

# **Vegetation Management Plan**

## *Mitigation Sites & Natural Areas*

*April 2016*



This report is a living document that began as a collaborative effort by the Port of Portland and SWCA Environmental Services.

## **PORT OF PORTLAND CONTACTS**

The following persons may be contacted if you have questions regarding any information in this report or for specific on-location needs:

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## **EMERGENCY CONTACTS**

Listed below are the primary emergency contact numbers and other information.

- **Medical or Other Emergencies**
  - In case of medical emergency, fire, or situations requiring police: Dial 911
  - If you think you have been poisoned by herbicides call the Oregon Poison Center: 1-(800) 222-1222
  
- **Chemical Spills**
  - To report a spill on Port-owned property, please notify:
    - Marine Security at (503) 240-2230 for spills on Rivergate sites
    - PDX Communications Center at (503) 460-4000 for spills on sites near the Portland International Airport
    - Notify Carrie Butler at 503-928-1611
  - For other spills contact OERS (Oregon Emergency Response System) at (800) 452-0311.
  - Please also refer to the Spill Response Policies in Appendix B.

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# VEGETATION MANAGEMENT PLAN

## SECTION 1 - BACKGROUND AND PURPOSE

The Port of Portland (Port) is one of the largest single landowners in the Portland metropolitan area, with approximately 10,000 acres of property holdings. Stewardship of these lands can be negatively impacted by the presence of invasive species, primarily non-native invasive plants. Effective invasive species management is a critical component of the Port's internal and external stewardship role. The Port's Environmental Policy for Natural Resources is to "minimize impacts and seek opportunities to enhance natural resources while carrying out Port projects." Invasive species management is a key factor of this policy.

Invasive species can affect both ecological and economic systems. Budget and staff allocations necessary to effectively manage invasive species on Port properties continue to require a large investment, with budget allocations projected at approximately \$256,000 in 2016–2017 just to control invasive plants that are currently known to occur on habitat mitigation sites. Invasive species are one of the primary maintenance concerns for the Port's wetland mitigation sites. These sites are managed under strict success criteria set by the U.S. Army Corps of Engineers and the Department of State Lands who issue wetland mitigation permits which often contain criteria for the management of invasive species.

Preventing the introduction and establishment of invasive species has been shown to be the most cost-efficient long-term management strategy. However, for invasive species that are already established, management programs must be developed and implemented in an attempt to counter their impacts. Control methods generally fall into one of the following categories: manual (hand pulling, digging, etc.), mechanical (using machinery to mow, plow, weedwack, etc.), chemical (herbicides), biological (live organisms), or hydrological (water level management). Each method has its advantages and disadvantages, and implementation must be carefully evaluated by the land manager.

This document focuses on the appropriate use of herbicides as a chemical control for invasive plant species. Herbicides can be a potent control method for invasive plant species, and have become a key tool for combating some species. However, the effects of an herbicide can extend outside the range of the target organism, particularly if applied incorrectly. Consequently, there is serious concern regarding the current use of herbicides. There are many regulations on the use of herbicides, with many more likely to be enacted in the near future. Past litigation (such as *Washington Toxics Coalition v. Environmental Protection Agency* [EPA]) has affected the way the public (and Port) use herbicides to control invasive plants near water bodies that contain fish listed under the Endangered Species Act (ESA). Specifically, this order restricts the use of certain herbicides (Carbaryl, Chlorpyrifos, Diazinon, Malathion and Methomyl) generally, within 20 yards for ground applications and 100 yards for aerial applications, adjacent to salmon supporting waters in California, Oregon and Washington. It is imperative that the use of herbicides be conducted in a responsible and judicious fashion.

The purpose of this document is to provide Port staff and Port-contracted workers who work on Port mitigation and natural areas with accurate information on the appropriate use of herbicides and also to give an overview of invasive species known to occur at each site, what maintenance has been done in the past and what is proposed for the near future. This information generally relates to the appropriate type of herbicide to use for a particular plant species and current restrictions and/or regulations that may apply to the use of the herbicide. Plants are ranked according to the City of Portland Classification system in their Nuisance Plants List; nuisance plants threaten the health and vitality of native habitats and cause economic harm to public and private landowners. This is a working document, and is intended to be modified every two years when new invasive species, herbicides, regulations, or site locations warrant change in application procedures.

## SECTION 2 - INVASIVE PLANTS

### 2.1 Target Invasive Species

This section lists most of the target invasive species controlled on Port mitigation sites using manual, mechanical, chemical, hydrological, and biological means. Photographs are provided for each species in addition to a brief summary of key features used for identification. Target species are arranged here by City of Portland Classifications A, B, C, D or W (Portland Plant List, 2011) as defined below:

**Class A:** *These species are known to be invasive. These species are known to occur but are not widely distributed in the region. Distribution is limited to a few sites. They spread rapidly and they are difficult to control once they become widespread.*

**Class B:** *These species are known to be invasive. These species are known to occur in the region. They are more abundant and widely distributed than A; however, the distribution is still limited to patches or specific habitats. Distribution is not as widespread as C plants. These species can spread rapidly and are difficult to control once they become widespread.*

**Class C:** *These species are known to be invasive. These species are widely distributed and abundant throughout the region. Their distribution is already very extensive throughout the natural areas and they are difficult to control once they become widespread. These plants are considered ubiquitous.*

**Class D:** *These species are known to be less aggressive than A, B, and C species. These species are known to occur in the region. These plants persist in ecosystems with native species and therefore, have less impact on the system than the A, B, and C species.*

**Class W:** *These are watch species. Species occurrence and distribution should be monitored for presence and/or to determine the level of invasiveness in the region.*

Preferred control methods are explained for each target species and can be found in Section 6 of this document. For consistency in nomenclature, throughout this document we use a single botanical name found in the USDA PLANTS database and the corresponding six-letter code for each species covered. The term “spray” refers to backpack spot-spraying unless otherwise noted. The Port uses broadcast spraying only where spot-spraying is not practical (such as on large expanses of land). Broadcast spraying requires the use of a long boom that provides treatment of large areas without the benefit of species-specific application. The Port currently has approved

only glyphosate-, triclopyr-, aminopyralid and metsulfuron-based herbicides for use at mitigation sites. The use of different herbicide formulations must be approved by the Port Senior Mitigation Specialist. Only non-ionic surfactants are approved for use on Port mitigation sites.

**Note:** Because this is a working document and meant as a tool to be used in the field, a “Notes” section has been provided for each plant profile. This section can be used to record improved management methods learned in the field. These notes will be referenced when writing the next vegetation management plan.

***Phytolacca americana* – American pokeweed (PHYAME), Class A**



**IDENTIFICATION**

- Perennial forb up to 8 feet tall with stout, purplish branching stem
- Leaves are oblong shaped, and alternate with smooth edges; up to 12 inches long and 4 inches wide
- Flowers are white or green in elongated clusters; bloom in early summer
- Fruits are deep purple berries with crimson juice that hang in distinct clusters from mid-summer to later fall

***WARNING: every part of this plant is poisonous with the root and leaves being the most toxic.***

**CONTROL METHODS**

The Port recommends manual and chemical control methods for pokeweed:

Manual Removal

Before spraying, all mature seeds/flowers should be cut, bagged, and solarize or disposed of in a landfill.

Chemical Treatments

Because American pokeweed re-sprouts from root fragments and develops a very large tap root, the Port prefers that this plant be selectively sprayed with a broadleaf herbicide. The Port recommends applying herbicide in the spring before it produces seed or within one month of flowering observations.

**NOTES**



***Silybum marianum* – blessed milk thistle (SILMAR), Class A**



**IDENTIFICATION**

- Biennial or annual forb up to 6 feet tall
- Leaves have spiny edges with white marbling along the veins
- Flowers are showy reddish-purple with leathery spine-tipped bracts

**CONTROL METHODS**

The Port recommends chemical and manual control methods for blessed milk thistle:

Chemical Treatments

Blessed milk thistle may be treated by spot-spraying with a selective herbicide in the Spring and Fall.

Manual Removal

Rosettes should be dug up when possible making sure to remove the entire taproot. Flower heads should be cut, bagged, and solarized or disposed of in a landfill and remaining foliage treated with herbicide as stated above.

**NOTES**

***Ailanthus altissima* – tree-of-heaven (AILALT), Class B**



**IDENTIFICATION**

- Deciduous tree up to 100 feet tall
- Leaves alternate, compound, to 3 feet long
- Leaflets are lanceolate; up to 5 inches long and 2 inches wide; toothed at base with unpleasant odor when crushed
- Flowers are small, greenish, and appear in dense terminal panicles
- Fruit appear in large dense clusters that hang on the tree through winter

**CONTROL METHODS**

The Port recommends chemical control methods for tree-of-heaven:

Chemical Treatments

Young, small trees can be cut/stump treated with glyphosate (or other/mixture). Mature trees can be drilled and injected (Most effective when tree is flowering) and then stump treated the following year. Mature trees should not be treated without first consulting Port staff.

Manual Removal

Saplings/seedlings can be dug up or pulled if the entire root system can be effectively removed. Dug up saplings/seedlings should be solarized or disposed of in a landfill.

**NOTES**



***Amorpha fruticosa* – false indigo bush (AMOFRU), Class B**



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**IDENTIFICATION**

- Perennial shrub up to 10 feet tall
- Each 4-inch- to 8-inch-long leaf is composed of 13 to 25 smaller leaflets that are 1 to 2 inches long, hairy, resinous, and dotted
- Seeds are approx. 0.25 inch long, brown, curved, and may be smooth or hairy
- Flowers are showy and purplish-blue with orange anthers; vanilla scent; blooms in early summer

**CONTROL METHODS**

The Port recommends manual and chemical control methods for false indigo bush:

Chemical Treatments

Large, more established plants should be cut and then stump treated with 50% glyphosate.

Manual Removal

Young plants can be hand-pulled in the spring before flowering occurs and if most of the root system can be removed. All dug up plant should be solarized or disposed of in a landfill.

**NOTES**

***Buddleja davidii* – orange eye butterflybush (BUDDAV), Class B**



**IDENTIFICATION**

- Deciduous shrub up to 15 feet tall
- Leaves opposite, glaucous beneath; young stems are square
- Flowers appear in dense terminal spikes up to 10 inches long, often nodding; flowers are very fragrant, light purple with orange centers
- Blooms mid-summer
- Reproduces mainly from seed
- Young stems are green while mature stems are covered in gray-brown bark

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**CONTROL METHODS**

The Port recommends manual and chemical control methods for orange eye butterfly bush:

Chemical Treatments

Large, more established plants should be cut and then stump treated with glyphosate. Flowering plants should be cut/stump treated or pulled and removed from the site to reduce seed dispersal.

Manual Removal

Young plants are to be hand-pulled in the spring before flowering occurs (be sure to remove the roots). Once cut or pulled, all parts of this plant must be bagged and disposed of in a landfill. Branches of butterfly bush can form roots and re-grow.

**NOTES**



***Centaurea* spp. – knapweed (CENSPE), Class B**



**IDENTIFICATION**

- Spotted knapweed (shown in photo) is most common although diffuse knapweed may also be present
- Young plants form grayish-green basal rosettes
- Plants may be 1 to 3 feet tall
- Leaves are narrow
- Bracts below the flower heads of diffuse knapweed have yellow spines with teeth rather than the distinctly black-tipped bracts of spotted knapweed

***WARNING: use gloves when handling this plant as it may emit toxic skin irritants***

**CONTROL METHODS**

The Port recommends chemical control and manual removal methods for knapweed:

Chemical Treatments

While knapweed plants can be controlled using glyphosate, annual re-applications are usually necessary. In upland grasslands the Port recommends using Milestone, a selective herbicide that won't harm native grasses.

Manual Removal

Port mitigation staff may ask that knapweed be hand-pulled in which case gloves are recommended to prevent skin irritation. All parts of this plant must be bagged, and solarized or disposed of in a landfill.

**NOTES**

***Chondrilla juncea* – rush skeletonweed (CHOJUN), Class B**



**IDENTIFICATION**

- Grows 1 to 4 feet tall
- Highly branched; leaves are inconspicuous
- Very small yellow composite flowers with 7–15 rays (similar to dandelion) appear in July
- In early summer the lower stem has prominent, reddish, downward pointing hairs
- Forms deep, extensive root system
- Typically found in areas with well-drained soil

**CONTROL METHODS**

The Port recommends chemical control methods for rush skeletonweed:

Chemical Treatments

Spot-spraying with glyphosate is most effective before rosette leaves fall off during flowering. First clip and bag any flowers or flower buds and remove them from the site to prevent seed production (seeds develop 2-weeks after flowering) then treat with glyphosate.

Manual Removal

Rush skeletonweed reproduces by cloning at the root thereby manual removal of the plant is not effective. Mechanical injury to the plant causes roots to produce new shoots.

**NOTES**

***Iris pseudacorus* – paleyellow iris (IRIPSE), Class B**



**IDENTIFICATION**

- Robust perennial with thick rhizomes
- Grows to 3 feet tall
- Leaves get to 1.5 inches wide and are flat
- Flowers are yellow, sometimes with purple markings
- Found at the edges of streams and ponds

**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for yellow-flag iris:

Manual Removal

***Bag and remove seed pods (solarize or bring to a landfill) before any control method is performed*** (see photo below). This can be done at any time of year and will eliminate new infestations.

Chemical Treatments

Large stands of iris are to be spot-sprayed with glyphosate. Flower heads should be cut and bagged before treating foliage.

**NOTES**



***Lythrum salicaria* – purple loosestrife (LYTSAL), Class B**



**IDENTIFICATION**

- Rhizomatous, perennial herb
- Grows up to 6 feet or greater
- Stem is square in cross section
- Leaves are lance shaped and opposite, attached directly to stem
- Blooms July–Sept
- Flowers in a terminal spike cluster of pink-purple blooms
- Grows in wetlands
- May be confused with native willow herbs (*Epilobium* spp.), which typically have round stems

**CONTROL METHODS**

The Port uses a combination of biological, manual, and chemical methods to control purple loosestrife. Biological agents are present at West Wye and Ramsey Lakes mitigation sites. The following methods are preferred to control this plant:

Chemical Treatments

In late spring/summer before blooming, positively identified plants can be spot-sprayed with glyphosate. Once flowers begin to bloom, flower heads should be cut and bagged and the remaining foliage spot-sprayed immediately with glyphosate. This regime is to be conducted weekly until purple loosestrife is no longer flowering. Bagged flower heads must be disposed of in a landfill or solarized.

**NOTES**



***Myriophyllum aquaticum* – parrot feather watermilfoil (YRAQU), Class B**



**IDENTIFICATION**

- Rhizomatous, aquatic perennial
- Leaves are finely dissected and 5–6 whorled
- Forms large subsurface and surface mats of dense vegetation in shallow water and along the water’s edge that displace other wetland vegetation

**CONTROL METHODS**

The Port recommends a combination of manual and chemical means to control parrots feather watermilfoil:

Chemical Treatments

Once water has receded in late summer/fall, populations can be sprayed with glyphosate, being careful to avoid overspray onto desirable wetland vegetation.

**NOTES**

***Polygonum cuspidatum* – Japanese knotweed (POLCUS), Class B**



**IDENTIFICATION**

- Strongly rhizomatous, woody-stemmed perennial shrub
- Grows up to 9 feet tall
- Leaves are broadly ovate and up to 6 inches long
- Stem is hollow, reddish color with prominent nodes like bamboo
- Blooms July through September in cream colored plume-like clusters
- Giant knotweed (*P. sachalinense*) occurs in similar habitats and looks similar except leaves have a more heart-shaped base

**CONTROL METHODS**

The Port recommends a combination of mechanical and chemical means to control Japanese knotweed:  
Chemical Treatments

Treat with glyphosate when knotweed is actively growing and most have reached the bud to early flowering stage (Usually July or August in the PNW). Flower heads should be cut, bagged and disposed of in a landfill (or solarized), and the remaining foliage sprayed. Small infestations or infestations that are too tall to reach can be treated by using the injection method.

**NOTES**

***Arrhenatherum elatius* – tall oatgrass (ARRELA), Class C**



**IDENTIFICATION**

- Leaf blades are flat, rough and 3/8 to 3/4 inches wide
- Panicles are 6 to 10 inches long with exposed awns



**CONTROL METHODS**

The Port recommends chemical control methods for tall oatgrass:

Chemical Treatments

Begin foliar treatment in early spring (April –May) when plants are around 15 inches tall. If plants are too tall in the spring, weedwack and treat in June.

