



Invasive Species Toolkit For Local Government, Real Estate Professionals and Land Managers

NOVEMBER 2018

Note: Some information in this document is now outdated.
Please verify details for the most current information.



Acknowledgements

The development of the Invasive Species Toolkit for Local Government, Real Estate Professionals and Land Managers was a dedicated and collaborative process. Coordinated by the Invasive Species Council of BC, the Toolkit is based on the input of numerous contributors from a range of agencies, organizations, and businesses.

The original Local Government Toolkit for Invasive Plant Management was developed in 2011 by a skilled and knowledgeable **Local Government Advisory Committee** that included: Brian Allaert (Comox Valley Regional District), Shannon Anderson (Peace River Regional District), Lanny Englund (City of Coquitlam), Christine Ensing (City of Burnaby), Bill Huot (Ministry of Community and Rural Development), Caroline Jackson (City of North Vancouver), Dennis Labrie (Thompson Nicola Regional District), Carolyn MacDonald (District of Saanich), Kevin Paterson (Regional District of East Kootenay), David Ralph (Ministry of Agriculture), and Emily Sonntag (Cariboo Regional District).

Building on this information and expertise, the Invasive Species Toolkit for Local Government was updated and broadened in 2014 and includes relevant invasive species information pertaining to all invasive species, and is not restricted to plant species alone. The Toolkit's updates and further development was guided by an advisory team whose role was to consider all input and advise on content to be included. Team members represented provincial and local governments, businesses, and non-government organizations. The team encompassed an array of perspectives and contributed expertise on governance and regulatory tools, property development processes, regulation and enforcement and non-regulatory management options for invasive species. Since this time, this Toolkit has been updated to include additional information relevant to real estate professionals, land developers and other land managers.

The **2014 Advisory Committee** included: Christine Ensing (City of Burnaby), Bill Huot (Ministry of Community, Sport and Cultural Development), Caroline Jackson (City of North Vancouver), Frank Limshue (Couverdon Real Estate), Ralph Nevill (District of North Vancouver), Adriane Pollard (City of Saanich), Dave Ralph (Ministry of Forests, Lands and Natural Resource Operations), Therese Reinch (Macdonald Realty Ltd.), Ken Schwaerzle (Fraser Valley Invasive Plant Council). The Council would also like to thank ISCBC staff members, Gail Wallin, Danielle Toperczer and Julianne Leekie, for their work in preparing this document.

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Thank you to all contributors!

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Executive Summary

Invasive species pose a threat to our environment, health, safety, and economy. These threats are becoming more pronounced as changing weather patterns impact the distribution and abundance of invasive species detected. Because of their negative impacts and rapid spread, invasive species have global recognition as a serious threat. Local governments can provide a critical component to addressing invasive species issues.

This Toolkit was developed by the Invasive Species Council of BC (ISCBC) to provide a resource for real estate professionals, landscape architects, property owners, developers and local governments (including regional districts and municipalities) and elected officials in British Columbia as a means of providing information on invasive species management tools and options. It is intended to be used in conjunction with the ISCBC's Legislative Guidebook for Invasive Plant Management in BC (ISCBC 2007).

Many local governments have enacted bylaws pertaining to noxious weeds or invasive plants specifically requiring property owners to ensure that certain listed species are not growing on their property, or are controlled from spreading from their property. However there are few, if any, local governments that are addressing other invasive species such as European fire ant (*Myrmica rubra*) and nutria (*Myocastor coypus*). While these are relatively new concerns at the local government scale, they are establishing themselves at a rapid rate causing mounting concern throughout the province. Local governments have a suite of tools and options available to them. Local governments can choose to adopt an invasive plant control function under the *Weed Control Act* to control the species listed under the regulations of that act and alternatively, or in addition, they can develop a program and regulations under the *Local Government Act* (regional districts), or Community Charter (municipalities) that can address invasive species beyond plants. More detailed information on the relevant sections of these Acts, factors to consider when developing regulations, and examples of bylaws, are provided in this Toolkit.

THIS TOOLKIT INCLUDES INFORMATION ON:

- Recommendations and tools available to developers and real estate professionals regarding invasive species on private lands,
- Local government jurisdiction and enabling legislation for local invasive species control programs,
- Non-regulatory approaches to invasive plant management,
- Recommendations for bylaws and development review processes,
- Information on determining responsibility and management of private property impacted by invasive species,
- Examples of existing bylaws and successful local government initiatives in BC,
- Tips for getting started; and
- Key resources and reporting tools available on invasive species in BC.



European fire ant (*Myrmica rubra*)
Photo: R. Ottens

A non-regulatory approach to invasive species management by local governments can include the prevention of infestations, engaging landowners, and the detection of new invaders. It would be beneficial to conduct inventories to determine which species and sites are a concern, followed by a means of prioritizing and coordinating a combination of treatments for high priority infestations. To be successful, every approach must be followed with consistent monitoring and continual revisions. This approach can form a unique and relevant program for any local government.

Partnerships can be an excellent method for developing and delivering invasive species management in terms of funding, expertise, resources, and services. Collaborations may be inter-departmental or extended to invasive plant/species committees, government agencies or community groups. Keys to success include pooling resources, thinking regionally, incorporating education, landowner incentives, and utilizing community volunteers in program development. In addition, training staff, incorporating best management practices into everyday procedures, identifying a contact staff member, prioritizing activities, and developing local government policies and programs related to invasive species management are all helpful in building and maintaining strong and successful programs.



Eurasian watermilfoil (*Myriophyllum spicatum*)
Photo: TSCBC



Scotch Broom (*Cytisus scoparius*)
Photo: L. Meinhoff, bugwood.org

Module 1.0 Introduction

1.1 LOCAL GOVERNMENTS, REAL ESTATE PROFESSIONALS AND LAND MANAGERS & INVASIVE SPECIES

Invasive non-native species pose a threat to our environment, health, safety, and economy due to their ability to spread rapidly and overwhelm native species, forming monocultures that can damage existing flora and fauna. For example, invasive plants can out-compete British Columbia's native, crop, and forage plant species for essential resources such as nutrients, sunlight, and water while other invasive species can cause economic or environmental harm by dominating a region and rendering it unusable by people or animals and reducing ecological diversity. Invasive species usually have no natural predators in these new environments, giving them a great competitive advantage against desirable species. Because of their negative impacts and rapid spread, invasive species have global recognition as a serious threat. International, National and Provincial regulations have been developed to address this problem. Local governments can play a key role in addressing invasive species issues.

This Toolkit was developed by the Invasive Species Council of BC (ISCBC), a non-profit society that works to minimize the negative ecological, social, and economic impacts caused by the introduction, establishment, and spread of invasive species. Comprised of technical specialists working for government and industry, regional plant/species committee coordinators, Aboriginal Peoples, foresters, biologists, ranchers, horticulturists, recreation enthusiasts, gardeners, and other concerned individuals, the ISCBC focuses on province-wide issues and provides a broad coordinating role in invasive species management.

1.2 TOP TEN REASONS TO GET INVOLVED

Invasive species impact local communities and their citizens throughout BC. There are many reasons for local governments, real estate professionals and others to become involved in addressing invasive species issues in their jurisdiction. There are many reasons for local governments to become involved in addressing invasive species issues in their jurisdiction.

1) Property Values

Severe invasive species infestations can depress property values. For example, European fire ants (*Myrmica rubra*) are capable of forming very high nest densities (e.g. up to 4 colonies per square metre) in urban areas resulting in stings to people who disturb nests, loss of use of green space both in private yards and public parks and grounds and in more rural areas, have the potential to impact agricultural crops. In British Columbia, knotweed (*Reynoutria* spp.) is creating challenges for many communities and home owners due to its aggressive ability



Knotweed (*Reynoutria* spp.); Photo: T. Huetten

to grow through concrete resulting in severe infrastructure damage and financial implications. In the United Kingdom, knotweed species are now included in disclosure statements during property transactions due to its financial implications, including refused mortgages of infested properties.

2) Recreation

British Columbia's natural environment supports a wealth of recreational activities including hunting, fishing, hiking, horseback riding, bird watching, wildlife viewing, camping, mountain biking, picnicking, interpretive programs and photography. Invasive species can impact all of these activities by damaging habitat, impacting fish and wildlife, obstructing trails and recreation equipment, impacting human safety and reducing aesthetics.

3) Human Health and Safety

Invasive species directly affect human health and safety in many ways. Giant hogweed (*Heracleum mantegazzianum*) produces skin burns that can cause blisters and long-term scarring. The large, sharp spines of gorse (*Ulex europaeus*) are unsafe to humans and the toxic berries of bittersweet nightshade (*Solanum dulcamara*) and spurge laurel (*Daphne laureola*) are poisonous. Some allergies, including hay fever, are caused by invasive species like spotted knapweed (*Centaurea biebersteinii*) and scotch broom (*Cytisus scoparius*). The European fire ant (*Myrmica rubra*) delivers a painful sting when disturbed, and in some rare cases has led to serious allergic reactions requiring medical treatment.

Invasive plants affect rights-of-way and transportation corridors when their rapid establishment and growth (up to 30 cm per day for some species) decreases access to equipment, signage and structures, reduces sightlines for drivers and animals, and increases the risk of accidents and collisions.

4) Economic impacts

Invasive plants have a wide range of detrimental impacts on agriculture, range and forest industries. They can harbour insects and diseases that affect crops, and in many cases, act as alternative hosts. They reduce crop quality and market opportunities and decrease farm income by reducing yields by an average of 10-15%. Ranchers stand to lose up to 75% of their grazing opportunities. Every year, British Columbia farmers and ranchers lose an estimated \$50 million in crop revenue and pay several million dollars more for control measures, such as herbicides and cultivation (ISCBC 2005). In the forestry industry, invasive plants compete with seedlings for light, nutrients, and water causing reduction in health and eventually, harvesting yield.

In BC, the economic impacts of just seven invasive plant species, in the absence of any management, were estimated to be a minimum of \$65 million in 2008, rising to \$139 million by 2020 (Frid et al. 2009). Across Canada, examining just 16 species for which published information is available, a conservative estimate of their cumulative annual costs was between \$13.3 and \$34.5 billion (Colautti et al 2003).



Burdock (*Arctium* sp.) in campground;
Photo: J. Leekie



Giant hogweed (*Heracleum mantegazzianum*); Photo: B. Brown



Spotted knapweed (*Centaurea maculosa*); Photo: B. Stewart

A US study conducted by the Center for Aquatic Conservation at the University of Notre Dame and University of Wyoming suggests invasive species transferred in ship ballasts may be costing the Great Lakes region more than \$200 million a year in losses to commercial fishing, sport fishing, and the area's water supply (Lodge and Finnoff 2008). On a larger scale, invasive species reduce the effectiveness of development investments by choking irrigation canals, fouling industrial pipelines, and impeding hydroelectric facilities. Invasive species therefore contribute to social instability and economic hardship, placing constraints on sustainable development, economic growth, poverty alleviation and food security, says the Global Invasive Species Programme (GISP).

5) Infrastructure

Some invasive species such as knotweed (*Reynoutria* spp.) have the ability to cause severe damage to infrastructure and facilities by penetrating concrete and other materials, damaging roads, foundations and drainage systems and inevitably leading to increased costs for maintaining resources and public utilities. Aquatic invasive species such as zebra (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*) create massive colonies that can block water intakes and interfere with municipal water supplies as well as agricultural irrigation and power plant operations. Unchecked, invasive mussels could cost British Columbia power producers hundreds of millions of dollars to protect and maintain hydro generation stations.

6) Biodiversity

In 1998, the World Conservation Union declared invasive species to be the second greatest threat to biodiversity on the planet, second only to habitat loss. In BC, it is estimated that 25% of our endangered species, 31% of our threatened species, and 16% of our species of special concern are negatively impacted by invasive alien species (Voller and McNay 2007).



7) Fire Hazard

Some invasive plant species are extremely flammable and can disrupt natural fire cycles, causing an increased fuel bed load and frequency of fires. For example, cheatgrass (*Bromus tectorum*) provides a continuous bed of highly flammable fuel that can readily carry a fast-moving fire. Scotch broom (*Cytisus scoparius*) has a high oil content and parts of the bush die off naturally on mature plants, so there is always dead wood, even on “healthy” plants.

8) Distribution and Spread

Most invasive species are generalists, meaning they can use a wide variety of species for food and habitat, and can survive in a variety of climates. Without efforts to prevent their spread, invasive plants will generally increase their distribution area an average of 14% annually. This exponential rate means that populations double every five years, making the task of eventual control financially insurmountable (ISCBC 2005).

9) Legal Requirements

Uncontrolled invasive plant infestations on public lands may place local governments in contravention of other provincial and federal laws. The *BC Weed Control Act*, *Integrated Pest Management Act*, and *Forest and Range Practices Act* provide legislation for invasive plant management at the provincial level.

Refer to ISCBC’s Legislative Guidebook for Invasive Plant Management in BC for more information.

10) No Boundaries

Many regional districts and municipalities have strong invasive plant programs but are largely without measures in place for other invasive species. Since “invasive species know no boundaries”, they spread between properties and inevitably between jurisdictions. Collaborative and consistent invasive species management between neighbouring jurisdictions is an effective approach to ensure that invasive species that are being managed in one area do not continue to be introduced from a neighbouring region.

1.3 Toolkit Overview, Scope and Purpose

This Toolkit provides an overview of the tools and resources available to support the development of an invasive plant or species program or bylaw for municipal and private lands.

This Toolkit can be used in conjunction with the ISCBC’s Legislative Guidebook for Invasive Plant Management in BC (ISCBC 2007). The Legislative Guidebook provides a description of the current legislative framework governing invasive plant management in BC at all levels of government. Following direction from local government representatives, the scope of this Toolkit includes both legislative and non-legislative options.

When designing an invasive plant or species program, local governments will need to determine their prime focus and implement a priority planning process to help determine the greatest threats and concerns to municipal and private lands in their area.



Scotch Broom (*Cytisus scoparius*)
Photo: E. Coombs, bugwood.org



Gorse (*Ulex europaeus*)
Photo: E. Coombs, bugwood.org

This Toolkit can be considered a starting point for engaging and encouraging local governments to get involved. Ideally, further additions to the Toolkit, including model bylaws and operational resources, will be developed.

A 2009 survey of local governments in BC by the Ministry of Agriculture determined that 69% of regional districts and 33% of municipalities did not have any bylaw pertaining to invasive plants or weed control (MAL 2009). An ISCBC survey (2010) of local governments as part of this project identified that barriers to initiating a program included funding, lack of interest, or not knowing where to begin. Of the local governments that were involved in noxious weed or invasive plant management (including those without bylaws), more than one quarter (27%) had no budget for this function.

The management, and in some cases the emergence, of some invasive species (including animal varieties) in BC is relatively new and is garnering interest by many local governments due to the extent of their impact. Local governments are recognizing their role and the importance of addressing invasive species issues. They are using innovative approaches with scant resources and are searching for ways to build more capacity. We hope that this Toolkit provides encouragement, guidance, incentive, and tools for local governments to initiate or expand an existing program.

THIS TOOLKIT INCLUDES INFORMATION ON:

- Recommendations and tools available to developers and real estate professionals regarding invasive species on private lands,
- Local government jurisdiction and enabling legislation for local invasive species control programs,
- Non-regulatory approaches to invasive plant management,
- Recommendations for bylaws and development review process,
- Determining responsibility and management of private property impacted by invasive species,
- Introduction to some provincial invasive species of importance
- Examples of existing bylaws and successful local government initiatives in BC,
- Best practices for managing infested soils,
- Tips for getting started; and
- Key resources, reporting tools and apps available on invasive species in BC.

THIS TOOLKIT DOES NOT INCLUDE:

- Operational information for invasive species management such as species identification, inventory methodology or treatment options by species, although links to valuable resources are provided in Appendix 1,
- A model bylaw. The ISCBC recognizes that a model bylaw, legally-vetted, is a priority for local governments, and
- Templates for handouts and presentations for politicians, outreach planning, developing an invasive species strategy and policies. Links to Key Resources are provided (Appendix 1).

Module 2.0 Non-Regulatory Invasive Species Management Options

Integrated invasive species management involves more than a regulatory approach to the control of invasive species on private land. Other steps include public outreach, preventing infestations, engaging landowners, detecting new invaders, conducting inventories to determine which species and sites are of concern, prioritizing sites, species and activities, treating high priority infestations using a combination of control methods, and monitoring success (see Table 2). These elements can be combined to form a unique, relevant and effective program for your area depending on the challenges you face, the goals of your program, availability of resources, and focus of your activities (private or local government lands).

