ADOPT AN AQUATIC HABITAT TOOLKIT

A GUIDE TO PROTECTING OUR WATERS FROM INVASIVE SPECIES

Canadian Council on Invasive Species
Conseil Canadien des Espèces Envahissantes
ISC Invasive Species Council of BC
Saskatchewan Invasive Species Council

Introduction

Overview of the Adopt an Aquatic Habitat Initiative

In 2018, the Canadian Council on Invasive Species (CCIS) received funding through the Eco Action grant program to work with partners to protect aquatic habitats from invasive species. The goal of this initiative is to assist stakeholder groups in protecting our precious aquatic habitats by effectively addressing aquatic invasive species issues. By adopting an aquatic habitat, these groups are taking concrete action against invasive species, and helping to preserve our natural resources for future generations. In doing so, they are contributing to the betterment of our environment, economy, health and social fabric. Furthermore, their actions may inspire others to do so, creating local networks of invasive species management.

An outcome of the initiative, is this aquatic toolkit. We encourage stakeholder groups outside of our initiative to take action and adopt aquatic habitats and protect them from invasive species, on their own. Therefore, within the toolkit, you will find pertinent information on specific strategies for managing aquatic invasive species in aquatic habitats, information on partnering with others, current invasive species programs that may assist you with the provision of educational resources and a case study to follow as an example.

Stakeholders interested in learning more or that have questions regarding the information in the toolkit, can contact the CCIS through our website: www.canadainvasives.ca.

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Canada's Water Resources

Canada is blessed with an abundance of water of all kinds and it is up to us all to protect it. Here is what is at stake:

- Canada has the longest coastline in the world, at 243,042 kilometers on three oceans.
- According to Statistics Canada, "Canada's average annual water yield – an estimate of the country's supply of renewable freshwater – is so large that there is enough water to approximate a one-minute flow over Niagara Falls for each and every Canadian."
- Approximately 12% of Canada's total area, or 1,169,561 km2, is fresh water.

What is an Aquatic Invasive Species?

According to Fisheries and Oceans Canada, aquatic invasive species (AIS) are "plants, animals, and micro-organisms that, when introduced outside of their natural environment, out-compete native species in a body of water. This includes rivers, lakes, wetlands, streams, oceans and riparian areas."

Why Care About Aquatic Invasive Species?

AIS have the potential to cause large scale and irreparable harm in many ways. They can:

- Damage the environment by disrupting the delicate ecological balance and decreasing biodiversity.
- Impact our economy by depleting commercial fish stocks, disrupting our tourism and energy industries and contributing to spiraling control costs.
- Threaten human health by spreading disease, clogging swimming areas and making beaches and shorelines impassable.
- Impair our societal relationships with each other and the land by reducing recreational opportunities such as boating, swimming or fishing, and decreasing opportunities for cultural practices including traditional medicine gathering.

Strategies for Managing Aquatic Invasive Species

Once established, AIS may be difficult or impossible to eradicate. In the past, issues that were not dealt with in a timely and effective manner have now become entrenched and widespread. AIS, such as invasive freshwater zebra mussels have ended up costing our economy many millions of dollars per year in control costs and lost productivity alone, not to mention the damage they cause to our environment and way of life.

The most effective strategy for managing AIS is prevention! A strategy for stopping invasive species from becoming established in the first place is known as Early Detection, and Rapid Response (EDRR). This proven strategy has evolved from decades of work and has been widely adopted. Here's a breakdown of each component:

PREVENTION – "an ounce of prevention is worth a pound of cure". Prevention is the most cost and time effective strategy, but it requires diligence and persistence. Prevention works best when there are a lot of people involved and they are all working together to carry out preventative actions. Maintaining healthy habitats to limit impede the establishment of AIS and using best practices to prevent accidental introduction of AIS are two great examples of prevention efforts.

EARLY DETECTION – If prevention efforts somehow fail, early detection ensures that the problem is identified in time to work toward a successful outcome. This requires perseverance and a well-coordinated network of people knowledgeable enough to be able to identify and report a potential problem. For an AIS project, this could mean conducting regular shoreline surveys to look for AIS.

