Invasive Phragmites

(Phragmites australis)

Credit: Matt Smith, MNRF

Best Management Practice Technical Document for Land Managers

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- DISCLAIMER -

This document conveys information recommended by leading professionals across Ontario. It contains the most up-to-date information available at the time of publication. It is not intended to provide legal advice. It is subject to change as new information emerges, tools and techniques evolve or as legislation or permitting requirements change. Tailor the timing of control to your region.

The prevention and early detection of *Phragmites* is essential for an effective plant management strategy. Use this document after you have assessed your site(s) to help identify potential control options that are appropriate on your site. An Integrated Pest Management approach is strongly encouraged - which involves using a combination of control tactics (e.g. herbicide application, cutting, and prescribed burns). This technical bulletin is only a summary of practices - for more information on the biology and life cycle of this invasive plant, please refer to the **Ontario Invasive Plant Council's Best Management Practices document for Invasive *Phragmites***.

Strategy and Cautions

- Invasive *Phragmites australis* (herein called *Phragmites*) is regulated under Ontario's Invasive Species Act as a Restricted species.
- Preventing the spread and establishment of *Phragmites* is essential for long-term success. Early detection and rapid response is key.
- Remove the outlying populations (isolated plants or satellite populations) first to prevent further spread and treat smaller patches before they develop into larger patches.
- Small populations (< 1000 plants) in water and on land can be successfully controlled using selective cutting; this includes underwater cutting at the sediment level with a cane cutter or saw, and terrestrial cutting under the soil with a spade.
- Large, expansive populations (> 1000 plants) terrestrial or aquatic environments can be most effectively controlled using an approved systemic herbicide and/or cutting. Please note: In terrestrial environments, if only the spading method is being used, many years of consistent cutting is required for successful management.
- Apply herbicide late summer to early fall. Do not cut after viable seed heads have developed as this may facilitate spread. If cutting seed heads is the only option to control the spread of *Phragmites*, do so before they are viable in late summer.
- Targeting only a portion of a *Phragmites* cell with herbicide or cutting is not recommended as it can be ineffective, waste resources and over the long-term will increase the need for herbicide.
- Regardless of the control method, *Phragmites* management activities may disturb native plants, fish, wildlife and Species at Risk. To minimize potential impacts to these species and their habitats, control activities should be strategically timed to reduce disruption and threat to wildlife, and other mitigative actions should be taken. The **Ontario Invasive Plant Council's Best Management Practices document for Invasive *Phragmites*** provides some guidance on timing windows to consider.
- Confirm that *Phragmites* stands are of the invasive subspecies and not the desired native species (*Phragmites americanus*). Hybrids have not yet been described in Ontario but may be present. Consult the **Ontario Invasive Plant Council's Best Management Practices document for Invasive *Phragmites*** for identification information.

Invasive Species Centre | Ontario Invasive Plant Council

Management of Small Populations (<1000 plants) In Terrestrial Environments

Selective cutting to drown during the growing season is the most effective control option if the use of herbicides are not advisable. This method can be used where the site is accessible by walking, including wet areas. Sandy soil is easiest. In areas where *Phragmites* is growing in sand or other soft substrates, the stalk could be cut below the sediment surface at the point where it is attached to the rhizome. This is best done using a sharpened spade with minimal disturbance to the sediment and surrounding plants. Removal using this method is most effective when done between mid-July to mid- August before flowering occurs. Removal twice during this time reduces the density of the stalks more than one cut. Removal below the soil surface makes the area safe to walk on after the stalks are removed. Consult this **spading infographic** for more information. This method is most effective when done between mid-July to mid- August before flowering occurs, over a period of about five years.

Please note: This timeline depends upon the initial size of the infestation and site conditions (e.g. high-density sites in nutrient-rich soil will take longer to control). If cutting can only occur once, the best time is when the plant reaches peak height, just as the seed head emerges. If seed heads are present, carefully remove and dispose of them first.

Caution: Do not carry out work during fish spawning season or during the time of other critical fish life stages as set out in the **In-Work Timing Windows**. In addition, it is important to minimize the removal of native aquatic vegetation (e.g. wild rice).

