



Prepared by:

Robyn Hooper, Executive Director

Laura Gaster, Field Operations Program Coordinator

Sue Davies, Aquatic Program Coordinator

Kim Kaiser, Outreach Program Coordinator

Columbia Shuswap Invasive Species Society

P.O. Box 2853, Revelstoke, BC V0E 2S0

info@columbiashuswapinvasives.org

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Figure 1. The 2019-2024 CSISS Strategic Plan goals, along with CSISS mission and vision statements.

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SHUSWAP
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EXECUTIVE SUMMARY

April 2020 marked the start of the eighth operational season of the Columbia Shuswap Invasive Species Society (C SISS). Thanks to dedicated staff, diligent directors, knowledgeable partners and inspired volunteers, the C SISS expanded its programming and made significant progress on each goal identified in the 2019-2024 C SISS Strategic Plan:



Goal 1: Implement a collaborative and coordinated program

- C SISS strengthened and expanded its network of partners;
- C SISS collaborated with all levels of government, ISCBC, other regional invasive species groups, local stakeholders, residents and NGO's;
- C SISS worked with over 278 organizations, 53 of whom were new in 2020.



Goal 2: Educate, engage and inspire participation

- C SISS completed targeted outreach to stakeholders, First Nations and landowners;
- C SISS hosted training workshops for government staff, contractors and the public;
- C SISS engaged with over 2,423 people in the region and attended 140 events;
- C SISS directly targeted outreach to various stakeholders through in-person; meetings/workshops, phone outreach, social media or e-mail outreach.



Goal 3: Prevent the introduction of new invasive species

- C SISS delivered the 'Plant Wise' message to 16 garden centers;
- C SISS visited boat launches, boat industry and marinas with 'Clean Drain Dry' message;
- C SISS installed 3 new Clean Drain Dry Signs at boat launches;
- C SISS completed 11 press releases and was featured in 64 news pieces;
- C SISS regularly created engaging posts on Facebook, Instagram and Twitter.



Goal 4: Maximize the probability of detection and eradication

- C SISS completed 1,162 targeted invasive plant surveys across the region;
- C SISS reached over 900 landowners regarding invasive plant management;
- C SISS completed 148 zebra and quagga veliger samples at 22 locations across 12; waterbodies and deployed 12 substrate samplers to monitor for adult mussels;
- C SISS completed 115 surveys for invasive clams.



Goal 5: Slow or reverse the spread of existing invasive species

- C SISS completed mechanical treatment at 43 priority locations;
- C SISS administered 5 herbicide spray contracts, treating 68 priority sites;
- C SISS installed 'Do Now Mow' signage and 'Do Not Compost' signage across the region;
- C SISS supported 7 weed pulls with 5 partner organizations.



Goal 6: Ensure program sustainability

- C SISS employed five staff members in 2020 and 11 volunteer Board Directors;
- C SISS maintained a similar operating budget;
- New funding sources and support from existing funding sources allow C SISS to continue and expand work in the Columbia Shuswap region;
- C SISS followed a long term funding strategy, a detailed annual workplan, and the C SISS 2019-2024 Strategic Plan, as well as helped lead annual updates to the regional 2020-2025 Columbia Shuswap Operational Plan.

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INTRODUCTION

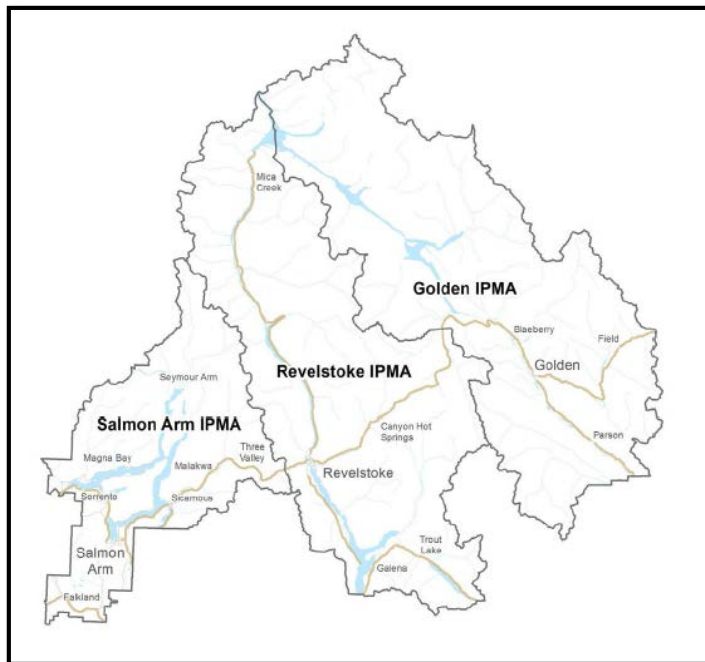
The CSISS was established in April of 2013 after a series of meetings and consultations with land managers, residents and other stakeholders with the aim to develop a collaborative and coordinated approach to invasive species management in the region. The CSISS joins a network of 12 regional invasive species groups in BC. These groups work in cooperation with each other, the Invasive Species Council of BC (ISCBC) and government agencies to inspire action, coordinate management and prevent the spread of invasive species within their jurisdictions.

Based on its constitution, the objectives of the CSISS are:

- To educate and engage public, private landowners, land and aquatic managers, First Nations and others about invasive species and their impacts.
- To establish and operate invasive species management programs.
- To do all other things as are incidental and ancillary to the attainment of the above purposes.

The summer of 2020 marked the Society's eighth season in operation. The five CSISS staff in 2020, including four returning staff, found new and innovative ways for the organization's ability to engage community members and residents as well as invest a presence in smaller communities across the regional district through the global pandemic – including online social media and physically distanced activities. The CSISS built and expanded connections within local communities and filled knowledge gaps regarding invasives on the landscape. In 2020, the CSISS continued operations, providing fee for service contract work to treat and monitor invasive plants, as well as grants to monitor waterways for aquatic invasive species, such as invasive zebra and quagga mussels.

Project Area



The Society's jurisdictional boundary includes the boundaries of the Columbia Shuswap Regional District (electoral areas A, B, C, D, E and F) (Figure 2). The CSISS operational area is divided into three Invasive Plant Management Areas (IPMAs) for planning purposes (Craig, 2013). This broad, ecologically diverse area includes the Ponderosa Pine (PP), Interior Douglas Fir (IDF), Interior Cedar Hemlock (ICH), Montane Spruce (MS) and high elevation Engelmann Spruce-Subalpine Fir (ESSF) biogeoclimatic zones (Craig, 2013).

Figure 2. The CSISS operating area, including the three IPMA boundaries in the region (Craig, 2013).

GOAL 1: COLLABORATIVE AND COORDINATED PROGRAMMING

The CSISS maintains a priority plant list for each Invasive Plant Management Area (IPMA) within the CSRD (Figure 2) to help partners coordinate programming and treatments. In addition to the plant lists, the CSISS maintains a regional species watchlist showing presence/absence of invasive mammals, birds, fish, amphibians, reptiles, invertebrates, fungi, and diseases. The CSISS continues to seek and engage partners to participate in collaborative planning and management. In doing so, the CSISS is the “one-stop-shop” for invasives in the CSRD and is the point of contact and lead on many invasive species-related issues in the region.

To maximize efficiencies and ensure program sustainability, the CSISS collaborates with invasive species groups within the Columbia Basin, regional committees across the province, the Invasive Species Council of BC (ISCBC), the Columbia Basin Trust (CBT), First Nations and various stewardship groups and NGOs. The CSISS currently partners with over 278 groups, including over 400 subscribers to the CSISS newsletter. These partnerships expanded CSISS’ successful outreach program, which include PlantWise, Clean-Drain-Dry, Play Clean Go, and Don’t Let It Loose campaigns, and continued to secure joint funding (Columbia Basin Collaboration).

The CSISS has been working in collaboration with the East Kootenay Invasive Species Council (EKISC) and the Central Kootenay Invasive Species Society (CKISS) to implement coordinated invasive species strategies within the Columbia Basin. This includes designing shared outreach materials to maintain consistent messaging throughout the region, collaborating on advertising and promotion, attending regional meetings and training opportunities, including a herbicide applicator certificate course in February 2020.

To maintain and grow presence across the region, CSISS staff attended and/or hosted over 50 regional meetings, training opportunities and workshops (Appendix D). The CSISS worked closely with the regional municipalities (City of Salmon Arm, City of Revelstoke, District of Sicamous, Town of Golden Wildsight Weed Coordinator) to provide staff training on invasive plant identification, provide high priority treatment lists and discuss other invasive plant management options. CSISS continued to work closely with the Columbia Shuswap Regional District to conduct extensive invasive plant surveys and respond to landowner requests/reports.

Indigenous Peoples Engagement

In 2020, the CSISS continued to develop Indigenous Peoples partnerships and collaborations. Staff cultivated relationships with various indigenous groups through networking at conferences and trail meetings, as well as undertook indigenous perspectives cultural training.

Engagement included:

- Indigenous Peoples Engagement Training Session - ISCBC Forum
- Working with Adams Lake Indian Band to sample for aquatic invasive species at reserve locations
- Shuswap Trails Working Group Meetings and networking with First Nations participants who included; Splatins, Neskonlith, Little Shuswap, and Adams Lake Indian Bands;
- Indigenous engagement meetings with the Invasive Species Council of BC and Splatins
- New CSISS volunteer Board Member Warren Fortier from the Little Shuswap Indian Band

All Indigenous Peoples within the CSISS region were invited to our Annual General Meeting and Workshops. Any Indigenous Peoples interested in participating in the CSISS or receiving training within the CSISS region are encouraged to contact CSISS staff.

Aquatic Invasive Species Partnerships

The CSISS Aquatic Invasive Species (AIS) program continues to be refined. CSISS Executive Director and AIS Program Coordinator participate in the Columbia Basin AIS Steering Committee Meetings and Provincial AIS meetings. Steering Committee member's combined knowledge and increased communication and collaboration between regional, provincial and international governing bodies, stakeholders and First Nations. CSISS staff implement the AIS Framework within the Columbia Basin in collaboration with other regional Columbia Basin invasive species organizations (EKISC, CKISS, NWIPC) with support from the CBT and the Ministry of Environment and Climate Change Strategy (ENV). The CSISS strengthened partnerships with the Shuswap Watershed Council, participating in water quality monitoring meetings, and working together to increase invasive mussel monitoring and AIS outreach.

GOAL 2: EDUCATE, ENGAGE AND INSPIRE

The CSISS continues to educate, engage and inspire residents and others to participate in invasive species management. CSISS staff received 157 requests for information and presentations in the past year. In 2020, CSISS education and outreach activities continued to focus on target audiences and pathways of invasion, with some adaptations to delivery based on the global pandemic, such as online workshops, phone/online meetings, increased social media and mail-out outreach and physically distanced information booths at boat launches. CSISS provided data on location of knotweed infestations (which can impact infrastructure) and other priority invasive plants to city and district planners. This dataset is now part of the land information systems that flag properties when applications are made for development.

In 2020, the CSISS was represented at 50 community events and meetings (See Appendix B for a complete list of events and meetings attended), hosted 6 online workshops/ presentations, facilitated 8 online and 13 in-person training sessions/ tailgates, supported 7 community weed pulls, and hosted 4 youth/school events (Figure 3).

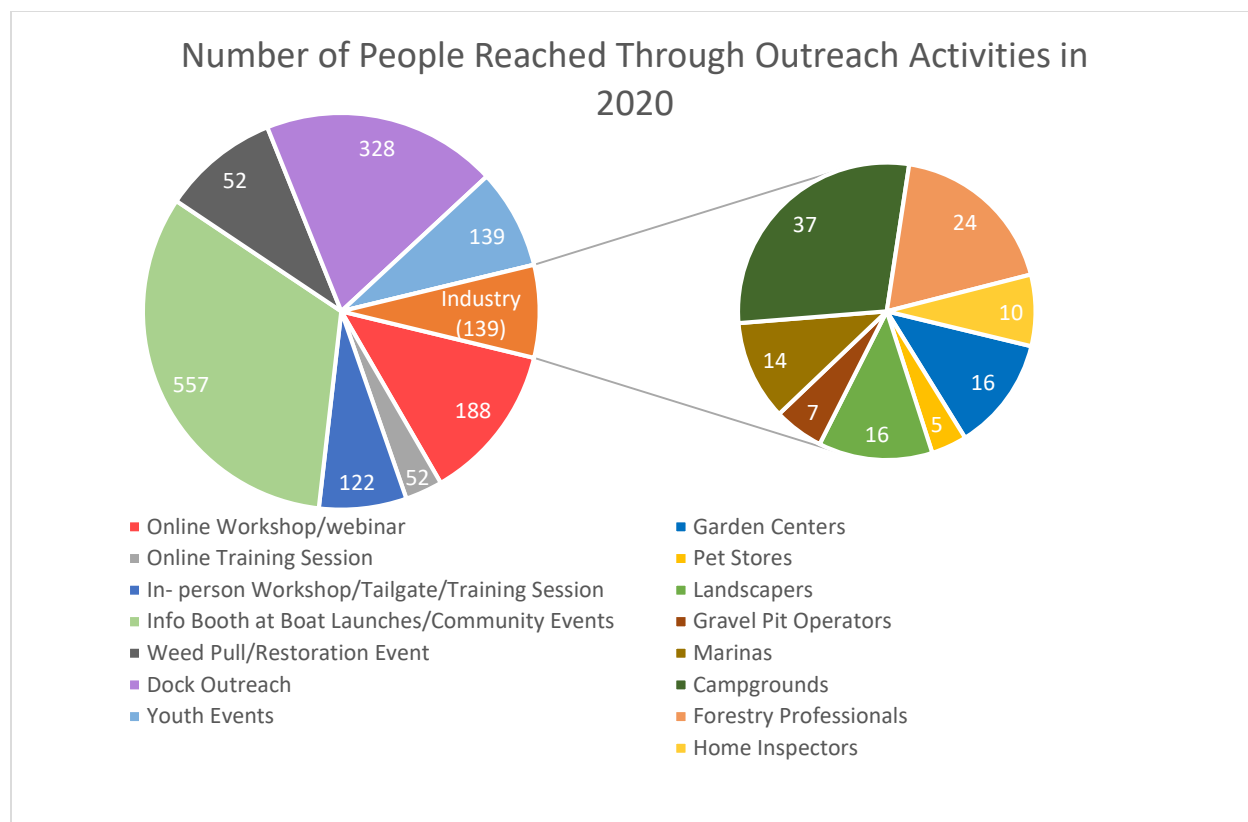


Figure 3. Chart showing a summary of outreach activities completed by CSISS in 2020.

The CSISS continues to receive significant numbers of requests for information and presentations. This year the CSISS focused on targeting our message to people most likely to be vectors of spread of invasive species (Figure 3).

In total, the CSISS had direct interactions with 2,423 people (Table 1). The CSISS outreach program continues to review and evaluate for improvements annually. After presentations and workshops, CSISS staff distributed feedback forms to participants and will work to incorporate suggestions for the 2021 season.

Table 1: Community Events and Meetings Attended by CSISS Jan- Dec 2020.

Type of Event Hosted/ Campaign Delivered	# Events	Direct Interactions
Youth Events (4 within Columbia Basin)	4	139
Weed Pulls/Restoration Events (5 within Columbia Basin)	7	52
Play Clean Go Outreach (27 within Columbia Basin)	36	457
PlantWise Outreach Events (30 within Columbia Basin) (16 Garden Centers received outreach, 7 within Columbia Basin)	42	583
Clean Drain Dry / Aquatic Outreach: 27 Marina staff briefings (3 Columbia) 26 Boater outreach events (10 Columbia) 5 Pet stores visited (2 Columbia) Visited 36 Boat launches (12 Columbia)	58	901
Events total in the Columbia Basin	67	1,564
Events total for CSISS 2020	140	2,423

Media Coverage

Since January, the CSISS delivered 11 e-newsletters, 10 press releases, and has been mentioned in 64 news and radio pieces (See Appendix C for a full listing of media interactions). Play Clean Go' messaging was placed in hiking maps supplied by Tourism Golden, See Revelstoke and Shuswap Tourism.

The CSISS partnered with the Shuswap Watershed Council (SWC) to help design billboard signs at two locations on the Trans-Canada Highway between Revelstoke and Sicamous (Figure 4).



