PORT OF PORTLAND

Mitigation Management Program

Site Status Report 2013-2014

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ABBREVIATIONS USED IN THIS REPORT

AAHU	average annual habitat units
BES	Bureau of Environmental Services (City of Portland)
BMP	best management practice
BPA	Bonneville Power Administration
COP	City of Portland
Corps	United States Army Corps of Engineers
CNLM	Center for Natural Lands Management
CSWC	Columbia Slough Watershed Council
CWS	Clean Water Services
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Department of State Lands
EMS	Environmental Management System
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GIS	geographic information system
HEP	habitat evaluation procedure
HIO	Portland-Hillsboro Airport
IGA	Intergovernmental Agreement
JBWP	Jackson Bottom Wetland Preserve
LUR	Land Use Review (City of Portland)
MCDD	Multnomah County Drainage District
MCT	Mitigation Core Team
MCVC	Multnomah County Vector Control
Metro	Metropolitan Service District
MMS	Mitigation Management Schedules and Integrated Pest Management
MOA	memorandum of agreement
MSE	mechanically stabilized earth
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRI	Natural Resources Inventory
NWI	National Wetland Inventory
NW PARC	Northwest Regional Chapter of Partners in Amphibian and Reptile Conservation
NW Swale	Northwest Swale
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife

ODOT	Oregon Department of Transportation
OPRD	Oregon Parks and Recreation Department
PDX	Portland International Airport
PEMC	palustrine emergent seasonally flooded
PEM	palustrine emergent
PFO	palustrine forested
PIC	Portland International Center
PSS	palustrine scrub-shrub
RGID	Rivergate Industrial District
SBWNA	Smith and Bybee Wetlands Natural Area
T	Terminal (e.g., T-5)
TRIP	Troutdale Reynolds Industrial Park
USACE	U.S. Army Corps of Engineers
USDA-ADC	U.S. Department of Agriculture, Animal Damage Control
USDA-APHIS	U.S. Department of Agriculture, Animal and Plant Health Inspection Service
USFWS	U.S. Fish and Wildlife Service
WC	Washington County
WET	wetland evaluation technique
WCS	water control structure
WMP	wetland management plan
Xerces	Xerces Society for Invertebrate Conservation

SECTION I. MITIGATION MANAGEMENT PROGRAM

Introduction

The Port of Portland's (Port) initiated their Mitigation Management Program in 1997 to respond to ongoing and proposed mitigation requirements and mandates from various regulatory agencies. At the start of the program, nine Port mitigation sites already existed, and the 3-year monitoring requirement had been completed for one site (Portland International Center [PIC] Corps). By 2004, monitoring requirements for six additional sites had been completed (Jewett Lake, Buffalo Street, Elrod Road, and Berths 408, 503 and 607). The Port's Mitigation Management Team currently manages 16 mitigation sites and 14 Columbia Slough enhancement sites (see Section IV). The City of Portland Bureau of Environmental Services (BES) planted a riparian buffer along the Columbia Slough sites, and the Port now provides vegetation management activities as part of an Intergovernmental Agreement (IGA). In 2013 and 2014, only two mitigation sites (Troutdale Reynolds Industrial Park [TRIP] Phase I and West Hayden Island) were still under regulatory obligation and required annual compliance monitoring. The Port also shares a mitigation bank at the Jackson Bottom Wetland Preserve (JBWP) with the Oregon Department of Transportation (ODOT); however, this site is managed, maintained, and monitored by JBWP (see Bobcat Marsh, Section III). This Mitigation Management Program report provides updated information for management of these sites conducted in 2013 and 2014. See Figure I-1 for site locations.

Mitigation and other natural resource enhancement projects are designed to provide a number of wildlife, ecological, and community benefits. These include increasing wildlife value by enhancing or creating nesting, foraging and resting habitat; creating and enhancing riparian zone functions; improving connectivity between wildlife areas; improving or restoring wetland hydrological functions; improving water quality; providing flood attenuation through water storage; reducing and controlling the spread of invasive weeds; and providing valuable 'greenspace' in a highly urbanized area. Mitigation planning, designing, monitoring, and reporting follow federal and state regulations, general authorizations, and guidelines.

The Mitigation Management Program is continually evolving and is influenced by the development of new or improved management techniques, increased coordination with other regional programs and conservation organizations, and changes in federal, state, and local regulations. In addition, as the Port's Environmental Management System (EMS) moves forward, Port policies and procedures that relate to mitigation management are being incorporated to ensure that mitigation activities are consistent with the Port's natural resources policy.

Program Goals

The goals of the Mitigation Management Program are as follows:

- Achieve regulatory compliance.
- Attain and maintain a high quality of functional performance and increased habitat value on mitigation sites and Port-owned natural area properties.
- Achieve sites that are self-sustaining and self-maintaining.
- Document best management practices (BMPs).
- Promote programs and projects that better the Port's relationships with the community and regulatory agencies.
- Support staff training with respect to new methodologies, technologies, and BMPs.
- Improve communication with stakeholders within the Port and the community.

Management Responsibility
This report covers the period from 2013 through 2014. The Mitigation Management Program resides within the Natural Resources group Environmental Operations Department. From 2013 through 2014, the mitigation management team comprised the following:

Dana Green	Natural resources manager
Carrie Butler	Senior mitigation specialist
Sarah Wilson	Mitigation site specialist
Maureen Minister	Senior natural resources specialist
Christie Galen	Consultant with Pacific Habitat Services, Inc. contracted to provide monitoring and reporting assistance
Taya MacLean, Matt Vesh	Consultants with SWCA Environmental Consultants, Inc., contracted to provide monitoring and reporting assistance
Green Earth Landscaping	Landscape contractor that provided natural area maintenance

Port Environmental Policies
The Port has adopted a number of administrative policies that form the guiding principles for all its environmental activities.

Of particular relevance to the Mitigation Management Program is the Port's natural resources policy, adopted on December 27, 2000:

The Port will seek opportunities to enhance and sustain Natural Resources as part of its planning, development and operations activities. Natural Resources mean the native vegetation, fish and wildlife influenced by the Port's activities; the relationships among them; and the physical processes that sustain them. The Port will identify the environmental aspects of its planned and actual activities and services that have or can have a significant impact on Natural Resources. The Port will manage Natural Resources in a manner which emphasizes ecosystem-based approaches that:

- *Protect the integrity of the natural environment;*
- *Promote natural ecosystems that favor biodiversity, reduce ecological fragmentation, maintain ecological connectivity, and promote native species; and*
- *Protect and enhance fish and wildlife habitat areas of potential ecological significance for the management of sustainable Natural Resources.*

The Port will manage its lands to enhance the natural ecological processes that sustain living resources. The Port recognizes that its activities may result in ecological disturbances, but will seek ways to minimize ecological impacts and reduce its pollution. The Port will implement mitigation methods that restore and maintain ecosystem functions and values. The Port is committed to ongoing improvement of its Natural Resources Program through review, monitoring, and adaptive management, which uses science-based methods to provide information to evaluate programs and adjust future management actions accordingly. The Port will seek opportunities to be proactive regarding Natural Resources issues within the region.

Regulatory Requirements
Mitigation projects provide compensation for unavoidable permanent and temporary impacts to wetlands and other natural resources resulting from development and operational activities undertaken by the Port.

If new development is proposed where wetlands or other regulated natural resources are impacted, federal, state, and local laws and regulations require that project alternatives be evaluated to 1) avoid the impact; 2) minimize the impact; and 3) mitigate or compensate for the impact to these natural resources. Mitigation is usually in the form of restoration, establishment (creation), enhancement, or preservation of the habitats and functions lost through the proposed development activities.

Permitting and compliance responsibilities for all mitigation sites are primarily enforced by the U.S. Army Corps of Engineers (USACE), Oregon Department of State Lands (DSL), and Oregon Department of Environmental Quality (DEQ), with associated federal, state, and local agencies having influence and comment on permit compliance. Mitigation may also be required through the City of Portland's (COP) land use process as a condition of project approval or Clean Water Services (CWS) in Washington County.

List of Concerned Agencies

Federal

- USACE
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- National Oceanic and Atmospheric Administration (NOAA)

State

- Oregon DSL
- Oregon DEQ
- Oregon Department of Fish and Wildlife (ODFW)
- Oregon Parks and Recreation Department (OPRD)

Local

- COP
- Metropolitan Service District (Metro)
- Multnomah County Drainage District (MCDD)
- Departments of Washington County
- CWS, Washington County

Key Management Issues and Actions

The Port's mitigation sites are selected and designed using professional expertise from within the Port; from external sources, such as local conservation organizations and environmental consulting firms; or from both. Depending on the complexity of the mitigation plan, construction is carried out either by the Port or by experienced contractors under the direction of Port engineers or mitigation management team. Once constructed, mitigation sites typically require a minimum of 5 years of maintenance, monitoring, and reporting to meet permit requirements. Once the permit requirements are satisfied, voluntary maintenance and site inspections continue, but they can be gradually reduced over time as the site becomes more self-sustaining. The Port uses adaptive management to meet the changing conditions of each site. Site maintenance and monitoring is completed by Port mitigation staff, experienced consultants, and contractors. There is a strong commitment from the mitigation management team and Port management to meet the program goals as previously listed.

The following topics are fundamental to the successful management of the sites:

- Reference Sites

Reference sites provide valuable information when developing design and success criteria for mitigation sites. Hydrology, soil characteristics, species composition, and planting density are all components of a mitigation site that determine how well the site is performing in relation to natural sites or previously established successful mitigation sites. Information from a reference site aids in the formulation of effective mitigation design parameters and serves as a benchmark to compare progress and setbacks. All recent Port mitigation sites include a reference site or reference sites; these are used as needed for setting design criteria and monitoring site performance.

- Achieving Wetland Hydrology

Wetland hydrology is the most important factor that determines the ultimate success of a wetland mitigation site. Achieving adequate wetland hydrology is an issue primarily on Port restoration sites where dredge or fill material has altered the site's original topography and hydrology. The Port monitors groundwater levels before final design whenever possible, and incorporates this information into the grading plan. Other factors considered in the design phase include current and historical rainfall patterns, historical river level data, soil type, and surrounding topographical features. Groundwater monitoring and surface water monitoring continue on these sites following excavation to provide evidence that wetland hydrology has been achieved and to identify conditions that may negatively affect mitigation efforts as early as possible.

- Invasive Species Management

Control of invasive, non-native plant species presents a constant challenge. Current management techniques used by the management team include mowing, selective removal by hand, seasonal flooding, herbicide applications at selected times of the year (depending on the plant's life cycle), weed barriers, and shading. Biological control, as administered by the Oregon Department of Agriculture (ODA), may be employed to control targeted invasive species. The need for weed control on each Port site is assessed monthly during the growing season, and priority is given to removing species ranked A–C in the COP Nuisance Plants List section of the *Portland Plant List* (City of Portland, 2011). These are species known to be invasive, known to occur in our region and can spread rapidly. Locations of invasive weeds are mapped for each site, and these areas are targeted for regular control. Herbicide use is conducted in line with the National Marine Fisheries Service (NMFS)–approved program specified by the COP and is limited to those chemicals that have minimal impacts to the environment.

Weed management is labor intensive but is recognized as being necessary to ensure that habitat functions and values replaced through mitigation are not lost in the long term. The Port has compiled a *Vegetation Management Plan* (Port of Portland, 2014) that is designed as a field manual for management of weeds and invasive plants on Port mitigation and enhancement sites to ensure that appropriate weeds are targeted on each site with minimal environmental harm or wildlife impact. The *Vegetation Management Plan* is available upon request.

- Animal Foraging Management

The Port mitigation sites are designed to improve habitat value and their connectivity with surrounding habitat. As a result, the sites are susceptible to animal foraging by wildlife not necessarily resident on the site, such as rabbits, deer, nutria, and beaver. Protector tubes may be used on planted woody species for a minimum of the first 3 years, and deer repellent or temporary deer fencing is considered at all sites where deer foraging may result in plant damage or mortality. Techniques such as over-planting, planting species not favored by beaver, and protecting selected plants are also employed where beaver damage is known to be a problem. Tubes and fences are removed by Port staff when they are no longer needed.

- Irrigation

During the plant establishment period (typically during the first 1–3 years), mitigation sites often require irrigation for promoting and sustaining plant growth during the dry season. Supplying water to plants during the establishment period can be difficult if a site is remote or has no access to a water source. Irrigation methods used by the Port include manual watering and temporary irrigation systems. Drip irrigation, which reduces water use, may be used where feasible. However, drip irrigation systems are very labor-intensive because emitters clog easily, animals regularly chew on irrigation hoses, and the entire system must be checked frequently. Using recycled water from sewage treatment facilities has also been investigated but deemed not feasible at the present time due to transportation issues. Other methods Port staff employ for reducing the need for water include using mulch around new plantings (to help retain soil moisture and minimize weed growth) and using synthetic absorption gels, which absorb and store water that can be released over time. Soil amendments are also incorporated to improve water-holding capacity. The ultimate goal is to ensure that sites become self-sustaining and not maintained by artificial hydrology.

- Year 1 Establishment

Plant establishment at mitigation sites can be hindered by animal foraging, human disturbances, dry weather periods, flooding, and/or weed invasion. One of the Port's mitigation objectives is to reduce the need for replanting. Where appropriate, new plants are inoculated with mycorrhizal fungi, and bare root stocks are dipped in a growth hormone to promote rapid root development. Other methods for improving survivability include placing a 4-inch layer of mulch around woody plants, removing weeds within a 3-foot radius of the stem, and providing and maintaining animal protection tubes or cages.

- Site Inspections and Monitoring

The objective of inspecting or monitoring site conditions is twofold: 1) to document on-the-ground conditions of each site for annual reporting requirements and 2) to provide a feedback loop to mitigation staff on the condition of the site to implement remedial actions and adaptive management measures. Site inspections take place approximately once per month during the regulatory period and quarterly, at a minimum, for sites that have been released of obligation. Notable site activities (i.e. vandalism, fence repair, sign installation, enhancements) are recorded during site inspections and logged in a site activity record database. Monitoring protocols have been established for vegetation, wildlife, and groundwater wells. Most wildlife and vegetation monitoring is performed by Port staff; however, consultants may be used when needed. Long-term monitoring continues for each site until an alternate, satisfactory, long-term management strategy is determined (possibly by turning over the management to conservation-oriented entities, such as a land trust).

- Human Disturbance

The Portland metropolitan region is growing, and open spaces, such as mitigation sites, are increasingly trespassed for bird watching, dog walking, mushroom collecting, illegal dumping, hunting, and transient camping. Although some activities do not significantly disturb mitigation areas, newly planted mitigation sites are more susceptible to minor disturbances than fully established sites. A number of mitigation sites have been fenced to limit disturbance, and most have been sign-posted as a mitigation site or natural area (Figure I-2). "No Trespass" signs are often posted to discourage public access. Site inspections identify if there is a need for increased protection from human disturbance.

- Staff Resources

To ensure that maintenance, monitoring, and recommended site actions are carried out effectively and efficiently, staff resources are continually evaluated. The staffing needs of the mitigation program must be balanced with the needs of other Port natural resources programs. As additional resource needs are

identified, actions are initiated to adjust the staffing needs and maintenance and monitoring priorities at each site. Currently, mitigation maintenance and other related activities are overseen by two full-time Port mitigation staff members, a part-time maintenance contractor, and contracted consultants as needed.

Mitigation Site Reviews
Sections III through VI of this document contain site-specific information on the Port's mitigation and enhancement sites. Each of these sections presents permits and agreements, background, mitigation plan information, reference site information (where available), permitting requirements and current status, activities that occurred during the reporting period (2013 through 2014), site performance, proposed future actions, a list of documentation specific for the site, and a site map. These sections are updated periodically, ideally every 2 years.

Information Gathering and Dissemination
To ensure that the Port is using the best management techniques and methods, mitigation staff make every effort to review new literature, exchange information with other organizations, and participate in relevant trainings, seminars, and conferences.

The Port's Public Affairs Department publishes news releases periodically to inform the public of events taking place on the mitigation sites. In addition, Port mitigation management information is available online through the Port's website. This site is updated periodically.

Integration with Other Port Programs
The Mitigation Management Program is linked to three Port-wide programs:

1. Environmental Management System
The Port's EMS is an internal management tool developed to ensure consistency in Port programs, to document Port policies and procedures that are designed to minimize environmental impacts from Port activities, and to ensure continuous improvement. As policies and procedures are developed related to land management, they are incorporated into the Mitigation Management Program. Additionally, mitigation staff work to incorporate EMS work instructions for mitigation procedures into the Port's EMS. Compliance, policies, work instructions, training, and other environmental elements are tracked through the EMS cycle of "Plan, Do, Check, Act."

2. Sustainable Natural Resources Policy
The Port's Sustainable Natural Resources Policy states that the Port is operating sustainably when they make business decisions that support long-term economic health, integrate community concerns into their work, and reflect a deep and broad commitment to environmental stewardship. In the mitigation context, the Sustainable Natural Resources Policy requires that the Port replace and improve natural resources affected when carrying out the Port's mission, in addition to providing mitigation as required by natural resource regulations.

3. Mitigation Core Team
The Mitigation Core Team (MCT) is a cross-discipline working group within the Port that meets regularly to address Port-wide mitigation needs. The purpose of the MCT is to establish management practices to clarify mitigation needs and optimize mitigation options for Port development. Additionally, the team strives to establish organizational and land management practices that optimize habitat value for ecosystem services and mitigation functions and values.

Mitigation Site Selection
As stated above, the MCT provides guidance for mitigation site selection. The MCT meets regularly and provides a mechanism for identifying priority habitats as well as opportunities for improving ecological

functions and values both on Port property and on a regional scale. The MCT seeks partnering opportunities and considers local and regional initiatives geared toward the protection of ecological functions such as ODFW's Oregon Conservation Strategy and the National Oceanic and Atmospheric Administration's *Lower Columbia River Recovery Plan* (2013). Some key objectives of the MCT are as follows:

- To encourage use of a federal/state framework to avoid, minimize, and then mitigate unavoidable impacts.
- To evaluate and recommend project-specific mitigation/habitat alternatives to project teams to meet or exceed regulatory requirements.
- To minimize the need for mitigation, evaluate, and recommend strategies to efficiently use land, reducing the footprint of development and preserving land for future development, conservation, or enhancement.
- To seek mitigation banking opportunities for the Port that provides fair-market value mitigation lands for Port use and other potential partners.
- To promote the quality of Port mitigation projects with regulatory and natural resource agencies.
- To provide an established process for identifying Port-wide mitigation needs in a timely manner to support initiatives and capital projects in advance of the need for them.
- To capture full costs of mitigation, including capital, maintenance, monitoring, and endowment, to aid in project decisions

Interaction with Environmental Agencies and Community Conservation Programs
One goal of the Mitigation Management Program is to increase interaction and cooperation with other local and regional conservation programs, as follows:

City of Portland Bureau of Environmental Services
The Port and BES have collaborated on several projects along the Columbia Slough, including revegetation of several Port-owned properties and a tree caging project called the "Better Beaver Behavior" project. More recently, the Port partnered with the City and others to improve salmon habitat at the Columbia Slough confluence. The Columbia Slough confluence project was completed in 2010 and consisted of several elements, including placement and anchoring of large woody material, revegetation, and the installation of bird and bat boxes that are monitored by community volunteers.

Federal and State Conservation Agencies
The Port works closely with the ODFW, USFWS, and EPA in monitoring mitigation site habitat use by wildlife and in improving habitat for wildlife (particularly those species that are listed as state sensitive). Agency staff may accompany Port staff on monitoring surveys when possible.

Smith and Bybee Wetlands Natural Area Management Committee
The Port owns a portion of the Smith and Bybee Wetlands Natural Area (SBWNA) and sits on the SBWNA Management Committee. In addition to committee meetings, regular individual meetings with the SBWNA manager take place along with information sharing and joint participation in the conservation/enhancement of properties of mutual interest. From 2009 to 2011, the Port provided invasive species control and native planting in a portion of the SBWNA adjacent to the Port's Leadbetter mitigation site to enhance a sedge meadow wetland habitat. The Port continued invasive species control in 2014. Additional work was conducted by Metro. This enhancement helped to protect native sedges by reducing competition from invasive plants and expanded the area of native sedges. This project will improve local wildlife habitat and plant diversity by controlling reed canarygrass (*Phalaris arundinacea*)

and enhancing the native sedge meadow. Metro plans to plant more Columbia sedge (*Carex aperta*) in the area where weed control took place to further expand the sedge meadow community.

Columbia Slough Watershed Council

The Port is a member of the Columbia Slough Watershed Council (CSWC) and takes part in and supports activities promoted by the CSWC. The Port and the CSWC have also worked cooperatively on mitigation site selection and the Vanport Wetland mitigation planning. The CSWC presented its 2001 Achievement Award to the Port for work on the Vanport Wetlands mitigation project. The award highlights the Port's outstanding efforts toward improving the Columbia Slough watershed. The Port also works with CSWC to identify areas of the Columbia Slough that could benefit from enhancements related to the Airport Futures natural resource mitigation requirements.

Oregon Native Turtle Working Group – Lower Willamette Chapter

The Oregon Native Turtle Working Group (Working Group) was formed to share expertise among various organizations and agencies involved in turtle conservation and to promote appreciation and conservation of turtles by all Oregonians. Port mitigation staff attend quarterly meetings and participate in activities that promote conservation efforts of Oregon's native turtle species. The Working Group in collaboration with the Oregon Wildlife Institute (2012) helped to develop the *Conservation Plan for Native Turtles in the Columbia Slough, Portland, Oregon*. The Port has helped fund multiple turtle studies locally that have contributed data for this effort. The Port worked with ODFW to design and produce a turtle BMP booklet developed by the Working Group to support the Oregon Conservation Strategy. The Working Group plans to offer a workshop at the Oregon Zoo to roll out the turtle BMPs in 2016. Port mitigation and GIS staff are also assisting with turtle distribution mapping throughout the state to further support the Oregon Conservation Strategy.

Partners in Amphibian and Reptile Conservation

The Port sponsored the Northwest Regional Chapter of Partners in Amphibian and Reptile Conservation (NW PARC) 2015 Annual Meeting, Workshop, and Speaker presentation. PARC is an inclusive partnership dedicated to the conservation of herpetofauna (reptiles and amphibians) and their habitat. The NW PARC region includes eight northwestern U.S. states and three Canadian provinces and territories.

Center for Natural Lands Management

In 2011, the Port partnered with Metro and USFWS to provide funds for the Center for Natural Lands Management (CNLM) to conduct a streaked horned lark (*Eremophila alpestris strigata*) vocalization study to attract them to the St. Johns Landfill for potential nesting. Streaked horned lark songs were recorded on Port-owned property in the Rivergate Industrial District, then played back at the St. Johns Landfill in conjunction with the use of decoys. In 2007, the Port provided dredged sand to help create the sparsely vegetated habitat on the Landfill that the streaked horned lark prefers. The conspecific attraction feasibility study continued through 2013.

Airport Futures

In 2011, the Port and COP signed an IGA for natural resources related to the Airport Futures Project, a collaborative effort between the Port, COP, and the Portland-Vancouver metropolitan community to create an integrated long-range development plan for PDX. The IGA requires that the Port mitigate for 300 acres of upland grassland resources in lieu of having four PDX properties (totaling approximately 268 acres) zoned as environmental overlays. Grassland mitigation began on Government Island in 2011 and will be phased in 50-acre allotments through 2035. The IGA states that the first 50 acres of mitigation must occur in advance of any development on one or more of the four PDX properties identified in the IGA. Future grassland mitigation on the island, above the initial 50 acres, would be triggered when development on the four properties is proposed to exceed 25 acres.

The IGA also includes compensation for natural resource impacts to offset loss of natural resources as a consequence of airport operations at PDX and permitted development at PIC. The Port will make annual monetary contributions for 25 years to enhance the urban tree canopy ($20,000 per year) and to enhance the Columbia Slough watershed ($30,000 per year). The Port and COP agreed to work cooperatively in the selection of projects for funding and will solicit advice from PDX's Community Advisory Committee.

In addition, the Port agreed to undertake the conversion of the 6.2-acre site "PIC Wetland" from a mixed wetland and upland area to an area with native shrub cover. The site was planted in February 2014, and plantings included 14 different species of native shrubs.

The IGA is effective for 25 years and includes four natural resource obligations on the part of the Port. The Port will report annually to PDX's Community Advisory Committee on the progress and status of mitigation activities and watershed enhancement activities. The report will include mitigation success criteria and descriptions of specific projects with relevant cost and budget information.

The Xerces Society for Invertebrate Conservation

The Port has collaborated with the Xerces Society for Invertebrate Conservation (Xerces) on multiple projects over the last few years, including wetland invertebrate assessment and establishing pollinator habitat. From 2007 to 2011, Xerces staff conducted macroinvertebrate surveys at Randall, Vanport Wetlands, West Hayden Island, and Bobcat Marsh as part of a larger effort to develop invertebrate tools to assess wetland biological health in the Willamette Valley. The project received support from the EPA and Oregon Watershed Education Board. For the Port, the tool may become a valuable resource for monitoring wetland mitigation sites and helping to determine whether mitigation efforts have improved wetland biological function.

Currently, the Port has engaged Xerces to assist with grassland mitigation efforts on Government Island. Xerces scientists have monitored the site for pollinator use and provided assistance for native seed acquisition in conjunction with other ecological guidance. Once the site is seeded (fall 2015) and vegetation is establishing, Xerces will again conduct monitoring for pollinators to compare the data from prior conditions.

Other Programs

A number of city, county (CWS, Soil and Water Conservation Districts), Metro (Parks and Green Spaces) and state (ODFW, OPRD) programs offer possibilities for cooperative ventures. In the past, The Nature Conservancy and Portland Audubon Society have collaborated with the Port on research and community outreach events. These opportunities are investigated as they are identified.

Long-Term Maintenance

Most permit requirements specify that mitigation sites be monitored for 5 years; however, after such a short period of time, the functions and values of mitigation sites rarely match those of natural sites. To meet the Port's objective to "achieve sites that are self-sustaining and self-maintaining," the Port will continue to maintain and monitor the mitigation sites as part of ongoing property management even after there is no regulatory requirement to do so. Long-term maintenance will help to ensure habitat integrity continues to improve and that the sites sustain their enhanced condition with minimal intervention. However, the Port's ultimate mission is "to enhance the region's economy and quality of life by providing efficient cargo and air passenger access to national and global markets," not managing natural areas. As the number and overall acreage of Port mitigation sites continue to grow, while Port resources for their management remain nearly constant, it will become necessary to look to conservation groups and land trusts to continue managing these sites.

Long-term Protection Instrument
Regulatory agencies often require a conservation easement or restrictive covenant to ensure that a site is protected over the long term. Some Port sites may not have a conservation instrument but are otherwise bound by the language of the permit to be managed in perpetuity as a habitat area. If applicable, conservation instruments are summarized in Sections III and VI for each site.

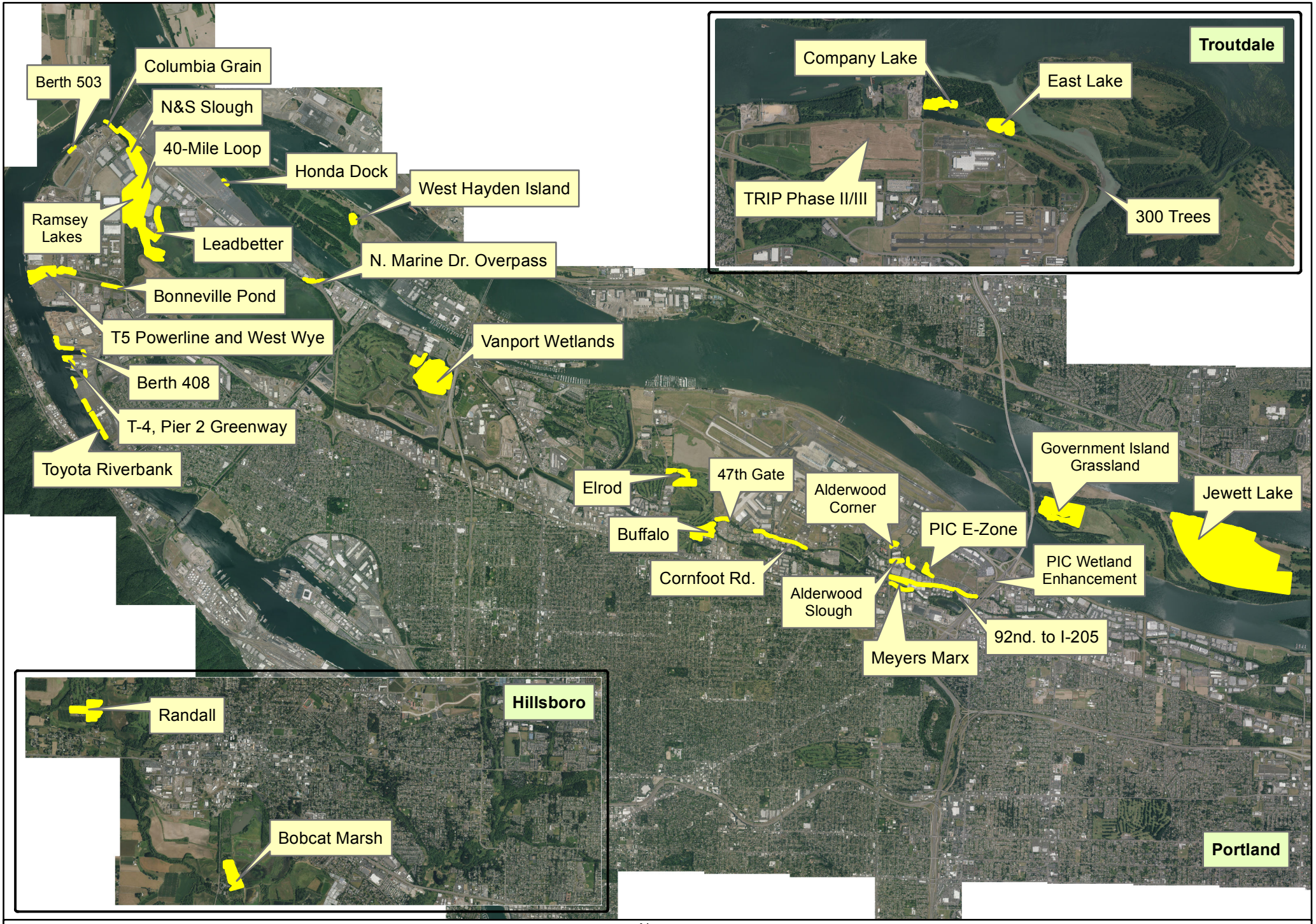
Program Costs and Funding
The Port's mitigation projects represent an investment of over $14 million since 1997. This investment requires a long-term maintenance and management commitment on the part of the Port. Following the initial capital investment during construction and design, ongoing management for each site is funded by the Port operating area responsible for initiating the project. Projected annual operating costs for the fiscal year 2015–2016 are shown at the end of this section.

The cost of site monitoring is generally consistent over the life of the project following a prescribed regimen of data collection and regular monthly inspections and maintenance actions. However, site circumstances may necessitate interim cost increases, such as specialized testing or additional data collection, new equipment, replacement planting, etc. Over a 5- to 7-year period, maintenance tasks on a site will vary each year, with costs generally decreasing over the life of the project. However, interim costs may increase if a site is not meeting permit requirements or other expectations for plant survival or if a site is impacted by natural (e.g., weather, hydrology) events.

An integral part of ensuring the success of a mitigation site after permitting and construction is the provision for ensuring long-term site protection. Regulatory agencies are becoming more concerned with preserving and maintaining the long-term functions and values of mitigation projects. One important mean of accomplishing this is through the establishment of conservation easements or deed restrictions on mitigation sites. The Port works with the agencies to identify and implement the most appropriate means for site protection.

