanent disturbance corridors that provide access for public utility transmission, as well as small meadows and roadsides within the Park resulting from historical disturbance from homesteads, grazing, mowing, and general park maintenance. Characteristic native species in this alliance include vine maple, western hazelnut, cascara, and serviceberry along corridor margins or in areas with fewer height constraints.

Managing power corridors as shrublands enhances wildlife habitat diversity while reducing wildfire risk and allowing for infrastructure maintenance. Restoration of these areas with native forbs and grasses has the potential to provide significant pollinator habitat and biodiversity near disturbed edges of the Park. For future restoration, Mock orange (*Philadelphus lewisii*), snowberry, red-flowering currant (*Ribes sanguineum*), thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), blue elderberry (*Sambucus cerulea*), and oceanspray are all appropriate selections to create a shrub-dominated system on an exposed site.

Funding provided through a FEMA Wildfire Risk Reduction Grant awarded in 2006 resulted in the treatment of invasive species within more than 150 acres of power corridors throughout Forest Park. In 2009/2010, following removal of invasives, more than 20,000 native shrubs were planted to revegetate the treatment areas.

6.6 CONCLUSION

A review of the vision and goals evident in these various plans and strategies for the Park reveals certain themes. They all envision a resilient forest with structural complexity, improved wildlife migration

conditions, and increased floristic biodiversity. The following goals are a subset of the many goals described in the various plans summarized above. These goals inform the mitigation concepts described in this Habitat Mitigation Plan. As such, this plan offers an opportunity to implement actions that address these goals:

- *Maintain and enhance regional biodiversity.*
- *Provide wildlife habitat and migration opportunities.*
- *Improve water quality and aquatic habitat.*
- *Repair damaged and fragmented natural systems.*
- *Provide a forest that has structural complexity.*
- *Provide floristic native biodiversity.*
- *Address wildlife movement barriers (roads).*
- *Maintain and expand existing Oregon white oak habitat.*
- *Manage for future habitat complexity.*
- *Remove invasive vegetation plants, in particular English ivy.*

These are the goals that inform the mitigation concepts described below in Section 9.

7. PROJECT EFFECTS

7.1 DIRECT EFFECTS

Direct effects are those effects that occur at the same time as a given action (in this case the Project) and directly affect individual organisms. Indirect effects (Section 7.2) are effects of the Proposed Project that occur later in time, after construction is complete.

7.1.1 Effects of Tree Removal

Trees provide food, shelter, and cover for movement and dispersal for wildlife species that occur in the Park. Trees also take up and sequester carbon, helping to mitigate human-induced climate change. Forest Park consists of 5,200 acres of mostly (75%) mixed conifer-deciduous forest, with the remainder mostly uniform conifer forest. Logging, other human disturbances, and residential and urban development have led to a forest composition that is typical of a second-growth Douglas-fir forest, with many areas consisting mostly of young trees (i.e., 50 to 100 years old) (FPC 2013). The Park includes several special-status habitats, including interior forest and oak woodlands. Native vegetation in the Park is still mostly healthy but is threatened by invasive plant species (FPC 2013).

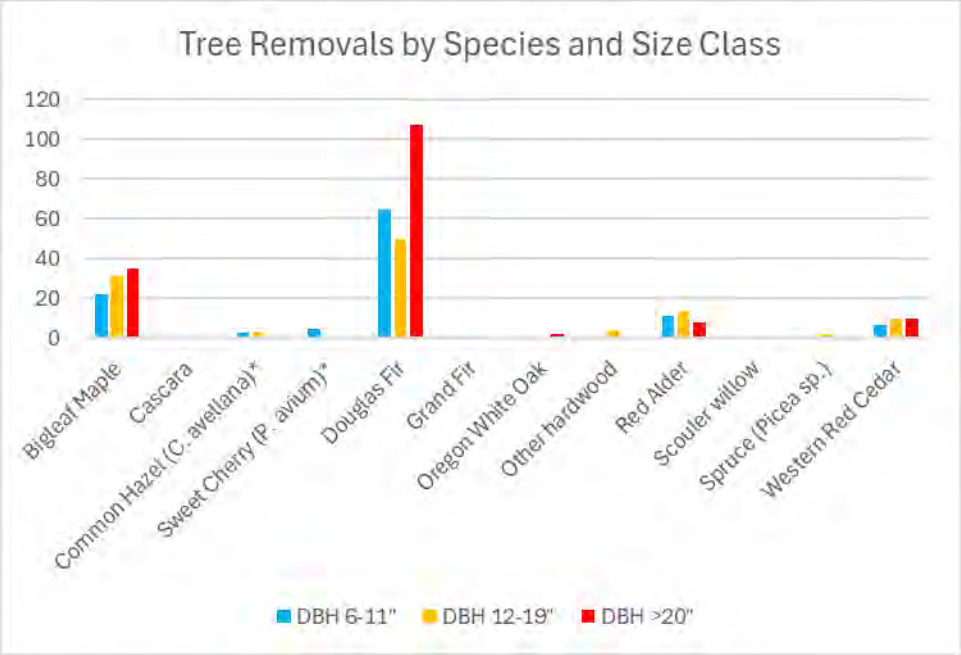
Removing trees is unavoidable given the need for a line routing into/out of the Harborton Substation. Tall monopoles were selected to reduce other Proposed Project effects. Monopoles have a smaller footprint and will allow establishment of taller woodland trees than would shorter, tower-type transmission structures. However, large equipment is needed to mobilize, remove conflicting conifer trees, and construct the new monopoles.

Based on the tree survey, 1,020 trees were surveyed within or adjacent to the project site. See the complete tree table in Land Use Application Exhibit C (Overall Site Plan and Tree Table) and Appendix B (Tree Protection Plan). Of these 1,020 trees, 376 are living trees that are in Forest Park and are proposed for topping or full removal to construct the Proposed Project. Following the complete, updated tree inventory, IAS worked with PGE's vegetation management department to apply International Society of Arboriculture and PGE standards to the inventoried trees and determine which would need to be removed to provide safe electrical transmission. This determination of tree removals included any trees

that would become windthrow concerns as a result of the reduced stand density of new open corridor area.

Figure 8 illustrates the trees that will be removed in Forest Park by species and by diameter at breast height (DBH) size class. Outside of Forest Park, PGE, in coordination with Oregon Department of Transportation, would remove an additional 20 trees in the U.S. Hwy 30 right-of-way (ROW) as part of the Proposed Project. These trees include a mix of bigleaf maples, cottonwoods, and one redcedar tree (*Thuja plicata*). This area outside of Forest Park has been affected by prior road ROW maintenance; existing trees have been cut and pruned previously. At the Harborton Substation, four additional young Douglas fir trees will be removed from the edge of the parking area to accommodate the new wire routing. Within the cottonwood forest south of the Harborton Substation, the Proposed Project design has sited all temporary access routes and work pads to avoid all tree impacts. Due to the presence of wetlands in the area, and to avoid root damage, matting will be used for construction access routes in this area.

Figure 8. Tree Removals Proposed in Forest Park



Note: * indicates non-native trees

The majority of the tree removals will take place on approximately 5 acres within Forest Park Vegetation Unit 283 (see **Figure 8**). This area is a regenerating Douglas fir-dominated forest. PP&R rated the ecological health of Unit 238 as “fair,” with 80% canopy cover and 5% non-native cover.

Table 6 provides an estimate of the PP&R mitigation in-lieu fee for the Proposed Project. The total fee shown is the amount that PGE would be required to pay if it were to rely solely on the in-lieu fee approach for resolving all mitigation. Additionally, this cost estimate assumes all tree removal fees are the same regardless of tree condition, species, or age. For example, Table 6 does not currently differentiate between a healthy western redcedar, a similarly-sized cedar tree in very poor condition, a non-native nuisance tree (e.g., common filbert), or a much younger multi-stem maple tree that has a

collective stem diameter equaling that of the healthy redcedar. Therefore, the following is a preliminary estimate of mitigation fees that would be owed to the City were PGE to resolve all mitigation obligations via payment in-lieu per City of Portland Ordinance 191314 (*Authorize Portland Parks & Recreation to establish and collect fees in-lieu of mitigation activities to implement restoration projects in natural areas*). The fee demonstrates that substantial funding for meaningful compensatory mitigation options could be provided through the in-lieu fee process to offset the loss of forest habitat resource values.

Table 6. Tree Mitigation Cost Estimate per PP&R In-lieu Fee

Tree Size Category	Units	Fee per Unit	Fee
6 inches–11 inches DBH (# of trees)	116	$675	$78,300
12 inches–19 inches DBH (# of trees)	116	$1,800	$208,800
≥20 inches DBH (total inches)	4,837	$450	$2,176,650
Total fee			**$2,463,750**
Total # of Tree Removals*	397*		

**Includes 21 dead trees, 13 non-native trees, and several trees that would be topped but still living or converted to snags. Further, it is proposed that approximately 10% of cut trees be left onsite in a fire-safe manner to enhance forest and stream habitat conditions.*

Currently, transmission corridors represent 3.0% (156 acres) of the 5,200 acres within Forest Park. The addition of approximately 5 more acres of transmission corridor will increase the total acreage of transmission corridors in Forest Park to approximately 161 acres, which is 3.1% of the total acreage of the Park. Because the Proposed Project's proposed area of additional transmission corridor is within Utility ROW and is already surrounded by transmission corridors, the loss of trees is not anticipated to have a substantial effect on overall forest ecosystem conditions, wildlife movements, or provision of other ecosystem services so long as the area is revegetated with native short-stature vegetation that provides important habitat resources, such as food, cover, and soil stability.

7.1.2 Effects to Individual Organisms

The Park is home to at least 104 bird, 50 mammal, and 7 amphibian species (FPC 2013). Many of these species rely, at least in part, on trees that will be removed by the Proposed Project. The Proposed Project's tree removal and construction activities could directly affect these species. Changes in the vegetative community or species population would be measurable within the Proposed Project footprint, but mobile organisms (amphibians, birds, and mammals) should be able to relocate to unaffected portions of the Park. There is no evidence that populations of any native species are limited by available Douglas fir-bigleaf maple habitat in the Park, which suggests that there should be ample appropriate habitat for those organisms forced to relocate from the work zone. In the long term, the Proposed Project would have moderate beneficial effects on individual organisms owing to the increase in oak woodland habitat and the associated biodiversity, increase in snags, removal of invasive species, increases in pollen and nectar sources, lowered risk of wildfire, and increased instream complexity (see Section 9, Mitigation). The permanent transition of conifer-dominant forest habitat to managed woodland and shrubland conditions in a utility corridor would also result in indirect effects, which are discussed in Section 7.2.

There are no Endangered Species Act (ESA)-listed species present in the Proposed Project area (ORBIC 2019; PP&R 2012), and there would therefore be no effect from the Proposed Project on ESA-listed species. In addition, given the distance between the proposed construction and the Willamette River, the

intervening natural gradient and railroad fill barriers within the downstream stream route, the fact that the on-site stream is expected to be dry during construction, and proposed Best Management Practices (BMPs) will be in place, the Proposed Project would have no potential for direct effects to aquatic species, including ESA-listed salmonids, downstream of the project area in the mainstem Willamette River.

The removal of trees would directly affect any organisms utilizing the trees themselves or resources provided by the trees. These species could include songbirds, woodpeckers, flying squirrels, western gray squirrels, bats, and a host of other species. However, the availability of Douglas fir and bigleaf maple is unlikely to be a limiting factor to any species extant in the Park. Douglas fir/bigleaf maple forest is the most common forest type in the Park and constitutes nearly 42% of the Park area (PP&R 2011b).

The Proposed Project could affect migratory birds, because work involving soil disturbance would occur during the breeding season, between May 1 and September 30. The disturbances in the project area could result in inadvertent nest destruction, birds abandoning nesting activities, and displacement of birds from preferred foraging areas. The Proposed Project proposes conducting nest surveys prior to any tree or vegetation removal to identify nests in accordance with the publication *Protecting Nesting Birds, Best Management Practices for Vegetation and Construction Projects* (BES 2022). The Proposed Project would coordinate nest surveys and BMPs with Oregon Department of Fish and Wildlife and the City to avoid nests where feasible. In addition to nesting survey protocols, the Project will comply with other provision in BES (2022), and will ensure compliance with the Migratory Bird Treaty Act (MBTA).

In general, direct effects to common wildlife species would be localized, minor, and short term. In the long term (see Section 7.2) the Proposed Project would result in an increase in woodland and grassland/forb habitat and a corresponding decrease in coniferous forest. And finally, given the proposed mitigation, the Proposed Project would have minor to moderate beneficial effects on fish, wildlife, and migratory birds because of native plantings, stream enhancements, and the reduced spread of invasive vegetation. Removal of the identified trees likely would affect individual organisms of several species native to the Park. However, given the prevalence of the habitat types that will be most affected by the Proposed Project, there is unlikely to be a measurable effect on species at the population scale. Sixteen dead trees will be removed beneath the powerlines potentially affecting species that frequently utilize snags and tree cavities including several species of bats. However, twenty-six dead trees will be retained and up to 22 trees along the edge of the Proposed Project site will be topped. While these topped trees are expected to survive, the topping will nonetheless increase habitat diversity to the benefit of bats and other species.

Proposed Project activities would directly affect any birds that are nesting in the project area. Although these effects would persist, given the shift in habitat types in the areas to be to be affected by tall tree removals, those effects are not expected to be significant to any species on a population scale, given the availability elsewhere in the Park of those habitat types that would be affected. The Proposed Project will adhere to the guidelines and implement the BMPs in *Protecting Nesting Birds, Best Management Practices for Vegetation and Construction Projects* (BES, 2022). Before any tree removal, the Proposed Project would survey the trees to be removed for nesting activity.

In summary, while it is unlikely, the Proposed Project could affect northern red-legged frogs and possibly some mammals and birds. However, effects to mammals and birds are expected to be minor and restricted to harassment. Effects to reptiles are possible, but likely not significant given their scarcity in the Park. The Proposed Project could also affect insects; however, in the long term, the Proposed Project

is expected to have positive effects on pollinators (see Section 9.2). No effects to fish are anticipated with the Proposed Project.

7.1.3 Soil Compaction

Site preparation, grading, and infrastructure installation will require the use of heavy equipment. In the absence of appropriate BMPs, this work could lead to soil compaction within the utility corridor. Soil compaction can lead to difficulty with future revegetation efforts, including seed germination. Additionally, compacted soils are less likely to absorb and infiltrate precipitation, leading to enhanced runoff and potential erosion and sedimentation concerns. To avoid soil compaction, heavy equipment should be kept to existing access roads and developed work pads where possible. In tree removal areas where there are no roads, use of BMPs for dispersing equipment weight will minimize the potential for detrimental soil compaction.

7.1.4 Visual Quality and Aesthetics

The Proposed Project will remove trees and install two tall utility monopoles. The Proposed Project therefore has the potential to affect visual quality, which is a factor of the recreational use of the Park. The analysis of visual quality is a qualitative analysis that considers the visual context of the project area, potential for changes in character and contrast, assessment of whether the project area includes any places or features designated for protection, the number of people who can view the project site and its activities, and the extent to which those activities are related to the aesthetic qualities of the area.