RAPID RESPONSE – Once a problem is identified, it is critical to act fast, as there is often a small window of opportunity before a problem becomes uncontrollable. Depending on the problem, a small team may be able to tackle the invasion; the key is to target the problem with an overpowering response and to not relent until it is certain that the problem has been dealt with.

Your AIS management plan should incorporate an EDRR strategy that includes the size of the area to be assessed and what species may be involved. If a problem goes beyond the reach of the rapid response stage of the EDRR strategy, AIS can quickly become an even bigger problem if left uncontrolled.

INTEGRATED PEST MANAGEMENT – Sometimes AIS have already been introduced or are becoming established in an area. However, they can still be managed or even eradicated with the use of a management plan that integrates the best tools to treat the target species. It will often be an ongoing project that will require multiple treatments but can be a rewarding project to undertake and result in a reclaimed habitat.

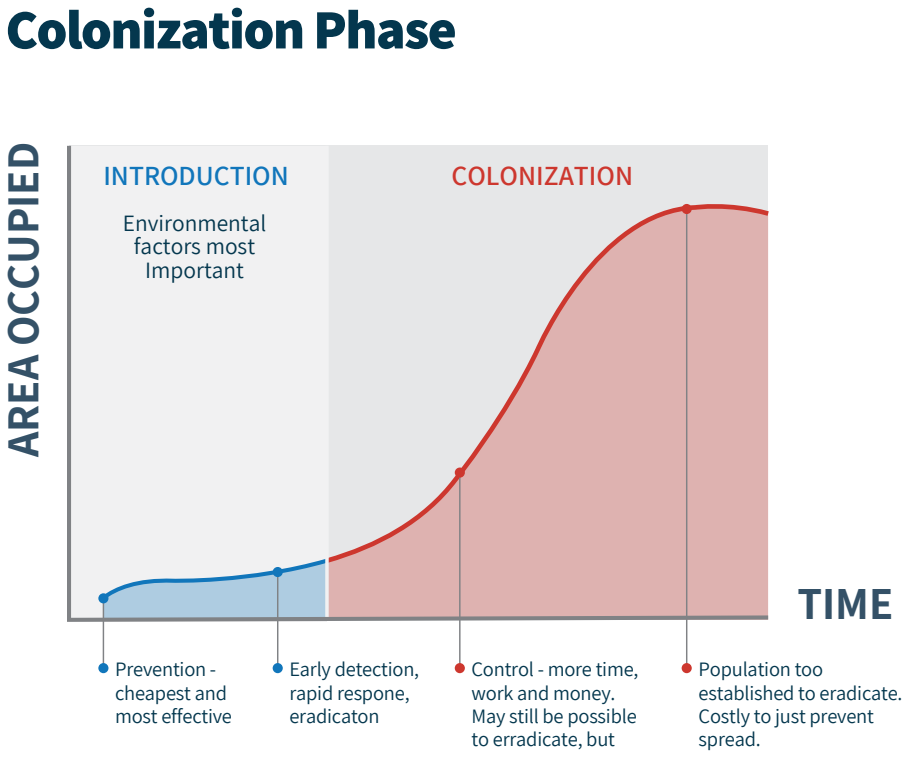


Figure 1 The invasion curve is a tool for understanding invasive species management. It illustrates the correlation between the amount of area AIS can occupy at each stage of intervention of colonization, ranging from prevention, EDRR, Control to Uncontrolled/Containment.

The Power of Partnerships

AIS challenges are best undertaken with as many people as possible at your side to avoid taking on the challenge alone. Most successful AIS projects rely on partnerships as even large organizations rarely have the necessary budgets, knowledge and skillsets to design and implement an AIS project. Partnerships enable groups to share the workload, draw from a range of skills and expertise, identify synergies and eliminate redundancy. Also, once a partnership is formed, those organizations are more likely to partner again, or even formalize a more long-term partnership. If neighbouring aquatic areas are adopted, local area AIS management networks can be formed. In the conservation community, co-operative projects are the norm and most organizations welcome partnerships. Contributions can vary from money to time to equipment and expertise, but all are valuable. Generally, the more partners a project has, the better, but you must ensure that every partner has clearly developed roles and channels of communication. There also must be a lead organization or individual to ensure that the project is running smoothly, and to be the point of contact for media and funders.

