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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- East Kootenay Invasive Species Council
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- Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Ministry of Transportation and Infrastructure
- Parks Canada
- Town of Golden
- Wildsight Golden
- Invasive Species Council of BC
- Interested residents

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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.

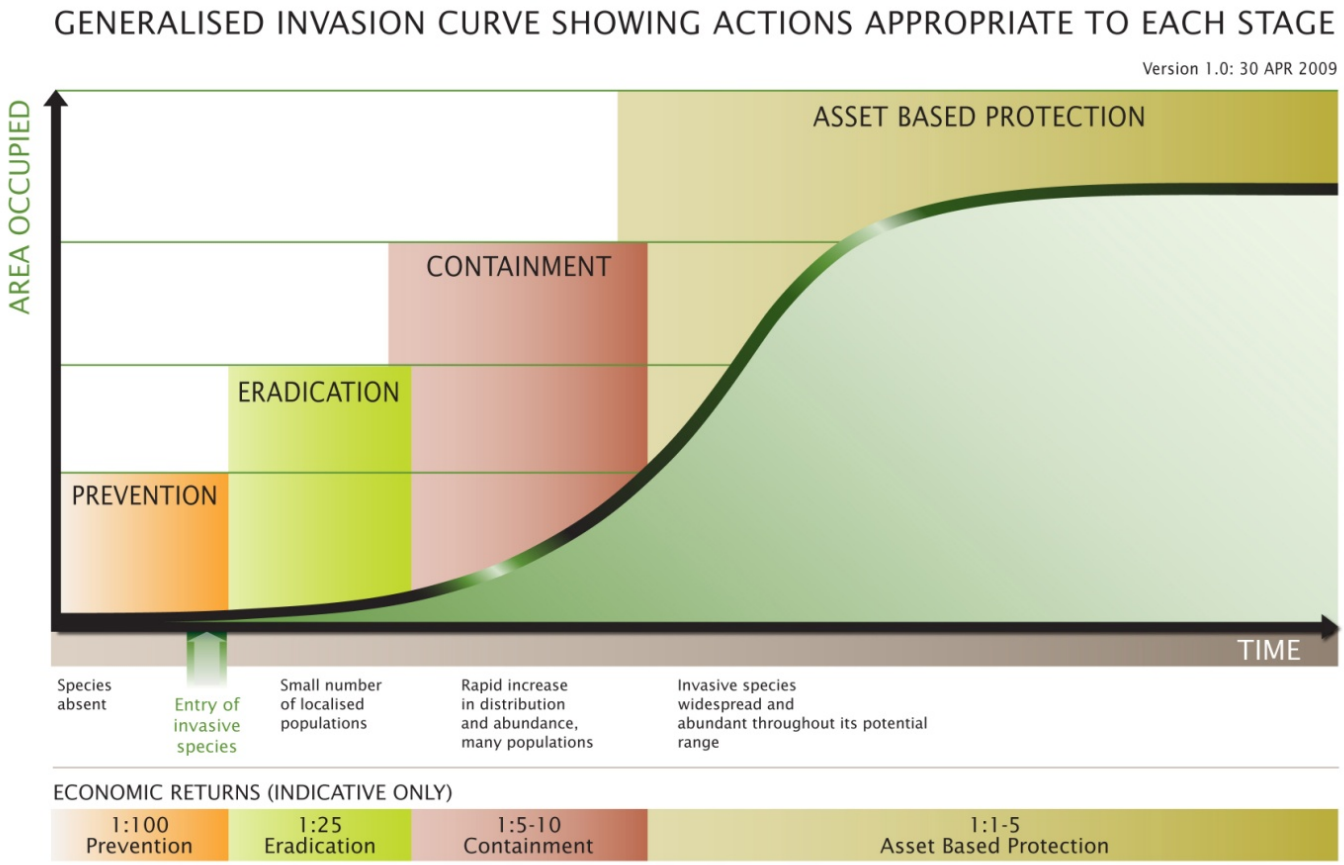

FIGURE 2: DIAGRAM SHOWING MANAGEMENT STRATEGIES MOST USEFUL DURING EACH PHASE OF THE INVASION PROCESS[2].

[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.

[4] Contact Invasive Plant Specialist (MFLNRORD)

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

2. **Second Pass:** Treatment objective is to prevent any missed plants from producing viable seed.

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;

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

- Use IAPP Monitoring Forms;
- Enter monitoring data into IAPP;
- Take monitoring photographs from the same location, aspect and viewpoint as in previous years;
- 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.

