Ontario

PHRAGMITES MANAGEMENT

Regional Plan Guidebook

2024 Edition

About the Green Shovels Collaborative

We are an informal coalition of conservation organizations, including Ducks Unlimited Canada, Federation of Ontario Cottagers' Associations, Invasive Species Centre, Nature Conservancy of Canada, Ontario Federation of Anglers and Hunters, and Ontario Invasive Plant Council.

Together we represent millions of people, with members and supporters who are nature lovers, cottagers, outdoor recreationists, anglers and hunters. We are also land managers, with many hectares of land under ownership or management. We came together to offer a list of shovel ready projects which would achieve the government's objectives of job creation and economic recovery, along with important benefits to local communities and the environment.

Land Acknowledgement

The Green Shovels Collaborative acknowledges that the work we do across Ontario is on the territories of many Indigenous Peoples, communities and Nations. Today, Ontario – derived from the Haudenosaunee word "kanadario", which translates into "sparkling" water – is home to 133 First Nations communities, the Métis Nation of Ontario, Inuit, and many other Indigenous Peoples from across Turtle Island who live, work and steward the lands here. We make this acknowledgement with respect and gratitude for the histories, languages and cultures of all Indigenous people in this province who are with us today, those who have come before us and for those who come after us.

Acknowledgements

Lead authors: Eric Cleland, Mhairi McFarlane, Nature Conservancy of Canada

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We are grateful to the considerable thought and input from Janice Gilbert (Invasive Phragmites Control Centre), especially during the early structuring of this guidebook. We are also grateful for feedback received from several current and about-to-be *Phragmites* practitioners from across the province.

Although lead authorship is from the Western perspective, this document has benefitted from review and input from First Nations communities. We are grateful for the thoughtful input and knowledge shared by 4 Directions Conservation Consulting Services. Moving forward, development of future versions and companion documents will include First Nations involvement for their complex understanding of the natural world and its processes; and will be customized to best represent the regional and local Indigenous Knowledge Systems and processes of the communities.

Front photo: Manual removal of invasive *Phragmites* (Near North Enviro-Education Centre).

CONTENTS

Scan to access document hyperlinks.

INTRODUCTION

As Canada's worst invasive plant, non-native European Common Reed, *Phragmites* australis (Cav.) Trin. Ex Steud (hereafter *Phragmites*) is impacting social, economic and environmental values across the province.

Native to Europe, *Phragmites* is well-documented to directly impact municipal and agricultural infrastructure, property values, recreational activities, and the environment (reduced biodiversity and habitat quality for Species at Risk and other wildlife). Indigenous communities may be impacted by *Phragmites* in many ways, including their inherent right to harvest on their territory. *Phragmites* outcompetes native plants, for example wild rice; impacts fish habitat, and impacts access by people to harvest food, medicine, and other products. A recent economic study by a group of environmental non-government organizations called the Green Shovels Collaborative (GSC) found that municipalities are particularly hard hit by its impacts: direct management costs such as increased roadside maintenance cost, public safety issues such as obscured sightlines, while lost revenue due to lowered property values and other economic drivers such as tourism may exceed $40 million annually. Similarly, harvest yields are impacted by delayed planting and crop damage from flooding due to clogged agricultural drains which is estimated to cost farmers $10.2 million annually. While in southern Ontario these impacts are already being realized, the *Phragmites* population in northern Ontario is currently mostly confined to urban centres, roadsides, and shorelines and so these costs are limited. However, *Phragmites* has the potential to spread from these areas into remote habitats where it will become very difficult and expensive to control, encroach on natural resource industries, and have large impacts on biodiversity and Indigenous communities.

In 2021, with funding from the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF) the GSC authored Ontario: *Phrag-free* by 2033! A Strategic Framework for Coordinated Management of Invasive *Phragmites* (the 'Framework') to guide the province in delivering a collaborative, regional-based *Phragmites* management program.

Since *Phragmites* is present in most municipalities across Ontario, and given the impacts to so many sectors, it comes as no surprise that the most successful management projects are being delivered in a collaborative nature, often with municipalities as key partners. This guide represents the collective experiences of successful *Phragmites* managers (or "Phraggers") with real-life, on-the-ground experience throughout Ontario. It is intended to be a helpful resource to municipalities, private land managers, community groups and individuals interested in establishing cooperative *Phragmites* management programs. It is a living document with flexibility to adjust as new information emerges. Efforts have been made to acknowledge Indigenous perspectives on what westerners call "invasive" species as an initial step toward collaboration with First Nations people and alignment of goals and objectives. This guidebook has been reviewed by an Indigenous consulting service and their advice allowed significant improvements to be made. Furthermore, the authors have benefitted from several training sessions and conference panels where Indigenous people shared their perspectives on *Phragmites*, its impacts, and the lessons it has for people. This guide attempts to provide advice and reminders about constitutionally protected rights which Indigenous communities, people and First Nations have which can be impacted by *Phragmites* itself, and by its management. The authors acknowledge that Indigenous reconciliation and engagement processes are an evolving part of our shared relationships, with much more sharing and learning ahead. While the authors have taken steps to include Indigenous perspectives and provided reminders about protecting the rights of Indigenous people, *Phragmites* practitioners must engage with affected communities on an ongoing basis.

THE GEOGRAPHY OF ONTARIO

The variable geography and sheer size of Ontario is such that different approaches may be warranted. Southern Ontario is heavily urbanized, and the disturbed landscape has lent itself well to extensive *Phragmites* establishment. In some areas of southern Ontario, successful management programs are well underway at the municipal scale. In northern Ontario, population density is low with large distances between urban centres. *Phragmites* is currently relatively rare on this large landscape, and largely confined to accessible areas. *Phragmites* management in the north is still in its infancy. This guide attempts to acknowledge these key differences in scale, opportunity and risk and aims to offer geographically tailored strategies based on existing successes.

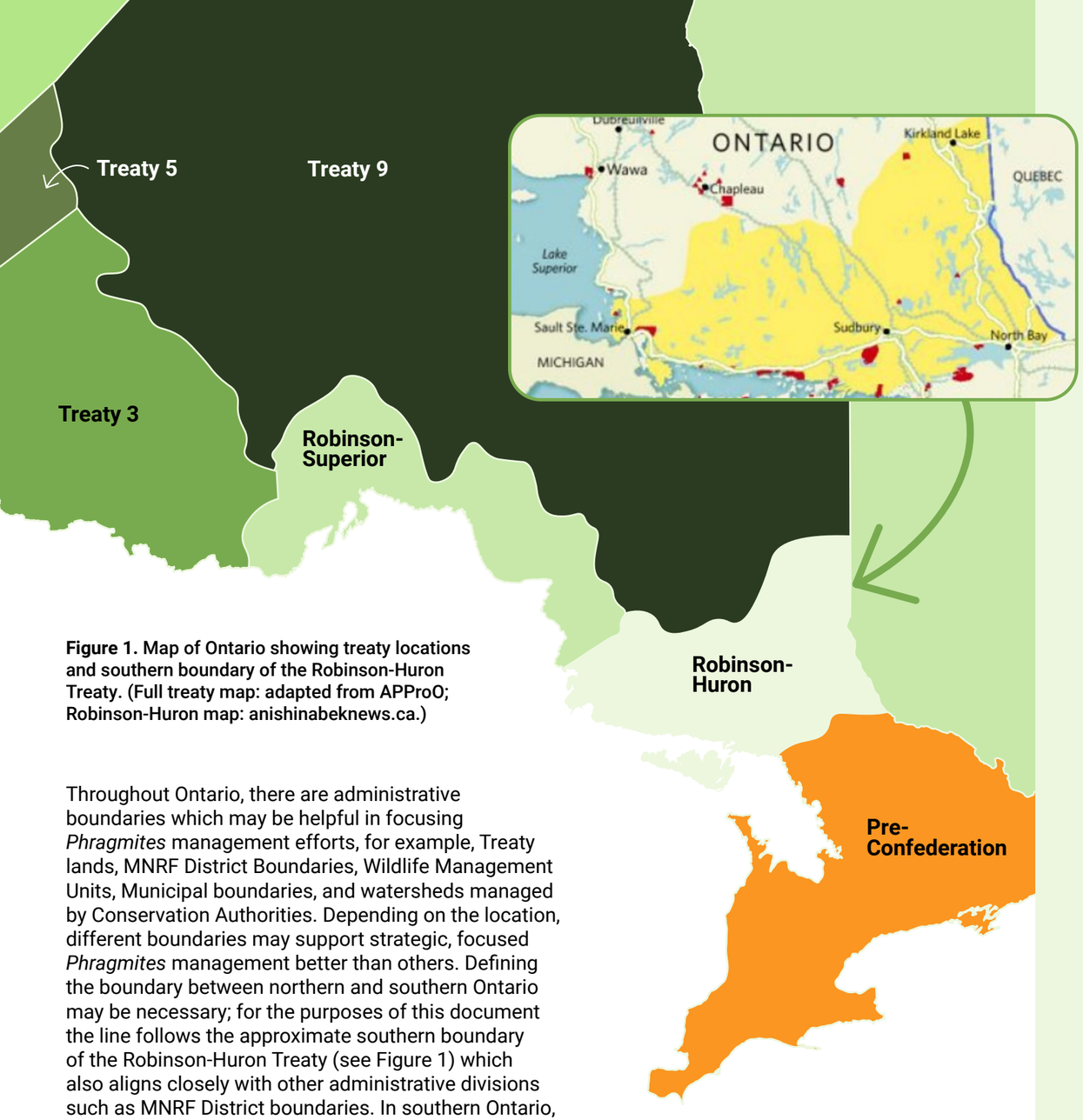


Figure 1. Map of Ontario showing treaty locations and southern boundary of the Robinson-Huron Treaty. (Full treaty map: adapted from APProO; Robinson-Huron map: anishinabeknews.ca.)

Throughout Ontario, there are administrative boundaries which may be helpful in focusing *Phragmites* management efforts, for example, Treaty lands, MNRF District Boundaries, Wildlife Management Units, Municipal boundaries, and watersheds managed by Conservation Authorities. Depending on the location, different boundaries may support strategic, focused *Phragmites* management better than others. Defining the boundary between northern and southern Ontario may be necessary; for the purposes of this document the line follows the approximate southern boundary of the Robinson-Huron Treaty (see Figure 1) which also aligns closely with other administrative divisions such as MNRF District boundaries. In southern Ontario, municipal boundaries may make the most sense to tap into existing resources that are aligned with those boundaries. These may also be grouped together in cases where that would support program delivery. In northern Ontario, this model may only make sense in urban areas, and defining *Phragmites* Management Areas (PMA) may be required given the remote nature of much of the landscape.

Southern Ontario

Municipal boundaries are used for many other types of infrastructure and resource management. Key sources of *Phragmites* are often associated with features which are managed by municipalities, including roadsides, drains and industrial lands. Municipalities are often burdened by the costs and effort required to manage *Phragmites* to maintain safety and access. Building on existing efforts by engaging in a regional planning exercise will bring the necessary partners to the table to ensure longer-term, sustained success.

Northern Ontario

In northern Ontario, MNRF district boundaries make sense as *Phragmites* Management Areas both from a geographic and administrative perspective. These districts are large enough to cover the landscape yet small enough to still be manageable. These boundaries will include towns and cities therefore it will be imperative that PMA programs work closely with those in urban centres. Furthermore, due to the remote nature and complexity of natural resources industries and the corridors and roads that serve them, an Industry Working Group may be needed to bring all necessary partners together to find efficiencies and ensure a broad reaching program. In between urban areas, management of invasive *Phragmites* along all the Ministry of Transportation of Ontario (MTO) series roads throughout northern Ontario should be achievable within a shorter time frame if this is undertaken through a well-managed, and sufficiently funded program. Such a program must include plenty of time for early and thorough engagement with affected First Nations, and respect and uphold the rights of Indigenous Peoples. Practitioners should co-develop *Phragmites* management plans with Indigenous communities.

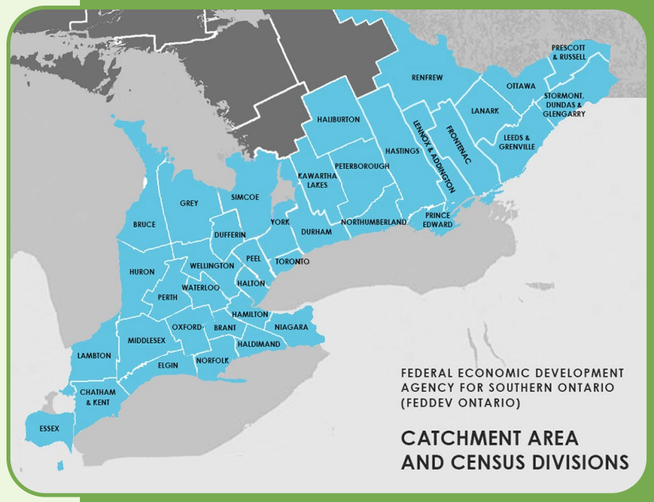


Figure 2. Map of southern Ontario showing municipal boundaries.

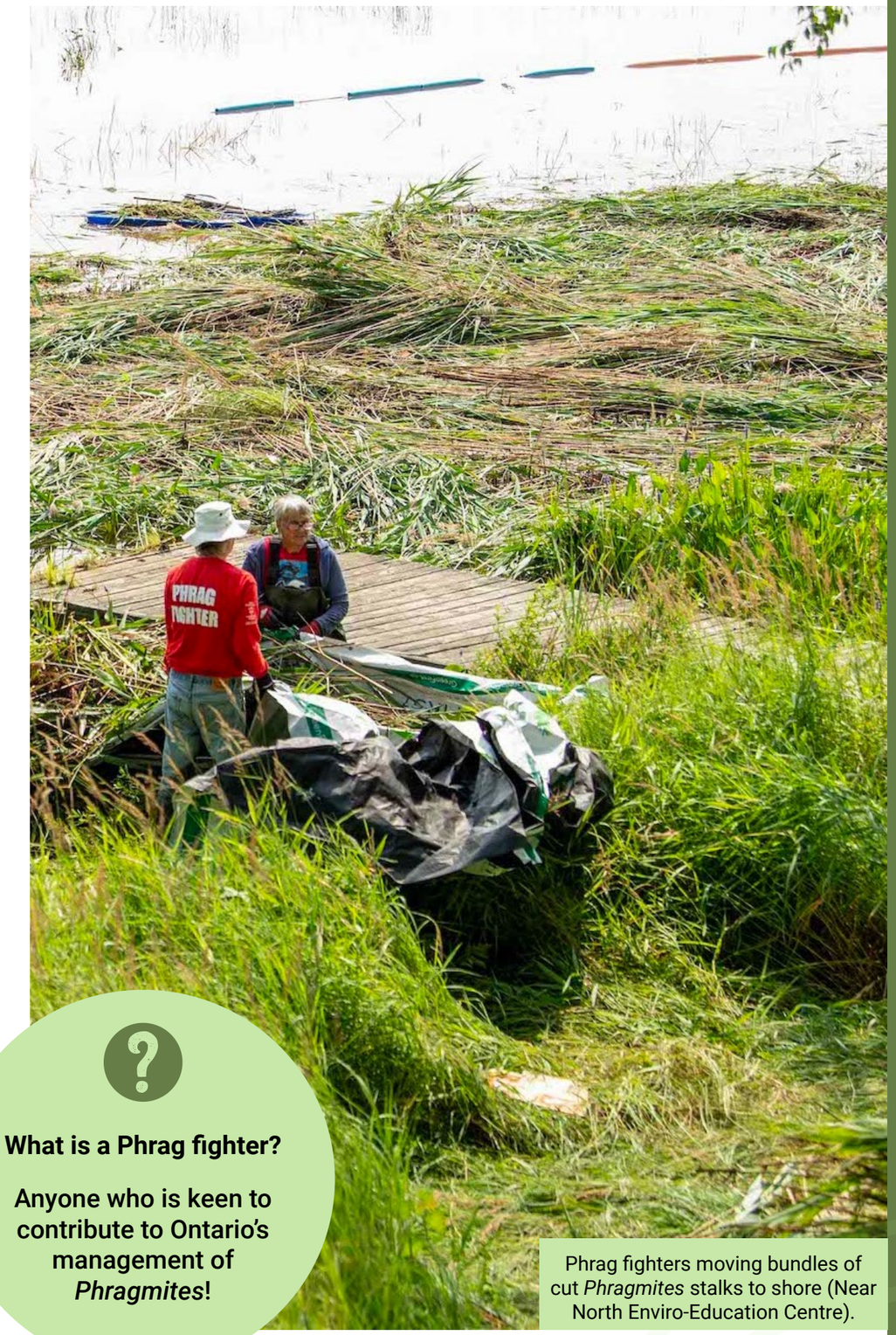
Figure 3. Map of northern Ontario showing municipal boundaries.

