PHRAGMITES:
Considerations for Management in the Critical Area

Critical Area Commission
Chesapeake and Atlantic
Coastal Bays

INTRODUCTION AND BACKGROUND

The common reed, *Phragmites australis*, is a non-native, invasive wetland grass considered to be a noxious weed in most states. It grows in fresh, brackish, and saline waters and in the moist soils of tidal and nontidal wetlands. It tolerates frequent and prolonged flooding as well as periods of prolonged drought. It is often found in disturbed areas such as ditches, roadsides, and dredge spoil sites. Young plants generally have purplish seed plumes that become tan as the plant matures; foliage is green during the growing season then turns brown in autumn.

Phragmites spreads by seeds via wind and water, as well as through its stolons (stems along the soil surface) and rhizomes (underground stems). Rhizomes and stolons that break off can rapidly infest a disturbed area. They often form dense thickets with thick matted vegetation. Research has shown that the spread of the invasive plant is accelerated by ground disturbance and excess nutrients, particularly nitrogen. *Phragmites* can grow up to 15 feet tall—not surprisingly the name comes from the Greek word meaning 'fence'.

Phragmites is considered both a pioneer and climax species in plant succession. Succession refers to how plant communities change over time—each stage providing unique habitat that benefits different wildlife species. A pioneer species is one that will rapidly move into a disturbed area. A climax species is a plant within a community that is considered fairly stable. A common example of succession is an abandoned field that will change over time from herbaceous vegetation to shrubs to trees. Trees in this case are generally considered the climax species. *Phragmites* can quickly colonize a disturbed area and prevent the natural succession of plant species, thereby reducing the diversity in a plant community.

There is a native variety, *Phragmites australis* subsp. *americanus*, but it is relatively rare. Most marshes in the Chesapeake Bay region are occupied by the invasive species that was introduced to the United States in the early 19th century by ballast water from ships traveling from Europe and Asia. "Invasive species" are defined in the Critical Area regulations as a type of plant that is non-native to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. Typically, invasive species adapt well to disturbance, tolerate a broad range of environmental conditions, and spread rapidly. As an invasive species, *Phragmites* is considered to be an ecological problem because it will choke out and displace native wetland plants. *Phragmites* has expanded rapidly over the last 50 years due to land disturbances, especially human activities.

Characteristic	Native	Invasive
Stem color	 Stem nodes are shiny and reddish-purple	 Stem nodes are tan-green, dull and rigid
Leaf color	 Lighter, yellow-green	 Dark blue-green
Rhizome	Yellow	White to light yellow
Growth habit	Co-occurs with other plants	Tend towards mature, dense, monotypic stands
Other	Leaf sheaths fall off during the winter, leaving bare stems standing in the spring	Leaf sheaths do not fall off, litter from the previous year has remnant leaves.

greatlakesphragmites.net

IDENTIFICATION: NATIVE VS. NONNATIVE PHRAGMITES

The Maryland Native Plant Society can help with plant identification if you think you might have found the native phragmites.

www.facebook.com/groups/plantstoidentify

Left: Invasive *Phragmites* on top, native leaf on bottom.
Right: Red stems of native phragmites.
Photo credit: greatlakesphragmites.net

THINGS TO CONSIDER BEFORE BEGINNING PHRAGMITES CONTROL

The control of *Phragmites* is encouraged by resource managers at local, state, and federal government levels due to its impact on native marsh vegetation. In general, control of *Phragmites* and restoration to native marsh vegetation is a good thing, but recent research has also documented that there may be ecological benefits to sometimes leaving the aggressive weed in place. Taking the pros and cons of *Phragmites* control into consideration, individual landowners should decide if *Phragmites* removal/control makes sense for them and their property.

Left: Typical dense stand of invasive *Phragmites*.
Right: Native phragmites growing with other species.
Photo credit: greatlakesphragmites.net

Climate Adaptation and Erosion Control

The aggressive, fast growth of *Phragmites* makes it useful for holding soil and protecting eroding shorelines. *Phragmites* produces a large amount of biomass not just above ground but in its extensive root system as well (as much as 80% of total biomass is below ground). The litter that accumulates within the root system contributes to accretion of soil and an increase in elevation that occurs in many phragmites marshes. This may be of particular importance in the Chesapeake Bay watershed where sea level rise of as much as 2 feet is predicted by 2050. The increased elevation in phragmites marshes can make them more resilient to higher tides and help maintain wetlands in situations where native grasses cannot keep up with sea level rise.