Under the Proposed Project, the project area would undergo a visual change, which could be perceived as both a detriment and a benefit to aesthetics. Removal of forest canopy will remove the forest habitat characteristic that is highly valued by Park users; however, it will also open up views of Mount Saint Helens, the Willamette River, Sauvie Island, and North Portland. Visual changes would be apparent within the park given the 4.7-acre area of affected forest that will be managed as transmission corridor. However, because the work would occur between two parallel, existing transmission lines, it would not substantially alter the current aesthetic context of the area. Also, because the Proposed Project will allow for a portion of the existing forest stand located between the PGE and BPA transmission corridors to remain, the general forest aesthetic will remain similar to the current condition. Outside of the park, much of the forest view is obscured by the wall above Highway 30 so that the changes within the park caused by the Proposed Project would only be visible from an airplane.

7.1.5 Water Resources

There are several small perennial and intermittent streams that flow through Forest Park, cross under U.S. Hwy 30, and pass through 0.1 mile to 0.2 mile of developed industrial areas before flowing into the Willamette River. These drainages include one intermittent stream at the project site (see Section 5.2). Selective tree removal and revegetation related to the Proposed Project near the upper headwaters of this stream will affect the riparian area for the stream where groundwater seeps into the channel, becoming seasonal streamflow. Although the upper limits of this stream are already beneath the BPA St Johns transmission line and, therefore already without trees, some minor additional tree removal would occur there as a result of the new transmission line segment between SP-3 and SP-5 (shown on Figure 3 above). With the exception of replacing a failed culvert within the existing PGE access road and a small area of tree removals near that failed culvert, the Proposed Project would avoid tree removal over the majority of this stream and would leave most of its forest canopy in place to continue providing shade, habitat, and bank stability. Along the middle of the creek, there will be two temporary crossings of the stream to provide access route circulation for forestry operations. The crossings will consist of bundled

logs or matting placed on cross beams. The cross beams would be placed parallel to the stream but set back from either side of the upper streambanks. Ramps or branch piles will be placed up to the crossing structures. To limit the height of the structure, a temporary steel culvert pipe may be placed in the stream to support the crossing. This arrangement will minimize damage to the streambanks. The Proposed Project will not alter the course of the stream. The stream may experience increased evapotranspiration where selective tall tree removal occurs near the upper end of the stream, but this effect should be temporary because the Proposed Project proposes the planting of short-stature riparian vegetation in this area to replace lost tree cover. Up to five pieces of woody material having a bole (trunk below the crown) diameter of 12 inches to 20 inches will be placed down the streambank and into the creek to increase the amount of aquatic habitat niches and slow flows, and to provide nutrients to the system. Based on these mitigating actions, the hydrologic conditions are expected to remain functional at a level similar to existing conditions.

7.1.6 Hazardous Materials Release

Releases of diesel fuel, lubricants, hydraulic fluid, and other contaminants contained in construction equipment could potentially result in acute negative impacts to downstream fish and local invertebrates and habitat quality. In addition, long-term effects could result if an accidental spill was not properly remediated. The only potential sources of contaminants in the project site would be the construction equipment itself (lubricating oils and fuel). Construction staging for the Proposed Project would occur on existing, gravel-surfaced roadside pullouts, and the potential for spills would be very low due to PGE's standard construction best management standards for contractors, which require that equipment be checked each day for any leaks and that refueling occur more than 100 feet from any waterbody.

7.1.7 Noise

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are considered noise impacts. Construction projects generate varying levels of in-air construction noise, depending upon the types of equipment used and whether multiple pieces of equipment are operated simultaneously. The Park would generally be considered to be a quiet area (noise levels of less than 40 decibels) and to have limited and intermittent noise coming from wildlife, Park patrons, and occasional and short-term use of Park maintenance equipment (vehicles, mowers, chainsaws, chippers, etc.). Similarly, the residential area bordering the Park is also considered to be relatively quiet, with typical noise coming from traffic on U.S. Hwy 30 and from intermittent use of lawn and garden equipment.

During construction of the Proposed Project, noise would be generated by the operation of equipment, such as vehicles, small chippers, and chainsaws. The loudest equipment likely to be used would be chippers and chainsaws, which can produce noise levels up to 125 decibels. Construction would increase noise levels within the immediate vicinity of the project site for the duration of the work. Vehicle and equipment runtimes would be kept to a minimum, and work would only occur during daytime hours. Work would be in compliance with the City's noise ordinance. Thus, construction noise impacts would be negligible to minor.

7.2 INDIRECT EFFECTS

7.2.1 Public Health and Safety

Under the Proposed Project, the proposed creation of defensible space and reduction of hazardous fuels around the proposed transmission routing areas in Forest Park would help to reduce the frequency, spread, and intensity of a wildfire in the project area. Additionally, the proposed access road

maintenance (resurfacing of deep ruts in existing roads) would allow for improved emergency access into the park when needed. The Proposed Project thus would create a safer environment for firefighters and allow them to more easily and quickly contain a wildfire, ultimately reducing the risks for people living adjacent to or near the project area.

7.2.2 Carbon Sequestration/Climate Change

The Proposed Project's removal of trees also would remove their ongoing carbon sequestration. Approximately 10% of cut trees will be left on-site for habitat, and the carbon sequestered in that material will remain as the trees very slowly rot. Other tree material will be hauled off-site and converted to lumber. This material will continue to sequester carbon as well. New vegetation, including trees, will be planted, both on-site and within City of Portland limits. Young trees sequester more carbon as they grow than older trees do in the same time span. With the Proposed Project's reuse of woody materials and planting of new trees, the amount of carbon sequestration is not expected to decrease over time. Additionally, PGE proposes to plant trees in areas of Portland that are identified as heat islands. Although not located in Forest Park, these plantings will also sequester carbon, enhance air quality, and provide shade for communities affected by a lack of tree canopy.

7.2.3 Permanent Shift in Habitat Type

Powerline rights-of-way typically provide permanently maintained linear corridors of early seral vegetation, which can harbor high levels of biodiversity (Fitzgibbons 2022). In managed older forest stands that lack diversity, they are routinely cleared (especially in the northeastern United States) to provide early seral habitat and to benefit the species that rely on that ecosystem type (Kellet et al. 2023). Shrub habitat is relatively uncommon in the Park but is important, and the wildlife species that use it are often localized breeders. The infrequent removal of trees associated with routine transmission corridor maintenance often impacts shrub habitat, which reduces breeding habitat for sparrows, thrushes, and warblers, and razes flowering plants that are important to hummingbirds, moths, bees, and other pollinators. PGE proposes to establish vegetation that can grow safely with little to no routine maintenance. PGE acknowledges that amending the oak woodland habitat type will require some maintenance over time to allow for oak release and regeneration. PGE will work with PP&R to modify ROW maintenance activities in the oak woodland planting areas to substantially reduce the negative habitat effects resulting from routine ROW maintenance. Another way to minimize habitat losses is by topping rather than cutting down some trees, leaving boles standing to become snags, which are especially valuable wildlife habitat components (Deshler 2012). PGE would leave up to 10% of cut trees on-site to provide more downed woody debris, a valuable habitat component that was noted as lacking during field studies conducted by DEA in 2023.

In the 4.7 acres of forest habitat that the Proposed Project would affect, there will be a shift from Douglas fir forest to a utility corridor that is maintained in an early seral stage. Consequently, there would be a resulting shift from more forest-dependent species to species that are more frequently found in prairies and shrubland. Transmission corridors, if maintained in a native vegetation status, provide some of the only open habitat in the Park and also provide important foraging resources and habitat connectivity for pollinators (Blackburn and Hatfield 2020). The presence of the transmission corridor also provides edge habitat, which is important for many wildlife species. Edges often have their own microclimates with greater sunlight and higher wind velocities than interior forest. Plant species richness is generally higher in edge habitats, thus increasing interspersion (the degree of intermixing between plants of different species).

Management of vegetation located within powerline rights-of-way often creates three distinct vegetative zones: forest zone, border zone, and wire zone. The implementation and management of distinct vegetative zones creates structurally complex habitats that support diverse plant communities and a variety of wildlife. Fitzgibbons (2022) found that, in maintained powerline corridors, species richness and species diversity increased from the forest zone to the wire zone, potentially driven by changes in light intensity, edge effects, and frequency of disturbance. Elk and blacktail deer use was most apparent in vegetation zones that contained the highest abundance of forage species. Fitzgibbons concluded that "utility companies and land managers should continue using or adopt integrated vegetation management practices to encourage the development and persistence of early seral plant communities in right-of-way features potentially conserving or enhancing biodiversity at landscape scales (2022)."

Swanson (2012) and Swanson et al. (2014) investigated species usage of powerline corridors in the Pacific Northwest. They found that compositional diversity of the vascular plant community (including forbs, shrubs, and trees) is a key attribute of early seral communities, with many forbs, shrubs, and tree species achieving their greatest importance in naturally occurring areas of early succession in the Pacific Northwest. After clearcutting (without replanting or herbicide application), there is a brief pulse of early colonizers – hardy species that are the first to establish in altered habitats. This phase is followed by colonization by, and fairly prolonged abundance of, Ceanothus (*Ceanothus spp)*, thimbleberry (*Rubus parviflorus*.), willows (mainly *Salix scouleriana*), fireweed (*Chamaenerion angustifolium*), and others, many of which are important for nutrient fixation or cycling (e.g., nitrogen fixation by ceanothus), forage, and other values (e.g., nectar provision to pollinators by fireweed. Huckleberry (*Vaccinium parviflorum* or *V. ovatum*) can also be an important food source for many species in early seral habitats, but it is uncommon in closed-canopy forest.

Downed woody debris and snags are also key structural elements of highly functional early seral forest ecosystems (Swanson 2012). Nutrient fixation, transformation, and movement are often accelerated during early succession. As in all things, there are winners and losers in early seral habitats; mature forest species such as flying squirrels and some amphibians are less well adapted to early seral habitats. Nonetheless, naturally structured early seral habitats with a diverse plant community can be rich in vertebrate species. Many ungulates preferentially use early seral areas that have a high availability of browse plants.

Some species that may decline as replanted tree stands mature include white-crowned sparrow (*Zonotrichia leucophrys*), song sparrow (*Melospiza melodia*), Spotted towhee (*Pipilo maculatus* willow flycatcher (*Empidonax traillii*), black-headed grosbeak (*Pheucticus melanocephalus*), orange-crowned warbler (*Vermivora celata*), yellow-rumped warbler (*Setophaga coronate*), and American kestrel (*Falco sparverius*). Cavity nesters, aerial insectivores, and ground feeders tend to respond well to stand replacement.

Small mammals show distinct seral associations following many kinds of disturbance. Following clearcutting and broadcast burning in the Oregon Cascade Mountains, late seral species such as northern flying squirrels (*Glaucomys sabrinus*) disappeared, while generalist and early seral mammals such as the California ground squirrel (*Spermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), and Townsend's chipmunk (*Eutamias townsendii*) increased.

Reptiles and amphibians often display seral tendencies. For instance, young stands (five to ten years old) in Oregon yielded the only observations of garter snakes (*Thamnophis* spp.) and a disproportionate abundance of the northern alligator lizard (*Elgaria coerulea principis*), while by contrast most of the amphibian populations increased with increasing stand developmental stage. The exceptions to this

were rough-skinned newt (*Taricha granulosa*) and western red-backed salamander (*Plethodon vehiculum)*, which were more associated with deciduous stands.

In the Pacific Northwest, a number of insects are associated with early seral habitats, including many moths and butterflies. Miller and Hammond (2007, as cited in Swanson et al. 2014) reviewed butterfly and moth species of conservation concern in the forests of the Pacific Northwest, concluding that early seral habitats make a crucial contribution to maintenance of these organisms in the regional landscape.

Swanson et al. (2014) compiled a list of Oregon Special Status Species (state listed, state conservation species, state species of special concern, etc.) that are more prevalent in mature forests compared to those that are more prevalent in early seral habitats (such as those in maintained powerline corridors). **Table 7** lists these species and their associated habitats. Note: The list in **Table 7** may not be a comprehensive list of current Oregon Special Status Species, because it was compiled in 2014.

Table 7. Oregon Wildlife Species Associated with Mature Forest Versus Those Associated with Early Seral Stage

Species	Scientific Name	Associated Habitat
Mature Forest Species		
Rocky Mountain tailed frog	*Ascaphus montanus*	Coarse substrates, cold water in forested watersheds
Cascade torrent salamander	*Rhyacotriton cascadae*	Forested small streams
Columbia torrent salamander	*Rhyacotriton kezeri*	Shaded watercourses
Northern goshawk	*Accipiter gentilis*	Mature forest for nesting
Boreal owl	*Aegolius funereus*	Mature forest
Marbled murrelet	*Brachyramphus marmoratus*	Mature forest in proximity to coast
Pileated woodpecker	*Dryocopus pileatus*	Generally mature forest with large-diameter snags
Flammulated owl	*Otus flammeolus*	Structurally complex forest with small mammal prey
Great gray owl	*Strix nebulosa*	Structurally complex older forest for nesting and other activities (note: uses early seral forest or meadows for some foraging)
Northern spotted owl	*Strix occidentalis caurina*	Structurally complex forest with small mammal prey
Johnson’s hairstreak	*Mitoura johnsoni, syn. Callophyrs johnsoni*	Dwarf mistletoe in late-seral forest
American marten	*Martes americana*	Structurally complex forest with small mammal prey
Fisher	*Martes pennanti*	Structurally complex forest with small mammal prey
Puget oregonian	*Cryptomastix devia*	Moist, shaded forest floors
Malone jumping-slug	*Hemphillia malonei*	Moist, shaded forest floors
Tillamook westernslug	*Hesperarion mariae*	Moist, shaded forest floors
A caddisfly	*Lepania cascada*	Shaded watercourses
A caddisfly	*Moselyana comosa*	Shaded watercourses
A caddisfly	*Namamyia plutonis*	Shaded watercourses
Haddock's rhyacophilan caddisfly	*Rhyacophila haddocki*	Shaded watercourses
Early-seral Pre-forest Species		
Olive-sided flycatcher	*Contopus cooperi*	Abundant insect prey associated with broadleaf vegetation
Mountain quail	*Oreortyx pictus*	Abundant insect prey associated with broadleaf vegetation

Species	Scientific Name	Associated Habitat
Black-backed woodpecker	*Picoides arcticus*	Insect prey and nesting in abundant snags
American three-toed woodpecker	*Picoides dorsalis*	Insect prey and nesting in abundant snags
Western bluebird	*Sialia mexicana*	Insect prey and nesting in abundant snags
Yellow-breasted chat	*Icteria virens*	Dense shrubs
Freija's fritillary	*Boloria freija freija*	Larval stage requires forb/herb/broadleaf vegetation
Taylor's checkerspot	*Euphydryas editha taylori*	Larval stage requires forb/herb/broadleaf vegetation
Gillette's checkerspot	*Euphydryas gillettit*	Larval stage requires forb/herb/broadleaf vegetation
Mardon skipper	*Polites mardon*	Larval stage requires forb/herb/broadleaf vegetation; meadows within forest matrix
Oregon silverspot butterfly	*Speyeria zerene hippolyta*	Larval stage requires fire-renewed coastal grassland on forest-potential sites
Sonora skipper	*Polites sonora siris*	Forest openings with thistle (*Cirsium*), legumes, hawkbit (*Agoseris*)
A leaf-cutter bee	*Ashmeadiella sculleni*	Flowering individuals of penstemon: woody debris with beetle galleries
Siskiyou short-horned grasshopper	*Chloealtis aspasma*	Open grassy areas on disturbed forest sites
Douglas-fir plant bug	*Platylygus pseudotsugae*	Open regenerating Douglas fir

Swanson et al. (2014) concluded that early seral conditions play an important role in maintaining a number of societally important values, including maintaining rare or conservation-dependent species. This analysis suggests that strategies to create or retain the elements of complex early-seral communities should be implemented as part of forest management where the conservation of biological diversity (including sensitive species) is an objective. This habitat mitigation plan is consistent with this strategy as it proposes to introduce greater habitat diversity, including early seral plant communities, and rare, biologically diverse woodland habitat.

