

## Chapter 13.9: Phragmites—Common Reed

*Phragmites australis* (Cav.) Trin. Ex Steud.; emergent plant in the Poaceae (grass) family  
Derived from *phragma* (Greek: fence) and *australis* (Latin: southern)  
"southern plant with fence-like growth"

Invasive variety probably introduced from Europe to the Atlantic Coast in the late 1800s (Non-invasive varieties are native)

Present throughout all states in the continental US

### Introduction and spread

Phragmites (also called common reed) is a wetland species that grows from a thick, white, hollow root (rhizome) system buried deep in the substrate in areas with fresh to brackish water. The species is distributed in temperate zones throughout the world and can be found on every continent except Antarctica. Phragmites is widely distributed in North America, occurring in all US states except

Alaska, and in all Canadian provinces and territories except Nunavut and Yukon. Phragmites has been widespread in the northeastern US for many years and is currently spreading west into the Great Plains. Nebraska has initiated a multi-million dollar control program on the Platte River, where growth of phragmites is totally altering the aquatic ecosystem and causing problems for endangered birds (Chapter 4). There are many distinct genotypes (varieties) of phragmites, including at least two native varieties and a nonnative variety from Europe that is



much more invasive than native varieties. The European variety was probably introduced to the Atlantic Coast in the late 1800s and has expanded its range throughout North America, most notably along the Atlantic Coast and in the Great Lakes area. The European variety has replaced native plants in New England and has become established in the southeastern US, where native phragmites has historically not occurred or has been present only in small populations. European phragmites sprouts, survives and grows better in fresh and saline environments than native phragmites. The species has been called an "ecosystem engineer" because numerous changes can occur when phragmites invades an area and replaces other vegetation. Large monotypic (single-variety) stands of European

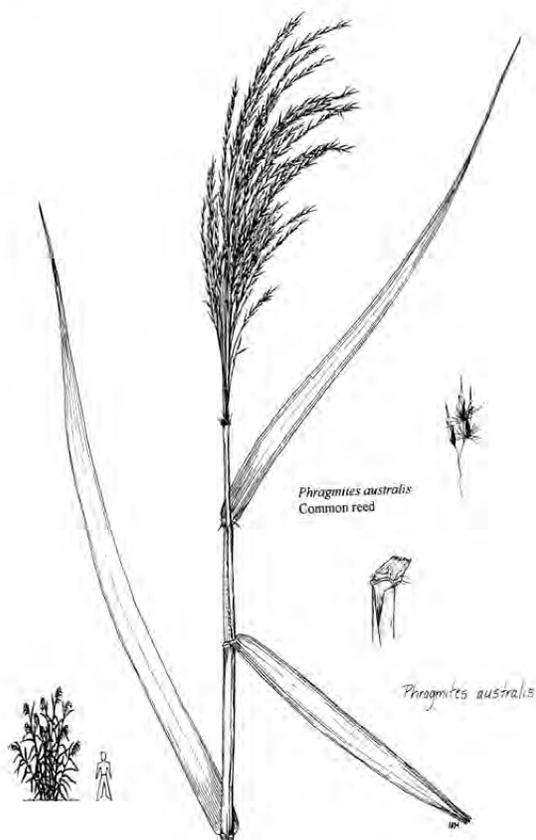
phragmites are associated with decreased plant diversity. In addition, soil properties, sedimentation rates, bird and fish habitat use and food webs may be altered when marshes are converted from diverse plant communities to dense, monotypic stands of phragmites.

Phragmites is most common on wet, muddy or flooded areas around ponds, marshes, lakes, springs, irrigation ditches and other waterways. The species persists during seasonal drought as well as frequent, prolonged flooding. Phragmites tolerates brackish and saline conditions, and the invasive European variety is better adapted to areas with higher salinity than are native varieties. The species grows best in sites with fresh to low brackish water (0 to 5,000 parts per million salinity), but can reportedly survive in areas with salinities equal to full strength ocean water (35,000 parts per million). Phragmites establishes and grows well on disturbed sites and is often considered a weedy or nuisance species. The species rapidly colonizes and forms monotypic populations in disturbed areas, but is slower to colonize and dominate in diverse vegetated wetlands. Phragmites grows best in full sun and is intolerant of shade.