THE NEED FOR COLLABORATION

Ontario is fortunate to have benefited from the efforts of many organizations, landowners and volunteers working to manage *Phragmites* across the province. In a 2021 survey, these "Phraggers" identified the need for better regional coordination and opportunities to collaborate and share lessons learned. As part of the research in preparing the framework, several case studies were completed focussing on successful *Phragmites* projects in Ontario, ranging from small to very large; and in all cases the common denominator was carefully planned collaboration. **To successfully manage *Phragmites*, an integrated, landscape-scale implementation plan that includes all necessary partners, rights holders and stakeholders within a region is needed.** These plans must consider several factors to achieve long term success and we have attempted to summarize them here.

OVERVIEW OF MANAGEMENT METHODS

Phragmites can spread rapidly and may require several techniques employed in a multi-stage approach to achieve successful management. For larger populations (~ greater than 0.5 ha) this usually involves an initial management action such as herbicide application followed by removal of the dead plant material using cutting, rolling or a prescribed burn where feasible. It is important to engage with people who use the landscapes where you are working, particularly Indigenous communities. Examples include hunters, anglers, trappers, wild food harvesters. Take time to ensure that culturally important species (e.g. medicinal plants) are protected. Some aquatic sites may require physical removal methods such as underwater "cutting to drown" where herbicide application is not appropriate, followed by the removal and responsible management of dead stalks. Other methods such as spading exist for smaller sparse populations and may be suitable for volunteer or landowner workforces in shallow water or dry sites. Each technique has its own pros and cons, and each site has its own set of unique conditions to consider when identifying the best management approach. For more detailed information on recommended techniques please see the Ontario Invasive Plant Council's Best Management Practices.



Phrag fighters moving bundles of cut *Phragmites* stalks to shore (Near North Enviro-Education Centre).

What is a Phrag fighter?

Anyone who is keen to contribute to Ontario's management of *Phragmites*!

Part I
GUIDEBOOK

INTRODUCTION

This guide is designed to support municipalities and their regional partners throughout their *Phragmites* eradication projects. It provides a step-by-step framework from start to finish aiming to be the one-stop resource to help with launching your *Phragmites* program. Each step is supported by tips with suggestions and links to province-wide resources including Best Management Practices (BMPs) derived from real *Phragmites* management projects in Ontario.

COLLABORATION: ESTABLISH A WORKING GROUP

Forming a working group for your project will foster communication to ensure protection of rights, the inclusion of all values and cultural practices, reduce costs and redundancy, identify barriers to implementation, and create collaborative solutions. Members of your working group bring resources and perspectives from the entities they represent which facilitates efficient, effective *Phragmites* management. *Phragmites* and its management requires expertise and buy-in from a large cross-section of any community. Successful *Phragmites* management in Ontario will not be possible without engagement and support from many sectors and communities.

Once you have identified the members of your Working Group, it may be helpful (and necessary for reporting) to track membership. An example table is provided below to guide you in assembling your regional Working Group. Using the tips above and your local knowledge, assess and fill any gaps in expertise, training, knowledge and community outreach.

TIPS WORKING GROUP

- Who needs to know? Identify rights-holders in your project area as early as possible, and provide frequent and early engagement, consultation and discussion throughout.
- Having a good cross-section of landowners and partners is important: *Phragmites* impacts everyone.
- Who should be at the table? You must engage rights-holders. Indigenous peoples and First Nations in Canada have constitutionally protected rights. Examples of groups you should consider engaging: drainage superintendent, roads manager, parks and recreation staff, existing Phraggers, Conservation Authority, naturalist groups, agricultural representative, any provincial and federal agencies present in community, cottage association, woodlot owners' association; Regional Coordinators from overarching *Phragmites* organization if applicable; utility and industry associations, ALUS if applicable.
- What about the land in between sites? Keep in close contact with province-wide utilities and industries.
- Who can help coordinate? Identify lead and supporting roles to coordinate the working group; have regular meetings, take minutes/ action items. Assign responsibility for key activities and time-sensitive actions.
- When? Early! Set up your working group in the winter so you are ready for Phrag o'clock in late summer.
- Who is already Phragging? Ascertain whether there are any local control projects underway you could learn from.
- Join the Ontario *Phragmites* Working Group (opwg.ca/) to learn more about *Phragmites* control and meet other Phraggers.
- Gather your supporters: It can be important to have a political ally at the local level, so engage your municipal councillors.

Invasive *Phragmites* removal effort (Evergreen).

Table 1. Example of relevant partner information to collect.

Full organization name	Federation of Agriculture
Contact name	John Smith
Contact details	John.smith@email.com
Sector represented	Farm community
Current projects underway	Successful Agricultural drain *Phragmites* removal project initiated in 2018
Resources to share	e.g. equipment, tools, staff, expertise, funding, licence holder
Qualifications/ licences relevent for project	e.g. operator licence

INDIGENOUS ENGAGEMENT

Engaging with Indigenous communities is an important part of this process. Indigenous people have constitutionally protected rights which can be impacted by both *Phragmites* and its management. Traditional cultural practices, beliefs and values are closely tied to land, and the viable ecosystems and species they support. Indigenous values and attitudes towards species, including non-native invasive species like *Phragmites*, sometimes differ from Western perspectives. It is therefore necessary to take the time to listen, to understand and to incorporate input into your plans before acting. This is important throughout Ontario, but the details may vary substantially between different communities. Each community is different, and it is important to take the time to learn from each one so they can become part of delivering your project.

There have been instances where failure to conduct early engagement with First Nations and Indigenous People has led to avoidable project delays and increased costs to proponents. Although only the Crown is legally obligated to consult with First Nations and Indigenous People concerning the possible effects of Crown actions with respect to proposed projects on established or potential Indigenous rights (see Consultation vs Engagement), early engagement with Indigenous groups by any proponent can yield positive results. Those benefits include enhanced relationships, increased trust, improved understanding by Indigenous groups of the proposed project and its objectives, and assisting the proponent to understand the interests and concerns of those living in the affected area.

Consultation vs. Engagement

Consultation refers to the legal obligations of the Crown (Government) when Indigenous interests (rights and title) may be adversely affected by a Crown decision. Consultation consists of information sharing between government and affected First Nations and seeks to resolve potential adverse impacts to Indigenous interests. Engagement is different from consultation. Engagement aims to build and enhance relationships with First Nations and Indigenous Peoples/Groups by exchanging information in the absence of legal consultation obligations. The purpose of engagement is to build trust, create meaningful relationships, to have the knowledge of neighbouring communities and of Indigenous matters. This includes information sharing regarding regulations, policy, legislation and procedures.

Relationship building involves several key steps which all require time and patience. Remember to build generous timelines into your project for these important activities. Each activity should focus on building trust and understanding mutual benefits rather than on your desired outcomes. The following is a series of suggested steps:

Learn

It is important to begin by familiarizing yourself with First Nation territories. This is a helpful website for doing so but may not always be accurate. You should consult additional resources, and your ongoing engagement should help determine which First Nations need to be included in consultation and relationship building. Project proponents should take on the responsibility of learning about the pertinent Indigenous community or First Nation and their rights. You should learn about treaties or other legal arrangements pertinent to the area, and local cultural practices. When done respectfully, making this effort contributes to creating an ethical space for engagement, relationship building and successful projects. Ethical space can be defined as "*a venue for collaboration and advice, sharing and cross-validation (where one side validates the other's decisions)*" (We Rise Together, 2018). In ethical space, different knowledge systems can be used to collaborate in what can be known as a "two-eyed seeing" approach – in other words, Indigenous ways of knowing and western science contribute to collective understanding.

Indigenous communities are diverse, and you will need to put the time in to learn about each one in your project area. Tension and even conflict can arise if you do not take the time to learn about both the relationships and differences between communities.

Making attempts to understand key local issues, but also understanding how the community regards western conservation and land management is a critical step as you start to build the relationship. Learning about the communities' relationship to the land both past and present may help you understand current perspectives, potential barriers as well as opportunities for meaningful engagement.

Some Indigenous groups and First Nations have online resources to help you learn about their communities. This can also be a good way to find out about local events which you may be able to attend so you can get to know people.

Plan

Plan how you would like to engage with each community. Take the time to introduce yourself, and later, when the time is right, your project, and key partners as appropriate. Some communities will have very limited capacity or interest to engage with your project: you can research this in advance and adjust your plan accordingly. Engaging with First Nations should never be an afterthought, and the focus should start firmly with relationship building rather than project delivery or outcomes. This work should begin early and be done consistently throughout the project and continue afterwards. Building on what you have learned about the community in advance, you may be able to ascertain key areas you should focus on to build trust.

It is important to think about who you should engage within communities. Having relationships with individual community members is good, but it is necessary to develop formal connection with elected representatives or staff. This may vary depending on how the community is structured.

Finding mutually acceptable times to engage can be challenging. Draw on what you have learned about common cultural activities in the community to help gauge suitable times: avoid times when you suspect many people will be busy (e.g. hunting or gathering activities).

Reaching Out

If you do not yet have any relationships with the community, a common first step is to contact the Band Council office/Métis Community Council/ Local Friendship Centre. You may need to try several times; many Indigenous communities are extremely busy and have many competing priorities. In some cases, you may need to find a way to be introduced by someone who has an existing relationship or get additional advice about how you might make contact.

General Tips

Engaging with cultures different from your own can be intimidating. Take the time to review these tips, and seek other advice online, however doing your best to behave respectfully and with careful thought is generally well-received. It is normal (and expected!) that you may make mistakes. Be humble about your knowledge, transparent about your motivations, and show a willingness to learn in order to build trust.

Some simple ideas to help with this:

Learn how to pronounce the name of the community and their language. This website may be helpful in this regard. Listening to recorded phone messages at the administrative offices might be helpful.

Show respect for both Elders and elected representatives by acknowledging them during any meetings. Follow the lead of others present to assess how to behave with regards to things like whether or not to make eye contact, whether hands are being shaken etc. Some First Nations culture requires that introductions be made clockwise around the room, while in others, the opposite is true.

Always remember that people's time is precious, and that your project will benefit enormously from their support and insights. It is therefore courteous to acknowledge this in every way you can, including via simple things like offering to meet in their community rather than expecting them to travel to you; ask if there are things you and your project can do for them before seeking their knowledge. Their knowledge is valuable, and so you should treat it with the same dignity and respect as any other valuable commodity.

Take the time to inquire what you or your project may be able to do for the community before making any demands of their time, knowledge or other resources. Build meeting agendas together and be flexible.

It can be challenging to gauge what stage is most appropriate to showcase your project. Ideally, you build a relationship and the project develops in tandem with that, however, the reality is many communities are extremely busy with many competing priorities, and there are many people with projects just like yours also queuing up to engage. As you learn about the community, take this time to assess at what stage you should bring your project into conversations. In some cases, there simply isn't the capacity to provide in-depth involvement through a lengthy process; in other situations, bringing a finalized draft may be particularly discourteous.

Making an Indigenous Engagement Plan

Engagement with First Nations and Indigenous Peoples/Groups early in the planning and design phases of a proposed project can benefit all concerned. Here are some specific good practices for Indigenous engagement and participation. There is no single approach to engagement, and it is an ongoing process. These good practices should be enacted throughout each *Phragmites* management project.

TIPS INDIGENOUS ENGAGEMENT PLAN

- Identify issues and factors where engagement is needed, and engagement strategies could help.
- Identify potentially affected Community, people(s), and organizations.
- Consider any existing and potential legal obligations relevant to the engagement.
- Consider cultural differences, community locations, and resources available.
- Build relationships based on trust and respect between project proponents and Indigenous peoples and local communities; conduct interactions in a transparent and culturally appropriate manner.
- Pinpoint the best times to begin engagement processes throughout an activity's lifetime.
- Determine how best to communicate with Indigenous peoples.
- Use multiple approaches and tools to engage, and practice early and proactive engagement at all levels.
- Develop an engagement plan or agreement with the community, and report back on progress.
- Set up supportive measures like record keeping, process reviews, and conflict resolution mechanisms, as appropriate.

FUNDING

Money is important! Fundraising for invasive species management can be challenging, particularly when there are activities all year round. It is important to fund every aspect of the work, including herbicide application, cutting to drown, biomass cutting and/or removal, monitoring and data collection. Don't forget to fund yourself (staff time)!

Grants: $how me the Money!

Many environmental grants (see list below) can be used to support *Phragmites* management; here are a few examples available at the time of writing:

Green Shovels Collaborative

Invasive Phragmites Control Fund

Species at Risk Stewardship Fund

Habitat Stewardship Program

Wildlife Habitat Canada Programs

Canada Nature Fund for Aquatic SAR

TD Friends of the Environment

Invasive Species Centre Microgrants

Other sources of funds

Phragmites impacts multiple sectors so the opportunity to approach management from several perspectives beyond simply environmental grants exists. For example, **Cottagers Associations, Ratepayers Associations, Lake Associations** may be able to support fundraising for *Phragmites* management. In some cases, these efforts can be substantial.

