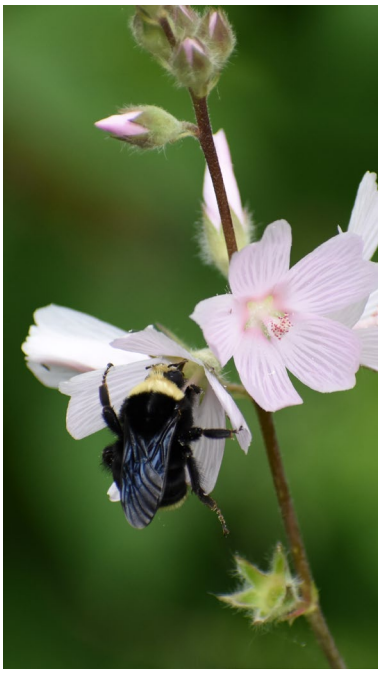


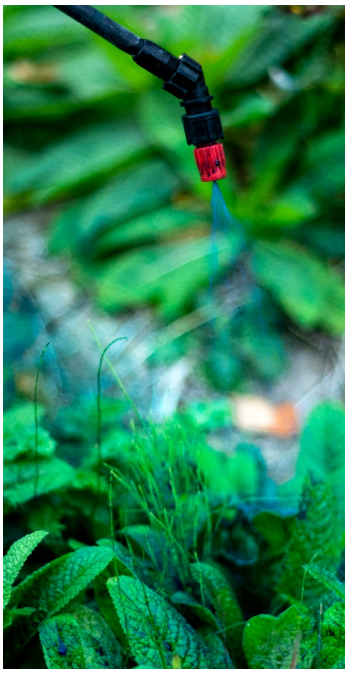
INTEGRATED PEST MANAGEMENT PLAN

UPDATED NOVEMBER 2026









Clean Water Services

Clean Water Services
2550 SW Hillsboro Highway
Hillsboro, Oregon 97123
cleanwaterservices.org

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INTRODUCTION

Clean Water Services (CWS) and its co-implementers work together to protect and enhance water quality in the Tualatin River Watershed in support of the Clean Water Act and Endangered Species Act. Additionally, CWS and co-implementers are required by the Storm Water Management Plan (SWMP) under the Municipal Separate Storm Sewer System (MS4) permit to reduce the discharge of pollutants to the stormwater system to the maximum extent practicable from properties they own or operate, in part by implementing a management program to control and minimize the use and application of pesticides, herbicides, and fertilizers.

CWS developed, distributes, and annual updates this Integrated Pest Management (IPM) plan to meet this permit requirement, and co-implementers may use this document or their own IPM programs to ensure compliance. The IPM provides effective and economical approaches to pest management based on the life cycles of pests and their interactions with the environment. The goal of the IPM is to minimize possible hazards to people, property, and the environment. The IPM is appropriate for Tualatin River Watershed land managers, and supports the Oregon Department of Environmental Quality's (DEQ) Pesticide Application General Permit (PAGP 2300-A) which first took effect October 31, 2011. The renewed permit went into effect July 18, 2022, and is in effect through May 31, 2027.

INTEGRATED PEST MANAGEMENT

IPM reduces and minimizes the use of chemicals through avoidance of pests through cultural practices, prevention, early detection, and then careful evaluation of pests before a chemical option is selected.

This IPM plan is most effective in conjunction with measures that prevent the introduction or establishment of new invasive species. This approach supports a regional invasive species Early Detection-Rapid Response (EDRR) program led by the Tualatin Soil and Water Conservation District that emphasizes education, monitoring for early detection, and control or eradication of invasive species. See Appendices A and B for more about invasive species and EDRR.

IPM is based on the life cycles of pests and their interactions with the environment and manages pest damage while limiting the hazard to people, property, and the environment. The IPM provides evaluation tools and guidance in the use of physical, cultural, mechanical, biological, and chemical controls or a combination of means to manage pests and watershed health.

IPM best practices include:

- Know the pest.
- Use the most appropriate control technique or pesticide, starting with the least toxic.
- Set appropriate thresholds of where to use chemical treatments and chemical concentrations.
- Pay careful attention to the method and rate of application (as per labeling instructions).
- Maintain equipment and safely handle and dispose of materials.
- Stay educated on pest control techniques through licensure, professional associations, testing, and regulation of pesticides.

SELECTING IPM MANAGEMENT METHODS

The following factors should be considered during the selection of pest management methods and products.

Site characteristics

- Susceptibility to erosion and potential soil movement through runoff
- Intended use and function
- Feasibility of the method, given the area and scope of the problem
- Relative importance of expectations by the public of manicured versus natural areas
- Conditions such as soil type, grade, drainage patterns, and presence of surface water

Possible health and safety effects

- Short- and long-term toxicological properties and any other potential health effects of the materials or methods, both to the applicator and the public
- Equipment or method safety for both the operator and the public

Potential environmental effects

- Acute and chronic toxicity to non-target aquatic and terrestrial species
- Impacts on non-target organisms
- Impacts on federally listed threatened or endangered species
- Environmental effects from potential bioaccumulation
- Unintentional introduction or establishment of invasive species

Pesticide characteristics

- Possible residual effects, decomposition pathways, rates, and breakdown products
- Volatility and flammability
- Solubility, and surface and soil bonding characteristics of the product
- Ease of equipment cleaning after use
- Positive and negative synergistic effects of product combinations
- Previous pesticide applications to the site and treatment interval
- Possible development of pest resistance to a material

Short- and long-term financial consequences

- Material or method costs
- Application and labor costs
- Duration and quality of control
- Feasibility of continued use
- Costs associated with not treating, or delaying treatment

VEGETATION MANAGEMENT

Managing vegetation is an effective strategy of the IPM that minimizes chemical control of invasive plants. CWS and permit co-implementers have planted millions of native trees and shrubs in the Tualatin River Watershed that support water quality functions of healthy wetlands and riparian areas. Healthy native vegetation is also integral in the proper functioning of the many water quality facilities that intercept runoff from impervious surfaces. The revegetation strategies outlined in the Clean Water Service's Design and Construction Standards promote biological diversity, plant competition, and plant succession. Successful establishment of native vegetation supports control of non-native, invasive vegetation and includes a range of vegetation management practices.

Plants on the Invasive Species List (Appendix A) may be removed from water quality sensitive areas, vegetated corridors and water quality facilities without prior approval when their removal follows the IPM framework outlined in this document. Invasive plants not included in the IPM may also be removed but are not of primary concern at this time. Plants on the Invasive Species List that are part of developed landscaping do not need to be removed but should be replaced with native plants if they become unhealthy or die. Reporting non-native species in the Tualatin River Watershed is encouraged to support keeping the Invasive Species List current.

The characteristics considered for the Invasive Species List include:

- Potential to disrupt or displace native riparian plant communities
- Potential to harm aquatic and riparian resources
- Potential damage to sanitary and storm infrastructure
- Oregon Department of Agriculture listing

Proper timing can be critical to the effectiveness of vegetation management practices. The IPM Calendar in Appendix C provides recommendations based on local experience and research.

State and federal agencies designate particularly undesirable invasive plants as noxious weeds. Many harmful invasive plants are not yet listed as noxious weeds because the official designation process takes time. As part of its IPM strategy, Clen Water Services actively participates in the 4-County Cooperative Weed Management Area (4-County CWMA) and ongoing research to stay ahead of new invasive threats.

In Oregon, officially designated noxious weeds are listed on the Oregon Department of Agriculture's website. The

Oregon Invasive Species Council also maintains a list of the worst invasives on their website. More information can be found: Invasive Species Council: oregoninvasivespeciescouncil.org and ODA - Pest Alerts - Insects - State of Oregon: oregon.gov/oda/ippm/insects-spiders/Pages/pest-alerts.aspx

TURF PEST MANAGEMENT

The establishment and maintenance of healthy turf that resists weeds requires a proper site, good root zone conditions, optimum fertility levels, adequate irrigation, correct mowing practices, and other factors. CWS and co-implementers may use selective herbicides to reduce or eliminate weeds.

Turf health practices by CWS or its co-implementers that reduce pests include:

- Proper siting
- Site and soil preparation
- Drainage improvements
- Pruning of adjacent plants to increase sunlight penetration
- Proper selection of grass seed varieties
- Core aeration
- Overseeding
- Mulch mowing to leave clippings on site
- Mowing at proper height and frequency
- Proper irrigation practices
- Proper fertilization
- Application of selective broadleaf herbicides

Because the acceptable level of turf quality and tolerance of weeds varies with the site, the use of additional controls is based on evaluation of the location, public expectations, activities taking place on the turf, previous control attempts, and stresses placed upon the site. The management effort must consider and employ all applicable cultural and mechanical methods to reduce soil compaction, improve soil structure, increase drainage capacity, and encourage healthy and vigorous turf growth through proper fertilization. Only turf-labeled herbicides may be used.

Special Considerations for Turf

Because turf is widely used by children and pets, applicators of broadleaf herbicides must carefully follow the label directives to minimize any potential impact on these users. Each application should consider the factors outlined below.

Time of day: Apply during the best time of day to avoid public use, high temperatures, and wind. Generally, this would be early morning, which may require scheduling employees to spray before park users arrive. To minimize public inconvenience or concerns, applications may take several days.

Scheduling: Contact schools and departments to coordinate treatments and avoid recreation and athletic field uses, nearby school activities, and all anticipated uses.

Signage: Place signs around the perimeter to ensure adequate notice before users reach the site. Signs must remain in place to keep users out until sprayed surfaces are completely dry and re-entry requirements are met.

Season: Plan applications at the ideal time for turf weed control, typically during spring and fall when weed growth is active and turf stress due to dry or hot weather is reduced.

Drift: Minimize any possible drift to unintended areas and cease application during windy conditions. Boom sprayers may increase the potential for drift. Use of backpack sprayers, appropriate pressure, correct nozzles, and other techniques can reduce drift.

Targeted use: Spot spray instead of broadcast application, when possible, to minimize the volume of pesticide used.

Rodent control: Refer to guidance in VERTEBRATE PEST MANAGEMENT section.

VERTEBRATE PEST MANAGEMENT

Mole and Rodent Management

Rats, voles, moles, mice, gophers, and nutria (Myocastor coypus) are small mammals that can cause extensive damage to turf, buildings, facilities, infrastructure, stream banks, irrigation ditches, and native vegetation.

All non-lethal and lethal rodent and mole control methods must comply with local, state, and federal laws. Nutria are classified as unprotected Nongame Wildlife (OAR 635-044-0132) and may be removed without a license. Nutria and any other unprotected rodents may be trapped mechanically as long as traps do not present a safety hazard. It is recommended that traps are hidden from view to reduce hazards. No license is required for mechanical control. Rodenticides cause direct or indirect toxicity to non-target organisms—especially raptors, foxes, and coyotes—and may pose a threat to people with access to baited areas. A license may be required if using a Restricted Use Pesticide, applying any rodenticide as a commercial application on someone else's property, and in publicly accessible areas.

For nutria or other small mammal trapping services, contact Oregon Wildlife Services at 503.326.2346 or visit their website. A list of state-licensed Wildlife Control Operators is available from the Oregon Department of Fish and Wildlife on their site dfw.state.or.us or by calling 503.947.6000.

Beaver Management

Beaver (Castor canadensis) activity can damage trees and shrubs in wetland and riparian areas. Over time, beaver dams change the geomorphic character of stream and wetland environments, but they rarely influence flood elevations with the exception of clogging culverts or other infrastructure with debris. CWS supports the Oregon Plan for Salmon and Watershed guidelines, as follows:

- The construction and maintenance of dams by beavers is a natural process benefiting salmon and other fish and wildlife species by creating beneficial pool habitat and wetland habitat in many stream reaches.
- The goal of management efforts should be to maintain or improve the distribution and amount of beaver pond habitat without creating unacceptable risks of damage to other public and private resources.
- Lethal control is usually only a temporary solution. Beaver populations are at or near carrying capacity and removing a beaver only opens living space for a new beaver.

If a beaver dam affects drainage pipes or culverts and creates a substantial flood risk to a structure or other significant property damage, the affected property owner may remove or modify the beaver dam to restore flow. The Tualatin River Watershed Council Watershed Navigator Program offers assistance and resources. The property owner may also request assistance from the Oregon Department of Fish and Wildlife (ODFW), which has the authority to regulate the trapping, hunting, and transportation of beavers. Beavers may be taken during trapping season by a licensed trapper or by the landowner with a landowner trapping license. Lethal control outside the trapping season requires a kill permit issued by ODFW.

