Columbia Shuswap
Operational Plan for Invasive Species
2020-2025

Prepared by: Columbia Shuswap Invasive Species Society, with input from land managers in the Columbia Shuswap region

CSISS
COLUMBIA SHUSWAP INVASIVE SPECIES SOCIETY

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1.0 Introduction

This Operational Plan (Plan) was prepared by the Columbia Shuswap Invasive Species Society (CSISS) to provide a framework for invasive species management activities within the Columbia Shuswap region. Since invasive species cross multiple jurisdictions, a cooperative and collaborative approach is essential to ensure that invasive species management activities are not hindered by geographic, jurisdictional, and political boundaries. By adopting a cooperative approach, land managers can more efficiently utilize limited funds and personnel, and can collaboratively achieve mutual objectives.

This Plan provides direction to resource managers, community groups, First Nations, and private citizens on invasive species of highest management priority for control, inventory, and monitoring in the Columbia Shuswap region. It has been developed through an ongoing collaborative process through which many organizations provided guidance and input during meetings in Salmon Arm, Revelstoke and Golden in the fall of 2013; and subsequently, helped develop a new 2020-2025 Operational Plan during a meeting in Revelstoke in the spring of 2019.

The scope of this Operation Plan takes an "all invasive species" approach to determining the terrestrial, riparian, and aquatic invasive species that have the potential to impact the ecological, economic and/or social well-being of the region; and to facilitate their prevention, reduction, and management. This plan reflects local priorities for invasive species management within a five-year time frame with the understanding that the plan will be revisited annually.

1.1 Impacts of Invasive Species

The spread of invasive alien species is now recognized as one of the greatest threats to the ecological and economic well-being of the planet (Global Invasive Species Programme 2000). 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). Without efforts to contain their spread, invasive species will generally increase their distribution area exponentially, making the task of eventual control impossible and financially insurmountable.

Detrimental impacts of invasive species on the agriculture and forest industries include harbouring insects and diseases of crops, reducing crop quality and market opportunities, and decreasing farm income and grazing opportunities. An estimated combined damage for six important invasive plants in BC was estimated to be at least $65 million in 2008 and with further spread, impacts would more than double to $139 million by 2020 (ISCBC 2009). In forestry, invasive plants compete with seedlings for light, nutrients, and water which reduces forest yield. Some invasive plant species are extremely flammable and can exacerbate natural fire cycles by causing an increased fuel bed load and frequency of fire. In addition, invasive insects and fungi can weaken forest health by infecting and killing off entire stands.

When established in crops, working forests or natural areas, invasive plants, animals and pathogens can result in a myriad of impacts, such as: reduced water quality and quantity; increased erosion and sedimentation; reduced property values; damage to private property and infrastructure; loss of traditional food and medicinal plants; reduced land and water recreational opportunities; increased control and management costs; and export and import trade restrictions imposed. Invasive plants also impact human health and safety by obstructing

sightlines and road signs along transportation corridors, as well as causing skin burns and dermatitis, and increasing allergies.

Invasive species also threaten biodiversity. Many rare and endangered species are at risk of extinction from non-native invasions of invasive plants and other alien organisms. Without prevention or intense and costly management, invasive species can disrupt the natural migrations of wildlife since their habitat can be damaged or destroyed, with impacts to the local ecosystem often irreversible.

Given these potential impacts of invasive species, the Columbia Shuswap region has significant ecological, economic and social values and assets at risk. Therefore, land managers must work together on common priorities for prevention, reduction and management of invasive species.

1.2 Columbia Shuswap Invasive Species Society

The Columbia Shuswap Invasive Species Society (CSISS) is a non-profit society founded in 2013, by a group of individuals and organizational representatives who recognized the need for a coordinated regional approach to the growing threat of invasive species in the Columbia Shuswap Regional District. The vision statement of the CSISS states:

> *The environment, economy and society of the Columbia Shuswap region are protected from the adverse impact of invasive species.*

The goals of CSISS (as per CSISS Strategic Plan) are to:

- Implement a collaborative and coordinated program
- Educate, engage and inspire participation in invasive species management
- Prevent the introduction of new invasive species
- Maximize the probability of detection and eradication of new invaders
- Slow or reverse the spread of existing invasive species and reduce their harmful impacts
- Ensure program sustainability

CSISS is not a landowner and does not hold land management responsibilities. Rather, CSISS is a network of partners that facilitate the prevention, reduction and management of invasive species through collaboration, engagement and education. It is the responsibility of each land owner or occupier to manage invasive species within their jurisdiction.

1.3 Key Organizations and Land Managers

Given the diverse land use and ownership in the region, a collaborative and coordinated approach to invasive species management is extremely beneficial. Key partners in the Columbia Shuswap region include: the Columbia Shuswap Regional District (which has a noxious weed program under bylaw #5110), First Nations and tribal bands, federal and provincial government agencies, municipalities, utility companies, agriculturalists, conservation and stewardship groups, regional invasive species committees, private landowners, forest licensees, and industry.

This plan provides a framework for this diverse range of organizations and individuals to develop work plans for their own land that are consistent with the goals and objectives of other land managers. *Each land owner or occupier is responsible for prevention, containment, and/or control of invasive species within their jurisdiction* and in accordance with their mandates, legal obligations and procedures (e.g. Pest Management Plans, Range Use Plans, Forest Stewardship Plans, BC Weed Control Act).

2.0 Columbia Shuswap Region

The Columbia Shuswap Invasive Species Society encompasses the geographic area of the Columbia Shuswap Regional District. For the purposes of planning, this region has been divided into three Invasive Plant Management Areas (IPMAs): Salmon Arm, Revelstoke and Golden (Figure 1). The label "IPMA" will continue to be used even though it is understood that management strategies will expand to include non-plant invasive species.

Figure 1: Map of the invasive Plant Management Areas (IPMAs) in the Columbia Shuswap Region.

2.1 Salmon Arm IPMA

The Salmon Arm IPMA includes CSRD Electoral Areas "C", "D", "E" and "F" including the City of Salmon Arm and District of Sicamous. There are a number of Indian Reserves in this IPMA including Switsemalph, Salmon River, North Bay and Quaaout. This IPMA borders the Thompson Nicola Regional District (TNRD) and the Thompson-Nicola Invasive Plant Management Committee as well as the Regional District of North Okanagan. Herald, Shuswap Lake, Yard Creek, Albas, Shuswap Lake Marine, White Lake, Tsutswec and Cinnemousun Narrows Provincial Parks are within this IPMA. Major transportation corridors include CP Rail, Highway 1, Highway 97A and Highway 97B. This IPMA encompasses the dry Ponderosa Pine to the wetter Interior Cedar Hemlock biogeoclimatic zones[1] including: PPxh2, MSdm3, IDFxh1, IDFxh2, IDFmw2, ICHdw4, IDFdk2, ICHwk1, ICHvk1, ICHmw3, ICHmw5, ICHmk2, ESSFwc2, ESSFwc4, ESSFvc, ESSFmh, and ESSFdc3.

2.2 Revelstoke IPMA

The Revelstoke IPMA includes CSRD Electoral Area "B" including the City of Revelstoke. This IPMA borders the Central Kootenay Invasive Species Society (CKISS) area to the south and the Northwest Invasive Plant Council (NWIPC) to the north. Shelter Bay, Blanket Creek and Martha Creek Provincial Parks are included in this IPMA along with Mount Revelstoke and Glacier National Park. Major transportation corridors include CP Rail, Highway 1, Highway 23N and Highway 23S. This IPMA is the wettest of the region, encompassing the following biogeoclimatic zones: ICHdw4, ICHmw3, ICHvk1, ICHwk1, ESSFrep, ESSFvc, ESSFvcp, ESSFwh1, ESSFwc4, ESSFwcp, ESSFdkw, and IMAun.

2.3 Golden IPMA

The Golden IPMA includes CSRD Electoral Area "A" including the Town of Golden. This IPMA borders the East Kootenay Invasive Species Council (EKISC) area to the south, Northwest Invasive Plant Council (NWIPC) to the north, and Alberta to the east. This IPMA includes Marl Creek, Burges James Gadsen, and Cummins Lake Provincial Parks, as well as Yoho National Park. Major transportation corridors include CP Rail, Highway 1, and Highway 95. The IPMA includes the dry northern portion of the East Kootenay trench including the following biogeoclimatic zones: IDFdk5, ICHmw1, ICHwk1, ICHmk5, ICHvk1, MSdk, ESSFdk2, ESSFwcp, ESSFwc2, ESSFwcw, ESSFmmp, ESSFmm1, and IMAun.

