Nonnative *Phragmites australis* plan development and evaluation

GUIDANCE DOCUMENT

2026

Great Lakes PHRAGMITES COLLABORATIVE

Great Lakes Commission des Grands Lacs

Great Lakes RESTORATION

ABOUT THE

Great Lakes *Phragmites* Collaborative

The Great Lakes *Phragmites* Collaborative (GLPC) is a network of agencies, organizations and residents who are engaged in nonnative *Phragmites* in some way, including management, research and communication. The Collaborative was established to reduce the spread and occurrence of *Phragmites* in the Great Lakes basin by improving management and research and enhancing communication and collaboration. The Collaborative also serves as a resource center for information on *Phragmites* biology, management, and research. We are led by a diverse Advisory Committee of binational *Phragmites* experts and a Core Team made up of Great Lakes Commission and US Geological Survey staff. The GLPC is organized according to the principles of Collective Impact.

Background

Nonnative *Phragmites australis* is a serious invader that has colonized over 60,000 acres of Great Lakes coastline and many inland areas. Control efforts are widespread, yet effectiveness may vary due to infestation level, application methods, environmental conditions, and other factors. The GLPC Advisory Committee, with support from the Core Team, released the Common Agenda in fall 2020. The Common Agenda is a shared understanding and an agreed-upon path for addressing invasive *Phragmites* in the Great Lakes basin.

The agenda sets goals, defines gaps and problem areas in management of *Phragmites*, and outlines the strategies collaborative members will use to fight invasive *Phragmites*. Several member strategies included in the Common Agenda focus on a need for consistent *Phragmites* management guidance, monitoring and reporting, and restoration efforts. To advance these member strategies and future outcomes, the GLPC has produced three separate guidance documents to help address these gaps. All guidance documents were created in consultation with GLPC staff, GLPC Advisory Committee members, and additional consulted experts.

How should these documents be used?

These three guides (Monitoring & Reporting, Program Development & Evaluation, and Restoration) are intended to be used together as a single resource (you will note that these documents frequently reference each other) to help managers tackle invasive *Phragmites* with access to the best resources currently available. The best practices for *Phragmites* management are constantly evolving, therefore, these are meant to be living documents and will be periodically updated as appropriate.

Note about funding

A critical aspect of all successful *Phragmites* management initiatives (including control, monitoring, and restoration) is long-term sustainable funding. Due to the biology of this invasive plant, specifically its substantial belowground rhizome (root) structure, multiple years of control are necessary to achieve local eradication or the desired impact mitigation. Further, there are multiple effective control techniques to manage *Phragmites*, all of which require substantial investments of time and resources to implement. As part of planning your comprehensive approach to *Phragmites* management, it is necessary to consider how the plan will be funded and how that funding will be sustained throughout the duration of the initiative.

Funding to address invasive *Phragmites* is available in many forms including federal, state, and local grants, philanthropic grants and awards, and in-kind support/ collaborations. It may be necessary to leverage multiple funding sources to support the entire breath and duration of the initiative. While we know that it can take five to seven years to locally eradicate a stand of *Phragmites*, funding opportunities are often limited to one- or two-year agreements, thus multiple cycles of grant funding may be required. Additionally, the scope of funding opportunities may limit the work that can be done. For example, the PAMF Active Adaptive Management Program is only able to support management and monitoring activities and does not include funding for post-control restoration. Therefore, it is essential to consider how each portion of a *Phragmites* management plan will be supported.

We would like to encourage funders of *Phragmites* management at all levels (federal, state, and local) to offer funding opportunities which allow for multi-year, comprehensive management projects that support post control monitoring and restoration activities in addition to *Phragmites* control.

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INTRODUCTION

The Great Lakes *Phragmites* Collaborative's staff and advisory committee developed this document, in consultation with experts, to provide present minimum best practice recommendations for *Phragmites* management planning. The document provides strategies, situations to consider, and recommendations to initiate, manage, and sustain a *Phragmites* management plan. However, it is not intended to be the definitive source detailing all aspects of an effective *Phragmites* management program and is intended for a broad audience. It is also important to note that there is not a one-size-fits-all plan that exists, especially when resources, time, and staff capacity vary from organization to organization.

This document is divided into seven topic areas: program mission; long-term funding; site selection; permit requirements and notifications; management support and engagement; post-treatment actions; establishing a monitoring protocol; and progress tracking and evaluation.