TABLE 1: Steps in invasive species management

* P – private landowners; LG – local government staff and lands

STEPS IN INVASIVE PLANT MANAGEMENT	GOAL	POTENTIAL ELEMENTS	PRIMARY TARGET AUDIENCE*
Public Outreach	To raise awareness about invasive species and their impacts	<ul style="list-style-type: none"> Develop and distribute public outreach materials and/or services Support volunteer stewardship activities Educate the public about new invasive species to watch for and where to report sightings 	P P P
	To involve public in other steps (below)	<ul style="list-style-type: none"> Provide information on best management practices for prevention, control and disposal 	P
Prevention	To prevent new infestations and the spread of existing infestations	Address vectors of spread including: Poor land practices (e.g. bare soil) <ul style="list-style-type: none"> Promote and practice good land management practices Reseed bare soil 	P, LG LG
		Contaminated soil, fill, hay, topsoil, mulch or composted materials from landfills, gravel pits admixing sites <ul style="list-style-type: none"> Separate invasive plants from other garden waste Remove or control invasive species at gravel pits, landfills and other high priority sites before soil is moved Prevent (through education or regulation) the deposit or movement of contaminated soil (with invasive plant seeds, parts or invasive animals) Educate public and regulate “no garden dumping” areas Prevent (through education or regulation) the introduction of invasive horticultural species in nurseries, garden centres, and gardens Ensure maintenance staff identify invasive species and clean machinery, equipment and vehicles after visiting infested sites. 	LG LG LG P P LG
Landowner and Land Manager Incentives	To provide incentives for landowners to encourage invasive plant management	<ul style="list-style-type: none"> Waive tipping fees Provide a cost-sharing rebate program Provide equipment loan Provide private property treatments Work with local nurseries to remove invasive plants from retail sales 	P P P P P

STEPS IN INVASIVE PLANT MANAGEMENT	GOAL	POTENTIAL ELEMENTS	PRIMARY TARGET AUDIENCE*
Early Detection, Rapid Response (EDRR)	To detect and eradicate species that are “Alert” species new to a region	<ul style="list-style-type: none"> Identify “Alert” species for your region Educate the public to identify and report “Alert” species Consider landowners incentives for private land invasive plant management Train local government staff to identify and control “Alert” species Have a plan for immediate response to new detections Create partnerships between local governments and other governments, agencies and NGOs for EDRR 	LG P P LG LG LG
Inventory and Data Management	To identify invasive species and sites of concern	<ul style="list-style-type: none"> Track high priority species at specific sites, as a response to reports and in order to create a management plan Inventory of parks and other local government lands Coordinated effort with other agencies for a full inventory of region Use smart phone app “Report-A-Weed” to record and report invasive species Use-data sharing programs like the Invasive Alien Plant Program’s (IAPP) Application 	LG LG LG LG LG
Prioritizing and Planning	To assess which species to address, when, where and how	<ul style="list-style-type: none"> Identify a list of species/sites of concern Use existing decision-support tools Develop an invasive species priority list Develop invasive species management strategy Determine the most effective tool(s) to address concerns (e.g. regulation, education, best management practices, etc.) Determine budget (resources, partnerships) and work within it 	LG LG LG LG LG LG
Treatment, Disposal, and Monitoring	<p>To contain or control existing infestations (using mechanical, biological, cultural, and/or chemical control methods)</p> <p>To evaluate the effectiveness of invasive species management activities. Adjust as necessary</p>	<ul style="list-style-type: none"> Control invasive species on local government lands (e.g. parks and landfills) based on priority sites and species Promote or enforce treatment of invasive species on private land Carefully dispose of invasive species waste – develop a regional approach Follow-up treatments with re-seeding, re-planting or other management practices that promote healthy land Monitor sites and treatment for success and follow-up Determine effectiveness of treatment methods Annual assessment of success of program 	LG P LG, P LG LG LG LG
Regulation	To regulate and enforce activities to control the introduction and spread of invasive species	<ul style="list-style-type: none"> Enforce treatment of invasive species on private land Regulate the introduction of horticultural species Regulate invasive species through development application processes 	P P P

2.1 PREVENTION

Generally, the most effective dollar spent on invasive species management is spent on prevention of infestations. Prevention tools include public education, engaging stewardship groups, pet, aquarium and plant retailers, staff training and best management practices.

Public Education

Education and awareness can strongly influence invasive species management. In many regions of BC, education is considered a first step while legislative tools are a “last resort”. One of the first steps for local governments to engage in public outreach programs is to identify existing educational programs and partnerships. There may be other agencies or NGOs already active in your area educating on these issues or prepared to undertake this kind of outreach given some resources and partnerships. For example, most regional invasive plant/species committees produce educational resources, usually in partnership with other agencies that are available to local governments for distribution. Local governments can support partners to develop mutually beneficial materials, or develop tools in-house.

Many local governments are using the principles of community-based social marketing in their outreach activities to promote changes in behaviour, which involves four steps (McKenzie-Mohr and Smith 1999):

- 1) Identifying the barriers and benefits to an activity,
- 2) Developing a strategy that utilizes “tools” that have been shown to be effective in changing behaviour,
- 3) Piloting the strategy and,
- 4) Evaluating the strategy once it has been implemented a cross a community.

The type of educational tools will depend on objectives, target audience, key messages, and budget. Ideas include:

- Brochures
- Articles or flyers
- Posters
- Signage (e.g. “no dumping” signs that include information on invasive species)
- Newsletters, e-newsletters or articles
- Social media
- Partake in Invasive Species Action Month
- Display booth
- Give-away items (hats, carabineers, mugs, magnets, bookmarks, playing cards, etc.)
- Radio ads
- Presentations and Webinars

A Partnership Approach to Public Education

With support from 20 organizations including federal, provincial and local government as well as foundations and stewardship groups, the Cowichan Shoreline Stewardship Project (CSSP) was launched in Spring 2014. This three-year public awareness, education and restoration initiative was designed to help lakeshore residents better understand and improve their riparian areas. Through the removal of invasive species and the re-planting of beneficial non-invasive plants, water quality and shoreline habitat in key locations will be rehabilitated and promoted to the public and residents as an example of natural ecological productivity and resilience in an effort to foster sustainable recreation.

Volunteers of the CSSP visit lakefront property owners and adjacent neighbors to educate and provide information on ways to maintain and improve riparian values and provide free riparian health assessments to indicate level of risk and need for rehabilitation. Property owners that have no impacted riparian areas and those that undertake riparian restoration are rewarded by public acknowledgement via signage to commend their stewardship efforts and to engage others in responsible behaviour. The CSSP restoration program employs local summer students and provides free professional services to support private property owners who want to restore their foreshore, improve ecological function and increase property value.



Cowichan River

Avenues for distribution include:

- Including information with building permits and property tax notices or water notices or bills
- Featuring articles in monthly e-newsletters or on local government website
- Webpage on invasive species as part of the local government website
- Distributing information when enforcing bylaws
- Including articles on invasive species in bulletins and newsletters (e.g. White Rock advertises an Invasive Species Clean-up Day in their online Events Calendar)
- Displaying information (brochures, posters, samples, playing cards) at local government office
- Distributing brochures around local government area including libraries, public racks, bed and breakfasts, garden centres and nurseries, businesses, etc. Note that in some regions brochure distribution services are available.
- Landowner visits or door-to-door services
- School flyers
- Radio ads
- Exhibits at public events, including fairs, home and garden shows
- Information/Inserts in recreation facility guides
- Information in parks events newsletter
- On-line social marketing tools (e.g. Facebook, twitter, blog)

Local governments are uniquely positioned for certain distribution methods such as distributing information with property tax notices or building permits. Timing the distribution of information in early spring (rather than fall/winter) when invasive species are appearing is critical for success.

Some regional invasive plant/species committees and other non-profit societies provide services such as writing newsletters, providing presentations and producing brochures, which are free to local governments and their residents. Other invasive plant/species committees or non-profit groups may require a fee.

For further information on Community-Based Social Marketing refer to www.cbsm.com.

Engaging Stewardship Groups

Community invasive plant hand-pulling days at local government parks can be a cost-effective method of achieving control through volunteer effort. Many local governments have identified community volunteers as a key to their success. Factors to consider when engaging community groups include the sensitivity and accessibility of the site (large numbers of people may impact sensitive ecosystems), liability insurance (groups should carry their own liability insurance or be registered with the local government if they offer volunteer coverage) and safety (particularly if the species is toxic to handle). Local governments may build their own formal volunteer program or provide support for community volunteer efforts and collaborative initiatives for invasive species management.

Staff and Contractor Training

Staff training opportunities are a tool to provide local government staff and contractors, including maintenance and operations workers, park staff and bylaw enforcement officers, with skills to prevent, identify, treat and manage invasive species. Most regional invasive plant/species committees in the province are available to provide workshops or materials to host a training event. These workshops can provide skills to recognize invasive species, detect new invaders, report or control high priority species, and prevent infestations.

Staff training tools include:

- Circulating an up-to-date list of invasive species to watch for
- Regular, seasonally-timed staff meetings, workshops or field talks
- Articles or features in newsletters for staff (by email or print)
- Monthly “get together” with short talks on invasive species and best management practices
- Training for meter readers to identify high priority species
- An operational guide for staff on approaches to effective removal, control and disposal of invasive species without contributing to their spread
- Development of binders with key information and Best Management Practices to be placed in staff trucks
- Posters for operational staff
- Staff participation in volunteer invasive species management events

Best Management Practices and Policies

Best management practices (BMPs) aimed at preventing invasive species establishment and spread are the most cost-efficient method of invasive species management for city and regional district workers, including maintenance and park staff. Many BMPs can be employed in regular activities within normal schedules or limitations.

- Identifying invasive species and providing a shortlist of priority species to watch for
- Regular mowing of roadsides, parks, vacant lots, and other areas with invasive species or timing mowing appropriately
- Mowing before seeds are produced (e.g. before full bloom)
- Cleaning mowing and other equipment between sites to prevent transporting seeds, plant parts and other invasive animals
- Avoiding creation of bare soil
- Re-seeding bare soil as soon as possible
- Ensuring that seed mixes do not contain invasive species
- Careful disposal of invasive species waste (bagged to the landfill or incinerated)
- Prohibiting invasive species from being planted or transported to local government parks
- Ensuring soil, fill and aggregates are “invasive-free”

“Communities Pulling Together”: Harnessing Volunteers to Control Invasive Plants

“Communities Pulling Together”, a province-wide initiative of the Invasive Species Council of BC, carried out in partnership with regional invasive plant/species committees, facilitates effective invasive plant management (hand-pulling) by volunteers. Throughout the province, volunteer groups are matched to high priority sites that have limited management options, such as riparian areas and pesticide-free zones. Participants learn about priority invasive plants and how to prevent their introduction and spread before spending a few hours hand-pulling the plants at the site. In recognition of their efforts, the group receives a \$200 honorarium. The events are usually hosted by a regional invasive plant/species committee in partnership with other interested volunteer groups. To find out how to setup a “Communities Pulling Together” event in your local government area, contact the Invasive Species Council of BC.



- Removing invasive species during park development or when undertaking natural area restoration
- Ensuring contractors who are working in local government areas are aware of concerns and best management practices for invasive species
- Developing policies or guidelines for both staff and contractors
- Staff training (as above)

These types of BMPs can be included in Standard Operating Procedures (SOPs) for Local Government Activities or special SOPs for invasive species can be developed. For example, the City of Victoria has developed SOPs for the control of specific invasive species that includes the minimum number of crew required, personal protective equipment, material required, identification features of the plant and procedures for removal and disposal. The Parks and Recreation Commission for the City of Surrey has developed a policy on invasive alien plant species management and incorporated it into their Policy Manual and has also included invasive species in their Natural Area Trail's standards and Natural Area Management Plan.

2.2 LANDOWNER INCENTIVES

In addition to public education and awareness, some local governments provide incentive programs for landowners to control invasive species on their property.

Free Tipping Fees and Green Waste Pick-Up

There are provincial variations around how invasive plants are handled at the landfill. The concern with invasive plants in compost is that it is a mechanism for spread as not all invasive plant seeds are destroyed through the composting process and seeds may remain viable for many years. One method to encourage landowners to hand pull or otherwise mechanically control invasive plants is to waive tipping fees at the local landfill or transfer station or provide free garden waste pick-up. This service requires a defined list of invasive plants, staff training around identification, and clear management policies at the landfill or transfer station to ensure that invasive plants do not become established there. If resources are limited, free pick-up or tipping fees can be offered for a limited time or for a limited number of people. For example, the City of Langford assists residents and groups who voluntarily remove broom and other invasive species throughout the City by arranging free pick up of the harvested materials for disposal – the City has received positive response from this initiative.

Cost-Sharing

A cost-sharing program is a rebate offered to landowners who conduct invasive species control using herbicides on their private land. The rebate, which is usually set at a percentage of the cost up to a given amount, is provided by the local government for either herbicide purchase or cost of application. For example, the Thompson Nicola Regional District (TNRD), Regional District of East Kootenay (RDEK), Regional District of Kootenay Boundary (RDKB), Cariboo Regional District (CRD) and Northwest Invasive Plant Council (NWIPC) offer landowners a rebate of 50% of their noxious weed control management costs which may include the cost of the herbicide or the cost of a licensed spray contractor. Local governments can also offer to treat species on private land at a subsidized rate.

Equipment Loan

Local governments can promote invasive species control on private land by providing equipment available for loan to landowners. For example, the RDKB, RDEK, TNRD, and CRD lend spray equipment such as backpack sprayers, skid tank sprayers, and ATV sprayers to landowners interested in undertaking invasive plant control on their privately owned land. Local governments address liability issues by having a waiver or rental agreement but the requirements to participate will depend on the local government policy.

Private Property Treatments

In some areas, local governments provide treatments on private land. For example, Cariboo Regional District staff conducts initial treatments of invasive plants on qualified private properties and concurrently provides instruction and demonstrations to landowners on the methods used to control invasive plants. The RDKB offers herbicide treatment of infestations of regional EDRR species free of charge to landowners. Some local governments have experienced positive results through on-site visits to provide advice and knowledge to landowners on prevention, treatment options and control techniques.

2.3 EARLY DETECTION, RAPID RESPONSE

Following prevention, the most cost-effective control of invasive species is when they are detected early and treated immediately. Small infestations of only a few species can quickly become large, unmanageable infestations and coupled with changing weather patterns, they have the ability to significantly increase geographically. EDRR is an integral component of invasive species management and its importance is becoming more evident over time.

EDRR requires a list of regional/local Alert Species to watch for and a mechanism for addressing these species if they are found. EDRR also requires coordination amongst multiple jurisdictions and broader areas to be effective. If one municipality is actively treating a species but a neighbouring municipality is not and is serving as a seed source, then EDRR will be less successful.

Leading Edge Bylaw Amendment: Invasive plants included in Environmental Protection Bylaw

Through significant development over the last 40 years, Whistler's natural areas and local biodiversity have been challenged by land conversion and habitat fragmentation. As a result, in March 2014, the Resort Municipality of Whistler (RMOW) Council voted to adopt the Environmental Protection Bylaw No. 2000, 2012 to help meet community goals for protecting the environment.

Introduced through a phased approach, the June 2014 bylaw amendment addressed the management of invasive species and development permit conditions for the protection of the natural environment, resulting in a clear, consistent and comprehensive tool that provides a framework for:

- protection of streams;
- clear tree cutting permit process;
- **management of invasive species;** and
- enforcement of Development Permit environmental conditions.

This recent and effective amendment to the Environmental Protection Bylaw is unique as it applies not only to the species listed under the B.C. *Weed Control Act*, but also to any other invasive plant species identified as priorities in the Sea to Sky region each year. This bylaw now prohibits the planting of invasive species in Whistler and facilitates enforceable notice to remove invasive plant species from an individual's property. RMOW Bylaw Services are now able to issue fines for non-compliance. Prior to the introduction of the Environmental Protection Bylaw, there was no municipal or provincial legislation in place to address the planting of invasive species in Whistler.

www.whistler.ca/environmental-protection-bylaw



Key steps to EDRR include:

- Identifying priority species for EDRR and reporting (see section 2.5)
- Coordinating with neighbouring jurisdictions for EDRR species
- Training local government staff and the public to identify EDRR species
- Establishing a contact for reporting EDRR species – this may be a local government staff, the coordinator of a regional invasive plant/species committee, a provincial government invasive plant/species specialist, or another contact
- Establishing a protocol for addressing EDRR species once they are reported

To address EDRR species on private land, landowner incentives can be used. For example, the TNRD will rebate landowners 100% of the cost for herbicide treatment of invasive plant species that are high priority (as listed by the Regional District). Enforcement bylaws can also be used, providing that the species are included or that a list of species is not defined.

2.4 INVENTORY AND DATA MANAGEMENT

Inventories provide the basic information necessary for prioritizing invasive species locations and sizes and making treatment decisions. They also provide data with clear direction for developing prevention practices and designing monitoring strategies. Inventories may be as simple as a sketch drawing on paper or as detailed as high resolution GIS mapping and may include information about area, density and distribution of infestations. Inventory methodology depends on the goals of the inventory (e.g. detect new invaders, provide a comprehensive list of all invasive species in the region, identify high priority areas), the resources available (budget, time, equipment), and the size and accessibility of the area. Inventories are more cost-effective when a single crew can cross multiple jurisdictions to collect data for multiple agencies. If resources are limited and a full inventory is not possible, tracking of high priority species is still an asset. For example, EDRR or other very high priority species can be identified and recorded during regular activities with notes on site location, key contact, control options, and monitoring records.