8. AVOIDANCE AND MINIMIZATION MEASURES

8.1 IMPACT AVOIDANCE

Avoidance of wildlife habitat has been incorporated into the design of the Proposed Project to the extent possible given the acreage and site-specific requirements of the Proposed Project. The initial Proposed Project design presented for the Early Assistance Pre-application Conference with the City of Portland (EA 22-142445) showed full clearing within the Utility ROW. While such a design would provide the most reliable configuration for transmission routing, substantial redesign efforts occurred throughout 2023 and 2024 to revise the Proposed Project design to include only the work necessary to meet the needs of the Proposed Project. This design revision complicates future full build-out options by forcing PGE to immediately begin planning for Forest Park avoidance opportunities in association with future power supply needs, rather than developing the full Utility ROW in Forest Park. Despite the related complications, PGE has committed to an exhaustive search for alternative means of delivering future power supply to Harborton Substation to meet longer-term demand forecasts (e.g., more than 10 years in the future).

Proposed Project siting was done so that areas where the most intense disturbances will occur will be contained within, and be adjacent to, existing transmission corridors within the existing Utility ROW. Through several design refinement efforts, the Proposed Project would remove or top only those trees that would present a safety hazard. The Proposed Project design will leave a remaining block of forest

habitat in place that would have only temporary impacts related to construction access. The central stand of trees to be retained is shown on Exhibits E (Proposed Development) and F (Construction Management Plan) of the Land Use Application.

8.2 IMPACT MINIMIZATION

Forest Park is the largest natural area within a city in the continental United States, and it provides for recreational activities, environmental research, and educational discovery. As such, it is important to tread as lightly as possible when completing necessary infrastructure maintenance and upgrades in the Park. PGE has committed to careful evaluation of its power delivery and transmission needs and the designs that can meet those needs while minimizing impacts to the valuable habitat present within the Utility ROW in Forest Park. This careful evaluation has resulted in numerous design refinements, often made at higher cost to PGE, which have reduced the number of tree removals and riparian habitat impacts compared to earlier designs. PGE is actively working with a consulting arborist (IAS) to assess each tree within the proposed transmission corridor for opportunities to avoid and minimize tree removal while ensuring safe operational conditions.

Minimization measures are the second step in mitigation sequencing, which follow the route of 1) avoid impacts, 2) minimize impacts, then 3) mitigate impacts. After determining that alternatives that would avoid any impact to Forest Park are not feasible, PGE moved on to a detailed examination of impact minimization before investigating mitigation options. In general, the goal of minimization measures is to minimize ground disturbance, stabilize disturbed areas as quickly as possible, control drainage through the area to avoid erosion, and trap sediment and other construction debris on-site. Staging areas for the Proposed Project construction have been minimized as much possible while still providing adequate area away from streams or drainages to park equipment and store materials.

Following preliminary design efforts that focused on reducing the transmission routing plan to only one new segment of transmission line in Forest Park, PGE reviewed the initial proposed access roads and new proposed transmission structures to identify further impact minimization potential. Initially, the proposed new transmission segment in Forest Park was going to require three new transmission poles (SP#3, SP#4, and SP#5). The central pole (SP#4) would have required its own landing and access road. After substantial re-evaluation of the design, PGE's team identified an opportunity to substantially reduce permanent impacts to vegetated areas with the removal of SP#4 entirely. In addition, the redesign of Structure 5 as a taller structure meant that it could be shifted down the hill, just above an existing BPA utility access road. These design changes resulted in the following reduced impacts as compared with PGE's original land use application submittal:

- Significant reduction in permanent impact footprint by >30,000 square feet with the removal of SP#4 and its associated new permanent access road.
- The new permanent access road spur for SP#5 became shorter and required less road fill and vegetation impact associated with the access road.
- Permanent impacts to forest habitat structure within the new transmission corridor segment were reduced by making SP#3 and SP#5 taller, which provided the opportunity for certain medium height native tree species like Oregon white oaks to be planted along the outer perimeter of the powerline.

In addition to this effort, the cut and fill impacts to the site were further reduced from PGE's original land use application based on detailed geotechnical investigations by the Geotechnical Consultant, which

resulted in smaller permanent tower base pads. The Proposed Project selected to use tall utility monopoles, in part to minimize impacts to the Park. Using tall utility poles will reduce the number of poles needed, thus avoiding ground disturbance that would otherwise be required for lattice tower installation, and allowing for the establishment of taller trees and shrubs than would otherwise be allowed to continue growing in the utility corridor.

The amount of tree removal has been kept to the minimum possible necessary to achieve the goals of the Proposed Project. The Proposed Project proposes topping of 22 selected individual trees in order to create habitat features, including snags, rather than full removal. Up to 10% of cut trees will be limbed and left on the ground on-site to provide habitat structure, nutrients, and flow dispersal/erosion control. Clearing of trees will start at one end of the site and work progressively in one primary direction in order to drive wildlife into areas of the forest that will remain undisturbed.

If work during the nesting season cannot be entirely avoided, PGE will implement BMPs (PP&R 2017) in order to mitigate impacts on migratory birds and will secure appropriate permitting from USFWS before such work begins.

Heavy equipment will be confined to established roads and temporary access roads and haul routes. Other vegetation management, defensible space/hazardous fuels reduction work, and planting would be conducted with ground crews using hand tools. Temporary haul routes for vehicles and mechanical equipment, such as chippers, would be covered in mulch or brush piles to limit compaction and incorporate organic materials into soils for improved revegetation success. Straw mulch may be applied as necessary to maintain surface sediment stabilization, particularly in areas where invasive plants have been manually removed and soil exposed. To reduce the number of vehicles in Forest Park, contractors will park at Harborton Substation and carpool into the Forest Park construction areas.

PGE will establish and adhere to work buffer zones to minimize tree removal and herbicide introduction into the intermittent stream in the project area. For broadcast spraying, the exclusion zone will be 50 feet from the OHW line when wet and 25 feet from the OWH line when dry. Within 25 feet of the OHW line, only manual removal of non-native invasive vegetation and direct herbicide application (e.g., wicking, cut stem injection) will be allowed. These mitigation measures will reduce the potential for herbicide spray drift and runoff into streams to negligible levels.

Noise-producing construction work will be short in duration (less than two months) and will be restricted to daylight hours. Noise, although it can have negative effects on wildlife, will also be important in alerting wildlife and allowing species to move out of the area.

Table 8 outlines the Proposed Project's additional impact avoidance and minimization measures.

Table 8. Impact Avoidance and Mitigation Measures and BMPs to be Implemented during Proposed Project Construction

Activity	Avoidance and Minimization Measures/BMPs
Direct upland disturbance during construction	Clearly delineate sensitive resources including, but not limited to, trees, wetlands, and riparian protection areas with staked ribbon flagging in a manner that is clearly visible to anyone in the area. No motorized construction equipment will be permitted to occur beyond the construction barrier.
	Implement temporary slope stabilization measures that include downslope perimeter barriers and covering of exposed soil with plastic sheeting, straw mulching, wood chips, or other approved measures. All sediment barriers will be installed before grading. Following construction, site stabilization measures will be installed promptly following establishment of finished grade.
	Install control devices, such as check dams, silt mats, and other erosion and sediment control measures.
	Preserve natural vegetation and minimize clearing and grubbing activities when preparing staging, construction, or stockpile areas to the extent possible. Leave a vegetated buffer zone when possible.
	Select heavy equipment that will minimize possible adverse effects to the environment, considering factors including, but not limited to, equipment that has the ability to conduct work from existing disturbed areas and minimize the amount of vibration and noise that could disturb aquatic species.
	Establish proposed staging areas for storage of equipment, project-derived material, and supplies. Whenever possible, proposed staging areas for any equipment with a fuel or other tank of greater than 5 gallons in volume must be a minimum of 100 feet away from water bodies.
	Locate temporary construction and proposed staging areas within already disturbed/developed areas and/or along the existing roadway.
	Restrict construction vehicles and equipment to roads and designated work areas.
	Minimize construction noise to the extent possible by ensuring all equipment is outfitted with appropriate sound-control devices (mufflers).
	Store trash in wildlife-proof garbage containers and collect site trash daily, especially during rainy and windy conditions.
	Return temporary disturbance areas to pre-construction contours.
	Revegetate ground disturbance areas with native seed mix, and shrubs and/or trees.
Work in sensitive forest habitat and aquatic habitat areas	Protect sensitive areas such as streams and wetlands before Proposed Project construction.
	Install sediment control methods, including wattles or silt fence, to prevent the discharge of any material into flowing water. Erosion and sediment control features should be incorporated into the Proposed Project at the earliest practicable time.
	Replace a failed culvert to reduce existing erosion and downcutting of the stream through the existing access road to the existing Tower No. 2999.
	Cut, do not grub, vegetation required for access that is not part of the permanent impact limits. This allows for natural regeneration in many shrub species.
	If required for this Proposed Project, comply with applicable Removal-Fill Law and Clean Water Act permits for work in wetlands or streams.
	Minimize the number of trees removed through the careful routing of all temporary construction and logging access/haul roads to avoid trees and woody vegetaton. Use matting or brush piles for temporary access routes.

Activity	Avoidance and Minimization Measures/BMPs
Unanticipated spills and releases	Dispose of all construction waste in designated areas and keep stormwater from flowing on or off these areas. Stage temporary spoils generated from site grading work in a stable upland site approved by a geotechnical engineer or other qualified personnel.
	Perform activities in a manner that keeps potential pollutants from either draining or being transported off-site by managing pollutant sources and modifying construction activities.
	Fuel vehicles only in designated areas and place a spill kit in the fueling area. Whenever possible, store, fuel, and maintain vehicles/heavy equipment in a designated upland staging area that is at least 100 feet from a stream, waterbody, or wetland.
	Check incoming vehicles and equipment (including delivery trucks and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment on-site. Place drop pans or absorbent materials under equipment when not in use. Clean up spills with absorbent materials rather than by burying.
	If a spill occurs, promptly contain the spill, eliminate the source, and deploy appropriate measures to clean/dispose of spilled materials in accordance with federal, state, and local regulations.
	Maintain a supply of surplus sediment control materials at the project site. The following are examples of materials to be kept on the project site for use in emergencies: • 100 feet of sediment fence • 260 square feet of plastic sheeting • 1,000 feet of rope • 20 sandbags • 10 bales of sterile straw • 10 filter bags for drilling operations (if groundwater is encountered) • 20 wood stakes
	Prevent fuel spills and leaks, and reduce their impacts to stormwater, by using off-site facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors. Supply portable refueling storage tanks or station equipment containing fuel (i.e., generators or pumps) with portable containment facilities able to contain 100% of the fuel they contain in the event of a leak.

9. MITIGATION

The overarching goal of this mitigation strategy is to implement a variety of habitat enhancement measures that will result in net improvements to a suite of resource values and expand priority or strategy habitats within Forest Park. An exact match of habitat gains and losses is not possible within Forest Park's NMU. The NMU already has well-established mature forest habitat that is identical to the habitat of the proposed impact area; however, there are other sensitive and degraded areas or wildlife passage conditions that can be enhanced to replace the habitat functions that would be affected.

The large extent of second growth, mixed conifer-deciduous forest habitat present throughout the NMU means that the affected habitat type is not unique or rare within the Park. For example, the 1991 Northwest Hills Natural Areas Protection Plan (BPS 1992) ranks the uniqueness of wildlife habitat in Site 104 (which is the area in the plan where Proposed Project impacts would occur) as "Low." However, due to the forest alteration necessary to build the proposed transmission line improvements, there are opportunities to enhance and expand other forest and shrubland habitat types within the affected area, including opportunities to expand Oregon Conservation Strategy habitats, enhance Oregon Conservation Strategy species, and increase habitat diversity and habitat interspersion. These actions would further conservation goals for strategy species and habitats identified by state and local conservation and habitat management plans developed for Forest Park, as described in Section 6, Desired Future Condition and Management Objectives, above.

Diversification of habitats within Forest Park is a key goal for promoting greater resilience of both native habitats and the species that inhabit them. As environmental conditions change due to climate change, having a variety of habitats can provide greater structural diversity, which may be more resilient to increasing temperatures, changes to precipitation conditions, and biological infestations. As noted in the EA summary notes (EA 22-142445) from PP&R, the native shrub habitat that exists beneath the existing PGE and BPA powerlines, which flank the impact area, provide important habitats for wildlife. These shrub and herbaceous habitats present an infrequent break in the homogeneous mixed conifer-deciduous forest habitat.

While they lack mature forest habitat functions, these shrub and herbaceous habitats do provide important food sources for terrestrial wildlife, especially where they are interspersed within mature forest habitat. Avoiding impacts to native shrubs; removing non-native, invasive shrubs; and installing robust native shrubs and woodland trees that are shorter than the current, conflicting fir trees within the proposed transmission corridor will minimize the functional habitat losses by providing food, cover, soil stability, nutrients, nesting structures, and shade for surface waters. Additionally, by removing invasive ivy and blackberry and incorporating native pollinator support species in clear areas around poles and access roads, the Proposed Project will enhance important ecosystem functions within the NMU and the local watershed.

For these reasons, rather than seeking to solely replace trees, PGE proposes to mitigate the loss of mature, mixed conifer and broadleaf deciduous forest habitat functions by improving a variety of habitat functions that are identified as restoration priorities for Forest Park in state, regional, and City of Portland plans.

