

# Integrated Pest Management Plan



2022

Prepared by the NCPRD IPM Team



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4-County Cooperative Weed Management Area

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## **1. Background and Purpose**

The purpose of this document is to provide operational guidance for NCPRD staff and all parties who NCPRD works with about principals and direction for implementing integrated pest management on all NCPRD owned or managed sites.

### **Intent**

NCPRD sets as our intent to manage pest issues, whether on NCPRD owned land or in partnership or through contracts and agreements, with a progressive and sustainable approach that uses multi-faceted strategies to minimize economic, health and environmental risk. It is both a philosophy and a practical approach to pest management that seeks to identify practices that are “environmentally sound, socially acceptable and economically feasible” (Hoover et al. 2011, p. 1). In addition to focusing on environmental health, it is also a priority to focus on the health and safety of all who work or play at NCPRD managed lands.

### **NCPRD Owned and Managed Assets**

NCPRD is a special district and part of Clackamas County and stewards hundreds of acres of land at more than 60 locations including community and neighborhood parks, natural areas, recreational facilities, special use areas and trails. These sites include trees, shrub beds, gardens, turf and athletic fields, and natural resources areas. These sites offer a wide array of recreational and enrichment opportunities for all people.

NCPRD maintains these land in a safe, attractive and healthy condition so that they can be a benefit to our district and our community. NCPRD uses its district operation tax to maintain these assets at a level of service that conserves and protects this economic investment. As a best management practice, NCPRD manage pests in park lands utilizing the principals of Integrated Pest management.

### **NCPRD’s Integrated Pest Management**

Human, economic and environmental health all depend on clean water free from harmful levels of fertilizers, pesticides and other pollutants. Such contaminants can enter ground water resources or travel long distances in storm water runoff to receiving streams and wetlands. They originate on public and private lands in both rural and urban areas and have been detected over many years in surface and storm waters in the Clackamas River

Basin (Carpenter et al. 2008). By adopting this IPM we are exhibiting our commitment to lead by example in our efforts to protect public health, wildlife habitat, and salmon bearing waters by ensuring judicious use of potential contaminants. This will include restricting certain types of inputs where appropriate and developing practices that sustain the integrity of natural systems while promoting efficient operations and maintenance of public infrastructure.

In 2011, Clackamas County agencies convened the Natural Resource Management - Landscaping Committee, a diverse group of natural resources, planning and operations and maintenance personnel, to develop a framework for management practices that reduce the use of toxics per Action 7.6 of the Action Plan for a Sustainable Clackamas County (2008) with the goal of demonstrating a reduction of toxics in county practices. The Natural Resource Management/Landscaping Committee became the Clackamas County Ad Hoc IPM Team (Clackamas County IPM Team) and, in October 2013 developed the Clackamas County IPM Plan Template. The template was then customized by each member of the IPM team, including NCPRD.

This NCPRD IPM is a living document that focuses on supporting NCPRD operations and staff. NCPRD has updated the IPM several times since 2013. This plan is based on standard IPM elements already in use by many public agencies in Oregon and throughout the Pacific Northwest. Some of the practices also fit within Integrated Vegetation Management (IVM) and are currently used by both roadside and parks managers in Clackamas County and the Portland metropolitan area. This IPM Plan seeks to assist the implementers of this plan in 1) using integrated pest management approaches to achieve environmentally responsible outcomes, 2) and in taking all reasonable precautions to protect environmental and human health. This IPM Plan applies to employees, contractors and volunteers (IPM implementers), but it makes policies and practices transparent and accessible to the public and is expected to also serve as a resource for private landowners and other land managers.

As stated above, this IPM Plan is a living document, is intended to be a useful and responsive tool that maintains relevance through periodic review and revision by those who use it. It aims to be both concise and comprehensive, addressing all major aspects of pest management relevant to NCPRD and all parties who NCPRD works with and providing links to more detailed information.

## **2. Regulatory Permits and Guidance Documents**

The Oregon Department of Environmental Quality administers the U. S. EPA's National Pollution Discharge Elimination System (NPDES) in Oregon. Under that program DEQ issues Municipal Separate Storm Sewer System (MS4) permits regulating systems of conveyances (e.g., roads with drainage systems, municipal streets, catch basins, curbs, gutters, manmade channels or storm drains) that discharge to waters of the State. The County MS4 permit requires Clackamas County Service District No. 1 (CCSD#1), the Surface

Water Management Agency (SWMACC) of Clackamas County, the Cities of Rivergrove and Happy Valley, and the other portions of unincorporated Clackamas County within the Portland Metro Area's Urban Growth Boundary to:

- Provide public education on the proper use and disposal of pesticides [schedule A(4)(d)(iii)].
- Provide training to City and County employees on the proper use and disposal of pesticides [schedule A(4)(d)(vii)].
- Implement a management program to control and minimize the use and application of pesticides on City, SWMACC, CCSD#1, and County-owned property [schedule A(4)(g)(ii)].
- Monitor for the presence of pesticides in surface water and/or stormwater [schedule B's table B-1].

The Oregon Pesticide General Permit (2300-A) regulates pesticide applications that may result in discharges of pesticides into Waters of the State. The permit covers all pesticide applications in or within three feet of water to control pests such as insects, weeds and algae, and nuisance animals.

All public and private entities are covered under this permit, and are required to implement IPM strategies. All pesticide applications within 3 feet of water must be recorded and kept on file. Entities such as Vector Control Districts and Weed Control Districts are required to register under this permit and have an IPM plan developed as part of their *Pesticide Discharge Management Plan*.

In addition to the above regulatory requirements several other documents guide County operations including:

- Storm Water Management Plans required under the NPDES permit (2012)
- Clackamas County Transportation Best Management Practices for Routine Road Maintenance (2010)
  - Based on *ODOT's Routine Road Maintenance – Water Quality and Habitat Guide Best Management Practices*, the guidebook is intended to comply with the National Marine Fisheries Service ESA 4(d) Rule Limit 10 program.
- Clackamas County Integrated Vegetation Management (IVM) Plan (2000)
  - Based on the *City of Portland's Integrated Vegetation Management Plan*, this program was developed using a multi-jurisdictional approach.

According to the Oregon Revised Statutes (ORS 2011),

“Integrated pest management means a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency pest management objectives. The elements of integrated pest management include:

- (a) Preventing pest problems;
- (b) Monitoring for the presence of pests and pest damage;
- (c) Establishing the density of pest population, which may be set at zero, that can be tolerated or corrected with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic or aesthetic threshold;
- (d) Treating pest problems to reduce population below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical and chemical control methods and that shall consider human health, ecological impact, feasibility and cost effectiveness; and
- (e) Evaluating the effects and efficiency of pest treatments.”

This IPM Plan represents both an important element of compliance strategy and a tool for use by the IPM plan group members that complements and strengthens existing guidelines. By providing additional detail around pest management and resource protections, the IPM Plan aims to protect public health, water quality and conditions for fish and wildlife.

### **3. IPM Process and Program Elements**

IPM is an effective, sustainable focused and environmentally sensitive approach to pest management that relies on researched-based practices. IPM programs use current, comprehensive information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property and the environment ([US EPA](#)).

When pest problems occur that are novel or beyond the scope of in-house experts, advice is obtained from other qualified sources such as state universities, state departments of agriculture, conservation districts, and university extension service experts. Oregon Public Pesticide Applicators License continuing education classes reinforce employee skills and provide current information concerning laws, safety, pests, and IPM methods. NCPRD employees monitor levels of pests in order to arrive at the best solution for managing a pest problem. When pest management methods are implemented by trained IPM personnel, it results in solutions that are economically and environmentally responsible. This provides the public with safe, healthy, and aesthetically pleasing park areas for many uses.

The IPM process includes pest management evaluations and decisions as well as consideration of all appropriate pest management options, including the judicious use of pesticides. It may be summarized in four steps:

- *Set Action Thresholds*

IPM sets action thresholds prior to taking action. An action threshold is the point at which conditions indicate the need for pest control. This may be the level at which

pests pose an economic or environmental threat or when a pest spreads beyond a confined area.

- *Identify and Monitor Pests*

Not all introduced organisms require control. Many are innocuous or even beneficial. IPM programs identify and monitor pests so that appropriate control decisions can be made in conjunction with action thresholds. Knowledge of the pest combined with monitoring increases the likelihood that appropriate pest control will be used, and only when needed.

- *Use Prevention*

IPM programs work to manage the crop, lawn, forest or other area to prevent pests from becoming a threat. This could be through timely mowing, crop rotation or selection of more appropriate plant species. Such methods can be very effective and cost-efficient and present little or no risk. A critical element of prevention is the careful inspection and cleaning of clothing, tools, vehicles and equipment to remove seeds and other propagules prior to use at different sites.

- *Implement Control*

If preventive methods are ineffective and pest control is required, IPM implementers evaluate potential control methods for risk and effectiveness to determine the proper methods and timing. Effective, lower risk pest controls are chosen first. However, if further monitoring and action thresholds indicate that the pest is spreading, more aggressive pest control methods may be employed.

Effective IPM begins with proper planning and management decisions and evaluates the potential risks and benefits of each of the above elements individually or in combination for each pest or site to yield the best overall outcome. Pest control action thresholds should vary according to pest, current and desired site conditions and management expectations. Such factors will determine whether a particular area should be the focus of pest management and at what level of intensity.

Pest control decisions can have far reaching economic, public safety and environmental consequences. Use of the IPM Checklist (Appendix 1) can facilitate consideration of appropriate factors prior to taking action. At a minimum, IPM implementers must consider feasibility and cost effectiveness as well as public safety, potential impacts to water quality and non-target organisms prior to taking actions.

To simplify pest management decision making, landscapes and other areas managed by IPM implementers are described in Appendix 2. In the event that chemical control is needed, the IPM Products List (Appendix 3) includes all of the products approved for use by IPM implementers and indicates the areas in which each product may be applied.



New and unexpected pests may necessitate the need for additional chemicals to be considered for treatment. In such an event additional products may be used, but only after a review of manual, mechanical, cultural, and biological control measures has been undertaken. This review must also consider the life cycle of the pest, and establish an action threshold for controlling that pest. New products will be presented to the IPM team on a regular basis for review and addition to the IPM product list.

The Invasive Species List (Appendix 4) includes invasive plant species of local and regional concern as well as high priority species identified by the Oregon State Noxious Weed Control Board and the Oregon Invasive Species Council. Both lists are updated periodically in response to new information, changing pest conditions and control priorities.

The Invasive Species Best Management Practices (BMP) Calendar (Appendix 5) provides recommendations for management of common weeds, but for many other pest species, IPM implementers must rely on additional research and first hand experience.

This IPM relies on the four major elements common to most IPM programs including: 1) cultural practices, which are focused on maintaining healthy, resilient systems that resist pest problems; 2) mechanical and physical controls; 3) biological controls; and 4) chemical controls that target specific pests using a range of products. Each program element is described below along with examples of representative pest control practices and methods.

### **Cultural Practices**

Sound cultural methods of vegetation and pest management are those that create conditions favorable to beneficial species over pests. Such practices may be viewed as avoidance measures and are essential to the maintenance of healthy landscapes. Examples include:

- Botanical knowledge to provide conditions for plant health and resistance to pests;
- adequate site preparation prior to landscape installation including soil improvements, pruning of surrounding vegetation, grade adjustments, drainage improvements, and installation of irrigation systems;
- use of native species or non-invasive disease resistant cultivars;
- proper use of irrigation to reduce over or under-watering;
- proper timing and use of fertilization to eliminate over fertilization;
- use of cover crops to improve soil structure and reduce soil erosion;
- aeration, over-seeding, and top-dressing to improve turf health and suppress weeds; and
- mulching for weed reduction, water retention, winter protection and root zone improvement.

