



## Marsh Invader!

*How to identify and combat one of  
Virginia's most invasive plants:  
**Phragmites.***



## Marsh invader

**Phragmites (*Phragmites australis*)** is a tall, perennial wetland grass found throughout the United States. Two varieties, one native and the other introduced from Europe, are found in Virginia. The non-native variety is an aggressive wetland invader that out-competes native plant species. It grows in dense single-species stands and forms a thick mat of roots and rhizomes, or underground stems. Phragmites spreads by seed and rhizomes.

Phragmites invades disturbed areas more readily than undisturbed sites. Both natural disturbances, such as storms and wave action, and human activities, such as soil exposure and vegetation removal, provide opportunities for invasion. Phragmites invades areas around docks, bridges and ditches. Once established, Phragmites often spreads rapidly and is difficult to remove.

To protect Virginia's wetlands from Phragmites, landowners must work with government agencies, nonprofit organizations, businesses and each other. This partnership will best control existing infestations and prevent further expansion.

## Threats

### **Phragmites:**

- Eliminates native plants by forming large, single-species stands.
- Reduces the amount and diversity of food sources available to wildlife.
- Increases the risk and intensity of wildfire.
- Obstructs views at waterfront properties.
- Blocks drainage and irrigation ditches and clogs drain fields.
- Slows water movement and increases mosquito breeding activity.



## Identification

Phragmites stems are green, rigid, one-quarter to one-half inch in diameter and often more than 12 feet tall. Its bluish-green leaves are 1 to 1.5 inches wide and up to 20 inches long. The leaves and stems turn tan in the fall. The dense, oval-shaped flowering plume takes on a purple-gray color as the cluster of flowers matures in July and August, later turning golden brown with a fluffy appearance. Phragmites typically grows in dense stands and forms a dense mat of roots and rhizomes ranging from one foot to several feet thick.

*Cover photo top: Steve Dewey, Utah State University, Bugwood.org*  
*Photo, top left: Richard Old, XID Services Inc, Bugwood.org*

## Distribution and abundance

Phragmites has become common in the coastal wetlands of Virginia. While preferring open conditions such as marshes and along waterways, it can also grow in disturbed or open, wet woodlands. It requires high soil moisture, so it often invades ditches, septic drainage fields and pond edges. It does not, however, tolerate continuous flooding by salt water.

Aerial mapping has helped document the abundance and distribution of Phragmites in Virginia. In 2007, DCR completed mapping that documented more than 3,000 acres of Phragmites on the Eastern Shore and 900 acres on the tidal Rappahannock River.

Mapped Phragmites can be viewed online by using the Virginia Phragmites Mapping Application, available on DCR's Natural Heritage Program website at [www.dcr.virginia.gov/natural\\_heritage/invspinfo.sbtml](http://www.dcr.virginia.gov/natural_heritage/invspinfo.sbtml).

## Prevention

One way to prevent invasion is to avoid soil disturbances or, if unavoidable, to quickly promote revegetation of the site. Native wetland shrubs can be planted, and the disturbed areas should be carefully monitored. At the first indication of a Phragmites invasion, control actions should be taken.

Soil and vegetation fragments should be cleaned from mowing equipment or other vehicles before moving from a site infested with Phragmites.

Early detection and control of new stands helps to prevent expansion. Phragmites is far easier to kill when the patch is smaller and younger. Less herbicide is needed because the root system is smaller and less established.



## Control methods

Both mechanical and chemical controls may be used to combat infestation. Mechanical control methods can be effective on smaller patches, but must be repeated many times and are labor intensive. Chemical controls have proven to be more effective. Following are various control methods.

***Mowing.*** Repeated mowing within a season and continued over several years can eventually deplete energy stored in the rhizomes and kill the plants. Equipment access and damage to wetland soils, however, constrain mowing for Phragmites control.

***Flooding.*** In settings where water levels can be controlled, such as ponds, ditches and impoundments, deep flooding can control Phragmites. To be effective, the rhizomes must be flooded continuously for four months during the growing season. Cutting combined with flooding with salt water also has been shown to kill Phragmites.

**Fire.** Fire in Phragmites stands clears away dead material and allows light to reach the soil, which encourages the germination of native wetland plants. Fire alone, however, actually invigorates Phragmites and promotes its spread. Prescribed fire as an intermediate step between two successive herbicide treatments can be effective. *Most landowners, however, should not use fire to control Phragmites because of the potential risk to life and property.*

**Biological control.** Scientists at Cornell University and the University of Florida are studying insects known to feed exclusively on Phragmites in Europe. This research is designed to predetermine the effects of releasing these insects in North America as a way to control Phragmites. Even if biological control methods are eventually discovered and approved, this technique is many years away from being available in the United States.

