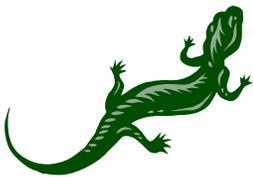


 **PORT OF PORTLAND**  
**Vegetation Management Plan**

*For Mitigation Natural Areas  
Marine & Industrial Development*

*March 2008*



Vanport Wetlands – July 2006

**This report was a collaborative effort by the Port of Portland and Fishman/SWCA Environmental Services.**

### **PORT OF PORTLAND CONTACTS**

The following persons at the Port may be contacted if you have questions regarding any information in this report:

- Carrie Butler (Mitigation Site Specialist- Monitoring and Maintenance) for questions regarding schedules, maps, monitoring, species identification wildlife issues.  
Phone: 503-944-7319  
Cell: 503-939-2094  
FAX: 503-944-7466  
e-mail: carrie.butler@portofportland.com
- Scott Carter (Property Manager- Maintenance) for questions regarding schedules, maps, herbicides, site access or species identification.  
Phone: 503-944-7510  
Cell: 503-701-8948  
FAX: 503-944-7466  
e-mail: scott.carter@portofportland.com

### **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**

#### **Herbicide Spills**

To report a major spill, contact OERS (**Oregon Emergency Response System**), **(800) 452-0311**

Please also refer to the procedures in the Portland Pesticide Spill Response Policy (**Appendix D**) and perform spill cleanup and record spill as suggested.

## TABLE OF CONTENTS

<b>SECTION 1 - BACKGROUND AND PURPOSE.....</b>	<b>4</b>
<b>SECTION 2 - INVASIVE PLANTS.....</b>	<b>5</b>
<b>SECTION 3 - HERBICIDES .....</b>	<b>24</b>
<b>3.1 GENERAL HERBICIDE INFORMATION AND INSTRUCTIONS .....</b>	<b>24</b>
<i>Surfactants .....</i>	<i>24</i>
<i>Selective and Non-Selective Herbicides.....</i>	<i>24</i>
<i>Post-Emergence and Pre-Emergence Herbicides .....</i>	<i>25</i>
<i>Adaptive Management .....</i>	<i>25</i>
<i>General Precautions Check List (All Herbicides) .....</i>	<i>25</i>
<b>3.2 SPECIFIC HERBICIDE INFORMATION AND INSTRUCTIONS .....</b>	<b>27</b>
<i>RODEO® .....</i>	<i>27</i>
<i>GARLON® 3A.....</i>	<i>28</i>
<i>ESCORT® .....</i>	<i>29</i>
<b>SECTION 4 – METHODS &amp; EQUIPMENT .....</b>	<b>30</b>
<b>SECTION 5 - BEST MANAGEMENT PRACTICES.....</b>	<b>32</b>
<b>5.1 PREVENTION .....</b>	<b>33</b>
<b>5.2 MONITORING .....</b>	<b>33</b>
<i>Record Keeping During Application of Herbicides.....</i>	<i>33</i>
<i>Monitoring of Invasive Plants Treated With Herbicides .....</i>	<i>34</i>
<b>5.3 RESOURCES .....</b>	<b>35</b>
<i>Local Groups and Organizations.....</i>	<i>35</i>
<i>Government Agencies .....</i>	<i>35</i>
<i>Port of Portland Contacts.....</i>	<i>37</i>
<i>Emergency Contacts .....</i>	<i>37</i>
<b>SECTION 6 - REFERENCES .....</b>	<b>39</b>
<b>SECTION 7 – PORT MITIGATION SITE MAPS .....</b>	<b>41</b>
<b>APPENDIX A: Invasive Plant Species by Site</b>	
<b>APPENDIX B: Herbicide Product Labels and Material Safety Data Sheets (MSDS)</b>	
<b>APPENDIX C: Further Discussion of Herbicide Restrictions and Regulations on Port Sites</b>	
<b>APPENDIX D: Spill Response Policies</b>	

# 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 impacted by the presence of invasive species. Effective invasive species management is a critical component of the Port's internal and external stewardship role. One of the long-range goals of the Port's Strategic Plan is to "...pursue pre-emptive measures to reduce the Port's contributions, and develop proactive mitigation and adaptation strategies." Invasive species management factors into each part of this goal.

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 \$389,000 in 2008/2009 just to control invasive plants that are currently known to occur on its habitat mitigation sites. Invasive species are one of the primary maintenance concerns for the Port's wetland mitigation sites. These sites are under strict success criteria set by the regulatory agencies, and often contain criteria for the presence 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 invasives that are already established, management programs must be developed and implemented in an attempt to counter the impacts. Control methods generally fall into one of the following categories: manual (hand pulling, digging, etc.), mechanical (using machinery to mow, plow, weed-wack, 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 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, and it is this property that has many people concerned with 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. Recent litigation (Washington Toxics Coalition v. EPA) has affected the way the public (and Port) utilizes herbicides to control invasive plants near water bodies that contain fish listed under the Endangered Species Act (ESA). 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 that utilize herbicides on Port mitigation and natural areas with accurate information on their appropriate use. 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, or the location where the herbicide is to be applied. This is a working document, and is intended to be modified when new invasive species, herbicides, regulations, or site locations warrant change in the application procedure.

## SECTION 2 - INVASIVE PLANTS

This section lists most of the target invasive species controlled on Port mitigation sites using manual, mechanical, chemical, hydrological and biological means. One or two photos are provided for each species in addition to a brief summary of key features used for identification of the species. Our preferred control methods are explained for each target species along with an adapted version of herbicide specifications from the 2007 Pacific Northwest Weed Management Handbook. This report may be updated every one to two years to include additional species as they are encountered. For consistency in nomenclature, throughout this document we use a single botanical name and the corresponding four-letter code for each species covered. The names chosen may not be the most up to date in the taxonomic sense but were chosen as commonly used names in the Portland/Metro area. The term “spray” refers to back-pack spot-spraying unless otherwise noted. The Port uses broadcast spraying only where spot-spraying is not practical (such as on large expanses of land like the area surrounding the Jewett Lake mitigation site on Government Island). The five chemicals currently allowed for use on Port property are Rodeo<sup>®</sup>, Garlon<sup>®</sup> 3A, Escort<sup>®</sup>, Agri-dex<sup>®</sup> surfactant and LI 700<sup>®</sup> the soy-oil derived, non-ionic surfactant. Each chemical is listed and described in detail in section 3.2.

**Note-** Never spray any plant species unless you are sure of its identity; contact Carrie Butler or Scott Carter if you have any doubts.

### Other Species to be Aware of

Other than the species profiled in the following pages, there are some additional species that are becoming problematic in the Portland area and may be found on Port mitigation sites. Port landscape contractors are required to familiarize themselves with all of the species profiled in this book as well as potential invasive species such as the ones listed below. If one of the following species is found on a site, contact Carrie Butler for treatment instructions.