- In agricultural areas, work closely with the Municipal Drainage Superintendent to include *Phragmites* management within agricultural drains as part of **drainage fees** charged under the Drainage Act.
- Proactively identify *Phragmites* management needs in **annual maintenance budgets** for roads, public lands, etc.
- *Phragmites* management requires a **multi-year investment**. Every effort should be made to apply for funding and arrange budgets accordingly. This may be achieved by tapping into a mixture of shorter-term funding opportunities in the absence of preferred, longer-term funding sources.
- Tap into the **grant-writing expertise**, matching funds opportunities and partner-sourced funds of your working group. Working with charitable partners can create opportunities for donations.
- **Corporate funding** (sponsorship, donation, partnership) may also be available.

Working in partnership with Long Point World Biosphere Reserve Foundation to offer charitable receipts to donors, the Long Point Ratepayers Association runs an annual silent auction, raising $10,000 for Phragmites management!

FINDING YOUR PHRAGMITES

A key starting point is to have a good idea of where *Phragmites* is likely to be within your region. It is not necessary to map every single patch from the outset. *Phragmites* occurs in many habitats and across many jurisdictions, including roadsides, infrastructure lands, natural areas, public lands, private lands, First Nation territories, and is not restricted to wetland habitat. ArcGIS Field Maps projects are good for collecting, storing and tracking progress and landowner permissions. The table below provides a suggested series of fields to support *Phragmites* projects.

TIPS FINDING YOUR PHRAG

- **Get techy:** use citizen science/engagement platforms to get the public to help locate *Phragmites* patches (apps such as iNaturalist or EDDMapS).
- **Use your views:** roadside surveys can help find easy-to-access populations allowing for planning to occur while avoiding entering private land until permission is attained.
- **Communicate:** Incorporate any local and Indigenous knowledge which has been shared via your engagement and relationship-building work. Communities may be able to share knowledge about the *Phragmites* populations in their territory.
- **Sharing is nice:** set up a shared platform (e.g. ArcGIS Collector/Field Maps or Survey 123?) so that all project partners can contribute data. The data described below is essential to support management, but may also be required for permits, funding, reporting and information sharing/celebrating success:
  - Landowner permission (to survey, to manage, and explicitly to use herbicide);
  - Roadside survey points; document if *Phragmites* has crossed into private land off road allowance (Density (low, medium, high), responsibilities – who will reach out to l/o; hydrological conditions (wet, dry, unknown); site access (on foot, truck, ATV, tracked vehicle, inaccessible).
- **Phrag can hide:** When collecting your own data think about the usual places you see Phrag (roads, shorelines and wetlands etc.) but also the non-traditional areas (agricultural drains and ponds, vacant lands, utility corridors, railways and other natural areas such as woodlots and grasslands
- **Maps are good:** Consider developing a series of maps highlighting different populations e.g. roads, utility corridors etc. It is best to have mapping in place for a given management season by late spring to inform permit applications and other approval processes as early as possible.

ArcGIS Field Maps projects are good for collecting, storing and tracking progress and landowner permissions. The table below provides a suggested series of fields to support *Phragmites* projects.

Table 2. Data fields to support *Phragmites* management.

Attribute	Drop Down Options	Informs
Density	» Low (<25%) » Medium (26-69%) » High (>70%)	Management planning; estimates for how much time it will take to treat an area, and how many years of treatment the site will require.
Size	» Approx Length X Width	Management planning/equipment and method choices and time involved in treatment
Responsibility	» Private » Land trust (conservation organizations) » Conservation Authority » MTO highways » Municipal land (roads, agricultural drains) » Industrial/utility » Indigenous Lands » Provincial (parks, Crown land) » Federal land (docks, military bases, parks and National Wildlife Areas) » Other	Management planning; knowing who owns what parcels helps to facilitate resource sharing. Document whether the patch straddles property lines e.g. roadside patch which extends onto private land.
Hydrologic Condition	» Wet (standing water) » Dry or Damp (no standing water) » Unknown	The type of permits or authorizations that may be required to undertake control. E.g. Wet stands require an aquatic extermination permit for herbicide application. E.g. Dry stands impacting farm crops/ operations may be regulated differently than those that do not. Unknown is a default colour used to estimate locations from a distance, until permission to access the property is given.
Site Access	» Foot » 4 by 4 Truck » ATV » Amphibious Vehicle » Inaccessible by Ground (add notes) » Other (e.g. safety issues, hidden infrastructure etc.) » Boat	Management planning

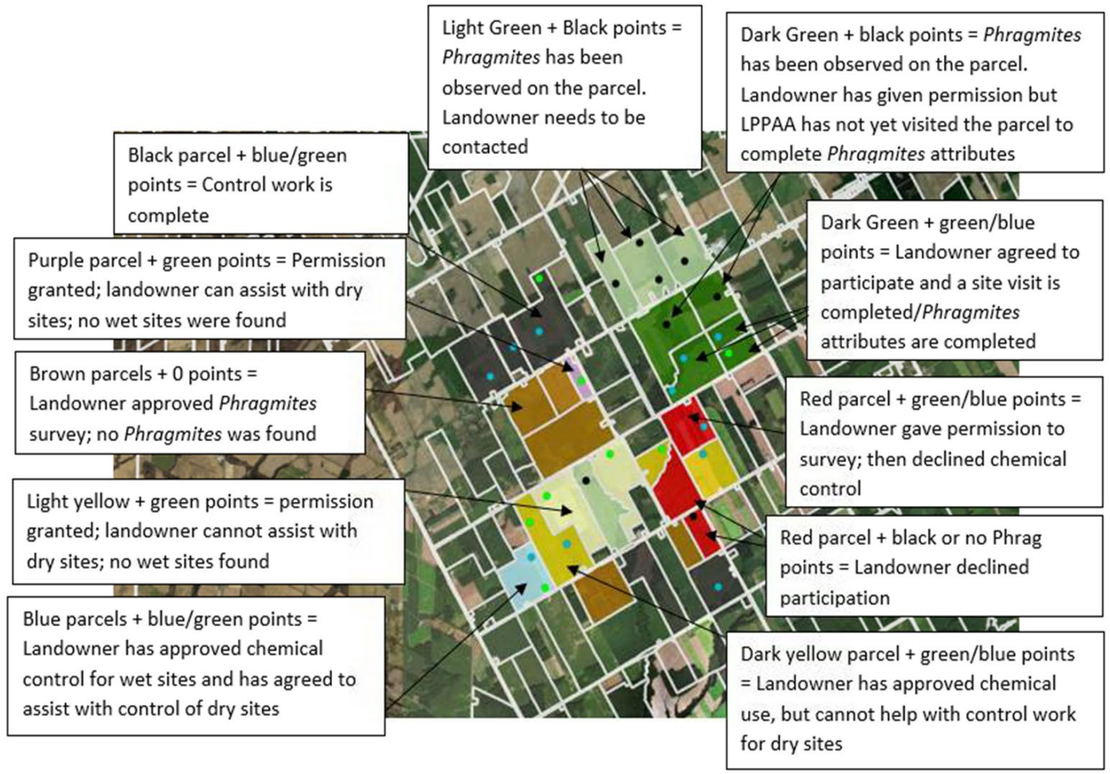


FIgure 4. An example of mapping outputs available through the ArcGIS Field Maps application. Seeing this information spatially can be helpful for field planning, implementation and reporting.

AWARENESS AND PARTICIPATION

Awareness: Let them know

Having broad community awareness is critical to delivering a successful *Phragmites* management program. It will be important for your working group to dedicate effort to both raising awareness about the project and to encourage as much participation as possible. This has direct engagement benefits but can also help when the time comes to secure appropriate contractors and volunteers.

Landowner Participation: Get them involved

Beyond the need to engage generally with the community, an effort targeted to landowners (private, corporate, industrial) is necessary to communicate the value of your project and achieve landscape scale participation. A variety of strategies may be necessary depending on the structure and composition of your community and landscape.

TIPS AWARENESS

- **Break out the rolodex:** tap into your regional working group's contacts in order to support communication of your project to the broader public, and gain participation of key partners.
- **Listen, learn, and liaise:** approach environmental team/staff of relevant Indigenous communities and request opportunity to provide a briefing note to council and committee.
- **Get online:** make a webpage and have a social media presence to both share information and provide a place for landowners to sign up and submit *Phragmites* location data.
- **Get offline:** attend/set up a booth at local events e.g. woodlot owners AGMs, local chapter of Federation of Agriculture, county fairs, local clubs etc.
- **Don't reinvent the wheel:** use existing resources to pro-actively educate about effective *Phragmites* management measures, including herbicide safety and efficacy e.g. Ontario Invasive Plant Council, including *Phragmites* Best Management Practices.
- **Make it public:** consider running an annual public information session.
- **Find your Super-Phragger:** Identify a strong community supporter as a potential project champion.
- **Old-school works too:** tap into any existing regular mailouts e.g. tax notices, drain maintenance notifications.
- **Municipalities matter:** make a deputation to council, approach council and mayor directly, one on one: a champion on council may be beneficial.
- **But don't forget your other governments:** engage your local MPP and MP.
- **Party-on:** celebrate successes and project accomplishments broadly.
- **Show off:** demonstration sites with interpretive signage in a high-traffic area can be very valuable.
- **Phrag affects all:** landowner associations such as cottage groups or ALUS can be a great partner to help with landowner engagement in rural areas.
- **Mix it up:** a mix of targeted and general outreach methods suitable for your location may be required to effectively reach all audiences.

Student volunteers working to remove invasive *Phragmites* (Lakehead University).

Ground sprayer being used to manage an established patch of invasive *Phragmites* (Ducks Unlimited Canada).

TIPS LANDOWNER PARTICIPATION

When gaining participation from landowners there are some specific considerations and methods that may be helpful. Some suggestions:

- **Be clear:** ensure communications are consistent and targeted to the audience.
- **Ask the right person:** you may encounter absentee landowners, who may have tenants on their land. You must obtain landowner permission directly. You may be able to reach them via their tenants, or via a mail-out (municipalities may be able to help). Working group partners may have access to Geowarehouse, property ownership databases or you may visit your local land registry office.
- **Use all of the tools:** consider all or a combination of several of these methods to engage the whole community: door-to-door, newspaper ad, social media, radio, websites, public info session, mail-out, roadside signs, events/AGMs. Door-to-door visits can be particularly effective for engaging private landowners as it provides the opportunity to share information, have conversations and build trust.

Timeline for Launching a *Phragmites* Program

Securing access and authorizations, procuring field crews and equipment, managing logistics, and obtaining and managing funding and associated reporting all take time and must be completed to allow you to take advantage of the correct biological windows for management. This is particularly important further north where effective management times are much shorter. It is worth planning at least a year ahead so that you have everything in place and don't miss any opportunities for *Phragmites* management. The tips below focus on the biological windows for *Phragmites* management. All projects must respect additional timing constraints raised via your engagement with First Nations, including respecting and accommodating cultural practices that revolve around the seasons and certain times of the year. These will vary between communities. Before initiating any work on the ground, you must also build in generous timelines to allow essential relationship-building, engagement and consultation with First Nations.

TIPS TIMING

- **Not just a summer problem:** *Phragmites* programs are year-round projects with key biological windows which can only be met with careful, advanced planning.
- **Plan ahead:** engagement, funding, authorizations and reporting may follow other timelines so it is important to plan your program well in advance. You may need to apply for funding a year in advance, and ensure you have staff in place to complete necessary reporting.
- **Time is on your side:** allow enough time to secure experienced field crews and ensure they have the required licences and training.
- **Other timing tidbits:** use the timeline on the following page to guide your efforts.

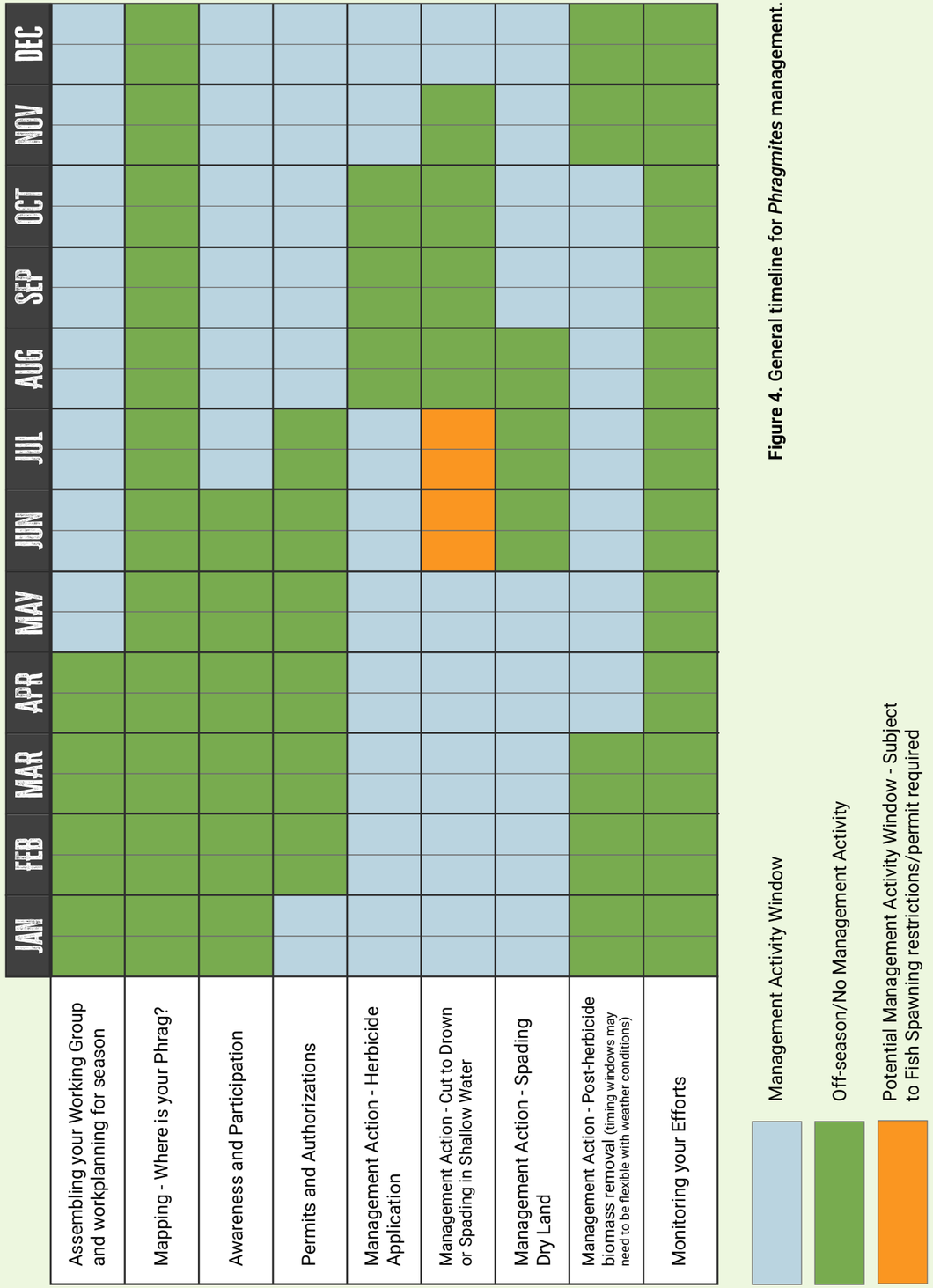


Figure 4. General timeline for *Phragmites* management.

