Operational Plan for Terrestrial Invasive Plants in the Columbia Shuswap 2014 – 2019

Rush skeletonweed

Yellow flag-iris

Bittersweet nightshade

Blueweed

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Updated Priority Plant Lists in March 2017 by CSISS staff following Land Manager Meeting

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- Shuswap Agriculture Strategic Group
- Southern Interior Weed Management Committee
- Town of Golden
- Wildsight Golden
- Interested residents

Table of Contents

1.0 Introduction 4

1.1 Impacts of Invasive Plants 4

1.2 Columbia Shuswap invasive Species Society 5

1.3 Key Organizations and Land Managers 5

2.0 Columbia Shuswap Region 6

2.1 Salmon Arm IPMA 7

2.2 Revelstoke IPMA 7

2.3 Golden IPMA 7

3.0 Priorities for Invasive Plant Management 7

3.1 Criteria for Prioritizing Invasive Species and Management Activities 8

3.2 Priority Species 10

3.3 Planning, Prevention and Best Management Practices 16

3.4 Early Detection, Rapid Response (EDRR) Protocol 16

3.5 Inventory 17

3.6 Treatment Priorities 18

3.7 Enforcement 19

3.8 Efficacy Monitoring Recommendations 19

3.10 Record-keeping and Data Management 20

4.0 Evaluating Success 20

References 22

Appendix A: Invasive Plants Documented in Columbia Shuswap 23

Appendix B: Invasive Plant Watchlist for Columbia Shuswap 26

Appendix C: Salmon Arm IPMA Priority species 28

Appendix D: Revelstoke IPMA Priority Species List 29

Appendix E: Golden IPMA Priority Species List 30

Appendix F: Useful Resources 31

Appendix G: Maps of Containment Lines 32

1.0 Introduction

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

This plan provides direction to resource managers, community groups and private citizens on invasive plant species of highest management priority for control, inventory, and monitoring. It is a working document that has been developed through an open, collaborative process through which many organizations provided guidance and input during meetings in Salmon Arm, Revelstoke and Golden in the fall of 2013.

The scope of this plan is to determine the terrestrial and riparian invasive plant species that have the potential to impact the ecological, economic or social well-being of the region and to facilitate their prevention, reduction and management. This plan reflects local priorities for invasive plant management within a five-year time frame with the understanding that the plan will be revisited annually.

1.1 Impacts of Invasive Plants

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 plants will generally increase their distribution area exponentially, making the task of eventual control financially insurmountable.

Detrimental impacts on the agricultural, range and forest industries include harbouring insects and diseases of crops, reducing crop quality and market opportunities, and decreasing farm income and grazing opportunities. In forestry, invasive plants compete with seedlings for light, nutrients, and water, reducing forest yield. Some invasive plant species are extremely flammable and can disrupt natural fire cycles, causing an increased fuel bed load and frequency of fire.

Invasive plants impact recreational activities by damaging fish and wildlife habitat, obstructing trails and reducing aesthetics. Property values can become depressed with severe invasive plant infestations. Invasive plants affect rights-of-way and transportation corridors when their rapid establishment and growth (up to 30 cm per day for some species) decrease access to equipment and structures, reduce sightlines for drivers and animals, and increase the risk of accidents and collisions. Some species can crack concrete and cause damage to buildings and infrastructure.

Given these potential impacts, the Columbia Shuswap region has significant ecological, economic and social values at risk.

1.2 Columbia Shuswap invasive Species Society

This plan was prepared for the Columbia Shuswap Invasive Species Society (CSISS), a non-profit organization founded in April, 2013, by a group of individuals and organizational representatives who saw the need for a coordinated regional approach to the growing threat of invasive species in the Columbia Shuswap Regional District. Members of CSISS envision that:

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

The goals of CSISS are to:

- Implement a collaborative and coordinated program;
- Educate, engage and inspire residents and others to participate in invasive plant 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; and
- Ensure program sustainability.

CSISS is not a land owner 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 plants within their jurisdiction.

1.3 Key Organizations and Land Managers

With diverse land use and ownership, a collaborative and coordinated approach to invasive plant 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 plant 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 plants 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 (see Figure 1).

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 City 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 Southern Interior Weed Management Committee (SIWMC) as well as the North Okanagan Regional District (NORD). Herald, Canoe, Shuswap Lake, Yard Creek, and Cinnemousun Narrows Provincial Parks are within this IPMA. Major transportation corridors include CP Rail, Highway 1 and Highway 97A. This IPMA encompasses the dry Ponderosa Pine to the wetter Interior Cedar Hemlock biogeoclimatic zones[3] including: PPxh2, MSdm3, IDFxh1, IDFxh2, IDFmw1, IDFmw2, IDFdk2, ICHwk1, ICHvk1, ICHmw2, ICHmw3, ICHmk1, ICHmk2, ESSFwc2, ESSFwc4, ESSFvc, and ESSFdc3. Historically, this IPMA has had an active invasive plant management program delivered by the CSRD with the primary goal to protect agricultural and rangeland values (Goodkey 2009).

2.2 Revelstoke IPMA

The Revelstoke IPMA includes CSRD Electoral Area "B" as well as all of Glacier National Park and the City of Revelstoke. This IPMA borders the Central Kootenay Invasive Plant Committee (CKIPC) area to the south and the Northwest Invasive Plant Council to the north. Arrow Lakes (Shelter Bay), Blanket Creek and Martha Creek Provincial Parks are included in this IPMA along with Mount Revelstoke and Glacier National Parks. 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: ICHmw2, ICHmw3, ICHvk1, ICHwk1, ESSFrep, ESSFvc, ESSFvcp, ESSFwc1, ESSFwc4, ESSFwcp, ESSFdkw, and IMAun. The primary focus of invasive plant management in this region is the protection of natural ecosystems and forest lands. Generally, communities in this region have a cautious approach to the use of herbicides as a standard treatment method.