Botanical Name	Common Name	Botanical Name	Common Name
<i>Ailanthus altissima</i>	Tree-of-heaven	<i>Robinia pseudoacacia</i>	Black locust
<i>Alliaria officinalis</i>	Garlic mustard	<i>Rosa multiflora</i>	Multiflora rose
<i>Barbarea</i> sp.	Mustard species	<i>Senecio jacobaea</i>	Tansy ragwort
<i>Buddleia davidii</i>	Butterfly bush	<i>Vicia</i> sp.	Vetch species
<i>Clematis vitalba</i>	Traveler’s joy		
<i>Convolvulus sepium</i>	Hedge bindweed		
<i>Cortaderia selloana</i>	Pampas grass		
<i>Crataegus (except native)</i>	Hawthorn		
<i>Ilex aquafolium</i>	English holly		
<i>Lysimachia nummularia</i>	Creeping jenny		
<i>Melilotus alba</i>	White sweet-clover		
<i>Phragmites australis</i>	Common reed		
<i>Phytolacca americana</i>	Pokeweed		
<i>Polygonum sachalinense</i>	Giant knotweed		
<i>Prunus laurocerasus</i>	English laurel		

## ***Centaurea* sp. (Knapweed – CENT.)**



### **IDENTIFICATION**

- Spotted knapweed shown in photo although diffuse knapweed may also be present.
- Young plants form grayish-green basal rosettes
- Plants may get 1 to 3 feet tall
- Leaves are narrow
- The 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**

### Chemical Treatments

While knapweed plants can be controlled using glyphosate, annual re-applications may be necessary. In upland, grasslands the Port recommends using Garlon<sup>®</sup> 3A, a selective herbicide that won't harm native grasses.

- Rodeo<sup>®</sup> (glyphosate): use when knapweed infestation is within 60 ft of water body
  - *Rate:* maximum 1.5% solution
  - *Time:* Apply to actively growing knapweed when most plants are at bud stage.
  - *Notes:* Use a non-ionic surfactant. Glyphosate will kill many existing knapweed plants but also kills grass that might compete with new knapweed seedlings. When using glyphosate, follow by seeding with native grass species in the spring or fall.
- Garlon<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water body
  - *Rate:* maximum 1.5% solution
  - *Time:* apply to actively growing plants
  - *Notes:* Use a non-ionic surfactant. Garlon<sup>®</sup> 3A is a selective broadleaf herbicide that will not harm grasses.

### Manual Removal

Port Mitigation staff may ask that knapweed be hand-pulled in which case gloves are recommended to prevent skin irritation. Hand-pulled plants should be bagged and removed from the site for disposal in a landfill to prevent further seed dispersal in the natural area.

### ***Chondrilla juncea* - Rush skeletonweed (CHJU)**



©John M. Randall/The Nature Conservancy

#### **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**

##### Manual Removal

The Port currently recommends hand pulling rush skeletonweed during spring and summer before seeds set. Hand-pulled plants should be bagged and removed from the site for disposal in a landfill to prevent further seed dispersal in the natural area.

## *Cirsium arvense* - Canada thistle (CIAR)



### 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
- Flowers Jun-Aug
- Colonizes disturbed areas; generally considered an upland species but may be found in emergent wetlands

### CONTROL METHODS

The Port controls Canada thistle using chemical, mechanical and manual means.

- Spring rosettes are to be treated chemically with the herbicide appropriate for the conditions where the infestation is found (see Chemical Treatments below).
- In May/June plants that are bolting (vertical growth) are to be cut down before allowed to produce flowers.
- In June/July any flowers observed are to be cut by hand, bagged and removed from the site for disposal in a landfill to prevent further seed dispersal in the natural area.
- In Sep/Oct new rosettes may be spot-sprayed with the appropriate herbicide.

### Chemical Treatments

- **Rodeo**<sup>®</sup> (glyphosate): use when thistle infestation is within 60 ft of water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply when thistles are actively growing but past the bud growth stage. Fall applications must be before the first killing frost. Thistles that were mowed or tilled and have rosettes at least 6 inches wide in late summer or fall can be suppressed with 0.75 lb ae/A glyphosate plus 0.5 to 1% nonionic surfactant applied in 3 to 10 gal/A water (max concentration 1.5%)
  - *Notes*: Glyphosate will control grasses as well as other vegetation in treated areas. When using glyphosate, follow by seeding with native grass species.
- **Garlon**<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: apply from rosette to bud stage to actively growing thistle
  - *Notes*: Use a non-ionic surfactant. Garlon<sup>®</sup> 3A is a selective broadleaf herbicide that will not harm grasses.

## ***Cirsium vulgare*- Bull thistle (CIVU)**



### **IDENTIFICATION**

- Grows 2-6 feet tall
- leaves are prickly hairy on the upper leaf surface and “cottony” on the underside
- Basal rosette can exceed 3 feet in diameter
- Flowers Jun-Sep
- Colonizes disturbed areas; generally considered an upland species but may be found in emergent wetlands



## **CONTROL METHODS**

Similar to Canada thistle control measures on previous page with the addition of the chemical treatment below.

### Chemical Treatments

- Escort<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: apply from rosette to actively growing plants
  - *Notes*: Use a non-ionic surfactant.

## *Conium maculatum* - Poison hemlock (COMA)



### IDENTIFICATION

- Grows 6-8 feet tall and up to 10 feet
- Leaves are shiny and finely dissected giving them a lacy or fern-like appearance
- Foliage gives off a musky odor, kind of like dirty socks
- Stems are hollow and hairless with purple blotches (see photo, upper right)
- Flowers May-Aug; flowers are white and arranged in umbrella-like clusters near the ends of the branches
- It is important to look for the purple blotches to avoid treating similar-looking native species such as *Angelica* species, 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 with the strong musky odor.
- This plant is typically found in upland conditions and not likely to occur in wetlands
- **WARNING:** Poison hemlock is toxic and may irritate the skin when handled – do not eat, always wear gloves when handling and respirator masks when cutting with machines.

### CONTROL METHODS

The Port controls Poison hemlock using chemical and mechanical means.

- In spring young plants may be treated chemically with the herbicide appropriate for the conditions where the infestation is found (see Chemical Treatments below).
- If allowed to flower, plants should be cut down before seed sets.

#### Chemical Treatments

- **Rodeo**<sup>®</sup> (glyphosate): use when hemlock infestation is within 60 ft of water body
  - *Rate:* maximum 1.5% solution
  - *Time:* Apply to actively growing plants before they begin to bolt
  - *Notes:* Glyphosate will control grasses as well as other vegetation in treated areas. When using glyphosate, follow by seeding with native grass species.
- **Escort**<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water body
  - *Rate:* maximum 1.5% solution
  - *Time:* apply to actively growing plants
  - *Notes:* Use LI 700<sup>®</sup> surfactant

## *Convolvulus arvensis* - Field bindweed (COAR)



### IDENTIFICATION

- Low-growing vine that will climb vertical structures
- Leaves are arrow-shaped
- Blooms Jun-Oct; flowers are white to pink trumpet-shaped and one 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 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 any herbicide.

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate): use when bindweed infestation is within 60 ft of water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply at full bloom early seed stage of maturity. Application on fall re-growth may provide some control.
  - *Notes*: Cover foliage thoroughly but avoid spray runoff. Repeat treatments may be needed for complete control. Glyphosate will control grasses as well as other vegetation in treated areas. When using glyphosate, follow by seeding with native grass species.
- Escort<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: apply to actively growing bindweed in bloom stage
  - *Notes*: Treatment is suppressive. Use a nonionic surfactant or silicone surfactant; don't let spray drift to sensitive plants.

## *Cytisus scoparius* - Scotch broom (CYSC)



### IDENTIFICATION

- Grows up to 10 ft.
- 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 yellow, pea flower-shaped
- 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.