TABLE 1: MITIGATION PROGRAM OPERATING BUDGET, YEAR 2015/2016

SITE NAME	ACRES	TOTAL PROJECTED FISCAL YEAR 2015/16
MITIGATION PROJECTS REGULATED THROUGH 2014		
BOBCAT MARSH MITIGATION BANK	15.66	N/A
GOVERNMENT ISLAND GRASSLAND I	58.00	$60,000
RANDALL	22.30	$20,000
TRIP PHASE I, Company & East Lakes	11.42	$42,000
WEST HAYDEN ISLAND MITIGATION	3.40	$20,000
ENHANCEMENT & FUTURE SITES		
COLUMBIA SLOUGH REVEGETATION	73.50	$27,500
FORCE AVE (site prep only)	6.00	$5,000
GOVERNMENT ISLAND GRASSLAND II (site prep only)	50.00	$20,000
PIC WETLAND ENHANCEMENT	6.20	$20,000
TRIP PHASE II/III, West Sundial Wetlands (construction)	90.48	N/A
MITIGATION PROJECTS RELEASED AS OF 2014		
BUFFALO STREET	15.60	$9,000
ELROD ROAD	10.00	$9,000
JEWETT LAKE	426.20	$48,000
PIC E-ZONE	3.80	$5,000
RAMSEY LAKES	16.00	$15,000
RIVERGATE ENHANCEMENT SITES	43.70	$20,000
T-5 POWERLINE	10.70	$9,000
VANPORT WETLANDS	90.44	$54,700
WEST WYE	2.40	$5,000
TECHNICAL AND COMPLIANCE SITE MONITORING SUPPORT	N/A	$150,000
TOTALS:	**955.80**	**$539,200**



PORT OF PORTLAND

Mitigation and Enhancement Sites

N

0 Miles 4

Figure I-1
All Mitigation and Enhancement Sites
2013 Aerial Photo

PORT OF PORTLAND

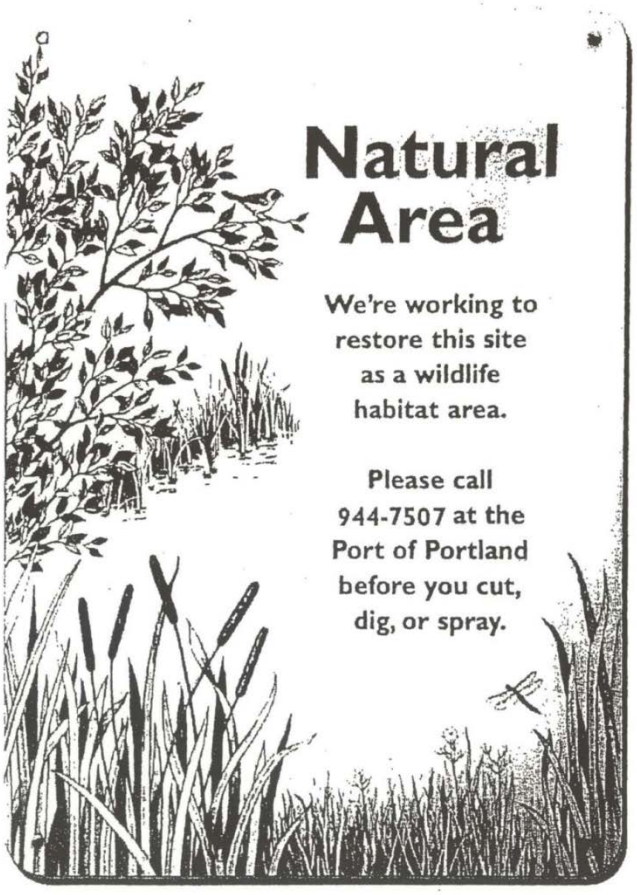
Wildlife Habitat Area

No Trespassing
No Dumping

Absolutely No Dogs Allowed

This site is under surveillance. It is illegal to hunt, kill or harass wildlife on this site.

Violators will be prosecuted under ORS statutes.



PRIVATE PROPERTY

NO TRESPASSING OR DUMPING

VIOLATORS WILL BE PROSECUTED PURSUANT TO O.R.S. 164.245/164.255 O.R.S. 459.108

PORT OF PORTLAND

SECTION II. PROGRAM STATUS REPORT

Since 2008, mitigation staff participated in a number of activities that affected mitigation sites. These activities were not necessarily site specific, or they were site specific but were in addition to permit requirements. Below is a summary of completed or ongoing projects and relevant studies that were incorporated into the work accomplished by the end of 2014.

Maintenance of Port-Owned Columbia Slough Revegetation Sites
Port mitigation staff continue to maintain sites where BES met their maintenance obligations. Port staff monitor these sites for weed control and inter-planting needs and assigns resources to resolve any issues. Additionally, the Columbia Slough revegetation sites are important with regard to the *Willamette Basin Temperature Total Maximum Daily Load* (TMDL) (see section below). See Figures IV-1 and IV-2.

Willamette River Temperature Total Maximum Daily Load
The Port's mitigation and revegetation sites play a critical compliance role with respect to the Willamette Basin temperature TMDL. The Port TMDL implementation plan requires the continued management of these sites to provide increased shade on the Columbia Slough. This metric will be tracked through documentation of the annual maintenance performed on these sites and the use of a geographic information system (GIS)–based shade model designed to quantify the incremental shade benefits generated over time. These activities constitute the core of the Port's TMDL temperature implementation strategy and will be included in the Port's annual progress reports to DEQ.

Western Painted Turtle (*Chrysemys picta belli*) Monitoring
Port mitigation staff monitor sites for turtle species, numbers, and disturbed nests. Disturbed nests are mapped to provide information about nesting site preference and predator damage. This monitoring helps determine whether control measures are necessary for non-native species (such as the red-eared slider [*Trachemys scripta elegans*]) and how sites may be enhanced to provide better overall habitat for native turtles, which are negatively impacted by many human activities.

Hydrology, Vegetation, and Wildlife Observations
Port mitigation staff monitor hydrology, vegetation, and/or wildlife as needed on mitigation sites. In addition, specific wildlife surveys may be conducted on particular sites for bats, amphibians, migratory songbirds, and nesting waterfowl. These data help to guide site management decisions and may provide input to natural resource management planning efforts at the city or regional level.

Maintenance of Released Mitigation Sites
As of 2014, sites where compliance was met were Buffalo Street, Elrod Road, Jewett Lake, PIC E-zone, Ramsey Lakes, Rivergate Enhancement, T-5 Powerline, riverbank projects (Toyota, Berths 408, 503, and 607 outfall repair, Honda Dock, and Pier 2), Vanport (including Northwest Swale ([NW Swale]), West Wye, and Randall. Port mitigation staff continue to maintain and improve these sites through weed control, maintenance, and habitat enhancement.

SECTION III. MITIGATION PROJECTS REGULATED THROUGH 2014

1. Bobcat Marsh Mitigation Bank

Mitigation location: Jackson Bottom Wetlands Preserve, 2600 Southwest Hillsboro Highway, Hillsboro, Oregon 97123
Location of impact: Portland-Hillsboro Airport (HIO) for Parallel Runway Project

PERMITS AND AGREEMENTS

- USACE Permit No. NWP-2008-658 (Parallel Runway Project)
- USACE Permit No. NWP-2008-658-1 (Bobcat Marsh Phase II)
- Oregon DSL Permit No. 43502-RF (Parallel Runway Project)
- CWS File No. 09-002218 (Parallel Runway Project)

BACKGROUND

The HIO Parallel Runway project was proposed to impact 1.92 acres of wetland. The alignment of the new runway and taxiways could not completely avoid wetland impacts. To mitigate these wetland impacts, and future impacts (1.67 wetland credits) at HIO, the Port entered into an agreement with ODOT, City of Hillsboro, and CWS to develop a wetland mitigation bank. The 18-acre wetland mitigation bank known as Bobcat Marsh is on City of Hillsboro land on the 725-acre JBWP. Before implementation, the mitigation site contained several large mounds consisting of material that was excavated in the early 1980s to create nearby ponds. The material was placed on agricultural fields that were drained in the 1920s by a drainage ditch, known as the Jackson Slough.

Excavation and grading of the mitigation site occurred in 2010 and 2011, and the site was planted in the spring of 2011 and 2012.

MITIGATION PLAN

The goal of the mitigation project was to restore 4.52 acres of wetlands and enhance 11.14 acres of wetlands to result in 8.23 wetland credits. The mitigation project removed 30,000 cubic yards of material and restored hydrology to the previously filled wetlands. Degraded wetlands were enhanced by increasing the hydroperiod and replacing the reed canarygrass–dominated site with native plant species. A shallow, braided linear swale was created through the restored and enhanced wetlands, and a portion of Jackson Slough was filled and rerouted to flow through the swale. Large wood and root wads were added to provide wildlife refugia and perches. The Bobcat Marsh Mitigation Bank is a riverine flow-through system and is hydrologically connected to the Tualatin River. It consists of a combination of palustrine forested (PFO), palustrine scrub-shrub (PSS), and palustrine emergent (PEM) wetlands. A portion of the mitigation bank (0.87 acre of wetland restoration) was completed by ODOT before the Port was involved in the project.

REFERENCE SITE

A site located east of the experimental wetland on the east-central side of JBWP was used as a reference site to identify plant species, structure, and density that the Port hopes to achieve at the mitigation site.

TABLE 2: BOBCAT MARSH MITIGATION BANK ACREAGE

Mitigation Method	Acres			
	PFO-PSS	**PSS**	**PSS-PEM**	**ACRES**
Restoration	1.06	1.69	1.77	4.52
Enhancement	0.85	7.49	2.80	11.14
Total	**1.91**	**9.18**	**4.57**	**15.66**

The numbers of credits that are expected to be generated from this mitigation project and the debits that have been subtracted from this mitigation site are summarized in the table below.

TABLE 3: BOBCAT MARSH MITIGATION BANK CREDIT DISTRIBUTION

CREDITS			
Mitigation Type	**Acres**	**Ratio**	**Credit**
ODOT restoration	0.87	1:1	0.87
Phase I restoration	3.65	1:1	3.65
Phase I enhancement	9.93	3:1	3.31
Phase II enhancement	1.21	3:1	0.4
Total credits	**15.66**		**8.23**

Table 4: Bobcat Marsh Mitigation Bank Credit Balance

DEBITS	
Description	**Acres**
ODOT incidental fall-back fill	0.13
ODOT Permit No. 34788-GA	0.29
ODOT Permit No. R/F 35732	0.45
Port Permits No. 43502RF and NWP-2008-658	1.92
JBWP access road and culvert	0.18
Total debits	**2.97**
Total credits remaining	**5.26***

* 1.67 of the remaining credits belong to the Port and 3.59 credits belong to ODOT.

MITIGATION SUCCESS CRITERIA

Entire Site

- During years of normal precipitation, no permanent standing water will be found on-site.

Emergent Wetlands

- The relative herbaceous invasive plant cover (including reed canarygrass) is no more than 30% in years 1–3, and no more than 20% in years 4 and 5. Invasive plants other than reed canarygrass cannot exceed 10%.
- Bare substrate cover is no more than 20% in year 1, 30% in year 2, 40% in years 3 and 4, and 50% in year 5.
- Six native species at year 1 with a total cover of at least 10%.
- Six native species at year 5 with a total cover of at least 30%. To qualify, a species must have at least 5% cover in the habitat class and occur in at least 10% of the plots.

Scrub-Shrub and Forested Wetlands

- The cover of woody invasive species is no more than 10% throughout the monitoring period.
- The relative herbaceous invasive plant cover is no more than 30% in years 1–3, and no more than 20% in years 4 and 5.
- Six native species (woody and herbaceous) at year 5 with a total cover of at least 30%.
- Native woody stem density is at least 1,600 stems (trees) or plants (shrubs)/acre at year 5, Native volunteers are counted, not dead plants or stems.
- Native woody canopy cover is 10% by year 1, 30% by year 2, 60% by year 5.

Restored Wetlands

- Shall meet the USACE 1987 *Corps of Engineers Wetlands Delineation Manual* wetland hydrology criterion.

2013–2014 UPDATE

- January 2013: broadcast seeded 270 pounds of native grasses and forbs over the entire site; installed 4,000 willow cuttings.
- March 2013: spot-treated invasive/non-native species.
- April 2013: installed 16,500 bare-root trees/shrubs.
- July 2013: spot-treated invasive/non-native species; watered plants four times.
- August 2013: watered plants four times.
- November 2013: mowed to reduce rodent girdling.
- December 2013: overseeded areas sprayed out to reduce non-native species; installed 5,500 bare root trees/shrubs.
- May 2014: spot-treated invasive/non-native species.
- July 2014: spot-treated invasive/non-native species.
- September 2014: spot-treated invasive/non-native species; mowed to reduce rodent girdling.
- October 2014: installed 5,000 container trees/shrubs.

2014 SITE PERFORMANCE

By the time year 3 annual monitoring occurred in 2014, the site was fully meeting all success criteria except two that are not required to be met until year 5. Palustrine emergent wetland and scrub-shrub forest species and cover will be assessed at year 5.

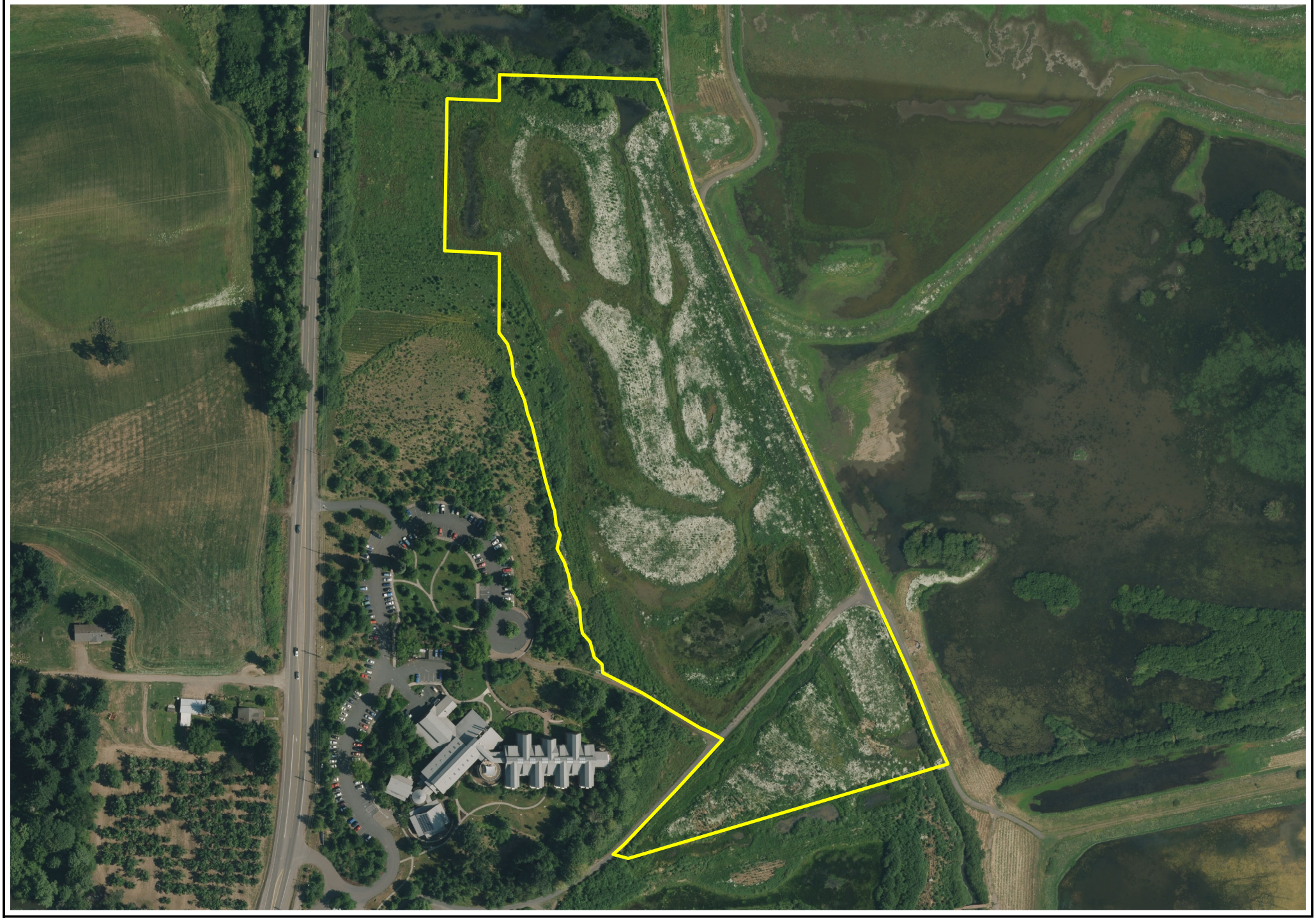
TABLE 5: 2015-2016 ACTION PLAN (CITY OF HILLSBORO STAFF)

Anticipated Tasks	Date
Ring spray around woody plants to reduce rodent girdling and plant competition; spot spray entire site for invasive species.	May
Ring spray around woody plants to reduce rodent girdling and plant competition; spot spray entire site for invasive species.	July
Spot spray entire site for invasive species.	September
Mow the entire site to reduce rodent girdling.	October

TABLE 6: BOBCAT MARSH MITIGATION BANK DOCUMENTATION LIST

Document	Author	Date
Wetland Delineation for a Potential Advance Mitigation Area at Jackson Bottom Wetland Preserve Hillsboro, Oregon	Pacific Habitat Services, Inc.	June 2009
Bobcat Marsh Mitigation Project - Endangered Species Act Documentation	Environ	February 2010
Jackson Slough Improvement Project (Phase II of the Bobcat Marsh Mitigation Project) - Endangered Species Act Documentation	Environ	July 2010
Bobcat Marsh Compensatory Wetland Mitigation Plan for the Hillsboro Airport Parallel Runway Project	Port of Portland	April 2010
Cooperative Improvement Agreement - Bobcat Marsh at Jackson Bottom Wetland Preserve (Advance Mitigation) Port of Portland, Clean Water Service, City of Hillsboro - Agreement Number 25960	ODOT	July 2009

Document	Author	Date
AMENDMENT NUMBER 01 Cooperative Improvement Agreement - Bobcat Marsh at Jackson Bottom Wetland Preserve (Advance Mitigation) Port of Portland, Clean Water Service, City of Hillsboro - Agreement Number 25960	ODOT	July 2010
Bobcat Marsh Mitigation Bank Prospectus	ODOT	November 2010
Mitigation Bank Instrument for Bobcat Marsh Mitigation Bank (Compensatory Wetland Mitigation)		August 2011
Bobcat Marsh Mitigation Bank Monitoring Report Year 1 (2012)	City of Hillsboro	January 2013
Bobcat Marsh Mitigation Bank Monitoring Report Year 2 (2013)	City of Hillsboro	January 2014
Bobcat Marsh Mitigation Bank Monitoring Report Year 3 (2014)	City of Hillsboro	February 2015



PORT OF PORTLAND

Mitigation Site Boundary

N

0 Feet 600

Figure III-1
Bobcat Marsh Mitigation Bank
2013 Aerial Photo

2. Government Island Grassland I

Mitigation location: Government Island, Multnomah County, Oregon
Location of impact: Southwest Quad, PDX

PERMITS AND AGREEMENTS

- Intergovernmental Agreement for Airport Futures Project. Port IGA No. 2011-065, effective May 13, 2011.

BACKGROUND

Airport Futures was a collaborative effort between the Port, COP, and the Portland-Vancouver metropolitan community to create an integrated long-range development plan for PDX. One result of Airport Futures was an IGA between the COP and the Port for natural resource mitigation. The IGA requires that the Port mitigate for 300 acres of upland grassland resources in lieu of having four PDX properties (totaling approximately 268 acres) zoned as environmental overlays. The IGA states that the first 50 acres of mitigation must occur in advance of any development on one or more of the four PDX properties identified in the IGA. Future grassland mitigation on the island, above the initial 50 acres, would be triggered when development on the four properties is proposed to exceed 25 acres.

The Government Island Grassland mitigation site is on Government Island outside of the COP boundaries and northeast of PDX. It is owned by the Port and managed by the OPRD. The mitigation site was created to offset future impacts to four properties at PDX and is a mitigation requirement resulting from an IGA between the COP and the Port as part of the Airport Futures planning process. It was selected because of its size and existing degraded grasslands that are dominated by non-native and invasive species such as pasture grasses, Himalayan blackberry (*Rubus armeniacus*), Canada thistle (*Cirsium arvense*), and teasel (*Dipsacus*). Up to 300 acres of grassland mitigation will occur on Government Island in 50-acre increments. The first 50 acres will be enhanced in advance of any impact on the four properties; future phases of mitigation will be triggered when development on the four properties is proposed to exceed 25 acres. The IGA is effective for 25 years and assumes that mitigation will cost approximately $600,000 per 50-acre parcel over the 25-year period. At the expiration or earlier termination of the IGA, the Port will be entitled to develop land in the amount of 0.89 times the amount of mitigation at the time of termination, not to exceed 268 acres for 300 acres of mitigation. The COP will apply the Conservation Overlay Zone on the balance of the land remaining. The final draft of the proposed mitigation plan for the first 50 acres was submitted to the COP in June 2012.

MITIGATION PLAN

The goal of the grassland mitigation project is to enhance the structure and species richness of grassland habitat by replacing non-native and invasive vegetation with a mosaic of diverse native forbs and grasses that can support grassland associated wildlife and insect populations. Plant species will be selected to attract and maintain native pollinator species that are experiencing significant declines locally. Plantings will also be selected to provide the structure and function necessary to provide the habitat requirements for other grassland associated species. At least 2 years of extensive site preparation will occur before planting to control invasive species and non-native pasture grasses and to expose bare ground, which will help facilitate native seed germination.

MITIGATION SUCCESS CRITERIA

Site-specific success criteria have not yet been established; however, the following two sources were used to develop a list of habitat conditions that we will aim to achieve: USFWS's 2010 *Recovery Plan for the Prairie Species of Western Oregon and Southwest Washington* (Appendix D: Guidelines for Assessment of Prairie Quality and Diversity) and the Oregon Conservation Strategy's 2011 *Willamette Valley Landowner's Guide to Creating Habitat for Grassland Birds*. The proposed targeted habitat conditions include the following:

1) Relative cover of native plant species 50% or more.
2) Little to no woody vegetation (less than 15%).
3) Approximately 10%–30% cover by forbs.
4) Greater than 5% bare ground, but no more than 20%.
5a) No single non-native plant having more than 50% cover on-site.
5b) Invasive non-native species targeted for appropriate level of control.
6a) Plant species richness greater than 10 species.
6b) Preferably three species of grasses and 10 species of forbs, but at a minimum one species of bunch grass and no fewer than seven species of forbs.
7) Mean vegetation height of 12–24 inches (measured in mid to late May), including
    a) less than 25% of the vegetation between 6 and 12 inches,
    b) greater than 50% of the vegetation between 12 and 24 inches, and
    c) less than 25% of the vegetation greater than 24 inches.

In addition to evaluating vegetation criteria, the Port intends to monitor pollinator communities within the mitigation site before and after treatments to measure whether habitat enhancement improves native pollinator abundance and diversity. The Port has hired Xerces, a Portland-based non-profit organization, to develop a monitoring approach and to conduct the pollinator monitoring. Xerces scientists are nationally recognized invertebrate experts who work internationally with scientists, land managers, and the public to conduct applied research, conservation advocacy, and environmental education.

2014 Update
In April 2013, the mitigation site buffer (30 feet around the perimeter of the 50-acre mitigation site) was sprayed, and the 50-acre mitigation site was spot sprayed using glyphosate. The entire 50-acre site was treated with glyphosate in July 2013 then mowed in September. When it was mowed in September, particular attention was paid to the buffer, ensuring that it was mowed as close to ground surface as possible with minimum soil disturbance in preparation for the seeding. The buffer area was broadcast seeded in mid-October with a native grass seed mix containing tufted hairgrass (*Deschampsia cespitosa)*, slender hairgrass (*Deschampsia elongata)*, and blue wildrye (*Elymus glaucus).* Unfortunately, the buffer failed to germinate in 2014. The reason for this failure is speculative, but because seed was broadcast rather than drilled, it is possible that there was insufficient soil contact or the seed was exposed to high amounts of herbivory.

During a site visit in April 2014, Port staff observed a significant amount of moss accumulation and mole activity throughout the site. In areas 1 and 2, large amounts of bare ground were observed, but the remaining three areas still showed considerable vegetation cover. In June 2014, the site was treated using a combination of Rodeo (glyphosate) and Opensight (aminopyralid, metsulfuron methyl). Then, the entire site was mowed in September and treated again in October with a combination of Rodeo and Metcel VMF (metsulfuron methyl).

Portions of the site flood during high river levels. There is a low outlet from the mitigation site into Commodore Cove where much of the flow enters and leaves the site. Due to concerns that the outlet was serving as a source for weed introduction into the site and could also be a path for native seeds to flow from the site, the outlet was planted with willow (*Salix*) and red-osier dogwood (*Cornus sericea*) wattles in December 2012 and again in 2014 to create a natural barrier.

2014 SITE PERFORMANCE
Although still within the site preparation period, the site was monitored, and annual monitoring reports were submitted to the COP and the Community Advisory Committee in January 2013 and 2014.

TABLE 7: 2015-2016 GOVERNMENT ISLAND GRASSLAND I ACTION PLAN

Anticipated Tasks	Date
Entire site treated with glyphosate	Spring 2015
Bird survey (point count)	April
Vegetation monitoring	Late spring
Entire site mowed	Summer 2015
Bird survey (point count)	June
Bird survey (area search)	September and October
Entire site treated with herbicide	Late summer before seeding 2015
Re-seeding of the buffer	September 2015
Seed grassland	September 2015
Bird survey (area search)	November and December
Seed acquisition (by Xerces)	May occur throughout 2015–2016

TABLE 8: GOVERNMENT ISLAND GRASSLAND I DOCUMENTATION LIST

Document	Author	Date
GI Grassland Mitigation Project Draft Planning Document	Port	September 2011
GI Grassland Mitigation Project Phase I Mitigation Plan	Port	June 2012
Xerces Status Report	Xerces	February 2013
GI Grassland Mitigation Project 2012 Annual Report	Port	April 2013
GI Grassland Mitigation Project 2013 Annual Report	Port	January 2014
GI Grassland Mitigation Project 2014 Annual Report	Port	January 2015

PORT OF PORTLAND

Mitigation Site Boundary

N

0 Feet 760

Figure III-2
Government Island Grassland Mitigation
2013 Aerial Photo

3. Randall

Mitigation location: 860 Northwest 334th Avenue, Hillsboro, Oregon
Location of impact: Portland-Hillsboro Airport (HIO), Airport Projects (2001–2011)
Year released: 2015

PERMITS AND AGREEMENTS

- Declaration of Restrictive Covenants No. 2001081934
- USACE Permit No. 2001-00059 (Runway Safety Area)
- USACE Permit No. 2005-00257 (Taxiway A)
- USACE NWP 2007-1033 (High Speed Exits and Taxiway C)
- USACE NWP 2008-498 (Aero Air)
- USACE NWP 2011-514 (Runway 2-20)
- Oregon DSL Permit No. 23613-RF (Runway Safety Area)
- Oregon DSL Permit No. 40015-FP (High Speed Exits and Taxiway C)
- Oregon DSL Permit No. 48489-RF (Runway 2-20)
- CWS Washington County File 782
- CWS, Service Provider Letter, File No. 08-000645 (Aero Air)
- CWS, Service Provider Letter, File No. 08-003416 (Taxiway C)
- CWS, Service Provider Letter, File No. 12-000864 (Runway 2-20)
- Washington County Land Use & Transportation Department Review File No. 01-119-FP/W
- Washington County Grading Permit No. 05229229

BACKGROUND

The Randall Mitigation Site is on both sides of Northwest 334th Avenue in Hillsboro, Oregon, west of Dairy Creek and south of the Killarney West Golf Course. At the time of purchase in March 2001, the property included a residence and associated outbuildings in the southwest portion of the property, a small excavated stock pond, a drainage swale, degraded wetlands (scrub-shrub), upland and riparian forest, and open fields used as pasture for several decades. The 22.3-acre site was constructed in 2003 to provide compensatory wetland mitigation for the Runway Safety Area Project at HIO and advanced mitigation credit for future projects. Since its construction, mitigation credits have been used for five additional projects: Taxiway Alpha, High Speed Exits, Taxiway C, Aero Air Hanger, and Runway 2-20. The site also includes vegetated corridor mitigation of enhancing the wetland buffer to comply with CWS.

MITIGATION PLAN

The goal of the wetland mitigation project was to restore, create, and enhance wetland and riparian conditions to replace wetland functions and values lost as a result of project impacts. The mitigation plan provides for 6.68 acres of enhanced wetland, 3.32 acres of created wetland, and 1.82 acres of restored wetland area, for a total of 6.25 acres of wetland mitigation credit to compensate for the loss of 5.92 acres of wetlands. The objectives of the plan include restoring wetland hydrology, creating wetland forest and scrub-shrub habitat, enhancing wetland prairie and riparian areas along Dairy Creek, and enhancing and restoring upland habitat.

Site preparation included the removal of all structures on the site, the abandonment of two water wells, and the installation of 11 groundwater monitoring piezometers to establish final grading levels. Excavation and grading of the site were completed in November 2002, and planting was completed in March 2003. Large woody debris, consisting of approximately 14 logs ranging in size from 10 to 20 feet long and 8 to 15 inches in diameter, were anchored in the wetland areas, and approximately 25 logs and 15 stumps were placed unanchored in the upland. Following completion of grading, five piezometers were decommissioned.

REFERENCE SITES

Dairy Creek riparian forest adjacent to the property and Jackson Bottom Wetlands Preserve were used to identify appropriate species composition and planting densities.

TABLE 9: RANDALL MITIGATION SITE PERMITS

Project Name	Runway Safety Area	Taxiway A	High Speed Exits	Aero Air	Taxiway C	Runway 2-20
USACE Permit No.	2001-00059	2005-00257	NWP 2007-1033	NWP 2008-498	NWP 2007-1033	NWP 2011-514
DSL Permit No.	23613-RF	n/a	40015-FP	41207-FP	40015-FP	48489-RF
Washington County	01-119-FP/W; CWS 782	01-119-FP/W	05229229	05229229	05229229	n/a
CWS	n/a	n/a	n/a	08-000645	08-003416	12-000864
Planting complete	September 2003	September 2003	September 2003/May 2008	September 2003/May 2008	September 2003/May 2008	September 2003/May 2008
Monitoring start date	October 2003	October 2003	October 2008	October 2008	October 2008	October 2008
Impact acres (federal/state)	3.460/5.400	0.110	0.120	0.030	0.057	0.270
USACE mitigation requirement (acres)	8.51	0.17	*1.40	0.17+*1.40	0.09+*1.40	0.41+*1.40
DSL mitigation requirement (acres)	10.67	n/a	0.18	0.17	0.09	0.41
CWS vegetated corridor (acres)	n/a	n/a	n/a	0.060	0.030	0.166
Creation (C)/enhancement (E)/restoration (R)	C/E/R	C	C	C	C	C

* 1.4 acres are the portion of Randall that was regraded in October 2007 and is included in the Runway Safety Area permits; USACE required 5 years of monitoring this area as mitigation, in part, for High Speed Exits, Aero Air, and Taxiway C impacts.