**NOTES**

***Cirsium arvense* – Canada thistle (CIRARV), Class C**



**IDENTIFICATION**

- Grows 1–4 feet tall
- May form dense, rhizomatous colonies
- Shoots emerge March–May; rosette formation follows with a period of vertical growth in mid-to-late June
- Blooms June through August
- Colonizes disturbed areas; generally considered an upland species but may be found in emergent wetlands

**CONTROL METHODS**

The Port recommends a combination of chemical, mechanical, and manual control methods for Canada thistle:

Chemical Treatments

Rosettes should be treated chemically in the spring with the herbicide appropriate for the conditions where the infestation is found (wetland vs. upland). In May/June, plants that are bolting (undergoing vertical growth) are to be cut down before being allowed to produce flowers. In June/July, any flowers present are to be cut, bagged and disposed of in a landfill or solarized. In September/October, new rosettes may be spot-treated with an appropriate herbicide.

**NOTES**

***Cirsium vulgare* – bull thistle (CIRVUL), Class C**



**IDENTIFICATION**

- Grows 2–6 feet tall
- Leaves are prickly and hairy on the upper leaf surface and covered in cotton-like webbed hairs on the underside
- Basal rosette can exceed 3 feet in diameter
- Blooms June through September
- Colonizes disturbed areas; generally considered an upland species but may be found in emergent wetlands

**CONTROL METHODS**

The Port recommends a combination of chemical, mechanical, and manual control methods for bull thistle:

Chemical Treatments

Rosettes should be treated chemically in the spring with the herbicide appropriate for the conditions where the infestation is found (wetland vs. upland). In May/June, plants that are bolting (undergoing vertical growth) are to be cut down before being allowed to produce flowers. In June/July, any flowers present are to be cut, bagged and disposed of in a landfill or solarized. In September/October, new rosettes may be spot-treated with an appropriate herbicide.

**NOTES**

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***Clematis vitalba* – evergreen clematis (CLEVIT), Class C**



**IDENTIFICATION**

- Woody, perennial, climbing vine
- Leaves are divided pinnately with leaflets entire or upper lobed with stalk winding around supports
- Flowers are in loose clusters from leaf axils with 5 white/green petal-like sepals
- Very similar to native western white clematis (*C. ligusticifolia*)



**CONTROL METHODS**

The Port recommends a combination of manual and chemical means to control evergreen clematis:

Chemical Treatments

Treat (glyphosate) foliage and stems of actively growing plants in the spring before stem elongation. If treatment is done after stem elongation, cut plants down and spray re-growth later. Cut and stump treat mature vines with glyphosate or triclopyr before seed production in the fall.

Manual Removal

Small plants and vines growing along the ground can be dug up and removed. Roots of this vine must be bagged, and disposed of in a landfill or solarized.

**NOTES**

***Conium maculatum* – poison hemlock (CONMAC), Class C**



**IDENTIFICATION**

- Grows 6–8 feet tall, occasionally to 10 feet
- Leaves are shiny and finely dissected giving them a lacy or fern-like appearance
- Foliage gives off a musky odor, similar to dirty socks
- Stems are hollow and hairless with purple blotches (see photo, lower right)
- Blooms May through August; flowers are white and arranged in umbrella-like clusters near the ends of the branches
- Purple blotches on stems distinguish this species from native look-a-likes such as Angelica species (*Angelica* spp.), western water-hemlock (*Circuta douglasii*), and water parsley (*Oenanthe sarmentosa*). Additionally, poison hemlock has more deeply divided compound leaves than these species and is the only one of these plants with a distinctive musky odor

**WARNING: Poison hemlock is toxic and may irritate skin when handled—do not eat, and always wear gloves when handling and respirator masks when cutting with machines**

**CONTROL METHODS**

The Port recommends a combination of chemical and mechanical means to control poison hemlock:

Chemical Treatments

Foliar treatments are most effective in spring to actively growing plants before they are in flower, followed by a summer treatment for re-growth/late sprouts. Stem injection treatments can be done to mature plants in the spring.

Manual Removal

Plants should be dug up when possible making sure to remove the entire root. Flower heads should be cut, bagged, and disposed of in a landfill or solarized.

**NOTES**



***Convolvulus arvensis* – field bindweed (CONARV), Class C**



**IDENTIFICATION**

- Low-growing vine that will climb vertical plants and structures
- Leaves are arrow-shaped
- Blooms June through October; flowers are white to pink, trumpet-shaped, and 1 inch in diameter
- Bindweed is highly rhizomatous with extensive underground root/stem system
- This plant is typically found in upland conditions and not likely to occur in wetlands

**CONTROL METHODS**

The Port recommends the same chemical treatments for field bindweed and the larger morning glory vine found in our area, hedge bindweed (*Convolvulus sepium*). However, since hedge bindweed is more likely to climb native vegetation it is important to first remove it from other plants before applying herbicide.

Chemical Treatments

Treat with glyphosate or triclopyr in the summer or fall before leaves die back. If re-treating with glyphosate in the same season, allow plants to produce flowers between each treatment.

**NOTES**





***Crataegus monogyna* – One-seed hawthorn (CRAMON), Class C**



**IDENTIFICATION**

- Leaves are deeply lobed (like an oak leaf)
- Has showy, creamy-white flowers and clumps of red fruit that stay on the tree over winter
- Similar to native black hawthorn (*C. douglasii*), which does not have deeply lobed leaves

**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for English hawthorn:

Chemical Treatments

Large, more established plants should be cut and the stump treated.

Manual Removal

Young plants can be hand-pulled in the spring before flowering occurs (make sure you have the correct ID—these plants are similar to black hawthorn).

**NOTES**

***Cytisus scoparius* – Scotch broom (CYTSCO), Class C**



**IDENTIFICATION**

- Grows up to 10 feet.
- Leaves are small and pressed close to stem; lower leaves are compound (3 leaflets), upper leaves simple
- Branch edges are strongly ridged
- Blooms late spring to early summer
- Flowers are bright yellow
- This plant is typically found in upland conditions and not likely to occur in wetlands

**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for Scotch broom:

Chemical Treatments

Large, more established plants should be cut and the stump treated. Foliar treatment may be effective in the fall.

Manual Removal

Young plants can be hand-pulled in the spring before flowering occurs.

**NOTES**

***Daucus carota* – Queen Anne’s lace (DAUCAR), Class C**



**IDENTIFICATION**

- Fern-like/lacey leaves 2–6 inches long
- Flowers are white and in compact umbels blooming in late summer
- Stem is single and tall

**CONTROL METHODS**

The Port recommends manual removal of Queen Anne’s lace:

- Hand-pull or weedwack flowering stalks when possible.
- In an effort to reduce herbicide use, no chemical treatments should be used to manage this species unless otherwise specified.
- 

**NOTES**



***Dipsacus fullonum* - Fuller's teasel (DIPFUL), Class C**



**IDENTIFICATION**

- Grows to 6 feet or greater
- Stem leaves are lance-shaped and up to 10 inches long with spines on the underside
- Flowering stalk is armed with spines and is produced in the second year
- Blooms July through August
- The flowering heads are stiff and very spiny; small purple flowers bloom in one to a few horizontal rows around the head rather than the entire head at once
- Although considered an upland species, this plant can often be found near the edge of wetlands

**CONTROL METHODS**

The Port recommends a combination of manual, chemical, and mechanical control methods for Fuller's teasel:

Chemical Treatments

Rosettes should be treated in the spring and fall.

Manual Removal

Bolting plants should be cut down before flowering begins. Flowering and immature seed heads should be cut, bagged, and solarized or disposed of in a landfill.

**NOTES**



***Hedera helix* – English ivy (HEDHEL), Class C**



**IDENTIFICATION**

- Perennial, evergreen woody vine that can reach 90 feet in length
- Leaves are leathery and dark green, and borne on long leaf stalks
- Flowers, which are not present on the younger vines, are about 0.2 to 0.3 inch in diameter and white to yellow-green. Berry-like fruits appear in clusters, are green (unripe) to dark blue or black (ripe), and are about 0.24 to 0.36 inch in diameter
- Blooms in the fall
- Reproduces vegetatively (i.e., from stem fragments or by seed)
- Upland plant that can tolerate a wide variety of environmental conditions. It will invade riparian zones where soil has been disturbed by floods but won't grow in areas with a high water table or soil saturation

**CONTROL METHODS**

The Port recommends a combination of manual, mechanical, and chemical control methods for English ivy:

Chemical Treatments

Large stands of ivy should be cut with weedwackers in January and stumps immediately treated with glyphosate. Ivy vines found climbing trees or shrubs should be either pulled out or cut and the stems treated with glyphosate.

Manual Removal

Herbicide control measures should accompany a regular manual pulling regime to keep ivy vines from climbing trees and spreading over large areas. If the vine is growing up a tree, use caution as there is a danger of pulling branches off as you pull the ivy.

**NOTES**

***Ilex aquifolium* – English holly (ILEAQU), Class C**



**IDENTIFICATION**

- Evergreen shrub that can reach 15–50 feet
- Leaves are glossy, green, and thick with wavy edges lined with sharp spines
- Flowers are small and white; red berries are seen in the winter and are poisonous to humans



**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for English holly:

Chemical Treatments

Large, more established plants should be cut and the stump treated. Frilling (making deep cuts into the tree and applying herbicide into the cut) can also be done. Foliar spraying of herbicide is not very effective as herbicide cannot easily penetrate its thick, waxy leaves.

Manual Removal

Young plants should be hand-pulled in the spring.

**NOTES**

***Leucanthemum vulgare* – oxeye daisy (LEUVUL), Class C**



**IDENTIFICATION**

- Basal leaves pinnately lobed and toothed; stem leaves are smaller and sessile
- One flower head per stem with fewer than 22 white “petals” (ray flowers)

**CONTROL METHODS**

The Port recommends manual removal of oxeye daisy:

- Hand-pull or weed-whack when possible.
- In an effort to reduce herbicide use, no chemical treatments should be used to manage this species unless otherwise specified.

**NOTES**



***Lotus corniculatus* – bird’s-foot trefoil (LOTCOR), Class C**



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**IDENTIFICATION**

- Creeping to erect plant that forms dense patches up to 1.5 feet tall
- Leaves are deeply divided into 5 distinct leaflets; the two lowermost ones are attached directly to the main stem or branch. The margins of the leaves have straight, stiff hairs
- Blooms May through September; flowers are yellow, pea flower–shaped, and are arranged in tight compound flowering heads
- Bird’s-foot trefoil can occur in either wetlands or uplands, and is often problematic; it thrives in moist open areas including wetland margins

**CONTROL METHODS**

The Port recommends chemical control methods for bird’s-foot trefoil:

Chemical Treatments

During spring and summer when plants are in bloom spot-spray with the herbicide most appropriate for the conditions

**NOTES**



***Nymphaea odorata* – American white waterlily (NYMODO), Class C**



**IDENTIFICATION**

- Flowers are sweet-scented and white, cream, pink, or red in color
- Have long, branching, creeping rhizomes 0.5–1.0 inch in diameter that are densely covered with short black hairs
- Found in quiet shallow waters
- Blooms June to October

**CONTROL METHODS**

The Port recommends manual removal of American white waterlily:

Chemical Treatments

Use a solution of Glyphosate with an aquatic surfactant.

1. Two people should treat lilies from a boat while the third treats lilies that cannot be reached from the boat along the shoreline (wearing waders).
2. Crew treating from the boat should use a 2.5 gallon tank sprayer for watercraft instead of backpack. The tank is easier to pump from a boat and reduces top-heaviness of applicator, therefore increasing reach and making canoe turnover less likely. Applicators on foot continue to use backpack sprayer.
3. 60” wand extensions with cone-shaped or flat fan-shaped nozzles should be used for sprayers in boat and on foot. Apply herbicide downward only; avoid spraying laterally to extend reach.
4. Treat each lily leaf that is floating above the water. Avoid overspray into the water as much as possible.
5. When work is done for the day, take note of where you will start the next time. You may want to mark a point on the shore where you finished work that day and continue from there the next time you are out.

**NOTES**

***Phalaris arundinacea* – reed canarygrass (PHAARU), Class C**



**IDENTIFICATION**

- Rhizomatous, perennial grass
- Grows up to 7 feet and higher
- Mature leaves are bluish-green, flat, 0.75 inch wide and about 12 inches long
- May be identified by a very long ligule (up to 0.4 inch)
- Blooms June through August in a dense panicle
- Forms dense stands in wetlands
- May be confused with the native rice-cut grass (*Leersia oryzoides*), so correct identification is essential

**CONTROL METHODS**

The Port recommends a combination of hydrologic manipulation, and manual, mechanical, and chemical means to control reed canarygrass:

Chemical Treatments

In spring new growth that is not in standing water should be spot-sprayed with glyphosate.

In summer, before seed heads come on, tall patches should be cut with weed wackers and spot-sprayed after a few weeks of new growth.

In fall, treat areas with desirable native vegetation (after natives enter dormancy).

Manual Removal

Seed heads should be cut, bagged, and disposed of in a landfill or solarized. Remaining foliage should be sprayed.

Hydrologic Manipulation

Hydrologic manipulation is used to control this species only at the Vanport Wetlands site where a water control structure allows the Port to hold water on-site over the winter and spring months, releasing it slowly starting in June or July. After the water has been drawn off the site, mechanical and chemical methods are used to control remaining patches in the wetland.

**NOTES**



***Prunus lusitanica* – Portugal laurel (PRULUS), Class C**



**IDENTIFICATION**

- Evergreen shrub with dark green, glossy toothed leaves
- Flowers are white and fragrant; fruit is dark purple
- Shrubs are densely branches; young branches are red in color



**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for Portugal laurel:

Chemical Treatments

Large, more established plants should be cut and the stump treated with the appropriate herbicide for the conditions where the infestation is found. Foliar spraying of herbicide is not very effective due to the thick, waxy leaves.

Manual Removal

Young plants should be hand-pulled in the spring.

**NOTES**

***Robinia pseudoacacia* – black locust (ROBPSE), Class C**



**IDENTIFICATION**

- Bark is dark reddish-brown to black with a pair of thorns (0.5 to 0.75 inch long) growing at each node
- Leaves pinnately compound and are 8–14 inches long with 7–19 short leaflets (see picture on the right)
- Has creamy white, sweetly fragrant flowers with 5 petals; blooms May and June
- Produces flat brown pods (2–4 inches long) with many seeds

**CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for black locust:

Chemical Treatments

Large, more established plants should be cut and the stump treated. Make sure the entire tree is dead before placing it on-site as it may re-grow from cut woody material

Manual Removal

Young plants can be hand-pulled in the spring.

**NOTES**

***Rosa rubiginosa* – Sweetbriar rose (ROSEGL), Class C**



**IDENTIFICATION**

- 3–10 foot shrub
- Olive-green stems covered with many curved thorns
- Leaves have 5–7 oval, double-toothed leaflets
- 1–8 flowers (0.5–0.75 inch long) in loose clusters with 5 prominent sepals at the base of each flower

**CONTROL METHODS**

The Port recommends a combination of mechanical, and chemical means to control Sweetbriar rose:  
Chemical Treatments

Mature shrubs can be cut and stump treated.

**NOTES**



***Rosa multiflora* – multiflora rose (ROSMUL), Class C**



**IDENTIFICATION**

- Shrub or climbing vine that ranges from 5–12 feet tall
- Leaves are pinnately divided with 5–11 leaflets
- Flowers grow in clusters, are white to pink, and fragrant
- Small clusters of red fruit form in summer and continue into winter (more leathery in winter)

**CONTROL METHODS**

Same as Sweetbriar rose control measures above.

***Rubus armeniacus* – Himalayan blackberry (RUBARM), Class C**



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**IDENTIFICATION**

- Perennial shrub with sprawling or climbing growth habit
- Leaves are deeply divided into 3–5 ovate toothed leaflets
- Flowers have five white or pinkish petals and are 1 inch or more in diameter
- Produces abundant sweet berries from mid to late summer
- Found in disturbed upland sites and along ditches and wetlands

**CONTROL METHODS**

The Port recommends a combination of manual, mechanical, and chemical means to control Himalayan blackberry:

Chemical Treatments

In spring, spray new growth. In fall, blackberry less than 2 feet tall can be sprayed with the herbicide appropriate for the conditions; larger stands should be cut manually or mechanically and then sprayed in spring. Stump treatments can also be done in the spring and fall.

Manual Removal

Young plants should be hand-pulled when possible (wearing thick gloves). In summer, blackberry should be cut and pulled away from desirable vegetation in preparation for re-growth treatment in the fall.