**Chemical control.** Chemical control, or the use of herbicides, is the most effective method for controlling extensive invasions of Phragmites. Several products have been approved by the Environmental Protection Agency for such control. These contain either of two active ingredients: glyphosate and imazapyr. *When using herbicides, federal law requires that all label instructions must carefully be followed.*

## Herbicides to control Phragmites

Glyphosate is a broad-spectrum, foliar-applied herbicide, meaning that it kills any green plant tissue it contacts. Glyphosate degrades rapidly in soil. Glyphosate-based herbicides are not “restricted use” and are readily available to the public. However, an aquatic formulation of glyphosate must be applied to Phragmites. Rodeo®, AquaNeat® and Glypro®, among others, are aquatic formulations.





Imazapyr also is a broad-spectrum, foliar-applied herbicide, but it does not kill many conifers (pines, red cedar), and some wetland shrubs (wax myrtle) appear to be resistant. Imazapyr remains active longer than glyphosate, although it breaks down rapidly in moist soil or water. The label states that only certified aquatic pesticide applicators may use imazapyr. A product called Habitat® is one formulation of this herbicide that is approved for use in wetlands to control Phragmites.

Imazapyr costs more per treated acre than glyphosate but seems to be more effective at controlling Phragmites, probably because of its slower degradation and soil activity.

## **Chemical control options**

Because it is impractical to treat areas much larger than one-tenth of an acre with backpack or hand-held sprayers, landowners wishing to control Phragmites should focus on smaller patches. Phragmites can be cut just above the ground with a power weed cutter in late spring or early summer when the plants are 5 to 6 feet tall. After the green re-growth is about three to four feet tall, it can be sprayed with a glyphosate-based herbicide.

Landowners treating areas up to one acre should consider using power-spray equipment with a long hose mounted on an all-terrain vehicle, pick-up truck or boat. For even larger areas, professional weed managers should be hired who, using commercial grade equipment, may treat up to about five acres using ground-based spray methods.

Aerial application generally becomes cost effective for areas greater than five acres. Cost comparisons for aerial vs. ground-based application should be made for treatment between 5 and 15 acres. It is recommended that landowners get several quotes from service providers for ground and aerial application methods. To lower costs, landowners interested in aerial herbicide application should partner with neighbors whenever possible.

## **Recommendations for specific settings**

### **Land between salt marshes and higher elevations**

Phragmites frequently becomes established in the zone between salt marshes and adjacent elevated lands. These areas are typically difficult to access from land or water. Aerial spraying is often the most feasible treatment in this situation. If the higher land is a lawn or is being farmed, mowing or ground-based spraying are options when the soils can safely support equipment.





## **Agricultural fields and lawns**

Fields and lawns next to wetlands are frequently invaded by Phragmites in part because of ongoing soil disturbances and fertilization. Low, wet areas of farm fields are most likely to become infested. Cessation of cropping practices for even one year can result in rapid spread of Phragmites into farm fields, especially along edges. Mowing, herbicides, and tillage all provide some control, and establishing winter cover crops can also help to prevent Phragmites infestation.

## **Boat docks and boardwalks**

When soils are disturbed and vegetation is removed during and after construction and maintenance, areas around docks and boardwalks may become infested with Phragmites. The tall, dense nature of the plant often obscures the view from these structures

or makes them difficult to access. Rapid response with cutting equipment, herbicide treatments or both helps keep a new infestation from becoming too large, making it difficult and expensive to control.

## **Rights-of-way**

Phragmites also frequently invades rights-of-way crossing wet areas. Maintenance activities, such as mowing, disturb soils and facilitates invasion. In these settings, herbicide treatment is another method that can work.

## **Impoundments, ponds, ditches**

Where water levels can be controlled, lowering the water level, then cutting or burning Phragmites, and then flooding the area can reduce Phragmites. Submerging rhizomes for four months during the growing season is key to reducing the plant's abundance. Mowing and flooding the area with salt water is another method that can work. *As stated on the product label, Phragmites in irrigation ponds may not be treated with herbicides containing imazapyr.*

## **Coastal pine forests**

Pine forests on low-elevation wet sites near tidal waters are frequently invaded by Phragmites. Establishment of the plant in such settings is likely to occur after trees are harvested and soils have been disturbed, and following coastal storms. Ground-based or aerial application of an imazapyr-based herbicide is recommended, perhaps along with treatments that control other unwanted plants. Herbicides containing imazapyr do not impact pines and are commonly used in forest management.

## Assistance

For more information about Phragmites, visit the DCR Natural Heritage Program website at [www.dcr.virginia.gov/natural\\_heritage](http://www.dcr.virginia.gov/natural_heritage) or call (804) 786-7951.

Contact the nearest Natural Resources Conservation Service office to learn about possible federal cost-share funds for controlling Phragmites.

To learn more about invasive species, visit the Virginia Invasive Species Working Group website at: [www.vainvasivespecies.org](http://www.vainvasivespecies.org).

To take action, form a community Phragmites action group. Phragmites is best controlled by neighbors joining together, pooling resources and hiring weed management professionals.

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