Piggyback on Programs

There are many existing AIS programs that can help ensure a more successful outcome for your project. These established programs provide a proven template and brand with common messaging and good public recognition across a wide geographic area. Many of the following programs are national in scope and implemented at the provincial/territorial level.

Clean, Drain, Dry

The Clean, Drain, Dry program is one of the oldest, most widespread and effective programs. Boats, trailers, non-motorized watercraft and associated equipment are often vectors in introducing invasive species into lakes, streams and wetlands. Microscopic AIS can be transported as tiny larvae and spores in water, mud, on gear or infected fish (alive or dead). This is how whirling disease and zebra mussels get into new waterbodies. The basic premise of the program is to Clean Drain Dry your watercraft between waterbodies:

1. **CLEAN** off all plant parts, animals, and mud from boats and equipment (e.g. boots, waders, fishing gear). Use a power wash station if available.
2. **DRAIN** onto land all items that can hold water (e.g. buckets, wells, bilge, and ballast). Pull the plug!
3. **DRY** all items completely before launching into another body of water.

Most provinces and territories have some form of this program, and likely have outreach materials developed that you can use. For more information, go to: www.cleandraindr y.ca

Grow Me Instead/Be Plant Wise

Known as Grow Me Instead in central and eastern Canada, and Be Plant Wise in western and northern Canada, this program supports the horticulture industry in becoming invasive-free and helps gardeners and industry understand which plants are invasive. As many AIS were imported for horticultural use, there may be opportunities for your initiative to help implement this program. For more information, go to: http://canadainvasives.ca

Don't Let it Loose

Unwanted pets are sometimes abandoned to nearby waters and other natural areas where they can become a significant problem. Don't Let it Loose focuses mainly on the pet and aquarium trade and works with both retailers and pet owners to ensure that nothing is released into the wild, including aquatic plants and animals.

PlayCleanGo: Stop Invasive Species in Your Tracks

PlayCleanGo started in Minnesota to stop the spread of invasive species in parks and natural areas by outdoor recreationists. The program's main activities are:

1. **PLAY** – enjoy the great outdoors! Stay on designated roads and trails.
2. **CLEAN** – remove plants, animals and mud from boots, gear, pets and vehicles before entering & leaving the recreation site.
3. **GO** – on to your next adventure!

CCIS is implementing PlayCleanGo as a branded program across Canada. Though mainly focused on terrestrial activities and species, it is worth considering how the program might fit with AIS initiatives, as some activities and species occur in both terrestrial and aquatic habitats. For more information, go to: www.playcleango.ca