PRIORITIZE WHERE TO START

Embarking on a *Phragmites* management project can feel overwhelming. Remember it is a long-term commitment and that even modest amounts of successful management are better than nothing. Every patch managed results in less of a seed source capable of invading other areas.

Permits and Authorizations

Similar to other management and maintenance activities, there may be authorizations required to deliver a *Phragmites* management program (see Ontario Invasive Plant Council's BMP). For example, if herbicides are required, a licenced exterminator (with the correct category of licence) under the Pesticides Act must undertake the application. When working in Species-At-Risk (SAR) habitat, guidance or an authorization under the provincial Endangered Species Act, 2007 or federal Species At Risk Act may be necessary. Projects being delivered in natural habitats requiring the use of a land-based herbicide application may require a Letter of Opinion from the local District office of the Ministry of Natural Resources and Forestry (MNRF) unless being delivered by or on behalf of MNRF or Conservation Authority staff.

Invasive *Phragmites* removal with phrag roller in Long Point, Ontario (Ducks Unlimited Canada).

TIPS PRIORITIZATION

- **Break it down:** Consider a phased approach especially in a large area. You may benefit from creating defined management units within your project area (see The Geography of Ontario, above, which recommends Municipal boundaries in the south, and MNRF District Boundaries in the north).
- **Phrag knows no boundaries:** Think about multiple ownership of a single Phrag patch, who needs to be contacted to permit control? Are Indigenous rights impacted? It is imperative to engage adjacent landowners where a roadside *Phragmites* patch extends on to private land.
- **Do what you can:** Manage what *Phragmites* you can – you may find roadside patches are an easy first phase (roads are important vectors, and roadside work is highly accessible, and visible). Roadside *Phragmites* control should be built into regular roadside maintenance.
- **Get mobile:** In northern Ontario, managing roadside *Phragmites* outside urban centres may require a dedicated mobile team that is coordinated centrally.
- **Priorities:** Other considerations for prioritizing control include: infrastructure, health and safety, property values, natural capital values, opportunities to build on existing/adjacent projects.
- **Use the skills:** Tap into the diverse skill sets and interests in the Working Group in order to identify projects that can be led by different agencies in the collaborative.

Table 3. Permits and authorizations guide.

Legislation & Permit type	Site applies to	Helpful Advice	Link to guidance/ application forms
Pesticides Act **– Permit to Perform a Water Extermination**	*Phragmites* growing in standing water	Must follow label guidelines incl. notification requirements and downstream impact mitigation	More information on permit requirements found here
Pesticides Act – Natural Resources Exception – Letter of Opinion	Herbicide application in natural areas not already covered by Forestry, Human Health and Safety or Public Works exceptions	Contact local MNRF office for application form. Issued for up to a maximum of a 5-year term. Seek the letter of opinion for all invasive species and areas you may wish to manage in the next 5 years. Apply at least 6 months in advance of management activities to ensure time for review and issuance. Ensure application demonstrates how BMPs will be used for management and provides details on management techniques, timing, public notification and project tracking/reporting.	» Letter of Opinion information found here » OIPC Invasive Phragmites BMP » Example Letter of Opinion – Pesticides Act Natural Resources Exception
Ontario's *Endangered Species Act, 2007* – **Authorization** **Ontario Ministry of Environment, Conservation and Parks (MECP)**	Any management activities that apply to known Species at Risk in Ontario (SARO) it's habitat or a site where a Species at Risk in Ontario are known to occur	If you suspect your site may contain SAR, conducting surveys may be appropriate prior to planning management. If you confirm SAR or SAR habitat then an authorization may be required under the ESA 2007. A request for review from MECP under the ESA can identify necessary permits and authorizations. There are other options that may apply to your project including: avoiding impacts to SAR altogether to negate the need for an authorization; applying for an Exemption for project activities; or entering in to a Stewardship Agreement to actively manage or enhance SAR habitat.	» To see the official Species at Risk in Ontario (SARO) click here » For information regarding the types of authorizations click here » For information on what requires an authorization click here
Invasive Species Act (ISA) **If prohibitions for a restricted species can be adhered to no permit is required** **Ontario Ministry of Natural Resources and Forestry (MNRF)**	*Phragmites* is listed as a Restricted Invasive Species under ISA	In Ontario, it is illegal to import, deposit, release, breed/ grow, buy, sell, lease or trade restricted invasive species. It is also illegal to bring these plants into provincial parks and conservation reserves and to possess, transport, deposit or release them in these protected areas. There are exceptions under the regulation to enable control of a restricted invasive species. For example, outside a provincial park or conservation reserve, it is not illegal to deposit or release a restricted species if you are trying to manage or control it. If you deposit or release a restricted invasive species during this activity, you must take reasonable precautions to prevent the spread of the restricted invasive species outside the immediate area where the activity is taking place. Ontario has also regulated watercraft (e.g. boats, barges) as a carrier of invasive species under the Invasive Species Act. As such, all boats, equipment, or any vehicles or trailers must be cleaned after control activities to prevent further spread of invasive species to new waterbodies.	» Ontario invasive species list showing Restricted and Prohibited species can be found here » Information on the prohibitions set out in regulation can be found here in the Act » ontario.ca/page/invasive-species-action-plans#boaters
Fisheries Act* and *Species at Risk Act **Authorization** **Fisheries and Oceans Canada (DFO)**	Primarily management activities that may impact fish and fish habitat, and/or known aquatic Species at Risk and their Critical Habitat.	Maps to determine if your project has known SAR occurrences can be found here. If planning activities that may impact fish, or fish habitat or aquatic SAR, a Request for Review is required which will screen the project for both Acts. If applying herbicide to aquatic sites or using the cut-to-drown method a Request for Review will initiate the permit process once the Request for Review is submitted.	» SARA maps with species and habitats are here » Request for Review link to initiate permit process under SARA and Fisheries Act
Public Lands Act **O. Reg 239/13 – Work Permit and Exceptions to Work Permit -**	Applies to work conducted on Crown land and shore lands, except federal waterways (e.g. Trent Severn and Rideau Canal)	» No permit required for mechanical or manual removal activities if you can follow all of the rules (e.g you are the waterfront property owner, dispose of all plants/ material on dry land, only use mechanical devices or your hands to remove plants, and follow the approved In-water Work Timing Window Guidelines). » Provide as much detail about the project, location, methods and mitigation measures as possible as part of the application	» General work permit information found here » Read O. Reg 239/13 to determine if a permit is required » Review In-water Work Timing Window Guidelines » Contact your local MNRF office to apply for a permit

Volunteers working to remove invasive *Phragmites* (Toronto Nature Stewards: Hoptree Misty Hills).

IMPLEMENTATION

Every patch of *Phragmites* you can manage is a step in the right direction and contributes to reducing its prevalence in the province. Consider the types of land you have in your area, and follow Part II for each. Below are some tips common for all land types.

Working in sensitive habitats and authorizations

Managing *Phragmites* can involve working in sensitive ecosystems which can provide habitat for Species at Risk and other sensitive plants and wildlife. *Phragmites* grows in or close to wet habitats, so management must consider potential impacts to the water quality and surrounding environment.

Everyone working on management projects should be particularly vigilant when following Best Management Practices, Clean Equipment Protocols and ensure adherence to herbicide labels and all any items outlined in conditions outlined in permits and authorizations for both physical and chemical control activities. Licensed herbicide applicators must also draw carefully on the training they received to obtain their provincial licences. These items are designed to protect ecosystems, species, water quality and human health. Special consideration should be given to working in sensitive habitats to minimize impact. This could include additional training and/or supervision of persons working in these ecosystems.

Constitutionally protected rights of Indigenous people also need to be upheld throughout. Local sensitivities and Indigenous cultural values and perspectives also need to be accounted for with care.

Adherence to these items, as well as Clean Equipment Protocols and other relevant guidelines, needs to be stipulated in any contractual documents, and supported by appropriate timelines, expectations and funding.

TIPS IMPLEMENTATION

- Follow Best Management Practices to manage *Phragmites*.
- Identify and secure contractors/staffing as early as possible; consider timelines necessary for training and obtaining required licences.
- Authorizations/permits may have long review times (see timeline).
- Formal public notice: 24 h prior to spraying at normal points of entry; signs must remain in place for 48 h after spraying.
- Consider the type of equipment and the experience of personnel especially carefully when working in sensitive habitats.

Photo: A biologist monitors a prescribed burn of *Phragmites* (Dax Melmer/Windsor Star).

PERSONNEL

Volunteers

A well-funded *Phragmites* program should use experienced, qualified, paid staff, however there are benefits to tapping into the (sometimes extensive!) volunteer labour force to augment this. Several successful *Phragmites* projects have been delivered wholly or in part by volunteers in southern Ontario. This can contribute substantially to community buy-in and support. Investing time into effective volunteer management, acknowledgement and effort recognition is very important. Happy, engaged volunteers who can speak highly of your project can open doors for additional participation.

Contractors

Choosing contractors with experience working in sensitive habitats is ideal for *Phragmites* management. Contractors will need to be familiar with the operation of a wide range of equipment, ranging from on-road equipment, off-road trucks and ATVs, boats, trailers, to hand-held tools. Appropriate health and safety and communication devices and protocols become increasingly important in remote areas both on and off road. In natural areas, crews need to be comfortable using equipment and hiking well away from roads and facilities.

It is good practice to inquire about your potential contractor's experience and credentials prior to awarding a contract. For example: inquiring about their experience acquiring necessary permits and authorizations for work in sensitive habitats; post-management restoration, project successes and if they are properly insured.

Crews should be responsive to new information concerning *Phragmites* locations, weather conditions, Indigenous people and others using the land, and permits and authorizations and so should be able to communicate with the broader *Phragmites* management team.

Mobile Crew in Northern Ontario

Although *Phragmites* does occur in extensive patches, it is generally quite scattered on the landscape. In northern Ontario, distances may be particularly large, and there may be tens or even hundreds of kilometres between *Phragmites* patches. This means that *Phragmites* management will require mobile crews that will have to travel long distances and require meals and accommodation on the road. It may also be necessary to stage materials and equipment in strategic, secure locations.

SEASONALITY

Follow the BMP regarding effective timing for different treatment techniques. Pay close attention to weather patterns and timing of the first frost in your project area: treatment seasons in northern Ontario are generally shorter than in southern Ontario. For example, effective herbicide use for

Phragmites management may be restricted to August in the north but can extend through October in southern Ontario. As with all herbicide, and potentially other forms of treatment, you must first conduct meaningful engagement with the Indigenous community in the territory. Ensure you discuss: the use of herbicide, the specific area to be sprayed (this may intersect with important harvest areas or areas used for hunting by the community), the timing of herbicide application, and strategies to ensure that the herbicide does not impact land use. Other techniques like cut-to-drown can be applied during longer biological windows, from earlier in the growing season to just before seed heads develop. These longer windows may intersect with other biological processes that need to be considered (ie. fish spawning/timing windows). This technique may also be effective in late fall into winter but becomes impractical when the ground/water freezes.

EQUIPMENT

All equipment should be used with caution, respect and safety of people and the environment in mind. Any invasive species management may have the potential for some negative impacts on the environment, however, following BMPs, associated permits and authorizations, and selecting the appropriate tool and using it thoughtfully, all contribute to minimizing long-term, negative impacts. Equipment should be well-maintained and stored safely and securely, and all projects should require the use of Clean Equipment Protocol for Industry. Equipment needs will vary depending on accessibility, habitat and patch size, as well as the management method to be applied.

Targeted application of an approved registered herbicide during the correct biological window to *Phragmites* is important. This brings a variety of logistical challenges, including the need to obtain and transport water or a filtration system for mixing herbicides and for clean-up of equipment.

See Table 4 below for equipment considerations. Most situations will require a combination of vehicles and tools for complete management.

Marsh Master and helicopter being used to combat invasive Phragmites (Giles Restoration Services/ Nature Conservancy of Canada).

Table 4. Equipment considerations.

Equipment Type	Land types and Considerations	Pros	Cons
Vehicles			
Boom Truck	Roads and road allowances	Efficient and effective coverage of Phragmites patches near road edge; contractors often set up for MTO highway work with appropriate safety lighting etc; low potential for exterminator exposure	Limited reach from road edge; cannot spray in a targeted manner
Pickup Truck *	Roads and road allowances, Natural Areas abutting roads	Readily available vehicle type	Limited to moderately accessible sites
Off-road vehicle (ATV, UTV etc.) *	Infrastructure Lands, Roads, Natural Areas (e.g. road allowances, ditches, forest edges)	Access difficult sites not suitable for other vehicle types	Requires a trailer,
Amphibious off-road vehicle (Marsh Master, Argo, Truxor, Fat Truck, Sherp etc.) *	Natural areas which are particularly wet and inaccessible. Terrain type is important when selecting an amphibious vehicle. Marsh Master: best used on soft substrates as rocky sites may cause damage to them. Argos with rubber tracks and rubber-tired equipment (Fat Truck/Sherp): more suitable in rocky, firm substrates	Access otherwise inaccessible aquatic sites; effective at crossing almost any terrain including open water; lightweight and efficient distribution of weight renders these vehicles low-impact in sensitive wetland habitat driven by qualified operator	Expensive to purchase, maintain and hire; limited availability; may travel through Phrag patch as part of control efforts so clean equipment protocol is particularly important; ability to access remote areas requires safety planning; requires a qualified operator and a trailer
Boat	Natural areas, open water. For shallow wetlands a Jon boat equipped with a 'Go-Devil' shallow drive motor is recommended. A larger boat that can hold a hydraulic sprayer * may be required for larger wetland projects	Excellent for treating berms along channels & outside edges of Phragmites patches; delivering herbicide and fuel to amphibious machinery working in wetlands	Requires boat and operator licencing, can only treat edges of patches, need good weather conditions, limited applications depending on site; requires a trailer.
Aerial: Helicopter	Natural areas, varying from wet to dry. Typically best in locations with less tree cover or aerial obstructions.	Access otherwise inaccessible or difficult to access sites; can cover large Phragmites patches.	Can be expensive and additional permitting and authorization need to be obtained; may not be suitable in areas with aerial obstructions (ie. trees, buldings).
Spray, hose, roller attachments for vehicles			
***Hydraulic sprayer, retractable hose reel and handheld wand**	All land types accessed by any of the vehicles described above	Thorough coverage of entire patch; controlled, targeted spray pattern; excellent efficacy	Limited to range of hose; physically demanding for exterminator; some potential for exterminator exposure
Drum roller (this equipment is attached large off-road vehicles to flatten dead standing Phragmites)	Biomass (treated stalks) may be cut or mulched one month after herbicide treatment.	Assists with identifying regrowth in the following growing season	Requires an additional visit to the site; not all sites may be accessible
Manual equipment			
Backpack Sprayers	All land types. Backpack sprayers are a key part of any Phragger's toolbox. Both manual and battery-powered versions are available. Purchase extra batteries and chargers if using battery-powered versions.	Lightweight, easy to pack; excellent for smaller patches; targeted application; inexpensive and easy to use; battery powered now available (reduces operator fatigue)	Limited range, physically demanding for exterminator; some potential for exterminator exposure; time consuming compared to larger machinery; depending on site, may requires lots of walking back and forth to re-fill sprayers and/or replace batteries

Equipment Type	Land types and Considerations	Pros	Cons
Cane cutters and sickles	Cut to down method for aquatic sites greater than 30 cm (12 in); may require sharpening to maximize efficiency	Lightweight, easy to use; requires little training; inexpensive	Water must be a minimum of 30 cm (12 in) deep; cuts only one stem at a time; slow progress; cut stems must be hauled away and disposed properly; risk of repetitive strain injury on larger projects
Spade (sharpened)	Used in dry or shallow (less than 30 cm) aquatic sites; must sharpen spade on grinding stone/wheel	Lightweight, easy to use; requires little training; inexpensive	Cuts only one stem at a time; slow progress; cut stems must be hauled away and disposed properly; risk of repetitive strain injury on larger projects; spade must be sharpened regularly
General items			
Pump and filter	All land types. Filtering debris out of water prior to making herbicide mixes is important to improve efficacy and avoid damage to spray equipment	Reduces the volume of water you need to transport to the work site	Requires access to water
GPS Tracking Systems	Tracking Phragmites management activities; spray-specific systems are available which track herbicide application when you press the sprayer trigger	Track exact treatment; verification of herbicide application; useful for mapmaking & reporting	GPS units can be expensive; may require time to get operators and data/GIS staff up to speed; can be expensive upfront and some have subscription costs; some use phone apps which may put pressure on daily phone battery life

Table 5. Additional equipment considerations.