2.3 Golden IPMA

The Golden IPMA includes CSRD Electoral Area "A" with the exception of Glacier National Park. The Town of Golden is situated in this IPMA. This IPMA borders the East Kootenay Invasive Plant Council (EKIPC) area to the south, Northwest Invasive Plant Council to the north, and Alberta to the east. This IPMA includes Marl Creek, Burges and 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, ICHmk4, ICHvk1, MSdk2, ESSFdk2, ESSFwcp, ESSFwc2, ESSFwcw, ESSFmmp, ESSFmm1, and IMAun. The primary focus of invasive plant management in this IPMA is the protection of ecological values, agriculture and forestry, keeping the region as invasive plant-free as possible since it borders Alberta and the Regional District of East Kootenay which both have active treatment programs.

3.0 Priorities for Invasive Plant Management

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

CSISS promotes partnerships, behaviours, 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, 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.

A species-specific approach is limited in that it does not necessarily consider the entire ecosystem as a whole. Often invasive plant 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 agriculture 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 plant activities, and to consider this regional prioritization a tool to facilitate a coordinated approach.

Based on the Invasive Alien Plant Program application (IAPP)[4], there are 56 invasive plant species recorded in the Columbia Shuswap region (See Appendix A). The most common species (i.e. highest number of sites recorded in IAPP) are spotted knapweed, sulphur cinquefoil, yellow hawkweeds, common tansy, orange hawkweed, oxeye daisy and hound's tongue. Some species that are of high concern have relatively few sites, including bighead knapweed, common bugloss, field scabious, hoary cress, perennial pepperweed, policeman's helmet, puncturevine, purple loosestrife and Scotch broom.

3.1 Criteria for Prioritizing Invasive Species and Management Activities

Given limited resources for invasive plant management, it is usually necessary to prioritize activities to achieve the "biggest bang for the buck". Each invasive plant species has been prioritized for treatment in the Columbia Shuswap region based on the following factors:

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

The phase of invasion (see Figure 2) was determined by the current and potential distribution of the species in the CSRD. Before a species arrives, the *prevention phase* includes activities such as distributing a "prevention watchlist" of species of concern, preventing intentional plantings or nursery sales, cleaning vehicles, equipment and machinery of seeds and plant parts, 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*, plants are

[4] http://www.for.gov.bc.ca/hra/plants/application.htm

often too widespread or costly to control and restoration activities are focused on small, high-priority sites.

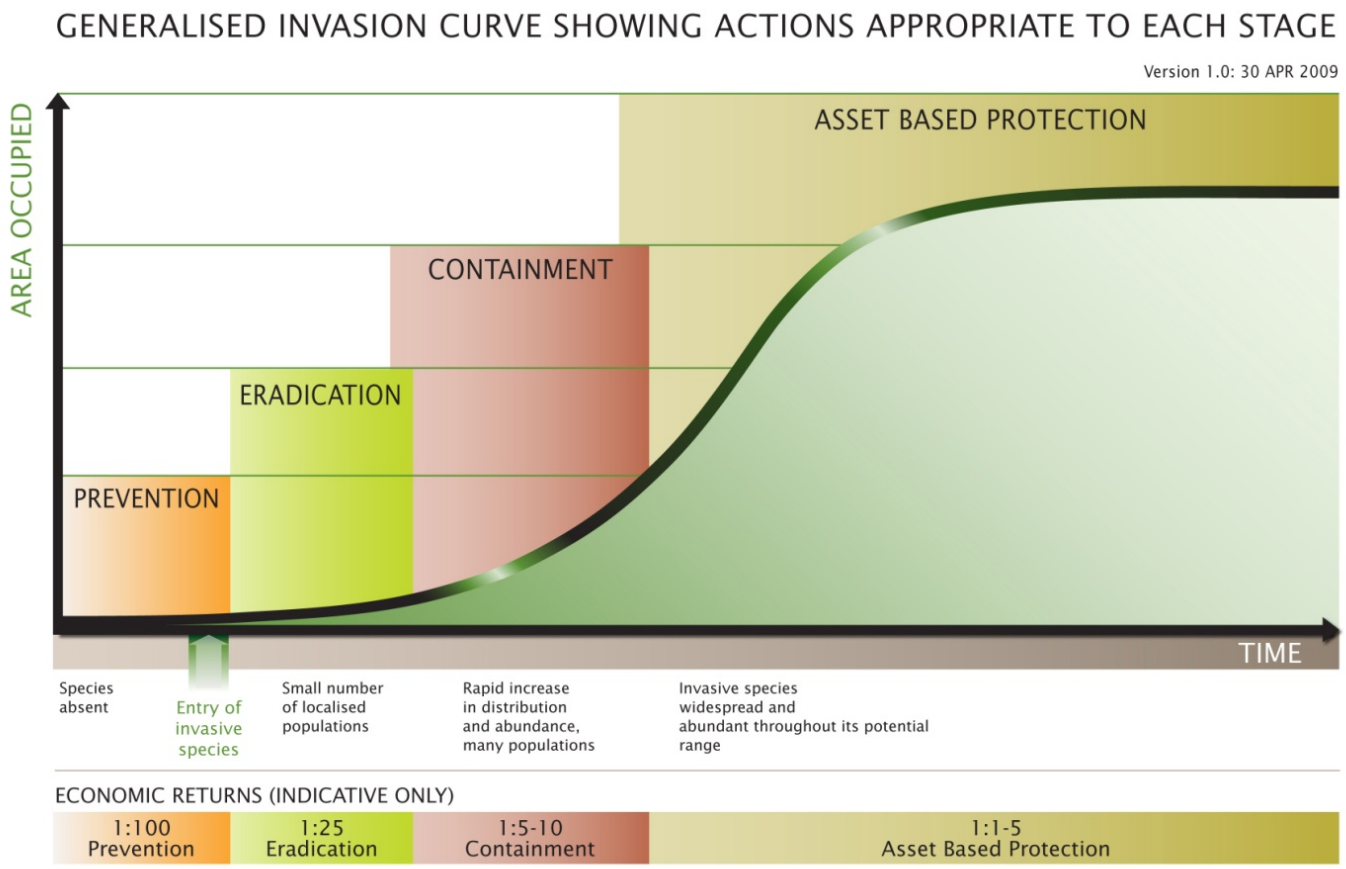

FIGURE 2: DIAGRAM SHOWING MANAGEMENT STRATEGIES MOST USEFUL DURING EACH PHASE OF THE INVASION PROCESS[5].