Per the NRMP, all long-term impacts to environmental resources must be mitigated within the same management unit of Forest Park. Long-term impacts resulting from the project include tree losses, which take several years to mitigate because replacement trees take time to grow into habitat that would provide similar levels of resource values. However, several short-term impacts are also proposed. These include habitat impacts that can be immediately replanted and functional within a few years (e.g., impacts to shrub and herbaceous habitats and soils). Mitigation for short-term habitat impacts is not restricted to the NMU and, therefore, PGE proposes to fund additional habitat enhancements (e.g., noxious weed removal and native plantings) in other management units of Forest Park. In this way, PGE can provide robust mitigation that provides several more acres of habitat enhancement and restoration relative to the acres of habitat impact. This abundance of habitat enhancement area relative to impact area is intended to compensate for the temporal losses of forest resource values as tree plantings grow and mature.

9.1 INVASIVE SPECIES REMOVAL

Noxious weed control activities will help minimize potential impacts by preventing the spread of noxious weeds during and after construction. Noxious weeds prevent seral forest development processes by preventing the growth of native saplings that would naturally create a native understory and, eventually, become the climax species in an ancient forest condition. In addition, noxious weeds can result in the rapid spread of wildfire and, therefore, in 2021 the City received a FEMA grant to remove noxious weeds in the NMU and replace them with native vegetation that is less prone to wildfire spread.

9.1.1 Noxious Weed Control Within the Project Limits

Noxious weeds observed within the project site include: Himalayan blackberry, Scotch broom (*Cytisus scoparius*), shining geranium (*Geranium lucidum*), and English ivy. Although individual specimens of these species are scattered about, the primary areas of weed infestation are mapped in the Existing Condition Plan (Land Use Application Exhibit D). The Proposed Project will implement the following specific strategies to reduce the spread of noxious weeds within the Proposed Project limits.

Pretreatment

Pretreatment will be accomplished primarily using mechanical operations by trimming to the ground level for the targeted weed species. Other appropriate mechanical methods may include disking, ripping, or chopping. Hand-pulling methods may also be utilized if the area of infestation is small or where mechanical methods are not feasible. Infested areas will be cleared in a manner that minimizes the transport of weed seed, roots, and rhizomes or other vegetative materials and soil from the site.

Spot treatments with appropriate herbicides will also be conducted where applicable, depending on the specific weed and site-specific conditions, using integrated weed management principles. Spot herbicide treatment would be used only when it could be effective (i.e., plant phenology and effective herbicide treatment windows coincide) before construction. Any herbicide treatment would be conducted by a licensed applicator using herbicides labeled for the targeted species and registered for the use. No herbicide spraying would occur within 25 feet of Stream 1 in Forest Park.

Equipment Inspection

Before transporting construction equipment to the site, all equipment will be inspected to check that it is clean and free of potential weed seed or sources (i.e., soil, roots, or rhizomes) and will be power washed, if necessary, as determined by the environmental inspector (EI). Any such power washing would occur in the gravel parking lot at the Harborton Substation. In addition, the EI will be responsible for performing inspections of all vehicles before they are allowed into Forest Park or into sensitive habitat areas at the Harborton Substation property.

Clearing and Grading

In areas where infestations have been identified, the contractor will stockpile cleared vegetation and salvage topsoil or graded material adjacent to the area from which they are stripped in order to eliminate the transport of soil-borne noxious weed seeds, roots, or rhizomes. Where practical and feasible, grading activities will occur toward any known areas of infestation to minimize the potential spread of noxious weeds.

Weed-free Materials

PGE will use certified weed-free materials such as seed, mulch, sterile straw, and sediment barriers. The EI will confirm that all materials are certified weed-free in accordance with ODA standards.

Weed Control

Where weed control is necessary, PGE will employ hand and mechanical methods (pulling, mowing, disking, etc.) to prevent the spread of potential weed infestations. Decisions about weed control methods will be made based on whether other methods or combinations of methods are known to be effective on the species in similar habitats. The choice of herbicides will be based on the invasive species, how it reproduces, its seed viability, the size of its population, site conditions, known effectiveness under similar site conditions, and the ability to mitigate effects on non-target species.

In most cases, if an herbicide is used for weed control, it would be used in combination with other methods. For example, initial treatment of an invasive species may be done with an herbicide, but then manual or mechanical methods may be implemented as maintenance treatments over the long term. If herbicides are used to control noxious weed infestations, PGE will employ a state-licensed or federally licensed herbicide applicator to make certain that the appropriate herbicides are utilized for the targeted weed species during its proper phenological period and at the specified rate. Herbicides will be used according to the labeling restrictions and according to all applicable laws and restrictions.

The applicator will confirm that the herbicides are used under the proper seasonal and weather conditions (e.g., low wind) to assist with effectiveness and to minimize drift to non-targeted areas. Herbicides will not be applied during precipitation events or when precipitation is expected within 24 hours, or will be applied as specified on the label. Before herbicide application, PGE and/or its contractor will confirm that treatment areas are isolated from the public and signage is in place for at least 48 hours after treatment.

Weed Control near Sensitive Areas and Habitats

Herbicides will not be used within 25 feet of a stream and will be used only when the stream is seasonally dry. If noxious weed infestations occur in the vicinity of sensitive sites, such as wetlands, the proper treatment buffers will be applied to avoid potential adverse impacts to non-targeted species. In these areas, the design (e.g., application rate and method, timing, wind speed and direction, nozzle type and size, buffers, etc.) of the site-specific control will be to mitigate the potential for adverse disturbance and/or contaminant exposure. For reed canarygrass treatment at the project site, PGE may elect to cover areas of dense canarygrass with cardboard or black sheeting to solarize those areas and assist in weed control treatment.

Revegetation and Seeding

PGE will consult with PP&R regarding recommended seed mixtures for the project area. **Table 9** lists the species that make up an initial recommended native erosion control/pollinator support seed mix that is composed of commercially available seeds from local vendors. The seed mix includes several species included in the Pollinators and Power Lines Project (Westside Trail Pilot Demonstration Project), which was a coordinated effort between PP&R, BPA, and Metro to seed in open areas of Forest Park with species that would benefit native birds and insects (Blackburn and Hatfield 2020). The species listed in **Table 9** include several that were observed during field investigations conducted by DEA in 2023 and, therefore, are suitable for the local habitat conditions. Disturbed areas will be seeded within six working days of final grading, weather and soil conditions permitting.

Table 9. Seed Mix for Erosion Control and Native Pollinator Support

Botanical Name	Common Name	% By Weight	Application Rate
Permanent Seeding, Mix No. 1 - Pollinator Seed Mix*			
Bromus carinatus	California brome	10%	43.67 lbs. pure live seed per acre/1 lb. per 1,000 square feet
Elymus glaucus	Blue wildrye	40%	
Hordeum brachyantherum	Meadow barley	20%	
Gaillardia aristata	Blanketflower	5%	
Achillea millifolium	Common yarrow	2%	
Clarkia amoena var. lindleyi	Farewell-to-Spring	1%	
Collinsia grandiflora	Giant blue-eyed Mary	3%	
Collomia grandiflora	Large-flowered collomia	3%	
Prunella vulgaris var. lanceolata	Self heal	2%	
Lupinus polyphyllus	Large-leaved lupine	3%	
Plectritis congesta	Shortspur seablush	1%	
Potentilla gracilis	Graceful cinquefoil	1%	
Gilia capitata	Bluehead gilia	1%	
Deschampsia cespitosa	Tufted hairgrass	3%	
Symphyotrichum subspicatum	Douglas aster	2%	
Lupinus bicolor	Miniature lupine	1%	
Epilobium densiflorum	Deseflower willowherb	1%	
Linaria maroccana	Dwarf spurred snapdragon	1%	
	Total	**100%**	

* If any of these seed materials are unavailable, other native forbs may be substituted, as determined in coordination with PP&R.

Seeding will be conducted using a mechanical broadcast seeder. Fertilizer, lime, or mulch will not be used. Seed will be broadcast with a mechanical seeder immediately after the seedbed has been prepared and the soil is loose to allow the seeds to be lightly covered as the soil settles. The seeding area will be lightly dragged with chains or other appropriate harrows to lightly cover the seed in areas where it is possible, as determined by the EI. Broadcast seeding will occur immediately before installation of erosion control fabric or application of weed-free mulch (straw or wood).

Alternatively, hydroseeding may be used in steep slope areas that can be safely accessed with hydroseeding equipment, such as near existing Tower No. 2998 or the slopes behind proposed SP-5 (please see **Figure 3** on page 6). Hydroseeding equipment will be equipped with sufficient tanks, pumps, nozzles, and other devices required for mixing and hydraulically applying the seed, wood fiber mulch, and tackifier mix in slurry form onto the prepared ground. The hydroseeding equipment will have built-in agitators that will keep the seed, mulch, tackifier, and water mixed homogeneously until pumped from the tank.

Hydroseeding and hydromulching may occur in two applications to allow seed contact with the soil. In this event, the hydroseeding slurry will contain tackifier at 25% of the manufacturer's recommended rate and 300 pounds of wood fiber mulch to mark the seeded locations and the evenness of the application. The hydromulching will occur immediately following hydroseeding on the same day, where feasible.

Hydroseeding and hydromulching will be done from two directions (e.g., left and right or up and down), where possible, to allow for maximum coverage of the soil. Hydroseeding will be conducted at the rates specified for broadcast seeding plus any adjustment the hydroseeding company recommends based on its equipment specifications.

9.1.2 Support for Ongoing Noxious Weed and Revegetation Efforts by PP&R in Forest Park Outside of the Utility ROW

In addition to noxious weed removal and native plant landscaping within the Utility ROW, PGE proposes to provide funding for noxious weed control efforts elsewhere within the NMU and, at PP&R's discretion, other management units of Forest Park. Based on feedback from PP&R, there are as many as 75 acres of forest habitat in the NMU that are still affected by large noxious weed populations (Pers. Comm., Marshall Johnson, Ecologist with PP&R, August 21, 2024). Through PP&R's Restore Forest Park initiative, PP&R and Portland Fire and Rescue applied for and received a grant from FEMA to remove noxious weeds within 500 acres of Forest Park around the Linnton Neighborhood. Through these efforts, the City has an established team of partnering contractors and staff that are managing this ongoing weed removal, maintenance, and native revegetation effort. With additional funding from PGE, these efforts can be expanded into a portion of the estimated 75 acres of forest habitat with substantial noxious weed presence within the NMU to provide additional mitigation for the anticipated impacts to forest resources associated with the Proposed Project.

9.2 POLLINATOR SUPPORT

The Pollinator Powerline Project is a partnership of BPA, Metro, PP&R, and the Forest Park Conservancy (Blackburn and Hatfield 2020). The focus of the project encompasses 67 acres in the north end of Forest Park. Phase one (site preparation) began in May 2016 with the removal of Scotch broom. In October 2016, treatments began on Himalayan blackberry and non-native grasses. Site preparation treatments continued in 2017 and 2018. Phase two (planting) began in fall 2018, when the vegetative community was augmented with nearly 250 pounds of native wildflower and grass seed that are beneficial for bees, butterflies, and birds. Nearly 6,000 native shrubs were added in early 2019. Phase three (establishment and maintenance) began in May 2019 with focused herbicide treatments across the project area on grasses, blackberry, and Scotch broom, as well as on weeds around planted shrubs to limit moisture competition. The actions were all taken on BPA utility corridors, with PGE corridors used as control sites. Investigators found 71 taxa of flowering plants in 2020 in the treatment area and only 47 taxa in the PGE control locations. Investigators reported that, "in 2020, overall floral visitor abundance (FVA) for the BPA corridor was higher than in all previous years of monitoring (2016-2019), while the PGE corridor FVA was lower than in all other years of monitoring, except 2019. This limited evidence suggests that restoration efforts in the BPA corridor may be having a net positive effect on FVA, as abundance in the BPA corridor was higher in years that appear to have lower FVA at our reference sites in the PGE corridor" (Blackburn and Hatfield 2020).

PGE will contribute to the Pollinator Powerline Project in several ways. Maintenance of PGE transmission corridors and access roads includes mowing encroaching vegetation on the edges of the trails and treating noxious weeds. By using a robust pollinator seed list (see **Table 9**) during site restoration along access road edges, PGE intends to establish a variety of native pollinator support species. Further, through ongoing road and corridor vegetation management, PGE can influence the availability of floral resources for birds and insects by avoiding pollinator vegetation during routine edge clearing and, where

feasible, by following guidelines in the Xerces Society's *Roadside Best Management Practices that Benefit Pollinators*.

PGE will also plant native wildflower and grass seed in the newly cleared areas of the corridor, which will increase available pollen sources. Early flowering plants are crucial to help springboard pollinator populations throughout the season, particularly bumblebees, as they establish new colonies. Because some of the early season floral resources for early emerging pollinators are flowering trees and shrubs, PGE will incorporate a planting mix that will provide pollen and nectar in the "shoulder seasons" (i.e., late fall and late winter). Proposed seed plantings are provided in **Table 9** above. Proposed woody plantings are detailed in Land Use Application Exhibit G (Mitigation Site Plan).

9.3 REVEGETATION WITH FOCUS ON OAK WOODLAND

Figure 9. Oregon Oak Stand Below Taller Conifers Near BPA Road in Forest Park

PGE will work to expand Oregon white oak woodland within the proposed forest impact areas. The selective removal of native conifers is a typical element of an oak release or oak woodland establishment project. Oak woodland is an Oregon Conservation Strategy habitat due to its rapid decline over the last few centuries. Once plentiful throughout the Willamette Valley, this habitat type was supported by periodic anthropogenic burnings; however, as the practice of these burnings was largely stopped at the time of European settlement, oak woodland habitat has decreased substantially in area and condition. Establishment, enhancement, and expansion of oak woodland habitat are identified as key priorities by the Oregon Department of Fish and Wildlife (Oregon Conservation Strategy Habitat), Metro (Natural areas bond measure[1]), and the City (Desired Future Condition Report, 2021). Mature oak trees are much shorter than conifers, and a small population of oak woodland exists within and adjacent to the project area (see **Figure 9**, which is a photo of an existing oak stand southwest of the project site along the BPA Road in Forest Park). PGE proposes to expand the existing woodland in specific areas in the existing and proposed transmission corridors while still maintaining a vertical clear zone between the wires and the top of mature oak tree heights to remain consistent with PGE's vegetation management protocols (see **Figure 10**). While oaks would not be planted directly beneath the wires, the edges of the cleared corridors would be amenable to the establishment of oaks. In total, the revegetation plan calls for the planting of 386 Oregon white oak trees in the Park.