Definitions used in this document

- **Local management –** In this document, "local" refers to a management plan that addresses a specific geographic area, typically a city or town.
- **Management action –** Any type of *Phragmites* control effort (e.g., glyphosate, flooding, cutting, etc.).
- **Management area –** The area where you manage nonnative *Phragmites* in a uniform manner.
- **Management plan or program –** In this document, a management plan and program, although technically different, are often used interchangeably. A management plan is the formal written document that outlines the goals and strategies for controlling and/or managing an invasive species (e.g. *Phragmites australis*). Whereas a "program" is the group in charge of enacting the management plan. The recommendations in this guidance document apply to the creation of both.
- **Management scope –** The defined geographic or ecological extent to which you wish to manage *Phragmites*. Often, the scope of the project can be depicted by a basic map illustrating the applicable project area and a general text description.
- **Regional management –** In this document, "regional" refers to a management plan that addresses a larger geographic area, such as a state or province.
- **Stakeholder –** Those who have a personal stake in your desired management area. This can include individuals, organizations, or groups that are actively involved, or who are significantly impacted by the project or policy.

TOPIC

Program Mission

Overview of Recommendations

When first thinking about creating a *Phragmites* management plan or program, there can be a daunting number of factors to consider. To ensure the work stays on task, you should create a clear purpose and rationale for your plan, identify the key necessary stakeholders, and pick the scope of management (regional, statewide, local) you plan to address. Identifying the mission and scope early on will help guide the creation of the management plan, define key programmatic needs, and prevent work that is out of scope. Remember that your management plan should be treated as a living document and therefore can be updated and adjusted as factors like funding, timeline, and program goals change over time.

Recommendations

1

A *Phragmites* management plan should include a clear purpose and rationale for *Phragmites* management. This can be a high-level mission statement as to why *Phragmites* management in the intended area is required, and if warranted, you can add extra context, background, and goals that are project specific.

- The Invasive *Phragmites* Control at Long Point Region and Rondeau Provincial Park Implementation Plan is a great example of a management plan with a written purpose and rationale both at an overarching and project specific level.
- Reviewing what other organizations have done to address invasive *Phragmites* is a great way to get inspired and fine tune your management mission. "Appendix B: *Phragmites* Management Case Studies", which starts in page 31 of the Green Shovels Collaborative's *Phragmites* Summary Report has many organizational case studies from around Ontario.
- In the early stages of planning, you will also want to set a timeline for your management plan. Is this plan going to cover two years or ten? An exact end date may not be necessary, but a general idea of plan implementation timing will help guide other key components such as funding, monitoring intervals, resource needs, etc.



2 While in the initial stages of creating a *Phragmites* management plan, identify your key local stakeholder or plan "champion," as their involvement and commitment is needed for long-term implementation of the plan and ensure ongoing success. Example groups may be lake associations, counties, Cooperative Weed Management Areas/ Cooperative Invasive Species Management Areas, Resource Conservation and Development Councils, etc. Roles of the stakeholders and their level of commitment should be defined.

- If the plan includes control on private land, ensure landowners are included in the stakeholder consultation process.
- Consider a stakeholder survey to help identify stakeholders' wants and/or needs surrounding *Phragmites*, as this will help inform the plan's goals.

3 All management plans should be living documents that can be referenced over time. Topics in a *Phragmites* management plan, such as management goals, funding, timelines, etc., are likely to change and require updating. It may also be helpful for the project team to maintain a regular timeline or schedule a periodic review of the management plan to ensure it accurately reflects any adaptations.

- It is important to keep in mind that many control and management actions need advanced planning to acquire appropriate permits and authorizations. Revisiting and updating the plan's timeline will often be necessary. The Ontario *Phragmites* Management Regional Guidebook provides an example of a management timeline that serves as a good starting place.