TABLE 10: RANDALL MITIGATION SITE CREDIT BALANCE

Type	PEM-E	PSS-E	PSS-R	PSS-C	PFO-E	PFO-C	*RB	*UFB	*UFR	*RBR	Total *Wetland* Acres
Baseline wetland acreage	6.58	–	–	–	–	0.58	0.74	0	0	0	7.16
Adjusted wetland acreage following mitigation	5.67	0.78	1.52	0.5	0.2	3.59	0.74	2.17	2.94	0.57	12.26
Adjusted wetland acreage following 2006 delineation	5.67	0.78	1.52	0	0.2	2.17	0.74	2.17	2.94	0.57	10.34
Adjusted wetland acreage following 2007 regrade	**5.67**	**0.78**	**1.52**	**0.5**	**0.2**	**3.09**	0.74	2.17	2.94	0.57	**11.76**
Acreage used for Impacts											
Runway Safety Area	5.67	0.78	1.52	0.5	0.2	1.99	–	–	–	–	10.66
Taxiway A	–	–	–	–	–	0.17	–	–	–	–	0.17
High Speed Exits	–	–	–	–	–	0.18	–	–	–	–	0.18
Aero Air	–	–	–	–	–	0.17	–	0.06	–	–	0.17
Taxiway C	–	–	–	–	–	0.09	–	0.03	–	–	0.09
Runway 2-20	–	–	–	–	–	0.41					0.41
Total acreage used to date	5.67	0.78	1.52	0.5	0.2	3.01	0	0.09	0	0	11.68
Total acreage remaining	0	0	0	0	0	0.08	0.74	2.08	2.94	0.57	**0.08**
Total credits remaining	0	0	0	0	0	0.05	–	–	–	–	**0.05**

C = creation; E = enhancement; R = restoration; RB = riparian buffer, UFB = upland forest buffer, UFR = upland forest Restoration, RBR = riparian buffer restoration. * Upland acreage not included in total.

MITIGATION SUCCESS CRITERIA

- Herbaceous cover shall be equal to or greater than 50% by year 1, 70% cover by year 2, and 80% cover thereafter.
- Woody vegetation shall be 350 trees or saplings at 1-inch diameter 5 inches above the ground in the forested wetland community and at least 850 shrubs in the wetland scrub-shrub community at the end of year 5 (USACE permit requirement); in addition, 80% survival (including recruits) of the original number planted is required on an annual basis (DSL permit requirement).
- Undesirable vegetation shall be less than 10%–15% for years 3 through 5, except for reed canarygrass, which can reach 25% cover in the depressional wetland prairie community.

TABLE 11: RANDALL MITIGATION SITE PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 2001-59 DSL No. 23613-RF	Monitoring will take place for 5 years.	Year 5 monitoring occurred July 2007.
USACE No. 2001-59 DSL No. 23613-RF	A monitoring report shall be submitted after year 2 and year 5 by October 15 to the USACE and annually by December 31 to DSL.	Year 5 monitoring report was submitted December 2007, but additional years of monitoring are required due to the 2007 regrade.
DSL No. 23613-RF	Fixed photo points shall be established for monitoring purposes.	Photo points were established for the first year monitoring.
DSL No. 23613-RF	The site shall be fenced to protect the area from human impacts.	Fence erected around the property summer 2001; replaced 2003
DSL No. 23613-RF	A deed restriction shall be put in place, including the mitigation site and the preservation area, before the placement of fill authorized by this permit.	Deed restriction recorded for the property August 9, 2001
DSL No. 23613-RF	A bond in the amount of $180,000 shall be obtained to ensure completion of the	Removal-Fill permit bond for $180,000 was put in place June

Permit	Requirement	Status
	mitigation work set out in the mitigation plan.	14, 2001.
CWS No. 782	Within 72 hours of completion of planting, applicant shall contact CWS to schedule an inspection visit.	Inspection carried out by Heidi Berg (CWS) July 2003.
WC No. 01-119	Within 90 days of completion of the wetlands enhancement activities, provide Washington County evidence that the landscaping associated with the enhancement has been installed consistent with the proposed planting plan and with the requirements of Section 407.	As-built report submitted October 2003.
WC No. 01-119	Within 2 years and 5 years of completion of the enhancement activities, provide the Land Development Division and biologist for the Clackamas District with a detailed status report by a wildlife biologist or ecologist of the enhancement project, with map and color photographs documenting the current condition of the site.	Copied Land Development Division on letter sent out to all agencies February 2005.
WC No. 01-119	Adequate sight distance shall be continuously maintained by the property owner. This may require the property owner to periodically remove obstructing vegetation from the road.	Monthly inspections made.
USACE No. 2005-257	Permit required that 0.17 acre of wetland credit be subtracted for 0.11 acre of impacts at HIO related to safety improvement for Taxiway A.	Acres remaining: 0.93. Wetland credits remaining: 0.62.*
DSL No. 40015-FP	Modified permit requires that the Port subtract 0.27 acre to mitigate for 0.18 acre of impacts at HIO related to the projects for High Speed Exits and Taxiway C.	Acres remaining: 0.66. Wetland credits remaining: 0.44.*
NWP-2007-1033	Modified permit requires that the Port subtract 0.09 acre to mitigate for 0.057 acre of impacts at HIO related to the projects for High Speed Exits and Taxiway C. Permit also requires that the 1.4-acre regraded area (2007) be monitored for 5 years to ensure compliance with permit conditions.	Wetland acres remaining: 0.66. Wetland credits remaining: 0.44.* Year 3 report of 5-year monitoring for regrade was submitted November 2010.
NWP-2008-498	Permit requires that the Port subtract 0.17 acre to mitigate for 0.03 acre of impacts related to the Aero Air Hanger project. Permit also requires that the 1.4-acre regraded area (2007) be monitored for 5 years to ensure compliance with permit conditions.	Wetland acres remaining: 0.49. Wetland credits remaining: 0.33.* Year 3 report of 5-year monitoring for regrade was submitted November 2010.
CWS No. 08-000645	Vegetated corridor permit requires 0.06 acre of vegetated buffer for the impacts	Year 1 monitoring occurred September–October 2010.

Permit	Requirement	Status
	related to the Aero Air Hanger project. The site shall be monitored for 2 years beginning in 2010 to ensure compliance with CWS.	
CWS 08-003416	Vegetated corridor permit requires 0.03 acre of vegetated buffer for the impacts related to the Taxiway C project. The site shall be monitored for 2 years beginning in 2010 to ensure compliance with CWS.	Year 1 monitoring occurred September–October 2010.
USACE No. 2011-514	Permit requires that 0.41 acre of wetland credit be subtracted for 0.27 acre of impacts at HIO related to Runway 2-20 improvements.	Wetland acres remaining: 0.08. Wetland credits remaining: 0.05.*
DSL No. 48489-RF	Permit requires that 0.41 acre of wetland credit mitigate for 0.27 acre of impacts at HIO related to Runway 2-20 improvements.	Acres remaining: 0.08. Wetland credits remaining: 0.05.*
CWS No. 12-000864	Permit requires 0.166 acre of vegetated buffer enhancement for impacts related to Runway 2-20.	

*Based on DSL ratio for created wetland mitigation (1.5:1).

2013–2014 UPDATE

- A follow-up delineation light was conducted in April 2013 of the regraded area.
- An amphibian egg mass survey was conducted in March 2014. Long-toed salamander (*Ambystoma macrodactylum*) egg masses were found.
- An amphibian egg mass survey was conducted in January 2015. Long-toed salamander and Pacific chorus frog (*Pseudacris regilla*) egg masses were found. DSL released the site from further obligation with a letter sent on May 18, 2015.
- USACE released the site from further obligation with a letter sent on June 11, 2015.

2014 SITE PERFORMANCE

Port staff delineated the mitigation wetland boundary in 2006 and discovered that the site was approximately 1.43 acres short of the required 11.76 acres. A portion of the site was regraded and planted in 2007 to meet the wetland acreage requirement. This area was monitored for 5 more years from 2008 through 2012. A follow-up delineation light was conducted in 2013 of the regraded area. The boundary of the created 1.47-acre palustrine emergent seasonally flooded (PEMC) wetland was delineated in the study area. The entire site has now met the required wetland acreage of 11.76 acres.

Vegetation monitoring conducted in 2012 showed that the site mostly meets all success criteria. Herbaceous cover averaged > 80% in the created wetland scrub-shrub community but < 80% (71%) in the created forest community; because this was caused by the longer period of inundation during the 2012 growing season and the reduced time for herbaceous vegetation to grow, it is likely that this criterion would have been met under normal conditions. In 2010, herbaceous cover averaged > 80%. Undesirable vegetation (including reed canarygrass) cover averaged 0.6% and met the criterion of < 10% cover. Although the stem density is high in the regraded area due to planting and recruitment, the 1-inch diameter criterion was not being met. In 2012, 283 trees measured 1-inch caliper or larger, which is 67 trees short of the 350 required, but clearly shows the site is on a positive trajectory.

The mitigation site was designed to provide additional habitat for native amphibians, reptiles, birds, and mammals. Baseline vegetation, wildlife, and hydrology data were collected in 2001 and 2002; post-project herbaceous vegetation species cover, tree/shrub survival, wildlife, and hydrology data have been collected annually from 2003 to 2012. To document site conditions, wildlife and hydrology data were collected in 2013 and 2014.

The Randall site receives annual overland flooding each winter and spring when McKay and Dairy Creeks rise. These conditions promote wetland hydrology throughout the site and provide a valuable influx of seed for natural recruitment. High surface water often lingers during the growing season and delays or impacts herbaceous and woody growth. In 2013 and 2014, the low areas of the site (swale, pond, and isolated depressions) were flooded seasonally.

Wildlife use of the site includes a variety of bird, mammal, herptiles, and macroinvertebrate species. The most common wildlife observed (i.e., those observed at least 6 months out of the year) include American robin, black-capped chickadee, Northern flicker, song sparrow, spotted towhee, western scrub jay, black-tailed deer, and Pacific chorus frog. Bird species observed that are associated with wetlands and grasslands included barn swallow, belted kingfisher, Canada goose, mallard, ring-necked duck, scaup, wood duck, marsh wren, red-winged blackbird, killdeer, great blue heron, great egret, spotted sandpiper, Wilson's snipe, California quail, common yellowthroat, golden-crowned sparrow, and Savannah sparrow. Other notable observations include lesser goldfinch, rufous hummingbird, osprey, willow flycatcher, common raven, white-breasted nuthatch, and red-breasted sapsucker. During amphibian egg mass surveys conducted in March 2014 and January 2015, long-toed salamanders and pacific chorus frog egg masses were observed.

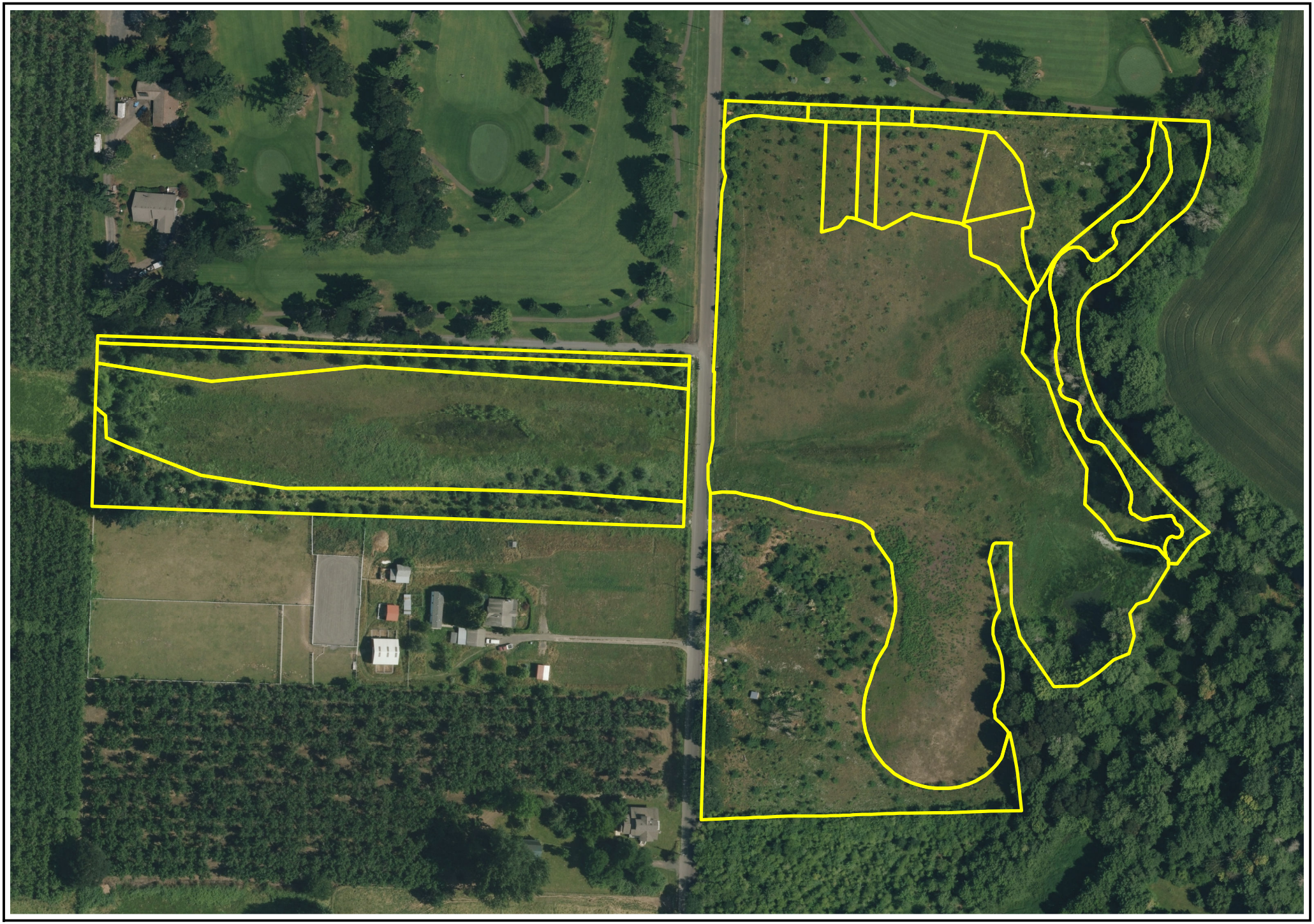
TABLE 12: 2015-2016 ACTION PLAN FOR RANDALL

Anticipated Tasks	Date
Site weeds maintenance during growing season (typically March–October).	As needed
Amphibian egg mass survey.	January
Amphibian surveys (for juvenile red-legged frogs).	Late summer

TABLE 13: RANDALL DOCUMENTATION LIST

Document	Author	Date
Randall Property Wetland Delineation Report	Entranco	June 2000
Compensatory Mitigation Plan	Entranco	December 2000
Washington County 421 Compliance Report for Proposed Randall Site Mitigation	Entranco	December 2000
Grading Plan for Randall Mitigation Site	Entranco	December 2000
Cultural Resources Study for the Randall Property Wetland Mitigation Area, Washington County	AINW	January 2001
Wildlife Census Study Randall Property/Port of Portland Mitigation Site	Entranco	March 2001
Randall Property Observation Well Soil Data	URS	April 2001
Randall Pre-construction Vegetation Survey	PORT	June 2001
Randall Property, Evaluation of Proposed Grading Plan Against Hydrology Data	URS	April 2002
Graphical Soil Analysis Report	A&L	May 2002
Vegetation Survey of Randall Property Washington County, Oregon	L. Wilson	July 2002
Randall Property, Piezometer Installation, 12 and 13	URS	August 2002
Graphical Soil Analysis Report	A&L	September 2002

Document	Author	Date
Randall Water Quality Sampling	PORT	May 2003
Vegetation Survey of Randall Property Washington County, Oregon	L. Wilson	June 2003
Randall Mitigation Site, Final As-built Report, July 2003	PORT	July 2003
Randall Mitigation Site Mitigation Monitoring Report Year 1 of 5	URS	October 2003
Randall Water Quality Sampling	PORT	June 2004
Randall Mitigation Site Mitigation Monitoring Report Year 2 of 5	Jones & Stokes	January 2005
Randall Mitigation Site Mitigation Monitoring Report Year 3 of 5	Jones & Stokes	December 2005
Randall Mitigation Site Mitigation Monitoring Report Year 4 of 5	Jones & Stokes	December 2006
Randall Mitigation Site Mitigation Monitoring Report Year 5 of 5	Jones & Stokes	December 2007
Randall Mitigation Site Mitigation Monitoring Report Year 6	Jones & Stokes	October 2008
Randall Mitigation Site Mitigation Monitoring Report Year 7	Jones & Stokes	December 2009
Xerces Society Project Completion Report to OWEB	Xerces	August 2009
Randall Mitigation Site Mitigation Monitoring Report Year 8	PORT	December 2010
Randall Mitigation Site Mitigation Monitoring Report Year 9	PORT	December 2011
Randall Mitigation Site Mitigation Monitoring Report Year 10	PORT	December 2012
Wetland Delineation Light Report	SWCA	May 2013
DSL Site Release Letter	DSL	May 2015
USACE Site Release Letter	USACE	June 2015



PORT OF PORTLAND

Mitigation Site Boundary

N

0 Feet 440

Figure III-3
Randall Mitigation
2013 Aerial Photo

4. TRIP Phase I, Company and East Lakes

Mitigation location: Troutdale, Multnomah County, Oregon
Location of impact: Troutdale, Multnomah County, Oregon, TRIP development

PERMITS AND AGREEMENTS

- Conservation Easement, December 13, 2007
- USACE Permit No. NWP-2007-889, May 28, 2009
- Oregon DSL Permit No. 40094-RF, February 10, 2011
- USACE Permit No. NWP-2011-432, August 9, 2013

BACKGROUND

In 2007, the Port purchased the Reynolds Metals Corporation property for development as the Troutdale Reynolds Industrial Park (TRIP). The TRIP project embodies the concept of beneficial reuse of a large brownfield site, in particular a Superfund-designated clean-up site. Development of the site began in 2008 with the Phase I construction of the FedEx Ground automated package distribution center. This development encompassed approximately 142 acres, 8,500 linear feet of paved trail on top of the levee, a new road (NW Swigert Way), the relocation of approximately 1,670 linear feet of Salmon Creek and its tributaries to accommodate the future widening of Sundial Road, the construction of a new utility corridor, and the construction of stormwater facilities for the new development. Phase 1 development impacted 0.28 acre of degraded wetland that was dominated by reed canarygrass and Himalayan blackberry and 0.53 acre of waters (Salmon Creek and two tributary ditches). Mitigation for Phase I consisted of a 0.42-acre wetland creation at East Lake. The mitigation site also provides advanced mitigation (3.18 credits) for future development (see TRIP Phase II mitigation in Section V of this report). Year 1 monitoring began in 2010 and will continue through at least 2015 as required by DSL and the USACE. In 2013, the PDX Logistics Center project impacted 0.98 acre of USACE-jurisdictional wetlands near PDX. Advance creation credits at East Lake were approved to mitigate for the impact.

By May 2015, both DSL and USACE approved a permit modification to extend monitoring through 2019 (10 years) to allow further opportunity for plant establishment. Due to prolonged inundation, the site was not meeting success criteria for groundcover and tree/shrub establishment.

MITIGATION PLAN

The goals of the mitigation plan (revised March 2015) for TRIP Phase I are as follows:

- Establish a minimum 0.42-acre created emergent and scrub-shrub wetland at East Lake (1.5:1 ratio) to mitigate for impacts associated with TRIP Phase I development.
- Establish a minimum of 1.47 acres of created emergent and scrub-shrub wetland at East Lake to mitigate for impacts associated with the PDX Logistics Center. In addition, the Phase I mitigation project was to provide advance credits and the following acreage:

TABLE 14: TRIP PHASE I MITIGATION SITE CREDIT BALANCE

Site	Enhanced Emergent Acres	Created Emergent Acres	Created Forest /Scrub-Shrub Wetland Acres	Credits
Company Lake	0.56	0.60	0.70	1.86
East Lake	0.60	0.90	2.10	3.60
Subtotal	1.16	1.50	2.80	**5.46**
TRIP Phase I				**-0.28**
PDX logistics				**-0.98**
Advance credits				**4.20**

- Improve wildlife habitat by diversifying vegetation and installing large woody material and snags.
- Establish wetland hydrology in the mitigation area.
- Create native-dominated wetland community in the mitigation area.
- Replace in-kind waters of the state (Salmon Creek and roadside ditch).

The completed wetland mitigation site includes planted 4:1 and 5:1 slopes, a hummock at 13 feet National Geodetic Vertical Datum (NGVD) and two shallow swales excavated to approximately 8 feet NGVD. The slopes and wetland bottom were seeded with native species. Silts encountered during grading were stockpiled and used as a 4- to 6-inch amendment to the slopes. Five cottonwood trees were removed from the excavation area, cut into manageable pieces and stockpiled before excavation began. Eight habitat logs, two with root balls intact, were then placed in the wetland once grading was complete.

REFERENCE SITE

Wetland "C" in the TRIP wetland delineation was chosen as a reference site for the mitigation project because it is a relatively intact Columbia River floodplain that includes forested, scrub-shrub, and emergent wetland plant communities. The mitigation site consists of a similar landscape position except it is not diked from the Columbia River.

MITIGATION SUCCESS CRITERIA (REVISED MARCH 2015)

- A minimum of 1.89 acre of created wetland shall meet the hydrology criterion specified in the USACE 1987 *Corps of Engineers Wetland Delineation Manual*.
- There shall be a minimum of 30% cover of native wetland plants by the end of year 1 after planting, 60% cover by the end of year 2, and 80% cover by the end of years 3 and 5; natural recruitment of native species may be included in the cover calculation.
- There shall be no more than 20% cover of non-native invasive plant species (e.g., designated as 'A' or 'B' by the ODA), including reed canarygrass, and there shall be a trend of decreasing non-native plant species cover.
- An area not exceeding 0.2 acre may be classified as a "prolonged inundated area" if it is ponded more than 7 months of the year and therefore exempt from the native plant cover percent success criteria. Noxious aquatic weeds shall not exceed more than 5% total cover.
- One habitat log (a minimum of 16-inch diameter at breast height and 30 feet long) and one snag shall be placed in the created wetland.
- Newly Constructed Salmon Creek: There shall be a minimum of 40% cover of native plants by the end of year 3, 50% cover by the end of year 5, and not more than 30% cover of non-native weeds as ranked by ODA and including reed canarygrass.
- As-built report shall be submitted within 60 days following completion of grading and planting.
- In addition, for the USACE, 0.67 acre of riparian forest and/or scrub-shrub will be planted and maintained near the Sandy-Columbia Rivers confluence and will consist of 300 trees of no less than 3 species and no one species comprising less than 20% of the mix. At least 75 viable trees stems per acre will be established. Herbaceous cover will consist of no less than 5 species with no one species comprising less than 10% of the mix and with 40% cover in year 1, 60% cover in year 2, and 80% cover in the following years; weedy species no more than 20% cover at any time during the monitoring period.
- The planting plan may now include native willow species in the PFO community. The combined stem density must exceed 500 stems per acre by 2019 with a 1-inch diameter at 5 inches above ground. Replanting may occur at any time but may extend the monitoring period.

TABLE 15: TRIP PHASE I MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. NWP-2007-889 DSL No. 40094-RF	An as-built report will be submitted within 60 days of completing grading and planting.	Submitted March 2011.
USACE No. NWP-2007-889	An annual report will be submitted by January 31 for 5 years following construction.	Year 1 monitoring report submitted January 2011.
USACE No. NWP-2007-889 DSL No. 40094-RF	Creation of 0.42 acre of emergent and scrub-shrub wetland at East Lake shall meet the USACE 1987 *Corps of Engineers Wetlands Delineation Manual* hydrology criterion.	Wetland acreage East Lake: estimated to be at least 0.42 acre.
USACE No. NWP-2007-889 DSL No. 40094-RF	Native plant cover shall be a minimum of 30% cover in year 1, 60% cover in year 2, and ≥ 80% cover in years 3–5.	Year 3 (2012) Transect Data: East Lake: 58%. Company Lake: 71%.
USACE No. NWP-2007-889 DSL No. 40094-RF	No more than 20% cover invasive species (i.e., ranked as A or B by ODA), including reed canarygrass.	Year 3 (2012) Transect Data: East Lake: 0%. Company Lake: 0%.
DSL No. 40094-RF	An area not > 0.2 acre may be classified as "Prolonged Inundated Area" if it is ponded > 7 months of the year and therefore exempt from the native plant cover criterion but shall not exceed > 5% noxious aquatic weeds.	Year 3 (2012) Noxious Aquatic Weeds < 5% cover: East Lake: 0%. Company Lake: 1% Eurasian water milfoil.
DSL No. 40094-RF	New construction of 820 feet of Salmon Creek channel and 850 feet of roadside ditch for conveyance adjacent to Sundial Road north of the road's intersection with Salmon Creek. Newly constructed Salmon Creek native cover shall be a minimum of 40% by year 3 and 50% by year 5, with no more than 30% cover of non-native weeds	2012 Native Cover: estimated to be at least 65%. 2012 Weedy Cover: estimated to be less than 10%.
DSL No. 40094-RF	Habitat elements: 1 habitat log and 1 snag with minimum dimensions of 16-inch diameter at breast height and 30 feet long.	At East Lake 3 snags and 8 rootwads were installed; at Company Lake 3 snags and at least 5 root wads were installed.
USACE No. NWP-2007-889	The use of irrigation water to assist in the establishment of mitigation plantings will be terminated for at least the last two growing seasons of the monitoring period.	2012: hand watered.
USACE No. NWP-2007-889	Establishment of 0.67 acres of riparian forest/scrub-shrub (300 trees site) with at least 3 species comprising at least 20% of the mix; 75 viable tree stems/acre; herbaceous cover with at least 5 species comprising 10% of the mix; herbaceous	Year 3 (2012): > 200 trees: 45 ash, 51 willow, 56 oak, 51 Douglas-fir, 15 cottonwood. Native Cover: 100% blue wildrye and California

Permit	Requirement	Status
	cover 40% in year 1, 60% in year 2, and 80% years 3–5; and no more than 20% cover of noxious weeds.	brome. Weedy Cover: 0%; trace blackberry on-site.

2014 UPDATE

- A survey for Asian longhorned beetle was conducted in April 2013.
- A survey for terrestrial amphibians was conducted in June and November 2013. American bullfrog (*Rana catesbeiana)*, Pacific chorus frog, and long-toed salamander were found in transects located at Company and East Lake.
- Inundation mapping was completed by Taya MacLean (SWCA) in April 2013.
- A survey for terrestrial and juvenile amphibians was conducted in May 2014. Northern Pacific chorus frog, long-toed salamander, and *Ensatina* were observed in the upland forested canal behind Company Lake.
- A site visit with Laura Guderyahn (City of Gresham) took place in June 2013 to discuss potential turtle habitat enhancement at Company and East Lake.
- An evening site visit to East and Company Lake was conducted in July 2013. The survey revealed an active beaver lodge, but no bats or turtles were seen.
- A bullfrog tadpole die-off occurred in October 2013 at East Lake. Sick tadpoles were collected and sent to ODFW to determine if *Ranavirus* was responsible for the die-off. The necropsy revealed that although the tadpoles exhibited physical indications of *Ranavirus*, the virus was not responsible for the die-off.
- A survey for amphibian egg masses was conducted in March 2014. Pacific chorus frog egg masses were observed at Company Lake and long-toed salamander egg masses were observed along the southeast shoreline at East Lake.
- An informal survey for red-legged frogs conducted north of Company Lake resulted in the observation of salamander larvae in the wooded channel located perpendicular to the north-south pipe ditch. No red-legged frogs were observed.
- Five new turtle nesting patches were created in October 2014 at East Lake and five new nesting patches at Company Lake.
- A portion of Company Lake was replanted in October 2014, due to mortality associated with prolonged inundation; 1,600 trees and shrubs were installed and the area was seeded with a native seed mix.

2013–2014 SITE PERFORMANCE

The fourth of a 5-year required monitoring period was conducted in September 2013. The site is on track to meet vegetation criteria at the 300 Trees and Salmon Creek mitigation areas and the invasive species cover success criterion at the East Lake and Company Lake mitigation areas. However, natural colonization of trees and shrubs was not successful, and plantings and seed installed in 2012 failed as well. This suggests that, due to dynamic hydrologic conditions at the site, native groundcover will continue to be lower than predicted and will likely be dominated by spikerush (*Eleocharis* spp.) and other obligate wetland plants. As negotiated with the regulating agencies, formal vegetation monitoring was not conducted in 2014; instead, a letter report was submitted, which included a brief maintenance summary and description of the October 2014 planting effort at Company Lake.

As a result of permit modifications with DSL and USACE, the site will be monitored for at least 5 more years through 2019. A summary of site activities conducted in 2014 follows:

Monitoring
General site inspections for wildlife, hydrology, and general site maintenance needs were conducted April–July and September–October 2014. Amphibian egg mass surveys were conducted February 13 and March 26, 2014. No egg masses were observed in February, possibly because the survey was done too early in the year. Seven Pacific chorus frog and two long-toed salamander egg masses were observed during the March survey.

General Maintenance
General maintenance activities during the 2014 season at Company and East Lake included treatment of Himalayan blackberry, tansy ragwort (*Senecio jacobaea*), Scotch broom (*Cytisus scoparius*), Canada thistle, reed canarygrass, and oxeye daisy (*Leucanthemum vulgare*) in upland areas; treatment of reed canarygrass and bird's-foot trefoil (*Lotus corniculatus*) in wetland areas; trash removal along lake edges, access roads and trails; access road maintenance; and vandalism repair.

Wildlife Habitat Enhancements
Native western painted turtles (an Oregon state-listed sensitive, critical species) have been regularly observed at both Company and East Lake from 2008 to 2014. During the planning stages of these mitigation sites, the benefit of turtle nesting habitat creation was recommended by ODFW because of the potential benefit to turtles. In 2013, two nesting patches were created at Company Lake by simply scraping vegetation from the ground surface and hand pulling weeds as they came up throughout the year. Nesting was not observed at these patches, and because of the extensive maintenance needed to keep these areas clear of weeds, a new method to create patches was implemented the following year.

In 2014, ten new turtle nesting patches (five at Company Lake, five at East Lake) were created in mid-October following BMPs generated by the ODFW. Patches were created by scrapping out all vegetation in a 6 × 6–foot area (turtle patch). The soil in this area was then tilled by hand 1 foot deep, and approximately 50 pounds of sand were mixed in with the soil. A thin layer of small (1/4-inch minus) river stone aggregate was then spread on the top of each turtle nesting patch to suppress weeds. Monitoring and management of these turtle nesting patches will occur in the 2015 field season, and observed use of these sites by turtles will be reported in the TRIP Phase I Mitigation Annual Report for 2015.

October 2014 Planting
Company Lake was replanted in October 2014 with rooted stock using species permitted under modified permit No. 40094-RF, Special Condition No. 30. Four species of trees and two shrub species were planted densely in the PFO community at Company Lake. The Port installed 625 Oregon ash, 450 native willows, and two shrub species that they have found to survive inundation. Once the site was planted, native seed was raked into the soil.