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APPENDIX A: INVASIVE PLANT WATCHLISTS FOR COLUMBIA SHUSWAP

TABLE 1: B.C. PROPOSED PROHIBITED NOXIOUS WEED LIST

B.C. Proposed Prohibited Noxious Weed List- The following plant species are not present in B.C. or are present but in extremely limited extent. **Provincial government takes lead role in treatments.** Report these species through Report-A-Weed app.		
Species Name * Currently not known in CSISS Region	**Ranking**	**Report for:**
African rue (PEGA HAR)*	1+	ALL IPMA's
Black henbane (HYSO NIG)*	1+	ALL IPMA's
Brazilian elodea (EGER DEN)*	1+	ALL IPMA's
Camel thorn (ALHA MAU)*	1+	ALL IPMA's
Common crupina (CRUP VUL)*	1+	ALL IPMA's
Common reed (PHRA AUS)*	1+	ALL IPMA's
Cordgrass, dense-flower (SPAR DEN)*	1+	ALL IPMA's
Cordgrass, salt meadow (SPAR PAT)*	1+	ALL IPMA's
Cordgrass, smooth (SPAR ALT)*	1+	ALL IPMA's
Cordgrass, common (SPAR ANG)*	1+	ALL IPMA's
Dyer's woad (ISAT TIN)*	1+	ALL IPMA's
Eggleaf spurge (EUPH OBL)*	1+	ALL IPMA's
False brome, slender (BRAC SYL)*	1+	ALL IPMA's
Flowering rush (BUTO UMB)*	1+	ALL IPMA's
Foxtail, slender / meadow (ALOP MYO)*	1+	ALL IPMA's
Geranium, Shiny (GERA LUC)*	1+	ALL IPMA's
Giant reed (ARUN DON)*	1+	ALL IPMA's
Goat's rue /French lilac (GALE OFF)*	1+	ALL IPMA's
Halogeton / Saltover (HALO GLO)*	1+	ALL IPMA's
Hawkweed, mouse-ear (HIER PIL)*	1+	ALL IPMA's
Hyacinth, water (EICH CRA)*	1+	ALL IPMA's
Hydrilla (HYDR VER)*	1+	ALL IPMA's
Johnsongrass (SORG HAL)*	1+	ALL IPMA's
Jointed goatgrass (AEGI CIL)*	1+	ALL IPMA's
Knapweed, squarrose (CENT VIR)*	1+	ALL IPMA's
Kudzu (PUER MON)*	1+	ALL IPMA's
Meadow clary (SALV PRA)*	1+	ALL IPMA's
Medusahead (TAEN CAP)*	1+	ALL IPMA's
Nightshade, silverleaf (SOLA ELA)*	1+	ALL IPMA's
North Africa grass (VENT DUB)*	1+	ALL IPMA's
Nutsedge, purple (CYPE ROT)*	1+	ALL IPMA's
Perennial pepperweed (LEPI LAT)*	1+	ALL IPMA's
Red bartsia (ODON SER)*	1+	ALL IPMA's
Sage, clary (SALV SCL)*	1+	ALL IPMA's
Sage, Mediterranean (SALV AET)*	1+	ALL IPMA's
Spring millet grass (MILI VER)*	1+	ALL IPMA's
Spurge flax (THYM PAS)*	1+	ALL IPMA's
Starthistle, Iberian (CENT IBE)*	1+	ALL IPMA's
Starthistle, Maltese (CENT MEL)*	1+	ALL IPMA's
Starthistle, purple (CENT CAL)*	1+	ALL IPMA's
Starthistle, yellow (CENT SOL)*	1+	ALL IPMA's
Syrian bean-caper (ZYGO FAB)*	1+	ALL IPMA's
Texas blueweed (HELI CIL)*	1+	ALL IPMA's
Thistle, Italian (CARD PYC)*	1+	ALL IPMA's
Thistle, slender-flowered (CARD TEN)*	1+	ALL IPMA's
Water lettuce (PIST STR)*	1+	ALL IPMA's
Water soldier (STRA ALO)*	1+	ALL IPMA's
Yellow floating heart (NYMP PEL)*	1+	ALL IPMA's

For online version of B.C. Proposed Prohibited Noxious Weeds, visit:
https://www.for.gov.bc.ca/hra/Plants/publications/Proposed_Prohibited_Noxious_Weeds_Feb2019.pdf

INVASIVE PLANT PRIORITY DEFINITIONS

The following definitions for priority ranking for invasive plant species are based on the Province of BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development provincial ranking.