- Young plants should be hand-pulled in the spring before flowering occurs
- Large, more established plants should be cut and the stump treated with the appropriate herbicide for the conditions where the infestation is found (see Chemical Treatments below)
- Flowering plants should be cut/treated or pulled and removed from the site to reduce seed dispersal

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate): use when Scotch broom infestation is within 60 ft of water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply to actively growing plants in the spring.
  - *Notes*: Use a non-ionic surfactant. Glyphosate controls grasses and other plants that are needed to compete with new seedlings of Scotch broom.
- Garlon<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water body
  - *Rate*: 1 to 1.5% concentration
  - *Time*: Apply any time the plants are actively growing.
  - *Notes*: Foliage must be thoroughly wet. For Garlon<sup>®</sup> 3A, it is especially important to use a high volume of water (100 gal/acre or more).

## *Dipsacus fullonum ssp. sylvestris* - Teasel (DIFU)



### IDENTIFICATION

- Grows to 6 ft. or greater
- Stem leaves are lance shaped and up to 10 inches long with spines on the under-side
- Flowering stalk is armed with spines and produced in the second year
- Blooms Jul/Aug
- The flowering heads are stiff and very spiny; the 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 teasel.

- Rosettes should be sprayed in the spring and fall with the herbicide appropriate for the conditions where the infestation is found (see Chemical Treatments below)
- Bolting plants should be cut down before flowering begins
- Flowering seed heads should be hand-cut, bagged for disposal in a landfill and removed from site

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate): use on teasel infestations within 60 ft of water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply only to rosettes in the spring
  - *Notes*: Use a non-ionic surfactant. Glyphosate controls grasses and other plants that are needed to compete with the target species.
- Garlon<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water
  - *Rate*: 1 to 1.5% concentration
  - *Time*: Apply only to rosettes in the spring
  - *Notes*: Use a non-ionic surfactant. Foliage must be thoroughly wet. For Garlon<sup>®</sup> 3A, it is especially important to use a high volume of water (100 gal/A or more).
- Escort<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply to actively growing plants.
  - *Notes*: Use a nonionic surfactant.

## *Hedera helix* - English ivy (HEHE)



### IDENTIFICATION

- Perennial, evergreen woody vine that can reach 90 ft in length
- The leaves are leathery and dark green and borne on long leaf stalks
- The flowers, which are not present on the younger vines, are about 0.2 to 0.3 inches in diameter and white to yellow-green. The berry-like fruits appear in clusters, are green (unripe) to dark blue or black (ripe) and are about 0.24 to 0.36 inches in diameter
- Flowers in the fall
- The plant can reproduce vegetatively e.g., from stem fragments or by seed.
- English Ivy is an 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.

- Ivy vines found climbing trees or shrubs should be either pulled out or cut and the stems treated with Rodeo<sup>®</sup>
- Large stands of ivy should be cut with weed whips in January and immediately treated with Rodeo<sup>®</sup>

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate):
  - *Rate*: maximum 1.5% solution
  - *Time*: apply to plant while in flower.
  - *Notes*: herbicide control measures should accompany a regular manual pulling regime to keep ivy vines from climbing trees and spreading over large areas. Glyphosate controls grasses and other plants that are needed to compete with the target species.

## *Iris pseudacorus* – yellow flag (IRPS)



### IDENTIFICATION

- Robust perennial with thick rhizomes
- Grows to 3 feet tall
- Leaves get to 1.5 “ 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.

- Small clumps (12 inch in diameter or less) should be dug out and removed from site.
- Large stands of iris are to be spot treated with Rodeo<sup>®</sup>. Flower heads should be cut and bagged before treating foliage. Bagged flower heads shall be disposed of in a landfill.
- Rodeo<sup>®</sup> is non-selective and should be used with care not to impact surrounding native vegetation.

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate):
  - *Rate*: maximum 1.5% solution
  - *Time*: apply pre-bloom or in the fall
  - *Notes*: Use LI 700<sup>®</sup> surfactant.

## ***Lotus Corniculatus* - birdsfoot trefoil (LOCO)**



### **IDENTIFICATION**

- Creeping to erect plant that forms dense patches that grow to about 1.5 feet tall
- The leaves are deeply divided into 5 distinct leaflets, the lowermost 2 are attached directly to the main stem or branch. The margins of the leaves have straight, stiff hairs
- Blooms May-Sep; flowers are yellow, pea flower-shaped that are arranged in tight compound flowering heads
- Birdsfoot trefoil can occur in either wetlands or uplands. It often occurs, and thrives, in moist open areas

### **CONTROL METHODS**

The Port recommends a combination of manual and chemical control methods for birdsfoot trefoil.

- During spring and summer when plants are in bloom spot-spray with the glyphosate based herbicide most appropriate for the conditions (see Chemical Treatments below).
- In late summer and fall plants are to be hand pulled and removed from site

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate): use on infestations within 60 ft of water body
  - *Rate*: maximum 1.5% solution
  - *Time*: apply to spring plants and/or when in full bloom
  - *Notes*: use LI 700<sup>®</sup> surfactant
- Garlon<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water body
  - *Rate*: 1 to 1.5% concentration
  - *Time*: apply to spring plants and/or when in full bloom
  - *Notes*: use a non-ionic surfactant

## *Lythrum salicaria* – purple loosestrife (LYSA)



### IDENTIFICATION

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

### CONTROL METHODS

The Port uses a combination of biological, manual and chemical means to control purple loosestrife. Biological agents are present and considered the only means of control at West Wye and Ramsey Lakes mitigation sites. At all other sites the following methods are preferred:

- In late spring/summer before flowers come on, positively identified plants can be spot-sprayed with Rodeo<sup>®</sup>.
- Once flowers begin to bloom, flowers heads are to be cut and bagged and the remaining foliage spot-sprayed immediately with Rodeo<sup>®</sup>. This regime is to be conducted weekly at all sites until purple loosestrife is no longer flowering. Bagged plant material shall be disposed of in a landfill.

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate):
  - *Rate:* 1.0 to 1.5% solution
  - *Time:* Apply to actively growing plants at full to late flowering stage. Seedlings may be effectively treated early in the season after a fall application to mature plants.
  - *Notes:* Use 0.5% v/v nonionic surfactant (LI 700<sup>®</sup> recommended). Thoroughly wet foliage, but avoid runoff. Glyphosate controls grasses and other plants that are needed to compete with the target species.

## ***Myriophyllum aquaticum* – parrotfeather (MYAQ)**



### **IDENTIFICATION**

- Rhizomatous, aquatic perennial
- Leaves are finely dissected and 5-6 whorled
- Forms large sub-surface and surface mats of dense vegetation that displaces other wetland vegetation

### **CONTROL METHODS**

The Port uses a combination of manual and chemical means to control parrotfeather:

- If parrotfeather is in water, then it must be hand pulled, bagged and removed from site to a landfill
- Once water has receded in late summer/fall, populations can be sprayed with Rodeo<sup>®</sup> being careful to avoid overspray onto desirable wetland vegetation

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate):
  - *Rate:* 1.0 to 1.5% solution
  - *Time:* Apply to plants in late summer or fall once water has receded
  - *Notes:* Do not apply over open water.

## *Phalaris arundinacea* – reed canarygrass (PHAR)



### IDENTIFICATION

- Rhizomatous, perennial grass
- Grows up to 7feet plus
- Mature leaves are bluish-green, flat, 0.75 inches wide and about 12 inches long
- May be identified by a very long ligule (to 0.4")
- Flowers in a dense panicle during Jun-Aug
- Forms dense stands and is found in wetlands
- May be confused with the desirable rice-cut grass (*Leersia oryzoides*) so correct identification is essential

### CONTROL METHODS

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

- In spring new growth that is not in standing water, should be spot-sprayed with Rodeo®
- In summer, before seed heads come on, tall patches should be cut with weed wackers and spot sprayed with Rodeo® after a few weeks of new growth
- Seed heads should be cut, bagged for disposal in a landfill, removed from site and the remaining foliage sprayed
- Currently the Port uses hydrologic manipulation 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 of the site, mechanical and chemical methods are used to control remaining patches in the wetland.

