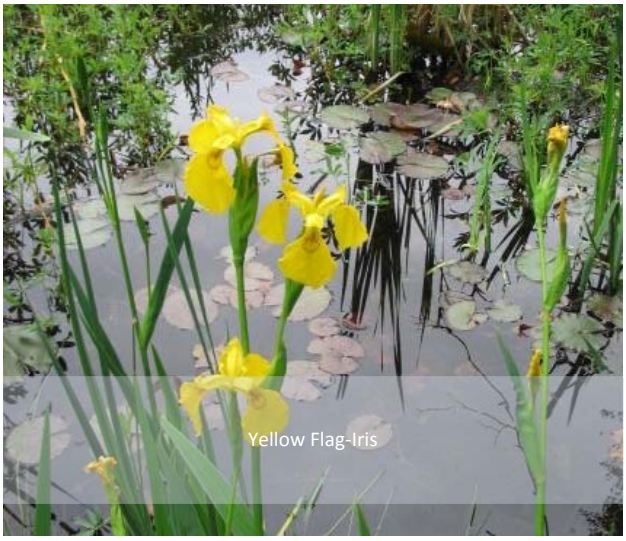
May 2015

Canadian Columbia Basin Regional Framework for an Aquatic Invasive Species Program: 2015 to 2020

Zebra Mussel


Yellow Flag-Iris

Eurasian Water-Milfoil

American Bullfrog

Prepared for Columbia Basin Trust |
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For more information, contact Columbia Basin Trust www.cbt.org

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 (AIS) are nonindigenous 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 four regional invasive species committees operating in this region (Central Kootenay Invasive Plant Committee, East Kootenay Invasive Plant Council, Columbia Shuswap Invasive Species Society and Northwest Invasive Plant Council) are developing or expanding their current AIS programs. The purpose of this document is to provide a framework for regional committees and their partners to promote a proactive, strategic, collaborative and coordinated approach to AIS 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 Columbia Basin Trust portion of the Canadian Columbia Basin in south-eastern British Columbia.

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 EDRR species), the scope and expertise of regional committees (e.g. currently regional committees 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 committees and partner organizations. The timeline, organization(s) responsible, and details for each task will be identified in regional committee annual work plans. Local and regional stewardship groups and other partners are encouraged to work with their regional committees 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, Outreach and Prevention, Watercraft Inspection and Decontamination, Monitoring and Research, and Response and Management. For each of these program areas, Goals and Action Items are identified.

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BACKGROUND

PURPOSE

Aquatic Invasive Species (AIS)[1] 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 four regional invasive species committees operating in this region (Central Kootenay Invasive Plant Committee, East Kootenay Invasive Plant Council, Columbia Shuswap Invasive Species Society and Northwest Invasive Plant Council) are developing or expanding their current AIS programs. The purpose of this document is to provide a framework for regional committees 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 BC and neighbouring jurisdictions and focuses resources where they are most effective within a 5-year time frame. 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.

AIS PROGRAM AREA

This program applies to the Columbia Basin Trust (the Trust) portion of the Canadian Columbia Basin (hereafter referred to as the "Basin") which includes the operating areas encompassed by the Central Kootenay Invasive Plant Committee (CKIPC), East Kootenay Invasive Plant Council (EKIPC), eastern portion of the Columbia Shuswap Invasive Species Society (CSISS) and southeastern tip of the Northwest Invasive Plant Council (NWIPC)(Figure 1). Although activities focus primarily on south-eastern BC, they are designed to be consistent with broader initiatives of the Province of BC and the Invasive Species Council of BC (ISCBC). 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 committees 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 regional committees and their partners in the Basin, such as local stewardship groups and provincial agencies, for delivering their AIS programs. Regional committees are non-profit societies that have no legal land or water management jurisdiction. One of the primary roles of regional committees is outreach and awareness, a critical component of AIS prevention. Regional committees also participate in monitoring, treatments and research activities by working in partnership with other

[1] For a list of acronyms, see Appendix A

organizations. This Program Framework may also be utilized by the partners of regional committees to identify shared priorities that promote a consistent and coordinated approach to AIS management in the Basin.

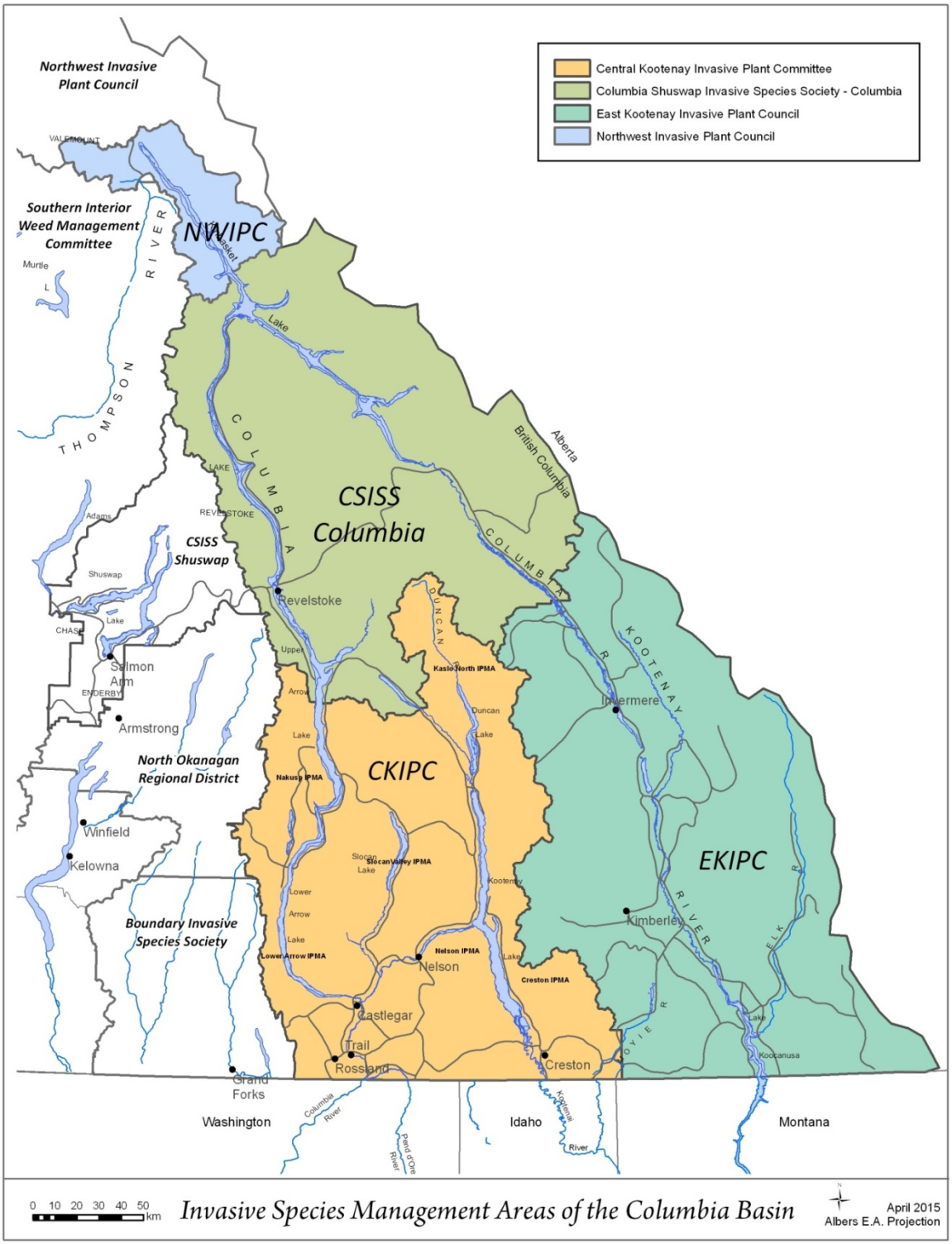


Figure 1: Administrative boundaries of Canadian Columbia Basin Aquatic Invasive Species program area including regional invasive plant committee boundaries.

The scope and roles of the regional program in the Trust portion of the Canadian Columbia Basin are designed to recognize the broader initiatives in the Province of BC[2] and neighbouring jurisdictions. One of the highest priorities of this program is to ensure that it compliments Provincial activities, remains within the scope of regional invasive plant committee's 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 BC (Figure 2).

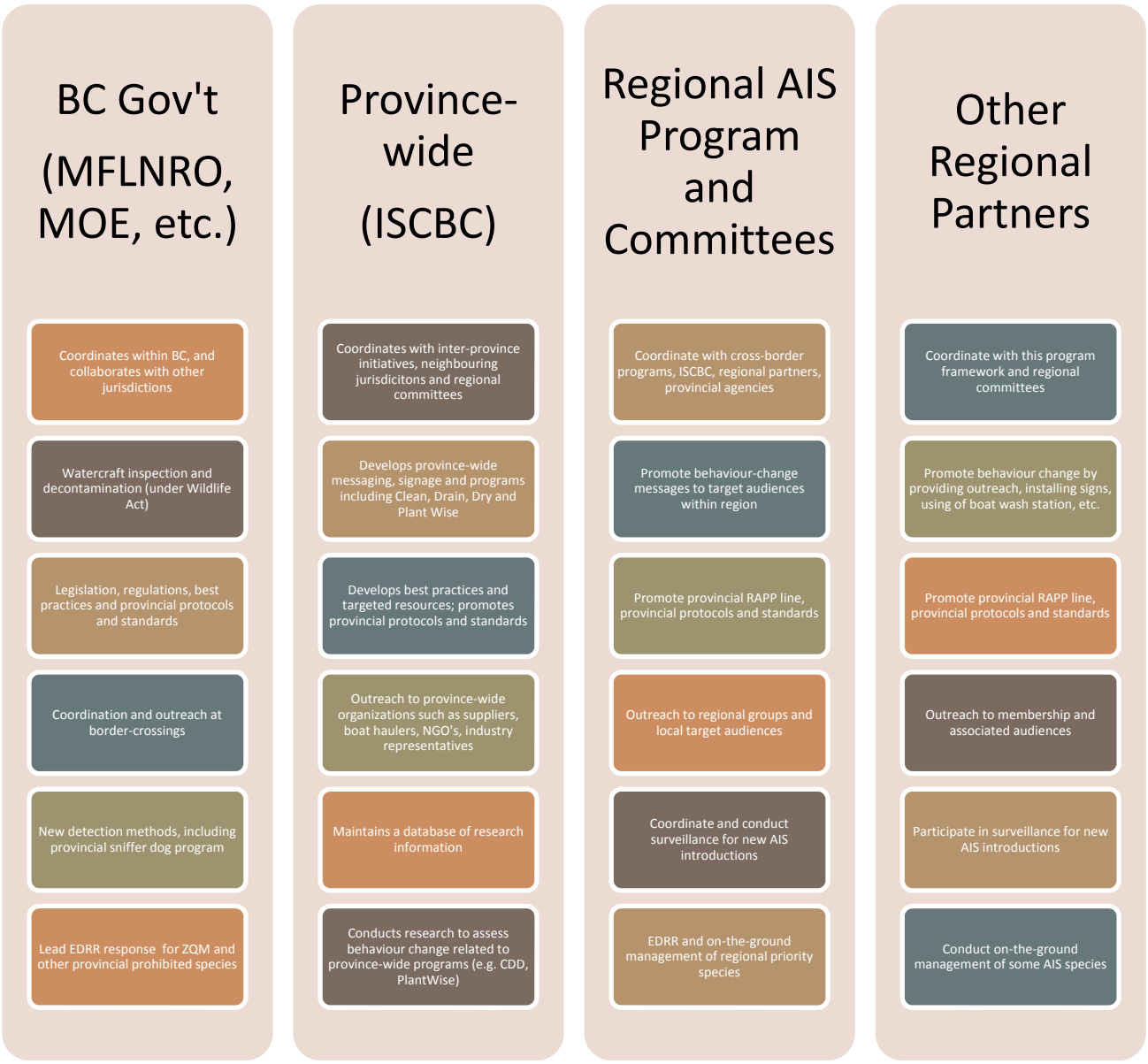


Figure 2: Overview of how regional AIS program aligns with province-wide initiatives. The majority of this AIS program will be delivered by the regional committees and their regional partners.