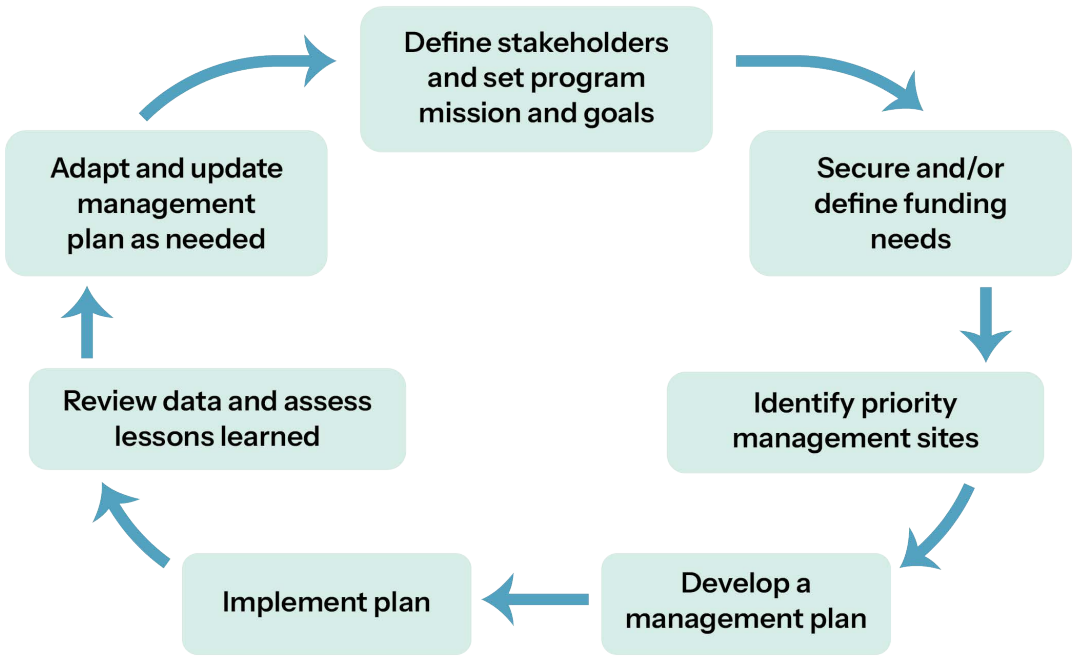


Figure 1. A visualization of how to think about and implement the management plan process. The key is that that is a management plan needs to be adaptable and often may have to be revised or adjusted for new circumstances.

4

Define the spatial scope of your *Phragmites* management plan. Understanding what scope of a *Phragmites* invasion your management plan will address is critical to the planning phase. The level of detail will likely change depending on whether the plan is for a specific area versus intended to be implemented across a region.

- A local management plan: Before writing a management plan for a specific area, you should have a general understanding of the geographic scope of the plant's invasion and spread. Knowing *generally* where *Phragmites* are located, how much of the area is infested, and the general density of invasion is a good start.
  - Other factors that may need to be considered are who owns the land that the *Phragmites* are on and the general hydrologic condition of the area. Even at a local scale, surrounding factors like how much of the landscape has been altered/hardscaped etc., can have management implications. Sites that are in water are likely going to need a very different management approach and have different restrictions than management sites on land.
  - Remember that factors like location and invasion density can change over time and even within seasons. While it is important to document where *Phragmites* are currently established, keeping the plan somewhat flexible, as the plant distribution changes overtime, can help prevent the plan from becoming outdated.
    - An example of a local-based management plan comes from section 4.1 of Invasive *Phragmites* management plan for the municipality of Lambton Shores, Ontario.
- A regional management plan: If your management plan is taking a more regional approach, factors such as exact *Phragmites* locations and invasion densities may be impractical to collect. Therefore, it will be helpful to review other regional plans (see below) to get a sense of what is a reasonable starting point.
  - An example of a regional program is documented in An assessment to support strategic, coordinated response to invasive *Phragmites* australis in Minnesota and Wisconsin's Aquatic Invasive Species Team *Phragmites* australis: A Statewide Management Strategy

5

When defining the scope of your management plan, make sure you have a reasonable understanding of how the work can be funded. Planning for management funding can be challenging, as access to funds is often variable and difficult to anticipate. How funding is reflected in the management plan will likely stem from one of two ways: resources and funding have already been made available for *Phragmites* management; therefore, a management plan is needed OR a management plan for *Phragmites* is necessary to make a case for funding.

- In both cases, an assessment of financial and staff resources will help guide realistic goals and timelines.
- While a lofty and detailed financial plan can be a good goal, it is important to remember that funding availability can quickly change, and a good management plan allows for flexibility based on changing resources (staff, funds, seasons, etc.).
- The University of Minnesota's "An assessment to support strategic, coordinated response to invasive *Phragmites* australis in Minnesota" includes a detailed Control Cost Estimation, which can be used as guidance when evaluating costs as part of your management plan.