### **Mechanical and Physical Controls**

This approach typically involves the manual or mechanical removal of vegetation, stinging insects or nuisance animals. Examples include:

- Mechanical edging of turf;
- mowing of weeds at the appropriate time to prevent seed set and reduce spreading;
- hand weeding in shrub beds;
- tilling and replanting with a more appropriate plant species to reduce persistent weed problems;
- use of environmentally safe traps for yellow jackets and mammalian pests;
- string trimming to control unwanted vegetation; and
- roof moss removal via pressure washing.

### **Biological Controls**

Native or introduced non-pest species have been used to control many pests. However, due to unintended consequences resulting from previous introductions, this approach has limited applicability. Most biological control measures are regulated by the Oregon Department of Agriculture (ODA) and the USDA Animal and Plant Health Inspection Service (APHIS). Examples of biological controls include:

- Introducing insect or disease parasitoids, predators, and microbial products to control pests;
- minimizing the use of disruptive techniques and materials in landscapes that may destroy natural pest control organisms;
- temporary livestock grazing; and
- installing raptor perches to control rodents.

### **Chemical Controls**

Pesticides are derived from many sources and vary widely in their characteristics and effectiveness. They may pose a hazard to human health and natural resources and must be examined individually to determine their suitability within the IPM approach. Examples of chemical controls include:

- Insect baits or sprays;
- rodent baits;
- root control in pipes;
- rooftop moss control;
- Herbicide spraying of noxious weeds around facilities and natural areas
- roadside vegetation spraying.

The use of pesticides is part of the IPM strategy, but give preference to effective non-chemical alternatives where appropriate, and limit the use of certain pesticides within specific areas. Procedures as well as state and federal regulatory requirements around pesticide use are included below in Section 7.

## **4. The Role of Landscape Design in IPM**

Proper landscape design can reduce or eliminate many pest problems. While no landscape is free of pests, building and developed park area landscape designs should aim to minimize the need for continued management inputs. To promote healthy landscapes, this IPM Plan should be included by reference in landscape planning documents and in construction and maintenance contracts. Landscape consultants and contractors should incorporate the following effective landscape design and management elements:

- replacing pest-susceptible plants with native or pest resistant species;
- selecting plants that are appropriate to sun exposure, soil type and irrigation capacity;
- modifying problem areas through adaptive management;
- appropriate spacing of plant materials to achieve shading;
- maintaining appropriate species diversity;
- eliminating alternate hosts for diseases;
- establishing appropriate groundcovers;
- maintaining an adequate layer of organic materials to reduce the need for irrigation fertilizers and pesticides; and
- establishing grades or modifying grades in existing landscapes to retain or reduce runoff amounts.

## **5. Early Detection and Rapid Response**

The need to implement potentially expensive weed control efforts (e.g., regional Japanese knotweed and garlic mustard control) may be reduced or prevented through the avoidance of species introductions, early intervention to prevent establishment and the protection and maintenance of natural processes and systems. Early Detection and Rapid Response (EDRR) describes such measures and is a key to effective land management on a regional scale.

To that end, Clackamas Soil and Water Conservation District's WeedWise Program has developed a county wide EDRR network in cooperation with Clackamas County agencies and municipalities and other members of the Four-County Cooperative Weed Management Area (4-County CWMA<sup>1</sup>) to improve the detection of invasive species and to increase the inter-jurisdictional communications needed to control invasive species.

A major aim of this IPM program is enhanced inter-agency and partner collaboration and inter-departmental communication. A natural outcome of this will be greater integration with regional efforts. The Clackamas Soil and Water Conservation District's WeedWise Program maintains a list of priority EDRR plant species on behalf of the county (Appendix 4) through an annual review of local concerns, state and federal weed risk assessments, and input from regional partners in the 4-County CWMA. IPM Team members will play an important role in communicating local needs to the Conservation District's WeedWise program during annual updates and maintenance to the Clackamas County priority EDRR

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<sup>1</sup> <http://4countycwma.org/>

list. The IPM Team will also serve to communicate list updates to the various agencies, groups and individuals to facilitate regional control efforts with other EDRR programs in the region.

IPM members are encouraged to report new Class A noxious weed occurrences to ODA upon identification; reporting all priority weeds to the Oregon Invasive Hotline<sup>2</sup> or to the Clackamas Conservation District's WeedWise Program is also encouraged to facilitate timely response. Agencies, groups and individuals are also encouraged to provide location data through either the Oregon *iMapInvasives*<sup>3</sup> or the Oregon *WeedMapper*<sup>4</sup> websites to promote inter-agency weed control efforts at the regional and state scales.

Commitments toward the rapid and coordinated containment of newly detected invasive species are vital to preventing establishment. Such commitments can be expected to yield significant cost savings through the avoidance of expensive and environmentally damaging long-term control programs (Cusack et al. 2009).

## 6. Management Guidelines for Selected Pest Species

### Vertebrates

The Oregon Invasive Species Council (OISC) has identified several introduced fish, turtles, frogs and mammals as high priority invasive species. When discovered, listed species should be reported immediately via the Invasive Species Hotline website ([www.oregoninvasiveshotline.org](http://www.oregoninvasiveshotline.org)) or 1-866-INVADER (1-866-468-2337). The impacts of pest species not included on the OISC list should be evaluated in the context of site or program priorities and available resources to determine whether control is warranted. In some circumstances, both native and introduced rats, voles, moles, mice, and gophers can cause health and safety problems and damage buildings, facilities and other infrastructure. Nutria (*Myocastor coypus*), an invasive rodent, can also cause extensive damage to stream banks, irrigation ditches and native vegetation. Classified as unprotected Nongame Wildlife (OAR 635-044-0132), Nutria 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 to humans or other wildlife. Nutria should not be relocated. Oregon Wildlife Services<sup>5</sup> provides nutria and other rodent trapping services. A list of State licensed Wildlife Control Operators is available from the Oregon Department of Fish and Wildlife website<sup>6</sup>.

Chemical rodenticide use should follow IPM methods, as they may cause direct or indirect toxicity to non-target organisms and may pose a human health threat in publicly accessible

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<sup>2</sup> <http://oregoninvasiveshotline.org/>

<sup>5</sup> [www.aphis.usda.gov/wildlife\\_damage/state\\_office/oregon\\_info.shtml](http://www.aphis.usda.gov/wildlife_damage/state_office/oregon_info.shtml) or (503) 326-2346

<sup>5</sup> [www.aphis.usda.gov/wildlife\\_damage/state\\_office/oregon\\_info.shtml](http://www.aphis.usda.gov/wildlife_damage/state_office/oregon_info.shtml) or (503) 326-2346

<sup>5</sup> [www.aphis.usda.gov/wildlife\\_damage/state\\_office/oregon\\_info.shtml](http://www.aphis.usda.gov/wildlife_damage/state_office/oregon_info.shtml) or (503) 326-2346

<sup>6</sup> [www.dfw.state.or.us/wildlife/license\\_permits\\_apps/wildlife\\_control\\_operator\\_contacts.asp#NWillamette](http://www.dfw.state.or.us/wildlife/license_permits_apps/wildlife_control_operator_contacts.asp#NWillamette) or (503) 947-6000

areas. All non-lethal and lethal rodent control methods must comply with state and federal laws, and users must have appropriate licenses prior to using certain rodenticides.

### **Invertebrates**

OISC listed terrestrial and aquatic invertebrate species should be reported via the hotline number and website listed above. Damage from other species such as slugs, insects, mites and other invertebrates to buildings, playgrounds or landscaped areas should be evaluated in the context of site or program priorities and available resources to determine whether control is warranted. Impacts can often be reduced to acceptable levels through improved cultural practices. In the event that invertebrate pests exceed tolerance thresholds, approved control products are included on the IPM Products List (Appendix 3). Information about selected pests is provided below.

#### *Mosquitos*

Mosquitoes breed in wetlands, slow moving waterways, drainage ditches and other standing water. Clackamas County Vector Control manages mosquitos and flies using methods outlined in an annual work plan available on the Clackamas County website<sup>7</sup>.

#### *Stinging Insects*

Public or worker safety risk from bees, wasps, hornets and yellow jackets varies with insect species, nest location, season and other factors. Yellow jackets and some wasp species can be particularly aggressive towards people, especially around nests. Honeybee swarms generally do not pose a significant risk. Nests located near walkways, buildings and playgrounds or in vegetation management areas may require intervention while those located in remote areas typically do not.

When stinging insect nests are discovered on county managed property, site managers should evaluate the safety threat. Nests near trails, publically accessible structures, and other places where people frequent should be controlled or removed. Other nests, if they're not in locations where people are expected to frequent, can be left intact at the discretion of the supervisor in charge of the property. Individuals with known wasp or bee allergies shall not participate in wasp or bee control.

When yellow jackets present a serious and ongoing problem at a site, use of commercial traps to target emerging queens in the spring should be considered. Trapping queens during the 30- to 45-day emergence period has the potential to provide an overall reduction in the yellow jacket population for the season. Typically one trap per acre is adequate in spring for depletion trapping of queens. Use of traps to reduce yellow jacket numbers later in the season may be ineffective (PP&R 2012).

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<sup>7</sup> [www.clackamas.us/vector/annual.jsp](http://www.clackamas.us/vector/annual.jsp)

Honey bee swarm collection is an effective alternative to controlling problem bees in heavily used areas. The Oregon State Beekeepers Association posts the Swarm Call List on its website<sup>8</sup>.

### **Vegetation**

Where practicable, NCPRD supports the control or removal of all species included on the Clackamas County Weed List. The Invasive Species BMP Calendar (Appendix 5) provides best management practices for controlling common invasive weeds. Invasive plants not included on the list may also be controlled or removed as part of native plant community enhancement or revegetation efforts. Native and non-native vegetation may also be removed or controlled as necessary to provide safety, habitat health, aesthetics and other benefits in accordance with protections to ESA-listed species and the Oregon Forest Practices Act. Activities such as manual, mechanical, or chemical vegetation management in roadside rights of way, parks, natural areas and golf courses, and forest plantation thinning shall be carried out in accordance with IPM principles and applicable regulations. Diseased trees may be removed in accordance with the local tree ordinances.

Mosses growing on rooftops and paved surfaces may be considered a nuisance, but many moss control products are known to have negative impacts on aquatic species. In the event that control is necessary, methods should minimize impacts to water resources. When feasible, runoff from pressure washing should be diverted onto landscaped areas where it can fully infiltrate or it can be directed to the sanitary sewer system. Treatment with moss control agents included on the IPM Products List is allowed as long as the product is applied in a manner which is consistent with the product label.

## **7. Pesticide Procedures and Regulations**

State and federal agencies regulate the use of pesticides. NCPRD conforms to all applicable pesticide laws and regulations and only uses products which are registered by the Environmental Protection Agency (EPA) and the Oregon Department of Agriculture (ODA). Chemicals included on the IPM Products List have been screened for human and environmental health risks. IPM managers are also encouraged to consult periodically with *Salmon-Safe*<sup>9</sup>, *EcoBiz*<sup>10</sup>, *GreenPro*<sup>11</sup> or other third-party certifiers as a means of validating environmental performance, maintaining public trust, promoting awareness, enhancing operational efficiency and achieving cost savings. <http://www.npmagreenpro.org/>

### **Applicator Licensing**

Applicators of certain pesticides must be licensed as required by ODA's *Pesticide Licensing in Oregon*<sup>12</sup>. Contractors must also have a Commercial Operator License and the

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<sup>8</sup> [http://www.orsba.org/htdocs/swarm\\_call\\_list.php](http://www.orsba.org/htdocs/swarm_call_list.php)

<sup>12</sup>[http://www.oregon.gov/ODA/PEST/licensing\\_index.shtml](http://www.oregon.gov/ODA/PEST/licensing_index.shtml)

<sup>12</sup>[http://www.oregon.gov/ODA/PEST/licensing\\_index.shtml](http://www.oregon.gov/ODA/PEST/licensing_index.shtml)

<sup>12</sup>[http://www.oregon.gov/ODA/PEST/licensing\\_index.shtml](http://www.oregon.gov/ODA/PEST/licensing_index.shtml)

<sup>12</sup>[http://www.oregon.gov/ODA/PEST/licensing\\_index.shtml](http://www.oregon.gov/ODA/PEST/licensing_index.shtml)

appropriate Commercial Applicator or Trainee License for each applicator. Responsibility for maintaining a valid license lies with the applicator.