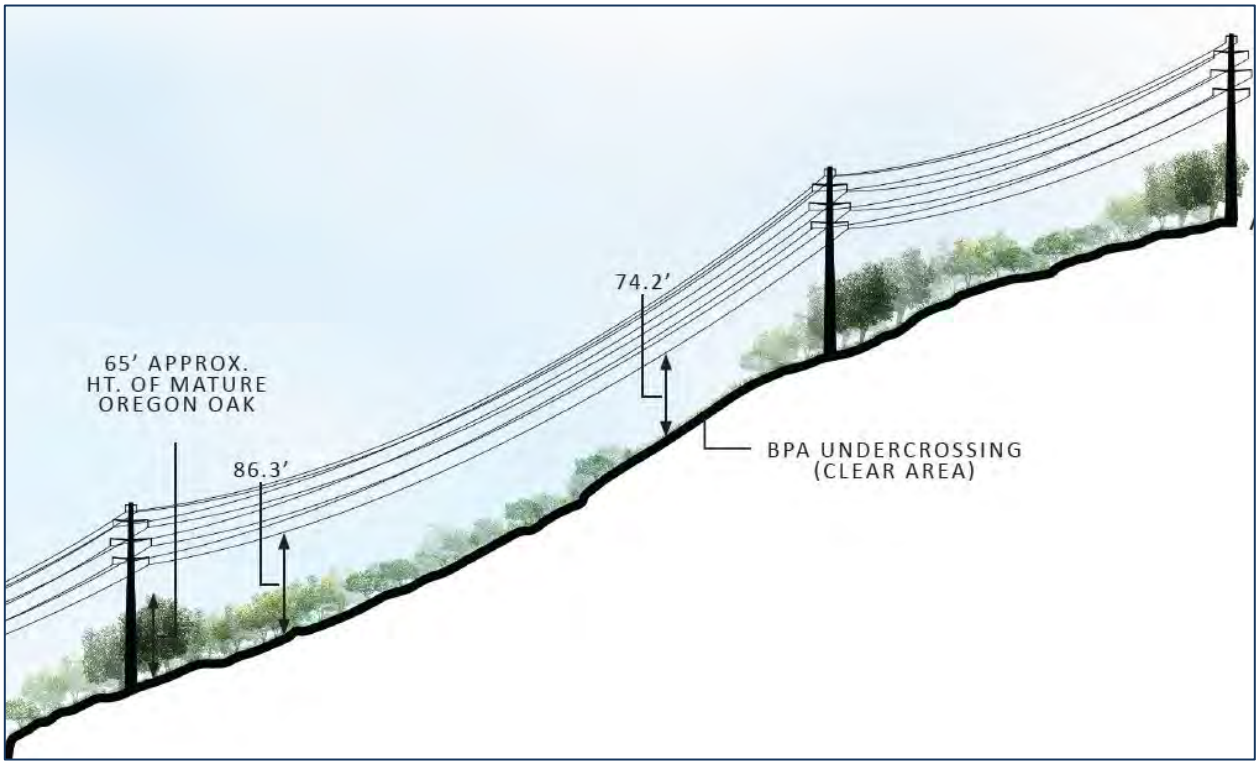
Most oak habitat restoration projects have difficulty in identifying a means of preserving the oak habitat against the long-term threat of conifer growth. Restoring and maintaining oak habitats usually requires

[1] *https://www.oregonmetro.gov/sites/default/files/2022/05/24/2019%20parks%20and%20nature%20bond%20-%20target%20area%20refinement%20plans%20-%20resolution%2022-5250.pdf.*

periodic disturbance to maintain open spaces for the slow-growing species that are intolerant to overhead canopy. Disturbances that landowners typically introduce in a controlled oak woodland establishment project include thinning/selective harvest, fire, grazing, and mowing. Due to the incompatibility of tall conifers with powerlines, PGE's transmission corridors would be managed over the long term to avoid the establishment of tall conifers through selective thinning or topping. Therefore, the management of the transmission corridor is compatible with the long-term maintenance and management requirements of a successful oak woodland expansion project. Further, ongoing assurance that the area will be maintained over the long term is inherent in PGE's requirements for vegetation management required by OPUC regulation 860-024-0016. For details on the proposed oak plantings, see the Land Use Application, Exhibit G (Mitigation Site Plan see "Planting Details and Notes" Sheets). These oak plantings would be supplemented with native shrubs associated with oak woodlands (Niemiec 1995), which include: bigleaf maple, Pacific madrone (*Arbutus menziesii*), common chokecherry (*Prunus virginiana*), California beaked hazelnut (*Corylus cornuta*), Douglas hawthorn (*Crataegus douglassii*), snowberry, serviceberry, wild roses (*Rosa nutkana and R. woodsii*), and oceanspray. The habitat would also be amended with a pollinator support seed mix (see **Table 9**).

These plantings will provide slope stability, food sources, and cover, and will increase local biodiversity and pollinator support. Oregon white oaks, in particular, support a broad diversity of native wildlife including up to 200 native species of wildlife that are endemic to oak woodlands. They capture and store more carbon than conifers, live much longer than other native deciduous trees, and provide leaf litter that is much more beneficial to soil development due to its more fibrous content. Due to these important ecosystem functions and the fact that oak habitat faces ongoing significant decline, they have been designated as a "Priority Habitat" by the Oregon Conservation Strategy (Ahr et al. 2018).

Figure 10. Conceptual Revegetation Strategy Beneath Proposed Powerlines



Additionally, PGE proposes to establish taller shrub linkages through existing and future transmission corridors. These taller shrubs would be located near the proposed poles where wire heights are tallest, as shown in **Figure 10.** These taller shrubs will be strategically arranged with taller vegetation in the adjacent BPA corridor to promote cover for wildlife migration through the transmission corridors and reduce the effects of habitat fragmentation.

9.4 AQUATIC RESOURCE ENHANCEMENT

The Proposed Project involves selective tree removals in the upper limits of Stream 1, two temporary stream crossings, and a culvert replacement. Although much of the upper headwaters are beneath the BPA St Johns transmission line, and therefore already cleared of vegetation, some minor additional tree removal would occur there as a result of the new transmission line segment between SP-3 and SP-5. In addition, because Wetlands A and B have formed where groundwater seeps onto an existing roadcut, ongoing use of the access road and the two new proposed tower foundations will require road fill and maintenance, which may alter the existing groundwater seepage source to the remaining, unfilled portions of the two wetlands.

9.4.1 Stream and Riparian Habitat Enhancement

PGE will enhance stream habitat through the installation of woody material (tree boles). The installation of large woody material can help connect the stream channel to its floodplain. During rainstorms and snow melts, large wood can act as an obstacle to flowing water, forcing high flows into the nearby floodplain along with any sediment and nutrients it may be carrying. The floodplain acts as a sponge, storing water, sediment, and nutrients while reducing the volume of water carried by the stream channel

itself. Allowing water to access the floodplain reduces flooding impacts downstream, where it may be more difficult to address high flows. Large wood present within the stream channel also slows the flow of water as it is forced to flow over and around logs. As the velocity of water is reduced, its ability to erode and carry sediment decreases as well. In combination with the riparian streambank protection plantings noted in the Land Use Application, Exhibit G (Mitigation Site Plan), the stream will contain an abundance of live and dead woody material.

This slowing and dispersing of water creates more diverse aquatic habitat niches that are beneficial to amphibians and aquatic organisms that may seasonally use the project area after construction. Exposed logs may be used as basking and perching sites for reptiles and birds, or crossing structures for small terrestrial species. Fallen trees create cover and hiding places for aquatic organisms. As water flows over and around large wood, localized scouring of the bed and banks creates pools and undercut banks that provide additional shelter and act as resting areas for fish, such as trout. Woody material in the stream, on streambanks, and in the adjacent riparian areas helps feed the aquatic food chain from the bottom up. Wood provides a surface for algae to grow on and often traps smaller sticks, leaves, and other organic material, all of which are food sources for a variety of aquatic macroinvertebrates.

In addition, PGE plans to fund a stream restoration project that would be coordinated by PP&R. An unnamed intermittent stream flows northeast across Newton Road approximately 500 feet south of the intersection of Newton and BPA roads in the Proposed Project limits. In this location Newton “Road” is an overgrown dirt and gravel trail. Rather than passing under the trail through a culvert, the stream flows over the trail, resulting in an erosive channel that has formed a head cut on the downstream side of the tail. Via PGE funding, PP&R would manage the design and construction of a crossing structure to allow for improved hydraulic conditions, reduced erosion, and separation between the stream and foot traffic on the trail.

9.4.2 Wetland Habitat Creation

To mitigate the potential loss of up to 0.068 acre of degraded wetland habitat (i.e., area of Wetland A and B combined), PGE is proposing to work with PP&R to fund the expansion and enhancement of one or more small, low-functioning wetlands near the north end of Forest Park to create breeding frog pond habitat for northern red-legged frogs and other native species. This effort would compensate for impacts to low-functioning, degraded wetlands that have formed on a roadcut and that contain noxious grass vegetation with wetlands that would contain native vegetation and could support a sensitive population of native frogs. In doing so, the ponds would provide a much more highly valued wetland habitat that can help meet regional conservation goals for the frogs. More detail on this wetland enhancement strategy is provided below in Section 9.5. Additionally, the wetland area south of PGE’s Harborton Substation contains a seasonally inundated depressional area with slow-moving water that is fed by Stream 1 within Forest Park. The wetland is largely dominated by reed canarygrass, an invasive species. PGE would enhance this wetland following any temporary access that may occur there by seeding incidental soil disturbance areas with native vegetation. Wetland mitigation will be coordinated with the Oregon DSL and the U.S. Army Corps of Engineers through state and federal wetland permitting processes, respectively.

9.5 RED-LEGGED FROG HABITAT ENHANCEMENT

Over the last several years, PP&R, in coordination with a local group of volunteers, has been monitoring water levels within various small wetlands that have formed in small depressions or along trail berms, including one wetland near the Newberry Trail entrance (near Newberry Road at the north end of the

Park) and two wetlands identified along Firelane 12, just north of the Proposed Project site. With funding, these wetlands could be expanded in area and depth, amended with a shallow aquitard, and planted with stiff emergent aquatic graminoids (grasses, rushes, and sedges) to create breeding frog pond habitat. This wetland enhancement would benefit several wetland-dependent and terrestrial species but, in particular, could benefit the population of northern red-legged frogs that migrate to and from PGE's Harborton wetland area across U.S. Highway 30 each year.

Existing wetlands in Forest Park could be enhanced to provide breeding habitat for northern red-legged frogs, precluding the need for frogs to traverse U.S. Highway 30 to reach the Harborton wetlands. In 2014, the City had wetland delineations conducted in portions of Forest Park to inform the Bureau of Environmental Services (BES) watershed planning process for Forest Park. Two wetlands (Wetlands D and E) were identified along Firelane 12, approximately 2,000 feet north of the existing PGE utility corridor (**Figure 11** shows Wetland E, which is in PGE easement near park entrance). Wetland D was 1,150 square feet in size and located upslope to the southwest from Wetland E, which was 1,090 square feet. According to the report (ESA Vigil-Agrimus 2014), Wetlands D and E were depressional wetlands along the trail. Both wetlands were "mostly" inundated with standing water during an April 15, 2014 site visit. Little emergent vegetation was present, and both were bordered by lady fern and salmonberry. On upslope areas outside the wetland boundary, big-leaf maple provided shade to approximately 80% to 100% of the wetlands.

BES staff monitored water depths in both wetlands in 2019 and 2022. Dates and water depths are provided in **Table 10**. Negative numbers indicate the subsurface depth at which water was encountered in boreholes during dryer periods.

Table 10. Water Level Monitoring Results in Wetlands D and E from City of Portland, BES (in inches)

Date	Wetland D	Wetland E
11/28/2018	7	0
12/4/2018	6.5	0
12/12/2018	8	0
12/26/2018	9	9
1/2/2019	8	11
1/9/2019	11	11.5
1/16/2019	5	9
2/6/2019	2	5
2/13/2019	15	28
2/28/2019	10	14
3/14/2019	9	10
4/3/2019	7.5	5
4/17/2019	11	9
5/1/2019	1	0
5/8/2019	0	0
5/22/2019	2.5	0
12/16/2021	11	17
2/16/2022	6	5
3/19/2022	11.25	11.5
5/31/2022	5	0
6/14/2022	Not recorded	4
6/30/2022	-7	-14
7/3/2022	-8	-17.5
7/8/2022	Not recorded	-24
7/10/2022	-11	-24
7/14/2022	Not recorded	-27
7/18/2022	-18	-32
8/1/2022	-30	-41
8/8/2022	-36	-45
8/16/2022	dry	dry

Wetland D was inundated from at least late November to mid-May 2019 with a maximum water depth of 15 inches, and from at least mid-December to early June 2022 with a maximum observed water depth of 11.25 inches. Wetland E was inundated from at least late December to mid-April 2019 and mid-December to mid-June (at least intermittently) in 2022. Wetland E was deeper, with a maximum water depth of 28 inches in 2019 and 17 inches in 2021. Red-legged frogs begin breeding in February. The water must be at least 12 inches deep, and the eggs are placed at least 3 feet from the edges (Licht 1969). Water utilized for breeding must last until the beginning of June to avoid stranding the tadpoles (Storm 1960).

DEA staff visited the wetlands on July 19, 2024. Both wetlands were dry and fully vegetated. Wetland E was dominated by false nettle and blackberry. Wetland vegetation included water parsley, lady fern, and sedges. The south side of Wetland D is more gently sloping and conducive for wetland expansion and the

northwest edge of Wetland E appears to have historically drained northwest toward a ravine and likely formed due to trail construction. Wetland soils displayed hydric features, starting near the surface.

Figure 11. Overview of a Conceptual Frog Breeding Pond Habitat Creation Site (Wetland E)

PGE proposes to fund the design, construction, maintenance, and monitoring of one or more wetland enhancement projects to create breeding frog habitat support. The wetlands would be excavated to the maximum width and depth appropriate to the site, given geographic constraints and avoidance of tree removal. Excavation depths of up to 2 feet may be necessary to achieve target ponding depths through June. To prevent water depths above the target threshold of 2 feet, an outlet can be installed at the appropriate elevation above the pond bottom to allow for overflow to exit the ponds safely during periods of intense rainfall. This outlet can prevent the pond from becoming too full of water and exerting an unacceptable level of pressure on the trail berm. If subsoils are too permeable to retain ponded water, an impermeable soil amendment, such as bentonite clay, could be added to subsoils to create a shallow aquitard. A portion of the existing soils can be retained and placed atop the aquitard and amended with organic materials to provide a 6-inch rooting medium for target pond vegetation, and thus to emulate a mature frog pond. Installed vegetation would include a mix of aquatic forbs and erect, stiff graminoids (grasses, rushes, and sedges) seeded/installed within 5 feet of the pond edges to support amphibian egg sacks.

Monitoring and adaptive management would be necessary to ensure that the pond (or ponds if more than one is constructed) retains water through mid-June. Selective pruning of the surrounding bigleaf maples is also recommended, particularly along the south side of the wetlands, to allow more sunlight into the pond. The pond may not be immediately colonized by red-legged frogs, but PP&R would continue to conduct egg mass surveys after construction. Conceptual graphics that help illustrate the proposed grading and enhancement of Wetland E (as an example project) are provided in **Figure 12** and **Figure 13**, respectively.