For beaver trapping services, contact Oregon Wildlife Services by calling 503.326.2346 or visit their website. A list of state-licensed Wildlife Control Operators is available from the ODFW at 503.947.6000 or on their website. For co-existence information and support, visit Living with Beavers in Washington County - Tualatin River Watershed Council: trwc.org/living-with-beavers

EMERALD ASH BORER MANAGEMENT





Emerald ash borer (Agrilus planipennis) — commonly called EAB — is a destructive, invasive beetle that infests and kills ash trees (Fraxinus species). EAB has spread across North America since it was first detected in Michigan in 2002, killing hundreds of millions of ash trees. EAB was confirmed in Oregon in 2022, the first known case on the West Coast. EAB has infested Washington County and once it arrives in an area, it cannot be eradicated. however, CWS recommends following steps to slow its spread and limit its impact. (Resources: OregonEAB.com: oregon-eab-geo.hub.arcgis.com, and Oregon State University Extension: extension.oregonstate.edu/collection/emerald-ash-borer-resources)

- Do not move firewood or woody debris more than 10 miles from where you buy or collect it. dontmovefirewood.org

- Do not move live ash trees or recently cut wood that has not been heat cured.
- Do not plant new ash trees (Fraxinus species). Instead, plant a diversity of trees and plants that are appropriate for the conditions of the site. A list of suitable native replacements can be found here: extension.oregonstate.edu/catalog/em-9396-alternatives-ash-western-oregon-critical-tree-under-threat-these-options-can-help
- Learn to identify ash trees and the signs and symptoms of an EAB infestation. oregon-eab-geo.hub.arcgis.com/pages/identify#destination1
- If you think you have found an EAB infestation, report it to the Oregon Invasive Species Hotline. oregoninvasiveshotline.org/reports/create
- Determine if you have ash on your property. If you do, discuss your options with an ISA-certified arborist before taking action. Some suggested actions are outlined in the table below. treesaregood.org
- Sign up for Oregon Tree Health Threats, a monthly newsletter from Oregon Dept. of Forestry covering EAB and other forest health issues. forms.office.com/pages/responsepage.aspx?id=Mmk_qnz6tEegzqWYytFhzwW3COU5ZtlCqFvLE2QzWVZURFFMRFRQMURDN0JKR0U2WEVFN0kxNlBJVSQlQCN0PWcu&route=shorturl
- The Oregon Department of Agriculture has approved a list of pesticides for application to EAB or prophylactically ahead of infestation in ash. That list can be accessed online here: oregon.gov/oda/Documents/Publications/IPPM/Pesticides-EABList.pdf
- The removal of hazardous Oregon ash trees within potential Sensitive Area (wetland/non-wetland water) and/or Vegetated Corridor (adjacent upland area) requires a CWS environmental review and approved Service Provider Letter. This process begins by submitting a pre-screen web form: dynamic.cleanwaterservices.org/Forms/PreScreen. If you have any questions, please contact SPLReview@cleanwaterservices.org

Other EAB Best Management Measures

In order to slow the spread of EAB, ODA regulates the movement of ash trees and wood material in Washington County and recommends these measures:

1. Movement of wood or live material from Washington County is a regulated activity. Variances can be granted but only with a permit from the ODA or, in some cases, with the ODF.
2. If wood is to be removed from a regulated or infested area, it should be heat treated to a minimum temperature of 170 degrees for 60 minutes or chipped to a size that is less than one inch on at least two dimensions. Because larvae can survive in rare cases, or in whole branches and logs, we urge tree care professionals to either move wood to a safe handling area designated by your local jurisdiction or leave it in place.
3. Burning is an approved method for treating infested wood or live material, though air quality must be considered, and any necessary permits secured, especially for open burning near communities. In some cases, burning ash trees may be regulated by the Oregon Department of Environmental Quality and/or ODF.

Strategy	**Insect Life Stages**	**Environment or Situation**	**Timing ***		
			Not Infested	Generally Infested	Heavily Infested
Inventory and Surveillance	All	All	Yes	Yes	No
Remove infested trees**	Larval and pupae stage, signs, & symptoms obvious	Developed landscapes, water quality facilities, trail accessible areas, near infrastructure such that trees may pose a hazard. May require partner coordination. Focus on hazard trees only.	No	Yes	Yes
Treat trees with emamectin benzoate trunk injection prior to 20% crown dieback	No life stage present or obvious	Developed landscapes, trail accessible areas, areas near infrastructure such that trees may pose a hazard. May require partner coordination. Must be repeated on 3-year cycle.	Yes	Yes	No
Leave trees standing	All life stages	Natural areas, locations away from human infrastructure, areas already infested with EAB population, areas without landowner permission.	Yes	Yes	Yes

Create trap tree by girdling one tree, and then treating nearby trees with emamectin benzoate	No life stage present or obvious, or low-density infestation present	Natural areas, techniques applied as part of Slowing Ash Mortality (SLAM) strategy. Repeat on 3-year cycle to preserve trees.	Yes	Yes	No
Replace trees with non-target species	Any life stages	Natural areas and developed landscapes. Replacement without removal of existing ash in natural areas is considered underplanting.	Yes	Yes	Yes
*Pre-infested areas have no confirmed detections of EAB; "Generally Infested" areas have a low-density EAB population and trees may have EAB but have not been killed; "Heavily infested" areas have enough EAB population to kill trees. ** The removal of hazardous Oregon ash trees within potential Sensitive Area (wetland/non-wetland water) and/or Vegetated Corridors (adjacent upland area) requires a CWS environmental review and approved Service Provider Letter. This process begins by submitting a pre-screen web form: dynamic.cleanwaterservices.org/Forms/PreScreen. If you have any questions, please contact SPLReview@cleanwaterservices.org.					

EAB References and Information:
EAB References and Information:
As the EAB infestation spreads, agencies should continue to consult with the latest ODA control area or quarantine for guidance.
Oregon State University Extension: extension.oregonstate.edu/collection/emerald-ash-borer-resources
Oregon Invasive Species Council: oregoninvasivespeciescouncil.org/eab
Oregon Department of Agriculture: oregon.gov/oda/programs/IPPM/SurveyTreatment/Pages/EmeraldAshBorer.aspx?utm_medium=email&utm_source
Oregon Department of Forestry EAB Information: oregon.gov/odf/forestbenefits/pages/foresthealth.aspx#%3A~%3Atext%3DAbout%20the%20Forest%20Health%20
Guidelines to Slow the Growth and Spread of Emerald Ash Borer. Minnesota Department of Agriculture. 2018. mda.state.mn.us/sites/default/files/inline-files/eabmgmtguidelines.pdf
"Challenges, tactics and integrated management of emerald ash borer in North America," McCullough, Deborah G. Forestry: An International Journal of Forest Research, Volume 93, Issue 2, April 2020, Pages 197–211 doi.org/10.1093/forestry/cpz049
List of Tree Removal and Disposal Resources (ODA): oregon.gov/oda/shared/Documents/Publications/IPPM/EAB Contact list.pdf

MOSQUITO MANAGEMENT

Mosquitoes breed in wetlands, slow moving waterways, drainage ditches, and other standing water. Effective control focuses on eliminating standing water where mosquitoes breed. The safest and most useful approach is to eliminate unnecessary pools of water and to maintain swimming pools, catch basins, and birdbaths. Because mosquitoes spread some diseases, their presence may concern residents and result in complaints and requests for action from public agencies.

The preferred control method in ponds, water features and catch basins is a biologically derived insecticide, Bacillus thuringiensis var. israelensis (Bti). Bti is an endospore-forming bacterium that is most effective when ingested by young larvae. Bti is less effective in highly turbid water. Bti may kill midges, an important food source for fish, and waterfowl and should not be used in natural wetlands or streams. Instead, control by other insects, birds, and bats should be encouraged through the creation of habitat and the installation of bird or bat houses. For additional information about mosquitoes, contact the Washington County Department of Health at 503.846.8722 or via the county website.

Washington County holds the Pesticide Application General Permit (PAGP) for mosquito control within its jurisdiction, fully encompassing the CWS jurisdiction. Catch basin mosquito control by CWS and co-implementers will be done as a contractor to the County, following the County's procedures. (See Appendix H)

GENERAL CRITERIA FOR PESTICIDE USE

When dealing with pesticides, the label is the law. Pesticides on the IPM Product List may be used according to their labeled uses in water quality sensitive areas, vegetated corridors, water quality facilities, streamside recreational areas, and developed landscapes when all the following criteria are met:

- The activity is part of an IPM strategy that seeks to minimize pesticide use.
- Best technology-based practices are followed, leaks or spills are reduced, and application equipment is maintained in good working order.
- The timing of pesticide application corresponds to the life cycle of the pests to be treated, and the life cycle is monitored appropriately.
- Pest population thresholds are determined, and monitoring ensures treatment only when the threshold is exceeded.
- Weather conditions are appropriate for the application.
- A non-toxic indicator dye is used in the chemical mix to identify treated vegetation (optional within fenced facilities).
- Applicators adhere to all the label requirements concerning the safe and effective use of the pesticide(s).
- People applying the pesticide meet Oregon Department of Agriculture license requirements.
- Activity minimizes pesticide application within a three-foot buffer of streams or other waterbodies.
- Activity minimizes the use of pesticides or in water.
- Monitoring, reporting and record keeping requirements are consistent with the Pesticide Application General Permit (PAGP) 2300-A. (see Appendix J for example forms).

SITE-SPECIFIC PESTICIDE USE

Typically, when using the IPM approach the first step in pest management is non-chemical prevention. Although CWS strives to minimize the use of pesticides, this document includes guidance for applicators to comply with DEQ's PAGP 2300A. Any application of pesticides within three feet of the water's edge must be documented. (See Appendices G and H for more about 2300A)

Water Quality Sensitive Areas

Pesticides may be used for control of non-native, invasive species that threaten the overall health or specific ecological functions of the habitat (e.g. functions may include shade, wildlife habitat, floodplain friction, sediment capture, or channel stability). Plants and other pests may be controlled using spot or area application of appropriately labeled chemicals above the water line or within the wetland boundary, depending upon the registration of the chemical. Pesticides should not be used more than once per season except for control of invasive species that threaten water quality or habitat value.

During ecological enhancement of sensitive areas, multiple applications of herbicide may be used in a targeted fashion to achieve eradication or control of highly competitive, invasive species such as reed canary grass, English ivy, woody knotweeds, or Armenian (AKA Himalayan) blackberries.

Vegetated Corridors

Pesticide use within vegetated corridors (Table 1) is limited to the control of non-native, invasive species that threaten the health of the habitat or hinder the establishment or maintenance of native plant communities. See Table 1 for vegetated corridor widths.

Water Quality Facilities

Pesticide use within water quality facilities is limited to the control of non-native, invasive species that hinder proper facility function or the establishment or maintenance of native plant communities. Plants may be controlled using spot or area application above the water line when such a line is apparent or at time when the facility is dry and rainfall is not anticipated to move pesticide before it is inert according to label recommendations. Because water quality facilities are directly connected to surface waters of the community, there is a higher-than-average probability that pesticides may be moved from a facility due to erosion of sediments or other materials. CWS therefore does not allow the use of pre-emergent products with strong soil binding activity in facilities. CWS encourages mechanical removal of weeds as much as practical, spot herbicide treatment only where appropriate, and planting with seed, plugs or other stock of the base plants to encourage density and competition for weeds.

Streamside Recreational Areas
Where regularly maintained lawns occur, such as on golf courses and manicured parks, and no vegetated corridors are present, CWS and its co-implementers will maintain a 25-foot buffer adjacent to streams and wetlands. No fertilizers or pesticides will be applied within the buffer, except to control invasive species.

Developed Landscapes
Pesticide use within the context of IPM is allowed in developed landscapes to control undesired vegetation or other pests. Developed landscapes exclude sensitive areas, vegetated corridors and water quality facilities and streamside recreational areas.

Table 1. Clean Water Services Vegetated Corridor (VC) Widths

Sensitive Area Type	VC Width on Slopes < 25%	VC Width on Slopes > 25%
Existing or created wetlands:		
< 0.5 acres and isolated*	25 ft.	Variable from 25-200 ft.
< 0.5 acres and not isolated*	50 ft.	Variable from 50-200 ft.
≥ 0.5 acres and isolated*	50 ft.	Variable from 50-200 ft.
Natural lakes, ponds, and in-stream impoundments	50 ft.	Variable from 50-200 ft.
Springs:		
Intermittent flow	0 ft.	15 ft.
Perennial flow	50 ft.	Variable from 50-200 ft.
Intermittent Streams draining:		
< 10 acres	0 ft.	0 ft.
≥ 10 to < 50 acres	15 ft.	Variable from 50-200 ft.
≥ 50 to < 100 acres	25 ft.	Variable from 50-200 ft.
≥ 100 acres	50 ft.	Variable from 50-200 ft.
Perennial Streams:		
Other than Tualatin River	50 ft.	Variable from 50-200 ft.
Tualatin River	125 ft.	Variable from 125-200 ft.

NOTIFICATION OF PESTICIDE USE
Employees and contractors of CWS and its co-implementers shall notify the public of pesticide application at publicly accessible sites by posting approved signs in clearly visible locations at all entries and trailheads near the treated area. The signs must include the name of pesticide(s) applied and a phone number for additional information. See Appendix K for CWS' Pesticide Use Notification Sign. Signs should be placed where people will see them before they enter the treated area.

Signs may be removed after the re-entry requirements on the label have been met. If the label does not specify a re-entry interval, applicators may remove the signs after the liquid pesticide has dried.

For any pesticide application on or immediately adjacent to school property, there may be additional notification requirements. Where landscaped facilities are adjacent to schools, CWS and its co-implementers should provide the school with a list of pesticides to be used, Material Safety Data Sheet (MSDS) forms, and a schedule of the approximate frequency of applications.

PESTICIDE APPLICATION DECISIONS AND PROCEDURES
Pesticides should be applied by directed, low-volume, single-wand sprayers; wiping; daubing and painting equipment; or injection systems. Boom application shall be limited to large scale (>five acres) natural resources enhancement, or farming activities. It is important to manage pesticide drift when surface waters or beneficial plants are nearby. Control nozzle size, pressure, and droplet size to minimize drift.

Application checklist:

1. Read the pesticide label.
2. Check and calibrate application equipment for safety and efficiency.
3. Check the weather conditions. Unless otherwise indicated on the product label, avoid pesticide use when air temperature is above 80 degrees Fahrenheit, it is raining, or expected to rain within 24 hours.
4. Do not apply at wind speeds greater than 10 mph. Only apply this product if the wind direction favors on-target deposition and there are not sensitive areas (including, but not limited to, residential areas, bodies of water, known habitat for nontarget species, nontarget crops) within 250 feet downwind (UF/IFAS Extension 2019).
5. Post notification signs at all entrances to sites associated with pesticide applications.
6. List re-entry specifications on the signs if required by the label.
7. Apply material according to the label and in accordance with state and federal regulations.
8. Record pesticide applications on application forms.
9. Remove signs as described above. (Signs may be removed after the re-entry requirements on the label have been met. If the label does not specify a re-entry interval, applicators may remove the signs after the liquid pesticide has dried.)

WORKER PROTECTION STANDARDS FOR PESTICIDE APPLICATION

The Federal Worker Protection Standard (WPS) is designed to protect employees engaged in pesticide application from occupational exposure to pesticides. WPS contains requirements for notifying employees of applications, the use of personal protective equipment (PPE), and restrictions on entry into treated areas.