### **Public Notification**

IPM implementers will provide notification on school properties, in accordance with ORS 634.700-634.75<sup>13</sup>. In other geographic areas, notification will be used, at the discretion of the IPM Implementer or if required by the product label. If notification signage is used, it should be posted in clearly visible locations at the entrance(s) to the treatment area(s). Signs shall include the name of the product(s) in use and a phone number for inquiries (see Appendix 6 for an example of a notification sign that could be used). Where required by the product label, signs may be removed after the re-entry requirements on the product label have been met. If signs are placed and the label does not specify a re-entry interval, applicators may remove the signs after the pesticide mixture has dried.

### **Application Decisions**

Pesticides on the IPM Products List may be used according to their labeled uses in appropriate areas when all of the following criteria are met.

- Applicators meet ODA license requirements;
- applicators adhere to all product label requirements concerning the safe and effective use of the product;
- public notification requirements have been satisfied, if any requirements apply; and
- weather conditions are appropriate for the application (for example, spraying herbicide during a rain event would typically not be prudent even if it is allowed by the product label).

### **Application Record Keeping**

Licensed applicators shall maintain written pesticide application records in accordance with ODA requirements and keep these records for at least three years. Application records must be available for review by the ODA.

Commercial pesticide operators and licensed public pesticide applicators are required to keep the following information for each pesticide application made. An example pesticide application record form is included as Appendix 7.

- Name of firm or person for whom the pesticide application was made;
- Applicator license;
- location of the land or property where application was made;
- date and approximate time of application;
- supplier of pesticide product(s) applied;
- trade name and the strength of such pesticides applied;
- amount or concentration pesticide product applied;
- specific property, crop or crops to which the pesticide was applied;
- description of equipment, device or apparatus used; and

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<sup>13</sup>[http://www.oregon.gov/ODA/PEST/docs/pdf/school\\_ipm\\_web.pdf?ga=t](http://www.oregon.gov/ODA/PEST/docs/pdf/school_ipm_web.pdf?ga=t)

- name of applicator(s) or trainee(s) who made application.
- **Pesticide Use Reporting**  
NCPRD will provide reports to the Oregon Department of Environmental Quality (DEQ) or Oregon Department of Agriculture (ODA) if these reports are required.

### **Pesticide Storage, Transport and Disposal**

Pesticides or pesticide containers shall be kept in secure and safe locations in accordance with local, state, and federal laws. Pesticides shall not be transported in passenger compartment of vehicles. Pesticides shall be secured within the trunk (if it is being transported in a car AND if it is legal to transport the product by car) or in the truck's bed (if being transported by truck) in tightly sealed containers. Oregon OSHA standards (OAR 437-004-1680) are available at the ODA website<sup>14</sup>.

At a minimum, storage facilities shall feature:

- Signage identifying facility;
- locked access to authorized personnel only;
- inventory list of all of the chemicals in storage and MSDS for each product;
- container labeling identifying contents, mix date, and volume remaining when placed in storage;
- protection from elements and temperature control;
- location at least 50 feet from any body of water or stream (150 feet from streams with ESA-list species);
- nonporous floors;
- adequate lighting and ventilation;
- capacity for spill containment; and
- a clean water source.

### **Best Management Practices for Pesticide Storage**

- Maintain and follow labels on all pesticide containers;
- store pesticides only in original containers, or make sure the new container is properly labeled;
- store like pesticides together (e.g., store herbicides with herbicides, and fungicides with fungicides);
- keep containers closed tightly;
- watch for damaged containers;
- store flammable pesticides separately;
- maintain an up-to-date inventory of pesticides;
- purchase only the amount needed;
- maintain ready access to spill containment materials; and
- post emergency contact information.

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<sup>14</sup> <http://www.oregon.gov/ODA/PEST/disposal.shtml>



**Use of Remaining Solutions and Rinsate**

Applicators should conduct pesticide operations using methods that prevent the need for disposal of pesticide wastes. By purchasing no more pesticide than can be used in one season, mixing and loading only enough pesticide needed for a site and applying all the pesticide solution according to the label instructions it is possible to eliminate pesticide waste.

Applicators should drain all pesticide contents from containers at the application site until dripping stops. Empty containers should then be triple rinsed using water or another specified diluting agent or pressure washed until the containers are clean. The collected rinse solution and pesticide-contaminated water from the cleaning pesticide application equipment should always be saved and added to the spray solution. The collected mixture (rinsate) should then be sprayed onto the previously treated area, sites or targets per label requirements. In the event applicator cannot spray the rinsates or if there is leftover pesticide or pesticide-containing material because of error or miscalculation, material should be placed in a container marked with the name of the pesticide contents, EPA Registration Number and date. These materials may be used as a "product" during the next application.

Oregon pesticide wastes include, but are not limited to:

- Surplus spray solution, ultra-low volume (ULV) spray concentrate, dusts, granules, or baits remaining in the application equipment (such as tanks, hoppers, booms, hoses) after use
- Pesticide-contaminated water produced by cleaning the interior surfaces of the pesticide application equipment or from rinsing empty pesticide containers
- Pesticide-contaminated absorbent, water, or other materials generated from cleaning up spilled spray solutions
- Empty, contaminated (un-rinsed) pesticide containers

**Disposal of Empty Containers and Unusable Pesticide**

IPM implementers shall dispose of all pesticide wastes and empty pesticide containers in accordance with Oregon and federal regulations. Personal Protective Equipment (PPE) required by pesticide labels shall be worn during the handling and disposal of materials. Contaminated (unwashed), empty containers are considered hazardous wastes unless they are accepted by a pesticide distributor or manufacturer for refill. Adequately rinsed containers should be inspected visually, dried and either crushed or punctured. In some cases, properly decontaminated containers may be recycled.

Pesticide-containing materials that cannot or will not be reused (i.e., pesticide wastes) are classified as hazardous wastes and must be disposed of accordingly. IPM implementers shall maintain pesticide disposal records for three years along with other spray records.

Materials generated in NCPRD sites should be disposed of at the Metro South Station<sup>15</sup>. To qualify under Metro's Conditionally Exempt Generator (CEG) Program<sup>16</sup>, county departments and contractors must generate less than 220 pounds of hazardous waste per month and store less than 2,200 pounds on-site. It is illegal to transfer damaged or altered pesticides to another party for use. Additional information about pesticide waste management is available at the Oregon DEQ website<sup>17</sup>.

### **Adverse Incident Procedures**

An adverse incident is an unusual or unexpected event in which a person or non-target organism is likely to have been exposed to pesticides or other toxins. This may include a spill, leak, or any unauthorized discharge to surface or ground water. Following product label and OSHA guidelines.

Oregon rules regarding spills or releases of hazardous substances are found in OAR 340, Division 142<sup>18</sup>. In the event of an adverse incident, IPM implementers shall:

- Activate alarms or otherwise warn persons in the immediate area;
- Notify the Oregon DEQ if the incident is near a potable water intake location;
- Undertake every reasonable method to **contain** the hazardous material;
- In the case of a medical emergency or public safety hazard, notify local emergency responders (fire department, ambulance, etc.) using 911 where available;
- If the amount of material that was spilled exceeds the reportable quantity (for example, for many pesticide products, 25 gallons or 200 pounds of a pesticide is the threshold as of November 2012) or if a visible oil sheen was generated, promptly report the spill or release to the Oregon Emergency Response System (1-800-452-0311) and to the National Response Center; If there is any doubt about whether or not the reportable quantity was exceeded by the spill, please report the release ASAP! During this call to OERS, if the spill occurred near potable water intakes, ask the dispatcher to directly, or indirectly notify the appropriate State Health Dept. officials, and notify the impacted water treatment plant operators ASAP.
- Take further corrective action if any permit requirement is not met;
- Notify the appropriate agency if the incident involves ESA listed species or critical habitat;
- Submit a report to DEQ within 30 days; and
- Maintain documentation of unreported adverse incidents for three years.

### **Best Management Practices for Spills or Releases Under 25 gallons or 200 pounds**

- Locate and **contain** the source;
- If the initial estimate about the size of the spill is incorrect, and it is larger than initially estimated, see the Adverse Incident Procedures section above;
- undertake every reasonable method to contain the hazardous material;

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<sup>15</sup> Located at 2001 Washington St., Oregon City, OR 97045

<sup>16</sup> <http://www.oregonmetro.gov/index.cfm/go/by.web/id=4442>

<sup>17</sup> <http://www.deq.state.or.us/lq/hw/pesticide.htm>

<sup>18</sup> <http://www.deq.state.or.us/regulations/rules.htm>

- for small spills, use kitty litter, vermiculite, shredded newspaper, adsorbent pillows, clean sand, or pads;
- direct large spills away from ditches, storm drains, water quality facilities, ponds and other water resources;
- place contaminated material in a plastic container for proper disposal; and
- report spills to the appropriate individuals or agencies as soon as possible.

## **8. Worker Protection and Training**

NCPRD requires its employees and contractors to comply with Oregon and federal laws governing worker protection and safety. Section 8 of the Clackamas County Risk Management Manual includes information regarding Hazard Communications/Right to Know rules and Personal Protective Equipment (PPE). The Federal Worker Protection Standard (WPS) is designed to protect employees engaged in pesticide application from occupational exposure to pesticides. The WPS contains requirements for notifying employees of applications, the use of PPE and restrictions on entry into treated areas. Licensed pesticide applicators must use all PPE required by pesticide product labels.

NCPRD will make Material Safety Data Sheet (MSDS) information available to all employees who apply pesticides and will provide the necessary training or education to promote the full understanding of and adherence to the worker protection and safety requirements. Contractors are responsible for maintaining current licenses, Material Safety Data Sheets (MSDS) for the products they use and for complying with state and federal worker protection and safety requirements.

### **Accidental Pesticide Exposure**

MSDS documents provide information about the symptoms and procedures for handling overexposure to individual pesticides. IPM implementers who apply pesticide must remain informed of proper procedures in case of pesticide exposure. Anyone who inquires about pesticide exposure should be referred to his or her personal physician, the Oregon Poison Center (OPC), and the Pesticide and Analytical Response Center (PARC); phone numbers for OPC and PARC are in Appendix 8. In the event of employee or contractor exposure to a pesticide, a report should also be filed with Clackamas County Risk Management. A summary of emergency and information contacts is included as Appendix 8.

Procedures in the case of a medical emergency:

- Call 911 for emergency assistance;
- contact the Oregon Poison Center (phone number is listed in Appendix 8);
- take a label for reference for medical personnel if it is necessary to leave the site;
- inform employee supervisor as soon as possible; and
- file a report with appropriate personnel.

## **9. IPM Monitoring and Adaptive Management**

To evaluate the effectiveness of its IPM Program, NCPRD will monitor and document the outcomes of their pest management practices and procedures. Monitoring activities may include visual or quantitative monitoring for beneficial or adverse effects, internal or external surveys or other data collection. To compliment monitoring efforts the county will conduct ongoing education and outreach to employees, contractors and the public.