### Description of the species

Phragmites is a robust perennial grass that may reach 20 feet tall, but generally reaches a height of 10 to 12 feet. Maximum height is usually attained when plants are 5 to 8 years old. Phragmites spreads

primarily by vegetative means via stolons and rhizomes and produces dense monotypic stands of clones, or plants that are genetically identical to one another. Clones are long-lived and can reportedly persist for over 1,000 years. Phragmites produces stout, erect, hollow above-ground stems from rhizomes that persist when stems and leaves die back during winter. Stems are usually unbranched and bear leaves that are arranged in an alternate manner along the top half of the stem. Leaf blades are blue-green to green in color and have margins that are somewhat rough. Leaves are flat at maturity and measure 4 to 20 inches long and 0.4 to 2 inches wide.



### Reproduction

Phragmites reproduces sexually from seed, but most growth is from stolons (creeping aboveground stems) and rhizomes (underground stems). Stolons can grow to greater than 40 feet in length and are typically produced when water availability is low. Rhizome production and vegetative spread can be extensive and allow the

species to spread into sites unsuitable for establishment from seeds. The species is often dispersed through the transport of rhizome fragments and the movement of soil or sod. Phragmites flowers are produced during mid-summer to fall and are borne in a large, feathery seed head that is 6 to 20" long. Seeds are dispersed by wind and water.

### Problems associated with phragmites

Phragmites forms large monotypic stands that are virtually impenetrable. These stands replace diverse native plant communities and reduce plant, fish, bird and wildlife ecosystem productivity and diversity. However, phragmites does provide minor shade, nesting and cover habitat for mammals, waterfowl, song birds and fishes. Phragmites provides food as well as nesting, roosting and hunting habitats to a wide variety of bird species, including ducks. In addition, waterfowl, pheasants and rabbits use the margins of stands of phragmites as cover to hide from predators. Some reports suggest that immature plants are readily eaten by goats, cattle and horses, but the species is not considered a high-value or highly palatable food for livestock or wildlife when plants are mature.

Habitat use by fish, crustaceans and other aquatic invertebrates can be affected by dense growth of phragmites. For example, small fish and crustaceans prefer habitats with smooth cordgrass (a shorter and less dense native species) to those with infestations of phragmites, and populations of aquatic invertebrates are generally highest in areas with other native vegetation such as cattail. Also, several studies report that marshes dominated by phragmites provide less suitable habitat for larvae and small juvenile forms of mud minnow.

### Management options

As with any invasive aquatic plant, preventing the establishment of phragmites is the best available option. This can be challenging because native and European phragmites are almost indistinguishable from one another and identification of the varieties of phragmites can only be done by experts. The range of the invasive European variety of phragmites appears to have been expanded by the movement of equipment used in ditching, drainage and dredging operations. Inspection and cleaning of equipment should be part of the operator's general protocol before moving equipment into new areas to prevent the dispersal of any aquatic invasive plants, but particularly invasive varieties of phragmites.

The use of chemical, mechanical, physical and integrated control methods are acceptable tools for the control of phragmites. There are native populations of phragmites in some areas and managers may wish to go to the expense of determining whether their populations are native plants or the invasive European variety before treating the area. Positive identification of the invasive variety requires the use of genetic tools and DNA analyses, which are currently not readily available to the public. It may be desirable to maintain and encourage populations of native phragmites while discouraging populations of the invasive European variety. For example, phragmites can be useful for erosion prevention and bank stabilization and can actually increase the elevation of some areas by trapping sediments and building "land" from decomposed plant material and root mat formation each winter. Integrated management that employs multiple control methods may lead to the most efficient and economical control plan. Mechanical (Chapter 7) and physical (Chapter 6) controls (primarily mowing and burning) have been utilized for many years, but have provided varying degrees of success and usually result in temporary control at best. There are no biological control options available to control phragmites, although large herbivores such as goats have been used to control phragmites along the Platte River in Nebraska. In addition, herbicide control options are few and only recently have new herbicides that provide medium- to long-term control been identified and registered.

Because phragmites is an emergent plant that does not grow in deep water, some control has been noted in areas that are dredged to deepen the body of water to a minimum of five to six feet. This

deepening removes plants and their rhizome systems and offers long term control. However, deepening is very expensive and eliminates desirable native plants as well. In addition, the permitting required to employ this control measure is tedious and difficult.