TABLE 2: DEFINITION OF PRIORITY RANKING CATEGORIES FOR INVASIVE PLANTS

Priority Ranking	Description
Provincial EDRR **Regional EDRR** **(Prevention)** **(1)**	These invasive plant species are proposed BC Prohibited Noxious Weeds and candidates for the BC Early Detection Rapid Response Program. CSISS reports occurrences to FLNRORD; FLNRORD will initiate treatment. For a list of current species, see: BC Government Noxious Weeds. These species are not currently known in this IPMA (and may also not be known in the CSISS region- CSISS Watchlist Species) or brand new incursions and high risk invasive plant species that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary. Regional EDRR species do not include Provincial Prohibited Species. The goal for these species is immediate eradication if they are detected. Regional EDRR reporting and action protocols for these species are outlined in Section 3.4. These sites are extremely high priority for treatment and eradication is the management objective.
ERADICATION OR ANNUAL CONTROL (2)	These species are known in the IPMA but with very limited distribution. Some of these species may have been present for a relatively long period so monitoring for spread is the management objective. Other species are relatively new to the IPMA so eradication is the objective.
CONTAINMENT (3)	These 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 (i.e. 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.
ESTABLISHED (BIOCONTROL OR SITE-SPECIFIC APPROACH) (4)	These are widespread species that are 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 agents available.
INSUFFICIENT INFORMATION (5)	There is insufficient information for these species on their distribution, impacts, potential for spread and/or feasibility of control. In some cases, species have also been classified in one of the other categories because enough is known about their distribution. They also appear in this category because further information is still required.

TABLE 3: INVASIVE PLANT WATCHLIST FOR COLUMBIA SHUSWAP

CSISS WATCHLIST will contain priority level 1 invasive plants currently not known in the Columbia Shuswap Region. **EDRR regional protocols** will be followed.		
Species Name *Currently not known in CSISS region	**Ranking**	**Report for:**
Buffalobur* (SOLA ROS)	1	ALL IPMA's
Bur chervil* (ANTH CAU)	1	ALL IPMA's
Colt's foot* (TUSS FAR)	1	ALL IPMA's
Garlic mustard* (ALLI PET)	1	ALL IPMA's
Gorse* (ULEX EUR)	1	ALL IPMA's
Greater knapweed* (CENT SCA)	1	ALL IPMA's
Himalayan knotweed* (POLY POL)	1	ALL IPMA's
Kochia (KOCH SCO) *	1	ALL IPMA's
Longspine sandbur* (CENC LON)	1	ALL IPMA's
Nodding thistle* (CARD NUT)	1	ALL IPMA's
Plumeless thistle* (CARD ACA)	1	ALL IPMA's
Puncturevine* (TRIB TER)	1	ALL IPMA's
Russian thistle* (SALS KAL)	1	ALL IPMA's
Tansy ragwort* (SENE JAC)	1	ALL IPMA's
Wild Four O'Clock* (MIRA NYC)	1	ALL IPMA's
Wood sage* (SALV NEM)	1	ALL IPMA's

TABLE 4: UNLISTED LOWER PRIORITY PLANTS FOR COLUMBIA SHUSWAP

UNLISTED Lowest Priority in all IPMAs (therefore not included in ranking, but some jurisdictions may still 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

TABLE 5: 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	1
Black locust (ROBI PSE)			5	5	5
Blueweed (ECHI VUL)		WCA, FRPA	2	2	2
Bohemian knotweed (FALL BOH)		WCA, CCSCJ	2	2	2
Brown Knapweed (CENT JAC)		FRPA	5	5	1
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, FRPA	4	4	4
Canada thistle (CIRS ARV)	Y	WCA, CCSCJ, FRPA	4	4	4
Caraway (CARU CAR)			1	2	2
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, 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	1	1
Cypress spurge (EUPH CYP)			2	1	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	1
Eyebright (EUPH NEM)			5	5	5
Field bindweed (CONV ARV)			5	5	5
Field scabious (KNAU ARV)		FRPA	2	1	1
Flat Peavine (LATH SYL)			5	5	5
Fragrant water lily (NYMP ODO)			3	1	1
Garlic mustard (ALLI PET)		WCA, CCSCJ	1	1	1
Giant hogweed (HERA MAN)		WCA, CCSCJ	1	1	1
Giant knotweed (FALL SAC)		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
Hawkweed spp. (HIER SPP) (see yellow hawkweeds)			4	4	4
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, 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	1
Knapweed species (CENT SPP)	Y		4	4	2
Kochia (KOCH SCO)			1	1	1
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	1
Meadow buttercup (RANU ACR)			4	4	4

