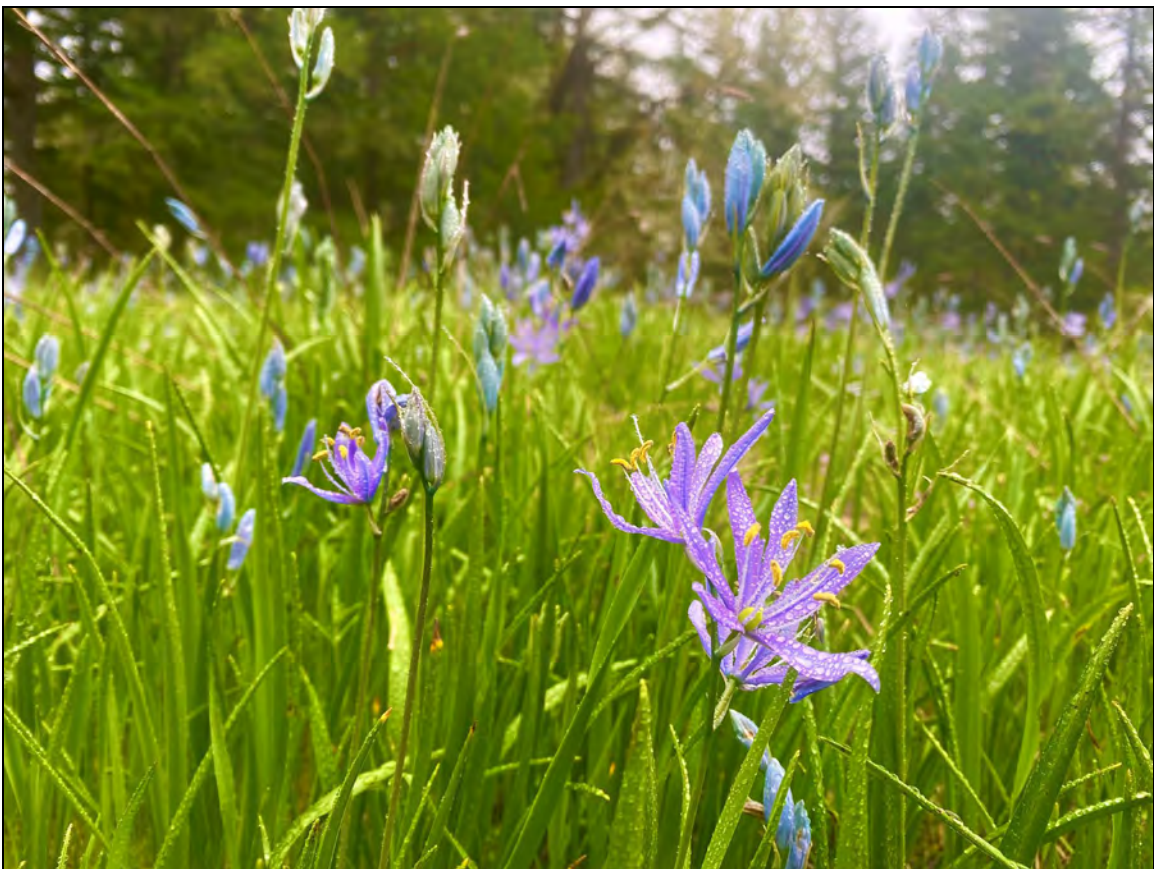


**Vegetation Management Plan**  
*Mitigation Sites & Natural Areas*

*November 2023*



## 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:

- **Sarah Wilson** (Conservation Ecologist) for questions regarding schedules, maps, monitoring, species identification, and wildlife issues  
Office: (503) 415-6527  
Mobile: (530) 588-4332  
[sarah.wilson@portofportland.com](mailto:sarah.wilson@portofportland.com)
  
- **Carrie Butler** (Senior Conservation Ecologist) Mitigation Program oversight  
Office: (503) 415-6319  
Mobile: (503) 928-1611  
[carrie.butler@portofportland.com](mailto:carrie.butler@portofportland.com)

## EMERGENCY CONTACTS

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

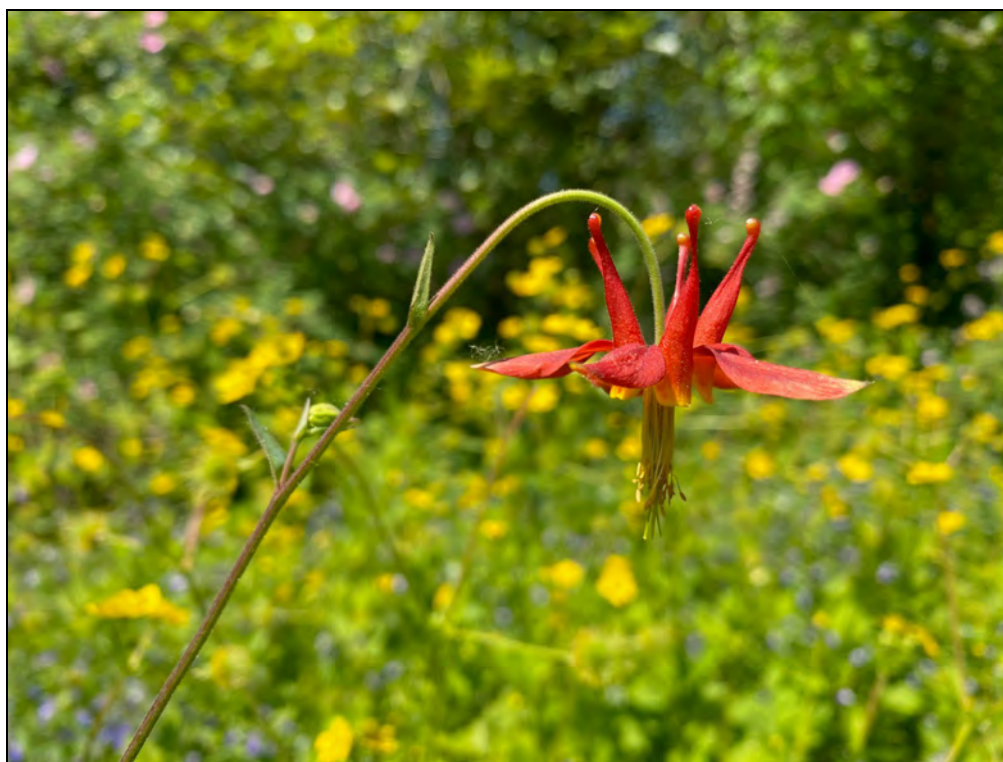
- **Medical or Other Emergencies**
  - In case of medical emergency, fire, or situations requiring police: Dial 911
  - If you think you have been poisoned by herbicides call the Oregon Poison Center: 1-(800) 222-1222
  
- **Chemical Spills**
  - To report a spill on Port-owned property, please notify:
    - 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.

## Land Acknowledgement

We acknowledge that the Port of Portland is located on lands that have been occupied and stewarded since time immemorial by people from the Bands of Cascade, Clackamas and Multnomah Bands of the Chinook Tribe.

Many other indigenous peoples have their homes in, travel through, harvest and use the plentiful natural resources of the Columbia River, Willamette River, and the other lands and waters within the Port's district.

The Port of Portland respects the history of the federally recognized sovereign Tribal Nations of the Northwest, whose people were forcibly dispossessed and removed from their homes and lands by the United States government following treaties entered into between 1851 and 1855. And we are committed to recognizing the ongoing relationship that exists between indigenous peoples and these places.



Western Columbine (*Aquilegia Formosa*) at West Sundial Wetlands. These flowers bloom from late spring through summer and attract hummingbirds and other pollinators.

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## **APPENDICES**

**Appendix A:** Further Discussion of Herbicide Restrictions and Regulations on Port Sites

**Appendix B:** Spill Response Policies

**Appendix C:** Links to Port iNaturalist project pages

# VEGETATION MANAGEMENT PLAN

## SECTION 1 - BACKGROUND AND PURPOSE

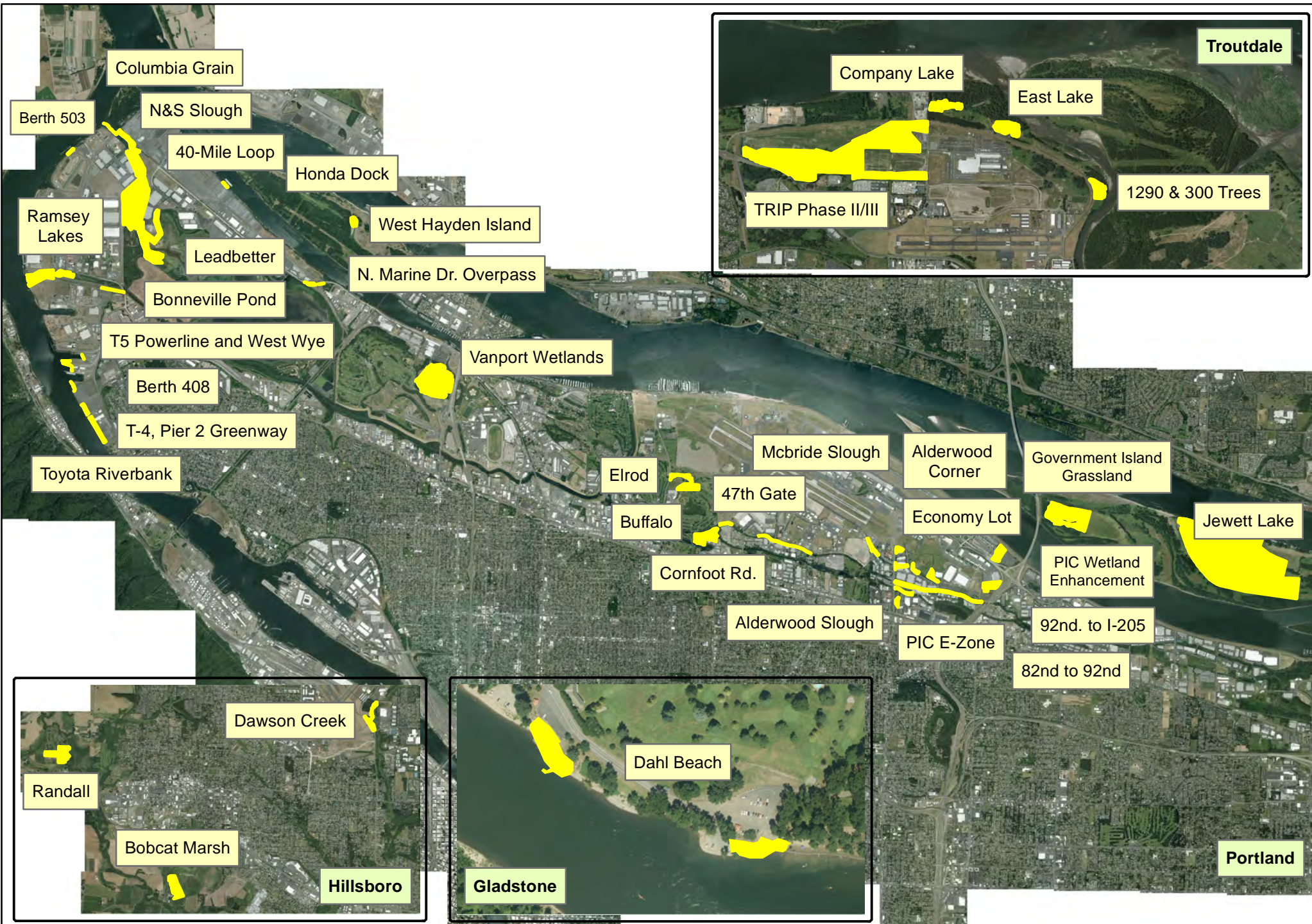
The Port of Portland (Port) is one of the largest single landowners in the Portland metropolitan area, with approximately 10,000 acres of property holdings. Stewardship of these lands can be negatively impacted by the presence of invasive species, primarily non-native invasive plants. Effective invasive 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 nearly \$445,700 in fiscal year 2024-2025 primarily 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 mitigation sites. These sites are managed under strict success criteria set by the U.S. Army Corps of Engineers, the Department of State Lands, and local agencies who issue permits which often contain criteria for the management of invasive species.