Figure 4. Billboard Clean, Drain, Dry advertisements installed near Craigellachie and Malakwa on Highway 1.

Website and Social Media

The CSISS website is updated regularly (www.columbiashuswapinvasives.org), with a focus on being a user-friendly platform for both public and land managers to enable people to connect with events and resources for the management of invasive species. (Figure 5).

The CSISS also hosts a Facebook page and posts updates of events, information and reminders of behavior change activities throughout the year. The CSISS Facebook page now has 560 followers and CSISS Instagram has 755 followers. The CSISS continues to deliver quarterly e-newsletters to more than 400 recipients highlighting our local and regional events and activities. Social media accounts were actively used as platforms to encourage best practices, promote events and share relevant news with followers.

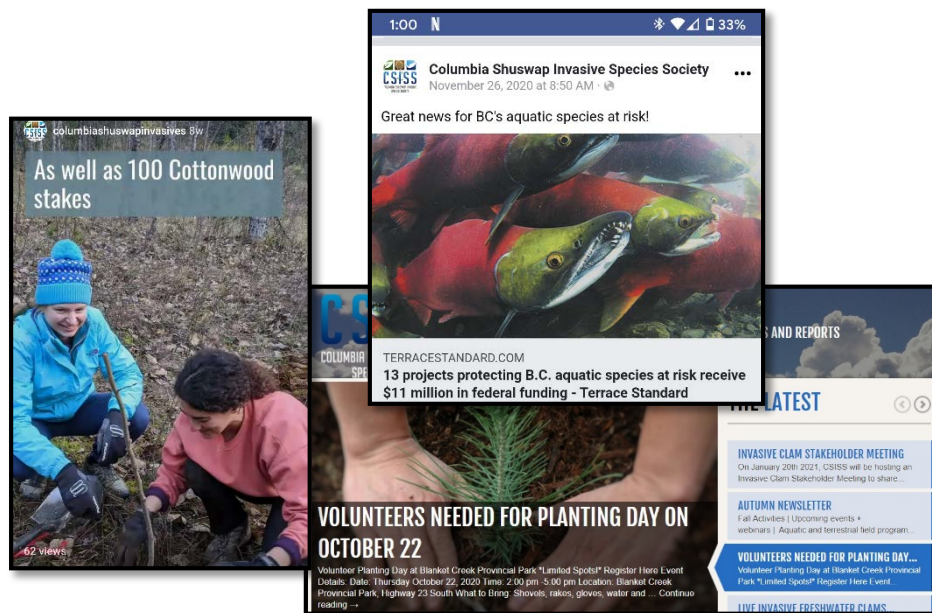


Figure 5. Instagram TV video featured on the CSISS Instagram page (left), the CSISS website page (bottom), and the CSISS Facebook page (centre).

Community Outreach

The CSISS partnered with numerous non-profit groups to raise awareness of invasive species in the Columbia-Shuswap region. CSISS provided outreach brochures to partner organizations to distribute at workshops and information booths throughout the region, as well as at accommodation and tourist locations, such as marinas, campgrounds and resorts.

Due to public health restrictions regarding COVID-19, the CSISS was not able to attend large gatherings and events where we normally reach thousands of individuals. Instead, the CSISS focused on online training/ webinars, small group training sessions and used social media to reach the general public and targeted groups. The CSISS presented to a variety groups; hosting online courses, webinars and youth focused events, reaching a wide audience while also focusing on important user groups and pathways of spread (Figure 6). The CSISS focused on targeting groups which we had not connected with in the past, specifically, recreation facility operators and various industry groups. Pre-COVID, the annual ISCBC forum provided the opportunity for staff to attend and present at the speedy session (Figure 6). Weed pulls were also limited in 2020, however with some support from

partner groups such as the Shuswap Trail Alliance and Revelstoke forest firefighters, we were still able to accomplish a lot (Table 2).

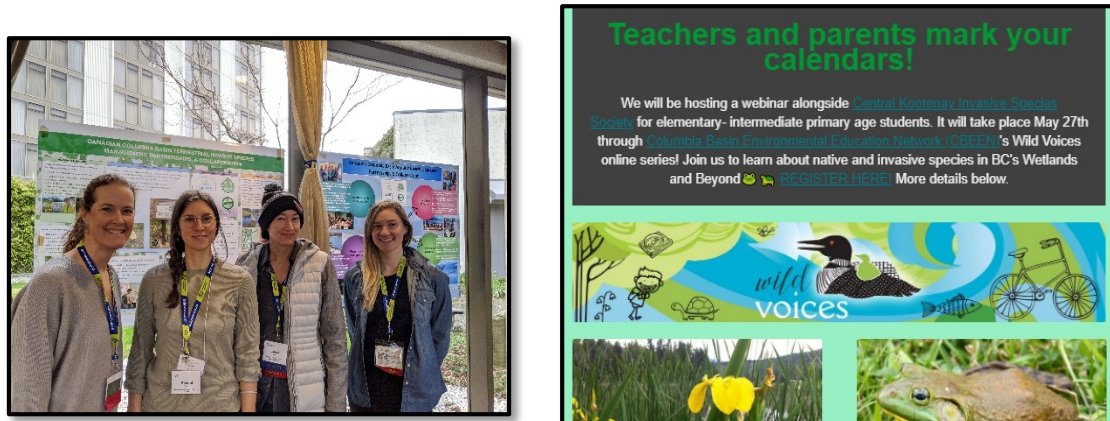


Figure 6. Laurie Francom, Kendal Benesh, Laurie Carr and Kim Kaiser, presenting the Columbia Basin Aquatic Invasive Species Partnership poster at INVASIVES 2020 forum (left) and event poster for Columbia Basin Environmental Education Network's Wild Voices Online series featuring CSISS (right).

Table 2: The CSISS supported 7 weed pulls/ mechanical treatment contracts in collaboration with community groups.

Target Species	Location	In Collaboration with:
Himalayan Balsam	Illecillewaet Walkway	Revelstoke Wildland Firefighters
Himalayan Balsam	Illecillewaet Walkway	Revelstoke Wildland Firefighters
Burdock	Peter Jannick Park	Shuswap Trail Alliance
Himalayan Balsam, Blueweed	SABNES Foreshore Trail	Nature Trust BC
Yellow-Flag Iris	White Lake	Shuswap Trail Alliance
Yellow-Flag Iris	Little White Lake	Shuswap Trail Alliance
Yellow-Flag Iris	Turner Creek	Shuswap Trail Alliance

Workshops and Events

To build capacity amongst partners, interested residents and stewardship groups, the CSISS hosted various workshops and training opportunities in 2020. Workshops, presentations and training opportunities were either moved to an online format or taught in-person with reduced group sizes. In 2020, CSISS focused efforts on providing outreach to new industry groups including landscapers, gravel owners/aggregate movers, recreation site operators and home inspectors.

CSISS-hosted workshops included:

- Invasive species plant identification workshops- Carrot Family Focus (x 2) (Online- May/June 2020);
- Impacts of invasive plants and edible invasives workshop through Okanagan College (Online-June 2020);
- Invasive plant identification walk- Revelstoke Wildflower Festival activity (in-person August 2020).

Targeted Industry Outreach included:

- Provided resources and training to 11 landscaping companies and held in-person training sessions with 10 individuals; received feedback for developing a landscaper certification program in 2021;
- Provided resources and phone outreach to 7 private gravel pit operators/ aggregate movers;
- Provided resources and phone outreach to 10 home inspectors;
- Facilitated in-person training sessions for 12 recreation site operators;
- Contacted 27 marinas and provided a recorded webinar for marina staff briefings.

Online workshops were well-attended and reached a wide audience throughout the province. The online format proved successful in engaging participants and the CSISS received positive feedback from workshop participants (Figure 7).



Figure 7. Kathleen Meszaros at Revelstoke Wildflower Festival Booth (left) and Spring Plant ID and Management Online Workshop poster (right).

Measures of Success

Outreach Program Evaluations

The CSISS continues to use feedback to help evaluate the effectiveness of our workshops and programs. People reported that they are more likely to take action to prevent the spread and reduce impacts of invasives (Figure 8). The results from our surveys help to guide our future outreach programming (Figure 9 and 10).

Results from CSISS Behavior Change Evaluations in 2020

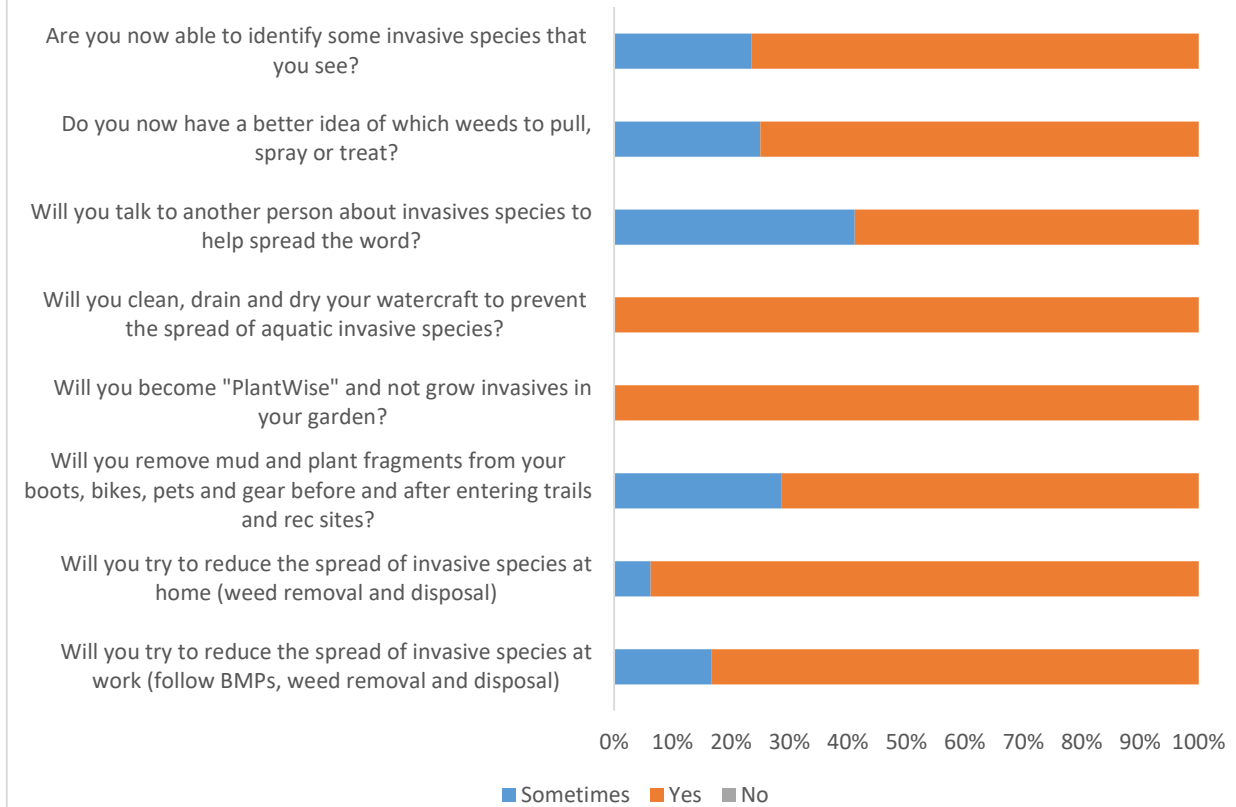


Figure 8. Results from CSISS behaviour change surveys in 2020.

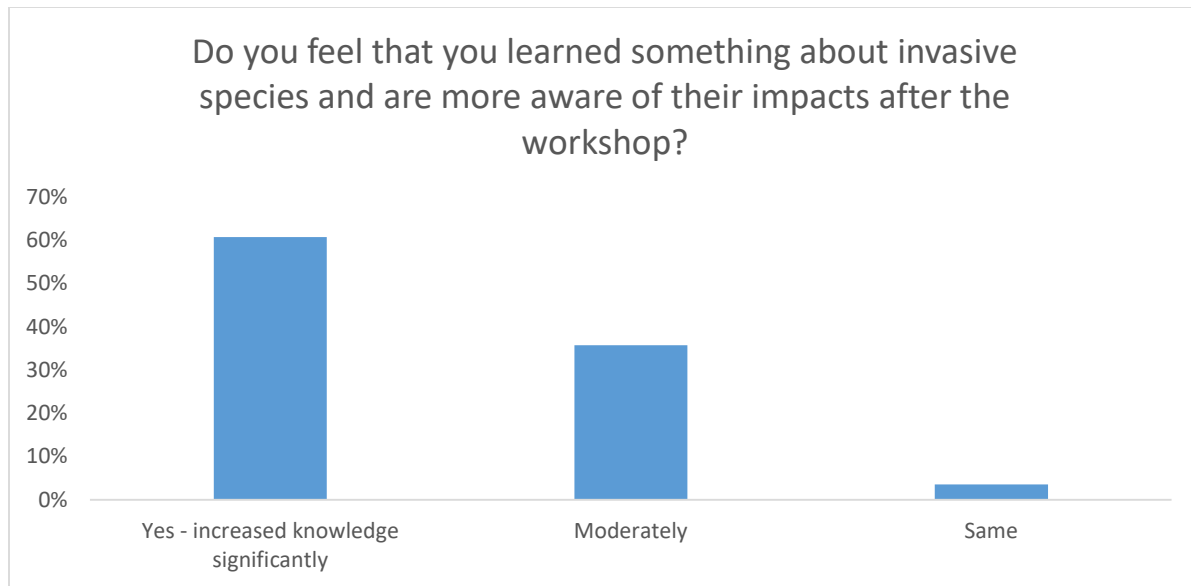


Figure 9. Survey Results from CSISS evaluation forms in 2020

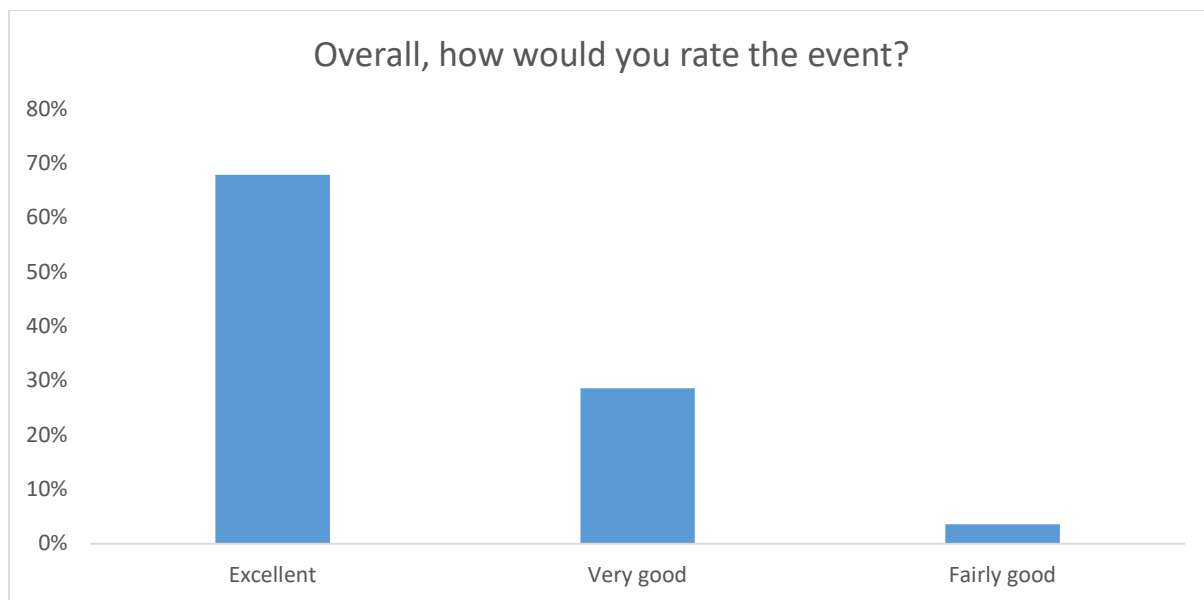


Figure 10. Survey Results from CSISS evaluation forms in 2020.

Social Media Metrics

The CSISS utilizes Facebook analytics to help develop engaging content and guide future social media campaigns. In 2020, the CSISS reached 32,423 people through Facebook and engaged with many others through posting to targeted groups, such as gardening pages, outdoor recreation groups, community pages and aquatic related pages.