3.0 Priorities for Invasive Species Management

CSISS promotes partnerships, practices, policies, tools and operations that prevent the introduction and spread of invasive species and facilitate collaborative management. These activities include: collaboratively prioritizing species, following prevention and best management practices (BMPs), ensuring early detection and rapid response (EDRR) of new invaders, conducting inventories to acquire enough information to make sound management decisions, coordinating treatment activities, monitoring efficacy, and ensuring that data are easily available.

[1] Biogeoclimatic zones based on maps from MFR at http://www.for.gov.bc.ca/hre/becweb/resources/maps/index.html.

A species-specific approach is limited in that it does not necessarily consider the entire ecosystem as a whole. Often invasive species management is an element of restoration where other factors are considered (such as prescribed burning, re-vegetation, better land management practices, wildlife habitat, rare plants, etc.). As well, many invasive plant species ranked as "low priority" in this plan may have detrimental impacts to a specific sector/land area and, in such cases, potentially all invasive plant species pose a threat and may be targeted for treatment, regardless of their regional priority. Land owners and occupiers are encouraged to consider their own land management objectives when prioritizing invasive species activities, and to consider this regional prioritization a tool to facilitate a coordinated approach.

3.1 Criteria for Prioritizing Invasive Species and Management Activities

Given limited resources for invasive species management, it is usually necessary to prioritize activities to achieve the "biggest bang for the buck". Invasive species can be prioritized for treatment based on the following factors (Figure 2):

- Risks from not managing the species;
- Phase of invasion (current and potential distribution);
- Effectiveness of available treatment strategies;
- Effectiveness and availability of biocontrol agents (for invasive plants); and
- Priorities in neighbouring jurisdictions.

The *phase of invasion* may be determined by the current and potential distribution of the species in the Columbia Shuswap. Before a species arrives, the *prevention phase* includes activities such as distributing a "prevention watchlist" of species of concern, preventing intentional plantings or releases, cleaning vehicles and watercraft, and implementing other best management practices. During the *eradication phase,* the species has a very limited distribution and early detection, rapid response (EDRR) efforts are likely to eradicate the species. As the population expands during the *containment phase*, eradication is no longer likely and efforts are focused on containing and controlling the expanding population before it becomes naturalized. Once the population reaches the *asset-based protection phase*, species are often too widespread or costly to control and restoration activities are focused on small, high-priority sites.

It can be helpful for land managers to use prioritization and risk assessment tools when resources are limited in invasive species management. Annually, resources permitting, the Columbia Shuswap Invasive Species Society will host a Columbia Shuswap Land Manager meeting to review this Operational Plan, the Columbia Shuswap priority lists for invasive plants by Invasive Plant Management Area (Appendix A, B, C, D), and the watchlist for non-plant invasive species (Appendix E).

The presence/absence watchlist for non-plant invasive species (animals, herpetofauna, fungi, and pathogens) (Appendix E) is useful for education, outreach and prevention work, including reporting; however the watchlist is not a thorough risk assessment meant for active control programs. Land managers are encouraged to discuss control of non-plant species with Provincial specialists.

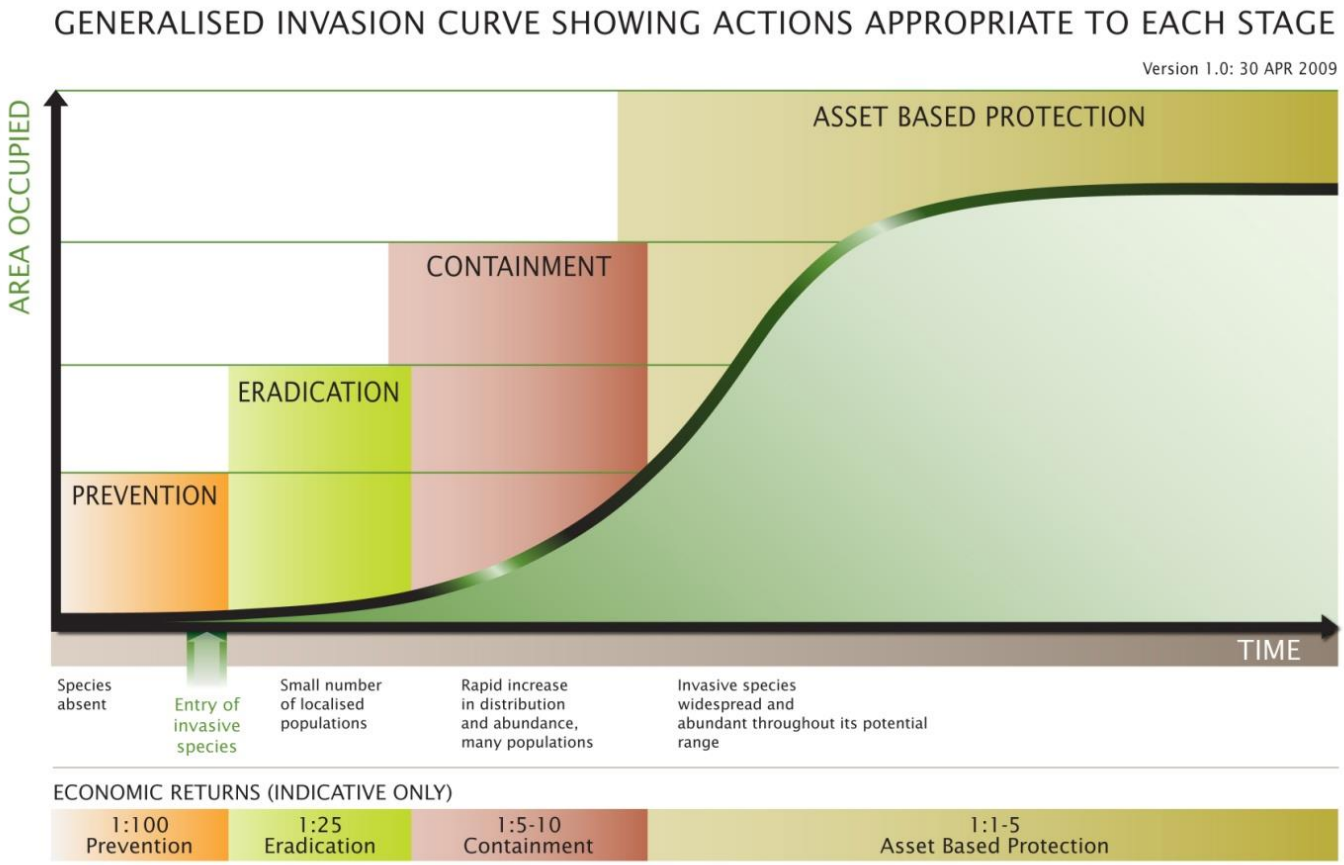

FIGURE 2: DIAGRAM SHOWING MANAGEMENT STRATEGIES MOST USEFUL DURING EACH PHASE OF THE INVASION PROCESS[2].

[2] Victoria State Government, Australia. http://www.depi.vic.gov.au/agriculture-and-food/pests-diseases-and-weeds/protecting-victoria-from-pest-animals-and-weeds

3.2 Planning, Prevention and Best Management Practices

There are a number of factors to consider when planning invasive species management programs. When planning non-plant invasive species management programs, there are a number of resources available depending on the species, vectors of spread, and other factors. Some resources include Provincial and regional planning documents, such as *Invasive Species Strategy for BC 2018-2020*, which is a collaborative document developed with input from governments, partners, industry and others (ISCBC 2018). As well, the *Ministry of Forests Invasive Alien Species Framework for BC: Identifying and Addressing Threats to Biodiversity* (2004) and the *Canadian Columbia Basin Aquatic Invasive Species Framework* (2016) offer great resources and recommendations. There are also a number of best practice guidelines, available through Province of BC, Invasive Species Council of BC, and other jurisdictions. For example, there are resources and best practices available for preventing the introduction of aquatic invasive species (ISCBC Resources https://bcinvasives.ca/resources). It is important to note the distinction between Clean Drain and Dry for preventing the spread of the majority of AIS within BC, and Decontamination for preventing the spread of Zebra and Quagga mussels into BC.

When planning invasive plant management programs, factors to consider include: the biology of the plant species, site-level considerations, proximity to species at risk and their habitats, proximity to water and wells, and goals of treatment (see Section 3.6).

Preventing the introduction and spread of invasive plants can be achieved through best management practices (BMPs) including:

- Minimizing soil disturbance
- Re-vegetating disturbed soil
- Using invasive plant free seed mixes
- Cleaning vehicles, clothing, equipment and machinery between sites
- Using clean (invasive plant-free) soil, gravel and fill
- Using invasive plant free hay for agriculture and restoration purposes
- Ensuring horticultural species that are planted, traded, sold and used are non-invasive
- Keeping equipment yards, storage areas and transportation corridors free of invasive plants
- Carefully disposing of invasive plant material

It is beyond the scope of this Plan to outline all best management practices (BMPs). Please see Appendix F for “Useful Resources” for more information.