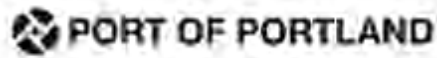
Preventing the introduction and establishment of invasive species has been shown to be the most cost-efficient long-term management strategy. However, for invasive species that are already established, management programs must be developed and implemented in an attempt to counter their impacts. Control 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.

A large focus of this document is 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. There are many regulations on the use of herbicides, with many more likely to be enacted in the 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 information on appropriate management strategies for invasive species. This document is also intended to give an overview of invasive species known to occur at each Port mitigation and enhancement site, what maintenance has been done in the past at each site and what is proposed for the near future. This information generally relates to management actions for the control of invasive species in various management scenarios, including manual/mechanical removal where appropriate and herbicide use. This is a working document and is intended to be modified every two years or when new invasive species, herbicides, regulations, or site locations warrant change in application procedures. See Figure 1 for an overview of site locations and Figure 2 for Port site signage examples.







# Wildlife Habitat Area

**No Trespassing, No Dumping, No Dogs**

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

Violators will be prosecuted under ORS statutes.



# PRIVATE PROPERTY

**NO TRESPASSING OR DUMPING**

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



Figure 2: Site Signage examples

## **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.

Invasive species control should be prioritized, and effort should be determined by multiple different factors including goals for the site, whether native species were recently planted or seeded, if a future enhancement is planned, if the site is still within the regulatory period or if the site is established. Table 1 provides an overview of different potential maintenance scenarios commonly encountered at Port mitigation and enhancement sites and the corresponding enhancement actions that should be considered for each scenario. Control methods by species are described in Table 2 along with priority ranking and general plant information. Prioritization of invasive species treatment is important especially when working at established mitigation and enhancement sites with limited budgets and specific long term management goals. We have created a prioritization category for each listed invasive species from (1) being the most important to target/prioritize to (5) the least important species to target/prioritize. This system was created to reduce the amount of herbicide used at established mitigation sites and to ensure work to control a certain species was followed up with a plan to restore the area or conduct follow-up treatments.

For consistency in nomenclature, throughout this document we use a single botanical name found in the USDA PLANTS database and the corresponding common name.

**Table 1. Maintenance Scenarios and Corresponding Enhancement Actions**

Maintenance Scenarios			
#	Type	*Enhancement action	Priority species to control
1	Future restoration area - Plan for native seeding and planting (or seeding only).	Boom spray all species (as long as it's dominated (>70%) by non-native species). If it's possible to preserve existing native species, spot spraying or mechanical/manual control should occur instead. Multi-year site prep is likely depending on starting conditions.	All non-native species in preparation for seeding and planting.
2	Future restoration area - Plan for native planting only (no seeding)	If existing vegetation is non-native but can be successfully controlled around plantings, focus on creating and maintaining planting circles around each planted shrub/tree. If non-native species are so aggressive that planting circles aren't effective, then clear entire restoration area (multi-year site prep) and re-seed with native species (see scenario 1).	All non-native species that could interfere with the growth of new plantings. Mechanical/manual methods should be prioritized if possible.
3	Newly planted area – native bareroot/gallon only (no seeding).	Prioritize protecting all newly planted shrubs/trees for at least two years after the original planting. Adapt management techniques and re-plant as needed. Extend prioritization period if needed.	All non-native species that could interfere with the growth of newly planted shrubs/trees. Mechanical/manual methods should be prioritized if possible.
4	Newly seeded area	Mechanical/manual control in the first year to protect new seedling growth (unless you can prevent overspray). Monitor in the second year to determine which non-native species are negatively impacting seeded species - plan management strategy moving forward.	All non-native species that could interfere with the growth of newly seeded species in the first year. Plan treatment strategy in the second year and beyond. If the site is within the compliance period, then all non-native species should be targeted throughout the site.
5	Established upland forest or shrub-scrub	Priority is to maintain existing native vegetation. If an opportunity for a focused restoration is identified and budgeted for, then this transfers to scenario #1 or #2 above. If a species is identified to be aggressive and is not Rank A or B (priority 1 and 2), communicate this to the mitigation management team.	<b>All non-native species if the site is within the compliance period</b> otherwise only <b>Rank A</b> and <b>B</b> invasive species (Priority 1 and 2) that are negatively impacting native vegetation. <b>Rank C</b> (priority 3) species if there is a long-term restoration plan for re-plant and/or seed (scenario 1 and 2). Please communicate if you think an invasive species is particularly aggressive in this area and if additional action should be taken.
6	Established shrub-scrub wetland or forested wetland		
7	Established palustrine emergent wetland		
8	Created/native, established grassland		
10	Established Riparian - shrub-scrub/forested		
11	Established Riparian - herbaceous		
9	Non-native pasture grass field	Treat only if there is a plan for re-plant AND re-seed (scenario 1).	Do not target unless there is a plan for re-plant AND re-seed.
* Mechanical maintenance should be prioritized before chemical treatments when feasible.			

**Table 2: Control Methods for Invasive Species Encountered at Port Sites**

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>American Pokeweed (<i>Phytolacca americana</i>)</b>	A	Priority 1	Perennial, herbaceous/shrub-like. Birds are thought to be key spreaders of pokeweed berries. The root and other parts of this plant are toxic. Use appropriate PPE when handling this plant.	<b>Mechanical/Manual:</b> Roots of older plants can be two to three feet long or more. Digging or cutting stems in June - July can effectively manage pokeweed, though it often needs several years of regular attention to fully eradicate. Larger, more established plants should be dug out in early spring when soil is moist and new growth has begun. At the very least, clip the berries and put them in the trash (not the compost) in October - November. Roots should also go in the trash. <b>Chemical:</b> Use herbicide control methods only for large infestations where manual and mechanical removal becomes impractical, and a re-planting plan is planned. Treat with 2% triclopyr in June or 4% glyphosate in October - November.
<b>Barnyardgrass (<i>Echinochloa crus-galli</i>)</b>	N/A	Priority 2 if population is small or at a mitigation site within compliance period. Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Fibrous root system, summer annual grass that germinates from late winter or early spring through the summer. Flowers bloom from June through October.	<b>Chemical:</b> Only target this species if it's growing at a mitigation site within the compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat newly growing plants in May or early June when identification is possible (before it goes to seed). Mature plants show little sensitivity to herbicides applications so these plants should be mowed, and re-growth treated. Herbicides applied pre-emergence or shortly after emergence typically exhibit the most effective control.
<b>Bird's-foot trefoil (<i>Lotus corniculatus</i>)</b>	C	Priority 2 if population is small (mechanical only) or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial herb. Bird's-foot trefoil reproduces by seed and plants also spread by modified stems (stolons) and rhizomes. Flowering period is indefinite, so the seeds set over a long summer period. Flowering mostly occurs from May to August.	<b>Mechanical/Manual:</b> If the population is small, dig up plants by the roots, making sure to remove all root fragments. Re-visit the area over multiple years. <b>Chemical:</b> Only target this species with herbicide if it's growing at a mitigation site within the compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat in March-April before flowering (do not treat while in flower).
<b>Bitter lettuce (<i>Lactuca virosa</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	In Latin, lactuca means "milky extract" and virosa means "toxic". A biennial herb, wild lettuce grows on the banks of rivers and on disturbed ground, flowering in July and August.	<b>Chemical:</b> Toxic - do not remove by hand. Only target this species if it's growing at a mitigation site within the compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat during regular spot treatments in spring.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Buffalo-Bur (<i>Solanum rostratum</i>)</b>	N/A	Priority 4	This annual plant is spiny, hairy and around 1/2 to 3 feet tall. Up to 8,500 seeds are produced per plant. Plants are self-fertile.	Preventing seed production is fundamental to its eradication, so control efforts should be undertaken in spring before flowering. <b>Mechanical/Manual:</b> Pull or dig up plants before seed heads form. Because of the sharp spines, be sure to always wear sturdy gloves. If you can't remove all the root, use a shovel to cut the plant off about one inch below the ground so the plant will not re-sprout. To be fully effective, all mature burs need to be bagged and removed so no new seeds are left on the site. Immature seeds can continue to develop in cut plants. <b>Chemical:</b> Treat in spring before plant goes to seed only if a specific restoration project is planned.
<b>Butterfly Bush (<i>Buddleja davidii</i>)</b>	B	Priority 2	Deciduous shrub that spreads profusely by seed. A single flower spike produces 40,000 seeds with a germination rate of 80% or higher.	<b>Mechanical/Manual:</b> Remove spent flowerheads in the fall before they disperse seeds (don't wait until spring) and discard these in the garbage to avoid spreading seeds. Seedlings can be easily hand-pulled and larger bushes can be dug out from December-June. Branches should not be left on the bare ground because they can form roots and re-grow. <b>Chemical:</b> Cut the trunk off at the base and apply 50% triclopyr to the freshly cut surface. Discuss multi-year restoration plan if the population is large.
<b>Caper Spurge (<i>Euphorbia lathyris</i>)</b>	D	Priority 5	Annual or biennial forb. All parts of this plant are poisonous. Nausea, vomiting, and diarrhea when ingested can cause death in people, pets or livestock. Causes redness, swelling, and blisters on the skin after some delay following contact.	<b>Mechanical/Manual:</b> Wearing appropriate PPE, dig up and bag entire plant before it goes to seed. All parts of this plant are poisonous – use caution.
<b>Clematis (Old Man's Beard), (<i>Clematis vitalba</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Aggressively spreading woody vine. Young plants can grow 6 feet a year and once established, vines can completely cover existing vegetation. The airborne seeds allow this vine to spread quickly to new locations. Also, damaged or cut stems can re-sprout so plants can spread vegetatively as well.	<b>Mechanical/Manual:</b> Climbing vines can be cut at waist height, allowing the upper vines to die back. Any kind of mechanical control (mowing or lopping) should be followed by digging out the roots or herbicide application on the cut stems or the re-growth. Old man's beard will readily re-sprout. Properly dispose of all parts of the plant. <b>Chemical:</b> For best results and least impact to surrounding vegetation, spray the leaves and stems of actively growing plants in the spring before stem elongation. If control is conducted later in the year after stem elongation, carefully cut the plants down to the ground, wait a couple of weeks or so, and then spray the re-growth. The "cut stump treatment" works as well. Cut the vine with a horizontal cut close to the ground and at about waist height, then apply herbicide to both cut ends, following the product label for this method.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Clover, red (<i>Trifolium pratense</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial, sometimes biennial or winter annual	<b>Mechanical/Manual:</b> Small populations can be hand pulled. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat before flowering (March-April). Do not treat if in flower.
<b>Clover, white (<i>Trifolium repens</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Cool-season perennial forb. Has a creeping stem system that roots at the nodes.	<b>Mechanical/Manual:</b> Small populations can be hand pulled. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat before flowering (March-May). Do not treat if in flower.
<b>Common groundsel (<i>Senecio vulgaris</i>)</b>	N/A	Priority 5. Use mechanical/manual control methods only.	Winter annual, sometimes biennial. Seeds can still mature even if the plant itself is killed.	<b>Mechanical/Manual:</b> Since seeds can mature even if the plant is killed, remove the plant from the area if there is any evidence of flowering. Seeds of common groundsel are not long-lived, usually remaining viable for about one year. Therefore, controlling this weed before flowering will have a great impact on the size of the next year's population. Start monitoring for seedlings in early fall and remove seedlings and plants as soon as possible. Monitoring should continue through early summer.
<b>Dovefoot (<i>Geranium molle</i>)</b>	N/A	Priority 5	Annual, Biennial or Perennial forb.	<b>Mechanical/Manual:</b> Hand pull in March-April while it is in bloom but before it goes to seed. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat in very early spring before blooming (Feb-Mar) – do not treat if in bloom.
<b>Dwarf Mallow (<i>Malva neglecta</i>)</b>	N/A	Priority 5	Annual, winter annual, or biennial. Mallows only reproduce by seed.	<b>Mechanical/Manual:</b> Hand dig small populations in March-April before they flower and go to seed. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat in early spring before the plant goes to flower.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>English ivy (<i>Hedera helix</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Woody, evergreen perennial grows as a vine (climbing or creeping) or as a shrub. Juvenile growth stage lasts for about 10 years. During the juvenile stage ivy only spreads vegetatively. Any stem fragments in contact with the soil can regenerate. Mature plants continue with a slower vegetative spread, but they also produce flowers and spread by seed. Clusters of small greenish-white flowers are usually produced in the fall.	<b>Mechanical/Manual:</b> The most effective control method is manual removal from December - June. Hand pull or dig out accessible plants. Cut the vines or pry them off trees. This will kill the upper vines, but the lower, rooted plant needs to be removed as well. <b>Chemical:</b> Controlling established English ivy with herbicides can be difficult because of the waxy leaves. Only use this method if mechanical/manual methods are not possible. Treat with 4% glyphosate + 2% triclopyr and follow-up with 50% glyphosate cut stump.
<b>English holly (<i>Ilex aquifolium</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Large, dense, slow-growing evergreen tree or shrub. Berries are poisonous to humans and pets. Reproduces mainly by seed, but also spreads vegetatively via suckering and layering. Birds eat the berries and spread the seeds to new areas.	<b>Mechanical/Manual:</b> Small plants can be pulled or dug up when soil is moist from December - June. Mature plants have deep and extensive roots so digging is labor-intensive and results in considerable soil disturbance. <b>Chemical:</b> Cut stump treat with 50% triclopyr from June - November or with 50% Glyphosate December - January. Foliar herbicide treatment is not very effective due to the thick, waxy leaves.
<b>English hawthorn (<i>Crataegus monogyna</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Its abundant red berries are attractive to birds and other animals, which help spread this tree far beyond where it's located.	<b>Mechanical/Manual:</b> Seedlings and young saplings can be pulled or dug up when soil is moist from December - June, but roots quickly become deep and stout and sharp thorns are present even on young seedlings. <b>Chemical:</b> Applying herbicide using the cut stump method with 50% triclopyr or frilling method is probably the most effective approach for plants that cannot be removed by digging or grubbing out. This can be done June - March.
<b>Field Bindweed (<i>Convolvulus arvensis</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial herbaceous plant with creeping and twining stems. It has an extensive system of rhizomes that can grow deep into the soil. Reproduces vegetatively from roots, rhizomes, stem fragments and by seeds.	<b>Mechanical/Manual:</b> In general, mechanical control is not a good option because plants are able to reproduce from roots, and seeds remain viable in the soil for long periods of time. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat in March before flowering or at early seed stage of maturity. Treat regrowth in the fall.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Field mustard (<i>Brassica rapa</i>)</b>	N/A	Priority 4	Winter annual or biennial. It has rapid fall growth, high biomass production, and nutrient scavenging ability.	<b>Mechanical/Manual:</b> Small populations can be dug up and removed. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat before it goes to bloom in very early spring (check plants in Feb-March).
<b>Floating primrose-willow (<i>Ludwigia peploides</i>)</b>	B	Priority 1	Blooms late July to August. Leaves are alternate on the stem (not opposite like the native water purslane). Floating primrose-willow spreads mostly through plant fragmentation, where pieces of plant break off and can form roots.	<b>Mechanical/Manual:</b> Be sure to remove the entire plant and not leave any stem or root fragments behind. Dispose of plants in the garbage to avoid spreading the plant further. <b>Chemical:</b> Treat only if the area is completely dry and the infestation is too large for practical mechanical removal. Only use herbicide approved for aquatic use.
<b>Fuller's teasel (<i>Dipsacus fullonum</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Taprooted, monocarpic plant that grows as a biennial or short-lived perennial that dies after it flowers, reproducing from seed. A single flowerhead can produce around 850 seeds and plants typically produce 1-40 flowerheads. Seedheads of various ages have been shown to contain viable seed.	<b>Mechanical/Manual:</b> Hand pull plants from April - July. Teasel develops a stout, fleshy taproot in the rosette stage that can be more than 2 feet long - digging out plants can be difficult. Flowering stalks can be cut from plants where flowering has already initiated and not before or stems will re-sprout and seedheads may double. Cut flower stalks should be removed from the area. <b>Chemical:</b> Treat rosettes with 2% triclopyr in March - April.
<b>Garlic mustard (<i>Alliaria petiolata</i>)</b>	B	Priority 1	Biennial, a single plant can make hundreds of small seeds; forms dense patches.	<b>Mechanical/Manual:</b> Hand dig small populations making sure to remove the entire root system (March-June). Do not hand pull if seedpods are dry. <b>Chemical:</b> Treat in March, re-visit site to monitor herbicide effectiveness and for follow-up treatments.
<b>Hairy bittercress (<i>Cardamine hirsuta</i>)</b>	N/A	Priority 5	Winter annual or biennial. Its seeds germinate in fall beginning as early as September. Mustard family that is native to Eurasia. Disturbing the pods can propel the seeds as far as 16 feet from the mother plant.	<b>Mechanical/Manual:</b> Small populations can be uprooted in early April and May when plants become more obvious or in late fall when new plants begin to grow. After setting seed, the life cycle is complete, and the plants die - hand-pull before the plants go to seed or wait until the next season if too late. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). After setting seed, the life cycle is complete, and the plants die - treat before the plants go to seed or wait until the next season if too late.



Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Herb Robert (<i>Geranium robertianum</i>)</b>	C	Priority 3 if population is small or at a mitigation site within compliance period, Priority 4 if established on site (discuss multi-year plan for treatment/re-plant).	Winter and a spring annual or biennial	<b>Mechanical/Manual:</b> Shallow, weak roots make this plant easy to pull before they go to seed. Hand-pull if population is small. <b>Chemical:</b> Only target this species if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Treat with 2% triclopyr in March-April.
<b>Himalayan blackberry (<i>Rubus armeniacus</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Somewhat evergreen sprawling perennial shrub	<b>Mechanical/Manual:</b> Removal of top growth by mowing or cutting will eventually kill blackberry if done regularly and over several years. Cutting followed by digging up root crowns is much more effective than cutting alone (April - August). Look out for nesting birds before removing large blackberry hedges. <b>Chemical:</b> Glyphosate is most effective on blackberry in September to October when canes are actively growing and after berries have formed. Fall treatments should be conducted before the first frost.
<b>Jewelweed, common (<i>Impatiens capensis</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Self-seeding annual. Seedlings sprout in early spring and reach maximum size by August. Flowering begins in mid-summer and continues until frost kills the plant.	<b>Mechanical/Manual:</b> Shallow root system can easily be hand-pulled when growing in damp soils. Make sure to remove the roots, especially in drier soils where plants may break off. If the plants do not have seed capsules, they can be crushed and left on site in a dry place to compost. If plants have seed capsules, make sure to bag and put them in the trash. <b>Chemical:</b> Mechanical removal should be prioritized. Only target this species with herbicide if growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals (leave if the restoration plan is for shrub/tree planting only). Large populations of spotted jewelweed may need chemical control for management only if a native re-plant/seed plan is in place.
<b>Jimsonweed (<i>Datura stramonium</i>)</b>	N/A	Priority 5 (1 if at mitigation site within compliance period)	Annual herbaceous forb, Seeds are dispersed by dehiscence (splitting open of the seed capsule) up to 3 to 10 feet from the parent plant.	<b>Chemical:</b> Only target this species if the population is small, it's growing at a mitigation site within compliance period or if there is a clear restoration plan with re-seeding goals. Treat in April-May before it goes to seed. Found primarily at Vanport Wetlands.
<b>Knapweed - Spotted, meadow and Diffuse (<i>Centaurea maculosa</i>, <i>C. protensis</i> and <i>C. diffusa</i>)</b>	B	Priority 1	Plants overwinter in rosette form, then grow a stem ("bolt") in May to flower and seed in June. We find it in sandy sites especially in the Rivergate area, WHI and Government Island.	<b>Mechanical/Manual:</b> Digging up knapweed is moderately effective, though remaining roots usually grow a new plant. Excavated plants should be bagged and put in the garbage (February - November). <b>Chemical:</b> Herbicides can be effective for larger populations in combination with mechanical methods (2% triclopyr + 0.5% aminopyralid (Milestone) from May-June).

