

May 2015

# CANADIAN COLUMBIA BASIN REGIONAL FRAMEWORK FOR AN AQUATIC INVASIVE SPECIES PROGRAM



*Revised December 2021*  
Columbia Basin Aquatic Invasive Species Steering Committee

## ACKNOWLEDGEMENTS

This Aquatic Invasive Species program framework is the result of a collaborative effort between many different partners. This document was originally written by Juliet Craig, Silverwing Ecological Consulting, in May 2015 with funding provided by Columbia Basin Trust and direction provided by an interim Steering Committee (Appendix A). This living document is updated annually through the Columbia Basin Aquatic Invasive Species Steering Committee.

Special thanks to the 2021 Columbia Basin Aquatic Invasive Species Steering Committee:

- Adam Croxall, BC Hydro and Fish and Wildlife Compensation Program
- Martina Beck, B.C. Ministry of Environment and Climate Change Strategy
- Georgia Peck, Columbia Basin Watershed Network
- Wendy Horan, Michael Hounjet, and Krista Watts, Columbia Power and Columbia Basin Trust
- Hamish Kassa, Columbia Shuswap Regional District
- James Baxter and Serina Swanson, FortisBC
- Nic Zurfluh, Idaho State Department of Agriculture
- Kenton Andreashuk, Ktunaxa Nation Council
- Paige Thurston, Living Lakes Canada
- Val Miller, Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Kate Wilson, Montana Department of Natural Resources and Conservation
- Michael Zimmer, Courtenay Heetebrij, and Evan Smith, Okanagan Nation Alliance
- Jeanette Goulet, Parks Canada
- Richard Visser and Jesse Schultz, Washington Department of Fish and Wildlife
- Justin Bush, Washington Invasive Species Council
- Invasive Species Council of BC
- Northwest Invasive Plant Council
- East Kootenay Invasive Species Council
- Columbia Shuswap Invasive Species Society
- Central Kootenay Invasive Species Society

We are extremely grateful to the program funders.



Cover photo credit: US Fish and Wildlife Service (Zebra mussels); Juliet Craig (Yellow flag iris); Jarek Tuszynski, Wikipedia (American bullfrog); A. Fox, U. of Florida, Bugwood (Eurasian water-milfoil)

## EXECUTIVE SUMMARY

Aquatic invasive species are non-indigenous species that impact, or have the potential to impact, the ecology, economy, and social opportunities of the Columbia Basin. In recognition of these concerns, the Columbia Basin Trust and the four regional invasive species organizations operating in this region (Central Kootenay Invasive Species Society, East Kootenay Invasive Species Council, Columbia Shuswap Invasive Species Society, and Northwest Invasive Plant Council) are developing or expanding their current aquatic invasive species programs. The purpose of this document is to provide a framework for regional invasive species organizations and their partners to promote a proactive, strategic, collaborative, and coordinated approach to aquatic invasive species prevention and management. The primary focus of this program is to prevent the introduction and establishment of aquatic invasive species (such as zebra and quagga mussels) as well as to enhance coordination, response, and management of other priority aquatic invasive species. This program applies to the Canadian Columbia Basin in south-eastern British Columbia where waterbodies drain into the Columbia River prior to it flowing into the United States.

Since many species are introduced and spread in the same ways, addressing the pathways and vectors, rather than focusing on species, is an effective approach. This program framework sets out two key strategies for addressing this pathway: boat decontamination and public outreach. Prevention is aimed at outreach for human-assisted pathways of introduction and spread, including recreational water activities (e.g. boating, angling, diving), horticultural and water garden trade, pet and aquarium trade, intentional illegal fishing introductions, and marine works and water-based restoration activities. Prevention also includes increased efforts toward watercraft inspection and decontamination since one of the highest risk pathways of introduction, particularly for zebra and quagga mussels, is by contaminated watercraft.

Focal aquatic invasive species have been identified for this program based on pathways of introduction, probability of establishment, current distribution, and potential impacts. The management approach for each group of species has been outlined depending on the role of the provincial government (i.e. some species are provincial Early Detection Rapid Response species), the scope and expertise of regional invasive species organizations (e.g. currently invasive species organizations do not have invasive fish expertise), and the feasibility of management actions given available tools.

The program framework is designed to reflect shared goals and priorities and to facilitate a coordinated approach and may be undertaken by regional invasive species organizations and partner organizations. The timeline, organization(s) responsible, and details for each task will be identified in regional invasive species organization's annual work plans. Local and regional stewardship groups and other partners are encouraged to work with their regional invasive species organizations to identify projects and actions that work towards the goals of these program areas. The five areas of focus for this Aquatic Invasive Species Program are Coordination and Collaboration, Education and Outreach, Watercraft Inspection and Decontamination, Monitoring and Research, and Response and Management. For each of these program areas, Goals and Action items are identified.

## CONTENTS

<b><i>Acknowledgements</i></b> _____	<b><i>ii</i></b>
<b><i>Executive Summary</i></b> _____	<b><i>iii</i></b>
<b><i>Background</i></b> _____	<b><i>6</i></b>
<b>Purpose</b> _____	<b>6</b>
<b>Aquatic Invasive Species Program Area</b> _____	<b>6</b>
<b>Implementation Principles</b> _____	<b>6</b>
<b>Who is this Program Framework For?</b> _____	<b>6</b>
<b><i>Priority Aquatic Invasive Species and Pathways</i></b> _____	<b><i>9</i></b>
<b>Priority Aquatic Invasive Species</b> _____	<b>9</b>
<b>Natural Pathways of Introduction</b> _____	<b>12</b>
<b>Human Pathways for AIS Introduction and Spread</b> _____	<b>14</b>
<b><i>Framework for Regional AIS Program</i></b> _____	<b><i>17</i></b>
<b>Coordination and Collaboration</b> _____	<b>18</b>
<b>Education and Outreach</b> _____	<b>19</b>
<b>Watercraft Inspection and Decontamination</b> _____	<b>21</b>
<b>Monitoring and Research</b> _____	<b>21</b>
<b>Response and Management</b> _____	<b>22</b>
<b><i>Additional Resources</i></b> _____	<b><i>23</i></b>
<b><i>Appendix A: List of Original Columbia Basin AIS Steering Committee Members (2014-15)</i></b> _____	<b><i>25</i></b>
<b><i>Appendix B: List of Acronyms</i></b> _____	<b><i>26</i></b>
<b><i>Appendix C: Aquatic and Riparian Species Regulated in B.C.</i></b> _____	<b><i>27</i></b>
<b><i>Appendix D: Completed Activities</i></b> _____	<b><i>28</i></b>

## LIST OF TABLES

Table 1: Management approach for aquatic invasive species.....	11
Table 2: Aquatic invasive species with potential natural introduction pathways into the Program Area.....	13
Table 3: Priority pathways of introduction and spread and target action items for education and outreach on aquatic invasive species in the Basin.....	15

## LIST OF FIGURES

Figure 1: Administrative boundaries of Canadian Columbia Basin Aquatic Invasive Species program including regional invasive species organization boundaries. ....	7
Figure 2: Overview of how regional AIS program aligns with province-wide initiatives. The majority of this AIS program will be delivered by the regional invasive species organizations and their regional partners.....	8
Figure 3: Canadian Columbia Basin region for this Framework for AIS Program (marked in red line).....	12
Figure 4: Diagram of five program areas for the Aquatic Invasive Species Program for the Columbia Basin. ....	17

## BACKGROUND

### PURPOSE

Aquatic invasive species (AIS)<sup>1</sup> are non-indigenous species that impact, or have the potential to impact, the ecology, economy, and social opportunities of the Columbia Basin. In recognition of these concerns, the Columbia Basin Trust and the four regional invasive species organizations operating in this region (Central Kootenay Invasive Species Society, East Kootenay Invasive Species Council, Columbia Shuswap Invasive Species Society, and Northwest Invasive Plant Council) have developed or expanded their current AIS programs. The purpose of this document is to provide a framework for regional invasive species organizations (RISOs) and their partners to promote a proactive, strategic, collaborative, and coordinated approach to AIS prevention and management. This Framework facilitates an AIS program that is consistent and complimentary to the efforts of the Province of B.C. and neighbouring jurisdictions and focuses resources where they are most effective. The primary focus of this program is to prevent the introduction and establishment of AIS (such as zebra and quagga mussels) as well as to enhance coordination, response, and management of other priority AIS.