Outreach plays a critical role in preventing the establishment and spread of invasive species and promoting best practices. For example, outreach activities can prevent invasive horticultural species from being planted or an invasive animal from being releasedor transported; provide the tools for a farmer to develop an invasive plant management plan; or promote invasive species reporting by a naturalist group. Although this Operational Plan does not include details of an outreach program, CSISS is aware of its importance and will continue to focus on outreach activities over the next five years ensuring that activities are consistent with the Communications Framework of the Invasive Species Council of BC (ISCBC).

3.3 Early Detection, Rapid Response (EDRR) Protocol

Early Detection and Rapid Response (EDRR) refers to the processes undertaken to find and eradicate a new incursion or infestation of an invasive species in the early stages of establishment when the new invasive species remains relatively easy to control. Species not known in the Columbia Shuswap are listed in Appendix A (plants) and E (non-plants).

Definitions of Provincial and Regional EDRR plant species are also listed in Appendix A. Detection of Provincial EDRR species should be reported to the Province and follow Provincial EDRR protocol for reporting and treatment (https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/edrr ; https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/final_imiswg_bc_is_edrr_plan_nov_2014.pdf)

Detection of **Regional EDRR species** should be reported to CSISS within 48 hours. CSISS and other agencies promote the 'Report-Invasives' App for online invasive species reporting.

Regional EDRR steps include:

1. Spotter **reports** Regional EDRR species sightings to CSISS within 48 hours. CSISS immediately reports sightings to the Provincial Invasive Plant/Species Specialist and the land manager/owner/occupier.
2. CSISS representative visits the site to **confirm** the identification of the species, records GPS coordinates, takes photos, and collects a voucher specimen. If the species cannot be identified, voucher specimens and photos will be submitted to Provincial identification specialists for confirmation, or a regional specialist may be contacted to visit the site (e.g. Provincial/Federal/Regional Habitat or Fisheries biologists). Information also will be shared with the Provincial Invasive Plant/Species Specialist. The affected land owner will be informed of this process immediately.
3. Once the species has been positively identified, information will be **shared** with the land owner, the spotter, and the Provincial Invasive Plant/Species Specialist.
4. CSISS will enter the site into **IAPP/appropriate invasive species database**.
5. CSISS will **contact the land owner** to further inventory the area to determine the full extent of the species, and to develop a strategy for eradication. If possible for invasive plant species, all **root and seed material will be bagged immediately until further treatments** can be conducted.
6. CSISS will **issue an Alert** on the species through the CSISS network (e.g., mailing lists, press releases etc.).

Provincial EDRR Steps:

1. Spotter reports directly to Province via "Report Invasives" app, or RAPP line for Mussels. If the species is new to BC, the Provincial Invasive Plant/Species Specialist will **trigger the Provincial EDRR Response Plan** (BC IMISWG 2010, https://www.for.gov.bc.ca/hra/invasive-species/Publications/How_EDRR_works.pdf). CSISS will remain coordinated with the response action.

Provincial Early Detection Rapid Response WATCHLIST Species
Report to: 'Report-A-Weed' / 'Report Invasives'
www.reportinvasives.ca

Any suspected, transport, possession, sale or release of Dreissenid mussels regulated under the BC Wildlife Act, Controlled Alien Species Regulation should be reported immediately to the Conservation Officer Services RAPP LINE 1-877-952-7277

Regional Early Detection Rapid Response WATCHLIST Species
Report to CSISS within 48 hours at:
info@columbiashuswapinvasives.org

3.4 Inventory

Inventories and surveys[3] provide fundamental information for assessing and prioritizing invasive species management efforts. Information from inventories can be used to answer a number of questions including the full extent of a target species, whether treatments have been effective, and how quickly a species is spreading. Inventory methods for non-plant invasive species may vary depending on the species and should follow recommended provincial or scientific protocols.

CSISS promotes the use of standardized invasive plant inventory methodology and data forms that are based on the provincial Invasive Alien Plant Program (IAPP) standards (MFR 2010). Further or continued inventory is required for some species to determine their full extent and to develop better management approaches. Priorities for invasive plant inventory include:

- All species on EDRR Watchlist;
- All species under ERADICATION/ANNUAL CONTROL (including CONTAINMENT species outside containment lines); and
- All species with INSUFFICIENT INFORMATION.

Border areas between regional invasive species society/regional district areas are high priority for annual invasive plant surveys to detect new invasive species. The following areas are a priority in the Columbia Shuswap:

Salmon Arm IPMA	• Hwy 1 between Chase and Sorrento • Hwy 97A south of Sicamous • Hwy 97 B south of Salmon Arm
Revelstoke IPMA	• Hwy 23S south of Galena Bay
Golden IPMA	• Hwy 95 south of Parson • Hwy 1 east of Field

[3] In this Plan, inventory and survey are used interchangeably. Technically, "…*an inventory is a cataloguing of all invasive species of concern within a management area, whereas a survey is an individual observation or a sampling of a representative portion of a larger landscape*" such as a road survey. (BC Ministry of Forests and Range 2010)

Other priority sites for inventory are:

- Priority waterbodies as defined in the CSISS AIS Priority Ranking Matrix and Provincial ZQM Risk Matrix
- Gravel pits
- Rail lines, utility rights-of-way, and other corridors of spread
- Newly developed/disturbed areas e.g., forestry, mining, other industry areas
- Trailheads/Recreation sites/Parks with high traffic and potential source areas
- Other sites that are potential vectors of spread (e.g., area around Field Town-site adjacent to federal Parks jurisdiction)

3.5 Treatment Priorities for Invasive Plants

Treatment priority level is based on the category of the invasive species (see Appendix A, B, C, D) as well as the specific land management objectives. The goal of treatment is to reduce impacts and/or prevent spread.

Treatment Priority level 1: All species under Regional EDRR and ERADICATION/ANNUAL CONTROL: These plant species/sites should be treated or visited every year. New occurrences of Eradication/Annual Control species should be reported to CSISS/ Report-Invasives Application for entering into IAPP database and contacting land owner/manager. New occurrences of Regional EDRR and Provincial EDRR species should follow EDRR Reporting protocols (see section 3.3).

Treatment Priority level 2: CONTAINMENT species *outside* containment lines: Isolated populations of invasive plants outside the containment lines will be treated as a higher priority than established populations within the containment lines. See invasive plant priority lists for descriptions/containment maps if applicable.

Treatment Priority level 3: ESTABLISHED and/or CONTAINMENT species *inside* containment lines on or near sites of high value or with high potential to spread: Sites will be considered based on land use values including agricultural values, livestock use, ecological and wildlife habitat values, spread vectors (e.g. waterways, utility corridors, road systems, trails), and adjacent areas at risk. Infestations along trails receiving high seasonal use, habitats for species at risk, and areas near hay production are examples of locations that may be a high priority for treatment.

Treatment Methods

Treatment is recommended to follow an Integrated Pest Management approach, which is based on:

- Strategic, monitoring-based, prevention-oriented management;
- Extensive communication and cooperation amongst stakeholders and landowners;
- Pairing control programs with public education and awareness.

Treatment options are considered after it has been determined that a species or site is designated as a high priority for control. The following treatment options are considered for use either individually or in combination:

- Mechanical control
- Cultural control
- Biological control

- Selective spot application of herbicides

Treatment methods are selected to ensure that an invasive plant species will receive the most effective treatment. The control method used at a particular site is determined by the land owner and/or qualified contractor, and depends on many factors:

- Location, including the remoteness of a site and proximity to riparian zones;
- Invasive plant species;
- Target species composition and percent cover;
- Stage of invasive plant life cycle (rosette vs. seed-set);
- Current and proposed land use;
- Proximity to primary biocontrol release sites[4];
- Availability of a Pest Management Plan or Pesticide Use Permit (where applicable);
- Topography;
- Availability of biocontrol agents;
- Non-target vegetation impacts;
- Treatment objective (eradication, containment or control);
- Seasonality;
- Weather conditions;
- Financial and human resources;
- Species at risk in area[5]; and
- Wells and waterbodies in area.

NOTE: It is important to hire a qualified contractor and to conduct all treatments in compliance with applicable legislation.

Treatment timing

The ideal treatment recommendation (when funding is sufficient and an integrated treatment approach is implemented) is a three or more pass system as outlined below;

1. First Pass: Treatment occurs on known sites when plants are at the rosette stage.
2. Second Pass: Treatment occurs when plants have bolted and a few are about to bloom.
3. Third Pass: Treatment objective is to prevent any missed plants from treatments 1 and 2 from producing viable seed.