Figure 12. Conceptual Grading Plan for Wetland Breeding Frog Pond Habitat Creation (Wetland E)

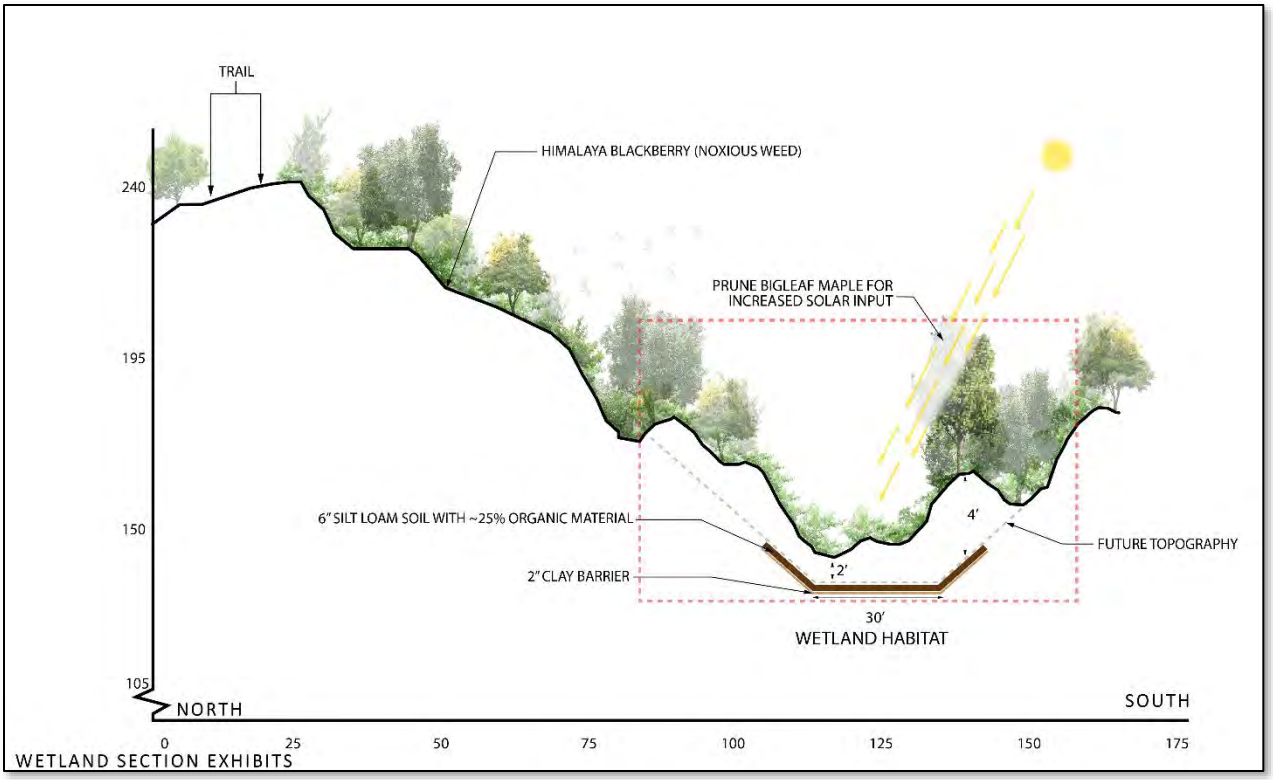
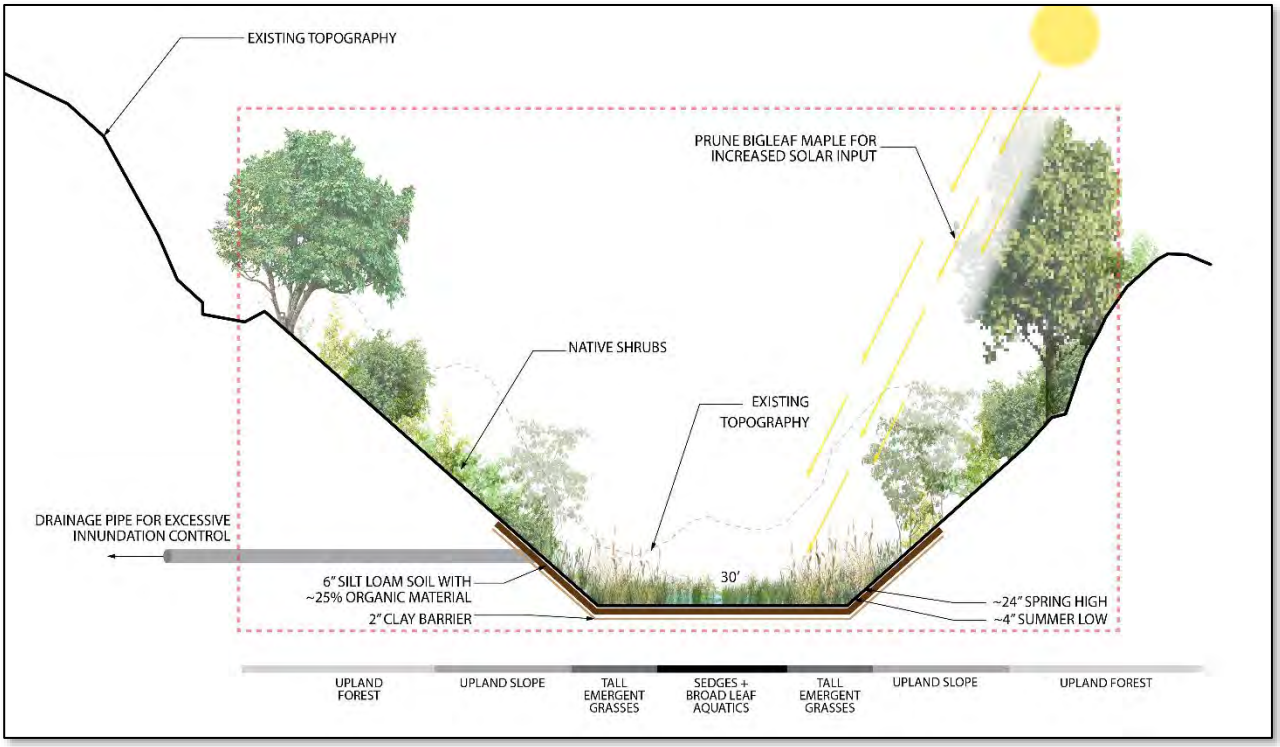


Figure 13. Conceptual Planting Plan for Breeding Frog Pond Habitat Creation (Wetland E)



The Oregon Wildlife Foundation is working with the City of Portland and local advocacy/volunteer groups to site and construct additional breeding ponds in Forest Park near the entrance to the Newberry Trail (near Newberry Road at the north end of the Park). The addition of a Firelane 12 pond would bolster this effort and place a breeding pond closer to the area where northern red-legged frogs are known to occur in Forest Park. Together, these pond creation sites would provide alternate breeding habitat for frogs within the safety of Forest Park. Given the available opportunities, PGE proposes to provide flexibility in how its funding support is used—either for breeding pond construction along Firelane 12, or at the Newberry Road pond creation site, or both. These proposed breeding habitat support projects are anticipated to result in substantial benefits for the population of northern red-legged frogs in Forest Park.

9.6 EXTERNAL TREE PLANTING

Converting the new transmission corridor area to a mix of oak woodland, riparian, and shrub habitat would provide a different assortment of functions that are highly valued; however, due to the time required for the vegetation to mature, the Proposed Project actions may leave a gap in the carbon sequestration potential for the affected site. Over time, the growth of Oregon white oaks and other native species would increase carbon sequestration in the affected area. However, to address the gap in time between the proposed tree removals and when vegetation would mature to provide a high level of carbon sequestration, PGE proposes to plant trees outside of the project area in collaboration with a conservation partner. Carbon sequestration is a regional ecosystem service tied to removal and storage of atmospheric carbon. Therefore, it is a service that can be provided outside of the Park and still benefit and compensate for tree removals proposed within the NMU of Forest Park.

In addition to filling the gap in the temporal loss of carbon sequestration, this action of planting trees outside the project area would provide many of the valued ecosystem functions and human values provided by trees, including air quality, shade, and habitat and food sources for a variety of wildlife. Further, tree planting can target the Urban Forestry Priority Service Areas in Portland, which are areas identified as urban heat islands most in need of equitable shading investment by PP&R's Urban Forestry team. A 2018 study by Portland State University found disparities between the temperatures of low-income neighborhoods with relatively high minority populations and the temperatures of higher income neighborhoods. In some cases, this disparity was as high as 10° F during a documented heat wave in 2014 (Voelkel et al. 2018).

PGE proposes to work with conservation partners to install 100 trees in portions of Portland that are underserved by the benefits of tree shading, such as areas in North Portland and East Portland identified as Priority 1 Urban Forestry Priority Service Areas by the City of Portland. Alternatively, this tree planting work could occur in coordination with PP&R at regional parks via PP&R's Tree Planting and Preservation Fund[2].

[2] Details of this fund are available online at https://www.portland.gov/code/11/15/010

9.7 MITIGATION PLAN SUMMARY

In summary, though the Proposed Project proposes removal of native conifer habitat that would result in ecological losses, there are opportunities for PGE to provide meaningful habitat enhancements that, together, would mitigate those ecological losses by introducing strategy habitat types and enhancements that benefit key conservation species and address the existing ecological prescriptions for Forest Park (PP&R 2011). Additionally, the area of mitigation would greatly surpass the area of impact to offset the time period necessary for the proposed mitigation plantings to mature (see **Table 12**).

PGE plans to accomplish the mitigation strategy presented in this plan through two primary avenues. First, within the Utility ROW, PGE will perform all site restoration and mitigation actions. Second, PGE plans to complement this site restoration work with funding for additional mitigation activities performed outside of the Utility ROW. This funding would be provided to the City via the City's Forest Park In-Lieu Fee Mitigation process, per City Ordinance 191314. PGE will partner with PP&R to fund a variety of park restoration/enhancement efforts in the NMU, several of which are described conceptually in this plan and accounted for in the mitigation summary tables (**Table 11** and **Table 12**).

Mitigation performed by PP&R outside of the Utility ROW is anticipated to include the establishment of wetlands to support northern red-legged frogs, the removal of noxious weeds, stream enhancement, and the planting of native forest habitat within the NMU of Forest Park. The combination of vegetation restoration and habitat enhancements within the Utility ROW, together with the various additional park enhancements performed by PP&R, will result in a net benefit to ecological resources over time.

Table 1011 provides a summary of existing resource functions, anticipated resource impacts, and the specific proposed mitigation measures that would compensate for those impacts to result in no net loss of ecological resource values over time.

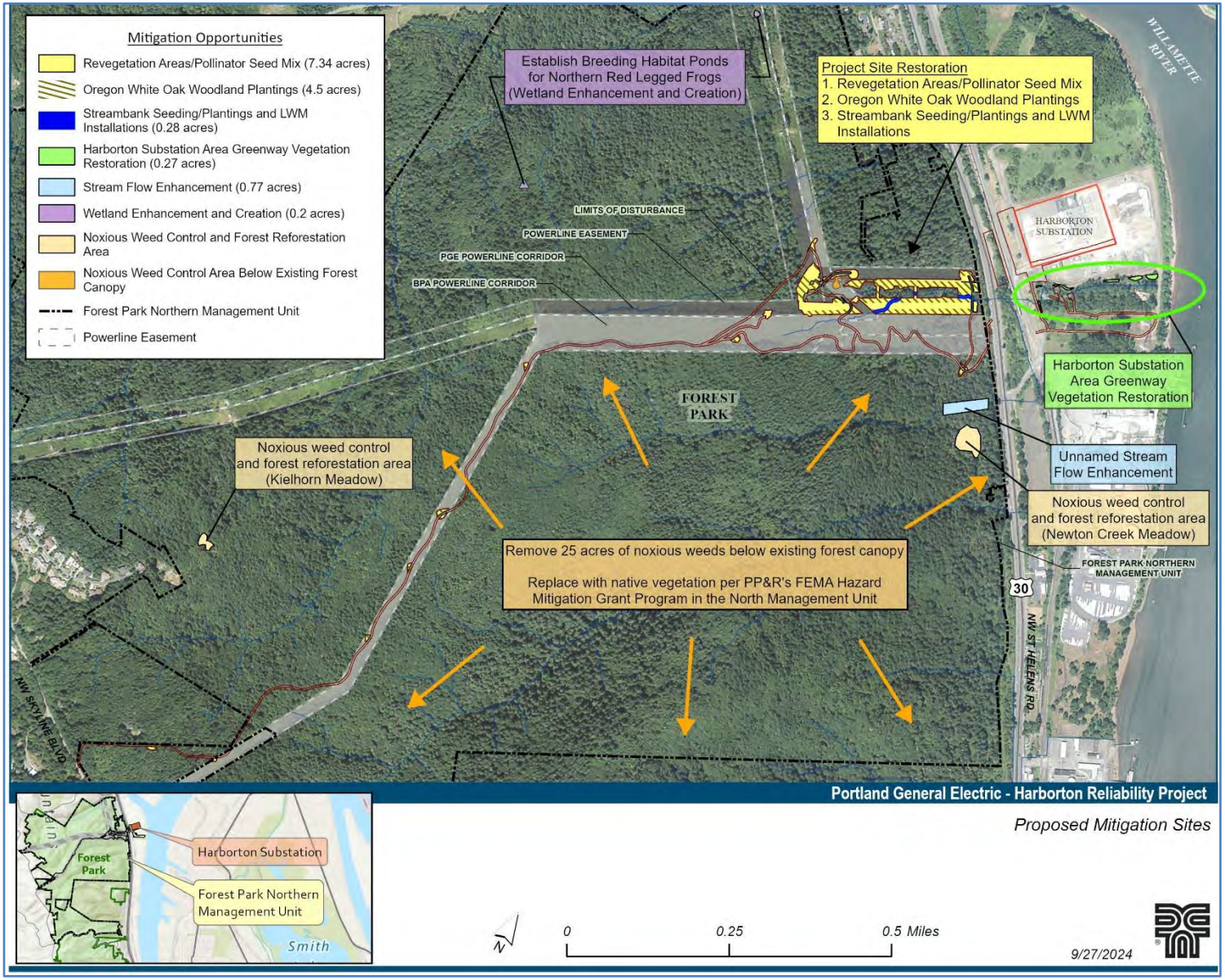
Table 1011. Summary of Proposed Mitigation Strategies for Resource Replacement in North Management Unit

Resource Function	Existing Condition	Anticipated Impacts	Proposed Mitigation
Water	Medium	• Partial loss of shade • Possible change to hydrology due to changes in evapotranspiration	• Remove noxious blackberry and ivy in riparian areas to promote robust native shrubs and short trees that can shade the water • Place felled wood in stream for grade control, pool formation, reduced incision/erosion, microclimate, shade, and habitat (avoid fine limbs that could increase fire hazards) • Replace failed culvert beneath access road to address a recreation hazard and area of erosion • Provide funding to PP&R to install culvert under Newberry Road (trail) south of Proposed Project site to minimize current erosion and a headcut beneath trail
Food	Moderately High	• Loss of food sources related to mature conifers; effect on sap suckers, etc. • Increase in fruit-bearing shrubs that are limited under dense canopy	• Expand native shrub habitat in areas of low sag (lowest point of transmission lines between poles, where trees cannot be placed) • Selectively expand oak habitat at the periphery of managed transmission corridors (increased acorn production and diversity of food sources) • Conduct noxious blackberry and ivy control, and replace with diverse native plantings