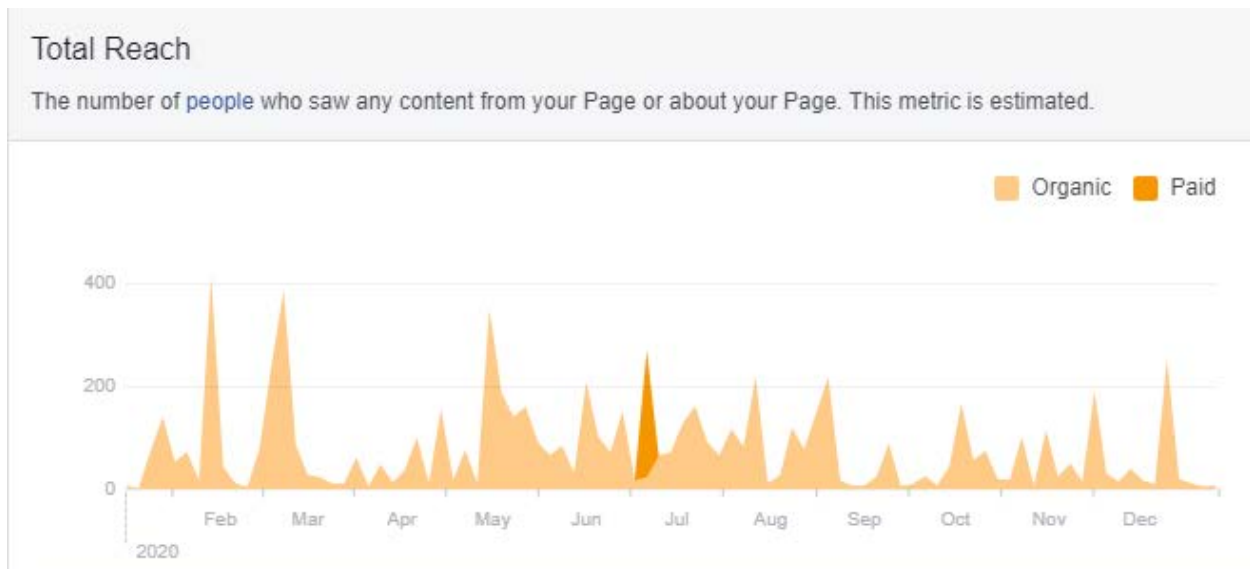


Figure 11. Number of people reached through @ColumbiaShuswapInvasives Facebook page in 2020.

Website Google Analytics

Google analytics results show over 3,400 website users in 2020. Metrics were used to determine which pages were most trafficked by users.

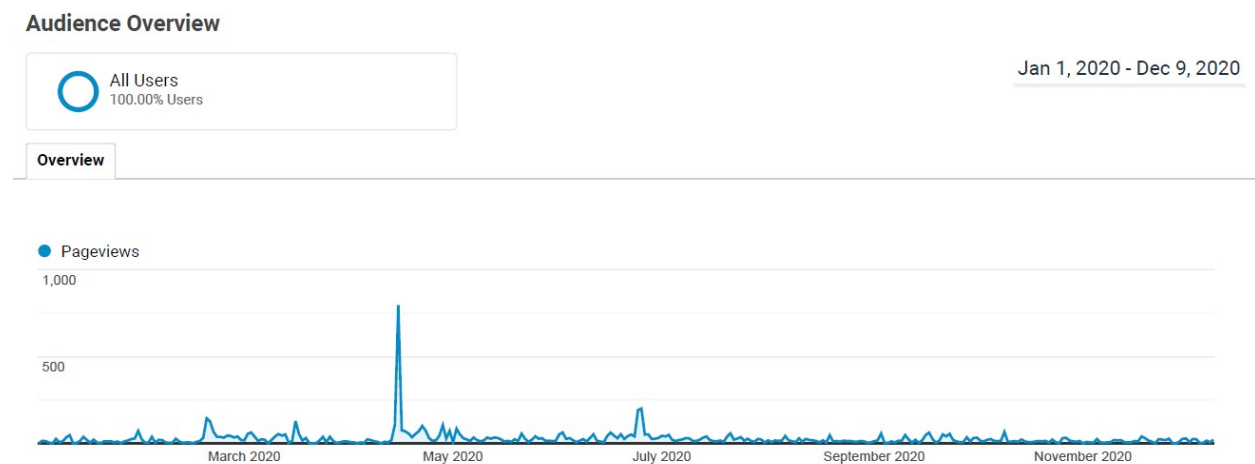


Figure 12. Number of page views of www.columbiashuswapinvasives.org webpage from Jan-Dec 2020.

Audience behavior data was used to determine the most frequently visited webpages (Figure 12). The CSISS webpage had 9.6 average daily users and 25 page views per day in 2020. Two distinct spikes in the number of page views per day originated from links to CSISS webpages posted in press releases that were shared widely online. Data from google analytics will be used to reconfigure website layout and content in order to optimize public access to important resources and information regarding invasive species awareness and management.

GOAL 3: PREVENT THE INTRODUCTION OF NEW SPECIES

The CSISS focuses on various behaviour change programs in partnership with others to help prevent the introduction of new species. The CSISS provides training, resources and best management practices to partners in order to help prevent new introductions (*see Workshops and Events section above*).

PlantWise Program

The CSISS continued to actively partner with the Invasive Species Council of British Columbia (ISCBC) to deliver the PlantWise Program, encouraging key groups such as the horticulture industry and consumers to commit to choosing and utilizing only native or non-invasive plants instead of their invasive alternatives.

CSISS staff delivered the PlantWise message at 30 community-based events, workshops and meetings, speaking to youth, home gardeners, land managers, and stewardship groups, directly reaching 583 individuals.

In 2020, CSISS offered training sessions for landscaping companies across the region and used a combination of small in-person training sessions, phone outreach and digital resources to engage with landscaping professionals (Figure 13).

The CSISS also worked with Okanagan College in Salmon Arm to provide PlantWise training to students: the CSISS was guest speaker for the Horticulture Program in February of 2020 and also hosted an online course through Okanagan college in June 2020.

The CSISS contacted garden centres in February to assist with ordering inventory. In April and May, the CSISS provided digital PlantWise resources and phone outreach to garden centers, in-lieu of in person visits. Most garden centres in the region are engaged and interested in following PlantWise practices.

Additionally, the CSISS promoted PlantWise messaging through the City of Revelstoke's Pollinator Committee, which aims to enhance and protect native pollinators and their habitat in the Revelstoke area. The CSISS also utilized Facebook to promote PlantWise messaging by engaging with members of local gardening facebook groups including "Shuswap Gardening and Crafts," Revelstoke Growing Community" and "Golden Community."



Figure 13: PlantWise training session with Oxner Landscaping in Golden BC.

Play, Clean, Go Program

In 2020, the CSISS promoted Play Clean Go, a program encouraging trail users to reduce the spread of invasive species by cleaning equipment, clothing, vehicles and pets when arriving at and leaving a recreation site.

Through partnerships with trail user groups, race organizers, Indigenous Peoples, and youth outdoor education programs, the CSISS successfully delivered the Play Clean Go message at 36 community or online events, directly reaching 457 individuals (Table 1).

The CSISS continued to attend trails meetings to engage with local trail users and provide input on regional activities. All major running and biking races/ events were cancelled due to physical distancing measures. In response, the CSISS focused outreach efforts on the creation of permanent boot brush kiosks at busy parks in the Shuswap and in Revelstoke (Figure 14).



Figure 14. Template for BC parks boot brush kiosk (left), and information board for Revelstoke Greenbelt Kiosk (right).

Clean Drain Dry Program

Online Outreach

COVID-19 restrictions meant that events and large gatherings did not feature in CSISS aquatic outreach program in 2020. Instead of group presentations and events, staff focused primarily on online venues for outreach. Industry groups such as marinas, waterfront campgrounds, and information centres were contacted by phone and offered training by webinar. As restrictions lifted throughout the season, staff visited some businesses to deliver brochures, in person briefings, and other resources. Twenty-seven marinas received a staff briefing, either by webinar or by socially distanced in-person visit.

Special attention was given to the use of social media in 2020. Staff posted to Facebook, Instagram, and our new YouTube channel throughout the season with at least 2 posts per week focusing on the clean drain dry message. Posts included engaging photos, relevant stories, and best practices information. The CSISS posted local aquatic invasive species (AIS) news, interesting AIS stories from further afield, and also sequential posts such as 'Invasive Catch of the Day' and 'Waterweed of the Week'. Staff addressed comments on these posts in a timely fashion.

As a way to interact with higher numbers of our target audience, staff posted frequently onto Facebook groups with a boating/fishing/aquarium focus, many with large followings. Groups included local groups, and some with a province-wide membership. These groups included Shuswap and Area Fishing (1200 members) Shuswap Fishing Reports (189 members), Columbia River Fishing (168 members), Shuswap Bucktail Flies (176 members), BC Kayakers and Canoes (1800 members), Aquarium Fish Hobbyist of B.C. (4700 members), B.C. Aquarium Hobbyists Club AKA BCA (5000 members). Posting to these pages generated many post views and comments.

AIS Conferences and Meetings

CSISS staff attended several online conferences and meetings in 2020. Post-COVID lockdown, staff attended various meetings in person where possible (outdoor and socially distanced). These included meetings with:

- Adams Lake Indian Band representatives (sampling on band lands)

- Little Shuswap Lake Indian Band representatives (sampling on band lands)
- Invasive clam training with Job Creation Project team and Eurasian Water-Milfoil crew.

Most meetings in 2020 were conducted online. These included meetings with:

- ENV and HCTF for ZQM lake monitoring and clam sampling
- Columbia Basin Watershed Network
- Shuswap Watershed Council
- Shuswap Watershed Council water monitoring group
- Columbia Basin AIS Steering Committee
- MP Mel Arnold and other regional partners for AIS Updates
- Columbia Basin Flowering Rush Group
- AIS regional groups

Industry visits

Marinas are a focus point for boaters, both from within BC and from out of Province. Staff called marinas and boat shops throughout the region in early spring, offering a recorded staff briefing webinar with information about aquatic invasive species. Other industry groups contacted by staff in 2020 included campgrounds with a lake focus, BC wildfire fighters, and BC Recreation Site Managers.

Table 3. Marinas contacted by CSISS staff in 2020.

Businesses highlighted in grey are within the Columbia Basin Region of the CSISS Area

Marina Name	Location	Marina Name	Location
Anglemont Marina	Anglemont	Little River Boat World	Sorrento
Bayside Marina and Grill	Blind Bay	Papa's Marina	Sicamous
Bluewater Houseboats	Sicamous	Reds Rentals and Marina	Sicamous
Bulldog Rentals	Sicamous	Sea Dog Rentals	Salmon Arm
Captains Cove Marina	Canoe	Seadogs	Sicamous
Captains Village	Scotch Creek	Shuswap Marina	Blind Bay
Copper Island Diving	Salmon Arm	Shuswap Waterfront Marina	Sicamous
Cottonwood Cove RV	Scotch Creek	Sunny Shore Fishing Resort	White Lake
FINZ Marina	Blind Bay	The Marina	Sicamous
Get Wet Rentals	Sicamous	Totem Pole Marina	Bastion Bay
Indian point resort	Adams Lake	Twin Anchors Resort	Sicamous
J.B. Marine	Sicamous	Kinbasket resort	Kinbasket
Sicamous Houseboats	Sicamous		

Table 4. Campgrounds contacted by CSISS staff in 2020.

Businesses highlighted in grey are within the Columbia Basin Region of the CSISS Area

Campground Name	Location	Campground Name	Location
Joe Schmucks	Sicamous	Sandy Pont Campground	Tappen
Salmon Arm Camping Resort	Salmon Arm	Pierre's Point Campground	Tappen

Glen Echo Resorts	Salmon Arm
FINZ Campground	Blind Bay
Blind Bay Resort	Blind Bay
Manga Bay Resort	Magna Bay
Sunny Shore Fishing Resort	White Lake
Woodhaven Campground	White Lake
Cedars RV Resort	Malakwa
Family Tree Riverside Campground	Sicamous
Sicamous KOA	Sicamous
Eagle River Campground	Malakwa

Hidden Valley Campground and RV	Canoe
Smoky Bear Campground	Revelstoke
Boulder Mountain Resort	Revelstoke
Lamplighter Campground	Revelstoke
Revelstoke Campground	Revelstoke
Canyon Hot Springs	Revelstoke
Williamson Lake Campground	Revelstoke
Campers Haven RV	Golden
Golden Municipal Campground	Golden

Boat Launch Signage

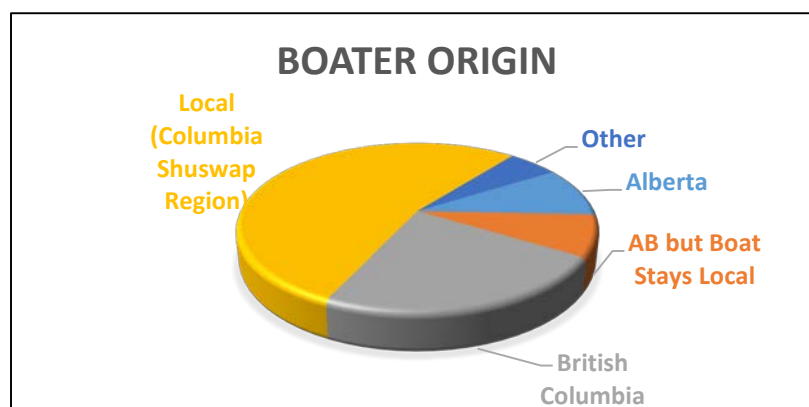
In 2019, the CSISS partnered with the Canadian Council on Invasive Species and jurisdiction owners to install 32 Clean Drain Dry (CDD) signs at boat launches across the region. In 2020, a further 3 signs were installed by CSISS. The CSRD also installed similar signage at some CSRD launches. Most public, and many private, launches across the region now have permanent CDD signage.



Figure 15. Clean Drain Dry signs are now installed at most public and many private boat launches across the region.

Boat Launch Outreach

CSISS staff visited 36 boat launches across the region. At ten of the busiest launches, staff surveyed a total of 513 boaters both as a way of gaining information about Clean Drain Dry (CDD) practices, and as a platform for education.



During boater surveys, boaters were asked their origin, whether they had stopped at an inspection station, and if they had prior knowledge of invasive mussels. The majority of boaters were local Columbia Shuswap residents (53.6%) or from B.C. (23.4%). Of those from Alberta (17.6%) almost half keep their boat permanently in the Shuswap area. Just over 5% of boaters were from outside BC or Alberta (Figure 16).

All boats from outside B.C. reported stopping at a watercraft inspection station, however some of these said they had no prior knowledge of invasive mussels and several were surprised to find that that is why their boat was inspected.

On average, sixty-seven percent of boaters had some prior knowledge of aquatic invasive species and were aware of the need to Clean Drain and Dry their watercraft. Albertans were most highly informed about invasives (81%), with local Columbia Shuswap residents (71%) being better informed than those from the rest of B.C. (55%). Travelers from outside B.C. and Alberta were the least well informed (46%) (Figure 17).

A detailed list of dates and locations of boater outreach days is given in Appendix 1.

In 2020, we focused on giving out materials that emphasized our message (Figure 18). We gave out waterproof Clean, Drain Dry (CDD) stickers, encouraging boaters to attach them to the trailer hitch on the day as a reminder to CDD whenever they were launching or hauling their watercraft; we also gave out chamois cloths to help with the drying process. These cloths are useful to help mop up any water that may be standing in the boat. We also gave out key chains, either with a CDD float, or a set of aquatic invasive information cards.