TOPIC

Long-term Funding

Overview of Recommendations

Successful *Phragmites* control requires a long-term (three to 10+ year) investment. As part of the planning phase, it is critical to brainstorm how your management plan will be funded and identify what opportunities exist to fully leverage your funding resources. Acquiring funding for invasive species management can be difficult and finding long-term funding sources is even more so, which is why mapping out financial needs in advance is important to *Phragmites* management planning.

Recommendations

1

A *Phragmites* management plan should consider that long-term funding is often necessary to achieve standard management goals. *Phragmites* management requires years of consistency to achieve desired levels of control, and a good management plan should reflect the necessary timeline and associated funding. A multi-year management plan that has associated long-term funding will be more effective than short-term projects.

- Acquiring long-term funding for invasive species management can be frustrating, as many grant opportunities only provide funds for a single year. Start looking for grant opportunities early in the planning phase.

2

During management planning and implementation, take advantage of collaborative opportunities with stakeholders in the area. Partnering with organizations can be beneficial in several ways and help lighten the financial burden of management, especially if specialized equipment can be shared. Remember, *Phragmites* do not stop at regional and private boundaries, therefore collaborating with partners is often a win-win!

- While planning, investigate who else is managing invasive *Phragmites* in your region. Are there any opportunities for research institutions or universities to get involved? Can you work with your provincial, state, or municipal natural resources department to borrow equipment?
- It may be beneficial to look for opportunities with partners that may not be involved in direct management or control but would contribute to other tangential parts of a management plan, like outreach, research, etc.

3

When creating a management plan, consider a wide range of avenues for funding. Environmental grant opportunities are a common way to fund *Phragmites* management.

- Utilize databases like the Nature-based Solutions Funding Database, the U.S. Environmental Protection Agencies Clearinghouse for Environmental Finance, and the U.S. Department of Agriculture's National Invasive Species Center's Grants and Funding page to search for these grant opportunities
- For management sites in Canada, see the listed environmental grant opportunities on page 14 of the Ontario *Phragmites* Management Regional Plan Guidebook
- Check out the GLPC's Case Study Mapper to see how other regional organizations funded their work.



TOPIC

Site Selection

Overview of Recommendations

Identify and map high-priority areas that align with your management goals and be sure to choose site-specific *Phragmites* control techniques for best management results. Regularly reassess priority sites to ensure they align with current management objectives.

Recommendations

1 Identify and, if possible, map high-value and management priority areas that align with your program's mission and management plan goals. For example, is your goal to protect or increase ecological biodiversity? To protect culturally significant resources? To increase land value or improve aesthetics? Increase public access? Decrease pathways of further spread? After priority management areas are chosen to support your management goal(s), decide on what management/control technique is most suitable for that site. Different management areas are going to be conducive to different *Phragmites* control techniques, therefore a one-size-fits-all approach is often not appropriate.

- Like most aspects of a management plan, what management areas have been ranked as a priority should be revisited regularly to ensure they continue to align with current management goals.
- Criteria for priority sites is often going to differ between each organization. See examples of different site-selection decision-support tools in Appendix 1 that may be useful in guiding the prioritization process.
- When working through the site selection process, consider removing *Phragmites* populations near vectors of spread (e.g., along waterways, service or transport corridors, the sides of trails or roads where people or vehicles frequent), including, if possible, the location at which the *Phragmites* infestation originated. This can lessen further spread in your region and reduce the need for *Phragmites* management in the future.

2 Confirm that your management location is infested with invasive *Phragmites*. During the site selection phase, it is crucial that selected sites are confirmed as the invasive subspecies (*Phragmites australis* subsp. *australis*) rather than the North American native subspecies (*Phragmites australis* subsp. *americanus*).

- While the two subspecies look very similar, many identification resources exist online (https://www.greatlakesphragmites.net/phragbasics/native-vs-nonnative/). If necessary, consult an expert or have the plant genetically tested to confirm whether it is a native or invasive subspecies.
- *Phragmites*, especially early in the growing phase when the plant's seed head is not in full bloom, can closely resemble other grass species like reed canary grass or switch cane. Identification techniques, like examining the plant's ligules for hair fringe (see https://www.greatlakesphragmites.net/phragbasics/native-vs-nonnative/ for visuals) can help identify invasive *Phragmites* from other look-alike grass species.