Specific PPE information is available on the product label and in the MSDS. Personnel who have any contact with pesticides shall follow all PPE requirements.

LICENSING FOR PESTICIDE APPLICATION

Contractors working for CWS and its co-implementers must be licensed as required by the Oregon Department of Agriculture's Pesticide Licensing in Oregon, which is available on their website. Contractors must also have Commercial Operator Licenses and the appropriate Commercial Applicator or Trainee Licenses for each applicator.

Responsibility for maintaining a valid license lies with the applicator. Employees of CWS and its co-implementers may purchase and apply non-restricted use pesticides without a license if the following conditions are met:

1. Application site is under the management or ownership of the employee's jurisdiction or agency
2. Application does not involve fuel or electric powered equipment.

PESTICIDE STORAGE AND TRANSPORT

Pesticides or pesticide containers shall be kept in secure and safe locations in accordance with local, state, and federal laws. This includes keeping them in a locked, well-ventilated, dry area where food and drinks are never stored or prepared. The floor should be made of concrete or lined with plastic or other impermeable surfaces.

Containers shall be labeled with the following information: contents (ratio of pesticide, surfactant, water, etc.), date mixed, and volume remaining when placed in storage. Areas used for storage shall be labeled. Pesticides shall be safeguarded from environmental damage (freezing, vaporizing, photodecomposition, or moisture). Pesticides shall not be transported in passenger cabs of vehicles and shall be secured within the truck bed in tightly sealed containers.

PESTICIDE APPLICATION RECORDS

State law requires written records to be kept for certain types of pesticide applications. Licensed applicators must record the details of pesticide applications and keep these records for no less than three years. These records must be available for review by the Oregon Department of Agriculture and by CWS and its co-implementers. A sample pesticide application record is provided in Appendix I.

USE OF REMAINING PESTICIDE SOLUTIONS AND RINSES

Applicators should conduct pesticide operations so that disposal of excess material is unnecessary. Prior to mixing, applicators should consider weather conditions and predictions, target acreage, and likely use of the site by others.

All pesticide solutions and rinses should be applied to target areas according to label requirements. If this is not possible, these solutions and rinses must be disposed of at an authorized pesticide disposal site.

DISPOSAL OF EMPTY PESTICIDE CONTAINERS AND UNUSABLE PESTICIDE

Agencies involved in the regulation of pesticide disposal include the Oregon State Department of Agriculture, DEQ, Environmental Protection Agency, and State and Federal OSHA programs. CWS, its co-implementers, and their contractors shall dispose of pesticides and empty pesticide containers in accordance with all state and federal regulations and label recommendations. The disposal of these materials requires care in handling and use of all necessary protective equipment.

Unusable pesticides are ones that:

1. Are damaged through vaporization, freezing, infiltration of moisture into containers, or photodecomposition.
2. Have exceeded their shelf life.
3. Have visually changed their composition or structure in some manner.

Pesticide disposal records should be maintained for three years along with other spray records. It is illegal to transfer damaged or altered pesticides to another party for use. It may be necessary to arrange for disposal of the pesticide in a manner recommended by DEQ.

PESTICIDE SPILL TO THE ENVIRONMENT

Upon becoming aware of a leak or spill, the operator must take immediate corrective action to stop and contain leaks or spills of pesticides. Oregon Emergency Response System (OERS) must be notified at 1- 800-452-0311 within 24 hours of the adverse incident. Corrective action will be taken to prevent reoccurrence. A written report of a reportable adverse incident must be provided to DEQ within 30 days.

ACCIDENTAL PESTICIDE EXPOSURE

Employees and contractors of CWS and its co-implementers who apply pesticide must remain informed of proper procedures in case of pesticide exposure. MSDS information must be available to all applicators. This information includes symptoms and procedures for handling overexposure to individual pesticides.

Anyone who experiences pesticide exposure should be referred to their personal physician, the Oregon Poison Center (OPC), and the Pesticide and Analytical Response Center (PARC). In the event of employee exposure to pesticide, a report should also be filed with the employer.

Procedures in the case of a medical emergency:

- Call 911 for emergency assistance.
- Contact the Oregon Poison Center at 800.222.1222.
- Take a label for reference for medical personnel if it is necessary to leave the site.
- Inform employee supervisor as soon as possible.
- File a report with appropriate personnel.

PESTICIDE REVISIONS PROCESS

CWS and its co-implementers maintain an IPM Product List (Appendix E), which includes all pesticides approved for use. To be included on the IPM Product List, a pesticide is reviewed for efficacy, public health and safety concerns, potential impacts to water resources and wildlife, and the tendency to move or persist in the environment.

Changes to the IPM are made annually and reviewed by staff, in consultation with partners and co-implementers as needed. Where necessary, a review team may be assembled to work through significant edits or policy changes. Annual revisions to the pests and pesticides lists are made by CWS staff and shared each year via the CWS public website.

Pesticides deleted from the IPM Product List but placed on the Do Not Restock List may be approved for use until current supplies are exhausted or disposed of in a legal manner. Banned pesticides will be deleted according to the schedule set by law and without prior approval. The Invasive Species List and EDRR priority list will be updated annually in consultation with the 4-County Cooperative Weed Management Area (CWMA) and local partners.

REGIONAL IPM PARTNERS

CWS is actively collaborating with a variety of regional and local partners on aspects of this Integrated Pest Management Plan. The following is a list of these partners and some of the elements where we collaborate or where the partner can provide resources that impact the IPM.

Partner	Role	IPM elements	Contact Information
Tualatin Soil and Water Conservation District	Invasive Species Management and Noxious Weed Control	Vegetation Management, EDRR trainings, and control of selected weeds inside the Tualatin River Watershed, weed identification, technical assistance with weed control.	Tualatinswcd.org 7175 NE Evergreen Parkway #400 Hillsboro, OR 97124 503.334.2288
Tualatin Hills Park and Recreation District	Invasive Species Management and Noxious Weed Control	Vegetation Management, EDRR trainings and control of selected weeds in park properties	Thprd.org Nature and Trails Fanno Creek Service Center 6220 SW 112th Ave., Suite 100 Beaverton, OR 97008 503.629.6305
West Multnomah Soil and Water Conservation District	Invasive Species Management and Noxious Weed Control	Vegetation Management, Control of selected weeds in Multnomah County portions of the Tualatin River Watershed	wmswcd.org 2701 NW Vaughn Street Suite 450 Portland, OR 97210 503.238.4775
City of Portland Bureau of Environmental Services	Invasive Species Management and Noxious Weed Control	Vegetation Management, Control of selected weeds in City of Portland portions of the Tualatin River Watershed	portlandoregon.gov/bes/45696 Invasive Plant Management 1120 SW 5th Ave, Room 1000 Portland, OR 97204 503.823.7740
Portland Parks and Recreation	Invasive Species Management and Noxious Weed Control	Control of selected weeds in Portland Parks that are the Tualatin River Watershed	portlandoregon.gov/parks/38296 1120 SW Fifth Avenue, Portland, OR 97204 503.823.7529
4-County Cooperative Weed Management Area	Invasive Species Management and Noxious Weed Control	Regional coordination of noxious weed control; research, education, and training for applicators and other professionals; technical assistance with weed control questions.	4countycwma.org 503.210.6015
Cities of Washington County	Invasive Species Management and Noxious Weed Control	Vegetation Management, Control of selected weeds, mapping, EDRR identification	
Washington County Land Use and Transportation	Invasive Species Management and Noxious Weed Control	Vegetation Management, Mapping, EDRR identification	

DISCLAIMER

The use of pesticide trade names in this document does not constitute an endorsement by CWS or its co-implementers. Trade names have been used specifically for reader familiarity, and no discrimination is intended.

REFERENCES AND RESOURCES

Bobbitt, Van M. et al. Pacific Northwest Landscape Integrated Pest Management Manual. Washington State University, 1999.

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McDonald, Sally A. Applying Pesticides Correctly. North Carolina State University, US Department of Agriculture, and US Environmental Protection Agency.

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Shaw, Sasha and Brunskill, Roy. King County Noxious Weed Control Program. Western Washington Invasive Weed Management Calendar.

Shenk, Myron. Oregon Pesticide Safety Education Manual, January, 2004. Agricultural Communications, Oregon State University, Washington State University, and University of Idaho.

Williams, Ray D. et al. Pacific Northwest Weed Management Handbook, revised annually. Extension Services of Oregon State University, Washington State University, and University of Idaho.

ONLINE IPM RESOURCES

Integrated Plant Protection Center (IPPC) Oregon State University: ipmnet.org
NSF Center for Integrated Pest Management Network: cipm.info/index.cfm
PNW Weed Management Handbook: pnwpest.org/pnw/weeds
Portland Parks and Recreation IPM Program: portlandoregon.gov/parks/article/116237

APPENDIX A: INVASIVE SPECIES

Treatment of Selected Pests
This section describes how to treat selected common or high-priority invasive plant species that CWS and co-implementers may encounter during normal maintenance, restoration or operations in water quality facilities, vegetated corridors, wetlands, or other sensitive areas.

Consult original sources cited here, which include publications of the region's extension services such as Oregon State University, University of California, University of Idaho, Washington State University, or land management agencies. Additional species may be listed as their treatment becomes more important.

Invasive Plant Species
The invasive plant species in Table 1 may pose threats to ecological processes and economies. Many of these plants are present in the Tualatin Watershed and adjacent areas including Yamhill, Multnomah, Columbia, Tillamook, or Clatsop Counties. Controlling them is a high priority.

A few of the plants listed here are not present within the CWS boundary but are considered to be a serious threat by the 4-County CWMA or the Oregon Invasives Species Council, and are on the EDRR watch lists. For more details on EDRR, see Appendix B.

Table 1: Invasive Plant Species

Species	Location	Notes
Armenian blackberry *Rubus armenicus*	WQF, VC, WQSA	Extremely common. Some mechanical control possible.
Bird's-foot trefoil *Lotus corniculatus*	WQF	Common. Problematic in WQF.
Butterfly bush *Buddleia davidii*	VC, WQSA	Escaped garden ornamental. Mechanical control possible.
Canada thistle *Cirsium arvense*	WQF	Common. Problematic in WQF.
Cattail *Typha latifolia*	WQF	Common aggressive native plant. Problematic only in WQF.
Common teasel *Dipsacus fullonum*	WQF, VC, WQSA	Common.
Drooping sedge *Carex pendula*	WQF, VC, WQSA	EDRR species, often mistakenly specified in WQF but extremely problematic.
English ivy *Hedera helix*	WQF, VC, WQSA	Extremely common. Some mechanical control possible.
False brome *Brachypodium sylvaticum*	WQF, VC, WQSA	EDRR species. Control immediately.
Garden loosestrife *Lysimachia vulgaris*	WQF, VC, WQSA	EDRR species.
Garlic mustard *Alliaria petiolata*	WQF, VC, WQSA	Targeted by CWS noxious weed control program.
Giant hogweed *Heracleum mantegazzianum*	VC, WQSA	EDRR species. Dangerous to human health. Handle with extreme caution.
Goats Rue *Galega officinalis*	WQF, VC, WQSA	EDRR species. Extremely problematic.
Hairy vetch *Vicia villosa*	WQF	Problematic in WQF.
Invasive water primroses *Ludwigia peploides or L. hexapetala*	WQSA, WQF	EDRR species. Report immediately.
Italian Arum *Arum italicum*	WQF, VC, WQSA	EDRR species. Extremely problematic to remove.

Species	Location	Notes
Lesser celandine *Ranunculus ficaria*	WQF, VC, WQSA	Limited EDRR species but extremely problematic in revegetation and WQF restoration or maintenance.
Meadow foxtail *Alopecurus pratensis*	WQF, VC, WQSA	Extremely common but must be controlled to meet restoration, enhancement, or mitigation standards.
Morning glory *Convolvulus sepium*	WQF	Common. Problematic in WQF.
Nightshade *Solanum dulcamara*	WQF, VC, WQSA	Most problematic in WQF.
North Africa grass *Ventenata dubia*	WQF, VC, WQSA	Extremely problematic in restoration, enhancement, or mitigation contexts. Recommend control to meet standards.
Old man's beard *Clematis vitalba*	WQF, VC, WQSA	Damaging to canopy trees.
Poison hemlock *Conium maculatum*	WQF, VC, WQSA	Common. Problematic in WQF.
Policeman's helmet *Impatiens glandulifera*	VC, WQSA	EDRR species.
Pokeweed *Phytolacca americana*	VC, WQF, WQSA	EDRR species. Dangerous to human health and problematic to remove.
Purple loosestrife *Lythrum salicaria*	WQF, VC, WQSA	Targeted by CWS noxious weed control program.
Red clover *Trifolium pratense*	WQF	Common escaped agricultural plant. Problematic only in WQF.
Reed canary grass *Phalaris arundinacea*	WQF, VC, WQSA	Extremely common but must be controlled to meet restoration, enhancement, or mitigation standards.
Scotch broom *Cytisus scoparius*	WQF	Common.
Spotted knapweed and diffuse knapweed *Centaurea spp.*	WQF	EDRR species. Extremely difficult to control.
Spurge laurel *Daphne laureola*	VC, WQSA	EDRR species. Dangerous to human health.
Velvet grass *Holcus lanatus*	WQF, VC, WQSA	Extremely common but must be controlled to meet restoration, enhancement, or mitigation standards.
Woody knotweeds *Polygonum cuspidatum or spp.*	WQF, VC, WQSA	Targeted by TSWCD noxious weed control program. Chemical control only.
Yellow flag iris *Iris pseudacorus*	WQF, VC, WQSA	Common but must be controlled to meet restoration, enhancement and mitigation standards. Extremely problematic in WQF.