#### Chemical Treatments

- Rodeo® (glyphosate):
  - *Rate:* maximum 1.5% solution with LI 700®
  - *Time:* Apply to actively growing plants in the spring and fall
  - *Notes:* Use nonionic surfactant (LI 700® recommended). Thoroughly wet foliage, but avoid runoff. Glyphosate controls grasses and other plants that are needed to compete with the target species.

## *Polygonum cuspidatum* - Japanese knotweed (POCU)



©Mandy Tu/The Nature Conservancy

### IDENTIFICATION

- Strongly rhizomatous, woody-stemmed perennial shrub
- Grows up to 9feet
- Leaves are broadly ovate and to 6” long
- Stem is hollow, with prominent nodes like bamboo, reddish color
- Blooms Jul-Sep in cream colored plume-like clusters
- Also look for giant knotweed (P. sachalinense) which leaves have a more heart-shaped base

### CONTROL METHODS

The Port uses a combination of mechanical and chemical means to control Japanese knotweed:

- In spring new growth that is not in standing water, should be spot-sprayed with Rodeo<sup>®</sup>
- In summer, before flowers emerge, tall patches should be cut with weed wackers and spot sprayed with Rodeo<sup>®</sup> after a few weeks of new growth
- Flower heads should be cut, bagged for disposal in a landfill, removed from site and the remaining foliage sprayed
- Small infestations can be treated by using the injection method (see below for details).

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate):
  - *Rate:* maximum 1.5% solution with LI 700<sup>®</sup>
  - *Time:* Apply as a coarse spray when the weeds are actively growing and most have reached the bud to early flowering stage of growth.
  - *Notes:* Spray for complete, uniform coverage but do not spray to point of runoff. Glyphosate controls grasses and other plants that are needed to compete with the target species.
  - *Injection Method:* For small infestations. Use 5 ml of undiluted product per stem; inject into actively growing plants; inject into the hollow stem just below a node. Each stem must be treated.

## ***Rubus discolor* - Himalayan blackberry (RUDI)**



### **IDENTIFICATION**

- Perennial shrub with sprawling or climbing growth habit
- Leaves are deeply divided into 3-5 ovate toothed leaflets
- The five petal flowers are white or pinkish and around 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 uses a combination of manual, mechanical and chemical means to control Himalayan blackberry.

- In spring spray new growth with the herbicide appropriate for the conditions
- In summer, problem blackberry should be cut and pulled away from desirable vegetation
- In fall blackberry less than a two feet tall can be sprayed with the herbicide appropriate for the conditions; larger stands should be cut manually or mechanically and sprayed in spring

#### Chemical Treatments

- Rodeo<sup>®</sup> (glyphosate): use on infestations within 60 ft of water body
  - *Rate*: 1 to 1.5% solutions
  - *Time*: Apply in September to October when canes are actively growing and after berries are formed. Fall treatments must be made before a killing frost.
  - *Notes*: Glyphosate controls grasses and other plants that are needed to compete with the target species.
- Garlon<sup>®</sup> 3A (triclopyr): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply when plants are actively growing.
  - *Notes*: Foliage must be thoroughly wet.
- Escort<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply to fully leafed-out vegetation before fall leaf coloration.
  - *Notes*: Constantly agitate while mixing product in water. Add 0.25% by volume of nonionic or silicone surfactant to spray mixture. Good coverage is essential. Avoid contacting non-target species.

## ***Solanum dulcamara* - climbing nightshade (SODU)**



### **IDENTIFICATION**

- Rhizomatous, climbing perennial vine
- Leaves are generally ovate with prominent basal lobes
- Blooms July-Aug
- 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 waterway

### **CONTROL METHODS**

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

- In spring young plants can be sprayed with Rodeo®
- In summer, once flowers set, entire plants should be pulled and removed from site
- In late summer to early fall, plants can be sprayed with Rodeo®

#### Chemical Treatments

- Rodeo® (glyphosate):
  - *Rate:* maximum 1.5% solution plus LI 700®
  - *Time:* Apply in late summer to early fall
  - *Notes:* Glyphosate controls grasses and other plants that are needed to compete with the target species.

## ***Tanacetum vulgare* - common tansy (TAVU)**



### **CONTROL METHODS**

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

- If plants to be controlled occur within 60 feet of water, then it is recommended they be cut down with weed wackers or hand-pulled and removed from site
- If plants occur outside of 60 feet from water, they can be sprayed with Escort<sup>®</sup> in the spring

#### Chemical Treatments

- Escort<sup>®</sup> (metsulfuron): use only in upland conditions at least 60 ft from water body
  - *Rate*: maximum 1.5% solution
  - *Time*: Apply to actively growing vegetation in the spring.
  - *Notes*: Use a surfactant to increase effectiveness (the Port recommends LI 700<sup>®</sup> or Agri-dex<sup>®</sup>). Do not allow spray to drift onto non-target species.

## SECTION 3 - HERBICIDES

### 3.1 General Herbicide Information and Instructions

The terms herbicide and pesticide are both used in this section and in Appendix C, 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 visa-versa.

Only the following three herbicide formulations (Escort<sup>®</sup>, Garlon<sup>®</sup> 3A, and Rodeo<sup>®</sup>) are approved for use on Port's mitigation and natural area sites. Please refer to the Product Label and Material Safety Data Sheets (MSDS) in Appendix B for the safe use the chemicals listed above.

In Section 3.2, please read the subsections pertaining to Herbicide Action, Targeted Plants, Recommended Mix Rates and Surfactants (if applicable) and Use Restrictions (restricted habitats, weather conditions, etc.). At the end of the Use Restrictions for each herbicide there is a Check List that summarizes the restrictions and other precautions pertaining to its use. Please refer to Section 7 (individual site maps) to determine No-Spray Zones or Restricted Areas within the sites before working at the site.

NOTE: The Use Restriction subsections 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 2004 NOAA Fisheries' Biological Opinion (BO) pertaining to the US Army Corps of Engineers (Corps) permits Nos. 200100247 and 200100553 for the Port's Rivergate Enhancement Area and Toyota T-4 sites. Finally, 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 54 pesticides near water-bodies that may contain threatened or endangered salmonid species in Oregon, Washington and California (US District Court of Seattle-2004). For a more detailed discussion of these restrictions and on-going legal cases please refer to Appendix C.

#### ***Surfactants***

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

#### ***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 i.e. grasses, broadleaf herbs, deciduous and evergreen trees and shrubs etc. A selective herbicide kills only certain types of plants. For example one type of herbicide

may be selective for broadleaf herbs but won't harm grasses whereas another selective herbicide may only kill certain grasses e.g. crabgrass etc.

### ***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. All the herbicides discussed below will be applied post-emergence. Pre-emergence herbicides are not allowed for use in Port natural areas.

### ***Adaptive Management***

It is planned that the on-going herbicide treatment of invasive plant species at the 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 e.g., every few years is suggested to prevent development of herbicide resistance in the target plants.

