Phragmites: A Tale of Two Strains

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In recent years, wildlife managers have villainized the common reed as a fast invading exotic marsh grass. Once established, it was thought to render marshes barren of wildlife and plants. As a result, many restoration programs seeking to combat the aggressive invader and reestablish native cattails and Spartina grasses have relied on drastic, expensive, and long-term projects. But with the discovery of North American strains of Phragmites, and scientific evidence supporting the nutritional value of Phragmites to Delaware Estuary finfish, many managers are rethinking their view of this costly, exotic invader.

The common reed, or *Phragmites,* is a tall, handsome, perennial grass. Germinating in new locations from wind-and waterborne seeds, it can spread quickly by sending out side shoots, or rhizomes. It is unusual among grasses in its ability to colonize a wide range of habitats, including fresh and brackish waters. It often forms dense colonies along the borders of lakes, ponds, and rivers. Broad environmental tolerance, combined with a propensity to crowd-out competitors, enables *Phragmites* to enjoy a cosmopolitan distribution throughout North American marshes.

Although the *Phragmites australis* found in North America is commonly considered a foreign species, fossil records indicate the reed has been present on the continent for more than 3,000 years. In fact, many Native American tribes gathered the plant stems for arrowshafts, cigarettes, flutes, whistles, pipe stems, matting and other purposes (Kiviat and Hamilton 2002). By the 1800's, however, botanists were describing *Phragmites* as a rare or uncommon species. How could such a rare species spread so aggressively in the 20th century? Recent research is beginning to shed light on this question.

In a 2001study, Kristin Saltonstall reported that the recent, improved vigor of *Phragmites* is likely due to a "cryptic invasion"-- a biological invasion that is difficult to distinguish because exotic strains so closely resemble native species. Saltonstall's DNA analyses corroborate that an introduced strain of *Phragmites* has displaced native strains and is expanding to regions previously devoid of *Phragmites.* Thus, it appears that the foreign, and not the native, strains possess the propensity to colonize wetlands historically uninhabited by *Phragmites.*

Also aiding *Phragmites* in its rapid march across America is the fact that the nonindigenous strain is also a superior competitor in disturbed habitats, i.e. dredged, filled, or reconstructed wetlands. Rapid coastal population growth and associated changes in land use patterns have played a key role in range expansion, particularly in the northeastern US.

So in light of Saltonstall's discovery, is *Phragmites* really a worthless species to be removed at any cost? The answer to this question, which once seemed black and white, has become a lot more complicated. Only additional research and time will tell. But for now, managers must weigh both sides of the equation: the costs and benefits of *Phragmites* removal.

Pro-removal arguments: *Phragmites* is a threat to biodiversity that warrants drastic removal measures.

- *Phragmites* establishes dense monocultures, which displace a variety of native wetland grasses and plants.
- Marsh structure may be altered. Dense *Phragmites* stands trap sediment, filling-in the rivulets and puddles that are important nursery areas for fish and other small creatures.
- Native *Spartina* and cattail marshes have more habitat complexity and are richer in plant and animal species.
- *Phragmites* marshes are generally barren of plants and wildlife particularly waterfowl.

Anti-removal arguments: *Phragmites* marshes are valuable, productive ecosystems that are part of our native heritage. The effectiveness of removing *Phragmites* from wetlands is questionable.

- Native *Phragmites* strains have been a part of our North American plant heritage for thousands of years and should be protected.
- *Phragmites* decomposes to provide food particles for tiny animals, which, in turn, become important food to support Delaware estuary finfish. Moreover, the nutritional value of *Phragmites* and *Spartina* leaves is comparable.
- Marsh restoration efforts to remove *Phragmites* are costly and long-term. Even after prescribed burning or herbicide treatments, *Phragmites* may recover quickly and at a higher density.
- Since recent studies have shown that *Phragmites* marshes are not worthless and devoid of life, funds might be better spent implementing other restoration measures.

Controlling *Phragmites*:

Habitat managers have tried many techniques to control Phragmites infestations. From mowing, to disking, to burning, to drowning, to chemical control—the list goes on and on. As a homeowner, what can you do to remove problematic *Phragmites* from your backyard? Below are several techniques that can be effective in small areas.