WQF: Water quality facility VC: Vegetated corridor WQSA: Water quality sensitive area

Table 2: Treatment Options for Common Invasive Plants (see Appendices C and F for specific options)

Plant	Mechanical Control	Chemical Control	Special Considerations
Armenian blackberry *Rubus armenicus*	Cut, excavate, mow, shade	Vastlan (triclopyr); Milestone VM (aminopyralid); Rodeo (glyphosate)	Seed bank lasts for years. Treat with herbicide in winter months to avoid damage to desirable deciduous vegetation that is mixed with blackberries.
Canada thistle *Cirsium arvense*	Can hand pull in small patches but rhizomes will persist	Vastlan (triclopyr); Milestone VM (aminopyralid); Rodeo (glyphosate)	Rhizomatous plants are extremely difficult to control without chemical means.
Common teasel *Dipsacus fullonum*	Pull or smother in small patches only	Vastlan (triclopyr); Milestone VM (aminopyralid); Rodeo (glyphosate)	
English ivy *Hedera helix*	Cut, ground clear, cut at base of trees	Vastlan, LM (triclopyr); Accord, Rodeo (glyphosate)	Needs good surfactant due to waxy leaves.
False brome *Brachypodium sylvaticum*	Excavation not advised	Rodeo (aquatic glyphosate); Roundup Pro (glyphosate)	Treat during active growth and before seeds set (spring).
Garlic mustard *Alliaria petiolata*	Hand pull in small patches	Rodeo (glyphosate); Habitat (imazapyr)	Treat during active growth and before seeds set (spring and fall for basal rosettes).
Giant hogweed *Heracleum mantegazzianum*	Not advised	Accord, Rodeo (glyphosate); Vastlan (triclopyr)	Foliar applications during spring. Extremely dangerous; do not handle without skin and eye protection.
Hairy vetch *Vicia villosa*	Mow or hand pull small patches	Accord, Rodeo (glyphosate)	Long-lived seedbank; retreat as needed.
Meadow foxtail *Alopecurus pratensis*	Excavate, mow, shade	Glyphosate; Clethodim;	Like reed canarygrass; must be treated 1–2 seasons. Use herbicides on fresh growth once at peak height after cutting.
Morning glory *Convolvulus sepium*	Not advised	2,4-D amine, dichamba, or glyphosate	Roots reproduce quickly.
Nightshade *Solanum dulcamara*	In small patches, hand pull	Accord, Rodeo (glyphosate); Vastlan (triclopyr)	Dispose carefully; re-sprouts easily.
Reed canary grass *Phalaris arundinacea*	Excavate, mow, shade	Rodeo (glyphosate); Habitat (imazapyr); ; Clethodim	Must be treated at least 1–2 seasons. Use herbicides on fresh growth once at peak height after cutting.
Scotch broom *Cytisus scoparius*	Cut or pull with weed wrench	Accord, Rodeo (glyphosate); Vastlan (triclopyr); Milestone VM (aminopyralid)	Long-lived seedbank (biological control: seed weevil).
Velvet grass *Holcus lanatus*	Excavate, mow, shade	Glyphosate); Clethodim	Must be treated at least 1–2 seasons. Use herbicides on fresh growth.
Woody knotweeds *Polygonum cuspidatum or spp.*	Not advised	Milestone VM (aminopyralid); Habitat (imazapyr); Rodeo (glyphosate)	Treat with herbicides late summer to fall only. Keep vegetative material in place and prevent transport to soil or water where it may re-root.
Yellow flag iris *Iris pseudacorus*	Dig roots and rhizomes, only if small patches.	Habitat, Polaris Nufarm (imazapyr)	Foliar application during dry season, rhizome injections only on small scale, and mechanical removal where feasible.

INVASIVE VERTEBRATE SPECIES

Exotic animals listed here are not subject to regular routine control, but early detection of them is important. Other animals listed here should be reported to the ODFW. Treatment is initiated only in consultation with these or other agencies.

Nutria (*Myocastor coypus*) is controlled by trapping and euthanasia with the assistance of the USDA Animal and Plant Health Inspection Service-Wildlife Services (APHIS). Report nutria problems to CWS Invasive Species Coordinator to request control. For more information, see Vertebrate Pest Management below.

Common snapping turtles *(Chelydra serpentina)* are a priority for control in the Tualatin basin by ODFW, THPRD, and TSWCD. The first large breeding population was found in Fanno Creek at Koll Wetlands in 2009 and trapped in 2010. Other sightings or captures occurred in Rock and Summer creeks, and the turtles may be in the mainstem of the Tualatin River. Report any suspected sightings of snapping turtles to the Oregon Invasives Hotline. TSWCD and ODFW regularly monitor reports and respond.

Bullfrog (*Rana catesbeiana*) are a common competitor with a variety of native amphibians. They are not a high priority for CWS response but should not be introduced intentionally by releases of pets into local waterbodies.

Red-eared slider (*Trachemys scripta ssp. elegans*) is another common invasive species. They are a competitor with a variety of native amphibians, fish, and reptiles. They are not a high priority but should not be introduced intentionally by releasing pets into local water bodies. Report any suspected sightings of red-eared sliders to the Oregon Invasives Hotline. TSWCD and ODFW regularly monitor reports and respond.

AQUATIC INVASIVE INVERTEBRATES

Aquatic invasive invertebrates are exceptionally difficult to control or eradicate without drastic measures such as draining a waterbody or chemically sterilizing it with piscidal-type pesticides such as rotenone. CWS will report these to the appropriate partners to determine the best course of action if an aquatic invasive invertebrate is discovered within its jurisdiction. Employees or contractors who discover any of the following species should report the sighting to ODFW.

New Zealand mudsnail (*Potamopyrgus antipodarum*) may be found in water quality facilities and riparian areas. They are an EDRR species and are common in the region with a range of impacts on salmonids.

Rusty crayfsh (*Orconectes rusticus*) may be found in water quality facilities and water quality sensitive areas. They are an EDRR species and have not been reported in the Tualatin basin.

Red swamp crayfsh (*Procambarus clarkii*) may be found in water quality facilities, riparian areas, and water quality sensitive areas. They are an EDRR species, found in slow-moving waterbodies and in neighboring counties.

New Zealand mudsnail (*Potamopyrgus antipodarum*) may be found in water quality facilities and riparian areas. They are an EDRR species and are common in the region with a range of impacts on salmonids.

Zebra and quagga mussels (*Dreissena polymorpha, D. rostriformis bugensis*) may be found in water quality sensitive areas. They are an EDRR species and are extremely problematic. Report immediately. Currently no known populations are in Oregon, but have been found in Idaho on the Snake River, which drains into the Columbia River.

INSECTS

The detection and management of these insects is a high priority for the ODA, Washington County agricultural and forest industries, CWS, and co- implementers.

Argentine ant (*Linepithema humile*) is an EDRR, prefers high moisture settings, causes severe ecological damage.

Asian and citrus long horned beetles (*Anoplophora glabripennis, A. chinensis*) is a high priority EDRR. Consumes native hardwoods and causes severe ecological or economic damage.

Emerald ash borer (*Agrilus planipennis*) is a high-priority EDRR in Oregon. Report immediately to Oregon Invasive Species Hotline.

European wood wasp (S*irex noctilio*) is an EDRR priority, is an exotic pine boring insect.

Spongy moth (*Lymantria dispar, L. mathura, L. monarcha*) is an EDRR priority, destructive to trees and shrubs. Found in Portland area 2005- 2009.

Japanese beetle (*Popillia japonica*) is an EDRR priority, destructive to horticultural crops but also lives on several native hardwoods.

Japanese Cedar Longhorn Beetle (*Callidiellum rufipenne*) an EDRR insect detected in Portland in 2023. Its host species are Arborvitae, juniper, Leyland cypress, Japanese cedar, and western and eastern redcedar. Mostly attacks stressed or dying trees, though sometimes infests healthy nursery stock.

Light brown apple moth (*Epiphyas postvittana*) is an EDRR priority, uses a wide variety of native and horticultural plants.

Mediterranean oak borer (X*yleborus monographus*) is an EDRR priority, destructive to white and red oaks.

Red and black imported fire ant (*Solenopsis invicta, S. richteri*) inhabit many settings, cause severe ecological damage, and harm to humans, pets, and livestock.

Spotted lanternfly (*Lycorma delicatula*) is a high priority EDRR, destructive to nurseries, vineyards, and fruit orchards, primary host species is Tree of heaven.

APPENDIX B: EARLY DETECTION AND RAPID RESPONSE (EDRR)

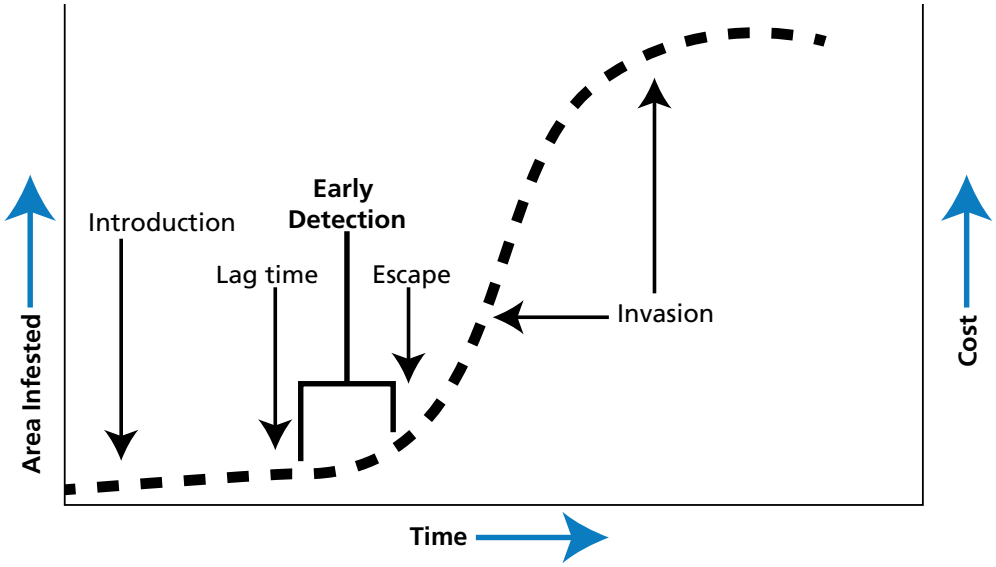
IPM is most effective when new invasive species are also prevented. This IPM strategy is integrated with the regional invasive species Early Detection and Rapid Response (EDRR) program in coordination with the 4- County CWMA. CWS is a participant in the 4-County CWMA and cooperates with Tualatin basin partners to manage invasive species. Information about the 4-County CWMA can be found online (4countycwma.org).

EDRR focuses on monitoring to find infestations at their earliest stages of invasion. Monitoring can be passive during normal land use, work or recreational activities, or by actively searching an area for invasive species. Once a new invasive species is found, control begins rapidly to prevent its establishment and spread. After prevention, EDRR is a successful, cost effective, and least damaging means of invasive species control (see Figure 1 below for how cost relates to management and invasion biology).

Successful EDRR depends upon the following activities:

1. CWS, its co-implementers and partners, will strive to prevent introductions of invasive species in the Tualatin basin.
2. CWS, its co-implementers and partners will strive to maintain lists of invasive species in neighboring areas and report potential invasive introductions into the Tualatin Basin using trained professionals and volunteers to report new invasive sightings to the Oregon Invasive Species Hotline. Some high priority EDRR invasive species may be reported on a statewide database system such as Oregon Weedmapper or iMapInvasives.
3. CWS, its co-implementers, and partners will strive to verify reports of new invasives and apply appropriate treatment, especially where invaders directly impact CWS activities or the health of Tualatin Basin watersheds.
4. CWS will prioritize its response to species by their impact on watershed health, treatment cost, and operates using the following major criteria:
    - Species appears in aquatic or riparian habitats that directly impact watershed health and therefore CWS watershed-based permit;
    - Species directly impacts CWS operations and;
    - Treatment of the species is limited to chemical approaches only, adding a pesticide burden to CWS surface water. Figure 1: Invasive species population curve illustrates the cost-effectiveness of early detection and rapid response.

Figure 1: Invasive species population curve illustrates the cost-effectiveness of early detection and rapid response.



REPORTING AN INVASIVE SPECIES WITHIN CLEAN WATER SERVICES BOUNDRIES

Gathering information in the Field

CWS employees, co-implementers, and contractors of CWS may assist in the early detection by following these steps after a finding an invasive species:

1. Accurately document the location so it can be found again.
2. Identify the species using a guide or watch list reference, and document as much information as you can. CWS staff will help identify the species.
3. Take digital photos, using the three-shot method: a wide shot of species and surrounding habitat; a close-up of the species; a detail shot such as leaves or flowers. For insects and animals, take photos of the habitat damage even if you can't photograph the specimen.
4. Take notes that describe the specimen and the area and habitat where you found it. Estimate the number of individuals in the area and how widespread the infestation may be.
5. Note the location by a Global Positioning System (GPS) or map. Be accurate to help others locate in the field. If the species is on private property, get permission from the landowner before reporting.

Documentation Tools

CWS recommends the following tools for reporting new invasives:

1. Digital camera and/or a cell phone
2. Map of the area (USGS Quad maps are ideal) or GPS unit
3. Notebook and pen
4. Invasive species guide or watch list for the area

Where to report:

Report to one of the following:

- Oregon Invasive Species Hotline: oregoninvasiveshotline.org or 1-866-INVADER
- iNaturalist: inaturalist.org

Upon request, CWS or Tualatin Soil and Water Conservation District (TSWCD) can supply an appropriate EDRR guide to employees, contractors, and co-implementers.

REPORTING NEW INVASIVES

Contact the Oregon Invasive Species Hotline online reporting form to report new invasive species online. An expert will review each report to confirm the species and location. Reports for high-priority species will receive immediate attention, while lower priority species or those located in areas that are outside of CWS jurisdiction will be addressed later or shared with an appropriate partner or jurisdiction.

EDRR DIVISION OF RESPONSIBILITIES

TSWCD may receive all electronic reports and disseminate them to appropriate parties to be distributed as follows, in most cases:

- CWS may validate and respond to riparian and aquatic invasive species throughout Washington County.
- TSWCD may validate and respond to upland invasive species in rural portions of Washington County.
- Tualatin Hills Park and Recreation District or Washington County may validate and respond to upland invasive species in urban areas.