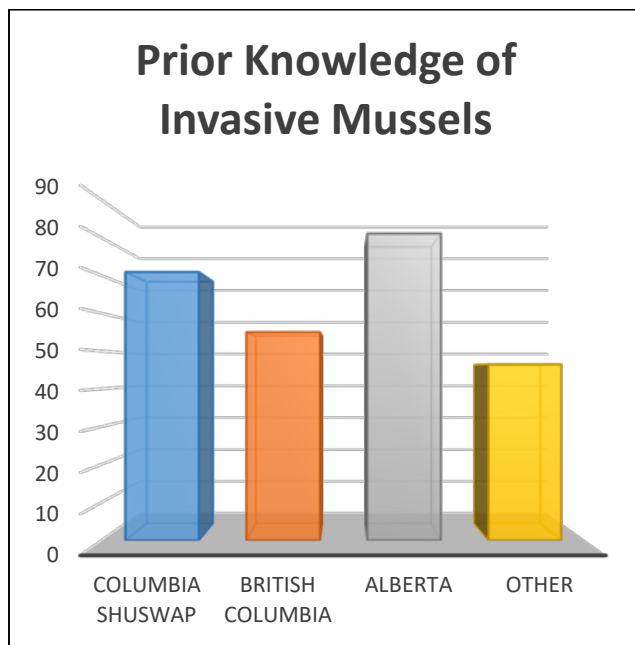
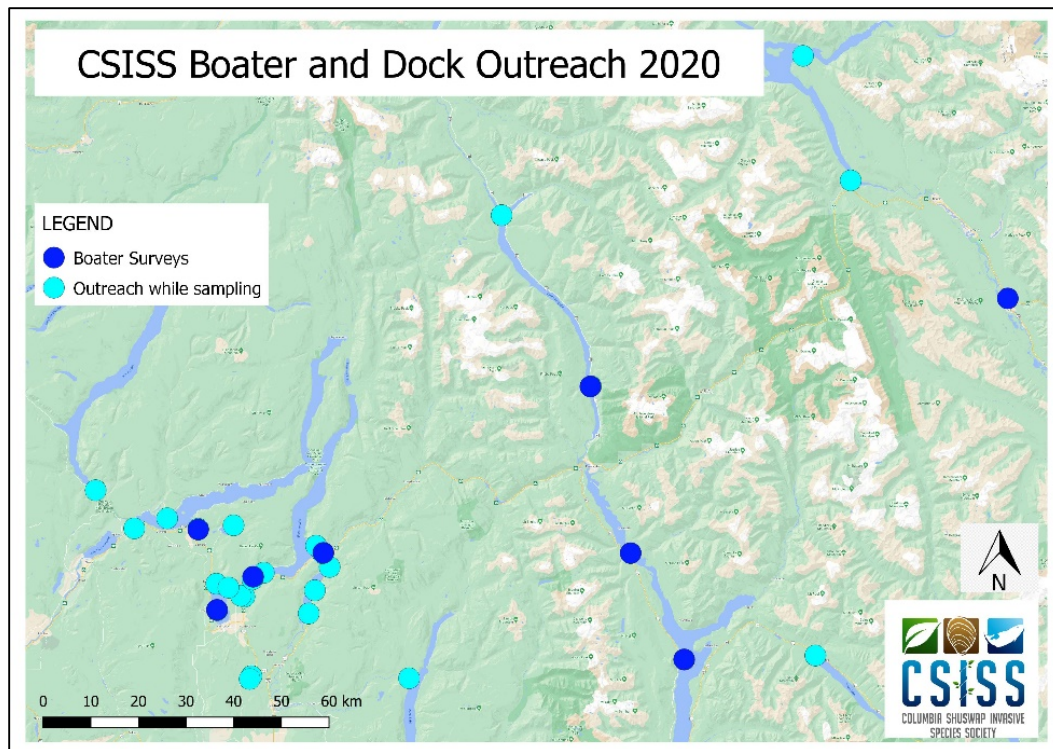


Figure 17. Percentage of boaters by origin who had prior knowledge of invasive mussels (total of 513 surveyed).



Figure 18. Boater receiving CDD resources at Herald Provincial Park.



Map 1. Boater surveys (blue) performed at busy boat launches, and outreach while sampling (teal) at other locations throughout the region.

In addition to dedicated boater outreach days, many outreach interactions occur during sampling at docks (Figure 19). Staff always carry outreach materials and encourage conversations with boaters about how to prevent the spread of invasive species. Outreach about aquatic invasive species was provided to an additional 264 people during invasive mussel and invasive clam sampling.



Figure 19. Busy dock on a day in mid summer at White Lake Provincial Park.

Don't Let It Loose Program

The 'Don't Let It Loose' program promotes returning or rehoming unwanted pets, rather than releasing them into the environment where they may become invasive. Additionally, the program focuses on ensuring live bait fish or other non-native species are not released by anglers/hunters.

In 2020, the CSISS inventoried aquarium/pet stores as they opened after COVID-19 lockdown. Information was provided to owners and staff to encourage them to refrain from selling invasive species. Invasive apple snails and mystery snails were found for sale in one pet shop in the region. Information was provided to the invasive fauna unit at the Ministry of Environment and Climate Change Strategy (ENV) staff.

Preventing human assisted transport of American Bullfrogs into this region is a priority for the CSISS. Invader Alert posters were installed at 22 potential dumping areas (sensitive wetland areas accessible to the public) in the region (Figure 20).



Figure. 20 Bullfrog Invader Alert poster (left) and business cards (right).

CSISS shared the Don't let It Loose message on social media platforms by running campaigns such as 'Invasive Catch of the Day' and posting directly onto Facebook groups about not releasing aquarium animals or fish into waterways (Figure 21). The Don't Let It Loose message was added to outreach about the new freshwater invasive clam discovery as dumping aquarium material may have been a pathway for this species to enter the Shuswap lake.



Figure 21. Don't Let It Loose post on Facebook.

GOAL 4: MAXIMIZE THE PROBABILITY OF DETECTION AND ERADICATION OF NEW INVASIVES

The CSISS maximized the probability of detection and eradication of new invasives by raising public awareness and delivering invasive species workshops described above. Additionally, CSISS staff responded to invasive species reports and conducted terrestrial and aquatic targeted invasive species surveys on behalf of partner agencies.

Public Reports

CSISS categorizes reports from the public in four ways: requests for information, invasive plant reports, noxious weed complaints, and landowner outreach. Depending on the nature and priority of the report, CSISS confirms by a site visit and/or responding with landowner extension, an outreach letter, or by enacting the provincial Early Detection Rapid Response (EDRR) protocol.

In total, CSISS had 110 requests for information, 64 invasive plant reports, 3 noxious weed complaints and 21 landowner visits. Due to COVID-19, CSISS restricted landowner visits to priority sites only and physical distancing was maintained along with mask wearing and hand sanitization.

In addition, CSISS completed landowner outreach specific to invasive blueweed through Canada Post's targeted mailing campaign, reaching 859 homes in the South East quadrant of Salmon Arm (Figure 22, Map 2). Inspection of

multiple properties within the mail out zone, showed mechanical treatment of the blueweed (through mowing or pulling) at 9 of the 13 sites, suggesting the targeted mail campaign had community uptake.

CSISS completed a second targeted landowner outreach campaign in Revelstoke for invasive policeman's helmet which has heavily infested the CP Hill neighbourhood (Figure 23). Inspection of multiple properties within the brochure drop zone, showed mechanical treatment of the policeman's helmet (through mowing or pulling) at 1 of the 14 sites, suggesting the targeted mail campaign may have greater community uptake through an alternate method.

INVASIVE PLANT ALERT

Blueweed (*Echium vulgare*)

Have you seen this plant? We need your help to stop the spread of Blueweed in Salmon Arm

What Is Blueweed?

Blueweed is a non-native plant that was introduced from Europe, most likely as an ornamental that has escaped from gardens. This biennial forb invades pastures and rangelands, reducing forage for livestock and other animals.

What Does Blueweed Look Like?

It has vibrant blue petals that are joined to form a funnel-shaped flower with 5 lobes. The entire plant, including leaves, is covered in stiff hairs. The swollen base of the hairs give the stem a black speckling appearance. It has a thick taproot that grows deep into the soil.

How Does it Spread?

Blueweed reproduces by seed, producing up to 2800 seeds/plant. The seeds can remain viable for up to 10 years and are easily transported by animals and watercourses.

Where In Salmon Arm Is It Found?

Blueweed is found in all areas of Salmon Arm. Land managers are working towards preventing further spread of Blueweed throughout the region, and they need your help to achieve this goal.

HERE'S HOW YOU CAN HELP!

Prevention

- Inspect and remove plant parts from personal gear, equipment and vehicles before moving to a new area.
- Use weed free hay, fillsoil and seed mixtures.
- Keep your fields and pastures healthy and invasive plant free by following these practices:
 - Seed bare spots. This reduces available habitat for invasive plants. Be certain to purchase certified seed and request and review the seed analysis certificate.
 - Maintain healthy soils for optimal desirable plant production. Test your soils for nutrient content, composition, pH and other characteristics and amend as needed.
 - Monitor your fields for invasive plants regularly on foot. Windshield surveys are not accurate indicators, as the extent of the infestation often goes undetected.
 - Do not overgraze. Practice rotation to allow desirable plant recovery.

Mechanical Control

Hand pulling and digging is effective on small infestations as long as the root is completely removed. Ensure that disturbed soil is re-seeded using native seed mixes. Ensure you bag and dispose of flowering plants at your local solid waste management facility. Mowing before flowering can reduce seed production however it is necessary to mow several times over the growing season.

Chemical Control

For large infestations, consider herbicide application. Herbicides must be applied in accordance with herbicide labels and other related regulations. If you are considering herbicide application, contact CSISS for a list of qualified herbicide applicators that work in Salmon Arm, or your local agricultural supply store for herbicide options.

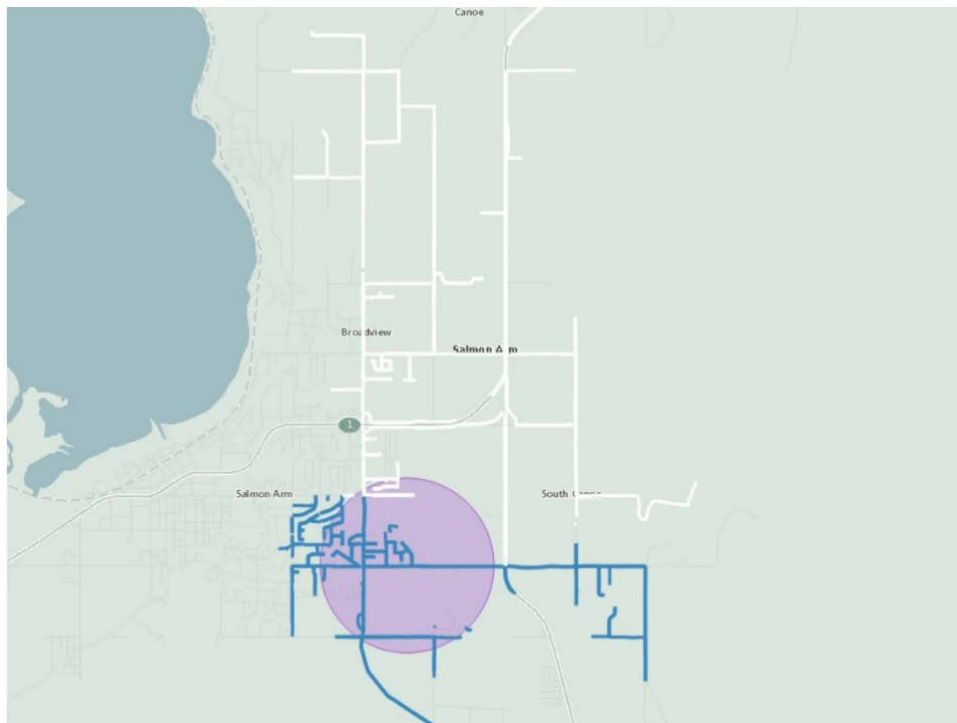
Did you know?

Invasive Plant disposal is FREE at landfills and transfer stations within the CSRD. Ensure your invasive plants are sealed in clear bags to be disposed of in the household waste section NOT yard waste.

Report!

If you see Blueweed, report it to CSISS or using the Report A Weed App: reportaweedbc.ca

Figure 22. Targeted blueweed mail-out through Canada Post



Map 2. Canada Post targeted mail-out for blueweed. Roads highlighted in blue received a blueweed information sheet with CSISS contact details.



Impacts

Ecological: With the ability to self-seed, late flowering native species in BC's riparian areas, introductions of Himalayan balsam decrease the diversity of plants in these areas and can damage ecosystems.

Economic: The shallow root system and annual nature of the plant exposes invaded areas to erosion during winter when the plants die off.

Ecological Characteristics

Habitat: Prefers disturbed, riparian systems. It can also grow in shaded environments, wet meadows, forest cut blocks, and damp natural woodland. The plant is intolerant of drought.

Reproduction: An annual that reproduces by seed. Seeds can remain viable for up to 18 months in the soil and typically germinate in early spring, approximately 80% germination rate.

Dispersal: Up to 32,000 seeds can be produced per square metre in a dense stand of Himalayan balsam. Seeds are produced in explosive seed-pods, which can throw seeds up to 7 m.

Identification

Flowers: Corolla-tubing with white to pink-purple, natural shaped flowers.

Stems: Stems are bamboo-like, thick, highly branched and purple to reddish tinged. Plants can grow over 2 m tall.

Leaves: Leaves are in whorls (usually in threes), oblong to egg-shaped, and have a serrated edge, often tinged with red.



CSISS
COLUMBIA SHUSWAP INVASIVE SPECIES SOCIETY

Report!

If you see Himalayan balsam, report it to CSISS or use the Report A Weed App: reportaweedbc.ca

For more information

- 1-855-PUL-WEED
- columbiashuswapinvasives.org
- info@columbiashuswapinvasives.org
- @ColumbiaShuswapInvasives
- @columbiashuswapinvasives
- @CSISS_invasives

Himalayan Balsam

Have you seen this plant?

Himalayan balsam (*Impatiens glandulifera*) is an exotic-looking annual with pink flowers and a hollow stem. Native to the Himalayas, this plant was introduced to British Columbia and has become extremely invasive in many regions. Himalayan balsam is spreading in Revelstoke near the Track street area and the Columbia Shuswap Invasive Species Society is working with land managers to help prevent further spread throughout Revelstoke.

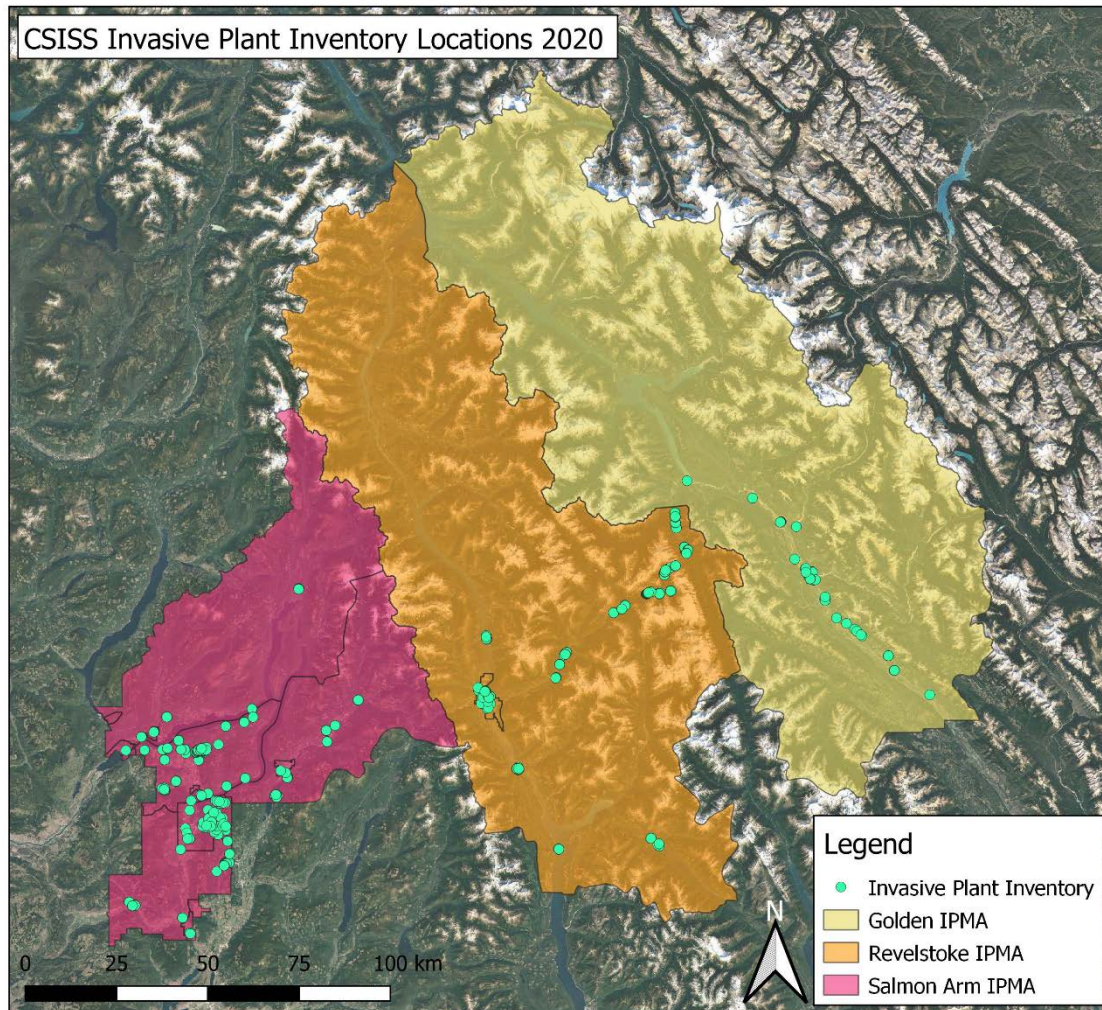


Figure 23. Himalayan balsam brochure delivered to targeted neighborhoods in Revelstoke.

