



**PORT OF PORTLAND**

# **2020 Lower Willamette River Basin Total Maximum Daily Load Progress Report**

Prepared for:  
**Oregon Department of Environmental Quality**

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## 1.0 Introduction

This Total Maximum Daily Load (TMDL) annual progress report is submitted to the Oregon Department of Environmental Quality (DEQ) as a requirement of the Willamette Basin TMDL. It presents the Port of Portland's (Port) actions in support of its TMDL Implementation Plan, which was last updated in 2019. The Implementation Plan is focused on the water temperature in the Columbia Slough, for which the Port has been named a Designated Management Agency (DMA). This report provides detail on plan elements addressing the funding of new natural resources enhancement projects in the Columbia Slough watershed and maintenance of existing mitigation and revegetation areas previously restored by the Port.

## 2.0 Columbia Slough Enhancement Projects

The Port has engaged in a collaborative planning effort (*Airport Futures*) with the City of Portland and the Portland-Vancouver metropolitan community to create an integrated development plan for Portland International Airport (PDX). As a result of this public process, the Port has entered an IGA with the City of Portland committing to completing or funding work that promotes Columbia Slough watershed health and tree canopy goals. The Airport Futures Natural Resource Program supports the Willamette River Basin TMDL objectives, the Port's obligations as a DMA, and its goal to maintain public involvement in enhancement projects moving forward. This commitment has resulted in new revegetation, water quality, and habitat enhancement projects near PDX within the Columbia Slough Watershed.

Through this program, a total of \$50,000 is available annually for watershed enhancement (escalating at 3% per year through 2035). A portion of this funding (\$20,000) is allocated specifically for increasing urban tree canopy. The remainder is used more broadly to help fund projects related to watershed health. Projects may include revegetation on the Columbia Slough, removal of invasive species, and improved hydrologic connectivity or increase summer base flow. Potential projects are reviewed and recommended by a Community Advisory Committee (CAC) made up of a diverse regional representation including stakeholders such as the City of Portland and the Columbia Slough Watershed Council. Airport Futures Natural Resources Enhancement projects that provide a temperature reduction benefit are included in the Port's TMDL Implementation Plan reporting.

### Project Selection Update

The PDX Community Advisory Committee receives annual updates on Columbia Slough enhancement projects and votes to select new projects for funding. The Port continues to work with a natural resources sub-committee of the CAC to expand the list of potential projects and refine the project selection criteria listed below.

1. Enhances shade cover or reduces temperature in support of the temperature TMDL.

2. Contribution to water quality and hydrologic improvement or habitat enhancement.
3. Community impact.
4. Consistency with other plans and regulatory requirements.
5. Accomplishes multiple objectives (multiple partners).
6. Match/leverage other resources.
7. Long-term commitment to maintenance and monitoring airport compatibility (wildlife/Part 77).
8. Enhances cold water refugia habitat.

## **2020 Projects**

### **Canopy Enhancement**

In partnership with Friends of Trees the Port provided \$25,335 and funded the following planting projects in 2020:

- 1/11/2020 Gateway Green Park, planted 167 trees
- 1/18/2020 Columbia Children's Arboretum, planted 982 trees
- 2/15/2020 Concordia, Piedmont, Vernon, Woodlawn neighborhoods, planted 150 trees
- 2/22/2020 Argay, Parkrose, Russel, Wilkes, Woodlawn Park neighborhoods, planted 100 trees
- 3/14/2020 Columbia Slough Natural Area, planted 746 trees.

Since the start of this program in 2011 nearly 9,000 trees have been planted in the watershed.

### **Watershed Enhancement**

In 2020, the Port funded two projects through the Airport Futures Natural Resource Enhancement Program that support the temperature TMDL. The following is a summary of the projects.

#### *Columbia Slough Watershed Council's (CSWC) Engineered Wetlands Project*

This project aimed to test out the feasibility of experimental floating vegetated wetland designs as a method to remediate eutrophic water bodies with a large emphasis on experiential STEM learning for Black youth of North Portland. The CSWC partnered with the non-profit Blueprint Foundation to implement this project. Blueprint's mission is to eliminate the opportunity gap for Black youth in the Portland metro area. The CSWC had 5 workshops with the students from Blueprint to design, build, implement and monitoring the floating wetlands. The project was delayed due to COVID-19, but Blueprint was able to finish building the floating wetlands with a smaller group in the fall of 2020. Four floating wetlands were constructed and installed in Whitaker Ponds.

Monitoring and data collection are ongoing.

### *Verde's Cully Community Rain Garden Project*

The original project that was funded by the Port, the Whitaker Ponds Oak Savanna Restoration and Verde Landscape Habitat Restoration Skills Development, would have restored a grass field area adjacent to the parking lot of the Whitaker Ponds Natural Area into oak savanna habitat by removing invasive species and planting native species. However, it could not be implemented because Verde's landscape program was permanently closed in April due to COVID-19.

Verde was able to identify a different project that met the Airport Futures program criteria, the Cully Community Rain Garden Project. However, this project has not been implemented yet. The program will provide downspout disconnection and rain garden construction and will be implemented in partnership with the CSWC and the Multnomah Youth Cooperative (MYC). It will initially include 8 low income households selected by Habitat for Humanity home repair program. A service agreement with the homeowner will be established for the first year which includes 3-month and 6-month site visits by the program team then it is up to the owner to maintain. The project will result in water bill discounts and will help manage stormwater in the neighborhood. The program begins in a classroom with students.

## **2021 Planned Projects**

The Port has funded two projects for 2021 through the Airport Futures Natural Resource Slough Enhancement Program that support the temperature TMDL. The following is a summary of the projects.

### **Columbia Slough Watershed Council's Stewardship Enhancement Project**

Over the next three years, this project will maximize prior investments at three existing enhanced sites. The goal is to build resilience by making them more self-sustaining through invasive species removal, native planting, habitat enhancement, reduce erosion and bank stabilization.

The project will work to develop green workforce skills by mentoring and contracting with Multnomah Youth Cooperative (MYC), Mudbone Grown, VoZ, Wisdoms of Elders, and Blueprint Foundation. Work and will include volunteer engagement with Stewardship Saturday events.

### **Audubon Backyard Habitat Certification Program on the Columbia Slough**

This project will expand previous Airport Futures funded Backyard Habitat Certification Program to new neighborhoods. It will reconnect with previous participants to plant

additional trees and will add 8 new raingarden sites. The project is designed to remove financial barriers, facilitates equitable involvement with underserved communities, and will collaborate with community organizers. Community partnerships include Verde at Helensview Habitat for Humanity as well as other community partners. The project will focus on removing invasive plants, reducing pesticide use, managing stormwater onsite, building wildlife habitat, planting native plants and trees.

### **Canopy Enhancement**

The Port has also funded Friends of Trees to conduct greenspace plantings at the Columbia Children's Arboretum, the Columbia Slough Natural Area and Gateway Green and conduct Neighborhood plantings.

## **3.0 Revegetation and Mitigation Site Management**

The Port has participated in the establishment of many native plant revegetation and mitigation sites along the Columbia Slough. As these projects mature, they will help increase the amount of shade and stormwater infiltration contributing to lower water temperature in the Columbia Slough during the critical summer months. Invasive plant species are a real threat to the health of these areas. The Port recognizes this and has made a commitment to continue management of these sites. This will ensure they provide the intended shade and habitat benefits for the Columbia Slough.

### **Management Activities**

The TMDL Implementation Plan detailing the management activities at Port's mitigation and revegetation projects is described in Table 2, Appendix B. The locations of the mitigation sites are included in Figures 1-4, Appendix C. The maps also indicate constraints impeding further revegetation (described in the Port's Implementation Plan) and give a brief project description. In 2020, approximately 20 acres were replanted and seeded.

Management activities are focused on providing the most efficient approach to protect the investment made at these sites. Sites are inspected regularly; invasive species removal or other actions are used to ensure the plantings are not impacted. The Port manages these areas based on an integrated pest management approach outlined in the Port of Portland Vegetation Management Plan for Mitigation Natural Areas, last updated in June 2020.

## **4.0 Portland Harbor Superfund Site Cleanup Program**

Portland Harbor was listed on EPA's National Priorities List (Superfund) in December 2000. Shortly after that, the Port was listed as a potentially responsible party for the Portland Harbor Superfund Site. Since that time, the Port has proactively initiated remediation and restoration efforts throughout Portland Harbor. To date the Port has



enhanced directly or purchased habitat restorations credits for approximately 13,460 linear feet of riparian habitat. Project locations are included in Appendix C.

## **2020 Work**

### **Dahl Beach**

The Port conducted compliance monitoring for Year 4 (2020) of the Dahl Beach Mitigation Project, which was implemented to provide compensatory mitigation for impacts to salmonid critical habitat incurred as a result of shoreline stabilization activities conducted during the Terminal 4 Phase I Removal Action within Wheeler Bay of the lower Willamette River in 2008. The monitoring program is intended to remain in effect for a five-year period to ensure that the site functions as designed. The year four monitoring results indicate that the site has achieved all performance standards, including vegetation, site protection, hydrology, and geomorphic and structural features.

### **Terminal 4 Bioinfiltration Projects**

Two stormwater structural source control measures (SCMs) are in the planning and design phases for construction at the Port's marine Terminal 4 facility. The stormwater SCMs are vegetated infiltration basins (bioinfiltration basins) that would be constructed to infiltrate stormwater runoff to reduce loading of polycyclic aromatic hydrocarbons (PAHs) and other pollutants to Willamette River. The two bioinfiltration basins would reduce and treat over 27 acres of stormwater runoff at Terminal 4. Oregon Department of Environmental Quality approved the preliminary engineering design (30% design level) in October 2020.