**NOTES**



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***Rubus laciniatus* – cutleaf blackberry (RUBLAC), Class C**



**IDENTIFICATION**

- Leaflets deeply incised, lower surfaces are green and sparsely to moderately hairy
- Berries are round, glabrous, black, and 1.5 centimeters (cm) in diameter

**CONTROL METHODS**

Similar to Himalayan blackberry control measures on previous page.

**NOTES**



***Senecio jacobaea* – tansy ragwort (SENJAC), Class C**



Both photos by Eric Coombs, Oregon Dept. of Agriculture

**IDENTIFICATION**

- Lower leaves are 8–10 inches and deeply pinnately divided
- 13 yellow ray flowers make up the flower head with numerous heads closely clustered on the top of the stem
- Stems are 1–6 feet tall
- Toxic to cattle and horses

**CONTROL METHODS**

The Port recommends a combination of manual, mechanical, and chemical means to control tansy ragwort:

Chemical Treatments

Apply a selective broadleaf herbicide in the spring (before any flowers appear) and again in the fall.

Manual Removal

If in bloom, first cut flowers and dispose of in a landfill (or solarize) before treatment.

**NOTES**





***Solanum dulcamara* – climbing nightshade (SOLDUL), Class C**



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**IDENTIFICATION**

- Rhizomatous, climbing perennial vine
- Leaves are generally ovate with prominent basal lobes
- Blooms July through August
- Flowers are deep purple with bright yellow anthers
- Produces oval-shaped fruit that vary in color from yellow to orange to bright red
- Found in wetland and upland habitats and along ditches and waterways

**CONTROL METHODS**

The Port recommends a combination of manual and chemical means to control climbing nightshade:

Chemical Treatments

In spring, young plants can be sprayed with glyphosate or a selective broadleaf herbicide if water levels are low enough. In the fall, remove any flowers and treat the plants with glyphosate or a selective broadleaf herbicide if water levels are low enough.

Manual Removal

In summer, once flowers set, entire plants can be pulled, bagged and disposed of in a landfill or solarized. Hand-pull the stem close to the ground and pull or dig up the roots, taking care not to break the slender roots. This method is most effective with young plants and new infestations.

**NOTES:**



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***Tanacetum vulgare* – common tansy (TANVUL), Class C**



**IDENTIFICATION**

- Rhizomatous, perennial herb
- Grows to 6 feet
- Leaves are pinnately divided and toothed
- Flowers are a tightly compressed disk of yellow flowers
- The plant has a spicy odor
- Usually found in upland conditions but may occur near wetlands

**CONTROL METHODS**

The Port recommends a combination of manual, mechanical, and chemical means to control common tansy:

Chemical Treatments

Apply a selective broadleaf herbicide in the spring (before any flowers appear) and again in the fall.

Manual Removal

If in bloom, first cut flowers and dispose of in a landfill (or solarize) before treatment.

**NOTES**

***Verbascum blattaria* – moth mullein (VERBLA), Class C**



**IDENTIFICATION**

- Stem is 1.5 to 5 feet in height with toothed leaves becoming progressively smaller
- Flowers are 5-lobed, bright yellow (sometimes white), and 0.75 to 1.25 inches wide
- Rosette leaves are dark green, reddish-tinged, and usually shallowly lobed and toothed

**CONTROL METHODS**

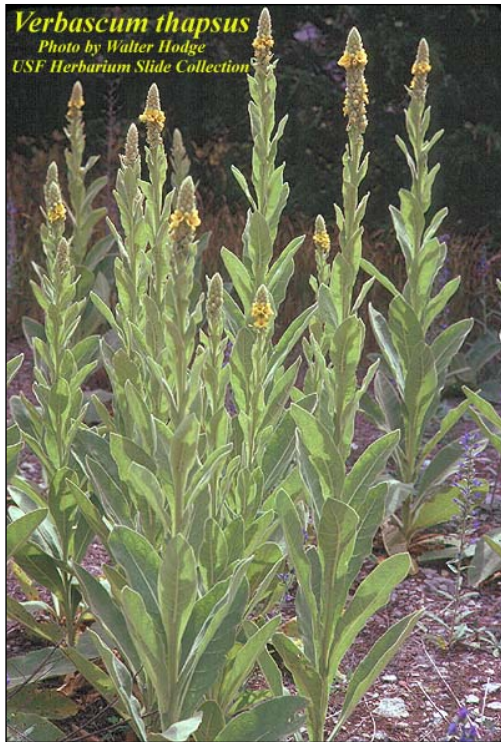
The Port recommends manual removal of moth mullein:

- Hand-pull or weed-whack when possible.
- In an effort to reduce herbicide use, no chemical treatments should be used to manage this species unless otherwise specified.
- 

**NOTES**



***Verbascum thapsus* – common mullein (VERTHA), Class C**



**IDENTIFICATION**

- Rosette is large with fuzzy leaves
- Second year of growth stem is 2–6 feet tall with fuzzy, alternate, overlapping light green leaves
- Flowers are 5-lobed, yellow, and positioned on terminal spikes

**CONTROL METHODS**

The Port recommends manual removal of common mullein:

- Hand-pull or weed-whack when possible.
- In an effort to reduce herbicide use, no chemical treatments should be used to manage this species unless otherwise specified.

**NOTES**



***Cichorium intybus* – chicory (CHIINT), Class D**



**IDENTIFICATION**

- Perennial herb with milky juice
- 1–6 feet tall with spreading branches
- Rosette: leaves are 2–10 inches long, oblanceolate, petiolate, toothed, and often pinnately parted
- Upper leaves are reduced, sessile, and sometimes entire
- Flowers are blue to purple and 1.5 inches across

**CONTROL METHODS**

The Port recommends manual removal of chicory:

- Hand-pull or weed-whack when possible.
- In an effort to reduce herbicide use, no chemical treatments should be used to manage this species unless otherwise specified.

**NOTES**

***Lysimachia nummularia* – creeping Jenny (LYSNUM), Class W**



**IDENTIFICATION**

- Perennial, forb, groundcover
- Leaves are opposite and rounded; 0.5–1 inch long and nearly as wide
- Blooms June through August; flowers are yellow and nearly as large as the leaves
- Creeping Jenny is found in seasonal wetlands and may form a dense mat, outcompeting more desirable native vegetation

**CONTROL METHODS**

Although the city ranks creeping Jenny as a Class W invasive, the Port has found this plant to be problematic in wetlands. The Port recommends this species be treated with glyphosate during the growing season.

Chemical Treatments

Spot spray when water levels are low with glyphosate.

**NOTES**



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## 2.2 Other Species to Know

Other than the species profiled in the preceding section, Port landscape contractors are expected to familiarize themselves with the following species as they may occur or are known to occur on Port properties. If one of the following species is found on a site, contact the Port mitigation site specialist for treatment instructions.

Botanical Name	Common Name	Botanical Name	Common Name
<i>Alliaria petiolata</i>	garlic mustard	<i>Impatiens glandulifera</i>	Policemen's helmet
<i>Anthriscus caucalis</i>	bur chervil	<i>Lathyrus sylvestris</i>	flat pea
<i>Cortaderia selloana</i>	Pampas grass	<i>Ludwigia peploides</i>	floating primrose-willow
<i>Cynodon dactylon</i>	Bermudagrass	<i>Melilotus officinalis</i>	sweetclover
<i>Cynoglossum officinale</i>	gypsyflower	<i>Phragmites australis</i>	common reed
<i>Galega officinalis</i>	professor-weed	<i>Polygonum sachalinense</i>	Giant knotweed
<i>Hypericum perforatum</i>	common St. Johns wort	<i>Paphanus raphanistrum</i>	wild radish

## SECTION 3 - HERBICIDES

### 3.1 General Herbicide Information and Precautions

The terms *herbicide* and *pesticide* are both used in this section and in Appendix B, particularly in the discussion of regulations, but they are not strictly interchangeable. An herbicide is simply a type of pesticide used to control or kill unwanted plants. Thus, all herbicides are pesticides but not vice-versa. General herbicide terminology and a list of general precautions to use when applying herbicides are listed below.

#### 3.1.1 Surfactants

Specific surfactants are discussed in Section 3.2. Surfactants are chemicals that are mixed with herbicides. These substances provide a variety of functions and, when used properly, increase the efficacy of certain herbicides. They can improve the emulsifying, dispersing, spreading, wetting, or other surface-modifying properties of liquids (National Oceanic and Atmospheric Administration [NOAA] 2004). By increasing the ability of the herbicide to stick to leaves, or other target tissues, surfactants can reduce drift and dripping of chemicals into the soil or desirable plants.

#### 3.1.2 Selective and Non-selective Herbicides

Herbicides are often described as being *non-selective* or *selective*. A non-selective herbicide will kill all types of plants—grasses, broadleaf herbs, deciduous and evergreen trees and shrubs, and so on. A selective herbicide kills only certain types of plants. For example one type of herbicide may be selective for broadleaf herbs but will not harm grasses, whereas another selective herbicide may only kill certain grasses, such as crabgrass for instance.

### ***3.1.3 Post-emergence and Pre-emergence Herbicides***

Herbicides are also often described as being *post-emergence* or *pre-emergence*. A post-emergence herbicide is applied at some point after plants emerge, whereas a pre-emergence herbicide is applied before seeds germinate or shoots penetrate the soil surface. Some types of herbicides are effective in either post-emergence or pre-emergence applications. Pre-emergence herbicides are not allowed for use in Port natural areas.

### ***3.1.4 Adaptive Management***

The ongoing herbicide treatment of invasive plant species at Port mitigation sites and natural areas will be adaptively managed in order to most effectively control the plants and to respond to changing regulations. The efficacy of the herbicides will be monitored (see Section 5.2). If a particular herbicide is not successful in eradicating or controlling a target species, then the managers will use a different herbicide or method authorized for use in that area. If two herbicides with different active ingredients are equally effective in controlling a target species, then periodic rotation of the herbicides, for instance every few years, is suggested to prevent development of herbicide resistance in the target plants.

### ***3.1.5 Herbicide Use Checklist***

- Minimize herbicide applications where possible by using manual weed removal methods (see Section 5.5).
- Always read and follow all instructions on the product label
- Always read the material safety data sheet (MSDS) prior to herbicide use.
- Apply herbicides in a manner consistent with all state and federal laws pertaining to application techniques, rates, record keeping, permitting, and licensing/certification of herbicide applicators.
- Do not apply herbicides within 30 feet of the Willamette River, Columbia River, Sandy River, Dairy Creek or the Columbia Slough.
- Do not spray within 3 feet of any waterbody unless specifically specified by the Port (DEQ's Pesticide General Permit, 2011).
- Contractors should take a copy of this *Vegetation Management Plan* to sites during applications.
- If there is any uncertainty regarding a plant's identity, provide a plant sample or representative photograph to the Port's mitigation site specialist for identification.
- Wear appropriate protective clothing or other gear, as suggested on the product label, during mixing and application of herbicides.
- Perform regular equipment maintenance activities to avoid leaks, spills, and other unintended discharges from application, mixing, and loading activities.



- Maintain pesticide application equipment in proper operating condition by calibrating, repairing, and cleaning the equipment to ensure effective and accurate applications.
- Assess weather conditions in the treatment area to ensure consistency with all applicable pesticide application requirements.
- Implement best management practices (Section 5) regarding the avoidance of introduction and spread of invasive species.
- A maximum of 3 major treatments (Spring, Summer and Fall) may occur per year, with limited spot spraying occurring between treatments.
- Cut/stump treatments will be mixed at 50% solution or as indicated on the product label.
- Plants will be sprayed at the optimum height to allow for adequate leaf surface coverage, ease of application, minimization of drift, and minimization of drip.
- No spraying is permitted if wind speeds exceed 5 miles per hour or if rain is forecast within 24 hours of spraying.
- All contractors will have a licensed pesticide applicator on-site during application
- The Port's spill reporting procedures for all Port properties must be followed and are provided in Appendix B.
- No chemical storage, mixing, or cleaning of equipment is permitted on-site. These activities must be carried out in a confined area at a minimum of 300 feet from any water body.
- Accidental spray of native plants resulting from herbicide applications will be reported to the mitigation site specialist on the day of the incident.
- Herbicide application will be sent monthly to the mitigation site specialist (see Appendix C for the herbicide application report to be sent)
- If any wildlife, including fish, are found dead, sick, or injured as a possible result of the herbicide application activities, notify the mitigation site specialist immediately.

### ***3.1.6 Recycling Procedures for Empty Herbicide Containers***

To protect the environment and decrease landfill waste we would like to encourage recycling of herbicide containers used at Port mitigation sites. The following steps need to be taken before depositing herbicide containers at processing facilities (Peachey et al. 2013):

- Containers must be dry, clean, and have their labels and foil seals removed, as required by landfills.
- Hard plastic lids need to be sorted into a separate container for recycling.
- Containers 5 gallons or smaller will be accepted whole.
- For more information on recycling services in the Portland area call: 503-234-300 or visit the Metro website at: [www.oregonmetro.gov](http://www.oregonmetro.gov)

## **SECTION 4 – METHODS AND EQUIPMENT**

This section lists and briefly describes the equipment to be used for the various methods of herbicide application, as well as some specific precautions regarding the use of this equipment. Section 5 (Best Management Practices) contains additional general precautions regarding equipment use.

### **4.1 Spot-spray**

The spot-spray technique is used in various situations, such as where the invasive plants are widely scattered and/or mixed with desirable native species and thus the boom spray technique (described below) is not appropriate. Additionally, the spot-spray technique is used in follow-up applications to target individual plants that were missed or not killed by boom sprayers.

#### ***4.1.1 Equipment***

The equipment used for the spot-spray method consists of low-pressure hand sprayers with a small tank, typically backpack mounted. Be sure that the nozzle and spray-tip type selected is appropriate for the herbicide in use; the herbicide labels will suggest which droplet-size nozzle to use (Shenk 2004). The droplet size (classified as very fine, fine, medium, coarse, very coarse, and extremely coarse) can influence the effectiveness of an herbicide as well as the amount of drift (Shenk 2004). The nozzle also influences the application rate. Additionally, be sure that the spray pattern of the spray tip is appropriate for the job. A spray pattern that is too narrow or the wrong shape can increase labor time, whereas a spray pattern that is too broad may deliver herbicide to desirable native species. Consider using a multi-pattern spray nozzle if different spray patterns are likely to be required on a site. Always be sure the equipment does not leak prior to use on the site(s).

### **4.2 Boom Spray**

The boom spray technique is used in situations where sizable populations of invasive plants are not mixed with desirable native species and thus the relatively broad application of herbicide will not harm desirable species. The boom spray technique shall be used only with permission from Port mitigation staff and only with low-pressure (generally 20 to 60 pounds per square inch [psi]) boom sprayers.

#### ***4.2.1 Equipment***

Low-pressure sprayers are generally mounted on ATVs, tractors, trucks, trailers etc. The equipment used for the low-pressure spray method (Shenk 2004) consists of:

- roller pump or centrifugal pump;
- tank;
- agitation system (generally a hydraulic agitator);

- flow control valves; and
- several nozzles along the boom (a pipe or other structure).

As with the spot-spray technique, be sure that the nozzle and spray-tip type selected is appropriate for the herbicide in use; herbicide labels will suggest which droplet-size nozzle to use (Shenk 2004). The droplet size (often classified as very fine, fine, medium, coarse, very coarse, and extremely coarse) can influence the effectiveness of an herbicide as well as the amount of drift (Shenk 2004). Additionally, be sure that the spray pattern of the spray tip is appropriate for the job. Since a spray boom uses multiple nozzles, it is especially important that the nozzles are calibrated to achieve proper pattern overlap so that application is even. Consider using multi-pattern spray nozzles if different spray patterns are likely to be required on a site. Always be sure the equipment does not leak prior to use on the site(s).

### **4.3 Weed Wick**

The weed wick technique has been used in the past to control cattail where it was overcrowding native wetland species. The Port is currently not targeting cattail but may again in the future if the need arises. Weed wicking could be used to control other flat-leaved species.

#### ***4.3.1 Equipment***

The equipment used for the weed wick technique is a small plastic squeeze-bottle with a sponge applicator, like those used to apply various household products such as detergents. Always be sure the equipment does not leak prior to use on the site(s).

### **4.4 Stem Injection**

The stem injection technique may be used to treat small stands of Japanese or giant knotweed. The undiluted glyphosate (5 mL) is injected into the hollow stem just below a node. Each stem must be treated (see Section 2, Japanese knotweed, Chemical Treatments).