### AQUATIC INVASIVE SPECIES PROGRAM AREA

This program applies to the Canadian Columbia Basin where waterbodies drain into the Columbia River north of the border with the United States (hereafter referred to as the “Basin”), which includes the operating areas encompassed by the Central Kootenay Invasive Species Society, East Kootenay Invasive Species Council, eastern portion of the Columbia Shuswap Invasive Species Society, and southeastern tip of the Northwest Invasive Plant Council (Figure 1). Although activities focus primarily on south-eastern B.C., they are designed to be consistent with broader initiatives of the Province of B.C. and the Invasive Species Council of BC. Many priority action items were identified as provincial in scope and, where relevant, the Basin would provide a supportive role for piloting or otherwise enhancing these activities.

### IMPLEMENTATION PRINCIPLES

- ✓ Strive for coordinated activities and avoid duplicating efforts
- ✓ Recognize scope and roles of regional invasive species organizations and their partners
- ✓ Celebrate success, particularly when goals of strategy are met

### WHO IS THIS PROGRAM FRAMEWORK FOR?

This Program Framework was designed primarily to increase collaboration between RISOs and their partners in the Basin, such as local stewardship groups and provincial agencies, for delivering their AIS programs. RISOs are non-profit societies that have no legal land or water management jurisdiction. One of the primary roles of these organizations is outreach and awareness, a critical component of AIS prevention. RISOs also participate in monitoring, treatments, and research activities by working in partnership with other organizations. This Program Framework may also be utilized by

---

<sup>1</sup> For a list of acronyms, Appendix B

the partners of RISOs to identify shared priorities that promote a consistent and coordinated approach to AIS management in the Basin.

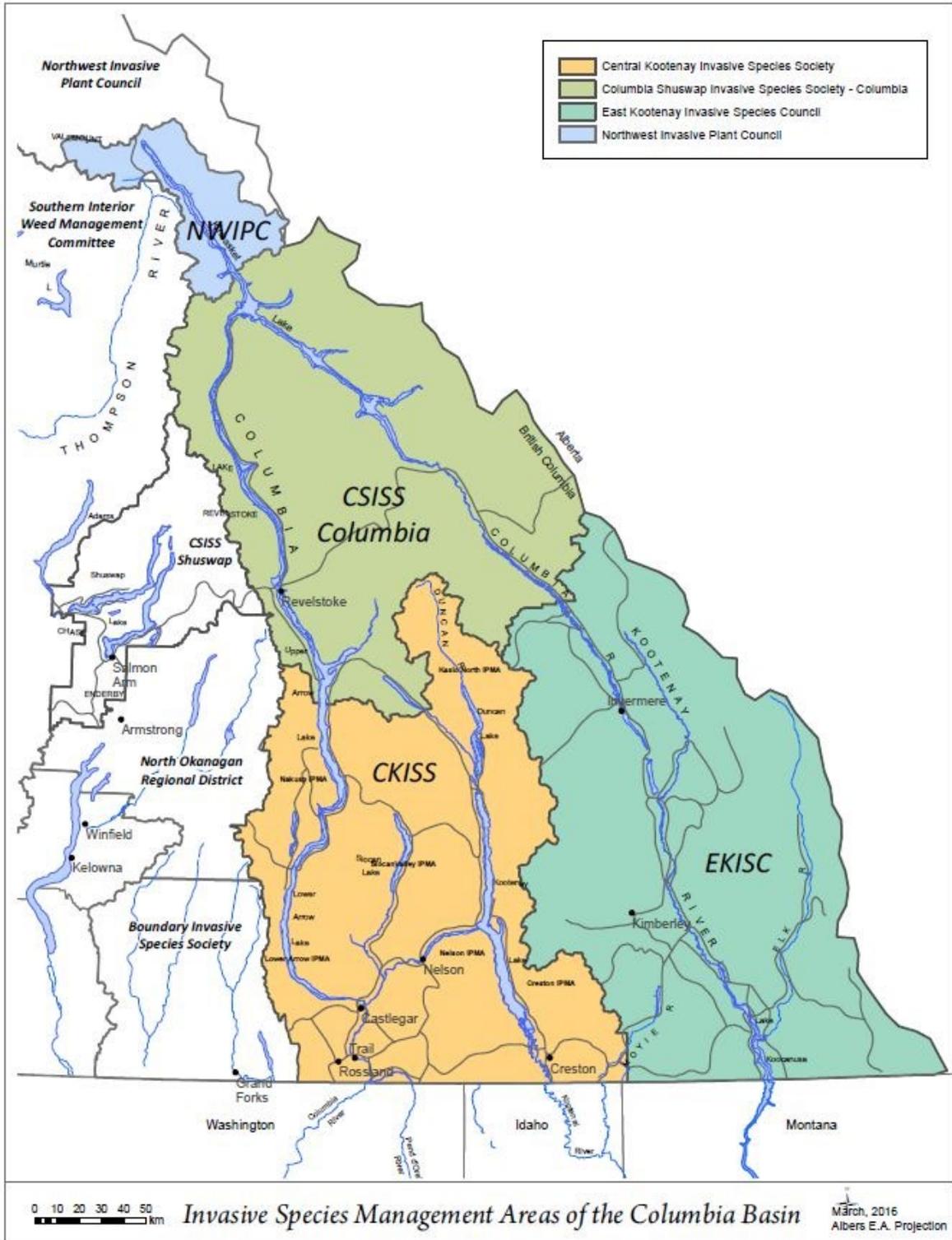


Figure 1: Administrative boundaries of Canadian Columbia Basin Aquatic Invasive Species program including regional invasive species organization boundaries.

The scope and roles of the regional program in the Basin are designed to recognize the broader initiatives in the Province of B.C.<sup>2</sup> and neighbouring jurisdictions. One of the highest priorities of this program is to ensure that it compliments Provincial activities, remains within the scope of RISOs' roles, and does not duplicate efforts. To illustrate the context within which this AIS program is nested, the following diagram describes some of the roles of organizations carrying out AIS activities in B.C. and bordering regions (Figure 2).

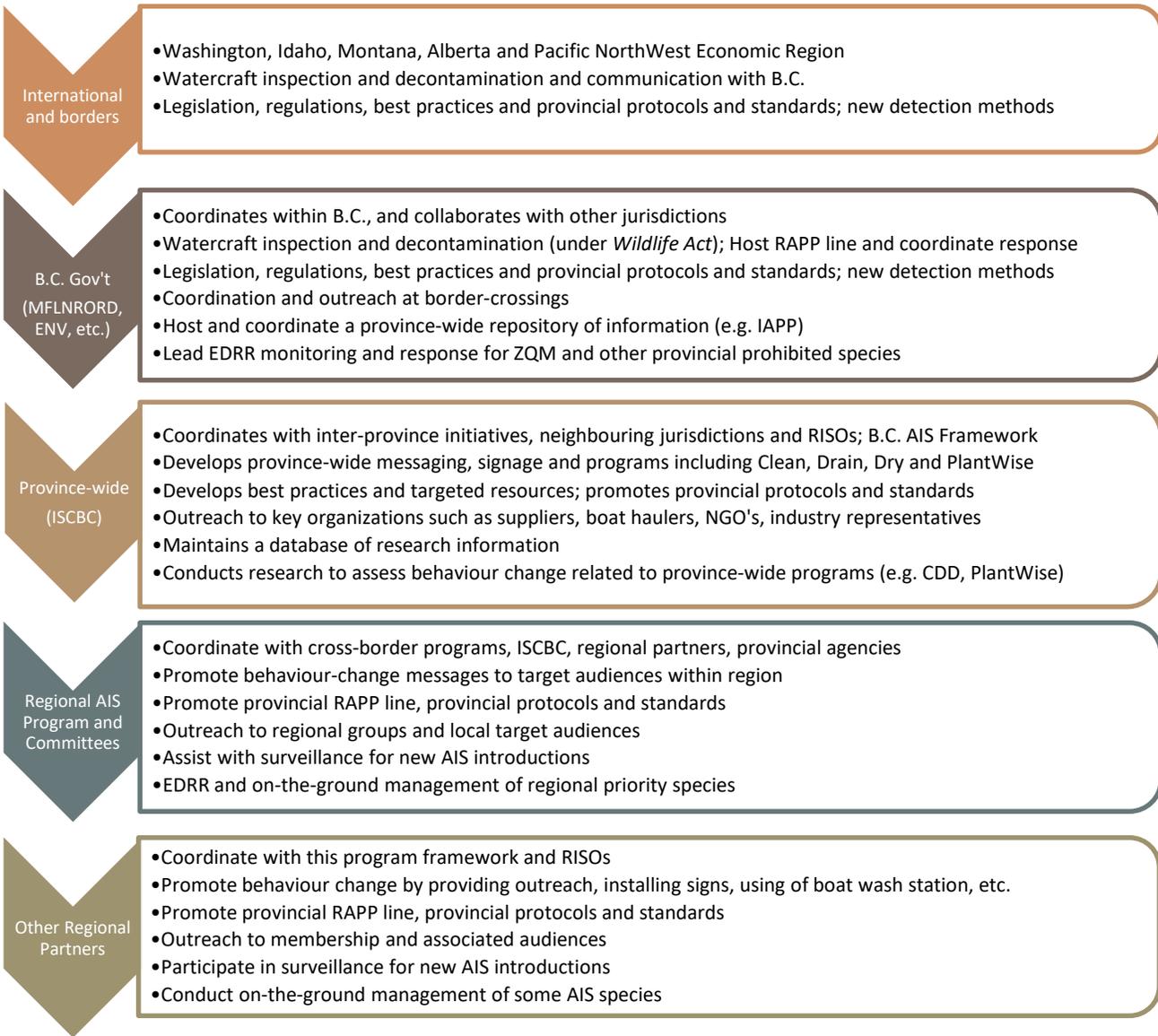


Figure 2: Overview of how regional AIS program aligns with province-wide initiatives. The majority of this AIS program will be delivered by the regional invasive species organizations and their regional partners.