### **2021 Planned Projects**

The Terminal 4 stormwater SCMs are scheduled for permitting and construction in 2021.

## **5.0 Progress Report Conclusions**

Based on the strategy described in the September 2019 TMDL Implementation Plan, the Port will continue to meet its obligations under the Willamette Basin TMDL for temperature by continuing its investment in Columbia Slough watershed health through the Airport Futures Natural Resources Program. The Port will monitor effectiveness of these projects by documenting the status of plantings three years after the completion date. To protect the progress that has been made on the Columbia Slough, the Port will continue to monitor and maintain the mitigation/revegetation sites on its property. This will allow native canopy growth capable of increasing shade and enhanced groundwater

recharge for the Columbia Slough. Accomplishments overall and in 2020 include the following estimates;

- 20 acres of 2020 planting and seeding in existing mitigation and restoration areas,
- 356 acres of total mitigation and restoration areas,
- 2,060 linear feet of stream restoration in 2020 (McBride Slough) and
- 76,202 linear feet of total restoration projects adjacent to waterbodies.

Note, that the reported estimation of linear feet of restoration adjacent to waterbodies is less than the reported number in 2019, which was 81,449 linear feet. The decrease is due to a more accurate accounting of restored areas. The GIS quality control and assurance process in 2020 identified linear segments of restored areas were double counted in 2019.

## **6.0 Appendices**

Appendix A – TMDL Implementation Plan Tracking Matrix (Table 1)

Appendix B – Mitigation/Revegetation Site Management Activities (Table 2)

Appendix C – Mitigation/Revegetation Site Maps

Appendix D – Airport Futures Natural Resource Enhancement Projects

**Appendix A - TMDL Implementation Plan Tracking Matrix**

Table 1 TMDL Implementation Plan Tracking Matrix			POLLUTANT: Temperature				
SOURCE	STRATEGY	HOW	FISCAL ANALYSIS	MEASURE	TIMELINE	MILESTONE	STATUS
What sources of this pollutant are under your jurisdiction?	What is being done, or what will you do, to reduce and/or control pollution from this source?	Specifically, how will this be done?	What is the expected resource need? Are there existing resources budgeted? If not, where will the resources come from?	How will you quantitatively or qualitatively demonstrate successful implementation or completion of this strategy?	When do you expect it to be completed?	What intermediate goals do you expect to achieve, and by when, to know progress is being made?	Include summary and date.
1. Land use activities under the Port's jurisdiction.	a. Continued maintenance of Port-owned revegetation and mitigation sites to prevent invasive plants from impacting maturation of native plantings.	Annual inspection and maintenance of these sites.	Existing resources are budgeted annually for this work.	Annual maintenance activities for each site are recorded.	Annually.	Completion of necessary maintenance to minimize impact of invasive plants on project sites annually.	On-going. <b>*See Appendix B for work completed in 2020. Ongoing work is reported in the Annual Progress Report in Appendix B.</b>
	b. Fund Airport Futures Natural Resources Enhancement Projects that address temperature in the Columbia Slough. This funding can be used for projects on Port properties and properties not owned by the Port. The implementing agreement is the Airport Futures Natural Resources IGA between the Port and the City of Portland.	The Port is working with a broad stakeholder group to develop and implement a list of potential Columbia Slough watershed projects. Projects are selected by the Community Advisory Committee (CAC) consisting of the Port, City of Portland, Columbia Slough Watershed Council, and other stakeholders. Annually, \$30,000 is available for Slough enhancement projects and \$20,000 for canopy enhancement projects. Funding can be carried over from one year to the next to fund larger projects. Slough enhancement and canopy enhancement funding can be combined in one project if both criteria are met. Potential project completion is dependent on property owner approval and available funding.	Existing resources are budgeted for projects through 2035, with an annual 3% escalation rate.	Document the projects completed during the previous year and provide information on the projects approved for the next year.	Canopy enhancement projects in the watershed will be completed annually. New Columbia Slough enhancement projects will be completed when property owner approval and full funding can be obtained.	Development of a prioritized potential project list. Project completion (based on property owner approval).	The project list was completed in 2012 and is revisited annually to select projects and add any new projects that are identified. Implementation of available projects is on-going. All unconstrained Port revegetation sites on the Columbia Slough were addressed in 2001 and are now managed under item a. above. Future project sites will primarily be located on properties not owned by the Port. <b>All current and future projects are listed in the Appendix A maps.</b>



## Appendix B - Table 2 Port Managed Mitigation, Revegetation and Enhancement

Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020			
<i>Location Number</i>	<i>Project Name</i>	<i>Year completed</i>	<i>Maintenance Activities</i>
1	<b>Columbia Grain Revegetation Project</b>	2000	Maintenance did not occur at this site in 2020.
2	<b>Kelley Point Park Revegetation Project</b>	2000	Port managed until 2005 when City Parks took over management.
3	<b>82nd Avenue to 92nd Avenue Revegetation Project</b>	2000	Planted (bareroot/gallon) throughout the western slough area, focusing on gaps in the canopy and outside of area where landscaping starts (February). Planted species: <i>Acer macrophyllum</i> (75), <i>Cornus stolonifera</i> (150), <i>Crataegus douglasii</i> (75) and <i>Physocarpus capitatus</i> (125).
4	<b>92nd Avenue to I-205 Revegetation Project</b>	2000	Caged 150 trees along the trail for beaver protection (January). Planted (bareroot/gallon) focusing on open areas lacking canopy cover (February). Treated yellowflag iris ( <i>Iris pseudacorus</i> ) by boat along the Columbia Slough (August). Worked with the NWYC to paint and install bird nesting boxes along the trail (August). Planted species: <i>Acer macrophyllum</i> (25), <i>Crataegus douglasii</i> (25) and <i>Physocarpus capitatus</i> (25).
5	<b>Cornfoot Road West of 47th Avenue to AMC Building Revegetation Project</b>	2000	Maintenance did not occur at this site in 2020.
6	<b>PDX Port Maintenance Building Revegetation Project (Meyers Marx)</b>	2000	No Port actions in 2019; Honeywell has taken over vegetation maintenance on their leasehold
7	<b>Cornfoot Road - NE 63rd to NE 55th Avenue Revegetation Project</b>	2000	Maintenance did not occur at this site in 2020.
8	<b>North Marine Drive Overpass Revegetation Project</b>	2000	Maintenance did not occur at this site in 2020.
9	<b>Buffalo Street Revegetation Project</b>	2000	Planted throughout the area adjacent to buffalo slough at a 5x5 spacing, skipping areas where existing shrub existed from previous years plantings (February). Planted species: <i>Acer macrophyllum</i> (200), <i>Amelanchier alnifolia</i> (550), <i>Holodiscus discolor</i> (750), <i>Philadelphus lewisii</i> (300), <i>Physocarpus capitatus</i> (400), <i>Quercus garryana</i> (225), <i>Rhamnus purshiana</i> (150), <i>Spiraea douglasii</i> and <i>Tsuga heterophylla</i> (75). Brushcut dead weedy material to provide easier access for planting maintenance. Treated American pokeweed ( <i>Phytolacca americana</i> ), common groundsel ( <i>Senecio vulgaris</i> ), field mustard ( <i>Brassica rapa</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), prickly lettuce ( <i>Lactuca serriola</i> ), sowthistle ( <i>Sonchus asper</i> ), tall fescue ( <i>Festuca arundinacea</i> ) and tansy ragwort ( <i>Senecio jacobaea</i> ) (August).