#### ***4.4.1 Equipment***

The equipment used for the stem injection technique includes a large plastic syringe filled with undiluted glyphosate and a sharp instrument to make an air hole in the stem.

### **4.5 Cut/stump Treatment**

The cut/stump treatment may be used to control woody species that are too large to pull out of the ground, including butterfly bush, indigo bush, Scotch broom, tree-of-heaven, black locust, even Himalayan blackberry. Cut/stump treatments typically require a 50% solution or as indicated on the product label.

### **4.5.1 Equipment**

The equipment used for the cut/stump treatment is the same as that used for spot-spraying. However, the stump must be treated immediately after it is cut.

### **4.6 Equipment Maintenance**

Never store, mix, or clean equipment within a mitigation site or natural area; these activities must be performed in a confined area at a minimum of 300 feet from any water body. It is beyond the scope of this plan to provide detailed information on equipment maintenance. However, the contractor should be diligent in the maintenance of all herbicide application equipment. Particular care should be exercised in cleaning the spray-nozzles as this will affect the performance (spray pattern, velocity, application rates). The nozzles should be examined for wear and discarded when they no longer perform according to specifications.

Please refer to Oregon State University's *Oregon Pesticide Safety Education Manual* (Shenk 2004) and the equipment owner's manual/specification for greater detail.

## **SECTION 5 - BEST MANAGEMENT PRACTICES**

This section describes general best management practices with regard to preventing the spread of invasive plant populations, as well as monitoring the control of established invasive species. Best management practices regarding the proper application of herbicides were discussed previously in Section 3.

In addition, Section 5.6 (Resources) provides a brief description of various local groups and organizations as well as governmental agencies that can provide further information. Addresses, phone numbers, and website URLs for these organizations are provided. Section 5.6 also provides Port contact information and emergency information.

### **5.1 Prevention**

The goals of prevention are twofold: to prevent the introduction of new invasive species into the Port's mitigation sites and restoration areas, and to prevent the spread of existing invasive species either within a given site or from one of the Port's sites to another. Vehicles, clothing, and tools are common vectors for weed seed transfer, so due diligence is required with respect to these items. Most of the measures suggested are common sense, and most apply to both preventing the establishment of new invasive plant populations as well as controlling the spread of established weeds.

- Always inspect clothing and boots for weed seeds before traveling from site to site or from an infested portion of a site to uninfested areas. Brush off (using scrub brush) any weed seeds or soil from boots and equipment before moving to the next area and dispose of them properly.

- Inspect all equipment (e.g., vehicles and tires, hand tools) for weed seed before entering or leaving a site. Please remove any weed seeds or contaminated soil and dispose of them properly.
- Cut and bag all seed heads of killed invasive plants; remove them from the site or solarize them.
- Never operate heavy machinery (e.g., trucks, tractors) on wet soils. Many weedy species *require* disturbed soil, such as tire tracks, in order to become established.
- Clear piles of material in such a way as to prevent dropping seed in the site. If plant material will be composted, be certain that the herbicides used are permissible in compost.
- Use approved dyes in herbicide sprays. Marking the sprayed plants will help ensure even and adequate coverage and will prevent missed applications. Additionally the dye has a safety factor: the public will be less likely to handle, or in the case of blackberries, eat, treated plants.
- If blackberries are sprayed at any time when the potential for persons harvesting berries exists, signs should be posted near the plants to alert people not to eat any berries due to herbicide contamination.
- Report new species at once. If a new weedy species appears on any of the Port's property, notify the mitigation site specialist. Because of ships' ballasts being emptied into waters at docks on the Columbia and Willamette Rivers, exotic species are often first observed in areas near or on Port facilities.

## **5.2 Monitoring**

### ***5.2.1 Record Keeping During Application of Herbicides***

During application of herbicide, accurate records must be kept in accordance with the Herbicide Application Report in Appendix C. This information is also required by NOAA at the Rivergate Enhancement Area and Toyota T-4 sites. Please refer to Appendix C for the minimum information to be recorded at each application.

### ***5.2.2 Monitoring of Invasive Plants Treated With Herbicides***

During monitoring events and bimonthly site visits, Port staff assess each mitigation site and develops site maps based on observations and maintenance needs. These maps are updated regularly and incorporated into the most recent version of this plan. Maps provided in Section 7 were compiled based on invasive plant populations identified over the last three monitoring seasons.

The Port tracks the efficacy of herbicide treatments on a larger scale through a more qualitative monitoring process. Effects of herbicide application should be visible within two to four weeks following application to an herbaceous invasive weed infestation. At that point a Port employee or qualified subcontractor visits and inspects the previously treated infestation. Specific

observations pertaining to the success of the herbicide application are recorded. At a minimum, the following types of information are recorded:

- Approximate percent of target plant species killed by the herbicide application. This can be done by a simple visual estimation, preferably by a person who observed the infestation prior to treatment. If necessary, “before” and “after” meter-square plot data along fixed transects would provide more accurate percentages, but would be *much* more labor-intensive, as well as causing the investigators to handle treated plants while recording the plot data.
- For large infestations, “before” and “after” photographs taken from one or more fixed photo-documentation points will provide good evidence of efficacy of the herbicide treatments.
- Any patches of plants that were missed or where the herbicide was apparently under-applied should be marked in the field (with approved spray paint or flagging), if necessary, to aid applicators in locating patches or individual plants for follow-up spot-spray treatment.
- Damaged, non-targeted plants must be noted. The investigators must record some estimate of percentages of non-targeted plants that have been injured or killed as a result of the herbicide application. These steps are critical; if desirable native plants are being killed, then the herbicide application strategy must be adapted. This may mean switching from boom-spray to backpack-spray, changing nozzle size, using a more selective herbicide, or using other options.

The above monitoring scheme is very general and will be adapted by investigators on a site-by-site basis. Nonetheless, the Port will employ most all of these monitoring methods when the efficacy of herbicide use under certain circumstances is unknown. The suggested monitoring schedule mentioned above (two to four weeks post-application) is suitable for herbaceous plants. For woody plants treated in the fall, effects may not be visible until the following spring and may therefore require additional monitoring once herbicide effects are visible.

### **5.3 Wildlife**

Port mitigation staff and consultants are diligent in scheduling invasive vegetation management activities around critical life cycle stages of native wildlife. This ensures minimally disturbed habitat for new and existing wildlife populations on Port mitigation sites. Below is a critical life cycle table outlining when certain maintenance activities are not permitted on Port mitigation sites. If a nesting bird or turtle is seen while working on a mitigation site, please report this sighting to the mitigation site specialist as soon as possible.

<b>Critical Life Cycle Stages for Native Species in Portland, Oregon</b>			
<b>Month</b>	<b>Bird</b>	<b>Turtle</b>	<b>Amphibian</b>
<b>January</b>			<b>Egg masses in water</b> No work in water. Look out for egg masses even in shallow water near the shore.
<b>February</b>			
<b>March</b>		<b>Baby turtles moving from nest to water</b> No earth-disturbing activities and no work to be done in nesting habitat areas. Be vigilant of turtles.	
<b>April</b>	<b>Primary Nesting Season</b> No mowing, weed-whacking, or limbing of trees unless explicitly instructed to do so. Be vigilant of nests on the ground when walking.		
<b>May</b>			
<b>June</b>		<b>Adult female turtles nesting on land</b> No earth-disturbing activities and no work to be done in nesting habitat areas. Be vigilant of turtles.	
<b>July</b>			
<b>August</b>			
<b>September</b>			
<b>October</b>			
<b>November</b>			
<b>December</b>			

#### 5.4 Equipment Cleaning Protocol

The purpose of this protocol is to outline preventative steps to control the spread of known and potential amphibian diseases. Two major amphibian diseases known to be present in parts of Oregon (but not yet recorded on Port mitigation properties) are Ranavirus and Chytrid fungus. Ranavirus consist of large, double-stranded DNA viruses that are known to infect invertebrates and cold-blooded vertebrates (Johnson et al. 2007). Fish, amphibians, and reptiles are all vulnerable to Ranaviruses, but they are an especially major pathogen of amphibians. Another major known amphibian disease is Chytrid fungus. Chytrid fungus has an alarmingly wide host-range, and due to its recognition as an invasive species and its status as an emerging infectious disease, it was listed as a notifiable disease by the World Organization for Animal Health in 2009 (Olson et al. 2013). This has resulted in an international effort to prevent the spread of this disease by humans.

Both Chytrid fungus and Ranavirus can be spread by improperly cleaned clothing and equipment. Mud and other debris left on equipment used in wetland improvement projects (including invasive plant control projects) can carry these diseases and be spread from site to site. When one of these diseases is introduced to a new site, it can result in a mass die-off of frogs and salamanders in the area. In 2013, the Port witnessed a die-off of tadpole and juvenile American bullfrogs (*Lithobates catesbeianus*) at the Troutdale Reynolds Industrial Park (TRIP) mitigation property. A lab analysis of deceased tadpoles and frogs was conducted. Results were inconclusive, but Ranavirus was suspected based on visual observations of lesions consistent with Ranavirus, thereby amplifying the need to establish an effective cleaning protocol.

#### **5.4.1 Equipment Checklist:**

Make sure that you have all of the below items before visiting any wetland mitigation site:

- Large waterproof dry bag
- Labeled bottle containing Quat 256
- Water
- Scrub brush

<b>How to make Quat 256 mixture</b>
Mix approximately 7 drops of Quat 256 concentrate with 1 liter of water (0.016% concentration) in a large waterproof dry bag. Be sure to follow all safety information in the MSDS when working with Quat 256 (see Appendix A).

#### **5.4.2 Directions:**

1. ***Before leaving any wetland site*** please scrub mud or other debris from your boots and equipment using scrub brush.
2. Place your equipment in the dry bag with the Quat 256 mixture inside. Immerse and saturate equipment for 5 minutes, shaking the bag so that everything is cleaned. ***Be sure to follow all safety information in the MSDS when working with Quat 256. Be sure to wear proper PPE including safety glasses and water resistant gloves.*** Make sure that the mixture does not get inside your boots by keeping the boot opening outside of the dry bag. ***Make sure that the excess Quat 256 mixture stays inside the dry bag and that you are washing equipment in an upland area 60 feet away from any wetland.***
3. After 5 minutes, take equipment out of the dry bag, if you can rinse it off with water then do so.
4. Seal the dry bag with excess water and Quat 256 mixture inside.
5. Discard remaining Quat mixture in broken-down organic soil in a non-vegetated area at least 100 feet away from any wetland. Cover lightly with soil.

**If you believe you have found a population of sick frogs report it to the appropriate Port staff immediately.**



### ***5.4.3 Seed Cleaning Protocol:***

To insure that invasive seeds are not spread across sites it is very important that boots and equipment are cleared of any seeds before leaving a site. See section 5.1 (prevention) for detailed seed cleaning protocol.

## **5.5 Herbicide Use Over Time**

Preventing the introduction and establishment of invasive species has been shown to be the most cost-efficient long-term invasive plant management strategy. The Port continually strives to reduce the amount of herbicide used over time by employing an effective vegetation management plan and by continually monitoring sites so that new populations of invasive plants are treated immediately, thereby preventing their spread. This not only reduces the cost to maintain each mitigation site but it also reduces dependence on chemical herbicides.

## **5.6 Resources**

### ***5.6.1 Government Agencies***

#### **Oregon Department of Agriculture (ODA)**

635 Capitol St. NE  
Salem, OR  
97301-2532  
(503) 986-4550

The ODA is the primary state regulatory agency responsible for authorizing pesticide uses in Oregon. The ODA also administers the licensing programs for state certification of pesticide applicators. The ODA has an excellent website that is easy to navigate with pages that provide links to useful pesticide-related topics.

- ODA Home Page: <http://www.oregon.gov/ODA/>
- ODA Pesticide Page (with links to permitting, applicator training, licensing information, and laws governing pesticide use): <http://www.oregon.gov/ODA/PEST/index.shtml>
- ODA Noxious Weed Program (with links to noxious weed list, plant profiles, and much more): <http://www.oregon.gov/ODA/PLANT/WEEDS/index.shtml>

#### **Washington State Noxious Weed Control Board**

This board has an excellent website with a photo gallery, articles, and other informational materials regarding noxious weeds in Washington: <http://www.nwcb.wa.gov>

#### **Oregon Invasive Species Council**

The purpose of the Oregon Invasive Species Council (OISC) is to conduct a coordinated and comprehensive effort to keep invasive species out of Oregon and to eliminate, reduce, or mitigate the impacts of invasive species already established in Oregon. Find out about local initiatives,

events, and how to report invasive species in Oregon. The URL is <http://www.oregon.gov/OISC/index.shtml>.

**Oregon Department of Environmental Quality (DEQ)**

DEQ State Headquarters  
811 SW Sixth Avenue  
Portland, OR 97204-1390  
Telephone: (503) 229-5696  
Toll Free in Oregon: (800) 452-4011  
TTY: (503) 229-6993  
Fax: (503) 229-6124  
[deq.info@deq.state.or.us](mailto:deq.info@deq.state.or.us)

In addition to local programs, the EPA delegates authority to DEQ to operate federal environmental programs within the state such as the federal Clean Air, Clean Water, and Resource Conservation and Recovery Acts. DEQ must be notified in case of a pesticide spill. The URL is <http://www.oregon.gov/DEQ>.

The DEQ partners with the Department of Human Services' Pesticide Analytical and Response Center (PARC), which runs a Pesticide Poisoning Prevention Program:

Pesticide Poisoning  
Prevention Program  
800 NE Oregon St. #827  
Portland, OR 97232  
(503) 731-4025,  
[pesticides.health@state.or.us](mailto:pesticides.health@state.or.us)

PARC's home page: <http://www.oregon.gov/ODA/programs/Pesticides/Pages/PARC.aspx>

**United States EPA**

The EPA is the primary federal regulatory agency responsible for authorizing pesticide uses in the United States. The EPA has a website that provides links to many useful pesticide-related topics as well as several other environmental topics.

- EPA Home Page: <http://www.epa.gov/>
- EPA Pesticide Page: <http://www.epa.gov/pesticides/index.htm>

**5.6.2 Port of Portland Contacts**

The following persons at the Port may be contacted if you have questions regarding any information in this plan or for specific on-location needs:

- **Carrie Butler** (Mitigation Manager) Mitigation Program oversight  
Phone: (503) 415-6319  
Cell: (503) 928-1611  
Fax: (503) 548-5998  
[carrie.butler@portofportland.com](mailto:carrie.butler@portofportland.com)

- **Sarah Wilson** (Mitigation Site Specialist) for questions regarding schedules, maps, monitoring, species identification, and wildlife issues  
Phone: (503) 415-6527  
Cell: (503) 820-1163  
sarah.wilson@portofportland.com

### ***5.6.3 Emergency Contacts***

Listed below are the primary emergency contact numbers and other information.

- **Medical or Other Emergencies**
  - In case of medical emergency, fire, or situations requiring police: Dial 911
  - If you think you have been poisoned by herbicides call the Oregon Poison Center: 1-(800) 222-1222
  
- **Chemical Spills**
  - To report a spill on Port-owned property, please notify:
    - Marine Security at (503) 240-2230 for spills on Rivergate sites
    - PDX Communications Center at (503) 460-4000 for spills on sites near the Portland International Airport
    - Notify Carrie Butler at 503-928-1611
  - For other spills contact OERS (Oregon Emergency Response System) at (800) 452-0311.
  - Please also refer to the Spill Response Policies in Appendix B.