When resources are limited, the ideal minimal treatment approach is a two pass system:

1. First Pass: Treatment has been delayed until most plants are at the bolt stage and a few are ready to bloom.
2. Second Pass: Treatment objective is to prevent any missed plants from producing viable seed.

[4] Contact Invasive Plant Specialist (MFLNRORD)

[5] Contact Conservation Data Centre (CDC) and MFLNRORD

3.6 Enforcement

High priority outreach efforts include private landowners whose properties contain ERADICATION/ ANNUAL CONTROL species or CONTAINMENT species outside containment lines. The Columbia Shuswap Regional District has the ability to enforce the *BC Weed Control Act* under Bylaw 5110.

Invasive plant infestations of ESTABLISHED species may also be a high priority if:

1) The infestation(s) of established invasive plants spreading onto, or adjacent to and threatening to spread onto, agricultural land or rangeland;
2) The infestation is an isolated occurrence for that portion of the IPMA;
3) There are citizens in the same area as the infestation(s) who are controlling these invasive plants on their own land and are concerned about their future spread; and
4) The invasive plant is toxic to livestock/wildlife or otherwise detrimental to the agricultural or rangeland values.

Parks Canada is exploring enforcement within its jurisdiction, including a permitting system for launching boats into some Parks Canada waterbodies (e.g., Lake Louise, Yoho, Kootenay Parks for 2019).

3.7 Efficacy Monitoring Recommendations

The effectiveness of treatment depends on many factors including time of year, type of treatment, climate conditions, geographic location, and number of passes. Monitoring treatment efficacy contributes to a better understanding of which treatments are most effective and allows for adaptive management within and between seasons. In association with IAPP, there are standardized forms for monitoring chemical, mechanical and biocontrol treatment efficacy[6]. Entering this data into IAPP allows land managers to easily share this information and assists with long term planning and management.

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development requires that **a minimum of 10% of treatment sites be monitored** for efficacy and contractor diligence (BC MFR 2010) and this target has generally become the standard for BC. Sites may either be chosen at random or selected based on treatment priority. Mechanically or chemically treated sites are monitored during the same field season while biological treatment sites are monitored the following year to determine establishment success of bioagents.

Where possible, land owners and occupiers are encouraged to:

- Monitor 10% of all treated sites, 2-6 weeks after treatment as appropriate and/or the following spring as appropriate;
- Use IAPP Monitoring Forms;
- Enter monitoring data into IAPP;
- Take monitoring photographs from the same location, aspect and viewpoint as in previous years;

6 IAPP Application and standardized forms: https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/iapp

- Monitor for at least 3 more years (depending on species longevity in the seed bank), following a season where 0 m^2 of the plant is observed; and
- See Provincial monitoring guidelines for species specific monitoring guidelines

3.8 Record-keeping and Data Management

Sharing invasive plant inventory, treatment and monitoring data facilitates a collaborative and long-term approach to management. Entry of this information into the IAPP database[7] allows land managers to determine which species are on or near their jurisdiction, what activities have occurred, and the efficacy of completed treatments. Where possible, *all* data will be entered into the IAPP database. Where this is not feasible, agencies are strongly encouraged to enter the following minimum critical data, in order of priority (See Table 2):

1. Immediately report and then enter EDRR WATCHLIST species;
2. Enter ERADICATION species and CONTAINMENT species *outside* containment lines;
3. Enter INSUFFICIENT INFORMATION species; then
4. Enter CONTAINMENT species *inside* containment lines and ESTABLISHED species.

Provincial government, in partnership with regional organizations, can provide courses on IAPP data entry.

4.0 Evaluating Success

Tracking progress is a key element of the success of this framework and of invasive plant management activities in general. Recommendations for monitoring progress include:

1. Assess species priorities annually and update the priority plant and non-plant list (Appendix A, B, C, D, E).
2. Measure success of eradication and containment of integrated pest management efforts annually (e.g., before and after photos and/or plot counts).
3. Evaluate education and outreach activities (as preventative measures) annually.
4. Review inventory requirements and gaps every five years.
5. Summarize data management activities and requirements annually.
6. Measure the degree of engagement of land managers, community groups, and the public annually and identify gaps.
7. Solicit input annually from all stakeholders to share successes, publish results, update priorities and coordinate activities.

REFERENCES

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APPENDIX A: PRIORITY INVASIVE PLANT LISTS- UPDATED 2020

Invasive species are prioritized at a Provincial scale using a science-based risk assessment process. Management actions are further determined based on these priorities at a both Provincial and Regional scale and depending on available resources and treatment methods. The management categories presented below have been developed by the BC Inter-Ministry Invasive Species Working Group and the Provincial Government's Invasive Species Specialists. The invasive species are presented in management categories based on a Provincial scale, and do not take into consideration local or regional criteria. The list does not include marine species.

Provincial Definitions	
Prevent	Species determined to be high risk to BC and not yet established. Management objective is to prevent the introduction and establishment.
Provincial EDRR	Species is high risk to BC and is new to the Province. Management objective is eradication.
Provincial Containment	Species is high risk with limited extent in BC but significant potential to spread. Management objective is to prevent further expansion into new areas with the ultimate goal of reducing the overall extent.
Regional Containment/Control	Species is high risk and well established, or medium risk with high potential for spread. Management objective is to prevent further expansion into new areas within the region through establishment of containment lines and identification of occurrences outside the line to control.
Management	Species is more widespread but may be of concern in specific situations with certain high values - e.g., conservation lands, specific agriculture crops. Management objective is to reduce the invasive species impacts locally or regionally, where resources are available.

TABLE 1: PROVINCIAL PRIORITY INVASIVE SPECIES

PROVINCIAL PRIORITY INVASIVE SPECIES			
Prevent	Camelthorn	Alhagi	maurorum
Prevent	Clary sage	Salvia	sclarea
Prevent	Common crupina	Crupina	vulgaris
Prevent	Eggleaf spurge	Euphorbia	oblongata
Prevent	Goatsrue	Galega	officinalis
Prevent	Halogeton/Saltlover	Halogeton	glomeratus
Prevent	Hydrilla	Hydrilla	verticillata
Prevent	Iberian starthistle	Centaurea	iberica
Prevent	Italian thistle	Carduus	pycnocephalus
Prevent	Johnsongrass	Sorghum	halepense
Prevent	Jointed goatgrass	Aegilops	cylindrica
Prevent	Kudzu	Pueraria	montana var. lobata
Prevent	Meadow clary	Salvia	pratensis
Prevent	Mediterranean sage	Salvia	aethiopis
Prevent	Medusahead	Taeniatherum	caput-medusae
Prevent	Purple nutsedge	Cyperus	rotundus
Prevent	Purple starthistle	Centaurea	calcitrapa
Prevent	Red bartsia	Odontites	serotina
Prevent	Silverleaf nightshade	Solanum	elaeagnifolium

Prevent	Slender/Meadow foxtail	Alopecurus	myosuroides
Prevent	Slenderflower thistle	Carduus	tenuiflorus
Prevent	Spring milletgrass	Milium	vernale
Prevent	Spurge Flax	Thymelaea	passerina
Prevent	Squarrose knapweed	Centaurea	virgata ssp. squarrosa
Prevent	Syrian bean-caper	Zygophyllum	fabago
Prevent	Texas blueweed	Helianthus	ciliaris
Prevent	Water soldier	Stratiotes	aloides
Provincial EDRR	African rue	Peganum	harmala
Provincial EDRR	Black henbane	Hyoscyamus	niger
Provincial EDRR	Brazilian elodea/Waterweed	Egeria	densa
Provincial EDRR	Dyer's woad	Isatis	tinctoria
Provincial EDRR	European common reed	Phragmites	australis
Provincial EDRR	Flowering rush	Butomus	umbellatus
Provincial EDRR	Giant reed	Arundo	donax
Provincial EDRR	Invasive cordgrasses	Spartina	spp.
Provincial EDRR	Maltese star thistle	Centaurea	melitensis
Provincial EDRR	Mouse-ear hawkweed	Hieracium	pilosella
Provincial EDRR	North African grass	Ventenata	dubia
Provincial EDRR	Perennial pepperweed	Lepidium	latifolium
Provincial EDRR	Shiny geranium	Geranium	lucidum
Provincial EDRR	Slender false brome	Brachypodium	sylvaticum subsp. sylvaticum
Provincial EDRR	Water hyacinth*	Eichhornia	crassipes
Provincial EDRR	Water lettuce*	Pistia	stratiotes
Provincial EDRR	Yellow floating heart	Nymphoides	peltata
Provincial EDRR	Yellow starthistle*	Centaurea	solstitialis
Provincial Containment	Garlic mustard	Alliaria	petiolata
Provincial Containment	Giant hogweed	Heracleum	mantegazzianum
Provincial Containment	Poison hemlock	Conium	maculatum
Provincial Containment	Rush skeletonweed	Chondrilla	juncea
Provincial Containment	Wild chervil	Anthriscus	sylvestris
Provincial Containment	Wild parsnip	Pastinaca	sativa
Regional Containment/Control	Blueweed	Echium	vulgare
Regional Containment/Control	Common bugloss	Anchusa	officinalis
Regional Containment/Control	Common tansy	Tanacetum	vulgare
Regional Containment/Control	Field scabious	Knautia	arvensis