Safety	» PPE: for herbicide-specific PPE, follow the label of the product you are using » PFD » First aid kit
Communications	Satellite comms (especially in the north), Spot/InReach, cellphone. Develop a check-in, check-out field safety procedure
Field preparedness	» Chemical spill kit » Hand tools (socket set, screw drivers, electrical tape, etc) » Battery booster pack, battery charger (backup power for cellphones, GPS etc). Consider also portable battery pack for cellphone backup
Navigation/ electronics	» Tablet with GPS capabilities » Handheld GPS unit » Kestrel unit (to measure relevant weather parameters)
Clothing and comfort	» Workboots, rubber boots, waders, work gloves, coveralls. » Consider the risk of ticks and include tick removal kits, permethrin-treated clothing » Sunscreen, insect repellant

MONITORING, MAINTAINING AND REPORTING

As with any program some effort must be dedicated to project monitoring and reporting. Establishing a tracking system (e.g. a daily form, ArcGIS Field Maps, ArcMap database applications, or other electronic method) for your project from the outset can be very helpful to meet the needs of all reporting as well as future management. *Phragmites* management is best delivered as a collaborative effort so reporting back to your Working Group partners will be an important part of your informal project reporting. Monitoring efforts are required to address four main elements: to focus your ongoing management efforts between years; to fulfil mandatory permit and authorization reporting; to fulfil funding and partner requirements, and lastly, to document progress towards Ontario becoming *Phrag-free.*

Monitoring and Maintaining Annual Progress

Although significant gains can be made in one season of management, to be successful, *Phragmites* management requires a multi-year, sustained effort over consecutive years that often benefits from a phased approach. Every site treated in year one will need to be monitored and almost certainly require some form of re-treatment in year two and occasionally later years, depending on treatment method. However, follow-up treatment is usually less time-consuming and resource-heavy than initial treatment. As such, projects may be able to phase personnel, equipment and materials over time, shifting to lower priority sites in later years. For example, several field crews may be required in initial year(s) in a highly infested area, but the required effort for follow-up management and monitoring may decline relatively quickly, requiring only one field crew for a shorter period of time in subsequent years. In all cases, it is important to remain vigilant, especially in high-traffic and highly disturbed areas, as reinvasion is always possible.

Even after several consecutive years of thorough management, occasional live, green *Phragmites* stems may regrow, particularly in high density populations. These may be stunted (shorter than 1 m) in their initial year, but can recover and repopulate areas which have been cleared. In their first year, these stunted stems may not have sufficient leaf surface area to absorb enough

TIPS MONITORING AND MAINTAINING ANNUAL PROGRESS

» Consider the use of GPS-based tracking software for project activities during treatment. Many tablets, phones and handheld GPS units are now inexpensive and offer the ability to take points and a track line that follows machinery and/or individual movement while working. This is helpful for tracking progress, making maps of treatment areas and calculating hectares treated.

» Focus on basic data which are essential to your subsequent season's program such *Phragmites* populations/individuals missed or re-growing, secondary invasions by other non-native plants, and the establishment of native plants that may need to be avoided.

» Use these data to determine next control measures (for *Phragmites* and secondary invasion of other species) and whether there is a need to restore sites with native plants.

» Don't initiate restoration with perennial native plants too early. In many cases, multi-year management efforts will be necessary so planting too early may result in impacts to planted individuals. Annual native plants may be a better choice at this stage. Monitoring may also determine that planting is not necessary as native plants may establish naturally..

» Share lessons learned with other Phraggers to support ongoing efficiencies and successes in *Phragmites* management, and to help improve this template and guide.

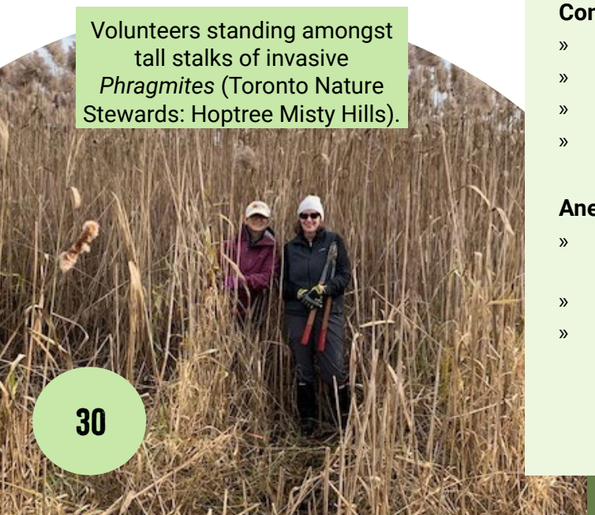
herbicide to be killed. These persistent individuals should be prioritized for follow-up control the following year.

Mandatory Reporting: Permits and Authorizations

Permits and authorizations almost always require some form of reporting. These requirements may be site and permit-specific, so a careful review of these documents prior to management is important to ensure necessary data collection is not overlooked. Often, these mandatory reports require data that is already being collected as part of management planning for future seasons or to satisfy the requirements of a funder or partner organization.

Tracking and reporting to Funders and Partners

Most funders will have specific requirements and often they align closely with other permit or reporting needs (e.g. hectares managed, # of volunteer hours etc). *Phragmites* management is best delivered as a collaborative effort so reporting back to your Working Group partners will be an important part of your informal project reporting.



Volunteers standing amongst tall stalks of invasive *Phragmites* (Toronto Nature Stewards: Hoptree Misty Hills).

TIPS MANDATORY REPORTING: PERMITS AND AUTHORIZATIONS

- Review all issued permits/authorizations for reporting requirements. These often align with other reporting needs for funders or the annual Phrag-free Report Card.
- Contribute standardized reporting metrics to support Ontario's annual Phrag-free Report Card once this is developed.
- Insurance providers may require a daily record of any herbicide application, check with your provider.

TIPS TRACKING AND REPORTING TO FUNDERS AND PARTNERS

General

- Take before and after pictures; these will be particularly valuable for reporting and to demonstrate success and grow support. Consider establishing 'permanent' photo stations and revisiting them annually to show change from project activities.
- # of hectares managed, km of shoreline/ or roadway managed etc.

Personnel and Equipment

- # of personnel formally trained (i.e. Exterminators etc.) as part of the project
- # people trained in Phrag management techniques
- Type and performance of equipment used
- Treatment site landowner name/organization

Communications and Outreach

- Type and # of materials produced
- # media released/printed
- Social media metrics
- # of events and workshops attended, # of event participants

Anecdotes you'd like to share

- Note interesting or rare species using your treated areas.
- Important feedback received from your communities
- At the end of a season take some time to record lessons learned. What was your most successful strategy and why? Were any strategies not as successful as you'd hoped? Why not?

COORDINATED ACTS OF STEWARDSHIP: ADDING IT ALL UP!

Every patch of *Phragmites* controlled through your efforts is contributing directly to our province's natural capital. In order to document our progress towards Phrag management, the data you are collecting annually is incredibly important to showcase our collective story. As the Ontario *Phragmites* Management Program develops, we foresee the development of convenient, online reporting tools to receive your data. Below is a suggested template you can use in the interim. In doing so, please report at the Working Group/program level to avoid duplication.

Reporting Template

Ontario Phrag-free Report Card 2022

The following link leads to an online Google Form that illustrates the concepts of an online *Phragmites* management reporting system that could be used to track our progress and combined acts of stewardship. The text beyond is an example of the types of information intended to be captured using the online form.

docs.google.com/forms/d/e/1FAIpQLScyFaMe627Q65z8sdjGwpI7Vd5t9HJU_q8X9zA1GDjOKz5_Qw/viewform

Example fields for project information collection:

Report on all *Phragmites* activities regardless of funding sources completed in this treatment year which contribute to the combined effort. Ensure no duplication with any project/Working Group partners. Complete by Feb 15th annually.

General Project Information

Project Name:
Planning team aka "The Collaborative/Working Group" (list, and total):
Phrag-free target location (municipality, county, etc):
Landowners who have received services (number):
Total area managed (hectares) (if applicable):
Total distance managed (linear, metres) (if applicable):

Anecdotes you'd like to share

- Note interesting or rare species using your treated areas.
- Important feedback received from your communities.
- At the end of a season take some time to record lessons learned. What was your most successful strategy and why? Were any strategies not as successful as you'd hoped? Why not?

Management Summary

There is value to reporting on *Phragmites* management based on land types (e.g. habitat types like forest, wetlands, etc), and possibly also based on jurisdiction (e.g. First Nation Reserve Lands, Treaty Territory area, Federal, Provincial, Private etc). Here is an example of how this could be divided, but note the extensive overlap between many categories:

- **Linear features** (roads, utility corridors etc): any municipal and provincial road and their

road allowance.

- **Natural lands:** Unfarmed areas remaining in a primarily natural state, including municipal parks, conservation authority lands, Provincial and National Parks, Crown Land, ENGO conservation lands, etc.
- **Anthropogenic lands:** Areas heavily influenced by humans such as urban centres, urban parks, public works yards, stormwater management ponds, landfills and transfer stations, ditches (excluding agricultural and roadside), vacant lands and industrial sites, landscaped or green space associated with offices and public buildings, schools, hospitals, airports, military bases.
- **Agricultural lands:** agricultural drains, farmland.
- **First Nation Reserve Lands:** Any lands within a reserve.
- **Private Lands (Commercial/Industrial):** Lands owned by corporations/ businesses including commercial, agricultural, industrial, hydro corridors, residential lands, and pits, quarries, gravel pits, mines.
- **Private Lands (Residential):** Lands owned by private residents including residential properties, hobby farms, agricultural and recreational properties.

Management technique	Hectares/ Metres managed	Work days (#)		Management year					Question only available in y 2 onwards
		Staff/ contractor	volunteer	first	second	third	fourth	fifth	Phrag free? y/n
Herbicide									
Cut to drown									
Manual spading									
Other									

Include a map showing ha and locations of areas treated and re-treated. Ideally, this is accomplished via sharing of spatial data or via an online spatial tool (to be developed).

Estimated time until your area is Phrag-free?

POST-PHRAGMITES CONSIDERATIONS

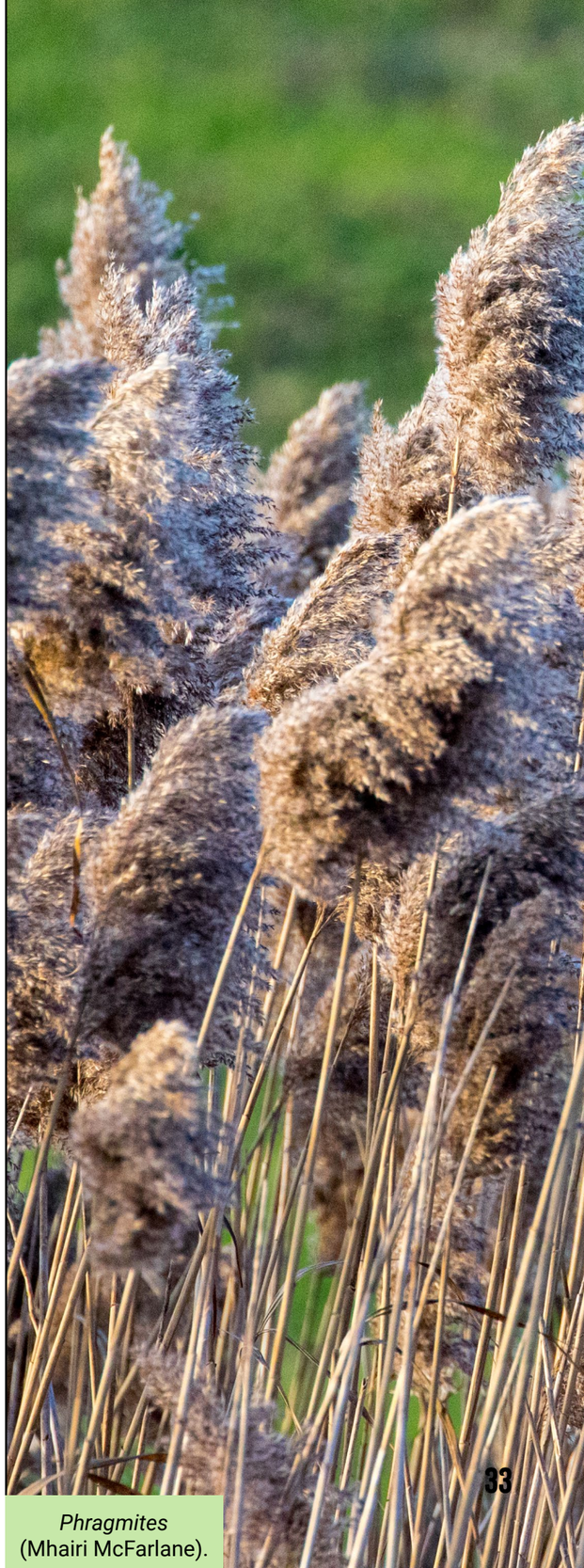
Introduction

In northern Ontario, *Phragmites* is still relatively uncommon and so a post-treatment era may feel quite close. In some areas in southern Ontario however, *Phragmites* management is a long-term project and it can be easy to push aside thinking about a restored ecosystem at the end. In both situations, it is important to think about and prepare for restoring the wetland ecosystem in order to reap the full benefits of investing in *Phragmites* management. Although native wetland plant seeds and root fragments can survive in a dormant state in invaded wetlands for several years, paying close attention to what species establish post-treatment is important. Other non-native species including European frogbit (*Hydrocharis morsus-ranae*), garlic mustard (*Alliaria petiolata*), depending on the type of site, can establish quickly. Although some non-native species may not persist for long, reducing their likelihood of establishment by adding desirable native species is recommended in most situations.