### ***General Precautions Check List (All Herbicides)***

- Minimize herbicide applications where possible by using manual weed removal methods.
- Always read and follow all instructions on product label (Appendix B).
- Always read the Material Safety Data Sheet (Appendix B).
- Always read the herbicide-specific Use Restriction sub-sections and Check Lists in this Section.
- 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.
- A copy of this book, the Vegetation Management Plan will be distributed to herbicide spray contractors to take to the sites during applications.
- If there is any uncertainty of the plant's identity, check with Carrie Butler or Scott Carter prior to spraying.
- Wear appropriate protective clothing or other gear, as suggested on the product label, during mixing and application of herbicides.
- Only apply herbicides to the species, on a site specific basis, indicated in Section 7.
- Only apply the herbicides indicated, on a site and plot-specific basis indicated on the site maps in Section 7.

- Always properly calibrate equipment (nozzles, pumps etc.) prior to spraying.
- Read the Best Management Practices (Section 5) regarding the avoidance of introduction and spread of invasive species.
- At present only Rodeo<sup>®</sup> is permitted by the Port for use within 60 feet of water-bodies or wetlands. Please refer to the maps in Section 7 to determine the restricted spray areas.
- When spot spraying herbicide, use only a hand wand from a low pressure backpack sprayer with a maximum 0.5 gallons per minute nozzle is authorized.
- When spot spraying; only equipment with a single nozzle is permitted.
- All herbicide solutions will be mixed with water to give an herbicide concentration no greater than 1.5%.
- 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 mph or if rain is forecast within 24 hours of spraying.
- All equipment must be leak and spill proof.
- All contractors will be licensed applicators and will provide weekly herbicide application records to Scott Carter.
- The Port of Portland's Spill Reporting Procedures for all non-Aviation and Aviation properties are provided in Appendix D preceding The City of Portland's Pesticide Spill Response Policy (Portland Parks and Recreation, updated in April 2007) and the Pesticide Spill Incident Report form.
- 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.
- Kills of native woody plants, resulting of herbicide applications will be reported to Scott Carter or Carrie Butler.
- Records of the following information will be sent by November 30 of each year to Scott Carter.
  - a. Total acres treated broken into upland and riparian (including wetland) acres treated
  - b. For each application:
    - i. Date of treatment, weather
    - ii. Application method
    - iii. Herbicide used, including concentration, rate of application per acre, treated and total amount used
    - iv. Name of applicator

- c. Report of accidents, if any
  - If any wildlife, including fish are found dead, sick or injured as a possible result of the herbicide application activities, notify Carrie Butler immediately.

### 3.2 Specific Herbicide Information and Instructions

#### ***RODEO® Dow AgroSciences™ (53.8 % glyphosate)***

##### **Herbicide Action**

Glyphosate (the active ingredient in Rodeo®) is a nonselective translocated herbicide that inhibits protein synthesis by disrupting the synthesis of several amino acids. (William et. al. 2004). Glyphosate is a rather slow-acting herbicide; symptoms appearing within a week include chlorosis (yellowing) and stunting of the youngest leaves and stem leader, but it may take more than 2 weeks for the plant to die (CIPWG 2004). Symptoms and death typically occur more rapidly in young, actively growing plants and when temperatures are warm. Woody plants are most susceptible to glyphosate when treated in late summer or fall, but damage may not be apparent until the following spring; leaves either fail to emerge from buds or are dwarfed, misshapen, and yellow (CIPWG).

##### **Target Plants**

Rodeo® is used for the control of annual or perennial broadleaf terrestrial herbaceous, woody plants, and grasses that have encroached within 60 feet of a water body. It is also appropriate for use against a wide variety of aquatic weeds (William et. al. 2004). Since it is non-selective, exercise caution when using in areas growing desirable grass species since the product will kill the grasses. Areas of large infestations sprayed with Rodeo® should be reseeded with the appropriate native grasses in the spring or fall.

##### **Recommended Mix Rates and Surfactants**

Rodeo® will be diluted to a maximum rate of 1.5% when mixed with water. Rodeo® will be used in a 1-1.5% solution according to specific conditions (plant species, stage of growth, season). The approximate amount of active ingredient used shall be 0.4 lbs. per acre, per application at the Rivergate Enhancement Area and the Toyota Facility at Terminal 4 (T-4) sites, but application amounts at other Port sites may be greater. The mix rate of added surfactants (LI 700® or Agri-Dex®, see below) will be between 0.5 and 1.5% when mixed with *undiluted* herbicide. The herbicide will then, as described above, be diluted with water.

##### **Use Restrictions**

Glyphosate, the active ingredient in Rodeo®, has several aspects that make it the best choice in or near environmentally sensitive areas such as wetlands or water-bodies. The glyphosate formulation contained in Rodeo® is “practically nontoxic” to freshwater fish and aquatic invertebrate animals (USDA 2001 [in NOAA 2004]). Some other formulations e.g. Roundup®, which contains surfactants is “moderately to slightly toxic” to freshwater fish (USDA 2001 [in NOAA 2004]). Additionally glyphosate is readily decomposed by microorganisms in the soil or water and does not persist in the environment (CIPWG 2004).

Rodeo<sup>®</sup> is an aqueous solution of the isopropyl amine salt of glyphosate, with which the manufacturer (Dow AgroSciences 2002b) recommends the use of a non-ionic surfactant such as LI 700<sup>®</sup> (from Loveland Industries Inc.) or Agri-Dex (from Setre Chemical Co.). At present these will be the only two surfactants that are permitted by the Port for use with Rodeo<sup>®</sup> in its mitigation sites and natural areas. These two surfactants are less toxic to fish and other aquatic organisms than many other surfactants. The use of one of the two approved surfactants with Rodeo<sup>®</sup> is required. This restriction originates from a 2004 Biological Opinion (NOAA 2004) issued by NOAA Fisheries (formerly National Marine Fisheries Service [NMFS]) for the Rivergate Enhancement Area and the Toyota Facility at Terminal 4 (T-4) in conjunction with the re-issuance of the US Army Corps of Engineers (Corps) permits Nos. 200100247 and 200100553. The Port extends this restriction to all the mitigation and natural area sites in this plan.

- Refer to the General Precautions Check List in section 3.1.
- Always read and follow all instructions on product label.
- Always read the Material Safety Data Sheet
- Only the surfactants LI 700<sup>®</sup> or Agri-Dex<sup>®</sup> will be used with Rodeo<sup>®</sup>.
- Rodeo<sup>®</sup> is the only herbicide permitted in wetlands or within 60 feet of any waterbody.
- There will be no more than 3 main applications per year with limited spot spraying taking place outside these 3 main times.
- Rodeo<sup>®</sup> is a nonselective herbicide; exercise caution when applying in fields dominated by native, or otherwise desirable, grass species.

### ***GARLON<sup>®</sup> 3A - Dow AgroSciences<sup>™</sup> : 44.4% triclopyr triethylamine salt***

#### **Herbicide Action**

Triclopyr amine, the active ingredient in Garlon<sup>®</sup> 3A, is a selective post-emergent herbicide that regulates plant growth by mimicking the action of natural plant hormones (William et. al. 2004). It is most effective when applied to actively growing plants. It is a fast acting herbicide; most herbaceous plants sprayed with triclopyr show some effects within 24 hours and will often die within a few days (CIPWG 2004). Woody plants sprayed with triclopyr in the fall however, may not show the effects until the following spring (CIPWG 2004).

#### **Targeted Plants**

Garlon<sup>®</sup> 3A is used for the control of broadleaf terrestrial herbaceous and woody plants (e.g. Scotch broom) and *not* for use against aquatic plants. Because it is selective for broadleaf plants it will not harm most grasses or sedges when used at recommended rates (CIPWG 2004).