The IPM Team will review and revise the IPM Plan periodically to maintain current and applicable information and to enable logical, local prioritization within the context of available resources and regional initiatives. Following revisions to the plan the IPM Team will take steps to inform IPM implementers about revised content.

Products will be removed from or added to the IPM Products List using the following criteria:

- Existing data or experience regarding product efficacy;
- documented public health risks (Appendix 9);
- documented impacts to water resources and wildlife;
- legal bans on use of product; and
- changes to the product label or formulation restrict its intended use.

Legal products deleted from the IPM Products List may be placed on a *Do Not Restock List* and used until current supplies are exhausted or disposed of in a legal manner. Products used to protect public health are exempt from the IPM review process.

## **10. Disclaimer**

The use of product trade names in this document does not constitute an endorsement. Trade names have been used specifically for reader familiarity and no discrimination is intended.

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## 12. Additional Resources

<b><i>Integrated Pest Management</i></b>	
Pacific Northwest Insect Management Handbook <a href="http://pnwpest.org/pnw/insects">http://pnwpest.org/pnw/insects</a>	Hard copy and on-line manuals of pest management options from extension personnel in OR, WA and ID.
Pacific Northwest Plant Disease Management Handbook <a href="http://pnwhandbooks.org/plantdisease/">http://pnwhandbooks.org/plantdisease/</a>	
Pacific Northwest Weed Management Handbook <a href="http://pnwhandbooks.org/weed/">http://pnwhandbooks.org/weed/</a>	
OSU Pacific Northwest Nursery IPM website <a href="http://oregonstate.edu/dept/nurspest/index.htm">http://oregonstate.edu/dept/nurspest/index.htm</a>	Educational materials and links for the identification and management of nursery pests
Washington State Pest Management Resource Service <a href="http://ipm.wsu.edu/">http://ipm.wsu.edu/</a>	Research-based information on pest management choices for home and commercial use
Internet Center for Wildlife Damage Management <a href="http://www.icwdm.org/">http://www.icwdm.org/</a>	An IPM Center resource for diagnosis and management of wildlife problems in agriculture

Oregon State University Integrated Plant Protection Center <a href="http://www.ipmnet.org/">http://www.ipmnet.org/</a>	Coordinates IPM programs in Oregon, delivers on-line IPM Handbooks, on-line weather and degree models
Oregon IPM Requirements for Schools <a href="http://www.oregon.gov/ODA/PEST/docs/pdf/school_ipm_web.pdf?ga=t">http://www.oregon.gov/ODA/PEST/docs/pdf/school_ipm_web.pdf?ga=t</a>	Pesticides and the Oregon IPM in Schools Law, ORS 634.700-634.750
<b>Pesticides</b>	
EPA Pesticides Program <a href="http://www.epa.gov/pesticides/">http://www.epa.gov/pesticides/</a>	The U.S. EPA pesticides information page
EPA Pesticide registration documents <a href="http://www.epa.gov/pesticides/reregistration/status.htm">http://www.epa.gov/pesticides/reregistration/status.htm</a>	Status of each chemical in the reregistration review process. Links to a company websites
EXTOXNET <a href="http://extoxnet.orst.edu/">http://extoxnet.orst.edu/</a>	Extension TOXicology NETwork
CDMS Label and MSDS site <a href="http://www.cdms.net/LabelsMsds/LMDDefault.aspx?t=">http://www.cdms.net/LabelsMsds/LMDDefault.aspx?t=</a>	CDMS National Agro-chemical database
Washington and Oregon Pesticide Information Center Online (PICOL) Databases <a href="http://cru66.cahe.wsu.edu/LabelTolerance.html">http://cru66.cahe.wsu.edu/LabelTolerance.html</a>	Washington and Oregon (ODA and IPPC)-funded database of pesticide labels and pesticide tolerances
Weather and degree-days for IPM decision making <a href="http://www.pnwpest.org/wea/">http://www.pnwpest.org/wea/</a>	Development models for over 40 pests, diseases and weeds, and general degree-day models for PNW states linked to weather data and maps
National Pesticide Information Center <a href="http://npic.orst.edu/">http://npic.orst.edu/</a>	National toll-free public service to answer questions and respond to concerns about any aspect of pesticide use, exposure or toxicity
Oregon Department of Agriculture, ODA Pesticides Division <a href="http://oregon.gov/ODA/PEST/">http://oregon.gov/ODA/PEST/</a>	Laws, licensing, IPM, Pesticide Use Reporting System info, etc.
Salmon-Safe High Risk Pesticide List <a href="http://www.salmonsafe.org/urban/salmonsafe-urban54.pdf">www.salmonsafe.org/urban/salmonsafe-urban54.pdf</a>	Non-profit organization promoting fish-friendly farms
Federal Worker Protection Standard <a href="http://www.epa.gov/pesticides/safety/workers/PART170.htm">http://www.epa.gov/pesticides/safety/workers/PART170.htm</a>	Links to federal regulations regarding worker protections
Oregon Pesticide Exposure Safety & Tracking (PEST) program <a href="http://public.health.oregon.gov/PHD/OEPH/RES/PESTICIDE/Pages/index.aspx">http://public.health.oregon.gov/PHD/OEPH/RES/PESTICIDE/Pages/index.aspx</a>	Tracking and investigation of health effects reported by people exposed to pesticides
Oregon Poison Center <a href="http://www.ohsu.edu/poison/about/index.htm">http://www.ohsu.edu/poison/about/index.htm</a>	24-hour regional poison information
<b>Invasive Species</b>	
Nature Conservancy Invasive Species Initiative <a href="http://www.invasive.org/">http://www.invasive.org/</a>	'Invasives 101' and management strategies
Oregon Department of Agriculture, Plant Division <a href="http://oregon.gov/ODA/PLANT/index.shtml">http://oregon.gov/ODA/PLANT/index.shtml</a>	Pest alerts, insect management, noxious weed control and Oregon State Weed Board grants program

Western Invasives Network <a href="http://www.westerninvasivesnetwork.org/pages/plants.php">http://www.westerninvasivesnetwork.org/pages/plants.php</a>	ED/RR species identified by one or more CWMA or ED/RR programs in Oregon and Washington
Oregon Invasive Species Hotline <a href="http://www.oregoninvasiveshotline.org">www.oregoninvasiveshotline.org</a>	Tips and identification and reporting of invasive species
Oregon iMapInvasives <a href="http://imapinvasives.org">http://imapinvasives.org</a>	Information regarding invasives species as well as a real-time map of invasives species locations reported throughout Oregon
Oregon Invasive Species Council <a href="http://oregon.gov/OISC/">http://oregon.gov/OISC/</a>	Oregon strategy for invasive species management
Weed Mapper <a href="http://www.weedmapper.org/">http://www.weedmapper.org/</a>	Spatial information on noxious weed distribution
Portland State University Center for Lakes and Reservoirs <a href="http://www.clr.pdx.edu/">http://www.clr.pdx.edu/</a>	Aquatic invasive weed management
Four-County Cooperative Weed Management Area <a href="http://4countycwma.org/">http://4countycwma.org/</a>	Cooperative Clackamas, Multnomah, Washington and Clark County focus on invasive weeds
Clackamas Soil and Water Conservation District WeedWise Program <a href="http://conservationdistrict.org/programs/weedwise">http://conservationdistrict.org/programs/weedwise</a>	Species lists, control info and priorities
City of Portland Invasive Species Program <a href="http://www.portlandonline.com/bes/index.cfm?c=45696">http://www.portlandonline.com/bes/index.cfm?c=45696</a>	Species lists, control info and priorities
<b>Water Quality</b>	
Oregon DEQ, Clackamas Water Quality Assessments <a href="http://www.deq.state.or.us/wq/assessment/rpt0406/results.asp">http://www.deq.state.or.us/wq/assessment/rpt0406/results.asp</a>	2004/2006 Integrated water quality assessment report
Clackamas River Basin Council <a href="http://clackamasriver.org/">http://clackamasriver.org/</a>	Watershed information
Metro <a href="http://www.oregonmetro.gov/">http://www.oregonmetro.gov/</a>	Maps, data and other information



## APPENDIX 1

### Clackamas County IPM Checklist

Effective IPM is predicated on the implementer's knowledge of the site, the target pest and the potential impacts of different management actions. This checklist presents key questions in logical order to help land managers identify and respond to pest management opportunities and constraints. To use the checklist proceed from top to bottom responding "yes" or "no" and continuing to the next question. This checklist may be used in an informal manner or completed and saved as a record of changing conditions, priorities and management actions.

User Name: \_\_\_\_\_ Site or Area Name: \_\_\_\_\_

Target Pest or Problem: \_\_\_\_\_ Date: \_\_\_\_\_

### Site characteristics

	If yes...	If no...
1. Adjacent to or drains directly to surface waters?	<input type="radio"/> Consider non-chemical IPM methods. See Water Quality Sensitive Areas management guidelines and approved products.	<input type="radio"/> Next question.
2. High erosion potential?	<input type="radio"/> Maintain ground cover, avoid soil disturbance.	<input type="radio"/> Next question.
3. ESA-listed species in, adjacent to or near the work area?	<input type="radio"/> Consider lowest impact IPM methods and/or timing. Follow all regulations to avoid 'Take' and document activities.	<input type="radio"/> Next question.
4. Adjacent to or within school grounds?	<input type="radio"/> Comply with Oregon IPM Requirements for Schools (ORS 634.700-634.750)	<input type="radio"/> Next question.
5. High use by public?	<input type="radio"/> Consider non-chemical IPM methods. See High-Use Public Areas management guidelines and approved products.	<input type="radio"/> Next question.
6. Site meets intended use?	<input type="radio"/> Consider whether pest is likely to interfere with current use and conditions.	<input type="radio"/> Evaluate current conditions and site context. Review desired future condition to establish an IPM plan.

<b>Pest characteristics</b>		
	<b>If yes...</b>	<b>If no...</b>
7. Is pest on Clackamas County or regional EDRR lists?	<input type="radio"/> Review pest with local and regional partners to evaluate current and potential threat. Determine pest tolerance threshold.	<input type="radio"/> Review invasive species literature and, if necessary, revise EDRR list with local and regional partners. Determine pest tolerance threshold.
8. Current infestation mapped?	<input type="radio"/> Estimate infestation area and number of locations. Determine land ownership and evaluate access limitations.	<input type="radio"/> Consult with local and regional partners to determine and map infestation.
9. Mode of pest spread known?	<input type="radio"/> Implement spread prevention measures.	<input type="radio"/> Determine mode of spread.
10. Potential rate and extent of spread estimated?	<input type="radio"/> Estimate annual control cost for all of known infestation (throughout jurisdiction or in target areas).	<input type="radio"/> Assuming no intervention, estimate potential rate of spread. Estimate potential infestation area and number of sites five years in future.
11. Pest infestation at or above tolerance threshold?	<input type="radio"/> Next question.	<input type="radio"/> Implement spread prevention measures and monitor infestation(s).
<b>Pest control or eradication feasibility</b>		
	<b>If yes...</b>	<b>If no...</b>
12. Effective control methods available?	<input type="radio"/> Compile list of all known effective control methods.	<input type="radio"/> Research potential control methods. Next question.
13. Pest associated with other pest species?	<input type="radio"/> Evaluate potential interactions with other pest species and compile list of potential control methods for (1) target pest and (2) target pest + associated pests.	<input type="radio"/> Next question.
14. Site-specific control or eradication deemed feasible?	<input type="radio"/> Determine site size and evaluate potential constraints. From the list of effective control methods (questions 12, 13) compile short list of feasible options.	<input type="radio"/> Next question.
15. Local control or eradication deemed feasible?	<input type="radio"/> Determine the scale of infestation. Evaluate jurisdictional boundary issues, cost-share opportunities and potential constraints. Coordinate with local partners to compile short list of feasible options.	<input type="radio"/> Next question.