[2] See the BC Provincial Government Invasive Species Strategic Plan: https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_IS_Strategy.pdf

PRIORITY AQUATIC INVASIVE SPECIES AND PATHWAYS

PRIORITY AQUATIC INVASIVE SPECIES

Focal aquatic invasive species 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 vector 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 regional committees (e.g. currently regional committees 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 regional committee's 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 BC, prevention is generally the focus. Some aquatic plant species are included on the BC Government's Prohibited Species List[3] and are considered by the Province to require "Early Detection, Rapid Response (EDRR)" tactics. For these species, the Province takes the lead role in management action if the species is detected. Regional committees 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. Regional committees and/or local governments will take the lead for management of aquatic plant species that are not on the BC Prohibited Species list, including outreach, inventory, and potentially treatment activities.

[3] http://hcp.ca/wp-content/uploads/2014/11/Proposed_Prohibited_Noxious_Weeds_June2014.pdf

Zebra Mussels
Photo credit: US Fish and Wildlife Service

Aquatic invertebrates, including zebra and quagga mussels (ZQM), are regulated under the *BC Wildlife Act* Controlled Alien Species Regulation (Appendix B) 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 BC Government is promoting their "Report All Poachers and Polluters" (RAPP) line for mussel reporting and hosting three mobile decontamination units in the province. They are also taking the lead in provincial highway signage, provincial early detection (e.g. sniffer dogs and watercraft inspection stations) as well as mussel response. Regional committees will provide "Clean, Drain, Dry" 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, regional committees have not participated in fish management and do not currently hold this expertise. Regional committees 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 Tuszynski, Wikipedia

Other aquatic invasive vertebrates (not including fish) include the American Bullfrog which is known to occur just across the U.S. border from Creston and could pose significant risks to at-risk northern leopard frog populations. The provincial government is coordinating the management of these species in BC and regional committees 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 Committee role					
			Prioritization of sites	Inventory/ Surveillance	EDRR Reporting	Treatments	Outreach	Collaboration with local groups
Riparian plants	Yellow flag-iris Purple loosestrife Policeman's helmet Giant hogweed Invasive knotweeds	As per committee IPMA management plans; Management approach and response led by each regional committee	✓	✓	✓	✓	✓	✓
Aquatic plants on Prohibited Species List (Provincial EDRR)	Brazilian elodea Water hyacinth Hydrilla	EDRR Response led by MFLRNO Regional involvement when required		✓	✓		✓	✓
Aquatic plants NOT on Prohibited Species List	Curly-leaf pondweed Eurasian water-milfoil Fragrant water lily Flowering rush	Management approach and response led by each regional committee or local government		✓	✓	✓ Partici-pation where required	✓	✓
Aquatic invertebrates	Zebra quagga mussel New Zealand mudsnail Rusty crayfish	Management approach and response led by provincial government. Regional involvement when required		✓	✓		✓	✓
Fish	Northern pike Yellow perch Large mouth bass	Management approach and response led by provincial government. Regional involvement when required		✓	✓		✓	✓
Vertebrates (non-fish)	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 water bodies that ultimately drain into the Columbia River, such as the Elk, Kootenay and Slocan 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: Columbia Basin Trust portion (marked in red line) of the Columbia River Basin[4].

Given this flow of water bodies, 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).

[4] 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
Kootenai River From Idaho and flows into the B.C. Kootenay River at Creston	American bullfrog	Surveillance done on bullfrogs in 2014 and none detected
	Eurasian water-milfoil	Already established in BC Kootenay River
	Brook trout	
	Brown bullhead	
	Mosquitofish	
	Pumpkinseed, largemouth bass, yellow perch	
	Curly leaf pondweed	Already established in BC Kootenay River
Pend D'Oreille River From Washington and flows into B.C. at Nelway	Curly leaf pondweed	
	Eurasian water-milfoil	
	Flowering rush	Has not been detected to date in Canadian Pend D'Oreille (PDO) River
	Yellow flag-iris	Small sites have been detected and treated in Canadian PDO River
	Purple loosestrife	Has not been detected to date in Canadian PDO River
	Asian Clam	Present in Lake Pend D'Oreille
	Chinese Mystery Snails	Present in Priest Lake Idaho. Enters PDO River downstream from Lake PDO
	Northern pike and walleye	Noxon Rapids reservoir and a few lakes in Lower Flathead drainage
	Lake trout, brown trout, black crappie, yellow perch, smallmouth bass, pumpkinseed and bullhead	Lake Pend D'Oreille
	Virile crayfish	Known presence throughout PDO system from Flathead Lake to Lake PDO. Also present in Lake Roosevelt, WA (Columbia River)
Columbia River Flows south from Trail, BC, into Washington	Northern pike and walleye	Northern pike already in Columbia River from Trail to south of Hugh Keenlyside Dam;
	Common carp, smallmouth bass, yellow perch, lake whitefish, lake trout	Present in the Columbia River up to the Hugh Keenlyside Dam and Brilliant Dam.
Koocanusa Flows south from Newgate, BC, into Montana	Yellow perch	
	Brook trout	
		Many fishing blogs/threads mention the presence of pike, small and largemouth bass in Koocanusa. Have found no official confirmation.
Flathead River Flows south from Flathead, BC, into Montana	American Bullfrog	Located near Kalispell, Montana upstream from Flathead Lake. Can migrate over land.
	Flowering rush	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 move 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 BC waters. The microscopic veligers (mussel larvae) 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 *Wildlife Act of BC* 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 are a critical component of AIS prevention. The Province of BC is the lead agency for establishing watercraft inspection and decontamination stations across the province. Regional committees will identify and act on opportunities to support and assist with watercraft decontamination given its high priority in the region.

Outreach strategies in this AIS Program to prevent human-caused AIS introductions are based on the concept of community-based social marketing[5], whereby key messages are promoted to encourage specific behaviours. The Invasive Species Council of BC (ISCBC) 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 and "Plant Wise" to encourage the use of non-invasive species for water gardens and other horticultural purposes. To be consistent with this province-wide approach, the outreach and prevention component of this program will focus on changing behaviour or target audiences for specific priority pathways of introduction and spread (Table 3).

[5] http://www.cbsm.com/public/world.lasso

Table 3: Priority pathways and target action items for prevention and outreach of aquatic invasive species in the Basin.

Pathway of Introduction	Strategy	Target Audience	Key message	Feature species[6]
Recreation (boating, fishing, diving)	Disseminate AIS messaging and encourage CDD behaviour	Boaters, anglers and divers	**Protect our waters, Clean, Drain, Dry**	Zebra and quagga mussels; NZ mudsnail
☐ 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) ☐ Conduct brochure runs and put up posters for "Clean, Drain, Dry" (CDD) ☐ Send outreach about CDD to contact list and offer presentations and demonstrations on CDD ☐ Prioritize boat ramps for outreach (use survey developed by EKIPC); utilize Priority Matrix for boat ramp Locations ☐ Prioritize boat events for info booths ☐ Determine potential signage location (based on priority matrix and input from contacts)				
Horticulture and water garden trade	Promote Plant Wise program	Horticultural centres, garden clubs, and stores	**Plant Wise**	Yellow flag-iris and invasive knotweeds; fragrant water lily; flowering rush
☐ Update and maintain overall contact list (garden clubs, plant nurseries, horticultural centres) ☐ Conduct brochure runs and put up posters for "Plant Wise" ☐ Visit garden centres to offer training/workshops/resources on species to avoid selling, and proper disposal techniques, and to review inventory ☐ Provide presentations to garden groups ☐ Provide display booth or presentations at garden tours/shows ☐ Provide information for Landscape Certification Courses with Codes of Conduct and/or principles ☐ Advertise "Plant Wise" garden centres and businesses on regional committee websites				
Aquarium, school and pet trade	Encourage the proper disposal of pets and lab specimens	Aquarium and pet stores, school biology depts, animal welfare societies, vets	**Don't Let it Loose**	Brazilian elodea; rusty crayfish; American bullfrog
☐ Update and maintain overall contact list (aquarium and pet centres, SPCA, animal welfare groups) ☐ Conduct brochure runs and put up posters for "Don't Let It Loose" ☐ Visit aquarium and pet centres to review inventory of species being sold and update on AIS Regulations o Determine which centres/stores provide disposal options (e.g. can they take pets back?) If so, advertise on website "Buy It Back" Program o Contact vets for humane disposal options ☐ Offer school programs through Wild Voices for kids (wait for ISCBC to develop curriculum) ☐ Visit/contact school Biology/Admin about school aquariums and proper disposal ☐ Provide programs to youth (e.g. Girl Guide, Scouts, Junior Naturalists, Fishing Clubs, Summer camps, Home-school groups) ☐ Contact Animal Welfare Societies ☐ Provide citizen-science opportunities for monitoring bullfrogs				

[6] Although the primary target species is the priority for outreach and management, the strategies address many other AIS.

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

Pathway of Introduction	Strategy	Target Audience	Key message	Feature species
Intentional unauthorized introductions	Educate anglers about impacts and consequences of illegal fish introductions		**Don't Let it Loose**… invaders make bad neighbours	Northern pike
☐ Promote message "Don't Let It Lose" and illegality of moving fish in existing CDD presentations ☐ Consider signage at sites where high priority fish AIS occur (e.g. Castelgar to Trail for northern pike) ☐ AIS Lead to explore and identify further outreach options in winter 2015				
Agency and restoration activities	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	**Protect our waters, Clean, Drain, Dry**	Eurasian water-milfoil; Zebra and quagga mussels
☐ Provide information/ presentations/ training to fisheries biologists, restoration ecologists, monitoring biologists, stream keepers on CDD (e.g. NCC, FWCP, stream keepers, stewardship groups) ☐ Provide information to organizations who develop contracts for water-based work so they can include best management practices within contract requirements ☐ Set up AIS Workshop that includes information and demonstrations on equipment disinfection, boat decontamination, AIS identification (e.g. CSISS AGM 2015 to model this)				
Industrial Marine Works[7]	Promote the adoption of policies and procedures for equipment cleaning and decontamination[8]	Industrial marine companies	**Protect our waters, Clean, Drain, Dry**	Eurasian water-milfoil; Zebra and quagga mussels
☐ Explore opportunities to contact or provide outreach to industrial marine works for CDD Outreach ☐ AIS Lead to explore and identify further outreach options in winter 2015 (e.g. MoE permits? BMPs?)				

[7] 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.

[8] http://gallery.mailchimp.com/e33c86939a981667760e6a3a2/files/MoE_CAS_training_V1.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 regional committees and partner organizations. The timeline, organization(s) responsible, and details for each task will be identified in regional committee annual work plans. Local and regional stewardship groups and other partners are encouraged to work with their regional committees 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, Outreach and Prevention, Watercraft Inspection and Decontamination, Monitoring and Research, and Response and Management (Figure 4).