#### **Recommended Mix Rates and Surfactants**

Garlon<sup>®</sup> 3A will be diluted to a maximum of 1.5% when mixed with water. Garlon<sup>®</sup> 3A will be used in a 1-1.5% solution according to specific conditions (plant species, stage of growth,

season). The approximate amount of active ingredient used shall be 0.04 lbs. per acre, per application.

The product label recommends the use of a non-ionic agricultural surfactant for all applications (Dow AgroSciences 2003). At the Rivergate Enhancement Area and the Toyota Facility at Terminal 4 (T-4) the only surfactants permitted are LI 700<sup>®</sup> and Agri-Dex<sup>®</sup>. While the use of surfactants with Garlon<sup>®</sup> 3A is not required, it is recommended (NOAA 2004).

### **Use Restrictions**

As of the January 2004, U.S. District Court of Seattle has ruled that the EPA's finding of "no effect" for the active ingredient in Garlon<sup>®</sup> 3A (triclopyr triethylamine [triclopyr TEA]) has excluded it from greater restrictions near water-bodies with protected threatened or endangered salmon and steelhead species in Washington, Oregon and California (US District Court of Seattle 2004, see Appendix C for details). Nonetheless, a NOAA BO for the Rivergate Enhancement Area and the T-4 Toyota sites restricts this herbicide to 25 feet from wetlands or water-bodies that may contain the listed fish species. The Port will extend the buffer to 60 feet and apply those restrictions to all its sites.

### **Check List**

- Refer to the General Precautions Check List in section 3.1.
- Garlon<sup>®</sup> 3A is not permitted in any wetland or within 60 feet of any water body.
- Garlon<sup>®</sup> 3A is not permitted in any ditches when water is present.
- All Garlon<sup>®</sup> 3A solutions will be mixed with water to give an herbicide concentration no greater than 1.5%.
- The use of non-ionic surfactants is required. The Port allows the use of LI 700<sup>®</sup> or Agri-Dex<sup>®</sup> surfactants only.

### ***ESCORT<sup>®</sup> XP - DuPont<sup>™</sup> : 60% metsulfuron methyl***

#### **Herbicide Action/**

Escort<sup>®</sup> XP is a dry, flowable granule to be mixed in water and applied as a foliar spray. The active ingredient, metsulfuron is a selective post-emergent that interferes with the action of an enzyme, resulting in the rapid cessation of cell division in roots and shoots (William et. al. 2004).

#### **Targeted Plants**

Escort<sup>®</sup> XP is selective for broadleaf herbaceous or woody weeds. Weeds should be actively growing when treated. Best results occur when applications are made to annual weeds less than 10 cm. (~4 inches) tall or broad; or to perennial weeds up to the early bud stage.

### **Recommended Mix Rates and Surfactants**

The product label publishes a wide range of mix and application rates depending on target species and volumes of spray to be used; it is important to wet the entire foliar surfaces on the plants so greater dilutions are used in “high volume” applications such as controlling tall brush. The use of surfactants with this product is generally recommended by the manufacturer, except in a few cases as noted on the label. Surfactants should be EPA approved and contain a minimum of 80% active ingredient. The surfactant should be mixed at a minimum concentration of 0.25% volume/volume with the spray solution e.g., 1 quart per 100 gallons of spray solution. The manufacturer does not recommend the use of surfactants that contain acetic acid e.g., LI 700<sup>®</sup> (DuPont 2007).

### **Use Restrictions**

Metsulfuron methyl is not among the 54 herbicides reviewed by the US District Court of Seattle and thus does not have any special new restrictions near water-bodies with listed threatened or endangered species of salmon or steelhead (US District Court of Seattle 2004).

While the label indicates that it is permissible to use this product in “...low lying areas where water is drained but may be isolated in pockets...”, the Port requires that this product *not* be used in or near wetlands, waterways or any area containing standing water even if “isolated”.

- Refer to the General Precautions Check List in section 3.1.
- Never use Escort<sup>®</sup> in or near *any* water-bodies or wetlands. At present only Rodeo<sup>®</sup> is permitted by the Port for use within 60 feet of water-bodies or wetlands. Please refer to the maps in Section 7 to determine the restricted spray areas.
- There will be only one main application per year with limited spot spraying follow-up.

## **SECTION 4 – METHODS & EQUIPMENT**

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

### **Spot Spray**

The spot spray technique is used in various situations e.g. where the invasive plants are widely scattered and/or mixed with desirable native species and thus the boom spray technique (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 the boom sprayers.

### ***Equipment***

The equipment used for the spot spray method consists of low pressure hand sprayers with a small tank, typically back-pack 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).

### **Boom Spray**

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

### ***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:

- A roller pump or centrifugal pump
- A tank
- An agitation system (generally a hydraulic agitator)
- Flow control valves
- Several nozzles along a pipe or other structure called a boom.

As with the spot-spray technique, 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 (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 evenly applied. 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).

### **Weed Wick**

The “weed wick” technique was used in the past to control cattail where it was over crowding native wetland species. The Port is currently not targeting cattail but may again in the future if the need arises.

### ***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 e.g. detergents. Always be sure the equipment does not leak prior to use on the site(s).

### **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)

### ***Equipment***

The equipment used for the “stem injection” technique includes a large plastic syringe filled with undiluted glyphosate (Rodeo<sup>®</sup>) and a sharp instrument to make an air hole in the stem.

### **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, Scotch broom, tree-of-heaven and black locust.

### ***Equipment***

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

### **Equipment Maintenance**

Never store, mix or clean equipment within a 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 in regard to the prevention of invasive plant species, as well as monitoring the control of established invasive species. The best management practices regarding the proper application of herbicides, is already covered in the “General Precautions Check List (All Herbicides)” in Section 3.

In addition subsection 5.3 (Resources) provides a brief description of various local groups and organizations as well as governmental agencies that can provide further information. Addresses, phone number and website URLs for these organizations are provided. Subsection 5.3 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 here are common sense; and most apply to both preventing the establishment of new species 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 another, un-infested portion. Please brush off any weed seed and dispose of properly.
- Inspect all equipment e.g., vehicles and tires, hand tools etc. for weed seed before entering or leaving a site. Please remove any weed seed and dispose of properly, if possible.
- Cut and bag all seed heads of killed plants; remove from the site and dispose of properly.
- Never operate heavy machinery e.g., trucks, tractors etc. 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. For example clopyralid, an active ingredient in Curtail<sup>®</sup>, is not permitted in compost.
- Use approved dyes in herbicide sprays. Marking the sprayed plants will help assure even and adequate coverage and 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 please let Carrie Butler and/or Scott Carter know about it so they can positively identify the species. Because of ships' ballast emptied into waters at docks on the Columbia and Willamette, exotic species are often first seen in areas near or on Port facilities.

## 5.2 MONITORING

### *Record Keeping During Application of Herbicides*

During application of herbicide, accurate records must be kept, in accordance with the General Precautions Check List in Section 3. This information is also required by NOAA at the Rivergate Enhancement Area and Toyota T-4 sites. The minimum information to be recorded at each application is:

- Total acres treated broken into upland and riparian (including wetland) acres treated
- For each application:
  - Date of treatment, weather, wind speed and direction
  - Application method
  - Herbicide used, including concentration, rate of application per acre, species treated and total amount used
  - Name of applicator
  - Report accidents, if any

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

The Port has a regular schedule of plant community monitoring (along fixed transects) and invasive species mapping that is beyond the scope of this plan. However, for the purpose of this management plan, which is updated every two years, Port staff assess each mitigation site and develop maps based on observations and maintenance needs over the last two monitoring seasons.