16.	Regional control or eradication deemed feasible?	○ Plan for inter-jurisdictional activities (e.g., along watershed boundaries). Evaluate cost-share opportunities and potential constraints. Coordinate with regional partners to compile short list of feasible options.	○ Next question.
Risk of preferred IPM method			
If yes...		If no...	
17.	High risk to non-target aquatic organism(s)?	○ If you answered 'Yes' to question 1, consider alternative methods and/or timing. If high risk method is deemed necessary, follow all regulations and document activities.	○ Next question.
18.	High erosion or soil disturbance potential?	○ If you answered 'Yes' to questions 1 or 2, consider alternative methods and/or timing. If high risk method is deemed necessary, implement seeding or other erosion control measures.	○ Next question.
19.	High risk to ESA-listed species?	○ If you answered 'Yes' to question 3, consider alternative methods and/or timing. If high risk method is deemed necessary, follow all regulations to avoid 'Take' and document activities.	○ Next question.
20.	High human health or safety risk?	○ If you answered 'Yes' to questions 4 or 5, consider alternative methods and timing. If high risk method is deemed necessary, implement communications strategy, restrict access to treatment area, follow all regulations and document activities.	○ Next question.
21.	High risk to non-target terrestrial organism(s), including beneficial pollinators?	○ Consider alternative methods and/or timing. If the high risk method is deemed necessary, follow all regulations and document activities.	○ Next question.

Characteristics of most effective pesticide		
	If yes...	If no...
22. High acute toxicity?	<input type="radio"/> If you answered 'Yes' to one or more of questions 1-5, use lower toxicity pesticide. If the high toxicity pesticide is deemed necessary, select application method to minimize toxicity, restrict access to treatment area, follow all regulations and document activities.	<input type="radio"/> Next question.
23. High environmental mobility potential?	<input type="radio"/> If you answered 'Yes' to one or more of questions 1-3, use less mobile pesticide. If the high mobility pesticide is deemed necessary, select application method to minimize mobility, follow all regulations and document activities.	<input type="radio"/> Next question.
24. High environmental persistence potential?	<input type="radio"/> If you answered 'Yes' to one or more of questions 1-5, use less persistent pesticide. If the high persistence pesticide is deemed necessary, select application method to minimize use, follow all regulations and document activities.	<input type="radio"/> Next question.
25. High bio-accumulation potential in fish or wildlife?	<input type="radio"/> Use alternative pesticide. If the pesticide is deemed necessary, select application method to minimize use, follow all regulations and document activities.	<input type="radio"/> Next question.
26. High herbicide resistance potential in plants?	<input type="radio"/> Use alternative pesticide. If the pesticide is deemed necessary, select application method to minimize development of resistance, follow all regulations and document activities.	<input type="radio"/> Next question.

<b>Fiscal impacts of preferred IPM method</b>		
	<b>If yes...</b>	<b>If no...</b>
27. High control cost?	<input type="radio"/> Evaluate current and long-term budget capacity against anticipated costs. Consider potentially higher cost of delayed control efforts.	<input type="radio"/> Next question.
28. Expected environmental or infrastructure damage without control?	<input type="radio"/> Evaluate cost and likelihood of success of early intervention.	<input type="radio"/> Next question.
29. Long-term control likely necessary?	<input type="radio"/> Evaluate long-term budget capacity. Consider likelihood of continued programmatic support for control efforts.	<input type="radio"/> Next question.
<b>Select the appropriate IPM method(s)</b>		
30. No viable IPM intervention identified. Take no action.		
31. Attempt site-specific control or eradication. Proceed to 34.		
32. Attempt local control or eradication. Proceed to 34.		
33. Attempt regional control or eradication. Proceed to 34.		
34. Rank control or eradication options described in questions 12-16. Next question.		
35. Select best available option and implement control or eradication strategy. Next question.		
36. Evaluate and document effectiveness of action(s) and take corrective measures as necessary.		

## APPENDIX 2 Clackamas County Management Areas and Pest Management Guidelines

IPM principles and practices will be applied in the management of all Clackamas County owned or managed lands and facilities. The following table defines 14 Management Areas within four broad categories: Water Quality Sensitive Areas, High-Use Public Areas, Forestry and Upland Natural Areas and Roadside Rights of Way. Pesticides approved for use in each Management Area are listed in Appendix 3.

*Note: Additional pesticide use restrictions from the Oregon Department of Fish and Wildlife, the National Marine Fisheries Service or other agencies to protect certain species or habitats may also apply.*

	Management Area	Pest Management Guidelines
Water Quality Sensitive Areas	<b>Ponds and Lakes</b> Includes both isolated natural and man-made water bodies  For additional information see Clackamas County Vector Control: <a href="http://www.clackamas.us/vector/">http://www.clackamas.us/vector/</a>	Use of approved aquatic labeled products is permitted for mosquito control, high priority noxious weeds and other high priority pests only where there is no existing or potential direct outflow to other surface waters. Such treatments must be for the protection of public health or the aquatic environment.  Aquatic pesticide applications require applicators to have aquatic certification. Applicable permits from other agencies may be required prior to treatment.
	<b>Rivers and Streams</b> Includes both natural and man-made flowing rivers, streams and ditches. Such areas may be either privately owned or Waters of the State.  Pesticide use near public and private potable water intake points is further regulated by Oregon DEQ: <a href="http://www.deq.state.or.us/wq/dwp/swrpts.asp#4100187">http://www.deq.state.or.us/wq/dwp/swrpts.asp#4100187</a>	Submerged weeds and other invasive aquatic species will not be controlled by chemical means in rivers, streams or other moving waters without the involvement of (or specific permission from) state regulatory agencies. In the rare need for pest control within such areas, cultural, mechanical and biological means will be utilized where possible. When these methods are not feasible, noxious emergent weeds may be controlled above the water line using approved aquatic labeled herbicides and surfactants. Examples include control of yellow flag iris and purple loosestrife to maintain healthy habitat. Such treatments shall take place at mid-summer.  Aquatic pesticide applications require applicators to have aquatic certification. Applicable permits from other agencies may be required prior to treatment.

Water Quality Sensitive Areas	<b>Seasonally Inundated Areas</b> Includes stream banks (below Ordinary High Water), wetlands, storm water facilities and bio-swales actually or potentially connected to surface water resources. Such areas may be privately or publically owned and may include jurisdictional wetlands.	The establishment and maintenance of appropriate vegetation helps protect water quality and habitat. Pest management shall be focused on controlling or preventing the establishment of species that threaten water quality, habitat health or the proper functioning of storm water management infrastructure. Approved aquatic labeled pesticides may be applied using backpack or hand application. Treatment areas must be free from standing water at the time of application. Use of fertilizers is not permitted.
	<b>Vegetated Buffer Areas</b> Includes corridors of land a minimum of 25 feet in width surrounding or adjacent to Ponds and Lakes, Rivers and Streams, and Seasonally Inundated Areas measured from above the Ordinary High Water line.	The establishment and maintenance of appropriate vegetation helps protect water quality and habitat. Pest management shall be focused on controlling or preventing the establishment of species that threaten water quality or habitat health or that interfere with native vegetation. Approved pesticides may be applied using backpack or hand application. Use of fertilizers is not permitted.
High-Use Public Areas	<b>Building and Facilities Landscapes</b> Includes buildings, parking areas, turf and flower, tree and shrub landscapes outside of Water Quality Sensitive Areas.	Highly managed landscapes provide a variety of functions around buildings and other facilities. Approved pest management products shall be used within an IPM context to minimize both the quantity applied and the necessary frequency.
	<b>Public Golf Courses</b>	<i>See Stone Creek Golf Course Integrated Pest Management Plan</i>
	<b>Park Developed Areas</b> Includes buildings, parking areas, turf, flower, tree and shrub landscapes within parks but outside of Water Quality Sensitive Areas.	Parks provide a variety of recreational functions. High use by the public makes the judicious use of pest control products especially important, and their use within an IPM context can reduce both the quantity applied and the necessary frequency. Area closures and notification using temporary signage may be required prior, during and following the use of certain products.

High-Use Public Areas	<p><b>Park Playground Areas</b> Includes fenced and unfenced playground or play structure areas with turf and/or wood chip surfaces within parks.</p>	<p>Playgrounds experience high levels of use by children. Pest management practices and materials used in these areas are, therefore, highly restrictive. Chemical pesticides will not be used to control vegetation in active playground turf or in chipped play areas or their margins. Instead, turf should be mowed periodically and chipped areas maintained through the periodic addition or replacement of wood chips. Playground/turf interface borders will be maintained through manual or mechanical means. If mowing, manual weeding and wood chip maintenance are inadequate to manage target weeds, playground areas should be closed temporarily for renovation. Stinging insects may be controlled using approved products.</p>
	<p><b>Park Athletic Fields</b> Includes turf fields managed for athletics that are not on school property. For athletic fields on school property, see the School Campuses section below.</p>	<p>Athletic fields experience high levels of use by children. Effective turf management combined with the judicious use of pest control products within an IPM context can reduce both the quantity applied and the necessary frequency. Where warranted, spot spraying should be used over broadcast treatments for turf weeds. To protect public health, any proposed pesticide applications must take into account athletic field scheduling, nearby school activities, evening recreation and other anticipated uses. Area closures and notification using temporary signage may be required prior, during and following the use of certain products</p>
	<p><b>Park Off-Leash Pet Areas</b> Includes fenced or unfenced park areas designated for users with off-leash dogs.</p>	<p>Concentrated pet activity in off-leash pet areas creates unique pest management challenges. Methods and materials should minimize potential risks to dogs and their owners. Off-leash pet areas should be closed prior to herbicide application within fenced areas or along fence lines. Area closures and notification using temporary signage may be required prior, during and following the use of certain products.</p>



High-Use Public Areas	<p><b>Community Gardens</b> Includes officially sanctioned fenced or unfenced community tended vegetable gardens.</p>	<p>Pest management in Community Gardens is generally limited to cultural, mechanical and physical and biological methods. In the absence of permission and prior notification, garden plots, pathways, fence lines, and any areas within and along garden boundaries are considered 'no-spray' areas. Low pressure, spot directed pesticide applications of approved products are permitted at least 25 feet from the outside perimeters of Community Gardens without prior notification. Broadcast pesticide applications boom sprayer equipment shall be kept at least 50 feet from the outside perimeters of Community Gardens without notification. Special circumstances requiring the applications of pesticides inside these limits must be made only through mutual agreement.</p>
	<p><b>School Campuses</b> Includes public or private school buildings, other structures, playgrounds, athletic fields, school parking lots, or other areas on school property that are accessed by students on a regular basis.</p> <p>A school IPM Coordinator is responsible for all aspects of pesticide use on school property. Pesticide applications are regulated by the Oregon IPM Requirements for Schools (ORS 634.700-634.750). For additional information see: <a href="http://www.oregon.gov/ODA/PEST/docs/pdf/school_ipm_web.pdf?ga=t">http://www.oregon.gov/ODA/PEST/docs/pdf/school_ipm_web.pdf?ga=t</a></p>	<p>At a minimum, schools must be notified in writing (email is acceptable) not less than 24 hours (during work days) before pesticide applications on school property. The notice must include the name of the pesticide product, the type of pesticide, the EPA registration number of each product, the expected date and area of application, the reason for the application. Notification signage must be posted around the pesticide application areas at least 24 hours before the pesticide application occurs and removed no earlier than 72 hours after the application. Signage must include: "Warning: Pesticide-Treated Area", the expected or actual data and time for the application and the telephone number of a contact person. The appropriate public or private pesticide applicator license or trainee license is required for anyone applying "low-impact" pesticides. The law requires that detailed pesticide application records be kept on file at schools for four years.</p>