Using Inventory and Mapping to Bridge Interdepartmental Collaboration Within a Local Government, Reducing Risk and Increasing Biodiversity

As an island city located in the Fraser River estuary, the City of Richmond has complex drainage and flood protection infrastructures. A dike system surrounds the majority of the island to prevent flooding from the river while a vast array of watercourses, drainage ditches and pump stations, convey excess water from agricultural field and farm drainage to the Fraser.

The City's Environmental Sustainability and Engineering Public Works staff have initiated mapping and inventories for two aggressive invasive plant species with high impacts to the integrity of the City's dike integrity, drainage infrastructure and biodiversity.

Using annual provincial funding and City funding, the City completed a 2013 knotweed inventory and mapping project to map knotweed infestations around the island perimeter. This database is now utilized through the City's capital and development process to ensure that all dike upgrade projects include the removal of all roots and above ground knotweed vegetation to protect dike integrity and biodiversity.

During the summer 2014, the City has initiated a second project to inventory and map all known parrot feather (*Myriophyllum aquaticum*) infestation in the City's drainage. This plant has spread aggressively into several watercourses since; necessitating prompt action to reduce the risk of rapid expansion and further threat to the drainage system and biodiversity. While establishing control options (e.g. shade trials, mechanical removal) for the next growing season, the City has initiated the mapping and inventory of all known parrot feather infestation in the City's drainage. By separating the complete mapping project into phases and by priorities, Environmental staff have garnered support and leverage resources to accomplish the partial mapping and inventory of priority invasive species. By demonstrating the efficiency and savings related to the parrotfeather invasive species, staff anticipate continued expansion of inventory and mapping in the future to reduce the risk and cost associated with invasive species.



Often tracking sheets and the inventory information for local governments is recorded in-house. However, entering data into a common database allows managers of multiple jurisdictions to share information, determine which species are near their boundaries, and plan more broadly. The first step to inventory is to determine what information has already been collected. Local government lands may have already been included in inventories conducted by regional invasive plant/species committees or other coordinating bodies. The Invasive Alien Plant Program’s (IAPP) Map Display function provides an overview of documented invasive plant sites in many areas of the province and can easily be incorporated by local governments as a tracking tool. Some local governments, particularly in coastal urban areas, have undertaken in-house invasive species inventories in specific areas of their regions. See Key Resources (Appendix 1) for more information.

2.5 PRIORITIZING AND PLANNING

Local governments have limited resources and cannot accomplish everything on their “wish list”. Therefore, prioritizing activities allows for the most “bang for the buck.” It is a critical step in planning a program. Focusing on a few critical species, sites and activities for education, reporting, treatment, or bylaw enforcement can be the key to a manageable program that will be successful and facilitate expansion if necessary.

Why prioritize?

- Resources are limited
- Goals may be affected differently by different species or sites
- Multiple goals may have different levels of importance. Health and safety might be more important than protecting biodiversity
- One area of infestation may be expanding quickly while efforts may be inadvertently placed on a larger, less important site
- Risk of spread from local government lands to other lands (especially where there may be a large economic, social or environmental impact)

ERADICATION IS FEASIBLE WHEN INVASIVE SPECIES ARE DETECTED EARLY!

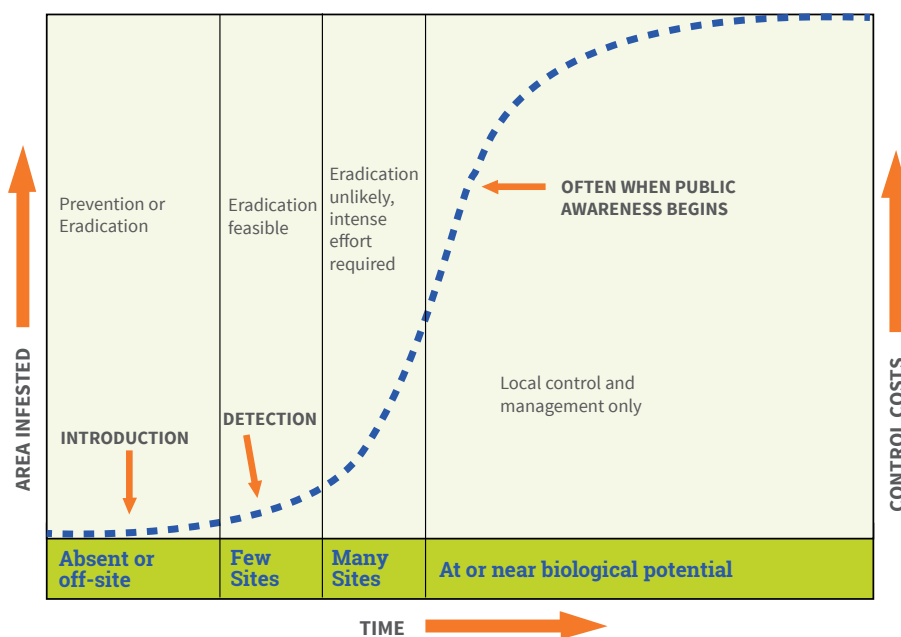


Figure 1. A growth curve demonstrating invasive species infestations over time and potential management methods during each phase. Adapted from Hobbs and Humphries (1995).

Generally, invasive species infestations start with just a few species at a site and then expand exponentially over time until they have reached their biological potential (see Figure 1). Concentrating efforts on the initial phases of management (prevention and early detection) is the most cost-effective activity. As infestations expand, efforts can be spent on containing a species geographically so it will not impact areas outside its known range. Once a species is established, widespread control is limited to targeting high priority sites to reduce impact since eradication is usually impossible at this point.

Prioritizing the management and control of species usually depends on:

- Biology - including aggressiveness, ability to spread and mode of reproduction
- Abundance - focusing on species that are not yet within an area or have a small distribution rather than those species that are “everywhere”
- Impacts - to health, agriculture, ecosystems, or other values
- Ease of control - small budgets may be better spent on species that have a high likelihood of being effectively controlled
- Risk assessments - of the species from BC or other regions

Some invasive species management strategies prioritize species based on their invasiveness, and then prioritize sites based on their size and potential for control. The priority of each species considers both of these rankings. For example, a category 1 invasive species (very invasive) on a category 1 site (small infestation with high likelihood of control) would receive the highest priority. Other strategies merge the invasiveness of the species with its known distribution in the region to categorize species for the region with their associated management approach (see Table 2 and Figure 1).

TABLE 2: Examples of categories for prioritizing invasive species based on degree of infestation in an area.

CATEGORY	DESCRIPTION	MANAGEMENT APPROACH
1	Watch list species that have not yet arrived in region	Watch list and EDRR if one arrives
2	Species that are new to area that have limited distribution and high potential impact (EDRR)	Eradication
3	Newer species that have few populations or where populations are concentrated in certain geographic regions.	Containment (Control in high priority areas)
4	Established species that are widely distributed	Biocontrol No Action Reduce impacts at key sites

Considerations for the priority of the site include:

- Potential impacts (e.g. a toxic plant in a schoolyard)
- Land value of the site (e.g. ecological value, species at risk, etc.)
- Size of the infestation (smaller infestations usually receive higher priority)
- Control options (e.g. pesticide-free zones or riparian areas)
- Source of spread (e.g. species that are situated on pathways, road edges, or other areas where they are likely to be spread are usually a higher priority than remote patches)
- Likelihood of spread

Generally, focusing on prevention or areas of low infestation of high priority species first, and working towards the heart of infestations is the most cost-effective.

The priority of the **activity** depends on:

- Where can you get the most effectiveness for the least resources? Usually, this is prevention or early detection and rapid response
- What can you do with a limited budget and resources?
- What activity will address the high priority species, their vectors of introduction and spread, and the high priority sites?
- What are the risks of action versus no action?
- Is this required under an existing policy or bylaw?

Several **decision-support tools** have been developed for land managers to assist in prioritizing invasive species and activities. These include:

Regional Invasive Plant/Species Committee Lists: In most areas of BC, regional invasive plant/species committees have developed invasive species priority lists. These lists usually consider the characteristics of the species as well as the abundance in the region.

<https://bcinvasives.ca/about/partners/bc-stakeholders/regional-committee-map>

Invasive Plant Management for Urban Municipalities: A Planning and Decision Support Tool: A step-by-step questionnaire that helps urban land managers and planners identify the management area, characterize the ecosystems, assess risks, prioritize invasive species, and conduct management planning. It includes reference materials on invasive plants, timing of control, and species rankings.

<https://open.library.ubc.ca/cIRcle/collections/graduateresearch/310/items/1.0102496>

Invasive Plant Core Ranking Calculator: Produced by the ISCBC and provincial government under guidance of an advisory committee, this MS Excel tool allows a land manager to answer specific questions about each invasive plant species and then translates each answer to a numerical score, which then prioritizes species. <https://www.for.gov.bc.ca/HRA/invasive-species/calculatorIndex.htm>

GOERT Decision Process for Managing Invasive Plant Species in Garry Oak and Associated Ecosystems (GOEs): A series of questions to help users decide whether, and how, to manage invasive plant species in Garry Oak Ecosystems. The tool includes a series of questions including ecosystem characteristics, the risk of action versus no action, and prioritizing species for treatment based on priority of species and degree of infestation. http://www.goert.ca/documents/General_Decision_Process_revised.pdf

Assessing and Managing Invasive Species within Protected Areas: An overview of steps involved in invasive species management including identifying species likely to become invasive in your protected area, identifying sites and habitats that are vulnerable, estimating risk and identifying pathways of introduction and spread, prevention strategies, early detection and rapid response (EDRR), management decision-tree, setting priorities, and creating a management plan.

<https://www.gisp.org/whatsnew/docs/IAS&protectedareas.pdf>

Ideally, planning invasive species management involves the development of a regional strategy that considers education, prevention, treatment and monitoring and identifies priority species and sites by region. This strategy can then provide the basis for annual work plans and budget allocations. See Key Resources (Appendix 1) for examples of regional strategies developed by local governments in BC.

2.6 TREATMENT AND DISPOSAL: INVASIVE SPECIES AND INVASIVE PLANTS

Treatment: Invasive Plants

Once an invasive species and site is determined to be a priority for treatment, there are many tools available. The choice of what treatment method to use depends on the biology of the species, size of infestation, characteristics of the site, goal of the treatment (eradication or control), cost, time involved, and impact of the species and the treatment method to the area. The following treatment methods apply both to public and private lands.

Integrated pest management (IPM) options include:

Mechanical - mowing, digging, clipping seed heads, hand pulling, cutting, solarization, hot water/steam. This method is most effective on annual species and for small sites. Depending on the biology of the plant species, mechanical control methods may foster rather than suppress growth.

Cultural - irrigation, fertilization, seeding, crop rotation, shade. This method focuses on modifying the invasive plant's habitat to promote desired plants. For example, if an invasive plant is shade intolerant, then planting shrubs to create shade will change the habitat to reduce the plant's population.

Biocontrol - use of insects or other predators that are imported from the plant species' country/region of origin and released in BC. These biological control agents (usually insects) are strictly screened and tested before being imported and released. This is a long-term control method that is usually slow to take effect and is limited to specific invasive plant species in BC. It is cost-efficient, particularly on large sites.

Burning/torching - use of fire to control invasive plant populations. Although some seeds can be destroyed by fire, many have hard shells that resist heat damage and often other desirable, more fragile plants can be killed using fire as a weed control tool. The risk of uncontrolled fire must be assessed. It is important to reseed the site with desired species promptly following treatment.

Herbicides - use of chemicals to suppress growth or kill plants. Herbicides are more time-efficient than mechanical methods and often more effective and cost efficient, particularly on large sites. Timing is very important for effective control results as plants usually need to be actively growing which is when they are most susceptible to herbicides. Research is on-going to develop effective, reduced risk herbicides that provide for increased control options on a wider range of invasive species.

Using All the Tools in the Toolbox: Multi-Faceted Invasive Plant Management

The Thompson-Nicola Regional District (TNRD) Invasive Plant Program is a multifaceted approach to invasive plant control in the region.

The TNRD aggressively manages invasive plants on all property owned or controlled by the district. The TNRD has a number of programs that assist private landowners with invasive plant management on their privately-owned property. Landowners in the TNRD are eligible for a 50% rebate (up to \$3000 maximum) for the cost of invasive plant control completed by a licensed contractor. There is also a 100% rebate available for treatment of specific invasive plants on the TNRD "New Invaders List". An herbicide rebate (up to \$250 maximum) is available to landowners who perform their own treatment (rather than hire a contractor) and have a valid pesticide applicator certificate.

The TNRD also owns a fleet of spray and seeding equipment that is loaned out free of charge to landowners. The Sprayer Loan-Out Program is managed under contract by Purity Feed Co. Ltd., a local agriculture supply store.

The TNRD invasive plant education and awareness initiatives and biological control program are carried out in partnership with the Southern Interior Weed Management Committee (SIWMC). The TNRD funds biological control on both public lands (based on the SIWMC strategic plan or partner agency requests) and private land (based on landowner requests).



Grazing – use of goats and sheep that feed on some invasive plant species, particularly early in the season, to control them from spreading.

Using these treatment methods in combination with each other, as appropriate, is defined in invasive plant management as an integrated approach. This approach is the most effective way of managing invasive plants. Describing treatment methods by species is beyond the scope of this Toolkit. However, some key sources of information are provided in Appendix 1.

Once invasive plants have been removed, post-treatment activities to prevent further infestations include:

- Reseeding or replanting site with desired vegetation capable of resisting re-invasion
- Minimizing future bare soil or disturbance at site
- Monitoring site for invasive plant regrowth
- Maintaining healthy vegetation base (e.g. turf, native plants)

If local government staff or contractors are conducting treatments on local government lands or on private land (through enforcement), it is important that they receive training on best management practices and treatment options for the control of invasive plants and importance of maintaining invasive plant-free sites after treatment. Information packages for landowners about the specific invasive plant species they are dealing with are also effective for promoting treatment on private land. Landowner assistance programs provided by a local government can successfully promote awareness of invasive plants and encourage control of invasive plant species on private land. Engaging volunteer groups can be a cost-effective method of mechanically controlling invasive plants in public areas.

An Innovative Approach to Garden Waste Dumping

The City of Coquitlam developed an innovative campaign in 2008 called “Bad Seed – Weed Out Invasive Plants” with the goal of changing the norm of accepting the act of yard waste dumping within the City.

The campaign uses community-based social marketing strategies which strive to identify and overcome barriers to long-lasting behaviour change (McKenzie-Mohr & Smith 1999).

The campaign includes brochures, advertisements in local newspapers, brown yard waste bags, bus shelter signs, material on the City’s website, an invasive plant PowerPoint Presentation, t-shirts and hats.

“Bad Seed – Weed Out Invasive Plants” runs during the spring when residents are busy buying new yard plants and again in the fall when residents clean up their yards and discard plants for the winter. City staff also bring a Bad Seed display to a number of local community events to educate residents about invasive plants and how they can stop their spread. The **Communication Strategy** for the campaign also targets homeowners that live adjacent to public green space through landowner mail-outs and door-to-door communications. Each resident is provided with information, brochures and solutions to their invasive plant and yard waste questions.

The logo for the City of Coquitlam, featuring the word "Coquitlam" in a blue, sans-serif font with a green leaf-like graphic under the letter 'i'.

Disposal: Invasive Plants

Invasive plants are proficient at spreading to new areas by seeds or vegetative fragments, so disposal must be planned carefully. Many invasive plant species can regrow from small vegetative fragments even after composting or from viable seeds dormant in the seed bank. Generally, the safest way to dispose of invasive plant material is by incineration or bagging in the landfill. Even high heat composting may not destroy some pervasive species like knotweed (*Reynoutria* and *Persicaria* spp.) or hawkweeds (*Hieracium* spp.). Many local governments do not have access to incinerators or high heat composting stations, so disposal of invasive plant material in landfill sites is common.

Local governments can assist invasive plant management in their region by providing free tipping fees for invasive plant material. Not only does this provide an incentive for private landowners to control invasive plants, it provides an opportunity for public education at landfills and transfer stations on what invasive plants are, why they are a problem, and what species are considered invasive in that region. This type of program requires training for both landfill staff and the general public on how to identify invasive plant species and what species are accepted in the area. As well, the public should receive information on how to transport invasive plants without spreading them. Local governments may consider using unique coloured bags or tags to identify invasive plant material. Some local governments, such as the Fraser Valley Regional District (FVRD), provide free pick up for designated noxious weeds.

Garden waste dumping is a primary vector of spread of invasive plants. It is a difficult issue to address because enforcement is extremely challenging. Including information about invasive plants, their impacts, and the role garden waste dumping plays in the spread of invasive plants, along with standard “no dumping” signs can increase public awareness and, ideally, change public behaviour.