Meadow goat's beard (TRAG PRA)			4	4	1
Meadow knapweed (CENT DEB)	Y	WCA, 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, 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	1	1	1
Policeman's helmet (IMPA GLA)		CCSCJ	2	2	2
Puncturevine (TRIB TER)		FRPA	1	1	1
Purple loosestrife (LYNT SAL)	Y	WCA, CCSCJ, FRPA	2	2	2
Queen anne's lace / wild carrot (DAUC CAR)			4	5	5
Rush skeletonweed (CHON JUN)		WCA, CCSCJ, FRPA	2	1	1
Russian knapweed (ACRO REP)		FRPA	5	1	1
Russian Thistle (SALS KAL)			1	1	1
Scentless chamomile (MATR PER)		WCA, CCSCJ, FRPA	5	5	2
Scotch broom (CYTI SCO)		CCSCJ, FRPA	2	2	1
Scotch thistle (ONOP ACA)		FRPA	2	1	1
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
St. John's wort (HYPE PER)	Y	CCSCJ, FRPA	4	4	5
Sulphur cinquefoil (POTE REC)		WCA, FRPA	4	4	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)		CCSCJ	4	4	4
Wild chervil (ANTH SYL)			2	2	1
Wild parsnip (PAST SAT)			1	1	1
Wild Four O'Clock (MIRA NYC)			1	1	1
Wood sage (SALV NEM)			1	1	1

Wormwood (ARTE ABS)			4	4	4
Yellow archangel (LAMI GAL)			2	2	1
Yellow flag-iris (IRI PSE)		WCA, CCSCJ, FRPA	2	1	1
Yellow hawkweeds (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

APPENDIX B: SALMON ARM IPMA PRIORITY PLANT LIST

REGIONAL EDRR - Not currently known in this IPMA (and may also not be known in the CSISS region- CSISS Watchlist Species*) or **brand new incursions and high risk invasive plant species that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary.** The goal for these species is immediate eradication if they are detected.

- **Bighead knapweed** - Buffalobur* - Bur chervil* - Caraway - Colt's foot* - **Common bugloss** - Garlic mustard* - **Giant hogweed** - Giant knotweed	- Gorse* - Greater knapweed* - Himalayan knotweed* - Hoary Cress - Kochia* - Longspine sandbur* - Nodding thistle* - Plumeless thistle*	- **Poison hemlock** - Puncturevine* - Russian Thistle* - **Short-fringed knapweed** - Tansy Ragwort* - Wild Four O'Clock* - **Wild parsnip** - Wood sage*

ERADICATION or ANNUAL CONTROL – Species known in IPMA but with very limited distribution. Enter inventory data, report and treat or monitor annually. Some of these species have biocontrol (BC) available.

ALL containment species OUTSIDE their containment lines (see CONTAINMENT) - 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) - Policeman's helmet - Purple loosestrife (BC)	- Rush skeletonweed - Scotch broom - Scotch thistle - Teasel - Wild chervil - Yellow archangel - Yellow flag iris

CONTAINMENT – Enter inventory data, report and treat all sites outside containment lines. Some of these species have biocontrol (BC) available which can be used within the containment line.

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 that are beyond landscape-level control 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) - Hawkweed spp.	- Hoary alyssum - Hound's tongue (BC) - Knapweed spp. (BC) - Meadow buttercup - Meadow goat's beard - Nightshade - Orange hawkweed - Oxeye daisy - Perennial sow thistle	- Queen Anne's Lace - Sow thistle spp - Spotted knapweed (BC) - St. John's Wort (BC) - Sulphur cinquefoil - Western goat's beard - Wormwood - Yellow hawkweeds - Yellow toadflax (BC)

INSUFFICIENT INFORMATION – There is a lack of information on the distribution, impacts and potential for spread and/or control of the following species. Some of these species may appear in other categories (since their distribution is relatively well understood) but they also appear in this category because further information is still required.

- Bachelor's button - Black locust - Brown knapweed - Creeping buttercup - Curly leaf pondweed - Dame's rocket	- Eyebright - Field bindweed - Flat peavine - Greater celandine - Green foxtail	- Hairy cat's ear - Lady's thumb - Night-flowering catchfly - Russian knapweed - Scentless chamomile

APPENDIX C: REVELSTOKE IPMA PRIORITY PLANT LIST

REGIONAL EDRR - Not currently known in this IPMA (and may also not be known in the CSISS region- CSISS Watchlist Species*) or **brand new incursions and high risk invasive plant species that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary**. The goal for these species is immediate eradication if they are detected.

- **Bighead knapweed**	- **Giant knotweed**	- Rush skeletonweed
- Buffalobur*	- Gorse*	- Russian knapweed
- Bur chervil*	- Greater knapweed*	- Russian Thistle*
- Colt's foot*	- Himalayan knotweed*	- Scotch thistle
- Common bugloss	- Hoary cress	- Short fringed knapweed
- Curly leaf pondweed	- Kochia*	- Tansy ragwort*
- Cypress spurge	- Longspine sandbur*	- Wild Four O'Clock*
- Field scabious	- Nodding thistle*	- **Wild parsnip**
- Fragrant water lily	- Plumeless thistle*	- Wood sage*
- Garlic mustard*	- Poison hemlock	- Yellow Flag Iris
- Giant hogweed	- Puncturevine*	

ERADICATION or ANNUAL CONTROL – Species known in IPMA but with very limited distribution. Enter inventory data, report and treat or monitor annually. Some of these species have biocontrol (BC) available.