Targeted Invasive Plant Surveys

In 2020, the CSISS inventoried 300 sites (21 new sites) and completed 1162 invasive plant surveys. Priority invasive plants were found in all 3 of CSISS's Invasive Plant Management Areas (IPMA's). Priority invasive plants inventoried in 2020 include: blueweed, bohemian knotweed, cypress spurge, field scabious, giant knotweed,

Himalayan blackberry, leafy spurge, marsh plume thistle, poison hemlock, policeman's helmet, rush skeletonweed, scotch broom, scotch thistle, teasel, wild chervil, wild parsnip and yellow flag iris (Map 3). CSISS entered all invasive plant surveys, site surveys, treatment records and monitoring records completed on behalf of partner/funding agencies into the Provincial Invasive Alien Plant Program (IAPP) database.



Map 3. Invasive Plant Inventories in the Columbia Shuswap Region 2020

Field Operations Funder Updates

CSRD Overview

In 2020, the CSISS completed invasive plant inventories of Columbia Shuswap Regional District properties including landfills, transfer stations, parks, fire halls and parcels (Figure 24). In addition to inventories, the CSISS administered and monitored landfill and transfer station invasive plant chemical treatments, completed mechanical removal of priority invasive plants, and completed landowner outreach throughout the region.

CSISS identified five landfills and transfer stations for priority invasive plant treatment. A certified pesticide applicator spot treated 0.1232 Ha over two rounds of treatment from May to September 2020. CSISS staff completed mechanical treatment at 3 sites, removing a total of 0.0007 Ha of priority invasive plants. Target species include: blueweed, rush skeletonweed, poison hemlock, field scabious, Himalayan blackberry, hoary alyssum and policeman's helmet. Comparing previous years, CSISS found a reduction of infestation size at some sites treated and 7 locations had 'No Weed Found' for priority invasive species.

In 2020, CSISS inventoried 33 CSRD parks, fire halls and land parcels (27 parks, 4 fire halls and 2 parcels). In total, CSISS staff mechanically treated 4 sites and .0007 Ha. Target species include: blueweed, English ivy, Himalayan blackberry, poison hemlock and greater celandine. CSISS found a reduction of infestation size at some sites treated and 4 locations had 'No Weed Found' for priority species in 2020.



Figure 24. Rocky Point Community Park (left), Salmon Arm Landfill with knotweed outreach signage (centre), Play Clean Go signage along CSRD trails (right).

BC Parks Overview

In 2020, the CSISS inventoried Martha Creek, Blanket Creek and Shelter Bay Provincial Parks focusing on expansion project areas and completed multiple mechanical treatments at each of the Parks (Figure 25). A certified herbicide applicator completed herbicide treatment at Martha Creek, Blanket Creek, and Shelter Bay Provincial Parks within the expansion project areas and the leafy spurge site in Martha Creek. CSISS staff completed herbicide monitoring, and all sites passed inspection. CSISS entered all data into the Provincial Invasive Alien Plant Program (IAPP) database.



Figure 25. Martha Creek Provincial Park leafy spurge (left), Blanket Creek Provincial Park recent construction of shower facility (centre), Shelter Bay Provincial Park priority invasive plant, hoary alyssum (right).

Blanket Creek Provincial Park Restoration Project

The CSISS is leading a multi-year project to restore an area of Blanket Creek Provincial Park that has been impacted by invasive plants, such as knapweed species, with the support of BC Parks. Blanket Creek Provincial Park is an area with important conservation values, such as Kokanee spawning habitat and winter ungulate range. The park also contains mature second growth stands of western hemlock and western cedar and is located within the traditional territories of the Okanagan and Secwépemc First Nations (Blanket Creek Park Management Plan).

Through the removal and/or displacement of invasive plant species of concern, and the reestablishment of native species, the project aims to encourage natural regeneration of local habitats and promote a resilient native plant assemblage for the future. Shearing Environmental Consultants Ltd provided expertise to help plan restoration and choose indigenous vegetation to support the natural ecosystem. The Shearing Ltd. restoration plan for the site will be posted to the CSISS website under publications and reports, following approval.

In fall of 2020, restoration efforts included the planting of 65 shrubs and trees and 100 cottonwood stakes and top soil was also added to an area where native seeds were planted. This project was undertaken with the financial support of Environment and Climate Change Canada and BC Parks License Plate funding. Watch the video by the CSISS: <https://www.youtube.com/watch?v=LZukobTGS3g&t=30s>. The project was highlighted on the Society for Ecological Restoration Western Chapter website as well: <https://chapter.ser.org/westerncanada/columbia-shuswap-invasive-species-society-blanket-creek-provincial-park-restoration-project/>



Figure 26. Blanket Creek Provincial Park restoration project consultants (left), volunteers planting and seeding restoration area (centre and right).

Shuswap Yellow Flag Iris Project Overview

In 2020, the CSISS completed detailed site inventory for invasive yellow flag iris (YFI) in sites around the Shuswap, including White Lake, Turner Creek, McGuire Lake, Gardom Lake, and Little White Lake (Figure 29). Using iPads and a GIS mapping program, a combined infestation size of 0.05 Ha in the Shuswap: 0.0238 Ha at White Lake and Little White Lake, 0.0160 Ha at Gardom Lake, 0.0001 Ha at SABNES foreshore trail, 0.0001 Ha at McGuire lake, and 0.0100 Ha at Turner Creek. Funding from TD Friends of the Environment and RBC Tech for Nature through the Shuswap Trail Alliance meant that their crews mechanically treated all infestations of yellow flag iris at White Lake as highest priority, as well sites at Turner Creek, and McGuire Lake, while CSISS was contracted to coordinate and monitor these efforts. CSISS also received funding from Environment and Climate Change Canada (EcoAction Community grant) and the Public Conservation Assistance Fund (PCAF) to help with this project. CSISS leveraged funding through a wage subsidized summer student position and other grant funding for outreach activities. CSISS staff completed deadheading of yellow flag iris seed pods and flowers at all locations on Little White Lake. CSISS staff completed mechanical treatment monitoring at each waterbody to ensure successful treatment.

Community weed pulls and restoration events usually take place at Little White Lake, however due to COVID-19 and physically distancing protocols no weed pulls took place in 2020. Due to past community education and outreach from CSISS, community members took it upon themselves to deadhead YFI in front of their own private properties. In total, community members treated .0180 Ha of YFI, including the removal of plant material to waste management centres. We applaud the continued effort and support of our local residents.

In total, mechanical treatment from digging removed 0.0043 Ha and dead-heading removed 0.0190 Ha of material from White Lake and Little White Lake respectively. In total, removal of 0.0340 Ha of YFI from dead-heading and seed collection at Little White Lake and Gardom Lake and removal of 0.0150 Ha from digging at White Lake, McGuire Lake, SABNES Trail and Turner Creek took place in 2020. Monitoring and further treatment is recommended for future years, as with all invasive species, especially aquatic/riparian plants, eradication is a multi-year effort.



Figure 29. Invasive yellow flag iris infestation on White Lake (left), yellow flag iris rhizome root mass (centre), CSISS staff completing yellow flag iris inventory on Little White Lake (right).

City of Salmon Arm Overview

In 2020, CSISS staff inventoried 57 priority sites on municipal properties completing 85 invasive plant surveys (some sites have more than one plant species). CSISS administered and coordinated a herbicide contract to ensure

effective treatment timing for priority species. Spot treatment of herbicide occurred at 35 municipal priority sites over two passes from May to September 2020. CSISS completed herbicide monitoring at 20 of the treated sites, all sites passed inspection. CSISS staff completed mechanical treatment at 16 municipal priority sites with a total of 637 m² of invasive plant material removed. CSISS installed 11 Do Not Mow signs along City right-of-ways to alert roadside mowers and public of the infestation (Figure 26).



Figure 26. Wild parsnip infestation (left), spot application of herbicide treating blueweed (centre), installation of 'Do Not Mow' signage (right).

Ministry of Transportation and Infrastructure Overview

Scope

The CSISS, acting as a qualified contractor on behalf of the Ministry of Transportation and Infrastructure (MoTI), completed Do Not Mow signage installation prior to roadside mowing and removal and storage of Do Not Mow signage after mowing ceased. Additionally, the CSISS completed tailgate and information sessions to all MoTI contractors spring 2020. CSISS staff tracked all deliverables in the workplan, and coordinated with relevant stakeholders in the region.

Summary of Work Completed

As part of the CSISS's contract with the MoTI, CSISS staff completed pre-season maintenance contractor meetings regarding invasive plant identification and best management practices. Sessions covered new and existing priority invasive plants in the area, mowing schedules, knotweed/ do not mow signage, best management practices for mowing/ ditching/ gravel pit activities and reporting. Emcon Services (Golden and Revelstoke) and AIM Roads (Salmon Arm) took part in the contractor meetings.

CSISS staff installed 19 Do Not Mow signs for knotweed infestations along MoTI right-of-ways, prior to mowing (Map 4, Figure 27). During signage installation, CSISS staff directly spoke with adjoining private landowners delivering information about knotweed. In five instances, landowners voiced concerns regarding Do Not Mow signage near their property. CSISS staff were able to speak with these individuals and in most cases flag the

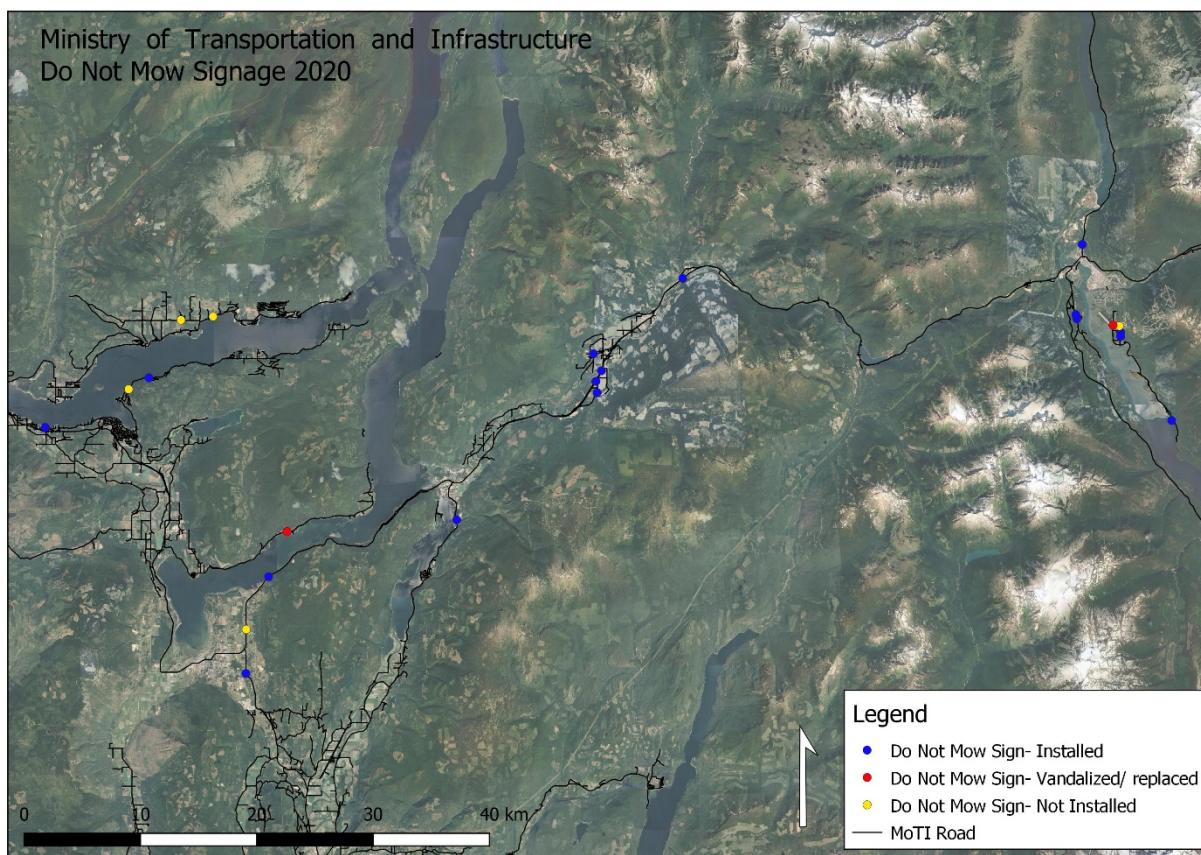
knotweed infestation for mowers. CSISS sent roadside contractors mapping files containing the locations of knotweed infestations with signage and without signage.

Throughout the season, CSISS staff re-visited Do Not Mow signage sites and replaced or repaired two vandalized signs. CSISS staff removed, cleaned and stored the signage in a secure CSISS lock-up after the mowing season ended.

During the mowing season, CSISS continued communication with mowing contractors and MoTI staff. CSISS staff continued to monitor for Early Detection and Rapid Response (EDRR) species, and report new priority sites to the Province, no MoTI Provincial EDRR sites were found in 2020 by CSISS.



Figure 27. Do Not Mow signage installed for the MoTI in 2020.



Map 4. Ministry of Transportation and Infrastructure Do Not Mow Signage in 2020.

Parks Canada Overview

The CSISS, acting as a qualified contractor on behalf of Parks Canada, completed Invasive Alien Plant (IAP) Herbicide Monitoring in Mount Revelstoke and Glacier National Parks (MRG) at sites allocated for spot application of herbicide treatment. The sites monitored are found within the integrated control zone on the highway corridor, both high and very high priority invasive species are managed in this zone.

In total, CSISS monitored 17 sites for herbicide effectiveness spanning two rounds of treatment from a certified pesticide applicator in both Mount Revelstoke and Glacier National Parks (Figure 28).



Figure 28. Mount Revelstoke and Glacier National Parks: inventory prior to spot herbicide application at Beaver Valley Picnic (left), Beaver Pit (centre) and Beaver Valley Lookout (right).

Nature Trust Overview

In 2020, the CSISS completed a comprehensive inventory of priority invasive alien plants on the Salmon Arm Foreshore property, mechanically treated high priority invasive alien plants and will continue to monitor treatment efficacies in 2021, pending funding. Target species include: yellow flag iris, teasel, burdock, blueweed and policeman's helmet (Figure 30). Treatment of invasive alien plants is a multi-year effort, it is recommended to continue inventory, treatment and monitoring of priority species in the following consecutive years. All invasive plant inventory, treatment and monitoring data was entered into the provincial Invasive Alien Plant Program (IAPP) database.

Due to COVID-19 and physically distancing protocols, no community weed pulls or larger restoration events took place in 2020. Additional treatment along the foreshore was possible due to funding from Invasive Species Council of British Columbia- Jobs Creation Program (ISCBC JCP) and Canada Summer Jobs.



Figure 30. Salmon Arm Foreshore target invasive plants: blueweed (left), teasel (centre), and policeman's helmet infestation (right).