Plant species distribution information was obtained from the Invasive Alien Plant Program Application, local input from stakeholder meetings in the fall of 2013, professional knowledge, and relevant documents (e.g. Craig 2013; EKIPC 2011; Fox 2013; Goodkey 2009; Hill 2013; Lassen 2013).

[5] 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 Priority Species

The species priority list (see Table 4) is based on our best knowledge of these species and their impacts in the Columbia Shuswap. Plants were categorized into the following five categories (see Table 1). Species lists by IPMA are included in Appendices C, D and E. Priority species lists were updated in March 2017 following a Land Manager Meeting. There is also an internal CSISS list of chosen 'unlisted species' that are common, widespread and do not fit the definitions for priority ranking.

TABLE 1: DEFINITION OF PRIORITY RANKING CATEGORIES FOR INVASIVE PLANT SPECIES- REVISED MARCH 2018

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 FLNRO; FLNRO 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) in this IPMA. 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 2: B.C. PROPOSED PROHIBITED NOXIOUS WEED LIST

The purpose of this category is to separate regional EDRR species and provincial EDRR watchlist species to ensure that the provincial Ministry specialists are notified and EDRR provincial protocols are followed.

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
Foxtail, slender / meadow (ALOP MYO)*	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, 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 soldier (STRA ALO)*	1+	ALL IPMA's

For online version of B.C. Proposed Prohibited Noxious Weeds, visit: https://www.for.gov.bc.ca/hra/invasive-species/Proposed_Prohibited_Noxious_Weeds_Apr2016.pdf

TABLE 3: INVASIVE PLANT WATCHLIST FOR COLUMBIA SHUSWAP – Revised March 2018

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
Flowering rush* (BUTO UMB)	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 SPECIES FOR THE COLUMBIA SHUSWAP – Revised March 2018

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 PLANT SPECIES IN THE COLUMBIA SHUSWAP BY IPMA – REVISED MARCH 2018

Species	Bio-control?	Relevant legislation[1]	Salmon Arm IPMA	Revelstoke IPMA	Golden IPMA
Annual sow thistle (SONC OLE)			4	4	4
Baby's breath (GYPS PAN)		CCA, FRPA	1	1	2
Bachelor's button (CENT CYA)			5	5	5
Bighead knapweed (CENT MAC)			1	1	1
Black knapweed (CENT NIG)		FRPA	2	2	1
Black locust (ROBI PSE)			5	5	5
Blueweed (ECHI VUL)		WCA, FRPA	2	2	2
Brown Knapweed (CENT JAC)			5	5	5
Bohemian knotweed (FALL BOH)		WCA, CCA, FRPA	2	2	1
Buffalobur (SOLA ROS)			1	1	1
Bull thistle (CIRS VUL)	Y	CCA, FRPA	4	4	4
Bur chervil (ANTH CAU)			1	1	1
Burdock (ARCT SPP)		WCA, FRPA	4	4	4
Canada thistle (CIRS ARV)	Y	WCA, CCA, FRPA	4	4	4
Caraway (CARU CAR)			1	1	1
Chicory (CICH INT)			4	4	4
Colt's Foot (TUS FAR)			1	1	1
Common bugloss (ANCH OFF)		FRPA	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) - Goutweed (AEGO POD) - Japanese butterbur (PETA JAP) - Mountain bluet (CENT MON) - Russian olive (ELAE ANG) - Salt cedar/ Tamarisk (TAMA RAM) - Siberian elm (ULMU PUM)			3	3	3
Creeping buttercup (RANU REP)			5	5	5
Curled dock (RUME CRI)			4	4	4
Cypress spurge (EUPH CYP)			2	1	2
Dalmatian toadflax (LINA DAL)	Y	WCA, CCA, FRPA	4	4	4
Dame's rocket (HESP MAT)			5	5	5

Diffuse knapweed (CENT DIFF)	Y	WCA, CCA, FRPA	4	4	2
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
Flowering rush (BUTO UMB)			1	1	1
Fragrant water lily (NYMP ODO)			2	1	1
Garlic mustard (ALLI PET)			1	1	1
Giant hogweed (HERA MAN)			1	1	1
Giant knotweed (FALL SAC)		WCA, CCA, FRPA	1	1	1
Gorse (ULEX EUR)			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)		CCA	2	2	5
Himalayan knotweed (POLY POL)		WCA, CCA, FRPA	1	1	1
Hoary alyssum (BERT INC)		FRPA	4	2	1
Hoary cress (CARD DRA)		WCA, FRPA	1	1	1
Hound's tongue (CYNO OFF)	Y	WCA, CCA, FRPA	4	4	4
Japanese knotweed (FALL JAP)		WCA, CCA, FRPA	2	2	1
Knapweed species (CENT SPP)	Y/ limited		4	4	2
Kochia (KOCH SCO)			1	1	1
Lady's thumb (POLY PER)			5	5	5
Leafy spurge (EUPH ESU)	Y	WCA, CCA, FRPA	2	2	1
Longspine sandbur (CENC LON)			1	1	1
Marsh plume thistle (CIRS PALU)		FRPA	2	2	1
Meadow/ tall buttercup (RANU ACR)			4	4	5
Meadow goat's beard (TRAG PRA)			4	4	1
Meadow knapweed (CENT DEB)		WCA, FRPA	2	2	1
Night-flowering catchfly (SILE NOC)			5	5	5
Nightshade (SOLA SPP)			4	5	5
Nodding thistle (CARD NUT)			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	4	4	4
Plumeless thistle (CARD ACA)			1	1	1
Poison hemlock (CONI MAC)			4	5	5
Policeman's helmet (IMPA GLA)		CCA	2	2	2
Puncturevine (TRIB TER)		FRPA	1	1	1
Purple loosestrife (LYNT SAL)	Y	WCA, CCA, FRPA	2	2	1
Queen anne's lace / wild carrot (DAUC CAR)			4	5	5
Rush skeletonweed (CHON JUN)	Y	WCA, CCA, FRPA	2	1	1
Russian knapweed (ACRO REP)		FRPA	5	1	1
Russian Thistle (Sals kal)			1	1	1
Scentless chamomile (MATR PER)	Y	WCA, CCA, FRPA	5	5	2
Scotch broom (CYTI SCO)		CCA, FRPA	1	1	1
Scotch thistle (ONOP ACA)		FRPA	2	1	1
Short-fringed knapweed (CENT NIR)			2	2	1
Sow thistle spp (SONC SPP)			4	4	4
Spotted knapweed (CENT BIE)	Y	WCA, CCA, FRPA	4	4	2
St. John's wort (HYPE PER)	Y	CCA, FRPA	4	4	5
Sulphur cinquefoil (POTE REC)		WCA. FRPA	4	4	5
Tansy Ragwort			1	1	1
Teasel (DIPS FUL)		FRPA	2	1	1
Western Goat's Beard (TRAG DUB)			4	4	4
Wild chervil (ANTH SYL)			2	2	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, CCA, 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)		WCA, CCA, FRPA	4	4	4