National Spotters Network

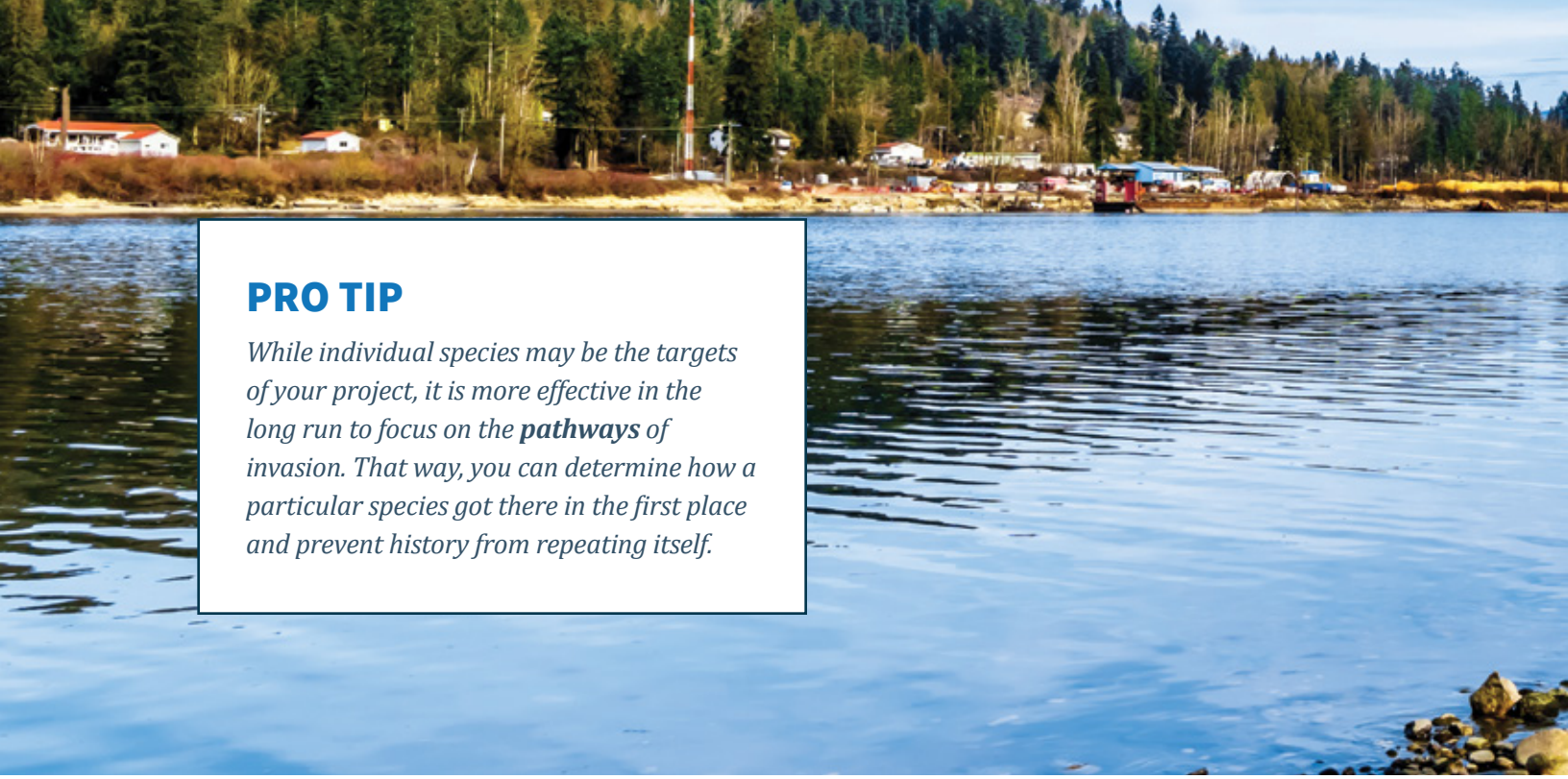
The National Spotters Network is made up of a dedicated group of volunteers located across Canada who are trained to identify and report invasive species. Currently, the main regional points of contact are the provincial/territorial invasive species councils and their reporting tools. The intent of the National Spotters Network is to increase the number of trained volunteers on the ground and to watch for new and existing invasive species infestations so that they can be reported to the appropriate agencies, and managed. CCIS has an excellent action plan that may help you use existing spotter's networks or form your own regional network. For more information, including the action plan, go to: www.canadainvasives.ca

To ensure that your actions are not only effective, but comply with federal, provincial/territorial and municipal laws and regulations, contact local and provincial authorities to inform them about your plan.

Steps for a Successful AIS Project

Planning is key to a successful AIS project. Every step should achieve one or more goals; if it fails to do so, it should be reconsidered. Here are some main steps to help with your adopted aquatic area:

- Outline the scope of your project. List the problem(s) to address and the outcomes you envision. Include an overall goal and a set of sub goals along the way – i.e. break up the project into distinct stages that you can measure progress against.
- Define what success will look like if your plan is implemented! This helps focus and sell your vision to others.
- Choose your priority species and ask yourself why they are important.
- Define the project area. Is it a manageable size?
- Will this be a one-time project or require ongoing management? If ongoing, you need to consider long-term human resources and budget requirements.
- Identify your target audience. This is a key component of planning the programs activities and outreach. Do you need to target homeowners? Anglers, boaters, paddlers? Pet owners? Gardeners? Be as specific as you can, as the materials and activities you develop will need to be relevant and applicable to your audience.
- How much do you know about the issues, species, and ecology and geography of the area? Including experts is recommended, and you may have to research different topics to be able to make informed decisions. Identify gaps that may need to be addressed.
- Define your budget and consider how much actual money you'll need versus what you can achieve with in-kind contributions of time and materials. Pursue funding early and strive to have a stable, long-term funding model that ensures financial security for the life of the initiative.
- Determine who has jurisdiction of the species and area.
- Identify the skills required to carry out your project. Do you need researchers, field workers, restoration experts, botanists, etc.

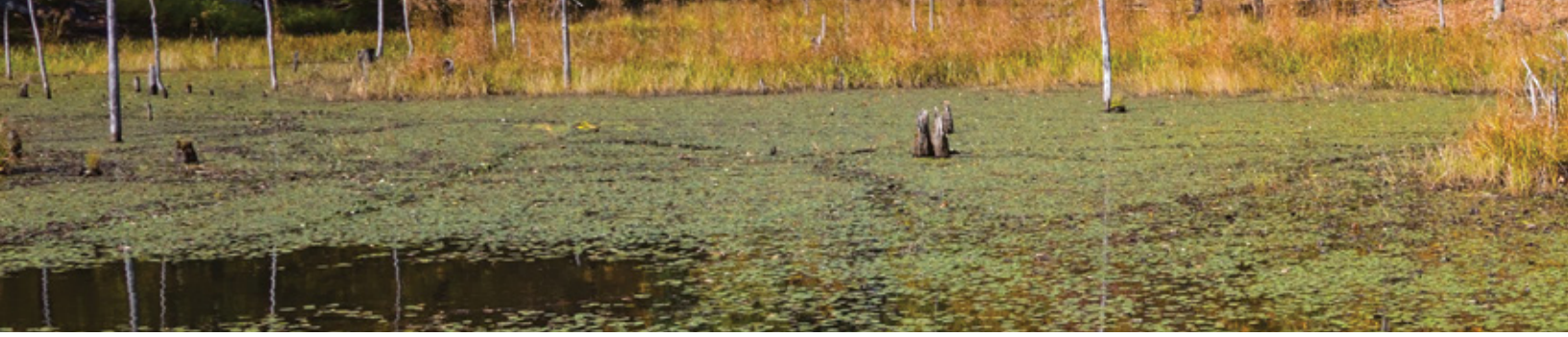


PRO TIP

*While individual species may be the targets of your project, it is more effective in the long run to focus on the **pathways** of invasion. That way, you can determine how a particular species got there in the first place and prevent history from repeating itself.*

- Identify all potential partners and approach them early. Try to find synergies; see what each partner's AIS priorities are and try to incorporate them if possible. Make sure the potential partners understand the full scope of the problem and project, how it relates to them and how they can benefit from being involved. Once partners become involved, give them some ownership of the initiative through involving them in the initial planning phase. They are more likely to work harder and stay involved if they see their role as integral to the project's success. Don't overlook unaffiliated volunteers; students are often great volunteers as they have time, energy and ambition.
- Check out citizen science programs. Citizen science is a growing trend and there may be an opportunity to harness the support of a local citizen science group or initiative for your adopted aquatic area. Examples of national citizen science programs include Frog Watch, Nature Watch, Plant Watch, Ice Watch, etc.
- With your partners, list the actions required to resolve your AIS problem(s). Every action should be purposeful and goal-oriented. Fitting actions into a timeline is helpful for planning and implementation. Make allowances for delays in the timeline so that an interruption in the timeline doesn't derail the entire project. Think outside the box – actions could include providing incentives to a target audience or attempting to strengthen bylaws. Behaviour change programs are effective but need to be led by experts. CCIS has a lot of experience with behavioural change projects and can province some guidance. Make contingency plans for if or when things go wrong, because they often do.
- Outline the tools and resources needed to carry out the actions. Often the focus tends to fall too heavily on money and, while it is important, there are many things that can be accomplished through in-kind support. It all goes back to the power of partnerships. Get creative!