PRIORITY EDRR PLANTS FOR THE TUALATIN BASIN AND CLEAN WATER SERVICES

These species have high potential to disrupt CWS operations, interfere with permit compliance, or negatively impact watershed functions. Be on the lookout for them and report to the Oregon Invasive Species Hotline. Tualatin River Watershed EDRR weed identification guides are available via CWS and TSWCD. In addition, CWS's public website has information on these plants.

Table 4: Priority EDRR Plants for the Tualatin Basin and Clean Water Services

Common Name (Scientific Name)	Habitat	Notes
Brazillian elodea *Egeria densa*	A	EDRR species. Aggressively invades aquatic environments, altering aquatic ecosystems. Impedes flow in waterways, clogging pumps, boat propellers, and recreation areas.
Common reed *Phragmites australis var. australis*	A, W	Common in neighboring coastal counties and along the Columbia and Willamette mainstems.
European water chestnut *Trapa natans*	A, W	Not in Oregon; difficult to eradicate wetland and aquatic invader; on the OISC 100 Worst List.
Eurasian watermilfoil *Myriophyllum spicatum*	A	Common in neighboring counties; causes serious problems in reservoirs and affects water quality.
False brome *Brachypodium sylvaticum*	R, U, W	Sherwood and South Willamette Valley; moving north quickly into Clackamas and Tillamook counties.
Flowering rush *Butomus umbellatus*	A, W	Found in Idaho and Montana, with serious implications for the Lower Columbia. Very problematic to control.
Garden loosestrife *Lysimachia vulgaris*	R, A, W	Similar invasive potential to purple loosestrife. Common in gardens until recent noxious designation.
Garlic mustard *Alliaria petiolata*	R, U	Already being treated in all sub-basins and coordinated with WMSWCD and the City of Portland.
Giant hogweed *Heracleum mantegazzianum*	R	Already being treated in selected cases. Common within the Fanno Creek watershed. Health hazard.
Giant reed *Arundo donax*	A, W	Common garden ornamental with extremely serious implications for riparian areas.
Goats rue / professor weed Galega officinalis	U	4-County CWMA EDRR Watch List species. Population in Fanno Creek watershed. Quarantine species for Oregon.
Gorse *Ulex europaeus*	U	Creates dense thorny stands that outcompete native plants. Significant fire hazard because it is highly flammable.
Indigo bush *Amorpha fruticosa*	R, W	Problem in riparian areas in Columbia and Multnomah counties.
Italian thistle *Carduus pycnocephalus*	R,U	Outcompetes crops and native vegetation. Extremely difficult to eradicate once established.
Knapweeds *Centaurea nigrescens, C. diffusa, C. jacea, C. pratensis*	R, U, W	Extremely aggressive meadow invaders that alter soil chemistry and plant communities. Extremely difficult to eradicate.
Meadow hawkweed *Hieracium pratense*	U	4-County CWMA EDRR species. Meadow weed currently found in Clackamas County.
Milk thistle *Silybum marianum*	R, U	Toxic to livestock. Forms dense stands that exclude native plants and crops.
Oblong spurge *Euphorbia oblongata*	U, R	Exudes caustic sap when cut. Skin contact should be avoided. Can establish despite significant competition. Class A noxious weed.
Orange hawkweed *Hieracium aurantiacum*	U	4-County CWMA EDRR species. Highly invasive meadow species. Class A noxious weed.

Common Name (Scientific Name)	Habitat	Notes
Parrot feather *Myriophyllum aquaticum*	A, W	Known infestations in Washington County in the Tualatin Watershed. Affects water quality.
Perennial pepperweed *Lepidium latifolium*	W	Wetland problem in Benton, Linn, and Yamhill counties; extremely difficult to eradicate.
Pokeweed *Phytolacca americana*	R, U	4-County CWMA EDRR species. Toxic and problematic with increasing pressure from Portland-area populations.
Policeman's helmet *Impatiens glandulifera*	R, W	4-County CWMA EDRR species. Difficult-to-eradicate riparian and wetland species.
Puncturevine *Tribulus terrestris*	R, U	4-County CWMA EDRR species. Toxic to livestock. Spiny burs can puncture tires and are painful if stepped on.
Purple loosestrife *Lythrum salicaria*	A, W	Already treating in selected cases; problematic wetland and aquatic invasive.
Spurge laurel *Daphne laureola*	U, R	Increasingly common in Washington County. Damaging to upland sites and highly toxic to humans.
Woody knotweeds *Fallopia spp. or Polygonum*	R	Already treating in all sub-basins and coordinating efforts with WMSWCD and the City of Portland.
Yellow and purple star thistle *Centaurea solstitialis & C. calcitrapa*	U	4-County CWMA EDRR species. Yellow star thistle found in Clackamas and Multnomah Counties through the Gorge.
Yellow archangel *Lamiastrum galeobdolon*	R	Common garden ornamental becoming common in eastern sub-basins.

R= Riparian, U=Upland, A= Aquatic, W= Wetland

VECTOR CONTROL IN CLEAN WATER SERVICES AND CO-IMPLEMENTER ACTIVITIES

Vectors spread invasives from one location to another. Where equipment, soil, plant material and water are moved from place to place it is important to prevent "vectoring" by pets, equipment, boots, vehicles, or other "vectors" that may carry eggs, seeds, plant material, or other portions of the invasive to a new location. All contractors, employees, or others who work in weed or invasive infested areas should clean themselves and their equipment before moving to a new site to avoid vectoring.

To minimize vectoring:

1. Clean soil and vegetation from vehicles before moving them to new areas.
2. Clean boots, pant legs and clothes before going to a new area.
3. Walk around known infestations of invasive plants.
4. When working in water, clean boots, waders and other equipment that is used in the water.
5. Inspect boats or watercraft and remove plants and mud before moving to a new waterbody.
6. When invasive plants are removed from a water quality facility or natural area, always bag and dispose of the debris in the landfill (not green waste).
7. When collecting a specimen for identification, place it in a bag and keep seeds, eggs, or other materials from contaminating new environments during transport.
8. Brush pets or other domesticated animals before moving them from one area to another.

APPENDIX C: WEED MANAGEMENT CALENDAR

This weed management calendar is meant as a summary of general guidelines for use by restoration or vegetation management professionals who are working to limit the impact of invasives on natural area restoration projects. For each species, each row represents one management approach. When using herbicides, always follow the label of the product being used. Herbicide suggestions in this document should not be followed if they contradict the label on the product being used. Make sure to follow all local, state, or federal regulations that apply to the project site. It is most effective to use an integrated vegetation management strategy. Always make sure that the benefits of the activity outweigh the impacts.

Plant	Treatment type(s)	Treatment duration	Winter			Spring			Summer			Fall		
			Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.
Garlic Mustard *Alliaria petiolata* *Herbaceous Biennial*		Seeds last 7+ years				Rosettes		Bolt/flower		Flower/seed/rosettes			Rosettes	
	Manual or mechanical					Pull rosettes if soil is moist		Pull & bag flowering stems				Pull rosettes if soil is moist		
	Chemical					Foliar spray (Glyphosate, Trichlopry or Aminopyralid)								
Butterfly Bush *Buddleia davidii* Tall Deciduous Shrub							Leaf out			Flower		Flower/seed		
	Manual		Dig up or weed wrench & get entire root											
	Chemical (option 1)								Foliar spray (Triclopyr)					
	Chemical (option 2)											Foliar spray (Glyphosate)		
	Mechanical & chemical											Basal or cut stump application (Triclopyr or Glyphosate)		
Bindweed or Morning Glory *Calystegia sepium or Convolvulus arvensis* Herbaceous Perennial				Emerge				Flower				Seed		
	Manual or mechanical	> 2 years		Cut or pull; remove fragments									Heavily mulch infested area	
	Shade	3-5 years	Cover infested area with landscape fabric or cardboard/woodchips - need to maintain cover so plants get no light over whole population; watch surrounding area for plants (at least 5-10 ft. from infested area)											
	Chemical	> 2 years						Foliar spray (Aminopyralid at bud stage or Triclopyr at full flower). Unwind from desireable vegetation before spraying.		Foliar spray or wipe on (Glyphosate at full bloom to early seed or Triclopyr or Aminopyralid at post bloom-follow up in spring); when re-treating, wait until stems are > 12 in. long				
	Mechanical & chemical							Cut plants & spray/wipe on when regrowth > 12 in. (Glyphosate)						
Spotted Knapweed *Centaurea biebersteinii* Herbaceous Perennial						Rosettes		Flower			Flower/seed			
	Manual or mechanical			Pull/dig up; in compacted soils will need to use fork tool or digging knife; most effective when soil is moist										
	Chemical						Foliar spray (Triclopyr)	Foliar spray (Triclopyr or Glyphosate)						
Canada Thistle *Cirsium arvense* Herbaceous Perennial						Germinate and growth/rosettes/bolt			Flower		Flower/seed		Germinate/rosettes	
	Manual or mechanical	> 2 years				Pull/mow every 3-4 weeks								
	Shade					Cut & Sheet Mulch						Cut & Sheet Mulch		
	Chemical					Foliar spot spray (Triclopyr or Aminopyralid)					Foliar spot spray (Glyphosate)			
	Mechanical & chemical									Cut late July	Spray regrowth late August (Glyphosate)			
Bull Thistle *Cirsium vulgare* Herbaceous Biennial							Emerge		Flower		Flower/seed	Seed/emerge		
	Manual or mechanical							Cut below crown, mow or dig up shortly before flowering						
	Chemical						Foliar spot spray (Triclopyr or Glyphosate)		Foliar spray before flower (Glyphosate)			Foliar spot spray (Triclopyr or Glyphosate)		
Old Man's Beard *Clematis vitalba* Climbing Deciduous Vine						Emerge			Flower			Seed		
	Manual or mechanical			Pull young plants up/cut mature stems at ground; dig up roots										
	Mechanical & chemical (option 1)	About 2 years						Cut stems & wipe on (Glyphosate, Triclopyr or Metsulfuron concentrate)						
	Mechanical & chemical (option 2)	About 2 years				Apply herbicide to regrowth in spring						Cut stems in fall		
Poison-hemlock *Conium maculatum* Herbaceous Biennial			Germinate/rosettes/bolt						Flower		Seed	Germinate		
	Manual or Mechanical		Pull by hand or dig up roots when soil is moist					Cut to below crown (1-3 in.)						
	Mechanical						Mow to 3-4 in.							
	Chemical					Foliar spray before flowering (Aminopyralid, Triclopyr, or Glyphosate)								

Plant	Treatment type(s)	Treatment duration	Winter			Spring			Summer			Fall		
			Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.
Scotch Broom *Cytisus scoparius* Large Shrub; deciduous leaves, evergreen stems				Growth/buds/leaf out			Flower			Seed			Growth	
	Manual		Pull small plant; weed wrench large plants											
	Mechanical								Cut mature stands down to ground					
	Chemical					Foliar spray (Triclopyr, Aminopyralid, Glyphosate)								
Herb Robert *Geranium robertianum* Herbaceous Annual			Rosettes/seedlings/rosettes					Flowering/seed				Seed		Rosettes
	Manual		Pull plants & mulch bare areas											
	Chemical				Foliar spray large patches of small seedlings (Glyphosate)				Foliar spray large patches of small seedlings (Glyphosate)				Foliar spray large patches of small seedlings (Glyphosate)	
English Ivy *Hedera hibernica, H. helix* Evergreen Woody Vine			Berry/seed			Vegitative						Flower		Berry/seed
	Manual or Mechanical	2 years	Dig up or pull up roots of accessible plants; Cut off vines (girdle) from base of trees											
	Cultural			Mulch to depth of 8 inches										
	Chemical (option 1)		Foliar spray on sunny day, temp > 50°F (Glyphosate or mix of Glyphosate & Triclopyr)			Foliar spray young plants with 2-4 newly expanded leaves (Glyphosate)						Spray regrowth (Glyphosate or Triclopyr); hand pull option		
	Chemical (option 2)									Foliar spray (Triclopyr & surfactant); more effective right after string trimming				
	Chemical (option 3)								Foliar spray (Aminopyralid)		Foliar spray on regrowth (Aminopyralid)			
Hawkweed *Hieracium sp.* Herbaceous Perennial						Emerge		Bud/flower		Flower/seed				
	Manual or Mechanical					Dig up including roots & runners/remove & discard flowers								
	Shading					Cover with landscape fabric or black plastic								
	Chemical					Foliar spray before flowers open (Triclopyr)								
English Holly *Ilex aquifolium* Evergreen Shrub or Tree; often muti- stemmed				Growth					Flower				Berry/seed	
	Manual		Pull or dig up small plants; use weed wrench on large plants											
	Mechanical & chemical					Cut trunk as close to the ground as possible and apply concentrated herbicide within 20-30 seconds (Triclopyr or Imazapyr). On large trunks only the outer edge needs to be cut and treated although stump treatment is most recommended..								
Policeman's Helmet *Impatiens glandulifera* Herbaceous Annual							Emerge		Flower		Flower/seed			
	Manual or mechanical								Pull or weed whack before seeds mature; compost on tarps					
	Chemical							Foliar spray young plants (Glyphosate)						
Perennial pepperweed *Lepidium latifolium* Herbaceous Perennial							Emerge	Flower		Flower/seed				
	Manual							Pull or dig plants growing in sand or loose soil						
	Chamical						Foliar spray up through bloom stage (Chlorsulfuron with surfactant)					Foliar spray (Chlorsulfuron with surfactant)		
	Mechanical & chemical							Mowing followed by foliar applications to resprouts (Glyphosate with appropriate surfactants)						
Garden Loosestrife *Lysimachia vulgaris* Herbaceous Perennial								Emerge		Flower	Flower/seed			
	Manual or mechanical								Cut at base/dig up where possible					
	Chemical								Foliar spray (Triclopyr or Glyphosate, aquatic formulation with suitable surfactant); need permit/license					