Appendix B Port Managed Mitigation and Revegetation Projects

<b>Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020</b>			
<b>Location Number</b>	<b>Project Name</b>	<b>Year completed</b>	<b>Maintenance Activities</b>
10	<b>Elrod Road Revegetation Project</b>	2000	Interplanted through areas planted in previous years to supplement loss and boost diversity. Covered more open areas at eastern portion of site (previously unplanted) (February). Species planted: <i>Acer circinatum</i> (200), <i>Holodiscus discolor</i> (400), <i>Philadelphus lewisii</i> (400), <i>Quercus garryana</i> (75) and <i>Tsuga heterophylla</i> (125). Treated Fuller's teasel ( <i>Dipsacus fullonum</i> ), bull thistle ( <i>Cirsium vulgare</i> ) and Canada thistle ( <i>Cirsium arvense</i> ) in areas that were planted (July). Circle sprayed plantings and treated blackberry ( <i>Rubus armeniacus</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), black nightshade ( <i>Solanum nigrum</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and velvet grass ( <i>Holcus lanatus</i> ) throughout the planting area.
11	<b>Alderwood Slough Revegetation Project</b>	2000	Treated English ivy ( <i>Hedera helix</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), black nightshade ( <i>Solanum nigrum</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), tansy ragwort ( <i>Senecio jacobaea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (July).
12	<b>Alderwood Corner Revegetation Project</b>	2000	Treated Himalayan blackberry ( <i>Rubus armeniacus</i> ), bull thistle ( <i>Cirsium vulgare</i> ) and reed canarygrass ( <i>Phalaris arundinacea</i> ) throughout the site (July).
13	<b>Rail Bridge to North Slough Revegetation Project</b>	2001	Maintenance did not occur at this site in 2020.
14	<b>Trail South of Railroad Bridge Revegetation Project</b>	2002	Maintenance did not occur at this site in 2020.
15	<b>Rivergate Bridges Banks Revegetation Project</b>	2002	Planted (bareroot/gallon) open areas along slough on either side of beaver channel. Installed <i>Ceanothus cuneatus</i> on sandy slopes near bee boxes (February). Species planted: <i>Philadelphus lewisii</i> (100), <i>Physocarpus capitatus</i> (100), <i>Rubus parviflorus</i> (100) and <i>Rubus spectabilis</i> (100).
16	<b>Bonneville Pond Revegetation Project</b>	2006	This site is no longer actively inspected or maintained.
17	<b>92nd Avenue to I-205 Bank Stabilization/ Revegetation Project</b>	2003	Caged 150 trees along the trail for beaver protection (January). Planted (bareroot/gallon) focusing on open areas lacking canopy cover (February). Treated yellowflag iris ( <i>Iris pseudacorus</i> ) by boat along the Columbia Slough (August). Worked with the NWYC to paint and install bird nesting boxes along the trail (August). Planted species: <i>Acer macrophyllum</i> (25), <i>Crataegus douglasii</i> (25) and <i>Physocarpus capitatus</i> (25).
18	<b>Buffalo Street Mitigation Site</b>	1994 & 2003	Planted throughout the area adjacent to buffalo slough at a 5x5 spacing, skipping areas where existing shrub existed from previous years plantings (February). Planted species: <i>Acer macrophyllum</i> (200), <i>Amelanchier alnifolia</i> (550), <i>Holodiscus discolor</i> (750), <i>Philadelphus lewisii</i> (300), <i>Physocarpus capitatus</i> (400), <i>Quercus garryana</i> (225), <i>Rhamnus purshiana</i> (150), <i>Spiraea douglasii</i> and <i>Tsuga heterophylla</i> (75). Brushcut dead weedy material to provide easier access for planting maintenance. Treated American pokeweed ( <i>Phytolacca americana</i> ), common groundsel ( <i>Senecio vulgaris</i> ), field mustard ( <i>Brassica rapa</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), prickly lettuce ( <i>Lactuca serriola</i> ), sowthistle ( <i>Sonchus asper</i> ), tall fescue ( <i>Festuca arundinacea</i> ) and tansy ragwort ( <i>Senecio jacobaea</i> ) (August).
20	<b>Elrod Road Mitigation Site</b>	1994	Interplanted through areas planted in previous years to supplement loss and boost diversity. Covered more open areas at eastern portion of site (previously unplanted) (February). Species planted: <i>Acer circinatum</i> (200), <i>Holodiscus discolor</i> (400), <i>Philadelphus lewisii</i> (400), <i>Quercus garryana</i> (75) and <i>Tsuga heterophylla</i> (125). Treated Fuller's teasel ( <i>Dipsacus fullonum</i> ), bull thistle ( <i>Cirsium vulgare</i> ) and Canada thistle ( <i>Cirsium arvense</i> ) in areas that were planted (July). Circle sprayed plantings and treated blackberry ( <i>Rubus armeniacus</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), black nightshade ( <i>Solanum nigrum</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and velvet grass ( <i>Holcus lanatus</i> ) throughout the planting area.

Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020			
Location Number	Project Name	Year completed	Maintenance Activities
21	Terminal 5 Powerline and West Wye Mitigation Sites	1995-2001	<b>T5 Powerline:</b> Planted lower bench, between large lupine patches, and avoiding areas underneath powerlines near turtle pond. Put some cherries on upper bench east of turtle pond. Scattered some <i>Ceanothus cuneatus</i> in open sandy area between powerlines, west of turtle pond (February). Species planted: <i>Philadelphus lewisii</i> (150), <i>Prunus virginiana</i> (300) and <i>Sambucus cerulea</i> (150). Treated bird's-foot trefoil ( <i>Lotus corniculatus</i> ), field mustard ( <i>Brassica rapa</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), bull thistle ( <i>Cirsium vulgare</i> ) and Canada thistle ( <i>Cirsium arvense</i> ) (August). Dead headed RCG and thistle (August). Planted collected SPDO (150) COSE (75) Salix (525) at edges of Turtle Pond (November). <b>West Wye:</b> Planted area that was disturbed from an unauthorized vehicle and tractor. Supplemented plantings with <i>Ceanothus cuneatus</i> along old access road just north of cottonwood forest (February). Species planted: <i>Carex obnupta</i> (plug) (100), <i>Philadelphus lewisii</i> (50), <i>Prunus virginiana</i> (200) and <i>Sambucus cerulea</i> (50). Treated reed canarygrass ( <i>Phalaris arundinacea</i> ). Dead headed and bagged RCG/Bull thistle (August).
22	Swan Island Boat Ramp Mitigation Project	1999	Maintenance did not occur at this site in 2020.
23	Vanport Wetlands Mitigation Site	2000-06	Planted the north wetland edge (flowering shrubs/pollinator habitat) - focused on open areas outside of tree line, east of access road. Planted shrubs through areas with existing canopy cover in North wetland edge planting area. Planted open area adjacent to the north channel with leftover plants. Put some of the remaining shrubs through northern forested area with good cottonwood canopy. Planted through gaps in the forest with cedar, ash and maple. Interplanted through previously planted areas with cedar and maple to increase diversity along northern wetland edge. Installed swamp rose (replacement) in areas where willow stakes were not already installed. Planted open SE field at a 5x5 density, avoiding areas with existing plant clusters. Put wetter species around wetland edge (February and March). Species planted: <i>Acer macrophyllum</i> (200), <i>Crataegus douglasii</i> (750), <i>Fraxinus latifolia</i> (325), <i>Lonicera involucrata</i> (600), <i>Mahonia aquifolium</i> (100), <i>Oemleria cerasiformis</i> (600), <i>Physocarpus capitatus</i> (800), <i>Rhamnus purshiana</i> (1000), <i>Rosa pisocarpa</i> (600), <i>Rubus parviflorus</i> (200), <i>Rubus spectabilis</i> (300), <i>Salix fluviatilis</i> (400), <i>Salix lasiandra</i> (600), <i>Salix sitchensis</i> (900), <i>Sambucus cerulea</i> (400), <i>Sambucus racemosa</i> (1600), <i>Symphoricarpos albus</i> (500) and <i>Thuja plicata</i> (425). Treated American pokeweed ( <i>Phytolacca americana</i> ), hedge bindweed ( <i>Calystegia sepium</i> ), field mustard ( <i>Brassica rapa</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), black nightshade ( <i>Solanum nigrum</i> ), orchard grass ( <i>dactylis glomerata</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), poison hemlock ( <i>Conium maculatum</i> ), prickly lettuce ( <i>Lactuca serriola</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), sowthistle ( <i>Sonchus asper</i> ), tall fescue ( <i>Festuca arundinacea</i> ), tall oatgrass ( <i>Arrhenatherum elatius</i> ), common tansy ( <i>Tanacetum vulgare</i> ), tansy ragwort ( <i>Senecio jacobaea</i> ), bull thistle ( <i>Cirsium vulgare</i> ), Canada thistle ( <i>Cirsium arvense</i> ), velvet grass ( <i>Holcus lanatus</i> ) throughout the site. ATV broadcast treated Himalayan blackberry ( <i>Rubus armeniacus</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), common mullein ( <i>Verbascum thapsus</i> ), moth mullein ( <i>Verbascum blattaria</i> ), orchard grass ( <i>dactylis glomerata</i> ), perennial ryegrass ( <i>Lolium perenne</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), tall fescue ( <i>Festuca arundinacea</i> ), tall oatgrass ( <i>Arrhenatherum elatius</i> ), bull thistle ( <i>Cirsium vulgare</i> ), Canada thistle ( <i>Cirsium arvense</i> ) and velvet grass ( <i>Holcus lanatus</i> ) throughout the site (June, July, September, October).
24	Rivergate Enhancement - North and South Slough Mitigation Site	2003	Planted (bareroot/gallon) open areas along slough on either side of beaver channel. Installed <i>Ceanothus cuneatus</i> on sandy slopes near bee boxes (February). Species planted: <i>Philadelphus lewisii</i> (100), <i>Physocarpus capitatus</i> (100), <i>Rubus parviflorus</i> (100) and <i>Rubus spectabilis</i> (100).