[1] WCA= Weed Control Act; CCA=Community Charter Act; FRPA=Forest and Range Practices Act

3.3 Planning, Prevention and Best Management Practices

There are a number of factors to consider when planning invasive plant management programs. They 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 species can be achieved through best management practices 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 prevention of establishment and spread of invasive plants and promoting best practices. For example, outreach activities can prevent invasive horticultural species from being planted, provide the tools for a farmer to develop an invasive plant management plan, or promote invasive plant 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 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 *in progress*).

3.4 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 B. Species categorized as EDRR WATCHLIST are not currently known in this IPMA (Table 2). Detection of these species should be reported to CSISS within 48 hours. CSISS and other agencies promote the 'Report-A-Weed' app for online invasive plant reporting. EDRR steps include:

1. Spotter **report**s the sighting to CSISS within 48 hours. CSISS immediately reports sightings of provincial EDRR species to the Provincial Invasive Plant Specialist.
2. CSISS representative visits the site to **confirm** the identification of the species, record GPS coordinates, take photos, and collect a voucher. If the species cannot be identified, voucher specimens and photos will be submitted to the Provincial EDRR specialist for confirmation. Information will also be shared with the Provincial Invasive Plant 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 IP Specialist.
4. CSISS will enter the site into **IAPP**.
5. If the species is new to BC, the Provincial Invasive Plant Specialist will **trigger the Provincial EDRR Response Plan** (BC IMISWG 2010). CSISS will remain coordinated with the response action.
6. If the species is considered EDRR for the IPMA but not for BC, **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, all **root and seed material will be bagged immediately** until **further treatments** can be conducted.
7. CSISS Coordinator will **issue an Alert** on the species for the IPMA through the CSISS network.

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

Regional Early Detection Rapid Response WATCHLIST Species
Report to CSISS within 48 hours at:
info@columbiashuswapinvasives.org
1-855-785-9333

3.5 Inventory

Inventories and surveys[6] provide fundamental information for assessing and prioritizing invasive plant 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. CSISS promotes the use of standardized 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 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 invasive plant committee areas are high priority for annual surveys to detect new invasive species. The following areas are a priority in the Columbia Shuswap:

[6] In this plan, inventory and survey are used interchangeably. Technically, "*…an inventory is a cataloguing of all invasive plants 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)

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

Other priority sites for inventory are:

- Gravel pits
- Rail lines, utility rights-of-way, and other corridors of spread

3.6 Treatment Priorities

Treatment priority is based on the category of the invasive species (see Table 1) as well as the specific land management objectives. The goal of treatment is to reduce impacts and/or prevent spread.

Priority 1: All species under ERADICATION/ANNUAL CONTROL: These plant species/sites should be treated or visited every year. New occurrences of these species should be reported to CSISS immediately and entered into IAPP.

Priority 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 Appendix G for maps of containment lines.

Priority 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 timing

CSISS's 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, CSISSs 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.

Treatment Considerations

There are many potential treatment methods including chemical, mechanical, cultural and biological control. 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;
- Stage of invasive plant life cycle (rosette vs. seed-set);
- Current and proposed land use;
- Proximity to primary biocontrol release sites[7];
- 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);
- Species at risk in area[8]; and
- Wells and water-bodies in area.

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

3.7 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 (Goodkey 2009):

1) The infestation(s) of established weeds spreading onto, or adjacent to and threatening to spread onto, agricultural land or rangeland
2) The infestation 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 weeds on their own land and are concerned about their future spread
4) The weed is toxic to livestock or otherwise detrimental to the agricultural or rangeland values.

3.8 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

[7] Contact Catherine MacRae (MFLRNO)

[8] Contact Conservation Data Centre (CDC) and Ted Antifeau (MFLRNO)

[9] http://www.for.gov.bc.ca/hra/plants/application.htm

standardized forms for monitoring chemical, mechanical and biocontrol treatment efficacy[9]. 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 and Natural Resource Operations 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.
- Use IAPP Monitoring Forms.
- Enter monitoring information into IAPP.

3.10 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[10] 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 1):

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 committees, 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 list (Table 2).
2. Measure success of eradication and containment efforts annually.
3. Evaluate education and outreach activities annually.

[10] http://www.for.gov.bc.ca/hra/plants/application.htm

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 update priorities and coordinate activities.

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APPENDIX A: INVASIVE PLANTS DOCUMENTED IN COLUMBIA SHUSWAP

Invasive plants documented (in IAPP) in the Columbia Shuswap region, based on extract from September, 2013 and partner knowledge at meetings in 2013. Note that in many cases, the area (ha) represents the area surveyed and not necessarily the area of infestation of the species. Please contact CSISS for updated invasive plant information.