<p><b>Forestry and Upland Natural Areas</b> Includes upland (i.e., not within Water Quality Sensitive Areas) county managed forests and natural areas exclusive of High-Use Public Areas.</p>	<p>Forests and natural areas provide wildlife habitat, timber and recreational opportunities. Pest management shall be focused on controlling or preventing the establishment of species that threaten habitat health or that interfere with native vegetation. Approved pesticides may be applied using backpack or hand application. Boom sprayers may be used in natural areas during preparation of open sites for revegetation with native plants as long as drift prevention measures and other label requirements are met. Motorized and aerial pesticide application is allowed in the context of forestry, only.</p>
<p><b>Roadside Rights-of-Way</b> Includes all public rights-of-way and the land on which roadways and their associated facilities and appurtenances are located. Where rights-of-way intersect with Water Quality Sensitive Areas, relevant requirements in such areas apply.</p>	<p>See <i>Clackamas County Integrated Vegetation Management Plan</i></p>

APPENDIX 3  
Clackamas County IPM Approved  
Products List

Product Type	Active Ingredient(s)	Product Names (Examples only)	Intended Purpose	Pesticide Hazard Tier <sup>1</sup>	Water Quality Sensitive Areas				High-Use Public Areas <sup>2</sup>								Forestry and Upland Natural Areas <sup>2</sup>	Roadside Rights-of- Way <sup>2</sup>
					Ponds and Lakes	Rivers and Streams	Seasonally Inundated Areas	Vegetated Buffer Areas	Building/ Facilities Landscapes	Public Golf Courses	Park Developed Areas	Park Playground Areas	Park Athletic Fields	Park Off-Leash Pet Areas	Community Gardens	School Campuses		
Herbicide	Aminopyralid	Milestone	Broadleaf selective herbicide	II				●	●	●	●		●	●		●	●	●
Herbicide	Triclopyr (amine)	Garlon 3A, LM Blackberry, Brush, Renovate 3, Tahoe 3A	Broadleaf selective herbicide	II					●	●	●						●	●
Herbicide	Triclopyr (ester)	Garlon 4 Ultra	Broadleaf selective herbicide	I*					●		●						●	●
Herbicide	2,4-D, 2-ethylhexyl ester, Mecoprop-p acid, Dicamba acid, Carfentrazone-ethyl	Speedzone	Broadleaf weed control in turfgrass	I*					●		●							
Herbicide	Clethodim	Section 2EC	Grass selective herbicide	I				●	●								●	●
Herbicide	Sethoxydim	Poast, Vantage	Grass selective herbicide	II					●								●	●
Herbicide	Ferrous sulfate monohydrate	Lilly Miller Moss Out!	Moss control in turf	II					●	●	●							
Herbicide	Glyphosate (aquatic label)	AquaMaster, AquaPro, Rodeo, Accord Concentrate, Aquaneat	Non-selective herbicide	III	●	● <sup>3</sup>	●	●	●	●	●		●	●	●	●	●	●
Herbicide	Imazapyr (aquatic label)	Habitat, Polaris	Non-selective herbicide	II	●	● <sup>3</sup>	●	●	●	●	●		●	●		●	●	●
Herbicide	Dichlobenil (2,6-dichlorobenzonitrile)	Barrier	Non-selective pre-emergent herbicide	I*					●	●	●							
Insecticide	Pyrethrin compounds	Aerosol Wasp Sprays	Directed Jet sprays used for individual wasp and hornet nest treatments posing human safety threat	III					●	●	●	●	●	●	●	●		
Insecticide	Imidacloprid	Mallet, Merit	Insecticide in turfgrass	I*					●		●							
Insecticide	Pheromone trap	Wasp/yellow jacket traps	Yellow jacket trap	III					●	●	●	●	●	●	●	●		
Marker dye	Marker dye	Dynamark U.V., Hi-Light Blue Indicator, others	Spray solution indicator dye	IV	●	● <sup>3</sup>	●	●	●	●	●		●	●	●	●	●	●
Rodenticide	Bromethalin	Talpirid	Mole control	II					●	●	●							
Surfactant	Methylated and ethylated seed oils	Hasten, Competitor, MSO, Super Spread MSO, others	Enhanced spray effectiveness	IV	●	● <sup>3</sup>	●	●	●	●	●		●	●	●	●	●	●
Surfactant	Phosphatidylcholine, methylacetic acid, alkyl polyoxyethylene ether	LI 700	Enhanced spray effectiveness	III			●	●	●	●	●		●	●	●	●	●	●
Insecticide	Chlorantraniliprole	Acelepryn	grub control in turf						●		●		●					
Herbicide	20% Vinegar	Green Gobbler	Burn down weed control								●		●					

<sup>1</sup> I = Minimize use or find alternative (\* = Listed on high risk chemical lists), II = More restrictive use, III = Less restrictive use, IV = Least restrictive use

<sup>2</sup> Excludes Water Quality Sensitive Areas

<sup>3</sup> Use limited to control of noxious weeds

## APPENDIX 4 Invasive Species Lists

CSWCD updated lists can be found at the CSWCD Weedwise Website

<https://weedwise.conservationdistrict.org/weeds>

Clackamas County Weed List					
Source: Clackamas County SWCD WeedWise Program, updated 6/26/2012					
Common Name	Scientific Name	ODA Listing	Priority <sup>1</sup>	Clackamas EDRR <sup>2</sup>	Regional EDRR
Scotch Broom	<i>Cytisus scoparius</i>	B			
Portuguese Broom	<i>Cytisus striatus</i>	B			
Spurge laurel	<i>Daphne laureola</i>	B	yes	yes	yes
Cutleaf teasel	<i>Dipsacus laciniatus</i>	B	yes		
Paterson's curse	<i>Echium plantagineum</i>	A	yes		yes
South American waterweed	<i>Egeria densa</i>	B			
Spanish heath	<i>Erica lusitanica</i>	B			
Leafy Spurge	<i>Euphorbia esula</i>	B	yes		
Myrtle Spurge	<i>Euphorbia myrsinites</i>	B			
Oblong spurge	<i>Euphorbia oblongata</i>	A	yes		
Japanese Knotweed	<i>Fallopia japonica</i> (Polygonum)	B	yes	yes	yes
Giant Knotweed	<i>Fallopia sachalinensis</i> (Polygonum)	B	yes	yes	yes
Goatsrue	<i>Galega officinalis</i>	A	yes		yes
French Broom	<i>Genista monspessulana</i>	B			
Shiny leaf geranium	<i>Geranium lucidum</i>	B			
Herb Robert	<i>Geranium robertianum</i>	B			
Halogeton	<i>Halogeton glomeratus</i>	B	yes		
English ivy	<i>Hedera helix</i>	B			
Irish ivy	<i>Hedera hibernica</i>	B			
Spikeweed	<i>Hemizonia pungens</i>	B	yes		
Giant hogweed	<i>Heracleum mantegazzianum</i>	A	yes	yes	yes
Orange Hawkweed	<i>Hieracium aurantiacum</i>	A	yes	yes	yes
Yellow Hawkweed	<i>Hieracium floribundum</i>	A	yes		yes
Mouse-ear Hawkweed	<i>Hieracium pilosella</i>	A	yes		
King-devil Hawkweed	<i>Hieracium piloselloides</i>	A	yes		
Meadow Hawkweed	<i>Hieracium pratense</i>	A	yes		yes
Hydrilla	<i>Hydrilla verticillata</i>	A	yes		
St. Johnswort	<i>Hypericum perforatum</i>	B			
Policeman's helmet	<i>Impatiens glandulifera</i>	B			
Yellow flag iris	<i>Iris pseudacorus</i>	B			
Dyers woad	<i>Isatis tinctoria</i>	B			
Kochia	<i>Kochia scoparia</i>	B	yes		
Yellow archangel	<i>Lamium galeobdolon</i>	B			yes
Perennial peavine	<i>Lathyrus latifolius</i>	B			
Lens-podded Whitetop	<i>Lepidium chalepensis</i>	B	yes		
Hoary cress	<i>Lepidium draba</i>	B	yes		
Perennial pepperweed	<i>Lepidium latifolium</i>	B	yes		
Hairy Whitetop	<i>Lepidium pubescens</i>	B	yes		
Dalmatian Toadflax	<i>Linaria dalmatica</i>	B			
Yellow Toadflax	<i>Linaria vulgaris</i>	B			
Water primrose	<i>Ludwigia grandiflora</i>	B			yes
Water primrose	<i>Ludwigia hexapetala</i>	B			yes
Water primrose	<i>Ludwigia peploides</i>	B			yes
Money Plant	<i>Lunaria annua</i>				yes
Purple loosestrife	<i>Lythrum salicaria</i>	B	yes	yes	yes
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>	B	yes		
Parrots feather	<i>Myriophyllum aquaticum</i>	B			

Clackamas County Weed List (contd.)					
Source: Clackamas County SWCD WeedWise Program, updated 6/26/2012					
Common Name	Scientific Name	ODA Listing	Priority <sup>1</sup>	Clackamas EDRR <sup>2</sup>	Regional EDRR
Matgrass	<i>Nardus stricta</i>	A	yes		
Yellow floating heart	<i>Nymphoides peltata</i>	A	yes		
Scotch Thistle	<i>Onopordum acanthium</i>	B	yes		yes
Taurian Thistle	<i>Onopordum tauricum</i>	A	yes		
Small broomrape	<i>Orobanche minor</i>	B			
African rue	<i>Peganum harmala</i>	A	yes		
Japanese Butterbur	<i>Petasites japonica</i>				yes
Common reed	<i>Phragmites australis ssp. Australis</i>	A	yes		yes
American pokeweed	<i>Phytolacca americana</i>				yes
Himalayan Knotweed	<i>Polygonum polystachyum</i>	B	yes	yes	yes
Sulfur cinquefoil	<i>Potentilla recta</i>	B	yes		
Kudzu	<i>Pueraria lobata</i>	A	yes	yes	yes
Lesser celandine	<i>Ranunculus ficaria</i>	B			
Creeping yellow cress	<i>Rorippa sylvestris</i>	B			
Armenian (Himalayan) blackberry	<i>Rubus armeniacus (R. procerus, R.</i>	B			
Mediterranean sage	<i>Salvia aethiopis</i>	B			
Tansy ragwort	<i>Senecio jacobaea</i>	B			
Blessed Milk Thistle	<i>Silybum marianum</i>	B			yes
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>	A	yes		
Buffalobur	<i>Solanum rostratum</i>	B			
Johnsongrass	<i>Sorghum halepense</i>	B	yes		
Smooth Cordgrass	<i>Spartina alterniflora</i>	A	yes		
Common Cordgrass	<i>Spartina anglica</i>	A	yes		
Dense-flowered Cordgrass	<i>Spartina densiflora</i>	A	yes		
Saltmeadow Cordgrass	<i>Spartina patens</i>	A	yes		
Spanish Broom	<i>Spartium junceum</i>	B	yes		
Swainsonpea	<i>Sphaerophysa salsula</i>	B			
Medusahead rye	<i>Taeniatherum caput-medusae</i>	B	yes		
Saltcedar	<i>Tamarix ramosissima</i>	B			
European water chestnut	<i>Trapa natans</i>	A	yes		
Puncturevine	<i>Tribulus terrestris</i>	B			
Coltsfoot	<i>Tussilago farfara</i>	A	yes		
Gorse	<i>Ulex europaeus</i>	B	yes	yes	yes
Spiny cocklebur	<i>Xanthium spinosum</i>	B	yes		
Syrian bean-caper	<i>Zygophyllum fabago</i>	A	yes		

<sup>1</sup>Priority weed species are eligible for Conservation District led control efforts. Priority weed criteria include ODA A-listing, and weeds that occur in an adjacent county but have not been observed in Clackamas County.