Appendix B Port Managed Mitigation and Revegetation Projects

<b>Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020</b>			
<b>Location Number</b>	<b>Project Name</b>	<b>Year completed</b>	<b>Maintenance Activities</b>
25	<b>Rivergate Enhancement - Leadbetter Peninsula Mitigation Site</b>	2003	Hand cut (brush) and Spot treated (backpack): bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), parrot feather watermilfoil ( <i>Myriophyllum aquaticum</i> ), pennyroyal ( <i>Mentha pulegium</i> ), sowthistle ( <i>Sonchus asper</i> ), Canada thistle ( <i>Cirsium arvense</i> ) and white waterlily ( <i>Nymphaea odorata</i> ) (July-August). Treated barnyardgrass ( <i>Echinochloa crus-galli</i> ), bird's-foot trefoil ( <i>Lotus corniculatus</i> ), creeping Jenny ( <i>Lysimachia nummularia</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), meadow foxtail ( <i>Alopecurus pratensis</i> ), black nightshade ( <i>Solanum nigrum</i> ), pennyroyal ( <i>Mentha pulegium</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), tansy ragwort ( <i>Senecio jacobaea</i> ), bull thistle ( <i>Cirsium vulgare</i> ) and Canada thistle ( <i>Cirsium arvense</i> ) (October). Collected and installed Salix (375) and COSE (75) along the edge of the new RCG restoration planting area (November).
26a	<b>Rivergate Enhancement - Ramsey</b>	2004	Planted "gourd island" at 5x5 spacing. Focused willows along shorelines and skipped areas with existing plants. Planted all open areas of north island. Planted open area in middle at very low density to allow seed mix to germinate and thrive, while providing some structural diversity. Planted through open areas of the NE shoreline at a 5x5 density, focusing drier species up high and willows along shoreline where they didn't already exist (February and March). Species planted: <i>Cornus stolonifera</i> (50), <i>Fraxinus latifolia</i> (250), <i>Physocarpus capitatus</i> (250), <i>Rhamnus purshiana</i> (200), <i>Rubus parviflorus</i> (100), <i>Salix hookeriana</i> (200), <i>Salix scouleriana</i> (900), <i>Salix sitchensis</i> (700), <i>Spiraea douglasii</i> (600) and <i>Symphoricarpos albus</i> (400). Planted some <i>Ceanothus cuneatus</i> (50) through sandy areas of western fence line area. Cut back/hand pulled Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), common mullein ( <i>Verbascum thapsus</i> ), poison hemlock ( <i>Conium maculatum</i> ) and reed canarygrass ( <i>Phalaris arundinacea</i> ) (June). Treated invasive species throughout the site: barnyardgrass ( <i>Echinochloa crus-galli</i> ), bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (July). Treated invasive species throughout the site: bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (August and October).
26b	<b>Ramsey Lake Mitigation Site</b>	1988	Planted "gourd island" at 5x5 spacing. Focused willows along shorelines and skipped areas with existing plants. Planted all open areas of north island. Planted open area in middle at very low density to allow seed mix to germinate and thrive, while providing some structural diversity. Planted through open areas of the NE shoreline at a 5x5 density, focusing drier species up high and willows along shoreline where they didn't already exist (February and March). Species planted: <i>Cornus stolonifera</i> (50), <i>Fraxinus latifolia</i> (250), <i>Physocarpus capitatus</i> (250), <i>Rhamnus purshiana</i> (200), <i>Rubus parviflorus</i> (100), <i>Salix hookeriana</i> (200), <i>Salix scouleriana</i> (900), <i>Salix sitchensis</i> (700), <i>Spiraea douglasii</i> (600) and <i>Symphoricarpos albus</i> (400). Planted some <i>Ceanothus cuneatus</i> (50) through sandy areas of western fence line area. Cut back/hand pulled Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), common mullein ( <i>Verbascum thapsus</i> ), poison hemlock ( <i>Conium maculatum</i> ) and reed canarygrass ( <i>Phalaris arundinacea</i> ) (June). Treated invasive species throughout the site: barnyardgrass ( <i>Echinochloa crus-galli</i> ), bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (July). Treated invasive species throughout the site: bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (August and October).
27	<b>Rivergate Enhancement - Culvert Removal and Visual Buffer</b>	2004	Planted "gourd island" at 5x5 spacing. Focused willows along shorelines and skipped areas with existing plants. Planted all open areas of north island. Planted open area in middle at very low density to allow seed mix to germinate and thrive, while providing some structural diversity. Planted through open areas of the NE shoreline at a 5x5 density, focusing drier species up high and willows along shoreline where they didn't already exist (February and March). Species planted: <i>Cornus stolonifera</i> (50), <i>Fraxinus latifolia</i> (250), <i>Physocarpus capitatus</i> (250), <i>Rhamnus purshiana</i> (200), <i>Rubus parviflorus</i> (100), <i>Salix hookeriana</i> (200), <i>Salix scouleriana</i> (900), <i>Salix sitchensis</i> (700), <i>Spiraea douglasii</i> (600) and <i>Symphoricarpos albus</i> (400). Planted some <i>Ceanothus cuneatus</i> (50) through sandy areas of western fence line area. Cut back/hand pulled Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), common mullein ( <i>Verbascum thapsus</i> ), poison hemlock ( <i>Conium maculatum</i> ) and reed canarygrass ( <i>Phalaris arundinacea</i> ) (June). Treated invasive species throughout the site: barnyardgrass ( <i>Echinochloa crus-galli</i> ), bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (July). Treated invasive species throughout the site: bird's-foot trefoil ( <i>Lotus corniculatus</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Ludwigia ( <i>Ludwigia peploides</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), pennyroyal ( <i>Mentha pulegium</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ) and bull thistle ( <i>Cirsium vulgare</i> ) (August and October).
28	<b>Rivergate Enhancement - 40-Mile Loop Trail Mitigation Site</b>	2004	Cut vegetation along path to allow for work vehicle to pass (November).
29	<b>PIC E Zone Mitigation Site</b>	2000-02	Maintenance did not occur at this site in 2020.
30	<b>Terminal 4, Berth 408</b>	2001-02	Periodically maintained by Port Marine Maintenance.
31	<b>Terminal 4, Pier 2, Rail Yard Improvements (Willamette Greenway)</b>	2007	Periodically maintained by Port Marine Maintenance.
32	<b>Terminal 4, Toyota Riverbank Restoration Project</b>	2003	Periodically maintained by Port Marine Maintenance.
33	<b>Terminal 5, Berth 503 Bank Stabilization/ Revegetation Project</b>	1997-2001	Periodically maintained by Port Marine Maintenance.
34	<b>Terminal 4, Berth 401 Riverbank Rehabilitation Project</b>	2000	Periodically maintained by Port Marine Maintenance.
35	<b>Terminal 4, Slip 3 Remediation and</b>	2004	Periodically maintained by Port Marine Maintenance.