TABLE 16: 2015-2016 ACTION PLAN FOR TRIP PHASE I MITIGATION

Anticipated Tasks	Date
Invasive species control (includes manual, mechanical, and chemical).	March–September
Vegetation monitoring.	July–August
Plant watering, as needed.	July–September
Site inspections (includes invasive species, wildlife and hydrology monitoring).	Monthly

TABLE 17: TRIP PHASE I DOCUMENTATION LIST

Document	Author	Date
Wetland Delineation Troutdale Reynolds Industrial Park (TRIP)	David Evans and Associates (DEA)	August 2007
OPRD Conservation Easement	OPRD/Reynolds Metals Corporation	December 2007
Wetland Mitigation Plan TRIP	DEA	March 2008
Request for Modification to DSL Permit No. 40094-RF (TRIP) Phase I (Permit Conditions 15 and 30) and USACE Permit 2007-00889 (Grading Plan Modification)	PORT	November 10, 2009
DSL Permit No. 40094-RF Modified	DSL	February 2011
As-built Report TRIP Mitigation Site	PORT	March 2011
2010 (Year 1) Monitoring Report TRIP Phase I Mitigation	PORT	January 2011
2012 (Year 3) Monitoring Report TRIP Phase I Mitigation	PORT	December 2012
2013 (Year 4) Monitoring Report TRIP Phase I Mitigation	PORT	December 2013
2014 (Year 5) Letter Report TRIP Phase I Mitigation	PORT	December 2014
DSL Permit No. 40094-RF Modified to include additional species in PFO and extend monitoring period 5 additional years through 2019	DSL	September 2014
USACE Permit No. 2007-00889 modified	USACE	May 2015

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Mitigation Site Boundary

N

0 Feet 920

Figure III-4
TRIP Phase I Mitigation
2013 Aerial Photo

5. West Hayden Island Mitigation

Mitigation location: West Hayden Island, Columbia River
Location of impact: West Hayden Island, Columbia River
Year released: 2015

PERMITS

- USACE Permit No. 2001-00062
- Oregon DSL Permit No. 23597-FP

BACKGROUND

In 2000, the Port began discussions with the USACE and DSL to address mitigation requirements for an alleged inadvertent fill of 1.19 acres of wetland on West Hayden Island in 1996. Compensatory mitigation included restoring 0.21 acre of forested wetland and creating 1.79 acres of scrub-shrub wetland. Excavation was completed in December 2006, planting was completed in March 2007 and vegetation monitoring took place from 2008 through 2014. In 2013 the site was not meeting woody vegetation success criteria due to prolonged inundation. As a result the Port pursued permit modifications to require a native palustrine emergent community with scattered trees and shrubs for structure. The agencies approved the modification by March 2014 and site was released by both regulating agencies after submittal of the 2014 annual monitoring report.

MITIGATION PLAN

The goal of the mitigation plan was to create a minimum of 2.26 acres of palustrine emergent/depressional wetland (as per the DSL permit modified in 2014) and to enhance wildlife habitat. The mitigation site is intended to replace the low functions and values lost due to the inadvertent fill of three isolated, degraded emergent wetlands totaling 1.19 acres. The adjacent black cottonwood wetland forest was chosen as the reference site.

MITIGATION SUCCESS CRITERIA

- At least 80% cover of desirable herbaceous species, including natural recruits, for the duration of the mitigation monitoring, including the revegetated upland slopes.
- Scattered groupings of trees and shrubs shall be present to provide structural diversity and to support wildlife habitat.
- Invasive species shall not exceed 20% coverage at any time during the monitoring period.
- 2.0 acres of created wetlands shall meet the hydrology and vegetation criteria specified in the USACE 1987 *Corps of Engineers Wetland Delineation Manual*.

TABLE 18: WHI MITIGATION PERMIT REQUIREMENTS (BASED ON PERMITS MODIFIED 2014)

Success Criteria	Status
2.25 acres of created wetlands shall meet the hydrology and vegetation criteria in the USACE 1987 *Corps of Engineers Wetland Delineation Manual.*	A wetland delineation light was conducted in September 2013, and the PEM wetland acreage criterion has been met. As reported in the 2013 monitoring report, the wetland boundary determination results showed that 2.5 acres of wetland have been created.
Desirable herbaceous species ≥ 80% cover in wetlands and uplands.	Desirable cover (i.e., non-weedy species) in wetland transects averaged 99% and in upland transects averaged 96%. Native species cover was 85% in wetlands and 11% in uplands. This criterion as defined by DSL has been met.

Success Criteria	Status
≤ 30% cover of non-native weedy species (i.e., reed canarygrass, purple loosestrife, climbing nightshade (*Solanum dulcamara*), Japanese knotweed (*Polygonum cuspidatum*), Canada thistle, teasel, Scotch broom, Himalayan blackberry)	Non-native weedy species cover on transects was < 1.5% and is representative of the site; weedy species present (but controlled) included reed canarygrass, thistle, and blackberry.
Scattered clumps of woody vegetation shall be present to provide structural diversity and support wildlife habitat.	Clumps of trees and shrubs are present and provide perches, resting spots, and forage sites for a variety of wildlife species.
Restore/create 2.0 acres of PEM; wetlands shall meet the hydrology and vegetation criteria in the USACE 1987 *Corps of Engineers Wetland Delineation Manual.*	A wetland delineation light was conducted in September 2013 and PEM acreage was 2.5 acres and meets the 2.0-acre criterion. As reported in the 2013 monitoring report, the wetland boundary determination results showed that 2.5 acres of wetland have been created.
Desirable herbaceous species ≥ 80% cover in wetlands and uplands; desirable species shall consist of non-invasive, native species (modified 2014).	Desirable native herbaceous cover was 85% in wetlands and 11% in uplands. This criterion has been met in wetlands but not in uplands. report
≤ 20% invasive species cover	Invasive species cover on transects was < 1.5% and is representative of the site; invasive species present (but controlled) included reed canarygrass, thistle, and blackberry.
Scattered clumps of woody vegetation shall be present to provide structural diversity and support wildlife habitat	Clumps of trees and shrubs are present and provide perches, resting spots, and forage sites for a variety of wildlife species.

2014 UPDATE

- A survey for Asian longhorned beetle was conducted in April 2013. No beetles were observed.
- Coverboards were placed in the mitigation site to monitor adult amphibian populations in June 2013.
- Annual vegetation monitoring was conducted in August and September 2013, and the site wetland boundary was mapped in September 2013.
- Amphibian egg mass surveys were conducted in February 2014. No egg masses were seen, most likely because the survey was conducted too early in the season.
- Amphibian egg mass surveys were conducted in March 2014. Approximately 1,000 long-toed salamander egg masses were seen throughout the mitigation site and on the southeast side of the adjacent reed canarygrass wetland. 100+ Pacific chorus frog egg masses were observed throughout the mitigation site.
- Annual vegetation monitoring was conducted in August 2014.
- Invasive species control took place in March–October in 2013 and 2014; target species included reed canarygrass, thistles (*Cirsium* sp.), knapweed (*Centauria* sp.), and Himalayan blackberry.
- Site inspections of vegetation, hydrology, and wildlife were conducted monthly.
- Site was released in 2015 from further obligation to monitor vegetation and submit annual reports.

2014 SITE PERFORMANCE

The seventh of 7-year required monitoring was conducted in August 2014. The site has met or is on track to meet all success criteria relating to vegetation cover, survival, and invasive species as per the permits modified in 2014. The site was released by the USACE and DSL in February 2015.

- Water levels and hydroperiod in the depression are related to Columbia River water elevations. Surface water measurements at the staff gage rose from 3.6 feet in February and March to a high of 4.6 feet in early June 2014, which was considerably lower than levels measured in 2012.
- Desirable herbaceous cover (i.e., native) averaged 85% in wetland sample plots. Dominant native species (> 5% average cover) included slough sedge (*Carex obnupta*), creeping spikerush (*E. macrostachya*), slender rush (*Juncus tenuis*), knotgrass (*Paspalum distichum*), jointleaf rush (*Juncus articulatus*), broom sedge (*Carex scoparia*), meadow barley (*Hordeum brachyantherum*), and Columbia willow (*Salix columbiana*). The dominant non-native species on wetland plots was redtop (*Agrostis gigantean*) with 8% cover. Redtop dominance was an anomaly due to the location of permanent wetland transects at the outer edge of the wetland boundary and was not representative of the mitigation wetland. The desirable herbaceous cover criterion in wetland plots was met.
- Desirable native herbaceous cover averaged 11% in upland sample plots. Native cover included meadow barley, Idaho fescue (*Festuca idahoensis*), broom sedge, Canadian horseweed (*Conyza canadensis*), and Pacific ninebark (*Physocarpus capitatus*). Desirable non-native cover averaged 85% and dominant species (> 5% cover) included redtop (37%), annual fescue (29%), rabbitfoot clover (8%), and sand plantain (5%). Besides redtop, all of these species are annuals and grow well in the sandy substrate. The desirable native herbaceous cover criterion (USACE permit modified 2014) in uplands was not being met. However, desirable herbaceous cover, including native and non-native non-invasive species in uplands, averaged 96% and met the DSL desirable herbaceous cover criterion.
- Weedy/invasive species cover averaged 0.5% in wetland sample plots and consisted of Himalayan blackberry and 0.8% in upland plots and consisted of Bermudagrass; no other non-native weedy/invasive species were observed in plots. In 2012 and 2013, Bermudagrass increased significantly on the mitigation site due to extensive flooding in 2011 that killed existing cover. As a result, it was targeted for control and removal in 2013. Control efforts have been successful, reducing its cover on sample plots from 33% cover in 2013 to less than 1% cover in 2014. Other invasive species observed on or immediately adjacent to the mitigation site included small amounts of reed canarygrass, thistle, and knapweed. These species were controlled through hand-pulling and herbicide treatment and had limited cover on the site. The DSL criterion of no more than 30% cover of non-native weedy species was met. The USACE criterion that invasive species shall not exceed 20% cover was also met.
- Port staff and others observed a total of 47 wildlife species in and immediately adjacent to the mitigation area consisted of 39 avian species, three mammals, and five herptiles. Confirmed breeding species on or adjacent to the site included bald eagle, red-tailed hawk, American robin, wood duck, Pacific chorus frog, long-toed salamander, and red-legged frog. Black-tailed deer fawns were also observed. Notable species observed in the mitigation area included red-legged frog, long-toed salamander, bald eagle, belted kingfisher, Eastern kingbird, great egret, orange-crowned warbler, pileated woodpecker, ring-necked duck, Swainson's thrush, western wood pewee, wood duck, and hooded merganser.
- The 2014 monitoring report was submitted to the USACE and DSL in December 2014, and the site was released by both agencies in February 2015.

TABLE 19: 2015-2016 ACTION PLAN FOR WHI MITIGATION SITE

Anticipated Tasks	Date
Invasive species control (includes manual, mechanical, and chemical)	March–September
Site inspections (includes invasive species, wildlife, and hydrology monitoring)	Monthly

TABLE 20: WEST HAYDEN ISLAND DOCUMENTATION LIST

Document	Author	Date
After-the-Fact Wetland Mitigation Plan on West Hayden Island	URS	May 2001
Port of Portland West Hayden Island Dredge Disposal Site Wetland Mitigation Plan	Fishman/SWCA	January 2005
As-built Report West Hayden Island Mitigation Site	PORT	December 2007
2008 (Year 1) Monitoring Report West Hayden Island Mitigation	PORT	November 2008
2009 (Year 2) Monitoring Report West Hayden Island Mitigation	PORT	October 2009
2010 (Year 3) Monitoring Report West Hayden Island Mitigation	PORT	December 2010
2011 (Year 4) Monitoring Report West Hayden Island Mitigation	PORT	February 2012
2012 (Year 5) Monitoring Report West Hayden Island Mitigation	PORT	December 2012
2013 (Year 6) Monitoring Report West Hayden Island Mitigation	Pacific Habitat Services (PHS)	December 2013
2014 (Year 7) Monitoring Report West Hayden Island Mitigation	PHS	December 2014
USACE and DSL letters of release	USACE/DSL	February 2015

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Mitigation Site Boundary

N

0 Feet 300

Figure III-5
West Hayden Island Mitigation
2013 Aerial Photo

SECTION IV. ENHANCEMENT PROJECTS

1. Columbia Slough Revegetation

Site locations: adjacent to Columbia Slough in PIC, PDX, Rivergate Industrial District

PERMITS AND AGREEMENTS

- Intergovernmental Agreement for Columbia Slough Revegetation. Port IGA No. 2000-039 superseded by IGA No. 2002-080
- Permit and Right of Entry 11-310
- Update letter of June 20, 2003: Port of Portland to COP, BES
- Update letter of October 21, 2003: Port of Portland to COP, BES

BACKGROUND

Oregon DEQ has designated the Columbia Slough as a 303(d) water quality–limited stream under the Clean Water Act. The Port entered into an agreement with the COP BES to fund work on revegetating portions of the Columbia Slough owned by the Port. The revegetation projects are being undertaken to improve water quality within the Columbia Slough and adjacent branches, and are being coordinated with MCDD. Some portions of the slough owned by the Port were not recommended for planting due to operational, regulatory, and/or litigation issues.

The goal of these projects is to make substantial vegetative improvements along the banks of the slough(s) in order to

- help filter stormwater runoff,
- provide shading to reduce surface water temperature,
- provide diversity in vegetation,
- provide food and shelter for wildlife,
- establish connectivity between open/natural spaces,
- provide continuity of cover and wildlife corridors, and
- reduce water velocities and potential erosion.

The Port's mitigation and revegetation sites play a critical compliance role with respect to the Willamette River temperature TMDL. The TMDL implementation plan requires the continued management of these sites to provide increased shade on the Columbia Slough. This metric will be tracked through documentation of the annual maintenance performed on these sites and the use of a GIS-based shade model designed to quantify the incremental shade benefits generated over time. These activities constitute the core of the Port's TMDL temperature implementation strategy and will be included in the Port's annual progress reports to DEQ.

PROJECTS

The following projects, totaling 73.5 acres, were initiated with BES as part of this program and are now all complete:

TABLE 21: COLUMBIA SLOUGH REVEGETATION PROJECTS

Site Name	Area	Year Planted	Description
Columbia Grain	RGID	2000	From the mouth of the Columbia Slough to the Union Pacific Railroad on the south side (3 acres).
Kelley Point Park	RGID	2000	Kelley Point Park from the park boundary to the road bridge between the waterline and the top of bank (1.5 acres). Top of bank and road on hold

Site Name	Area	Year Planted	Description
			pending completion of the trail (2 acres). Now managed by BES.
92nd–I-205	PIC	2000 (slope) 2001 (TZ)	PIC 92nd to I-205 from the waterline to the top of bank (0.78 acre) and from the top of bank to edge of 50-foot transition zone (2.69 acres).
82nd–92nd	PIC	2000	PIC 92nd west to 82nd from the waterline to the top of bank (1.6 acres) and from the top of bank to the edge of transition zone or edge of tenant landscaping.
Buffalo	PDX	2000	Buffalo Street Mitigation Site from waterline to top of bank (2.3 acres).
Elrod	PDX	2000	Elrod Road Mitigation Site from the waterline to the top of bank (1 acre). This site was planted by BES but is maintained by the Port as part of its mitigation activities for this site.
West of 47th Avenue - AMC Site	PDX	2000	From the waterline to the top of bank (1.25 acres).
Port Maintenance Building (Meyers Marx)	PDX	2000	From the waterline to the top of bank and 50-foot E-zone (3.7 acres).
Cornfoot Road	PDX	2000	Tree planting only (4.3 acres)
North Marine Drive Overpass	RGID	2000	Abutment from base of slope to the top of bank (6 acres).
Alderwood Slough	PIC	2000–2001	Between 82nd and Alderwood Road from waterline to 10 feet landward of the top of bank on north and south sides (1.7 acres).
Alderwood Corner	PIC	2000–2001	Replaces portion of project 5. which could not be completed,
Rail Bridge to North Slough	RGID	2001–2002	From the top of bank landward to toe of Leadbetter slope on north side of slough (30 acres).
Trail south of railroad bridge	RGID	2002–2003	Planting adjacent to the 40-mile loop trail for a length of 5,274 feet.
Rivergate Bridges banks	RGID	2002–2004	Blackberry and broadleaf weed removal only; seeding; top of bank to ordinary high water mark from Lombard/North Marine Drive bridge on north end to the railroad bridge on the south end; two treatments each year, 2002–2004.
Bonneville Pond	RGID	2005–2006	Maintenance only.
92nd to I205 bank stabilization	PIC	2003–2004	Re-planting and 5-year maintenance of approximately 1.6 acres along the regraded bank.
Beaver protection installation	PDX	2003–2004	Installation of 100 beaver protection cages around alder and cottonwood trees on the Buffalo Street site.

Maintenance and Monitoring

As of fall of 2007, BES fulfilled their maintenance and monitoring obligations under the IGA with the exception of Kelley Point Park, which they continue to maintain. The Port continues to manage all other sites and inspects for and controls invasive species.

2013–2014 UPDATE

- Slough enhancement sites received seasonal monitoring and maintenance, which included manual, mechanical, and chemical control measures.
- Garlic mustard, a B-ranked plant on the COP's Nuisance Plant List, was identified on the Cornfoot Road site and is now closely monitored and treated for control.
- Invasive plant removal of English ivy, Himalayan blackberry, and thistles was conducted in the spring and fall of 2013 and fall of 2014.

TABLE 22: 2015-2016 ACTION PLAN FOR COLUMBIA SLOUGH REVEGETATION PROJECTS

Anticipated Tasks	Date
Invasive species control using manual, mechanical, and chemical means	April–October
Site inspections	Spring and Fall

TABLE 23: ENHANCEMENT PROJECTS DOCUMENTATION LIST

Document	Author	Date
Slough Revegetation Project Port of Portland Monitoring Fall 2000	PORT	November 2000
BES Project Status Report	BES	December 2000
Port of Portland Pre-burn Baseline Monitoring Report	PORT	March 2002
Slough Revegetation Project Port of Portland Monitoring 2001	PORT	May 2002
Port of Portland Slough Burn Site Monitoring Report, 2002	PORT	October 2002
Slough Revegetation Project Port of Portland Monitoring 2002	PORT	November 2002
Port Site Monitoring Results Oct-Dec 2002	BES	December 2002
Slough Burn Site Monitoring Report, 2003 Final and Inclusive Report	PORT	June 2003
Slough Revegetation Project Port of Portland Monitoring Fall 2003	PORT	November 2003
BES Treatment and Monitoring Report for all sites	BES	October 2004
BES Slough Revegetation Project Port of Portland Monitoring Fall 2004	PORT	December 2004
BES Slough Revegetation Project Port of Portland Monitoring Fall 2005	PORT	December 2005
BES Slough Enhancement Mitigation Sites: Fall 2010 Maintenance Recommendations	SWCA	November 2010
BES Slough Enhancement Mitigation Sites: March 2011 Maintenance Recommendations	SWCA	November 2011
BES Slough Enhancement Mitigation Sites: Fall 2012 Maintenance Recommendations	SWCA	November 2012

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Enhancement Sites

N

0 Feet 4,400

Figure IV-1.1
Columbia Slough Revegetation Sites, Rivergate
2013 Aerial Photo

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Enhancement Sites

N

0 Feet 5,000

Figure IV-1.2
Columbia Slough Revegetation Sites, PDX-PIC
2013 Aerial Photo

2. PIC Wetland Enhancement

PERMITS AND AGREEMENTS

- IGA for Airport Futures Project. Port IGA No. 2011-065, effective May 13, 2011.
- COP BDS Zoning Permit 12-109955-000-00-ZP
- COP BDS Zoning Permit 13-228632-000-00-ZP, issued December 13, 2013

BACKGROUND

As part of Airport Futures, the Port of Portland and the COP entered into an IGA for natural resources enhancements on and around the airport. One natural resource enhancement project that was included in the agreement was Enhancements to the PIC Wetland. The PIC Wetland is directly adjacent to IKEA located west of Interstate 205. The IGA required the Port to convert 6.2 acres of wetland dominated with reed canarygrass and other invasives to a scrub-shrub community dominated by native shrub species. There were no success criteria required by the COP for this project, nor was there an annual reporting requirement.

MITIGATION PLAN

The project was planted in two phases. Phase I included 2.36 acres on the western portion of the site and was planted in March 2013. Phase II included 3.84 acres on the eastern side and was planted in February 2014.

There was no soil disturbance associated with this project. Site preparation consisted of mowing and broadleaf invasive species control. Plantings included only native shrubs, which were planted according to hydrologic requirements. In wet areas, red-osier dogwood, pacific ninebark (*Physocarpus capitatus*), Sitka willow (*Salix sitchensis*), Douglas spirea (*Spirea douglasii*), and Nootka rose (*Rosa nutkana*) were planted. In transitional areas, tall Oregon grape (*Mahonia aquifolium*), black twinberry (*Lonicera involucrata*), red currant (*Ribes sanguineum*), and thimbleberry (*Rubus parviflorus*) were planted. In the upland zone, western serviceberry (*Amelanchier alnifolia*), oceanspray (*Holodiscus discolor*), baldhip rose (*Rosa gymnocarpa*), and common snowberry (*Symphoricarpos albus*) were planted.

2013/2014 UPDATE

Tall grass at the Phase II site was mowed between plantings in May 2014. Later, in July, grass and invasive weeds were weedwacked back 4 feet around each planting cluster at the Phase I and II sites. Six-foot-tall bamboo stakes were then placed in the middle of each planting cluster so that they would be more visible when mowing the field in 2015. Grass and invasive weeds that started to grow back in August 2014 were treated with herbicide 4 feet around each planting cluster at the Phase II site. Wood chip mulch was then placed around each planting cluster at the Phase II site (4 feet around and 2–3 inches deep). All of the plant clusters were watered in the Phase II area in late August.

TABLE 37: 2015-2016 ACTION PLAN FOR PIC WETLAND ENHANCEMENT

Anticipated Tasks	Date
Site inspections.	Monthly during growing season
Invasive species control.	As needed throughout the growing season
Mow around plant clusters at Phase II.	Early to mid-June
Water plants as needed.	Late July to August
NW Youth Corps to hand pull teasel in Phase II field.	June
NW Youth Corps to remove grass/weeds 4 feet around planting clusters at the Phase II site.	June

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Enhancement Site Boundary

N

0 Feet 320

Figure IV-2
PIC Wetland Enhancement
2013 Aerial Photo

SECTION V. FUTURE MITIGATION AND ENHANCEMENT PROJECTS

Future mitigation will be required as development projects result in unavoidable impacts to wetlands and other identified natural resources. The extent of the impacts and the type of compensatory mitigation will be determined on a project-by-project basis.

Force Avenue
An exchange of property between Metro and the Port resulted in the Port taking ownership of a 6-acre parcel of wetlands and uplands adjacent to the Vanport Wetlands in 2003. A habitat characterization study and conceptual restoration plan for this property were prepared. The site will likely serve the Port as tree mitigation in the future.

Government Island Grassland II
Although there is currently no requirement to do so, Port Natural Resource staff began site prep for the phase II grassland mitigation project in fall of 2014. Mowing and herbicide application will continue as needed in an effort to continue reducing the non-native seed bank and thatch cover.

TRIP Phase II/III, West Sundial Wetlands
The Phase II/III mitigation site for the TRIP development project is proposed west of Sundial Road and includes approximately 32 acres of PEM, 47 acres of PSS, and 3 acres of PFO habitats from creation and enhancement. The site could provide mitigation for over 36 acres of impacts associated with the TRIP Phase II /III development while providing potential additional advanced credits for other Port impacts within the service area.

Other Mitigation Opportunities
Several other mitigation opportunities will be explored by the Port to meet Marine, Aviation, and Property and Development Services needs and to improve ecological functions in watersheds or drainage basins in which the Port is, or will be, operating. For example, the Port may partner with other agencies to produce larger mitigation sites on Port-owned or non-Port-owned properties, such as doing projects already identified by the Columbia Slough Watershed Council as part of their Action Plan, and to use mitigation banks as they come on-line in the region.

SECTION VI. MITIGATION PROJECTS RELEASED AS OF 2014

1. Buffalo Street

Mitigation location: NE Buffalo Street, Portland, Oregon 97211
Location of impact: Southwest Quadrant, PDX
Year released: 2003

PERMITS AND AGREEMENTS

- USACE Permit No. 009753
- Oregon DSL Permit No. 6273
- Oregon DSL Permit No. 21869
- Correspondence from Oregon DEQ to USACE, January 6, 1993
- Memorandum of agreement (MOA), 1994
- COP LUR 93-00539EN
- Restrictive Covenant, February 14, 2003

BACKGROUND

The Port filled approximately 65 acres of wetland at the SW Quad of PDX in 1993. Most of the required wetland mitigation took place at the Jewett Lake site on Government Island; however, the permit also included upland and riparian mitigation at Buffalo Street (approximately 15.6 acres) and Elrod Road (approximately 10 acres). The Buffalo Street site is located on Northeast Buffalo Street west of Northeast 42nd Avenue and is surrounded on three sides by slough channels, including the Columbia Slough and Buffalo Slough.

An MOA to "implement a mitigation program for wetland impacts at the PDX and provide a means to identify future airport development projects that may result in wetland losses" was a requirement of the DSL removal/fill permit and DEQ's Section 401 Water Quality Certification. The MOA has specific requirements for the upland sites at Buffalo Street and is referenced in the DSL permit conditions. The MOA is an agreement between the Port, DSL, USACE, DEQ, ODFW, EPA, and USFWS.

The site was first planted in November 1994. In 1998, vegetation survival was estimated to be 57%, and did not meet the 80% requested by DSL in their letter to the Port on March 30, 1998. Replanting of portions of the site was conducted in the fall of 1998, early in 1999, and again in early 2001. A status report documenting survival of areas that had been replanted since 1999 was submitted to USACE and DSL in June 2001. At the request of the agencies, continued monitoring and reporting for the permit occurred through 2002.

MITIGATION PLAN

The goal for the Buffalo Street mitigation was to create connectivity between existing natural areas in the Columbia South Shore Plan District. The plan included enhancing the slough banks, riparian woodland, emergent wetland, and upland meadow habitat (approximately 15.56 acres) to provide cover to the slough and nesting habitat, food, and cover for a variety of terrestrial and avian species. Additional habitat improvements included construction of hibernacula for reptiles and placement of large woody debris throughout the site.

MITIGATION SUCCESS CRITERIA

- DSL requested 80% survival of vegetation in their letter to the Port dated March 30, 1998.

TABLE 24: BUFFALO STREET MITIGATION SITE PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 009753 DSL No. 6273 MOA	Annual monitoring reports required by November 30 for 5 years.	Year 5 monitoring report submitted January 2000; status report on re-planted areas submitted June 2001; final acceptance by the agencies received September (DSL) and November (USACE) 2003.
USACE No. 009753 MOA	Submit as-built report following construction of the site.	Report submitted January 1994.
DSL No. 6273	Develop an MOA addressing mitigation monitoring, Government Island long-term management, and planning process for PDX wetlands.	MOA submitted 1993.
MOA	Provide protection for the habitat areas	Deed restriction filed February 2003.

2014 UPDATE

Additional plantings at the site through other agreements have occurred since 2000. In 2000, the Port entered into an IGA with the COP BES to fund work on revegetating portions of the Columbia Slough owned by the Port, including 2.3 acres of riparian habitat at the Buffalo Street site. In 2007, the Port installed approximately 1,000 native trees and shrubs along the west fence line where Himalayan blackberry was removed. The now established buffer enhanced approximately 0.3 acre along the western edge of the site adjacent to a golf course. In 2013, the CSWC used grant funding and volunteers to plant native trees and shrubs at the top of bank along the Buffalo Slough.

The Buffalo Street site provides a diversity of habitat, including wooded upland, emergent and scrub-shrub wetland, meadow, and forested riparian communities. Weedy and invasive species (i.e., teasel, thistle, and blackberry) are regularly monitored and controlled during the growing season.

SITE PERFORMANCE AND COMPLIANCE

The mitigation site was designed to promote habitat connectivity and to provide nesting habitat, food, and cover for a variety of terrestrial and avian species. Compliance monitoring of the site took place between 1995 and 2003. Regulatory agencies released the site from further obligation to monitor and report in 2003 (DSL, September 2003; USACE, November 2003).

TABLE 25: 2015-2016 ACTION PLAN FOR BUFFALO STREET MITIGATION SITE

Anticipated Tasks	Date
Site maintenance and weed control	Spring and fall
Site inspections	Quarterly
Potential turtle nesting substrate enhancement	September and October

TABLE 26: BUFFALO STREET DOCUMENTATION LIST

Document	Author	Date
Assessment of Wildlife Impacts and Mitigation Opportunities Associated with Wetland Filling on PDX SW Quadrant	Fishman Environmental Services (FES)	October 1991
Portland International Airport SW Quad Wetland Mitigation Plan	FES	July 1992

Document	Author	Date
Habitat Evaluation of the Port of Portland PDX SW Quadrant Wetland Fill Site & Government Island Mitigation Site	Wildlife Dynamics (WD)/FES	October 992
Noxious Weed Control Plan	ODA	March 1993
A Biological Assessment of PDX with Recommendations to Alleviate Wildlife Hazards to Aircraft Operations	U.S. Department of Agriculture (USDA)/Animal Damage Control (ADC)	June 1996
Restrictive Covenant	PORT	February 2003
Monitoring Reports		
Buffalo Street & Elrod Road Mitigation Monitoring Report 10/93–10/95	Mt. Hood Community College (MHCC)	October 1995
Buffalo Street & Elrod Road Mitigation Monitoring Report 6/96–4/97	MHCC	June 1997
Buffalo Street & Elrod Road Mitigation Monitoring Report 11/96–11/97	MHCC	November 1997
Buffalo Street & Elrod Road Mitigation Monitoring Report 1998	INTERN	November 1998
Wetland Mitigation Monitoring Report 1998 SW Quadrant	FES	January 1999
Buffalo Street and Elrod Road Mitigation Sites Monitoring Reports 1999	PORT	December 1999
Wetland Mitigation Final Monitoring Report SW Quad. Buffalo, Elrod, GI	FES	January 2000
Buffalo and Elrod Mitigation Monitoring Letter Report 2001	PORT	June 2001
Wildlife Observations, Vegetation Monitoring	PORT	December 2002
Wildlife Observations, Vegetation Monitoring	PORT	December 2003

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Mitigation Site Boundary

N

0 Feet 440

Figure VI-1
Buffalo Mitigation
2013 Aerial Photo

2. Elrod Road

Mitigation location: PDX
Location of impact: Southwest Quadrant, PDX
Year released: 2003

PERMITS AND AGREEMENTS

- USACE Permit No. 009753
- Oregon DSL Permit No. 6273
- Oregon DSL Permit No. 21869
- Correspondence from Oregon DEQ to USACE January 6, 1993
- MOA (1994)
- COP LUR 93-00538EN
- Restrictive Covenant, March 5, 2003

BACKGROUND

The Port filled approximately 65 acres of wetland at the SW Quad of PDX in 1993. Most of the required mitigation took place at the Jewett Lake site on Government Island; however, the permit also included upland and riparian mitigation at Buffalo Street (approximately 15.6 acres) and Elrod Road (approximately 10 acres). The Elrod Road site is located at Northeast Elrod Road and Northeast 33rd Avenue and is bordered on two sides by the East Slough. The central portion of the site is reserved for a flood storage/water-quality facility to treat stormwater runoff from future development on the SW Quad property.

An MOA to "implement a mitigation program for wetland impacts at PDX and provide a means to identify future airport development projects that may result in wetland losses" was a requirement of the DSL removal/fill permit and DEQ's Section 401 Water Quality Certification. The MOA has specific requirements for the upland sites at Elrod Road and is referenced in the DSL permit conditions. The MOA is an agreement between the Port, DSL, USACE, DEQ, ODFW, EPA and USFWS.

The site was first planted in November 1994 and met the minimum of 80% tree/shrub survival during each year of the 5-year monitoring period. Despite this, new plantings were installed by Port staff in January 2000 to increase plant densities in some areas and help control weed invasion. In January 2001, sections along Elrod Ditch were inter-planted by BES to increase plant densities. A status report documenting survival of areas, which had been replanted since 1999, was submitted to USACE and DSL in June 2001.

MITIGATION PLAN

The goal for the Elrod Road mitigation site was to create connectivity between existing natural areas in the Columbia South Shore Plan District. The plan included enhancing habitat surrounding the proposed water quality treatment facility to attract passerine birds, small mammals, and reptiles while discouraging potential aviation hazards such as waterfowl. Approximately 10 acres of upland woodland were planted with deciduous and coniferous trees and shrubs in two locations, referred to as the north and south fields.