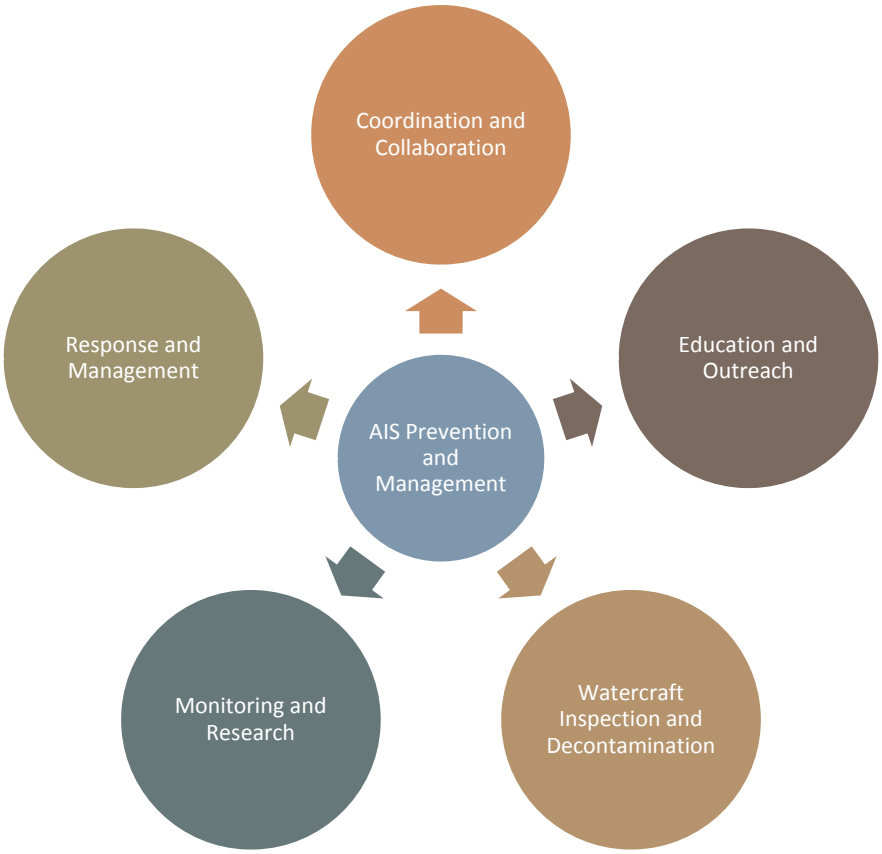


Figure 4: Diagram of five program areas for the Aquatic Invasive Species Program for the Columbia Basin.

COORDINATION AND COLLABORATION

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

- Form a basin-wide AIS Working Group (that includes a representative from each regional invasive plant committee) to oversee implementation of this Program. Potential AIS Working Group members include representatives from:
    - Regional Committees: Central Kootenay Invasive Plant Committee, East Kootenay Invasive Plant Council, Columbia Shuswap Invasive Species Society, Northwest Invasive Plant Council
    - Interested regional and local stewardship groups
    - Provincial Government: Ministry of Environment, Ministry of Forests, Lands and Natural Resource Operations
    - First Nations: Ktunaxa Nation Council, Canadian Columbia River Inter-Tribal Fisheries Commission (CCRIFC)
    - Federal Government: Department of Fisheries and Oceans (they have indicated they are not available), Parks Canada (they have indicated they are not available)
    - Local government (e.g. municipality, regional district)
    - Province-wide programs (e.g. Invasive Species Council of BC)
    - Neighbouring jurisdictions: Alberta, Idaho, Washington, Montana
    - Utility companies: e.g., FortisBC, Columbia Power Corporation, BC Hydro
    - Private sector: e.g., Teck Ltd.
    - Educational Institutions: e.g., Selkirk College, College of the Rockies
    - Major funders: e.g., Columbia Basin Trust
- Promote regional committees as the “go to” organizations for AIS in the Basin.
    - Regional committees can play an important role as a coordinating body for AIS activities in the Basin.
- Designate an AIS Basin-wide Lead Coordinator for the Columbia Basin AIS Program
    - Consider a regional committee representative (such as a regional AIS Coordinator)
- Identify an AIS Coordinator for each regional committee (in addition to the AIS Lead Coordinator) to maintain communication for on-the-ground coordination of efforts
- Maintain communication, and participate as required, with working groups established for priority AIS
    - E.g. American bullfrogs, northern pike, flowering rush
- Maintain regular and two-way information flow with cross-border and provincial initiatives through the AIS Working Group
    - E.g. MFLNRO, ISCBC, and US Columbia Basin ZQM group (100th Meridian)
- 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
    - See MS Excel Workbook titled: *AIS Partners in Columbia Basin.xls*
- Develop and maintain a website 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
- Produce a CB AIS Newsletter to maintain communication and highlight achievements of the CB AIS program

- Revisit this AIS Program Framework annually 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

- Develop and maintain a list of priority species with their associated known locations and pathways of introduction
    - See MS Excel Workbook titled: *CB AIS List.xls* and maps in Appendix F
- Develop collaborative proposals 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 Working Group

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

- 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 an annual review of committee and partner achievements with follow-up every two years
    - Check-in by AIS Working Group and AIS Coordinators of which action items have been completed or addressed annually
- 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 through an AIS newsletter and on website
- 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 Plant Wise 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 two years, beginning in 2016, 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 (CBSM) and social networking tools (Facebook, website) and other appropriate approach (e.g. Clean, Drain, Dry; Plant Wise)
    - 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 (see Table 3)
- Ensure regional outreach is consistent with the ISCBC BC Education and Outreach Framework for Invasive Species (in development)
- Identify and maintain a list of all relevant audiences to target for presentations, brochures, posters
    - E.g. horticultural centres, marinas, boat repair shops, angling clubs, etc. (see 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 a the development of a CB AIS brochure that is consistent between regions
- Promote AIS education in schools by providing a guest speaker program or train the trainer or delivering programs
- Provide programs to youth (e.g. Girl Guide, Scouts, Junior Naturalists, Summer camps, Home-school groups)
- Provide training workshops to relevant audiences
    - E.g. Plant Wise for horticultural centres; CDD for anglers, etc. (See Table 3)
- Support the development of a video on the threat and potential impacts of ZQM introduction in the Basin

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
- Develop a handout of boat and car wash stations available that do not drain into natural water bodies and advertise these to boaters
    - Promote CDD signs at these venues
- Utilize regional boat decontamination stations for outreach and demonstration at high priority events
    - E.g. fly fishing symposium, kayak festivals, wakeboarding competitions, BC River's Day, fishing derbies

- Promote and provide 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 BC Wildlife Federation)
- Promote AIS education in 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 and 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 (WID)

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

- Identify opportunities to establish and/or support watercraft inspection and decontamination stations in the region
- Facilitate and/or participate in watercraft inspection and decontamination training opportunities in the Basin
- Provide Rapid Response crews with watercraft decontamination units as required

GOAL 3.2 INCREASE DETECTION OF MUSSEL-INFESTED WATERCRAFT

- Promote the RAPP line for mussel-reporting
- Work with provincial government, as required, to support deployment of sniffer dog teams in the Basin

RESEARCH AND MONITORING

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

- ☐ Identify high priority sites for monitoring by developing Basin-wide criteria for prioritizing waterbodies
  - Utilize criteria that are easily defined by regional committee coordinators (see Appendix C)
- ☐ Coordinate monitoring activities with provincial government and regional organizations
- ☐ Conduct inventories for AIS, including aquatic and riparian plants and ZQM veligers, at high priority water ways
  - Develop and maintain a map of monitoring sites by species and year (see Appendices D and E)
- ☐ Contribute monitoring location data to the Columbia River Basin Aquatic Invasive Species Database (http://crbais.psmfc.org/)
- ☐ Identify natural colonization pathways of high priority AIS across the borders
  - See MS Excel Workbook *AIS Locations.xls* and Appendix F
- ☐ 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[9] available. The fields required for IASPP will be[10]:
  - UTMs (coordinates), species name, survey date, surveyor, jurisdiction
  - Density and distribution of infestation
  - Area of infestation (if possible) or presence/absence
- ☐ Promote and distribute BC AIS Monitoring protocols[11]
- ☐ Develop expertise within Regional Committees to identify provincial Prohibited and Controlled Alien Species as well as regional priority species
- ☐ Report Provincial EDRR species to the Provincial Government
- ☐ Where applicable, pilot novel monitoring options

GOAL 4.3: INCREASE OPPORTUNITIES TO PARTICIPATE IN AIS MONITORING

- ☐ Develop a citizen science AIS monitoring program and link high priority monitoring sites with nearby stewardship groups
  - See MS Excel Workbook *AIS Partners in Columbia Basin.xls*
- ☐ Work with provincial government to provide training sessions in the Columbia Basin to train the AIS Coordinator and regional committee staff on provincial AIS monitoring protocols allowing them to train others in the region
- ☐ Provide training workshops (potentially including a "train the trainer") to relevant regional groups on AIS identification, monitoring standards and disinfection protocols

[9] MFLNRO is developing the Invasive Alien Species Program Application that will be centralized database for BC: Available 2016
[10] Becky Brown, Invasive Plant Specialist – EDRR Coordinator, MFLRNO, personal communication
[11] BC Ministry of Environment is developing standardized AIS monitoring protocols (available spring, 2015); MFLNRO has developed standardized aquatic plant monitoring protocols.

GOAL 4.4 PROMOTE AND FACILITATE AIS RESEARCH

- ☐ Identify, support and partner with research projects including potential impacts, mitigation techniques and management strategies.
- ☐ Establish research priorities and share these with funding agencies, college researchers and AIS –related organizations. Potential topics include:
    - What would be the true cost of invasive mussels establishing in the Columbia Basin? (economic, ecological, social impacts)
    - What are the costs of aquatic and riparian plant infestations? (including property value impacts of Eurasian water-milfoil and knotweeds)
    - How can AIS be prevented from entering the Basin? (natural and human-assisted introduction)
    - How can AIS be successfully managed once it has established? (e.g. yellow flag-iris trials)
    - Baseline survey on resident's current knowledge of AIS and where their knowledge is acquired
- ☐ Enable communication of research activities through regional forums, website or other means

RESPONSE AND MANAGEMENT

GOAL 5.1: FOLLOW THE PROVINCIAL RESPONSE PLAN FOR ZEBRA AND QUAGGA MUSSELS (ZQM)

- ☐ Participate on the Provincial ZQM Rapid Response Team[12] as required
- ☐ Report any new potential Dreissenid mussel incursion events to the Provincial ZQM EDRR Coordinator
- ☐ Promote the provincial RAPP line for reporting
- ☐ 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[13] as required
- ☐ Promote regional committees 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 infested sites of AIS to promote CDD or Plant Wise to reduce spread
- ☐ Develop "alerts" and other tools for new invaders to prevent spread of existing infestations

[12] https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_ZQM_EDRR_Plan.pdf
[13] https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_EDRR_IS_Plan.pdf

ADDITIONAL RESOURCES

REGIONAL INVASIVE SPECIES COMMITTEES

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

- Central Kootenay Invasive Plant Committee: www.ckipc.ca
- East Kootenay Invasive Plant Council: www.ekipc.com
- Columbia Shuswap Invasive Species Society: www.columbiashuswapinvasives.org
- Northwest Invasive Plant Council: www.nwipc.org

INVASIVE SPECIES COUNCIL OF BC

- Province wide resources for AIS; www.bcinvasives.ca

INVASIVE SPECIES STRATEGY FOR BC (NON-GOVERNMENT)

