

PHRAGMITES – INVASION OF THE COMMON REED

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You may have noticed stands of tall green reeds growing in our area along shorelines, in wetlands, inland marshes, ditches, and alongside roads. *Phragmites australis* is a perennial grass growing 6-15 feet tall that remains standing through all seasons and is fairly easily recognized by its plume-like flower head. The common name for phragmites is Common Reed. In the marshlands south of Philadelphia, throughout much of New Jersey, and near the marshy areas around Newark and the Meadowlands sports



complex, one can see dense populations of phragmites stands dominating the shorelines. The high reed density is problematic in several ways, and is what makes phragmites an unwelcome invader to our local area. Phragmites pushes out native species of plants, and the lack of sunlight and high reed density is inhospitable to most animal species normally living in the marshy areas. Root systems and rhizomes (defined later) in the soil tend to stabilize the soil from erosion, but the natural plant species that are displaced generally do that as well. Biomass produced from the stalks and leaves increase the soil base over time, thus raising marsh levels and altering wetland hydrology. This can change the flow of water through a wetland and can dry wetlands over time. Walking through phragmites stands is very difficult due to the density and height of the stalks. A phragmites invasion can hinder access to areas that were previously accessible. And once a phragmites colony is established, it will continue to spread and push out all previously established vegetation.



Pictures (Photo credits: Google Images)

one whose nativity is unclear, occurring across the southern U.S. from California to Florida and into Mexico and Central America (the “Gulf Coast” type).

Phragmites in North America -- *Phragmites australis* (Cav.) Trin. ex Steud, or common reed, is thought to be one of the most widespread plants on Earth and is found in marshes world-wide. Although the species name, *australis*, suggests it is native to Australia, it is believed to have originated in the Middle East. Today phragmites exists throughout the lower 48 states, Central America, and southern Canada, but not in Hawaii or Alaska. Recent research using genetic markers shows that three separate lineages occur in North America –one endemic and widespread (the native), one from Europe (the introduced invasive), and

The native endemic lineage (*Phragmites australis* ssp. *americanus*) was historically widespread, occurring throughout Canada and most of the U.S. except for the Southeast (Texas to Florida and north to South Carolina). It remains widespread in the western U.S. In the eastern U.S., the native has been largely replaced by the invasive lineage, but it can still be found in scattered locations, including along several major rivers on Maryland’s eastern shore.

The invasive lineage of *Phragmites australis* was likely introduced from Europe. It is now found throughout the continental U.S. and in southern portions of six Canadian provinces. In the southern U.S., where it overlaps with the Gulf Coast lineage, the invasive form occurs around the Mississippi River delta and has the potential to spread further to other parts of the Gulf Coast.



The “Gulf Coast lineage” has been recognized as *Phragmites australis* subsp. *berlandieri*. Its distribution is restricted to the southernmost states and it has been introduced to southern Arizona and California. It is not clear if it is truly native to the U.S. or spread north from Mexico and Central America.

Phragmites has been present in North America for more than 3,000 years. Prior to the 1900s, the native reed was found mostly along the upper borders of marshes in mixed communities of plants such as sedges and cattails. Over the last century, however, Phragmites has rapidly expanded its range, becoming dominant in marshes throughout the Mid-Atlantic. This spread appears to be associated with the arrival of the invasive lineage from Europe occurring in

the 1800s. Recent scientific studies have indicated that cross-pollination of the native and non-native species results in increased viability of the seeds produced. Ironically, colonies of phragmites in Europe have declined in recent years.

Uses of Phragmites -- Phragmites reeds have been employed since ancient times for a variety of uses. Native Americans used phragmites reeds and leaves to make prayer sticks, flutes, cigarettes, arrows, paper, roof thatch, mats, baskets, and other products. Today, there are potential uses in industry (roof thatching, construction and gardening, paper and pulp, polymerization for textile or plastic); energy (combustion, biogas, biofuel); agriculture (animal feed, fertilizer, compost); and water treatment (natural filtering and purification). These uses generally require managed growth and harvesting. One advantage is that production and harvesting of phragmites would not compete for land currently in agricultural production.

Colonization and Spread -- Colonization is generally by seed spread. Seeds form and are dispersed into the air in the fall. Up to 2,000 seeds are produced per seed head per year. The seeds are dispersed generally by wind and water. Water dispersal carries seeds to shorelines, but a single high-water event can carry a large number of seeds to more inland locations where new colonies are established.

Stolons are stems that are connected to the parent plant that grow along the soil surface and can form roots and shoots. *Rhizomes* are underground stems connected to the parent plant that are capable of growing roots and shoots. Both allow Phragmites to expand around an area where the plant is already established. *Phragmites* can also spread to new areas when pieces of rhizomes or stolons are broken off and moved to a new location by water, bird, or human activity where they can root.

Once a patch of Phragmites is established, it can form dense stands and spread rapidly via rhizomes and stolons. Studies have shown that the growth of rhizomes averages about 15.7 in. per year, and stolons can grow up to 4.25 in. in a day. Stem density can be up to 200 stems per square meter.

Treatment and Control -- Efforts to control Phragmites have been extensive across the Chesapeake Bay watershed. Maryland is required by law to control Phragmites in state-owned wildlife management areas. Anne Arundel County is currently considering control measures on county owned lands.

Methods to control phragmites include: herbicide spraying, mowing, burning, grazing, flooding, and smothering. Efforts to eradicate a colony require that the entire plant be killed, including the roots and rhizomes. Otherwise the plant will regenerate. Mowing and grazing are therefore more of a maintenance method rather than eradication. Mechanically removing the root system by large scale tilling generally promotes considerable wetlands erosion. Additionally, pieces of rhizome remain in the soil enabling reestablishment.