Regional Containment/Control	Himalayan blackberry	Rubus	armeniacus
Regional Containment/Control	Himalayan knotweed	Persicaria	wallichii
Regional Containment/Control	Hoary alyssum	Berteroa	incana
Regional Containment/Control	Hoary cress	Cardaria	draba
Regional Containment/Control	Knotweeds (Japanese, Giant and Bohemian)	Fallopia/Reynoutria & Polygonum	spp.
Regional Containment/Control	Leafy spurge	Euphorbia	esula
Regional Containment/Control	Marsh plume thistle	Cirsium	palustre
Regional Containment/Control	Orange hawkweed	Hieracium	aurantiacum
Regional Containment/Control	Policeman's helmet/Himalayan balsam	Impatiens	glandulifera
Regional Containment/Control	Puncturevine	Tribulus	terrestris
Regional Containment/Control	Scotch broom	Cytisus	scoparius
Regional Containment/Control	Spotted knapweed	Centaurea	stoebe
Regional Containment/Control	Teasel	Dipsacus	fullonum
Regional Containment/Control	Whiplash hawkweed	Hieracium	flagellare
Regional Containment/Control	Yellow archangel	Lamium	galeobdolon
Regional Containment/Control	Yellow flag iris	Iris	pseudacorus
Management	Bur chervil	Anthriscus	caucalis
Management	Carpet burweed	Soliva	sessilis
Management	Cypress spurge	Euphorbia	cyparissias
Management	Gorse	Ulex	europaeus
Management	Invasive yellow hawkweeds	Hieracium	spp.
Management	Longspine Sandbur	Cenchrus	longispinus
Management	Mountain bluet	Centaurea	montana
Management	Purple loosestrife	Lythrum	salicaria
Management	Scentless chamomile	Tripleurospermum	inodorum
Management	Scotch thistle	Onopordum	acanthium
Management	Spurge laurel	Daphne	laureola
Management	Sulphur cinquefoil	Potentilla	recta
Management	Sweet fennel	Foeniculum	vulgare
Management	Tansy ragwort	Jacobaea	vulgaris

**Status under review*

INVASIVE PLANT PRIORITY DEFINITIONS

Priority Ranking	Description
Regional EDRR (1)	High risk invasive plant species not currently known within the Columbia Shuswap Regional District boundary or brand new incursions that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary. Management objective is eradication.
Eradication and Annual Control (2)	Species are known in the IPMA but with very limited distribution. Some species are relatively new to the IPMA so eradication is the objective. Other species may have been present for a relatively long period so monitoring for spread is the management objective.
Containment (3)	Species are abundant (with no expectation of eradication) in certain portions of the IPMA but have not yet infested all potential habitats. Management efforts are delineated by containment lines which may be based on geographic (e.g. a specific region) or jurisdictional boundaries (e.g. private gardens only). Some of these species have biocontrol (BC) agents available which may be useful within the containment line. Containment is the management objective. Treat all sites outside of containment lines.
Established (biocontrol or site-specific approach) (4)	Widespread species beyond landscape-level control and/or have relatively low impact. Land managers may choose to treat these species at high priority sites (e.g. wildlife habitat, corridors of spread, adjacent to agricultural land, restoration goals, etc.) based on specific land management objectives. Some of these species have biological control (BC) agents available.
Insufficient information (5)	Insufficient information for these species on their distribution, impacts, potential for spread and/or feasibility of control. Further information is required.

TABLE 2: PRIORITY INVASIVE PLANTS IN THE COLUMBIA SHUSWAP BY IPMA

Species	Bio-control?	Relevant legislation[1]	Salmon Arm IPMA	Revelstoke IPMA	Golden IPMA
Annual sow thistle (SONC OLE)		WCA, CCSCJ	4	4	4
Baby's breath (GYPS PAN)		CCSCJ, FRPA	2	2	2
Bachelor's button (CENT CYA)			5	5	5
Bighead knapweed (CENT MAC)			1	1	1
Black knapweed (CENT NIG)	Y	FRPA	2	2	5
Black locust (ROBI PSE)			5	5	5
Blueweed (ECHI VUL)		WCA, CCSCJ, FRPA	2	2	2
Bohemian knotweed (FALL BOH)		WCA	2	2	2
Brown Knapweed (CENT JAC)		FRPA	5	5	5
Buffalobur (SOLA ROS)			1	1	1
Bull thistle (CIRS VUL)	Y	CCSCJ, FRPA	4	4	4
Bur chervil (ANTH CAU)		WCA	1	1	1
Burdock (ARCT SPP)		WCA, CCSCJ, FRPA	4	4	4
Canada thistle (CIRS ARV)	Y	WCA, CCSCJ, FRPA	4	4	4
Caraway (CARU CAR)			5	2	2

Carpet burweed (SOLI SES)		CCSCJ	5	5	5
Chicory (CICH INT)			4	4	4
Colt's Foot (TUS FAR)			1	1	1
Common bugloss (ANCH OFF)			1	1	1
Common comfrey (SYMP OFF)			4	4	4
Common tansy (TANA VUL)		WCA, CCSCJ, FRPA	3	3	2
Contain to gardens: - Butterfly bush (BUDD DAV) - Common periwinkle (VINC MIN) - English holly (ILEX AQU) - English ivy (HEDE HEL) - Garden yellow loosestrife(LYSI VUL) - Goutweed (AEGO POD) - Japanese butterbur (PETA JAP) - Mountain bluet (CENT MON) - Russian olive (ELAE ANG) - Salt cedar/ Tamarisk (TAMA RAM) - Siberian elm (ULMU PUM)		CCSCJ (English ivy, Salt cedar)	3	3	3
Creeping buttercup (RANU REP)			5	5	5
Curled dock (RUME CRI)			4	4	4
Curly leaf pondweed (POTA CRI)		CCSCJ	5	5	5
Cypress spurge (EUPH CYP)			2	5	2
Dalmatian toadflax (LINA DAL)	Y	WCA, CCSCJ, FRPA	4	4	4
Dame's rocket (HESP MAT)			5	5	5
Diffuse knapweed (CENT DIFF)	Y	WCA, CCSCJ, FRPA	4	4	2
Eurasian Water Milfoil (MYRI SPI)		CCSCJ	3	3	5
Eyebright (EUPH NEM)			5	5	5
Field bindweed (CONV ARV)			5	5	5
Field scabious (KNAU ARV)		FRPA	2	5	5
Flat Peavine (LATH SYL)			5	5	5
Fragrant water lily (NYMP ODO)			3	5	5
Garlic mustard (ALLI PET)		WCA, CCSCJ	1	1	1
Giant hogweed (HERA MAN)		WCA, CCSCJ	1	1	1
Giant knotweed (FALL SAC)		WCA,CCSCJ, FRPA	1	1	1
Gorse (ULEX EUR)		WCA, CCSCJ, FRPA	1	1	1
Greater celandine (CHEL MAJ)			5	5	5
Greater knapweed (CENT SCA)			1	1	1
Green foxtail / green bristlegrass (SETA VIR)			5	5	5
Hairy cat's ear (HYPO RAD)			5	5	5
Himalayan blackberry (RUBU ARM)		CCSCJ	2	2	5
Himalayan knotweed (POLY POL)		WCA	1	1	1
Hoary alyssum (BERT INC)		FRPA	4	2	2