- http://bcinvasives.ca/about/invasive-species-strategy-for-bc

PROVINCIAL INVASIVE SPECIES STRATEGIC PLAN

- https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_IS_Strategy.pdf

PROVINCIAL GOVERNMENT EARLY DETECTION AND RAPID RESPONSE PLANS

- Invasive Species: https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_EDRR_IS_Plan.pdf
- Zebra and Quagga Mussels: https://www.for.gov.bc.ca/hra/invasive-species/Publications/Prov_ZQM_EDRR_Plan.pdf

BC'S NEW CONTROLLED ALIEN SPECIES REGULATION

- Includes flow chart for watercraft decision-making: http://gallery.mailchimp.com/e33c86939a981667760e6a3a2/files/MoE_CAS_training_V1.pdf
- Full list of Controlled Alien Species: http://www.env.gov.bc.ca/fw/wildlifeactreview/cas/

BC PROPOSED PROHIBITED NOXIOUS WEEDS

- http://hcp.ca/wp-content/uploads/2014/11/Proposed_Prohibited_Noxious_Weeds_June2014.pdf

REPORT-A-WEED ONLINE APPLICATION

- https://www.for.gov.bc.ca/hra/Plants/raw.htm

BC AQUATIC INVASIVE SPECIES SURVEY METHODS

- Prepared by Inter-Ministry Invasive Species Working Group, March, 2015
- https://www.for.gov.bc.ca/hra/invasive-species/Publications/BC_Aquatic_Sampling_March2015.pdf

INVASIVE ALIEN PLANT PROGRAM

- Database for invasive plant records. The Map Display is publicly accessible.
- http://www.for.gov.bc.ca/hra/Plants/application.htm

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://crbais.psmfc.org/

100TH MERIDIAN INITIATIVE (ZEBRA AND QUAGGA MUSSEL)

- http://100thmeridian.org

INVASIVE MUSSEL VIDEO FOR BC (5 MINUTES - GREAT FOR PRESENTATIONS)

http://vimeo.com/125057151

APPENDIX A: LIST OF ACRONYMS

AIS	Aquatic Invasive Species
CCRIFC	Canadian Columbia River Inter-Tribal Fisheries Commission
CDD	Clean, Drain, Dry
CKIPC	Central Kootenay Invasive Plant Committee
CPC	Columbia Power Corporation
CSISS	Columbia Shuswap Invasive Species Society
EDRR	Early Detection, Rapid Response
EKIPC	East Kootenay Invasive Plant Council
FWCP	Fish and Wildlife Compensation Program – Columbia Basin
IAPP	Invasive Alien Plant Program application (Provincial government database for invasive plants)
IASP	Invasive Alien Species Program application (IAPP being developed to incorporate invasive species)
ISCBC	Invasive Species Council of BC
KNC	Ktunaxa Nation Council
MFLNRO	BC Ministry of Forests, Lands and Natural Resource Operations
MOE	BC Ministry of Environment
MOTI	BC Ministry of Transportation and Infrastructure
NWIPC	Northwest Invasive Plant Council
PDO	Pend D'Oreille (River)
RAPP	Report All Poachers and Polluters (provincial government phone line)
ZQM	Zebra and quagga (dreissenid) mussels

APPENDIX B: AQUATIC AND RIPARIAN SPECIES REGULATED IN BC.

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 pondweed		✓		
Reed canary grass		✓		
Hydrilla		✓		
Bullfrog		✓		
Zebra mussels				✓
Quagga mussels				✓

For a full list of Controlled Alien Species, see http://www.env.gov.bc.ca/fw/wildlifeactreview/cas/.

APPENDIX C: DRAFT RANKING MATRIX FOR MONITORING PRIORITY OF WATER BODIES.

This ranking tool is designed to help prioritize monitoring, outreach and boat wash sites by indicating waterbodies with the highest priority for AIS Introduction and the greatest potential impacts. The ranking tool was adapted from one in Idaho[14]. This version is in draft form until several regions have applied and adapted the tool. A document on "*How to use the AIS Ranking Tool*" has also been developed.

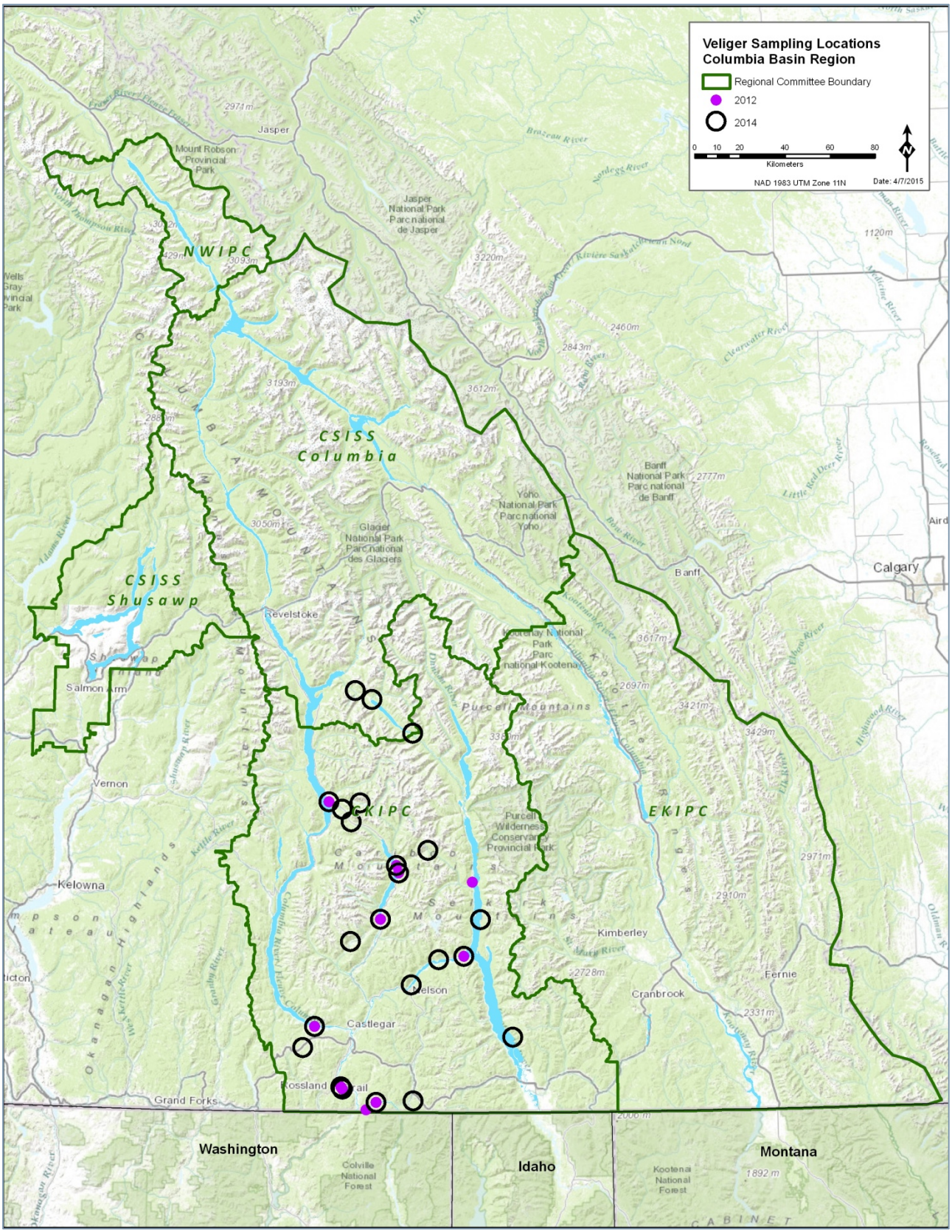
Factor	Ranking	Comments
Probability of AIS Introduction (Use)		
# Boat Launches into waterbody	• 1 ramp = 1 points • 2-3 ramps = 3 points • 4-5 ramps = 4 points • More than 5 ramps = 7 points	This is a proxy for the amount of boat traffic into this waterbody.
Moorage	If a waterbody has a boat moorage facility, the waterbody is given 4 points.	This information was used to factor in long term boater usage (vs. "day tripper" use). Long-term usage is seen as higher risk for inoculation of a waterbody.
Water-based events e.g. fishing/ wakeboard/ kayak festivals and tournaments	Waterbodies that have at least one event per year are given 3 points.	This data was factored into use due to the large number of out-of-province boats that compete in these events.
Ease of Access	By paved road (5 points) By gravel road (3 points) By foot (1 point)	More tourism and boat traffic with easier access, therefore more likelihood of AIS introduction
Proximity to source population	Upstream source of AIS (of category being monitored) (6 points)	Waterbodies that already have an upstream AIS population would be more likely to have natural introduction
Severity of Consequence of AIS Establishment and Spread		
Endangered/Threatened Species	If a waterbody has endangered species, it is given 6 points, if a waterbody has threatened species, it is given 3 points.	The presence of these species is a proxy for ecological impacts of invasion. Use Ecosystem Explorer for amphibians and fish species.
# Hydro-electric facilities and water intakes	A point is given for each water intake present in the waterbody; large dams and hydroelectric facilities receive 5 points	The number of these facilities is a proxy for the economic impacts of invasion.
Recreation	Points for # recreation icons in the Backroads Mapbook (1=1; 2 to 4=2; 5+=3)	The number of these icons is a proxy for the recreational impacts of AIS on this waterbody Include the following icons: Anchorage; Boat launch; Beach; Campsites; Canoe access; Diving; Fishing; Paddling; Picnic site; Portage; Resort; Wildlife viewing; Windsurfing; Float Plane
Size of waterbody (as measured at longest/widest point)	< 2 km = 1 point 2 to 4 km = 2 points Greater than 4 km = 3 points	This is a proxy for the difficulty of control. Small discrete lakes may have more control options than larger or connected waterbodies. Note backroad mapbook is 1 cm = 2 km