Chemical control:

Glyphosate-based herbicides, like Rodeo, can be effective in managing *Phragmites* populations. They can be applied large-scale, or as a spot treatment by hand or backpack sprayer. Although Rodeo is not selective in killing grasses and broad-leaved plants, it is virtually non-toxic to aquatic animals once it bonds to plants or soil. (Try to prevent spraying directly into waterways where it could be toxic to invertebrates). Success of these herbicides is highly dependent on *Phragmites* growth stage, population size, and the absence of wind or rain that may dilute chemical concentrations. Rodeo may also be more effective if sprayed two weeks after cutting or mowing. Before you spray, always consult the labels on your herbicide products.

Mechanical control:

Cutting *Phragmites* can help manage the size of the population, but timing is critical to minimize regrowth and stand density. Eradication generally requires annual cutbacks, and shoots must be properly disposed of to prevent sprouting in treated areas. Covering *Phragmites* stands with plastic sheeting is less labor intensive than cutting, but stands must first be mowed or burned to

reduce plant biomass. To create a plastic barrier, secure a length of 6mm black plastic with stakes or sandbags. Temperatures will increase under the barrier, effectively killing surface growth (Norris et al, 2002).

You may also find that a combination of the above techniques is a more effective tool for eradication. But whichever method you choose for control, remember that frequent monitoring will help prevent reinvasions. With a little TLC, native vegetation will re-colonize from dormant seeds and tubers in the soil.

Adapted from: The Nature Conservancy's Element Stewardship Abstract for *Phragmites* by Marianne Marks, Beth Lapin, and John Randall.
(http://tncweeds.ucdavis/esadocs/documents/phraaus.)

Also see: "Status and Trends of *Phragmites australis* invasion within constructed wetlands in Virginia" for a more complete summary of control techniques
http://www.vims.edu/ccrm/phragmites.

How do I find out if my *Phragmites* is native?
Historically, native strains of *Phragmites* occurred across the Northeast, South, and Midwest. But scientists now believe a European strain has become the dominant species across much of North America. Distinguishing between the varieties is difficult without the proper training. If you are uncertain whether your *Phragmites* is native or invasive, Cornell University offers a free diagnostic service. Visit www.invasiveplants.net for more information.

Whatever its heritage, *Phragmites* is clearly here to stay. While more information is needed to help manage the common reed, a few prudent removal guidelines should be followed. It makes sense to control new invasions of *Phragmites* in newly created wetlands or wetlands that have suffered a soil disturbance because control in the first year of the invasion is often more feasible. Older invasions should be decided on a case-by-case basis, comparing all the ways in which restoration dollars might be spent. Also, mechanical control methods should be used whenever possible to avoid negative impacts to aquatic plants and animals. Finally, with the virtual elimination of native *Phragmites* across New England, if new native stands are identified, they should be protected. --Wait, protecting *Phragmites*? What's the world coming to? Just remember, it's not all bad!

References

Kiviat, E; Hamilton, E. 2001. *Phragmites use by Native North Americans.* Aquatic Botany, Vol. 69, no. 2-4, pp. 341-357.

Norris, L. J.E. Perry, K.J Havens. 2002. A summary of methods for controlling Phragmites australis. VIMS Wetlands Program Tech. Rep.

Saltonstall, K. 2002. *Cryptic invasion by a non-native genotype of the common reed, Phragmites australis, into North America*

Proceedings of the National Academy of Science of the United States of America , Vol. 99, no. 4, pp. 2445-2449

Weinstein, MP; Balletto, JH. 1999. *Does the Common Reed, Phragmites austalis, Affect Essential Fish Habitat?* Estuaries, Vol. 22, no.3B, pp.793-802.

Weinstein, MP, Litvin, SY; Bosley, KL; Fuller, CM; Wainright, SC. 2002. *The role of Tidal Salt Marsh as an Energy Source for Marine Transient and Resident Finfish: A Stable Isotope Approach.* Transaction of the American Fisheries Society, Vol. 129, no.3, pp. 797-810.

Weis, JS; Windham,L.; Santiago-Bass; Weis, P. 2002. *Growth, survival, and metal content of marsh invertebrates fed diets of detritus from Spartina alterniflora Loisel. and Phragmites austalis Cav. Trin. ex Steud. from metal-contaminated and clean sites.* Wetlands Ecology and Management. Vol. 10,no.1, pp.71-84.

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