MITIGATION SUCCESS CRITERIA

- DSL requested 80% survival of vegetation in their letter to the Port dated March 30, 1998.

TABLE 27: ELROD ROAD MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 009753 DSL No. 6273	Annual monitoring reports required by November 30 for 5 years.	Year 5 monitoring report submitted January 2000; status

Permit	Requirement	Status
MOA		report on re-planted areas submitted June 2001; completion of permit requirements received September (DSL) and November (USACE) 2003
USACE No. 009753 MOA	Submit as-built report following construction of the site.	Report submitted January 1994.
DSL No. 6273	Develop an MOA addressing mitigation monitoring, Government Island long-term management, and planning process for PDX wetlands.	MOA submitted 1993.
MOA	Provide protection for the habitat areas	Deed restriction filed 2003.

2014 UPDATE

In 2000, the Port entered into an IGA with the COP BES to fund work on revegetating portions of the Columbia Slough owned by the Port, including a 1-acre area adjacent to a conveyance ditch at the Elrod Road site.

Wildlife monitoring has documented more than 65 species of birds; notable species include belted kingfisher, American goldfinch, brown creeper, downy woodpecker, great egret, red-tailed hawk, killdeer, violet-green swallow, wood duck, and western wood peewee. Owls (barn and great-horned) are frequently observed using evergreen trees planted in the southern portion of the mitigation area. Other wildlife observed on the site included coyote, Townsend vole, garter snake, Pacific chorus frog, and long-toed salamander.

Weedy and invasive species (i.e., teasel, thistle, blackberry, English ivy [*Hedera helix*], and English holly [*Ilex aquifolium*]) are regularly monitored and controlled during the growing season.

MCDD removed two culverts from the Elrod Ditch adjacent to the Elrod Road mitigation site and Elrod Road. One culvert and road crossing was completely removed, and the other was replaced with a rail-car bridge (a bridge made from the bottom of a rail car).

Bee hives were placed near the Elrod Road mitigation site by Bridgetown Bees. Bridgetown's goal is to breed hardier, locally adapted queen bees. Pollen and bee samples from the hives will also be analyzed to help further understand what type of forage creates healthy bees.

SITE PERFORMANCE AND COMPLIANCE

The mitigation site was designed to promote habitat connectivity and to provide nesting habitat, food, and cover for a variety of terrestrial and avian species. Compliance monitoring of the site took place between 1995 and 2003. Confirmation that all mitigation obligations had been met was received from DSL (September 2003) and USACE (November 2003). Additional habitat improvements have included construction of hibernacula for reptiles, placement of large woody debris throughout the site, and caging some trees to protect them from beaver damage.

TABLE 28: 2015-2016 ACTION PLAN FOR ELROD ROAD MITIGATION SITE

Anticipated Tasks	Date
Regular site maintenance and weed control	March–October
Site inspections	Monthly and as needed

TABLE 29: ELROD ROAD DOCUMENTATION LIST

Document	Author	Date
An Assessment of Wildlife Impacts and Mitigation Opportunities Associated with Wetland Filling on PDX SW Quadrant	FES	October 1991
Portland International Airport SW Quad Wetland Mitigation Plan	FES	July 1992
Habitat Evaluation of the Port of Portland PDX SW Quad Wetland Fill Site & Government Island Mitigation Site	WD/FES	October 1992
Noxious Weed Control Plan	ODA	March 1993
A Biological Assessment of PDX with Recommendations to Alleviate Wildlife Hazards to Aircraft Operations	USDA/ADC	June 1996
Restrictive Covenant	PORT	March 2003
Monitoring Reports		
Buffalo Street & Elrod Road Mitigation Monitoring Report 10/1993–10/1995	MHCC	October 1995
Buffalo Street & Elrod Road Mitigation Monitoring Report June 1996–April 1997	MHCC	June 1997
Buffalo Street & Elrod Road Mitigation Monitoring Report 11/1996–11/1997	MHCC	November 1997
Buffalo Street & Elrod Road Mitigation Monitoring Report 1998	INTERN	November 1998
Wetland Mitigation Monitoring Report 1998 SW Quadrant	FES	January 1999
Buffalo Street and Elrod Road Mitigation Sites Monitoring Reports 1999	PORT	December 1999
Wetland Mitigation Final Monitoring Report 1999 SW Quadrant	FES	January 2000
Buffalo and Elrod Mitigation Monitoring Letter Report 2001	PORT	June 2001
Wildlife Observations. Vegetation Monitoring	PORT	December 2002

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Mitigation Site Boundary

N

0 Feet 440

Figure VI-2
Elrod Mitigation
2013 Aerial Photo

3. Jewett Lake

Mitigation location: Government Island
Location of impact: Southwest Quadrant, PDX
Year released: 2003

PERMITS AND AGREEMENTS

- USACE Permit No. 009753
- Oregon DSL Permit No. 6273
- Oregon DSL Permit No. 21869
- Correspondence from Oregon DEQ to USACE dated January 6, 1993, supersedes letter dated February 5, 1992
- MOA, 1994
- Restrictive Covenant, February 14, 2003

BACKGROUND

The Port filled approximately 65 acres of wetland at the SW Quad of PDX in 1993. Most of the compensatory mitigation occurred at the Jewett Lake site. Additional mitigation for upland and riparian impacts occurred at the Buffalo Street and Elrod Road mitigation sites.

The 427-acre Jewett Lake mitigation site, located on Government Island, was a shallow basin that had been connected to the Columbia River by a human-made channel. The channel allowed water to flow into the lake whenever river elevations exceeded 10.7 feet. However, water also flowed out of the lake when river levels dropped below this elevation, which resulted in the lake and wetlands drying in the summer. The mitigation plan was designed to increase water retention in the lake and enhance and restore adjacent wetlands.

An MOA to "implement a mitigation program for wetland impacts at the PDX and provide a means to identify future airport development projects that may result in wetland losses" was a requirement of the DSL removal/fill permit and DEQ's Section 401 Water Quality Certification. The MOA includes specific requirements for the Jewett Lake site and is referenced in the DSL permit conditions. The MOA is an agreement between the Port, DSL, USACE, DEQ, ODFW, EPA and USFWS.

MITIGATION PLAN

The goal of the Jewett Lake mitigation project was to diversify winter waterfowl habitat because this was the primary wetland function lost at SW Quad. The mitigation plan included installing a water control and fish exclusion structure to increase the water retention time in Jewett Lake, creating approximately 30 acres of wetland, and enhancing the remaining wetland and upland areas of the site through cattle exclusion and vegetation management. The water control and fish exclusion structure was completed in 1993. Compliance monitoring of vegetation and wildlife was required for 5 years.

TABLE 30: JEWETT LAKE MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
DSL No. 6273	Determine mitigation requirements through habitat evaluation procedure (HEP) analysis.	HEP analysis completed 1992.
USACE No. 009753 MOA	Submit an as-built report following construction of the site.	Report submitted January 1994.
USACE No. 009753	Construct a fish exclusion facility as part of the water impoundment structure.	Completed by December 1993.

Permit	Requirement	Status
MOA	Enhance, create, or restore wetlands to ensure 40 acres within Jewett Lake.	1999 HEP results showed approximately 58 acres of wetland were created.
DSL No. 6273	Develop an MOA addressing mitigation monitoring, Government Island long-term management, and planning process for PDX wetlands.	MOA submitted 1993.
MOA	Develop an updated draft management plan for Government Island using the 1982 plan as basis.	Draft submitted 1996; updated in 2002; current revision in progress.
MOA	Develop a detailed management plan for Government Island to be adopted by the Port Commission.	Commission adopted lease agreement with Oregon State Parks, 1999. Plan submitted spring 2002.
DSL No. 6273 USACE No. 009753 MOA	Annual monitoring reports required by November 30 for 5 years.	Year 5 monitoring report submitted January 2000; acceptance of permit requirements received from USACE (November 2003) and DSL (September 2003).
MOA	Provide protection for the habitat areas.	Deed restriction for the site filed in Multnomah County February 2003.
MOA	Conduct an interagency visit to the Jewett Lake site to review mitigation establishment.	Site visit conducted June 2000.
DSL No. 6273 USACE No. 009753	Prepare a habitat evaluation to test the predicted changes from actual conditions and summarize the monitoring results.	Final HEP analysis submitted January 2000 and results summarized.
USACE No. 009753	Cattle exclusion fence will be designed to allow deer passage.	Deer passage design discussed with agencies and incorporated into fence around mitigation site in mid-1990s.
MOA	Carry out wetland inventory/delineations of PIC property.	Delineations completed 1992, 1995, 1996, 1997, 1998, 1999, and 2000.
MOA	Develop a management planning process for wetlands and water resource areas of PDX properties.	Port Wetland Management Plan in draft form; Wildlife Hazard Management Plan completed in 2003; PIC Subdistrict B fill permits received in 2003.
MOA	Timing or timeframe and notification process for Phase I development and filling and any further filling required for long-range management of the airport properties.	PIC Phase I completed; PIC Phase II fill in progress.

SITE PERFORMANCE AND COMPLIANCE

Permit conditions required using a habitat evaluation procedure (HEP) as the methodology for measuring mitigation success. An interagency HEP review team visited the site and met four times to discuss HEP methodology, species model assumptions, and field data. Wildlife habitat conditions at both the SW Quad and Jewett Lake were documented with HEP analyses before filling and mitigation actions and again at Jewett Lake 5 years after construction. Compliance monitoring began in 1993 and was completed in

1999. The final monitoring report, including the Jewett Lake HEP review analysis, was submitted to USACE and DSL in January 2000. The HEP analysis demonstrated that the mitigation site had exceeded predictions; in addition to meeting the permit requirements of replacing 149 average annual habitat units (AAHU) impacted at SW Quad, the mitigation resulted in creation of 58 acres of wetlands and an additional 100 AAHU. The Port received confirmation of permit closure from regulatory agencies in 2003 (DSL, September 2003; USACE, November 2003).

TABLE 31: JEWETT LAKE HEP, 1999 ACREAGE AND HABITAT UNIT COMPARISONS

Evaluation Species	Baseline Acres	Target Year 5 Acres	1999 Acres	Baseline AAHU	TY 5 AAHU (original HEP)	1999 AAHU
Muskrat	81	190	105	9.72	60.8	61.2
American widgeon	134	236	294	133.56	169.92	175.58
Common snipe	235	194	191	112.8	114.46	155.11
Northern harrier	158	152	197	53.72	56.24	63.49
Great blue heron	160	237	295	97.6	168.27	200.32
Cinnamon teal	0	225	261	0	101.25	159.09
Western pond turtle	1	73	0	.36	43.07	0
Total AAHUs				**407.76**	**714.01**	**814.79**

2013/2014 UPDATE

- Maintained buffer around the mitigation site as needed.
- Consultant contracted to monitor and maintain fish screen and debris boom in the winter, spring, and summer, as needed.

GOVERNMENT ISLAND MANAGEMENT PLAN

As part of the MOA, the Port was required to develop a management plan for Government Island. In December 1998, the Port Commission approved a 99-year lease of Government Island, McGuire Island, and Lemon Island to the OPRD. The ground lease expired on October 31, 2012, and was terminated. The Port and OPRD entered into a new 5-year agreement in November 2012. OPRD in consultation with the Port has developed a 20-Year plan for Government Island (Government Island State Park Master Plan) which is consistent with the Port's 2002 Government Island Management Plan. OPRD's responsibilities include monitoring and deterring trespassing, vagrancy, dumping, and other illegal or unapproved activities. OPRD maintains the recreational aspects of Government Island in a clean and safe condition, whereas the Port remains responsible for the 427-acre Jewett Lake mitigation, water control structure (WCS), and the more recent 50-acre grassland mitigation.

TABLE 32: 2015-2016 ACTION PLAN FOR JEWETT LAKE MITIGATION SITE

Anticipated Tasks	Date
Weed control through mowing	Spring–fall
Site inspections and wildlife observations	Seasonally and as needed
Monitoring and maintenance of the debris boom and fish screen (Environ)	Winter, spring, and summer

TABLE 33: JEWETT LAKE DOCUMENTATION LIST

Document	Author	Date
Assessment of Wetland Mitigation Opportunity for Proposed Wetland Fill Associated with Development of the SW Quad Site at Portland International Airport	SRI/Oakley	February 1991
Archaeological Monitoring of Wetland Mitigation Tests on Government Island	Mills/Ellis	May 1991
Wetland Determination and Delineation for the Jewett [sic] Lake Area, Government Island, Portland, OR	SRI	July 1991
An Assessment of Wildlife Impacts and Mitigation Opportunities Associated with Wetland Filling on PDX SW Quad	FES/WD	October 1991
SW Quad Flood Storage Analysis	Oakley	November 1991
Port of Portland Jewett Lake Hydrologic Analysis	Oakley	May 1992
Port of Portland Jewett Lake Mitigation Area Hydrologic Analysis	Oakley	July 1992
Portland International Airport SW Quad Wetland Mitigation Plan	FES	July 1992
An Assessment of Wildlife Impacts and Mitigation Opportunities Associated with Wetland Filling on PDX SW Quad	FES/WD	August 1992
Habitat Evaluation of the Port of Portland PDX SW Quad Wetland Fill Site & Government Island Mitigation Site	FES	October 1992
Executive Summary of Mitigation Monitoring on Government Island & Buffalo & Elrod Sites	Wildlife Dynamics	November 1995
A Hydrologic Analysis of Government Island, Oregon (S.G. Bittenger)	PSU	1995
Government, Lemon and McGuire Island Management Plan	FES/PORT	April 1996
A Biological Assessment of PDX w/ Recommendations to Alleviate Wildlife Hazards to Aircraft Operations	USDA/ADC	June 1996
Recreation Feasibility Study for Government, Lemon, McGuire & Triclub Islands	DEA	July 1997
Aviation Operations Wildlife Hazard Management Plan	PORT	April 1998
Ground Lease Between The Port of Portland and State of Oregon	PORT	March 1999
Government Island Management Plan	FES/PORT	Spring 2002
Restrictive Covenant	PORT	February 2003
Monitoring Reports		
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	December 1993
Government Island Wetland Mitigation Monitoring Update (PSU)	PSU	July 1994
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	December 1994
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	December 1995
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	November 1996
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	November 1997
Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	December 1998
Wetland Mitigation Monitoring Report 1998 SW Quadrant Buffalo, Elrod, and Government Island Mitigation Sites	FES	January 1999

Government Island Wetland Mitigation Monitoring Report (PSU)	PSU	December 1999
Wetland Mitigation Final Monitoring Report 1999 SW Quadrant Buffalo, Elrod, and Government Island Mitigation Sites (including HEP analysis)	FES	January 2000

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Mitigation Site Boundary

N

0 Feet 2,480

Figure VI-3
Jewett Lake Mitigation
2013 Aerial Photo

4. PIC E-Zone

Mitigation location: PIC
Location of impact: Cascade Station Development, Zone Map Correction by City of Portland
Year released: 2005

PERMITS AND AGREEMENTS

- COP LUR-99-00120 EN ZC, Decision recorded August 16, 2000 (Landscape permit 00-124792-ZP)
- COP LUR-99-00071 EN, Decision rendered February 24, 1999

BACKGROUND

The PIC E-Zone enhancement planting project resulted from a Type II Environmental Review by the COP in 1999 for removal of the E-zone designation from 2.04 acres of drainageways in the Columbia South Shore Plan District. These drainages were filled as a result of activities associated with the Cascade Station development. The mitigation includes sites adjacent to a 2.5-acre USACE wetland mitigation site that was constructed in 1989 (USACE 071-OYA-4-007950 and DSL 4925), which is now managed as a part of the PIC E-zone mitigation. The project is also adjacent to the 40-mile loop trail that parallels Northeast Alderwood Road at PIC.

This Environmental Review was linked to a second Type II Environmental Review in 1999 for impacts to the E-Zone from the construction of a bridge over the Columbia Slough (LUR-99-00071EN) as part of the Tri-Met light rail project. The Port was responsible for implementing a portion of the mitigation that consisted of revegetation of approximately 4.5 acres of the E-zone (Transition) along the Columbia Slough between Northeast 82nd Street and Northeast Glass Plant Road. This enhancement project was included as part of the IGA with the BES.

MITIGATION PLAN

PIC E-Zone
Mitigation included enhancing 3.8 acres of habitat at PIC, consisting of 1.2 acres of willow scrub-shrub and 2.6 acres of riparian/upland. Following successful completion of the plantings, a total of 6.8 acres, including the mitigation areas, were to be added to the E-Zone.

The areas chosen for enhancement consisted of emergent and scrub-shrub wetlands adjacent to small, artificial channels. Riparian and upland scrub-shrub vegetation was already established in low densities, but there was extensive invasion of weedy species. Mitigation increased the density of plantings and implemented a weed management program to control invasive species. Planting of the site was completed in April 2000, and 5,927 plants were installed. Monitoring in October 2000 indicated substantial damage to plantings from animals and from MCDD maintenance activities, and replanting of the site with selected species occurred in autumn and winter of 2000–2001. An additional 910 plantings of Oregon ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), red-osier dogwood, and several willow species were installed in March 2002 to increase plant density in two areas of the site. Animal protection was placed around each woody plant. Bare ground in all areas was reseeded in 2002 with a mix of blue wildrye, California brome (*Bromus carinatus*), and meadow barley (*Hordeum brachyantherum*).

Transition Zone
Mitigation for impacts from the construction of a bridge over the Columbia Slough called for enhancement of the 50-foot transition zone on the north shore of the slough. This enhancement project was included as part of the IGA with the COP's BES for Columbia Slough revegetation in March 2000 (Port IGA Number 2000-039; revised June 2002, Port IGA No. 2002-080). Under this agreement, BES

was responsible for all ground preparation and planting in accordance with local and state regulations. The site was partially planted by BES in 2000 following clearing of blackberries, bamboo, and knotweed (*Polygonum* sp.). Planting was placed on hold while design plans for the Port's employee parking lot were discussed since moving the path to the northern boundary of the transition zone was being considered. In July 2001 a total of 2,945 plants were installed, and the area was seeded in October with a mix consisting of 50% grasses and 50% sedges and forbs. Planting was completed in February 2002. In all, 4,600 woody plants were installed consisting of big leaf maple (*Acer macrophyllum*), red alder, black hawthorn (*Crataegus douglasii*), Oregon ash, black cottonwood (*Populus balsamifera*), red elderberry (*Sambucus racemosa*), vine maple (*Acer circinatum*), tall Oregon grape, red-osier dogwood, Douglas' spirea, snowberry, and thimbleberry. Animal protection tubes were used around certain species. BES monitored and maintained the site for 5 years as specified in the IGA. At that time, the Port assumed management responsibilities.

REFERENCE SITE

The reference site is adjacent to the mitigation area and is a continuation of the drainageway that is being enhanced. It supports a healthy wetland scrub-shrub/forest community in the lower elevations, and upland scrub-shrub on the slopes.

MITIGATION SUCCESS CRITERIA

- Planting in the transition zone shall cover 90% of the ground within 1 year or two growing seasons after planting.
- 75% survival after year 1 of the total number of plants installed in the PIC E-zone, including desirable recruits.

TABLE 34: PIC E-ZONE MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
LUR 99-00120	Planting of E-zone by April 1, 2000.	Planting completed 3/00.
LUR 99-00120	Mitigation report submitted to city following completion of planting.	Report submitted June 2000.
LUR 99-00120	Plantings shall be monitored and maintained for not less than 5 years following planting.	Five-year monitoring and report completed in 2005.
LUR 99-00120	A Performance Guarantee for plantings shall be filed before filling the drainageways (E-zone).	Filed September 1999.
LUR 99-00071 LUR 99-00120	Revegetation of the E-zone transition area along the Columbia Slough where it crosses the site.	Revegetation started in 2000 and completed in 2002.
LUR 99-00071 LUR 99-00120	A site development permit is required to document the plantings on the site.	Site development permit approved for PIC E-zone (1/30/02) and transition zone (6/21/02).
LUR 99-00120	As required in Section 33.515.280, 6.8 acres will be added to the Environmental Protection Zone.	Additional 6.8 acres have been added as shown on city plans.
LUR 99-00071	Monitoring and maintenance of transition zone plantings may be incorporated into the Columbia Slough Watershed Revegetation Program.	Incorporated into IGA with BES in 2000; IGA revised 2002.
LUR 99000120	Inspection for site development permit required.	Inspection completed January 2002.

2013/2014 UPDATE

PIC E-Zone

- Site inspections occurred monthly during the growing season.
- Mechanical weed control was conducted by the Northwest Youth Corps in August 2013.
- Herbicide treatment of invasive broadleaf weeds was conducted as needed throughout the field season.

Transition Zone

- Herbicide treatment of invasive broadleaf weeds, June and September

SITE PERFORMANCE

PIC E-Zone

The goal of this mitigation project was to increase the habitat value of wetland and upland scrub-shrub habitat along drainageways where these communities had been degraded. Monitoring began in 2000; vegetation performance data were collected from 2000 through 2005, and wildlife use was recorded from 2001 through 2008. The Port met its 5-year permit monitoring obligation in 2005. The final monitoring report demonstrated at least 80% plant survival with 100% aerial cover in some areas. The Port continues to manage and maintain the site through seasonal inspections, invasive species control, and other maintenance such as trash removal at least three times per year.

Transition Zone

Of the regraded portion of the bank to the Columbia Slough, BES reported adequate survival of planted woody species and patchy but persistent groundcover where the area was seeded in 2006. BES observed a reduction in coverage of Japanese knotweed and suggested caging established trees in the vicinity to protect them from beaver damage.

TABLE 35: 2015-2016 ACTION PLAN FOR PIC E-ZONE MITIGATION

Anticipated Tasks	Date
Site inspections	Monthly during growing season
Invasive species control	March–October

TABLE 36: PIC E-ZONE DOCUMENTATION LIST

Document	Author	Date
Summary of Results of Monitoring Three Wetland Mitigation Sites: August 1990–July 1992	C. Turner	1992
PIC-E-Zone As-built Mitigation Report, LUR 99-00120	PORT	June 2000
PIC-E-Zone As-built Mitigation Report, Transition Zone	PORT	February 2001
PIC E-Zone Mitigation Report Year 1 of a 5-year Monitoring Program	PORT	March 2002
PIC E-Zone Mitigation Report Year 2 of a 5-year Monitoring Program	PORT	October 2002
PIC E-Zone Mitigation Report Year 3 of a 5-year Monitoring Program	PORT	October 2003
PIC E-Zone Mitigation Report Year 4 of a 5-year Monitoring Program	PORT	September 2004
PIC E-Zone Mitigation Report Year 5 of a 5-year Monitoring Program	PORT	November 2005

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Mitigation Site Boundary

N

0 Feet 600

Figure VI-4
PIC E-Zone Mitigation
2013 Aerial Photo

5. Ramsey Lakes

Mitigation location: Rivergate Industrial District, North Portland
Location of impact: Rivergate Industrial District, North Portland
Year released: 1999

PERMITS AND AGREEMENTS

- Rivergate Cooperative Agreement, 1988

BACKGROUND

A number of mitigation projects were identified in the 1988 cooperative agreement between agencies, which was brokered to "*Establish a Rivergate development program and an acceptable mitigation program for wetland impacts.*" The agreement was between DSL, ODFW, EPA, USACE, USFWS, and the Port. The cooperative agreement established mitigation obligations for the Port's planned development of the Rivergate Industrial area and included the establishment of Ramsey Lake wetlands. This agreement was superseded by the Rivergate Consent Decree signed on January 31, 2001. The consent decree leaves the Ramsey ponds, slopes to the west of the ponds, and a 100-foot buffer to the east of the ponds intact (approximately 35 acres). The following update addresses only the areas left intact by the consent decree.

MITIGATION PLAN

The primary goals of the mitigation plan were to diversify habitat, enhance emergent and riparian vegetation, and improve wildlife habitat values. Ramsey Lakes wetlands consist of three excavated ponds with a total of at least 16 acres of water surface area. Construction was completed in 1990, and material removed from the lakes was used for construction of adjacent fill dikes and/or islands, or used to enhance upland soil before planting. The wetland fringe and islands associated with the ponds were planted with native vegetation. Following completion of enhancement activities specified by the consent decree, the 100-foot buffer area was set aside as turtle nesting habitat, and management activities for this area focused on restoring open native grassland.

2014 UPDATE

The Port continues to control invasive species throughout the meadow annually. Invasive species are controlled by hand pulling and chemical means. Targeted herbicide spot-spraying for reed canarygrass, teasel, Canada thistle, and Himalayan blackberry typically occurs from March through October depending on weather conditions and surface water levels.

During inspections of Ramsey Lakes and the more recent Ramsey enhancement site, wildlife observations are recorded. Over 60 species of birds have been observed; notable species include American kestrel, bald eagle, band-tailed pigeon, black-headed grosbeak, cinnamon teal, gadwall, greater yellowlegs, hooded merganser, northern harrier, northern pintail, olive-sided flycatcher, orange-crowned warbler, peregrine falcon, red-tailed hawk, ring-necked duck, spotted sandpiper, tree swallow, western tanager, and willow flycatcher. The site also provides nesting and basking sites for western painted turtle, and hatchling turtles have been observed in the wetland areas of the site. It also provides habitat for beaver, black-tailed deer, coyote, mole, and vole. Bullfrog, Pacific chorus frog, long-toed salamander, and garter snake have also been observed. Pacific chorus frog and long-toed salamander egg masses have also been observed on site. A turtle nest predation survey was conducted in June and July 2014.

SITE PERFORMANCE

The primary goals of the mitigation plan were to diversify emergent and riparian vegetation and increase wildlife habitat values. Mitigation performance was required to be met at year 3; however, the site did not

meet success criteria and required additional monitoring through 1999. The Port continues to inspect and maintain the site to control invasive vegetation.

In 1997, biological controls for the control of purple loosestrife (*Lythrum salicaria*) were released by ODA in Ramsey Lakes, including 100 *Galerucella pusilla* and 50 *Galerucella calmariensis*.

TABLE 38: 2015-2016 ACTION PLAN FOR RAMSEY LAKES

Anticipated Tasks	Date
Site inspections	Monthly and as needed
Weed control in the 100-foot buffer zone	As needed throughout growing season.
White water lily control	August–September
Turtle nest predation survey (GPS)	August–October
Amphibian egg mass surveys	February

TABLE 39: RAMSEY LAKES DOCUMENTATION LIST

Documents	Author	Date
North Portland Peninsula Study by the Columbia Slough Environment Improvement Task Force	See title	December 1972
Summary of Mitigation Results Ramsey Lake 1988–1992	C. Turner	1992
Vegetation Survey (Ramsey Lakes)	FES	July 1998
Ramsey Lakes Water Surface Calculations	PORT	July 1998
Water Quality Evaluation of Drainage Ditch/Swale in the Ramsey Lake Area	Vigil-Agrimis	July 2000
Monitoring Reports		
Ramsey Lakes Mitigation Monitoring Report August 1990–July 1994	MHCC	July 1994
Ramsey Lakes Mitigation Monitoring Report July 1994–December 1995	MHCC	December 1995
Ramsey Lakes Mitigation Monitoring Report May 1996–April 1997	MHCC	April 1997
Ramsey Lakes Mitigation Monitoring Report May 1997–December 1997	MHCC	December 1997
Ramsey Lakes Mitigation Monitoring Report November 1997–October 1998	INTERN	October 1998
Port of Portland Wetland Mitigation Monitoring Report 1998 Ramsey Lakes	FES	November 1999
Ramsey Lakes Mitigation Monitoring Report 1999	PORT	December 1999
Ramsey Slope Replant As-built 2001	PORT	March 2002

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Mitigation Site Boundary

N

0 Feet 1,040

Figure VI-5
Ramsey Lakes Mitigation
2013 Aerial Photo

6. Riverbank Projects

PERMITS AND AGREEMENTS

Terminal 4 (T-4), Berth 408
- USACE Permit No. 2000-479 – NWP 03 and 13
- Oregon DSL Permit No. GA-22613
- NMFS Letter of Concurrence, September 14, 2000
- COP LUR 00-00369 GW

T-4, Pier 2, Rail Yard Improvements
- COP LU No. 05-176115 GW
- EPA Administrative Order on Consent for Removal Action

T-4, Toyota Riverbank Restoration
- USACE Permit No. 2001-00553
- Oregon DSL Permit No. 24231-RF
- NOAA Invasive Species Management Permit No. 2004/00423
- COP LU 02-116099 GW

Terminal 5 (T-5), Berth 503
- USACE Permit No. 96-711
- Oregon DSL Permit No. RF-11224
- Oregon DEQ letter dated August 9, 1996

Terminal 6 (T-6), Berth 607
- USACE Permit No. 2000-347–NWP 03 and 13
- Oregon DSL Permit No. 22389-FP
- NMFS Letter of Concurrence, September 14, 2000
- COP LUR 00-00243 EN

T-6, Berth 607, Honda Dock Improvements
- Oregon DSL Permit No. 35399-FP
- USACE Permit No. 2005-00638
- COP, LU 05-174695 EN

BACKGROUND

The Port's Marine Operations section manages a variety of constructed and natural riverbanks, and has initiated a Riparian Zone Management Program to address conditions along the Willamette and Columbia Rivers in association with its other programs. A number of these projects involve vegetation enhancements or stabilization improvements and do not have mitigation permit requirements. These projects are managed entirely by Marine Operations Property Maintenance, with natural resource guidance and regulatory monitoring provided by Mitigation staff.

The responsibility for design, permitting, and other regulatory requirements of the Riparian Zone Management Program rests with Marine Operations staff. Maintenance of vegetation and control of invasive weed species are performed by the Port's Marine Operations landscape maintenance crew in consultation with mitigation staff. Mitigation staff provide technical advice regarding plant species selection for vegetation diversity and wildlife value. Staff also monitor the sites for performance and permit compliance, provide guidance for adaptive management, and prepare monitoring reports for submittal to regulatory agencies or to guide future actions. The Port's Marine Operations Landscape Maintenance Group continues to provide invasive species management as necessary to all of the Riverbank sites during and after the permit compliance period.

TERMINAL 4, BERTH 408

The Berth 408 project involved stabilizing and replanting approximately 3,200 square feet (0.07 acre) of the Willamette riverbank at T-4, Berth 408. Riprap was placed on the riverbank, and the riprap and upper portions of the bank were planted. Permits required planting 53 (USACE, DSL, DEQ) and 121 (COP) woody plants. In all, 123 trees and shrubs were planted, including black hawthorn, red alder, red-flowering current, common snowberry, and Nootka rose, and live cuttings of local willow species were planted below an elevation of 17 feet. A piped irrigation system was also installed. The work was completed by February 2001. In 2002, eight additional tree/shrubs were planted on the slope.

TABLE 40: T-4, BERTH 408 PERMIT REQUIREMENTS

Permit	Requirement	Status
DSL No. GA-22613	Monitoring shall take place for 3 years incorporating specifications stated in the permit.	Year 3 monitoring took place in July 2004.
COP LUR 00-369	Planting must be completed before approving site development permit.	Permit approved April 2001.
USACE No. 2000-479	Compliance certificate to be forwarded to USACE following completion of mitigation.	Sent compliance certificate March 2005.

MITIGATION SUCCESS CRITERIA

- 80% survival of the total number of plants installed after 5 years.

SITE PERFORMANCE

The site was monitored for 3 years. The final monitoring report (2004) indicates that the total survival of plantings exceeded the required 80% and met permit compliance.