<sup>2</sup>Targeted weed species highlighted for free weed treatment in Clackamas County.

<sup>3</sup>Weed Species have been targeted for rapid response control efforts in the Portland Metro region. Affected landowners should contact their local SWCD for eligibility.

Oregon Invasive Species Council 100 Worst List		
Source: OISC, updated 9/5/2012		
Group	Common name	Scientific name
Aquatic invertebrates	Asian tapeworm	<i>Bothriocephalus acheilognath</i>
	Waterflea (fishhook, spiny)	<i>Cercopagis pengoi</i> , <i>Bythotrephes cederstroemi</i>
	Transparent tunicate	<i>Ciona savigny</i>
	Sea squirt	<i>Didemnum sp.</i>
	Zebra mussel, guagga mussel	<i>Dreissena polymorpha</i>
	Mitten crabs	<i>Eriocheir spp.*</i>
	Japanese shore crab	<i>Hemigrapsus sanguineus</i>
	Leidy's comb jelly	<i>Mnemiopsis leidy</i>
	Crayfish	<i>Orconectes virilis</i> (virile crayfish), <i>Procambarus sp.</i> (marbled crayfish or "marmorkrebs")
	New Zealand seaslug	<i>Philine auriformis**</i>
	Asian clam	<i>Potamocorbula amurensis</i>
	Veined rapa whelk	<i>Rapana venosa</i>
	Club tunicate	<i>Styela clava</i>
Aquatic plants	Flowering rush	<i>Butomus umbellatus</i>
	Caulerpa seaweed	<i>Caulerpa taxifolia</i>
	Dead man's fingers	<i>Codium fragile tomentosoides</i>
	Rock snot	<i>Didymosphenia geminate</i>
	Hydrilla	<i>Hydrilla verticillata</i>
	Yellow floating heart	<i>Nymphoides peltata**</i>
	Common reed	<i>Phragmites australis</i>
	Algae, toxic (golden, toxic cyanobacteria)	<i>Prymnesium parvum</i> , <i>Cylindrospermopsis raciborskii</i>
	Giant salvinia	<i>Salvinia molesta</i>
	Cordgrasses	<i>Spartina alterniflora*</i> , <i>S. densiflora</i> , <i>S. anglica</i> , <i>S. patens**</i>
	European water chestnut	<i>Trapa natans</i>
	Asian kelp	<i>Undaria pinnatifida</i>
Birds	Mute swan	<i>Cygnus olor</i>
Fish	Snakehead	<i>Channa spp.</i>
	Threadfin shad (yellow tails, shad and	<i>Dorosoma petenense</i>
	Muskellunge, northern pike, tiger muskie	<i>Esox spp.*</i>
	Ruffe	<i>Gymnocephalus cernuus</i>
	Asian carp (bighead, silver), black carp	<i>Hypophthalmichthys nobilis</i> , <i>H. molitrix</i> , <i>Mylopharyngodon piceus</i>
	Golden shiner	<i>Notemigonus crysoleucas</i>
	Amur goby, round goby, Shimofuri goby	<i>Rhinogobius brunneus</i> , <i>Neogobius melanostomus</i> , <i>Tridentiger bifasciatus</i>
	Atlantic salmon	<i>Salmo salar</i>
Land invertebrates	Emerald ash borer	<i>Agilus planipennis</i>
	Oriental beetle	<i>Anomala orientalis</i>
	Asian longhorned beetle	<i>Anoplophora glabripennis</i> , <i>A. chinensis</i>
	Africanized honey bee	<i>Apis mellifera scutellata</i>
	Silver Y moth	<i>Autographa gamma</i>
	Japanese wax scale	<i>Ceroplastes japonicus</i>
	Plum curculio	<i>Conotrachelus nenuphar</i>
	Swede midge	<i>Contarinia nasturtii</i>
	Siberian moth	<i>Dendrolimus superans</i>
	Mexican bean beetle	<i>Epilachna varivestis</i>
	Light brown apple moth	<i>Epiphyas postvittana</i>
* Detected previously in Oregon, but eradicated or did not establish.		
** Currently under eradication or restricted to a small area in Oregon.		

Oregon Invasive Species Council 100 Worst List (contd.)		
Source: OISC, updated 9/5/2012		
Group	Common name	Scientific name
Land Invertebrates	Old world bollworm	<i>Helicoverpa armigera</i>
	Spruce bark beetle	<i>Ips typographus</i>
	Argentine ant	<i>Linepithema humile</i> *
	Gypsy moths (European, Asian, pink, nun moth)	<i>Lymantria dispar</i> *, <i>L. mathura</i> *, <i>L. monacha</i>
	Bean plataspid	<i>Megacopta cribraria</i>
	European corn borer	<i>Ostrinia nubilalis</i>
	Japanese beetle	<i>Popillia japonica</i> *
	European chafer	<i>Rhizotrogus majalis</i>
	European woodwasp	<i>Sirex noctilio</i>
	Imported fire ants (red, black)	<i>Solenopsis invicta</i> *, <i>S. richteri</i>
	Brown spruce longhorn beetles	<i>Tetropium fuscum</i> , <i>T. castaneum</i> *
	White garden snail, vineyard snail, and Heath snail (terrestrial snails)	<i>Theba pisana</i> , <i>Cernuella virgata</i> , <i>Xerolenta obvia</i>
	Khapra beetle	<i>Trogoderma granarium</i>
	Granulate ambrosia beetle	<i>Xylosandrus crassiusculus</i> *
Mammals	Feral swine	<i>Sus scrofa</i> **
Micro-organisms	Blackberry yellow vein disease, blackberry yellow vein-associated virus (BYVaV) and blackberry virus Y (BVY)	
	Blueberry hill carlavirus - New Jersey strain	(BBScV-NJ)
	Willow watermark disease	<i>Brenneria salicis</i>
	Oak wilt	<i>Ceratocystis fagacearum</i>
	Chronic wasting disease	CWD prion
	Elm yellows	<i>Elm yellows phytoplasma</i>
	Potato cyst nematode	<i>Globodera pallida</i>
	Infectious salmon anemia virus	ISAV
	Whirling disease	<i>Myxobolus cerebralis</i>
	Viral hemorrhagic septicemia virus (VHSV)	<i>Novirhabdovirus spp.</i>
	Alder root rot	<i>Phytophthora alni</i>
	Phytophthora taxon C	<i>Phytophthora kernoviae</i>
	Ramorum canker and blight, sudden oak death	<i>Phytophthora ramorum</i>
	Plum pox	<i>Plum pox potyvirus (PPV)</i>
	Hazelnut bacteria canker	<i>Pseudomonas avellanae</i>
	Southern wilt, bacteria wilt	<i>Ralstonia solanacearum</i> Race 3 Biovar 2
	Potato wart	<i>Synchytrium endobioticum</i>
	Poplar canker	<i>Xanthomonas populi</i>
	Bacterial blight of grape	<i>Xylophilus ampelinus</i>
Reptiles	Eastern snapping turtle	<i>Chelydra serpentina serpentina</i>
* Detected previously in Oregon, but eradicated or did not establish. **		
Currently under eradication or restricted to a small area in Oregon.		

## APPENDIX 5 Invasive Species Best Management Practices Calendar

Note: This weed management calendar was adapted from the Western Washington Invasive Weed Management Calendar (2007). The 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 particular 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.

LATIN NAME	COMMON NAME	PLANT TYPE/ TREATMENT TYPE(S)	MINIMUM TREATMENT DURATION	WINTER			SPRING			SUMMER			FALL								
				December	January	February	March	April	May	June	July	August	September	October	November						
<i>Alliaria petiolata</i>	Garlic Mustard	Herbaceous Biennial	Seeds last 7+ years		Rosette/2nd Year Rosettes Re-emerge		Bolt				Seed Pods Mature/ Seed Mature										
									Flower	Flower/ Seed Pods Emerge	Flower/ Seed Pods Green/ Seed Develops	Seed Pods Release									
		Manual	>5 years						Pull and bag bolting, flowering and seeding plants. Dispose of bagged material in trash. Revisit sites every few weeks to pull plants sprouting from left behind root fragments.												
				Mowing is not effective. Mowing when seed is present (typically between June and October) will spread garlic mustard seeds.																	
		Chemical	>5 years						Spray with glyphosate or triclopyr						Spray rosettes with						
		IPM	>5 years						Spray with glyphosate or triclopyr					Re-visit sprayed sites to hand pull all plants that were missed during, or grew after herbicide application							
<i>Buddleia davidii</i>	Butterfly Bush	Tall Deciduous Shrub							Leaf Out			Flower		Flower/Seed							
		Manual		Dig up or weed wrench and 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)		
<i>Calystegia sepium</i> or <i>Convolvulus arvensis</i>	Bindweed or Morning Glory	Herbaceous Perennial					Emerge			Flower			Seed								
		Manual or Mechanical	>2 years				Cut or pull; remove fragments										Heavily mulch infested area				
		Shade	3 to 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 feet from infested area)																	
		Chemical	>2 years						Foliar spray (Aminopyralid at bud stage or Triclopyr at full flower). Unwind from desirable 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 inch long									
		Mechanical + Chemical							Cut plants and spray/wipe on when regrowth > 12 inches (Glyphosate)												
<i>Centaurea biebersteinii</i>	Spotted Knapweed	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)											
<i>Cirsium arvense</i>	Canada Thistle	Herbaceous Perennial						Germinate & Growth	Rosettes	Bolt	Flower		Flower/Seed	Seed	Germinate/Rosettes						
		Manual or Mechanical	>2 years					Pull/mow every 3-4 weeks													
		Shade						Cut and Sheet Mulch								Cut and Sheet Mulch					
		Chemical												Foliar spot spray (Triclopyr or Aminopyralid)							
		Mechanical + Chemical												Cut late July	Spray regrowth late August (Glyphosate)						



LATIN NAME	COMMON NAME	PLANT TYPE/ TREATMENT TYPE(S)	MINIMUM TREATMENT DURATION	WINTER			SPRING			SUMMER			FALL		
				December	January	February	March	April	May	June	July	August	September	October	November
<i>Cirsium vulgare</i>	Bull Thistle	Herbaceous Biennial						Emergence		Flower		Flower/Seed	Seed/Emergence		
		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)		
<i>Clematis vitalba</i>	Old Man's Beard	Climbing Deciduous Vine					Emergence			Flower			Seed		
		Manual or Mechanical													
		Mechanical + Chemical (option 1)	about 2 years												
		Mechanical + Chemical (option 2)	about 2 years												
<i>Conium maculatum</i>	Poison-hemlock	Herbaceous Biennial					Germinate	Rosettes	Bolt	Flower		Seed	Germinate		
		Manual or Mechanical													
		Chemical													
<i>Cytisus scoparius</i>	Scotch Broom	Large Shrub; deciduous leaves, evergreen stems			Growth		Buds/Leaf Out	Flower				Seed		Growth	
		Manual													
		Mechanical													
		Chemical													
<i>Geranium robertianum</i>	Herb Robert	Herbaceous Annual					Rosettes	Seedlings/Rosettes	Flowering/Seed				Seed	Rosettes	
		Manual													
		Chemical													
<i>Hedera hibernica, H. helix</i>	English Ivy	Evergreen Woody Vine					Berry/ Seed	Vegetative				Flower		Berry/Seed	
		Manual or Mechanical	2 years												
		Cultural													
		Chemical (option 1)													
		Chemical (option 2)													
		Chemical (option 3)													