TOPIC

Permit Requirements and Notification

Overview of Recommendations

A *Phragmites* management plan should include the necessary permits and authorizations based on local regulations. In some areas, consultation with Indigenous Nations is recommended and may be necessary to respect treaty rights. If herbicide is applied in public spaces, notifying the public and stakeholders also may be required. Additionally, the plan should consider environmental impacts, such as changes to hydrology or the risk of secondary invasive species colonizing treated areas.

Recommendations

1 A management plan should include the proper permit authorization for anticipated *Phragmites* management.

- The permits and authorizations required will vary depending on your location and jurisdiction. Work with your local regulating authorities to ensure compliance before any control/management actions are taken.
- Possible actions that may require permits or approved authorization include, but are not limited to: herbicide application, herbicide application on/near water, aerial herbicide application, prescribed fires, flooding, and earth moving.
- Depending on your location, there may be requirements to consult with Indigenous Nations to ensure the proposed management does not impede with treaty rights. It is best practice to include Indigenous Nations in any planning discussions if they have been identified as a rightsholder in or near the management area.



2 If your management plan includes applying herbicide in a public place, know if there is a public right to know regarding herbicide applications made to outdoor public places that are owned or controlled by public authorities. If this is not regulated within your jurisdiction, it may still be beneficial to notify the public and important stakeholder/rightsholder groups of upcoming management actions.

- The Ontario *Phragmites* Management Regional Plan Book has an example of a Public Notice of Pesticide Use template. While this template is written for Ontario, the layout can be modified to fit other jurisdictions.

3 Consider the holistic environment when determining specific and best treatment options for an area. For example, how will the planned management alter the area's hydrology? Are secondary invaders, like European frog-bit or flowering rush nearby that might invade the newly managed site?

- When applying your control measure, limit nontarget impacts to your management area. The Ontario Ministry of Natural Resources, Invasive *Phragmites* – Best Management Practices summarizes this concept well: "a detailed inventory of each site is strongly recommended prior to initiating control efforts to help ensure the proper control methods and timing are selected to minimize negative impacts to the system. The inventory should identify the flora present and wildlife usage so there are minimal impacts to them. Recreational usage and the presence of people and domestic animals around control sites should be minimized when herbicides are being used. The presence of Species at Risk flora or fauna at the site is a key consideration in control planning. There are a number of mitigation efforts that can be used to reduce potential harm to plant Species at Risk, including timing."



TOPIC

Management Support and Engagement

Overview of Recommendations

A collaborative approach can enhance the effectiveness and long-term success of a *Phragmites* management plan. This can include cost sharing with organizations or landowners, coordinating with adjacent municipalities, raising public awareness, and working with road authorities to address spread along transportation corridors. Engaging with Indigenous Nations early in the planning process is crucial, ensuring open communication and respect for treaty rights.

Recommendations

1

If possible, your management plan should take a collaborative approach to enhance management efficacy and long-term success. Collaboration and creating partnerships with other relevant organizations can have countless benefits to a *Phragmites* management project such as: increased regional perspective and implementation, potential cost-sharing, enhanced coordination, etc. There are many ways to utilize outside collaboration within your management plan. Listed here are just a few examples:

- If opportunities allow, consider cost sharing with other organizations or private landowners to allow others to contribute to the management plan in your region.
- Connect with adjacent landowners/town/counties, etc. for an increased regional coordination of *Phragmites* management.
- Increase public awareness of invasive *Phragmites* and your plan's goal through education with local groups, private and commercial landowners, Lake Association, etc. This may lead to volunteer interest.
- Collaborate with road municipalities in your area if roadways are a major vector of the spread of *Phragmites.*
- Seek inspiration from other *Phragmites* programs on how they have utilized partnerships to achieve management goals.

2

Engagement with Indigenous Nations should be an essential part of your management plan (location dependent). Engagement and open communication should start early in the planning and design phase, NOT once management is about to start/already taken place. The Ontario *Phragmites* Management Regional Plan Book includes tips for engagement with Indigenous partners. While this document is written with Canadian managers in mind, their advice and tips are relevant to managers in the United States.