<sup>2</sup> See the B.C. Provincial Government Invasive Species Strategic Plan: [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/imiswg/prov\\_is\\_strategy.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/imiswg/prov_is_strategy.pdf)

## PRIORITY AQUATIC INVASIVE SPECIES AND PATHWAYS

### PRIORITY AQUATIC INVASIVE SPECIES

Focal AIS have been identified for this program based on pathways of introduction, probability of establishment, current distribution, and potential impacts (Table 1). Since the pathways of introduction and vectors of spread for many AIS are similar, focusing on the prevention of one or two species in each pathway or species group will ideally prevent the spread of many other AIS. The management approach for each group of species has been outlined depending on the role of the provincial government (i.e. some species are provincial EDRR species), the scope and expertise of RISOs (e.g. currently RISOs do not have invasive fish expertise), and the feasibility of management actions given available tools. A comprehensive list of all AIS of concern is available as a spreadsheet.



**Yellow Flag Iris**

Photo credit: Juliet Craig

**Riparian plants** include species such as yellow flag iris, purple loosestrife, giant hogweed, and invasive knotweeds that grow at the edge of aquatic environments. These species are generally introduced as horticultural species and can “jump the garden fence” to invade and impact riparian areas. The management action for each riparian plant species has already been defined in each RISOs’ current operational plan.



**Hydrilla**

Photo credit: Chris Evans, Bugwood

**Aquatic plants** include species that are partly or wholly submerged such as Eurasian water-milfoil, curly leaf pondweed, and fragrant water lily. Given the limited effectiveness of mechanical control of these species and the current lack of herbicide tools to treat them in B.C., prevention is generally the focus. Some aquatic plant species are included on the B.C. Government’s Prohibited Species List<sup>3</sup> and are considered by the Province to require “EDRR” tactics. For these species, the Province takes the lead role in management action if the species is detected. RISOs will report these species immediately to the provincial government if they are detected during surveillance activities, assist with management (where required), and focus on education and outreach to prevent introduction and spread. RISOs and/or local governments will take the lead for management of aquatic plant species that are not on the B.C. Prohibited Species list, including outreach, inventory, and potentially treatment activities.

<sup>3</sup> [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/proposed\\_prohibited\\_noxious\\_weeds.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/proposed_prohibited_noxious_weeds.pdf)



### **Zebra Mussels**

Photo credit: US Fish and Wildlife Service

**Aquatic invertebrates**, including ZQM, are regulated under the B.C. *Wildlife Act* Controlled Alien Species Regulation (Appendix C) which gives authority to Conservation Officers and other provincial officers to inspect and issue a decontamination order for watercraft and equipment with signs of mussel contamination. The B.C. Government is taking the lead in provincial early detection by operating mandatory watercraft inspection stations throughout the Columbia Basin and elsewhere in the province, and in mussel response. In addition, they are promoting their “RAPP” line for mussel reporting and taking the lead in provincial highway signage. RISOs will provide “CDD” outreach for mussel prevention, promote boat wash activities and watercraft decontamination, and participate in veliger (mussel larvae) sampling. Since other aquatic invertebrates, such as New Zealand mudsnail, will also be addressed under these activities, no other specific invertebrate management actions have been defined.



### **Northern Pike**

Photo credit: Jeremy Baxter

**Fish**, including invasive species, are currently managed by the provincial government as well as other groups including the Fish and Wildlife Compensation Program (FWCP), BC Hydro, and the Upper Columbia White Sturgeon Recovery Initiative. Historically, RISOs have not participated in fish management and do not currently hold this expertise. RISOs will focus on education and awareness for fish, particularly for the pathways of intentional illegal release and the aquarium trade.



### **American Bullfrog**

Photo credit: Jarek Tuszyński, Wikipedia

**Other aquatic invasive vertebrates** (not including fish) include the American bullfrog, which is known to occur in the Central Kootenay region’s Pend D’Oreille and Creston Valleys, and could pose significant risks to at-risk northern leopard frog populations. The provincial government is coordinating the management of these species in B.C. and RISOs will focus on outreach and education (e.g. “Don’t Let It Loose”) and participate in surveillance and management as required.

Table 1: Management approach for aquatic invasive species.

Species Group	Examples of priority species	Management Approach	Regional invasive species organization role					
			Prioritization of sites	Inventory/ Surveillance	EDRR Reporting	Treatments	Outreach	Collaboration with local groups
<b>Riparian plants</b>	Yellow flag iris Purple loosestrife Policeman’s helmet Giant hogweed Invasive knotweeds	As per regional organization IPMA management plans; Management approach and response led by each regional invasive species organization	✓	✓	✓	✓	✓	✓
<b>Aquatic plants on Prohibited Species List (Provincial EDRR)</b>	Brazilian elodea Water hyacinth Hydrilla	EDRR Response led by MFLRNORD Regional involvement when required		✓	✓		✓	✓
<b>Aquatic plants NOT on Prohibited Species List</b>	Curly leaf pondweed Eurasian water-milfoil Fragrant water lily Flowering rush	Management approach and response led by each regional invasive species organization or local government		✓	✓	✓ Participation where required	✓	✓
<b>Aquatic invertebrates</b>	Zebra & quagga mussel New Zealand mudsnail Rusty crayfish	Management approach and response led by provincial government. Regional involvement when required		✓	✓		✓	✓
<b>Fish</b>	Northern pike Yellow perch Large mouth bass	Management approach and response led by provincial government. Regional involvement when required		✓	✓		✓	✓
<b>Vertebrates (non-fish)</b>	American bullfrog	Management approach and response led by provincial government. Regional involvement when required		✓	✓	✓	✓	✓

## NATURAL PATHWAYS OF INTRODUCTION

Pathways are the geographic routes by which AIS are introduced to the Basin. Pathways may be natural (e.g. downstream flow of flowering rush, natural movement of bullfrogs), or may be human-related. The primary natural pathway of AIS introduction into the Basin is via waterways, particularly those that flow into the Basin. The Columbia River begins at Columbia Lake and flows north through the East Kootenay and Columbia Regions, south through the Central Kootenay and then flows through Washington and Oregon before draining into the Pacific Ocean (Figure 3). The Columbia River Basin includes rivers, streams, and other waterbodies that ultimately drain into the Columbia River, such as the Elk, Kootenay, and Slokan river systems. For the context of this program, the “Basin” refers to the Columbia Basin Trust area, which includes only those waterbodies and drainage areas that flow into the Columbia River north of the US border.



Figure 3: Canadian Columbia Basin region for this Framework for AIS Program (marked in red line)<sup>4</sup>.

Given this flow of waterbodies, there are several natural pathways of introduction for downstream and upstream movement of AIS into the Basin (Table 2). These natural pathways are a high priority for surveillance and monitoring activities, particularly for AIS found across the border. For many species, research is required to determine if and how they can be prevented from natural introduction (e.g. flowering rush, American bullfrog).

<sup>4</sup> Map by Kmusser - self-made, based on USGS and Digital Chart of the World data. Licensed under CC BY-SA 3.0 via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:Columbiarivermap.png#mediaviewer/File:Columbiarivermap.png>.

Table 2: Aquatic invasive species with potential natural introduction pathways into the Program Area.