## SECTION 6 – REFERENCES

- Connecticut Invasive Plant Working Group (CIPWG). 2004. Safety and Environmental Considerations for the Use of Herbicides to Control Invasive Plants. Available at: [http://www.hort.uconn.edu/cipwg/art\\_pubs/GUIDE/consideration.htm](http://www.hort.uconn.edu/cipwg/art_pubs/GUIDE/consideration.htm).
- Johnson, A. J., Jacobson, E. R., and Pessier, A. P. 2007. Experimental transmission and induction of Ranaviral disease in western ornate box turtles (*Terrapene ornata ornata*) and red-eared sliders (*Trachemys scripta elegans*). *Veterinary Pathology* 44(3):285–297.
- National Oceanic and Atmospheric Administration (NOAA). 2004. Biological Opinion by NOAA regarding Army Corp of Engineers permits 200100247 (Rivergate Enhancement mitigation) and 200100553 (Toyota Riverbank Enhancement). On file at the Port of Portland, Environmental Operations, Mitigation Library.
- Olson, D. H., Aanensen, D. M., Ronnenberg, K. L., Powell, C. I., Walker, S. F., Bielby, J., and Fisher, M. C. 2013. Mapping the global emergence of *Batrachochytrium dendrobatidis*, the amphibian Chytrid fungus. *Plos ONE* 8(2):1–13. doi:10.1371/journal.pone.0056802
- Oregon Department of Agriculture (ODA). 2004. Federal Court Case: Washington Toxics Coalition v. United States Environmental Protection Agency Federal Court Decision Affecting Pesticide Use in Oregon. Available at: [http://www.eswr.com/docs/cts/cca9/washtoxics\\_v\\_epa\\_2008op.pdf](http://www.eswr.com/docs/cts/cca9/washtoxics_v_epa_2008op.pdf) Accessed May 6, 2014.
- Oregon State Administrative Rules (OAR). 2004. Department Of Agriculture Division 57 Pesticide Control 603-057-0001 through 603-057-0535. OARs filed through July 15, 2004. Available at: [http://arcweb.sos.state.or.us/rules/OARS\\_600/OAR\\_603/603\\_057.html](http://arcweb.sos.state.or.us/rules/OARS_600/OAR_603/603_057.html). Accessed August 2004.
- Oregon State Revised Statutes (ORS). 2003. Chapter 634- Pesticide Control. 2003 edition. Available at: <http://landru.leg.state.or.us/ors/634.html>. Accessed August 2004.
- Peachey, E., Ball, D., Hulting, A., Miller, T., Morishita, D., and Hutchinson, P. 2014. Pacific Northwest 2013 Weed Control Handbook. Available at: <http://pnwhandbooks.org/weed/>.
- Peachey, E., Ball, D., Parker, R., Yenish, J.P., Miller, T.W., Morishita, D.W., and Hutchinson, P.J.S. 2007. *Pacific Northwest Weed Management Handbook*. Oregon State University Extension Service Publication, Corvallis
- Shenk, Myron (editor). 2004. *Oregon Pesticide Safety Education Manual-A Guide to the Safe Use and Handling of Pesticides*. Oregon State University, Corvallis, Oregon.
- The Oregonian*. 2004. Groups Serve EPA Notice Over Pesticides. July 27:B1 and B4.

U.S. District Court of Seattle. 2004. Case No. C01-0132C. Order. Washington Toxics Coalition, Northwest Coalition for Alternatives to Pesticides, Pacific Coast Federation of Fisherman’s Association and Institute for Fisheries Resources, Plaintiffs v. Environmental Protection Agency and Mike Leavitt, Administrator, Defendants, v. American Crop Protection Association, et. al., Intervenor-Defendants. Court Order dated January 22, 2004. Western District of Washington, Seattle.

William, R.D., A.G. Dailey, D. Ball, J. Colquhoun, T.L. Miller, R. Parker, J.P. Yenish, T.W. Miller, D.W. Morishita, and P.J.S. Hutchinson. 2004. *Pacific Northwest 2004 Weed Control Handbook*. Oregon State University Extension Publication, Corvallis, Oregon.

**The following resources were used in Section 2 to develop the summarized identification keys and chemical treatment plans:**

A Guide to Field Identification TREES OF NORTH AMERICA

Brockman, C. F. 1986. Golden Press. New York

A Field Guide to the Common Wetland Plants of Western Washington & Northwestern Oregon

Cooke, Sarah Spear. 1997. Seattle Audubon Society, Seattle, Washington.

Aquatic and Riparian Weeds of the West

DiTomaso, Joseph M. and Evelyn A. Healy. 2003. Publication No. 3421. University of California.

Flora of the Pacific Northwest

Hitchcock, C. Leo and Arthur Cronquist. 1973. University of Washington. Seattle.

King County Washington – Noxious Weed Control Agency

[www.kingcounty.gov](http://www.kingcounty.gov)

Plants of the Pacific Northwest Coast

Pojar, Jim and Andy MacKinnon. 1994. Lone Pine Press, Canada.

Portland Plant List

Bureau of Planning and Sustainability, City of Portland, Oregon. September, 2011.

Thurston County Washington – Noxious Weed Control Agency

<http://www.co.thurston.wa.us/tcweeds/factsheets.htm>

USDA PLANTS Database

[www.plants.usda.gov](http://www.plants.usda.gov)

Weeds of the West

Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee., and R. Parker. 1996. 5th Edition. Pioneer of Jackson Hole, Jackson Wyoming.

Wetland Plants of Oregon and Washington

Guard, B. Jennifer. 1995. Lone Pine Press, Canada.

Wildflowers of the Pacific Northwest

Turner, M. and P. Gustafson. 2010. Timber Press, Inc. Portland, Oregon.

## SECTION 7 – PORT SITE MAPS

This section contains site-specific materials. The following aerial mitigation site maps show the last known locations of specific invasive species on each site. A table is provided on each map listing the species present along with the last year's maintenance activities and future proposed maintenance goals for each site.. The Port may conduct weed control and maintenance activities on natural areas other than those listed below, particularly riverbank enhancements and Columbia Slough sites. It is important to use these maps in conjunction with the textual materials presented in this document.

Site figures are listed alphabetically as follows:

Figure No.	Site Name
1	Buffalo
2	Elrod
3	Columbia Slough Sites – PDX/PIC
4	Columbia Slough Sites - Rivergate
5	Jewett Lake
6	Leadbetter
7	North & South Sloughs
8	PIC E-Zone
9	Ramsey Lakes
10	Randall
11	Riverbank Restoration Sites - Rivergate
12	T-5 Powerline Site
13	TRIP Phase I, Company Lake
14	TRIP Phase I, East Lake
15	TRIP Phase I, 300 Trees
16	Vanport Wetlands
17	West Hayden Island
18	West Wye
19	40-Mile Loop Trail

### KEY

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PDX – Portland International Airport

PIC – Portland International Center

## APPENDIX A

### Further Discussion of Herbicide Restrictions and Regulations at the Port's Sites

The **Use Restriction** subsections of Section 4 discuss limits on use of each herbicide. There are multiple sources for these restrictions. Many restrictions are printed on the product labels and often originate directly from the EPA's findings on the actions, toxicity etc. of the specific herbicides. In addition some restrictions are a result of specific Oregon laws, either Oregon Administrative Rules (OARs[2004]) or Oregon Revised Statutes (ORSs [2003]).

Other restrictions come from a NOAA Fisheries' Biological Opinion (BO) resulting from formal consultation under the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act in support of the US Army Corps of Engineers (Corps) permits Nos. 200100247 and 200100553 (NOAA 2004). These permits were issued for the Port's Rivergate Enhancement Area and Toyota T-4 sites. The restrictions are to protect fish species covered either under the ESA or Magnuson-Stevens Act from potential adverse effects from herbicide contamination. The Evolutionary Significant Units (ESUs) of ESA-protected fish that may be present at Port sites are Snake River (SR) sockeye salmon (*Oncorhynchus nerka*), SR spring/summer Chinook salmon (*O. tshawytscha*), SR fall Chinook, Lower Columbia River (LCR) steelhead (*O. mykiss*), Upper Columbia River (UCR) steelhead, SR steelhead, Middle Columbia River (MCR) steelhead, Columbia River (CR) chum salmon (*O. keta*), LCR Chinook salmon, UCR spring Chinook salmon, Upper Willamette River (UWR) steelhead and UWR Chinook salmon (NOAA 2004).

Some of the restrictions result from a ruling in US District Court in a law suit filed by the Washington Toxics Coalition *et. al.* vs. the EPA to restrict the use of 55 pesticides near water-bodies that may contain threatened or endangered salmonid species in Oregon, Washington and California. In January of 2004, the US District Court (US District Court of Seattle 2004) imposed buffer zones with a minimum of 20 yards (60 feet) width for "ground use" and 100 yards (300 feet) for "aerial application" between the application site and water-bodies containing listed Evolutionary Significant Units (ESUs) of threatened or endangered salmon or steelhead species. However the court agreed with the EPA's finding of "no effect" for 13 pesticides for all ESUs of ESA-listed fish. These 13 pesticides thus have no new buffer restrictions under this court order, but rather retain any previous restrictions placed upon their use by the EPA. Of the remaining 21 pesticides, EPA is in consultation with the National Marine Fisheries Service to determine what appropriate, science-based measure may be necessary to prevent jeopardy to the species. Additionally the court order resulted in several other pesticides given new buffer restrictions, other than the 20 yard (ground) and 100 yard (aerial) widths imposed on most of the chemicals. Also the buffer requirements for some pesticides in some ESUs were waived because of "no effect" determinations for those *particular* ESUs. Effect determinations are still pending for certain pesticides the ester formulation of triclopyr (triclopyr BEE); until that effect call is made and concurred with by the court, the new buffer widths still apply. While some authorities feel that this will ultimately reduce the number of pesticide restrictions (ODA 2004), it is not a foregone conclusion. Indeed, a citizens group called Earth Justice sent the EPA a notice of intent to sue to seek re-evaluation of several of the pesticides that currently have "no effect" determinations (The Oregonian 2004). Since the Port owns property near several water-bodies



with numerous ESUs of protected fish species, it must exercise due diligence in following the changing regulations pertaining to the herbicides and the buffer width restrictions.

Finally, DEQ's Pesticide General Permit (PGP) went into effect on October 31<sup>st</sup>, 2011. It provides coverage for discharges of any pesticide to waters of the state. Pesticides are very defined broadly as any "defoliant, desiccant, fungicide, herbicide, insecticide, nematocide, plant regulator or any substance (or mixture) intended to be used for defoliating plants, preventing, destroying repelling or mitigating insects, plant fungi, weeds, rodents, predatory animals"... or any other form of pest. An application of any pesticide is covered under this permit if it is applied in any of the following locations;

1. In or over waters of the state;
2. Within three feet of waters of the state;
3. In or within three feet of conveyances with a hydrologic connection to waters of the state at the time of application.

Because the Port does not allow for any herbicides to be applied within 3 feet of any water body, thresholds will not be exceeded on Port mitigation sites.

# **APPENDIX B**

## **Spill Response Policies**

- 1. Spill Reporting Procedure for all Non-aviation Properties (Port of Portland)**
- 2. Spill Reporting Procedure for all Aviation Properties (Port of Portland)**



# Spill Reporting for Mitigation Sites on Aviation Properties<sup>\*</sup>

If this is an **Emergency** requiring Fire,  
Medical, HazMat or Police Response...

**Dial 911** from a safe location...

then the PDX Communications Center

For Spills which are on or may impact  
Port of Portland Property...

**Notify the PDX Communications Center**

as soon as possible at:

**503-460-4000**

PDX Communications Center will ask for information regarding  
the location, source, and volume of the release...

The communications Center will then page the On-Call Aviation  
Environmental Staff

\*including Buffalo, Elrod, PIC E-Zone and Columbia Slough sites  
February 2008 – adapted specifically for the Port of Portland Vegetation Management Plan for Mitigation Natural Areas



# Spill Reporting for all Non-Aviation Properties\*

If this is an **Emergency** requiring Fire,  
Medical, HazMat or Police Response...

**Dial 911** from a safe location...

then Notify Marine Security

For Spills which are on or may impact  
Port of Portland Property...

**Notify Marine Security**

as soon as possible at:

**503-240-2230**

Marine Security will ask for information regarding the  
location, source, and volume of the release...

Marine Security will then page the On-Call Environmental Staff

\*including all Port-Owned Terminals,  
Rivergate/Harborgate /Swan Island Properties and Navigation Facilities

November 2007

# **APPENDIX C**

## **Herbicide Application Report**

FIRM FOR WHOM THE HERBICIDE APPLICATION WAS MADE:



7200 N.E. Airport Way

Portland, OR 97218

Sarah Wilson: 530-588-4332; email completed form to sarah.wilson@portofportland.com

HERBICIDE APPLICATION REPORT

APPLICATOR COMPANY NAME: \_\_\_\_\_

APPLICATION SITE NAME: \_\_\_\_\_

WEATHER: \_\_\_\_\_  
Wind Speed Humidity Temperature

ADDRESS or MAP REFERENCE OF APPLICATION SITE: \_\_\_\_\_  
Street City Zip

SPECIFIC LOCATIONS TREATED ON SITE (NE CORNER ETC.): \_\_\_\_\_

APPROXIMATE SIZE OF AREA TREATED (ACRES, SQUARE FEET ETC.): \_\_\_\_\_

DATE OF APPLICATION (BEGINNING & ENDING):

Beginning: \_\_\_\_\_ Ending: \_\_\_\_\_  
Time Month Day Year Time Month Day Year

HERBICIDE INFORMATION:

1: \_\_\_\_\_  
Trade Name EPA Registration Number Concentration (oz/gallon) Amount of Solution Applied (gallons)

2: \_\_\_\_\_  
Trade Name EPA Registration Number Concentration (oz/gallon) Amount of Solution Applied (gallons)

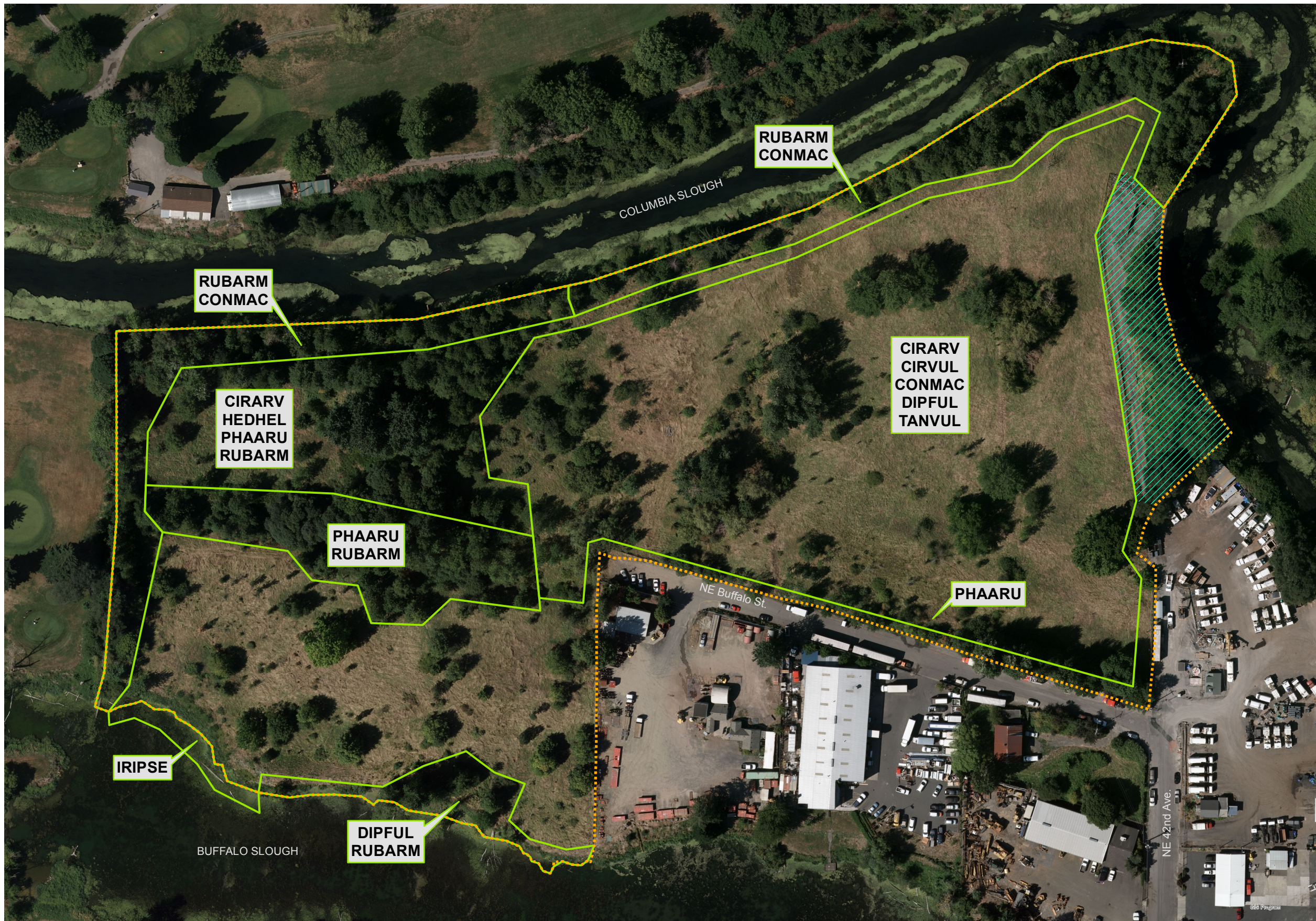
SURFACTANTS USED: \_\_\_\_\_  
Trade Name

SUPPLIER OF PESTICIDE PRODUCTS: \_\_\_\_\_

APPLICATION METHOD (BACKPACK SPRAYER ETC.): \_\_\_\_\_

TARGET PLANT SPECIES OR TYPE (BROADLEAF WEEDS, GRASSES, SHRUBS, TREES ETC.): \_\_\_\_\_

NAME OF APPLICATORS/TRAINEEs and LICENSE NUMBER: \_\_\_\_\_



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
HEDHEL	<i>Hedera helix</i>	English ivy
IRIPSE	<i>Iris pseudacorus</i>	paleyellow iris
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry
TANVUL	<i>Tanacetum vulgare</i>	common tansy

**2015 maintenance activities**

1. Spot treated CONMAC, CIRARV and CIRVUL in the upland field areas.
2. Cut and stump treated English holly/hawthorn shrubs in upland forest understory areas.
3. Repaired fence, removed trash and repaired vandalism.
4. Treated RUBARM and CONMAC growing along the Columbia Slough.