T-4, PIER 2, RAIL YARD IMPROVEMENTS (WILLAMETTE GREENWAY)

The Willamette Greenway (1,370 linear feet) planting occurred in September 2007 as a result of rail yard improvements to the adjacent upland at T-4. In November 2007, shortly after planting was complete, heavy rains caused bank erosion adjacent to Wheeler Bay. The erosion was temporarily stabilized with class 50 riprap. During the summer and fall of 2008, as part of the Phase I T-4 Removal Action, the Port restructured the entire slope adjacent to Wheeler Bay to address areas of soil contamination in over-steepened conditions and to prevent future erosion. This action constituted a source control measure required by the Portland Harbor Cleanup. Replanting and seeding of the slope and Greenway was completed in November 2008.

The 1,370 linear feet of Greenway were planted in two sections that are adjacent to an existing Greenway project (LUR 9600269 GW). Plantings included 180 native trees and 850 native shrubs. The regraded Wheeler Bay slope was planted with 120 native trees, and 210 native shrubs were planted in November 2007. The entire slope and Greenway was seeded with native seed mix, including California brome, Sitka brome (*Bromus sitchensis*), California oatgrass (*Danthonia californica*), blue wildrye, slender wheatgrass (*Elymus trachycaulus*), Roemer's fescue (*Festuca idahoensis*), bluefield gilia (*Gilia capitata*), and checkermallow (*Sidalcea* sp.), which was applied at 90 pounds per acre for a total of about 64 pounds.

MITIGATION SUCCESS CRITERIA

The COP Willamette Greenway Standards require one tree per 20 feet of river frontage and one shrub per 2 feet of river frontage; for a total of 69 native trees and 685 native shrubs on the site. Living groundcover must be present on the remaining area.

SITE PERFORMANCE
The site was monitored for 3 years. Final monitoring in 2011 indicated that tree and shrub density exceeded Greenway Standards and groundcover averaged 96% cover with no invasive species observed in sampling plots. Mitigation met permit compliance.

T-4, TOYOTA RIVERBANK RESTORATION
The T-4 Toyota site is zoned Heavy Industrial, with a River Industrial Greenway overlay designation. The River Industrial Greenway zone (enforced by COP) encourages and promotes the development of river-dependent and river-related industries that strengthen the economic viability of Portland as a marine shipping and industrial harbor, while preserving and enhancing the riparian habitat. The existing use of the T-4 Toyota site consists of a river-dependent industrial operation for the transfer of vehicles from ocean going vessels to inland destinations. The Greenway Review (LU 02-116099 GW) was approved in July 2002, and work was completed in December 2003. Permits were also obtained through the USACE (2001-00553), DSL (24231-RF), and NOAA Fisheries (2004/00423).

The Toyota Riverbank Restoration site encompasses 11.2 acres (5,250 linear feet) of river frontage at T-4 and includes a regraded shoreline, new outfalls, stormwater containment and treatment swales, native riparian vegetation, anchored logs, and a cellular confinement system to provide bank stabilization. This project required city, state, and federal permits and was completed in December 2003. In all, 541 trees and 11,791 shrubs were installed, and over 2,000 pounds of native seed were applied (Riverbank Planting Seed Mix and Bioswale Seed Mix) at a rate of 200 pounds per acre. Plantings were irrigated with a piped irrigation system, and weeds were controlled by herbicide and non-herbicide methods.

TABLE 41: T-4 TOYOTA RIVERBANK RESTORATION PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 2001-00553	Plantings will achieve an 80% survival success after 3 years.	Year 3 (internal) report completed in November 2006; plant survival was 179% due to colonization by desirable recruited trees and shrubs.
NOAA 2004/00423	Only Rodeo® and Garlon® 3A with an adjuvant LI-700 or Agri-Dex may be used on the Toyota riverbank site.	The Port has included the Toyota Riverbank site in its vegetation management plan with all herbicide use conditions illustrated as per the NOAA biological opinion. The Port's landscapers continue to adhere to the conditions and have successfully controlled invasive species to date.

MITIGATION SUCCESS CRITERIA
- 80 percent survival of plantings after 3 years.

SITE PERFORMANCE
The site was monitored for 3 years. Final monitoring in 2006 indicated that plant survival exceeded 100% due to colonization by desirable trees and shrubs and met permit compliance.

TERMINAL 5, BERTH 503
Bank stabilization at Berth 503 was undertaken to repair damage caused by the 1996 flood to the Willamette River frontage at T-5. The bank was reconstructed using sand fill, rock, and riprap up to 20 feet NGVD and mechanically stabilized earth (MSE) above 20 feet NGVD. The MSE of the slope was planted initially in spring 1997 with red-osier dogwood and Sitka willow live stakes. A number of these

live stakes did not survive, and the area was replanted in March 1999 and again in October 2000 with supplemental plantings, including Scouler willow and Sitka willow, which are more tolerant of drier conditions than the original plantings. In December 2002, other areas of the site were planted with red alder, red elderberry, Indian plum, and black cottonwood. The upland area adjacent to the slope is in the COP's Greenway and was planted to exceed Greenway planting requirements. The total mitigation area, including the slope and Greenway, is approximately 34,000 square feet (0.8 acre). An irrigation system was installed and used until the plants became established. Beaver protection around selected trees was used to limit damage.

TABLE 42: T-5 BERTH 503 PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 96-711 DSL No. 11224	The bank will be planted with native species from an elevation of 20 feet to elevation of 34 feet NGVD.	Bank planted in 1997 and 1999.
DEQ	Photo monitor the site for 3 years and provide results to DSL.	Monitoring report 3 sent to agencies in 2001.
DEQ	Planted areas shall be fenced off for protection from disturbance and/or erosion.	Area fenced along eastern boundary.

MITIGATION SUCCESS CRITERIA

- 70% survival of planted trees and shrubs.

SITE PERFORMANCE

The site was monitored for 3 years. Final monitoring in 2005 indicated 78% plant survival and met permit compliance.

TERMINAL 6, BERTH 607

Mitigation at Berth 607 was a result of impacts to surrounding habitat caused by repairing two outfalls on the Columbia River that were heavily eroded in 2000. The two areas were repaired by April 2001 and planted with native trees and shrubs to provide stabilization of the outfalls and riverbank. The permit required planting approximately 23,200 square feet (0.5 acre) with 1,690 woody plants. Planting occurred over a slightly larger area (0.7 acre) and consisted of 2,560 native trees and shrubs, including black hawthorn, Oregon ash, red alder, Indian plum, Oregon crab apple, red flowering current, salmonberry, common snowberry, red-osier dogwood, and Pacific willow. Invasive vegetation was removed, silt loam was spread over the sand, and MSE and a piped irrigation system were installed.

TABLE 43: T-5 BERTH 503 PERMIT REQUIREMENTS

Permit	Requirement	Status
DSL No. 22389-FP COP LUR 243 EN	The site shall be monitored and maintained for a period of 3 years until the planted areas have become established.	Year 3 monitoring took place July 2004.
DSL No. 22389-FP COP LUR 243 EN	Monitoring reports shall be submitted by August 1 (COP) or November 30 (DSL) for 3 years incorporating specifications stated in the permit.	Year 3 and final year monitoring report submitted August 2004.
USACE No. 2000-347	Compliance certificate to be forwarded to USACE following completion of mitigation.	Sent compliance certificate March 2005.
COP LUR 243 EN	Plantings must occur no later than 6 months following repair of outfalls.	Planting completed April 2001.

Permit	Requirement	Status
COP LUR 243 EN	The portions of three cottonwood trees removed at site 2 shall be anchored and maintained as LWD components.	Anchored in 2001.
COP LUR 243 EN	A monitoring and maintenance plan must be submitted.	Monitoring and maintenance plan submitted with as-built report July 2001.
COP LUR 243 EN	A final site development permit inspection shall be made before approving permit.	Permit approved April 26, 2002.

MITIGATION SUCCESS CRITERIA

Mitigation success required 80% survival of the total number of plantings (minimum of 1,352 plants) after 3 years (DSL) and 5 years (DEQ), with replacement of dead plants equaling at least 90% of the original number during the first 2 years (COP). The COP also required that plantings achieve 90% cover of all exposed soils above 14 feet elevation within 2 years of project completion. DSL also required no more than 20% cover of exotic species after the third monitoring year, whereas the COP required continued removal of all invasive species during the monitoring period.

SITE PERFORMANCE

Year 3 (2004) monitoring results indicated that plant survival exceeded 80% and invasive weed cover was less than 20% and met all permit requirements.

HONDA DOCK IMPROVEMENTS (T-6, BERTH 607)

In 2006, the Port replaced a portion of the Honda facility to improve operational efficiency and safety. The improvements included widening the access ramp to Berth 607, repairing deteriorated pilings, removing creosote-treated dolphins, installing new steel dolphins, and adjusting the ballast from the floating dock. Native planting was required due to construction-related bank disturbances within the E-zone (COP).

The planting plan was designed to complement existing native vegetation and to allow an unobstructed view of the unloading area from the building. It was also designed to maintain a 25-foot security corridor between the fence and the plantings. Plantings were interplanted with existing native trees and shrubs. The planting area covered approximately 6,300 square feet (0.14 acre) of the 1.21-acre mitigation area from the top of bank landward to within 25 feet of the security fence, between and on both sides of the two access bridges for Berth 607. Plantings were installed in March 2007 and included 150 native trees and shrubs, including red alder, Oregon ash, black hawthorn, Indian plum, snowberry, red flowering currant, Nootka rose, tall Oregon grape, twinberry, Douglas' spirea, and mock orange. All disturbed areas were seeded with a native seed mix at a rate of 20 pounds per acre.

TABLE 44: T-6 HONDA DOCK IMPROVEMENTS PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE 2005-00638 DSL 35399-FP	Monitoring will take place for 3 years.	Year 3 monitoring occurred in June 2010.
USACE 2005-00638 DSL 35399-FP	A monitoring report shall be submitted by December 31 of each year for 3 years.	Year 3 monitoring report was submitted March 2011.
USACE 2005-00638 DSL 35399-FP LU 05-174695 EN	The percentage of non-native, undesirable invasive species within the mitigation shall be less than 20 percent by the end of year 3.	Based on sampling data, invasive species cover was at 1.3% at year 3.
LU 05-174695 EN	Permittee shall monitor the required	Year 2 monitoring report was

Permit	Requirement	Status
	plantings for 2 years and submit the first report within 9–19 months after installation and the second report within 24–27 months after installation.	submitted by December 31, 2009 (approximately 21 months after installation).
LU 05-174695 EN	Dead trees are to be replaced within one planting season if survival drops below 100% during the monitoring period.	Tree survival exceeded 100%.
LU 05-174695 EN	Native shrubs and groundcovers must cover at least 80% of the planting area.	At year 3, desirable cover exceeded 100%.

MITIGATION SUCCESS CRITERIA

- 80% survival of planted trees and shrubs.
- 80% cover of desirable species; < 20% cover invasive species.

SITE PERFORMANCE

The site was monitored for 3 years. Year 3 (2010) monitoring results indicated that overall tree and shrub survival exceeded 100%, invasive species cover was 1.3%, and desirable cover was 100% and met all performance criteria.

TABLE 45: 2015-2016 ACTION PLAN FOR ALL RIVERBANK SITES

Anticipated Tasks	Date
Weed control, all sites	April–October
Site inspections	As needed
Litter removal	As needed
Remove dead trees at T-4 projects	Fall 2015
Replant with trees better adapted to site conditions at a ratio of 2:1	Winter 2016

TABLE 46: RIPARIAN ZONE MANAGEMENT PROGRAM DOCUMENTATION LIST

Documents	Author	Date
Marine Department Riverbank Management Plan Review Document	PORT	December 1998
Port of Portland General Terminals Marine Department Riverbank Survey Review Set	PORT	December 1998
Port of Portland General Terminals Marine Department Riverbank Survey Review Set	PORT	February 2000
Marine Department Riverbank Management Plan Review Document	PORT	July 2000
Marine Department Riverbank Management Plan Report	PORT	April 2001
Toyota, As-built Information Form for Planting Projects	PORT	December 2003
Invasive Species Management Permit No. 2004/00423	NOAA	July 2004
Monitoring Reports		
Berth 503 Bank Stabilization Mitigation Monitoring Report 1999	PORT	June 1999
Berth 503 Bank Stabilization Mitigation Monitoring Report 2000	PORT	July 2000
Berth 503 Bank Stabilization Mitigation Monitoring Report 2001	PORT	May 2001
As-built Letter Report Berth 607 Outfall Repair	PORT	July 2001
As-built Letter Report Berth 408	PORT	July 2001
Memorandum: Monitoring Plantings of Berth 408 and 607	URS	September 2002
Berth 503 Bank Stabilization Mitigation Monitoring Report 2002	PORT	October 2002
Berth 607: 2003 Monitoring Report, Year 2	URS	October 2003

Documents	Author	Date
Berth 408: 2003 Monitoring Report, Year 2	URS	October 2003
Berth 503 Bank Stabilization Mitigation Monitoring Report 2003	PORT	October 2003
Toyota, US Army Corps of Engineers Permitted Project Monitoring Report	PORT	April 2004
Berth 607: 2003 Monitoring Report, Year 3	URS	August 2004
Berth 408: 2003 Monitoring Report, Year 3	URS	August 2004
Berth 503 Bank Stabilization Mitigation Monitoring Report 2004	PORT	August 2004
Toyota Riverbank Restoration (internal) Monitoring Report – Year 1 of 3	PORT	October 2004
Toyota Riverbank Restoration (internal) Monitoring Report – Year 2 of 3	PORT	November 2005
Toyota Riverbank Restoration (internal) Monitoring Report – Year 3 of 3	PORT	November 2006
Honda Dock Improvements at Berth 607: 2008 Monitoring Report – Year 1 of 3	PORT	December 2008
Honda Dock Improvements at Berth 607: 2009 Monitoring Report – Year 2 of 3	PORT	December 2009
Honda Dock Improvements at Berth 607: 2010 Monitoring Report – Year 3 of 3	PORT	March 2011
T-4, Pier 2, Rail Yard Improvements: 2011 Final Monitoring – Year 3 of 3	PORT	2011

PORT OF PORTLAND

Willamette Greenway and bank restoration

0 Miles 1.2

Figure VI-6.1
Riverbank Projects on the Willamette
2013 Aerial Photo

Figure VI-6.2
Riverbank Projects on the Columbia (Honda Dock)
2013 Aerial Photo

7. Rivergate Enhancement Sites

Mitigation location: Rivergate Industrial District, North Portland
Location of impact: Rivergate Industrial District, North Portland
Year released: 2010

CONSENT DECREE

Consent Decree, Order of Dismissal with Prejudice and Release. Case No. CV-97-1674-ST, November 22, 2000
Consent Decree Settling United States' Cross-Claim Against Port of Portland, January 31, 2001
First Amendment to Consent Decree and to Enforcement Consent Decree, September 20, 2002

PERMITS AND AGREEMENTS

- USACE Permit NWP32-2001-00247 August 17, 2001 (Leadbetter)
- USACE Permit NWP32-2001-00247 December 17, 2001 (All, excluding Leadbetter and 40 mile loop trail)
- USACE Permit NWP32-2002-00133 September 24, 2002 (40-mile loop trail)
- Oregon DSL Permit No. 23801-RF (all, excluding 40-mile loop trail)
- Oregon DSL Permit No. 25119-RF (40-mile loop trail)
- NMFS Biological Opinion December 17, 2001 (all, excluding 40-mile loop trail)
- NMFS Biological Opinion August 23, 2002 (40-mile loop trail)
- COP LUR 01-00567EN, recorded February 14, 2002 (South bank, Visual buffer, Culvert removal)
- COP LUR 01-00568EN, recorded December 6, 2001 (Leadbetter, North bank, Lombard undercrossing)
- COP LUR 02-125102EN, recorded September 4, 2002 (Ramsey)
- Declaration of Restrictive Covenant regarding DSL Permit No. 25119, November 2002
- COP LUR 02-134231EN, recorded December 26, 2002 (40-mile loop trail)
- Restrictive Covenant, November 13, 2002
- NMFS Biological Opinion July 14, 2004 (all Rivergate Enhancement sites and T-4 Toyota)

BACKGROUND

This project is a result of a federal consent decree settling a citizen lawsuit against the Port (Jones *vs.* Thorne *et al*., 2001) and several other agencies. The consent decree was signed on January 31, 2001, and it specifies mitigation actions for wetland fills that occurred during the development of the Rivergate Industrial Park over the past 30 years. Mitigation was designed to restore and enhance approximately 43.7 acres of wetland and riparian habitat for native plants and wildlife in the Rivergate area. The consent decree supersedes several earlier mitigation projects including the Ramsey Lakes MOA.

The Rivergate Enhancement project includes two other prior mitigation efforts required by the COP in 1998:

- The Pacific Gateway project (LUR 98-00426) was a mitigation requirement for construction of a stormwater outfall within the COP's E-zone on the north bank of the Columbia Slough adjacent to the rail bridge in Rivergate. Mitigation consisted of planting native trees and shrubs (18,500 square feet) on the north side of the slough from the ordinary high water to the top of the natural bank. Mitigation design was based on revegetation standards from the Columbia South Shore Natural Resources Protection Plan. Site preparation included spraying and clearing blackberry before planting. Live willow stakes were installed within the riprap, and over 600 native trees and shrubs were planted at the top of bank; planting was completed in 1999.
- The Slough Rail project (LUR 95-00943 EN) was a mitigation requirement for a rail crossing over the Columbia Slough to expand capacity and provide more efficient rail service in the

Rivergate Industrial District. The site of the crossing was in an E-zone and within the Smith and Bybee Wetlands Natural Area. The construction involved the removal of six trees. Two sites were planted in 1998 as a mitigation requirement for impacts in the COP's E-zone, including 1.4 acres of native understory planting within the 150-foot buffer area on the north side of the slough, and 3.5 acres of native vegetation along the development boundary between the rail yard and the Ramsey Lakes mitigation site.

MITIGATION PLAN

The goals of mitigation are to increase or restore the following wetland functions: water storage capacity, thermoregulation, anadromous fish habitat, amphibian habitat, waterfowl habitat, and native plant communities. The mitigation plan is divided into eight discrete elements:

1. Construction of an 8-foot-wide asphalt path under the Lombard Street Bridge.
2. North bank, Columbia Slough: removal of fill to native soils and native plantings over a width of 150 feet and length of approximately 1,400 feet between the Lombard Street bridge and the Columbia Slough rail bridge; slopes no steeper than 3:1; construction of 800 feet of swale at least 10 feet wide and 1–2 feet below native soils and parallel to the Columbia Slough.
3. South bank, Columbia Slough: removal of fill to native soils and native plantings over a width of 50 feet and length of approximately 1,550 feet between the Lombard Street bridge and Columbia Slough rail bridge; slopes no steeper than 3:1.
4. Leadbetter Peninsula: removal of fill to native soils and native plantings over a width of 125 feet around the eastern, southern, and western boundaries of the peninsula, and a contoured slope to have an average of no greater than 4:1 grade for approximately 75 feet on the upland edge beyond the excavated area; construction of 1,500 feet of swale at least 10 feet wide and 2–4 feet below native soils and parallel to the toe of the fill slope.
5. Ramsey Lake visual buffer of native shrubs and trees along a corridor with a width of 10–100 feet at the top of slope west and north of Ramsey Lake mitigation area.
6. Ramsey Lake enhancement: removal of fill to 14 feet NGVD and construction of two meandering swales with a combined length of 2,000 feet and individual width of at least 50 feet at approximately elevation 10 feet NGVD; swales to connect to the slough at the upstream and downstream ends; and native plantings.
7. Culvert removal and removal of existing fill to the bottom of the elevation of the culvert adjacent to and east of the railroad bridge on the south side of the Columbia Slough.
8. Construction of a segment of the 40-mile loop trail from the rail bridge east to the Port's property line and mitigation for impacting 1.67 acres of wetland for trail construction. On-site wetland mitigation consisted of enhancement of 5.0 acres of reed canarygrass dominated wetland adjacent to the 40-mile loop trail near its terminus at the Port's property line. Enhancement measures were designed to re-establish forested wetland with native trees and shrubs and initially control reed canarygrass through a combination of burning, mowing, limited chemical applications, and shading.

REFERENCE SITE

The Smith and Bybee Wetlands Natural Area was used as a reference site to identify appropriate species composition and planting densities.

MITIGATION SUCCESS CRITERIA

The consent decree and COP required that 80% of mitigation plantings survive for at least 5 years (COP for North and South Slough, Leadbetter only). In addition, DSL, NMFS (North and South Slough, Ramsey), and COP (Ramsey, 40-mile loop trail) required the following success criteria (some of the following may be modified as the as-built reports confirm final acreage of community types):

NORTH AND SOUTH SLOUGH

- Establish 5.21 acres of riparian forest (PFO) with 180 tree stems and 250 shrub stems per acre, including desirable volunteer species.
- Establish 3.56 acres of scrub-shrub (PSS) with 250 tree stems and 100 shrub stems per acre, including desirable volunteer species.
- Establish 0.53 acre of emergent (PEM) habitat in swale area with 50% visual cover of planted and desirable volunteer emergent species at the end of year 1, 70% cover at the end of year 2, and 80% cover from years 3 through 5.
- Maintain five pieces of LWD within PEM/PSS habitat.
- Positive drainage of the swale and ditch following at least two flooding events per year.

LEADBETTER PENINSULA

- Establish 4.28 acres of PFO with 180 tree stems and 250 shrub stems per acre, including desirable volunteer species.
- Establish 1.46 acres of 250 tree stems and 100 shrub stems per acre of PSS community, including desirable volunteer species.
- Establish 8.69 acres of PEM with 50% visual cover at the end of year 1, 70% at the end of year 2, and 80% from years 3 through 5.
- Maintain five pieces of LWD within the emergent community.
- Positive drainage of the swale and ditch following at least two flooding events per year.

RAMSEY LAKE

- Establish 8.04 acres of PFO (8.0 acres, COP) with 180 tree stems and 250 shrub stems per acre, including desirable volunteer species.
- Establish 3.64 acres of 250 tree stems and 100 shrub stems per acre of PSS community, including desirable volunteer species.
- Establish 1.3 acres of grassland community dominated by planted or desirable volunteer emergent species and 10 trees per acre with 50% visual cover at the end of year 1, 70% cover at the end of year 2, and 80% cover from years 3 through 5.
- The four grass species shall cumulatively compose at least 50% of the total cover of the herbaceous stratum.
- Maintain 20 pieces of LWD (COP).

ALL AREAS LISTED ABOVE

- 50% cover in the herbaceous stratum of all PFO and PSS communities at the end of year 1, 70% cover at the end of year 2, and 80% cover from years 3 through 5.
- No more than 30% cover shall consist of non-native, undesirable invasive species.

40-MILE LOOP TRAIL MITIGATION SITE

- Establish forested wetland with 1,000 tree/shrub stems per acre, including desirable recruits.
- The plant diversity success criterion, as measured by Simpson's Index of Diversity, shall be such that the mitigation area meets or exceeds that in the reference areas.*
- 20% aerial cover of planted trees and shrubs, including desirable recruits after year 3, 30% after year 4, and 40% after year 5
- No more than 15% cover of non-native, invasive broad-leaf species, and no presence of purple loosestrife at any time during the monitoring period

*****This success criterion was substituted and approved by DSL on March 4, 2008, for the original DSL success criterion listed in State Permit No. 25119-RF, Condition No. 21(B): "At least five planted tree and shrub species, including desirable native recruits (FAC or wetter), representing at least 10% of the total stem count, each shall be present in the mitigation area for the duration of the monitoring period." This modification is considered a minor modification by the DSL and does not require additional public review.

TABLE 47: RIVERGATE ENHANCEMENT PERMIT REQUIREMENTS

Permit	Requirement	Status
Consent decree	Deed restrictions shall be placed on consent decree property.	Notice of consent decrees and covenants affecting real property recorded 6/29/01
Consent decree DSL No. 23801 DSL No. 25119	An as-built site construction report will be submitted in year 0 (Year 1, DSL), including information as specified in the consent decree.	As-built report submitted August 2004
Consent decree DSL No. 23801 DSL No. 25119 COP LUR-01-567 COP LUR-01-568 COP LUR-02-125102 COP LUR-02-134231	The site shall be monitored for a minimum period of 5 years (3 years NMFS). An annual report is required by November 1 of each year (December 31 for DSL No. 25119) and shall include information as specified in the permit and consent decree.	Year 5 monitoring completed August 2009 and reports submitted Dec 15, 2009.
Consent decree	The Port shall contribute $285,000 for additional mitigation projects within the Smith & Bybee Lakes Management area.	$285,000 placed in an interest bearing account until money is requested
Consent decree	The Port shall contribute $64,000 to the COP for revegetation of the lower Columbia Slough outside of the mitigation area.	Contribution submitted May 23, 2001
DSL No. 23801	Swales shall be monitored for at least two flooding events per year and until positive drainage is documented.	In a 2008 report, Ellis Ecological reported that the Rivergate sites do not present a significant stranding concern.
DSL No. 23801	The site shall be maintained for a period of 5 years until vegetation has become established and the area is functioning as designed.	Green Earth Landscaping has held the contract since 2006; before that Teufel Nursery, PHC and C&R worked on the sites.
DSL No. 25119	Mitigation for impacts to 1.67 acres of wetland during the construction of the 40-mile loop trail shall consist of 5.0 acres of enhancement wetland.	Mitigation site planted in February 2002.
DSL No. 25119	Mitigation site planting shall be completed by March 31, 2003 (amended 1/17/03 to allow planting to 3/31/04).	Planting was complete by February 2004.
DSL No. 25119 COP LUR-02-134231	LWD removed during trail construction shall be anchored in or adjacent to the mitigation area.	Two trees removed and logs retained within general area.
DSL No. 25119	Signs “Nature Area Please Stay on Trail Area Protected under State and Federal Law” will be posted in two locations along the trail.	Signs were installed by March 2004.

Permit	Requirement	Status
DSL No. 25119	A performance bond for $85,000 shall be provided; release is specified according to stages of completion.	Performance bond reduced by 50% in September 2008 due to compliance with success criteria at year 3.
DSL No. 25119	Restrictive covenant will be filed for long-term protection of the 40-mile loop trail mitigation site.	Restrictive covenant filed November 13, 2002.
NMFS	No herbicide application will occur within 300 feet of any stream channel unless approved by a NMFS biologist.	NOAA allowed Port-limited herbicide use as per biological opinion dated July 2004.
NMFS	No surface application of fertilizer will be used within 50 feet of any stream channel.	No fertilizer is being used with the plantings.
COP LUR-02-125102 COP LUR-02-134231	Mitigation plantings shall be installed 6 months after issuance of the site development permit.	Planting was complete by February 2004
COP LUR-01-567 COP LUR-01-568 COP LUR-02-125102 COP LUR-02-134231	A site development permit shall be finalized following completion of planting; letter confirming plant numbers installed shall be submitted before inspection (2002 LURs).	Final inspections were approved in September and October 2004 and in February 2005.
COP LUR-01-567 COP LUR-01-568 COP LUR-02-125102	A second site development permit shall be submitted after year 5 to document completion.	Submitted site development permit letter in February 2010.
COP LUR-02-134231	Certification shall be provided after year 5 showing that success criteria have been met.	Submitted certification letter in January 2010.
COP LUR-02-125102	All temporary irrigation shall be removed by October 1, 2007.	All irrigation was removed by 2012

2013/2014 UPDATE

- Reed canarygrass was removed in 2013 from around the planted Columbia sedge at the Leadbetter Peninsula where more sedge will be planted by metro.
- Amphibian egg mass surveys were conducted at Ramsey Enhancement and Leadbetter in 2013.
- A turtle nest predation survey was conducted June and July 2014.
- Two turtle nesting patches were cleared of vegetation at Leadbetter in 2014.
- White water lily was removed at Ramsey Lakes and Leadbetter in 2013 and 2014.

2009 FINAL YEAR 5 MONITORING SITE PERFORMANCE

- North and South Slough: met or exceeded all success criteria except PEM herbaceous cover, which was estimated to be 65%.
- Leadbetter: met or exceeded all success criteria except PEM herbaceous cover, which was estimated to be 72%.
- Ramsey Enhancement and Visual Buffer: met or exceeded all success criteria.
- Columbia Slough Levee Repair: met all three success criteria. Plant densities exceeded the criterion and aerial cover was estimated to be 67.6%. Cover of invasive species was 1.3%, well below the 15% target limit, and no purple loosestrife was observed.

- 40-Mile Loop Trail: met three of the four success criteria. Stem density exceeded the requirement and aerial cover was 66.4%. The Simpson's Index of Diversity analysis conducted in 2008 showed species diversity in the mitigation area (0.81) to be similar to that of the reference area (0.79). Invasive species were estimated at 2.0% cover; although purple loosestrife was observed during monitoring.

TABLE 48: 2015-2016 ACTION PLAN FOR THE RIVERGATE ENHANCEMENT SITES

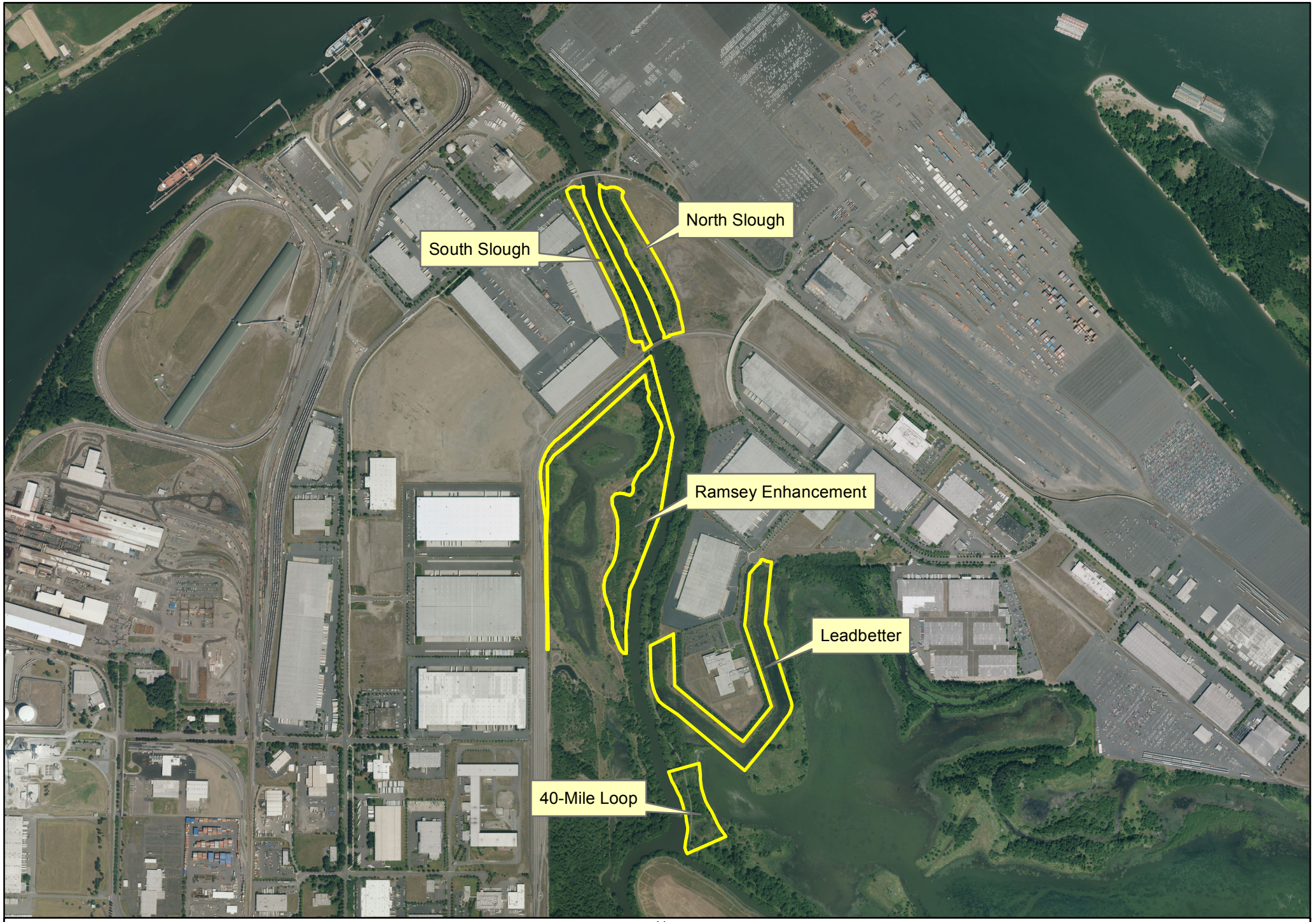
Anticipated Tasks	Date
Disturbed turtle nest monitoring at Leadbetter and 40-mile loop.	July and August.
White water lily removal at Leadbetter and Ramsey Lakes.	Early July.
Collaborate with Metro regarding access issues/solutions at Leadbetter due to increasing use of the site by birding community.	May and June 2013.
Site maintenance: general maintenance, invasive species control, etc.	Ongoing during growing season.
Site inspections and invasive species monitoring.	Seasonal, monthly during growing season, or as needed.