ALL containment species OUTSIDE their containment lines (see CONTAINMENT)	- Caraway	- Policeman's helmet
- Baby's breath	- Himalayan blackberry	- Purple loosestrife (BC)
- Black knapweed (BC)	- Hoary alyssum	- Scotch broom
- Blueweed	- Japanese knotweed	- Teasel
- Bohemian knotweed	- Leafy spurge (BC)	- Wild chervil
	- Marsh plume thistle	- Yellow archangel
	- Meadow knapweed (BC)	

CONTAINMENT – Enter inventory data, report and treat all sites outside containment lines. Some of these species have biocontrol (BC) available which can be used within the containment line.

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 that are beyond landscape-level control or have relatively low impact. May have biocontrol (BC) available. Treat based on land management objectives.

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

INSUFFICIENT INFORMATION – There is a lack of information on the distribution, impacts and potential for spread and/or control of the following species. Some of these species may appear in other categories (since their distribution is relatively well understood) but they also appear in this category because further information is still required.

- Bachelor's button	- Field bindweed	- Lady's thumb
- Black locust	- Flat peavine	- Night-flowering catchfly
- Brown knapweed	- Greater celandine	- Nightshade
- Creeping buttercup	- Green foxtail	- Queen Anne's Lace
- Dame's rocket	- Hairy cat's ear	- Scentless chamomile
- Eyebright		

APPENDIX D: GOLDEN IPMA PRIORITY PLANT LIST

REGIONAL EDRR - Not currently known in this IPMA (and may also not be known in the CSISS region- CSISS Watchlist Species*) or **brand new incursions and high risk invasive plant species that are extremely limited in extent (less than 10 very small sites) within the Columbia Shuswap Regional District boundary**. The goal for these species is immediate eradication if they are detected.		
- **Bighead knapweed** - Black knapweed - Brown knapweed - Buffalobur* - Bur chervil* - Colt's foot* - **Common bugloss** - Curly leaf pondweed - Eurasian water milfoil - Field scabious - Fragrant water lily - Garlic mustard* - Giant hogweed - **Giant knotweed**	- Gorse* - Greater knapweed* - Himalayan knotweed* - **Hoary cress** - Japanese knotweed - Kochia* - Longspine sandbur* - Marsh plume thistle - Meadow goat's beard - Nodding thistle* - Plumeless thistle* - Poison Hemlock - Puncturevine*	- Rush skeletonweed - Russian knapweed - Russian Thistle* - Scotch broom - Scotch thistle - **Short fringed knapweed** - Tansy ragwort* - Wild chervil - Wild Four O'Clock* - Wild parsnip - Wood sage* - Yellow archangel - Yellow flag-iris
ERADICATION or ANNUAL CONTROL – Species known in IPMA but with very limited distribution. Enter inventory data, report and treat or monitor annually. Some of these species have biocontrol (BC) available.		
ALL containment species OUTSIDE their containment lines (see CONTAINMENT) - Baby's breath - Blueweed - Bohemian knotweed - Caraway	- Common Tansy - Cypress spurge - Diffuse knapweed (BC) - Hoary alyssum - Knapweed spp. (BC) - Leafy spurge (BC)	- Meadow knapweed (BC) - Policeman's helmet - Purple loosestrife (BC) - Scentless chamomile - Spotted knapweed (BC) - Teasel
CONTAINMENT – Enter inventory data, report and treat all sites outside containment lines. Some of these species have biocontrol (BC) available which can be used within the containment line.		
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 that are beyond landscape-level control 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) - Hawkweed spp. - Hound's tongue (BC) - Meadow buttercup - Oxeye daisy	- Perennial sow thistle - Sow thistle spp - Western goat's beard - Wormwood - Yellow hawkweeds - Yellow toadflax (BC)
INSUFFICIENT INFORMATION – There is a lack of information on the distribution, impacts and potential for spread and/or control of the following species. Some of these species may appear in other categories (since their distribution is relatively well understood) but they also appear in this category because further information is still required.		
- Bachelor's button - Black locust - Creeping buttercup - Dame's rocket - Eyebright - Field bindweed	- Flat peavine - Greater celandine - Green foxtail - Hairy cat's ear - Himalayan blackberry - Lady's thumb	- Night-flowering catchfly - Nightshade - Orange hawkweed - Queen Anne's Lace - St. John's Wort (BC) - Sulphur cinquefoil