Plant	Treatment type(s)	Treatment duration	Winter			Spring			Summer			Fall		
			Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.
Purple Loosestrife *Lythrum salicaria* Herbaceous Perennial								Emerge		Flower/seed		Seed		
	Manual or mechanical	> 5 years							Pull small plants; cut large plants at base					
	Chemical	2-3 years							Foliar spray (Glyphosate or Triclopyr, aquatic formulation); need permit/ license					
	Biocontrol	< 5 years before significant decrease in plant density						Release galerucella beetles on large stands		Release galerucella beetles on large stands				
Reed Canary Grass *Phalaris arundinacea* Perennial grass						Emerge		Flower/seed			Seed/growth			
	Manual	> 5 years					Hand pull/dig over whole population							
	Mechanical	5-10 years					Mow							
	Mechanical & shade	> 1 year					Mow & cover with a combination of several layers of cardboard covered with 4-6 in. woodchips							
	Flooding	1-3 years			Inundation for whole growing season									
	Mechanical & chemical	1-2 years								Mow fields before seeds mature	Foliar spray when regrowth is 1 ft. tall (Glyphosate plus ammonium sulfate adjuvant such as Bronc Max or Class Act NG); wait 2 weeks; mow; spray again when it is about 1 ft. tall			
	Chemical	Minimum of 2 years for small patches and 2.5-3 complete years of treatment for large infestations				Foliar spray young shoots (Glyphosate plus ammonium sulfate adjuvant such as Bronc Max or Class Act NG); less damage to native grasses				Foliar spray before summer dormancy (Glyphosate plus ammonium sulfate adjuvant such as Bronc Max or Class Act NG)		Foliar spray regrowth (Glyphosate plus ammonium sulfate adjuvant such as Bronc Max or Class Act NG); till 2-3 weeks after spray for improved control		
Knotweed *Polygonum cuspidatum, P. bohemicum, P. sachalinense* Tall Rhizomatous Perennial							Emerge/growth			Flower		Seed/die back		
	Mechanical & chemical									Cut once	Foliar spray when about 3 ft. (Glyphosate, Triclopyr, Imazapyr, or Aminopyralid)			
	Chemical	> 2 years									Foliar spray (Glyphosate, Imazapyr, Aminopyralid; Inject stems >1/2 in. for small patches only. With injection, be very careful not to exceed per acre rate on label.			
English Laurel *Prunus laurocerasus* Evergreen Shrub or Small Tree								Flower			Seed			
	Manual		Pull or dig up small plants; use weed wrench on large plants									Pull or dig up small plants; use weed wrench on large plants		
	Mechanical & chemical					Cut trunk as close to the ground as possible &apply concentrated herbicide within 20-30 seconds (Triclopyr or Glyphosate)								
Blackberry (Himalayan and Cutleaf) *Rubus armeniacus, R. discolor, R. lacinatus, R. praecox* Cane-producing shrub; roots at nodes					Growth			Flower			Berry/seed			
	Mechanical	> 2 years			Clear mechanically			Clear mechanically (if only once: when flowers form)			Clear mechanically			
	Manual or mechanical	> 2 years	Cut canes/grub out crowns when soil is moist						Dig or cut regrowth			Grub out roots when soil is moist		
	Cultural											Mulch area after blackberries are cleared to prevent errosion & re-invasion		
	Chemical (option 1)							Foliar spray when plants are actively growing (Triclopyr)				Foliar spray when canes are actively growing & after berries are formed (Glyphosate); NOTE: post sprayed areas or control access to sprayed bushes		Clear dead canes, stabilize area to prevent possible erosion
	Chemical (option 2)						Cut large canes & spot spray (Triclopyr) immediately			Check area & repeat if necessary				
	Mechanical & chemical							Clear mechanically with commercial masticator or heavy duty mower.				Foliar spray regrowth (Triclopyr, Aminopyralid or Glyphosate)		

Plant	Treatment type(s)	Treatment duration	Winter			Spring			Summer			Fall		
			Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.
Tansy Ragwort *Senecio jacobaea* Herbaceous biennial						Rosettes		Bud/flower			Flower/seed/rosettes		Rosettes	
	Manual or Mechanical					Dig up rosettes if soil is moist			Pull & bag flowering stems			Dig up rosettes if soil is moist		
	Chemical					Foliar spray rossettes & flowering plants (Aminopyralid or Triclopyr)						Foliar spray rossettes (Aminopyralid or Triclopyr)		
Bittersweet Nightshade *Solanum dulcamara* Semi- Woody Vine							Growth	Flower				Seed		
	Manual or mechanical		Dig up plants in winter when possible to avoid damaging other plants				Dig, cut, pull or mow several times / season							
	Chemical						Information limited. Foliar spray or wipe on, late bud to early flower (Glyphosate, Triclopyr or Aminopyralid); plan to spray any regrowth							
Perennial Sowthistle *Sonchus arvensis* Herbaceous Perennial							Seeding/rosettes			Flower		Seed		
	Manual or mechanical						Dig up including roots & runners/remove and discard flowers							
	Shading						Cover with landscape fabric or black plastic							
	Chemical						Foliar spray actively growing plants before bud stage & at bud stage before flowers open (Aminopyralid). Plan to spray regrowth & beware of permit/ license restrictions in coastal & wet areas							
Common Tansy *Tanacetum vulgare* Herbaceous Perennial					Emerge				Flower		Flower/seed			
	Manual				Dig up						Dig up, cut & bag seed head			
	Mechanical						Mow/cut before bud stage		Cut regrowth as needed					
	Chemical	> 1 year					Spot spray actively growing plants (Metsulfuron), or wipe on (Glyphosate)			Wipe on during flower/seed set (Glyphosate); not as effective as metsulfuron-cut & bag flower/seed heads				

APPENDIX D: APPROVED PRODUCTS LIST

Product Type	Active Ingredient(s)	Example Product Names	Approved Use [2]	Approved Locations[1]					
				SA	VC	WQ	SR	BLD	DL
Post-emergent	Glyphosate	Accord® Concentrate, Aquaneat®, Aquamaster®	Spot, ring or broadcast spray applications with or without approved surfactant	●	●	●	●		●
	Halosulfuron-methyl	Sedge Hammer®, Manage® Turf Herbicide	Spot or area spray applications with approved surfactant	●	●		●		●
Non-selective herbicide	Pelargonic fatty acid	Scythe®	Top-kill of early-stage, easily killed weeds	●	●	●	●		●
Post-emergent broadleaf	Triclopyr (amine)	Element 3A, Garlon 3A	Woody plants and difficult to control perennials. Used in spot spray and cut-stem applications with or without surfactant	●	●	●	●		●
	Triclopyr (Choline)	Vastlan®	Woody plants and difficult to control perennials. Used in spot spray and cut-stem applications with or without surfactant	●	●	●	●		●
	Triclopyr (Ester)	Garlon 4 Ultra	Woody plants and difficult to control perennials. Used in basal bark, broadcast, spot spray, and cut-stem applications with surfactant/penetrant	●	●	●	●		●
	4-chloro-2-methylphenoxy acetic acid	MCPA	Broadleaf weeds, foliar application, especially Asteraceae. Most applicable in turf and grass- dominated plant communities.	●	●		●		●
Selective herbicide	Clopyralid	Transline, Stinger	Foliar applied, selective herbicide effective for Asteraceae, Fabaceae, Solanaceae, Polygonaceae, and Violaceae, in particular thistles, teasel, knapweeds, hawkweeds**	●	●	●	●		
	Metsulfuron methyl	Escort®	Broadleaf control in native prairie restoration	●	●				●
	Aminopyralid [3]	Milestone VM® Aminopyralid + Triclopyr (amine) Milestone VM Plus®	Woody plants and difficult to control perennials. Used in broadcast and spot spray with approved surfactant. Do not apply to water surfaces or groundwater-connected areas.**	●	●	●	●		●
	Imazapic	Panoramic 2SL, Plateau	Selective herbicide for post emergence weed control	●	●	●	●		●
Post-emergent and Pre-emergent	Imazapyr [4]	Habitat®, Imazapyr 2SL	Spot or broadcast spray, and cut-stem applications with or without approved surfactant	●	●	●	●		●
Post-emergent grass selective herbicide	Sethoxydim	Poast®	Post-emergence herbicide for grass control among broadleaf plants. Do not apply to water surfaces or groundwater-connected areas.**	●	●	●			
	Clethodim	Cleanse, Select Max, Section 3	Post-emergence herbicide for grass control among broadleaf plants. Do not apply to water surfaces or groundwater-connected areas.**	●	●	●	●		●
	Fluazifop -P-butyl	Fusilade II	Post-emergence herbicide for grass control among broadleaf plants.**	●	●	●	●		●
Pre-emergent	Trifluralin and Isoxaben	Snapshot®	Broadleaf and grass control in developed landscapes						●
	Flumioxazin	SureGuard	Preemergence herbicide for control of selected grass and broadleaf weeds	●	●	●	●		●

Non-selective herbicide	Imazamox (ammonium salt)	Clearcast	Aquatic plant control	●	●	●	●		●
	Pendimethalin	Pendulum® 2G	Broadleaf and grass control in developed landscapes						●
	Metam-sodium	Vapo-Rooter®	Root killer for use in sanitary lines, only						
Selective herbicide	Ferrous Sulfate		Moss control in lawns					●	
	Zinc or Zinc-Copper		Moss control in roofs					●	
	Potassium salts of fatty acids		Moss control in roofs					●	
Surfactant	Methylated Seed Oil	MSO, Super Spread MSO®	0.16-.32 fluid ounce/gallon	●	●	●	●		●
	Ethylated Seed Oil and Non-Ionic Surfactant	Hasten®	0.16-.48 fluid ounce/gallon	●	●	●	●		●
	Phytobland paraffinic oil, high fructose corn syrup, polyoxyethylene sorbitan fatty esters	Superb® HC	1.28-5 fluid ounce/gallon	●	●	●	●	●	●
	Surfactant + Ammonium sulfate	Class Act NG, Classs Act Flex	Water conditioning agent + non-ionic surfactant 1.28-5 fluid ounce/gallon	●	●	●	●		●
	Crop Oil Concentrate	Agridex	0.64-8 fluid ounce/gallon	●	●	●	●		●
	Modified Vegtable Oil	Competitor	1.28-6.4 fluid ounce/gallon	●	●	●	●		●
	Organosilicone	SYL-TAC-EA, Freeway	4 fluid ounces/acre	●	●	●	●		●
Adjuvant	Ammonium sulfate	Bronc Max	Water conditioning agent 0.16-1.28 fluid ounce/gallon	●	●	●	●		●
Indicator dye	Food grade colorant	Dynamark™ U.V.	0.1 fluid ounce/gallon	●	●	●	●		●
Insecticide	Indoxicarb	Arilon Insecticide	For control of indoor pest insects.				●		
	lambda-cyhalothrin	Demand CS	For control of indoor pest insects.				●		
	Pyrethroids		Directed jet sprays used for individual wasp and hornet nest treatments posing human safety threat	●	●	●	●		
	Bacillus thuringiensis var. israelensis		Mosquito control in ponds, water features and catch basins. Not for use in streams and wetlands			●		●	
	Diquat	Razorooter®	Root killer for use in sanitary lines, only						
	Emamectin benzoate	Tree-Age G4, Tree-Age R10, Mectinite	Control of emerald ash borer applied as systemic via trunk injection	●	●	●	●		●
	Azadirachtin	Neem Oil	Control of emerald ash borer applied as systemic via trunk injection	●	●	●	●		●
Rodenticide									

[1] SA = Sensitive Area, VC = Clean Water Services Vegetated Corridor, WQ = Water Quality Facility, SR= Streamside Recreational Area, BLD = Building, DL = Developed Landscape

[2] Always read and abide by the most current information

[3] Applications should be outside of the drip line of non-target trees and shrubs. Treated material should not be composted.

** Approved for spot application at least 25 feet from water and when conditions prevent movement to water body.

APPENDIX E: IPM GUIDE FOR COMMON WEEDS

DISCLAIMER

This document is a basic guide and assumes no liability toward product efficacy, loss of non-targeted plants, or personal safety issues. Always follow label instructions, wear proper safety gear, and avoid herbicide drift. If in doubt as to control practices, consult a licensed treatment contractor.

PREVENTING SPREAD OF COMMON WEEDS:

Weed prevention is first element of successful management. Take care not to spread invasive plant seeds and materials as you work or recreate.

- Clean boots and tools, and dog companions before and after working at a weedy site.
- Increase awareness of vectors by installing informational signs and boot brushes at trailheads to urge hikers to clean clothes, pets, and OHVs.
- Dispose of noxious weed material properly. Dry and/or burn pulled or cut plant material. Dry the plant material on a tarp or plastic barrier to prevent soil contact with roots.

CONTROLLING WEEDS:

- Always read and understand the entire label before using any herbicide and surfactant. Wear recommended Personal Protective Equipment and mix herbicides in a safe environment.
- ALWAYS follow the recommended rates on the herbicide labels. More is no better. Determine if lower rate on the recommended range of rates on the label will be effective for your site.
- Include spill prevention and preparation of a spill kit and appropriate contact numbers as part of your work habit.
- Review plant treatment timing to ensure your control efforts are effective for your method and the type of herbicide you choose.
- Sustain your work. Reseed and revegetate the area appropriately to help suppress undesirables. Keep an eye on the perimeter of your site. What surrounds your area is likely to move in. Make sure that any planting materials/mulch are weed free.
- A surfactant and indicator dye will help with control and efficacy. Note regarding surfactants: Just as with herbicides, read label directions! Some surfactants are appropriate for use with certain herbicides but not others. Also, if using a surfactant on or near water, read label directions to see if the surfactant you are using is approved for aquatic environments.
- Glyphosate-based products, such as AquaMaster are non-selective — they will kill all green plants!
- Herbicides typically work best when applied on temperate (~ 60 - 72 degrees) non-windy days followed by 12 hours of no rain. If temps are cooler and/or there has been limited rainfall, the effects of herbicide application will take longer to become apparent.
- Plant material disposal: Completely dry and/or burn pulled or cut plant material. Dry the plant material on a tarp or plastic barrier to prevent soil contact with roots.
- With all herbicides, when you apply them is as important as how you apply them.