Hoary cress (CARD DRA)		WCA, CCSCJ, FRPA	1	1	1
Hound's tongue (CYNO OFF)	Y	WCA, CCSCJ, FRPA	4	4	4
Japanese knotweed (FALL JAP)		WCA, CCSCJ, FRPA	2	2	2
Knapweed species (CENT SPP)	Y		4	4	2
Kochia (KOCH SCO)			5	5	5
Lady's thumb (POLY PER)			5	5	5
Leafy spurge (EUPH ESU)	Y	WCA, CCSCJ, FRPA	2	2	2
Longspine sandbur (CENC LON)			1	1	1
Marsh plume thistle (CIRS PALU)		FRPA	2	2	5
Meadow buttercup (RANU ACR)			4	4	4
Meadow goat's beard (TRAG PRA)			4	4	5
Meadow knapweed (CENT DEB)	Y	WCA, CCSCJ, FRPA	2	2	2
Night-flowering catchfly (SILE NOC)			5	5	5
Nightshade (SOLA SPP)			4	5	5
Nodding thistle (CARD NUT)	Y	CCSCJ, FRPA	1	1	1
Orange hawkweed (HIER AUR)		WCA, CCSCJ, FRPA	4	4	5
Oxeye daisy (LEUC VUL)		FRPA	4	4	4
Perennial sow thistle (SONC ARV)		WCA, CCSCJ	4	4	4
Plumeless thistle (CARD ACA)	Y	FRPA	1	1	1
Poison hemlock (CONI MAC)		CCSCJ	2	2	2
Policeman's helmet (IMPA GLA)		CCSCJ	2	2	2
Puncturevine (TRIB TER)		FRPA	1	1	1
Purple loosestrife (LYNT SAL)	Y	WCA, CCSCJ, FRPA	4	4	4
Queen anne's lace / wild carrot (DAUC CAR)			4	5	5
Rush skeletonweed (CHON JUN)	Y	WCA, CCSCJ, FRPA	2	5	5
Russian knapweed (ACRO REP)		FRPA	5	5	5
Russian thistle (SALS KAL)			5	5	5
Scentless chamomile (MATR PER)	Y	WCA, CCSCJ, FRPA	5	5	2
Scotch broom (CYTI SCO)		CCSCJ, FRPA	2	2	5
Scotch thistle (ONOP ACA)		FRPA	2	5	5
Short-fringed knapweed (CENT NIR)	Y		1	1	1
Sow thistle spp (SONC SPP)		WCA, CCSCJ	4	4	4
Spotted knapweed (CENT BIE)	Y	WCA, CCSCJ, FRPA	4	4	2
Spurge laurel (DAPH LAU)		CCSCJ	5	5	5
St. John's wort (HYPE PER)	Y	CCSCJ, FRPA	4	4	5
Sulphur cinquefoil (POTE REC)		WCA, CCSCJ, FRPA	4	4	5
Sweet fennel (FOEN VUL)			5	5	5

Tansy ragwort (SENE JAC)	Y	WCA, CCSCJ, FRPA	1	1	1
Teasel (DIPS FUL)		FRPA	2	2	2
Western Goat's Beard (TRAG DUB)			4	4	4
Wild chervil (ANTH SYL)			2	2	5
Wild four o'clock (MIRA NYC)			5	5	5
Wild parsnip (PAST SAT)			1	1	1
Wood sage (SALV NEM)			1	1	1
Wormwood (ARTE ABS)			4	4	4
Yellow archangel (LAMI GAL)			2	2	5
Yellow flag iris (IRI PSE)		WCA, CCSCJ, FRPA	2	5	5
Yellow hawkweed spp (HIER SPP) (including: king devil, meadow, polar, queen devil, spotted, tall, whiplash, yellow devil)		FRPA (meadow)	4	4	4
Yellow toadflax (LINA VUL)	Y	WCA, CCSCJ, FRPA	4	4	4

[1] WCA= Weed Control Act; CCSCJ= Community Charter- Spheres of Concurrent Jurisdiction, Environment and Wildlife Regulation; FRPA=Forest and Range Practices Act- Invasive Plants Regulation

TABLE 3: UNLISTED LOWER PRIORITY PLANTS FOR COLUMBIA SHUSWAP

UNLISTED Lowest Priority in all IPMAs (therefore not included in ranking, some jurisdictions may choose to control - consider as priority 4)		
Species Name	**Rank**	**IPMA**
Annual hawksbeard (CREP TEC)	6	All
Bladder Campion (SILE VUL)	6	All
Cudweed (GNAP ULI)	6	All
Groundsel (SENE VUL)	6	All
Mullein (VERB THA)	6	All
Sheep sorrel (RUME ACE)	6	All
Shepherd's purse (CAPS BUR)	6	All
Watercress (NAST OFF)	6	All
White Cockle (LYCH ALB)	6	All
Wild buckwheat (POLY CON)	6	All

APPENDIX B: SALMON ARM IPMA PRIORITY PLANT LIST

REGIONAL EDRR - High risk invasive plant species not currently known within the Columbia Shuswap Regional District boundary or brand new incursions that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary. Management objective is eradication.		
- Bighead knapweed - Buffalobur - Bur chervil - Colt's foot - Common bugloss - Garlic mustard - Giant hogweed	- Giant knotweed - Gorse - Greater knapweed - Himalayan knotweed - Hoary Cress - Longspine sandbur - Nodding thistle	- Plumeless thistle - Puncturevine - Short-fringed knapweed - Tansy Ragwort - Wild parsnip - Wood sage
ERADICATION or ANNUAL CONTROL – Species are known in the IPMA but with very limited distribution. Some species are relatively new to the IPMA so eradication is the objective. Other species may have been present for a relatively long period so monitoring for spread is the management objective.		
- Baby's breath - Black knapweed (BC) - Blueweed - Bohemian knotweed - Cypress spurge - Field scabious - Himalayan blackberry	- Japanese knotweed - Leafy spurge (BC) - Marsh plum thistle - Meadow knapweed (BC) - Poison hemlock - Policeman's helmet - Rush skeletonweed (BC)	- Scotch broom - Scotch thistle - Teasel - Wild chervil - Yellow archangel - Yellow flag iris
CONTAINMENT – Species are abundant (with no expectation of eradication) in certain portions of the IPMA but have not yet infested all potential habitats. Containment is the management objective. Treat all sites outside of containment lines.		
Contain to gardens: - Butterfly bush - Common periwinkle - English holly - English ivy - Garden yellow loosestrife - Goutweed - Japanese butterbur	**Contain to gardens Cont'd:** - Mountain bluet - Russian olive - Salt cedar/ Tamarisk - Siberian elm **Contain to White Lake:** - Fragrant water lily	**Contain to west portion of IPMA (treat Seymour Arm and east portion of IPMA):** - Common tansy **Contain to Shuswap/ Mara/White Lake:** - Eurasian water milfoil
ESTABLISHED (BIOCONTROL OR SITE-SPECIFIC APPROACH) – Widespread species beyond landscape-level control and/or have relatively low impact. May have biocontrol (BC) available. Treat based on land management objectives.		
- Annual sow thistle - Bull thistle (BC) - Burdock - Canada thistle (BC) - Chicory - Common comfrey - Curled dock - Dalmatian toadflax (BC) - Diffuse knapweed (BC) - Hoary alyssum	- Hound's tongue (BC) - Knapweed spp. (BC) - Meadow buttercup - Meadow goat's beard - Nightshade - Orange hawkweed - Oxeye daisy - Perennial sow thistle - Purple loosestrife (BC)	- Queen Anne's Lace - Sow thistle spp - Spotted knapweed (BC) - St. John's Wort (BC) - Sulphur cinquefoil - Western goat's beard - Wormwood - Yellow hawkweed spp. - Yellow toadflax (BC)
INSUFFICIENT INFORMATION – Insufficient information for these species on their distribution, impacts, potential for spread and/or feasibility of control. Further information is required.		
- Bachelor's button - Black locust - Brown knapweed - Caraway - Carpet burweed - Creeping buttercup - Curly leaf pondweed - Dame's rocket	- Eyebright - Field bindweed - Flat peavine - Greater celandine - Green foxtail - Hairy cat's ear - Kochia - Lady's thumb	- Night-flowering catchfly - Russian knapweed - Russian thistle - Scentless chamomile (BC) - Spurge laurel - Sweet fennel - Wild four o'clock

BC – biocontrol

APPENDIX C: REVELSTOKE IPMA PRIORITY PLANT LIST

REGIONAL EDRR - High risk invasive plant species not currently known within the Columbia Shuswap Regional District boundary or brand new incursions that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary. Management objective is eradication.

- Bighead knapweed	- Giant knotweed	- Plumeless thistle
- Buffalobur	- Gorse	- Puncturevine
- Bur chervil	- Greater knapweed	- Short-fringed knapweed
- Colt's foot	- Himalayan knotweed	- Tansy Ragwort
- Common bugloss	- Hoary Cress	- Wild parsnip
- Garlic mustard	- Longspine sandbur	- Wood sage
- Giant hogweed	- Nodding thistle	

ERADICATION or ANNUAL CONTROL – Species are known in the IPMA but with very limited distribution. Some species are relatively new to the IPMA so eradication is the objective. Other species may have been present for a relatively long period so monitoring for spread is the management objective.