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Knotweed - Japanese, Giant and Himalayan (<i>Polygonum cuspidatum</i>, <i>P. sachalinense</i>, <i>P. polystachyum</i>, <i>P. cuspidatum x sachalinense</i>)</b>	B	Priority 1	Knotweed is known to form dense patches that begin in disturbed areas (trails, streams, etc.) and expand into undisturbed areas. In addition, knotweed's deep, persistent roots make it extraordinarily difficult to kill.	<b>Mechanical/Manual:</b> Cut down in July before treatment. <b>Chemical:</b> Treat regrowth in August - October.
<b>Lesser Celandine (<i>Ficaria verna</i>)</b>	N/A	Priority 4	Herbaceous perennial. Low growing and mat-forming, with long stalked leaved densely arranged in a basal rosette. Shoots emerge from late-March to mid-April depending on environmental conditions, and flowering, which may be linked to water availability, occurs from late April to mid-May. Seed production occurs in late spring, and by summer the above ground vegetation dies back, and the plant becomes dormant.	<b>Mechanical/Manual:</b> Small infestations can be removed manually, though care must be taken to completely remove the tubers from the soil. <b>Chemical:</b> Treat before flowering in March.
<b>Meadow foxtail (<i>Alopecurus pratensis</i>)</b>	D	Priority 5	Perennial bunchgrass naturalized, tolerates periods of waterlogging and flooding, reproduces via seed dispersal and vegetatively from root nodes.	<b>Mechanical/Manual:</b> Hand-pulling/ digging is possible for small colonies because rhizomes are not extensive. <b>Chemical:</b> Treat in late summer to early fall with Glyphosate.
<b>Milk thistle (<i>Silybum marianum</i>)</b>	A	Priority 1	A single plant can produce about 6,000 seeds that can stay viable for nine years.	<b>Mechanical/Manual:</b> If you have a small patch, hand pulling can be effective in March - May, but you should follow up with planting a native replacement, such as a native perennial grass. <b>Chemical:</b> Treat rosettes with 2% triclopyr from April - June.
<b>Mullein, common (<i>Verbascum thapsus</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Sturdy biennial, deep taproots with fibrous lateral roots are produced in the first year of rosette growth, reproduces entirely by seed.	<b>Mechanical/Manual:</b> Cut and remove seed head of mature plants, cut plant to ground level. <b>Chemical:</b> Treat basal rosette before it bolts.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Mullein, moth (<i>Verbascum blattaria</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Biennial/short-lived perennial, deep taproot, each plant can produce 100,000 seeds - most seeds fall near parent plant and ground disturbance can stimulate new growth.	<b>Mechanical/Manual:</b> Cut and remove seed head of mature plants, cut plant to ground level. <b>Chemical:</b> Treat basal rosette before it bolts.
<b>Nightshade, black (<i>Solanum nigrum</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Biennial/perennial, each nightshade plant is capable of producing up to 1,000 berries. Contained in each berry are 50 to 100 seeds, toxic.	<b>Mechanical/Manual:</b> Hand pull/dig small populations. Bag and remove plants that have berries wearing appropriate PPE. <b>Chemical:</b> If possible, treat in early March before it blooms. Treat with herbicide that is safe to use near a wetland and wait until the area is completely dry.
<b>Nightshade, climbing (<i>Solanum dulcamara</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial vine or semi-woody shrub, spreads by seed and root fragments, toxic	<b>Mechanical/Manual:</b> Manually control small infestations as early as possible making sure to remove all roots (wear gloves) from May - July (or when water levels allow). If growing in other vegetation and cannot be pulled out, cut at base and dig out roots. If roots cannot be removed effectively, herbicide may need to be used. <b>Chemical:</b> Treat from April - June.
<b>Orchard grass (<i>Dactylis glomerata</i>)</b>	N/A	Priority 4 (1 if at mitigation site within compliance period)	Persistent - cool season bunchgrass, one of the earliest species to grow in the spring, capable of strong summer growth when conditions are favorable, Seed matures in June to July, does not perform well on wet or poorly drained soils	<b>Mechanical/Manual:</b> Small populations can be hand pulled.
<b>Oxeye daisy (<i>Leucanthemum vulgare</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Short-lived perennial, Rosettes grow in clumps resulting in plants with multiple flowering stems, long seed dispersal period from September through March. New plants may propagate any month of the year (unmanaged small populations may grow quickly).	<b>Mechanical/Manual:</b> Mowing may stimulate shoot production and subsequent flowering. Small populations can be hand pulled (shallow root systems). Methods that repeatedly stress and/or attack the root system are especially effective - reseed disturbed areas. <b>Chemical:</b> Treat in March-May before it blooms. Re-treat in summer/fall as needed.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Pennyroyal (<i>Mentha pulegium</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial, seeds are produced abundantly from the numerous dense inflorescences from late spring through to autumn, toxic.	<b>Mechanical/Manual:</b> Grub single plants or small infestations before flowering, taking care to remove as many roots and stolons as possible (wear gloves). <b>Chemical:</b> Treat before flowering (if possible, with water levels) in March-April.
<b>Perennial ryegrass (<i>Lolium perenne</i>)</b>	D	Priority 4 (1 if site is within compliance period – discuss re-seeding plan)	Herbicide resistant, annual/biennial/short-lived perennial, reproduce by abundant seed production.	<b>Mechanical/Manual:</b> Mowing not effective (easily recovers). Small patches can be hand pulled. <b>Chemical:</b> Grass specific herbicide may be effective in early spring before it goes to bloom (March-April). Use glyphosate if site is too wet for grass specific but monitor for effectiveness.
<b>Poison hemlock (<i>Conium maculatum</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Biennial, germinates throughout the year, acutely toxic.	<b>Mechanical/Manual:</b> Toxic - minimize exposure by wearing gloves and taking frequent breaks when pulling or mowing large amounts of plants. Digging up small infestations and removing the entire taproot is effective throughout the year. Mowing is ineffective as plants will re-sprout, sending up new stalks in the same season mowing occurs. <b>Chemical:</b> Treat basal rosette, before it forms a stem and flowers in early spring (March/April) with 2% triclopyr.
<b>Prickly lettuce (<i>Lactuca serriola</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Annual or biennial, herbicide resistance, late germinating, taproot.	<b>Mechanical/Manual:</b> With gloves, remove entire taproot.
<b>Purple loosestrife (<i>Lythrum salicaria</i>)</b>	B	Priority 2 (1 if at a mitigation site within compliance period).	Perennial emergent aquatic plant. Spreads mainly by seed but also by stem and root fragmentation.	<b>Mechanical/Manual:</b> If the plants are in flower or seed, cut off and bag all flower stalks and seed heads. It is very difficult to pull the plants without dispersing the small, lightweight seeds. Brush off boots, clothes, before leaving the infested area. Pulling purple loosestrife by hand is easiest when plants are young from July - September. Remove as much of the root system as possible because broken roots may sprout new plants. All purple loosestrife plant parts, including flowers, seed heads, stems, leaves and roots must be securely bagged, and discarded in the trash or taken to a transfer station. <b>Chemical:</b> Can be treated when water levels are low and when flowers have been removed from July - August.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Queen Anne’s lace (<i>Daucus carota</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Annual or short-lived perennial. Wild carrot reproduces by seed. Estimates of seed production vary from 1,000 to 40,000 seeds per plant.	<b>Mechanical/Manual:</b> Hand-pulling or mowing, during the first year when the plants are 7 - 10 inches tall, can be effective.
<b>Rat-tail fescue (<i>Vulpia myuros</i>)</b>	N/A	Priority 4	Aggressive, early maturing, winter-growing annual grass. Fibrous root system is extensive.	<b>Mechanical/Manual:</b> Rat-tail fescue has shallow roots and can be controlled with tilling. Till in the Fall and manually remove seedling re-growth in small patches. May be too time consuming in large infestations. <b>Chemical:</b> Spray actively growing plants (EARLY Feb-Mar) before they go to seed only on sites with a clear restoration plan with re-seeding or sites within the compliance period.
<b>Reed canarygrass (<i>Phalaris arundinacea</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial, cool-season, rhizomatous. Can reproduce vegetatively by its rhizomes and rhizome fragments (most recurring populations), as well as sexually by its abundantly produced seed (relatively low rate of germination).	<b>Mechanical/Manual:</b> If reed canarygrass is mowed only once or twice per year, it actually stimulates additional stem production - mowing should be done in July and followed by herbicide treatment. Several layers of cardboard covered by 4 to 6 inches of wood mulch can shade out RCG - must be kept in place for over one year (over an entire growing season), even under inundation. <b>Chemical Removal:</b> Herbicide should be applied to foliage during the growing season and when water levels allow (when it's dry). Application in the PNW can occur in mid-summer (just prior to summertime dormancy) or preferably in late fall (just prior to frost and wintertime dieback). It is recommended to apply herbicide at these times, since it is speculated that these are the times of year when RCG is most actively translocating carbohydrates (along with the herbicide) down into the root system. New growth can be treated in March - April if water levels allow.
<b>Rush skeletonweed (<i>Chondrilla juncea</i>)</b>	B	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant)	Perennial, grows in open disturbed roadsides especially sandy areas of Rivergate. Plants spread by seed with each mature plant producing between 1,500 and 20,000 seeds. Rush skeletonweed also spreads by shoot buds found along lateral roots and from shoot buds found near the top of the main root. It also grows from root fragments in the soil.	<b>Mechanical/Manual:</b> Hand-pulling can work for small infestations. Areas must be controlled 2 to 3 times per year for 6 to 10 years to remove seedlings and re-sprouting roots. Removal of deep tap roots is easiest when soils are damp (February - November). <b>Chemical:</b> Treat larger populations with 2% triclopyr + 0.5% aminopyralid (Milestone) from June - July.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Salsify (<i>Tragopogon dubius</i>)</b>	N/A	Priority 5	Monocarpic (the plant dies after seed production - usually after two to four years) perennial dependent upon seed production to maintain and spread populations. In Oregon, western salsify was shown to be one of the most important plant foods of blue grouse ( <i>Dendragapus obscurus</i> ) during the fall.	<b>Mechanical/Manual only:</b> Small infestations of western salsify can be hand-pulled or dug. Older plants are difficult to hand pull because of the taproot. Note that prior to bolting and flowering, the leaves can be readily mistaken for grass.
<b>Scotch broom (<i>Cytisus scoparius</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 2 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial shrub, each seed can remain viable for over 30 years.	<b>Mechanical/Manual:</b> Hand pull and dig up plants for small infestations from October - June. Soil disturbance can cause a flush of seed germination so re-seed and re-plant after manual removal or minimize soil disturbance as much as possible. Cutting plants close to the ground when they are drought stressed, can provide control on plants with stems wider than 2 inches from July - September, but make sure to monitor plants for resprouts and control. <b>Chemical:</b> Foliar spray while actively growing and before seed pods mature (early March - June) with 2% triclopyr or glyphosate. Basal bark treatment (any time of year) and cutting stems and painting the fresh cut with herbicide can also provide effective control.
<b>Shining Crane's-Bill (<i>Geranium lucidum</i>)</b>	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Low-growing annual forb, reproduces by seed, flowers from April-May to July and seeds mature and spread usually from late June to early July.	<b>Mechanical/Manual:</b> Small patches can be carefully hand-pulled or dug out before they are in seed but take care to remove as much root and stem as possible to prevent plants from re-sprouting. Large areas can be controlled by covering with a deep layer of mulch, or for better results, cover with cardboard first, then a thick layer of wood chip mulch. <b>Chemical:</b> Treat before flowering (late March through April) with 2% triclopyr.
<b>Sowthistle (<i>Sonchus asper</i>)</b>	N/A	Priority 4	A deep-rooted perennial herb	<b>Mechanical/Manual:</b> Manual control should be limited to small, isolated populations of seedlings or small plants (6 to 8 or more if plants are very small). Dig as deep as you can, remove, collect and bag as much of the root and rhizome material as possible. Rhizomes remaining in the soil will likely regenerate and produce new plants in subsequent seasons. <b>Chemical:</b> Apply to actively growing plants before the bud stage of growth (EARLY - Feb-March).
<b>Soft brome (<i>Bromus hordeaceus</i>)</b>	N/A	Priority 4	Cool season (grows primarily in spring and fall), annual, produces large numbers of seeds, needs full sun (plant tall, native vegetation to shade).	<b>Mechanical/Manual:</b> Small infestations can be uprooted before flowering. Will rapidly re-grow after mowing and can be eliminated with shade. Do not mow or till. <b>Chemical:</b> Treat with glyphosate while actively growing in early spring (March) and re-treat in Fall (Sept). Re-seed with forb only pollinator mix in the Fall. Re-treat in Fall with a grass specific.

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<b>St. Johns wort</b> ( <i>Hypericum perforatum</i> )	C	Priority 4	Perennial forb. It has long slender “runners” or stems growing at the soil surface or just below the ground. It also has aggressive rhizomes. Produces large amounts of persistent seed. One plant can produce up to 15,000 to 34,000 seeds per year that are viable for up to 30+ years.	<b>Mechanical/Manual:</b> Pulling should only be considered an option on new or small infestation sites. Repeated pulls will be necessary to ensure removal of the whole plant and any lateral roots. Do not leave plants at the site since vegetative growth will occur, and the seed source will remain. <b>Chemical:</b> Treat before it goes to seed in March-April.
<b>Sweet vernal grass</b> ( <i>Anthoxanthum odoratum</i> )	D	Priority 4	Perennial, caespitose, contains coumarins (allelopathic), prolific seed production (remains viable 5 years in soil), roots are relatively shallow.	<b>Mechanical/Manual:</b> Hand pulling is an effective method of control. Mowing before seeds have matured may reduce or delay seed set but if moisture is adequate the plants will regrow and flower again. <b>Chemical:</b> Treat with glyphosate before flowering (March- April). <b>Alternative/Natural Chemical Removal:</b> Plant essential oils were the most effective natural based treatment for controlling velvet grass, sweet vernal grass and common cats ear (>86%) (Exploring alternative methods for vegetation control and maintenance along roadsides; Steve L. Young; 2002).
<b>Tall fescue</b> ( <i>Festuca arundinacea</i> )	N/A	Priority 4	Cool season (grows primarily in spring and fall), long-lived, perennial, bunchgrass (technically rhizomatous) native to Europe. Spreads primarily by seed to form dense, solid stands. Roots 2-3’ deep.	<b>Chemical:</b> Treat with glyphosate before flowering (March- April) or in Fall (September - October).
<b>Tall oatgrass</b> ( <i>Arrhenatherum elatius</i> )	C	Priority 2 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Tall (up to 180 cm), usually erect, tussock-forming, perennial grass.	<b>Mechanical/Manual:</b> Mow in late spring or early summer, when <i>Arrhenatherum</i> is flowering. Mow for multiple years to be effective. Re-seed with <i>Danthonia californica</i> .