Burning also does not affect the root and rhizome system of a living colony, and therefore is not effective as a standalone control method. After treatment with an herbicide, burning can be an effective method to clear the remaining biomass enabling native vegetation to quickly regenerate. Locally of course, burning can only be conducted under carefully controlled conditions and with proper permitting. Dead phragmites burns readily with the associated risk of fire spread.

Smothering is done with black plastic sheets laid over areas of cut stems for an entire summer. High heat and lack of light will eventually kill the plants beneath the plastic. This method is most effective in small areas exposed to direct sunlight.

Biological control is also a possibility. Literature and field studies reveal that currently 26 herbivores (insects) are known to attack phragmites australis in the U.S. Many of these species were accidentally introduced during the last decades. Five are potentially native. Of the species identified in both the U.S. and Europe, some are phragmites specialists. Much study is needed before a species can be safely introduced to control phragmites. Introducing new species to control problem plants or animals has not always worked as intended.

Herbicide spraying therefore is currently the most effective and preferred method of phragmites control. Effective herbicides are absorbed and transported throughout the plant including the root and rhizome systems. These herbicides are non-selective, but phragmites colonies grow so densely that nothing else grows within a stand, and it is relatively easy to apply herbicide with little overspray on adjoining vegetation.

Glyphosate (the formulation approved by the U.S. EPA for use in wetlands) is sold under trade names such as Rodeo, Aquaneat, and Aquastar and is a broad spectrum aquatic herbicide that is virtually nontoxic to mammals, birds, and fish when used according to instructions. It can be purchased at any store that sells agricultural chemicals. Habitat is another broad spectrum herbicide effective in controlling Phragmites, utilizing Imazapyr as the active ingredient. All herbicides must have a non-ionic surfactant added which allows the herbicides to adhere to the plants

leaves, stalks and rhizomes for effective control. These herbicides may be applied in or around wetlands using aerial spray equipment, a boom or handgun from a boat, or from the shore using spray equipment. However, large stands in open areas are sometimes best treated with application by helicopter. Phragmites should be treated when they are actively growing and are at mid- to full-bloom (late July through October before a killing frost).

Follow-up spot treatment is frequently required as some regeneration occurs in the following year. If phragmites stands remain in the local area, reestablishment by seeding may occur in subsequent years, so the property owner should be vigilant to the signs of colonies starting to re-establish.

Because of the potential for misuse and degradation to sensitive wetlands and animal habitat, Maryland requires that spraying in wetlands be conducted with an approved aquatic herbicide by a licensed and certified technician. A toxic chemicals application permit is also required in wetlands. Permits can be obtained from MD Dept. of the Environment, Industrial Discharge Permits Division 410-537-3323 or <http://www.mde.state.md.us/assets/document/permit/MDE-WMA-PER015.pdf>

Maryland provides information on appropriate methods of control, property owner assistance programs, and help in locating licensed applicators and professionals in the control of phragmites. For information contact:

Waterfowl Habitat Specialist – Donald Webster
MD DNR – Wildlife and Heritage Service
828-B Airpax Rd., Suite 500, Cambridge, MD 21613
410-221-8838 x103

Awareness is the Key to Local Control -- Once a phragmites invasion is recognized, control is not difficult or expensive. However, vigilance is required to provide follow-up treatments or control measures as needed. State and local authorities are generally supportive of phragmites control measures. Since seed spread is the dominant form of colonization, it is desirable to rid an entire area of colonies to reduce the instances of re-colonization. Homeowners associations, garden clubs, and environmental organizations can be instrumental in organizing property owners and sharing costs.

Credits and References - These were sources for this article:

1. Swearingen, J. and K. Saltonstall. 2010. *Phragmites* Field Guide: Distinguishing Native and Exotic Forms of Common Reed (*Phragmites australis*) in the United States. Plant Conservation Alliance, Weeds Gone Wild. <http://www.nps.gov/plants/alien/pubs/index.htm>
2. Whigham, D., Kettnering, K., McCormick, M., Baron, H., The invasion of common reed (*Phragmites australis*) in Chesapeake Bay, USA
3. Aquatic Invasive Species in the Chesapeake Bay: Phragmites, Maryland Sea Grant, Publication UM-SG-PI-2013-03, September 2013
4. J.F. Köbbing¹, N. Thevs¹ and S. Zerbe², The utilization of reed (*Phragmites australis*): a review, *Mires and Peat*, Volume 13 (2013/14), Article 01, 1–14, <http://www.mires-and-peat.net/>, ISSN 1819-754X © 2013 International Mire Conservation Group and International Peat Society
5. Web site: Invasive Plants, Phragmites: Common Reed, <http://www.invasiveplants.net/phragmites/>
6. Web site: USDA, National Agricultural Library, National Invasive Species Information Center, Aquatic Species, Common Reed, <http://www.invasivespeciesinfo.gov/aquatics/commonreed.shtml>
7. Web site: Common Reed – Biological Control of Invasive Plants in the Eastern United States (Aug 2002), Bugwood Wiki. Published by USDA, Forest Service, Publication FHTET-2002-04, http://wiki.bugwood.org/Archive:BCIPEUS/Common_Reed
8. Web site: Great Lakes Phragmites Collaborative, <http://greatlakesphragmites.net/>
9. Web site: Maryland DNR, A Landowners Guide for the Control of Phragmites, http://dnr2.maryland.gov/wildlife/Pages/plants_wildlife/Phragmites.aspx

Much more information can be found by searching for “phragmites” on the Maryland DNR web site.

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