- Baby's breath	- Hoary alyssum	- Policeman's helmet
- Black knapweed (BC)	- Japanese knotweed	- Scotch broom
- Blueweed	- Leafy spurge (BC)	- Teasel
- Bohemian knotweed	- Marsh plume thistle	- Wild chervil
- Caraway	- Meadow knapweed (BC)	- Yellow archangel
- Himalayan blackberry	- Poison hemlock	

CONTAINMENT – Species are abundant (with no expectation of eradication) in certain portions of the IPMA but have not yet infested all potential habitats. Containment is the management objective. Treat all sites outside of containment lines.

Contain to gardens:	**Contain to gardens Cont'd:**	**Contain to southern portion of IPMA:**
- Butterfly bush	- Japanese butterbur	- Common tansy
- Common periwinkle	- Mountain bluet	**Contain to Revelstoke and Arrow Reservoirs:**
- English holly	- Russian olive	- Eurasian water milfoil
- English ivy	- Salt cedar/ Tamarisk	
- Garden yellow loosestrife	- Siberian elm	
- Goutweed		

ESTABLISHED (BIOCONTROL OR SITE-SPECIFIC APPROACH) – Widespread species beyond landscape-level control and/or have relatively low impact. May have biocontrol (BC) available. Treat based on land management objectives.

- Annual sow thistle	- Hound's tongue (BC)	- Sow thistle spp.
- Bull thistle (BC)	- Knapweed spp. (BC)	- Spotted knapweed (BC)
- Burdock	- Meadow buttercup	- St. John's Wort (BC)
- Canada thistle (BC)	- Meadow goat's beard	- Sulphur cinquefoil
- Chicory	- Orange hawkweed	- Western goat's beard
- Common comfrey	- Oxeye daisy	- Wormwood
- Curled dock	- Perennial sow thistle	- Yellow hawkweed spp.
- Dalmatian toadflax (BC)	- Purple loosestrife (BC)	- Yellow toadflax (BC)
- Diffuse knapweed (BC)		

INSUFFICIENT INFORMATION – Insufficient information for these species on their distribution, impacts, potential for spread and/or feasibility of control. Further information is required.

- Bachelor's button	- Field scabious	- Queen Anne's Lace
- Black locust	- Flat peavine	- Rush skeletonweed (BC)
- Brown knapweed	- Fragrant water lily	- Russian knapweed
- Carpet burweed	- Greater celandine	- Russian thistle
- Creeping buttercup	- Green foxtail	- Scentless chamomile (BC)
- Curly leaf pondweed	- Hairy cat's ear	- Scotch thistle
- Cypress spurge	- Kochia	- Spurge laurel
- Dame's rocket	- Lady's thumb	- Sweet fennel
- Eyebright	- Night-flowering catchfly	- Wild four o'clock
- Field bindweed	- Nightshade	- Yellow flag iris

BC – biocontrol

APPENDIX D: GOLDEN IPMA PRIORITY PLANT LIST

REGIONAL EDRR - High risk invasive plant species not currently known within the Columbia Shuswap Regional District boundary or brand new incursions that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary. Management objective is eradication.		
- Bighead knapweed - Buffalobur - Bur chervil - Colt's foot - Common bugloss - Garlic mustard - Giant hogweed	- Giant knotweed - Gorse - Greater knapweed - Himalayan knotweed - Hoary Cress - Longspine sandbur - Nodding thistle	- Plumeless thistle - Puncturevine - Short-fringed knapweed - Tansy Ragwort - Wild parsnip - Wood sage
ERADICATION or ANNUAL CONTROL – Species are known in the IPMA but with very limited distribution. Some species are relatively new to the IPMA so eradication is the objective. Other species may have been present for a relatively long period so monitoring for spread is the management objective.		
- Baby's breath - Blueweed - Bohemian knotweed - Caraway - Common Tansy - Cypress spurge	- Diffuse knapweed (BC) - Hoary alyssum - Japanese knotweed - Knapweed spp. (BC) - Leafy spurge (BC) - Meadow knapweed (BC)	- Poison hemlock - Policeman's helmet - Scentless chamomile (BC) - Spotted knapweed (BC) - Teasel
CONTAINMENT – Species are abundant (with no expectation of eradication) in certain portions of the IPMA but have not yet infested all potential habitats. Containment is the management objective. Treat all sites outside of containment lines.		
Contain to gardens: - Butterfly bush - Common periwinkle - English holly	- English ivy - Garden yellow loosestrife - Goutweed - Japanese butterbur	- Mountain bluet - Russian olive - Salt cedar/ Tamarisk - Siberian elm
ESTABLISHED (BIOCONTROL OR SITE-SPECIFIC APPROACH) – Widespread species beyond landscape-level control and/or have relatively low impact. May have biocontrol (BC) available. Treat based on land management objectives.		
- Annual sow thistle - Bull thistle (BC) - Burdock - Canada thistle (BC) - Chicory - Common comfrey	- Curled dock - Dalmatian toadflax (BC) - Hound's tongue (BC) - Meadow buttercup - Oxeye daisy - Perennial sow thistle	- Purple loosestrife (BC) - Sow thistle spp. - Western goat's beard - Wormwood - Yellow hawkweed spp. - Yellow toadflax (BC)
INSUFFICIENT INFORMATION – Insufficient information for these species on their distribution, impacts, potential for spread and/or feasibility of control. Further information is required.		
- Bachelor's button - Black knapweed (BC) - Black locust - Brown knapweed - Carpet burweed - Creeping buttercup - Curly leaf pondweed - Dame's rocket - Eurasian water milfoil - Eyebright - Field bindweed - Field scabious - Flat peavine	- Fragrant water lily - Greater celandine - Green foxtail - Hairy cat's ear - Himalayan blackberry - Kochia - Lady's thumb - Marsh plume thistle - Meadow goat's beard - Night-flowering catchfly - Nightshade - Orange hawkweed - Queen Anne's Lace	- Rush skeletonweed (BC) - Russian knapweed - Russian thistle - Scotch broom - Scotch thistle - Spurge laurel - St. John's Wort (BC) - Sulphur cinquefoil - Sweet fennel - Wild chervil - Wild four o'clock - Yellow archangel - Yellow flag iris

BC – biocontrol

Columbia Shuswap Regional Invasive Species Watchlist 2020

PROVINCIAL PRIORITY DEFINITIONS (as per February 2020 list: https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/provincial_priority_is_list_final2019_march2_2020_posted_online.pdf)		
Prevent	1	Species determined to be high risk to BC and not yet established. **Management objective** is to prevent the introduction and establishment.
Provincial EDRR	2	Species is high risk to BC and is new to the Province. **Management objective** is eradication.
Provincial Containment	3	Species is high risk with limited extent in BC but significant potential to spread. **Management objective** is to prevent further expansion into new areas with the ultimate goal of reducing the overall extent.
Regional Containment/Control	4	Species is high risk and well established, or medium risk with high potential for spread. **Management objective** is to prevent further expansion into new areas within the region through establishment of containment lines and identification of occurrences outside the line to control.
Management	5	Species is more widespread but may be of concern in specific situations with certain high values - e.g., conservation lands, specific agriculture crops**. Management objective** is to reduce the invasive species impacts locally or regionally, where resources are available.
Not listed	6	Columbia Shuswap regional watchlist species that are not currently ranked on the Provincial list

Amphibians & Reptiles	**Priority rank**	***Genus***	***Species***	**Present in CSRD?**	**Known Location(s)**
Italian wall lizard	1	*Podarcis*	*siculus*	Absent	Vancouver
American bullfrog	4	*Lithobates*	*catesbeianus*	Absent	Creston Valley, Lower Mainland, Vancouver Island, Okanagan (populations may be eradicated). Idaho, US
Common wall lizard	4	*Podarcis*	*muralis*		
Green frog	4	*Lithobates*	*clamitans*		Vancouver, Southern Vancouver Island
Red-eared slider	4	*Trachemys*	*scripta*	Unconfirmed	McGuire Lake (unconfirmed)
Snapping turtle	4	*Chelydra*	*serpentina*		
Softshell turtle	6	*Apalone sp.*			
Western fence lizard	6	*Sceloporus*	*occidentalis*		
Birds	**Priority rank**	***Genus***	***Species***	**Present in CSRD?**	**Known Location(s)**
American black duck	5	*Anas*	*rubripes*		
Eurasian collared dove	5	*Streptopelia*	*decaocto*	Present	CSRD, TNRD
European house sparrow	5	*Passer*	*domesticus*	Present	CSRD, TNRD