Species	# Sites	# Ha	Comments
Baby's breath (*Gypsophila paniculata*)	8	2.09	Imler Rd., 9th St. South, Golden area, Crossroads of Hwy 95 and Ben Hynes loop; Golden at Kicking Horse River (11th Ave N)
Bighead knapweed (*Centaurea macrocephala*)	2	.002	City of Salmon Arm and Blind Bay (20 km W of Salmon Arm)
Bittersweet nightshade (*Solanum dulcamara*)	1	1.0	(Under nightshade spp.)
Black knapweed (*Centaurea nigra*)			Not in IAPP. Mount Revelstoke – Glacier National Park.
Bladder campion (*Silene vulgaris*)	16	13.4	Scattered throughout region, including Mount Revelstoke – Glacier National Park.
Blueweed (*Echium vulgare*)	34	5.73	Sites near Salmon Arm. In Revelstoke at Illecillewaet Greenbelt near Downie mill access. Golden. Donald?
Brown knapweed (*Centaurea jacea*)	3	.52	
Bull thistle (*Cirsium vulgare*)	125	762	Scattered through region, including Mount Revelstoke - Glacier National Park – moderate. Harvested openings in Revelstoke and Golden (moderate).
Bur chervil (*Anthriscus caucalis*)	1	.0000	
Burdock (*Arctium minus*)	109	84.5	Scattered throughout region? Revelstoke greenbelt and industrial park area. Rotary trails and industrial properties in Golden.
Canada thistle (*Cirsium arvense*)	116	154	
Caraway (*Carum carvi*)	1	.0002	Watch for this species on railways. One site listed at Birch Crescent in Golden.
Chicory (*Cichorium intybus*)	18	5.58	Railyard in Revelstoke, Mount Revelstoke - Glacier National Park, Salmon Arm.
Common bugloss (*Anchusa officinalis*)	1	?	1 site near Golden on private property. Possibly near Golden visitor's centre.
Common comfrey (*Symphytum officinale*)	1	.0025	In gardens in Golden.
Common tansy (*Tanacetum vulgare*)	426	821.3	Widespread in valley bottoms. Contain from spreading into FSRs. Transcanada in Mount Revelstoke - Glacier National Park, Salmon Arm and area. Through Yoho
Curled dock (*Rumex crispus*)	3	.052	Throughout region? Likely in Mount Revelstoke – Glacier National Park.
Cypress spurge (*Euphorbia cyparissias*)	3	.15	Check ID. Is this leafy spurge? Sites are: Malakwa (Malakwa. Rail line r.o.w.), Salmon Arm (Tranns-Can. Hwy 100m north of 63rd Ave NE) and Big Bend hwy, 100 m west of junction with Donald rd. Next to driveway of heli ski.
Dalmatian toadflax (*Linaria dalmatica*)	61	122.1	Small site on Whatshan reservoir (on BC Hydro workplan).
Diffuse knapweed (*Centaurea diffusa*)	158	2,052	Mount Revelstoke, - Glacier National Park (high). Revelstoke (high). Along Kicking Horse river in Golden (weed pulls). Highway 1.
Downy brome (*Bromus tectorum*)			

Species	# Sites	# Ha	Comments
Eyebright (*Euphrasia nemorosa*)	3	.065	Widespread.
Field bindweed (*Convolvulus arvensis*)			CPR Boulevard in Golden
Field scabious (*Knautia arvense*)	3	.0137	Few sites near Malakwa – suspect more – need inventory in the area.
Flat peavine			On watchlist. Check Revelstoke gravel pits.
Groundsel (Senecio vulgaris)	1	.0001	
Hairy cat's ear (*Hypochaeris radicata*)	3	.5004	Abundant around Revelstoke. Requires further inventory.
Hawkweed spp. (*Hieracium* spp.)	254	88.2	Throughout region? Mount Revelstoke - Glacier National Park (moderate). Revelstoke GS, MCA Gs and townsite.
Himalayan blackberry (*Rubus discolor*)	2	.0034	Revelstoke along Track St.
Hoary alyssum (*Berteroa incana*)	132	12.98	
Hoary cress (*Cardaria draba*)	1	.2	City of Salmon Arm, Mara near farms (low). ?
Hound's tongue (*Cynoglossum officinale*)	220	2,580	
Knapweed spp. (*Centaurea* spp.)	161	1145	Throughout region? Mount Revelstoke - Glacier National Park (highway), Canyon ridge (Golden), Linear occurrences on trails, dikes, and roads in Revelstoke.
Knotweeds (*Fallopia* spp.)			Japanese knotweed (23; 1.59 ha), Bohemian (2; .004 ha). Malakwa, Craigellachie, Mica, Many local yards and public lands in Revelstoke.
Lady's thumb (*Polygonum persicaria*)	1	.0001	
Leafy spurge (*Euphorbia esula*)	15	2.67	1 site north of Revelstoke at Martha Creek Park, 1 site somewhere near Revelstoke, 1 site at snowmobile unloading spot near Salmon Arm, 2 sites in Mount Revelstoke - Glacier National Park (high). Widespread and abundant, recent arrival, distributed in Arrow Reservoir influence areas.
Marsh plume thistle (*Cirsium palustre*)	13	.25	Handful of sites up Crazy Creek off the trans-Canada west of Revelstoke and apparently 1 site somewhere in Revelstoke Ntl Park (high)
Meadow/brown knapweed (*Centaurea x moncktonii*)	19	2.6	Few sites near Malakwa – suspect more – need inventory in the area
Meadow goat's beard (*Tragopogon pratensis*)	3	.0034	Revelstoke generating station.
Meadow knapweed (*Centaurea debeauxii*)	23	2.67	
Mouse-ear hawkweed (*Pilosella officinarum*)			Two reported sites. Need follow-up to verify identification at Illicillawaet camp and an island in Shuswap Lake.
Mullein (*Verbascum thapsis*)	10	8.3	Scattered throughout region? Revelstoke. Small localized occurrences in Revelstoke and Golden.
Orange hawkweed (*Hieracium aurantiacum*)	307	56.7	Contain from spreading into the Beaverfoot FSR. Golden (moderate), Lower Golden. Mount Revelstoke and Glacier National Park (high). Meadows in the Sky parkway, TransCanada, Salmon Arm.
Oxeye daisy (*Leucanthemum vulgare*)	285	101.2	Scattered throughout region? Mount Revelstoke - Glacier National Park, Revelstoke generating station, harvested openings in Revelstoke FSR and Golden (moderate).