Landscape considerations

As you initiate *Phragmites* management, take note of the landscape immediately surrounding your management area. If the immediate surrounds are reasonably natural and dominated by native plants, the area you have managed may recover naturally with minimal if any intervention. This may be particularly true if the *Phragmites* patch is small, and recently established.

In contrast, if *Phragmites* is being managed in less natural settings, such as urban or intense agricultural areas, with limited native plant cover nearby, pro-active restoration will be required to restore ecosystem function and reduce the risk of *Phragmites* reinvasion, or secondary invasion by other non-native species.



Phragmites (Mhairi McFarlane).

Seeding

In both cases, it is not necessary to wait until *Phragmites* management is complete. Depending on how well your site responds to initial management, native ruderal species can be seeded in immediately after *Phragmites* biomass has been removed. Ruderal species are short-lived, “weedy”, and do well in disturbed areas. Annual species including spotted touch-me-not (*Impatiens capensis*), devil’s beggarticks (*Bidens frondosa*) are good choices in cases where you know you have additional *Phragmites* management to complete, as this species can establish and complete its life cycle between treatment windows. In some cases, seeding a few native annuals like these may be sufficient to pave the way for natural establishment of other native species, but strategic monitoring of your site should inform next steps and whether investment in seeding or planting additional species, including perennial species, is necessary. At this stage, you should also give some thought to whether your site could support culturally important species or activities. For example, wild rice is important among many Indigenous people and this and other native species are important for waterfowl foraging and nesting habitat.

Depending on your site, access for seeding may have similar challenges to access for treatment. Seeding from a boat, or by personnel on foot, all have similar health and safety considerations to other aspects of *Phragmites* management. Seeding from drones is becoming increasingly possible and this may be particularly valuable technique in areas which are difficult to access.

TIPS POST-PHRAGMITES CONSIDERATIONS

- **Timing:** Don’t wait until Phragmites has been eliminated to think about restoration. Seeding of native annuals could be helpful immediately after biomass removal.
- **Species selection:** Native “weeds” are your friend. Select rapidly establishing, prolific seed-producers to fill the ecological niche Phragmites is vacating.
- **Plan:** Think about what ecosystem you want to establish. What would be valuable for people? For wildlife?
- **Monitor:** Monitor strategically for native plant establishment. Some sites may recover quite well, others may need more significant seeding effort. Acting early to solicit the help of native plants will help you keep Phragmites in check and protect your investment.

Part II
TIPS FOR SPECIFIC LAND TYPES

This section includes guidance on *Phragmites* management with regards to specific land types. Both land ownership/jurisdiction and physical landform (e.g. moisture levels and vegetation structure) have implications for collaboration, the authorizations which may be required, methods, timing and ongoing management. This section should be used as a companion to Part I. Select the jurisdiction/ land type of most relevance to your project and follow the tips. There may be some overlap and opportunity for efficiency between land types, so you may wish to review the entirety of Part 2.

No Legal Advice. Nothing contained in the Ontario Phragmites Management Regional Plan Guidebook constitutes legal advice. Please consult the labels and/or safety date sheets for any precautions or instructions prior to implementing use of herbicides. All information, content, and materials contained herein are for general informational purposes only.

Roadside *Phragmites* (Mhairi McFarlane).

ROADS

This section includes all classes of managed roadways in Ontario. Many of these tips are aimed at public roads, however most are relevant to private and industrial (e.g. access roads for logging, mineral extraction etc) as well.

Considerations for undertaking roadside *Phragmites* management

Roadside *Phragmites* management is one of the most effective ways to make substantial progress towards making your region Phrag-free. Roads are a significant mode of spread for *Phragmites* that frequently lead into more sensitive habitats and areas not currently supporting *Phragmites*. Most regions will have roads falling under Local Municipal, Regional, Provincial (MTO) and Private jurisdictions: having all these partners collaborating as part of your Regional Working Group is critical to success. In northern Ontario, this should also include the agencies, corporations and licensees responsible for the maintenance and operation of resource access/logging roads. Roadside *Phragmites* is arguably the easiest of all populations to access, and is highly visible to the public. Roadside *Phragmites* is also a major spread vector, so managing it is a top priority.

As your Regional Working Group is planning, consider the following Tips:

- **Roadside infrastructure** may be impacted by *Phragmites* growth and can also have implications for management actions. Keep in mind infrastructure which may be obscured by *Phragmites* including hydro, telecommunications, road signs, watermains, catch basins and encroachment from adjacent lands.
- **Safety** of contractors undertaking management, and road users, is paramount. Sightlines may be restricted by *Phragmites*, dead stalks may be a fire hazard, and other road users may pose a hazard. Consult your local municipality or MTO regarding the need for a Traffic Control Plan. When working on Provincial highways, follow MTO guidelines (Ontario Traffic Manual Book 7).

Biological/other considerations

- *Phragmites* does not respect **property boundaries** and roadside patches often extend onto adjacent lands. Conduct mapping on both sides of the boundary to inform management programs (patches extending off road allowances may require additional permission, timeframes and authorizations) and share this information with the rest of the Regional Working Group. This may be particularly important in northern Ontario where adjacent land may be infrequently monitored and visited, allowing *Phragmites* to expand unchecked for years.
- Respect no spray zones and **sensitive adjacent land uses including** Source Water/ Wellhead protection areas. In cases where *Phragmites* is mapped on such properties, prioritize these landowners for education and awareness and appropriate management techniques.
- Standing dead *Phragmites* can be a fire hazard and may continue to impact sightlines. **Removal of these stalks (biomass)** may be important in such cases.

Integrating with other work and maintenance

- Although *Phragmites* management is always a multi-year activity, roadsides are particularly prone to frequent disturbance which makes them vulnerable to reinvasion. It is likely that investment in *Phragmites* management will need to be ongoing and therefore is best incorporated into regular roadside maintenance schedules. However, this investment is still worthwhile: the costs of doing nothing increases over time, and the likelihood of success decreases the longer *Phragmites* remains established.
- Schedule *Phragmites* management at least 1 year, preferably 2, prior to roadside maintenance work including ditching, regrading and other activities that may cause soil disturbance, such as activities led by other industries including hydro, communications infrastructure and maintenance etc.
- Standardize the use of clean equipment protocols (OIPC Clean Equipment Protocol) for all work, and mandate contractors such as utility industries to do so as well. See Appendix A for suggested language to include in maintenance contracts.

Engagement with First Nations and Indigenous communities

Meaningful and sustained relationship building and engagement with Indigenous communities and First Nations in the area is essential prior to embarking on any work and should be ongoing throughout.

Monitoring

Monitor *Phragmites* management activities the following year in late July for regrowth. Any regrowth should be added to the current season's management program. Managing regrowth is critical to achieving success; without this, *Phragmites* will re-establish rapidly to pre-management levels.

Public notification

Notification of the public is a requirement under the Pesticides Act when delivering management in areas accessible to the public. There are several methods of notification available including alternatives to individual property signage: Pesticide Act Alternative Notification.

UTILITY CORRIDORS AND INFRASTRUCTURE LANDS

This land type includes often relatively narrow, linear corridors associated with hydro lines, pipelines, and rail lines, but also associated yards, depots and working zones which may harbour *Phragmites*. Infrastructure lands may include, or pass very close to, ecologically-important natural lands, so see tips found in the Natural Areas section as well.

Considerations for undertaking *Phragmites* management on Utility Corridors and Infrastructure Lands

Similar to roads, *Phragmites* management along often linear, already regularly maintained infrastructure corridors may be relatively straightforward and contribute substantially to making your region Phrag-free. Infrastructure corridors are a significant mode of spread for *Phragmites* (and other invasive species) that frequently lead into more sensitive habitats and areas not currently supporting *Phragmites*. In northern Ontario, these lands are often leased, or include easements or other forms of tenure on Crown land; similarly in the south easements regularly cross private land. Including these landowners and the utility holders as part of your Regional Working Group is critical to success. You may need to give careful consideration regarding how to best engage large and/or province-wide (e.g. Hydro One) or national (e.g. CN and CP) corporations.

As your Regional Working Group is planning, consider the following Tips:

- **Associated infrastructure** may be impacted by *Phragmites* growth and can also have implications for management actions. Keep in mind infrastructure which may be obscured by *Phragmites* including: hydro, telecommunications, signs and signals, pipelines, catch basins and encroachment from adjacent lands.
- **Safety** of contractors undertaking management, and any other users, is paramount. Hydro corridors may be used recreationally by ATVs, horse riders, hikers, hunters etc. Sightlines may be restricted by *Phragmites*, dead stalks may be a fire hazard, and other users may pose a hazard.

Biological/other considerations

- *Phragmites* does not respect **property boundaries** and patches often extend onto adjacent lands. Conduct mapping on both sides of the boundary in order to inform management programs (patches extending off utility lands may require additional permission, timeframes and authorizations) and share this information with the rest of the Regional Working Group.
- Respect no spray zones and **sensitive adjacent land uses including** Source Water/Wellhead protection areas. In cases where *Phragmites* is mapped on such properties, prioritize these landowners for education and awareness and appropriate management techniques.
- Standing dead *Phragmites* can be a fire hazard; mowing or mulching of treated stalks may be beneficial.
- Removal of standing dead *Phragmites* should occur in the dormant season to avoid inadvertently impacting nesting birds during active seasons.
- Some corridor lands may support important biological values. Discuss strategies with your Working Group to protect and enhance these.

Integrating with other work and maintenance

- Although *Phragmites* management is always a multi-year activity, some utility lands are particularly prone to regular disturbance and unmonitored use which makes them vulnerable to reinvasion. The nature of *Phragmites* growth and establishment requires a significant upfront investment in management effort to get a population under control. This effort must be maintained for at least three consecutive years to achieve control after which monitoring may be incorporated into less frequent maintenance schedules. Particularly in northern Ontario, special focus should be given to where utility routes intersect with other utility routes and roads, as invasion is most likely in these areas.
- Engage with utility and rail companies to better understand regular maintenance and upgrade work, and schedule *Phragmites* management in conjunction.
- Where utility lands cross roads, prioritize *Phragmites* monitoring and management to prevent further infestation of nearby utility lands. If possible, take into account sensitive habitats that should be prioritized for protection from *Phragmites* invasion.
- Standardize the use of clean equipment protocols (OIPC Clean Equipment Protocol) for all work, and mandate contractors such as utility industries to do so as well. See Appendix A for suggested language to include in maintenance contracts.

Engagement with First Nations and Indigenous communities

Meaningful and sustained relationship building and engagement with Indigenous communities and First Nations in the area is essential prior to embarking on any work, and should be ongoing throughout.

Monitoring

Monitor *Phragmites* management activities the following year in late July for regrowth. Any regrowth should be added to the current season's management program. Managing regrowth is critical to achieving success; without this, *Phragmites* will re-establish rapidly to pre-management levels.

Public notification

Notification of the public is a requirement under the Pesticides Act when delivering management in areas accessible to the public. There are several methods of notification available including alternatives to individual property signage Pesticide Act Alternative Notification.

NATURAL AREAS

This section is aimed at the biological, physical and authorization considerations for *Phragmites* management in natural habitat, including forest, wetland, grassland. This is a very broad category of lands which fall under many jurisdictions, including Treaty Territories, municipal parks, conservation authority lands, Provincial and National Parks, Crown Land, ENGO conservation lands, etc.

Considerations for undertaking *Phragmites* management in Natural Areas

Phragmites is well understood to have serious negative impacts on natural areas and the species they support. This in turn impacts people via flooding, access to water for recreation, etc. Natural areas can be challenging to work in and support many biological values which need to be treated with caution. However, there have been many successful *Phragmites* management projects in diverse and sensitive natural areas, and as a result, there is a lot of collective expertise.

Biological considerations

- Considerable knowledge on managing *Phragmites* in natural lands already exists, including via the full suite of management techniques (herbicide use, cutting, spading, burning) outlined in the BMP.
- It is important to be aware that some habitat disturbance and even damage is necessary to manage *Phragmites* successfully. Every effort needs to be made to minimize habitat damage while keeping the long-term goals of *Phragmites* eradication in mind. This may require consistent, pro-active outreach and education of the public who may visit these lands. Concerned groups/individuals should ideally be engaged via the collaborative process in advance, but ongoing outreach to the public still important.
- Dynamic natural lands may always be subject to *Phragmites* invasion (e.g. areas subject to flooding, wind and ice scour, forest succession). In addition, the effects of insect and disease invasions and climate change on vegetation structure may have implications for *Phragmites* establishment (e.g. Emerald Ash Borer killing trees and resulting in open canopy conditions suitable for the establishment of *Phragmites* in formerly forested systems). This highlights the importance of regular monitoring and follow-up management.
- Indigenous people have constitutionally protected rights, and certain Indigenous communities may also have Treaty rights to the land. *Phragmites* may directly impact species of cultural significance, and some communities may be sensitive to *Phragmites* management techniques. *Phragmites* management may infringe upon Indigenous peoples' rights when conducted by non-Indigenous people.
- *Phragmites* does not respect **property boundaries** and patches often extend onto adjacent lands. Conduct mapping on both sides of the boundary in order to inform management programs and share this information with the rest of the Regional Working Group.
- Respect no spray zones and **sensitive adjacent land uses including** Source Water/ Wellhead protection areas. In cases where *Phragmites* is mapped on such properties, prioritize these landowners for education and awareness and appropriate management techniques.
- Standing dead *Phragmites* can be a fire hazard and may continue to impact sightlines. **Removal of these stalks (biomass)** may be important in such cases.

Integrating with other work and maintenance

- Although *Phragmites* management is always a multi-year activity, trails which are regularly used, particularly by motorized vehicles, may be more vulnerable to reinvasion. It is likely that investment in *Phragmites* management will need to be ongoing and therefore is best incorporated into regular monitoring and maintenance schedules.
- Natural areas which are subject to easements or right of ways by utilities and industrial sectors may be more prone to invasion and require more regular monitoring to maintain a Phrag-free state.
- Standardize the use of clean equipment protocols (OIPC Clean Equipment Protocol) for all work, and mandate contractors such as utility industries to do so as well. See Appendix A for suggested language to include in maintenance contracts.

Engagement with First Nations and Indigenous communities

Meaningful and sustained relationship building and engagement with Indigenous communities and First Nations in the area is essential prior to embarking on any work, and should be ongoing throughout.

Monitoring

Monitor *Phragmites* management activities the following year in late July for regrowth. Any regrowth should be added to the current season's management program. Managing regrowth is critical to achieving success; without this, *Phragmites* will re-establish rapidly to pre-management levels if re-treatment is overlooked.