**Tentative invasive species management goals for 2016**

1. Treat/remove all RUBARM and CONMAC from the edge of the Columbia Slough.
2. Treat/remove all CIRARV, CONMAC, DIPFUL and TANVUL from upland field areas.
3. Remove all IRIPSE from shoreline of Buffalo Slough.

**Tentative invasive species management goals for 2017**

1. Continue to treat/remove all RUBARM from the edge of the Columbia Slough.
2. Continue to treat/remove all CIRARV, CONMAC, DIPFUL and TANVUL from upland field areas.
3. Continue to remove all IRIPSE from shoreline of Buffalo Slough.
4. Treat/remove PHAARU in forested wetland areas.
5. Treat RUBARM and HEDHEL growing in native shrubs/trees.

**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

Site Boundary  
 Management Areas

Maintained by MCDD

**Vegetation Management Plan**

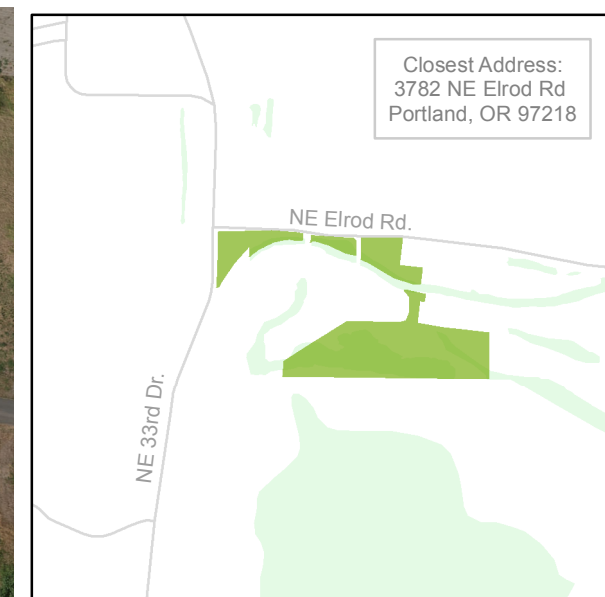
Map prepared by Sarah Wilson - Port Environmental Department | 2016

**Port of Portland**

0 30 60 120 180 240 Feet



**BUFFALO**  
**Figure 1**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
CRAMON	<i>Crataegus monogyna</i>	oneseed hawthorn
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
EPISPE	<i>Epipactus sp.</i>	helleborine orchid
HEDHEL	<i>Hedera helix</i>	English ivy
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry
RANREP	<i>Ranunculus repens</i>	creeping buttercup

**2015 maintenance activities**

Cut and stump treated CRAMON and ILEAQU shrubs in the upland forest understory. Spot treated (and stump treated) HEDHEL and RUBARM in upland forested areas. Cut down and then treated re-growth of RUBARM, DIPFUL, CIRARV, CIRVUL and CONMAC along the MCDD channel.

**Tentative management goals for 2016**

1. Re-treat RUBARM, DIPFUL, CIRARV, CIRVUL and CONMAC along the MCDD channel that was cut back/treated in 2015 (Spring). 2. Add Habitat Enhancements - bee nesting blocks, reptile rock piles (Summer) 3. Collect native shrub cuttings and plant a dense native shrub buffer along the fenceline of the southern forested area (Winter).

**Tentative management goals for 2017**

1. General invasive control throughout the site (Spring). 2. Re-plant/maintain the buffer along the fenceline of the southern forested area (Winter).

**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

  Site Boundary       Management Area  
 Mowed by Port contractor  
 Mowed by MCDD

**Vegetation Management Plan**  
Map prepared by Sarah Wilson - Port Environmental Department | 2016

0 40 80 160 240 320 Feet

**ELROD  
Figure 2**





 Revegetation Sites

### Vegetation Management Plan

Map prepared by Sarah Wilson - Port Environmental Department | 2016



0 750 1,500 3,000 Feet



### PDX/PIC COLUMBIA SLOUGH SITES Figure 3



 Revegetation Sites

## Vegetation Management Plan

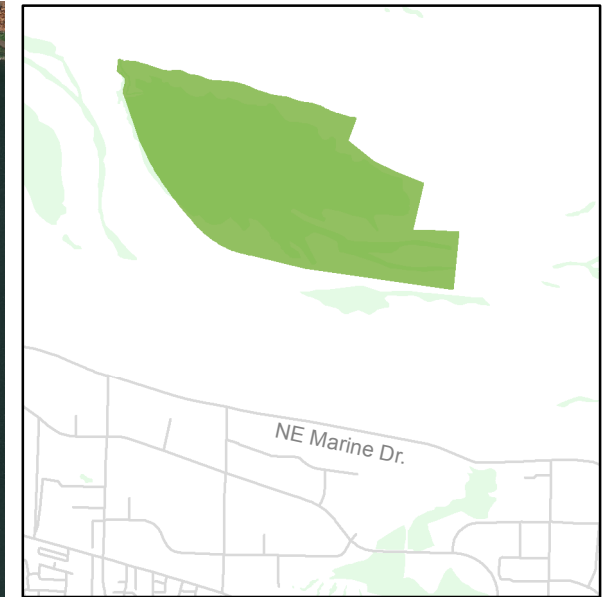
Map prepared by Sarah Wilson - Port Environmental Department | 2016

 Port of Portland

0 450 900 1,800 2,700 3,600 Feet



**RIVERGATE  
COLUMBIA SLOUGH SITES  
Figure 4**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Buffers were mowed in the spring and the whole site was mowed in late summer.

**Tentative management goals for 2016**



1. Mow buffers (spring and summer).

**Tentative management goals for 2017**

1. Mow buffers (spring and summer).

**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

-  Site Boundary
-  Management Areas

**Vegetation Management Plan**

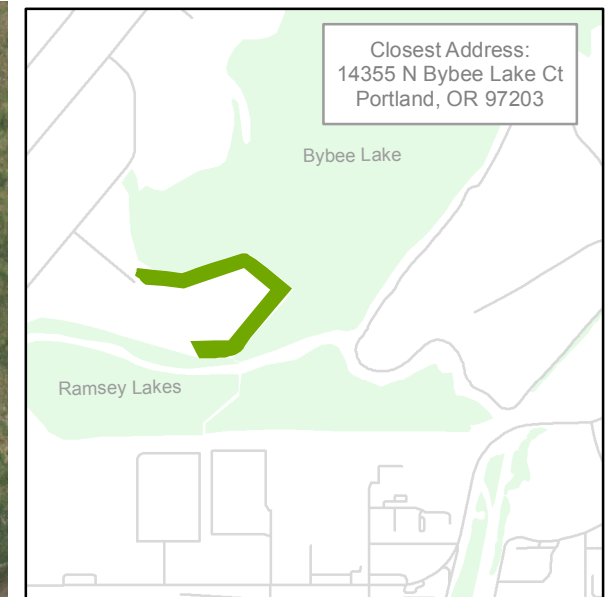
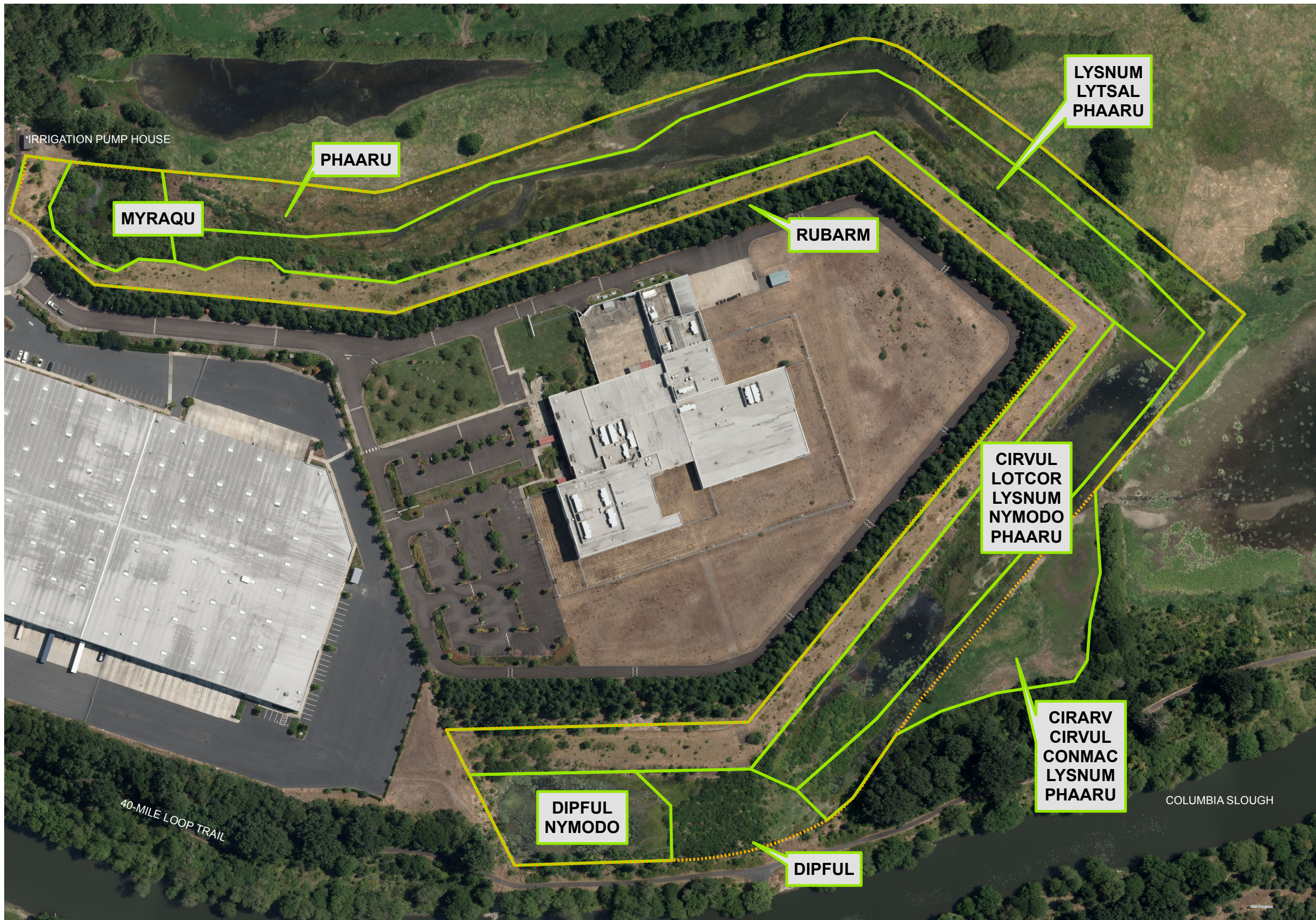
Map prepared by Sarah Wilson - Port Environmental Department | 2016



0 180 360 720 1,080 1,440 Feet



**JEWETT LAKE**  
Government Island  
**Figure 5**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
LYSNUM	<i>Lysimachia nummularia</i>	creeping jenny
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
MYRAQU	<i>Myriophyllum aquaticum</i>	parrot feather watermilfoil
NYMODO	<i>Nymphaea odorata</i>	American white waterlily
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Efforts were made to remove PHAARU from the east site of the wetland area. RUBARM, DIPFUL and CIRVUL were spot treated in upland areas. LOTCOR, LYSNUM, NYMODO and MYRAQU were spot treated in wetland areas.

**Tentative management goals for 2016**

1. Treat large patch of PHAARU (also CIRARV, CIRVUL, CONMAC and LYSNUM) on SW edge of the Leadbetter wetland area (Spring and Fall). 2. General treatments for invasives throughout the site (Spring).

**Tentative management goals for 2017**

1. Treat large patch of PHAARU (also CIRARV, CIRVUL, CONMAC and LYSNUM) on SW edge of the Leadbetter wetland area (Spring and Fall). 2. Plant the SW area (that was treated) with native willow cuttings and Carex (Fall/Winter).

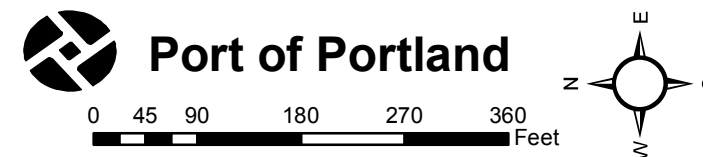
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

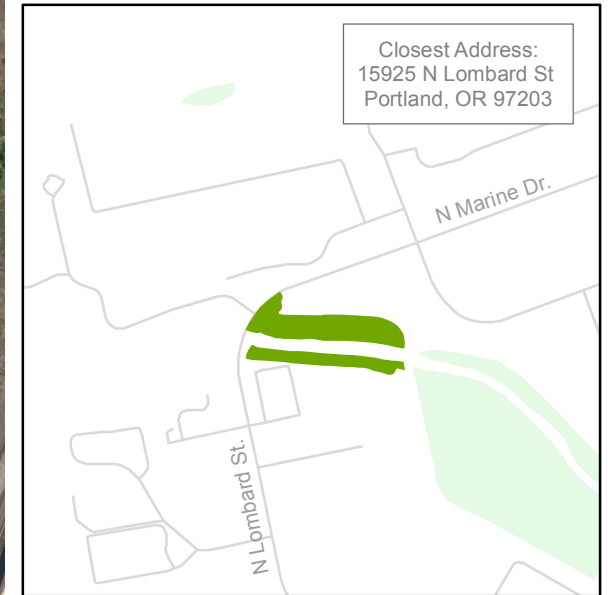
- Site Boundary
- Management Area

**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**LEADBETTER**  
**Figure 6**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CENSPE	<i>Centaurea spp.</i>	knawweed
CHOJUN	<i>Chondrilla juncea</i>	rush skeletonweed
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
IRIPSE	<i>Iris pseudacorus</i>	paleyellow iris
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
LYSNUM	<i>Lysimachia nummularia</i>	creeping jenny
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
MYRAQU	<i>Myriophyllum aquaticum</i>	parrot feather watermilfoil
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
QUEPAL	<i>Quercus palustris</i>	pin oak
ROSMUL	<i>Rosa multiflora</i>	multiflora rose
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Spot treated PHAARU, MYRAQU, IRIPSE and LYTSAL in wetland areas. Treated a large patch of DIPFUL, CIRARV and CIRVUL in forested wetland understory area on the south side. Cut and stump treated ROSMUL. Treated CENSPE and CHOJUN along the 40-mile loop trail.

**Tentative management goals for 2016**

1. Clear all trash and metal/plastic tree cages throughout the site (when raining). 2. Habitat Enhancements: rock piles for reptiles, 2 pollinator patches (Spring). 3. Treat weeds throughout the wetland and upland areas (Spring).

**Tentative management goals for 2017**

1. Spot spray weeds throughout the site (Spring and Fall).

**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

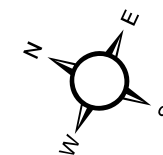
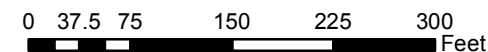
-  Site Boundary
-  Management Area

**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**Port of Portland**



**N&S SLOUGH**  
**Figure 7**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Spot treated DIPFUL, CIRARV, CIRVUL, RUBARM and CONMAC along the MCDD canals. Cut fallen branches away from the trail. Removed trash from the site.

**Tentative management goals for 2016**



- Habitat Enhancements: 2 rock piles for reptiles (Summer).
- Treat weeds throughout the site (Spring).
- Plant a dense native shrub buffer (collected from the site) along the upland forest buffer (Winter).