Appendix B Port Managed Mitigation and Revegetation Projects

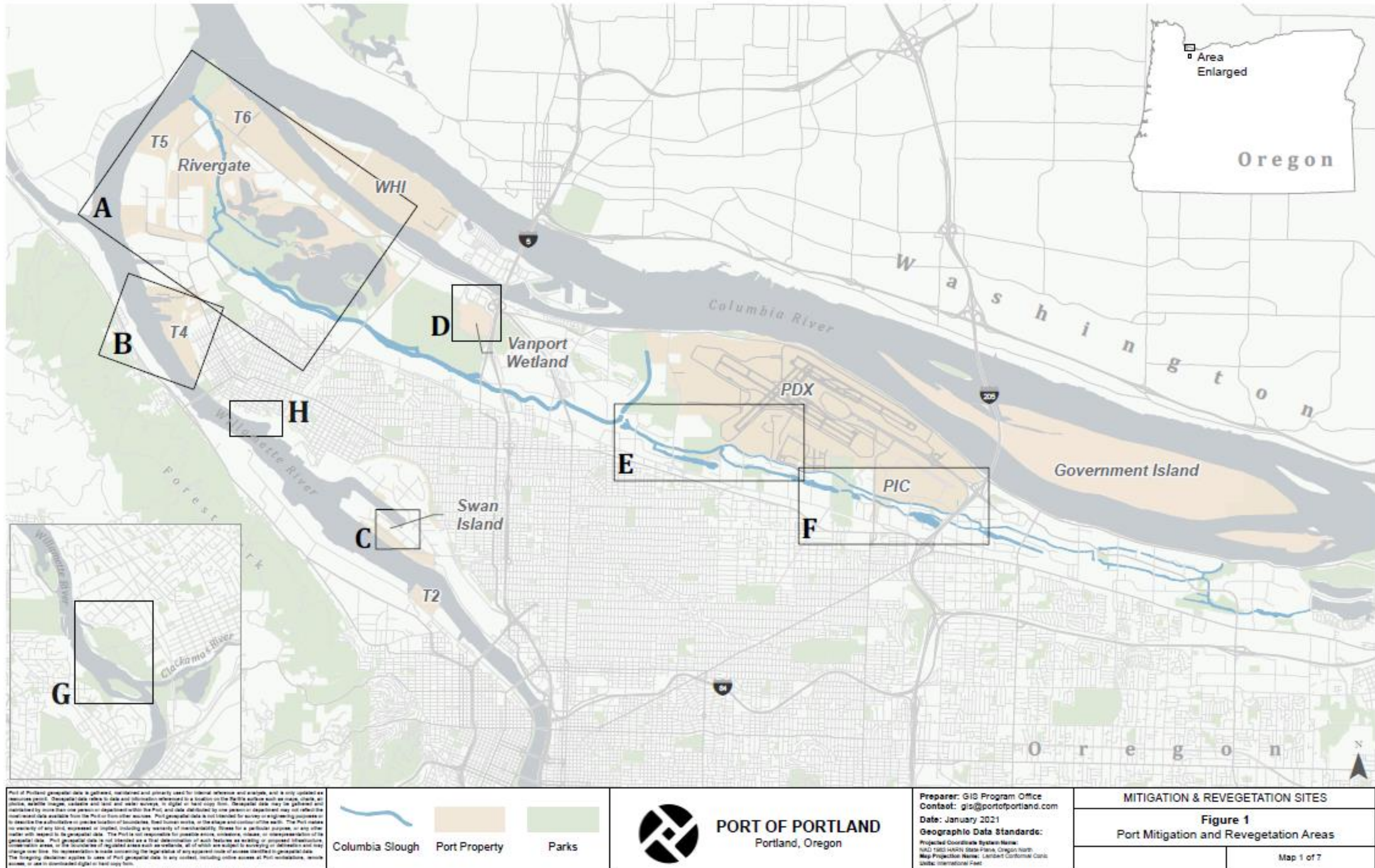
<b>Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020</b>			
<b>Location Number</b>	<b>Project Name</b>	<b>Year completed</b>	<b>Maintenance Activities</b>
	<b>Revegetation Project</b>		
36	<b>T-5 Greenway Planting Revegetation Project</b>	2002	Periodically maintained by Port Marine Maintenance.
37	<b>Force Avenue</b>	2009	Site was mowed
38	<b>Dahl Beach</b>	2016	Interplanted with <i>Holodiscus discolor</i> (25), <i>Mahonia aquifolium</i> (25), <i>Psuedotsuga menziesii</i> (25) and <i>Sambucus racemosa</i> (25) (March). Treated bird's-foot trefoil ( <i>Lotus corniculatus</i> ), black locust ( <i>Robinia pseudoacacia</i> ), butterflybush ( <i>Buddleja davidii</i> ), chicory ( <i>Cichorium intybus</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), Japanese knotweed ( <i>Polygonum cuspidatum</i> ), common mullein ( <i>Verbascum thapsus</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), oxeye daisy ( <i>Leucanthemum vulgare</i> ), pennyroyal ( <i>Mentha pulegium</i> ), prickly lettuce ( <i>Lactuca serriola</i> ), purple loosestrife ( <i>Lythrum salicaria</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), common tansy ( <i>Tanacetum vulgare</i> ), bull thistle ( <i>Cirsium vulgare</i> ), butterflybush ( <i>Buddleja davidii</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ) and tree-of-heaven ( <i>Ailanthus altissima</i> ) (July). Watered the site in August and September.
39	<b>Swan Island Enhancement Project</b>	2017	As a result of the riverbank inspection completed the end of 2019, several trees were re-staked and blackberries in the enhancement area in 2020. The 2020 riverbank inspection was recently completed, and as a result several more trees will be re-staked and blackberries removed in the enhancement area in 2021.
40	<b>Rinearson Creek/Meldrum Bar Park Restoration Project</b>	2018	Project completed in 2018. Ongoing maintenance and long-term oversight are provided by the Portland Harbor Trustee Council
41	<b>Linnton Mitigation Bank</b>	2019	Most construction was completed in 2019. Revegetation and planting were completed in the spring of 2020. The project will be monitored for at least 10 years, with ongoing oversight from the Trustee Council. After that, long-term stewardship of the site will begin, ensuring restoration benefits in perpetuity.
42	<b>T4 Infiltration</b>	2020	This project is currently in the design process.
43	<b>Willamette Cove</b>	2023	No work until 2023.
44	<b>82nd Avenue Oak Woodland Planting</b>	2019/2020	Area sprayed for nonnative species in preparation for planting. 43 oak trees planted in February. Trees mulched around bases. Grass mowed. Trees watered every 2 weeks during the summer dry period.
45	<b>McBride Slough</b>	2019/2020	Planted <i>Acer circinatum</i> (500), <i>Cornus stolonifera</i> (600), <i>Physocarpus capitatus</i> (500), <i>Ribes sanguineum</i> (200) and <i>Spiraea douglasii</i> (900) along the slough edges (February). Planted 500 more shrubs (200 <i>Spiraea douglasii</i> , 100 <i>Physocarpus capitatus</i> and 200 <i>Cornus stolonifera</i> ) in the mitigation area on SW portion and around culvert (March). Treated field bindweed ( <i>Convolvulus arvensis</i> ), Fuller's teasel ( <i>Dipsacus fullonum</i> ), Himalayan blackberry ( <i>Rubus armeniacus</i> ), common mullein ( <i>Verbascum thapsus</i> ), climbing nightshade ( <i>Solanum dulcamara</i> ), poison hemlock ( <i>Conium maculatum</i> ), prickly lettuce ( <i>Lactuca serriola</i> ), reed canarygrass ( <i>Phalaris arundinacea</i> ), tall oatgrass ( <i>Arrhenatherum elatius</i> ) and Canada thistle ( <i>Cirsium arvense</i> ) throughout the planting areas (June).
46	<b>Wheeler Bay Bank Stabilization Project</b>	2008	Maintenance did not occur at this site in 2020.
47	<b>PDX Economy Lot E-zone Conversion Project</b>	2013	Maintenance did not occur at this site in 2020.

Appendix B Port Managed Mitigation and Revegetation Projects

<b>Table 1 Port Managed Mitigation, Revegetation and Enhancement Projects - 2020</b>			
<b><i>Location Number</i></b>	<b><i>Project Name</i></b>	<b><i>Year completed</i></b>	<b><i>Maintenance Activities</i></b>
48	<b>PIC Wetland Enhancement</b>	2017	Planted "wetter" species in southern portion, "drier" species in northern portions of phase 1 (February, March). Species planted: Amelanchier alnifolia (650), Cornus stolonifera (200), Holodiscus discolor (150), Lonicera involucrata (100), Physocarpus capitatus (200), Rhamnus purshiana (150), Ribes sanguineum (200), Rosa pisocarpa (200) and Spiraea douglasii (200). Dead headed Teasel, RCG and Bull Thistle (July). Hand cut common groundsel (Senecio vulgaris), field mustard (Brassica rapa), Fuller's teasel (Dipsacus fullonum), common mullein (Verbascum thapsus), moth mullein (Verbascum blattaria), perennial ryegrass (Lolium perenne), prickly lettuce (Lactuca serriola), tansy ragwort (Senecio jacobaea), bull thistle (Cirsium vulgare), Canada thistle (Cirsium arvense) and milk thistle (Silybum marianum).



# Appendix C - Mitigation/Revegetation Area Overview Map



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- 1. Columbia Grain Revegetation Project, 2000:** Revegetated south bank of the Columbia Slough from the mouth of the Willamette River to the Union Pacific rail line (3 ac, 1,050 LF, 100' wide).
- 8. N Marine Dr Overpass Revveg Project, 2000:** Currently maintains abutment from base of slope to top of bank (0.2 ac).
- 13. Rail Bridge to North Slough, 2001-02:** Revegetated from top of bank landward to the Leadbetter slope on north side of Slough (30 ac). 2002-03: Revegetated adjacent to the 40 mile loop trail (5,274 LF).
- 21. Terminal 5, Powerline and West Wye Mitigation Sites, 1995:** Restored wetlands in a corridor connecting the Willamette River to Smith and Bybee wetlands (10.5 ac). 2002: Installed an additional 205 native plants in the Willamette Greenway (1.3 ac).
- 24. Rivergate Enhancement - North and South Slough Mitigation Site 2002-2004:** Removed invasive species and revegetated area from top of bank to ordinary high water (4.5 ac). Constructed 800 ft bioswale and established riparian forest (5.21 ac), scrub-shrub (3.56 ac), and emergent habitat (0.53 ac) (3,297 LF).
- 25. Rivergate Enhancement - Leadbetter Peninsula Mitigation Site, 2003:** Construction of 1,500 ft of 10-foot wide bioswale; establishment of 4.28 acres of riparian forest, 1.46 acres of scrub-shrub community, 8.69 acres of emergent habitat, and incorporated LWD within the emergent community (3,381 LF).
- 26. Ramsey Lake Mitigation Site, 1988:** Created three separate ponds totaling 16 acres of surface area. Fringe and upland areas were planted with native vegetation. 2004: Constructed 2,000 ft of swales connected to the Slough at both ends, established (8.04 ac) riparian forest and (1.3 ac) grassland habitat. Removed culvert and performed associated work to stabilize, replant, and re-establish proper hydrology.
- 28. Rivergate Enhancement - 40-Mile Loop Trail Mitigation Site, 2004:** Established forested wetland, removed invasive species.
- 33. Terminal 5, Berth 503 Bank Stabilization/Revegetation Project, 1997-2001:** Reconstructed and revegetated Willamette River bank, beaver protection installed and supplemental plantings in 2000 and 2002 (476 LF).