TABLE 49: RIVERGATE MITIGATION DOCUMENTATION LIST

Document	Author	Date
Consent Decree, Order of Dismissal with Prejudice and Release	Unites States District Court (US Dis. Crt.)	January 2001
Consent Decree, Settling United States' Cross-Claim Against Port of Portland	US Dis. Crt.	January 2001
Fish Species and Their Habitat near the Rivergate Industrial District, Baseline Conditions Report	Ellis	April 2001
Geotechnical Investigation, Rivergate Industrial District Habitat Mitigation and Revegetation	Foundation Engineering	May 2001
Wetland Delineation Report	DEA	July 2001
A Cultural Resources Study For the Proposed Rivergate Fill Removal Project, Portland	AIN, Inc.	July 2001
Graphical Soil Analysis Report	A&L Labs	August 2001
Endangered Species Act – Section 7 Consultation & Magnuson-Stevens Act Essential Fish Habitat Consultation Biological Opinion	NMFS	December 2001
Port of Portland 40-Mile Loop Trail Wetland Mitigation Plan	Beak-Jones & Stokes	April 2002
Endangered Species Act – Section 7 Consultation & Magnuson-Stevens Act Essential Fish Habitat Consultation Biological Opinion	USACE/NOAA	August 2002
First Amendment to Consent Decree and to Enforcement Consent Decree	US Dis. Crt.	September 2002
Archaeological Monitoring of Rivergate Fill Removal Project. AINW Report No. 1027	AIN, Inc.	December 2002
Archaeological survey, Port of Portland's Bybee Lake "breach" repair project AINW Report No. 1174	AIN, Inc.	August 2003
Fish Stranding Survey	Ellis	August 2003

Document	Author	Date
2003 Status Report Rivergate Enhancement Mitigation Projects	MF&A, Inc.	October 2003
Archaeological Monitoring Report for 2003 Rivergate Fill-Removal Project AINW Report No. 1241	AIN, Inc.	December 2003
Fish Stranding Survey	Ellis	August 2004
As-Built Report Rivergate Habitat Restoration and 40-Mile Loop Trail, Section I: North Slough, South Slough and Leadbetter Work Areas	DEA	August 2004
As-Built Report Rivergate Habitat Restoration and 40-Mile Loop Trail, Section II: Ramsey Lake, Culvert Removal and Visual Buffer Work Areas	DEA	August 2004
As-Built Report Rivergate Habitat Restoration and 40-Mile Loop Trail, Section III: 40-Mile Loop Trail Segment	DEA	August 2004
BES Monitoring Report for Leadbetter Port and Leadbetter Port TRAIL sites	BES	November 2004
2004 Wetland Mitigation Status Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	December 2004
Ramsey Lake and Visual Buffer 2004 Wetland Mitigation Status Report	Jones & Stokes	December 2004
2004 Status Report Rivergate Enhancement Mitigation Projects Leadbetter and North & South Slough	Tetra Tech FW, Inc.	December 2004
2005 Monitoring Report Rivergate Enhancement Mitigation Projects, Leadbetter and North and South Slough (Year 1); includes original plot/transect drawings	Port of Portland	October 2005
2005 (Year 1) Wetland Mitigation Monitoring Report Ramsey Enhancement and Visual Buffer	Jones & Stokes	October 2005
2005 (Year 1) Wetland Mitigation Monitoring Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	October 2005
2006 (Year 2) Monitoring Report Rivergate Enhancement Mitigation Projects, Leadbetter and North and South Slough	Port of Portland	December 2006
2006 (Year 2) Wetland Mitigation Monitoring Report Ramsey Enhancement and Visual Buffer	Jones & Stokes	October 2006
2006 (Year 2) Wetland Mitigation Monitoring Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	October 2006
2007 (Year 3) Monitoring Report Rivergate Enhancement Mitigation Projects, Leadbetter and North and South Slough	Port of Portland	October 2007
2007 (Year 3) Wetland Mitigation Monitoring Report Ramsey Enhancement and Visual Buffer	Jones & Stokes	October 2007
2007 (Year 3) Wetland Mitigation Monitoring Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	October 2007
2008 (Year 4) Monitoring Report Rivergate Enhancement Mitigation Projects, Leadbetter and North and South Slough	Port of Portland	December 2008
2008 (Year 4) Wetland Mitigation Monitoring Report Ramsey Enhancement and Visual Buffer	Jones & Stokes	October 2008
2008 (Year 4) Wetland Mitigation Monitoring Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	October 2008
2009 (Year 5) Monitoring Report Rivergate Enhancement Mitigation Projects, Leadbetter and North and South Slough	Port of Portland	December 2009

Document	Author	Date
2009 (Year 5) Wetland Mitigation Monitoring Report Ramsey Enhancement and Visual Buffer	Jones & Stokes	December 2009
2009 (Year 5) Wetland Mitigation Monitoring Report 40-Mile Loop Trail and Columbia Slough Levee Repair	Jones & Stokes	December 2009
DSL Release Letter for permit No. 23801-RF	DSL	August 2010



PORT OF PORTLAND

Enhancement Site Boundary

N

0 Miles 0.6

Figure VI-7
Rivergate Enhancement Sites
2013 Aerial Photo

8. T-5 Powerline

Mitigation location: Rivergate Industrial District, South Rivergate Corridor
Location of impact: Terminal 5
Year released: 2008

PERMITS

- USACE Permit No. 95-534
- Oregon DSL Permit No. 9836 Renewal
- Oregon DEQ – Letter of September 29, 1995

BACKGROUND

The Port filled approximately 12.5 acres of USACE jurisdictional wetlands (9.4 acres DSL jurisdictional) at the T-5 property for development of a bulk commodities marine terminal facility. The T-5 Powerline site was chosen for mitigation because it offered an opportunity to restore wetlands adjacent to the Willamette River and along a corridor that connected the river with the Smith and Bybee Wetlands Natural Area. There are two mitigation sites associated with the T-5 development. The first, the T-5 Powerline site, is located along the Willamette River at approximately river mile 3 and is divided into an east and west section by Time Oil Road. Historically, it was part of a large wetland complex in the Ramsey Lake area and was filled with dredge material in the early 1940s. The second is the Vanport Wetlands site, and mitigation status at this site is addressed in the Vanport Wetlands section of this report.

MITIGATION PLAN

The goals for this site were to 1) restore wetland hydrology; 2) establish emergent, scrub-shrub and forested wetland; and 3) establish a buffer around the wetland area. Target wetland functions and values included 1) diversifying wildlife habitat and enhancing the wildlife corridor between the Willamette River and the Columbia Slough; 2) increasing ecological integrity; and 3) protecting and increasing western painted turtle habitat. The regulatory requirements for the site include restoring 10.7 acres (7 emergent, 1 open water, 2.7 scrub-shrub) of wetland at the T-5 Powerline site, and restoring approximately 4 acres of wetland at the Vanport Wetlands site.

The T-5 Powerline site was initially constructed as a 10.7-acre site in 1995. In 1996 and again in 1997, the section west of Time Oil Road was re-excavated to improve wetland hydrology. However, dry conditions in 1999 and 2000 further reduced the wetland footprint. In all, 10 monitoring wells were used to evaluate groundwater levels on the western portion of the site, and information obtained indicated that adequate hydrology could not easily be achieved in the portion of the property closest to the river without jeopardizing the function of the existing wetlands. A modified design for restoring the wetlands was proposed in 2001, which allowed for the restoration of 2.6 acres east of Time Oil Road, re-excavation of approximately 4.4 acres west of Time Oil Road, and approximately 3.7 acres of restoration work at the Vanport Wetlands site. This was accepted by the agencies, and restoration work was completed in 2003.

Phase I of the re-excavation west of Time Oil Road was completed in 2001, and final ground elevations were adjusted in 2002 following review of the winter hydrology monitoring data; grading was completed in 2002. Soil amendments, in the form of DEQ-approved dredged silts from the Willamette and Columbia Rivers, were used to improve soil water-holding capacity along the north slopes and the wetland bottom. The south-facing slopes were left un-amended in order to provide potential turtle nesting habitat.

All slopes were hydro-seeded with a native seed mix in 2001 and broadcast seeded with the same mix in 2002, and the bottom was seeded and raked. Trees and shrubs were planted along the north slopes and in the Greenway; herbaceous vegetation on the south slopes was maintained as potential turtle nesting

habitat. Surrounding upland areas were regraded and seeded with native grasses mixed with Re-green to establish grassland prairie habitat. Large woody debris was placed in strategic spots in all ponds including in the wetland emergent area adjacent to Pickle Pond on the eastern side of Time Oil Road.

A road-over-rail project located near the wildlife corridor facilitated an under-crossing tunnel for wildlife below Time Oil Road and the rail road line. The tunnel was completed in the spring of 2004. Motion sensor surveillance has captured numerous animals using the passage, including rodents, river otter, coyote, raccoon, and reptiles. In spring 2007, the Port installed approximately 1,000 new native shrubs along both sides of Time Oil Road. The plantings will enhance the wetland buffer while providing a natural barrier meant to direct wildlife toward the tunnel entrance and keep them off of the road.

REFERENCE SITES

Smith and Bybee Wetlands Natural Area and Burlington Bottoms were used as reference sites to identify appropriate species composition and density for planting the mitigation area.

MITIGATION SUCCESS CRITERIA

- Equal to or greater than 50% herbaceous cover year 1.
- Equal to or greater than 65% herbaceous cover year 2.
- Equal to or greater than 80% herbaceous cover thereafter.
- No more than 10% combined cover of invasive, non-native species by the end of the third growing season, with the exception of reed canarygrass, which would not have more than 20% combined coverage, and purple loosestrife, which would have 0% cover.
- Woody vegetation (planted trees and shrubs) shall have 80% survival in each of the 5 years. For the western section, survival must reach a minimum of 344 plants annually in the emergent and scrub-shrub wetland communities and a minimum of 370 plants annually along the north slopes.
- Wetland habitat is to be saturated to the surface a minimum of 21 days during spring of a normal rainfall year, and wetland habitat acreage will equal or exceed 4 acres by the end of year 3 west of Time Oil Road.

TABLE 50: T-5 POWERLINE MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
USACE No. 95-00534 DSL No. 9836	An as-built report will be submitted within 60 days of completing grading and before planting.	Submitted April 1, 1996.
DSL No. 9836	An as-built report for the section west of Time Oil Road will be submitted within 60 days of completing grading.	Preliminary as-built for Phase I submitted March 2002; as-built for Phase II submitted April 2003.
DSL No. 9836 USACE No. 95-00534	An annual report will be submitted by November 1 for 5 years following construction; a copy will also to be submitted to the USFWS, Portland Field Station.	Year 5 report submitted December 2002 (east of Time Oil Road); year 5 report submitted December 2007 (west of Time Oil Road).
DSL No. 9836	Establishment of wetland criteria by year 3 (west of Time Oil Road).	Determined to be approx. 4.18 acres in May 2006.
USACE No. 95-00534	Surface soil shall contain a minimum of 8% organic material (east of Time Oil Road).	Surface soil greater than 8% and consists of leaf litter, thatch, plant debris, and wood mulch.
USACE No. 95-00534	A habitat evaluation shall be completed at the end of 5 years and compared to the HEP of	To be completed following completion of the site west of

Permit	Requirement	Status
	9/95 to determine success.	Time Oil Road. The Port is exploring the idea of allowing PSU graduate students to complete the HEP.
DSL No. 9836	Re-excavation and re-planting of the modified area will occur in accordance with the schedule in the mitigation plan.	Re-excavation and planting completed March 2003.
DSL No. 9836	A 3.7-acre shortfall shall be compensated for by mitigation at Vanport Wetlands.	See Vanport Wetland section of this management plan.

2013/2014 UPDATE

- Turtle nest predation surveys were conducted in July 2013 and 2014.
- Western painted turtles actively nest on-site, as evidenced by predated nests and observations of juveniles.
- Invasive species were managed throughout the site.

SITE PERFORMANCE

Compliance monitoring of the site took place from 1996 through 2007. The performance criteria for the section of the site east of Time Oil Road were met in 2003. Monitoring of performance criteria west of Time Oil Road continued through 2007 when the mitigation project received regulatory compliance. Since 2003, wildlife observations on the site have included over 60 species of birds, three amphibian species, three species of reptiles (western painted turtle, common garter snake, and western terrestrial garter snake), and 12 species of mammals, including river otters.

Biological controls were released from 1997 through 2001 to control purple loosestrife. The Port periodically checks loosestrife leaves for shot-hole to ensure that biological controls are still active. The following species were released:

TABLE 51: BIOLOGICAL CONTROLS RELEASED AT T-5 POWERLINE

Biological Control	Date of Release	Location	No. Released	Released By
Galerucella pusilla	July 1997	Corridor	200	ODA
Galerucella pusilla	August 1999	Nursery Pond	Approx. 250	USDA-Animal and Plant Health Inspection Service [APHIS]
Galerucella calmariensis	August 1999	Nursery Pond	Approx. 250	USDA-APHIS
Nanophyes marmoratus	August 1999	Pickle Pond	Approx. 100	USDA-APHIS
Hylobius transversovittatus	September 2000	Nursery Pond	82	USDA-APHIS
Hylobius transversovittatus	May 2001	Nursery Pond	100	USDA-APHIS

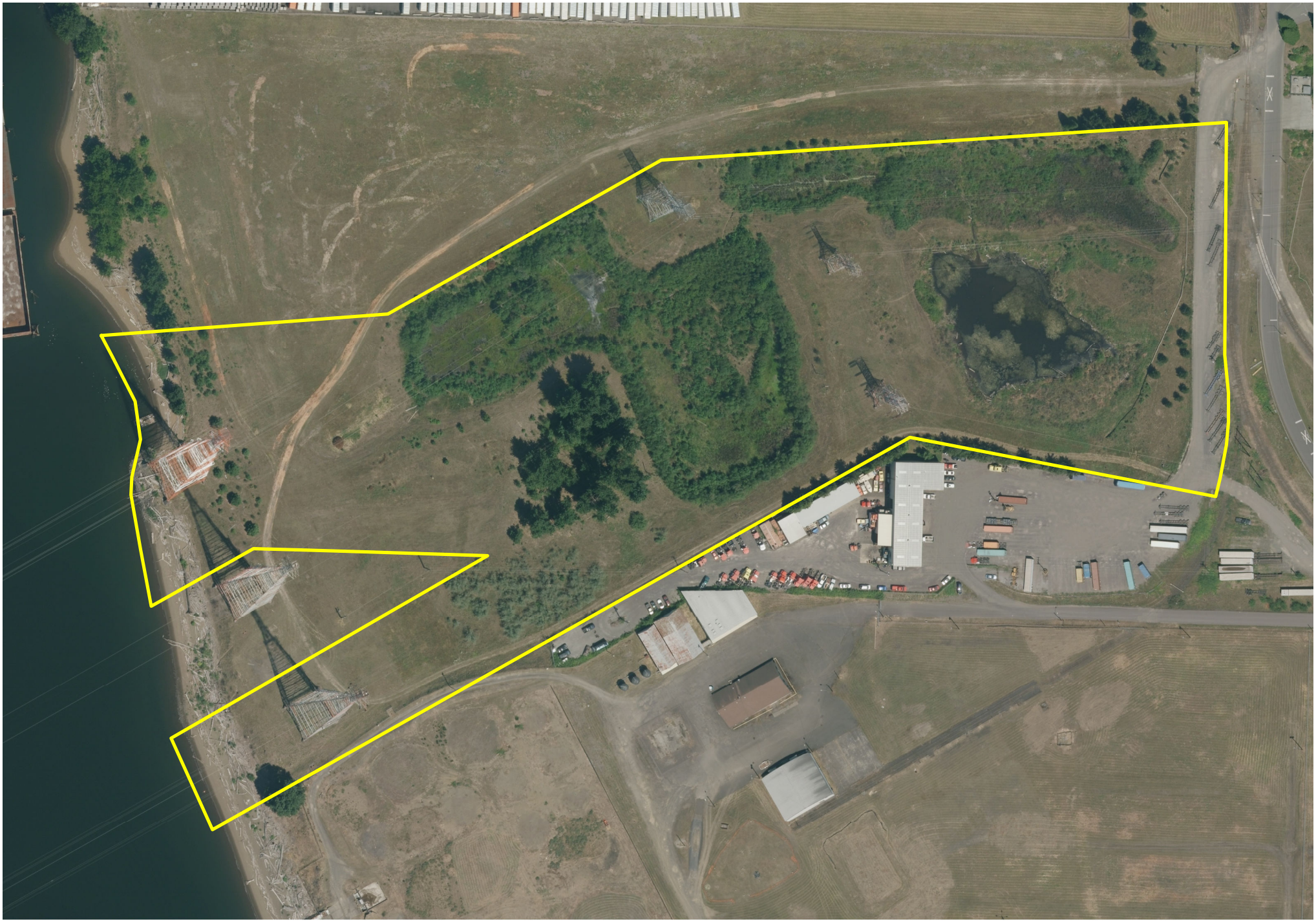
TABLE 52: 2015-2016 ACTION PLAN FOR T-5 POWERLINE MITIGATION

Anticipated Tasks	Date
Site inspections.	Monthly
Maintain south slopes as potential turtle nesting area.	Spring and summer
Turtle nest predation survey.	July
Site maintenance and weed control.	March–October
Amphibian egg mass survey.	February

TABLE 53: T-5 POWERLINE DOCUMENTATION LIST

Document	Author	Date
Evaluation of Natural Resources Port of Portland Properties	FES	September 1990
Vegetation Management Plan for Portland Bulk Terminal Site Mitigation	PORT	1995
Wetland Mapping T-5 Rivergate Industrial Area	FES	April 1995
Wetland Mitigation Plan for Wetland Impacts Associated with T-5 Development	FES	August 1995
HEP Study of Impacts and Mitigation of the Proposed Wetland	FES	September 1995
T-5 Mitigation Planting Plan	PORT	December 1996
T-5 Year 1 Wetland Mitigation Monitoring Report 1996	FES	December 1996
T-5 Year 2 Wetland Mitigation Monitoring Report 1997	FES	October 1997
T-5 Wetland Mitigation Monitoring Report 1998	FES	November 1998
T-5 Wetland Mitigation Expansion (groundwater investigation)	FES	September 1999
T-5 Wetland Mitigation Monitoring Report 1999	FES	December 1999
T-5 Wetland Mitigation Monitoring Report 2000	FES	November 2000
Final Hydrogeologic Characterization Report Port of Portland T-5 Wetland Mitigation Site	URS	May 2001
T-5 Wetland Mitigation Monitoring Report 2001	FES	October 2001
Purple Loosestrife Monitoring Report 2001 T-5 Mitigation, Pickle Pond	PORT	November 2001
T-5 Powerline Mitigation Acreage Compensation Wetland Mitigation Plan	FES	June 2002
T-5 Wetland Mitigation Monitoring Report 2002 (Pickle Pond)	FES	October 2002
Greenway Replant 2002 (T-5 Powerline Site)	PORT	November 2002
Purple Loosestrife Monitoring Report 2002, Year 2, T-5 Mitigation, Pickle Pond	PORT	November 2002

Document	Author	Date
T-5 Powerline Mitigation Site As-Built Report, April 2003	PORT	April 2003
T-5 Ponds Vegetation Survey	L. Wilson	July 2003
Analytical Report for Water Samples	NCA	July 2003
Port of Portland T-5 Powerline Wetland Mitigation Monitoring Report 2003 Year 1 of 5	FES	October 2003
Purple Loosestrife Monitoring Report 2003, Year 3, T-5 Mitigation, Pickle Pond	PORT	November 2003
Comparison of Mycorrhizal Fungi Colonization in Three Plots at T-5 Mitigation Site (Mycorrhizal Study and Soil Test)	D. Rennis/Soil Foodweb, Inc.	July 2004
Purple Loosestrife Monitoring Report 2004, Year 4, T-5 Powerline Mitigation, Pickle Pond	PORT	August 2004
Port of Portland T-5 Powerline Wetland Mitigation Monitoring Report 2004 Year 2 of 5	FES/SWCA	December 2004
Port of Portland T-5 Powerline Wetland Mitigation Monitoring Report 2005 Year 3 of 5	FES/SWCA	November 2005
Port of Portland T-5 Powerline Wetland Mitigation Monitoring Report 2006 Year 4 of 5	FES/SWCA	November 2006
Purple Loosestrife Monitoring Report 2006, Year 6, T-5 Powerline Mitigation, Pickle Pond	PORT	October 2006
Port of Portland T-5 Powerline Wetland Mitigation Monitoring Report 2007 Year 5 of 5	FES/SWCA	November 2007
Time Oil Road Wildlife Undercrossing, Urban Ecosystem Research Consortium (UERC) Conference presentation	Carrie Butler	February 2008
Rivergate Wildlife Undercrossing: Connecting Habitats for Urban Fauna, Society of Wetland Scientists (SWS) conference presentation	Carrie Butler	April 2010



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Mitigation Site Boundary

N

0 Feet 440

Figure VI-8
T-5 Powerline Mitigation
2013 Aerial Photo

9. Vanport Wetlands

Mitigation location: North Portland, south of Expo Center
Locations of impacts: PIC, PDX, Rivergate Industrial District, T-5 Powerline Mitigation, on site
Year released: 2008

PERMITS AND AGREEMENTS

- USACE Permit No. 99-632 (modified), (Cascade Station)
  USACE Permit No. 99-632-1 (PIC)
  USACE Permit No. 2000-043 (Airfield)
  USACE Modification to Permits, Letter of October 4, 2001
  USACE NW Permit No. 2001-00564 (N Simmons Road)
  USACE Permit No. 95-534 (T-5), letter of August 30 2002
  USACE Permit No. 2004-00091 (SW Quad)
  USACE Permit No. 2005-00131 (Taxiway B, April 2005)
  USACE Permit No. NWP-2010-66 (NREX Taxiway A Ditch, May 2010)
- Oregon DSL Permit No. FP-17198 modified (Cascade Station)
  Oregon DSL Permit No. FP-21878 renewal (Airfield)
  Oregon DSL Modification to Permits, Letter of October 3, 2001
  Oregon DSL Permit No. 24248-FP (N Simmons Road)
  Oregon DSL Permit No. 9836 Renewal (T-5)
  Oregon DSL Permit No. 30286-RF (PIC)
  Oregon DSL Permit No. 31722-RF (SW Quad)
- DEQ Certification
- MOA for the Removal of the Radio Towers, December 26, 2000
- First Amendment to MOA for Demolition of KGW Building, September 17, 2004
- COP LUR 00-00365 EN, recorded August 28, 2001
  COP LUR 00-00667EN, recorded November 30, 2000 (Radio wires removal, NW Swale mitigation)
  COP LU 04-028327 EN (SW Quad)
  COP LU 04-043122 EN (KGW Building Demolition)
- Conservation Easement, July 20, 2000
  Conservation Easement Amendment, November 27, 2001

BACKGROUND

The 90.5-acre Vanport Wetlands site is west of Interstate 5 and south of the Expo Center in North Portland. This site provides compensatory mitigation for wetland impacts at nine locations on Port property. Historically, the Vanport Wetlands site was part of the Columbia River floodplain; however, the surrounding area has been diked, and now groundwater, precipitation, and stormwater runoff are the sole sources of surface water. Flooding is controlled on the site by a WCS and pump station, which is managed by the MCDD. At the time of purchase in 1999, the site contained the pumping station and slough channels, two radio towers, the KGW transmission building, access roads, and degraded wetlands (62 acres of reed canarygrass monoculture) and uplands (pasture grasses, Himalayan blackberry, black cottonwood) used for cattle grazing.

MITIGATION PLAN

The goal of the Wetland Mitigation Plan was to increase diversity of plant and wildlife habitat by establishing a native plant-dominated wetland with a surrounding scrub-shrub or forested buffer. The mitigation plan was designed to alter the site's hydrology by capturing precipitation during the rainy season with a WCS and modifying the existing pumping/drainage regime to allow increased water depth within the wetland basin. This creates an open water habitat in the winter and spring months. The extended duration of inundation was used to stress and ultimately reduce the reed canarygrass so that

native wetland species could become established. The design also incorporated a number of physical modifications to the site, including a low, earthen berm in the northern portion of the property to prevent the flooding of Expo Road and the site's north ditch and reconfiguration of the central drainage channel to provide a meandering swale. The plan included mowing and spraying the reed canarygrass, plowing, seeding, and planting the wetland and enhancing adjacent upland and buffer habitats with native trees, shrubs, and herbaceous species.

Because the entire site falls under the COP E-zone, mitigation also included a requirement to mitigate for the ground disturbance that resulted from the removal of copper wiring associated with radio transmission. The goal was to enhance 0.1 acre of the existing riparian forest habitat in the NW Swale by removing invasive species and planting native trees and shrubs in riparian wetland forest habitat. In addition to removal of the invasive species, the mitigation plan called for the installation of 12 trees (black cottonwood, Oregon ash), 15 red-osier dogwood cuttings, 140 willow stakes, slough sedge, and mannagrass.

The radio towers and underground wires were removed, other physical modifications were completed by December 2001, and planting was completed in March 2003. The KGW transmission building was removed, and soils beneath the building were excavated in 2004 to provide additional emergent wetland mitigation.

The Vanport Wetlands site has received local and state honors. In November 2001, it won the Columbia Slough Watershed Council's Achievement Award, and in 2004, it won the Oregon State Land Board Award for wetland restoration.

REFERENCE SITES
Smith and Bybee Wetlands Natural Area and Ridgefield National Wildlife Refuge were chosen as reference sites to determine appropriate species composition and density for mitigation planting.

PERMIT SUMMARY
Site modification, planting, and increased flooding have resulted in approximately 65.5 acres of wetland habitat in the original central wetland. All of this acreage has been used to meet the Port's mitigation obligations from a number of projects. Tracking of mitigation acreage requirements is shown in the table below.

TABLE 54: VANPORT WETLANDS PERMITS

Project Name	Airfield	Cascade Station	NW Swale	N Simmons Road	T-5	PIC Sub-district B*	SW Quad	Taxiway A	Taxiway B
USACE Permit No.	2000-00043	99-632	N/A	2001-00564	1995-00534	1999-00632	2004-00091	NWP-2010-066	2005-00131
DSL Permit No.	FP-21878	FP-17198	N/A	FP-24248	9836	30286-RF	31722-RF	N/A	N/A
portCOP LUR	00-00365	00-00365	00-00667	N/A	N/A	N/A	04-028327	N/A	N/A
Mitigation start date	June 2000	June 2000	June 2000	June 2000	June 2000	June 2000	January 2005	June 2000	November 2005
Planting complete	March 2003	March 2003	March 2003	March 2003	March 2003	March 2003	January 2005	March 2003	November 2005
Monitoring start date	October 2003	October 2003	October 2003	October 2003	October 2003	October 2003	November 2005	October 2003	November 2006
Impact acres (federal/state)	8.25	5.77	N/A	0.22	4	5.47/3.41	3.94	0.29	0.435
USACE mitigation requirement	24.75	17.31	N/A	0.22	4	8.55	8.66	0.87	3.04
DSL mitigation requirement	24.75	17.31	N/A	0.22	4	8.55	8.66	N/A	N/A
COP mitigation requirement (E-zone LUR)	N/A	N/A	0.1	N/A	N/A	N/A	N/A	N/A	N/A
Enhancement (E)/ Restoration (R)/Creation (C)	E	E	E	R	R	E	E/R	E	C/E/R

*Original permit required 10.23 acres for mitigation; this was modified to 8.55 acres of mitigation since a portion of the wetland was never filled.

TABLE 55: VANPORT WETLANDS MITIGATION ACREAGE AND CREDIT BALANCE

Type	PEM-E	PEM-R	PSS-E	PSS-R	PSS-C	PFO-E	PFO-R	Upland Forest	*Wetland Outside of Lakebed	Total
Baseline wetland acreage	59.12	–	–	–	–	–	–	–	2.47	61.59
Adjusted wetland acreage following mitigation	52.36	0.38	6.06	3.16	0.50	0.70	2.21	–	2.47	67.84
Adjusted wetland acreage following building demo	52.36	0.56	6.06	3.16	0.50	0.70	2.21	–	2.47	68.02
Acreage used as of 2015 for Section 404 Impacts										
Airfield	21.83	–	2.22	–	–	0.70	–	–	–	24.75
Cascade Station	15.84	–	1.47	–	–	–	–	–	–	17.31
N Simmons Road	–	–	–	0.22	–	–	–	–	–	0.22
T-5 Powerline Compensation	–	–	–	2.51	–	–	1.49	–	–	4.00
PIC Subdistrict B	10.05	–	0.18	–	–	–	–	–	–	10.23
PIC Subdistrict B Wetland 63 Credit	-1.68	–	–	–	–	–	–	–	–	-1.68
SW Quad	4.64	0.38	2.19	0.25	0.50	–	0.70	–	–	8.66
Taxiway B	–	0.18	–	0.10	–	–	–	(2.76)	–	0.28
Taxiway A	0.87	–	–	–	–	–	–	–	–	0.87
Total acreage used to date[1]	51.55	0.56	6.06	3.08	0.50	0.70	2.19	–	–	64.6
Total acreage remaining	0.81	0.00	0.00	0.08	0.00	0.00	0.02	0.00	*2.47	0.91

*Wetland outside of lakebed includes forested drainage swales located to the north and west of the lakebed.

[1]Assumes ratios of 1:1 for restoration; 3:1 for enhancement

MITIGATION SUCCESS CRITERIA

All Sites

- 80% survival of woody plantings, including recruits, annually.
- No more than 20% cover of reed canarygrass, 10% cover of other invasive species, and 0% cover of purple loosestrife by the end of the monitoring period.
- The enhanced and restored wetland sites meet wetland criteria (as defined in the USACE 1987 *Corps of Engineers Wetland Delineation Manual*).

Airfield/Cascade Station Mitigation (42.05 acres)

- Greater than 50% cover of native emergent species in the enhanced emergent wetland.
- Greater than 75% cover at the end of year 5 for the swale bench and upper slopes.

N Simmons Road Mitigation Area (0.22 acre)

- Minimum of five shrub species and minimum stem count of 300 stems/acre (66 stems) by the end of 3 years.

Radio Towers Grounding Wires Removal at Vanport (NW Swale)

- 90% cover after year 1.
- No non-native invasive species will be dominant within its respective strata by year 5.

T-5 Powerline Compensation Mitigation Area (3.7–4.0 acres)

- Minimum of four shrub species and minimum stem count of 330 stems/acre (828 stems) at the end of 5 years in the scrub-shrub wetland.
- Minimum of three tree species and 150 stems per acre (223 stems) at the end of Year 5 in the forested wetland.