Invasive plant removal, photo by Invasive Species Council of Metro Vancouver



Hand-pulling invasive plants in Penticton, Photo: L. Scott

Treatment: Invasive Species

The control and management of invasive species is increasingly becoming a priority for land managers. Invasive species such as the European fire ant, American bullfrog, Eastern grey squirrel and others all vary in the level of impact on the environment and economy. Some species may be relatively minor “nuisance” type complaints or may pose more serious economic, safety, health and environmental concerns. Some of these species may be able to co-exist with humans if managed to contain their spread, while others require efficient eradication measures. The determination of a species as a priority for treatment is contingent on the ability to treat it, as tools may be limited depending on the species. As with invasive plants, it depends on the biology of the species, size of the infestation, characteristics of the site, goal of the treatment (eradication or control), cost, time involved, and impact of the species and treatment method to the area.

The treatment and control options vary depending on the species and encompass four main aspects:

1. Quick and effective response to newly arrived species of concern, both at the regional and provincial levels, using EDRR principles and methods.
2. Conducting inventories, using established methods for the target species and entering data into a central database, for the purpose of undertaking control treatments where necessary.
3. Treatment of known occurrences based on current best management practices and scientific understanding.
4. Monitoring target invasive species to evaluate management efforts and identify trends in populations.



Disposal: Invasive Species

As with invasive plants, other invasive species are also proficient at spreading to new areas, making it necessary to plan carefully for invasive species disposal after successful removal has taken place. Local governments can assist invasive species management in their region by providing education and information to private landowners on infestations, eradication and disposal methods. Not only does this provide an incentive for private landowners to control invasive species, it provides an opportunity for public education on what invasive species are, why they are a problem, and what species are considered an issue in that region. There are various disposal methods available depending on the type of species being dealt with and it is best to consult with an invasive species professional when developing a disposal plan.

Monitoring: Invasive Species and Invasive Plants

Monitoring efficacy of treatments and programs is a critical step in management. Resources are often spent on controlling invasive species with little reserved for monitoring the effectiveness of the program. Monitoring a site to determine if the treatment method was successful, or a program to determine if resources are still being spent on priority areas ensures that resources are being put into the best possible activities.

For example, if resources are being put into a single species for years or even decades because that species was a priority at the time the policy was developed (as sometimes occurs with local government bylaws and policies) and little effect is seen, it may be time to re-evaluate the program and put those dollars towards new EDRR species, different sites, or different control methods.

Module 3.0 Governance and Regulatory Tools

3.1 DEFINITIONS: INVASIVE SPECIES, INVASIVE PLANTS AND NOXIOUS WEEDS

Understanding the many different Acts and legislation in BC for invasive species is complicated by the fact that there is no standardized terminology for undesirable plants and animals. The BC Provincial government is moving towards harmonizing all related Acts and legislation into one invasive species legislation in BC utilizing the term “invasive species” in entirety. The following terms are defined by how they are used in this document as they relate to legislation.

Invasive Species – Refers to any harmful invasive alien or non-native species, including animals, plants and other organisms whose introduction or spread threatens the environment, the economy, or society, including human health. This simplified version of “invasive species” is used throughout this Toolkit as a general term that includes species listed as noxious, invasive, or alien invasive in federal, provincial, or local regulations. It is important to note that the term “alien” refers to species that are not native, but that not all alien species are invasive.

Invasive Alien Species – Harmful alien species whose introduction or spread threatens the environment, the economy, or society, including human health. This term is used in the Community Charter’s Spheres of Concurrent Jurisdiction and is under review as governments move towards standardized use of the term “invasive species”.

Invasive Plant – Generally refers to any invasive alien plant species that has the potential to pose undesirable or detrimental impacts on humans, animals, or ecosystems. Invasive plant is used throughout this Toolkit as a general term that includes all species listed as noxious, invasive, or alien invasive in federal, provincial, or local regulations.

Noxious Weed - Legislative term for: (i) A weed designated in Schedule A and/or Schedule B of a Regulation under the *Weed Control Act* to be a noxious weed, includes the seeds of the noxious weed; or (ii) A species designated by the Federal Weed Seeds Order to be a noxious weed. The term “noxious weed” is also used in s. 64 of the *Local Government Act* and may be used by municipalities for weeds considered to be undesirable and regulated under local bylaws. When the term “noxious weed” is used generally by local government, it does not necessarily refer to Schedule A or B of the *Weed Control Act*.

See the **Legislative Guidebook (ISCBC 2007)** for a more comprehensive glossary.

<https://bcinvasives.ca/documents/IPC3-Legislative-Guidebook.pdf>

3.2 AGENCIES INVOLVED IN INVASIVE SPECIES MANAGEMENT IN BC

There are a number of agencies involved in invasive species management in BC (see Table 1). Coordinated regional programs have been established to promote management across jurisdictions so that local governments have resources available to them and do not need to work in isolation.

TABLE 3: Overview of Agencies Involved in Invasive Species Management in BC. For more information on the legislation relating to each of these agencies, and a more complete list of agencies, see the Legislative Guidebook (ISCBC 2007).

AGENCY/ ORGANIZATION	JURISDICTION (LAND AUTHORITY)	ACT/PLAN	COMMENTS
FEDERAL AGENCIES			
Parks Canada	National Parks	Parks Canada Agency Act Canada National Parks Act http://laws-lois.justice.gc.ca/eng/acts/P-0.4/	
Transport Canada	Federal transportation corridors, such as railway, highway through national parks, and pipeline corridors	Canada Transportation Act and Regulations https://laws-lois.justice.gc.ca/eng/acts/C-10.4/	
Environment Canada		Canadian Environmental Protection Act https://laws-lois.justice.gc.ca/eng/acts/c-15.31/ Species at Risk Act https://laws-lois.justice.gc.ca/eng/acts/s-15.3/ Wild Animal and Plant Protection and Regulation of International and Inter-Provincial Trade Act https://laws-lois.justice.gc.ca/eng/acts/W-8.5/index.html	Leading an Invasive Alien Species Strategy for Canada
Canadian Food and Inspection Agency		Plant Protection Act/Regulations https://laws-lois.justice.gc.ca/eng/acts/P-14.8/ Seeds Act and http://laws-lois.justice.gc.ca/eng/acts/S-8/ Regulations Weed Seeds Order https://laws-lois.justice.gc.ca/eng/regulations/SOR-2016-93/page-1.html#h-1	
Health Canada	Pest Management Regulatory Agency	Pest Control Products Act https://laws-lois.justice.gc.ca/eng/acts/P-9.01/	Responsible for the regulation of pest control products in Canada
Agriculture and Agri-Food Canada		See: http://www.agr.gc.ca/eng/about-us/acts-and-regulations/list-of-acts?id=1362055182397	Various agriculture production and marketing legislation
Fisheries and Oceans Canada		Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), under the Wild Animal and Plant Protection and Regulation of International and Inter-Provincial Trade Act Aquatic Invasive Species Regulations under the Fisheries Act https://laws-lois.justice.gc.ca/eng/regulations/SOR-2015-121/index.html	CITES administered in cooperation with Environment Canada
Other Federal agencies	Post offices, airports, national defence lands		
ABORIGINAL PEOPLES			
Aboriginal peoples	Indian Reserves and treaty lands	Numerous Acts. Many pertaining to land jurisdiction across Canada and some BC specific See: http://www.aadnc-aandc.gc.ca/	Nations, Councils or Bands involved in consultation regarding management of Aboriginal peoples and other lands

PROVINCIAL AGENCIES

Ministry of Agriculture		<p>Plant Protection Act http://www.bclaws.ca/civix/document/id/lc/statreg/96365_01</p> <p>Agricultural Land Commission Act http://www.bclaws.ca/Recon/document/ID/freeside/00_02036_01</p> <p>Farm Practices Protection ('Right to Farm') Act http://www.bclaws.ca/Recon/document/ID/freeside/00_96131_01</p>	<p>Various Regulations under 'Right to Farm'</p>
Agricultural Land Commission		<p>Agricultural Land Commission Act http://www.bclaws.ca/Recon/document/ID/freeside/00_02036_01</p>	<p>Restriction on what regulation can be applied to farming activities on agricultural lands</p>
Ministry of Energy, Mines and Petroleum Resources	<p>Includes Crown Corporation rights-of-way (see Utility and Gas companies below)</p>	<p>repealed by the Oil and Gas Activities Act</p> <p>Hydro and Power Authority Act http://www.bclaws.ca/civix/document/id/complete/statreg/96212_01</p>	<p>Primarily through Oil and Gas Commission</p> <p>lectricity Policy Branch oversees BC Hydro, BC Transmission Corporation and Columbia Power Corporation. Crown agencies perform vegetation management, including invasive plants, on their rights-of-way.</p>
Oil and Gas Commission		<p>Oil and Gas Activities Act http://www.bclaws.ca/Recon/document/ID/freeside/00_08036_01</p> <p>Land Act http://www.bclaws.ca/civix/document/id/complete/statreg/96245_01</p>	
Ministry of Environment & Climate Change Strategy	<p>Provincial parks</p>	<p>Environmental Protection Division administers:</p> <p>Integrated Pest Management Act http://www.bclaws.ca/Recon/document/ID/freeside/00_03058_01 /Regulations http://www.bclaws.ca/civix/document/id/loo91/loo91/604_2004</p> <p>Alien Invasive Species Environmental Stewardship Division administers:</p> <p>Environmental Land Use Act http://www.bclaws.ca/civix/document/id/lc/statreg/96117_01</p> <p>Park Act http://www.bclaws.ca/civix/document/id/complete/statreg/96344_01</p> <p>Ecological Reserve Act http://www.bclaws.ca/civix/document/id/lc/statreg/96103_01</p>	<p>Provincial conservation officers are involved in management of some invasive animal species</p>
Ministry of Forests, Lands, Natural Resource Operations and Rural Development	<p>Crown forest and range land in British Columbia (approx. 82 million hectares, or 80% of land base)</p> <p>Includes protected areas, ecological reserves, conservation lands, and wildlife management areas</p> <p>Private managed forest lands</p>	<p>Weed Control Act http://www.bclaws.ca/civix/document/id/lc/statreg/96487_01 /Regulations http://www.bclaws.ca/Recon/document/ID/freeside/10_66_85</p> <p>Forest and Range Practices Act http://www.bclaws.ca/Recon/document/ID/freeside/00_02069_01</p> <p>Other legislation potentially affecting Invasive species and plants includes:</p> <p>Wildlife Act http://www.bclaws.ca/Recon/document/ID/freeside/00_96488_01</p> <p>Land Act</p> <p>Range Act http://www.bclaws.ca/Recon/document/ID/freeside/00_04071_01</p> <p>Private Managed Forest Land Act http://www.bclaws.ca/civix/document/id/lc/statreg/03080_01</p>	<p>Compliance and Enforcement Division has authority to respond/address multi-ministry legislation</p> <p>Local government bylaws cannot impact forestry operations under this Act</p>

Ministry of Transportation and Infrastructure	Management authority for transportation corridors	<i>Transportation Act, in accordance with the Weed Control Act</i>	Ministry has no specific legislation pertaining to invasive plants or species
Ministry of Municipal Affairs & Housing	none	Community Charter and Local Government Act http://www.bclaws.ca/civix/document/id/lc/statreg/r15001_00 Spheres of Concurrent Jurisdiction - Environment and Wildlife Regulation http://www.bclaws.ca/civix/document/id/complete/statreg/144_2004	
Inter-Ministry Invasive Species Working Group	As above for each provincial ministry or agency	Ministry members represent their respective organization's legislation and responsibilities	Designated representatives from various provincial agencies who work collaboratively to develop policy and cooperative programs and resources
Utility and Gas Companies			
Electrical Generation or Transmission Companies / Crown Corporations/ Authorities	Management on their rights-of way in cooperation with Crown Agencies/ Regional Invasive Species/Weed Committees	<i>Hydro and Power Authority Act</i> (See Ministry of Energy, Mines and Petroleum Resources)	BC Hydro, Teck, FortisBC, Columbia Power Corporation
Petroleum pipeline distribution companies	Management on their rights-of way in cooperation with Crown Agencies/ Regional Invasive Species/Weed Committees	<i>Oil and Gas Activities Act</i> (See Ministry of Energy, Mines and Petroleum Resources)	Fortis BC, Pacific Northern Gas, TransCanada Pipelines, Kinder Morgan
Local Governments			
Regional Districts	Land within regional district boundaries	<i>Local Government Act</i> Local bylaw legislation	Authority can include the regulation of land within municipal boundaries only if the municipality agrees
Municipalities	Private land within municipal boundaries Municipal land within municipal boundaries	Municipal bylaws, policies, management plans, and programs Powers under the Community Charter and the Local Government Act	Private land managers must use and manage their land consistent with existing provincial and municipal legislation Municipalities have the same responsibilities for their properties as other landowners Local government bylaws are not applicable to Federal and Provincial government or Crown Corporations

Non-profit Societies/Community Groups

Invasive Species Council of BC	None	Societies Act http://www.bclaws.ca/civix/document/id/lc/statreg/15018_01 Operates under no invasive plant/invasive species legislation in BC	Comprised of representatives from agencies, groups, and individuals involved in invasive species management. Addresses provincial-level issues that deal with multiple agencies and stakeholders
Regional Invasive Species Committees	None		Coordinate multiple stakeholders in their region and may take on some on-the-ground delivery on behalf of stakeholders. Boundaries of the regional committee's operating area are determined by the committee. Some follow regional district lines, but others do not
Community groups with land management authority	Any authority derived from ownership of land or contractual agreements with owners		E.g. Ducks Unlimited, The Land Conservancy, The Nature Trust, The Nature Conservancy
Stewardship groups	None		Stewardship of parks and other areas. Must work with landowner to obtain access. Have limitations on what they're able to do

Landowners and occupiers

Land they own or occupy Basic property rights and legal responsibilities

3.3 JURISDICTION IN BC

Regional districts and municipalities both have jurisdiction over development and use of private land in BC. Municipalities have regulatory jurisdiction for the land within their municipal boundaries. Regional districts have jurisdiction over land in the unincorporated areas within their regional boundaries, and with the municipalities' agreement they can perform administrative, enforcement, service delivery and some regulatory functions within municipalities.

Local governments are significant land managers within their jurisdiction, having responsibilities for local parks and other properties that they own. Municipalities (but not regional districts) own and maintain road rights-of-ways. Local governments are particularly well positioned for early detection of new invasive species in their jurisdiction and should be actively engaged in any rapid response actions against invasive alien species. Municipally-led volunteerism and local stewardship groups are also key in early detection and control of invasive species.

Since the introduction and spread of invasive species can be impacted by private land use and development, it is appropriate that local governments provide a leadership role in preventative or corrective measures. Municipalities and regional districts both have jurisdiction and legal authority to enact local invasive species management and removal programs that are appropriate to their local needs and objectives. Local governments have the ability to enact bylaws or policies pertaining to invasive species, specifically requiring property owners to ensure that certain listed species are properly removed from their property, or are controlled from spreading from their property. For a thorough overview of the local government agencies that have jurisdiction over invasive plant management in BC, as well as an overview of the legislative framework governing invasive plant management refer to A Legislative Guidebook to Invasive Plant Management in BC (ISCBC 2007).

Like many issues that governments have to deal with, “invasive species know no boundaries.” Ideally, the most effective approach to managing invasive species would be to administer a program for all lands, across jurisdictions. However, a single province-wide approach is unrealistic given the variety of landscapes, multiple jurisdictions, range of species and varied local needs and concerns. To be effective, local governments need to look beyond their boundaries and coordinate their efforts with adjacent jurisdictions by developing invasive species management programs in partnership with affiliated municipalities and/or regional districts, regional invasive plant/species committees, provincial ministries, Aboriginal peoples, industry and other land managers.

Although regulatory authority cannot cross the boundaries of respective jurisdictions, to reduce costs and improve program effectiveness, adjacent local governments, agencies and Aboriginal peoples can establish joint programs for administration, monitoring, enforcement and service delivery – functions that can be delegated between governments. In some cases (such as dealing with invasive plant or animals), municipalities can cede their regulatory authority to the regional district level of governance.

With regard to waste generated from the removal of invasive species, it is often governed on a regional basis with local governments providing direction to private landowners that may be dictated by general Best Management Practices.

3.4 RELEVANT AND ENABLING LEGISLATION

Local governments can choose to adopt an invasive plant control function through the *Weed Control Act* (WCA). In addition to their WCA capabilities, or instead of it, regional districts can enact and enforce bylaws under the *Local Government Act* (LGA) and municipalities can establish their programs under the Community Charter (CC). Similarly, when managing for animal species, local governments can choose to adopt an invasive species control function through the *Local Government Act* (LGA) or the Community Charter (CC).