Species	# Sites	# Ha	Comments
Perennial pepperweed (*Lepidium latifolium*)			Error in IAPP Database (shows as Big Mouth FSR)
Perennial sow thistle (*Sonchus arvensis*)	2	1.01	Mount Revelstoke - Glacier National Park (high)
Policeman's helmet (Himalayan Orchid) (*Impatiens glandulifera*)	9	.312	City of Salmon Arm, Blind Bay (W. of Salmon Arm), 110 FSR (E. of Salmon Arm), Eastern access Revelstoke gardends throughout Revelstoke .Gardens in Golden.
Puncturevine (*Tribulus terrestris*)	1	.01	Deep Creek Road – DATA ERROR?
Purple loosestrife (*Lythrum salicaria*)	4	.022	W. of Salmon Arm on Hwy 1, Eagle Ba (CSRD Area C), Near little Shuswap Lake, Lund Pond Park in N. Canoe area, Mount Revelstoke - Glacier National Park
Rush skeletonweed (*Chondrilla juncea*)	33	.88	
Russian knapweed (*Acroptilon repens*)	5	19.03	South of Salmon Arm
Scentless chamomile (*Matricaria perforata*)	5	.03	City of Salmon Arm, Golden sewage treatment plant, Mount Revelstoke National Park transCanada.
Scotch broom (*Cytisus scoparius*)	3	.03	Shelter Bay ferry (south of Revelstoke), Mabel Lake (Enderby)
Scotch thistle (*Onopordum acanthium*)	6	.22	Adjacent to Skimikin dump, East of Falkland, McTavish Road, Yankee Flats, Revelstoke Golf Course
Spotted knapweed (*Centaurea biebersteinii*)	877	3,433	Mount Revelstoke - Glacier National Park (high), Golden (high), Illecillewaet Greenbelt (high)
Squarrose knapweed (*Centaurea virgata*)	1	.1	20 km N. of Parson
St. John's Wort (*Hypericum perforatum*)	49	37.5	Mount Revelstoke - Glacier National Park
Sulphur cinquefoil (*Potentilla recta*)	639	1,289	Mount Revelstoke - Glacier National Park (high), localized in Revelstoke
Tall buttercup (*Ranunculus acris*)			Not in IAPP
Teasel (*Dipsacus fullonum*)	4	.1	Turtle Valley Rd., TCH E. of Rogers Pass, Sunnybrae Canoe point road, Notch Hill Rd. (Balmoral), Hwy 1 NW of Salmon Arm
White cockle (*Silene alba*)	1	1	
Wormwood (Absinth) (*Artemesia absinthium*)	1	.04	N. of Golden (junction of Hwy 1 and Donald Rd.)
Yellow hawkweeds[11] (*Hieracium* spp.)	342	217.3	Mount Revelstoke - Glacier National Park (any roadside), many areas of private and public land in Revelstoke.
Yellow flag-iris (*Iris pseudacorus*)	8	1.22	Mallory Rd. (Enderby?), Gardom Lake Park rec rite (Salmon Arm), Malakwa, Turner Creek Trail (Salmon Arm) and Deep Creek Road, White Lake.
Yellow/common toadflax (*Linaria vulgaris*)	61	5.04	Mount Revelstoke - Glacier National Park (moderate)

[11] King devil (15; 2.45 ha); meadow (24; 2.56 ha); polar (1; 3.9 ha); queen devil (52; 12.92 ha); tall (10; 33.6 ha); whiplash (22; 38.4 ha); yellow devil (10; .88 ha); yellow (208; 35.5)

APPENDIX B: INVASIVE PLANT WATCHLIST FOR COLUMBIA SHUSWAP

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
Foxtail, slender / meadow (ALOP MYO)*	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, 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 soldier (STRA ALO)*	1+	ALL IPMA's

For online version of B.C. Proposed Prohibited Noxious Weeds, visit: https://www.for.gov.bc.ca/hra/invasive-species/Proposed_Prohibited_Noxious_Weeds_Apr2016.pdf

INVASIVE PLANT WATCHLIST FOR COLUMBIA SHUSWAP - REVISED MARCH 2018

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
Flowering rush* (BUTO UMB)	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

UNLISTED LOWER PRIORITY SPECIES FOR THE COLUMBIA SHUSWAP – REVISED MARCH 2018

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

APPENDIX C: SALMON ARM IPMA PRIORITY SPECIES – REVISED MARCH 2018

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)** in this IPMA. Regional EDRR species do not include Provincial Prohibited Species.		
- **Baby's breath** - **Bighead knapweed** - Buffalobur* - Bur chervil* - Caraway - Colt's foot* - Common bugloss - Flowering rush* - Garlic mustard*	- **Giant hogweed** - Giant knotweed - Gorse* - Greater knapweed* - Himalayan knotweed* - Hoary Cress - Kochia* - Longspine sandbur*	- Nodding thistle* - Plumeless thistle* - Puncturevine* - Russian Thistle* - **Scotch broom** - Tansy Ragwort* - Wild Four O'Clock* - 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 next section) - Black knapweed - Blueweed - Bohemian knotweed - Cypress spurge - Field scabious	- Fragrant water lily - Himalayan blackberry - Japanese knotweed - Leafy spurge (BC) - Marsh plum thistle - Meadow knapweed - Policeman's helmet - Purple loosestrife (BC)	- Rush skeletonweed (BC) - Scotch thistle - Short-fringed knapweed - Teasel - Wild chervil - Yellow archangel/ lamium - 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 - Goutweed	**Contain to gardens Cont'd:** - Japanese butterbur - Mountain bluet - Russian olive - Salt cedar/ Tamarisk - Siberian elm	**Contain to west portion of IPMA (treat Seymour Arm and east portion of IPMA):** - Common tansy
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/ Tall buttercup - Meadow goat's beard - Nightshade - Orange hawkweed - Oxeye daisy - Perennial sow thistle - Poison hemlock	- 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/common toadflax
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 - 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 (BC)