The regular quantitative transect monitoring (above) provides, among other things, a sample with which to calculate the percentages of invasive plants each year. However, what is important to this vegetation management plan is a means to track the efficacy of the herbicide treatments. It is proposed that this monitoring be a more qualitative type. The effects should be visible two to three weeks after herbicide is applied to an herbaceous invasive weed infestation. At that point a Port employee or qualified sub-contractor should visit the site and inspect the treated area(s). In general this type of monitoring can be more qualitative than the plant community monitoring but, at a minimum, the following sorts of information should be 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 the managers think it 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, flagging etc.), if necessary, to aid applicators in locating patches or individual plants for follow-up spot treatment.
- All the species names of damaged non-targeted plants must be noted. The investigators must record some estimate of percentages non-targeted plants 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 hand-spray if drift is a problem, changing nozzles size, using a more selective herbicide etc.

Please note that the above monitoring scheme is very general and will be adapted by the managers on a site by site basis. Nonetheless some sort of monitoring including the above elements must be employed at a reasonable time after each application. The time suggested above, 2 to 3 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 then.

Monitoring required by NOAA to satisfy conditions for the Rivergate Enhancement Area and the Toyota T-4 sites are outlined in the BO (NOAA 2004). The monitoring required pertains more to the application than the efficacy of the herbicides, as in the bulleted list in Record Keeping During Application of Herbicides (above). NOAA also requires that non-target plant mortality in riparian areas is monitored. The monitoring results for the Rivergate Enhancement Area and the Toyota T-4 sites will be reported to Dan Gambetta at NOAA (503-231-2243).

## 5.3 RESOURCES

### Local Groups and Organizations

- **The Nature Conservancy (TNC) of Oregon**

Oregon Field Office  
821 SE 14th Avenue  
Portland, OR 97214  
(503) 230-1221  
oregon@tnc.org

TNC's Invasive species workshop has an excellent website through University of California at Davis (URL <http://tncweeds.ucdavis.edu/>); many of the photos used in this report were from the photo archive on that site. This site regularly offers new resources for treating, tracking and identifying invasive species.

### Government Agencies

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

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

The ODA 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 much useful pesticide related topics

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

- **The 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.

URL <http://www.nwcb.wa.gov/INDEX.htm>

- **The 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

E-mail: [deq.info@deq.state.or.us](mailto:deq.info@deq.state.or.us)

In addition to local programs, The Environmental Protection Agency (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 DEQ partners with the Department of Human Services' Pesticide Analytical and Response Center (PARC) which runs a Pesticide Poisoning Prevention Program, below:

Pesticide Poisoning

Prevention Program

800 NE Oregon St. #827

Portland, OR

97232

(503)731-4025,

E-mail [pesticides.health@state.or.us](mailto:pesticides.health@state.or.us)

PARC's Home Page: URL <http://www.oregon.gov/DHS/ph/pesticide/>

- **The United States Environmental Protection Agency (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: URL <http://www.epa.gov/pesticides/>
- EPA Pesticide Fact Sheets Page (with links to search engine that retrieves EPA fact sheets for individual pesticides):  
URL [http://www.epa.gov/pesticides/factsheets/chemical\\_fs.htm](http://www.epa.gov/pesticides/factsheets/chemical_fs.htm)

**Port of Portland Contacts**

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

- **Carrie Butler** (Mitigation Site Specialist- Monitoring & Maintenance) for questions regarding schedules, maps, monitoring, species identification and wildlife issues.  
Phone: 503-944-7319  
Cell: 503-939-2094  
FAX: 503-944-7466  
e-mail: [carrie.butler@portofportland.com](mailto:carrie.butler@portofportland.com)
- **Scott Carter** (Property Manager- Maintenance) for questions regarding schedules, maps, herbicides, site access or species identification.  
Phone: 503-944-7510  
Cell: 503-701-8948  
FAX: 503-944-7466  
e-mail: [scott.carter@portofportland.com](mailto:scott.carter@portofportland.com)

**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

- **Herbicide 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
- For other spills contact OERS (Oregon Emergency Response System), (800) 452-0311.
- Please also refer to the procedures in the Portland Pesticide Spill Response Policy (Appendix D) and perform spill cleanup and record spill as suggested.

## SECTION 6 - REFERENCES

- Connecticut Invasive Plant Working Group (CIPWG) 2004. Safety and Environmental Considerations for the Use of Herbicides to Control Invasive Plants. (online article). URL [http://www.hort.uconn.edu/cipwg/art\\_pubs/GUIDE/consideration.htm](http://www.hort.uconn.edu/cipwg/art_pubs/GUIDE/consideration.htm)
- NOAA, 2004. Biological Opinion by National Oceanic and Atmospheric Administration (NOAA) regarding Army Corp of Engineers permits 200100247 (Rivergate Enhancement mitigation) and 200100553 (Toyota Riverbank Enhancement).
- Oregon Department of Agriculture (ODA) 2004b. Federal Court Case: Washington Toxics Coalition v. United States Environmental Protection Agency Federal Court Decision Affecting Pesticide Use in Oregon. (online article)  
URL <http://www.ofsonline.org/oda-dept-ag.htm> (visited August 2, 2004).
- Oregon State Administrative Rules (OAR) 2004. Department Of Agriculture Division 57 Pesticide Control 603-057-0001 through 603-057-0535. The Oregon Administrative Rules contain OARs filed through July 15, 2004. (online version URL [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) [visited August 2004])
- Oregon State Revised Statutes (ORS) 2003. Chapter 634- Pesticide Control 2003 Edition (online version URL <http://landru.leg.state.or.us/ors/634.html> [visited August 2004])
- Shenk, Myron, editor/co-author 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. (Newspaper article in the July 27 edition of The Oregonian pp. B1 and B4)
- United States District Court, Western District of Washington at Seattle (US District Court 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.
- 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.

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

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. University of California: Publication No. 3421

Flora of the Pacific Northwest

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

Pacific Northwest Weed Management Handbook 2007

Peachey, Ed., D. Ball, R. Parker, J.P. Yenish, T.W. Miller, D.W. Morishita, P.J.S. Hutchinson, 2007. Oregon State University Extension Service Publication.

Plants of the Pacific Northwest Coast

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

Weeds of the West

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

Wetland Plants of Oregon and Washington

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

## 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, chemicals allowed for use on the site and any other restrictions such as distance from water bodies. 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:

Sheet No.	Site Name	Location
1/20 (C-1)	Berth 503 Bank Stabilization	RG - Terminal 5
2/20 (C-2)	Berth 607 Honda Dock Improvements	RG – Terminal 6
3/20 (C-3)	Buffalo	PDX – NE 42 <sup>nd</sup>
4/20 (C-4)	Columbia Slough Sites	RG
5/20 (C-5)	Columbia Slough Sites	PDX, PIC
6/20 (C-6)	Elrod	PDX – NE 33 <sup>rd</sup>
7/20 (C-7)	Jewett Lake	Government Island
8/20 (C-8)	Leadbetter Peninsula	RG – near Bybee Lake
9/20 (C-9)	North & South Sloughs	RG – near Columbia Slough
10/20 (C-10)	PIC E-Zone	PIC – NE Alderwood Rd.
11/20 (C-11)	Ramsey Enhancement	RG – near Columbia Slough
12/20 (C-12)	Ramsey Lakes	RG – near Columbia Slough
13/20 (C-13)	Randall	Hillsboro – NW 334 <sup>th</sup>
14/20 (C-14)	T-4, Pier 2 Greenway	Terminal 4
15/20 (C-15)	T-4, Toyota Riverbank	Terminal 4
16/20 (C-16)	T-5 Powerline	RG – west of Time Oil Road
17/20 (C-17)	Vanport Wetlands	RG - near the Expo Center
18/20 (C-18)	West Hayden Island	West Hayden Island
19/20 (C-19)	West Wye	RG – east of Time Oil Road
20/20 (C-20)	40-Mile Loop Trail	RG – near Slough and Bybee Lake