It is important for local governments to review existing and related bylaws when creating or amending any new bylaws as there may be potential for contradiction with existing regulation. For example, some local governments have a bylaw restricting the use of cosmetic pesticides except under certain situations. For landowners required to remove invasive plants from their property, this bylaw may become problematic if it doesn't take into consideration the use of pesticides as a best management tool.

Overview of Enabling Legislation

The *Weed Control Act (WCA)* is administered by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development and is the overarching legislation concerning invasive plant management and control in British Columbia. The Act places a duty on all land occupiers (including public and private lands) to control the noxious weed species that are listed in its accompanying Regulations and pertains to all land in BC, except federal lands. Section 9 of the Act provides for municipalities or regional districts to appoint local Weed Committees and weed control officers or inspectors (section 10) and gives municipalities the opportunity to enter into an agreement with each other with respect to noxious weed control and associated costs (section 11). The WCA can only be enforced by a weed Inspector appointed by the Minister, or by an inspector appointed by the local government under the Act.

The *Community Charter* (administered by Ministry of Municipal Affairs & Housing) provides authority for municipalities. Municipalities are authorized to control invasive species within their jurisdiction and to regulate in relation to weeds or animals on public and private property under the broad powers identified in section 8(3). The selection of the appropriate enabling power depends on whether the species is considered to be a threat to the environment or the economy, a nuisance, a public health concern, or whether the troublesome species is a plant or other organism. These are broad powers that give municipalities flexibility in the kinds of regulations they might want to establish for invasive species management. Municipalities can use their bylaw enforcement powers to enforce the regulations. Besides dealing with regulatory authority, the Community Charter also includes broad land management powers to deal with invasive species issues that arise in parks and road rights-of-way, and on other land that the municipality owns and manages. In addition, some Community Charter provisions apply to Regional Districts through cross-references in the Local Government Act.

The *Local Government Act* (administered by the Ministry of Municipal Affairs & Housing) includes enabling powers that apply primarily to regional districts. Under this Act, regional districts can establish a service having invasive species management as one of its purposes. The purpose of the invasive species management program may be to operate an early detection and rapid response program directly, to enforce the *Weed Control Act*, or to implement and enforce regulations within the regional district. As with municipalities' regulatory powers under the Community Charter, the regional districts' full array of bylaw enforcement options is available to enforce its invasive species control bylaws. Municipalities within the regional district can elect to be within the regional district service area (and contribute to the cost of the service), in which case both the regional district's regulations and its services apply within the municipal boundaries.

Other Related Legislation for Invasive Plants

Sometimes the application of an appropriate herbicide is the only effective way to manage or eliminate an invasive plant infestation; this management is not considered "cosmetic" use of pesticide. The *Integrated Pest Management Act* is provincial legislation designed to ensure that pesticides will not cause harm to people or the environment, and that pesticides will be used within an integrated pest management program. The Act presides over the sale, storage, transport and use of pesticides in BC and outlines training requirements, certification, licensing of businesses that sell or apply pesticides for a fee, and requirements for application to public lands, among others. For private property, the pesticide must be registered for the use, and used according to all label directions (as per the *Pest Control Products Act*). Regulatory requirements include

pesticide-free zones around waterways, domestic water sources and other sensitive areas; requirements for personal protection and use and storage of equipment; protection of stream banks and slope stability and environmental requirements for pesticide use (e.g. weather conditions). Depending on the size and area of a pest management program, a Pest Management Plan, consultation with Aboriginal peoples and the general public and a Pesticide Use Notice may be required. See Key Resources (Appendix 1) for an example of a local government Pest Management Plan.

As of September 2013, the Ministry of Environment & Climate Change Strategy announced that it intends to amend the **Integrated Pest Management Regulation (IPMR)** to ensure that most pesticides used in landscaped areas are applied by trained people. Amendments to the regulation will also change the way Domestic class pesticides are sold, and they will update the schedule of excluded pesticides.

Other Related Legislation for Invasive Species

The **Controlled Alien Species Regulation (CAS)** (administered by the Ministry of Environment & Climate Change Strategy) under the *Wildlife Act* is a regulation that controls the possession, breeding, shipping and releasing of alien animals (e.g. that are not native to B.C.) that pose a risk to the health or safety of people or the environment. Under this Act, the Minister of the Environment and Climate Change Strategy has authority to designate species as controlled alien species and to regulate these species. Most of the species that this regulation deals with are of concern because of their potential danger to people (e.g., tigers and poisonous snakes), however in December 2012 the regulation was amended to include a number of potential invasive aquatic species. It is important to note that on a community and local government scale, the Controlled Alien Species Regulation is relevant as there continues to be banned substances sold in commercial stores, such as some aquatic invasive species. If municipalities have encouraged voluntary compliance and have not been successful, they could regulate the sale of an invasive species provided it is on a list that they are trying to prohibit. This option could be a potential tool if a Regional District was to appeal to the Ministry for regulation on a regional basis and the associated municipality were in agreement. Some municipalities have additional bylaws that regulate the sale of invasive turtles, rabbits and other species.

For a comprehensive overview of federal, provincial, First Nation, regional, municipal, and private landowner jurisdiction and the associated legislative framework in British Columbia, please see the ISCBC's Legislative Guidebook (ISCBC 2007).



Yellow flag iris (*Iris pseudacorus*)
Photo: J. Leekie

3.5 SOIL-RELATED LEGISLATION

At present there is no existing provincial legislation specifically regulating the movement of invasive species contaminated soil. Currently, the relocation of chemically contaminated soil is regulated under the *Environmental Management Act* and is associated with Contaminated Sites Regulation, however this does not include soil contaminated by noxious weeds, invasive plants or pests. Instead, some regional districts or municipalities may have local bylaws (e.g. Soil Deposit and Removal Bylaw or Soil Deposit Regulation Bylaw) relating to the removal, movement, deposit and disposal of soils contaminated with invasive plant parts, seeds or other invasive species. While these bylaws are not widespread across the province, it is crucial that prior to movement of soil, a management plan including a comprehensive search of the local bylaws is developed. In the absence of such local regulations, movement of soil contaminated by invasive species could be subject to common law civil actions as there is the potential for liability and unexpected costs resulting from invasive species fragments and seeds impacting future development and adjacent infrastructure.

A Tool for Education and Enforcement: A Bylaw to Regulate the Deposit and Removal of Soil

[The SLRD's Soil Deposit and Removal Bylaw No. 1423-2015](#) applies to the entire regional district (Electoral Areas) as a regulatory bylaw seeking to address issues/impacts to protect infrastructure, public health and safety, by providing the SLRD with proactive and reactive regulatory tools. It has the power to protect topsoil, agricultural lands, riparian areas and watercourses, and prevent the introduction, establishment and spread of invasive species.

Importantly, the bylaw prohibits the deposit of other materials (which includes invasive species):

- 5.1 No person shall cause or permit the deposit or removal of soil within the Regional District except in accordance with this Bylaw.
- 5.2 No person shall deposit other material on any land within the Regional District without a valid permit or exemption under the *Environmental Management Act*, and amendments thereto.

Other details within the bylaw as they relate to invasive species are:

1. Other Material includes, but is not limited to, construction and demolition waste, masonry rubble, concrete, asphalt, wood waste, unchipped lumber, drywall, refuse, undecomposed organic matter, contaminated soil, soil containing invasive species, and other similar matter.
2. Permit Application Requirements - Every application for a permit for more than 100 cubic metres of soil shall be accompanied by detailed plans, data, and specifications for the proposed site prepared by a Registered Professional to a scale of not more than 1:1,000, unless otherwise authorized by the Director, showing the contour of the ground in its current state and shall contain information regarding the soil deposit or removal with respect to the following matters: (r) a site reclamation plan including Invasive Species Management Plan, prepared by a Registered Professional to be incorporated into the permit.
3. Permit Conditions - No person may deposit or remove soil so as to do any of the following: (k) permit the promotion of growth of invasive species on the parcel that are subject to the permit.



Module 4.0 Private Property Development and Invasive Species Management

4.1 CURRENT ISSUES AFFECTING PRIVATE PROPERTY DEVELOPMENT AND REAL ESTATE TRANSFER

Invasive species are a growing concern for local governments, developers and real estate professionals. Species such as European fire ants, Giant hogweed, and knotweeds can have profound detrimental effects on the use and value of property. The multiple impacts resulting from these invasive species can include damage or loss of crops and productive land, human health risks and implications, and unusable or significantly depreciated land value. The sale and purchase of infested private property can become very complex and can quickly be terminated or result in legal implications due to damage caused by the invasive species and high maintenance costs associated with, when possible, the removal of an invasive species.

4.2 ROLES AND RESPONSIBILITIES

In dealing with private land development issues concerning invasive species there is a wide range of people with varying degrees of interest and responsibility involved. However, understanding the legal obligations and responsibilities can be challenging and not always clear. Some local governments are addressing the need for clearer bylaws and policies to assist in determining these responsibilities and obligations on private land. Local governments should consider the development review process as an opportune time to set conditions regarding the type of development to take place. Landowners, developers and local governments are increasingly faced with invasive species concerns and impacts on private land and these impacts have the potential to result in litigation due to the lack of clarity regarding liability. Those involved in private property transactions including real estate professionals, insurance companies and financial institutions, also need to be clear on the policies, bylaws and best management practices in order to provide sound guidance and advice to clients.

Developers, Contractors, Equipment Operators and Landscapers

The movement and distribution of infested soils, including infested vegetative material associated with land development activities, can be a primary pathway for the introduction and spread of invasive species. These matters can be regulated through the development of a regional bylaw or a set of municipal bylaws relating to the removal and deposit of soil and could also be used to prohibit the movement or deposit of contaminated soils, inclusive of those infested with invasive plant parts, seeds or other invasive species (See Appendix 2). In the absence of such local regulations, movement of soil contaminated by invasive species could be subject to common law civil actions as there is the potential for liability and unexpected costs resulting from invasive species fragments and seeds impacting future development and adjacent infrastructure.

The management of invasive species is not commonly addressed in permitting requirements for a development process however to avoid introduction of invasive species it is important to take precautionary measures. When a parcel of land is cleared, developed and re-seeded promptly, the potential for spread and introduction of invasive species is greatly minimized. However, this is often not the case as tracts of land can stay vacant for significant periods of time whereby allowing invasive species to establish making removal much more difficult and costly. It is in the best interest of developers to explore cost-effective ways to reduce the introduction of invasive species. The size of the area being cleared for construction should be minimized and natural vegetation should be retained as much as possible to discourage the spread of invasive species. Maintenance strategies including mowing before seeds develop and/or establishing a grassy ground cover, and hydro-seeding with a clean mix or planting native plant species can also help to minimize the spread of invasive species and costs associated with their removal and disposal.

Further best management practices can be found in *Develop with Care* (2014), produced by the Ministry of Environment & Climate Change Strategy.

Property Owners

Regulations regarding invasive species may be embedded in various bylaws or created by consolidating several bylaws, such as the good neighbour bylaw. The various bylaws that may pertain to invasive species include noxious weeds, invasive species, pesticides, nuisance, and unsightly premises. Property owners and land occupiers must follow any relevant bylaws and must comply with the provincial *Weed Control Act* (WCA) as well as any municipal bylaws requiring them to control those invasive species listed in the bylaw. In addition, some covenant documents require landowners to protect natural areas from invasive species and, if damage occurs on these adjacent properties, the landowner could be subject to civil action.

When involved in a property transaction, landowners have an ethical duty to be forthcoming with all information about the property. While not legally binding, the Property Disclosure Statement (PDS) is the tool to disclose any issues and concerns surrounding a property. In addition, the seller's agent should be apprised of any issues or concerns regarding invasive species within property boundaries and adjacently when possible.

Real Estate Professionals and Other Land Use Professionals

Real estate and other land use professionals are often able to gain access to a property and structures that others wouldn't otherwise be able to. By understanding how invasive species can reduce residential property values, impact successful mortgage applications and jeopardize property transactions the professional can better inform their client to ensure that they are protected in the purchase or amendment of a property. For REALTORS®, when acting as a seller's agent they have a duty to maintain client confidentiality but must also avoid committing fraud or misrepresentation.

Typically, most REALTORS® receive little to no training in recognizing the characteristics of invasive species and the environmental, economic and human health impacts that they pose. With the increasing occurrence of these undesirable species, further training and education is needed to protect not only themselves but also their clients.

A free interactive invasive species e-learning resource for real estate professionals, professional landscape architects, land developers and other land use disciplines is available to help those professionals:

- identify existing or prospective issues with invasive species on properties,
- identify some species of concern in BC, learn the impacts and risks associated with them,
- assist their clients by informing them of the risks, their land-owner responsibilities and advice towards the next steps on their impacted properties, and
- identify where to gather further information and resources.

<https://bcinvasives.ca/resources/invasive-species-training/real-estate-and-land-use/>

Property Disclosure Statement Declaration

The Property Disclosure Statement Declaration (PDS) is a possible tool that could be amended to include further disclosure of invasive species on private property and one that REALTORS® can utilize to protect both themselves and their clients. Currently the PDS asks a property seller to disclose any defects to a prospective buyer. While not a legally binding warranty of the property's condition and not required by law, this document, if amended could include further and specific disclosure of any invasive species on private property.

A PDS will decrease the chance of any misunderstandings by allowing the seller to inform potential buyers of any past or present conditions of the property, not immediately obvious. During transactions sellers have an ethical duty to be forthcoming with all information about the property.

To avoid potential implications on the sale, it is good practice for the REALTOR® to advise the client to control any invasive species on the property prior to listing. Failing to do so could result in the invasive species being considered a latent material defect – similar to mould. Thus, the seller should be advised to disclose all defects, including all known invasive species that could impact property structures or condition of the property itself, on the PDS. In doing so the seller may avoid any future control costs that could come back to the seller if not disclosed and thereby reduce the potential of invasive species issues from hindering the property transaction. Sellers can be liable for damages if they misrepresent the condition of a property, conceal any patent defects or fail to disclose latent defects.

Local government bylaws

Real estate professionals and their clients are subject to the same local government bylaws as all land occupiers and therefore must adhere to jurisdictional legislation.

Professional Standards Manual (Best Management Practices)

Buyers and land occupiers of real estate are becoming more aware of health, safety, and environmental aspects of property they intend to purchase and/or occupy. Legislation reflects those concerns and mandates ever more stringent levels of safety, greater disclosure and broader responsibilities and liabilities for these matters. The Real Estate Council (RECBC) of BC provides a Professional Standards Manual <https://www.recbc.ca/licensee/psm.html> that advises how licensees should deal with various issues that could impact the sale and transfer of property. There are numerous guidelines within this Manual that address environmental issues however there is a lack of content relating to invasive species. With updates and the addition of required criteria to include invasive species education in yearly professional credits, real estate professionals could be better equipped to deal with invasive species issues on private lands.

Additional Tools

Some municipalities and regional districts provide public access to online mapping services that identify key invasive species infestations - this tool, when used by real estate professionals, can assist in planning for site visits. As well, real estate professionals and the public have access to the Ministry of Forests, Lands, Natural Resource Operations and Rural Development Invasive Alien Plant Program (IAPP) online and mobile application, a database for invasive plant data in BC. It shares information generated by various agencies and non-government organizations involved in invasive plant management. The application allows the entry, editing and querying of invasive plant information including useful site details and invasive plant inventory information.

4.3 RECOMMENDATIONS FOR LOCAL GOVERNMENTS

The purpose of this section is to provide recommendations for local governments to refer to when determining how best to manage invasive species in BC.

Local Governments - Bylaws and Policies

Local governments in BC have considerable opportunity to develop or amend an invasive species program within their jurisdiction. A successful program is most often built on both regional districts and municipalities delivering a joint invasive species program thereby ensuring maximum efficiency and effectiveness. There are several recommendations available for local governments to explore when implementing a strategy to prevent the introduction or spread of invasive species.

Educate to Prevent Introduction and Spread of Invasive Species

Local governments are severely challenged by vectors of invasive species spread as many of these species are introduced and spread by uncontrollable means such as invasive plant matter transported unknowingly by vehicles, and dispersal by natural means such as wind, water and animals. It is recommended that local governments consider developing or extending existing best management practices to the public for various activities undertaken within jurisdictional boundaries.

Restrict the Transfer and Sale of Invasive Species Within the Area

While there are several uncontrollable vectors of invasive species spread, there are also some species that are spread through the sale and transfer of invasive horticulture plants, aquarium trade and the exotic pet trade. Invasive species continue to be sold in many retail outlets across BC. Unfortunately, these invasive species are often released into natural landscapes or escape cultivation or containment and cause long-lasting changes to nearby ecosystems, impacts to wildlife habitat, species-at-risk, human health and safety, and economies. The development of a region-wide program that restricts the transfer and sale of invasive species could have significant impact on reducing their spread and introduction in BC.