River System	AIS in waterway	Comments
<b>Kootenai River</b>  From Idaho and flows into the B.C. Kootenay River at Creston	American bullfrog	Present, and migrating into Creston via this waterway
	Eurasian water-milfoil	Already established in B.C. Kootenay River
	Brook trout	Possibly most widely distributed non-native fish in the Basin
	Brown bullhead	May be present in Creston; often confused with black bullhead so range not known definitively
	Pumpkinseed, largemouth bass, yellow perch	
	Curly leaf pondweed	Already established in B.C. Kootenay River
<b>Pend D'Oreille River</b>  From Washington and flows into B.C. at Nelway then flows into Columbia River south of Trail, B.C.	Curly leaf pondweed	Already present in B.C. PDO River
	Eurasian water-milfoil	Already present in B.C. PDO River
	Flowering rush	Has not been detected to date in B.C. PDO River
	Yellow flag iris	Small sites have been detected and treated in B.C. PDO River
	American bullfrog	Already present in the Pend D'Oreille IPMA, Regional District Central Kootenay
	Purple loosestrife	Has not been detected to date in B.C. PDO River
	Asian clam	Present in Lake Pend D'Oreille; detected in B.C. PDO 2021
	Chinese mystery snails	Present in Priest Lake Idaho. Enters PDO River downstream from Lake PDO
	Northern pike and walleye	Already present in B.C. PDO River
	Lake trout, brown trout, black crappie, yellow perch, smallmouth bass, pumpkinseed and bullhead	Lake Pend D'Oreille; most species present in B.C. PDO River
Virile crayfish	Known presence throughout PDO system from Flathead Lake to Lake PDO. Also present in Lake Roosevelt, WA (Columbia River)	
<b>Columbia River</b>  Flows south from Trail, B.C., into Washington	Northern pike and walleye	Northern pike in Columbia River from Trail to south of Hugh Keenleyside Dam; present in Lake Roosevelt, WA (Columbia River)
	Common carp, smallmouth bass, yellow perch, lake whitefish, lake trout	Present in the Columbia River up to the Hugh Keenleyside Dam and Brilliant Dam
<b>Koocanusa</b>  Flows south from Newgate, B.C., into Montana	Yellow perch	Already present in Lake Koocanusa, Montana
	Brook trout	
	Northern pike, small and largemouth bass	Many fishing blogs/threads mention the presence of pike, small and largemouth bass in Koocanusa. Have found no official confirmation
<b>Flathead River</b>  Flows south from Flathead, B.C., into Montana	American bullfrog	Located near Kalispell, Montana upstream from Flathead Lake. Can migrate over land
	Flowering rush	Present in Flathead Lake. Has been spreading northwards, perhaps by wildlife
	Northern pike, small mouth bass, black bullhead, pumpkinseed, yellow perch	Present in Flathead Lake. These species would be unlikely to migrate up the Upper Flathead to Canada
	Brook trout, brown trout	Flathead Lake

## HUMAN PATHWAYS FOR AIS INTRODUCTION AND SPREAD

Intentional human pathways of introduction include activities such as planting invasive horticultural species or releasing fish into lakes. Pathways may also be unintentional, such as aquatic “hitch-hikers” on watercraft. Once introduced into the Basin, various vectors spread AIS from source populations to new destinations (e.g. fishing gear, boats, intentional illegal fish stocking). Addressing both pathways of introduction and vectors of spread is a critical component of AIS prevention. Since many species are introduced and spread in the same ways, addressing the pathways and vectors, rather than focusing on species, is an effective approach. This program framework sets out two key strategies for addressing this pathway: boat decontamination and public outreach.

One of the highest risk pathways of introduction, particularly for zebra and quagga mussels, is by contaminated watercraft. Watercraft inspection stations in many US States, including Idaho and Montana, have identified and addressed mussel-fouled boats heading for B.C. waters. The microscopic veligers can stay alive in wet conditions (such as bilge water, wet gear, engine water) for up to 30 days allowing for easy and unintentional transport of these species. Decontamination of these watercraft and associated equipment is a critical component of preventing the introduction of invasive mussels to the Columbia Basin. Recent changes to the B.C. *Wildlife Act* Controlled Alien Species Regulation provide authority to the provincial government to issue decontamination orders for watercraft suspected of containing live or dead mussels. The establishment of watercraft inspection and decontamination stations in the Basin is a critical component of AIS prevention. The Province of B.C. is the lead agency for establishing and operating watercraft inspection and decontamination stations across the province.

Outreach strategies in this AIS Program to prevent human-caused AIS introductions are based on the concept of community-based social marketing<sup>5</sup>, whereby key messages are promoted to encourage specific behaviours. The Invasive Species Council of BC has developed key messages for specific AIS-related behaviours including “Clean, Drain, Dry” your boat (and other water-based equipment) to remove aquatic hitch-hikers, “Don’t Let it Loose” to discourage the release of pets and aquarium contents, and “PlantWise” to encourage the use of non-invasive species for water gardens and other horticultural purposes. To be consistent with this province-wide approach, the education and outreach component of this program will focus on changing behaviour of target audiences for specific priority pathways of introduction and spread (Table 3).

---

<sup>5</sup> <http://www.cbsm.com/public/world.lasso>

Table 3: Priority pathways of introduction and spread and target action items for education and outreach on aquatic invasive species in the Basin.

Pathway of Introduction	Strategy	Target Audience	Key message	Feature species <sup>6</sup>
<b>Recreation (boating, fishing, diving)</b>	Disseminate AIS messaging and encourage CDD behaviour	Boaters, anglers, and divers	<b>Protect our waters, Clean, Drain, Dry</b>	Zebra and quagga mussels; NZ mudsnail
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Update and maintain overall contact list (fishing/rod gun clubs, marine industry, boat and diving shops, stewardship groups, houseboat associations, water recreation clubs and centres)</li> <li><input type="checkbox"/> Conduct brochure runs and put up posters for “Clean, Drain, Dry”</li> <li><input type="checkbox"/> Send outreach about CDD to contact list and offer presentations and demonstrations on CDD</li> <li><input type="checkbox"/> Prioritize boat ramps for outreach</li> <li><input type="checkbox"/> Prioritize boat events for info booths</li> <li><input type="checkbox"/> Determine potential signage locations (based on input from contacts)</li> </ul>			
<b>Horticulture and water garden trade</b>	Promote PlantWise program	Horticultural centres, garden clubs, and stores	<b>Be PlantWise</b>	Yellow flag iris and invasive knotweeds; fragrant water lily; flowering rush
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Update and maintain overall contact list (garden clubs, plant nurseries, horticultural centres)</li> <li><input type="checkbox"/> Conduct brochure runs and put up posters for “PlantWise”</li> <li><input type="checkbox"/> Visit garden centres to offer training/workshops/resources on species to avoid selling, and proper disposal techniques, and to review inventory</li> <li><input type="checkbox"/> Provide presentations to garden groups</li> <li><input type="checkbox"/> Provide display booth or presentations at garden tours/shows</li> <li><input type="checkbox"/> Provide information for Landscape Certification Courses with Codes of Conduct and/or principles</li> <li><input type="checkbox"/> Advertise “PlantWise” garden centres and businesses on regional invasive species organization websites</li> </ul>			
<b>Aquarium, school and pet trade</b>	Encourage the proper disposal of pets and lab specimens	Aquarium and pet stores, school biology depts., animal welfare societies, vets	<b>Don’t Let it Loose</b>	Brazilian elodea; rusty crayfish; American bullfrog
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Update and maintain overall contact list (aquarium and pet centres, SPCA, animal welfare groups)</li> <li><input type="checkbox"/> Conduct brochure runs and put up posters for “Don’t Let It Loose”</li> <li><input type="checkbox"/> Visit aquarium and pet centres to review inventory of species being sold and update on AIS Regulations <ul style="list-style-type: none"> <li><input type="checkbox"/> Determine which centres/stores provide disposal options (e.g. can they take pets back?) If so, advertise on website “Buy It Back” Program</li> <li><input type="checkbox"/> Contact vets for humane disposal options</li> </ul> </li> <li><input type="checkbox"/> Offer school programs through Wild Voices for kids (wait for ISCBC to develop curriculum)</li> <li><input type="checkbox"/> Visit/contact school Biology/Admin about school aquariums and proper disposal</li> <li><input type="checkbox"/> Provide programs to youth (e.g. Girl Guide, Scouts, Junior Naturalists, Fishing Clubs, Summer camps, Home-school groups)</li> <li><input type="checkbox"/> Contact Animal Welfare Societies</li> <li><input type="checkbox"/> Provide citizen-science opportunities for monitoring bullfrogs</li> </ul>			

<sup>6</sup> Although the primary target species is the priority for outreach and management, the strategies address many other AIS.

Table 3 cont.: Priority pathways of introduction and spread and target action items for education and outreach on aquatic invasive species in the Basin.