**Tentative management goals for 2017**

- Re-plant buffer with more cuttings (Winter).
- Spot spray weeds throughout the site (Spring).

**Herbicide Use Conditions**


Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

 Site Boundary
  Mowed by Port Contractor


 Management Area

**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016

 **Port of Portland**

0 45 90 180 270 360 Feet



**PIC E-ZONE**

**Figure 8**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
IRIPSE	<i>Iris pseudacorus</i>	paleyellow iris
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
LYSNUM	<i>Lysimachia nummularia</i>	creeping jenny
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
NYMODO	<i>Nymphaea odorata</i>	American white waterlily
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry
TANVUL	<i>Tanacetum vulgare</i>	common tansy
VERTHA	<i>Verbascum thapsus</i>	common mullein

**2015 maintenance activities**

Extensive work was done to remove NYMODO from wetland areas (almost 75-80% cover before removal). CIRARV, CIRVUL, LYTSAL, RUBARM, TANVUL and CONMAC were treated/cut back from open meadow areas and islands. IRIPSE was treated along lake edges. PHAARU, LYTSAL, LOTCOR and IRIPSE was spot treated in the enhancement areas.

**Tentative management goals for 2016**

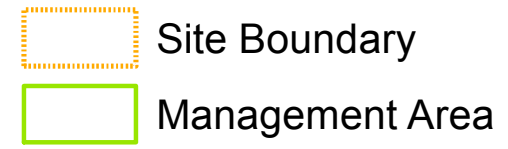
1. Spot spray all islands that were cut back/treated last year (Spring). 2. Clear paths through PHAARU to turtle nesting areas (Spring). 3. Treat remaining NYMODO (mid-Aug). 4. Improve turtle nesting habitat in the meadow areas and collect native cuttings (Winter). 5. Seed and install native cuttings on islands (Winter).

**Tentative management goals for 2017**

1. Spot spray all islands (Spring). 2. Create turtle nesting habitat on south islands (Spring). 3. Treat any remaining NYMODO (mid-Aug). 4. Weedwack and then treat all PHAARU between Ramsey Lakes and the COP stormwater treatment lake (Spring and Fall). 5. Treat all RUBARM and IRIPSE around the lake edges (Spring and Fall).

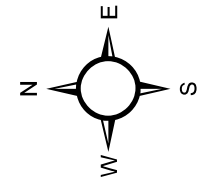
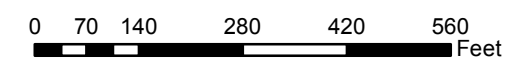
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

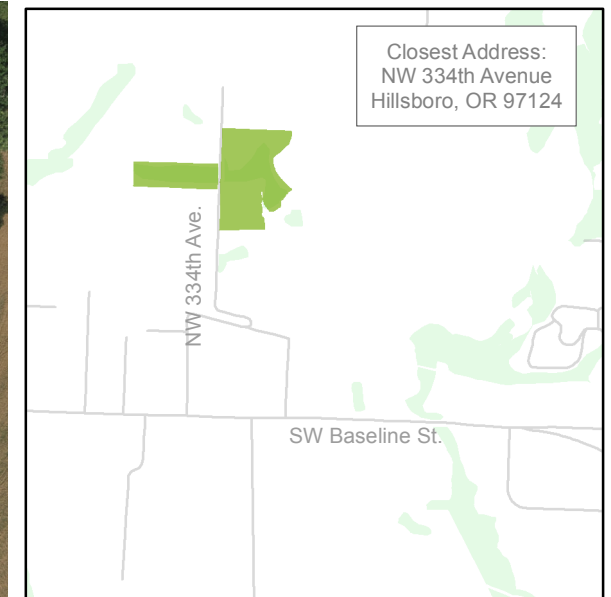


**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**RAMSEY LAKES**  
**Figure 9**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
AILALT	<i>Ailanthus altissima</i>	tree of heaven
ARRELA	<i>Arrhenatherum elatius</i>	tall oatgrass
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CONARV	<i>Convolvulus arvensis</i>	field bindweed
CRAMON	<i>Crataegus monogyna</i>	oneseed hawthorn
DAUCAR	<i>Daucus carota</i>	Queen Anne's lace
LEUVUL	<i>Leucanthemum vulgare</i>	oxeye daisy
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RANREP	<i>Ranunculus repens</i>	creeping buttercup
ROBPSE	<i>Robinia pseudoacacia</i>	black locust
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Treated ARRELA growing along the front gate/fenceline.  
 Treated RUBARM growing in upland forested areas and hand cut back RUBARM along farm fenceline that cannot be treated.  
 Weedwacked DAUCAR and LEUVUL in upland field areas.  
 Treated CONARV throughout the site.

**Tentative management goals for 2016**

1. Habitat Enhancements: Install four pollinator patches, purple martin gourds, native bee blocks and rock piles (Spring and Summer). 2. General site sweeps for invasive species (Spring). 3. Collect native seed (Fall). 4. Collect native shrub cuttings to be installed at other sites (East Lake) (Winter).

**Tentative management goals for 2017**

1. General site sweeps for invasive species (Spring and Fall). 2. Collect native seed (Fall). 3. Collect native shrub cuttings to be installed at other sites (East Lake) (Winter).

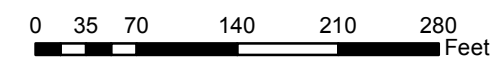
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

- Site Boundary
- Management Area

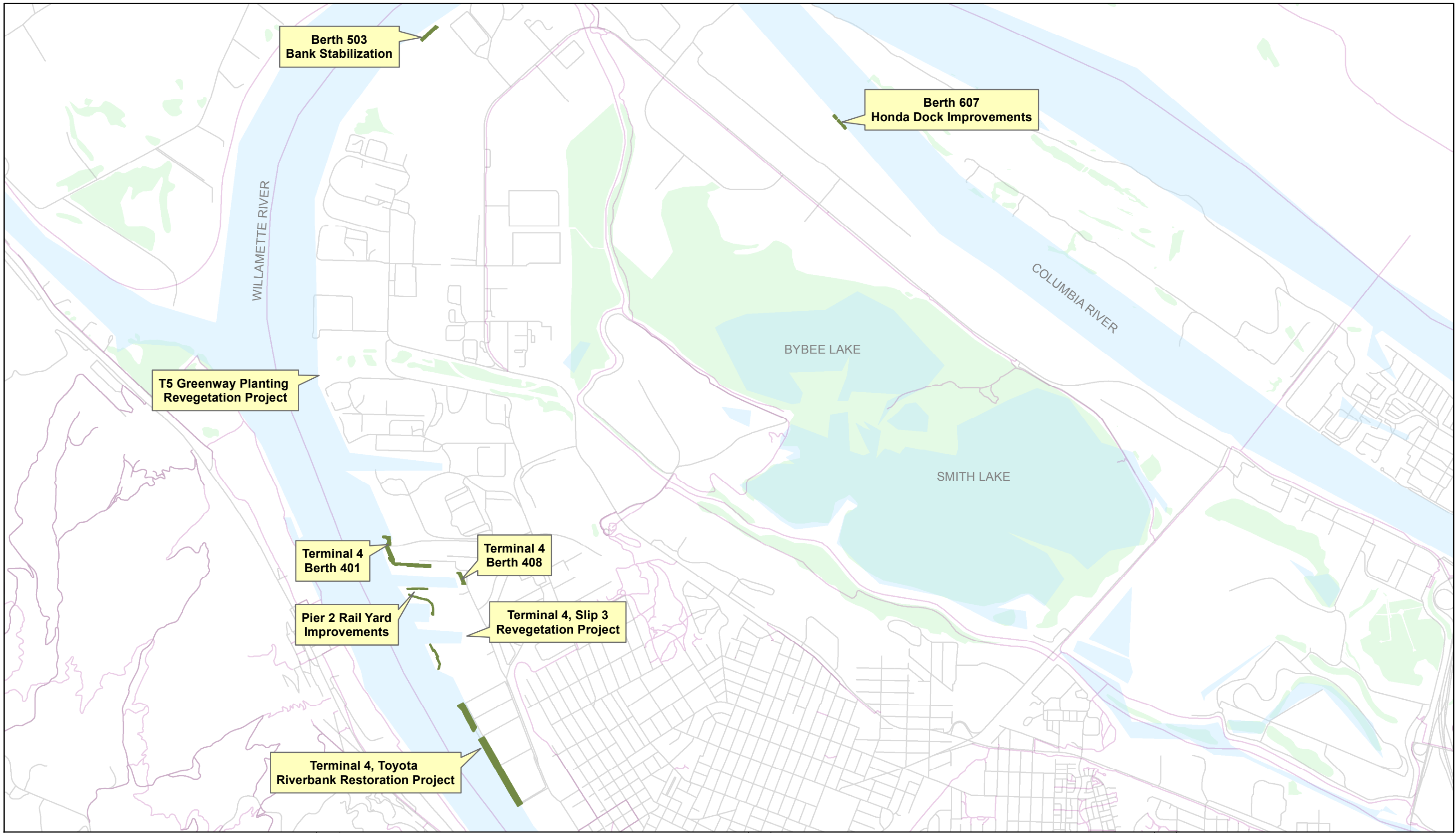
**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**RANDALL  
Figure 10**





 Riverbank Sites

### Vegetation Management Plan

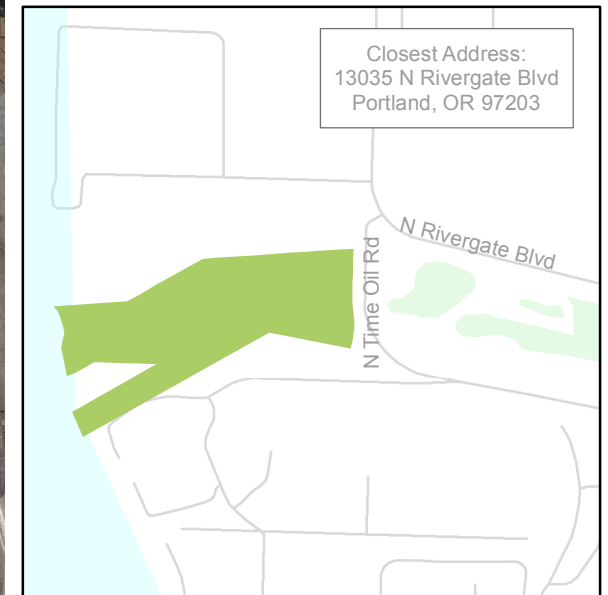
Map prepared by Sarah Wilson - Port Environmental Department | 2016



0 1,300 2,600 5,200 Feet



**RIVERGATE**  
**RIVERBANK RESTORATION SITES**  
**Figure 11**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
ALLVIN	<i>Allium vineale</i>	wild garlic
ANTCAU	<i>Anthriscus caucalis</i>	bur chervil
ARRELA	<i>Arrhenatherum elatius</i>	tall oatgrass
CARKOB	<i>Carex kobomugi</i>	Japanese sedge
CENSPE	<i>Centaurea spp.</i>	knapweed
CHOJUN	<i>Chondrilla juncea</i>	rush skeletonweed
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONARV	<i>Convolvulus arvensis</i>	field bindweed
CONMAC	<i>Conium maculatum</i>	poison hemlock
CYTSCO	<i>Cytisus scoparius</i>	Scotch broom
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
HEDHEL	<i>Hedera helix</i>	English ivy
LEUVUL	<i>Leucanthemum vulgare</i>	oxeye daisy
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
PHRAUS	<i>Phragmites australis</i>	common reed
POLCUS	<i>Polygonum cuspidatum</i>	Japanese knotweed
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

A large patch of ANTCAU was treated near turtle pond. LEUVUL, CONARV, CHOJUN, CIRARV, CIRVUL, DIPFUL, ARRELA, CENSPE and HEDHEL were treated in upland areas. CONMAC, RUBARM and LYTSAL were treated in wetland areas. ALLVIN was hand pulled in upland areas. CYTSCO, PHRAUS, CARKOB and POLCUS were treated along the Willamette river shoreline.

**Tentative management goals for 2016**


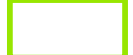
1. Create and install floating islands (Spring). 2. Re-treat PHRAUS, POLCUS, CHOJUN, POLCUS and other invasives throughout the site (Spring/Summer).

**Tentative management goals for 2017**

1. General invasive sweep of the site (Spring). 2. Re-treat PHRAUS, POLCUS, CHOJUN, POLCUS and other invasives throughout the site (Spring/Summer).

**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

 Site Boundary  
 Management Area

**Vegetation Management Plan**

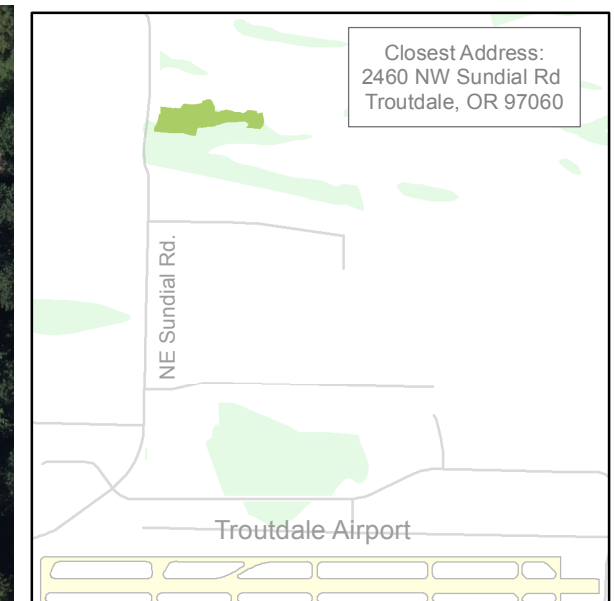
Map prepared by Sarah Wilson - Port Environmental Department | 2016



0 285 570 1,140 1,710 2,280 Feet



**T5 POWERLINE  
Figure 12**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
LEUVUL	<i>Leucanthemum vulgare</i>	oxeye daisy
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
MENPUL	<i>Mentha pulegium</i>	pennyroyal
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Treated PHAARU in southern buffer area. Hand dug and treated LOTCOR along wetland edges. Cut and stump treated RUBARM in forested buffer areas. Treated CIRARV, RUBARM, DIPFUL, PHAARU, MENPUL and LEUVUL in wetland buffer areas. Watered shrubs/trees planted in fall 2014.

**Tentative management goals for 2016**



1. Start to expand buffers around the mitigation site (Spring and Fall).
2. Habitat Enhancements: Pollinator patches (Spring).
3. Water new plants as needed (Summer).
4. General invasive species maintenance (Spring and Fall).
5. Plant site with native seed/cuttings collected from site/other sites (Fall and Winter).

**Tentative management goals for 2017**

1. Continue to expand buffers around the mitigation site (Spring and Fall).
2. Water new plants as needed (Summer).
3. General invasive species maintenance (Spring and Fall).
4. Plant site with native seed/cuttings collected from site/other sites (Fall and Winter).


**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.


 Site Boundary  
 Management Area

**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016

 **Port of Portland**

0 25 50 100 150 200 Feet



**TRIP PHASE 1**  
**Company Lake**  
**Figure 13**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
CYTSCO	<i>Cytisus scoparis</i>	Scotch broom
DAUCAR	<i>Daucus carota</i>	Queen Anne's lace
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
LEUVUL	<i>Leucanthemum vulgare</i>	oxeye daisy
LOTCOR	<i>Lotus corniculatus</i>	bird's-foot trefoil
MENPUL	<i>Mentha pulegium</i>	pennyroyal
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Hand dug and treated LOTCOR along wetland edges. Cut and stump treated RUBARM in northern forested buffer area. Treated CONMAC, CIRARV, DIPFUL and CYTSCO 5ft back from the southern fenceline. Weedwacked DAUCAR and LEUVUL along the western fenceline. Planted the site with native seed and plugs.

**Tentative management goals for 2016**

- Habitat enhancements: pollinator patches, purple martin gourds, bat house and bee blocks (Spring).
- General invasive species maintenance - expand buffer areas (Spring and Fall).
- Water new plants (if needed in Summer).
- Plant site with native seed/cuttings collected from other sites (Fall and Winter).
- Plant buffer area just outside the fence with native shrubs.

**Tentative management goals for 2017**

- General invasive species maintenance (Spring and Fall).
- Water new plants as needed (Summer).
- Re-plant the buffers and expand them out (Spring and Fall).
- Plant site with native seed/cuttings collected from other sites (Fall and Winter).