Choosing Effective Control/Management Techniques

Overview of Recommendations

There are various management options for controlling invasive *Phragmites*, and selecting the right approach depends on site-specific factors and defined management goals. There are many great resources that already exist to help with the process of understanding what control technique is most suitable for your management sites.

Recommendations

1

When preparing your management plan, it will be critical to understand what control techniques are best suited for your specific management area. While there are many management and control options that address invasive *Phragmites*, this section highlights a few resources that may be helpful in deciding what control and management options (e.g., glyphosate application, prescribed burns, flooding, etc.) are best suited for your intended area of management. Different management areas are going to be conducive to different *Phragmites* control techniques; therefore, a site-specific management approach will be more effective than a one-size-fits-all approach.

- Decision trees, like the Decision Tree for Control of Common Reed (*Phragmites australis*) in Massachusetts, may be useful in determining the best management and control options for your intended site.
- If your management location is in one of the Great Lakes states or Ontario or Québec, considering joining the *Phragmites* Adaptive Management Framework (PAMF) to receive site-specific management guidance.
- The size of the management area will affect your management options and dictate what is realistically feasible to accomplish. The Invasive *Phragmites* best management practice technical document for land managers offers suggestions for how to approach the management of small (<1,000 plants) versus large (>1,000 plants) *Phragmites* populations.
- Reference the Ontario *Phragmites* Management Regional Plan Book for management tips that are geared for specific land types (i.e., roads, natural areas, urban centers, etc.).

2 When determining your management plan for invasive *Phragmites*, it will be important to consider the following factors: management area size, management area density, proximity to water, the cultural landscape, presence of desirable plants, habitat value, presence of wildlife including species at risk or endangered species, human activity in the area, and site accessibility.

- Ensure you have a good understanding of control tools that have limited efficacy on *Phragmites*. Some common invasive species management techniques such as excavating, grazing, tarping, cutting seed heads, and removing biomass (burning, cutting) offer variable success. The Ontario Invasive Plant Council *Phragmites* Best Management Practices Document has information of control methods that have proven effectiveness against invasive *Phragmites* and how/when they should be applied.
  - See Appendix 2 for documents and resources regarding the correct application of invasive *Phragmites* control techniques.

3 Lastly, when planning for *Phragmites* management, consider the principles of Integrated Pest Management (IPM). According to the U.S. Environmental Protection Agency, IPM is an effective and environmentally sensitive approach to pest (or in this case *Phragmites*) management that relies on a combination of commonsense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. Learn more about the principles of IPM here: https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles.



Post-treatment Decontamination

Overview of Recommendations

When managing invasive *Phragmites*, it is important that actions in the field are not perpetuating further spread of the species. Include comprehensive decontamination steps and protocols as part of your management plan.

Recommendations

1

Ensure that your management plan includes a decontamination protocol. All clothing, tools, and machinery should be properly cleaned and inspected to prevent spreading invasive *Phragmites.* An example protocol to follow is the "Clean Equipment Protocol for Industry" best management practices. Anyone visiting the management site(s), including contractors and those outside your organization, should also follow the stated decontamination procedures.

- See the Ontario *Phragmites* Management Regional Plan Book for an example of how to incorporate a clean equipment protocol in service contracts.
- In addition to a clean equipment protocol, if you plan to dispose of any of the plants off site, be aware of proper disposal methods for invasive species (see the Michigan Citizen's Guide to Invasive Plant Disposal as an example). Always refer to your local bylaws regarding proper disposal of invasive species.

tips

If sending *Phragmites* to a landfill, use thick, industrial-grade garbage bags to prevent stems from piercing the bag.

If appropriate, dried *Phragmites* can be safely incinerated, for example in burn barrels or fire pits, where local bylaws permit.

Composting *Phragmites* is not advised due to the potential spread of viable seeds in the process.

Establishing a Monitoring Plan

Overview of Recommendations

Monitoring is a crucial component in any invasive *Phragmites* management plan, as it helps track the effectiveness of control efforts, detect new invasions, and guide future management decisions. Regular monitoring allows for adaptive management, ensuring that strategies are adjusted based on changing conditions, identifying plant regrowth, or detecting new threats. It also helps optimize resource use by identifying priority areas for intervention and improving long-term success in controlling invasive species.