Pathway of Introduction	Strategy	Target Audience	Key message	Feature species
<b>Intentional unauthorized introductions</b>	Educate anglers about impacts and consequences of illegal fish introductions	Anglers	<b>Don't Let it Loose...</b> invaders make bad neighbours	Northern pike
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Promote message "Don't Let It Loose" and illegality of moving fish in existing CDD presentations</li> <li><input type="checkbox"/> Consider signage at sites where high priority fish AIS occur (e.g. Castlegar to Trail for northern pike)</li> <li><input type="checkbox"/> Explore and identify further outreach options</li> </ul>			
<b>Agency and restoration activities</b>	Promote decontamination and other prevention procedures into contracts, standard operating procedures, official community plans, and policies	Agencies that do water monitoring, fire suppression, AIS harvesting, etc.	<b>Protect our waters, Clean, Drain, Dry</b>	Eurasian water-milfoil; Zebra and quagga mussels
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Provide information/presentations/training to fisheries biologists, restoration ecologists, monitoring biologists, stream keepers on CDD (e.g. NCC, FWCP, stream keepers, stewardship groups)</li> <li><input type="checkbox"/> Provide information to organizations who develop contracts for water-based work so they can include best management practices within contract requirements</li> <li><input type="checkbox"/> Set up AIS Workshop that includes information and demonstrations on equipment disinfection, boat decontamination, AIS identification (e.g. CSISS AGM 2015 to model this)</li> </ul>			
<b>Industrial Marine Works<sup>7</sup></b>	Promote the adoption of policies and procedures for equipment cleaning and decontamination <sup>8</sup>	Industrial marine companies	<b>Protect our waters, Clean, Drain, Dry</b>	Eurasian water-milfoil; Zebra and quagga mussels
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Explore opportunities to contact or provide outreach to industrial marine works for CDD outreach</li> <li><input type="checkbox"/> Explore and identify further outreach options (e.g. ENV permits? BMPs?)</li> </ul>			

<sup>7</sup> E.g. equipment used to build and repair bridges, dredge navigation channels, install docks and breakwaters, underwater work diving equipment, boat hoists and lifts, AIS harvesting equipment, etc.

<sup>8</sup> <https://cpw.state.co.us/Documents/ANS/WIDStudentCurriculum.pdf>

## FRAMEWORK FOR REGIONAL AIS PROGRAM

The following program framework is designed to reflect shared goals and priorities and to facilitate a coordinated approach and may be undertaken by RISOs and partner organizations. The timeline, organization(s) responsible, and details for each task will be identified in RISOs annual work plans. Local and regional stewardship groups and other partners are encouraged to work with their RISOs to identify projects and actions that work towards the goals of these program areas. The five areas of focus for the AIS Program are Coordination and Collaboration, Education and Outreach, Watercraft Inspection and Decontamination, Monitoring and Research, and Response and Management (Figure 4).

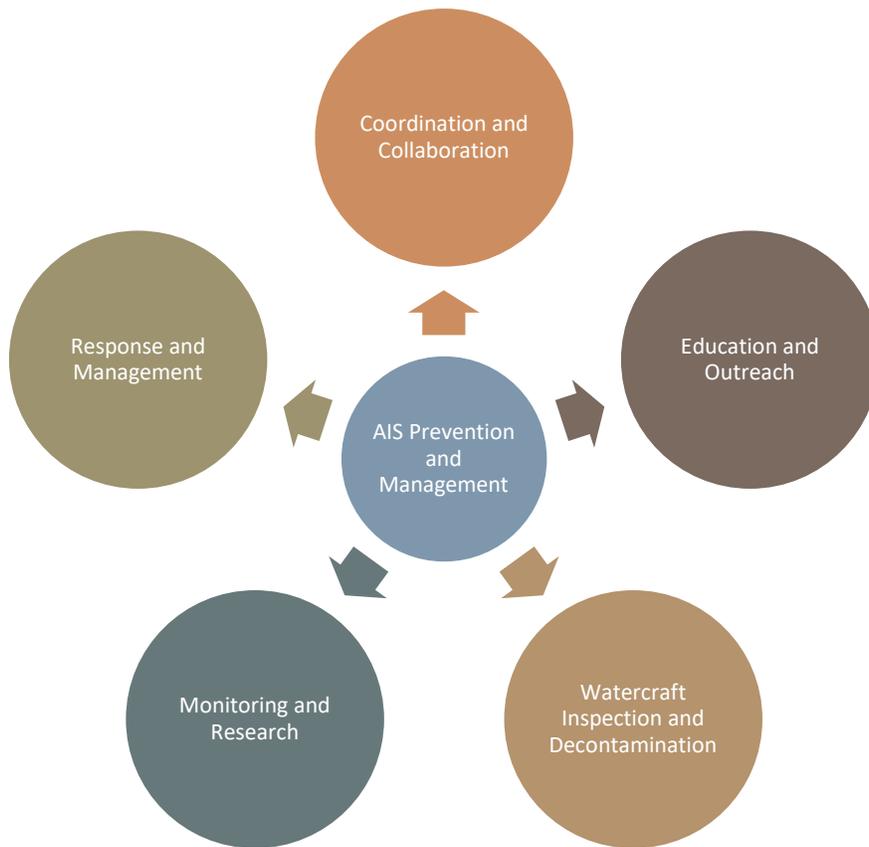


Figure 4: Diagram of five program areas for the Aquatic Invasive Species Program for the Columbia Basin.

## COORDINATION AND COLLABORATION

### GOAL 1.1: ESTABLISH A COORDINATED AIS PROGRAM IN THE BASIN, BUILDING ON EXISTING EFFORTS AND INTRODUCING NEW ONES

- Maintain a basin-wide AIS Steering Committee (that includes a representative from each regional invasive species organization) to oversee implementation of this Program
- Promote regional invasive species organizations as the “go to” organizations for AIS in the Basin.
  - Regional invasive species organizations can play an important role as a coordinating body for AIS activities in the Basin
- Maintain an AIS Coordinator for each regional invasive species organization (in addition to the Columbia Basin AIS (CB AIS) Lead Coordinator) to maintain communication for on-the-ground coordination of efforts
- Maintain communication, and participate as required, with species-specific working groups established for priority AIS and identify opportunities to participate
  - E.g. American bullfrogs, northern pike, flowering rush
- Maintain regular and two-way information flow with cross-border and provincial initiatives through the AIS Steering Committee
  - E.g. MFLNRORD, ISCBC, and US Columbia Basin ZQM group (100<sup>th</sup> Meridian Initiative)
- Maintain a list of all local organizations involved in AIS including their roles and responsibilities, their activities, and waterbodies in which they are active
  - See MS Excel Workbook titled: *AIS Partners in Columbia Basin.xls*
- Maintain a webpage for the CB AIS Basin-wide program that includes:
  - List of project partners’ activities and relevant links
  - Alerts on new/approaching species
  - Where to report AIS in the Basin
  - Links to databases for locations and surveying/monitoring sites of priority AIS
- Produce annual communication that highlights achievements of the AIS Program
- Revisit this AIS Program Framework annually (fall SC meeting) to check-in with previous year’s activities and adapt and modify this document as required

### GOAL 1.2 FACILITATE COORDINATED PRIORITIES AND ACTIVITIES FOR MAXIMUM EFFICIENCY AND EFFECTIVENESS

- Maintain a list of priority species with their associated known locations and pathways of introduction
  - See MS Excel Workbook titled: *CB AIS List.xls*
- Develop collaborative actions between agencies and organizations, including cross-border initiatives
  - Ensure that cross-border initiatives are carried out in collaboration with the Provincial Government
- Maintain communication with provincial and province-wide programs to align with provincial priorities
  - Through CB AIS Steering Committee

### GOAL 1.3: IDENTIFY MODELS AND OPTIONS FOR LONG-TERM STABLE FUNDING

- Bring four regional invasive species organizations together to identify collaborative funding opportunities
- Identify, seek and acquire a range of funding models, partners, and opportunities

---

#### GOAL 1.4: EVALUATE AND CELEBRATE SUCCESS

- Monitor success of AIS Program and associated activities through a twice annual review of committee and partner achievements
  - Check-in by AIS Steering Committee and AIS Coordinators of which action items have been completed or addressed and to determine funding opportunities in the fall, and to discuss upcoming seasons workplans in the spring
- Develop a “report card” of AIS in the Basin every three to five years: new AIS introductions, extent of infestations, and success of eradication efforts
  - Report out this information on the CB AIS Basin-wide program webpage
- Develop and utilize a method of evaluating the outreach program by creating a baseline survey to measure change in knowledge and/or behaviour
  - E.g. Tracking form for recording how many and which invasive species are being sold in garden and aquarium centres
  - E.g. Tracking form for discussions at display booth and outreach events to find out if people have heard of Clean, Drain, Dry (or PlantWise or Don’t Let It Loose), where they heard about it, and if they follow it
  - E.g. Boat Ramp Outreach Survey
- Host a regional AIS forum every 3 to 5 years to share expertise, review program and celebrate success