[14] http://www.aquatics.org/musselreport.pdf

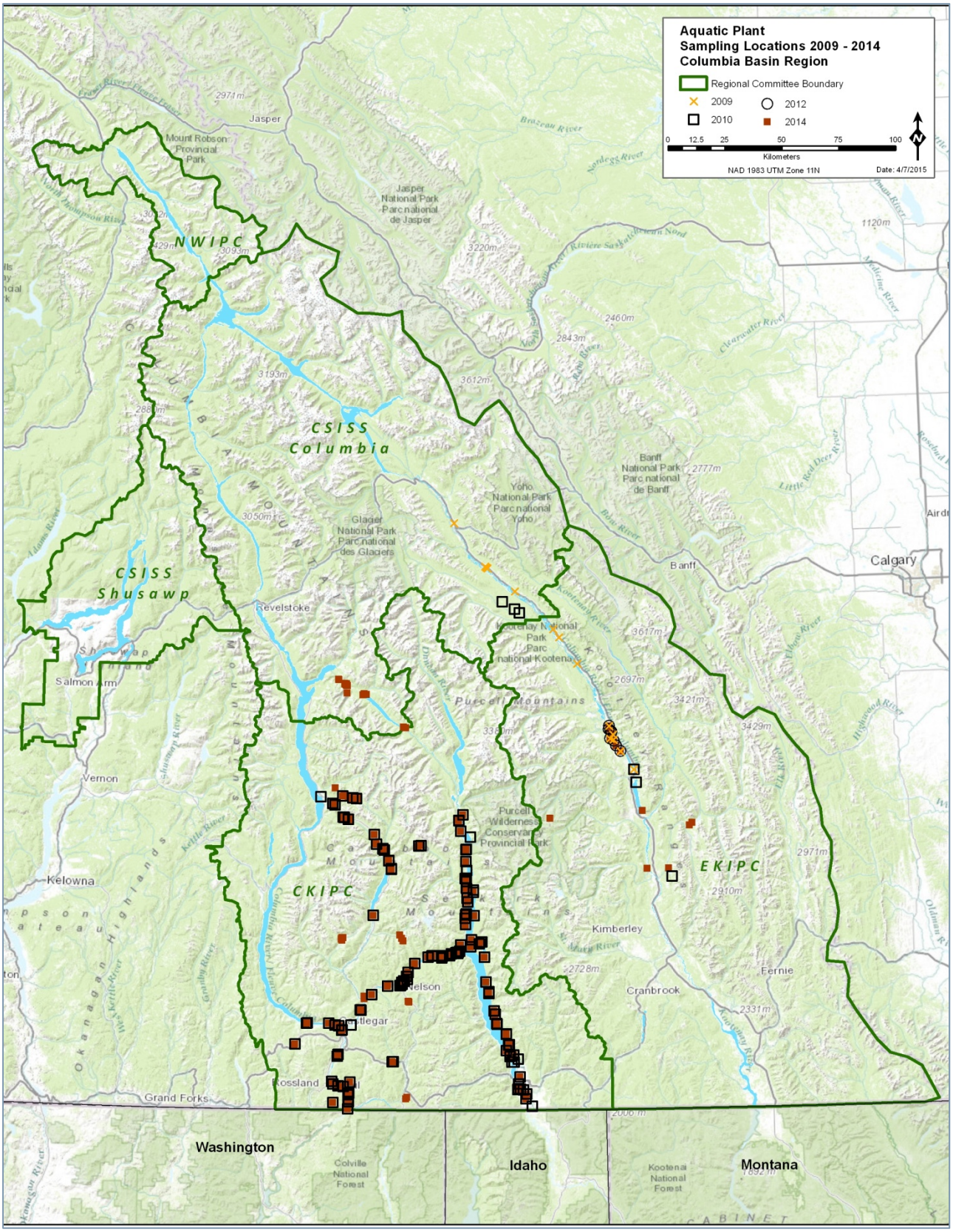
RANKING DESCRIPTION

Critical	Greater than 20 points	"Critical" waterbodies are either highly susceptible to invasion and/or have significant threatened and endangered species concerns. In a "Critical" waterbody, it is considered essential that robust monitoring continue.
High Priority	10-19 Points	"High Priority" waterbodies are considered susceptible to invasion and/or have significant consequences.
Medium Priority	1-10 points	"Medium Priority" waterbodies have limited access/ low use and/or less significant impacts. These waterbodies are the lowest priority for monitoring

APPENDIX D: MAP OF VELIGER MONITORING SITES (2012-14)

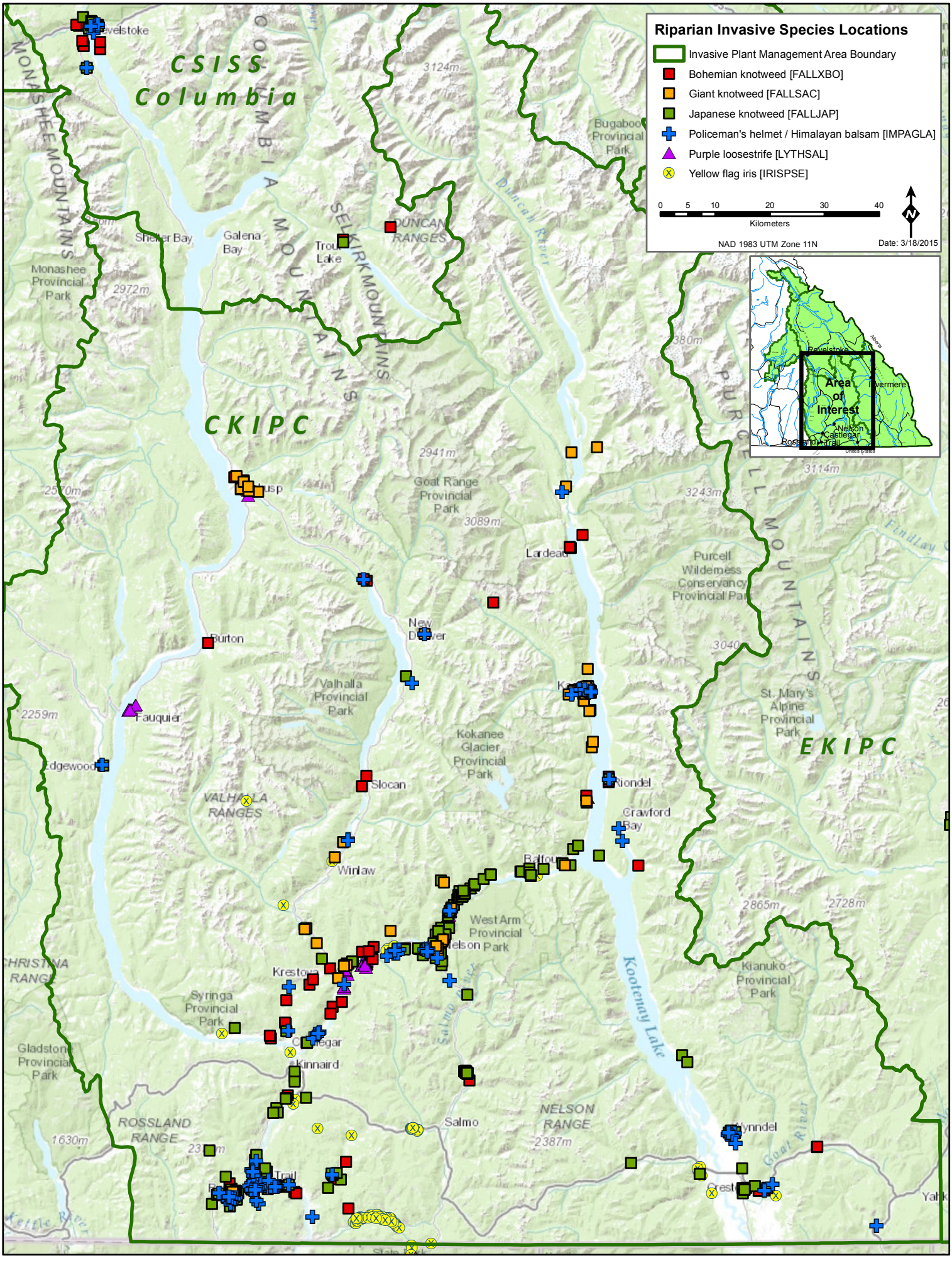


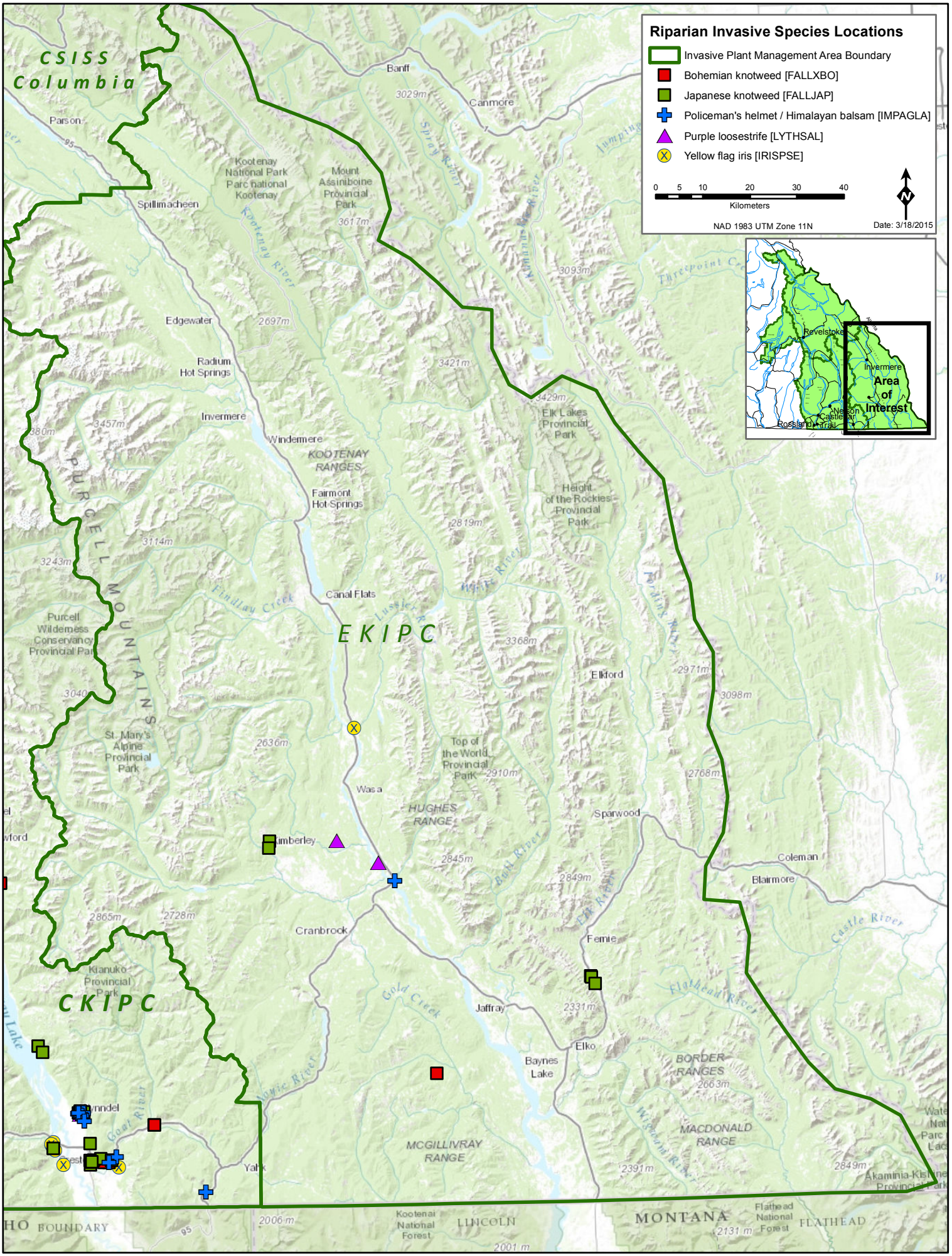
APPENDIX E:MAP OF AQUATIC PLANT SAMPLING SITES (2010-14)