Burning – either alone or in combination with deep flooding or herbicides – has provided some level of success in some areas. Burning alone offers only a short-term solution, especially in wet areas, because this method does not effectively control the rhizome system and can actually stimulate rhizome growth that benefits from nutrients released during burning. A multi-stage process of burning followed by deep flooding or herbicide application after plants begin to regrow has been more successful. However, parameters such as the optimum depth of flooding required and the best stage of plant growth before herbicides can be applied are unclear. Also, the use of fire to control phragmites has become impractical in many locations and permits are sometimes difficult to obtain.



Managers of some impounded areas have flooded impoundments with high-salinity water and maintained flood conditions for an extended period of time. Partial control has been obtained using this method, but a minimum of half-strength seawater (18,000 parts per million) or higher is required. The use of high-salinity flooding is extremely site-specific. Also, the invasive European variety of phragmites is more tolerant of high salinity than are native phragmites.

No purposeful introductions of insects, pathogens or diseases have been attempted to control European or native phragmites to date. Several nonnative insect species have been accidentally brought into the country with European phragmites when it was used as packing material in shipments, but these do not appear to be viable biocontrol candidates. Livestock grazing (e.g., goats, cattle and horses) on young plants of phragmites reportedly provides some control of the species. However, the nutritional value of phragmites is only fair

and the logistical and health aspects associated with managing livestock in marshy, wetland situations is extremely site-specific and generally impractical.

Herbicides currently labeled for control of phragmites in aquatic habitats are the systemic herbicides glyphosate, imazamox, imazapyr and triclopyr. Glyphosate and imazapyr are broad-spectrum herbicides that control both grasses and broadleaf plants, whereas imazamox and triclopyr are selective and cause damage only to certain groups of plants. The criteria for herbicide selection are site-specific and dependent on environmental conditions, growth stage of the plant, presence of

desirable nontarget plant species in the area and alternate uses of the water such as drinking and irrigation (Chapter 11).

Several general application recommendations apply for any herbicide selected. The area to be treated should be drained if possible to allow the herbicide to contact as much of the plant as possible. Also, the maximum volume of water recommended on the label should be used for herbicide applications to ensure complete coverage of all leaves and stems. Deeply flooded areas should be treated at the highest herbicide rates allowed on the label. Because phragmites occurs in large, poorly accessible, expansive areas, aerial applications may offer the most efficient and economical method of application. Additional aerial application restrictions according to the specific herbicide labels must be followed.

Backpack sprayers can be used for small infestations and spot treatments. Plants should be carefully sprayed to wet, but runoff should be avoided. Herbicide labels list more specific instructions on herbicide mixing and use.

### Summary

Phragmites is a widely distributed wetland species with both non-invasive native varieties and an invasive European variety in the US. The European variety has replaced native plants in New England and has become established in the southeastern US, where native phragmites has historically not occurred. The European variety of phragmites is more competitive than native varieties and sprouts, survives and grows better in fresh and saline environments than native phragmites. The invasive nature of European phragmites results in large monotypic populations of the species, which are associated with decreased plant diversity and changes to the ecosystem that include alterations of soil properties, sedimentation rates, bird and fish habitat use and food webs. A variety of methods can be used to provide varying levels of control of invasive phragmites and the greatest success is realized when a number of different methods are employed in an integrated program. However, control of the invasive European variety of phragmites is made more challenging by the presence of the native non-invasive varieties, which can be a desirable part of aquatic ecosystems.

### For more information:

- Common reed management. Texas A & M University. Texas Agrilife Extension Service.  
[http://aquaplant.tamu.edu/database/emergent\\_plants/common\\_reed\\_mgmt.htm](http://aquaplant.tamu.edu/database/emergent_plants/common_reed_mgmt.htm)
- Common reed: *Phragmites australis*. University of Florida Center for Aquatic and Invasive Plants.  
<http://plants.ifas.ufl.edu/node/323>
- Environmental assessment for control of *Phragmites australis* in South Carolina. US Army Corps of Engineers.  
[http://www.sac.usace.army.mil/assets/pdf/environmental/Final\\_Phragmites\\_EA.pdf](http://www.sac.usace.army.mil/assets/pdf/environmental/Final_Phragmites_EA.pdf)
- Phragmites australis*. United States Department of Agriculture – US Forest Service.  
<http://www.fs.fed.us/database/feis/plants/graminoid/phraus/all.html>

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