APPENDIX E: COLUMBIA SHUSWAP INVASIVE SPECIES WATCHLIST

TABLE 6: COLUMBIA SHUSWAP INVASIVE ANIMALS, FISH, HERPETOFAUNA, INVERTEBRATES, FUNGI WATCHLIST, NOT INCLUDING PLANTS (DRAFT 03-SEPT-2019):

COMMON NAME	Latin Name	Presence/ Absence in CSRD	Known Location(s)
MAMMALS	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Black rat	*Rattus rattus*	Present	Revelstoke. Vancouver, Fraser Valley, the Queen Charlotte Islands, Vancouver Island and Cortes Island.
Brown rat / Norway rat	*Rattus norvegicus*	Absent	Nelson (unconfirmed), Lower Mainland and the islands off BC
Eastern cottontail rabbit	*Sylvilagus floridanus*	Absent	Lower Mainland, Saskachewan, widely prolific throughout US
Eastern fox squirrel	*Sciurus niger*	Absent	Localised areas in Southern BC, and south-central locations throughout Canada
Eastern grey squirrel	*Sciurus carolinensis*	Present	CSRD (Revelstoke, Salmon Arm), Okanagan, Lower Mainland
European rabbit	*Oryctolagus cuniculus*	Absent	Lower Mainland, Vancouver Island, and AB.
Feral swine	*Sus scrofa*	Absent	Alberta to Quebec. Throughout the US. Lower Mainland, Vancouver Island, Thompson-Okanagan, Peace, Chilcotin and Kootenay Regions. Feral pigs have not yet established large populations in the province.
House mouse	*Mus musculus*	Present	All throughout CSRD
Nutria	*Myocastor coypus*	Absent	South Vancouver, Washington, Oregon
Virginia opossum	*Didelphis virginiana*	Absent	Eastern U.S. and Southeastern Canada, ranging up Columbia River and into Southern BC.
FISH	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
American Shad	*Alosa sapidissima*	Absent	Vancouver Island, Lower Mainland
Amur goby	*Rhinogobius brunneus*	Absent	Washington, Oregon
Atlantic salmon	*Salmo salar*	Absent	Vancouver Island, Lower Mainland

Bighead carp	*Hypophthalmichthys nobilis*	Absent	Eastern US
Bitterling	*Rhodeus sp.*	Absent	New York
Black bullhead	*Ameiurus melas*	Absent	Lower Mainland, Okanagan
Black carp	*Mylopharyngodon piceus*	Absent	Eastern Canada and US
Black crappie	*Pomoxis nigromaculatus*	Absent	Lower Mainland, South Okanagan, Pend Orielle River
Blotch snakehead	*Channa maculata*	Absent	Vancouver, Eastern US
Bluegill sunfish	*Lepomis macrochirus*	Absent	Washington, Creston Valley
Brown bullhead	*Ameiurus nebulosus*	Absent	Lower Mainland, Vancouver Island
Brown Trout	*Salmo trutta*	Absent	Lower Mainland, Vancouver Island, Okanagan, Kootenays
Channel fish	*Ictalurus punctatus*	Absent	Washington
Common carp	*Cyprinus carpio*	Present	CSRD: Shuswap Lake, Upper Arrow, Canoe Pond, Larch Hills Lake, Shuswap River
Eastern Brook Trout	*Salvelinus fontinalis*	Present	Gardom Lake and the Columbia River System. Eradication in progress LLKY (Parks Canada)
Fathead minnow	*Pimephales promelas*	Absent	Lower Mainland
Goldfish	*Carassius auratus*	Present	CSRD: White Lake, Shuswap Lake, 70th Ave Pond (Salmon Arm), Lost Lake (Shuswap), McGuire Lake (Salmon Arm)
Grass carp	*Ctenopharyngodon idella*	Absent	Washington, Eastern Canada
Green sunfish	*Lepomis cyanellus*	Absent	Washington, Montana
Largemouth bass	*Micropterus salmoides*	Absent	Gardom Lake (eradicated)
Monkey goby	*Neogobius fluviatilis*	Absent	Great Lakes (Ontario)
Muskellunge	*Esox masquinongy*	Absent	Eastern Canada and US
Northern Pike	*Esox lucius*	Unknown	Peace River, Northern B.C.
Northern snakehead	*Channa argus*	Absent	Eastern US
Oriental weatherfish	*Misgurnus anguillicaudatus*	Absent	Fraser Valley
Prussian carp	*Carassius gibelio*	Absent	Alberta
Pumpkinseed sunfish	*Lepomis gibbosus*	Present	Vancouver Island, Lower Mainland, Columbia, Thompson, Fraser River