APPENDIX F: AIS LOCATIONS

Maps on following pages


Riparian Invasive Species Locations
Invasive Plant Management Area Boundary
Bohemian knotweed [FALLXBO]
Giant knotweed [FALLSAC]
Japanese knotweed [FALLJAP]
Policeman's helmet / Himalayan balsam [IMPAGLA]
Purple loosestrife [LYTHSAL]
Yellow flag iris [IRISPSE]
0 5 10 20 30 40
Kilometers
NAD 1983 UTM Zone 11N
Date: 3/18/2015
Area of Interest
CSISS Columbia
CKIPC
EKIPC
Revelstoke
Sheller Bay
Galena Bay
Trout Lake
DUNCAN RANGES
Monashee Provincial Park
Bugaboo Provincial Park
Goat Range Provincial Park
Lardeau
Purcell Wilderness Conservancy Provincial Park
New Denver
Burton
Valhalla Provincial Park
Fauquier
Edgewood
Kokanee Glacier Provincial Park
Slocan
Riondel
Crawford Bay
VALHALLA RANGES
Winlaw
West Arm Provincial Park
Nelson
Krestova
Syringa Provincial Park
Kinnaird
Salmo
NELSON RANGE
ROSSLAND RANGE
Trail
Kootenay Lake
Kianuko Provincial Park
St. Mary's Alpine Provincial Park
Gladstone Provincial Park
Kettle River
Goat River
Salmo River
Duncan River
Findlay
Alberta
Invermere
Nelson
Castlegar
Rossland
Trail
Unites States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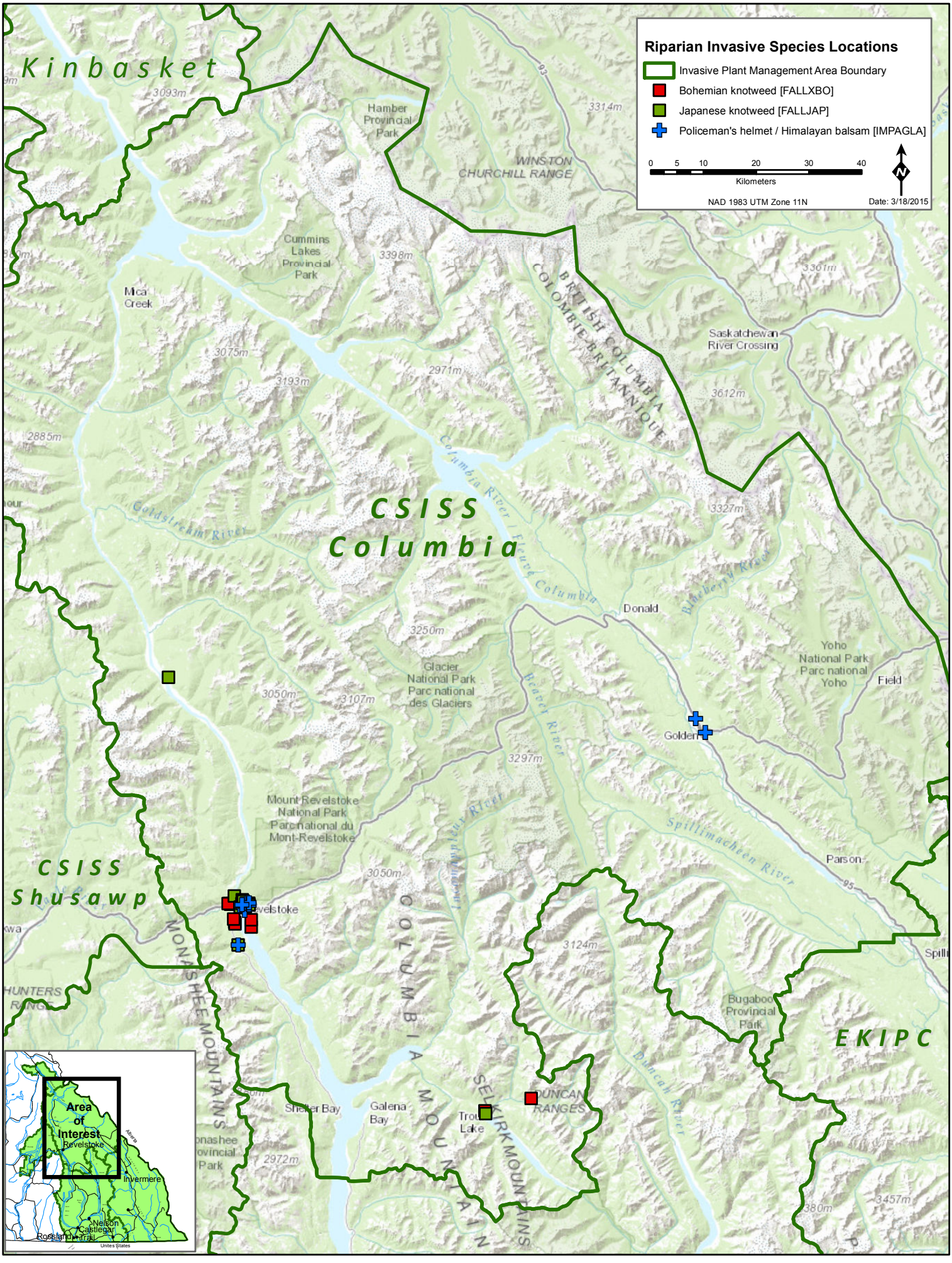
Invermere
Nelson
Castlegar
Rossland
Trail
CSISS Columbia
CKIPC
EKIPC
Banff
Canmore
Parson
Kootenay National Park
Parc national Kootenay
Mount Assiniboine Provincial Park
Spillimacheen
Edgewater
Radium Hot Springs
Invermere
Windermere
KOOTENAY RANGES
Fairmont Hot Springs
Elk Lakes Provincial Park
Height of the Rockies Provincial Park
PURCELL MOUNTAINS
Purcell Wilderness Conservancy Provincial Park
St. Mary's Alpine Provincial Park
Canal Flats
Elkford
Top of the World Provincial Park
Wasa
HUGHES RANGE
Kimberley
Sparwood
Coleman
Blairmore
Cranbrock
Fernie
Kianuko Provincial Park
Jaffray
Elko
Baynes Lake
BORDER RANGES
MACDONALD RANGE
MCGILLIVRAY RANGE
Yahk
Akamina-Kishinena Provincial Park
BOUNDARY
Kootenai National Forest
LINCOLN
MONTANA
Flathead National Forest
FLATHEAD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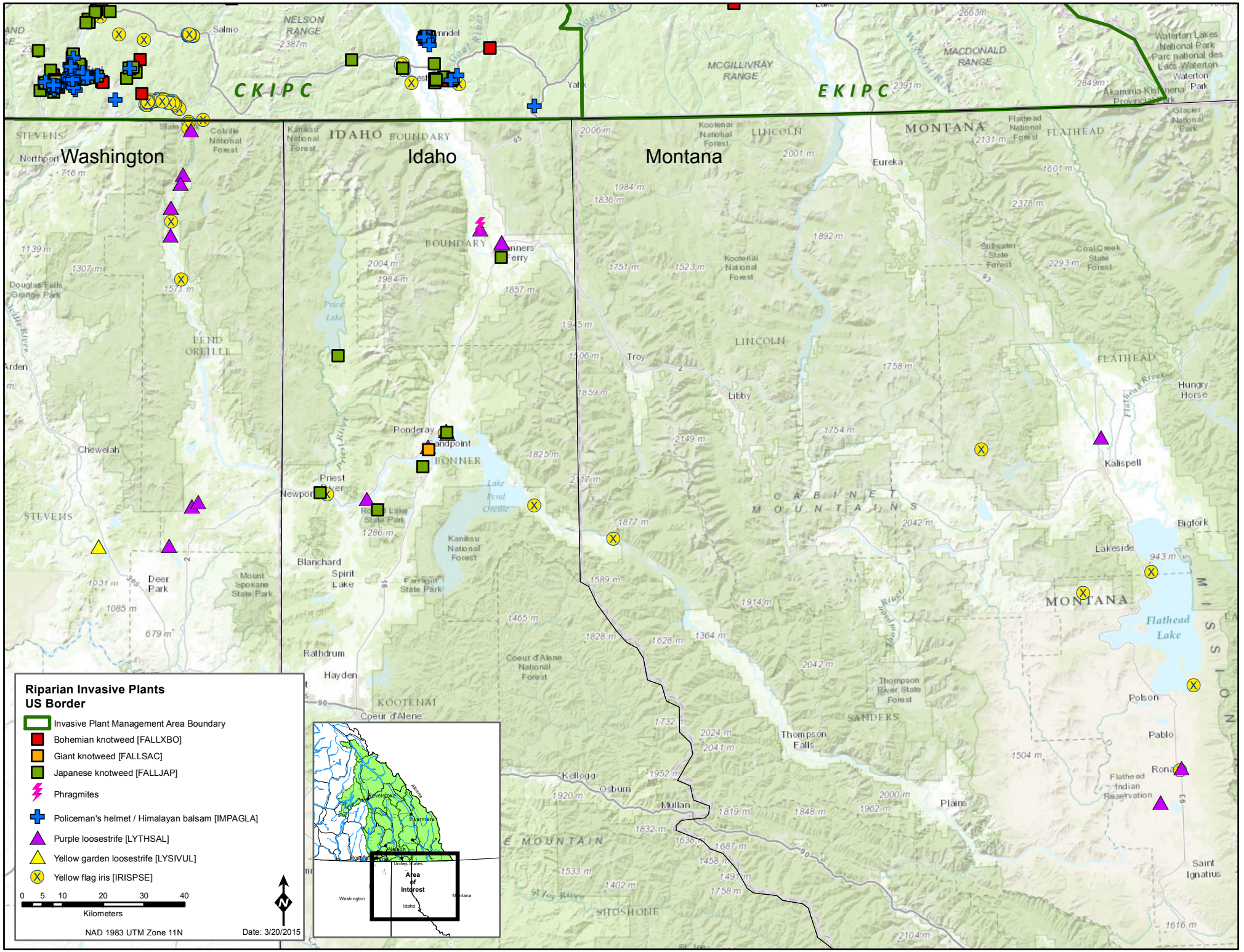
0 5 10 20 30 40
Kilometers
NAD 1983 UTM Zone 11N
Date: 3/18/2015
Kinbasket
Hamber Provincial Park
WINSTON CHURCHILL RANGE
Cummins Lakes Provincial Park
Mica Creek
BRITISH COLUMBIA
COLOMBIE-BRITANNIQUE
Saskatchewan River Crossing
CSISS Columbia
Columbia River
Goldstream River
Donald
Blueberry River
Yoho National Park Parc national Yoho
Field
Glacier National Park Parc national des Glaciers
Golden
Beaver River
Mount Revelstoke National Park Parc national du Mont-Revelstoke
Illecillewaet River
Spillimacheen River
Parson
CSISS Shusawp
Revelstoke
MONASHEE MOUNTAINS
COLUMBIA MOUNTAINS
SELKIRK MOUNTAINS
Shelter Bay
Galena Bay
Trout Lake
DUNCAN RANGES
Bugaboo Provincial Park
Duncan River
EKIPC
Area of Interest
Revelstoke
Invermere
Nelson
Castlegar
Rossland
Trail
United States