WEED TREATMENT IMPACTS TO WILDLIFE

Please consider songbirds and pollinator species when doing weed treatments. Some excellent information can be found at these links:
Protecting nesting song and migratory birds: portlandoregon.gov/bes/index.cfm?a=322164
Reducing Bee Poisoning from Pesticides: catalog.extension.oregonstate.edu/fles/project/pdf/pnw591.pdf
Please refer to the PNW Weed Management Handbook (uspest.org/pnw/weeds) for specific herbicide recommendations.
Migratory Bird Treaty Act: fws.gov/law/migratory-bird-treaty-act-1918
Turtle habitat: dfw.state.or.us/wildlife/living_with/docs/ODFW_Turtle_BMPs_March_2015.pdf

Armenian or (Himalayan Blackberry (Rubus armeniacus,) Cutleaf Blackberry (Rubus laciniatus), European Blackberry (Rubus fruiticosus,) European Blackberry (Rubus praecox)

Mechanical:

- Mow at least twice a year: June and September.
- For small patches, grub roots in the winter through early summer when soil is moist. Be sure to remove root collar.
- Other than for the European blackberry, shading is a possible long-term non-chemical approach to blackberry control (except if species is R. praecox).
- Repeated mowing or disking can also be effective.
- Graze with goats.

Chemical:

- Treat with triclopyr (e.g. Vastlan) in fall, usually September/October. Treat during winter months when other deciduous vegetation has dropped leaves to minimize damage to desirable vegetation that can compete with blackberry plants after they have been treated.

IPM:

- Mow in June and allow for regrowth, then spray in fall.
- A cut stump treatment works well and prevents overspray and drift. Cut the stem next to the ground and, using a brush, sponge, or small spray bottle, apply a 50% solution of glyphosate or triclopyr and water immediately to the cut stem.

Notes/Tips:

- A rust that stunts blackberry growth was accidentally introduced to the U.S. and is active in SW Oregon. This rust affects R. praecox and R. laciniatus, but not R. armeniacus.
- Its impact appears to be dependent on local climate (dry weather is not conducive to the rust).
- (New data suggests multiple species of blackberry in NW, with rust only effective on 1).
- Re-seed area with native grasses, trees, and shrubs.
- Be persistent! New vines are always showing up.

Scotch Broom (Cytisus scoparius,) French Broom (Genista monspessulana,) Portuguese Broom (Cytisus striatus)

Mechanical:

- Cutting large plants (stem greater than 1/2 inch) below the crown can be effective without herbicides in August - September when they are stressed from drought.
- Pull smaller plants (less than 1/2 inch) by hand or with a weed wrench.
- Mowing is sometimes done to knock down large Scotch broom patches but should be avoided when seed pods are ripe. There is a good chance that seeds already on the ground will be spread by mowing.
- Biocontrol seed beetles and weevils, may provide a measure of control by feeding on seeds. They are readily available and widespread. Collect and release in April to May.

Chemical:

- If possible, spray Scotch broom before and after bloom, as the flowers intercept the herbicide

IPM:

- Water stress in late summer can cause reduced herbicide effectiveness.
- Vastlan, glyphosate, and Crossbow are all effective.
- Vastlan and Milestone (Aminopyralid) mixed are very effective and don't require complete coverage of plant for total control.
- Silicone/ organosilicone spreader surfactant such as Sylgard or Freeway ensure excellent coverage and reduces overall herbicide use Be careful of surrounding vegetation
- Mow in early spring.
- Treat regrowth in fall or the following spring with Vastlan, Milestone VM Plus or Crossbow.
- You can also use glyphosate (Rodeo or Roundup Pro) for early fall treatments, though results may be marginal on thicker stems. Application will kill non-target vegetation.

- In dry settings, cut stumps often don't need herbicide treatment if they are two inches in diameter or bigger. Late summer cutting below crown is advised.

Notes/Tips:
- Don't mow Scotch broom when seed pods are ripe.
- Pulling large plants with a weed wrench creates ideal growing conditions for seed bank so consider cutting instead.
- Seed treatment area heavily with grass to shade out Scotch broom seedlings.
- Calibrate sprayer well and watch your rates.
- Early season mowing typically results in dense, multi-stemmed regrowth; great for spraying.

English Ivy
Mechanical:
- Protect trees and prevent seed production by cutting vines around tree trunks. Clear ivy three feet out from the base of the tree.
- Using rakes and shovels vines can be pulled and rolled down a slope like a carpet.
- Goats and sheep love ivy and can be used to clear areas prior to pulling of the roots.

Chemical:
- A common "ivy mix" includes: 4% Accord Concentrate (glyphosate)] + 2% Vastlan (triclopyr choline) + 1.5% Competitor (or modified vegetable oil (MSO) surfactant.
- 50% Vastlan for cut stump for cut stump.
- If possible, apply during dry periods in late winter or early spring before native plants leaf out or emerge.
- You will not notice effects until weeks, if not months later, so be patient.

IPM:
- Cut ivy away from trees and apply foliar herbicide treatment to leaves on the ground.
- Cut ivy trunks back to ground and paint or spot spray them with Vastlan.
- Weed whacking and applying herbicide to new growth can also be effective.

Notes/Tips:
- If you do nothing else, keep ivy out of the trees to keep seed production lower.
- Cut the climbing vines (air-gap), taking at least one-foot portions out of them so they don't grow back together. This also ensures you don't miss any of the small vines that might be mixed in hidden in the larger ones.

Parking lot weeds - (puncture vine, prostrate knotweed, et al)
Mechanical:
- Burn them out - apply early season flaming.
- Hand pull large weeds early in season before seed set.
- Apply fresh gravel on a regular basis. Chemical:

Chemical:
- A wide range of herbicide products can be used to initially control the vegetation.
- Pre-emergent herbicides that are effective, products containing: oryzalin, benefn, or trifuralin will provide partial control of germinating seeds. These must be applied prior to germination (late winter to mid-spring).
- Post emergent products containing 2,4-D, glyphosate, and Dicamba are effective on puncture vine, especially when small.

IPM:
- Pull/hoe when you can; if things get away from you, apply herbicides.
- Smothering with fresh gravel over a residual treatment helps sustain longer control.

Notes/Tips:
- Control early and monitor it often as seasonal annuals sprout at different times of the year and new species are introduced.

False Brome

Mechanical:

- Mowing can be used to remove/deplete annual seed production. Optimal mowing for this purpose is June (plants will still flower when mowed earlier). Mowing should not be used between April through August to avoid nesting season for birds.
- Hand pulling small patches is best in April and early May.
- Mulching with clean, weed free straw works well to suppress false brome for at least two years.

Chemical:

- Broadcast application of a glyphosate-based herbicide such as Roundup, is effective in mid-May through fall.
- OSU field trials suggest tank mixing glyphosate (2%) with a preemergent herbicide such as Surfan (3.3%) applied in October. This kills mature plants AND stops seeds from germinating.
- Apply herbicides in fall after first rains, as that is when the plants start growing again

IPM:

- To reduce the amount of herbicide used, mow for several years to eliminate soil seed bank. Then treat with herbicide.
- Also, burning followed by spot-spraying after the grass resprouts can minimize the amount of herbicide needed
- You can also mow in June and then treat with Roundup in the fall.

Notes/Tips:

- False brome can spread fast. Slow the spread by making sure clothing and equipment are free of seeds before you leave an infested site.
- Put up informational signs at trailheads to urge hikers to clean clothes, pets, and OHVs.

Garlic Mustard

Mechanical:

- Mowing is not an effective control because plants will still bolt and seed.
- Mowing after seeds are present (typically, May- September) will spread garlic mustard. This has been shown to turn small infestations into large infestations very quickly.
- Hand pulling can be very effective but must be done when the soil is moist enough to allow complete root extraction. Pull carefully from root crown to avoid breaking off the stem. A hori hori can be useful to loosen soil around base of plants. May not be practical at larger sites, or in all situations. Roots left behind may resprout. Monitor site for regrowth.
- Second-year plants will continue to bolt, flower and set seed even once pulled, unless disposed of properly.
- All pulled plants must be bagged, removed from the site, and disposed of in the landfill and not yard debris/ compost.
- Soil disturbance may cause increased seed germination or seedling fish.
- Best time for hand pulling is during flowering when plants are most visible and when root stores have been used for flower production. However, rosettes can be hand pulled any time of year, provided the soil is moist enough and generally not late summer.
- Priority should be bolting and flowering, second-year plants. Rosettes may be controlled on a time permitting basis but note that only a percentage of rosettes will make it to adult stage.

Chemical:

- Spring (April - May): If only treating sites once a year, be sure to visit them in early April to late May. Apply the suggested foliar spray during bolting or flowering to prevent seeding. Be sure flowers and developing siliques (i.e. seedpods) have adequate herbicide coverage. Triclopyr amine at 2% rate (or Vastlan at 1.5% rate), plus 1% site-suitable non-ionic surfactant (e.g. Competitor or Agridex) will minimize damage to competitive grasses and work quickly on preventing seed maturation. Up until flowering (but no later), 2% glyphosate can be used instead of triclopyr amine.
- Fall (September - October): Rosettes can be sprayed in early fall after rain events end summer dormancy but before leaves begin to fall from trees and cover garlic mustard plants. Recommend 2% triclopyr amine or 1.5% glyphosate with an ammonium sulfate adjuvant like Bronc Max, Class Act II or similar. Imazapyr can work at 1% on many species of weeds.

IPM:

- Rosettes can also be sprayed in late winter, but this is only effective after winter dormancy ends. Garlic mustard often dies back in the winter so you must wait until the great majority of plants have re-sprouted.
- Recommend pulling flowering or seeding plants. Or deadheading flowering plants and spraying them. Seeds can still drop and are viable after plants are sprayed.
- Rosette treatments at the height of summer may be least effective due to summer dormancy.
- Combination of spring herbicide application followed by hand pulling is very effective.
- Spray bolting in early spring (typically early April - late May).
- Revisit sprayed sites in early June (once seedpods have started to harden and spraying has become ineffective) to hand pull any plants that were missed or bolted after spraying. Pulled plants must be bagged and removed from the site and disposed of in the trash.
- Revisit sites if possible after initial pull and be prepared to repeat pulling if smaller or later growing plants bolt.
- Fall rosette treatments can also be added to this IPM method as directed in 'Chemical' section of this document. This approach has the potential to reduce spring workloads and may be beneficial to desirable native plant recruitment.
- Reseed (e.g. blue wild rye etc.) or replant trees/shrubs to provide competitive cover. Installing >5" layer of mulch, particularly hemlock mulch, may limit seed germination.

Notes/Tips:

- Multiple years are needed to exhaust seed bank, which can last at least 5 -10 years. Early detected sites are much easier to manage!
- Control before the plant goes to seed!
- Once seedpods are no longer milky, even sprayed plants will continue to set seed. TIP: hand pull and properly dispose of plants before seed matures.
- Do not move plants, or enter site, once seedpods yellow and mature black seed is present.
- Prevention is Key! Consider the impact of crews – clean boots, clothing, and machinery before moving from areas with garlic mustard plants/seed into uninfested areas.

Yellow Flag Iris

Mechanical:

- Not effective on large infestations
- Repeated mowing or cutting in early summer before seeds mature may contain/kill by depleting energy after many years of intensive mowing.
- Small infestations may be pulled or dug out. All rhizomes must be removed. Incomplete removal may enhance the spread of plants.
- Cutting and covering with landscape fabric or durable tarps moderately successful.
- Bag and dispose of mature seed heads and bulbs to reduce spread.

Chemical:

- Aquatic approved imazapyr (i.e. Ecomazapyr 2SL) or glyphosate (i.e. Aqua Neat) products at the following ratio: Ecomazapyr at 1.5% or Aqua Neat at 5%, with addition of organosilicone or other aquatic approved surfactant.

IPM:

- Very small infestations can be dug; dispose of plants and rhizomes in landfill or dry and burn.
- Contain existing colonies by suppression and prevention of seed spread.

Notes/Tips:

- Do not compost any parts of plant.
- If using an herbicide use a surfactant to get maximum product penetration.
- Resins in leaves and rhizome can cause skin irritation, wear hand protection when handling.
- Applications of aquatic imazapyr products require a licensed applicator with an aquatic endorsement.

Spurge Laurel

Mechanical:

- Hand pull small plants.
- Larger plants can be pulled with a weed wrench or similar tool. All the root should be removed to avoid re-growth from root sprouts.
- After pulling, the area should be monitored for new seedlings.
- It is more cost effective to use mechanical methods for large populations. Plants up to three years old can be controlled by cutting the plant close to the ground. Older plants should be cut below the soil line to minimize re-sprouting.

Chemical:

- Cut plants can sprout from suckers, so it is advisable to apply herbicide to stems immediately following cutting.
- 50% Triclopyr/Vastlan has been shown to be effective. Please refer to the PNW Weed Management Handbook for specific herbicide recommendations.

IPM:

- Public education.
- Treat small infestations by pulling.
- Cut larger plants close to the ground and spray cut stump.

Notes/Tips:

- Note: there are irritating toxins in the sap, fruit and leaves that can cause blindness. Wear gloves and other protective clothing when removing or cutting.

Shining Geranium, Herb Robert

Mechanical:

- Hand-weed or torch isolated plants in small populations before they are in seed.
- Cover with sheet mulch for at least two growing.
- Heavy mulch (wood debris, chips, etc.) about 3 inches thick has worked well to suppress the plants.
- Mowing or weed eating prevents plants from producing seed. It must be done frequently, as plants will continually produce flowers from early spring until late fall.

Chemical:

- Chemical treatment is not recommended.

IPM:

- Public education, plant and seed available at nurseries and on the Internet.