Removal, Management and Proper Disposal of Invasive Plants

Unfortunately a common by-product of improper disposal of invasive species waste is the dumping in ravines, parks, and other green spaces resulting in further invasive species introduction and spread. In order to minimize improper disposal, clear regulations and bylaws regarding invasive species disposal and soil removal on private land must be effectively communicated. This situation is complicated and unique in some areas due to geography and types of invasive species in question and can be further complicated by varying infrastructure and management practices among regions. There is a need for clearly communicated information for landowners and developers on proper management, removal and disposal of invasive species and infested soils. By clarifying the process of appropriate disposal and making it readily accessible, and by providing incentives to landowners/developers to separate invasive waste from regular garden waste, local governments can build a successful invasive species management program that is easily adopted. Please see Appendix 2 for the 2018 ISCBC Best Management Practices for Soil Movement and Disposal.

Local Government Invasive Species Network

The Local Government Invasive Species Network is a listserv dedicated to connecting local governments throughout BC that have an interest in or function pertaining to invasive species. This listserv acts to enable communication and sharing regarding management and prevention of invasive species and relevant programming, bylaws and initiatives. To join email info@bcinvasives.ca

Invasive Species Action Plan

The City of Richmond is taking significant efforts to detect and rapidly respond to newly arrived invasive species. To mitigate the impacts of invasive species, the City is addressing emergent invasive species on City lands. Their Invasive Species Action Plan is a strategic and risk-based approach to guide and prioritize invasive species management moving forward. The Plan provides guidance on setting priorities, establishing a consistent approach, and delivering public outreach and engagement.



https://www.richmond.ca/_shared/assets/ISAP43428.pdf

Removal or Containment of Invasive Species

The responsibility of removal and/or containment of invasive species is largely within the *Weed Control Act* revision which was released in February 2014 for public consultation. This revision will provide specific recommendations and requirements for species listed and will be more prescriptive in nature. This revision provides specific recommendations and requirements for species listed and is more prescriptive in nature. The BC Prohibited Weed list was updated in February 2015.

Remediation

Invasive species can quickly establish on disturbed or bare sites and it is therefore important to ensure that any sites that have been cleared of topsoil, invasive species or other materials are appropriately addressed to avoid re-colonization by undesired species. Employing best management practices to ensure quick re-vegetation with appropriate species is paramount to maintaining a site's integrity and discouraging re-establishment of undesirable species.

Invasive Species Requirements Within the Development Process

Local governments have the opportunity to require specific invasive species management action through the development process. This can include invasive species management requirements for: demolition permits, building permits, the subdivision process, and the rezoning process. Consistent inclusion of invasive species management through the development process can greatly reduce the spread of invasive species. Local governments are encouraged to utilize the Local Government Network to connect with colleagues from across the province on this topic.

For further information on best practices, please see the ISCBC's collection of Best Practices Guidebooks. (<https://bcinvasives.ca/resources/publications/>).

4.4 RECOMMENDATIONS FOR LAND USE PROFESSIONALS INCLUDING DEVELOPERS AND LANDSCAPE ARCHITECTS

Landscape architects and developers have the ability to play an important role in preventing and slowing the spread of invasive species within BC by designing and developing lands to protect and promote biodiversity. The purpose of this section is to provide recommendations and suggest best practices for developers, landscape architects and other land use professionals to refer to when developing private land to minimize the spread of invasive species in BC.

Know Local Bylaws and Polices

The first step before commencement of operations should always include a review of provincial regulations and local bylaws, special requirements, or options that are applicable in the area where the operation is to take place. Some local governments have bylaws that regulate development and the removal of soil or fill, including requirements for invasive species management. In addition, when determining options for disposal it is important to be aware that some landfills accept invasive species or soil, while others do not. By knowing these requirements and options from the outset, the development process can move forward more easily. Alternatively, some specialized recycling facilities will accept soils.

Know the Site and the Soil

Limiting the spread of invasive species when designing sustainable landscapes or developing land first involves knowing the site and the soil, including a site assessment prior to any soil disturbance to determine the risks and to make management recommendations. Inspect both the active development site and the adjacent areas, ensuring survey staff are up-to-date with the latest invasive species information. If needed consult local invasive species professionals to help identify threats.

Treat the Site Before Soil Disturbance

Following the completion of the initial property survey and species inventory, control the invaders in the above ground soil. Treat according to the species present and degree of infestation by following the recommended guidelines, with the goal to keep the treated soil on-site when possible. Please see the ISCBC Soil BMP (Appendix 2) for soil treatment, transport and disposal recommendations.

Import 'Clean' Fill

Before moving any soil, the equipment, vehicles and workers should be clean of any soil and invasive species to reduce the chance of accidentally introducing invasives species to new areas. If importing soil or other materials into the site, perform due diligence and verify it is 'clean' and sourced from locations known to be free of invasive species.








Select Non-Invasive Plants




The inclusion of ornamental plants is very common in the designs of outdoor environment projects; however, the selection of plants can sometimes include invasive species that can pose serious harm to our environment and economy. Commit to be 'PlantWise' in design. For developers where work on site will not proceed immediately, stabilize by re-seeding with a non-invasive seed mix as soon as possible to reduce the likelihood of germination and regrowth of invasive species. For landscape architects select native or non-invasive exotic plants. If needed, contact the local invasive species organization for assistance. A selection of non-invasive plant species, categorized by region can be found on the PlantWise website (beplantwise.ca).

Continued Monitoring

Sites should be continuously monitored for invasive species to assess treatment efficacy and need for retreatment. Time and resources after project completion should be allocated to follow-up for any re-growth or new invasions, and retreatment should proceed as needed.

TABLE 4: Description of invasive species of concern in B.C.

SPECIES/ INTRODUCTION	COMMON NAME	IMAGE	HABITAT PREFERENCE	REPRODUCTION/ SPREAD	IMPACTS
<i>Reynoutria japonica</i> Escaped Ornamental https://bcinvasives.ca/documents/ISCBC-Factsheet-Knotweeds-180216-WEB.pdf	Japanese Knotweed		Prefer moist soil and full or partial sun; often found in riparian areas stockpiled material, derelict land, road and railway right of ways and gardens	Predominantly reproduces vegetatively from root/stem fragments and less frequently by seed which can remain viable for up to 15 years. Spread via contaminated equipment and soil, and improper disposal of removed plant material. Also dispersed through wind, wildlife, cutting, mowing, flooding events and through human actions such as selling, purchasing, and trading.	Capable of growing through concrete and asphalt, damaging infrastructure. Grow rapidly, forming monocultures that limit resources for native plants. Their ability to out-compete native species threatens biodiversity and ecosystem functions.
<i>Reynoutria sachalinensis</i> Escaped Ornamental https://bcinvasives.ca/documents/ISCBC-Factsheet-Knotweeds-180216-WEB.pdf	Giant Knotweed				
<i>Reynoutria x bohemica</i> Escaped Ornamental https://bcinvasives.ca/documents/ISCBC-Factsheet-Knotweeds-180216-WEB.pdf	Bohemian Knotweed				
<i>Polygonum polystachyum</i> Escaped Ornamental https://bcinvasives.ca/documents/ISCBC-Factsheet-Knotweeds-180216-WEB.pdf	Himalayan Knotweed				
<i>Hieracium spp.</i> Escaped Ornamental https://bcinvasives.ca/documents/Yellow_Hawkweeds_TIPS_2017_WEB.pdf	Yellow Hawkweeds		Prefer well-drained and coarse textured soils with low organic matter such as fields, meadows, forest clearings, pastures, farmland and other various habitats	Propagation is through large volume seed production, long distance dispersal, high germination ability and root fragments. Spread of small seeds and root fragments through intentional and unintentional human activity allows this species to disperse widely and colonize new locations.	Competes with desirable/native species negatively affecting biodiversity and impacts ranching and agriculture by decreasing yields and quality of forage production resulting in low stocking rates.
<i>Hieracium aurantiacum</i> or <i>Pilosella aurantiaca</i> Escaped Ornamental https://bcinvasives.ca/documents/Orange_Hawkweed_TIPS_2017_WEB.pdf	Orange Hawkweed				
<i>Heracleum mantegazzianum</i> Escaped Ornamental https://bcinvasives.ca/documents/Giant_Hogweed_TIPS_2017_WEB.pdf	Giant Hogweed		Wide variety of habitats, but prefers rich, damp soil. Is common along roadsides, right-of-ways, ditch-lines, vacant lots, river and stream banks, wetlands, riparian areas, agricultural areas, wooded ravines, and other disturbed sites.	Reproduces by seed only. Plants require 2 to 5 years from germination to develop a flowering stem. Seed production varies from 5,000 to 100,000 per plant that may remain viable for up to 15 years. Long distance dispersal is typically by water as the winged seeds can float for 3 days before they become water logged and sink. Short distance dispersal is commonly a result of wind. Humans can also disperse plants through horticultural activities, vehicles and movement of contaminated soil and aggregates.	Highly competitive plant that can displace other plant species due to vigorous early-season growth, tolerance of full shade and seasonal flooding. This can result in changes to ecosystem biodiversity and functions. A toxic plant by Worksafe BC posing a human-health hazard as the leaves and stems contain highly toxic sap that can cause hypersensitivity to sunlight resulting in burns, blisters, and scarring when coming into contact with skin.

SPECIES/ INTRODUCTION	COMMON NAME	IMAGE	HABITAT PREFERENCE	REPRODUCTION/ SPREAD	IMPACTS
<p><i>Centaurea biebersteinii</i> From contaminated seed https://bcinvasives.ca/documents/Knapweed_TIPS_Final_08_06_2014.pdf</p>	<p>Spotted Knapweed</p>		<p>Prefers open areas and well-drained soils and can become established in grasslands, open forests, and along roadsides and right-of-ways. Spotted knapweed is more intolerant to dense shade and prefers moister habitats than diffuse knapweed</p>	<p>Reproduce solely by seed. Dormant seeds may remain viable in the soil for over 8 years, potentially remaining viable for over 15 years. Seeds are usually dispersed in the immediate vicinity of the parent plant. They can be spread greater distances in hay, on and through animals, soils and on vehicles.</p>	<p>Dense infestations of knapweed can increase runoff and erosion, leading to sedimentation of watercourses. Can displace native vegetation, dead plant material can increase risk of fire and is allelopathic capable of altering soil chemistry, preventing the growth of other plants.</p>
<p><i>Centaurea diffusa</i> From contaminated seed https://bcinvasives.ca/documents/Knapweed_TIPS_Final_08_06_2014.pdf</p>	<p>Diffuse Knapweed</p>		<p>Prefers open areas and well-drained soils and can become established in grasslands, open forests, and along roadsides and right-of-ways. Cannot tolerate cultivation or excessive moisture and thus uncommon on cultivated land.</p>	<p>Reproduce solely by seed. Dormant seeds may remain viable in the soil for over 8 years, potentially remaining viable for over 15 years. Seeds are usually dispersed in the immediate vicinity of the parent plant. They can be spread greater distances in hay, on and through animals, soils and on vehicles.</p>	<p>Loss of forage on rangeland and pasture, depletion of soil and water resources, displacement of native species on wildlands, reduction of biodiversity, reduced land value and increased maintenance costs. Nutrient competition and allelopathy leads to dominance over native biodiversity.</p>
<p><i>Myrmica rubra</i> From infested garden or landscape material https://bcinvasives.ca/documents/European_Fire_Ants_in_BC_Public_Factsheet_V1-Nov_2012.pdf</p>	<p>European Fire Ant</p>		<p>Not conspicuous as they do not build mounded nests, but prefer humid moist environments including in the soil and along roots of trees or shrubs, under rocks, logs, patio stones and in decaying wood or other rotting debris.</p>	<p>Spread by “budding” when established colonies move to adjacent areas and occurs when one or more queens and a group of workers, frequently with brood, move from an existing colony to a new nest site. The most common means of spread is through human-aided dispersal such as dumping or transporting infested debris, plants, mulch or soil.</p>	<p>If disturbed ants will aggressively defend their territory biting and stinging repeatedly. In a few cases it has produced severe allergic reactions including anaphylaxis. Research in BC and eastern North America shows that, where the ant is established, there is localized loss of biodiversity with the ants displacing other species of ants. Loss of use of green space can occur if the ant becomes widely established in an area.</p>

Module 5.0 Regulation and Enforcement

5.1 IS REGULATION THE RIGHT TOOL?

Regulation is a tool that can be used to enforce invasive species management and invasive species control within local government jurisdictions. Clear and concise bylaws are required. The purpose of the bylaw determines which enabling provision should be used. For example, if the “protection of the natural environment” bylaw is used, even if it dealt only with the listed alien invasive species in the Schedule, it could presumably be challenged if it could be shown that the real purpose of the bylaw was to protect neighbouring gardens and lawns rather than “the natural environment”. If the actual purpose is to protect neighbouring gardens and lawns, then nuisance powers should be used. See Figure 2 for a flow chart of steps to determine legislation to consider.

Some questions to consider before developing regulations include:

Step 1: Consult with community, staff and politicians to determine:

- Why is an invasive species program desired?
- Who are the primary supporters?
- What is the primary concern (e.g. impacts to agriculture, nuisance to neighbours, impacts to the environment, or protecting gardens)?
- What species are of concern?
- What is the primary source of spread (e.g. private properties, garden dumping, road edges, and local parks)?
- Who needs to be addressed (e.g. private landowners, business owners, sellers of wildflowers or land developers)?
- Are neighbouring jurisdictions prepared to work together to operate a joint invasive species control program?

Step 2: Consider all options for invasive species management to determine if a legal tool will address the concerns.

- Can the issues be addressed without regulation (through education, incentives, or other local government initiatives)?
- If no, then what is the bylaw intended to accomplish? Identify bylaw purpose and content.
- If the bylaw is to enforce control on private land, go to Step 3.
- If the bylaw is to enforce the sale of wildflowers, the planting of species in new developments, the protection of public health, or the movement of infested soil, go to Step 4.
- Consult with your solicitor to determine if you are using the right enabling provision and for drafting of the bylaw.

Step 3: If the bylaw is to enforce control on private land, determine what legal tool will address the concerns.

- a) What species are of concern?
 - In general, if the species you are concerned about are included in the provincially noxious Schedule A or regionally noxious Schedule B of the *Weed Control Act*, and if your primary aim is to require property owners and occupiers to control or remove targeted species, then operating your program under the *Weed Control Act* may be your best choice.
 - If you are a regional district, and you want to deal with species that are not on the *Weed Control Act*'s list, your *Local Government Act* power to deal with nuisances may be your best choice.

- If you are a municipality, and you want to deal with species that are not on the *Weed Control Act*'s list, you may want to use the powers in section 8 of the Community Charter, but which specific power will depend upon the objectives of the program.
- b) What is the primary concern?
 - Agricultural protection – consider the *Weed Control Act*
 - Environmental protection – consider the *Local Government Act* (regional districts) or Community Charter (municipalities)
 - Nuisance to neighbours - consider the *Local Government Act* (regional districts) or Community Charter (municipalities)

Step 4: If the bylaw is to enforce another aspect of invasive species spread:

Municipalities

Community Charter options:

- The sale or planting of invasive species – consider Section 8(3)(j) or 8(6)
- Public health (e.g. giant hogweed) – consider Section 8(3)(i)
- Removal or deposit of soil contaminated with invasive species – consider Section 8(3)(m)
- The control and eradication of alien invasive species – consider under section 8(3) (j) and (k) of the Spheres of Concurrent Jurisdiction
- The control of wildlife species listed in Schedule B or C – consider 8(3) (k)

Local Government Act options:

- Weed removal or preventing introduction during development – consider Section 919.1 and 920

Weed Control Act options:

- Duty to control noxious weeds – consider Section 2

Regional districts

Local Government Act options:

- Removal or deposit of soil – consider Section 723(1)
- Weed removal or preventing introduction during development – consider s. 919.1 and 920

Step 5: Define a “weed”, “invasive plant” or “invasive species”.

- When enabling the *Weed Control Act*, local governments are limited to the species listed in its associated Schedule A or B. However, not all of these species need to be included.
- When using the protection of the natural environment power in the Community Charter, municipalities may select which species they are enforcing and add species by applying to the Ministry of Environment & Climate Change Strategy.
- For other options, local governments can deal with any species considered to be undesirable by the council or board.

Step 6: Other considerations

- What are adjacent local governments using? Consider standardization of bylaw definitions and wording. Municipalities can consider being added to regional district programs or developing a joint program with neighbouring municipalities, senior government land managing agencies, or Aboriginal peoples. Similarly, adjoining regional districts can develop joint programs with their neighbours.
- How will the bylaw be enforced?

For steps in developing a bylaw, refer to resources in Appendix 1.