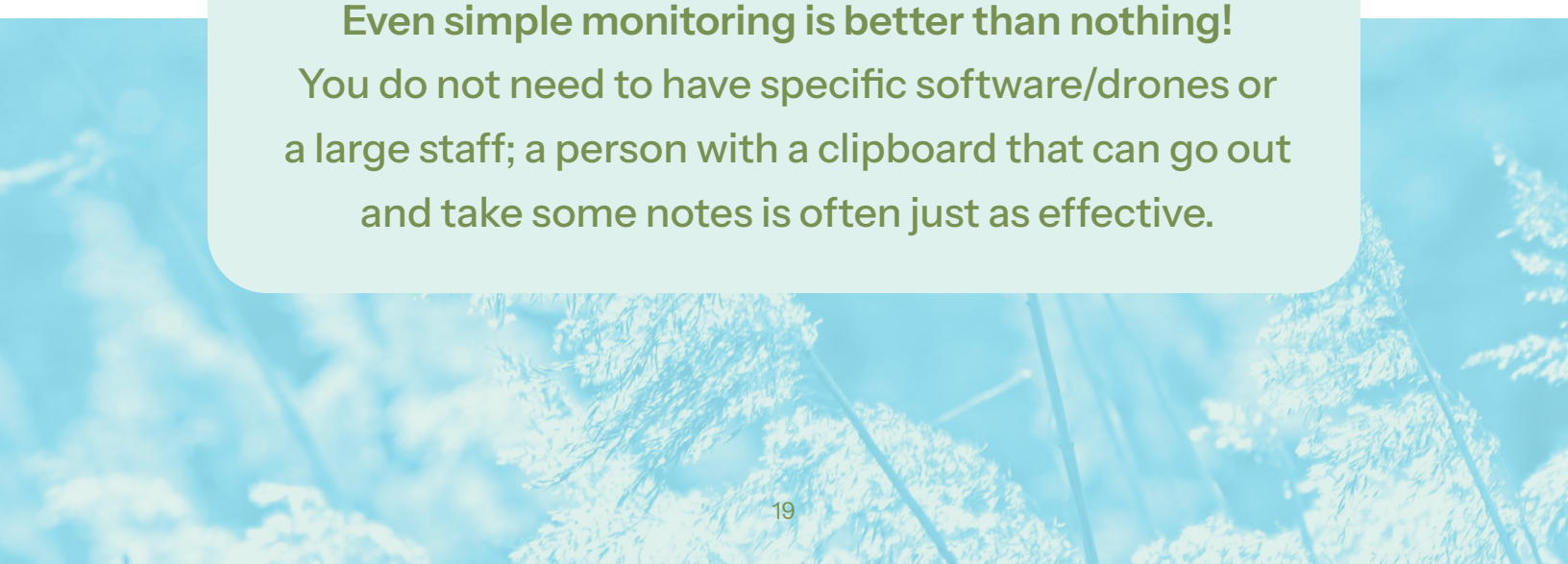
Recommendations

1. A *Phragmites* management plan should include a monitoring protocol that documents management results. See the GLPC's Monitoring and Reporting Guidance Document for details on creating an appropriate *Phragmites* monitoring protocol based on your management goal.

2. Ideally, a *Phragmites* management plan should include monitoring as a long-term strategy (rather than just before and after control). As stated in the GLPC's Monitoring and Reporting Guidance Document, to ensure *Phragmites* do not re-establish, monitoring should continue for at least five years post management (or three consecutive years of *Phragmites* absence).

tip

Even simple monitoring is better than nothing!
You do not need to have specific software/drones or a large staff; a person with a clipboard that can go out and take some notes is often just as effective.



TOPIC

Progress Tracking and Evaluation

Overview of Recommendations

Thorough documentation of control activities is essential for evaluating progress and success of a *Phragmites* management plan. Long-term tracking, such as using GIS mapping, photo logs, and data analysis, helps measure progress and guides future efforts. If eradication is not feasible, set realistic management goals based on site-specific priorities. Restoration should follow successful control efforts where needed. Management plans should remain adaptable, adjusting to new conditions and goals. Finally, sharing results through conferences, publications, or webinars helps improve regional *Phragmites* management and gain broader support.

Recommendations

1 To help with the evaluation of your management plan, always make sure you are documenting your control and management activities thoroughly. Documentation of activities should include the control methods (e.g., herbicide treatment, spading) and site preparation approaches (e.g., none, mowing) implemented, equipment used, herbicide formulation and rates used (if applicable), environmental conditions during implementation, dates of implementation, area managed, and difficulties encountered.