BC Hydro Overview

In 2020, the CSISS completed invasive alien plant inventory and identification of areas for noxious and invasive weed control initiatives on BC Hydro transmission line corridors, determined treatment plans, administered herbicide treatment contracts to a certified pesticide applicator, monitored effectiveness of weed control treatment and provided recommendations for future management plans. A certified pesticide applicator treated nine spotted knapweed sites within the Golden IPMA and one site bordering private property within the Salmon Arm IPMA. In addition, CSISS staff completed bioagent monitoring for leafy spurge and rush skeletonweed species near Falkland BC (Figure 31).



Figure 31. BC Hydro transmission line corridor spot application of herbicide for spotted knapweed in the Golden IPMA (left), bioagent dispersal monitoring for *Aphthona nigricutis* on leafy spurge (centre) and bioagent dispersal monitoring for *Puccinia chondrillina* on rush skeletonweed (right).

Recreation Sites and Trail BC: Skimikin Lake Overview

In 2020, the CSISS provided invasive alien plant inventory and identification of areas for noxious and invasive weed control initiatives throughout Skimikin Lake Recreation Site, manual treatment of high priority invasive plants, data entry and management using the Provincial Invasive Alien Plant Program (IAPP) database and provided recommendations for future management plans (Figure 32).

In total, CSISS staff identified twenty different invasive plant species throughout the inventory area. Species found were listed as Containment, Established, Insufficient Information and Unlisted- Lowest Priority. Fortunately, no Regional or Provincial Early Detection Rapid Response (EDRR) species or Regional Eradication and Annual Control species were found within inventory boundaries. While it is unfortunate there are many widespread, low priority plant species on the site, it is excellent to have no findings of any high priority species at this time.

Mechanical treatment of a single plant of diffuse knapweed and St. John's wort was completed on site. All plant material was bagged and disposed of properly.

Biological agent monitoring of spotted knapweed found adults present and foliar feed damage from *Larinus obtusus*, a seed feeding weevil. Root damage and larvae were observed from *Cyphocleonus achates*, a root feeding weevil within the same spotted knapweed plant.

A shoreline cursory aquatic invasive plant survey was performed; no aquatic invasive plants were found. Native aquatic plants inventoried include: *Persicaria amphibia*, *Ranunculus aquatilis*, *P. gramineus* and *Potamogeton amplifolius*.



Figure 32. Skimikin Lake Recreation Site: sulphur cinquefoil infestation (left), Canada thistle infestation (centre) and *Cyphocleonus achates* bioagent for spotted knapweed (right).

Aquatic Invasive Species Surveys

Zebra and Quagga Mussels (*Dreissenid* spp.)

The province of BC uses a risk matrix to determine which waterbodies to monitor for invasive *Dreissenid* mussels. This matrix takes into account probability of invasion, probability of mussel survival, and vulnerability of waterbody (environmental, social, and economic). Waterbodies at critical risk from zebra and quagga mussels (ZQM) are monitored bi-weekly and those considered high risk are monitored monthly.

The CSISS monitored 12 waterbodies at 22 locations (Table 4) in the region for ZQM, adhering to the 2020 Provincial Invasive Mussel Field Protocol. Sampling began on May 30th 2020 and the last sample was taken on October 22nd 2020. Plankton tow sampling was used to monitor for veligers (larvae) (Figure 33).



Figure 33. Plankton tow net used to sample for *Dreissenid* veligers (larvae).

Table 4. Locations sampled by CSISS for invasive mussels in 2020

Region	Priority	Waterbody	Sample site	Sampling frequency	Plankton samples
Shuswap	Critical	Shuswap Lake	Blind Bay	Bi-weekly	11
Shuswap	Critical	Shuswap Lake	Captain's Village	Bi-weekly	11
Shuswap	Critical	Shuswap Lake	Little River Boat World	Bi-weekly	11
Shuswap	Critical	Shuswap Lake	Sandy Point	Bi-weekly	11
Shuswap	Critical	Shuswap Lake	Cinnemousun Narrows	Once*	1
Shuswap	Critical	Shuswap Lake	Old Town Bay	Monthly**	6
Shuswap	Critical	Mabel Lake	Kingfisher	Monthly	11
Shuswap	High	Adams Lake	Indian Point Resort	Monthly	6
Shuswap	High	Little Shuswap Lake	Chase	Monthly***	3
Shuswap	High	White Lake	White Lake PP	Monthly	6
Shuswap	High	Mara Lake	Sicamous Narrows	Bi-weekly	11
Shuswap	High	Mara Lake	Swansea Point	Monthly	6
Shuswap	High	Mara Lake	Sicamous Houseboats	Monthly****	0
Shuswap	High	Gardom Lake	Gardom Community Park	Monthly	6
Total Shuswap Samples					100
Columbia	Critical	Kinbasket Lake	Kinbasket Resort	Bi-weekly	6
Columbia	Critical	Kinbasket Lake	Bush Harbour	Bi-weekly	6
Columbia	Critical	Revelstoke Lake	Martha Creek	Bi-Weekly	7
Columbia	Critical	Revelstoke Lake	Downie RV	Bi-Weekly	7
Columbia	Critical	Revelstoke Lake	Mica Creek	Bi-Weekly	6
Columbia	High	Columbia River	Donald Bridge	Monthly	3
Columbia	High	Upper Arrow Lake	Shelter Bay	Bi-weekly	10
Columbia	High	Trout Lake	Denver Street	Monthly***	3
Total Columbia Samples					48
TOTAL SAMPLES					148

Notes:

*Cinnemousun Narrows was sampled only once. COVID-19 restrictions prohibited CSISS staff from boat sampling but one sample was collected by ENV staff while on location.

**Old town bay was only sampled monthly due to its proximity to the Sicamous Narrows Site.

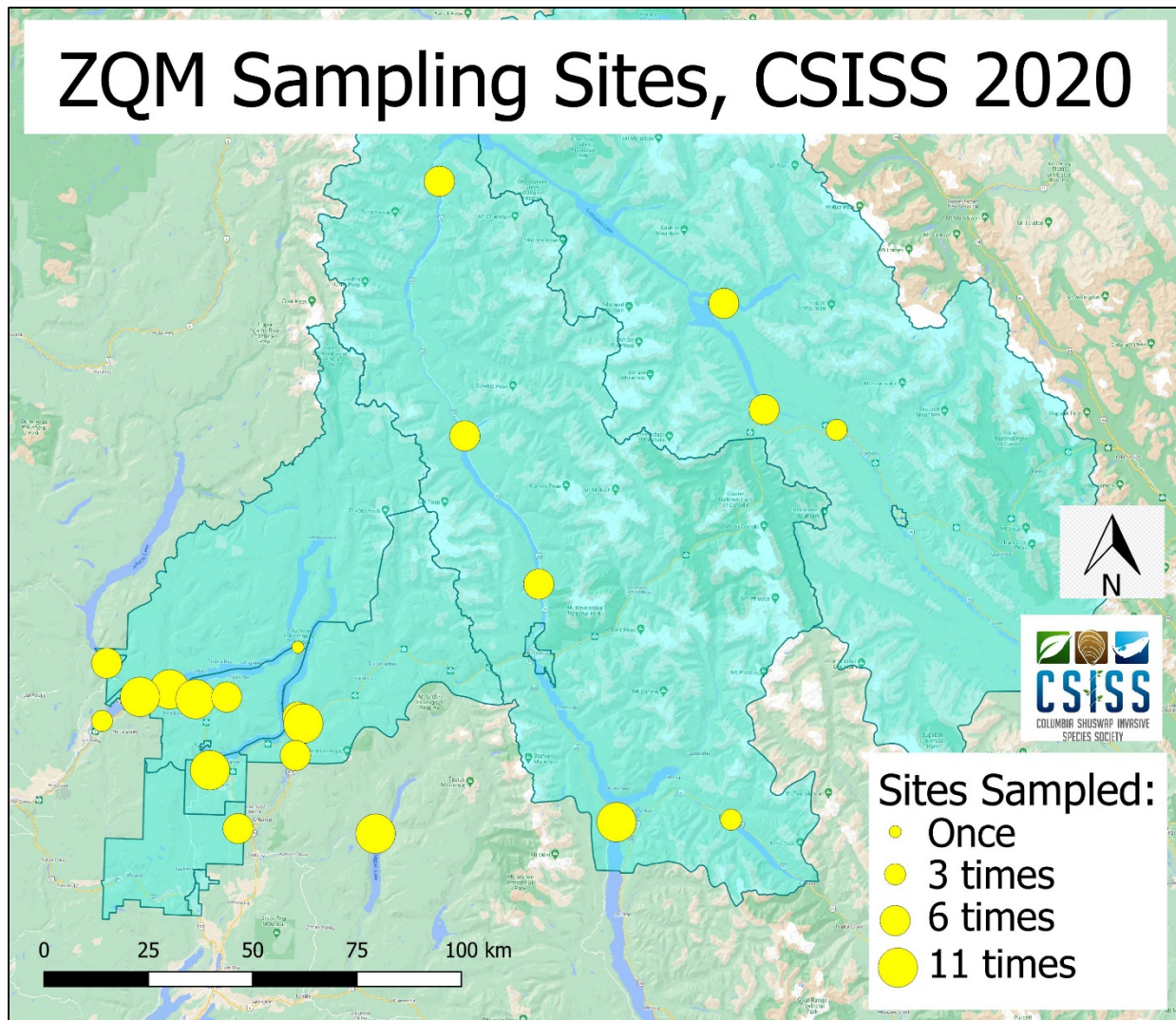
***Little Shuswap lake and Trout Lake were only sampled in the later half of the season.

****Sicamous Houseboats sampled only for adults (substrate sampler)

The Province (ENV) provides funds to monitor waterbodies through the Habitat Conservation Trust Foundation (HCTF). Additional funds were obtained from the Shuswap Watershed Council.

Two of CSISS ZQM sampling sites (Kingfisher at Mabel Lake, and the site at the Village of Chase), are outside of the CSISS operating area (Map 5). CSISS sampled these locations because there was no other agency able to sample them. It was deemed important to sample these sites as they are important sites within the Shuswap Watershed.

ZQM Sampling Sites, CSISS 2020



Map 5. Locations of sites sampled by CSISS for ZQM in 2020.

To monitor for adult ZQM, staff deployed 12 substrate samplers and checked local substrates where deploying a sampler was not an option. Staff checked samplers and local substrates at each plankton sampling visit.

In late September, CSISS found encrusting animals on the sampler at Sicamous Narrows. It was immediately removed and not returned to the lake. A sample of the animals was sent to the laboratory for identification and was determined to be native limpets (*Ferrissia* sp).

Also in late September, parts of the wooden dock structure at Kingfisher (Mabel lake) had gritty particles clinging among algae. A sample was taken for lab analysis and found to contain Hydroid and Trichoptera larvae, as well as plant seeds. This type of deposit was not found on the substrate sampler at this location, so the sampler was left in place for the remainder of the season.

The CSISS worked closely with other organizations (BC Hydro, OASISS CKISS, EKISC, ENV) sampling for ZQM in and around the Columbia Shuswap Region. CSISS sampling sites and dates complimented those other organizations to ensure sampling did not overlap, and maximized sampling efforts across regional waterbodies.

All waterbodies tested negative for ZQM veligers and adults at all locations sampled by CSISS. There are currently no known occurrences of ZQM in the Province of BC.

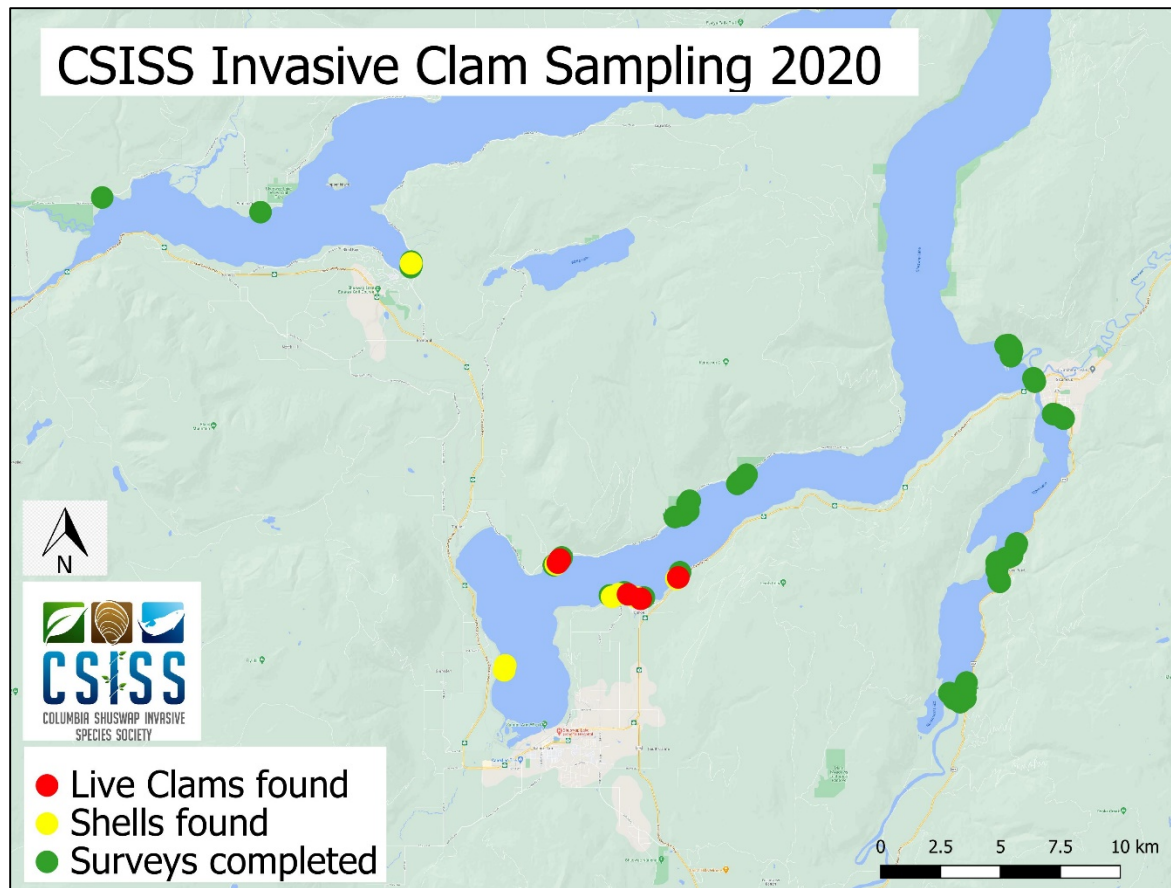
Invasive Freshwater Clam Surveys (*Corbicula fluminea*.)

Late in 2019 dead shells of the invasive clam *Corbicula fluminea* (aka golden, pygmy, or Asian clam) were detected at Sandy Point and Sunnybrae in the Salmon Arm of the Shuswap Lake. Sampling for live clams was planned for spring 2020, but COVID-19 restrictions meant that the early spring low water sampling opportunity was not available. Sampling for live clams began as late summer water levels dropped below 345.5 meters, which was in mid-September in 2020.

CSISS staff originally planned simply to try and confirm the presence of live clams in the Shuswap. Once confirmed, it was determined that extent surveys were necessary. The Shuswap Watershed Council provided funding to perform beach walking and digging samples (1 square metre plots) to determine the extent of the live population. Beach surveys required staff and volunteers to walk the beach scanning from shore to high water mark. Digging surveys were performed at ~80m intervals along the beach. For each digging survey, staff walked off shore to a depth of ~0.5 metre installed a temporary 1 m x 1 m quadrat, dug and sieved the sediment to a depth of ~5cm and determined the number of clams present. Time, location, presence of dead shells on beach, number of live clams, size of largest clam found, and substrate type were all recorded for each survey. Surveying method protocols were developed by Provincial staff and refined by CSISS staff as experience was gained.

Live clams were first found at Sunnybrae on September 9th at a depth of around 0.5m below waterline. Once live clams were found at Sunnybrae, it was assumed that live populations exist from Sandy Point to Sunnybrae and Canoe where dead shells had also been found in the early summer. It was also assumed that clams were potentially spreading east, with the lake flow, along the Salmon Arm of the lake. Thus, surveys worked east along the north shore of the Salmon Arm from Sunnybrae, and along the south shore of the Salmon Arm from Canoe.