Public Notification

- Visitors to natural areas may not be accustomed to seeing signs for herbicide use. Consider the need for proactive communications relating to management activities in advance. Temporary "trail closure" signs or other similar measures may be warranted to maintain public safety.
- Natural areas often have multiple access points that can be challenging to appropriately sign. Refer to the requirements for public notification in the Ontario Pesticide Act; Signs, requirement to post
- Natural areas may support homeless populations, so extra care and considerations may be required.

URBAN CENTRES AND PUBLIC LANDS

There are many different types of public land which may harbour *Phragmites* and be a priority for management. These include a mixture of municipal, provincial and federal jurisdictions, and may include public works yards, stormwater management ponds, landfills and transfer stations, unopened road allowances, ditches and agricultural drains, vacant lands and industrial sites, landscaped or green space associated with offices and public buildings, schools, hospitals, airports, military bases. Public lands may include ecologically-important natural lands, so see tips found in the Natural Areas section as well.

Considerations for undertaking *Phragmites* management on Public Lands

Phragmites populations may hinder access for day-to-day operations, including emergency vehicles and personnel (e.g. access to fire hydrants, signs, etc) and as such is a threat to public safety. Managing *Phragmites* on all of these sites, including small patches and single stems, is very important to becoming Phrag-free. These areas often see high traffic, with machinery and vehicles coming and going regularly, increasing the potential for moving *Phragmites* to other sites. For many of the same reasons, managing *Phragmites* on public lands may require extra caution to ensure the safety of people.

As your Regional Working Group is planning, consider the following Tips:

- **Infrastructure** may be impacted by *Phragmites* growth and can also have implications for management actions. Keep in mind infrastructure which may be obscured by *Phragmites* including: hydro, telecommunications, road signs, watermains, catch basins etc. Consider also encroachment from adjacent lands.
- **Safety** of equipment operators, and the general public, is paramount. Sightlines may be restricted by *Phragmites*, dead stalks may be a fire hazard, and other users may pose a hazard.

Biological/other considerations

- *Phragmites* does not respect **property boundaries** and patches often extend onto adjacent lands. Conduct mapping on both sides of the boundary in order to inform management programs (patches extending off public lands may require additional permission, timeframes and authorizations) and share this information with the rest of the Regional Working Group.
- Respect no spray zones and **sensitive adjacent land** uses including Source Water/ Wellhead protection areas. In cases where *Phragmites* is mapped on such properties, prioritize these landowners for education and awareness and appropriate management techniques.
- Work with public lands managers to identify the best timing for treatment at times that do not interfere with peak recreational or social activities/events occurring in the area.
- Standing dead *Phragmites* can be a fire hazard and may continue to impact sightlines. **Removal of these stalks (biomass)** may be important in such cases.

Integrating with other work and maintenance

- Although *Phragmites* management is always a multi-year activity, some areas are particularly prone to frequent disturbance which makes them vulnerable to reinvasion. It is likely that investment in *Phragmites* management will need to be ongoing and therefore is best incorporated into regular maintenance schedules where possible.
- Schedule *Phragmites* management at least 1 year, preferably 2, prior to significant maintenance work including ditching, regrading and other activities that may cause soil disturbance, such as activities led by other industries including hydro, communications infrastructure and maintenance etc.
- Standardize the use of clean equipment protocols (OIPC Clean Equipment Protocol) for all work, and mandate contractors such as utility industries to do so as well. See Appendix A for suggested language to include in maintenance contracts.

Engagement with First Nations and Indigenous communities

Meaningful and sustained relationship building and engagement with Indigenous communities and First Nations in the area is essential prior to embarking on any work, and should be ongoing throughout.

Monitoring

Monitor *Phragmites* management activities the following year in late July for regrowth. Any regrowth should be added to the current season's management program. Managing regrowth is critical to achieving success; without this, *Phragmites* will re-establish rapidly to pre-management levels.

Public notification

- Notification of the public is a requirement under the Pesticides Act when delivering herbicide management in public spaces. When using herbicides, signage at normal points of entry is required 48 h prior to spraying. Signs must remain for 24 h after application is complete. There are alternatives to individual property signage that may be used – for more information see Pesticide Act Alternative Notification.
- Further to the legal requirements of signage described above, it may be advisable to consider additional informational signs in heavily accessed public spaces to explain the need for *Phragmites* management and to offset public concerns.

PRIVATE LANDS (COMMERCIAL/INDUSTRIAL, AND RESIDENTIAL)

Private lands include commercial, agricultural, industrial, residential lands, and pits, quarries, gravel pits, mines. Landowners of private lands can vary greatly from site to site ranging from individual residents to large corporations. The landowner and land-use type should influence the discussion and approach used to initiate the conversation (i.e. the approach for a private hobby farm could vary greatly from discussion with a commercial quarry). In southern Ontario, this represents most of the landscape, therefore engaging these landowners/businesses/industries is critical to success. In Northern Ontario, the balance shifts, however private lands are still important to manage for *Phragmites*. Private lands may include ecologically important natural lands, so see tips found in the Natural Areas section as well.

Considerations for undertaking *Phragmites* management on Private Lands

Private lands abut every other land type, and in the spirit of managing the entire patch, their participation is crucial. Becoming Phrag-free requires managing *Phragmites* on both sides of the fence. Making substantial progress with private lands requires concerted public awareness and education which can be achieved by leveraging your Working Group.

As your Regional Working Group is planning, consider the following Tips:

- Private land is just that: private. Respecting the privacy of landowners is paramount, and it is important to constantly work hard at open and transparent relationship building as trust is easy to lose. One bad experience can spread quickly and turn other landowners away from the program. These sentiments can persist for decades.
- Every landowner and property is unique. Taking the time to understand their values and land use is crucial. Several one-on-one conversations are often required to build trust before management activities can occur.
- Dedicating a person to have these conversations and to share information about *Phragmites* management is necessary.
- Ask landowners about site specific restrictions. Collect data on preferred access points and timing, no-go areas and other considerations (organic farms, irrigation requirements, pets, business operations etc.) are necessary to inform management on the ground.
- Discuss in advance and throughout the process, who is doing what. Some landowners may wish to conduct some aspects of *Phragmites* management, while others may prefer experts to conduct the full suite of management activities. Ensuring understanding of the ongoing nature of *Phragmites* management and the need for repeat visits is important.
- Landowners appreciate advanced notice of when you may be visiting their property. Aim to do so at least a week prior and communicate if the plan changes.
- It is important to be upfront in all communications, in particular when you are initially advertising your project, as to how the work will be paid for. Offering complimentary *Phragmites* management services is likely to get the best participation rate.

Biological/other considerations

- *Phragmites* does not respect **property boundaries** and patches often extend onto adjacent lands. Conduct mapping on both sides of the boundary in order to inform management programs (patches extending off private lands may require additional permission, timeframes and authorizations) and share this information with the rest of the Regional Working Group. It is important to respect the different values of neighbours and be open to compromise.
- Respect no spray zones and **sensitive adjacent land uses including** Source Water/ Wellhead protection areas. In cases where *Phragmites* is mapped on such properties, prioritize these landowners for education and awareness and appropriate management techniques.
- Standing dead *Phragmites* can be a fire hazard and may continue to impact sightlines. **Removal of these stalks (biomass)** may be important in such cases.

Integrating with other work and maintenance

- Although *Phragmites* management is always a multi-year activity, some sites are particularly prone to frequent disturbance which makes them vulnerable to reinvasion. It is likely that investment in *Phragmites* management will need to be ongoing and therefore is best incorporated into regular maintenance schedules.
- Schedule *Phragmites* management at least 1 year, preferably 2, prior to maintenance work such as ditching, tile drain installation, regrading, vegetation management and other activities that may cause soil disturbance, including activities led by other industries e.g. hydro, communications infrastructure and maintenance etc.
- Standardize the use of clean equipment protocols (OIPC Clean Equipment Protocol) for all work, and mandate contractors such as utility industries to do so as well. See Appendix A for suggested language to include in maintenance contracts.

Engagement with First Nations and Indigenous communities

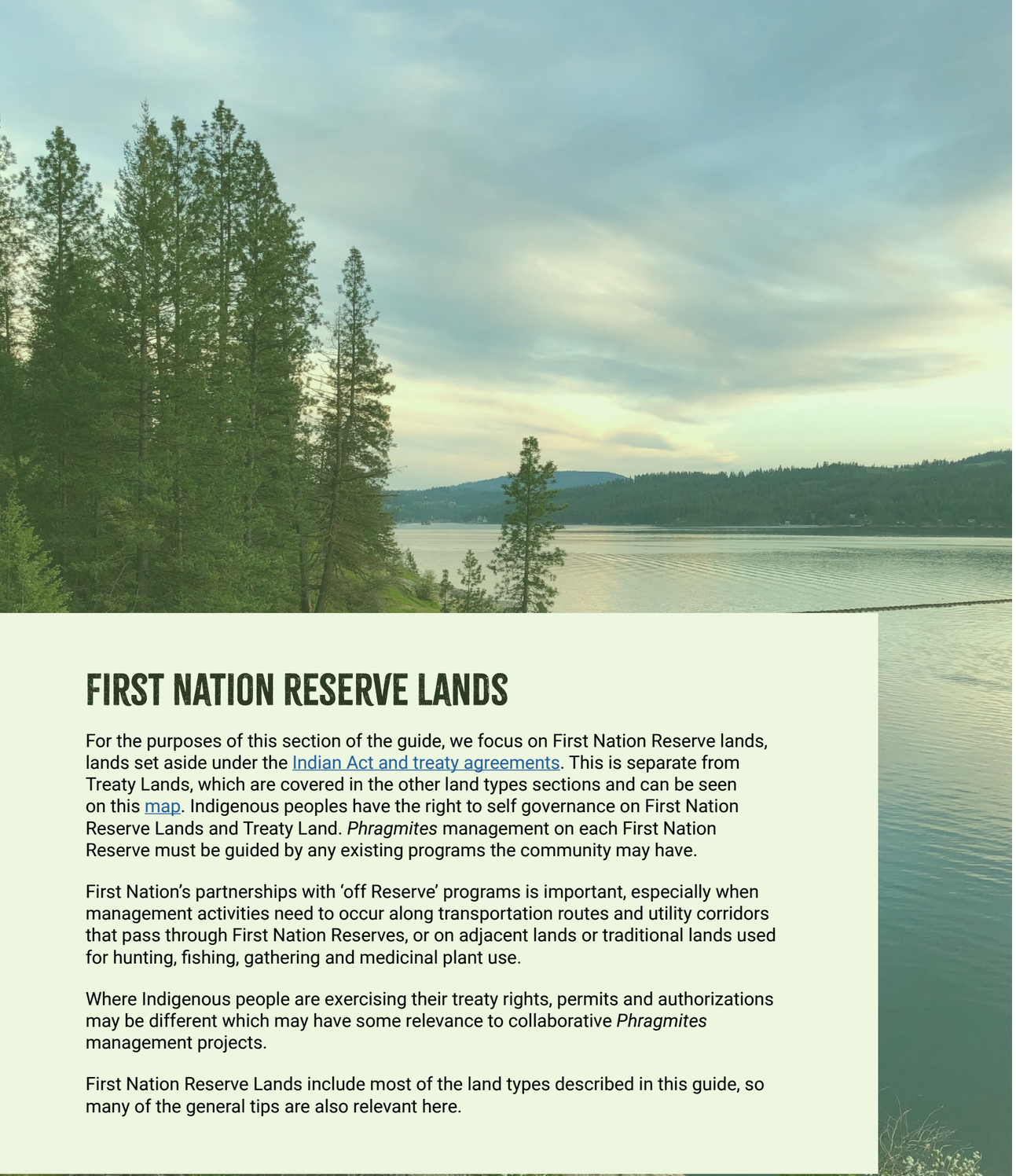
Meaningful and sustained relationship building and engagement with Indigenous communities and First Nations in the area is essential prior to embarking on any work, and should be ongoing throughout.

Monitoring

Monitor *Phragmites* management activities the following year in late July for regrowth. Any regrowth should be added to the current season's management program. Managing regrowth is critical to achieving success; without this, *Phragmites* will re-establish rapidly to pre-management levels.

Public notification

Notification of the public is a requirement under the Pesticides Act when delivering herbicide management in public spaces. This may apply where the public has access. When using herbicides, signage at normal points of entry is required 48 h prior to spraying. Signs must remain for 24 h after application is complete.



FIRST NATION RESERVE LANDS

For the purposes of this section of the guide, we focus on First Nation Reserve lands, lands set aside under the Indian Act and treaty agreements. This is separate from Treaty Lands, which are covered in the other land types sections and can be seen on this map. Indigenous peoples have the right to self governance on First Nation Reserve Lands and Treaty Land. *Phragmites* management on each First Nation Reserve must be guided by any existing programs the community may have.

First Nation's partnerships with 'off Reserve' programs is important, especially when management activities need to occur along transportation routes and utility corridors that pass through First Nation Reserves, or on adjacent lands or traditional lands used for hunting, fishing, gathering and medicinal plant use.

Where Indigenous people are exercising their treaty rights, permits and authorizations may be different which may have some relevance to collaborative *Phragmites* management projects.

First Nation Reserve Lands include most of the land types described in this guide, so many of the general tips are also relevant here.

Part III
EXAMPLE TEMPLATES

See below for suggested wording and layout for various *Phragmites* management-related documents. Adapt these to suit your own project.

APPLICATION FOR A LETTER OF OPINION

Discuss any projects with your local MNRF office to ensure letter of opinion is required. District offices can provide a template for letter of opinion applications if needed.

While much of this application is self-explanatory, below are some suggested wording templates (italicised text) for selected sections. **Replace all green text with project-specific information.**

Street address or legal description of the land/property that contains the application area(s):

If your project involves a small number of known sites, then this should be straightforward, however, if not, here is some suggested wording:

Application areas are not yet known. The [Proponent] will request written permission via consent and release forms from owners/managers of lands and private lands not owned by [Proponent] to conduct invasive species management using an Integrated Pest Management approach on their properties annually. Invasive species populations typically require a 'spot treatment' approach to reduce volume of herbicide applied and promote growth of surrounding native species (examples of management activities include spot treatment of Garlic mustard, basal bark application for woody invasives including European Black Alder, Autumn Olive, etc.). The release will provide permission to [Proponent] to collect GPS coordinates and collect legal property descriptions for control areas for tracking and program reporting purposes. Specific treatment sites/ locations will be submitted to MNRF annually. [Proponent] estimates that approximately [50 properties] will participate in the program annually.

A) If the purpose for which the pesticide is to be used is to control an invasive species that may be detrimental to the health of persons or the environment or economy of Ontario, please provide the following information:

- **The name(s) of the invasive species proposed for control**

[List species]
Note: some species listed above occur in aquatic environments. [Proponent] recognizes that herbicide application in aquatic environments require an Aquatic Extermination permit from MECP. A separate application to MECP for aquatic exterminations, if required, will be made independently. However, instances do occur where a species associated with aquatic environments may extend onto dry land or occur in areas where water levels fluctuate with seasonal change allowing for dry land application of herbicides. Application of herbicide for

management of these species, in circumstances where they occur in a dry land setting, will require support via Letter of Opinion.