Notes/Tips:

- Clean boots, tools, vehicles and pets after visiting parks, forests or other areas where there are populations of Herb Robert.
- Dispose of plants that have been weeded in the trash.

Knotweeds -Japanese, Bohemian giant, Himalayan

Mechanical:

- Mowing or cutting alone is not recommended as it typically encourages the knotweed roots to spread outward.
- Digging is very labor intensive, generally causes more harm than good, and should only be reserved for very small patches in upland areas.

Chemical:

- IMPORTANT: Do not spray glyphosate in early summer. Spray from onset of flowering through September but before first frost. Recommend using 4% glyphosate. Early season treatments are not effective.
- Injection tools can be effective for small infestations and are best used on stems with diameter > ¾". 3ml is the generally accepted amount.

- Imazapyr offers a larger treatment window starting in mid-summer. Coverage is critical. Take care not to spray foliage of non-target shrubs and trees.
- If knotweed is found near water, use herbicides and surfactants approved for riparian use.

IPM:
- To reduce overall herbicide use, allow to regrow and spray in September. Cutting is not recommended to reduce biomass and spread.
- Light deprivation can provide some control on small, isolated patches. Care must be taken to maintain coverage and monitor for out runners.

Notes/Tips:
- Coverage is typically more important than product concentration!
- Applications should be directed to both top and underside of canopies and stems to ensure complete coverage. Over-the-top treatments miss many smaller stems, resulting in regrowth.
- Injection can result in more water contamination of adjacent streams than foliar spray.

Tree of Heaven (Ailanthus altissima)
Mechanical:
- Cutting alone is usually counter-productive because Ailanthus responds by producing large numbers of stump sprouts and root suckers.

Chemical:
- The most effective method of Ailanthus control seems to be through the use of herbicides, which may be applied as a foliar (to the leaves), basal bark, cut stump, or hack and squirt treatment.
- Triclopyr (Vastlan) or over the counter Bayer Brush Killer (Triclopyr amine 8%).

IPM:
- A combination of complementary control methods may be helpful for rapid and effective control of tree-of-heaven.
- Some examples include bigleaf maple (acer macrophyllum) Oregon white oak (Quercus garryana), and ponderosa pine (Pinus ponderosa).

Notes/Tips:
- Young seedlings may be pulled or dug up, preferably when soil is moist. Care must be taken to remove the entire plant including all roots and fragments.

Meadow Knapweed
Mechanical:
- Digging plants is effective for small areas.
- Disking or roto-tilling can control infestations, but established plants can survive if root fragments remain.

Chemical:
- May until flowering is best (before seed set) but could be treated any time during active growing season.
- Use either 0.25% Milestone or 0.25% Transline with 1% Competitor. You can also use 2% Garlon 3A or 1.5% Vastlan + 1% Competitor.

IPM:
- There are several insects that reduce plant biomass or seed production.
- An integrated management plan that includes selective herbicides and biological control may show the greatest effectiveness for removal of meadow knapweed.

English Hawthorn
Mechanical:
- Pull small plants (1" diameter) when soil conditions allow.

- Mowing plants is effective for suppression only. Plants that have been repeatedly mowed tend to have a larger root system, decreasing success with pulling later.
- Cutting and then cross-hatching the stump with an axe or power saw to promote drying out of the stump.
- Girdling plants is typically not effective; plants resprout from the lateral root system.

Chemical:

- Glyphosate (Round up) painting cut stems of plants larger than 1" diameter in mid-late summer/dry season.
- Cut stump treatment using 50% safest aquatic approved triclopyr formulation available mixed with water carrier. August is a good time to spray the resprouts.

Notes/Tips:

- Resprouting is the biggest challenge, so a well-timed integrated mechanical plus herbicide program is advised.
- Resprouting from stem or lateral roots is almost a given, regardless of the method you choose.
- Seed bank along fence rows may be a problem.
- Plan for multiple years of treatment (e.g., 3 years of spot spraying to control resprouts and new plants).

APPENDIX F: FACT SHEET 2300A PESTICIDE APPLICATION GENERAL PERMIT

Pesticide Application General Permit (PAGP 2300A) and Clean Water Services Activities

On October 31, 2011 the Oregon Department of Environmental Quality (DEQ) issued a Pesticide Application General Permit (PAGP 2300) for pesticide application activities in water or at water's edge. No NPDES permit is required for pesticide application away from water. The PAGP covers a variety of pesticide application, described below, of which CWS conducts only weed/algae control, and mosquito control as a contractor to Washington County.

- **Mosquito and other flying insect pest control** to protect public health and prevent nuisance. Coverage extends to mosquitoes, black flies and other flying insect pests that develop or are present during a portion of their life cycle in or above standing or flowing water.
- **Weed and Algae Control** for invasive or other nuisance weeds, algae and pathogens such as fungi and bacteria in water or at the water's edge. The term "in water" includes applications to creeks, rivers, lakes, riparian areas, wetlands, and other areas when water is present.
- **Nuisance Animal Control** for invasive or other nuisance animals and pathogens in water and at the water's edge. Coverage extends to but is not limited to control of fish, mollusks, fungi and bacteria.
- **Forest Canopy Pest Control** including but not limited to an insect or pathogen, by using aerial application of a pesticide over a forest environment or from the ground when, in order to target pests effectively, a portion of the pesticide unavoidably will be applied over and deposited in water.
- **Area-wide Pest Control** by using aerial pesticide application to cover a large area to avoid substantial and widespread economic and social impact when, in order to target pests effectively, a portion of the pesticide unavoidably will be applied over and deposited in water. The pest control under this category is not included in the above categories.

PAGP DEFINITIONS

Operator: Any owner or entity with operational control over the decision to perform a pesticide application that is covered under this permit or has the day-to-day operational control of activities that are necessary to ensure compliance with the permit.

Permittee: Any operator conducting a pesticide application listed on page 1 that results in a discharge to waters of the state.

Water's edge: Within 3 feet of waters of the state and conveyances with a hydrologic surface connection to waters of the state at the time of pesticide application. The 3 feet is measured horizontally from the water's edge and conveyance.

Treatment Area: The area where a pesticide application is intended to provide pesticidal benefits within the pest management area; water and land which includes water, such as pesticide application over water and within 3 feet of the water's edge.

APPLYING PAGP REQUIREMENTS

The requirement to register for the PAGP is based on thresholds. Entities that are below the thresholds (such as CWS) are automatically covered by the permit and must adhere to select management, reporting, and record keeping provisions. Entities that exceed the threshold must register for the permit and comply with all requirements. Note: state and federal agencies, weed control districts, pest control districts, etc., must register regardless of the scale of their pesticide application programs.

CWS does not meet the threshold to register for the PAGP, but Co-Implementers may conduct additional activities that may require them to register for the permit. Washington County is the mosquito control authority, and entities must register with Washington County for coverage. The following chart, excerpted from the PAGP, lists entities that must register for the permit for CWS-related activities.

Operators Required to Register for Clean Water Services-related Activities

Type of Pest Control	Required to register	Annual Threshold
Mosquito and Other Flying Insect Pest Control	Federal and State agencies with a responsibility to control mosquitoes for public health, nuisance control and animal welfare	None
	Mosquito Control Districts, or similar pest control districts	None
	Operators who conduct pesticide applications that exceed the annual treatment area threshold	6400 acres of treatment surface area with an adulticide
Weed and Algae Control (Pesticide applications for weed and algae control approved and regulated under a separate NPDES permit are not included in this category.)	Federal and State agencies with a responsibility to control weeds and algae	None
	Weed control districts, or similar pest control districts, excluding irrigation districts	None
	Operators who conduct pesticide applications that exceed the annual treatment area threshold in the water or at the water's edge.	In water: 20 acres of treatment surface area OR In water and at the water's edge: 20 linear miles of treatment area

Clean Water Services annual treatment areas
CWS calculates a total annual treatment area of less than 20 linear miles based on the following data from all departments that conduct or oversee pest control activities. Therefore the permit does not apply because the annual treatment area is below the threshold.

Field Operations = zero miles
Water Quality Facilities (WQF): Field Operations applies pesticide during the dry season. Most WQF that are treated tend to be dry. For wet ponds, application is kept more than 3 feet from the water.

Mosquito tablets in catch basins: As the mosquito control district, Washington County applied for the permit for this activity and developed appropriate management practices which CWS crews follow as a contractor to the County.

Watershed Management = 3 to 4 linear miles
Riparian planting projects (temperature trading and community enhancement projects): Contractors typically spot spray pesticide, and may treat within 3 feet of water's edge to control noxious weeds. The total treated area is 3 to 4 linear miles.

Noxious weed management program: Contractors apply pesticide to control garlic mustard, knotweed, etc. Since 2009, about 120 miles have been surveyed for noxious weeds and a small portion of the area is treated. The estimated area treated within 3 feet of water's edge is 5.2 linear miles.

Engineering CIP = less than 3 linear miles
Riparian corridor projects: Contractors typically spot spray pesticide, and may treat within 3 feet of water's edge to control noxious weeds. The total treated area is 3 linear miles or less. (This estimate includes some applications that are more than 3 feet from water's edge.)

Annual Treatment Area Calculation
The total treatment area must be calculated as described below to determine whether the PACP threshold has been met and the permit applies.

Count Once: For Weed and Algae Control and Nuisance Animal Control, any area where pesticide was applied is counted once regardless of the number of applications to that area in a calendar year. For linear features such as a stream or ditch, count the length of the treatment area in or near the water. Examples:

- If pesticide is applied to a 10-mile-long ditch on one or both banks or in the water, the total treatment area is ten miles even if the same 10 miles is treated more than once in a calendar year.
- If 10 percent of a 10 square foot bed within three feet of water is treated, the total treatment area is 1 square foot. (While spot spraying, count only the area sprayed, not the entire area that may be surveyed for)

Don't Count: Do not count the following toward the annual threshold:

- Pesticide application to an intermittent stream or ditch that is dry at the time of application.
- Application along edges of dry ditches or dry season streams.
- Application to stagnant water from a catch basin or cistern.

These applications do not count toward the threshold because at the time of application there must be a hydrologic surface connection from the treatment area to the water. Operators who conduct pesticide applications at or below the annual threshold do not need to register with Oregon DEQ, but are still responsible for keeping a copy of the permit and meeting the permit requirements below (see Schedule A: conditions 1-4, schedule B: conditions 1-8 and Schedule F where applicable):

- Technology based management practices (follow label directions, conduct maintenance activities to reduce leaks/spills, maintain equipment in good working order, etc.)
- Corrective action measures.
- Pesticide application activities must take into account life cycles of pests, must include a monitoring component, consider alternatives to pesticide use, and identify threshold levels.
- Monitoring, reporting, and recordkeeping requirements consistent with the pesticide general permit. Records are required to be kept for 3 years.

APPENDIX G: 2300A PESTICIDE APPLICATION GENERAL PERMIT

Visit oregon.gov/deq/FilterPermitsDocs/2300aPermit.pdf for the Pesticide application general permit.

APPENDIX H: WASHINGTON COUNTY MOSQUITO CONTROL MANAGEMENT PRACTICES IN CATCH BASINS

For the Washington County Mosquito Control Management Practices in Catch Basins document, visit co.washington.or.us/HHS/EnvironmentalHealth/MosquitoControl/Prevention/imm.cfm.

APPENDIX I: SPRAY LOG

Site Name:		Client: Clean Water Services	License Category:
Address:		Treatment Type (circle one): Site Prep Establishment Stewardship	
Date:	Start Time:	End Time:	Treatment Area (Acres):

Type of Vegetation Controlled	Prescription or Percent Solution (oz/ac or v/v%)	Application Technique/Equipment (ring, boom, spot, etc)
1	1	1
2	2	2
3	3	3
4	4	4

Herbicide Inventory			
	Amount (oz)	Water (gal or oz)	Pesticide Supplier
Glyphosate (Include EPA Reg#)			
Triclopyr (Include EPA Reg#)			
Other Herbicides (Include EPA Reg#)			
Surfactants			
Colorant (Dye)			

Applicators:		
Name of Applicator	Applicator License Number	# of hours spraying
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
Total Number of Hours		

Weather Conditions						
Time	Weather Condition	Precipitation (inches)	Air Temp. (°F)	Wind Speed (MPH)	Relative Humidity (%)	Wind Direction

Licensed Applicator		
Name of Applicator	Applicator License Number	# of hours on site

Herbicide In Use

The blue dye indicates where herbicide has been applied to control invasive weeds.

Please avoid contact until it dries to keep the herbicide where it belongs. Your cooperation is appreciated. When this sign is removed, the herbicide is dry.

Materials used:

- ☐ AquaNeat, EPA Reg. No. 228-365
- ☐ Vastlan, EPA Reg. No. 62719-687
- ☐ Transline, EPA Reg. No. 62719-259
- ☐ _____
- ☐ _____

Date: _____

For questions about herbicides, please visit:
National Pesticide Information Center - npic.orst.edu

For questions about this CWS project,
please call: 503.681.3600

npic NATIONAL PESTICIDE INFORMATION CENTER 1.800.858.7378

CleanWater Services

Herbicida en Uso

El tinte azul indica el lugar en que se ha aplicado el herbicida para controlar las malezas invasivas.

Por favor evite todo contacto hasta que el herbicida se seque y así mantenerlo donde pertenece. Apreciamos su cooperación. Cuando quitemos este aviso, es que el herbicida ya está seco.

Materiales usados:

- ☐ AquaNeat, EPA Reg. No. 228-365
- ☐ Vastlan, EPA Reg. No. 62719-687
- ☐ Transline, EPA Reg. No. 62719-259
- ☐ _____
- ☐ _____

Date: _____

Si tiene alguna pregunta sobre estos herbicidas,
por favor visite el: Centro Nacional
de Información Sobre Pesticidas en npic.orst.edu

Para preguntas referentes a este proyecto de CWS,
por favor llame al: 503.681.3600

npic NATIONAL PESTICIDE INFORMATION CENTER 1.800.858.7378

CleanWater Services