APPENDIX D: REVELSTOKE IPMA PRIORITY SPECIES LIST – REVISED MARCH 2018

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)** in this IPMA. Regional EDRR species do not include Provincial Prohibited Species.		
- **Baby's breath** - **Bighead knapweed** - Buffalobur* - Bur chervil* - **Caraway** - Colt's foot* - Common bugloss - Cypress spurge - Field scabious - Flowering rush* - Fragrant water lily	- Garlic mustard* - Giant hogweed - **Giant knotweed** - Gorse* - Greater knapweed* - Himalayan knotweed* - Hoary cress - Kochia* - Longspine sandbur* - Nodding thistle* - Plumeless thistle*	- Puncturevine* - Rush skeletonweed - Russian knapweed - Russian Thistle* - Scotch broom - Scotch thistle - Tansy ragwort* - Teasel - Wild Four O'Clock* - Wood sage* - 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 next section) - Black knapweed - Blueweed - Bohemian knotweed	- Himalayan blackberry - Hoary alyssum - Japanese knotweed - Leafy spurge (BC) - Marsh plume thistle - Meadow knapweed	- Policeman's helmet - Purple loosestrife (BC) - Short-fringed knapweed - Wild chervil - Yellow archangel/ lamium
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 - Goutweed	**Contain to gardens Cont'd:** - Japanese butterbur - Mountain bluet - Russian olive - Salt cedar/ Tamarisk - Siberian elm	**Contain to southern portion of IPMA:** - Common tansy
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. - Hound's tongue (BC) - Knapweed spp. (BC) - Meadow/ Tall buttercup - Meadow goat's beard - Orange hawkweed - Oxeye daisy - Perennial sow thistle	- Sow thistle spp - Spotted knapweed (BC) - St. John's Wort (BC) - Sulphur cinquefoil - Western goat's beard - Wormwood - Yellow hawkweeds - Yellow/common toadflax
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 - Dame's rocket - Eyebright	- Field bindweed - Flat peavine - Greater celandine - Green foxtail - Hairy cat's ear - Lady's thumb	- Night-flowering catchfly - Nightshade - Poison hemlock - Queen Anne's Lace - Scentless chamomile (BC)

APPENDIX E: GOLDEN IPMA PRIORITY SPECIES LIST - REVISED MARCH 2018

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)** in this IPMA. Regional EDRR species do not include Provincial Prohibited Species.		
- **Bighead knapweed** - Black knapweed - **Bohemian knotweed** - Buffalobur* - Bur chervil* - Caraway - Colt's foot* - **Common bugloss** - Field scabious - Flowering rush***** - Fragrant water lily - Garlic mustard* - Giant hogweed - **Giant knotweed** - Gorse*	- Greater knapweed* - Himalayan knotweed* - **Hoary alyssum** - **Hoary cress** - Japanese knotweed - Kochia* - **Leafy spurge** - Longspine sandbur* - Marsh plume thistle - Meadow goat's beard - **Meadow knapweed** - Nodding thistle* - Plumeless thistle* - Puncturevine*	- **Purple loosestrife** - Rush skeletonweed - Russian knapweed - Russian Thistle* - Scotch broom - Scotch thistle - **Short fringed knapweed** - Tansy ragwort* - **Teasel** - Wild chervil - Wild Four O'Clock* - Wood sage* - Yellow archangel/ lamium - 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 next section) - Baby's breath	- Blueweed - Common Tansy - Cypress spurge - Diffuse knapweed (BC)	- Knapweed spp. - Policeman's helmet - Scentless chamomile (BC) - Spotted 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: - Butterfly bush - Common periwinkle - English holly	- English ivy - 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) - Oxeye daisy - Perennial sow thistle	- Sow thistle spp - Western goat's beard - Wormwood - Yellow hawkweeds - Yellow/common toadflax
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 - Dame's rocket - Eyebright - Field bindweed	- Flat peavine - Greater celandine - Green foxtail - Hairy cat's ear - Himalayan blackberry - Lady's thumb - Meadow/Tall Buttercup	- Night-flowering catchfly - Nightshade - Orange hawkweed - Poison hemlock - Queen Anne's Lace - St. John's Wort (BC) - Sulphur cinquefoil

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

- Grow Me Instead booklet on alternative horticultural species
- Best Management Practices for Roadside booklet
- Best Management Practices for Parks and Protected Areas booklet
- http://www.bcinvasives.ca/resources/outreach-materials/booklets-brochures-and-presentations

WeedsBC

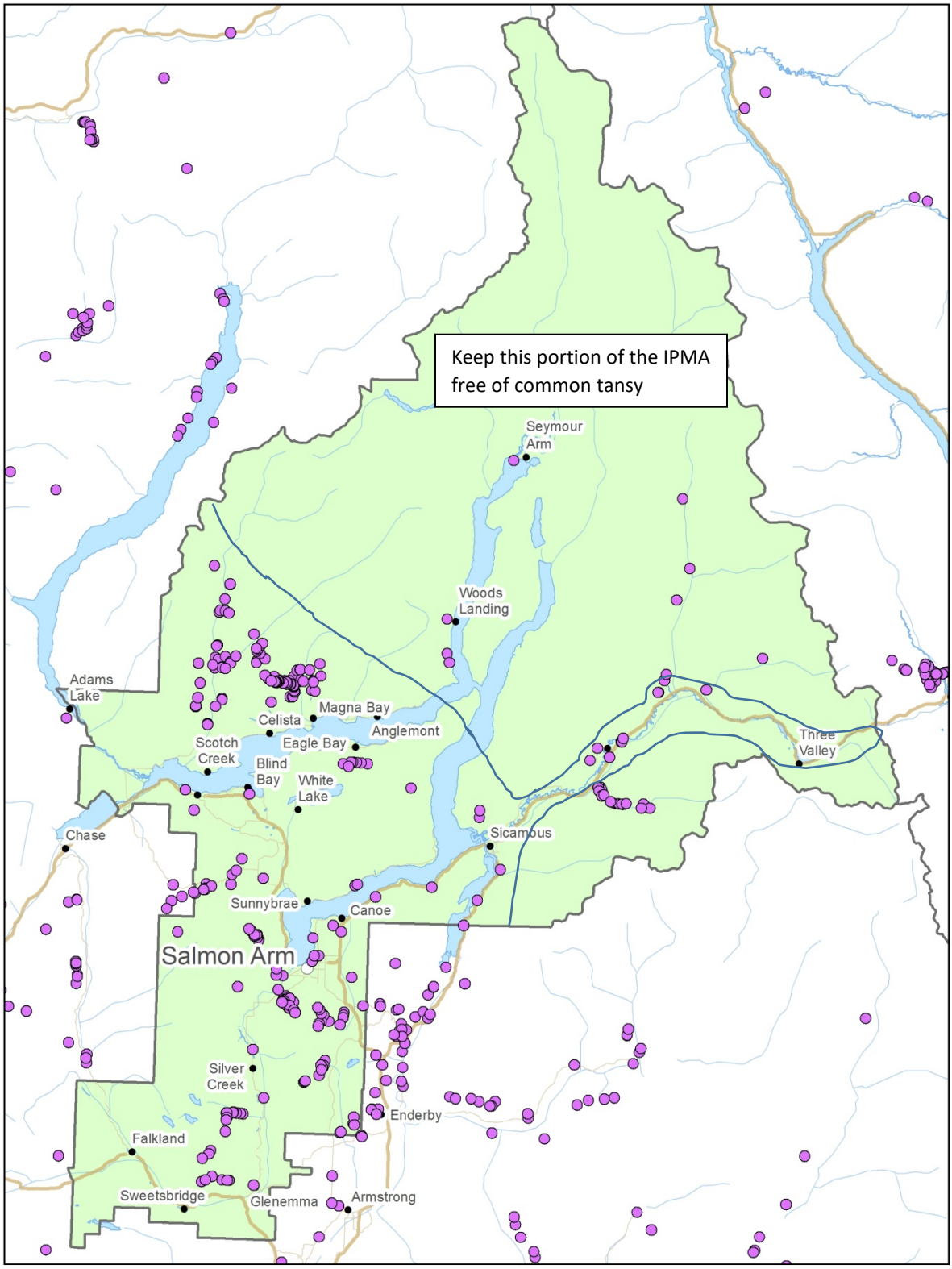
- Information on over 80 invasive plant species including identification and control techniques.
- http://www.weedsbc.ca/