CKIPC
EKIPC
Washington
Idaho
Montana
Riparian Invasive Plants
US Border
Invasive Plant Management Area Boundary
Bohemian knotweed [FALLXBO]
Giant knotweed [FALLSAC]
Japanese knotweed [FALLJAP]
Phragmites
Policeman's helmet / Himalayan balsam [IMPAGLA]
Purple loosestrife [LYTHSAL]
Yellow garden loosestrife [LYSIVUL]
Yellow flag iris [IRISPSE]
0 5 10 20 30 40
Kilometers
NAD 1983 UTM Zone 11N
Date: 3/20/2015
Area of Interest
Washington
Idaho
Montana
Kalispell
Libby
Eureka
Troy
Hungry Horse
Bigfork
Lakeside
Flathead Lake
Polson
Pablo
Ronan
Plains
Thompson Falls
Saint Ignatius
Flathead Indian Reservation
Lake Pend Oreille
Coeur d'Alene
Hayden
Rathdrum
Spirit Lake
Blanchard
Priest River
Newport
Ponderay
Sandpoint
Chewelah
Deer Park
Colville National Forest
Kaniksu National Forest
Kootenai National Forest
Coeur d'Alene National Forest
Thompson River State Forest
Stillwater State Forest
Coal Creek State Forest
Flathead National Forest
Glacier National Park
Waterton Lakes National Park
Mount Spokane State Park
Farragut State Park
Round Lake State Park
Douglas Falls Grange Park
Kellogg
Osburn
Mullan
Wallace
Kootenai
Libby
Troy
Eureka
Whitefish
Kalispell
Bigfork
Lakeside
Polson
Pablo
Ronan
Plains
Thompson Falls
Saint Ignatius
Flathead Indian Reservation
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Flathead National Forest
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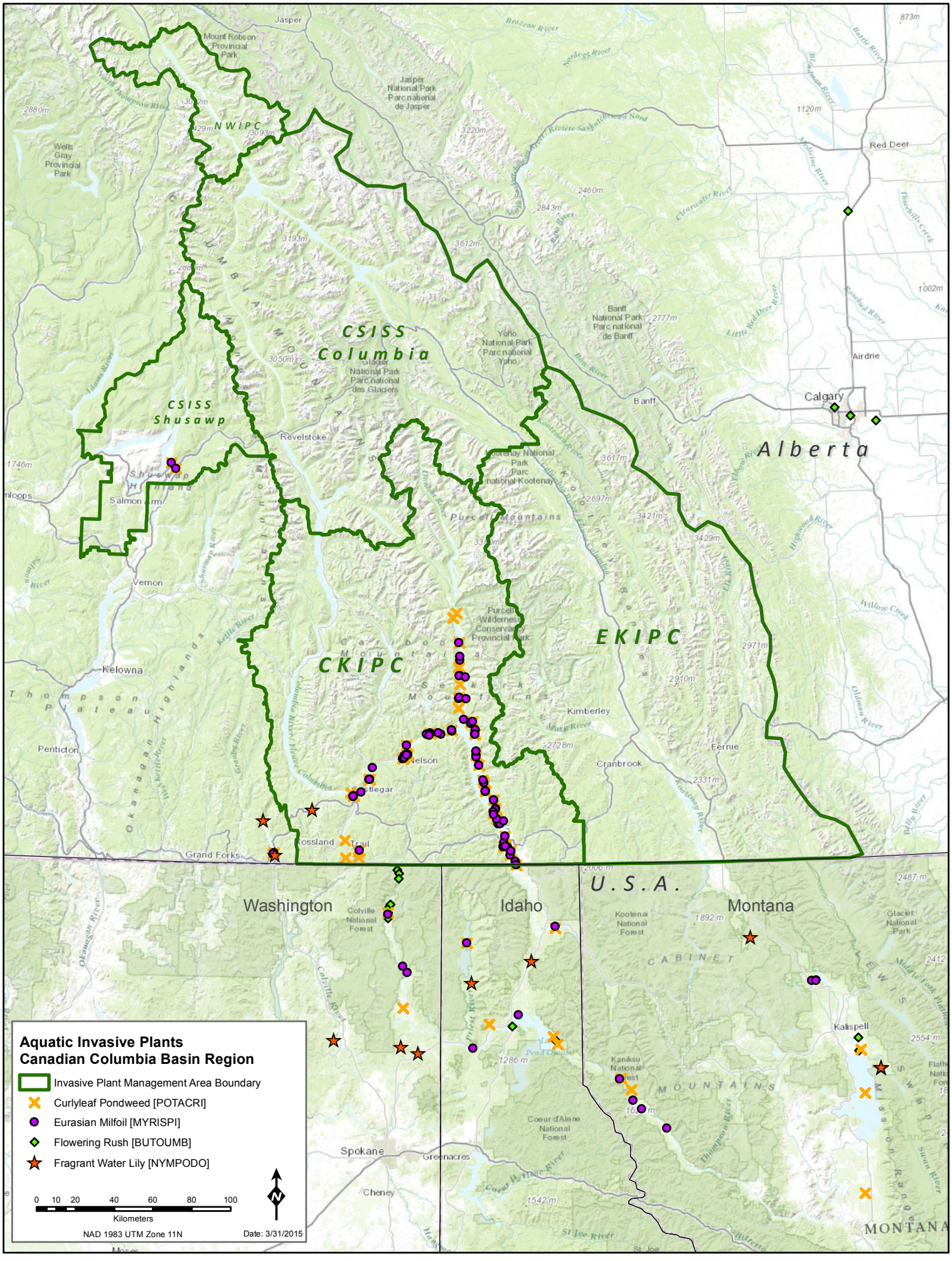
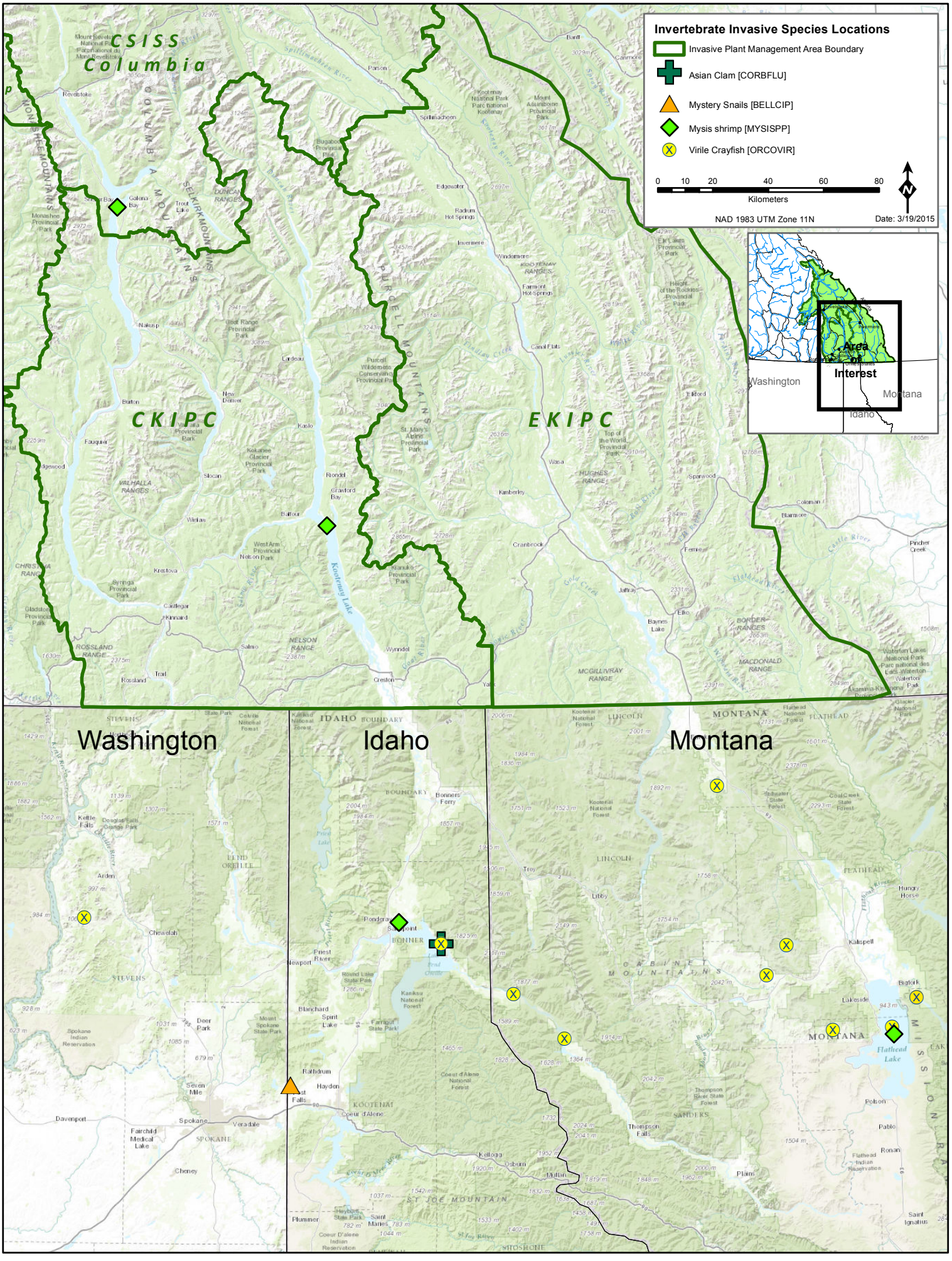
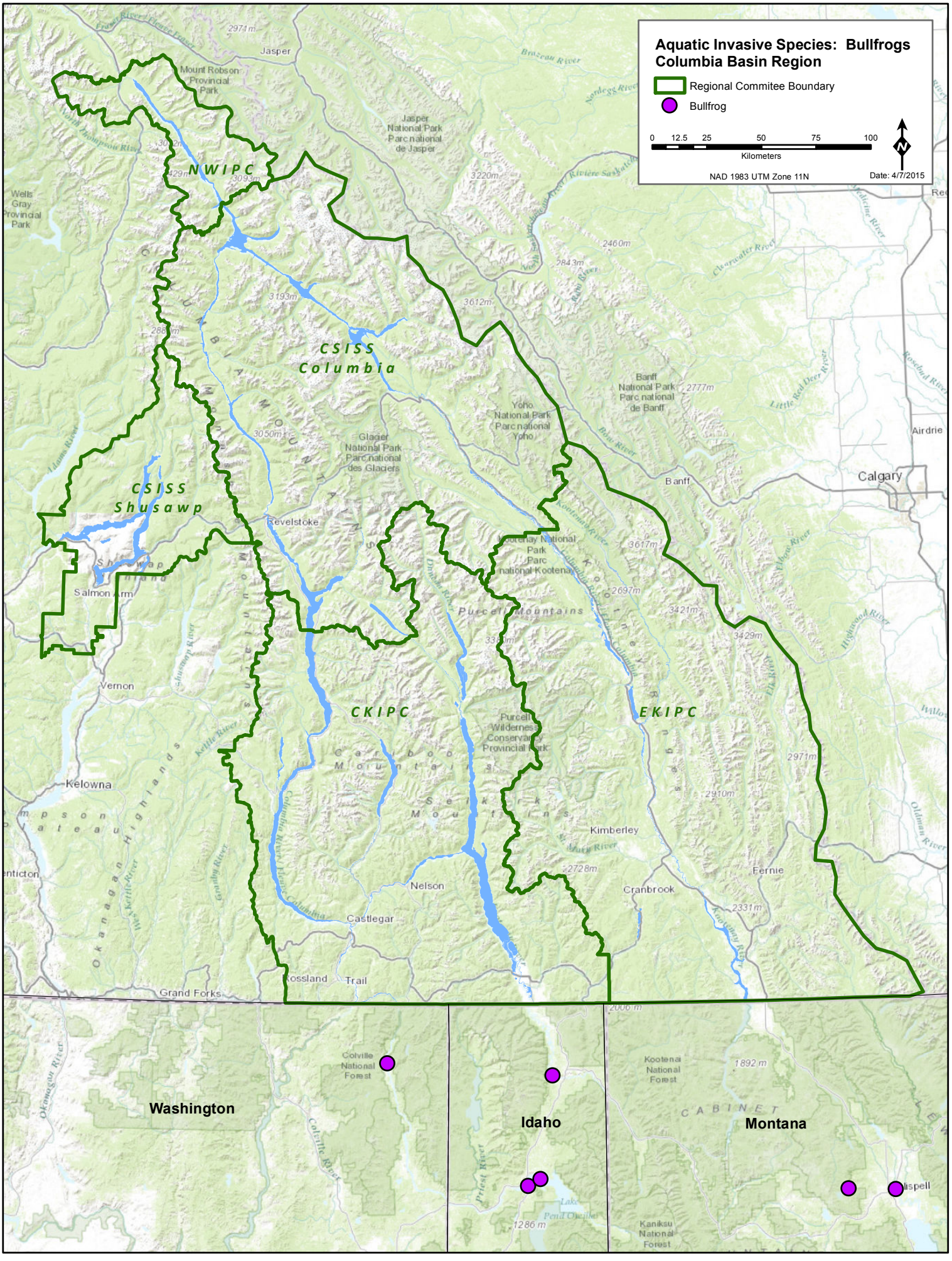
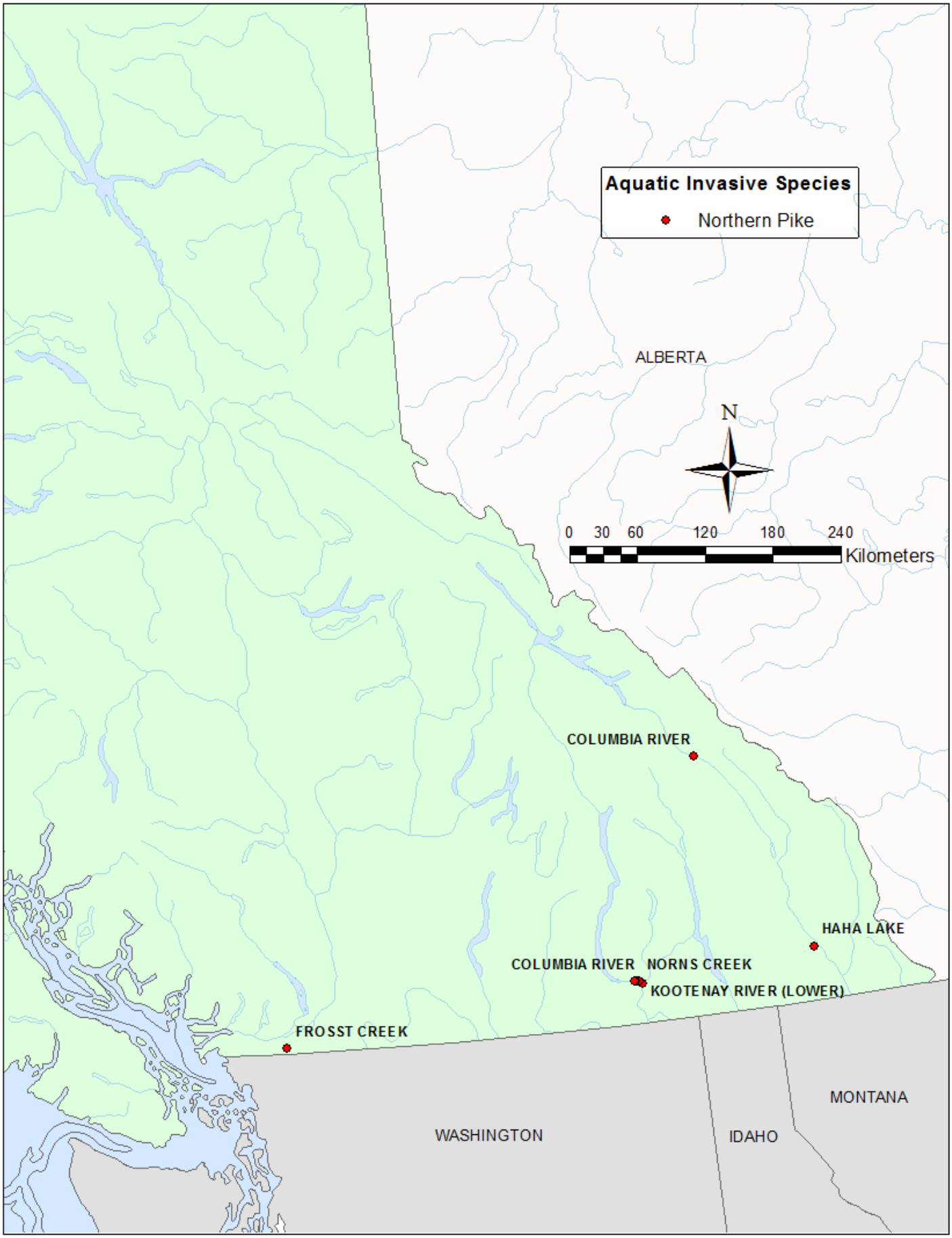
Waterton Lakes National Park
Mount Spokane State Park
Farragut State Park
Round Lake State Park
Douglas Falls Grange Park