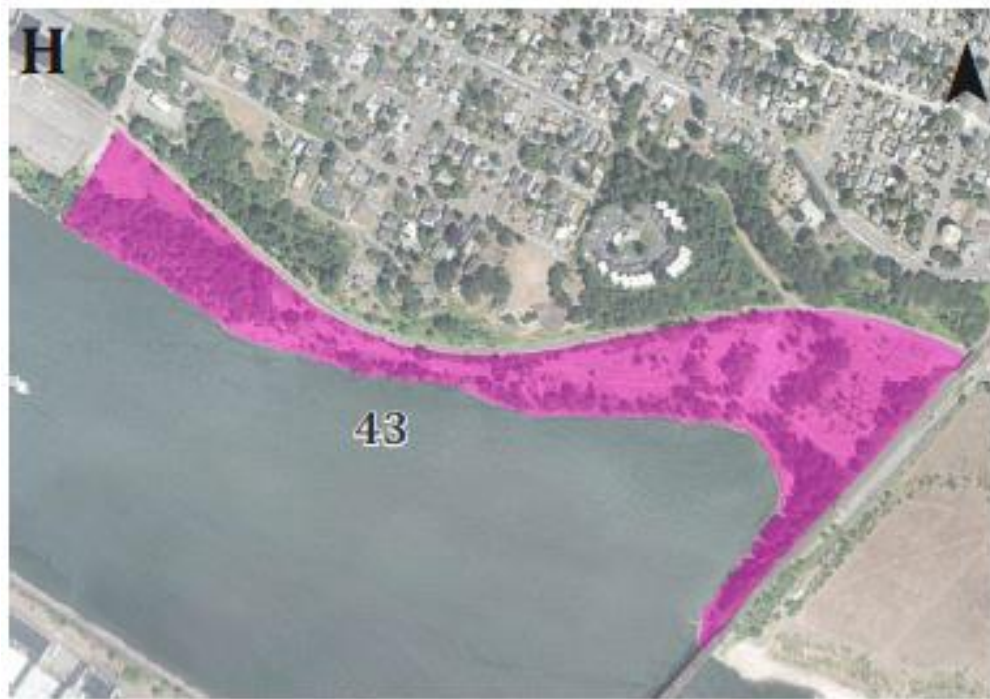
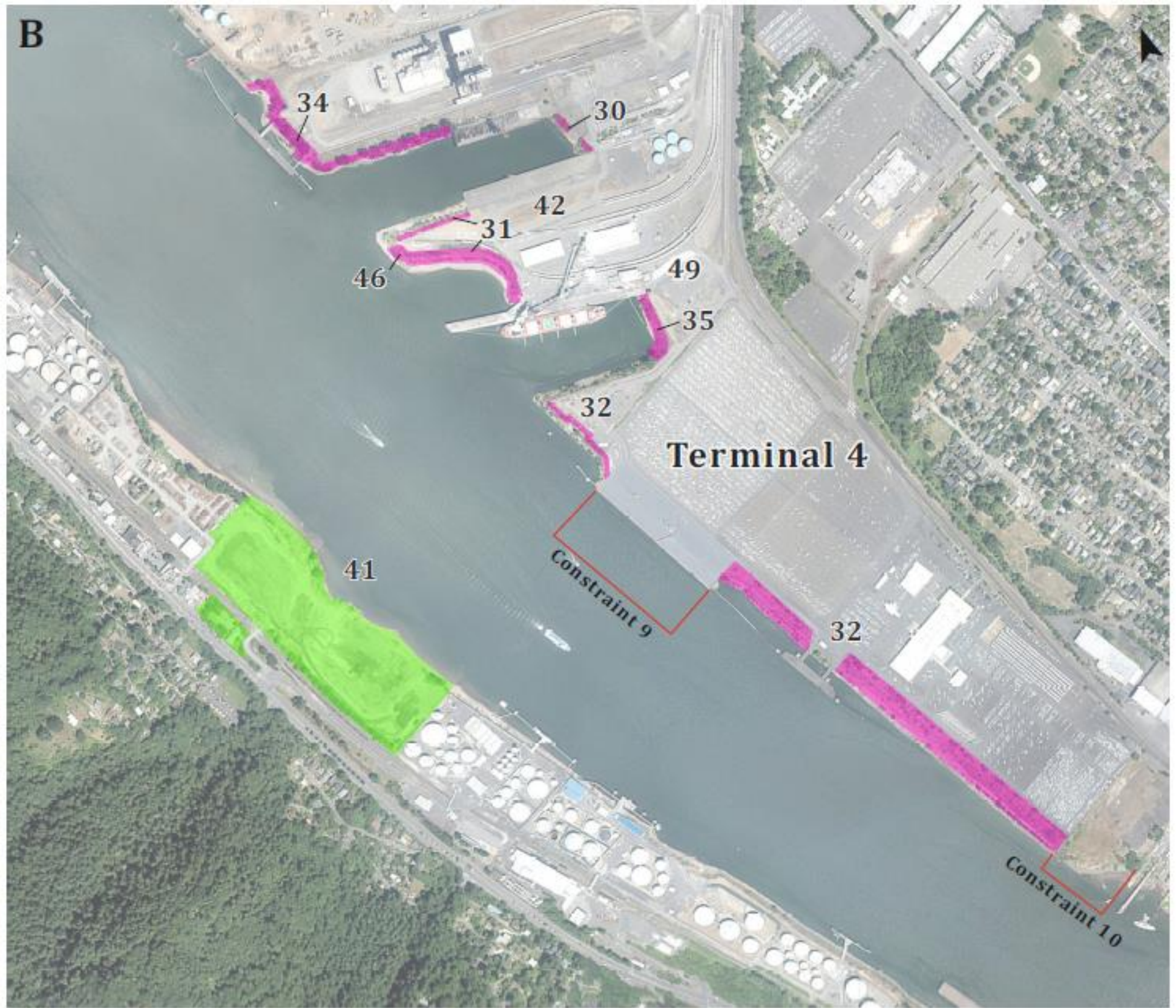


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Mitigation Sites	Revegetation Sites		<b>PORT OF PORTLAND</b> Portland, Oregon 	Preparer: GIS Program Office Contact: gis@portofportland.com Date: January 2021 Geographic Data Standards: Projected Coordinate System Name: NAD 1983 HARN StatePlane, Oregon North Map Projection Name: Lambert Conformal Conic Units: International Feet	<b>MITIGATION &amp; REVEGETATION SITES</b> <b>Figure 2</b> Terminal 5, Terminal 6, and Rivergate Map 2 of 7
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- 30. Terminal 4, Berth 408, 2001-02: Stabilized and replanted (0.07 ac).
- 31. Terminal 4, Pier 2 (Terminal 4, Pier 2, Rail Yard Improvements (Willamette Greenway), 2007: Installed two stormwater filter strips (0.71 ac) and planted trees and shrubs in the Willamette Greenway (0.83 ac).
- 32. Terminal 4, Toyota Riverbank Restoration Project, 2001-04: Revegetated the riverbank with native plants, installed bioswales and irrigation system (11.2 ac, 5,250 LF).
- 34. Terminal 4, Berth 401 Riverbank Rehabilitation Project, 2000: Stabilized bank to reduce erosion; planted native vegetation (2 ac).
- 35. Terminal 4, Slip 3 Remediation and Revegetation Project, 2004: Revegetated with native shrubs and trees (0.5 ac).
- 41. Linnton Mitigation Bank, 2019: The project converted 25-acres of industrial riverfront to riparian and upland habitat, created new off-channel habitat with a cold water tributary, restored shallow water and the active channel margin.
- 42. T4 Infiltration, 2021: Stormwater from 27 acres at Terminal 4 will be infiltrated through constructed infiltration basins.
- 43. Willamette Cove, 2023: Restoration of approximately 27 acres of upland and riparian area. Removal of invasive species, bank grading and planting of native species.
- 46. Wheeler Bay Bank Stabilization Project, 2008: 800-feet of riverbank enhancement included: Bank grading, removal of concrete debris, vegetation, and miscellaneous debris; Placement of armor stone at the bottom of the shoreline and covered it with sand/gravel and wooded debris; Placed topsoil and planted cottonwood and willow trees, and grasses above the armor. Installed large wood structures within the active channel margin.
- 49. T4 Infiltration, 2021: Stormwater from approximately 3.6 acres at Terminal 4 will be infiltrated through constructed infiltration basins.



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Mitigation Sites      Revegetation Sites



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MITIGATION & REVEGETATION SITES

Figure 3  
Terminal 4

Map 3 of 7



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**22. Swan Island Boat Ramp Mitigation Project, 1999:** Removed invasive species (2 ac) and planted natives (0.7 ac).

**23. Vanport Wetland Mitigation Site, 2000-06:** Created a 65 acre regionally significant wetland, modified hydrology to reduce invasive species, promote native plants, and minimize flooding. Remaining 25 acres in upland/riparian forest, meadow and scrub-shrub vegetative communities. (7,856 LF).

**37. Force Avenue:** This is an undeveloped site adjacent to Vanport Wetland. The site is managed for invasive species removal.

**38. Dahl Beach, 2016:** Project restored 0.5 acres and 506 LF of active channel margin, shallow water, and riparian habitat along the confluence of the Willamette and Clackamas Rivers. Work included converting parking lot areas to habitat by removing asphalt, concrete, and riprap and planting natives. Work also included the removal of an existing failed bulkhead structure, including all riprap and sheet piles, grading the riverbank to be stable, and establishing native vegetation.

**39. Swan Island Enhancement Project, 2017:** 25-foot-wide Greenway from the top of the riverbank slope to the fence line located along the southwest boundary of the Daimler leasehold. Landscaped along the top of bank, removed invasive species and revegetated on the riverbank slope, re-graded erosional scarp features and rip rap armoring.

**40. Rinearson Creek/ Meldrum Bar Park Restoration Project, 2018:** Restored 33-acres of upland, channel and pond habitat. Project removed a dam, created narrow open water and emergent wetlands, recontoured stream to restore natural meander, removed invasive species and planted natives (6,956 LF).