Invasive Alien Plant Program Application

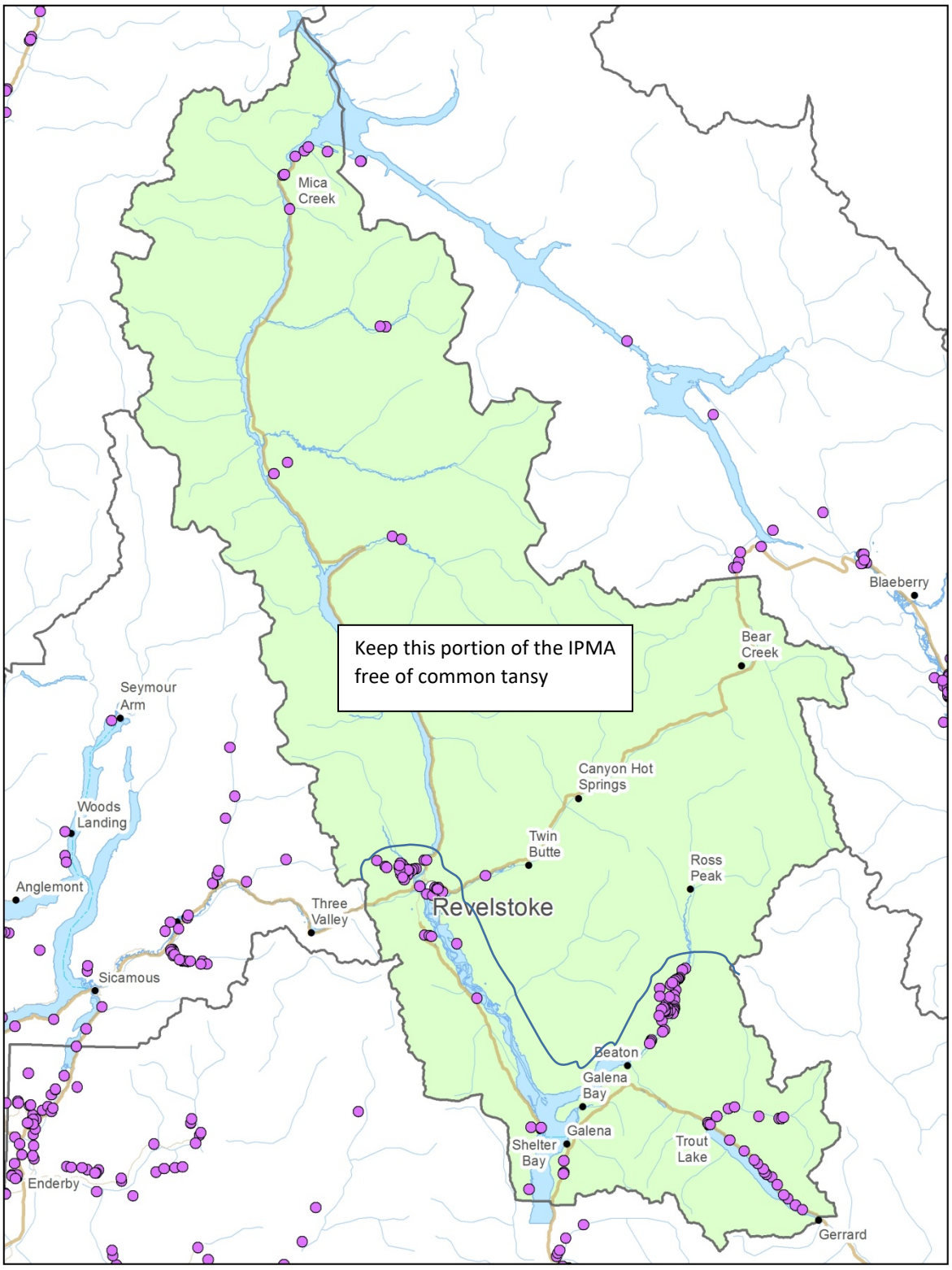
- Database that includes invasive plant inventory, treatment and monitoring information, map display, and training modules for standardized operations
- http://www.for.gov.bc.ca/hra/plants/application.htm

Invasive 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



Containment line for **common tansy in the Salmon Arm IPMA**. Contain to west of Sicamous as well as to Hwy 1 from Sicamous to Clanwilliam.



Containment line for **common tansy in the Revelstoke IPMA.** Contain to southern portion of IPMA.