- Based on everything you've to this point, develop an action plan.
- Once your plan is developed, announce your project to your target audience, local media and social media. In addition to raising awareness, it may also help you gain additional funding and volunteer support.
- Track your progress: develop and implement a monitoring protocol for your adopted aquatic area to measure progress and alert you of any new or worsening issues.
- Celebrate reaching the sub-goals along the way and at the end or key stage of a project. This is especially important when using volunteers – but everyone involved needs to see benchmarks of success and feel that they are doing something worthwhile.
- During and after the project, report any data you collect to proper agencies. Many provinces and territories have conservation data centres and/or invasive species databases/mapping tools, many with smart phone apps. If none of these exist, a smart phone app such as iNaturalist can help you report your data. Many provincial or territorial invasive species database/mapping systems allow a user to set up a project within the system to house specific data collected. Consider doing this for your adopted aquatic area.
- Meet with all partners and volunteers, celebrate the project, and discuss progress, results, lessons learned and next steps. If you project has generated momentum, it is important to maintain that through continued stakeholder engagement. Report your progress and results to funders, local media and social media.



Adopt an Aquatic Area Case Study

Flowering rush (Butomus umbellatus) is native to Eurasia and first discovered in Canada in 1897 along the St. Lawrence River in Quebec. In the past 35 years, it has spread rapidly to sporadically cover the northern United Sates and southern Canada, with the exception of Saskatchewan until the early 2000's.

Acting on a tip from local landowners who observed an unusual plant they'd never seen in their wetland, an ad hoc group of botanists first visited the rural site south of Saskatoon, SK in 2004. They verified the province's first-known occurrence of flowering rush, consisting of several plants occupying a small area. Basic data was collected, and all seed heads were clipped in order to prevent its spread. However, the record of this visit appears to never have been submitted to any agencies and no evidence could be found to support any subsequent visits or control measures between 2004 and 2008. Had a plan been in place, the issue would likely have been quickly and permanently resolved, as the group had the advantage of early detection.

In 2009 the site was again visited, this time by the Native Plant Society of Saskatchewan. In the short time that the site had been neglected, it went from several plants occupying a small area to many hundreds of plants infesting most of the shoreline of the 5-acre (2 hectare) wetland.

This time a plan was formed and implemented, which included adopting a portion of the watershed that included the flowering rush infested wetland. Luckily, the infestation was still within the window for effective EDRR, albeit at the latter stages. In order to determine the scope of the infestation, it was decided that a comprehensive survey of the area for flowering rush was needed. All wetlands (50+) occurring within a 1 km radius of the flowering rush infested wetland were surveyed to determine the true extent of the infestation. Fortunately, no other flowering rush populations were found, and the focus could be solely on the original infestation.

The owners of the wetland were at first hesitant to have attention drawn to the problem, as many people share the misbelief that having invasive species is the mark of a careless landowner. Once the issues and opportunities were fully explained, the landowners quickly became one of the initiative's biggest proponents.

Best practices for eradication were researched and, when little information on the subject was found, removal techniques were tested until an effective protocol was formed. The removal technique settled upon was digging the flowering rush by hand, which meant the need for dozens of volunteers, given the size of the infestation.

Calls for volunteers were sent out to potential stakeholder groups and were met with a mixed response, although sufficient volunteer numbers were ultimately achieved. One of the owners of the flowering rush-infested wetland was also a local high school teacher, so it was arranged to bring her science class out to help dig up flowering rush, and to make it a teachable moment by talking to the class about the importance of wetlands and the threat of AIS.

Long-term funding was pursued, as the issues needed long-term solutions. Fortunately, most of the anticipated work could be accomplished through in-kind contributions of equipment and labour, allowing less time needed to pursue funding and more time designing and delivering the plan.