LOCAL GOVERNMENT BYLAW FLOW CHART

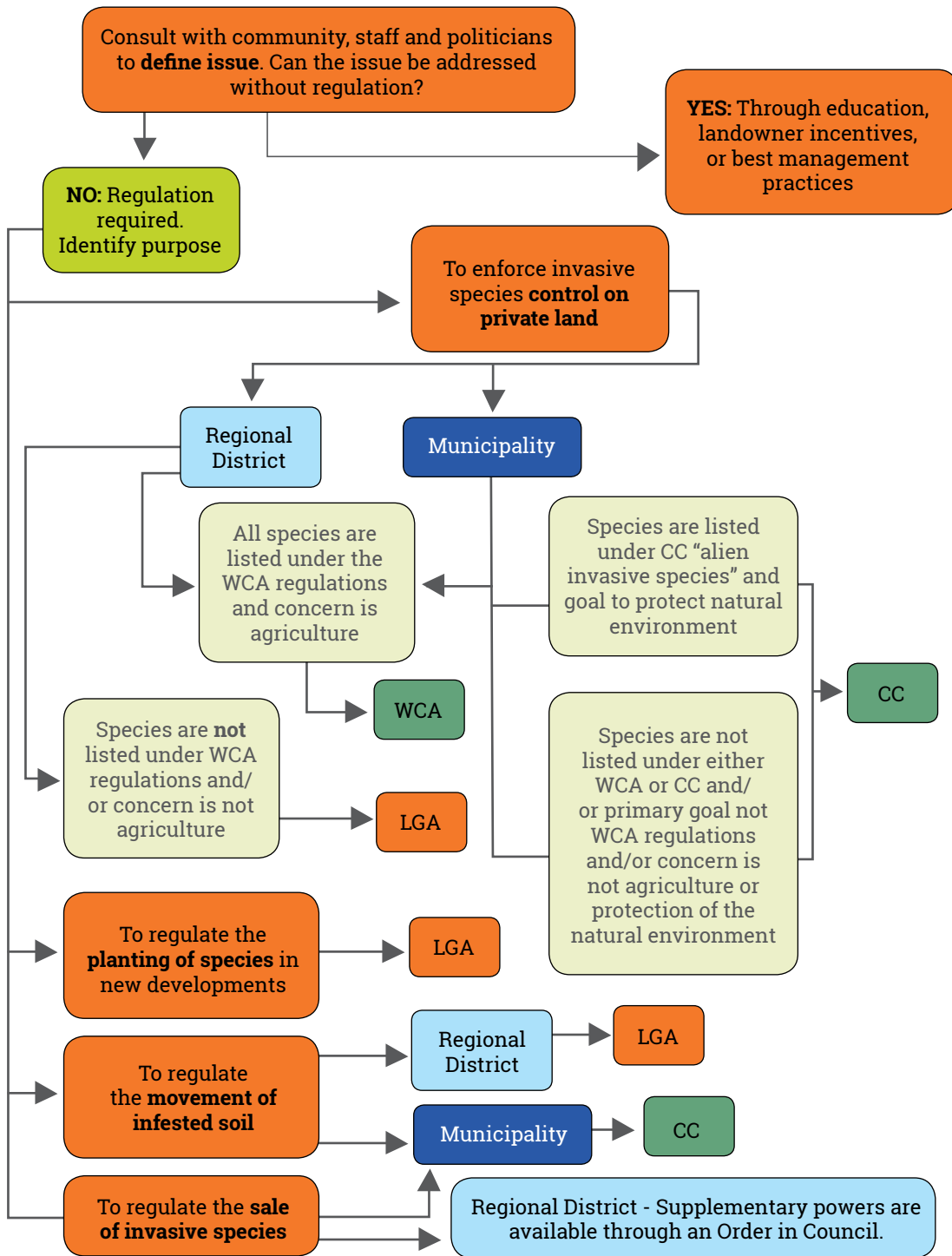


Figure 2: Flow chart of steps to decide which legislation is appropriate for your local government bylaw.

Weed Control Act



Local Government Act



Community Charter



INVASIVE PLANTS AND RESTRICTED PESTICIDE USE BYLAWS

Relating to the control of invasive plants, the Community Charter, Section 8(3) (j) “protection of the natural environment”, enables municipalities to restrict the use of pesticides on public and private lands. More than 40 BC municipalities have instituted a Pesticide Use bylaw. Although Restricted Pesticide Use Bylaws generally are intended to focus on the cosmetic or non-essential use of pesticides, they can inadvertently affect invasive plant management by removing herbicides as one of the tools available for control.

There are required exemptions under the Community Charter that a municipality may not exercise the authority under Spheres of Concurrent Jurisdiction BC Reg. 144/2004 Section 2(2) in relation to the application of pesticides (a) for the management of pests that transmit human diseases or impact agriculture or forestry, (b) on the residential areas of farms, or d) on land used for agriculture, forestry, municipality.

For the purposes of effective invasive plant management, restricted pesticide use bylaws will ideally exempt invasive plants so that herbicides may still be considered as an option for control. Examples of optional exemptions for invasive species for pesticide bylaws in BC include:

- Applied to control a noxious weed or noxious insect designated by bylaw of the City of X;
- Eradication of noxious and invasive species in accordance with the *Weed Control Act* (only where biological and mechanical controls either do not exist or have proven ineffective);
- The application of pesticides to control noxious weeds throughout the City after alternatives have been utilized without success (see provincial regulation *BC Weed Control Act* for defined noxious weeds);
- The bylaw does not apply to the management of pests that have been designated as invasive species;

- A permit may be issued to authorize use and application of pesticides to public land where an Integrated Pest Management Program is in place and is governing the applicant;
- A person may apply to local government for an exemption from section 4 for the use of Pesticides for Pest infestations that threaten the integrity of sensitive ecosystems;
- The management of pests that have been designated as invasive species.

The establishment of Restricted Pesticide Use bylaws provides an opportunity for education and awareness about invasive plants, either during the development of the bylaw or during the distribution of educational materials around the bylaw.

Note that if a herbicide were the only way to control a noxious weed as listed under the *Weed Control Act*, then any municipal bylaw which prohibited the use of that herbicide would have no effect as it would be inconsistent with the provincial requirement to control the noxious weed.

5.2 REGULATORY OPTIONS FOR INVASIVE SPECIES ON BOTH PUBLIC AND PRIVATE LAND

Option 1: Regulate noxious weeds under the BC *Weed Control Act*

Applies to both regional districts and municipalities

Steps Involved:

1. Regional District Board or Municipal Council establishes a weed control committee by appointing: a council member; a municipal resident; a Ministry of Agriculture representative, and a not-for-profit society member. A representative must also be appointed by the Minister of Health. The Committee may or may not be established by bylaw.
2. Regional District Board or Municipal Council submits a letter to the Minister of Agriculture notifying that they are taking on the powers of the *Weed Control Act*. The letter must include:
 - a. Names of the appointed committee members.
 - b. List of weeds considered noxious and requiring control, selected from the provincial and/or regional noxious weeds listed under the provincially noxious Schedule A or regionally noxious Schedule B of the BC *Weed Control Act* Regulation.
 - c. The appointment of a Weed Control Officer(s) (typically bylaw enforcement officers) and intentions to supervise officer(s).
 - d. Management plan for identified species to be carried out by Weed Control Officer(s), including an approach for responding to public concern.
3. Regional District Board or municipal council generally establishes a service establishment bylaw, under the *Local Government Act*, to generate a source of income for this endeavour. This bylaw will define the objectives and geographic scope of the program and identify who will pay for it. Once the service is established, the regional district board enacts its regulatory bylaw which includes how it will be enforced, and what the implications are for non-compliance.
4. Regional District Board or Municipal Council submits an annual report to the Minister of Agriculture detailing Weed Control Activities, annual spending and estimates for the next year.

Pros of this option:

- A mechanism for notices and enforcement is already outlined in the *Weed Control Act*.
- Local governments administering an invasive plant management program for all lands within their regional/municipal boundaries may be eligible for an annual grant from MAL to offset program costs. Historically, MAL grants compose up to 25% of a local government's program budget, with the remaining budget obtained from rural taxation and other sources.

Cons of this option:

- Local government is restricted to the species listed under Schedule A and B of the WCA Regulations listed as provincially or regionally noxious. If there are other invasive plant species of concern, they cannot be addressed under the *Weed Control Act*.
- Added work to set this up and includes on-going administration.
- Goal of invasive plant program must be protection of agriculture.

Option 2: Regulate alien invasive species through the Community Charter

Applies to municipalities only

Steps involved:

1. Municipal Council adopts an invasive species bylaw under the broad powers of the Community Charter Act discussed above. Municipalities operating under the nuisance weed control power may add new species to the bylaw at their discretion. Municipalities operating under the “protection of the natural environment” power must gain approval from the Minister responsible for the administration of the environment management act to add species if they are not identified in BC Reg. 144/2004. Municipalities operating under the health protection power must get permission from the Ministry of Health. A single program can be operated under multiple enabling provisions (e.g., its goal can be to control nuisance species as well as to protect the natural environment and to address risks to human health.)

Pros of this option:

- Flexible. Program can be tailored to local objectives.
- The broader alien invasive species list in the Community Charter (B.C. Reg. 144/2004) may be more relevant to urban or other non-agricultural environments than the noxious weed list within the *Weed Control Act*.

Cons of this option:

- With regards to noxious weeds, unless the program also meets the requirements of a program under the *Weed Control Act*, it may not be eligible for funding from Ministry of Agriculture.

Option 3: Establish an invasive species control function under the *Local Government Act* applies to regional districts only

Steps involved:

1. Regional District Board develops a service establishment bylaw having invasive species management as one of its purposes. This bylaw establishes the objectives of the service, the geographic area in which the service will be provided, and identifies who will pay for the service through their property taxes.
2. Unless the program is solely oriented to the use of educational approaches and voluntary compliance, the Regional District Board exercises nuisance control regulatory powers that “require the owners or occupiers of real property, or their agents, to clear the property of brush, trees, noxious weeds, or other growths.”
3. Regional District Board identifies a list of invasive species considered to be invasive and requiring control. They may refer to the provincial or regional noxious weeds listed under the BC *Weed Control Act* Regulation or develop their own list. Alternatively, for plants they may not define noxious weeds but rather, establish a maximum height for herbaceous vegetation.
4. The ability to order the removal of invasive species can be used in two ways. First, as with the *Weed Control Act*, the bylaw could identify species that must be removed by property owners or occupiers whenever they appear. Alternatively, the regional district could identify a particular property where a problem is beginning to appear and make a targeted order that requires only that owner or occupier to remove the invasive species.

Pros of this option:

- Generally regional districts already have a nuisance control services bylaw that often includes the clause above, so a new bylaw need not be written. It can be amended with a Schedule of listed species or refer to the *Weed Control Act* list.
- Local governments can create their own list of invasive species that they consider to be a problem.

Cons of this option:

- Unless the program also meets the requirements of a program under the *Weed Control Act*, it may not be eligible for funding from Ministry of Agriculture.

Option 4: Establish an invasive species control function through the nuisance or unsightly premises options of the Community Charter

Applies to Municipalities only

Steps involved:

1. Municipality exercises nuisance or unsightly premises powers for “brush, trees, noxious weeds or other growths that council considers should be removed, cut down or trimmed” or uses an existing nuisance or unsightly premises bylaw under the former *Municipal Act*.
2. Municipality may identify a list of invasive species considered to be a nuisance and requiring control through an associated Schedule or within the bylaw, refer to an existing list such as the *Weed Control Act*, or identify a maximum height for vegetation.

Pros of this option:

- Local governments can create their own list of invasive species that they consider to be a nuisance. Generally municipalities already have a nuisance control bylaw that often includes the clause above, so a new bylaw need not be written. It can be amended with a Schedule of listed species.

Cons of this option:

- Might not be enforceable for working farm land.

Mechanism for enforcement

Bylaws must have a mechanism for enforcement allowing a bylaw enforcement officer to inspect a property, issue a monetary fine, or serve a notice to the owner or occupier that may require the removal of the identified species (such as weeds, noxious weeds, unsightly growth, alien invasive species) within a given time period, and allow for local government treatments that can be reimbursed. If the program is operated under the *Weed Control Act*, that legislation provides the authority for weed control officers to enforce the statutory requirements. If it is operated under the Community Charter or *Local Government Act*, local governments’ ability to enforce their bylaws, including the authority to enter on to property and inspect and enforce bylaws, derives from their general bylaw enforcement powers.

Although they issue notices, some local governments whose legislative authority do not always enforce compliance with their bylaws. There can be a concern about the legal costs of going to court if the notice gets challenged, and of justifying that particular notice given other infested properties. In some cases, educational material included with the notice and the threat of action is often enough for landowners to control their invasive species. In general, the effectiveness of the local program depends upon the local government budgeting enough money for enforcement, and if necessary, court action.

Keys to Success for Regulation

- Consider other program elements before using a regulatory approach
- Use a bylaw in conjunction with landowner education and engagement
- Consider using existing bylaws
- See ‘Towards a Model Bylaw’ section for tips on writing a bylaw
- Ensure that the list of target invasive species is reasonable
- Expect to do equitable control on local government lands as is expected on private lands while recognizing local government, as stewards of substantial public lands, may need more time to achieve results
- Issue notices early in the season or be pro-active with education
- Provide adequate time for landowners to address the problem based on the scale of the problem
- Ensure that operators conducting invasive species treatments are using best management practices
- Develop an associated policy for Administration
- Develop an associated Education Plan and Enforcement Policies
- Integrate invasive species management throughout local government development processes

5.3 BYLAW EXAMPLES

Bylaws are often variable between and among local governments, and as such there is no set template for an effective invasive species bylaw. This Toolkit presents these examples to show the variety of ways local governments are addressing invasive species issues across the province. These are not necessary model bylaws to use as a template. As part of drafting noxious weed or invasive species bylaws, expert advice should be sought to ensure the design of the bylaw is appropriate to local conditions and is defensible. For information on steps in developing a bylaw, see resources listed in Appendix 1.

Example of a bylaw to establish a service to enforce the *Weed Control Act*:

AND Whereas the Board of the Columbia Shuswap Regional District wishes to establish an extended service for the purpose of providing a Noxious Weed Control (Enforcement) Program; ...The Regional District hereby establishes an extended service for the purpose of providing a Noxious Weed Control (Enforcement) Program to Electoral Areas ‘A’, ‘B’, ‘C’, ‘D’, ‘E’, and ‘F’, to be known as “Noxious Weed Control (Enforcement) Program Extended Service Area.” ... (*Columbia Shuswap Regional District Bylaw No. 5110*)

Steps in Enforcement of Invasive Species on Private Property

An owner or occupier of real property must not:

- (a) allow such property to become or remain unsightly; or,
- (b) cause or permit rubbish, noxious, offensive or unwholesome matter or substance, filth or discarded materials to collect or to accumulate on or around such property.

The following process for enforcement is used by the City of Coquitlam:

1. The offending material is identified and the landholder issued an Order to Comply notice requiring the person to remove or clear the offending material from the property within 14 days.
2. The offending material is re-inspected to determine compliance.
3. If control was satisfactory, there is no further action.
4. If control was unsatisfactory, City staff or a contractor is retained to complete the control at the landholder’s expense.
5. If the landowner fails to pay the control expenses by December 31st of the year that the control is performed, the outstanding fee payable is added to the landholder’s property taxes.



Example of a bylaw that refers to the *Weed Control Act*:

All owners of real property situated within the Town of Qualicum Beach, or their agents, shall:

- (a) keep the real property clear of noxious weeds: and
- (b) prevent the growth or presence thereon of grasses exceeding 25 cm (10 in.) in height.

(Town of Qualicum Beach Noxious Weeds and Grass Control Bylaw No. 722, 2018)

- “Noxious Weeds” means any weed designated by regulation to be a noxious weed pursuant to the *Weed Control Act*, Regulation 66/85 and all amendments thereto; and in addition, any plant identified in “Schedule A” attached to this bylaw.

Example of a bylaw that does not define a noxious weed:

Every owner of real property in XXX shall clear such real property of all brush, noxious weeds or other vegetation which because of their condition are likely to spread to or become a nuisance to other real property in the vicinity or which are so unkempt as to be unsightly to nearby residents. (Many examples – *Unsightly Premises or Nuisance Bylaw*)

- Not always used for invasive plant enforcement
- Local governments may choose to use this clause for invasive plant control
- Usually local governments have not defined noxious weeds or assume it refers to the *Weed Control Act*

Examples of bylaws that define a maximum height of vegetation and a list of invasive plants:

Without limiting the generality of subsection 5.2.1, every Owner of a parcel must: (d) clear the parcel of brush, noxious weeds listed in Schedule “A”, and of grass in excess of 30 centimetres in length (City of West Vancouver, *Good Neighbour Bylaw No. 4380, 2004*)

- Schedule A lists 5 invasive plant species.

All owners and occupiers of real property situated within the designated area, or their agents, between April 1 and September 30 of any year, shall: (a) prevent the growth of noxious weeds on the real property from exceeding growth above 20.32 cm (8 inches); (b) prevent the growth of grasses on the real property from exceeding growth above 20.32 cm (8 inches); ...