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 Mitigation Sites  
 Revegetation Sites



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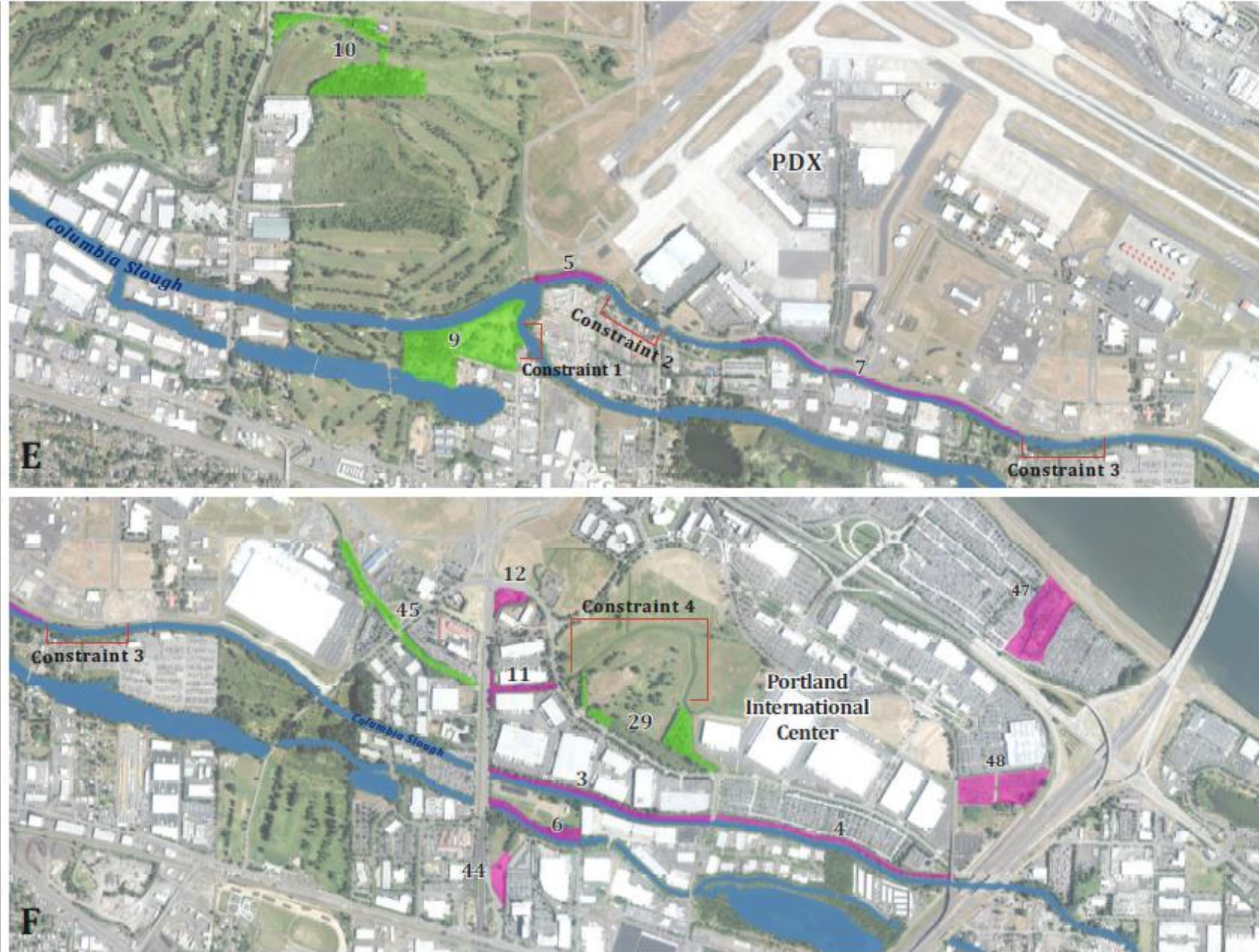
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**MITIGATION & REVEGETATION SITES**  
**Figure 4**  
 Swan Island, Vanport Wetland, and Confluence  
 of Willamette and Clackamas Rivers  
 Map 4 of 7

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Appendix C - Mitigation/Revegetation Area Maps (PDX and PIC)

- 3. 82nd to 92nd Ave Revegetation Project, 2000: Removed invasive species and revegetated Columbia Slough from 92nd Ave, west to 82nd Ave from the waterline to the top of the bank (1.6 ac) and from top of bank to edge of transition zone or edge of tenant landscaping (2,600 LF Total).
- 4. 92nd Ave to I-205 Revegetation Project 2000-01: Removed invasive species and revegetated Columbia Slough from 92nd Ave to I-205 from the waterline to top of bank (0.78 ac) and from top of bank to edge of 50' transition zone (2.69 ac, 2,850 LF total). 2003-04: Revegetated along the regraded bank (1.6 ac).
- 5. Cornfoot Rd West of 47th Ave to AMC Building Revegetation Project, 2000: Removed invasive species and revegetated area from the waterline to top of bank (1.25 ac, 915 LF).
- 6. PDX Port Maintenance Bldg Revegetation Project (Meyers Marx), 2000: Revegetated area on south side of Slough from 82nd Ave to Port property boundary and on north side of Whitaker Slough from 82nd Ave to Port property boundary; removed invasive species and re-vegetated from the waterline to top of bank and 50' E-zone (3.7 ac; 2,400 LF).
- 7. Cornfoot Rd - NE 63rd to NE 55th Ave Revegetation Project, 2000: Planted trees (4.3 ac; 3,550 LF) and modified planting plan based on factors including steep slope, utility cable at top of bank, subsurface drainage undermining bank, and a waterline on top of bank.
- 9. Buffalo Street Mitigation Site, 1995, 2003: Installed 100 beaver protection cages around alder and cottonwood trees on the Buffalo street site. 2000: Removed invasive species and revegetated from waterline to top of bank (2.3 ac; 1,970 LF).
- 10. Elrod Rd Mitigation Site, 1994: Enhancement of woodland and shrub-scrub habitat adjacent to a Slough tributary (10 ac). 2000: Revegetated from the waterline to top of bank (1 ac; 1,300 LF).
- 11. Alderwood Slough Revegetation Project, 2000-01: Revegetated Alderwood Slough between 82nd Ave and Alderwood Rd from water-line to 10' landward of top of bank on north and south sides (1.7 ac).
- 12. Alderwood Corner Revegetation Project, 2000-01: Revegetated Alderwood Slough at corner of Alderwood Rd and 82nd Ave (1.5 ac).
- 29. PIC E-zone Mitigation Site, 2000-02: Revegetated riparian and upland willow scrub-shrub habitat (2.6 ac). Added an additional 6.8 acres to the Env Protection Zone.
- 44. 82nd Ave. Oak Woodland Planting, 2019: Planted 2 acres with Oregon white oak and oak woodland understory vegetation.
- 45. McBride Slough, 2019: Removed invasive species. Replanted trees that were removed for the clean-up to occur (2,369 LF). 2020: Additional trees and shrubs were planted to enhance the area that was impacted by the project west of NE Alderwood Rd. Removed non-native vegetation east of NE Alderwood Rd (2,060 LF).
- 47. PDX Economy Lot E-zone Conversion Project, 2019: Removed invasive species (9.0 acres).
- 48. PIC Wetland Enhancement, 2019: Removed invasive species and planted 800 native shrubs and trees (6.2 acres). 2020: Planted 2050 native shrubs.



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Mitigation Sites
  Revegetation Sites

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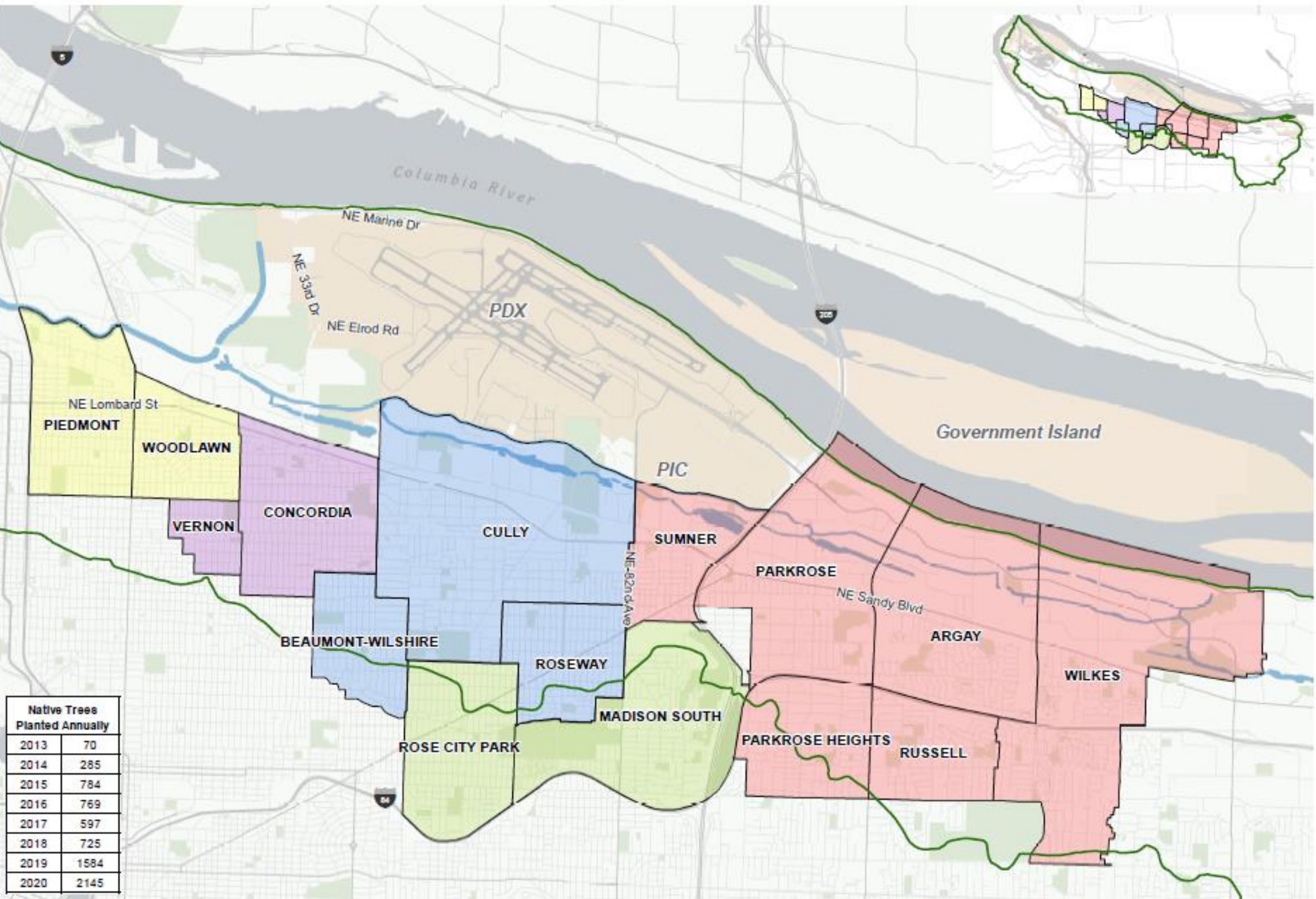
MITIGATION & REVEGETATION SITES	
Figure 5	
PDX and Portland International Center	
	Map 5 of 7