- Documentation of the resulting effects on targeted invasive *Phragmites* will be required for future assessments. More information on what pre/post treatment data should be collected and reported can be found in the GLPC's Monitoring and Reporting Guidance Document.

2 Ensure your *Phragmites* management plan includes a way to track program and management progress over time. Long-term tracking is a vital component in informing program progress and understanding whether your management actions are having the desired effect. There are numerous ways management progress can be tracked over time, the examples provided here are just a few:

- Utilize GIS software and high-resolution imagery (e.g., WorldView, aerial photos, RapidEye, or other source) to map *Phragmites* infestations in your program area and track progress over time. See the GLPC's Monitoring and Reporting Guidance Document's Utilizing Tools and Technology section for how aerial maps and imagery can be applied to track *Phragmites* invasion over time.
- A simple method to track progress is through the creation and maintenance of a photo log of management sites. Photo monitoring protocols from Association of Fish & Wildlife Agencies and Ash Meadows National Wildlife Refuge provide guidelines for an effective photo log.
- If applicable, analyze and evaluate monitoring data to understand management efficacy of the plan.

3

Once invasive *Phragmites* have been eliminated from a location, revegetation and restoration activities should begin. See the GLPC's Restoration Guidance Document for specific information on restoring previously invaded sites.

- If eradication is not possible, establish reasonable targets for *Phragmites* management outcomes. What is "reasonable" will vary greatly not only between organizations but between your desired management goals. For example, a 50% reduction in *Phragmites* density might be a reasonable end point for an area where the goal is to improve recreational access but not acceptable for an area where the management goal is habitat improvement for a threatened or endangered species.
- Remember: a good management plan is a living document! If full eradication was the original goal of the plan but now is no longer feasible, work to adjust the plan to reflect the current state of management.

4

Lastly, share your programmatic results widely to improve *Phragmites* management regionally and broaden support from scientists, funders, and the public. How this will look will vary from organization to organization but consider presenting at a relevant conference, publishing your program success in a journal, presenting a webinar, sharing management success in a newsletter, etc.

tip

Remember, always be prepared to adjust your *Phragmites* management plan! If trends over time are not going in a direction that aligns with the goal, adjustments to the plan may have to be made.

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Great Lakes PHRAGMITES COLLABORATIVE

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APPENDIX 1

Site-selection Decision Support Tools

- Rapid response for reed grass (*Phragmites australis*) in Massachusetts
    - See pages six and seven of this document for an example of site evaluation questions to consider and fillable matrix
- *Phragmites* Treatment/Management Prioritization Tool (Michigan DEQ/ EGLE)
- *Phragmites* Site Prioritization Tool (Ontario *Phragmites* Working Group)
- Invasive Plant Management Prioritization Tool (U.S. Fish and Wildlife Service)



APPENDIX 2

Tips for Effective *Phragmites* Control and Application

- Many control strategies rely on *Phragmites* being in a certain biological phase. See the document, Wisconsin's *Phragmites australis*: A Statewide Management Strategy and paragraphs "Biology" and "Timing" for helpful information on this topic.
- This document Invasive *Phragmites* (*Phragmites australis*) Best Management Practices in Ontario: Improving species at risk habitat through the management of Invasive *Phragmites* is an all-around great resource. It contains information on planning consideration and includes a detail description of the different management techniques and how they should be applied to specifically target invasive *Phragmites*.
- Another resource is A Guide to Control and Management of Invasive *Phragmites*. This resource includes recommended management strategies depending on site size, *Phragmites* density, and site hydrology.
- The Best Management Practice Technical Document for Land Managers includes timing and application advice for a variety of common invasive *Phragmites* control methods.
- The Great Lakes *Phragmites* Collaborative's website summarizes and links resources about different *Phragmites* management techniques.
- See the University of Minnesota's management recommendation summary for invasive *Phragmites,* which provides simple and concise set of actions that have been used to eliminate numerous sites of *Phragmites* within the state.
- "Attachment 1: Compilation of Treatment Protocols" from the document Comprehensive Invasive *Phragmites* Management Planning summarizes *Phragmites* treatment protocols gathered from the review of the peer reviewed and gray literature, relevant webinars and conferences attended, and discussion with managers and stakeholders.

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