Rototilling for milfoil control was identified as another potential mechanism of spread. Rototilling has occurred over past years at the following locations; Sandy Point, Sunnybrae, Sicamous Narrows, Old Town Bay, the southern end of the Mara Lake, Swansey Point, Blind Bay, and Scotch Creek. These locations were also surveyed. Surveys were only completed in areas with suitable habitat, which include cobbles, gravel, sand, or silt. A total of 115 surveys were completed in the Shuswap and Mara Lakes (Map 6).



Map 6. Invasive clam (*C. fluminea*) sampling sites, CSISS 2020.

Live clams were found at Sunnybrae, and Canoe to east of the mill, but not at any other locations. Shore access from Canoe to Sicamous along the south shore was not possible without boat access, and boat travel during COVID-19 restrictions was not possible in 2020. Surveys along this portion of the shore should be undertaken as and when possible. A single dead clam shell (old and water worn) was found at Blind Bay, but no live clams were found there. No shells or live clams were found at any other sampled locations.

Aquatic Invasive Plants

All CSISS shore-based ZQM sampling sites (21 sites) were surveyed for aquatic invasive plants on two occasions throughout the year. A number of invasive plants are present in the Columbia Shuswap region including: Eurasian watermilfoil (*Myriophyllum spicatum*), yellow flag iris (*Iris pseudacorus*), curly-leaf pondweed (*Potamogeton crispus*), watercress (*Nasturtium officinale*), and fragrant waterlily (*Nymphaea odorata*). No new infestations of invasive plants were discovered.

The prolonged high water in the early part of this season prompted many public reports of unusual aquatic plants, however most reports were identified as native plants. Fortunately, none of these reports were found to be new infestations of aquatic invasive plants.

American Bullfrogs

American bullfrogs are not known to exist in the Columbia Shuswap Region. The closest populations are in the lower mainland, Creston Valley, and a treated (and possibly eradicated) population in the southern Okanagan.

Bullfrogs may be transported by humans for a variety of reasons; as pets, as garden ornaments, as educational dissection animals, or as food. Targeted outreach was designed to reach people who may unwittingly release these animals to the Columbia Shuswap.

GOAL 5: SLOW AND REVERSE THE SPREAD AND MINIMIZE THE IMPACT OF EXISTING INVASIVES

The CSISS works hard to slow and reverse the spread of existing invasive species and reduce their impacts. Collaboration, clear and effective communication, community participation and establishing realistic, obtainable treatment goals all play a role in minimizing the impact of invasives.

Mechanical Treatment

In 2020, the CSISS mechanically treated 43 priority invasive plant sites, removing a total of 0.1505 Ha of material. The invasive plants treated consist of: blueweed, bull thistle, burdock, common tansy, diffuse knapweed, English ivy, greater celandine, Himalayan blackberry, hoary alyssum, leafy spurge, meadow knapweed, poison hemlock, policeman's helmet, rush skeletonweed, spotted knapweed, St. John's wort, teasel, wild chervil, wild parsnip and yellow flag iris (Figure 33). As part of mechanical treatment, the CSISS supported 7 weed pulls throughout the Columbia Shuswap region. Due to COVID-19, physical distancing was maintained along with mask wearing and hand sanitization during weed pulling activities. As well, weed pulls were with designated partner organization teams as opposed to larger public events due to COVID-19 safety concerns.



Figure 33. Blueweed rosette (left), yellow flag iris removal (centre), and policeman's helmet infestation (right).

Chemical Treatment

In 2020, the CSISS administered five herbicide spray contracts treating 68 priority sites and 4.9352 Ha of land. All treatments were carried out by a certified herbicide applicator. The CSISS monitored each herbicide spray contract, all sites passed inspection. Priority invasive plants treated include: blueweed, bohemian knotweed, bull thistle, burdock, Canada thistle, field scabious, Himalayan blackberry, leafy spurge, hoary alyssum, oxeye daisy poison

hemlock, policeman's helmet, rush skeletonweed, spotted knapweed, sulphur cinquefoil and yellow hawkweed species (Figure 34).



Figure 34. Successful blueweed treatment at Klahani Park (left) and bohemian knotweed treatment at Park Hill trail system (right).

Signage and Education

To reduce the spread of knotweed on roadside right-of-ways, the CSISS installed 19 'Do Not Mow' signs for MoTI and 11 signs for the City of Salmon Arm to alert mowers of the infestation ahead. Signs were installed prior to mowing, repaired throughout the growing season and removed post mowing to be stored in a secure area.

To encourage proper disposal of knotweed at landfills and transfer stations, the CSISS ensured each refuse station had a 'Do Not Compost Knotweed' sign visible to members of the public (Figure 35).

In addition to signage, CSISS staff completed pre-season maintenance contractor meetings regarding invasive plant identification, and best management practices. Sessions covered new and existing priority invasive plants in the area, mowing schedules, knotweed/ do not mow signage, best management practices for mowing/ ditching/ gravel pit activities and reporting. Emcon Services (Golden and Revelstoke) and AIM Roads (Salmon Arm) took part in the contractor meetings. Specific knotweed education was provided to landfill and transfer station operators throughout the season. For invasive plant practitioners, members of the public and other interested individuals, CSISS hosted two virtual 'Invasive Plant Identification and Management Training' workshops early spring to increase education and awareness about invasive plants, best management practices and reporting methods.



Figure 35. Do Not Mow sign (left) and Do Not Compost Knotweed sign (right).

GOAL 6: PROGRAM SUSTAINABILITY

In 2020, the CSISS gratefully received in kind and financial support for invasive species related programming in the region from over 25 sources and maintained a similar operating budget. The CSISS received funds from B.C. Community Gaming Grant, Parks Canada, Habitat Conservation Trust Foundation (Invasive Mussel Monitoring and Public Conservation Assistance Fund), City of Salmon Arm, BC Hydro, Shuswap Watershed Council, the Nature Trust, MFLNRORD (Benson Pit treatment contract, Skimikin Rec Site inventory), Environment and Climate Change Canada (Eco Action grant) and BC Parks (Parks Enhancement Funds and license plate funding for restoration project in Columbia region). In addition, the CSISS continued multi-year funding agreements from the Columbia Shuswap Regional District (CSRD, renewed in 2019 for 2019-2024 agreement), the Ministry of Forests, Lands and Natural Resource Operations and Rural Development (MFLNRORD), the Ministry of Transportation and Infrastructure (MoTI), and the Columbia Basin Trust (CBT). CSISS received funding for one summer assistant (two projects) from the federal government through the 'Canada Summer Jobs' program. Small contributions were also received from: Shuswap Trail Alliance, CBEEN, Revelstoke Grant In Aid, Sicamous Grant In Aid, and BC Hydro community grant. We also received a donation from Monashee Spirits from the Revelstoke Wildflower Festival.

Additional funding sources are being pursued for the 2021 season.

The CSISS staff team in 2020 included four returning staff members, Robyn Hooper (Executive Director), Laura Gaster (Field Operations Program Coordinator), Sue Davies (Aquatics Program Coordinator), Kim Kaiser (Education Program Coordinator). Kathleen Meszaros (Invasive Species Program Assistant), an SFU/BCIT Masters student was a welcome new staff and assisted on the Blanket Creek restoration project as part of her Masters project. Staff helped greatly enhance the level of service the CSISS was able to deliver in the region (Figure 36). Retaining a quality staff team is important for the CSISS which has thus far been exceptionally successful. Similarly, the CSISS has been fortunate to have received direction from a knowledgeable, diverse Board of Directors. Each individual brings a unique perspective to the organization and has been instrumental in helping the CSISS address many aspects of invasive species management in the region.

The CSISS Policy Manual was reviewed and updated in 2020; the manual helps to facilitate orientation of new staff and directors (Stafl, 2015, updated Hooper 2020). The manual is reviewed and signed by the Board Directors annually and updated as necessary. The Employee Handbook was reviewed and updated, which helps to further

guide CSISS staff on organizational, human resources and administrative standards. CSISS staff have created and maintained an Outreach Framework 2015-2020 and various outreach activities schedules and workplans (Hooper et al. 2015 updated by Sue Davies 2017). Outreach planning documents informs CSISS outreach targets, performance measures, staff work plans, calendars for specific outreach programming, and helps to determine gaps in stakeholder groups and pathways of spread. CSISS staff also work diligently from individual workplans and an organizational workplan that links to the CSISS Strategic Goals.



Figure 36. CSISS Staff members (from left to right): Robyn Hooper (Executive Director); Laura Gaster (FieldOperations Coordinator); Sue Davies (Aquatic Coordinator); Kim Kaiser (Outreach Coordinator); Kathleen Meszaros (Program Assistant).

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Craig, J.A. 2013. Operational Plan for Terrestrial Invasive Plants in the Columbia Shuswap 2014 to 2019. Prepared for Columbia Shuswap Invasive Species Society.

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Harkness, C. 2016. North Columbia Priority Aquatic Invasive Species Surveys. Prepared for the Columbia Shuswap Invasive Species Society.

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Stafl, N. 2014. CSISS Invasive Species Reporting Protocol. Prepared for the Columbia Shuswap Invasive Species Society.

Stafl, N. 2015. CSISS Policy Manual Version 2.0. Prepared for the Columbia Shuswap Invasive Species Society. Updated in 2016 and 2017 by R. Hooper and CSISS Board.

Additional Resources:

CSISS Resources (Operational and Strategic Plans, Aquatic Survey Reports): <http://columbiashuswapinvasives.org/about-csiss/csis-resources/>

Information on high priority regional species: <http://columbiashuswapinvasives.org/invasive-species/high-priority-invasives/>

Appendix A: CSISS Staff and Board Directors 2020

Current CSISS Board Directors (2020- 2021)

Hamish Kassa	Chair, CSISS	Columbia Shuswap Regional District
Chris Cochran	Vice-Chair, CSISS	Town of Golden
John Braisher	Board Director, CSISS	Rancher and Golden resident
Adam Croxall	Board Director, CSISS	BC Hydro
Darren Komonoski	Board Director, CSISS	City of Revelstoke
Diane Millar	Board Director, CSISS	MFLNRORD
Chris Gill	Board Director, CSISS	Shuswap resident and environmental consultant
Laurel Corrigan	Board Director, CSISS	Revelstoke resident
Joe McCulloch	Board Director, CSISS	District of Sicamous
Peter Tarleton	Board Director, CSISS	Parks Canada
Warren Fortier	Board Director, CSISS	Little Shuswap Indian Band

Previous CSISS Board Directors (2019- 2020)

Hamish Kassa	Chair, CSISS	Columbia Shuswap Regional District
Chris Cochran	Vice-Chair, CSISS	Town of Golden
John Braisher	Board Director, CSISS	Rancher and Golden resident
Bruce Husband	Board Director, CSISS	Shuswap Agricultural Strategy Group
Adam Croxall	Board Director, CSISS	BC Hydro
Darren Komonoski	Board Director, CSISS	City of Revelstoke
Diane Millar	Board Director, CSISS	MFLNRORD
Chris Gill	Board Director, CSISS	Shuswap resident and environmental consultant
Laurel Corrigan	Board Director, CSISS	Revelstoke resident
Natalie Stafl	Board Director, CSISS	Parks Canada
Joe McCulloch	Board Director, CSISS	District of Sicamous

CSISS Staff 2020

Robyn Hooper	Executive Director, CSISS
Laura Gaster	Field Operations Program Coordinator, CSISS
Sue Davies	Aquatic Invasive Species Program Coordinator, CSISS
Kim Kaiser	Outreach and Education Program Coordinator, CSISS
Kathleen Meszaros	Program Assistant (Summer Staff), CSISS

Appendix B: Events Attended by CSISS and partners 2020

Events highlighted in grey pertain to the Columbia Basin Region of the CSISS Area

Date	Event	# of Attendees	# of Direct Interactions
21-Jan-20	Ministry of Environment and Climate Change aquatics field call	15	15
27-Jan-20	Ministry of Environment and Climate Change and Habitat Conservation Trust Foundation's Partner Meeting Lake Monitoring Planning	5	5
31-Jan-20	Shuswap Trails Working Group Meeting	20	20
01-Feb-20	Indigenous Peoples Engagement Session at INVASIVES 2020 forum	20	20
10-Feb-20	Speedy Session ISCBC Forum	180	60
12-Feb-20	Invasive Species Council of BC's Annual Forum (INVASIVES 2020)	180	30
18-Feb-20	Thompson Nicola Regional District Meeting	1	1
18-Feb-20	Parks Canada Meeting	1	1
18-Feb-20	BC Parks Meeting	1	1
20-Feb-20	Columbia Basin Field Operations Meeting	4	4
20-Feb-20	BC Hydro/ Ministry of Forests, Lands, Natural Resources and Rural Development Meeting	2	2
25-Feb-20	Presentation to Okanagan College Horticulture Program	7	7
28-Feb-20	Columbia Basin Field Team Meeting	5	5
04-Mar-20	CSISS Land Manager Meeting	14	14
16-Mar-20	City of Salmon Arm Partner Meeting	3	3
26-Mar-20	Revelstoke Chambers Update Meeting	50	10
02-Apr-20	Herbicide Refresher with Corteva Agrosience and Columbia Basin Teams	6	6
06-Apr-20	Wellness Workshop	5	5
07-Apr-20	Columbia Basin Regional Invasive Species Organization executive Director Meeting	3	3
07-Apr-20	Invasives BC Webinar for New Invasives Provincial Database	0	0
08-Apr-20	East Kootenay Invasive Species Council Land Manager Meeting	20	20
08-Apr-20	Columbia Basin Outreach Team Meeting	4	4
09-Apr-20	Vantage Point Non Profit Leader Checkins	10	10
16-Apr-20	Regional Invasive Species Councils Outreach Planning Meeting	20	20
16-Apr-20	COVID-19 Coaching Session with Bookkeeper	10	10
16-Apr-20	ZOOM 101 webinar	1	1
17-Apr-20	Shuswap Trails Working Group Meeting	25	25
22-Apr-20	Vantage Point Non Profit Leader Checkins	15	15
23-Apr-20	CBT Ecosystem Grant Planning Session	14	14

24-Apr-20	Regional Invasive Species/ Invasive Species Council of BC's Joint Strategic Meeting	20	20
27-Apr-20	Meeting Shuswap Trail Alliance Contractor	1	1
27-Apr-20	Funding and COVID-19 CBEEN Webinar Meeting	20	20
28-Apr-20	Meeting CSISS Spray Contractor	1	1
29-Apr-20	Social Media Webinar	1	1
01-May-20	MLA and MP Engagement Session with Revelstoke Chamber	52	52
05-May-20	Emcon contractor meeting	8	8
06-May-20	AIM Contractor Meeting	3	3
07-May-20	Forestry Presentation with Downie Timber	4	4
12-May-20	Columbia Basin Watershed Network AGM	20	20
13-May-20	BC Parks staff and contractor meeting	6	6
19-May-20	Parks Canada Training	8	8
21-May-20	Webinar Guest on Canadian Council of Invasive Species's webinar series	40	40
21-May-20	Columbia Basin AIS Steering Committee Meeting	12	12
25-May-20	Columbia basin Trust Ecosystem Enhancement Meeting-Revelstoke	20	20
26-May-20	Parks Canada Training	8	8
26-May-20	Columbia Basin Trust Ecosystem Enhancement Meeting-Golden	20	20
27-May-20	Columbia Basin Environmental Education Network's Wild Voices Online Webinar Series Speaker	111	111
28-May-20	East Kootenay Stewardship Meeting Kootenay Conservation Program and other Stewardship Groups	17	17
10-Jun-20	Presentation to BC Wildfire Fighter crews in Revelstoke region	44	44
12-Jun-20	Witness Provincial Budget Consult		
15-Jun-20	Partner meeting with Invasive Species Council of BC- Torin	1	1
16-Jun-20	CSISS Plant Identification Presentation	23	23
18-Jun-20	BC Wildfire Fighters Weed Pull	10	10
19-Jun-20	BC Wildfire Fighters Weed Pull	10	10
24-Jun-20	Edible Invasives Workshop Through Okanagan College	10	10
26-Jun-20	Campground Outreach Golden	5	5
26-Jun-20	Don't Let it Loose Outreach Golden	1	1
30-Jun-20	CSISS Plant Identification Presentation	42	42
30-Jun-20	Meeting with MP Mel Arnold for Aquatic Invasive Species Updates	7	7
01-Jul-20	Campground Outreach Revelstoke	8	8
02-Jul-20	Golden Visitor Center Briefing	5	5
07-Jul-20	Junior Naturalists aquatic invasives	17	17
07-Jul-20	Revelstoke Pollinator Committee Meeting	3	3