(*Regional District of Central Okanagan, Consolidated Bylaw No. 179*)

- Noxious weeds shall include all plants defined in Schedule A, attached to and forming part of this bylaw, and shall include alien plants. For certainty, noxious weeds do not include dandelions (*Taraxacum officinale*) or trees.
- Noxious weeds shall include all plants defined in Schedule A, attached to and forming part of this bylaw, and shall include alien plants (e.g. CORD). The bylaw also defines invasive as: “Invasive shall mean any plant which has the potential to pose negative or detrimental impacts on humans, animals or ecosystems.” And alien is defined as: “alien plant shall include any invasive plant which has been introduced from another region or country”

Examples of bylaws that requires the destruction of noxious weeds

All Owners and Occupiers of Real Property situated within the Service Area, or their agents, shall cut or cause to be cut down or otherwise destroy all Invasive Plants growing thereon so often in each year as is necessary to prevent them from going to seed. (*Regional District of East Kootenay - Invasive Plant Regulation Bylaw No. 2711, 2017*)

- Invasive Plants has the same meaning as the definition of noxious weeds in Section 1 (1) of the Weed Control Act; where “noxious weed” means a weed designated by regulation to be a noxious weed, and includes the seeds of the noxious weed.

Every owner or occupier of real property in Electoral Areas “A”, “B”, “C” and “K” of the Regional District of Comox-Strathcona, or that person’s agent, shall ensure that his or her property be cleared of, and remain free from, all noxious weeds listed in Schedule “A” to this Bylaw. (*Regional District of Comox-Strathcona Regional District of Comox-Strathcona Weed Control Regulation Bylaw No.2347*)

- Schedule A lists 10 weed species.

Example of clause to charge control activities to property owner:

Where weeds, tall grass or other unsightly growth are not controlled within the time or in the manner specified in the notice, the Bylaw Enforcement Officer may, without further notice, take the action he considers necessary to enter onto the property and control such growth and to charge the expenses incurred for such work to the owner of the property.

5.4 TOWARDS A MODEL BYLAW

The ISCBC recognizes the need of local governments to have a model bylaw to adopt or adapt as appropriate as part of a multi-tiered approach. The process of writing a model bylaw may include the establishment of working groups, provincial partners, and legal advice. Although the development of a model bylaw was beyond the scope of this project, ideally this Toolkit will provide an initial platform to encourage the development of such a bylaw or series of bylaws.

Even local governments with an existing bylaw may wish to re-examine their bylaw and update it. In many cases, local governments have noxious weed bylaws that are out of date or focus only on one concern (such as agriculture) rather than impacts to natural ecosystems or take in to consideration other invasive species.

Elements to consider towards a model bylaw:

- Identify if local governments want to address complaints of overgrown lawns and dandelions (e.g. vegetation height restriction).
- Consider limitations of using vegetation height as the regulatory measure since some invasive species, such as carpet burweed or orange hawkweed, survive very well at heights less than 20 cm and with mowing.
- Include only high priority species of concern for the local government.
- Consider designating different actions required for different species. For example:
 - Prohibited (must be eradicated)
 - Primary (must be controlled from spreading)
 - Secondary (enforcement may be considered depending on severity of infestation and its impacts)
- If referring to the invasive species list from the WCA or CC, clarify whether the species included in the bylaw are those on the list at the time of writing, or those on the most current version (since it may be updated).
- Include species beyond the *Weed Control Act*.
- Provide adequate time for landowners to address the problem based on its scale.

Module 6.0 Getting Started

6.1 CONSIDERATIONS FOR GETTING STARTED

There are a number of possible options for establishing or expanding an invasive species control program. Deciding on the right approach for your local government will depend on:

- The type of local government (Regional District or Municipality)
- The goals of your program and your land use
- The primary concern(s) about invasive species in your area
- Species of concern in your area
- Vectors of spread in your area
- Whether your issues require a regulatory approach
- Whether there is an active invasive species/plant committee operating in your area
- Whether other local governments in your region already have a program you can join
- Political commitment
- Your budget and resources

6.2 PARTNERSHIPS AND OPTIONS FOR DELIVERY

Partnerships can be an excellent method for developing and delivering invasive species management in terms of funding, expertise, resources, and services. For example, in regions where an invasive plant/species committee is established, local governments may develop a management program in partnership with these efforts to achieve a total management program for the region and ensure no duplication of efforts. Regional invasive species committees fulfill many functions, especially public education, technical advice and land manager coordination.

Interdepartmental Partnerships

There is no single department for invasive species management in local governments. The focus of the program (e.g. extension to private landowners, control in parks, strategic planning) will determine an appropriate department. Ideally, an invasive species program will involve a partnership of staff from multiple departments. Examples of where invasive species initiatives are housed within local governments in BC include:

- Parks and Recreation Department
- Parks and Environment Department
- Environmental Services/ Environmental Health Services
- Environmental Sustainability Department
- Development and Environment Department
- Climate Action and Environment Department
- Engineering Department
- Engineering and Public Works Department
- Planning and Development Department

Invasive Species Council of BC

The Invasive Species Council of BC (ISCBC) is a provincial registered charity and non-profit society comprised of representatives from agencies, groups, and individuals involved in invasive species management. The ISCBC generally takes on a coordinating role to address provincial-level issues that deal with multiple agencies and stakeholders. The ISCBC has developed educational materials, technical reports, and other resources that may be useful to local governments.

Regional Invasive Plant/Species Committees

There are 13 non-profit organizations involved in invasive plant/species management across BC. These regional committees promote a coordinated approach to invasive plant/species management to strive for a total management program for the region and prevent duplication of efforts. These committees are a wealth of knowledge, expertise, and resources. Some regions include on-the-ground operations while others focus primarily on outreach and education. Regional invasive plant/species committees have usually already formed partnerships with multiple agencies including many levels of government, utility companies, community groups, non-government organizations, and industry. A downloadable map of the regional committees in BC is available through the ISCBC website at www.bcinvasives.ca.

Government Agencies

Local governments may enter into partnerships with other agencies, including provincial governments, regional districts, or other municipalities.

A Pooled Resource Delivery Model

From 2005-2013, members of this non-profit organization, including municipalities, regional districts, provincial government agencies, utility companies, and other organizations, used a common strategy and pooled their resources to provide more efficient inventories and treatments of invasive plants. The NWIPC managed the on-the-ground work on behalf of their members with one contractor for each Invasive Plant Management Area (IPMA) working on multiple jurisdictions. High priority species and sites, regardless of jurisdiction, are inventoried and treated through this program. The NWIPC strategic plan, updated annually, tracked invasive plants, categorized and prioritized invasive plants and sites for control and outlined required actions. NWIPC also provided support and coordination for those involved in the various aspects of invasive plant management including awareness, reporting sites, inventory, treatments and assessment. While this model worked well, not all potential partners contributed to the pool over time. With changes to reporting requirements and higher scrutiny by government agencies, the NWIPC has moved to a Partnership/Pooled Delivery Model continuing to use a shared strategic plan and pooling funds for Coordination, Education and Awareness activities. On-ground delivery continues as a Partnership model with one contractor per area managing invasive plants for multiple contributing partners using direction given in the strategic plan. A pooled Regional EDRR fund allows treatment of critical species regardless of jurisdiction.

SPOTLIGHT ON THE NORTHWEST INVASIVE PLANT COUNCIL (NWIPC)



Community Groups

Many local governments attribute their success to the engagement of volunteers from community and stewardship groups. Public involvement allows for invasive species to be controlled by volunteers in local parks and other local government lands when few resources are available. For example, the City of North Vancouver engages community volunteers to do invasive plant removal at a number of their parks. Local governments may also use community groups to monitor control contracts as a service. For example, the District of Saanich supports community groups in the removal of invasive plants and ecosystem restoration by providing start-up training, on-going ecological advice, restoration plan guidance, staff and equipment for selected work parties, plant debris removal, and annual training and recognition events.

6.3 COST AND COST-RECOVERY

Like all local government initiatives, funding is one of the greatest challenges. Examples of how local government invasive species programs are funded in BC include:

Local Government Funds

- Ministry of Forests, Lands and Natural Resource Operations Coordination and Awareness Grant and Operations Grants
- Service taxation for invasive species service
- Operating budget
- Capital budget (including through Development Cost Charges, Park Improvement Development Cost Charges)
- Environmental Services budget (for private lands)
- Parks Budget (for public lands)
- Carbon tax funds (returned from the province)
- Regular staff time (e.g. Parks staff)

External Funds

- Ministry of Forests, Lands and Natural Resource Operations Coordination and Awareness Grant and Operations Grants
- Development and casino funding
- Summer students through HRDC grants (work for Parks Department)
- Contracts with municipalities (for Regional District to provide service)
- Contract with Ministry of Transportation and Infrastructure (to do control on highways rights-of-way)

Other Options

- Community volunteers

6.4 KEYS TO SUCCESS

The following keys to success have been identified by local government representatives involved in invasive species programs across BC:

- **Think regionally** – deal with issues such as EDRR, disposal or education at a regional level.
- **Contact your regional invasive plant/species committee** – to identify local resources and what programs are already operating in your area.
- **Pool resources** – where several local governments are interested in achieving the same outcome, such as educational materials, inventory or management plan.
- **Do not underestimate the power or education** – it can make a difference.
- **Use landowner incentives** – to encourage control on private land.
- **Engage communities and volunteers** – to assist with control efforts, education and other projects.
- **Engage and train staff** – to promote an interest in doing things right to control and prevent the spread of invasive species.
- **Collaborate with partners** – including interdepartmental, community groups, and multiple stakeholders.
- **Use existing resources** – such as work crews and budgets.
- **Incorporate best management practices** – into “everyday activities” such as park maintenance and landscaping, mowing, and movement of soil.
- **Identify a staff contact for invasive species** – so your local government can become informed and begin to get involved.
- **Prioritize species, areas and activities** – by using decision-making tools, working with neighbouring jurisdictions, and developing a strategic plan.
- **Designate manageable units for management** – to make planning, treatment and monitoring efforts much more focused and efficient. This may be areas within a regional district, areas of high priority species, or high value parks.
- **Develop regional educational and administrative policies** – to provide direction to municipalities.
- **Develop administrative and educational programs** – to provide incentives for municipalities.
- **Consider regulation** – to address private property concerns.
- **Consider developing a service** – to provide a budget for invasive species.
- **Do not get overwhelmed** – by all the invasive species that are out there, focus on the ones where you can make a difference.

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Appendix 1: Key Resources

Public Awareness and Educational Resources

* Contact your regional invasive plant/species committee for local resources*

“Invasive Plant Alert” poster (Comox Valley Regional District) https://www.comoxvalleyrd.ca/sites/default/files/docs/Services/cvrd_knotweed_alert_2016.pdf

“Controlling invasive plants on your property” (District of Saanich) <http://www.saanich.ca/assets/Community/Documents/Environment/Invasive%20Plants%20Booklet%202015%20web.pdf>

“Control of invasive knotweed species” (Capital Regional District Parks) <https://www.crd.bc.ca/docs/default-source/parks-pdf/knotweedfactsheet2013.pdf?sfvrsn=2>

“Grow me instead” (ISCBC) <https://bcinvasives.ca/resources/publications/grow-me-instead-booklet>

“Integrated Pest Management Program” (District of Saanich) <http://www.saanich.ca/EN/main/parks-recreation-culture/parks/guidelines-policies/integrated-pest-management-program.html>

“Noxious weeds of the North Okanagan” brochure and posters (Regional District of North Okanagan) http://www.rdno.ca/docs/2014_RDNO_Weed_Brochure.pdf

Noxious weed fact sheets (Regional District of Okanagan Similkameen) www.rdos.bc.ca/index.php?id=249

“Weed of the Week” articles (Regional District of Okanagan Similkameen) www.rdos.bc.ca/index.php?id=623

Various fact sheets by species (District of Saanich) http://www.rdno.ca/docs/2014_RDNO_Weed_Brochure.pdf

“Invasive Species e-Learning for Real Estate and Land Use Professionals” (ISCBC) <https://bcinvasives.ca/resources/invasive-species-training/real-estate-and-land-use/>

“Real Estate and Land Use” webinar <https://bcinvasives.ca/resources/webinars/webinar-archive>

Invasive Species factsheets (ISCBC) <https://bcinvasives.ca/resources/tips/>

Appendix 2: Soil Best Management Practices



**Invasive Species
Council of BC**

Best Management Practices for Soil Movement and Disposal

Invasive Species and Why You Should Care

When soil, gravel, mulch, and other organic matter containing an invasive species is moved or disturbed, it can frequently result in the establishment or re-establishment of an unwanted species. Following best management practices will help prevent spread and reduce the risk of potential impacts on human health, infrastructure, agriculture and the environment in BC.

By identifying issues, developing a response, and carefully executing a plan that utilizes best practices, problems can be managed up front instead of becoming overwhelming or surprising.

The following Best Management Practices will help reduce the risk of transporting invasive species to new locations.

Prevention of invasive species introduction and spread should always be the first consideration in any project. By managing invasive species we will lessen the impacts to the environment, economy and to human health. Inevitably, many projects require the movement of soil, whether developing a new building project, building a new road, or any other activity requiring soil relocation. The key is to follow best practices to ensure that invasive species are managed on-site and are not spread to new areas.

1/ Know Your Legal Obligations

The first step before commencement of operations should always include a review of provincial regulations and local bylaws, requirements, or options that are applicable in the area where the operation is to take place. Many local governments have bylaws that regulate development and the removal of soil or fill, including requirements for invasive species management. In addition, when determining options for disposal it is important to be aware that some landfills accept invasive species or soil, while others do not. By knowing these requirements and options from the outset, the development process can move forward more easily, with a successful outcome.

2 / Know Your Soil

Identify Invasive Species and Plan Accordingly

Whether small or large soil removal operations, invasive species and fragments of invasive plants can be undetected.

The most effective method of preventing transfer of invasive species is to eliminate that species from the soil prior to movement. Before moving the soil for any reason, the soil surface should be inspected for evidence of invasive species. It is best to inspect both the area to be excavated and adjacent areas as root material, seeds, or insects may have entered the excavation zone from nearby infestations.

The Invasive Species Council of BC and regional invasive species committees provide an abundance of information to assist with the identification of species. Your regional committee can provide advice about species of particular concern in your area: bcinvasives.ca/about/partners/bc-stakeholders/regional-committee-map



3 / Control It Before You Move It

Where possible, the invasive species should be treated on the site where they were found. The effectiveness of a range of control strategies, from pesticide application to manual removal, will depend on the species. Several invasive species are not adequately controlled by single treatments and while the visible portions of an invasive species may be dead, parts hidden underground can remain viable. Excavation or other soil disturbance may stimulate growth by providing access to light, water, and air. It is important to ensure careful application of pesticide according to its label. Therefore, **pre-movement treatment and control must be thorough!**



Photo provided by:
Ministry of Transportation and Infrastructure

4 / Move the Soil Responsibly, Not the Invasive Species

Soil is typically moved by dump truck with a rock screen that covers the box to prevent flying debris. The normal screen is not sufficient to prevent plant fragments being freed by vibrations and wind that occur during transport. Heavy tarpaulins that cover the top of the box are necessary to ensure that fragments are not spread. As well it is necessary to ensure that the sides and back of the vehicle are secured with no chance of soil, seeds and fragments escaping. In high risk or special attention areas, trailers with containment used for hauling mineral ores may be required. Alternate measures may need to be taken if transporting soil infested by invasive insects.

5 / Ensure Clean Equipment Before and After Moving Infested Soils

Even with careful loading, prior to leaving the source site, the truck exterior and wheels should be washed thoroughly and movement through infested areas should be avoided. After dumping the load at the receiving site, the interior of the box should be washed and the tarpaulin re-secured for a return trip.

6 / Treat Infested Soil Wisely Determine Best Method of Soil Treatment

Most control of invasive species has focused on eradicating plant matter or live insects. Limited research has been completed on management of soil that guarantees that plant fragments or insects are inactive. For some persistent species such as knotweeds, the cautionary principle will apply: **do more than expected and always follow directions as per the pesticide label.**

7 / Manage Source Materials Know Before You Import Soil

The import of fill, especially topsoil, to a site must include verifiable information on the source site. Without realizing it, a vendor may blend infested material with topsoil and resell it without treatment. After this topsoil is applied to a restoration site or a newly-landscaped location, an invasive plant or insect may establish. Monitoring at the site should be undertaken. **Know your soil provider. Require assurance that the material is weed free.**

8 / Revegetate Disturbed Sites

Most invasive species establish on sites where the soil has been disturbed and spread from there. It is important to revegetate sites quickly, or establish an interim cover crop that will ultimately be replaced by the final landscaping or planting.

As critical as acquiring soil without invasives is important, the seeds and plants used for revegetation must also be free of invasive species.

Currently there are few tools that exist for the successful eradication and control of certain invasive species. While it is well-recognized that there is need for development of new, improved options, prevention of invasive species spread and establishment should always be the first priority.

For more information and guidance on preventing and managing for invasive species, visit the Invasive Species Council of BC's suite of online resources at:

www.bcinvasives.ca/resources/publications including:

- » [Invasive Species Toolkit for Local Government](#)
- » [Aboriginal Community Toolkit for Invasive Plant Management](#)