Outreach during the project included media releases to the local newspaper and "wanted" posters mailed to everyone within a 20 km radius of the site. As the wetland is situated along a busy rural road, a sign was installed during on-site activities and many locals stopped to talk. Word soon spread to everyone in the area, and within the first two years the same locals were stopping to report that they had been looking for flowering rush but had not seen any. Some of the more non-traditional outreach resulted in being some of the most rewarding. The Native Plant Society of Saskatchewan was able to successfully advocate for the inclusion of flowering rush as Prohibited (the highest designation) on the Saskatchewan Weed Control Act. Reaching out to Washington State University resulted in free genetic testing of Saskatchewan's flowering rush population to determine the phenotype, which has implications for control; without this free service it would have otherwise been prohibitively costly. Connecting with the Columbia River Basin Flowering Rush Task Force provided access to experts and facilitated information exchange.

Eradication began in earnest in 2009. Annual protocol used GPS to map the waterline and any flowering rush found, then marked all flowering rush with pin flags to make them easier to find by the eradication crew. After each plant was removed, the pin flag was replaced in the hole and revisited the following year to ensure that the plant didn't re-sprout from anything that was missed. This helped to measure search effectiveness and eradication success. From this, it was estimated that it would take 10 years to restore the wetland to a flowering rush-free state, followed by a minimum of 5 years of monitoring with no new detections. If any flowering rush was found during the monitoring period, it would reset the 5-year timeline.

Every year, the protocol was followed, and the entire wetland's population of flowering rush was mapped and removed. Due to varying degrees of removal success, and the unknown quantity of seeds and propagules that had built up prior to detection, nearly an identical amount of flowering rush was found in the subsequent years. It took approximately 3 years before real progress was seen, and during the first 6 years of the project, up to 5 metric tons of flowering rush per year was being manually removed. By 2018, however, the project was on-track to full and permanent eradication; only 8 plants were found and subsequently removed, validating the initial 10-year timeline and initiating the monitoring phase of the project in 2019. The success of this project was celebrated in local media and at a provincial conference attended by stakeholder groups and the public.

Resources

Canadian Council on Invasive Species: www.canadainvasives.ca

Lake County Adopt-a-lake Program: A Citizen's Guide to Lake Protection and Preservation. https://www.lakecountyfl.gov/pdfs/Public_Works/adopt_a_lake/Adopt-a-Lake_educational_guide.pdf

Adopt a Watershed: Leadership in Aquatic Invasive Species. Invasive Species Council of British Columbia. Final report. Prince George, BC. May 2018. 28 pp.

Alberta Invasive Species Council: www.abinvasives.ca

Invasive Species Council of British Columbia: www.bcinvasives.ca

Ontario Invasive Plant Council: www.ontarioinvasiveplants.ca

Prince Edward Island Invasive Species Council: www.peiinvasives.ca

Saskatchewan Invasive Species Council: www.saskinvasives.ca

Yukon Invasive Species Council: www.yukoninvasives.com

Conseil québécois des espèces exotiques envahissantes: www.cqeee.org

Invasive Species Council of Manitoba: www.invasivespeciesmanitoba.com

Pledge

Recognizing the significant threat AIS can cause to our valuable and fragile aquatic habitats, commit on our website at www.canadainvasives.ca, to:

- Do your part to prevent the introduction and spread of AIS by adopting an aquatic area.
- Share this important message with others whenever possible.

AIS Project Activity Plan Checklist

Steps	Activity	Comments
Development & Initiation		
1	Outline the scope of your project.	
2	Choose your priority species and define the project area. Determine jurisdiction.	
3	Identify your target audience.	
4	Evaluate your group's knowledge of the subject matter and skillsets.	
5	Define your budget.	
6	Identify and approach project partners.	
7	Look at existing programs to connect with.	
8	Identify all project-oriented actions and the tools and resources needed to carry them out.	
9	Develop an action plan.	
Accomplishing Project		
10	Ensure all tools and resources are in place.	
11	Undertake project's action plan.	
12	Track your progress and celebrate milestones.	
13	Report project activities to funders/partners and data collected to relevant agencies.	
Review & Recap		
14	At project's end (or yearly for multi-year projects) meet to debrief and discuss next steps.	

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