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# Appendix D - Airport Futures Natural Resource Enhancement Projects

## Neighborhood Canopy Enhancement Projects:

1. Parkrose Summer Transit Station Tree Planting  
2012: Planted native trees and added stormwater infiltration features.
2. Elrod Slough Tree Planting  
2013: Planted 70 native trees.
3. Columbia Children's Arboretum Tree Planting  
2014-2015: Planted 570 native trees and shrubs and removed invasive species.  
2016: Planted 300 native trees and shrubs and invasive species removal. This project helped revegetate the site increasing infiltration to enhance summer base flows in the lower reach of the Columbia Slough.  
2017: Planted 330 native trees and shrubs.  
2018: Planted 400 native trees and shrubs.  
2019: Planted 1,300 native trees and shrubs.  
2020: Planted 982 native trees.
4. Argay, Parkrose, Russell, Summer, Wilkes Tree Planting  
2015: Planted 132 native trees for canopy enhancement.  
2018: Planted 110 native trees.  
2019: Planted 84 native trees.  
2020: Planted 100 trees.
5. Concordia, Vernon Tree Planting  
2015: Planted 142 native trees.  
2016: Planted 125 native street and yard trees in Concordia and Vernon neighborhoods.  
2017: Planted 125 street and yard trees.  
2020: Planted 150 trees.
6. Beaumont-Wilshire, Cully, Roseway Tree Planting  
2015: Planted 180 native trees for canopy enhancement.  
2018: Planted 215 trees.  
2019: Planted 200 trees.
7. I-205 Tree Planting, 2015:  
2015: Planted 45 native trees for canopy enhancement.
8. I-205 Piedmont, Woodlawn tree Planting  
2016: Planted 234 native trees for canopy enhancement over the course of two projects.  
2017: Planted 142 street and yard trees.
9. Madison South, Rose City Park, Summer  
2016: Planted 110 native trees for canopy enhancement.
10. Columbia Slough Natural Area  
2016: Planted native trees and shrubs.  
2020: Planted 746 trees.
11. Gateway Green Park  
2020: Planted 167 trees.



Native Trees Planted Annually	
2013	70
2014	285
2015	784
2016	769
2017	597
2018	725
2019	1584
2020	2145

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**AIRPORT FUTURES**

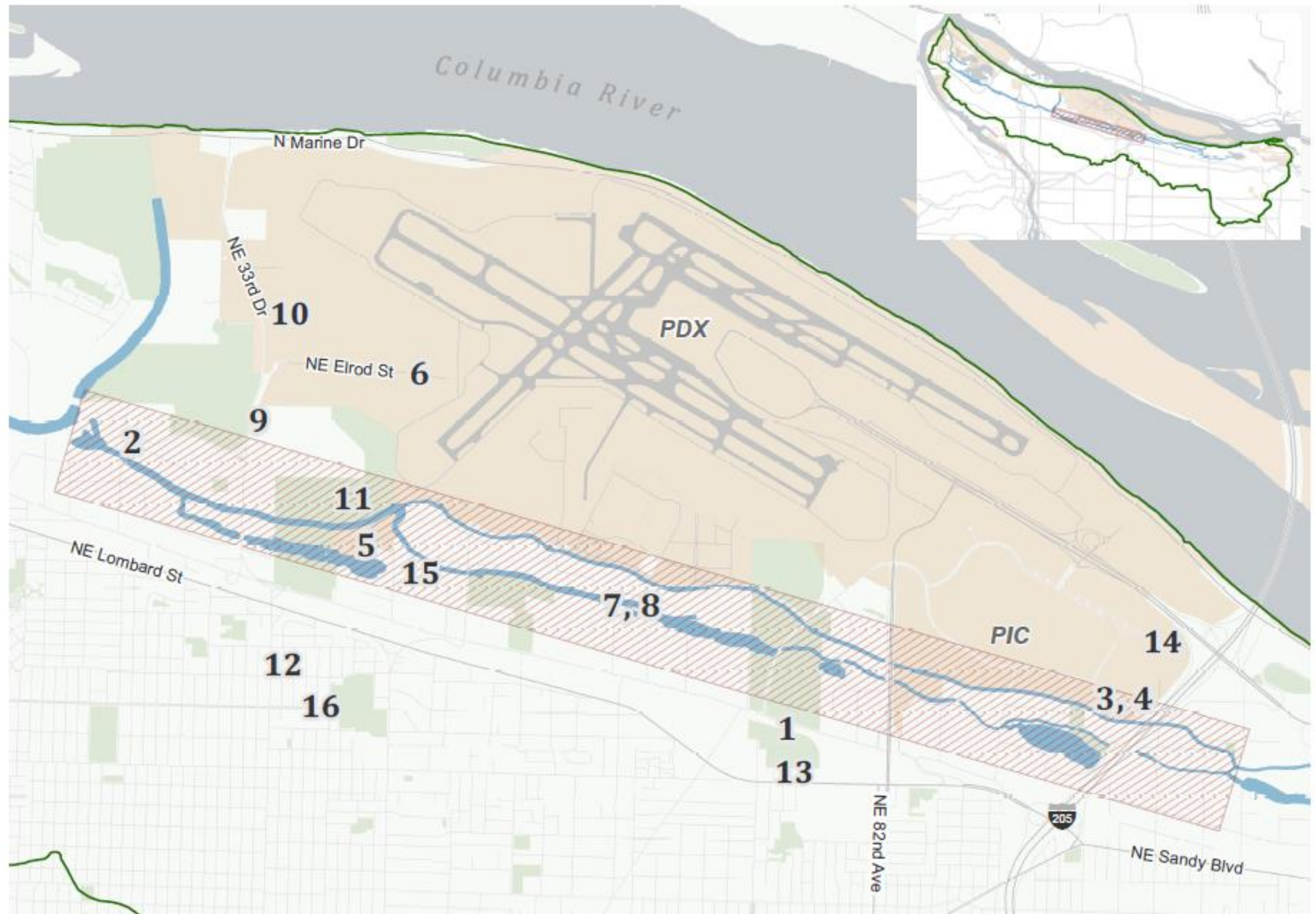
**Figure 6**  
**Canopy Enhancement Projects**

Map 6 of 7

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**Columbia Slough Enhancement Projects:**

1. Cully Park North Slope Restoration, Nov. 2012
2. Elrod Slough Restoration, 2013
3. Portland International Center (PIC), Wetland Conversion Project - Phase I, 2013
4. Portland International Center (PIC), Wetland Conversion Project - Phase II, 2014
5. Buffalo Slough Turtle Habitat Enhancement, 2016: Installation of in-water structure increased habitat complexity to provide microclimate benefits for fish.
6. Elrod Slough Culvert Replacement, 2015: Removed existing culverts and restored conveyance and riparian bank configurations. Revegetated disturbed areas with native plantings.
7. Main Channel Benches, 2016: Removed invasive aquatic and riparian species and planted the benches with native wetland species.
8. Better Beaver Behavior, 2016: Protected trees from damage caused by beaver, allowing trees to grow and provide shade to the Slough.
9. Vegetation Management, 2016: Maintenance of vegetation to ensure that the investment in previous restoration is not lost.
10. NE 33rd Riparian Corridor, 2018-19: Replaced invasive vegetation with native species to increase amount of shade on water to create cool water refuges for aquatic species.
11. Island Canopy Establishment, 2018-19: Weed control and establishment of native shrub and tree species on islands within the Middle Columbia Slough.
12. Backyard Habitat Certification, 2018: Coached participants to create site plans to remove invasive weeds, increase native plants, reduce pesticide use, manage stormwater onsite, and build wildlife habitat in three Portland neighborhoods.
13. North Slope Habitat Restoration, 2018: Converted 3.6 acre North Slope into a native Columbia Gorge meadow landscape.
14. ACME Riparian Restoration, 2019: Removed non-native species and replaced with native shrubs on 7-acre parcel for wildlife habitat and shade.
15. CSWC Engineered Wetland Whitaker Ponds, 2020: Constructed 4 vegetated, engineered wetlands that were installed in Whitaker Slough and will be monitored to determine if they reduce water temperature.
16. Verde Cully Community Rain Garden Project, 2020: Provided downspout disconnection and rain garden construction for 8 households in Cully neighborhood.



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Columbia Slough	Watershed Boundary	7 & 8 Project Area	Port Property	Parks
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<b>AIRPORT FUTURES</b>	
<b>Figure 7</b>	
Columbia Slough Enhancement Projects	
Map 7 of 7	