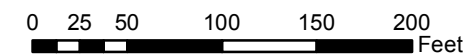
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

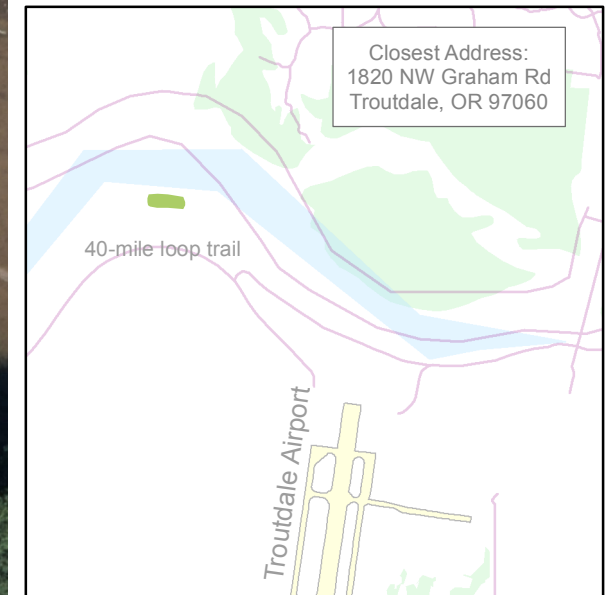
- Site Boundary
- Management Area

**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**TRIP PHASE 1  
East Lake  
Figure 14**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Treated RUBARM, CIRARV, CIRVUL and DIPFUL throughout the site.

**Tentative management goals for 2016**

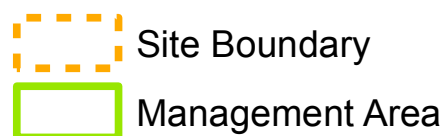
1. Spot spray invasive species throughout the site (Spring).
2. Start to treat blackberry (etc.) 40ft out (in buffer areas) on south side of the site (Spring and Fall).

**Tentative management goals for 2017**

1. Re-treat buffer area created the year before (Spring).
2. Spot spray invasive species throughout the site (Spring).
3. Plant buffer areas with willow/ dogwood/ twinberry cuttings (Winter).

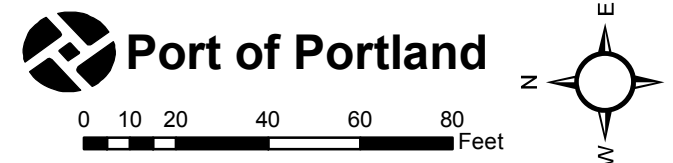
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

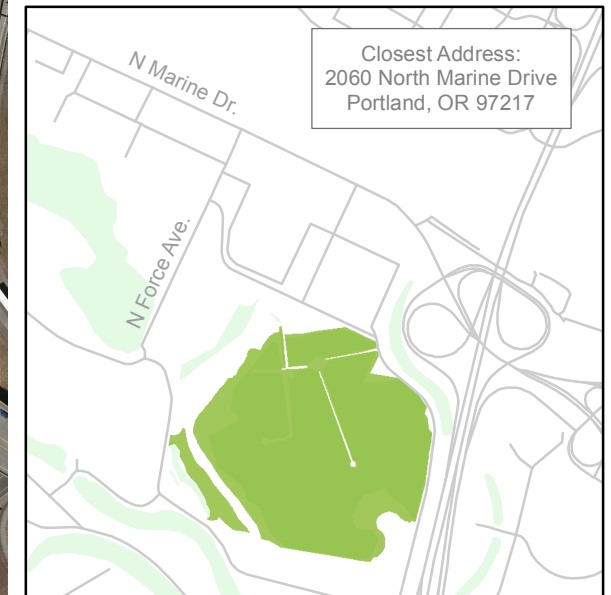


**Vegetation Management Plan**

Map prepared by Sarah Wilson - Port Environmental Department | 2016



**TRIP PHASE 1**  
**300 Trees**  
**Figure 15**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
ARRELA	<i>Arrhenatherum elatius</i>	tall oatgrass
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
HEDHEL	<i>Hedera helix</i>	English ivy
ILEAQU	<i>Ilex aquifolium</i>	English holly
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry
SOLDUL	<i>Solanum dulcamara</i>	climbing nightshade
SOLNIG	<i>Solanum nigrum</i>	black nightshade

**2015 maintenance activities**

Extensive efforts were made to remove SOLDUL, SOLNIG and LYTSAL in the wetland areas (when the water was drained). Extensive efforts were made to remove CIRARV, CIRVUL, DIPFUL from the upland meadow areas. RUBARM, HEDHEL, PHAARU and ARRELA were spot treated throughout the site. Extensive trash removal and vandalism repair was done.

**Tentative management goals for 2016**

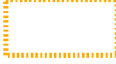

1. Habitat Enhancements: Purple Martin Goats, Pollinator patch, bee blocks, bat houses, rock piles (Spring). 2. Treat CIRARV, CIRVUL and DIPFUL in upland meadow area (Spring). 3. Cut and stump treat all cottonwood sapplings <6 inch DBH along the North and West fence line (Spring). 4. Treat SOLDUL, SOLNIG and LYTSAL in wetland areas (Aug). 5. Start to treat RUBARM in SW corner (Spring and Fall). 6. Collect native seed and collect cuttings throughout the site (Fall/Winter).

**Tentative management goals for 2017**

1. Re-treat CIRARV, CIRVUL and DIPFUL in upland meadow area (Spring). 2. Treat SOLDUL, SOLNIG and LYTSAL in wetland areas (Aug). 3. Continue to treat RUBARM in the SW corner (Spring and Fall). 4. Collect native seed and cuttings throughout the site (Fall and Winter).

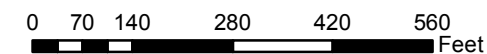
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

-  Site Boundary
-  Management Area

**Vegetation Management Plan**

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**VANPORT WETLANDS**  
**Figure 16**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
CENDIF	<i>Centaurea diffusa</i>	diffuse knapweed
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
HOLLAN	<i>Holcus lanatus</i>	common velvetgrass
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Installed and repaired the bald eagle nest buffer fence on the north side of the island. Treated (and hand pulled as much as possible) CIRARV, CIRVUL, HOLLAN, PHAARU and RUBARM throughout the wetland and upland areas of the mitigation site. Weedwacked and then treated PHAARU re-growth in the buffer area of the mitigation site.

**Tentative management goals for 2016**



- Habitat Enhancements: 2 rock piles, 4 native bee blocks.
- General site sweep for weeds throughout the mitigation site (use manual control as much as possible) (Spring and Fall).
- Repair eagle buffer fence (as needed throughout the year).
- Treat any PHAARU in the buffer area that was mowed and treated last year (Spring).
- Weedwack 40ft beyond the existing PHAARU buffer that was created last year and treat (Summer/Fall).
- Take out all metal tree cages that aren't being used (Winter).
- Take out drainage pipe while water levels are low (Winter).
- Install native cuttings in RCG buffer area (will seed next Fall) (Winter).

**Tentative management goals for 2017**

- General site sweep for weeds throughout the mitigation site (use manual control as much as possible) (Spring and Fall).
- Repair eagle buffer fence (if installed and as needed throughout the year).
- Treat any PHAARU in the buffer area that was mowed and treated last year (Spring/Fall).
- Weedwack 40ft beyond the existing buffer that was created last year and treat (Summer/Fall).
- Install native cuttings in RCG buffer area (will seed next Fall) (Winter).
- Seed buffer with native seed collected from other sites/on site (Fall).

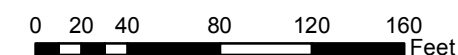
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

-  Site Boundary
-  Management Area

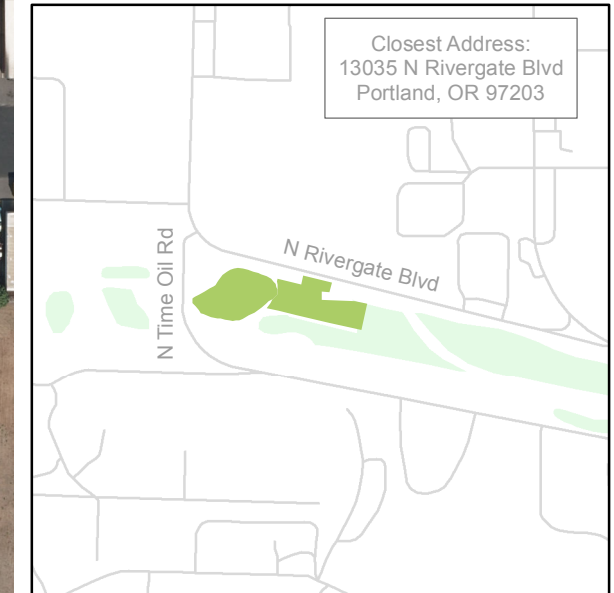
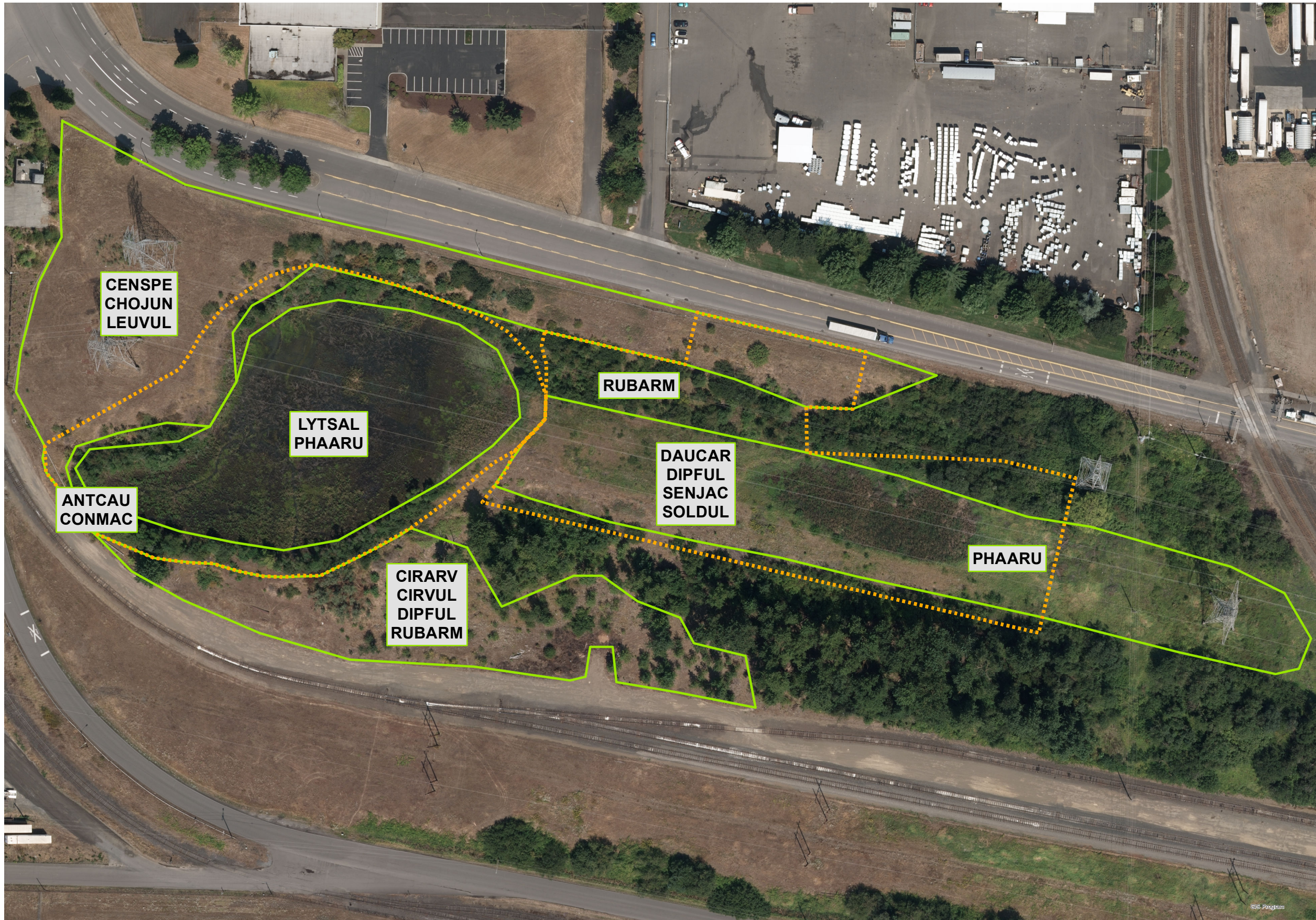
**Vegetation Management Plan**

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**WEST HAYDEN ISLAND**

**Figure 17**



**Invasive species known to occur on site**

Code	Botanical Name	Common Name
ANTCAU	<i>Anthriscus caucalis</i>	bur chervil
CENSEPE	<i>Centaurea spp.</i>	knapweed
CHOJUN	<i>Chondrilla juncea</i>	rush skeletonweed
CIRARV	<i>Cirsium arvense</i>	Canada thistle
CIRVUL	<i>Cirsium vulgare</i>	bull thistle
CONMAC	<i>Conium maculatum</i>	poison hemlock
DAUCAR	<i>Daucus carota</i>	Queen Anne's lace
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
LEUVUL	<i>Leucanthemum vulgare</i>	oxeye daisy
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry
SENJAC	<i>Senecio jacobaea</i>	stinking willie (tansy ragwort)
SOLDUL	<i>Solanum dulcamara</i>	climbing nightshade

**2015 maintenance activities**

Treated RUBARM throughout the site and stump treated any growing in native shrubs. Treated ANTCAU and CONMAC and later seeded the treatment area with native plants. Dug up CENSEPE in wetland areas and treated CENSEPE and CHOJUN in upland open areas. Treated SENJAC and weedwacked DAUCAR in wetland areas. Weedwacked and treated re-growth of PHAARU in wetland areas.

**Tentative management goals for 2016**

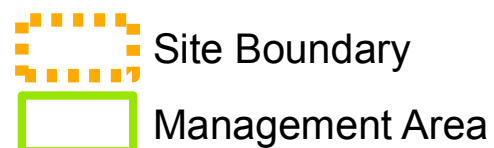
1. Treat PHAARU re-growth in buffer areas and expand buffer (Spring and Fall).
2. Treat LYTSAL in Pickle Pond (Spring and Fall).
3. Plant willow cuttings in buffer area where PHAARU was treated (Winter).

**Tentative management goals for 2017**

1. Spot treat PHAARU re-growth in buffer areas and expand buffer (Spring and Fall).
2. Treat LYTSAL in Pickle Pond (Spring and Fall).
3. Plant willow cuttings in buffer area where reed canary grass was treated (Winter).

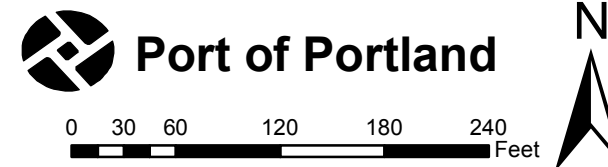
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.



**Vegetation Management Plan**

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**WEST WYE  
Figure 18**





**Invasive species known to occur on site**

Code	Botanical Name	Common Name
AMOFRU	<i>Amarpha fruticosa</i>	false indigo bush
CIRARV	<i>Cirsium arvense</i>	Canada thistle
DIPFUL	<i>Dipsacus fullonum</i>	Fuller's teasel
IRIPSE	<i>Iris pseudacorus</i>	paleyellow iris
LYTSAL	<i>Lythrum salicaria</i>	purple loosestrife
PHAARU	<i>Phalaris arundinacea</i>	reed canarygrass
ROSEGL	<i>Rosa eglanteria</i>	sweetbriar rose
RUBARM	<i>Rubus armeniacus</i>	Himalayan blackberry

**2015 maintenance activities**

Branches and fallen trees were cleared from the trail. Trash removal, vandalism repair and tree cone removal. AMOFRU was treated near the damaged trail.

**Tentative management goals for 2016**



1. Clear branches/fallen trees from the trail (Winter). 2. Begin to clear weeds along the trail within the 5 acre site.

**Tentative management goals for 2017**

1. Work to clear all major weeds along the trail within the 5 acre site (Spring and Fall). 2. Clear branches/fallen trees from the trail (Winter).

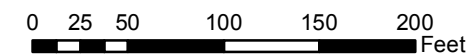
**Herbicide Use Conditions**

Read and follow all herbicide use conditions outlined in the "Herbicide Use Checklist" (Section 3.1.5) before applying herbicide at this site.

 Site Boundary  
 Management Area

**Vegetation Management Plan**

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**40-MILE LOOP**

**Figure 19**