PIC Mitigation (8.55 acres)

- Greater than 50% cover of native emergent species in the enhanced emergent wetland.

SW Quad Mitigation (8.66 acres)

- Greater than 50% cover of native emergent species in the enhanced emergent wetland.
- Minimum of four shrub species and minimum stem count of 142 stems at the end of 5 years in the scrub-shrub wetland; minimum of three tree species and 152 stems at the end of 5 years in the forested wetland.

Taxiway A Mitigation (0.87 acre)

- Advanced emergent wetland mitigation.

Taxiway B Mitigation (3.04 acres)

- In the SW area of site, 0.1 acre shall be enhanced wetland scrub-shrub, and in the location where transmission building was removed, 0.18 acre of emergent wetland shall be restored. Cover of desirable native species shall be 80% each year after year 2, except where inundation precludes plant coverage. No more than 20% cover reed canarygrass, 10% cover other invasive species, and 0% cover of purple loosestrife.
- In the created 2.76-acre upland forest, 80% survival of the original 1,200 plantings, including desirable recruits each year during the 5-year monitoring period.

TABLE 56: VANPORT WETLANDS PERMIT REQUIREMENTS

Permit	Requirement	Status
DSL FP-17198 Modified DSL FP-21878 USACE 99-632	Wetland enhancement shall begin no later than November 1, 1999. Wetland enhancement shall begin with mowing and spraying the site.	Mowing and spraying began September 1999.
DSL 24248-FP	Construction for N Simmons Road mitigation shall begin by November 2001 and be completed by March 31, 2003.	Construction of the site began October 2001; completed by March 2003.

Permit	Requirement	Status
USACE 99-632	A historical evaluation of the buildings at the site shall be conducted to determine their historical significance and eligibility for the National Register of Historic Places.	Evaluation completed November 1998; MOA signed December 2000.
DSL FP-17198 Modified DSL FP-21878 USACE 99-632 DEQ Letters of Modification	A vegetated buffer of an average of at least 25 feet shall be maintained on the periphery of the entire 62-acre wetland mitigation site. This condition was superseded by letters of modification.	Completion of buffer planting March 2003.
DSL FP-17198 Modified DSL FP-21878	A planting plan for the buffer area shall be submitted to DSL for approval before planting.	Planting plan submitted July 2001.
DSL FP-17198 Modified DSL FP-21878 DSL 24248-FP DSL 31722-RF USACE 99-632 USACE 2000-043 USACE 2001-00564 USACE 2004-00091 USACE 2005-00131	The site shall be monitored for 5 years following planting (3 years for N Simmons Road mitigation).	Year 5 monitoring completed October 2007. Year 7 report documents overall site conditions and provides year 4 (of 5) monitoring results for the Taxiway B mitigation.
DSL FP-17198 Modified DSL FP-21878 DSL 24248-FP DSL 9836 DSL 30286-RF DSL 31722-RF USACE 99-632 USACE 99-632-1 USACE 2000-043 USACE 2001-00564 USACE 2004-00091 USACE 2005-00131	An annual monitoring report is due December 1 of each year for a period of 5 years (3 years for N Simmons Road mitigation and to COP) following planting. Specifications for report are detailed in each permit.	Year 5 monitoring report submitted December 2007. Year 7 report submitted November 2009.
USACE 99-632 USACE 99-632-1 DSL 24248-FP DSL 9836 USACE 2005-00131	An as-built mitigation site report shall be submitted the year in which the site is constructed and planted. As-built for the Taxiway B mitigation to be provided within 90 days of completion.	Final as-built report submitted June 2003. Taxiway B as-built submitted to USACE in February 2006.
DSL 24248-FP	Shrubs and trees shall be physically protected from herbivory.	Shrub and tree protection installed following planting.
DSL FP-17198 DSL FP-21878 DSL 30286-RF	A bond in the amount of $118,000 and $185,000 shall be assigned to DSL before filling any wetlands; an additional bond in the amount of $74,000 shall be assigned for the PIC fill.	Bonds assigned July 1, 1999 and April 29, 2000, respectively; additional bond assigned October 2, 2003.
DSL 31722-RF	A bond in the amount of $62,000 has been assigned to DSL.	Bond No. 104252672 was received in June 2004.

Permit	Requirement	Status
DSL FP-17198 Modified DSL FP-21878 DSL 31722-RF USACE 99-632 Modified	A conservation easement shall be filed for two sites (17.31 acres, 24.75 acres) by June 30, 2000.	Recorded for 42.44 acres, Multnomah County July 20, 2000.
DSL 24248-FP	A conservation easement for the N Simmons Road property shall be in place no later than February 28, 2002.	Conservation easement amended to include total property, 90.4 acres, November 27, 2001.
DSL 9836 USACE 1995-00534	Mitigation for the T-5 compensation site shall be excavated and revegetated according to the mitigation plan.	Excavation completed 2002; final planting completed March 2003.
DSL 31722-RF	The site shall be monitored for a minimum of 5 years beginning in 2005.	Year 3 monitoring completed October 2006.
USACE NWP-2010-066	Mitigation for impacts to two stormwater ditches (0.29 acre) south of Taxiway A at PDX.	Advanced mitigation credit at Vanport for 0.87 acre approved by USACE.
LUR 00-365	A site development permit will be obtained before ground-disturbing activities.	Site development permit issued October 2, 2001 and finalized on March 21, 2003.
LUR 00-365	Enhancement plantings shall be installed by December 2002.	Planting began November 2002 and completed March 2003.
LUR 00-667 EN	Annual monitoring report required for 5 years.	Year 5 report submitted July 2006.
LUR 00-667 EN	A site development permit must be applied for on July 1, 2006 for the purpose of inspection.	Inspected and approved by COP in October 2006.
LU 04-028327 EN	A Landscape Self-Certification Form shall be submitted to the Site Development Section of the BDS after plant installation.	Sent Landscape Certification to BDS March 23, 2005.
LU 04-028327 EN	Submit letter to BDS within 9–18 months after installation of the required plantings. Submit first letter by January 2006.	Sent December 2005 with Vanport Monitoring Report.
LU 04-028327 EN	Submit letter to BDS within 24–27 months after installation of the required plantings. Submit second letter by March 2007.	Sent December 2006 with Vanport Monitoring Report.
LU 04-043122 EN	Plant and seed regraded area. Building was removed by January 2004 and the area planted and seeded in February 2004 (95% of plantings were removed by waterfowl).	Due to incorrect elevation, the site was regraded in October 2005 and reseeded.
MOA	Draft Tier I Mitigation Documentation due before February 24, 2001.	Draft report submitted February 15, 2001; final report submitted April 24, 2001.
MOA	Port will prepare a photographic exhibit of the history of the radio facility.	Website exhibit online as of January 11, 2002.

Permit	Requirement	Status
MOA	Port will begin the preparation of a maintenance plan for preservation of the facility building by March 1, 2001.	Preservation of the building has been investigated; other alternatives were considered.
MOA	Port will investigate the structural soundness of the building by March 1, 2001.	Preliminary structural investigation completed March 2001, final completed January 2003.
MOA	Port will evaluate access, security, handicapped access, and visitor provisions related to the site and the facility building by March 1, 2001.	Evaluation of building completed March 2001; public use restricted by conservation easement and building structure.
MOA (First Amendment to demolish KGW building)	The Port will submit to State Historic Preservation Office floor plans, interior photography of building, and an additional historical report.	Photography, floor plans, and report submitted August 2004; building demolished in January 2005.

2013/2014 UPDATE

- Flooding of the site, November–June (see Flood Management below).
- Weed control including manual, mechanical and chemical, March–October.
- Wildlife surveys (typically occur in conjunction with site inspections) monthly, as-needed.
- 12–15 purple loosestrife plants were mechanically removed in the wetland in 2014.
- Site preparation began in 2014 to create two pollinator patches to support native pollinator species. The patches will be planted in fall 2015.
- Bee hives were placed on-site by Bridgetown Bees. Bridgetown's goal is to breed hardier, locally adapted queen bees. Pollen and bee samples from the hives will also be analyzed to help further understand what type of forage creates healthy bees.

FLOOD MANAGEMENT

At the Port's direction, MCDD begins releasing water from the wetland at approximately 3 inches per week starting in June if water levels are high (over 7 feet NGVD29 at MCDD gage) or July if water levels are below 7 feet on June 1. Flooding the site into the growing season helps to suppress reed canarygrass, whereas the drawdown provides mudflat habitat for migrating shorebirds in late summer and promotes the establishment of native emergent vegetation throughout the 65-acre wetland. Drawdown ideally is completed by mid-October when the water elevation in the wetland swale is approximately 2.75 feet NGVD29. In the fall, the WCS is inspected to ensure functionality by MCDD and is closed before the wet season to retain water for the following season.

SITE PERFORMANCE

Site modification, planting, and increased flooding have resulted in approximately 65.5 acres of wetland habitat in the original central wetland. All of this acreage has been used to meet the Port's mitigation obligations from a number of projects.

Compliance monitoring of the Vanport Wetland site was conducted from 2000 through 2010. The final monitoring report was submitted in 2010 and approved by regulatory agencies. However, maintenance

and weed control, primarily for reed canarygrass, thistle, teasel, blackberry, and nightshade, is ongoing. Since completing and meeting the regulatory compliance requirements, the Port cleared a dense thicket of Himalayan blackberry in the southwest corner of the property across from Heron Lakes Golf Course and installed 450 native shrubs in an effort to improve wildlife habitat. The Port continues to look for habitat enhancement opportunities that will benefit wildlife at Vanport Wetlands.

Vanport Wetlands provides habitat for over 100 species of birds, including many species that nest and raise young on the site (e.g., great horned owl, yellow-headed blackbird, red-winged blackbird, marsh wren, ruddy duck, American coot, Canada goose, mallard, red-tailed hawk, and American robin). Many mammals have been observed, including small rodents, beaver, muskrat, coyote, and black-tailed deer. Amphibian species that are frequently observed on the site include the Pacific chorus frog, long-toed salamander, and bullfrog. Western painted turtles have been observed infrequently and do not appear to be resident.

Vegetation and wildlife monitoring during the final monitoring year, 2010, indicated the following:

- 2010 marked the eight year following the completion of planting for most of the site and the fifth year following planting for Taxiway B mitigation.
- In the lakebed, percentage cover of herbaceous vegetation averaged 90% with 72% native species and 18% non-natives. Invasive species averaged less than 0.5% and included reed canarygrass and climbing nightshade. No purple loosestrife was observed in 2010.
- The Taxiway B mitigation area met all tree and shrub survival and invasive species cover criteria. Native herbaceous cover averaged 60% and did not meet the native cover criterion. Non-native cover was dominated by annual smartweed and most likely it will transition into perennial native Pennsylvania smartweed mimicking other areas of the lakebed.
- The Port will continue regular maintenance of the entire site to control invasive species and encourage native plant establishment.
- Approximately 88 avian species were recorded in 2010; the most common species (i.e., those observed at least 6 months out of the year) included American coot, American crow, American goldfinch, American robin, barn swallow, black capped chickadee, bushtit, Canada goose, downy woodpecker, European starling, gadwall, great blue heron, green-winged teal, killdeer, marsh wren, mallard, northern flicker, redhead, red-tailed hawk, red-winged blackbird, ruddy duck, song sparrow, spotted towhee, tree swallow, and western scrub jay; noteworthy observations included bald eagle, blue-winged teal, yellow-headed blackbird, snow goose, and 12 migratory shorebird species consisting of Baird's sandpiper, dunlin, greater yellowlegs, least sandpiper, lesser yellowlegs, long-billed dowitcher, semipalmated plover, semipalmated sandpiper, solitary sandpiper, spotted sandpiper, western sandpiper, and Wilson's snipe. The cumulative bird species count since 1999 is approximately 153.
- Nine mammals or signs of these mammals were recorded in 2010, comprising beaver, black-tailed deer, cottontail rabbit, coyote, deer mouse, nutria, raccoon, Townsend mole, and vole.
  Four herptile species were observed: common garter snake, Pacific chorus frog, long-toed salamander, and bullfrog.

TABLE 57: 2015-2016 ACTION PLAN FOR VANPORT WETLANDS

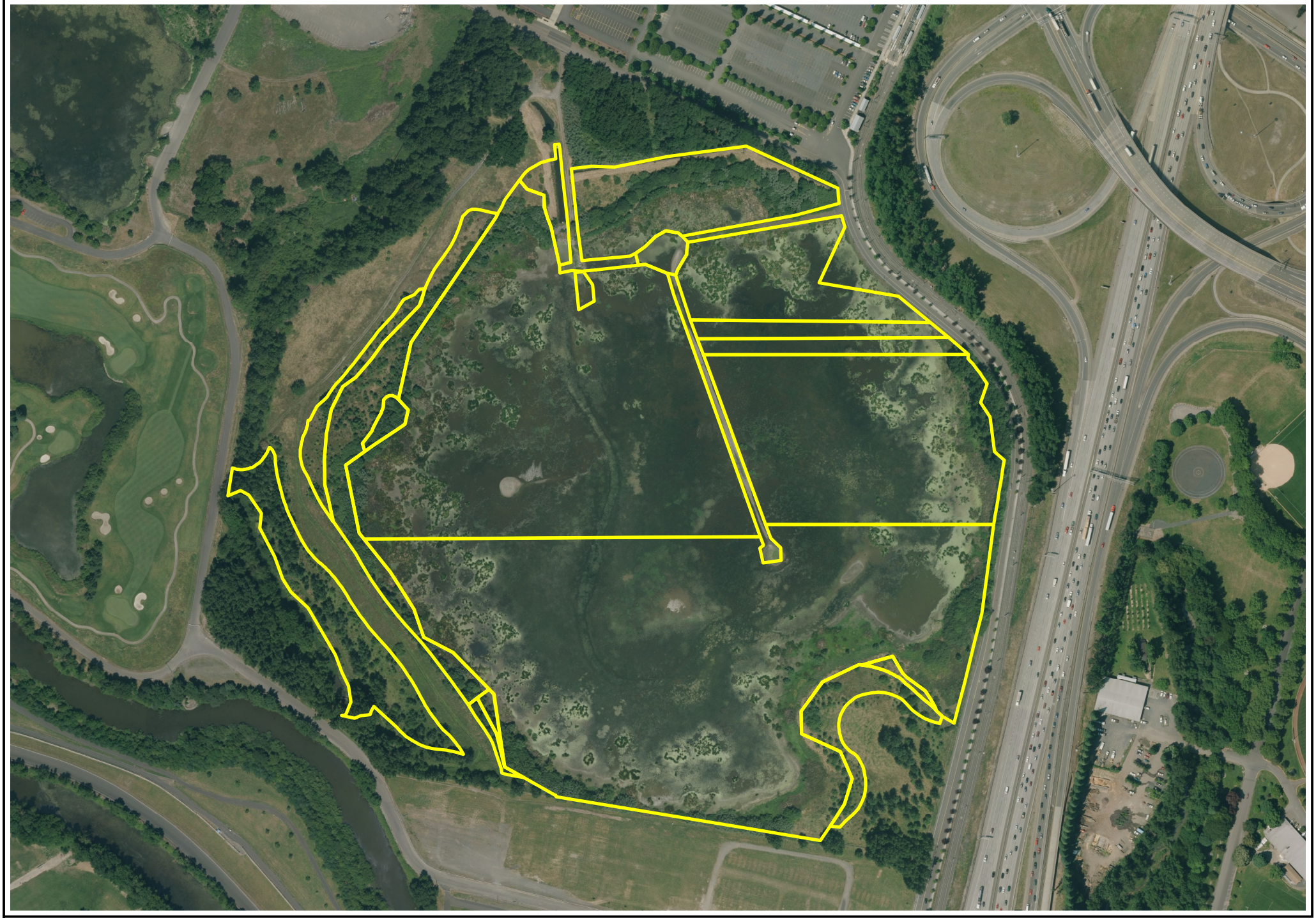
Anticipated Tasks	Date
Flooding of site	Winter/spring
Drawdown of water (adaptive plan)	June or July
Wildlife monitoring/site inspection	Monthly
Monitoring of surface water levels	Quarterly

Anticipated Tasks	Date
Continued weed control efforts throughout site	Spring/summer/fall
Further control of tall oatgrass	Spring
Amphibian egg mass survey	February
Using solarization to kill vegetation on pollinator patches	Summer
Seeding pollinator patches with native flowering forbs	Fall

TABLE 58: VANPORT WETLANDS DOCUMENTATION LIST

Document	Author	Date
Multnomah County Corrections Facility Radio Towers Site Portland, Oregon Wetland Study Report	Adolfson	September 1997
Cultural Resources Investigations for a Proposed New Multnomah County Correctional Facility, Portland, OR	AIN, Inc.	November 1998
Port of Portland Cascade Station Project Jurisdictional Determinations	DSL	March 1999
Cascade Station Final Technical Report	David Evans	April 1999
Biological Assessment Cascade Station	M. Smyth	April 1999
Functional Assessment of Wetlands	PORT?	April 1999
Port of Portland Radio Tower Site Wetland Mitigation Plan	FES	December 1999
Port of Portland Cascade Station Project Jurisdictional Determinations	USACE	February 1999
Radio Tower Site Ground Wire Removal Mitigation Plan ANZ 2000-126No. /4	PORT	October 2000
NW Swale Mitigation	FES	November 2000
Geotechnical Engineering Report Proposed Wetland Mitigation Berm Radio Towers Site	Geo Eng.	November 2000
Radio Towers Mitigation Site Amphibian Survey	PORT	November 2000
Preliminary Soil Investigation Radio Tower Site, Final Report	URS	December 2000
KGW Radio Towers Mitigation Documentation Tier 1	AIN, Inc.	February 2001
Brief Synopsis of Mosquito Species Characteristics of KGW site	Multnomah County Vector Control (MCVC)	September 2001
Port of Portland N Simmons Road Development Wetland Mitigation Plan	FES	September 2001
T-5 Powerline Mitigation Acreage Compensation Wetland Mitigation Plan	FES	June 2002
Vanport Wetlands Preliminary As-built Report as of February 2002	PORT	March 2002
Vanport Wetlands Mitigation Site As-built Report	PORT	June 2003
PIC Subdistrict B Development Wetland Mitigation Plan	PORT	June 2003
Port of Portland SW Quad Wetland Mitigation Plan	FES	January 2004
Hydrogeomorphic Assessment of the Vanport Wetlands	FES	June 2004
Port of Portland Vanport Wetlands Comprehensive Management Plan	PORT	July 2004
KGW Radio Transmission Building Documentation Record	AIN, Inc.	August 2004
Radio Towers Wetland Mitigation Project Status Report - December 1999	FES	December 1999
Port of Portland Radio Towers Wetland Mitigation 2000 Status Report	FES	November 2000
Mitigation Monitoring/Status Reports	**Author**	**Date**
Port of Portland Radio Towers Wetland Mitigation 2001 Status Report	FES	January 2002

Vanport Wetlands Wildlife Exclusion Enclosure Experiment Baseline Data	PORT	August 2002
Wildlife Exclusion Enclosure Experiment: Vegetation Monitoring – Year 1	PORT	October 2002
Vanport Wetlands NW Swale Mitigation Monitoring Report – Year 1	PORT	September 2002
Vanport Wetlands NW Swale Mitigation Monitoring Report – Year 2	PORT	September 2003
Vanport Wetlands NW Swale Mitigation Monitoring Report – Year 3	PORT	August 2004
Vanport Wetlands NW Swale Mitigation Monitoring Report – Year 4	PORT	August 2005
Vanport Wetlands NW Swale Mitigation Monitoring Report – Year 5	PORT	July 2006
Vanport Wetlands 2003 Mitigation Monitoring Report – Year 1	FES	October 2003
Vanport Wetlands 2004 Mitigation Monitoring Report – Year 2	FES	December 2004
Vanport Wetlands 2005 Mitigation Monitoring Report – Year 3	FES	November 2005
Vanport Wetlands 2006 Mitigation Monitoring Report – Year 4	FES	November 2006
Vanport Wetlands 2007 Mitigation Monitoring Report – Year 5	SWCA/FES	December 2007
Vanport Wetlands 2008 Mitigation Monitoring Report – Year 6	SWCA	December 2008
Vanport Wetlands 2008 Mitigation Monitoring Report – Year 7	SWCA	December 2009
Vanport Wetlands 2008 Mitigation Monitoring Report – Year 8	SWCA	December 2010
News Updates		
Radio Towers Site Update No. 1	PORT	February 2001
Radio Towers Site Update No. 2	PORT	May 2001
Radio Towers Site Update No. 3	PORT	October 2001
Vanport Wetlands News Update No. 4	PORT	March 2002
Vanport Wetlands News Update No. 5	PORT	November 2002



PORT OF PORTLAND

Mitigation Site Boundary

N

0 Feet 920

Figure VI-9
Vanport Wetlands Mitigation
2013 Aerial Photo

10. West Wye

Mitigation location: Rivergate Industrial District, South Rivergate Corridor
Location of impact: Rivergate Industrial District, South Rivergate Corridor
Year released: 2003

PERMITS

- USACE Permit No. 95-986
- Oregon DSL Permit No. FP-10282
- COP LUR 95-00964 EN
- Coast Guard Bridge Permit 1-96-13
- Restrictive Covenant, 2002-068964, April 16, 2002

BACKGROUND

The Port impacted a total of 1.3 acres of scrub-shrub, emergent, and open water wetlands adjacent to North Lombard Street along the Columbia Slough. This occurred during the expansion of rail capacity to provide more efficient rail service to industries in the southern portion of the Rivergate Industrial District. The West Wye mitigation site is west of the impact area in the same drainage corridor and is immediately adjacent to the T-5 Powerline mitigation site.

The invasive species purple loosestrife spread on the site after the initial excavation. ODA and USDA-APHIS released biological control agents in the area from 1997 to 2001. The Port maintenance crews are instructed not to cut, pull, spray, or dig up purple loosestrife plants on the West Wye mitigation site. Although Port mitigation staff discontinued a monitoring program due to inconclusive results after 7 years, the effectiveness of the biological agents will continue to be visually assessed during regular site visits. Below are the release dates for biological control agents in the vicinity.

TABLE 59: BIOLOGICAL CONTROL AGENTS RELEASED AT WEST WYE MITIGATION

Biological Control	Date of Release	Location	No. Released	Released By
Galerucella pusilla	July 1997	Corridor	200	ODA
Galerucella pusilla	August 1999	Nursery Pond	Approx. 250	USDA-APHIS
Galerucella calmariensis	August 1999	Nursery Pond	Approx. 250	USDA-APHIS
Nanophyes marmoratus	August 1999	Pickle Pond	Approx. 100	USDA-APHIS
Hylobius transversovittatus	September 2000	Nursery Pond	82	USDA-APHIS
Hylobius transversovittatus	May 2001	Nursery Pond	100	USDA-APHIS

MITIGATION PLAN

The goal of the mitigation plan was to restore wetland hydrology and increase wildlife habitat diversity by establishing 1.3 acres of wetland surrounding an existing 0.32-acre pond (Nursery Pond) and by enhancing approximately 1.1 acres of surrounding upland habitat. This area is contiguous with the corridor that restores the connection between Smith and Bybee Wetlands Natural Area and the Willamette River.

The mitigation design included excavating dredged sands and planting and seeding with native vegetation. Site construction began in 1996 and planting was completed in 1997. Some replanting took place in 1998 to replace tree/shrub plants that did not survive. Additional habitat improvements included construction of snake hibernacula and placement of large woody debris.

MITIGATION SUCCESS CRITERIA

The permit conditions stipulate the following:

- Ground surface cover of herbaceous species is equal to or greater than 50% in year 1.
- Ground surface cover of herbaceous species is equal to or greater than 65% in year 2.
- Ground surface cover of herbaceous species is equal to or greater than 80% thereafter.
- 80% survival of planted trees and shrubs in each of the 5 years.
- Surface saturation for at least 21 days during a normal rainfall year.

TABLE 60: WEST WYE MITIGATION PERMIT REQUIREMENTS

Permit	Requirement	Status
DSL FP No. 10282	The site shall be donated to a Land Trust or a conservation easement shall be established.	Declaration of restrictive covenant was filed in the County of Multnomah on April 16, 2002.
USACE No. 95-986 DSL FP No. 10282	Approximately 1.3 acres of wetland will be established.	September 2002 wetland boundary GPS data indicated 1.3 acres of wetland established.
USACE No. 95-986 DSL FP No. 10282	Annual reports, for a period of 5 years, are due by November/December 1 of each year.	Year 5 monitoring report submitted November 2002.
USACE No. 95-986	Surface soil shall contain a minimum of 8% organic material.	Surface soil greater than 8% and consists of leaf litter, thatch, plant debris, and wood mulch.
USACE No. 95-986	An as-built mitigation report shall be submitted following construction of the site.	Report submitted 1996 and 1997.
LUR 95-00964 EN	The mitigation site and the adjacent 4.5 acres mitigation site (Pickle Pond) will be placed within the environmental conservation zone.	E-zone overlay became effective September 1, 1996.

2013/2014 UPDATE

- Site inspections occurred monthly during the growing season.
- Invasive species control (manual, mechanical and chemical) occurred during the growing season.

SITE PERFORMANCE

The mitigation site was designed to improve wildlife habitat and increase wetland acreage along the corridor between the Willamette River and Smith and Bybee Wetlands Natural Area. Vegetation and wildlife were monitored annually between 1998 through 2002. The final-year monitoring report was submitted to regulatory agencies in 2002, and it showed that overall survival of woody plants and herbaceous species cover exceeded performance criteria. Agency acknowledgement of completion of permit requirements was received in April (USACE) and June (DSL) 2003.

Approximately 70 species of plants, including 35 native plants, have been recorded from the site. The wetland provides valuable scrub-shrub habitat within this wildlife corridor for birds, mammals, amphibians, and reptiles. The Port continues to inspect and manage the site to control invasive species such as Himalayan blackberry, poison hemlock, and common tansy.

Since 2002, approximately 50 different bird species were observed on the site, including American kestrel, bald eagle, Cooper's hawk, red-tailed hawk, red-shouldered hawk, downy woodpecker, fox sparrow, hermit thrush, and Wilson's snipe. In addition, common garter snake, Pacific chorus frog, long-toed salamander, bullfrog, and eight mammal species have been recorded.

TABLE 61: 2015-2016 ACTION PLAN FOR WEST WYE MITIGATION

Anticipated Tasks	Date
Site inspections	Quarterly/as needed
Turtle nest predation survey	July–October
Invasive species removal	April–October

TABLE 62: WEST WYE DOCUMENTATION LIST

Document	Author	Date
Rivergate Rail System and Columbia Slough Intermodal Expansion Bridge Review of Environmental Issues	FES	March 1992
Final Report Wetland Determination and Delineation Columbia Slough Rail Bridge Crossing	FES	September 1995
Monitoring Reports		
West Wye Rail Project Wetland Mitigation Monitoring Report (as built) 1996	FES	December 1996
West Wye Rail Wetland Mitigation Monitoring Report (as built) 1997	FES	October 1997
West Wye Rail Wetland Mitigation Monitoring Report 1998	FES	November 1998
West Wye Rail Wetland Mitigation Monitoring Report 1999	FES	December 1999
West Wye Rail Wetland Mitigation Monitoring Report 2000	FES	November 2000
West Wye Rail Wetland Mitigation Monitoring Report 2001	FES	October 2001
West Wye Rail Wetland Mitigation Monitoring Report 2002, Final	FES	October 2002
Purple Loosestrife Monitoring Report Year 1 2002	PORT	November 2002
Purple Loosestrife Monitoring Report 2003, Year 2, West Wye Mitigation	PORT	November 2003
Purple Loosestrife Monitoring Report 2004, Year 3, West Wye Mitigation	PORT	August 2004
Purple Loosestrife Monitoring Report 2005, Year 4, West Wye Mitigation	PORT	November 2005
Purple Loosestrife Monitoring Report 2007, Year 5, West Wye Mitigation	PORT	September 2007

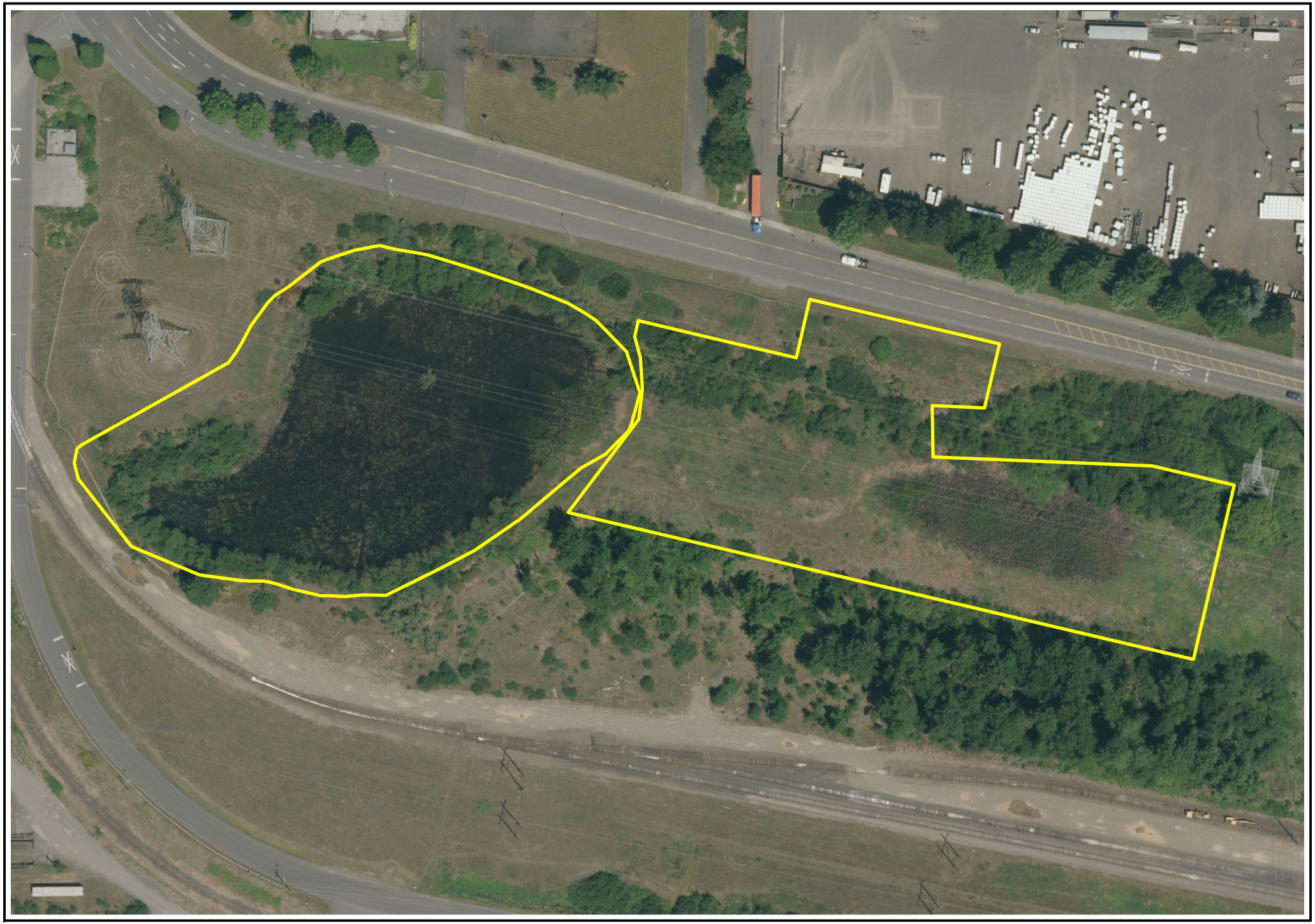


Figure VI-10
West Wye Mitigation
2013 Aerial Photo