08-Jul-20	Campground Outreach Sicamous/Malakwa	6	6
08-Jul-20	Meeting Invasive Species Council of BC- Sue Staniforth-Indigenous Federal Fund	1	1
13-Jul-20	Meeting Invasive Species Council of BC- Splatsin Federal Fund	10	10
14-Jul-20	Junior Naturalists Presentation	11	11
14-Jul-20	Peter Jannik Burdock Weed Pull with Shuswap Trail Alliance	4	4
27-Jul-20	Community Morning Glory Weed Pull	5	5
01-Aug-20	Golden Watercraft Inspection Station Booth	40	12
05-Aug-20	Weed Pull With Nature Trust Staff	5	5
08-Aug-20	Booth at Revelstoke Mountain Resort for Wildflower Festival	300	15
11-Aug-20	Plant Identification Walk for Wildflower Festival	1	1
12-Aug-20	Landowner Outreach for Himalayan balsam	8	8
13-Aug-20	Plant Identification Walk for Wildflower Festival	10	10
13-Aug-20	Landowner Outreach for Himalayan Balsam	2	2
15-Aug-20	Booth at Revelstoke Mount for Wildflower Festival	300	17
21-Aug-20	Meeting with Invasive Species Council of BC Executive Director	1	1
23-Aug-20	Columbia Basin Trust and Columbia Basin Executive Director Meeting	3	3
26-Aug-20	Skimikin Recreation Site Operator and Volunteer Training	6	6
26-Aug-20	Meeting with Ministry of Environment and Climate Change Strategy - Invasive Clam Surveys	2	2
27-Aug-20	Invasive Species Council of BC Job Creation Program Salmon Arm Plant Identification Training	4	5
02-Sep-20	Wadey Recreation Site Operator Training	2	2
08-Sep-20	Partner Meeting with Invasive Species Council of BC - Lara	4	4
09-Sep-20	Clam Sampling Training with Job Creation Partnership Team	4	4
10-Sep-20	Landscaper Phone Outreach- See log	9	9
11-Sep-20	Begbie Falls Rec Site Operator Training	2	2
15-Sep-20	Downie Creek Rec Site Operator Training	2	2
16-Sep-20	Meeting EcoAction		
18-Sep-20	Columbia Basin Trust Annual General Meeting	50	0
22-Sep-20	Splatsin/Invasive Species Council of BC Meeting	13	13
23-Sep-20	Meeting with Erin Viera Shuswap Watershed Council	1	1
28-Sep-20	Salmon Arm Job Creation Partnership mMeeting	4	4
29-Sep-20	Columbia Basin Trust Ecosystems Grant Meeting	12	12
29-Sep-20	Revelstoke Pollinator Committee Meeting	4	4
01-Oct-20	Landscaper Training-Oxner Landscaping Golden	6	6
01-Oct-20	Landscaper Training-Jackson Excavating Golden	2	2
02-Oct-20	Kootenay Conservation Program, Fall Gathering	30	30
02-Oct-20	CSISS and SSISC ED meeting re charity status	1	1

05-Oct-20	CSISS AGM	32	32
06-Oct-20	Meeting with Kendal Benesh EKISC re: Habitat Conservation Fund Grant Funding	1	1
06-Oct-20	Columbia Basin Trust and Columbia Basin Regional Invasive Species Organizations Meeting	4	4
06-Oct-20	Meet Hamish Kassa and Eurasian Watermilfoil Team	4	4
07-Oct-20	East Kootenay Invasive Species Council Annual General Meeting		
08-Oct-20	Landscaper Outreach Lush Landscapes	1	1
08-Oct-20	Meeting with Province re Clams	2	2
09-Oct-20	Habitat Conservation Trust Foundation Meeting re: Grant Applications	1	1
09-Oct-20	Meeting with Masters student at Blanket Creek	1	1
13-Oct-20	Meeting with Shearing Ltd. Consultants at Blanket Creek	4	4
16-Oct-20	Shuswap Trails Working Group Meeting	15	15
19-Oct-20	EcoGarden Plant List Meeting	5	5
22-Oct-20	Blanket Creek Restoration Project	13	13
22-Oct-20	Invasive Species Council Metro Vancouver Annual General Meeting		
02-Nov-20	Blanket Creek Seeding	5	5
05-Nov-20	Meeting with MP Mel Arnold and Other Regional Partners for AIS Updates	9	9
05-Nov-20	Meeting with MP Mel Arnold and Other Regional Partners for AIS Updates	9	9
11-Nov-20	Society for Ecological Restoration Western Canada Annual General Meeting	20	20
12-Nov-20	Flowering Rush Meeting	25	25
16-Nov-20	Meeting with new Splatins Territorial Land Manager with the Splatins Title and Rights Department	1	1
20-Nov-20	Meeting Regional District North Okanagan Parks Review	1	1
23-Nov-20	Aquatic Invasive Species Regional Call	15	15
01-Dec-20	Shuswap Watershed Council Water Quality Meeting	18	18
02-Dec-20	Shuswap Trails Roundtable	57	57
03-Dec-20	Columbia Basin Environmental Education Network Annual General Meeting	31	31
08-Dec-20	Connect with Invasive Species Council of BC re Posting to Province Wide Social Media	2	2
09-Dec-20	Shuswap Watershed Council Meeting	20	20
27 to 30-Oct-20	California Invasive Plant Council Conference	500	0
Monthly	Monthly Regional Invasive Species Organization (RISO) Meetings	20	20

Appendix C: Media coverage of CSISS activities in 2020

Date	Publisher	Headline
2020	Shuswap Tourism Guide	Bringing a watercraft to BC?
2020	SuperCamping Guide BC	Bringing a watercraft to BC?
29-Jan-20	Salmon Arm Observer	Asian Clams Make First Appearance at Shuswap Lake
30-Jan-20	CBC Kamloops	Asian Clams Make First Appearance at Shuswap Lake
30-Jan-20	InfoTel Kamloops	Evidence of New Invasive Species Found in Shuswap Lake
30-Jan-20	CBC Radio News	Sue interview CBC Kamloops
30-Jan	CBC Radio News	Sue interview CBC Daybreak
30-Jan	CHNL NL Newsday Kamloops	Sue interview Local News Kamloops
01-Feb	CBC News	Clean your boat, says B.C. official, as invasive Asian clam shells found in Shuswap Lake
30-Jan	Globalnews.ca	Invasive species society in BC raising alarm after Asian clam shells found at Shuswap Lake
30-Jan	CFJC Today Kamloops	Invasive Asian clams make first appearance in Shuswap Lake
30-Jan	iNFOnews	Evidence of new invasive species found in Shuswap Lake
29-Jan	Revelstoke Current	Invasive Asian Clam Shells Found on a Shuswap Lake Beach May Indicate New Infestation
30-Jan	CFOX	Invasive species society in BC raising alarm after Asian clam shells found at Shuswap Lake
01-Feb	CHEK News	Clean your boat, says BC official, as invasive Asian clam shells found in Shuswap Lake
29-Jan	BC Local News	Invasive clams make first appearance at Shuswap Lake
30-Jan	Global News	Asian clam Local Okanagan news
30-Jan	98.3 C1FM	Local News Kamloops
05-Feb	Canada News	Invasive species society in BC raising alarm after Asian clam shells found at Shuswap Lake
24-Mar-20	CSISS E-newsletter	Asian Clams Found in Shuswap Lake
17-Apr-20	Salmon Arm Observer	Online Resources Available to Learn about Invasive Plants in The Columbia Shuswap Region
15-Apr-20	Castanet	How to stop invasive plants: a few tips on how to tackle invasive plants while at home
13-Apr-20	Revelstoke Review	Five Ways to Take Action Against Invasive Plants While Stuck at Home
14-Apr-20	Info News Vernon	Wondering what to do? Stop these pesky plants from invading your yard
11-Apr-20	ISCMV	Job posting
13-Apr-20	BC Local News	Five Ways to Take Action Against Invasive Plants While Stuck at Home
17-Apr-20	BC Local News	Online Resources Available to Learn about Invasive Plants in The Columbia Shuswap Region
16-May-20	Eagle Valley News	Boating season time to keep invasive mussels out of Shuswap
16-May-20	Salmon Arm Observer	Boating season time to keep invasive mussels out of Shuswap
04-Jun-20	Wildsight Blog	Wildsight invasive plant program starting up in 2020
09-Jun-20	Allevants Revelstoke	Edible invasive workshop added to events calendar

18-Jun-20	Revelstoke Review	Columbia Shuswap Environmental Society Hosting Edible Plants Webinar
24-Jun-20	Castanet	Columbia Shuswap Offer Workshop on How to Identify and Consume weeds
07-Jul-20	Castanet	Media interview -Castanet - Scotch Thistle
21-Jul-20	Revelstoke Review	Revelstoke's Bee City Application Accepted
15-Jul-20	Castanet	BC's Big Mountain Getaway
05-Aug-20	Revelstoke Review	Celebrate wildflowers nest week in Revelstoke
08-Aug-20	Revelstoke events Calendar	CSISS Invasive Species Walk
06-Aug-20	Revelstoke Mountaineer	Wildflower blooms focus of new Revelstoke festival
12-Aug-20	Revelstoke Review	Revelstoke Council Approved \$16,000 in grants
17-Aug-20	Revelstoke Review	Revelstoke in full Bloom
18-Aug-20	Revelstoke Mountaineer	Threat of invasive mussels continues as domestic travel in encouraged
18-Aug-20	Vernon Morning Star	Mussel risk reminder issued in Shuswap after invasive species intercepted at inspection sites
18-Aug-20	InfoNews	10 boats infested wht invasive mussels have been stopped in BC so far this year
25-Aug-20	Castanet	Hyro Grants Fund Groups
16-Sep-20	CSISS E-newsletter	New Species Alert and Reminder CSISS AGM 2020
18-Sep-20	CBC Kelowna Daybreak South	Live Asian Clams Found in Shuswap Lake
16-Sep-20	Penticton Western News	Invasive clams discovered in Salmon Arm of Shuswap Lake
16-Sep-20	Salmon Arm Observer	Invasive clams discovered in Salmon Arm of Shuswap Lake
16-Sep-20	Keremeos Review	Invasive clams discovered in Salmon Arm of Shuswap Lake
17-Sep-20	CSRD website	Invasive clams discovered in Salmon Arm of Shuswap Lake
17-Sep-20	ISCBC website	Invasive clams discovered in Salmon Arm of Shuswap Lake
21-Sep-20	Cast-a-net	Invasive clams discovered in Salmon Arm of Shuswap Lake
16-Sep-20	Kamloops this week	Warning issued after Asian clams found in Shuswap Lake
21-Sep-20	Kelowna Now	Invasive species of freshwater clams found in Shuswap Lake
Oct-20	North Shuswap Kicker	Not All Visitors Will Be Leaving
Oct-20	North Shuswap Kicker	Survey finds live Asian clams in Shuswap Lake
Dec-30-20	Society for Ecological Restoration Western Canada	Restoration Showcase- Blanket Creek Project
04-Dec-20	Castanet	Invasive clams new threat
04-Dec-20	iNforNews.ca Kelowna	Move over mussels, invasive clams found in Shuswap Lake
07-Dec-20	Castanet	Shuswap Still Mussel-Free
18-Dec-20	Kelownacapnews	Okanaga-Shuswap MP advocates for aquatic invasive species funding
18-Dec-20	BCLocal News	Okanaga-Shuswap MP advocates for aquatic invasive species funding
12-Dec-20	Castanet	MP concerned about clams

Appendix D: CSISS Collaboration, Workshops and Training Opportunities Attended or Hosted by CSISS in 2020

- Monthly conference calls and meetings with Columbia Basin invasive species groups
- Monthly conference calls with BC regional invasive species groups
- Provincial aquatic invasive species conference calls
- Meetings with Parks Canada
- Invasive Species Council of BC Annual Forum
- Herbicide applicator training with Columbia Basin partner organizations
- Shuswap Watershed Council meeting (December presentation)
- Shuswap Watershed Council Water Quality Monitoring Group meetings (2-3 times/year)
- CSISS Annual Land Manager's meeting
- Participation in Invasive Species Action Month planning and delivery (April – May)
- Columbia Basin Aquatic Invasive Species Steering Committee Meetings (Fall and Spring)
- ISCBC Job Creation Partnership Meeting
- Meeting with BC Parks staff and contractors
- Invasive Species Webinars for training purposes, e.g. ISCBC webinars, Aquatic Invasives webinars
- CSISS Invasive Species Identification Workshops online
- Best Management Practices presentation to Revelstoke BC Wildfire Crew
- Best Management Practices presentation to Revelstoke Downie Timber
- City of Salmon Arm partner meeting
- Meetings with BC Hydro and Ministry of Forests, Lands, Natural Resources and Rural Development
- Boater Outreach and clam sampling training with ISCBC Job Creation Partnership Program
- Shuswap Trails Working Group meetings (4 times/year) and Shuswap Trails Roundtable
- Regional Invasive Species Organizations and ISCBC Joint Strategic Planning Session (key messages sharing for provincial presentations)
- Regional Invasive Species Organizations field tour online
- Staff briefings on invasive mussels for Shuswap area marinas
- Edible Invasive Workshop and Invasive Plant ID workshop online through Okanagan College
- Kootenay Conservation Program Fall Gathering
- CSISS Annual General Meeting with guest speakers
- California Invasive Plant Council Conference
- Columbia Basin Environmental Education Network Annual General Meeting

- North Columbia Environmental Society Annual General Meeting
- Trans-boundary Flowering Rush meeting
- Meeting with new Splat-sin Territorial Land Manager with the Splat-sin Title Rights Department
- Society for Ecological Restoration Annual General Meeting
- Invasive Species Council of Metro Vancouver Annual General Meeting
- East Kootenay Invasive Species Society Annual General Meeting
- Revelstoke Bee City Pollinator Committee meetings
- Invasive species training sessions with BC Recreation Site operators
- Meetings with Ministry of Environment and Climate Change Strategy regarding invasive clams
- Indigenous Federal Fund Meetings with ISCBC
- Meeting with Hamish Kassa and Watermilfoil team regarding invasive clams
- East Kootenay Invasive Species Society Land Manager Meeting
- Indigenous People's Engagement Session at ISCBC Annual Forum
- Columbia Basin Watershed Network Annual General Meeting
- Meeting with Member of Parliament Mel Arnold and Shuswap/Okanagan AIS partners

Appendix E: CSISS Invasive Mussel Sampling Locations in 2020

Locations highlighted in grey are within the Columbia Basin Region of the CSISS Area

Waterbody Rank	Waterbody name	Location	Samples collected	Adult sample type
Critical	Mabel Lake	Kingfisher	11	Substrate Sampler
Critical	Mara Lake	Sicamous Narrows	11	Substrate Sampler
Critical	Shuswap Lake	Blind Bay	11	Substrate Sampler
Critical	Shuswap Lake	Captain's Village	11	Local Substrates
Critical	Shuswap Lake	Little River Boat World	11	Substrate Sampler
Critical	Shuswap Lake	Sandy Point	11	Local Substrates
Critical	Shuswap Lake	Old Town Bay	6	Substrate Sampler
Critical	Revelstoke Lake	Downie RV	7	Local Substrates
Critical	Revelstoke Lake	Martha Creek	7	Substrate Sampler
Critical	Revelstoke Lake	Mica Creek	7	Local Substrates
Critical	Kinbasket Lake	Kinbasket Resort	6	Local Substrates
Critical	Kinbasket Lake	Bush Harbour	6	Substrate Sampler
Critical	Upper Arrow Lake	Shelter Bay	10	Substrate Sampler
High	Adams Lake	Indian Point Resort	6	Substrate Sampler
High	Gardom Lake	Gardom Community Park	6	Substrate Sampler
High	Little Shuswap Lake	Chase	3	Local Substrates
High	White Lake	White Lake PP	6	Local Substrates
High	Mara Lake	Swansea Point	6	Substrate Sampler
High	Columbia River	Donald Bridge	3	Local Substrates
High	Trout Lake	Denver Street	3	Local Substrates