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Tansy, common (<i>Tanacetum vulgare</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Aromatic perennial with 2 to 6-foot-tall purplish stems topped with dense clusters of bright yellow "button" flowers. Reproduces by seed and rhizomes, often forming dense vegetative colonies.	<b>Mechanical/Manual:</b> Small infestations can be dug up in April-May on rainy days when the ground is wet. If manually removing when plants are in bloom, bag and dispose of the entire plant in landfill. Follow-up is important to control regrowth from severed roots. Roots break off easily and re-sprout with new plants. Minimize disturbance to avoid creating more opportunities for seed germination. <b>Chemical:</b> Apply selective broadleaf herbicide or Glyphosate in the spring (April-May) before plants bloom. Re-treat in the fall (September-October).
<b>Tansy, ragwort (<i>Senecio jacobaea</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Biennial or sometimes a winter annual or perennial herbaceous plant. Disturbance, such as mowing, may cause the plant to behave as a perennial, appearing year after year. Tansy ragwort usually reproduces by seed, although it can also reproduce vegetatively.	<b>Mechanical/Manual:</b> Small infestations can be controlled manually by pulling up the entire plant, including its roots in March - May before plants go to flower. If in flower, the entire plant needs to be bagged and disposed on in a landfill. Do not mow. You can also dig up rosettes in September - October. <b>Chemical:</b> Treat in spring (March-May) before any flowers appear; the earlier the application in relation to plant growth, the better the control. Re-treat in Fall after rain begins seed germination (September-October).
<b>Thistle, bull (<i>Cirsium vulgare</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Biennial thistle. Rosettes form in first year, flowering stems the second. Basal rosettes form and continue to grow until winter. Bull thistle does not reproduce vegetatively and does not have rhizomes.	<b>Mechanical/Manual:</b> Bull thistle can be dug up with a shovel any time of year preferably while raining and the soil is wet. Removing the top couple of inches of root is usually sufficient to kill the plant, especially after it has bolted (produced stems). If manually removing while in bloom, flowering stems should be collected and destroyed to keep them from forming viable seed. <b>Chemical:</b> Bull thistle only reproduces by seed so prevention of seeding and taking care not to spread seeds are key to preventing new infestations. Treat with 2% triclopyr or 0.2% aminopyralid in March-May before it goes to flower.
<b>Thistle, Canada (<i>Cirsium arvense</i>)</b>	C	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	A colony-forming, aggressive perennial, that spreads primarily by its creeping root system. Separate male & female plants. Individual plants live about 2 years but are continually replaced by new shoots from adventitious buds on its extensive root system. This can result in infestations composed entirely of genetically identical plants of one sex. Most seeds germinate within a year, but buried seed can stay dormant for up to 20 years.	Most of the biomass of Canada thistle is below ground; therefore, killing the roots is the only effective control method. <b>Mechanical/Manual:</b> Only implement if multiple years of manual removal can be completed and if appropriate timing can be achieved. Regular, repeated mowing through the growing season can gradually deplete the food energy stored in the root system but only if done correctly for multiple years. <b>Chemical:</b> Treat with 2% triclopyr or 0.2% aminopyralid from March - May before it goes to bloom.



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<b>toadflax (<i>Linaria vulgaris</i>)</b>	D	Priority 4	This perennial plant makes seed, but reproduction is primarily by sprouting from its extensive, creeping root system (rhizomes) – 2-3-week-old seedlings can produce creeping roots. The ability of this plant to form large colonies allows it to crowd out other vegetation. Despite its prolific seed production (5000 seeds/stem) and long viability (up to 10 years), germination rates are often very low – less than 10%.	<b>Mechanical/Manual:</b> Only implement if the population is small and the soil allows complete removal of root system. Can be done any time of the year, plan for rainy days if possible. Thorough hand-pulling can be effective in soft soils where the roots can be removed easily. Repetition is required to deplete the seed bank and root pieces. Mowing can assist by starving the roots but only if done regularly. <b>Chemical:</b> Treat from March - May before it goes to bloom. Re-treat in the Fall.
<b>Tree-of-heaven (<i>Ailanthus altissima</i>)</b>	B	Priority 2 - discuss with mitigation management team if the tree is >6inch DBH	Rapidly growing deciduous tree native to China. Produces an abundant amount of seeds, crowds out native species with its dense thickets and secretes a chemical into the soil that is toxic to surrounding plants.	<b>Mechanical/Manual:</b> Weed wrench (or dig up) trees <2" DBH (December-June). <b>Chemical:</b> Frill only (cut stump/girdle ineffective on this species) (June - November).
<b>velvet grass (<i>Holcus lanatus</i>)</b>	D	Priority 1 if population is small or at a mitigation site within compliance period, Priority 3 if established on site (discuss multi-year plan for treatment/re-plant).	Perennial, roots are fibrous and deep, reproduces by seed. Seed can germinate immediately or remain in seedbank for 10 years.	<b>Mechanical/Manual:</b> May not be feasible unless the population is very small, and plants can be completely removed. Mowing can stimulate growth and reproductive potential. Plants can be dug up but it's usually not practical for large populations. Burning has shown to be effective. <b>Chemical:</b> Grass specific herbicide can be applied in early-mid March (if able to identify) as grass is just beginning to actively grow. Glyphosate should be used in April-May before grass begins to bloom.
<b>White waterlily (<i>Nymphaea odorata</i>)</b>	C	Only known to be located at Ramsey Lakes - treat each year.	White waterlily is a perennial aquatic plant native to the eastern half of North America. It thrives in shallow, still water environments such as lake margins, ponds and slow-moving streams where it can form dense monospecific stands.	<b>Chemical:</b> Each spring (around April) new shoots grow from rhizomes until they reach the surface of the water. They continue to grow to the surface into August. To avoid missing plants or returning to the site more than needed, treat in July. Repeat foliar treatments using a 3% Glyphosate and 1% surfactant solution.

Species	*Rank	**Priority	Plant Information	***Control Methods
<b>Yellow-flag iris (<i>Iris pseudacorus</i>)</b>	B	Priority 2	Yellow flag iris is an invasive aquatic plant that spreads by seed and rhizomes.	<b>Mechanical/Manual:</b> Small stands of yellow flag iris can be controlled through hand removal in April - May when in bloom. Plants should be dug, taking care to remove as many rhizomes as possible. Plant parts should be disposed of. Remove seed pods from August - September. <b>Chemical:</b> Glyphosate can be applied to actively growing plants in September.

\*City of Portland Ranking:

Rank 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.

Rank 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.

Rank 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.

Rank 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 the ecosystems with native species and therefore, have less impact on the system than the A, B, and C species.

Rank W — Watch species. Species occurrence and distribution should be monitored for presence and/or to determine the level of invasiveness in the region.

\*\*Priority - Prioritize species from (1) being most important to target/prioritize to (5) least important species to target/prioritize. If possible (considering budget and time available), always prioritize mechanical removal methods before chemical. Plant information collected from a variety of local, State and Federal agencies including: CalFlora, King County, Oregon State University, CWMA Integrated Weed Maintenance Calendar (2020), ODA, Clackamas SCD, USDA, OISC, US Forest Service, ODFW and City of Portland.

\*\*\*Mechanical control of plants should be prioritized when possible. Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. Follow all label directions. Maintenance suggestions collected from a variety of local, State and Federal agencies including: CalFlora, King County, Oregon State University, CWMA Integrated Weed Maintenance Calendar (2020), ODA, Clackamas SCD, USDA, OISC, US Forest Service, ODFW, City of Portland and experience of Port of Portland staff and contractors.

## **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 onto 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-emergent and Pre-emergent Herbicides**

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

#### **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

- All contractors will have a licensed pesticide applicator on-site during application
- 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
- 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 Conservation Ecologist 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

- 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 Conservation Ecologist on the day of the incident.
- Herbicide application will be sent monthly to the Conservation Ecologist.
- If any wildlife, including fish, are found dead, sick, or injured as a possible result of the herbicide application activities, notify the Conservation Ecologist 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:

- 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. 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. 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 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. The droplet size can influence the effectiveness of an herbicide as well as the amount of drift. 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 the 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.

##### **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.

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

This section describes general best management practices with regard to preventing the spread of invasive plant populations, monitoring the control of established invasive species and protecting wildlife during site management activities. 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.
- Report new species at once. If a new weedy species appears on any of the Port's property, notify the Conservation Ecologist. 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 all State and Federal regulations.

### 5.2.2 Monitoring of Invasive Plants Treated with Herbicides

During monitoring events and bimonthly site visits, Port staff assess each mitigation site and develop maintenance recommendations that are later discussed with the maintenance contractor.



Port staff and maintenance contractors track the efficacy of herbicide treatments through a qualitative monitoring process. Effects of herbicide application should be visible within two to four weeks following application to an herbaceous invasive weed population. At that point, a Port employee or maintenance contractor inspects the previously treated plants. Specific observations pertaining to the success of the herbicide application is 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. Ideally, “before” and “after” meter-square plot data along fixed transects would provide more accurate percentages, but would be so labor-intensive, as to be impractical. This method would also put the investigators in close proximity to 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 modified. 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 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 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.

The primary goals of the Port’s wildlife avoidance procedure are to:

- 1.** If appropriate, conduct wildlife surveys prior to maintenance activities to determine potential wildlife impacts that may occur during a project. Determine if any wildlife-

related permits are required such as a Capture Handle Transport and Relocate (CHTR) permit through ODFW.

**2.** Incorporate wildlife avoidance strategies in the planning process of maintenance projects.

**3.** Avoid impacts to listed species during maintenance activities and to the best of our ability, and within reason, avoid impacts to other native wildlife during construction activity.

Port Natural Resources staff will create specific wildlife avoidance strategies for the project based on wildlife observed on-site. Avoidance strategies may include planning a project to avoid critical lifecycle stages of encountered species or, if a project cannot be scheduled around these critical lifecycle stages, then suggestions will be made for avoidance during maintenance activity (Figure 1). Note that State and Federally listed species, State Protected Wildlife and birds protected under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act must be protected by law (Figure 2). Strategies will be provided to the project manager.

**Table 3. Critical Life Cycle Stages for Sensitive Species in Portland, Oregon**

Month	Bird	Turtle	Amphibian	Fish	Bat	Mussel
January	<b>Early Nesting Season</b> If early nesting species are present on site, follow guidelines for “Primary Nesting Season”.	<b>Juvenile turtles underground in their nest</b>	<b>Egg masses in water</b> Activities that should be avoided during this time include: In-water work* within a suitable water body** if egg masses are identified on site.	<b>Permits may be required for any in-water work*</b>	In winter, <b>avoid places where bats hibernate</b> , because awakening a bat depletes energy reserves. A bat can lose 10 to 30 days’ worth of fat reserves from being awakened and then is at risk of starvation before spring arrives. Support protecting caves from human use when bats are present.	A. californiensis / A. nuttalliana are gravid during all months except from late July to mid-October. Avoid impacts to host fish, channel modification, dredging, restoration activities, contamination, sedimentation, nutrient enrichment, water withdrawal, diversion and thermal pollution in areas with recorded populations of freshwater mussels.
February						
March		<b>Juvenile turtles moving from nest to water</b> Activities that should be avoided during this time include: Any earth-disturbing activities (digging, earth removal, fill placement, trenching etc.) within a mile of a suitable water body ** and in-water work* within a suitable water body** if nesting turtles are identified on site.				
April	<b>Primary Nesting Season</b> Activities that should be avoided during this time include: mowing, weed-whacking, tree removal or maintenance, ground disturbance etc.					
May		<b>Adult female turtles nesting on land</b> Activities that should be avoided during this time include: Any earth-disturbing activities (digging, earth removal, fill placement, trenching etc.) within a mile of a suitable water body** and in-water work* within a suitable water body if nesting turtles are identified on site. Avoid any activity in known turtle nesting locations.	<b>Larvae (tadpoles) in water</b> Activities that should be avoided during this time include: In-water work* within a suitable water body** if egg masses are identified on site.			
June					In summer, <b>avoid disturbing nursery caves or roosts</b> . Frightened mother bats may drop or abandon their babies	
July			<i>Complete metamorphosis in early August</i>			
August						
September		<b>Eggs and juvenile turtles underground in their nest</b>				
October						
November						
December						See “Winter” advice

**\*In-water work** - Activities that involve equipment and/or personnel working below the Ordinary High-Water Mark (OHWM). Permits may be required for any in-water work.