### KEY

---

PDX – Portland International Airport

PIC – Portland International Center

RG – Rivergate Industrial District

## APPENDIX A

### Invasive Plant Species by Site

Site	Botanical Name	Common Name	Man/Mech Control	Chemical Control	Bio-control
BERTH 503, T-5	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
BERTH 607, HONDA	<i>Cirsium arvense</i>	Canada thistle	x	x	
DOCK IMPROVE- MENTS, T-6	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Hypericum perforatum</i>	St. John's wort	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
BUFFALO	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Convolvulus arvensis</i>	field bindweed	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x		
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Solanum dulcamara</i>	climbing nightshade	x		
ELROD	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Convolvulus arvensis</i>	field bindweed	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Cortaderia selloana</i>	pampas grass	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Hedera helix</i>	English ivy	x	x	
	<i>Ilex aquafolium</i>	English holly	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Polygonum cuspidatum</i>	Japanese knotweed	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
JEWETT LAKE	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x		
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
LEADBETTER	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x	x	
	<i>Lotus corniculatus</i>	birdsfoot trefoil	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Myriophyllum aquaticum</i>	parrotfeather	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	

## Vegetation Management Plan – 2008

Site	Botanical Name	Common Name	Man/Mech Control	Chemical Control	Bio-control
N & S SLOUGH	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cytisus scoparius</i>	Scotch broom	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Ilex aquifolium</i>	English holly	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Robinia pseudoacacia</i>	black locust	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
PIC E-ZONE	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x		
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
RAMSEY	<i>Cirsium arvense</i>	Canada thistle	x	x	
ENHANCEMENT	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x	x	
	<i>Lotus corniculatus</i>	birdsfoot trefoil	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Melilotus alba</i>	white sweet-clover	x		
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
RAMSEY LAKES	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife			x
	<i>Phalaris arundinacea</i>	reed canarygrass	x		
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Solanum dulcamara</i>	climbing nightshade	x	x	
RANDALL	<i>Ailanthus altissima</i>	Tree-of-heaven	x	x	
	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Convolvulus arvensis</i>	field bindweed		x	
	<i>Convolvulus sepium</i>	hedge bindweed	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x	x	
	<i>Lotus corniculatus</i>	birdsfoot trefoil		x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Solanum dulcamara</i>	climbing nightshade	x	x	

Site	Botanical Name	Common Name	Man/Mech Control	Chemical Control	Bio-control
T-4, PIER 2	<i>Buddleia davidii</i>	Butterfly bush	x	x	
GREENWAY	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Cytisus scoparius</i>	Scotch broom	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Hedera helix</i>	English ivy	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Senecio jacobaea</i>	tansy ragwort	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
T-4, TOYOTA	<i>Buddleia davidii</i>	Butterfly bush	x	x	
RIVERBANK	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cytisus scoparius</i>	Scotch broom	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Vicia sp.</i>	Vetch	x	x	
T-5 POWERLINE	<i>Barbarea sp.</i>	mustard species	x		
	<i>Centaurea diffusa</i>	diffuse knapweed	x	x	
	<i>Centaurea maculosa</i>	spotted knapweed	x	x	
	<i>Chondrilla juncea</i>	rush skeletonweed	x		
	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Clematis vitalba</i>	traveler's joy	x	x	
	<i>Cytisus scoparius</i>	Scotch broom	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Elytrigia repens</i>	quackgrass	x	x	
	<i>Hedera helix</i>	English ivy	x	x	
	<i>Lotus corniculatus</i>	birdsfoot trefoil	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Melilotus alba</i>	white sweet-clover	x		
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Phragmites australis</i>	common reed	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Solanum dulcamara</i>	climbing nightshade	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
VANPORT	<i>Barbarea sp.</i>	mustard species	x		
WETLANDS	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Cortaderia selloana</i>	pampas grass	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Hedera helix</i>	English ivy	x	x	
	<i>Hypericum perforatum</i>	St. John's wort	x	x	
	<i>Ilex aquifolium</i>	English holly	x	x	
	<i>Melilotus alba</i>	white sweet-clover	x		
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	

Site	Botanical Name	Common Name	Man/Mech Control	Chemical Control	Bio-control
	<i>Polygonum cuspidatum</i>	Japanese knotweed	x	x	
	<i>Polygonum sachalinense</i>	giant knotweed	x	x	
	<i>Rosa multiflora</i>	multiflora rose	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Solanum dulcamara</i>	climbing nightshade	x	x	
	<i>Solanum nigrum</i>	black nightshade	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
WEST HAYDEN	<i>Barbarea sp.</i>	mustard species	x		
ISLAND	<i>Centaurea maculosa</i>	spotted knapweed	x	x	
	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Cirsium vulgare</i>	bull thistle	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
WEST WYE	<i>Barbarea sp.</i>	mustard species	x		
	<i>Centaurea diffusa</i>	diffuse knapweed	x		
	<i>Centaurea maculosa</i>	spotted knapweed	x		
	<i>Cirsium arvense</i>	Canada thistle	x	x	
	<i>Conium maculatum</i>	poison hemlock	x	x	
	<i>Coronilla varia</i>	purple crown vetch	x		
	<i>Lythrum salicaria</i>	purple loosestrife			x
	<i>Phalaris arundinacea</i>	reed canarygrass	x	x	
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	
	<i>Tanacetum vulgare</i>	common tansy	x	x	
40-MILE LOOP	<i>Cirsium arvense</i>	Canada thistle	x	x	
TRAIL	<i>Dipsacus fullonum</i>	common teasel	x	x	
	<i>Iris pseudacorus</i>	yellow flag	x	x	
	<i>Lythrum salicaria</i>	purple loosestrife	x	x	
	<i>Phalaris arundinacea</i>	reed canarygrass	x		
	<i>Rubus discolor</i>	Himalayan blackberry	x	x	

## **APPENDIX B**

### **Herbicide Product Labels and Material Safety Data Sheets (MSDS)**

- 1. Escort<sup>®</sup> (metsulfuron methyl)**
- 2. Garlon<sup>®</sup> 3A (tryclopypyr)**
- 3. Rodeo<sup>®</sup> (glyphosate)**
- 4. Agri-dex<sup>®</sup> (non-ionic surfactant)**
- 5. LI 700<sup>®</sup> (non-ionic surfactant)**

## APPENDIX C

### 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).

Finally 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 54 pesticides near water-bodies that may contain threatened or endangered salmonid species in Oregon, Washington and California. On January 22, 2004, the Court issued an order (US District Court of Seattle 2004) that required a buffer width minimum of 20 yards (60 feet) 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 for most of the 54 named herbicides. 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. 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 have recently 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. The ODA will provide periodic updates to e-mail subscribers pertaining to the court order from the Washington Toxic Coalition lawsuit. To obtain updates send a blank e-mail to ODA at: [pesticide.crtorder-subscribe@oda.state.or.us](mailto:pesticide.crtorder-subscribe@oda.state.or.us)

## **APPENDIX D**

### **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)**
- 3. Portland Parks and Recreation Integrated Pest Management Program, updated April 2, 2007**