Rainbow snakehead	*Channa bleheri*	Absent	No known locations in North America
Rainbow trout	*Oncorhynchus mykiss*	Present	Widespread in all IPMA's. Eradication in progress LLKY (Parks Canada)
Red bellied pacu	*Piaractus brachypomus*	Absent	Washington, Eastern US
Red shiner	*Cyprinells lutrensis*	Absent	Central and Southern US
Rock bass	*Ambloplites rupestris*	Absent	Washington, Eastern US and Canada
Round goby	*Neogobius melanostomus*	Absent	Eastern US and Canada
Silver carp	*Hypophthalmichthys molitrix*	Absent	Eastern US
Smallmouth bass	*Micropterus dolomieu*	Absent	Lower Mainland, Vancouver Island, Okanagan, Kootenays, Southern Columbia River
Spottail shiner	*Notropis hudsonius*	Absent	Peace River, Northern BC, Montana
Trench	*Tinca tinca*	Present	Okanagan, Columbia River, CSRD (Revelstoke and Golden)
Tubenose goby	*Proterorhinus semilunaris*	Absent	Eastern US and Canada
Tui chub	*Gila bicolor*	Absent	Oregon
Walleye	*Sander vitreus*	Absent	Northern BC, Peace River, Grand Forks
Warmouth	*Lepomis gulosus*	Absent	Washington, Eastern US
Western mosquitofish	*Gambusia affinis*	Absent	Alberta, widespread through US
White cloud mountain minnow	*Tanichthys albonubes*	Absent	Eastern US only
Yellow bullhead	*Ameiurus natalis*	Absent	Washington, Lower Mainland
Yellow perch	*Perca flavescens*	Present	Pend d'Oreille, Kootenays, Okanagan, CSRD (Upper Arrow, Williamson Lake, Pinaus Lake, Little Pinaus Lake, Square Lake, Cedar Creek)
BIRDS	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
California Quail	*Callipepla californica*	Present	Vancouver Island, Lower Mainland, Okanagan, Shuswap (Salmon Arm)
Chukar partridge	*Alectoris chukar*	Absent	Okanagan, Thompson-Nicola, Vancouver Island

Eurasian collared dove	*Streptopelia decaocto*	Present	Widespread through central and southern BC, scattered populations in northern BC.
European house sparrow	*Passer domesticus*	Present	Widespread through central and southern BC, scattered populations in northern BC.
European startling	*Sturnis vulgaris*	Present	Widespread through central and southern BC, scattered populations in northern BC.
Mute swan	*Cygnus olor*	Absent	Lower Mainland, Vancouver Island
Rock pigeon	*Columba livia*	Present	Widespread through southern BC, including CSRD
Wild turkey	*Meleagris gallopavo*	Present	Vernon, Radium, Kootenays, CSRD (Golden)
AMPHIBIANS &REPTILES	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
American bullfrog	*Lithobates catesbeiana*	Absent	Creston Valley, Lower Mainland, Vancouver Island, Okanagan (populations may be eradicated). Idaho, US
Common wall lizard	*Podarcis muralis*	Present	Vancouver Island, Lower Mainland, Okanagan, Coastal Islands, Little Shuswap Lake (may have been an isolated incident)
Green frog	*Lithobates clamitans*	Absent	Vancouver Island, Lower Mainland, Coastal Islands
Red-eared slider	*Trachemys scripta*	Unknown	Vancouver Island, Lower Mainland, Okanagan, McGuire Lake (unconfirmed)
Snapping turtle	*Chelydra serpentina*	Absent	One sighting on Vancouver Island, Washington, Alberta.
Softshell turtle	*Apalone sp.*	Absent	Eastern Canada and US, Central US
Western fence lizard	*Sceloporus occidentalis*	Absent	Western US
INSECTS	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Argentine ant	*Linepithema humile*	Absent	Victoria, various US locations
Asian needle ant	*Pachycondyla chinensis*	Absent	Widespread in Eastern US, isolated incidents in Washington
Balsam woolly adelgid	*Adelges piceae*	Present	CSRD- Parks Canada will be monitoring