European startling	5	*Sturnus*	*vulgaris*	Present	CSRD
Mute swan	5	*Cygnus*	*olor*		
Rock pigeon	5	*Columba*	*livia*		
Birds	**Priority rank**	***Genus***	***Species***	**Present in CSRD?**	**Known Location(s)**
Wild turkey	5	*Meleagris*	*gallopavo*		Vernon, Radium, Slocan, Armstrong, Golden?
California Quail	6	*Callipepla*	*californica*		Possibly Kamloops, Bachelor Heights
Chukar partridge	6	*Alectoris*	*chukar*		
Fish	**Priority rank**	***Genus***	***Species***	**Present in CSRD?**	**Known Location(s)**
American Shad	1	*Alosa*	*sapidissima*	Present	Williamson Lake
Amur goby	1	*Rhinogobius*	*brunneus*		
Bighead carp	1	*Hypophthalmichthys*	*nobilis*		
Bitterling	1	*Rhodeus*	*species*		
Black carp	1	*Mylopharyngodon*	*piceus*		
Blotched snakehead	1	*Channa*	*bleheri*		
Channel catfish	1	*Ictalurus*	*punctatus*		
Grass carp	1	*Ctenopharyngodon*	*idella*		
Green sunfish	1	*Lepomis*	*cyanellus*		
Monkey goby	1	*Neogobius*	*fluviatilis*		
Muskellunge	1	*Esox*	*masquinongy*		
Northern snakehead	1	*Channa*	*argus*		Burnaby Lk- eradicated
Prussian carp	1	*Carassius*	*carassius*		
Rainbow snakehead	1	*Channa*	*maculata, argus & bleheri*		
Red bellied piranha*	1	*Pygocentrus*	*nattereri*		
Rock bass	1	*Ambloplites*	*rupestris*		
Round goby	1	*Neogobius*	*melanostomus*		
Silver carp	1	*Hypophthalmichthys*	*molitrix*		
Spottail shiner	1	*Notropis*	*hudsonius*		
Tubenose goby	1	*Proterorhinus*	*semilunaris*		
Tui chub	1	*Gila*	*bicolor*		
Warmouth	1	*Lepomis*	*gulosus*		

Western mosquitofish	1	*Gambusia*	*affinis*		
White cloud mountain minnow	1	*Tanichthys*	*albonubes*		
Oriental weatherfish	2	*Misgurnus*	*anguillicaudatus*		
Rosy red minnow (or Fat head minnow)	2	*Pimephales*	*promelas*		
Fish	**Priority rank**	***Genus***	***Species***	**Present in CSRD?**	**Known Location(s)**
Goldfish	4	*Carassius*	*auratus*	Present	White Lake, Shuswap Lake, 70th Ave Pond, Lost Lake?, McGuire Lake?
Northern Pike	4	*Esox*	*lucius*	Absent	Incorrect information in iMap BC shows at Pearson Crossing Columbia Wetlands.
Yellow perch	4	*Perca*	*flavescens*	Present	Upper Arrow, Williamson Lake, Pinaus Lake, Little Pinaus Lake, Square Lake, Cedar Creek, Some lakes treated with Rotenone (Gardom, Skimikin, Larch Lake, Larch Pond, Nellies Lake) no re-establishment since.
Black crappie	5	*Pomoxis*	*nigromaculatus*		Vancouver
Bluegill sunfish	5	*Lepomis*	*macrochirus*		
Brown bullhead	5	*Ameiurus*	*nebulosus*		
Back bullhead		*Ameiurus*	*natalis*		
Yellow Bullhead		*Ameiurus*	*melas*		
Common carp	5	*Cyprinus*	*carpio*	Present	Shuswap Lake, Upper Arrow, Canoe Pond, Larch Hills Lake, Shuswap River (Enderby)
Largemouth bass	5	*Micropterus*	*salmoides*	Absent	
Pumpkinseed sunfish	5	*Lepomis*	*gibbosus*	Absent	Skimikin Lake
Smallmouth bass	5	*Micropterus*	*dolomieu*	Absent	Gardom Lake, treated
Trench	5	*Tinca*	*tinca*		
Walleye	5	*Sander*	*vitreus*		
Atlantic salmon	6	*Salmo*	*salar*		
Black bullhead	6	*Ameiurus*	*melas*		
Brown Trout	6	*Salmo*	*trutta*	Present	Trout Lake

Eastern Brook Trout	6	*Salvelinus*	*fontinalis*	Present	Gardom Lake and the Columbia River System (iMapBC) ALL IPMS's (consensus at land manager meeting) Eradication in progress LLKY (Parks Canada)
Fathead minnow	6	*Pimephales*	*promelas*		
Rainbow trout	6	*Oncorhynchus*	*mykiss*	Present-Widespread	All IPMA's. Eradication in progress LLKY
Red bellied pacu	6	*Piaractus*	*brachypomus*		
Red shiner	6	*Cyprinells*	*lutrensis*		
Yellow bullhead	6	*Ameiurus*	*natalis*		

APPENDIX F: USEFUL RESOURCES

Columbia Shuswap Invasive Species Society

- Local information about invasive species
- www.columbiashuswapinvasives.org

Invasive Species Council of BC "Targeted Invasive Plant Solutions (T.I.P.S.)"

- Best management practices that are species-specific or on activities such as seed mixtures, transportation corridors, aquatic recreation or forestry operations.
- http://www.bcinvasives.ca/resources/outreach-materials/invasive-plants-tips
  http://www.bcinvasives.ca/resources/outreach-materials/activities-tips

Invasive Species Council of BC – other resources

Publications can be found at: https://bcinvasives.ca/resources/publications/ and include:

- Best Management Practices for Invasive Plants in Parks and Protected Areas of British Columbia
- Best Practices for Preventing the Spread of Invasive Plants during Forest Management Activities
- Best Practices for Managing Invasive Species on Utility Operations
- Best Practices for Managing Invasive Plants on Roadsides
- Best Practices a Pocket Guide for British Columbia's Oil and Gas Workers
- Best Management Practices for Soil Movement and Disposal
- Aquatic Invasive Species Best Practices for the Boating Industry
- Other ISCBC Resources: https://bcinvasives.ca/resources

WeedsBC

- Information on over 80 invasive plant species including identification and control techniques.
- http://www.weedsbc.ca/

Invasive Alien Plant Program Application

- Database that includes invasive plant inventory, treatment and monitoring information, map display, and training modules for standardized operations
- http://www.for.gov.bc.ca/hra/plants/application.htm

Invasive Species Legislation

BC Laws. 2009 (updated 2017). Controlled Alien Species Regulation.
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/94_2009

Invasive Plant Legislation

- IPCBC A Legislative Guidebook to Invasive Plant Management in BC:
  http://www.bcinvasives.ca/resources/outreach-materials/technical-reports
- BC Weed Control Act:
  http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96487_01
- Forest and Range Practices Act Invasive Plant Regulation:
  http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/18_18_2004
- Community Charter Act Environment and Wildlife Regulation:
  http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/41_144_2004

Invasive Species Frameworks/Strategies

Columbia Basin Aquatic Invasive Species Steering Committee. 2015 (Updated 2017). Canadian Columbia Basin Aquatic Invasive Species Framework. https://columbiashuswapinvasives.org/about-csiss/csiss-resources/ ; https://columbiashuswapinvasives.org/about-csiss/columbia-basin-aquatic-invasive-species-team/

Ministry of Forests. 2005. Invasive Alien Species Framework for BC: Identifying and Addressing Threats to Biodiversity. https://www.for.gov.bc.ca/hra/invasive-species/Publications/MoE_alien_species_framework_BC_2004.pdf

Invasive Species Council of BC (ISCBC).2014. *BC Communications Framework on Invasive Species*. http://www.bcinvasives.ca/special-highlights/communications-framework-for-bc

Invasive Species Council of BC. 2018. *Invasive Species Strategy for BC 2018-2022.* https://bcinvasives.ca/about/invasive-species-strategy-for-bc ; https://bcinvasives.ca/documents/Invasive_Species_Strategy_for_BC-2018-180117-WEB.pdf

Province of BC

BC Ministry of Forests and Range (BC MFR). 2019. *Invasive Plant Pest Management Plan for the Southern Interior of British Columbia: MFR PMP 402-0656-10/15*. Range Branch, Ministry of Forests and Range. https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/integrated-pest-management/pmp-pup

BC Inter-Ministry Invasive Species Working Group. 2014. *Invasive Species Early Detection and Rapid Response Plan for British Columbia*. https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/final_imiswg_bc_is_edrr_plan_nov_2014.pdf ; https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/edrr

Regional Organizations/Partners

Central Kootenay Invasive Species Society. https://ckiss.ca/resources/publications/
East Kootenay Invasive Species Council. https://www.ekisc.com/ekisc-publications
North Okanagan Regional District http://www.rdno.ca/index.php/services/community/environmental-services/noxious-weeds-invasive-plants
Thompson Nicola Regional Invasive Plant Management Committee
http://tnipmc.com/index.php/resources/
Columbia Shuswap Regional District. https://www.csrd.bc.ca/services/noxious-weed-control