It is also worth noting that removal of *Phragmites* may destabilize sediments and result in marsh loss. There have been situations where control of *Phragmites* has resulted in additional shoreline erosion if native wetland vegetation isn't planted or naturally established through an existing seed bank.

Native *Spartina patens* in foreground, invasive *Phragmites* in back (www.scienceteacherprogram.org)

Wildlife Habitat

There is no question that invasive phragmites outcompetes native wetland plant species such as the low growing salt meadow hay (*Spartina patens*) that provides food and nesting habitat for many ducks, geese, and other marsh birds. Large acreages of native high marsh (above mean high water) also provide nesting habitat for bird species such as the declining salt marsh sparrow and the endangered black rail.

Although phragmites supports fewer bird species than other wetland habitats, red-winged blackbirds and boat-tailed grackles will nest in common reed stands and song sparrows and some waterfowl will eat the seeds. Muskrats consume rhizomes and stems. Numerous animals use phragmites for roosting and escape from predators.

Carbon Sequestration and Nutrient Uptake

Carbon sequestration is the capture and storage of carbon dioxide, a greenhouse gas, that in the atmosphere can trap heat and contribute to climate change. All wetlands can sequester carbon, but as a larger plant with deeper roots, phragmites takes up two to three times as much carbon as native shorter cordgrasses in the Chesapeake Bay. It also takes up more of the nutrients (nitrogen and phosphorus) and toxins that can be so detrimental to water quality.

Phragmites growth along tidal pond in Dorchester County.
Photo credit: Claudia Jones

MANAGEMENT AND CONTROL MEASURES

If you decide that phragmites control is something you'd like to undertake, though difficult to control, phragmites is not altogether impossible to manage. The most effective management method is **herbicide application**. Rodeo (active ingredient: glyphosate) and Habitat (active ingredient: imazapyr) are the recommended herbicides that have been approved for use in aquatic environments. The Maryland Department of Agriculture can provide guidance on using herbicide control. Further, applying these herbicides near water requires authorization from the Maryland Department of the Environment (MDE).

Herbicide Control
- Herbicide treatment must be continued for at least two years.
- Application is recommended in the fall, when other plants are dormant.

Physical Control
- Mowing
- Burning *(note: cutting or burning alone generally encourages growth)*
- Excavation
- Smother with plastic tarp

Physical control is also a recommended method. All physical control measures will likely require multiple treatments over several years as well as long term monitoring and maintenance to prevent new invasion—especially when a treatment site is surrounded by extensive stands of *Phragmites* in the landscape. *Phragmites* is less likely to invade/reinvade already-vegetated areas, so the quick establishment of native plants is key.

A Simplified Buffer Management Plan approved by local government and authorization may be required by MDE. More information about control methods is listed in this this Natural Resources Conservation Service resource.

Shore Erosion Control - Living Shoreline

In some instances a property owner may want to combine phragmites control/eradication with a larger erosion control project known as a living shoreline. Living shorelines consist of native marsh plantings usually combined with a low rock sill. Living shorelines are the preferred method of shore erosion control along Maryland's tidal waters as they provide a more natural and environmentally beneficial alternative to bulkheads and rip rap. For more information check out these resources: MDE Living Shorelines page | DNR Living Shorelines page

Permits and Authorizations

- Before disturbing wetlands, consult the MDE's Water and Science Administration to determine if a wetland permit is required (call 410-537-3000). View contact information for individual MDE tidal wetland reviewers by county here.
- A toxic chemicals application permit is required to spray these herbicides near water. To learn more, visit the MDE website or call MDE's Industrial Discharge Permits Division at 410-537-3323.
- Spraying requires application by a Certified Pesticide Applicator. A list can be found on the Maryland Department of Agriculture website.
- Contact your local government's Critical Area department to learn more about their specific requirements. Requirements range from submitting a Simplified Buffer Management Plan to requiring a grading permit in order to remove *Phragmites* in the buffer. Contact information for your Critical Area jurisdiction can be found here.

SELECTED REFERENCES

Wildlife and Heritage Service phragmites information (DNR)

Phragmites australis: Phriend or Phoe (MDE)

Jekyll or Hyde: the Many Faces of Phragmites (Smithsonian Environmental Research Center)

Phragmites vs. Climate Change (Smithsonian Environmental Research Center)

Extensive *Phragmites australis* species information (U.S. Forest Service)

Phragmites australis field guide (Chesapeake Bay Program)

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