Brown marmorated stink bug	*Halyomorpha halys*	Present	CSRD (South of Revelstoke), widespread in Okanagan
Coddling Moth	*Cydia pomonella*	Present	CSRD (only Salmon Arm), Okanagan, Lower Mainland
Drumming katydid	*Meconema thalassinum*	Absent	Widespread through Lower Mainland
European fire ant	*Myrmica rubra*	Absent	Vancouver Island, Lower Mainland, Fraser Valley
European chafer beetle	*Rhizotrogus majalis*	Absent	Vancouver, Burnaby, and Coquitlam
European paper wasp	*Polistes dominula*	Present	CSRD (Golden confirmed), Okanagan, Lower Mainland
Garden soldier fly	*Exaireta spinigera*	Absent	Isolated incidents in Lower Mainland
Gypsy month	*Lymantria dispar*	Absent	Eastern US and Canada
Impressive fire ant	*Myrmica specioides*	Absent	Established only in Vancouver
Japanese beetle	*Popillia japonica*	Absent	Vancouver, widespread in Eastern US
Large yellow underwing	*Noctua pronuba*	Absent	Vancouver Island, Lower Mainland, isolated incidents in Okanagan
Little fire ant	*Wasmannia auropunctata*	Absent	Southern US (mainly Florida), isolated incidents Lower Mainland
Praying mantis	*Mantis religiosa*	Absent	Vancouver Island, Lower Mainland, Okanagan (to Kamloops), Kootneys
Seven-spotted ladybug	*Coccinella septempunctata*	Present	CSRD (Rogers Pass confirmed), Okanagan, Lower Mainland, Vancouver Island
Tropical stinging ant	*Hypoponera punctatissima*	Absent	Southern US, one case in Manitoba
Winter moth	*Operophtera brumata*	Present	CSRD (Revelstoke), Okanagan, Lower Mainland
Woodlouse spider	Dysdera crocata	Absent	Vancouver Island, Lower Mainland
OTHER INVERTEBRATES	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Apple snail	*Ampullariidae*	Absent	Southern and Eastern US
Asian clam	*Corbicula fluminea*	Absent	Vancouver Island, Lower Mainland, Fraser River
Chinese, Japanese and other mystery snails	*Bellamya / Cipangopaludina spp.*	Absent	Vancouver Island, Lower Mainland

Conrad's false mussel	*Mytilopsis leucophaeata*	Absent	Eastern US Coast
European black slug	*Arion ater*	Present	Widespread through CSRD (Revelstoke, Salmon Arm, Golden)
European Brown garden snail	*Cornu aspersum*	Absent	Vancouver Island, Lower Mainland
Giant garden slug/ leopard slug/ great grey slug	*Limax maximus*	Present	Columbia River Basin, Okanagan (to Vernon), Slocan Valley, Fraser Valley
Japanese mussel / Asian date mussel	*Musculista senhousia*	Absent	South Western US Coast
Land slugs	*Arion / Deroceras spp.*	Absent	BC, isolated locations
Large red slug	*Arion rufus*	Absent	Nakusp, Slocan
Larger banded snail	*Cepaea nemoralis*	Present	Most of the CSRD (Golden, Revelstoke, Sicamous)
New Zealand green-lipped mussel	*Perna spp.*	Absent	Washington and Florida
New Zealand mudsnail	*Potamopyrgus antipodarum*	Absent	Spokane and Vancouver Island
Northern quahog clam	*Mercenaria mercenaria*	Absent	Eastern US and Canada
Quagga mussel	*Dreissena rostriformis bugensis*	Absent	Montana, Manitoba, Eastern Canada and US
Red swamp crayfish	*Procambarus clarkii*	Absent	Washington and Oregon
Ringed crayfish	*Orconectes neglectus*	Absent	Oregon
Rusty crayfish	*Orconectes rustica*	Absent	Eastern US, Ontario, and localized areas Western Canada
Spanish slug	*Arion vulgaris*	Absent	Possibly Western North America
Spiny waterflea	*Bythotrephes longimanus*	Absent	Eastern Canada
Varnish clam	*Nuttalia obscurata*	Absent	Coastal BC, around Vancouver Island
Virile crayfish	*Orconectes virilis*	Absent	AB and throughout the US.
Zebra mussel	*Dreissena polymorpha*	Absent	Montana, Manitoba, Eastern Canada and US
FUNGI	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Chytrid fungus	*Batrachochytrium dendrobatidis*	Present	Creston, Glacier/Golden area, Peace River
Death cap	Amanita phalloides	Absent	Vancouver Island, Lower Mainland, Fraser Valley
White-nose syndrome	Pseudogymnoascus destructans	Absent	Washington, Eastern US

White pine blister rust	*Cronartium ribicola*	Present	Widespread- CSRD All
PARASITES	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Whirling disease	*Myxobolus cerebralis*	Absent	Bow River Watershed, Old Man watershed, North Saskatchewan below dam.
ALGAE	**Latin Name**	**Presence/ Absence in CSRD**	**Known Location(s)**
Didymo	*Didymospenia geminate*	Present	Vancouver Island, Bulkley, South Thompson, Kettle, Columbia and Kootenay Rivers.

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