**\*\*Suitable Water body** – Any water body that supports a confirmed population of turtles/amphibians as determined by a qualified biologist.

State and Federally listed species that have been encountered on Port of Portland property as of March 2023. Note that this table does not include every listed species that may be encountered on a project site and listing status may change over time. Fish species are not included on this list. Please review current listings before recommending actions for a project.

**Table 4: State and Federally Listed Species Observed on Port Property**

SPECIES	STATE*	FEDERAL**	ORBIC***	Port sites where species have been encountered
<b>REPTILES</b>				
Western Painted Turtle ( <i>Chrysemys picta bellii</i> )	SC, CS PW	-	2	Multiple mitigation sites
Western Pond Turtle ( <i>Actinemys marmorata</i> )	SC, CS, PW	SOC	2	Ramsey Lakes
<b>AMPHIBIANS</b>				
Northern Red-legged Frog ( <i>Rana aurora</i> )	SV, CS, PW	SOC	4	TRIP, Randall, West Hayden Island, Government Island, McGuire Island
<b>BIRDS (note that most birds are protected under the Migratory Bird Treaty Act)</b>				
Acorn Woodpecker ( <i>Melanerpes formicivorus</i> )	SV, CS	SOC	4	Solar World Site HIO airfield
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	SV	BGEPA	4	Government Island (nesting), West Hayden Island (nesting)
Burrowing Owl ( <i>Athene cunicularia hypugaea</i> )	SC, CS	SOC	4	PDX airfield
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )	OC	-	4	Vanport Wetlands, West Hayden Island, TRIP
Olive-sided Flycatcher ( <i>Contopus cooperi</i> )	SV, CS	SOC	4	Buffalo, Vanport Wetlands
Peregrine Falcon ( <i>Falco peregrinus anatum</i> )	SV, CS	-	2	Government Island, West Hayden Island, Vanport Wetlands
Pileated Woodpecker ( <i>Dryocopus pileatus</i> )	OC	-	4	Multiple mitigation sites
Purple Martin ( <i>Progne subis arboricola</i> )	SC, CS	SOC	2	Ramsey Lakes, Company and East Lake (nesting), Leadbetter, West Hayden Island, Government Island (nesting), Vanport Wetlands (nesting)
Streaked Horned Lark ( <i>Eremophila alpestris strigata</i> )	SC, LT, CS	LT	1	Rivergate, PDX; GVB, TRIP, TTD (winter forage), Sandy island
Western Bluebird ( <i>Sialia Mexicana</i> )	ST, CS	-	4	Government Island
Western Meadowlark ( <i>Sturnella neglecta</i> )	SC, CS	-	4	West Hayden Island, Government Island, TRIP, West Sundial Wetlands, Rivergate
White-breasted Nuthatch ( <i>Sitta carolinensis aculeata</i> )	ST, CS	-	-	West Hayden Island, Vanport Wetlands, TRIP, Randall
Willow Flycatcher ( <i>Empidonax traillii</i> )	SC, CS	SOC	4	West Hayden Island, TRIP, Vanport Wetlands, Government Island, Buffalo and Elrod
Yellow-breasted Chat ( <i>cteria virens auricollis</i> )	SC, CS	SOC	4	West Hayden Island, TRIP, Government Island
<b>MAMMALS</b>				
California Myotis ( <i>Myotis californicus</i> )	SV, CS, PW	-	4	West Hayden Island, Elrod
Hoary Bat ( <i>Lasiurus cinereus</i> )	SV, CS, PW	SOC	4	West Hayden Island, Leadbetter, Government Island, PDX – OANG Base
Long-legged Myotis ( <i>Myotis volans</i> )	SV, CS, PW	SOC	4	West Hayden Island, Leadbetter
Little Brown Myotis ( <i>Myotis lucifugus</i> )	PW	-	4	Government Island, West Hayden Island, Elrod

SPECIES	STATE*	FEDERAL**	ORBIC***	Port sites where species have been encountered
Pallid Bat ( <i>Antrozous pallidus</i> )	CS, PW, SV	SOC	2	West Hayden Island
Western Red Bat ( <i>Lasiurus blossevillii</i> )	PW			West Hayden Island
Silver-haired Bat ( <i>Lasionycteris noctivagans</i> )	SV, CS, PW	SOC	4	West Hayden Island, Elrod, Government Island
Western Small-footed Myotis ( <i>Myotis ciliolabrum</i> )	PW	SOC	4	West Hayden Island
Yuma Myotis ( <i>Myotis yumanensis</i> )	PW	SOC	4	West Hayden Island, Government Island, McGuire Island
<b>INVERTEBRATES</b>				
California Floater Freshwater Mussel ( <i>Anodonta californiensis</i> )	CS, PW	SOC	2	East and Company Lake

**STATE STATUS\***

LE Listed as an Endangered Species  
 LT Listed as a Threatened Species  
 PE Proposed as an Endangered Species  
 PT Proposed as a Threatened Species  
 SC Sensitive – Critical  
 SV Sensitive – Vulnerable  
 CS Conservation Strategy Species  
 PW Protected Wildlife (Oregon Administrative Rule 635-044): Except as provided by Oregon statute or rule or letter of authorization, it is unlawful for any person to take, capture, hold, release or have in possession, either dead or alive, whole or in part, any wildlife listed as Protected Wildlife in the State of Oregon.

**ORBIC\*\*\***

ORBIC Oregon Biodiversity Information Center  
 1 Threatened or Endangered Throughout Range  
 2 Threatened, Endangered or Extirpated from Oregon, but Secure or Abundant Elsewhere  
 3 Review  
 4 Watch

Note: This list of species was compiled in March 2023 and includes species known to occur on Port mitigation sites and natural areas as of that date.

**FEDERAL STATUS\*\***

LE Listed as an Endangered Species  
 LT Listed as a Threatened Species  
 PE Proposed as an Endangered Species  
 PT Proposed as a Threatened Species  
 C Candidate for Listing as Threatened or Endangered  
 SOC Species of Concern - Taxa for which additional information is needed to support a proposal to list under the ESA  
 BGEPA Bald and Golden Eagle Protection Act  
 MBTA Migratory Bird Treaty Act

**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 items listed below before visiting any wetland mitigation site:

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

How to make Quat 256 mixture
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.

### 5.4.2 Directions:

1. ***Before leaving any NEW 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 ensure 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>

#### **USDA PLANTS Database**

The USDA hosts a plant identification site that provides standardized information about plant species including distribution maps and classification <https://plants.usda.gov>

#### **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/>

### **Inaturalist**

Inaturalist is an online social network of people sharing biodiversity information to help each other learn about nature. It is also a crowdsourced species identification system and organism occurrence recording tool. You can use it to record your own observations, get help with identifications, collaborate with others to collect this kind of information for a common purpose, or access the observational data collected by iNaturalist users. For a list of all Port mitigation site Inaturalist project pages see Appendix D.



## 5.6.2 Port of Portland Contacts

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

- **Sarah Wilson** (Conservation Ecologist) for questions regarding schedules, maps, monitoring, species identification, and wildlife issues  
Office: (503) 415-6527  
Mobile: (530) 588-4332  
sarah.wilson@portofportland.com
  
- **Carrie Butler** (Sr. Conservation Ecologist) Mitigation Program oversight  
Office: (503) 415-6319  
Mobile: (503) 928-1611  
carrie.butler@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 Sarah Wilson (530-588-4332) or Carrie Butler (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

- 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: <https://www.epa.gov/endangered-species/endangered-species-case-washington-toxics-coalition-v-epa>.
- 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: <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=2734>
- Oregon State Revised Statutes (ORS). 2003. Chapter 634- Pesticide Control. 2017 edition. Available at: [https://www.oregonlegislature.gov/bills\\_laws/Archive/2017ors634.pdf](https://www.oregonlegislature.gov/bills_laws/Archive/2017ors634.pdf)
- Peachey, E., editor. 2022. Pacific Northwest Weed Management Handbook [online]. Corvallis, OR: Oregon State University. <https://pnwhandbooks.org/weed> (accessed 31 March 2022).
- Shenk, Myron (editor). 2008. *Oregon Pesticide Safety Education Manual-A Guide to the Safe Use and Handling of Pesticides*. Oregon State University, Corvallis, Oregon. <file:///C:/Users/wilsos/Downloads/em8850.pdf>
- 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.

## SECTION 7 – PORT SITE MAPS

This section contains site-specific materials. The following aerial mitigation site maps show mitigation and enhancement site boundaries. 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:

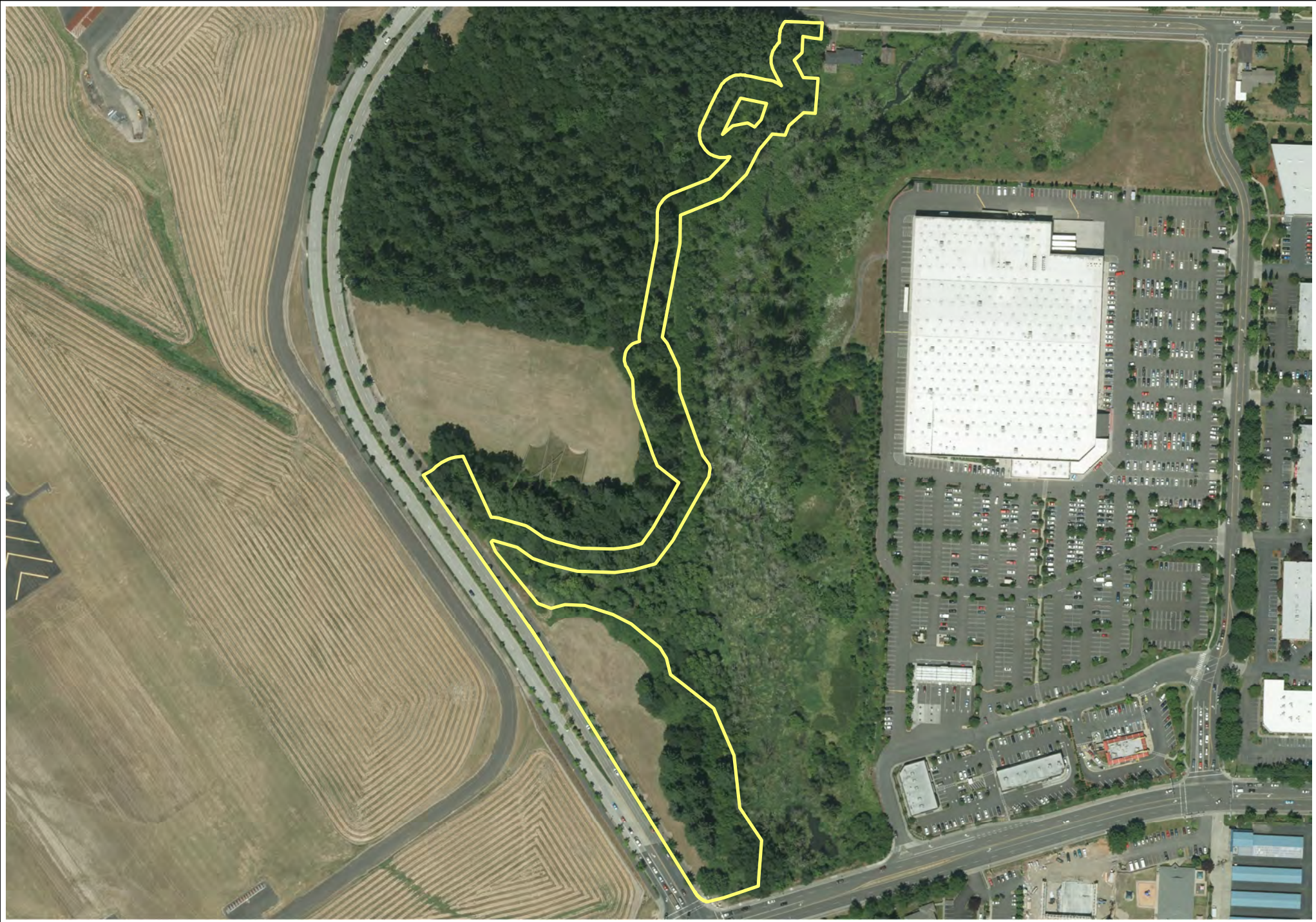
**Table 5: List of Exhibits**

1	Buffalo Street
2	Columbia Slough Revegetation sites, PDX-PIC
3	Columbia Slough Revegetation Sites, Rivergate
4	Dawson Creek
5	Elrod Road
6	Government Island Grassland I
7	Jewett Lake
8	McBride Slough
9	PDX Economy Lot E-Zone Conversion
10	PIC E-Zone
11	PIC Wetland Enhancement
12	Randall
13	Rivergate Enhancement Sites & Ramsey Lakes
14	Riverbank Projects on the Columbia (Honda Dock)
15	Riverbank Projects on the Willamette
16	Sandy Island Habitat Conservation Area
17	T-5 Powerline
18	TRIP Phase I, Company and East Lakes & Tree Mitigation
19	Vanport Wetlands
20	West Hayden Island Mitigation
21	West Sundial Wetlands
22	West Wye