#### EDUCATION AND OUTREACH

---

#### GOAL 2.1: IMPLEMENT SUCCESSFUL BEHAVIOURAL CHANGE PROGRAMS WITH CONSISTENT AND PROVEN MESSAGES THAT TARGET KEY PATHWAYS

- Utilize community-based social marketing and social networking tools (Facebook, website) and other appropriate approach (e.g. Clean, Drain, Dry; PlantWise; Don’t Let It Loose)
  - Work with ISCBC on changing behaviour to stay engaged with new and emerging opportunities provincially and within the Basin
  - Develop and distribute targeted resources for horticultural Industry, horticultural consumers, boaters, anglers (Table 3). E.g. certification manuals, code of conduct, education materials/handouts, staff training, E-communications, mobile apps, magazine articles, press releases, signs, decals, brochures
- Utilize most effective key messages, locations, methods, and audiences for priority pathways (Table 3)
- Ensure regional outreach is consistent with the ISCBC B.C. Education and Outreach Framework for Invasive Species (in development)
- Maintain a list of all relevant audiences to target for presentations, brochures, posters
  - E.g. horticultural centres, marinas, boat repair shops, angling clubs, etc. (Table 3)
  - See MS Excel Workbook titled: *AIS Partners in Columbia Basin.xls*
- Provide outreach at relevant community events and with relevant audiences
  - E.g. garden clubs, fly fishing symposium, wakeboarding competition, fishing derbies, garden tours
- Write regular articles and press releases to distribute to media and local group’s newsletters
- Install signage by identifying existing and potential locations of signs, kiosks, and billboards (except at provincial and federal border crossings)
  - Fill in gaps at high priority locations
  - Maintain a spreadsheet of sign locations and the key message at each location

- Coordinate the development of a CB AIS brochure that is consistent between regions
- Provide programs to youth (e.g. Girl Guide, Scouts, Junior Naturalists, Summer camps, Home-school groups)
- Provide training workshops to relevant audiences (Table 3)

---

#### GOAL 2.2 REDUCE THE POTENTIAL FOR AIS-FOULED BOATS AND EQUIPMENT TO ENTER LOCAL WATER BODIES THROUGH EDUCATION

- Partner with the province-wide Clean, Drain, Dry program
- Coordinate with the ISCBC to share resources and messaging
- Target marinas, boat ramps, boat shops, marine mechanics, divers, anglers, etc. for face to face outreach
- Maintain a handout of boat and car wash stations available that do not drain into natural waterbodies and advertise these to boaters
  - Promote CDD signs at these venues
- Conduct outreach and coordinate to have WID stations at high priority events
  - E.g. fly fishing symposium, kayak festivals, wakeboarding competitions, B.C. River’s Day, fishing derbies
- Promote training on disinfection protocols to relevant audiences

---

#### GOAL 2.3 ENGAGE STEWARDSHIP GROUPS, COMMUNITY ORGANIZATIONS, EDUCATIONAL INSTITUTIONS, AND INDUSTRY FOR AIS OUTREACH

- Coordinate with and provide training (when required) to stewardship groups and others who do aquatic outreach to facilitate incorporating AIS messaging into programs
  - See MS Excel Workbook titled: *AIS Partners in Columbia Basin.xls* for a list of stewardship groups
  - Ensure that stewardship groups are recognized and compensated for their time
  - Coordinate with the Basin-wide stewardship groups such as the Columbia Basin Watershed Network
- Continue to promote and incorporate AIS training into regional water/wetland training programs
  - Currently Wetland Keepers incorporates AIS fact sheets into the resources of their workshops and will incorporate AIS training as part of the program if it is a local interest
  - Coordinate with ISCBC (who works with province-wide stewardship groups such as B.C. Wildlife Federation)
- Promote AIS education in elementary and secondary schools and post-secondary institutions by providing guest speaker programs or “train the educator” opportunities
- Work with hydro electric utilities to conduct mail-outs, sponsor signs, and develop a mussel-impact on hydro-power awareness campaign
  - E.g. FortisBC, BC Hydro, Nelson Hydro

---

#### GOAL 2.4 ENGAGE LOCAL GOVERNMENTS AND INDUSTRY IN AIS ISSUES

- Develop a template briefing note and associated talking points for meeting with officials
- Provide City Council delegations presentations on the importance of ZQM and other AIS prevention
- Write letters, conduct follow-up phone calls, and provide presentations to elected officials about the importance of AIS prevention and programs
  - Prioritize municipalities situated on or nearby lakes

## WATERCRAFT INSPECTION AND DECONTAMINATION

### GOAL 3.1: REDUCE THE POTENTIAL FOR AIS-FOULED BOATS TO ENTER LOCAL WATERBODIES THROUGH WATERCRAFT INSPECTION AND DECONTAMINATION

- Identify opportunities to collaboratively support watercraft inspection and decontamination stations in the region
- Coordinate to have WID stations demonstrated at high priority events
  - E.g. fly fishing symposium, kayak festivals, wakeboarding competitions, B.C. River's Day, fishing derbies

### GOAL 3.2 INCREASE DETECTION OF MUSSEL-INFESTED WATERCRAFT

- Promote the RAPP line for mussel-reporting

## MONITORING AND RESEARCH

### GOAL 4.1: DEVELOP A COORDINATED, SPATIALLY COMPREHENSIVE MONITORING PLAN TO MONITOR AREAS AT HIGH RISK OF AIS INTRODUCTIONS

- Work with provincial government and RISOs to identify high priority sites for monitoring
- Coordinate monitoring activities with provincial government and RISOs
- Conduct inventories for AIS, including aquatic and riparian plants and ZQM veligers, at high priority water ways
  - Develop maps of monitoring sites by species up to 2015
- Contribute ZQM monitoring location data to the Columbia River Basin Aquatic Invasive Species Database<sup>9</sup>
- Identify natural colonization pathways of high priority AIS across the borders
  - See MS Excel Workbook titled: *CB AIS List.xls*
  - Develop maps of species closest known locations up to 2015
- Work with provincial government to identify experts in identification of species as required

### GOAL 4.2: PROMOTE AND UTILISE STANDARDIZED MONITORING, DATA SHARING, AND REPORTING

- Promote and utilize a centralized database for AIS including IAPP until IASP<sup>10</sup> is available. The fields required for IASP will be<sup>11</sup>:
  - UTM coordinates, species name, survey date, surveyor, jurisdiction
  - Density and distribution of infestation
  - Area of infestation (if possible) or presence/absence
- Promote and utilize B.C. AIS monitoring protocols<sup>12</sup> (Additional Resources section)
- Develop expertise within RISOs to identify provincial Prohibited and Controlled Alien Species as well as regional priority species

<sup>9</sup> <http://www.westernais.org/>

<sup>10</sup> MFLNRORD is developing the Invasive Alien Species Program Application that will be centralized database for B.C. Expected launch date is spring 2022.

<sup>11</sup> Becky Brown, Invasive Plant Specialist – EDRR Coordinator, MFLNRORD, personal communication

<sup>12</sup> B.C. Ministry of Environment and Climate Change Strategy has developed, or is developing, standardized AIS monitoring protocols

- Report Provincial EDRR species to the Provincial Government
- Where applicable, pilot novel monitoring options

---

#### GOAL 4.3: INCREASE OPPORTUNITIES TO PARTICIPATE IN AIS MONITORING

- Promote a citizen science AIS reporting program and link high priority sites with nearby stewardship groups
  - See MS Excel Workbook titled: *AIS Partners in Columbia Basin.xls*
- Provide training workshops to relevant regional groups on AIS identification, monitoring standards, and disinfection protocols

---

#### GOAL 4.4 PROMOTE AND FACILITATE AIS RESEARCH

- Identify, support, and partner with research projects including potential impacts, mitigation techniques, and management strategies
- Enable communication of research activities through regional forums, basin webpage or other means

### RESPONSE AND MANAGEMENT

---

#### GOAL 5.1: FOLLOW THE PROVINCIAL RESPONSE PLAN FOR ZEBRA AND QUAGGA MUSSELS

- Participate on the Provincial ZQM Rapid Response Team<sup>13</sup> as required
- Report any new potential Dreissenid mussel incursion events to the Provincial ZQM EDRR Coordinator
- Report suspected contaminated watercraft to the provincial RAPP line
- Collaborate with the Province where there are opportunities for EDRR and assist in any way possible