LATIN NAME	COMMON NAME	PLANT TYPE/ TREATMENT TYPE(S)	MINIMUM TREATMENT DURATION	WINTER			SPRING			SUMMER			FALL		
				December	January	February	March	April	May	June	July	August	September	October	November
<i>Hieracium</i> sp.	Hawkweed	Herbaceous Perennial					Emerge		Bud/Flower		Flower/Seed				
		Manual or Mechanical					Dig up including roots and runners								
		Shading					Remove and discard flowers								
		Chemical					Cover with landscape fabric								
							Foliar spray before flowers open (Triclopyr)								
<i>Ilex aquifolium</i>	English Holly	Evergreen Shrub or Tree; often multi- 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 Glyphosate). On large trunks only the outer edge needs to be cut and treated.								
<i>Impatiens glandulifera</i>	Policeman's Helmet	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)						
<i>Lepidium latifolium</i>	Perennial pepperweed	Herbaceous Perennial					Emerge		Flower		Flower/Seed				
		Manual								Pull or dig plants growing in sand or loose soil					
		Chemical							Foliar spray up through bloom stage (Chlorsulfuron with surfactant)				Foliar spray (Chlorsulfur on with surfactant)		
		Mechanical + Chemical							Mowing followed by foliar applications to resprouts (Glyphosate with appropriate surfactants)						
<i>Lysimachia vulgaris</i>	Garden Loosestrife	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					
<i>Lythrum salicaria</i>	Purple Loosestrife	Herbaceous Perennial						Emerge		Flower		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	Up to 5 years before significant decrease in plant density						Release galerucella beetles on large stands			Release galerucella beetles on large stands			

LATIN NAME	COMMON NAME	PLANT TYPE/ TREATMENT TYPE(S)	MINIMUM TREATMENT DURATION	WINTER			SPRING			SUMMER			FALL		
				December	January	February	March	April	May	June	July	August	September	October	November
<i>Phalaris arundinacea</i>	Reed Canary Grass	Perennial grass					Emerge		Flower		Flower/Seed	Seed/Growth			
		Manual	at least 5 yrs					Hand pull/dig over whole population							
		Mechanical	5 to 10 years					Mow							
		Mechanical + Shade	at least 1 year					Mow and cover with a combination of several layers of cardboard covered with 4-6 inches woodchips							
		Flooding	1 to 3 yrs					Inundation for whole growing season							
		Mechanical + Chemical	1 to 2 years							Mow fields before seeds mature	Foliar spray when regrowth is 1 ft tall (Glyphosate); wait 2 weeks; mow; spray again				
		Chemical	1 year for small patches; 2 or more years for large infestations				Foliar spray young shoots (Glyphosate ); less damage to native grasses			Foliar spray before summer dormancy (Glyphosate)		Foliar spray regrowth (Glyphosate); till 2-3 weeks after spray for improved control			
<i>Polygonum cuspidatum, P. bohemicum, P. sachalinense</i>	Knotweed	Tall Rhizomatous Perennial					Emerge	Growth		Flower		Seed		Die back	
		Mechanical	at least 5 years, not very effective on established patches				Cut twice each month					Cut once; then cover area with cardboard and deep mulch			
		Mechanical + Shade	5 years; can plant in area after 3 years							Cut to ground and cover with landscape fabric; stake down and monitor for growth at the edges					
		Mechanical + Chemical								Cut once	Foliar spray when about 3ft (Glyphosate, Triclopyr or Aminopyralid)				
		Chemical alone	at least 2 years									Inject stems >1/2 inch			
<i>Prunus laurocerasus</i>	English Laurel	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 and apply concentrated herbicide within 20-30 seconds (Triclopyr or Glyphosate)								
<i>Rubus armeniacus, R. discolor, R. laciniatus</i>	Blackberry (Himalayan and Cutleaf)	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	at least 2 yrs	Cut canes/grub out crowns when soil is moist						Dig or cut regrowth		Grub out roots when soil is moist			

LATIN NAME	COMMON NAME	PLANT TYPE/ TREATMENT TYPE(S)	MINIMUM TREATMENT DURATION	WINTER			SPRING			SUMMER			FALL		
				December	January	February	March	April	May	June	July	August	September	October	November
		Cultural Chemical (option 1)							Foliar spray when plants are actively growing (Triclopyr)				Mulch area after Foliar spray when canes are actively growing and 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 and spot spray immediately after cutting (Glyphosate or Triclopyr)			Check area and repeat if necessary				
		Mechanical + Chemical							Clear mechanically				Foliar spray regrowth (Triclopyr, Aminopyralid or Glyphosate)		
<i>Senecio jacobaea</i>	Tansy Ragwort	Herbaceous biennial					Rosettes	Bud/Flower	Flower	Flower/Seed	Seed/Rosettes	Rosettes			
		Manual or Mechanical						Dig up rosettes if soil is moist			Pull and bag flowering stems			Dig up rosettes if soil is moist	
		Chemical						Foliar spray rosettes and flowering plants (Aminopyralid or Triclopyr)					Foliar spray rosettes (Aminopyralid or Triclopyr)		
<i>Solanum dulcamara</i>	Bittersweet Nightshade	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							
<i>Sonchus arvensis</i>	Perennial Sowthistle	Herbaceous Perennial					Seedlings/Rosettes	Flower	Seed						
		Manual or Mechanical					Dig up including roots and runners								
		Shading					Cover with landscape fabric								
		Chemical					Foliar spray actively growing plants before bud stage and at bud stage before flowers open (Aminopyralid). Plan to spray regrowth and beware of permit/license restrictions in coastal and wet areas								
<i>Tanacetum vulgare</i>	Common Tansy	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 yr					Spot spray actively growing plants (Metsulfuron), or wipe on (chemical ?)			Wipe on during flower/seed set (Glyphosate); not as effective as metsulfuron - cut & bag flower/seed heads				

# **RESTORATION IN PROGRESS ATTENTION**

**Invasive weeds are being treated with approved herbicides by state-licensed applicators.**

**Application methods are designed to protect park visitors, water quality, and native species.**

**Treated plants may show signs of blue dye. Avoid areas that have been treated until the herbicide has dried.**

**DATE:**

**TARGETS:**

**PRODUCT USED:**

The National Pesticide Information Center at OSU can address public concerns regarding herbicide use.

1-800-858-PEST (7378) **NPIC@ace.orst.edu**

**APPENDIX 7**  
**Sample Pesticide Application Record**

PESTICIDE APPLICATION RECORD			
Applicator's full name:		Applicator company name:	Applicator license#:
Trainee's full name:		Applicator company address:	Business license #:
Application Location:		Product name(s):	Mix ratio or percentage: (e.g., 3g/100g or 3%)
Date:	Site:	Formulation(s):	
Time in:			
Time out:	Specific area treated:	EPA registration number(s):	
Temp:			
Wind:			
Equipment used:	Total area treated:	Total amount of dilute pesticide applied:	
	Target species:	Coverage rate (e.g., 6lbs/1000 sq ft):	
Notes:			
Pesticide supplier:			

## APPENDIX 8 Clackamas County Emergency and Informational Contacts

Emergency Phone Numbers	
Fire, Ambulance, HAZMAT	911
Clackamas County	
Risk Management	503-655-8576
Medical Emergencies & Immediate Health Concerns	
Oregon Poison Center- 24 hours Daily	Portland Area 503-494-8968 Outside Portland Area 800-222-1222
DEQ Northwest Regional Office	503-229-4263
Oregon Emergency Response System	800-452-0311
Oregon DEQ Environmental Cleanup Program	503-229-5913
National Response Center	800-424-8802
CHEMTREK: an industry emergency spill information service	800-424-9300
Informational Phone Numbers	
NPIC - National Pesticide Information Center	800-858-7378
Oregon Department of Agriculture	503-986-4635
Pesticide Exposure Reporting	
Pesticide Analytical and Response Center (PARC)	503-731-4025

## APPENDIX 9 Priority Chemicals of Concern Resources

Adapted from Multnomah County, Oregon.

1. Environmental Protection Agency (EPA), *First 12 Priority PBT's "Dirty Dozen"*, retrieved July, 2005, from <http://www.epa.gov/pbt/pubs/accomp99.htm> .
2. Oregon Department of Environmental Quality, *P2 for Persistent, Bioaccumulative Toxic Pollutants (PBT's)*, retrieved July, 2005 from <http://www.deq.state.or.us/nwr/epoc/ch2.htm> .
3. WA Department of Ecology, *Persistent Bioaccumulative Toxins (PBT List Section)*, retrieved Sept., 2005 from [http://www.ecy.wa.gov/laws-rules/wac173333/p0407\\_cont\\_a.pdf](http://www.ecy.wa.gov/laws-rules/wac173333/p0407_cont_a.pdf) .
4. Dieckhoner, T., City of Seattle, *PBT Reduction Strategy: Progress Report to City Council*, retrieved Sept., 2005 from <http://www.ci.seattle.wa.us/environment/Documents/PBTStrategy3-07-03.pdf> .
5. Tolman, S., The Commonwealth of Massachusetts, *An Act for A Healthy Massachusetts: Safer Alternatives to Toxic Chemicals*, retrieved July, 2005 from <http://www.mass.gov/legis/bills/senate/st00/st00553.htm> .
6. Oregon Environmental Council, *Children at Risk: How Toxic Chemicals Threaten Oregon's Children and What We Can Do About It*, retrieved Oct., 2005 from [www.oeconline.org/kidshealth/childrenatrisk](http://www.oeconline.org/kidshealth/childrenatrisk).
7. Toxic Reduction Strategy Workgroup recommendations September 2005 until January 2006.
8. United Nations Environment Program (UNEP), *Stockholm Convention Persistent Organic Pollutants*, retrieved Jan. 2006 from [http://www.pops.int/documents/guidance/beg\\_guide.pdf](http://www.pops.int/documents/guidance/beg_guide.pdf) .
9. Community stakeholder input - Chemicals/products and practices suggested by local citizens.
10. Oregon Partnership for Cancer Control (2005), *Oregon Comprehensive Cancer Plan*, retrieved July, 2005, <http://www.oregon.gov/DHS/ph/cancer/docs/cancerplan/cplan05.pdf> .
11. State of California, Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *Safe Drinking Water and Toxic Enforcement Act of 1986 (Prop 65), Chemicals known to the State to cause cancer or reproductive toxicity, February 3, 2006*, retrieved March 2006 from [http://www.oehha.ca.gov/prop65/prop65\\_list/files/P65single20306.pdf](http://www.oehha.ca.gov/prop65/prop65_list/files/P65single20306.pdf) .
12. Oregon Department of Environmental Quality, Oregon Air Toxics Program, *Notice of Proposed Rule Making, Ambient Benchmarks for 49 air toxics*, retrieved March, 2006 [http://www.deq.state.or.us/news/publicnotices/uploaded/060207\\_5621\\_05-AQ-002\\_Benchmarks.pdf](http://www.deq.state.or.us/news/publicnotices/uploaded/060207_5621_05-AQ-002_Benchmarks.pdf) .
13. State of California, Environmental Protection Agency, Office of Environmental Health Hazard Assessment, *All chronic reference exposure levels adopted by OEHHA as of February 2005*, retrieved March, 2006 from [http://www.oehha.ca.gov/air/chronic\\_rels/AllChrels.html](http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html) .
14. Environmental Protection Agency (EPA), *National Partnership for Environmental Priorities, 31 Priority Chemicals*, retrieved March, 2006 from <http://www.epa.gov/epaoswer/hazwaste/minimize/chemlist.htm>.