Management Populations in Aquatic Environments

There is currently one pesticide approved to control *Phragmites* in or near water in Ontario (Habitat Aqua, PCPA Registration No. 32374), however, selective cutting to drown during the growing season is the most effective control option if herbicides are not advisable. Under flooded conditions, cutting may also cause drowning. First, remove and dispose of seed heads, if present. Use hand-held cutters, pruners, knives or sharp spades for smaller stands, larger cutters for medium stands, and a motorized cutting device for large stands. Reach down under the water and cut the stalk as close to the sediment as possible or even beneath it, ensuring the entire cut plant is still well covered with water. **Caution:** Cut stalks will be hazardous if stepped on. Use proper footwear. Depending upon water depths, this may need to be repeated throughout the growing season and for several consecutive years. If only one cut per year is feasible, cut mid-July to mid-August to prevent seed development. All cut stalks must be removed from the water to reduce further spread Consult this **Cut-to-Drown Infographic**.

Management of Large or High Density, Expansive Populations (>1000 plants) in Terrestrial or Aquatic Environments

Herbicide application combined with manual removal (such as cutting), either before or after treatment depending on the site, yields the strongest control results. The potential for drift may prohibit the use of certain pesticides near water. Consult the product label for more information.

Cutting before herbicide treatment:

Pre-herbicide removal of standing, dead stalks may be needed to allow the herbicide to contact fresh growth. Herbicides are likely to be more effective on plants at peak height because of more leaf surface area for the active ingredient to translocate to the root. Cutting, rolling and/or burning of the stalks should be conducted a minimum of four weeks (but preferably in the winter) prior to herbicide applications to allow for re-growth of leaves.

After herbicide treatment:

If required and appropriate, post-treatment cutting should not occur until at least three weeks after the herbicide has been applied, to give adequate time for the herbicide to be translocated into the below- ground structures. For some herbicide products, it is more effective to leave plants standing until fall. To remove the dead and dry stalks after herbicide application, cut, roll and/ or burn the stalks between early fall and early spring.

Consult the product label for more information.

Legislation and Permitting Requirements for Phragmites Management

Depending on the location, timing of work, and the type of management activity being used, permits, approvals or authorizations may be required from municipal, provincial or federal agencies before *Phragmites* control can be initiated. Land/vegetation managers are responsible for ensuring that these are obtained prior to proceeding with *Phragmites* control. Additionally, if protected species or habitats are present, an assessment of the potential effects of the control project and authorization could be required. Depending on the species and its location, applications should be directed to the appropriate authorities.

Legislation and Permitting Requirements for Phragmites Management (Continued)

The management of pesticides is a joint responsibility of the federal and provincial governments. The federal government, through the Pest Management Regulatory Agency (PMRA), is responsible for approving the registration of pesticides across Canada under the ***Pest Control Products Act***. Ontario regulates the sale, use, storage, transportation and disposal of pesticides including issuing licenses and permits under the ***Pesticides Act*** and ***Ontario Regulation 63/09***. Exceptions exist to allow the use of these herbicides for control of plants in terrestrial environments, such as *Phragmites*, that are detrimental to the environment, economy, agriculture and/or human health. To qualify for these exceptions specific criteria must be met and in some circumstances appropriate ministry approval is required (e.g. Letter of Opinion for the Natural Resources Exception from MECP or MNRF). For information on obtaining a license or a permit refer to Ministry of the Environment, Conservation and Parks website at www.ontario.ca/page/pesticide-licences-and-permits

Please consult the **Ontario Invasive Plant Council's *Phragmites* Best Management Practices** guide for a summary of some of the agencies that may need to be contacted prior to aquatic vegetation removal.

Table 1: Exceptions to the *Ontario Cosmetic Pesticides Ban* which may be applicable for control of invasive *Phragmites* in terrestrial environments.

Public health or safety:	The negative impacts that invasive *Phragmites* presents along roads and other transportation corridors include reduced and blocked sightlines, physical damage to asphalt roads from rhizomes, fire hazards from standing dead stalks, and blocked drainage ditches resulting in localized flooding.
Agricultural:	Invasive *Phragmites* encroaches on agricultural fields, impacting crop yields through the disruption of nutrient and water regimes. The roots and rhizome structures can grow dense and obstruct drainage channels, impede water flow, and interfere with or uproot drainage tiles. It also forms dense mats of vegetation in streams and ponds used for drinking water by livestock.
Natural resource:	Invasive *Phragmites* forms monocultures which crowd out native vegetation and hinder native wildlife from using the area or travelling through the area, resulting in a decrease in both plant and animal diversity.

For more information on these exceptions and applicable procedures, please refer to the **Ontario Invasive Plant Council's Best Management Practices document for *Phragmites***.

Herbicide Selection and Application

The herbicides registered for the control of *Phragmites* can change over time, both in terms of the available products and their use pattern. To ensure you have the most current label, and that the product is registered, consult the PMRA's pesticide label search tool, which can be found by searching "PMRA label search" in any major search engine. **Read the entire label before using and follow the label instructions. All applicable federal and pesticide legislation must be followed.** Applicators must observe the specified buffer zones for protection of sensitive aquatic habitats and be aware of the drift potential of the selected herbicide.