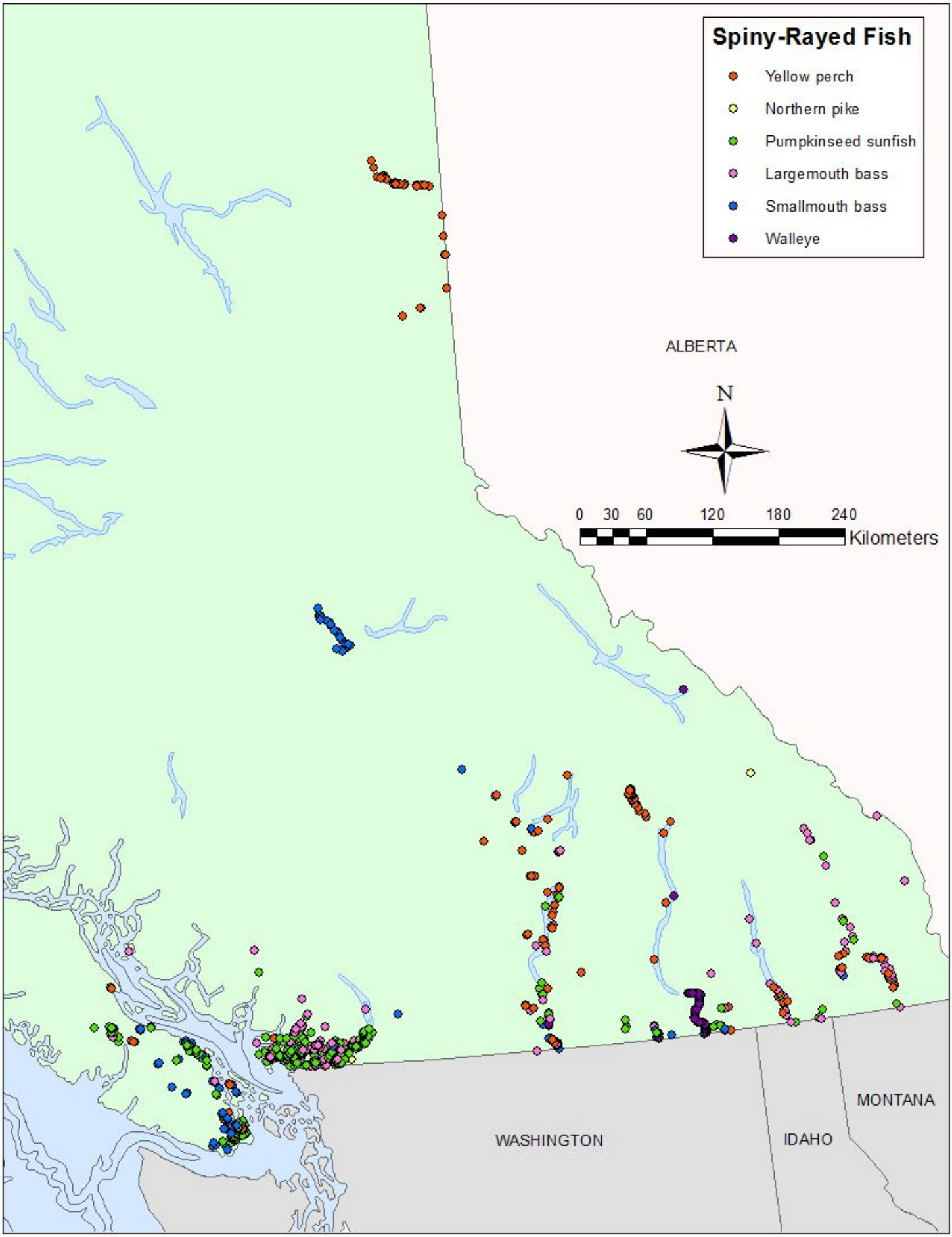

Aquatic Invasive Plants
Canadian Columbia Basin Region
Invasive Plant Management Area Boundary
Curlyleaf Pondweed [POTACRI]
Eurasian Milfoil [MYRISPI]
Flowering Rush [BUTOUMB]
Fragrant Water Lily [NYMPODO]
0 10 20 40 60 80 100
Kilometers
NAD 1983 UTM Zone 11N
Date: 3/31/2015
CSISS Columbia
CSISS Shusawp
NWIPC
CKIPC
EKIPC
Alberta
U.S.A.
Washington
Idaho
Montana
Jasper
Mount Robson Provincial Park
Jasper National Park Parc national de Jasper
Wells Gray Provincial Park
Revelstoke
Glacier National Park Parc national des Glaciers
Yoho National Park Parc national Yoho
Banff National Park Parc national de Banff
Kootenay National Park Parc national Kootenay
Red Deer
Airdrie
Calgary
Banff
Salmon Arm
Vernon
Kelowna
Penticton
Purcell Wilderness Conservancy Provincial Park
Nelson
Castlegar
Rossland
Trail
Grand Forks
Kimberley
Cranbrook
Fernie
Colville National Forest
Kootenai National Forest
Kaniksu National Forest
Coeur d'Alene National Forest
Glacier National Park
Kalispell
Spokane
Greenacres
Cheney
MONTANA


Invertebrate Invasive Species Locations
Invasive Plant Management Area Boundary
Asian Clam [CORBFLU]
Mystery Snails [BELLCIP]
Mysis shrimp [MYSISPP]
Virile Crayfish [ORCOVIR]
0 10 20 40 60 80
Kilometers
NAD 1983 UTM Zone 11N
Date: 3/19/2015
Area of Interest
Washington
Montana
Idaho
CSISS Columbia
CKIPC
EKIPC
Washington
Idaho
Montana



Aquatic Invasive Species: Bullfrogs
Columbia Basin Region
Regional Commitee Boundary
Bullfrog
0 12.5 25 50 75 100
Kilometers
NAD 1983 UTM Zone 11N
Date: 4/7/2015
NWIPC
CSISS Columbia
CSISS Shusawp
CKIPC
EKIPC
Jasper
Mount Robson Provincial Park
Jasper National Park Parc national de Jasper
Wells Gray Provincial Park
Banff National Park Parc national de Banff
Yoho National Park Parc national Yoho
Glacier National Park Parc national des Glaciers
Revelstoke
Salmon Arm
Vernon
Kelowna
Kootenay National Park Parc national Kootenay
Purcell Mountains
Purcell Wilderness Conservancy Provincial Park
Kimberley
Cranbrook
Fernie
Nelson
Castlegar
Rossland
Trail
Grand Forks
Banff
Calgary
Airdrie
Washington
Idaho
Montana
Colville National Forest
Kootenai National Forest
Kaniksu National Forest


Aquatic Invasive Species
Northern Pike
ALBERTA
N
0 30 60 120 180 240
Kilometers
COLUMBIA RIVER
HAHA LAKE
COLUMBIA RIVER
NORNS CREEK
KOOTENAY RIVER (LOWER)
FROSST CREEK
WASHINGTON
IDAHO
MONTANA


Spiny-Rayed Fish
Yellow perch
Northern pike
Pumpkinseed sunfish
Largemouth bass
Smallmouth bass
Walleye
ALBERTA
N
0 30 60 120 180 240
Kilometers
WASHINGTON
IDAHO
MONTANA