Resource Function	Existing Condition	Anticipated Impacts	Proposed Mitigation
Cover	Moderately High	• Partial loss of cover; greater area of fragmentation associated with existing transmission corridors	• Selectively remove tall conifers where necessary but retain smaller trees and shrubs in areas where transmission clearance will remain sufficient to meet reliability standards • Establish enhanced wildlife corridor "linkages" through transmission corridors by removing blackberries and installing tall native shrubs and short-stature native trees around the new poles where the wire will be highest (but not within 25 feet of poles for safety and maintenance access) • Expand oaks and shorter-stature woodland trees at the periphery of managed transmission corridors to replace cover functions and support an ecologically important and highly limited habitat type
Interspersion	High	• Interspersion will remain high	Diversify habitat types and increase interspersion to include: • Additional oak woodland • Additional native shrubs • Additional native pollinator species diversity • Enhanced riparian conditions
Uniqueness	Low	• Conifer removal will create opportunities to diversify habitat types	• Replace relatively common forest habitat type with a diversity of less typical habitat types in Forest Park, including open areas for wildlife and pollinators, shrub habitats, and oak woodland patches • Expand oak woodland habitat in support of Oregon Conservation Strategy to support up to 200 native species that are associated with oak woodland habitat
Disturbance	Medium-Low	• Existing fragmentation resulting from the 275-foot-wide linear BPA transmission line managed vegetation corridor will be expanded by approximately 100 feet in an approximately 1,400-foot-long, parallel clearing area • Taller conifer trees will be removed where they would be a risk to existing or new powerlines • Staging and construction will utilize existing roads but may require some additional construction access routes for pole construction and string pulling sites • The added transmission line will increase disturbance until alternative habitat replacement elements have time to grow and fill in the gaps in tree canopy (using shorter stature trees) and enhancements performed outside of the Utility ROW by PP&R mature to enhanced functioning habitat conditions	• Expand oak woodland habitat to compensate for lost conifer and broadleaf deciduous habitat; support Oregon Conservation Strategy • Remove noxious weeds and install native shrubs and short-statured trees within the affected area to replace cover, shade, soil stability, and habitat functions • Restore temporary disturbance areas with native species • Maintain restoration areas to promote native vegetation and diverse habitat structure • Leave 10% of the removal trees as habitat snags, downed wood, and in-stream wood • Incorporate pollinator support species in seed mixes used to restore temporary soil disturbance areas

Resource Function	Existing Condition	Anticipated Impacts	Proposed Mitigation
Recreation/ Scenery	Limited	• During construction, segments of the BPA and PGE access roads will be temporarily closed to recreation access for safety; the Wildwood Trail crossing of the BPA Road would be managed for safety • Proposed Project will not alter recreation access or routing through affected area after construction • The additional transmission line will introduce structural elements similar to those that already exist in the parallel BPA and PGE transmission corridors, and as such, it will not have a substantial effect on scenic resources • The Proposed Project will initially create improved vistas of Portland Harbor and Mt. Hood from existing access roads that traverse the project area and are frequently used as trails by the public	• After selective tall conifer tree removals, expand the existing native oak woodland habitat type that attracts unique species and will offer an interesting diversification of habitat structure and associated species that may be of interest to recreational park users
Carbon Seques-tration	Moderately High	• After construction, fewer trees will remain to actively sequester carbon • Tree roots will remain for soil stabilization and nutrients • 10% of cut trees will remain onsite to reduce the removal of sequestered carbon • Oak trees sequester carbon at high rates and younger trees sequester carbon at higher rates than mature trees due to accelerated growth, thus the carbon sequestration will increase at the site after an initial period of plant establishment	• A reliable electrical grid is necessary to support regional greenhouse gas reduction goals, which rely heavily on increased electrification; with improved grid capacity and reliability, more electrical charging infrastructure can be implemented to support public transition away from petroleum fuel sources • Although the Proposed Project will remove trees that provide carbon sequestration, new trees will be planted in the affected area and elsewhere in the City; young trees sequester more carbon than old trees and the proposed tree planting will also address areas of Portland that are “heat islands” (areas that have relatively few trees) • Several topped trees will remain as snags • Cut trees that are not retained onsite are anticipated to be used for lumber, which will continue to sequester carbon (as opposed to burning)

Figure 14. Mitigation Opportunity Areas



9.8 PROPOSED MITIGATION RATIOS

As described in this plan, PGE proposes a multifaceted mitigation approach to compensate for the anticipated negative environmental impacts resulting from 4.7 acres of permanent broadleaf deciduous and coniferous forest resource impacts (i.e., selective mature tree removal). Because there is no locally established mitigation ratio for upland forest impacts, DEA conducted a literature review to identify exemplary or recommended mitigation ratios. No well-established, general guidance was identified that would be clearly applicable to the Forest Park conditions. Much of the established literature is related to special/unique habitat types or commercial forestry operations.

To assist with setting ratios for upland forest impacts, City staff provided the West Hayden Island (WHI) Floodplain Forest Mitigation Framework (BES and OHWR 2012). This reference includes research to support a basis for establishing a mitigation framework for any future development in WHI. The island is located in the Columbia River, and the western half of it is currently dominated by bottomland deciduous floodplain wetland and upland forest habitat. The WHI framework includes proposed mitigation ratios to be used for any future development in WHI. These ratios are adjusted based on proximity of mitigation to impact area, type of proposed mitigation, and type of habitat affected. Due to the ecological significance and scarcity of floodplain forest habitat in the City of Portland, the WHI framework generally suggests fairly high mitigation ratios for impacts to floodplain forest habitat.

Based on a review of this reference and best professional judgment of the ecologists and biologists involved in the preparation of this plan, PGE proposes unique mitigation ratios for each type of mitigation proposed. For the enhancement of forest habitat, which includes the removal of noxious vegetation, maintenance of those weed infestation areas, monitoring, and eventual native understory landscaping, PGE proposes a mitigation to impact ratio of 8:1. This means that for each acre of impact, 8 acres of noxious weed removal and understory revegetation would be required. This ratio is borrowed from the WHI mitigation framework, which suggests an 8:1 ratio for enhancement of floodplain forest habitat when mitigation is provided within 5 miles of the impact site. Because mature coniferous-broadleaf deciduous forest is not as scarce as bottomland floodplain/wetland forest, this ratio is quite high when applied to the fairly common Douglas fir-bigleaf maple dominated forest habitat that would be affected by the Proposed Project. However, it is useful in demonstrating that there is an abundance of opportunity to offset the impacts of the Proposed Project on forest resources. The various mitigation ratios are presented below in **Table 12**.

For the permanent impacts to Wetland A and B that have formed on the road cut at the eastern edge of Forest Park in the project area (see **Figure 7** above), a mitigation ratio of 3:1 is proposed, consistent with the Oregon Aquatic Resource Mitigation Framework (for combined wetland creation and enhancement). The impacts to Wetland A and Wetland B would total 0.025 acre and 0.043 acre, respectively (0.68 combined). Therefore, the proposed frog pond creation/enhancement area should total at least 0.2 acre (8,886 square feet).

Table 12. Habitat Impact Acres and Proposed Compensatory Mitigation

Project Area/Activity	Impact Area (Debit Acres)	Permanent Impact?	Proposed Mitigation	Mitigation Acres	Proposed Mitigation Ratio* (credit:debit)	Resulting Mitigation Credit Acres	Remaining Mitigation Debit Acres
Existing Forest Affected to Develop Transmission Corridor	4.68	Yes	Remove noxious weeds in mature forest in NMU to allow forest regeneration and seral development (PP&R Lead)	25	8:1	3.13	1.56
			Remove noxious weeds and plant trees/shrubs in areas of NMU dominated by Himalayan blackberry and lacking a forest canopy (Newton Creek Meadow and Keilhorn Meadow areas) to provide direct compensation for tree removals (PP&R Lead)	0.75	5:1	0.02	1.54
			Improve hydraulic processes through stream enhancement on unnamed creek crossing Newton Trail (PP&R Lead)	0.05	1:3	0.15	1.39
			Construct northern red-legged frog breeding habitat ponds along/near to Firelane 12 and Newberry Rd. to support local Forest Park population (PP&R Lead)	0.204	3:1	0.07	1.32
			Establish short-stature forest habitat including large percentage of Oregon white oak; include several snags and large tree boles left on ground in fire-safe manner for habitat enhancement	4.72	3:1	1.56	-0.23
			Establish native shrub habitat beneath wires; increase biodiversity	2.56	5:1	0.26	-0.49
			Apply Native Pollinator Support Seed along road margins and areas around tower bases	0.53	10:1	0.05	-0.54
			Total Mitigation Acres	**34.49**			
			Average Mitigation Ratio (mitigation acres: impact acres)	**7.4:1**			

*Mitigation ratio = how many acres of mitigation (credit) would be necessary to compensate for an acre of impact (debit). For example, 8 acres of forest enhancement would be necessary to mitigate for 1 acre of impacted forest habitat.

Note: Mitigation Elements that PP&R would take responsibility for are highlighted green. Upon in-lieu fee funding agreement, PP&R would develop a separate document detailing its restoration strategy per City Ordinance 191314.

10. PERFORMANCE STANDARDS

Mitigation for the loss of resource values in Forest Park will be monitored to make certain that mitigation efforts are progressing well and to note when maintenance or adaptive management is necessary. Performance will be measured based on the following performance standards, which are organized by the mitigation objectives described in this plan.

Objective 1: To fully revegetate the 4.7 acres of affected mature forest area, establish a minimum of 3.5 acres of native short-stature woodland habitat and 1.2 acres of native shrub habitat. Additionally,

- **Performance Standard 1.1 (Woody Survival):** Monitoring of 5% of the revegetation areas, chosen randomly, will demonstrate that 80% of installed woody plants have survived in Years 1 and 3 after construction. Monitoring at Year 5 will show a 70% survival.
- **Performance Standard 1.2 (Areal Cover):** Monitoring for woody cover within 5% of revegetation area, chosen randomly, will show that vegetation is achieving the following areal cover targets by year after construction:
    - Year 1 – 15%
    - Year 3 – 40%
    - Year 5 – 60%

- **Performance Standard 1.3 (Oak Cover):** Monitoring conducted per standard 1.2 above will demonstrate that at least 30% of tree canopy in the medium and tall upland plant zones in Forest Park is comprised of Oregon White Oak by Year 10. Oaks spend several years establishing complex and substantial root zones prior to producing bole and foliar growth. Therefore, monitoring should be repeated at Year 10 if this standard is not met at Year 5. If met at Year 5, this performance standard should be considered successfully met.

- **Performance Standard 1.4 (Photo Monitoring):** Permanent photo monitoring points will be established at four representative locations to document various areas of the revegetation area. For five years, photos will be taken in the summer or early fall at each of these points so that vegetation progress can be tracked year to year.

Objective 2: Enhance 1 acre of roadside habitat using native species that provide pollinator support.

- **Performance Standard 2.1 (Bare Ground):** Monitoring of 5% of the roadside seeding areas, chosen intentionally in open canopy areas during the first year after construction, will demonstrate that bare ground is not to exceed the following areal cover amounts in years 1, 3, and 5 after construction:
    - Year 1 – 80%
    - Year 3 – 60%
    - Year 5 – 50%

Objective 3: Provide funding for breeding frog pond habitat (e.g., Newberry Trail Wetlands and Wetland D, and/or Wetland E along Firelane 12) design, construction, maintenance, and monitoring to create breeding frog pond habitat in Forest Park along Firelane 12 or the Newberry Trail entrance (or where PP&R determines beneficial for northern red-legged frogs in the NMU). Alternately, PP&R may elect to have PGE lead the development of one or more breeding frog habitat pond(s).

- **Performance Standard 3.1 (Demonstration of Funding)**: Upon receipt of all necessary permits from the City of Portland, PGE will provide the City with funding per the City's Forest Park In Lieu Fee Mitigation process.
- **Performance Standard 3.2 (Alternate Self-Performance Strategy**): If, alternately, PP&R chooses to have PGE lead one or more breeding frog pond habitat creation efforts at these sites, PGE must demonstrate that the intended area of pond habitat was successfully created after three years of monitoring. Additionally, by the third year after construction, water level monitoring will confirm that between 4-24 inches of surface water are available within the created ponding areas between the months of February and July (on average over the 3-year monitoring period).

Objective 4: Remove up to 0.5 acre of noxious vegetation within the project area and remove noxious weeds within at least 25 acres of forest habitat outside of the Utility ROW in coordination with PP&R via the Forest Park Mitigation In-Lieu process. After removal, maintain areas in a weed free status and replant with native vegetation after 2-3 years, and maintain for a five-year period. This includes, but is not limited to removal of the following noxious weeds in Forest Park: Himalayan blackberry, English ivy, Scotch broom, shining geranium, and holly (*Ilex aquifolium*).

- **Performance Standard 4.1**: Monitoring within 10% of the noxious weed removal area in the Utility ROW, chosen randomly, will confirm that noxious weed cover is below the following aerial cover thresholds:
    - Year 1 – 25%
    - Year 3 – 20%
    - Year 5 – 15%

Objective 5: Establish 100 trees in the City of Portland, outside of Forest Park, to offset the loss of carbon sequestration and to improve equitable shading opportunities within Portland. Where possible, work with conservation partners to establish trees in City of Portland Urban Forestry Priority Service Areas.

- **Performance Standard 5.1 (Progress Tracking)**: Track installed trees and provide summary of what was planted (and where) by the fifth year after construction of the Proposed Project; confirm planting of 100 native trees by the fifth year after construction.

11. MONITORING PLAN

PGE will continue to maintain and monitor the proposed plantings and other mitigation measures for a five-year intensive period. Following this period, PGE will continue to monitor the transmission corridors long term. Monitoring described below includes active construction monitoring, post-construction monitoring for five years, and long-term monitoring.

11.1 CONSTRUCTION MONITORING

PGE will be responsible for making sure that environmental monitoring is conducted in order to minimize impacts during construction of the Proposed Project. PGE will assign a lead Environmental Inspector (EI). The EI will be responsible for agency notifications and reporting requirements and will conduct routine meetings and maintain communications to uphold consistencies and compliance with the appropriate federal, state, and local regulations and permit requirements.

The EI, who will be on-site during active construction, will have peer status with all other activity inspectors. The EI will have authority to stop activities that violate the measures set forth in the permits and authorizations and will have the authority to order corrective action. At a minimum, the EI will be responsible for:

- Providing a single point of contact for City of Portland staff.
- Ensuring compliance with the measures set forth in environmental permits and approvals.
- Identifying, documenting, and overseeing corrective actions, as necessary, to bring an activity back into compliance.

Verifying that the limits of authorized construction work areas and locations of access roads are properly marked before vegetation removal.

- Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, or areas with special requirements along the construction work area.
- Identifying erosion/sediment control and stabilization needs in all areas.
- Determining the need for and ensuring that erosion controls are properly installed, as necessary, to prevent sediment flow into wetlands, waterbodies, sensitive areas, and onto roads. This would include evaluating controls prior to a predicted storm event whenever possible and installing additional measures as needed to control storm water and sediment.
- Inspecting and ensuring the maintenance of temporary erosion control measures at least daily in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of each rainfall of 0.5 inch or greater. The EI will record all inspections, and these inspection records will be maintained for review upon request.
- Stopping work any time that work is observed to be out of compliance with PGE's environmental protocols or permit conditions.
- Ensuring the repair of all ineffective temporary erosion control measures as soon as possible but not longer than 24 hours after identification.
- Keeping records of compliance with conditions of all environmental permits and approvals during active construction and restoration.
- Identifying areas that should be given special attention regarding stabilization and restoration after the construction phase.

During construction and restoration work, PGE also would provide additional personnel as needed to support the EI. Support personnel may include, among others: biologists, wetland scientists, soil scientists, agronomists, foresters, reclamation specialists, visual resource specialists, or geologists, who have the appropriate education, training, and expertise to effectively address the EI's concerns and responsibilities.

11.2 AS-BUILT SURVEY (YEARS 1 AND 2)

An as-built survey will be conducted to document that appropriate contours have been attained (where grading is proposed) and plantings were installed as designed. A focus of the Year 1 (interim) as-built survey will be temporary grading areas near the proposed steel pole (SP-5) because temporary slopes will remain over winter after Year 1 above SP-5. Additionally, the Year 1 survey will focus on logging areas to document removal and restoration of temporary logging roads.

Construction will commence in Year 2 to finish pole construction and final landscaping. A final as-built report will be prepared after Year 2 that will include the as-built survey, photos, and a brief synopsis of work completed including any design changes.

11.3 VEGETATION HEALTH AND SURVIVAL SURVEYS (YEARS 1 THROUGH 5)

Tree health and survival will be monitored by selecting four randomly placed sampling areas spread throughout the restoration area. Within each sample area, a baseline transect will be established, and sample transects will be established that run perpendicular to the baseline through the sample area. The sample transects will be used to measure aerial cover by tree and shrub species, area of bare soil, and area of noxious weeds. An inventory of installed shrubs will be collected within the defined sample areas, and the aggregate data from the four sample areas will be compared to the proposed plant spacing to determine survival. Individual species encountered during sampling will be noted as healthy, poor, or dead.

The BPA and PGE roads and native reseeding areas will be walked and sampled in four separate, randomly selected areas throughout the project site. Each of these four areas will include a 50-foot-long by 3.3-foot-wide herbaceous sample area along the roadsides. Within these herbaceous sample areas, a 1-meter quadrat will be placed at four equally spaced locations, starting at a randomly selected distance from the start of each sample area. At each quadrat location, the herbaceous species, cover by species, and bare ground will be recorded. The results of this woody and herbaceous vegetation monitoring will directly inform the maintenance and adaptive management strategies described in Section 12, Maintenance and Adaptive Management Plan.

11.4 PHOTO DOCUMENTATION (YEARS 1 THROUGH 5)

Fixed photo monitoring locations will be established as appropriate within the revegetation sites and in the enhanced Wetland D to document conditions within the first five years. Supplemental photos will be taken as appropriate to document enhancement and any problem areas. Well-marked metal stakes will be used to mark the fixed photo monitoring locations.

11.5 MONITORING REPORTS (YEARS 1 THROUGH 5)

Each year, following the summer and fall monitoring activities, PGE will prepare a monitoring report to document performance trajectory, areas requiring maintenance, and areas requiring an adaptive management strategy. The reports will include a summary of methods, monitoring results, conclusions, and recommendations. The reports will include figures showing monitoring areas, areas requiring improvement or maintenance, and photos taken from fixed photo monitoring locations. PGE will submit the reports to PP&R by February 15 following each monitoring year.

12. MAINTENANCE AND ADAPTIVE MANAGEMENT PLAN

12.1 ANTICIPATED MAINTENANCE ACTIONS

During the five-year maintenance and monitoring period, PGE will provide the following site maintenance:

- Noxious weed removal.
- Replanting as necessary.

- Adaptive native plant selection as necessary (if a particular species does not do well).
- Site stabilization where necessary to address incidental erosion control.
- Installation/removal of tree protection tubes as necessary.
- Plant watering during summer months as necessary.

12.2 ENTITY RESPONSIBLE FOR MAINTENANCE

Either PGE will be responsible for maintenance of the mitigation sites, or PP&R will be responsible via funding provided by PGE.

12.3 ANTICIPATED FUNDING SOURCE

PGE will include funds to cover maintenance and monitoring costs for the Proposed Project in the capital project budget associated with the transmission line improvements. These funds will cover maintenance, monitoring, and adaptive management for five years after construction. Long-term maintenance will be factored into PGE's operational environmental compliance and vegetation management responsibilities for transmission corridors in accordance with the agreements between PGE and PP&R.

12.4 ADAPTIVE MANAGEMENT PLAN

If monitoring reports indicate that restoration actions are consistently underperforming the intended levels (e.g., two years in a row with ineffective maintenance), PGE will prepare an adaptive management plan and submit it to PP&R for consideration and approval. This adaptive management plan may include the following:

- The currently planned restoration actions propose only limited watering because plants will be installed during the winter season. If summer observations show that watering is necessary, water will be delivered by water truck, and crews will water plants by hand up to once per week between June and September. This may include the setup of a temporary irrigation system that would be removed in the Fall.
- If seeded or planted species are not becoming established, they may be replaced by other native plant species.
- If herbivory is high, PGE may place additional herbivory barriers around plants. Placement of such barriers would be limited to plant species that appear to be especially susceptible to herbivory.

In addition, funding provided by PGE for general ecological restoration, fire hazard reduction, and habitat enhancement efforts associated with mitigation for short-term ecological impacts may occur outside of the NMU. This work would be managed by PP&R and the specifics of this work would be provided by PP&R in a plan, per the City's in-lieu fee mitigation program. These restoration efforts should occur as soon as possible but only after restoration activities have commenced in the NMU as planned. This priority is to limit the temporal loss of environmental resources in the NMU.

12.5 LONG-TERM SITE MANAGMENT

After the intensive 5-year maintenance and monitoring period, long-term maintenance will transition to PGE's normal vegetation management protocols. However, the habitat established in accordance with this Habitat Mitigation Plan will be managed uniquely to allow for establishment and maintenance of the oaks and other native trees and shrubs within the transmission corridor. Over time, thinning and selective limbing will be necessary for stand development and oak release. Selective limbing is not a

common practice for PGE's vegetation management crew; however, PGE is committed to this unique forestry practice as part of this mitigation proposal. In addition, PGE will continue to observe noxious weed presence within the Park and will coordinate with PP&R to see that any noxious weed infestations are addressed.

13. REFERENCES

Ahr, Nicole, Michael Ahr, Ken Bevis, and Fran Cafferata Coe. 2018. Oregon White Oak and Wildlife Tools for Family Forestland Owners.

BES and OHWR (Portland Bureau of Environmental Services and the Portland Office of Healthy Working Rivers). 2012. City of Portland West Hayden Island Forest Mitigation Framework. March 23, 2012 Framework and August 16, 2012 Addendum.

BES. 2022. Protecting Nesting Birds, Best Management Practices for Vegetation and Construction Projects. City of Portland, OR. Available online at: https://www.portland.gov/bes/documents/protecting-nesting-birds-best-management-practices-vegetation-and-construction/download.

Blackburn, M. and R. Hatfield. 2020. Pollinators In Forest Park Pollinator Monitoring In The BPA And PGE Powerline Corridors, Year 5. Xerces Society. December 2020.

BPS (Bureau of Planning Services). 1992. Northwest Hills Natural Areas Protection Plan Inventory, Analysis and Regulations for the Protection of Wetlands, Water Bodies, Fish and Wildlife Habitats, Open Space and Natural Areas. Adopted by Portland City Council July 31, 1991. Effective July 31, 1991. Ordinance No. 164517, Bureau of Planning, Portland, Oregon, March 1992.

BPS (Portland Bureau of Planning and Sustainability). 2020. ENVIRONMENTAL OVERLAY ZONE MAP CORRECTION PROJECT. VOLUME 3:Natural Resources Inventory Summary. PROPOSED DRAFT. June 2020.

BPS (Portland Bureau of Planning and Sustainability). 2022. ENVIRONMENTAL OVERLAY ZONE MAP CORRECTION PROJECT VOLUME 2, PART A1: Forest Park and Northwest District, Natural Resources Inventory and Protection Decisions (Resource Sites 1-20). May 2022. Adopted by City Council May 25, 2022. Zoning Maps and Code Changes Effective October 1, 2022. Ordinance No. 190834

Deschler, J. 2012. Forest Park Wildlife Report. December 2012. Available online at: https://www.portlandoregon.gov/parks/article/427357. Accessed on December 16, 2023.

ESA Vigil-Agrimis. 2014. Memorandum. Date June 6, 2014 to Mary Bushman, Portland BES from Maureen Raad, RLA: Forest Park Wetland Reconnaissance and Determination

Fitzgibbons. T. A. 2022. Plant Community Ecology And Ungulate Use Of Powerline Rights-Of-Way In Northern Idaho And Northwestern Montana. A thesis submitted in partial fulfillment of the requirements for the degree of Master Of Science In Natural Resource Sciences, Washington State University School of the Environment.

FPC (Forest Park Conservancy). 2013. Forest Park Conservancy and Forest Park Alliance, Greater Forest Park Conservation Initiative. R. Myers, principal author. Available online at: www.forestparkconservancy.org.

Licht, L.E. 1969. Comparative breeding behavior of the Red-Legged Frog and the Western Spotted Frog in Southwestern British Columbia. Canadian Journal of Zoology 47(6): 1287-1299.

Kellett, M.J., Maloof, J.E., Masino, S.A., Frelich, L.E., Faison, E.K., Brosi, S.L. and Foster, D.R. 2023. Forest-clearing to create early-successional habitats: Questionable benefits, significant costs. Frontiers in Forests and Global Change, 5, p. 274.

MES (Millennium Ecosystem Assessment). 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC.

Ober, Holly K. and John P. Hayes. 2008. Influence of Vegetation on Bat Use of Riparian Areas at Multiple Spatial Scales. The Journal of Wildlife Management, Volume 72, Issue 2 p. 396-404

ODFW (Oregon Department of Fish and Wildlife). 2018. Wildlife Capture, Holding, Transport and Relocation Protocols.

ODFW. 2023. Oregon Conservation Strategy. Available online at: https://oregonconservationstrategy.org/conservation-opportunity-area/forest-park/.

ORBIC (Oregon Biodiversity Information Center). 2019. Rare, Threatened and Endangered Species in Oregon. Available online at: https://inr.oregonstate.edu/sites/inr.oregonstate.edu/files/2019-rte-book.pdf.

NatureServe. 2023. NatureServe Data Explorer. Available online at: https://www.natureserve.org/. Accessed on December 19, 2023.

Niemiec S.S., G.R. Ahrens, S. Willits, and D.E. Hibbs. 1995. Hardwoods of the Pacific Northwest. Oregon State University. Forest Research Laboratory. Oregon White Oak Summary available online at: https://owic.oregonstate.edu/oregon-white-oak-quercus-garryana. Accessed on February 12, 2024.

ODF (Oregon Department of Forestry). 2021. Climate Change and Carbon Plan. Approved by the Board of Forestry, November 3, 2021. Available online at: https://www.oregon.gov/odf/forestbenefits/Documents/odf-climate-change-and-carbon-plan-draft.pdf

PP&R (Portland Parks and Recreation). 1995. Forest Park Natural Resources Management Plan. Available online at: https://www.portland.gov/parks/documents/forest-park-natural-resources-management-plan/download. Accessed October 11, 2023.

PP&R. 2011a. Forest Park Desired Future Condition, January 2011. Available online at: https://www.portlandoregon.gov/parks/article/335638. Accessed on December 19, 2023.

PP&R. 2011b. Forest Park Ecological Prescriptions, August 2011. Available online at: https://www.portland.gov/parks/documents/forest-park-ecological-prescriptions/download. Accessed on December 19, 2023.

PP&R. 2023. Natural Area Vegetation. Available online at: https://www.portlandoregon.gov/parks/39872 Forest Park Summary. Accessed on December 26, 2023.

PP&R. 2024. Urban Forestry Priority Service Areas. Available online at: https://www.portland.gov/trees/priority-service-areas. Accessed February 14, 2024.

Samara Group. 2022. Harborton Frog Crossing Project, Existing Information on Herptile Crossing Structure Projects. Prepared for the Oregon Wildlife Foundation.

Storm, R.M. 1960. Notes on the breeding biology of the Red-Legged Frog. Herpetologica 16: 251-259.

Swanson, M. 2012. Early Seral Forest in the Pacific Northwest: A Literature Review and Synthesis of Current Science. Produced under contract for: Cheryl Friesen, Science Liaison, Willamette National Forest Central Cascades Adaptive Management Partnership. 57600 McKenzie Hwy, McKenzie Bridge, OR 97413.

Swanson, M.E., Studevant, N.M., Campbell, J.L., and Donato, D.C. 2014. Biological associates of early-seral pre-forest in the Pacific Northwest. Forest Ecology and Management, 324, pp.160-171.

Swenson, J.E. and G.F. Shanks, Jr. 1979. Noteworthy records of bats from northeastern Montana. Journal of Mammalogy. 60(3): 650-652.

Trout Mountain Forestry and Moore Iacofano Goltsman, Inc. 2009. City of Portland Wildfire Readiness Assessment: Gap Analysis Report. Available online at: https://www.portlandoregon.gov/parks/article/238523. Accessed on December 22, 2023.

Temple, A. H. 2020. Wildlife Connectivity Modeling for the Northern Red-legged Frog in the Portland Metropolitan Area, Oregon. Dissertations and Theses. Paper 5432. Available online at: https://doi.org/10.15760/etd.7305.

USFWS (U.S. Fish and Wildlife Service). 2007. National Bald Eagle Management Guidelines. U.S. Department of the Interior. Washington, D.C., May 5, 2007.

USGS (U.S. Geological Survey). 2018. Gap Analysis Project (GAP), Northern Red-legged Frog (Rana aurora). U.S. Geological Survey data release available at: https://doi.org/10.5066/F7RR1WHW.

Voelkel J, Hellman D, Sakuma R, Shandas V. 2018. Assessing Vulnerability to Urban Heat: A Study of Disproportionate Heat Exposure and Access to Refuge by Socio-Demographic Status in Portland, Oregon. International Journal of Environmental Research and Public Health. 15(4):640. Available online at: https://doi.org/10.3390/ijerph15040640

WDFW (Washington Department of Fish and Wildlife). 2023. Species accounts. Yuma myotis. Available online at: https://wdfw.wa.gov/species-habitats/species/myotis-yumanensis#desc-range.