Note: See Appendix D for details regarding herbicide use per species with applicable aquatic buffers. Label directions for terrestrial habitat buffers will be followed at all times during the validity of the Letter of Opinion.

- **A description of how this invasive species has impacted the health of persons or the environment or economy of Ontario (note: reference to information in the literature will suffice; e.g., Garlic Mustard impacts the biodiversity in the area as outlined in the Landowners Guide to Controlling Invasive Woodland Plants)**

Due to the variety of species being controlled there is also a variety of environmental, health, and economic impacts. Detailed impacts can be found in the Best Management Practices (BMP) guidelines found here: [Proponent to insert relevant link: ontarioinvasiveplants.ca/resources/best-management-practices/].

Generally, the species named for control in section (A) cause environmental impacts through displacement of native species due to unchecked growth, alterations of the surroundings that make the habitat unsuitable for native species and/or humans, and economic impacts through seeding into areas with alternative uses that require control to prevent interference with that use (e.g. growth of crops in farm fields, water drainage in drain ditches, etc.)

- **If proposing treatment of invasive species which is commonly found within or adjacent to wetlands and other aquatic features (e.g. Common Reed, Purple Loosestrife, Himalayan Balsam) please provide further description as to how the applicant or exterminator will ensure application of the pesticides occurs only on dry land**

All sites will be surveyed by [Proponent] prior to control with site characteristic information stored for future reference. Only sites considered to be dry will be controlled under this authorization. All buffers as outlined on the product labels will be adhered to when conducting applications near aquatic environments. A separate application to MECP for aquatic exterminations, if required, will be made independently.

Note: See [Appendix D Proponent to list specific products and the buffers listed on the product label] for details regarding herbicide use per species with applicable aquatic buffers. Label directions for terrestrial habitat buffers will be followed at all times during the validity of the Letter of Opinion.

[Note: The Letter of Opinion application is a requirement of the Pesticide Act. Pertaining to Section C, consideration for the impacts (potential or perceived) to SAR or their habitats will/may require consideration from MECP under the Endangered Species Act or any other applicable legislation.

B) If the purpose for which the pesticide is to be used is to protect or restore a rare ecosystem or its components, please provide the following information:

- **A description of the rare ecosystem or the ecosystem components to be protected or restored. Please include in this description the names of the species that would benefit from this proposal (e.g., the rare species, community, ecosystem or its components that will be restored)**

This control work will occur [Project Location] focusing on the conservation targets outlined under [Insert any relevant plan]. The land cover includes [describe landcover e.g. agriculture, forests, beaches and coastal dunes, tallgrass communities, and wetlands, all drained by anthropogenic ditches and natural streams that empty into…]. [Project Location] has retained much of its natural habitat due to a history steeped in conservation and stewardship initiatives spearheaded by private landowners, conservation authorities, not-for-profit organizations, and governments. These groups have come together to form a conservation community to address the threat of invasive species to preserve improve the ecosystems and habitats in the conserved natural areas within the

[Project Location].

Part 5 – Integrated Pest Management (IPM)

- **In accordance with O.Reg 63/09 please describe how Integrated Pest Management will be achieved through one or both of the following:**

  a) Will Best Management Practices be followed? Best Management Practice guides are available for many invasive species in Ontario here. Indicate the Best Management Practice document used:

Yes, BMP for invasive species control will be followed including OIPC Clean Equipment Protocol for Industry Use (Appendix C).

[Proponent] will follow the relevant BMP listed here: invasivespeciescentre.ca/invasive-species/invasive-species-resources/best-management-practices-database/#:~:text=The%20Best%20Management%20Practices%20(BMP,to%20help%20individuals%20and%20organizations for each species listed in Part 3, Section A.

[Proponent] has extensive experience conducting invasive species control. Herbicide application to control invasive species is conducted by trained biologist with the ability to identify native and non-native species to protect and conserve sensitive values. For Species without developed BMP's [Proponent] will follow all guiding principals, including:

- *Identification of the species to evaluate it's behaviour and life cycle. This information will be used to develop an appropriate management strategy including when to act and what techniques to use.*
- *Monitor the species to help further inform timing and locations for treatment*
- *Determine an action threshold. [Proponent] is conducting invasive management working with conservation partners. Partners will be assisting by providing information relevant to the points above and, working closely with [Proponent], identifying management needs to support conservation values.*
- *Determine the best management option. To determine the best management options consideration will be given to site characteristics, species behaviour and lifecycle, timing, and ability to minimize disturbance. Where possible [Proponent] will implement a variety of control measures including those not covered by a Letter of Opinion (LoO) (physical, or cultural control). With the purpose of the LoO in mind, chemical control will be used where it is the most practical, efficient and beneficial management method. Management will be followed with other beneficial management methods (i.e. physical cutting to remove dead biomass, etc.) where relevant for the species being managed.*

Evaluation of management activities will be done to determine effectiveness of management activities and retreatment needs.

AND/OR

b) Describe control measures by outlining how the unlisted Class B or C pesticide will be used in accordance with Integrated Pest Management (IPM) principles. IPM is an approach that considers all management options to control the invasive species effectively while minimizing adverse effects to the environment. Applying IPM principles can include activities such as monitoring the invasive species populations to inform appropriate treatment decisions, control methods previously used/tried, using a variety of control techniques – mechanical and biological, along with pesticides as necessary – to manage the invasive species in an effective manner, and evaluating effectiveness of the control techniques.

[Proponent] has been implementing invasive species control for [experience e.g. over a decade]. Many considerations are put in place to mitigate potential for impacts to species and to ensure an integrated program is being delivered. These include:

- *Assessment of site to determine appropriate control techniques that includes control history (e.g. should herbicides be used, should active ingredient be switched to avoid resistance buildup, is it possible to use a non-herbicide option, are there sensitive features that need to be avoided)*
- *Appropriate timing windows are followed (e.g. after most plants senesce, native fauna is staging for overwintering, most vulnerable time to control plant to ensure high efficacy and minimize need for follow-up control etc.)*
- *Trained high-quality biologist staff and contractors with excellent ID skills used solely*
- *Follow-up BMPs used where possible (e.g. winter rolling and prescribed burning to remove standing dead biomass and reset site for native vegetation re-colonization)*
- *Ongoing evaluative monitoring of site success and use of adaptive management to ensure continued positive outcomes for species and habitats occurs at every treatment site*
- ***If relevant, describe any follow up rehabilitation measures planned to ensure the species in question does not become re-established (e.g., planting of native vegetation).***

Once the initial treatments are complete, effective control will depend on the partners and landowners to maintain a watchful eye on the treated sites. Monitoring will identify areas for follow up treatment and detect re-establishment.

PUBLIC NOTICE OF PESTICIDE USE TEMPLATE

Replace all green text with project-specific information.

PUBLIC NOTICE OF PESTICIDE USE

[issuer of notice]

The [Proponent] intends to control invasive Phragmites [where e.g. along our rural roadside] under the exception to the cosmetic pesticide ban in subsection 7.1(2)(4) of the Pesticides Act for the promotion of public health and safety using [product name and active ingredient e.g. Roundup WeatherPRO Solution Water Soluble Herbicide, active ingredient: Glyphosate, 540 grams acid equivalent per litre, present as potassium salt, Pest Control Product (PCP) Registration Number: 33653 under Pest Control Products Act Canada,]

Pesticide use is scheduled to begin no sooner than [Month Day Year] and will be completed by [Month Day Year]. The commencement date is approximate and weather permitting.

This notice will also be posted [e.g. on website]

For further information please contact:

[Contact details of proponent or the applicator company contact?]

PESTICIDE ALTERNATIVE NOTIFICATION TEMPLATE

Replace all green text with project-specific information.

Director Under the Pesticides Act
Pesticides Management Section
Standards Development Branch
40 St. Clair Avenue West, 7th Floor
Toronto, ON M4V 1M2

Email: SDB-PesticideApproval@ontario.ca

Attention: *Director under the Pesticides Act*

The [Proponent] plans to control invasive Phragmites [where e.g. along our rural roadsides] and is requesting approval for alternative notification as the scope of work will require posting of more than 20 signs (O.Reg. 63/09, s. 79 (1)(a)). Pesticide products being used for this purpose include [list products e.g. Roundup WeatherPRO Solution Water Soluble Herbicide, active ingredient: Glyphosate, 540 grams acid equivalent per litre, present as potassium salt, Pest Control Product (PCP) Registration Number: 33653 under Pest Control Products Act Canada,

The [Proponent] would like to request approval for alternative notification method for non-residential area signs. Please find our advertisement enclosed for your approval which will be posted in the local newspapers at minimum 7 days in advance of the pesticide application.

[Proponent] will also post this notice on our website 7 days in advance of the pesticide application. The website address is, [website]

If you have any questions please contact me at [contact details].

Thank you for consideration of this request.

Sincerely,

CLEAN EQUIPMENT PROTOCOL INCORPORATED IN FEE FOR SERVICE CONTRACT

Including the Clean Equipment Protocol in all contracts is a key step to prevent the spread of *Phragmites*. This is important for contractors involved with *Phragmites* management as well, and should be integrated into the cost of management. As you work with contractors to obtain quotes and agree upon work to be done, you may want to draw their attention to the inclusion of the Clean Equipment Protocol early on in the process. Send it to them at the outset of the project, and in particular when seeking quotes. Make it clear that you expect their quote to include the cost of them implementing this protocol.

Example text for email, replace all green text with project-specific information:

Thanks CONTRACTOR NAME for speaking with me about potentially providing WORK DESCRIPTION services to the [Proponent]. One item that may be unique to [Proponent] as a client is our requirement around cleaning equipment to prevent the spread of invasive plants, diseases, insects and animals.

Please see the attached hand out on the equipment cleaning protocol that [Proponent] will require whenever equipment leaves or enters the properties where the services are planned to occur. This additional protection step is important to [Proponent] and its mandate to preserve the natural environment. We understand that there is time and costs associated with inspecting and cleaning equipment. Any agreement that [Proponent] signs for the proposed services will include a contractual requirement for the contractor to carry out the clean equipment protocol work described in the attached handout.

Accordingly please make sure any quotes or pricing estimates provided reflect the anticipated time and costs associated with fulfilling the steps outlined in the clean equipment protocol handout. If you have any questions don't hesitate to contact [Project Contact] to discuss".

Include the following language in your fee for service contracts to reference the Clean Equipment Protocol. Replace all green text with project-specific information:

CONTRACTOR OBLIGATIONS: *The Contractor, in providing the Services, undertakes to do and fulfill each of the following:*

Clean Equipment Protocol: *inspect and decontaminate equipment in accordance with the instructions described in the "Clean Equipment Protocol for Industry Summary" which is attached to this Agreement as Schedule B in order to prevent the spread of plant and animal invasive species onto or from one location / property to another.*

Work Restrictions: *The Contractor shall ensure the Services are provided in conformance with, but not limited to, the following restrictions, limitations and requirements:*

If applicable (Invasives transport prevention) Each and every time equipment or materials are brought onto or removed from the location(s) where the Services are provided they shall be inspected and decontaminated by the Contractor in accordance with the instructions described in the "Clean Equipment Protocol for Industry Summary" which is attached here as Schedule B.

Clean Equipment Protocol for Industry – Summary

Invasive species are plants, animals and microorganisms that have been accidentally or deliberately introduced into areas beyond their normal range, that out compete native species. Invasive species are a major threat to Ontario's natural areas, and are very costly to deal with once established.

Invasive species can be spread to new areas by contaminated mud, gravel, soil and plant materials on vehicles and machinery.

The best practice is to prevent the spread of invasive species. By inspecting and cleaning equipment and following some simple guidelines, the risk of spreading invasive plants is greatly reduced.

- Identify invasive plants and plan activities accordingly (i.e. schedule work in areas without invasive plants first, leaving infested areas til the end, to reduce the risk of unintentionally moving plants into a new area).
- Record & report sightings of invasive plants
  (Invading Species hotline at **1-800-563-7711** or online www.invadingspecies.com/report/ or www.eddmaps.org/Ontario)
- Inspect vehicles and machinery before and after entering sites or conducting work along roadways & waterways.

How to Inspect

Before leaving the site, inspect the vehicle thoroughly inside and out for where dirt, plant material and seeds may be lodged or stuck to interior and exterior surfaces. Remove and clean any guards, covers or plates that are easy to remove.

Pay attention to the underside of the vehicle, radiators, spare tires, foot wells and bumper bars. If clods of dirt, seed or other plant material are found, remove immediately and discard where the contamination occurred or in the garbage.

When Cleaning is required

- Safely locate the vehicle and equipment away from any hazards, ensure engine is off and the vehicle or equipment is immobilized.
- Clean the vehicle/equipment in an appropriate area where contamination and seed spread is not possible (or limited).

  The site should be:

  - Mud free, gravel covered hard surface, or, if this is not available, a well maintained grassy area.
  - Gently sloping to assist in draining water and material away from the vehicle or equipment. Care should be taken to ensure that localized erosion will not be created.
  - At least 30m away from any watercourse, water body and natural vegetation.
  - Large enough to allow for adequate movement of larger vehicles and equipment.

Continued...

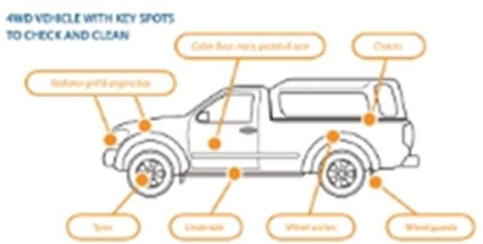
Equipment Required

- [ ] A pump and high pressure hose OR High pressure water unit
- [ ] Air compressor and blower OR Vacuum
- [ ] Shovel
- [ ] Pry bar
- [ ] Stiff brush or broom

Final Inspection Checklist

- [ ] No clods of dirt should be visible after cleaning.
- [ ] Radiators, grills and the interiors of vehicles should be free of accumulations of seed, soil, mud and plant material parts including seeds, roots, flowers, fruit and or stems.

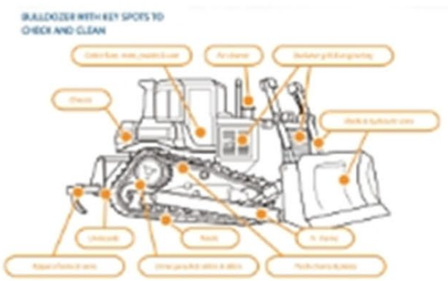
2WD and 4WD Vehicles



Excavator

Backhoe

Bulldozer



Invasive Species Centre
Catalyst for research and response

Ontario

Ontario Invasive Plant Council

Staff from Gerogian Bay Forever raising their cane cutters that are being used to cut *Phragmites* stalks (Georgian Bay Forever).

Green Shovels Collaborative
www.greenshovels.ca

GREEN SHOVELS COLLABORATIVE