---

#### GOAL 5.2: COORDINATE WITH RELEVANT PARTNERS TO PARTICIPATE IN RESPONSE STRATEGY FOR HIGH PRIORITY AIS AS REQUIRED

- Participate on the Provincial EDRR Response Team<sup>14</sup> as required
- Promote RISOs as the organization to report sightings of regional priority species
- Develop a response plan for species that are not of provincial EDRR priority but are regional priority species
- Support the development of response tools that can be utilized if a high priority species is detected
- Disseminate annual update of Provincial EDRR activities and fact sheets to membership and networks

---

#### GOAL 5.3: CONTAIN AND MANAGE EXISTING AIS INFESTATIONS TO REDUCE IMPACTS AND SPREAD

- Identify potential spread patterns for existing AIS infestations to determine where to monitor or contain
- Prioritize AIS sites for management action
  - Consider funding opportunities, jurisdiction, potential impacts, species at risk, and probability of success
- Install signage at AIS infested sites to promote CDD, Don't Let it Loose, or PlantWise to reduce spread
- Develop "alerts" and other tools for new invaders to prevent spread of existing infestations

---

<sup>13</sup> [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/invasive-mussels/prov\\_zqm\\_edrr\\_plan.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/invasive-mussels/prov_zqm_edrr_plan.pdf)

<sup>14</sup> [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/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/final_imiswg_BC_is_edrr_plan_nov_2014.pdf)

## ADDITIONAL RESOURCES

### REGIONAL INVASIVE SPECIES ORGANIZATIONS

General information and resources; specific operational plans for riparian plant species; AIS workplans and projects

- Central Kootenay Invasive Species Society: [www.ckiss.ca](http://www.ckiss.ca)
- East Kootenay Invasive Species Council: [www.ekisc.com](http://www.ekisc.com)
- Columbia Shuswap Invasive Species Society: [www.columbiashuswapinvasives.org](http://www.columbiashuswapinvasives.org)
- Northwest Invasive Plant Council: [www.nwipc.org](http://www.nwipc.org)

### INVASIVE SPECIES COUNCIL OF BC

- Province wide resources for AIS: [www.bcinvasives.ca](http://www.bcinvasives.ca)

### INVASIVE SPECIES STRATEGY FOR BRITISH COLUMBIA (NON-GOVERNMENT)

- [https://www.bcinvasives.ca/documents/Invasive\\_Species\\_Strategy\\_for\\_BC-2018-180117-WEB.pdf](https://www.bcinvasives.ca/documents/Invasive_Species_Strategy_for_BC-2018-180117-WEB.pdf)

### PROVINCIAL GOVERNMENT INVASIVE SPECIES STRATEGIC PLAN

- [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/prov\\_is\\_strategy.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/prov_is_strategy.pdf)

### PROVINCIAL GOVERNMENT EARLY DETECTION AND RAPID RESPONSE PLANS

- Invasive Species: [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/prov\\_edrr\\_is\\_plan.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/prov_edrr_is_plan.pdf)
- Zebra and Quagga Mussels: [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/invasive-mussels/prov\\_zqm\\_edrr\\_plan.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/invasive-mussels/prov_zqm_edrr_plan.pdf)
  - Includes flow chart for watercraft decision-making

### PROVINCIAL CONTROLLED ALIEN SPECIES

- <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/cas>

### B.C. PROPOSED PROHIBITED NOXIOUS WEEDS

- [https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/proposed\\_prohibited\\_noxious\\_weeds.pdf](https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/invasive-species/guidance-resources/proposed_prohibited_noxious_weeds.pdf)

### PROVINCIAL PRIORITY INVASIVE SPECIES

- <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/edrr>

### REPORT INVASIVES ONLINE APPLICATION

- <https://forms.gov.bc.ca/industry/report-an-invasive-species/>

### INVASIVE MUSSELS

- **INVASIVE MUSSEL PREVENTION FRAMEWORK FOR WESTERN CANADA**
  - [https://www.bcinvasives.ca/wp-content/uploads/2021/01/ICSBC-IMPf-Doc-180828\\_WEB.pdf](https://www.bcinvasives.ca/wp-content/uploads/2021/01/ICSBC-IMPf-Doc-180828_WEB.pdf)
- **B.C. INVASIVE MUSSEL DEFENCE PROGRAM**
  - <https://www2.gov.bc.ca/gov/content/invasive-mussels>
- **INVASIVE MUSSEL MONITORING PROTOCOL**
  - <https://www2.gov.bc.ca/gov/content/invasive-mussels/early-detection-lake-monitoring>
  - Includes Ministry staff contact information

### B.C. AQUATIC INVASIVE SPECIES SURVEY METHODS (non-mussel species)

- Updated provincial protocol pending
  - To include Ministry staff contact information

### INVASIVE ALIEN PLANT PROGRAM

- Database for invasive plant records. The Map Display is publicly accessible: <https://maps.gov.bc.ca/ess/hm/iapp/>

**DATA BC**

- Database for invasive species records: <http://maps.gov.bc.ca/ess/sv/imapbc/>

**COLUMBIA RIVER BASIN AQUATIC INVASIVE SPECIES DATABASE (US AND CANADA)**

- <http://www.westernais.org/>

**100<sup>TH</sup> MERIDIAN INITIATIVE (ZEBRA AND QUAGGA MUSSEL)**

- <http://100thmeridian.org>

**UPPER COLUMBIA CONSERVATION COMMISSION**

Established to protect western waters from aquatic invasive species threats

- <https://invasivespecies.mt.gov/uc3>

**INVASIVE MUSSEL VIDEO FOR B.C.**

Five minutes - great for presentations, updated 2019

- <http://vimeo.com/125057151>

## APPENDIX A: LIST OF ORIGINAL COLUMBIA BASIN AIS STEERING COMMITTEE MEMBERS (2014-15)

Guidance for the original version of this document, and the process through which it was developed, was provided by the Columbia Basin Aquatic Invasive Species Steering Committee:

- Kenton Andreashuk, Canadian Columbia River Inter-Tribal Fisheries Commission
- Joe Caravetta, Ministry of Environment
- Tara Clapp, Columbia Basin Watershed Network
- Alvin Cober, Northwest Invasive Plant Council
- Adam Croxall, BC Hydro
- Rachel Darvill, Columbia Basin Watershed Network
- Dave DeRosa, Teck Ltd.
- Jason Hawkes, Ministry of Environment
- Matthias Herborg, Ministry of Environment
- Tim Hicks, Columbia Basin Trust
- Hamish Kassa, Columbia Shuswap Regional District
- Crystal Klym, Fish and Wildlife Compensation Program – Columbia Basin
- Todd Larsen, East Kootenay Invasive Plant Council
- Allana Oestreich, Ministry of Forests, Lands and Natural Resource Operations
- Trevor Oussoren, Fish and Wildlife Compensation Program – Columbia Basin
- Jodi Romyn, Invasive Species Council of BC
- Sheila Street, FortisBC
- Natalie Staf, Columbia Shuswap Invasive Species Society
- Mike Trepanier, Northwest Invasive Plant Council
- Rena Vandebos, Selkirk College
- Jennifer Vogel, Central Kootenay Invasive Plant Committee
- Will Warnock, Canadian Columbia River Inter-Tribal Fisheries Commission
- Kate Wilson, Alberta Environment & Sustainable Resource Development

Advisors included James Littlely (Okanagan Water Board), Val Miller (MFLNRORD), Krista Watts (Columbia Power Corporation) and Tom Woolf (Idaho Department of Agriculture). Khaylish Fraser and Chris Harkness (CKISS) conducted background research. Tim Hicks (CBT), Crystal Klym (formerly CKIPC), and Jennifer Vogel (CKISS) provided project support and direction. Kathleen McGuiness (Touchstone GIS Services) prepared the maps.