Professionals recommend using a glyphosate-based or imazapyr-based herbicide for which *Phragmites* is identified on the label. A tank mix of both products may be an additional consideration – for particularly dense/persistent populations in certain terrestrial environments (if allowed on the labels). The plants should reach at least 1.5 m in height and have sufficient leaf surface for the herbicide to be effective. Application of herbicide before mid- to late-August or early fall will generally kill plants before they are able to produce viable seed. Do not spray when temperatures are not ideal (below 4˚C and above 25˚C), since plant metabolism will be lower and the amount of active ingredient taken up by the plant will be significantly reduced. Do not break stems during treatment, as this would also prevent the herbicide from reaching the rhizomes. For plants over open water, only use the appropriate registered product. Herbicide application in sensitive habitats should be restricted to late summer through to early fall. This timing coincides with senescence of most native plants and reduced activity of native wildlife and species at risk and allows for the herbicide to be translocated into the root system. For more details refer to species timing windows before applying herbicides to reduce potential impacts on Species at Risk and native plants and wildlife. Herbicide application is most effective in late summer to early fall.

Herbicide Application in Terrestrial Environments

Table 2: Chemical control techniques recommended by experts to manage *Phragmites* stands in terrestrial environments

Chemical Control Method	Timing and Application
Foliar Glyphosate Terrestrial	Apply to plants in late summer or early fall. Allow a 3 or more week gap before cutting/burning, and follow up herbicide in 12 month if necessary. May need multiple treatments. First choice in natural environments. Use in non-aquatic areas, where no surface water is present.
Foliar Imazapyr Terrestrial	Treat in late summer or early fall when translocation of nutrients is directed towards the roots of the plants. Use in non-aquatic areas, where no surface water is present.

***Please read the label in full before use**

Glyphosate-based or imazapyr-based herbicides are not to be applied using the hand-wicking/wiping method. These are not approved methods in accordance with the pesticide label.

Herbicide Selection in Aquatic Environments

An imazapyr based herbicide (Habitat Aqua, PCPA Registration No. 32374) is registered for use in Canada which allows for the treatment of *Phragmites* in and around water. Note that only those with the appropriate aquatic pesticide exterminator license are permitted to use this product, and a permit may be required. Refer to the product label for more details.

Phragmites Treatment Times:

	J	F	M	A	M	J	J	A	S	O	N	D
Selective Cutting	J	F	M	A	M	J	J	A	S	O	N	D
*Herbicide Application	J	F	M	A	M	J	J	A	S	O	N	D

Optimum Treatment Times

Prohibited Treatment Times

***Note: The above treatment times for herbicide application must consider weather conditions.**

Disposal

Viable plant material must be solarized before disposal or sent to large-scale municipal composting facilities where the compost pile reaches temperatures high enough to kill living plant material. Ontario composting facilities are required to routinely monitor the compost process and meet strict, provincially regulated time-temperature parameters for pathogen kill. Consult your local municipality to determine if this is an appropriate course of action. Place material into thick, industrial-grade garbage bags (to prevent stems from piercing the bag) and tie securely, or pile cut stalks under a dark-coloured tarp, or dark plastic bag, and leave in the sun for 1-3 weeks until the material has dried or decayed and is no longer viable. Bags can then be sent to a municipal landfill that will accept invasive plant waste. Alternatively, dried *Phragmites* can be safely incinerated, for example in burn barrels or fire pits, where local bylaws permit. The cut plants that are removed should be piled on dry land to prevent it from re-entering the water.

Rehabilitation and Monitoring

In order to promote growth of native species, removal of the biomass is recommended. A long-term management and monitoring plan is imperative to achieve control success. Remove isolated populations as they appear. Revegetate the site with competitive native grasses, forbs and wood plants to resist future *Phragmites* invasions. *Phragmites* management areas which are very close to or among natural areas with native plant communities may require minimal or even no reseeding. However, sites in more disturbed and unnatural areas, far from native plant seed sources, are likely to require more extensive restoration. It can be beneficial to start reseeding with native annual species after the first treatment, even in cases where follow up treatment will be required. Native annual species can start filling the ecological niche being made available by Phrag removal and make the site more robust against *Phragmites* reinvasion, and invasion by secondary invasive species. Perennial native species can be added later in the treatment cycle when the majority of the *Phragmites* has been managed.