 **PORT OF PORTLAND**



**Exhibit 5**  
**Elrod Road**

2016 Aerial Photo









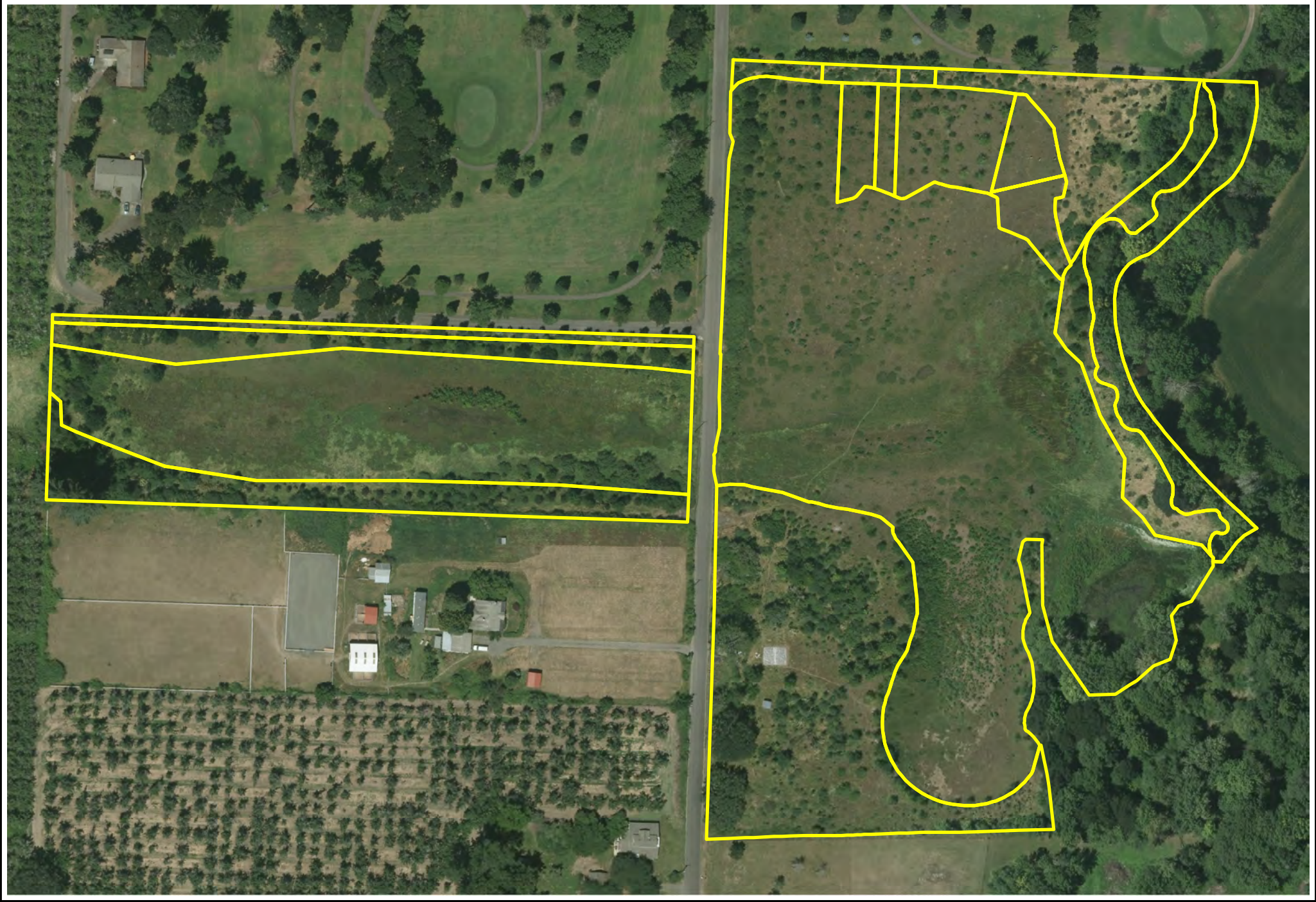






Phase 1

Phase 2











Berth 503

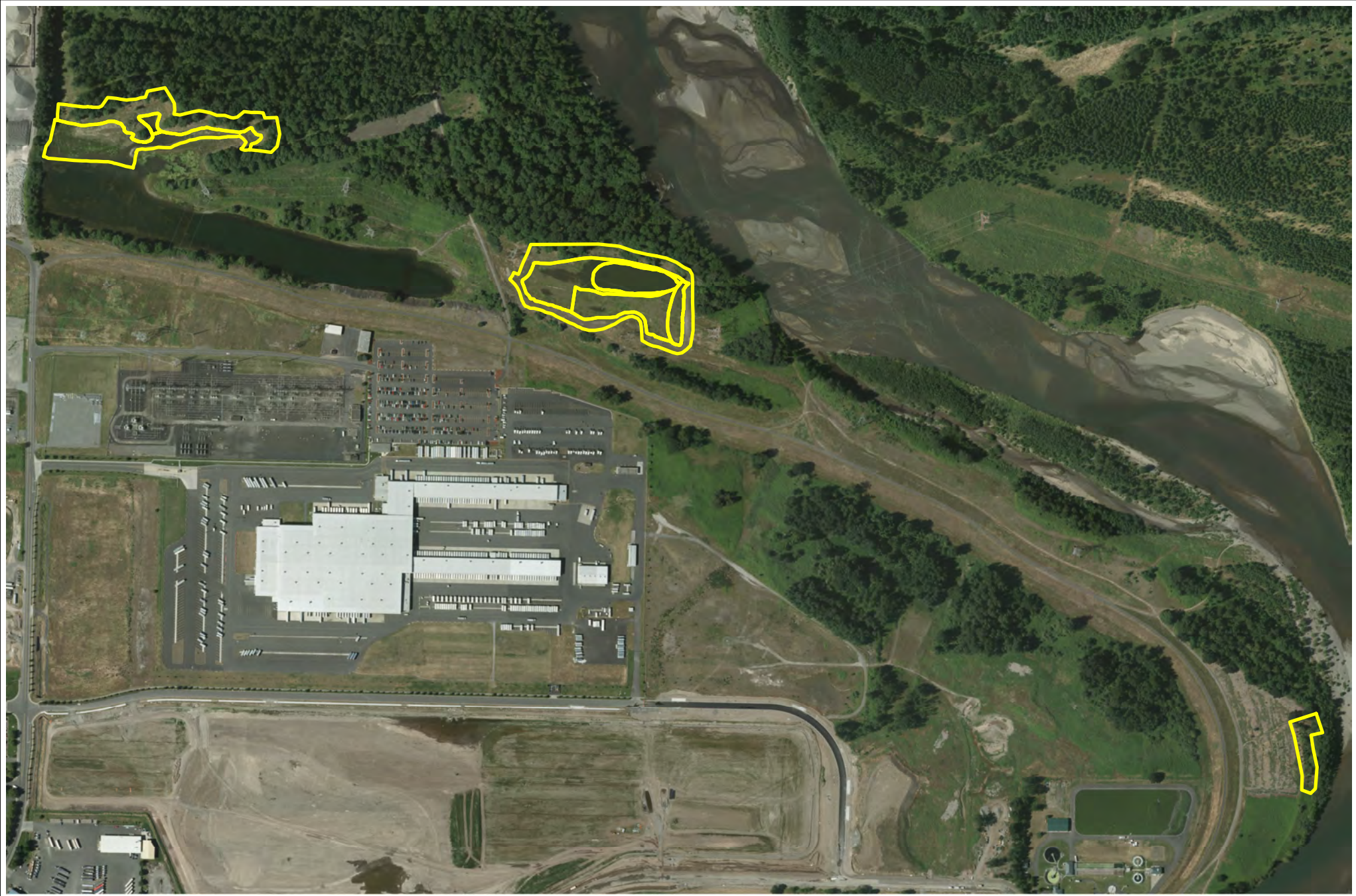
T-4, Pier 2 Greenway

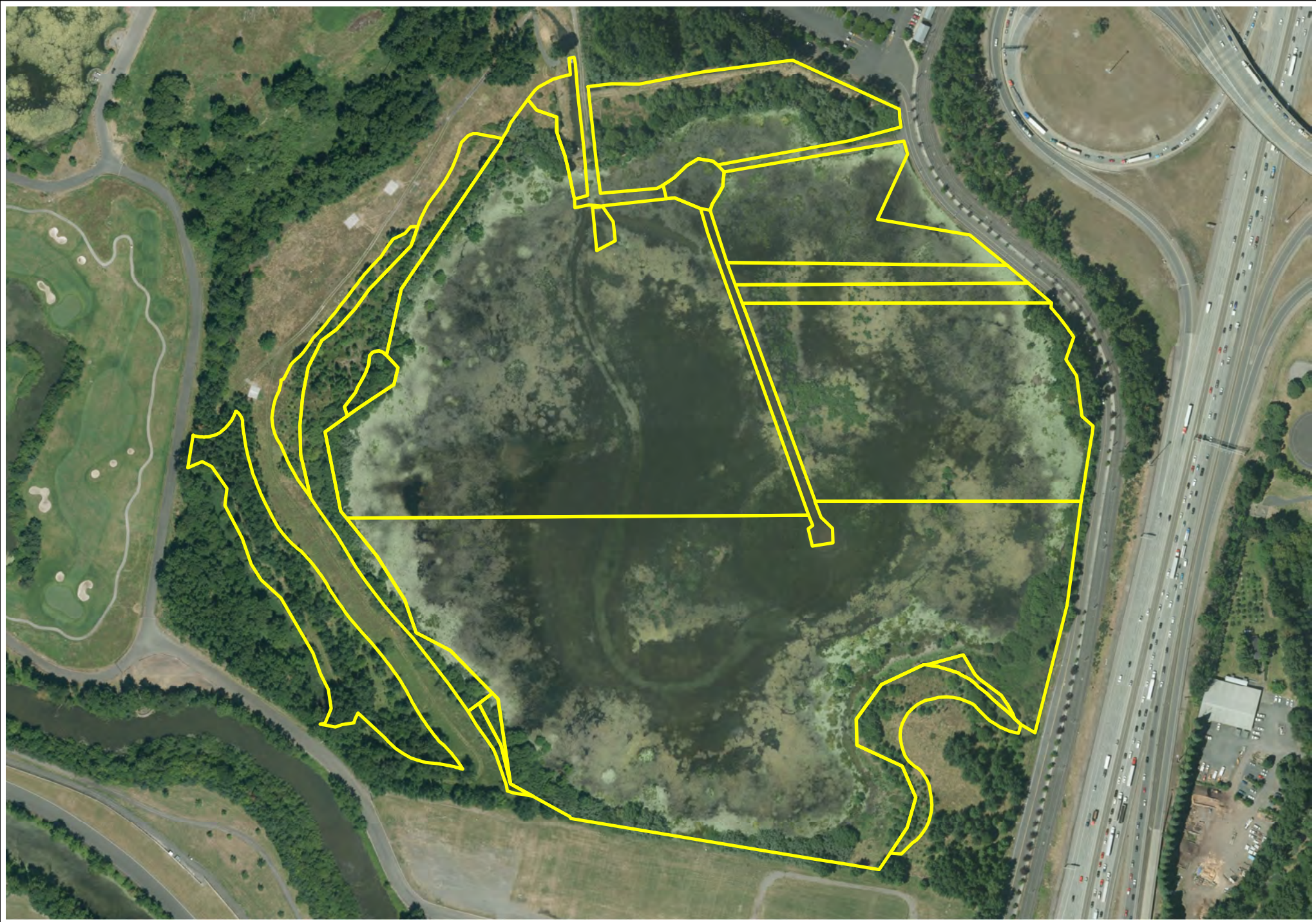
Berth 408

Toyota Riverbank

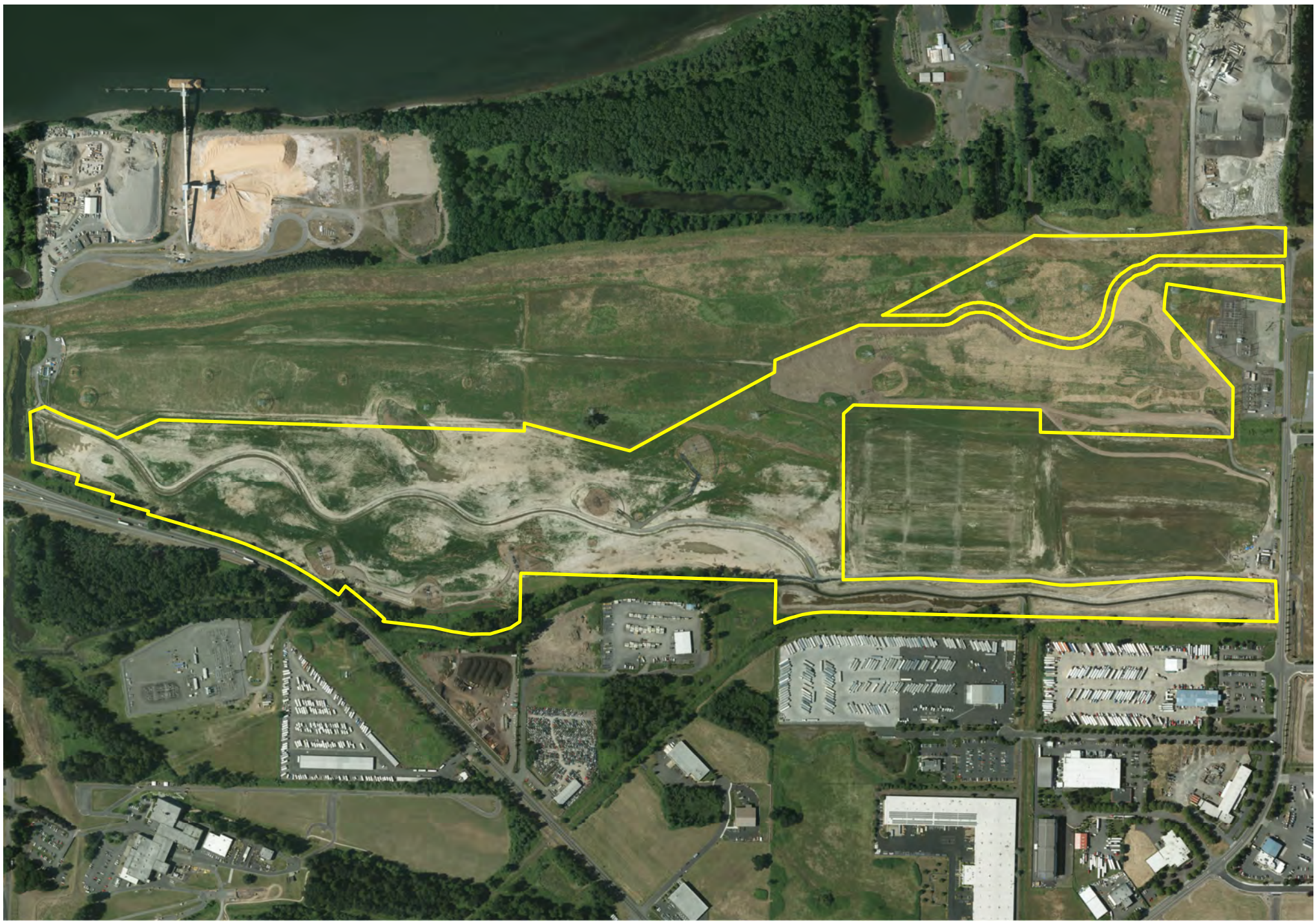




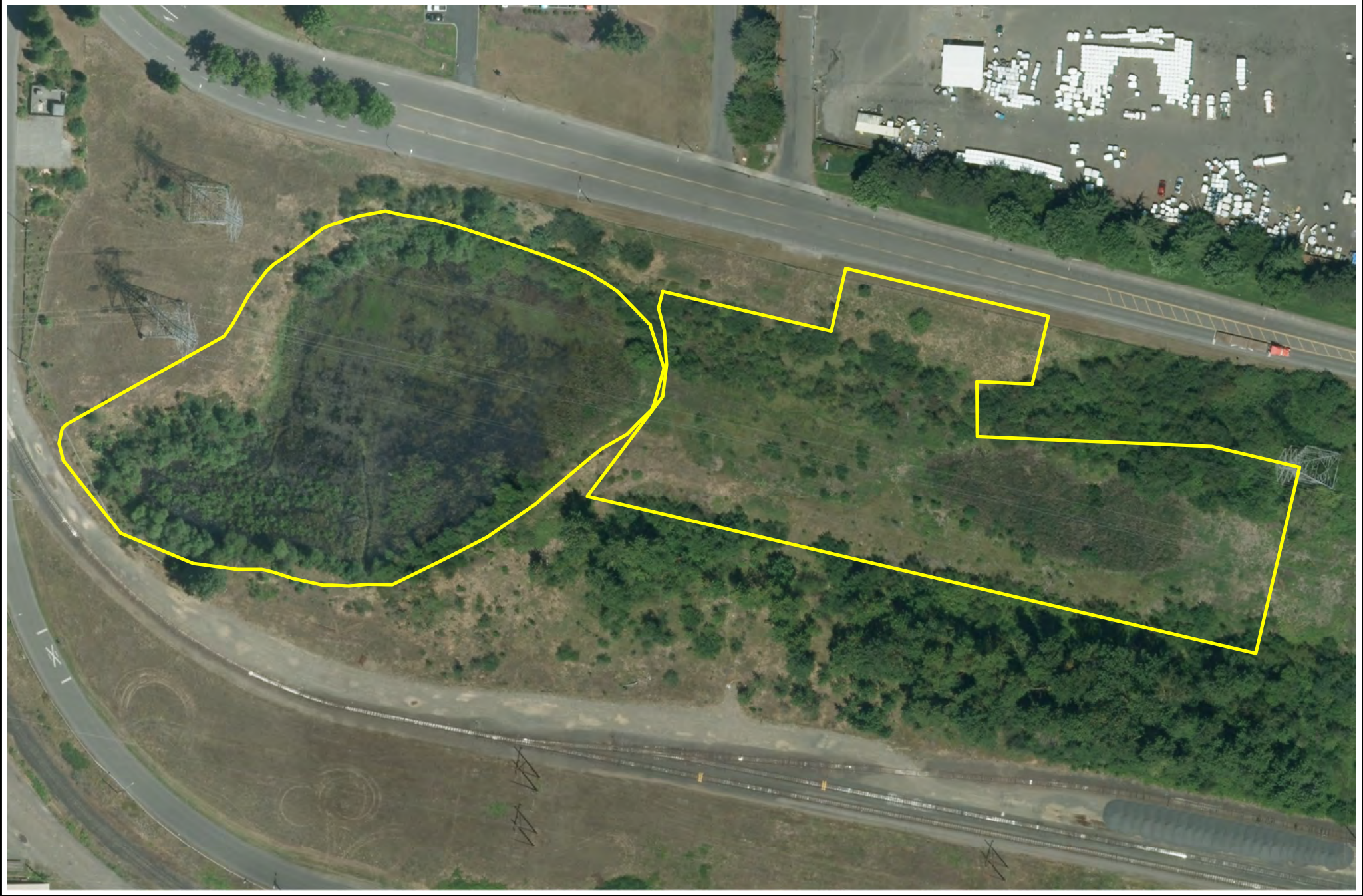




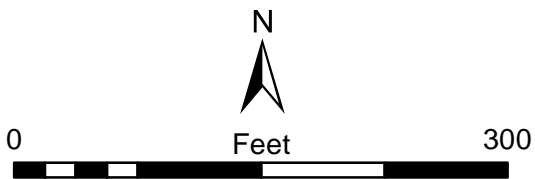








 **PORT OF PORTLAND**



**Exhibit 22**  
**West Wye**  
2016 Aerial Photo

## 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. 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\*

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

## Links to Port Inaturalist Project Pages

**1290 and 300 Trees:** <https://www.inaturalist.org/projects/1290-trees>

**Buffalo:** <https://www.inaturalist.org/projects/buffalo-mitigation-site>

**Dahl Beach:** <https://www.inaturalist.org/projects/dahl-beach>

**Elrod:** <https://www.inaturalist.org/projects/elrod-mitigation-site>

**Government Island:** <https://www.inaturalist.org/projects/government-island-grassland>

**IKEA PIC:** <https://www.inaturalist.org/projects/ikea-pic-enhancement-site>

**Leadbetter:** <https://www.inaturalist.org/projects/leadbetter-mitigation-site>

**N&S Slough:** <https://www.inaturalist.org/projects/n-s-slough-mitigation-site>

**PIC/PDX Enhancement and Mitigation:** <https://www.inaturalist.org/projects/pic-pdx-enhancement-and-mitigation-sites>

**Ramsey Lakes:** <https://www.inaturalist.org/projects/ramsey-lakes>

**Randall:** <https://www.inaturalist.org/projects/randall-mitigation-site>

**T5 and West Wye:** <https://www.inaturalist.org/projects/t5-and-west-wye-mitigation-sites>

**TRIP Phase I – Company and East Lake:** <https://www.inaturalist.org/projects/trip-phase-i-east-and-company-lake>

**TRIP Phase II – West Sundial Wetlands:** <https://www.inaturalist.org/projects/trip-phase-ii-iii-mitigation-site>

**Vanport Wetlands:** <https://www.inaturalist.org/projects/vanport-wetlands>

**West Hayden Island:** <https://www.inaturalist.org/projects/west-hayden-island>