## APPENDIX B: LIST OF ACRONYMS

<b>AIS</b>	Aquatic Invasive Species
<b>BMP</b>	Best Management Practices
<b>CBSM</b>	Community-Based Social Marketing
<b>CDD</b>	Clean, Drain, Dry
<b>CKISS</b>	Central Kootenay Invasive Species Society
<b>CSISS</b>	Columbia Shuswap Invasive Species Society
<b>EDRR</b>	Early Detection, Rapid Response
<b>EKISC</b>	East Kootenay Invasive Species Council
<b>ENV</b>	B.C. Ministry of Environment and Climate Change Strategy
<b>FWCP</b>	Fish and Wildlife Compensation Program – Columbia Basin
<b>IAPP</b>	Invasive Alien Plant Program application (Provincial government database for invasive plants)
<b>IASP</b>	Invasive Alien Species Program application (IAPP being developed to incorporate invasive species)
<b>IPMA</b>	Invasive Plant Management Area
<b>ISCBC</b>	Invasive Species Council of BC
<b>MFLNRORD</b>	B.C. Ministry of Forests, Lands, Natural Resource Operations, and Rural Development
<b>NCC</b>	Nature Conservancy of Canada
<b>NWIPC</b>	Northwest Invasive Plant Council
<b>PDO</b>	Pend D’Oreille (River)
<b>RAPP</b>	Report All Poachers and Polluters (provincial government phone line)
<b>RISO</b>	Regional Invasive Species Organization
<b>WID</b>	Watercraft Inspection and Decontamination
<b>ZQM</b>	Zebra and quagga (dreissenid) mussels

**APPENDIX C: AQUATIC AND RIPARIAN SPECIES REGULATED IN B.C.**

Invasive Species	Weed Control Act	Community Charters Act Spheres of Concurrent Jurisdiction	Forest and Range Practices Act, Invasive Plants Reg.	Weed Control Act (Controlled Alien Species Reg.)
Yellow flag iris	✓	✓	✓	
Purple loosestrife	✓	✓		
Himalayan balsam		✓		
Invasive knotweeds	✓	✓		
Flowering rush	✓	✓		
Eurasian water-milfoil		✓		
Common reed		✓		
Curly leaf pondweed		✓		
Reed canary grass		✓		
Hydrilla		✓		
Bullfrog		✓		
Zebra mussels				✓
Quagga mussels				✓

For a full list of Controlled Alien Species, see <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/cas/list-of-species>

## APPENDIX D: COMPLETED ACTIVITIES

Goal*	Date Completed	Comments
<b>Goal 1: Coordination and Collaboration</b>		
Form a basin-wide AIS Working Group (that includes a representative from each regional invasive plant committee) to oversee implementation of this Program	April 2016	Steering Committee was struck to oversee implementation of this Program
Designate an AIS Basin-wide Lead Coordinator for the Columbia Basin AIS Program	May 2015	Khaylish Fraser is CB AIS Program Coordinator
Identify an AIS Coordinator for each regional invasive species organization (in addition to the AIS Lead Coordinator) to maintain communication for on-the-ground coordination of efforts	2015	
Maintain communication, and participate as required, with working groups established for priority AIS		American bullfrog action team; Columbia Basin Cooperative Weed Management Area (flowering rush focus); northern pike working group (2016-17)
Maintain regular and two-way information flow with cross-border and provincial initiatives through the AIS Steering Committee		Twice annual steering committee meetings
Develop and maintain a list of all local organizations involved in AIS including their roles and responsibilities, their activities, and waterbodies in which they are active	May 2015	
Develop and maintain a website for the CB AIS Basin-wide program		A webpage is dedicated to the CB AIS basin-wide program on basin RISO websites
Produce a CB AIS Newsletter to maintain communication and highlight achievements of the CB AIS program	May 2019	Program progress report completed: highlights program achievements from 2015 - 2019
Revisit this AIS Program Framework annually to check-in with previous year's activities and adapt and modify this document as required		CB AIS Steering Committee reviews and updates Framework during the fall meeting
Develop and maintain a list of priority species with their associated known locations and pathways of introduction	April 2016	Updated annually
Develop collaborative proposals between agencies and organizations, including cross-border initiatives		
Maintain communication with provincial and province-wide programs to align with provincial priorities		B.C. Invasive Mussel Defence Program; behaviour change programs; Invasive Species Strategy for B.C.

Bring four regional invasive species organizations together to identify collaborative funding opportunities		Annual meetings to work on fund development strategies to continue to seek long-term, sustainable funding
Identify, seek and acquire a range of funding models, partners, and opportunities		
Monitor success of AIS Program and associated activities through an annual review of committee and partner achievements		CB AIS Steering Committee met on 5 April 2016. Consensus of SC was to meet twice annually moving forward
Develop and utilize a method of evaluating the outreach program by creating a baseline survey to measure change in knowledge and/or behaviour	June 2015	
<b>Goal 2: Education and Outreach</b>		
Utilize community-based social marketing and social networking tools and other appropriate approach: develop and distribute targeted resources (Table 3 target audience)		Inclusion of BMP for AIS prevention in environmental mgmt. plans & training modules (BCH); Invasive species e-learning certification for real estate & land use professionals (ISCBC)
Identify and maintain a list of all relevant audiences to target for presentations, brochures, posters	May 2015	
Install signage by identifying existing and potential locations of signs, kiosks and billboards (except at provincial and federal border crossings)		Over 60 signs with AIS messaging installed
Coordinate the development of a CB AIS brochure that is consistent between regions	Spring 2017	
Provide training workshops to relevant audiences (Table 3 target audience)		'Train the Trainer' sessions (BCH)
Partner with the province-wide Clean, Drain, Dry program		
Develop and maintain a handout of boat and car wash stations available that do not drain into natural waterbodies and advertise these to boaters	August 2015	Updated annually
Promote training on disinfection protocols to relevant audiences		
Coordinate with and provide training (when required) to stewardship groups and others who do aquatic outreach to facilitate incorporating AIS messaging into programs		
Promote AIS education in elementary and secondary schools and post-secondary institutions by providing guest speaker programs or "train the educator" opportunities		"Teaching about Native & Invasive Species" train the educator workshops (CKISS)

Work with hydro electric utilities to conduct mail-outs, sponsor signs, and develop a mussel-impact on hydro-power awareness campaign		Columbia Power, BCH, FortisBC
Provide City Council delegations presentations on the importance of ZQM and other AIS prevention		Presentation for local city councils and district staff (CKISS, CSISS)
Write letters, conduct follow-up phone calls, and provide presentations to elected officials about the importance of AIS prevention and programs		AIS presentation for local MP, MLA (CSISS)
<b>Goal 3: Watercraft Inspection and Decontamination</b>		
Identify opportunities to establish and/or support watercraft inspection and decontamination stations in the region		Promoting stations through traditional and social media spots/posts
Facilitate and/or participate in watercraft inspection and decontamination training opportunities in the Basin		WID crews present at annual fly fishing symposium; marina owner's education event
Promote the RAPP line for mussel-reporting		Information included in press releases, interviews, resources, websites, etc.
<b>Goal 4: Monitoring and Research</b>		
Work with provincial government and RISOs to identify high priority sites for monitoring		
Coordinate monitoring activities with provincial government and regional organizations		Dreissenid mussel early detection lake monitoring program
Conduct inventories for AIS, including aquatic and riparian plants and ZQM veligers, at high priority water ways		Yellow flag iris, flowering rush, American bullfrog, Dreissenids, New Zealand mudsnail, northern pike
Contribute monitoring location data to the Columbia River Basin Aquatic Invasive Species Database	Annually	Regional invasive mussel monitoring uploaded to database
Develop and maintain maps of monitoring sites by species and year and of species closest known locations		Links to relevant AIS databases available through program webpage on RISO's websites (SC consensus was map maintenance is cost prohibitive). Pre-2016 maps available from Program Coordinator.
Work with provincial government to identify experts in identification of species as required		

Promote and utilize a centralized database for AIS including IAPP until IASP is available		
Promote and distribute B.C. AIS Monitoring protocols		British Columbia Dreissenid Mussel Lake Monitoring Field Protocol; British Columbia Aquatic Invasive Species Survey Methods
Develop expertise within RISOs to identify provincial Prohibited and Controlled Alien Species as well as regional priority species		
Provide training workshops to relevant regional groups on AIS identification, monitoring standards, and disinfection protocols		BCH, CKISS, CSISS, EKISC, COS, ISCBC
Identify, support, and partner with research projects including potential impacts, mitigation techniques, and management strategies		ONA, CKISS, BCH, CSISS
Enable communication of research activities through regional forums, website or other means		Invasive Species Research Conference
<b>Goal 5: Response and Management</b>		
Develop a response plan for species that are not of provincial EDRR priority but are regional priority species		EDRR American Bullfrog Kootenay-Boundary Region (American Bullfrog Action Team); corporate Invasive Species Strategy, including species risk assessments and associated action plans (BCH)
Support the development of response tools that can be utilized if a high priority species is detected		Support ready access to registered control products for AIS to enable rapid response
Identify potential spread patterns for existing AIS infestations to determine where to monitor or contain	April 2016	
Prioritize AIS sites for management action		
Install signage at AIS infested sites to promote CDD or PlantWise to reduce spread		
Develop “alerts” and other tools for new invaders to prevent spread of existing infestations		American bullfrog invader alert

\*WORDING HAS BEEN PRESERVED FROM THE ORIGINAL FRAMEWORK GOALS.