Phragmites: Controlling the All-Too-Common Common Reed

Massachusetts Wetlands Restoration Technical Notes

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The Plant

Common Reed (Phragmites australis, formerly P. communis) is a tall grass attaining a height of 16 feet or more. Referred to by many people as "Phrag", it occurs on every continent except Antarctica and may be the most wide-ranging of all flowering plants. Phragmites grows under a variety of environmental conditions ranging from salt to fresh which probably has led to its ubiquitous occurrence around the globe. In the United States, common reed grows mainly in wetlands, but also can be found on disturbed uplands, often in close proximity to wetlands.

Some people think that common reed is an invasive exotic, yet surprisingly, evidence of it has been found in 3000-year old peat cores extracted from Connecticut salt marshes. Phragmites was part of our New England flora well before Colonial times. While present here for eons, it is clear that common reed has been spreading rapidly over the past half century. You might even know of some former salt marshes that had no common reed when you were growing up that are now wall-to-wall Phragmites. This type of rapid invasion is characteristic of exotic species, leading some people to speculate that an aggressive genotype of common reed has been recently introduced. Studies in Louisiana and adjacent Gulf coast states have shown that the invasive Phragmites is genetically different from natural populations of this species. Regardless of its genetic status, common reed is creating a problem for many native species.

The Problem

Common reed has been invading agressively many tidal marshes and some inland wetlands. Eventually, Phragmites becomes the sole dominant plant in many of these wetlands. It is doing so at the expense of native flora and animals dependent on these native habitats. The tall grass often forms monotypic stands where it is virtually the only species present. The change in plant structure (from short grasses to tall grass), in biodiversity (from many species to a single species), and in wildlife food production has reduced the habitat value of these marshes for many fish and wildlife species. In addition to ecological concerns, stands of common reed may represent a potential fire hazard, especially where they occur contiguous to housing

developments. In fall and winter, the dried stems are easily ignited. In the 1980s, Phragmites at the 250-acre Sagamore Marsh caught on fire. The marsh was completely burned and the fire spread to adjacent uplands. Fortunately, no homes were damaged.

Diagnosing the Problem

Why has Phragmites been able to invade Massachusetts wetlands? The abundance of common reed usually indicates some type of disturbance or environmental stress, including altered hydrology, filling, stormwater discharge, road salts, or other water pollution. The proliferation of common reed is most prevalent along the coast where it has successfully invaded tidally restricted salt marshes. It also can be found in smaller stands along the upland border of many salt marshes, especially in areas of recent fill. In freshwater areas, common reed has colonized similarly disturbed sites and also has become well established in some wetlands receiving stormwater discharge. Common reed is frequent along highways throughout the Commonwealth.

Before considering Phragmites control techniques, it is vital to understand how environmental conditions changed to favor the growth of this species. This is somewhat akin to diagnosing the disease and treating the disease, rather than simply trying to cure a symptom. To eliminate or control common reed effectively, we first need to resolve or minimize the problem that created a favorable environment for the spread of this species.

Three basic problems are usually responsible for the invasion and spread of Phragmites:

1. *Tidal restrictions* - reduced flooding and salinity of salt marshes.

This restrictive culvert at Argilla Rd. in Ipswich has now been replaced by a much bigger box culvert,allowing the natural flow of the tide.

2. *Minor filling* - increased elevation and reduced soil wetness (also reduced flooding and salinity in tidal areas);

3. *Water quality degradation* - stormwater discharges, increased nutrient inputs, introduction of road salts, and other forms of water pollution also seem to provide Phragmites with a competitive advantage over native species.

Stormdrain discharge has led to increased elevation, favoring Phragmites on this site in Rockport, MA

Sites dominated by common reed must be evaluated to determine the underlying cause to help design the restoration plan. Without identifying and addressing the fundamental problem in some way, the control of common reed may be unsuccessful or at best, a more costly annual or biannual maintenance project. The goal of any restoration project related to Phragmites should be to change the environmental conditions favoring it to conditions that will promote the establishment of more desirable wetland species.

Remedying the Environmental Problem

Some common solutions to the problems listed above are the following:

1. Increase tidal flooding through removing restrictions (e.g., expanding culverts and replacing tide gates with state-of-the art self-regulating tide gates) and increasing salt water flow into various parts of the marsh (e.g., open marsh water management techniques).

2. Restore original marsh elevations by removing fill and regrading.

3. Improve water quality by eliminating a pollution source, such as diverting stormwater discharge through a specially-designed constructed wetland for water treatment prior to releasing water into wetland.

Control Techniques

Once a problem stand of Phragmites has been identified, one or more techniques may be applied to control it. Possible control measures include cutting, burning, herbicides, hydrologic controls, and plastic covers. The following discussion is a brief review of these methods and their likelihood for success. Again, it is best to address the underlying environmental conditions prior to attempting to eradicate common reed by these techniques.

1. Cutting or mowing. Not successful in eradicating common reed, but is useful to eliminate the fire hazard potential. Cutting any grass at the wrong time may stimulate growth and increase stem density. Cutting at the end of the growing season or in winter can increase density. Cutting after tasseling (e.g., before the end of July) may produce the most stress on the plants. Mowing with machines requires ground pressure-sensitive equipment (less than 2lbs/sq.in) to minimize soil compaction. Cutting can be expensive, especially for large stands.

2. Mowing and disking. Disking of rhizomes may enhance restoration, but it is usually too expensive for large stands. Perhaps most useful for controlling common reed in small backyards.

3. Dredging. Can eliminate common reed but also changes marsh to a pond. May be useful where pond restoration is desired.

4. Burning. Only a root burn will reduce growth of common reed. Winter and spring burning may actually stimulate growth, whereas mid- to late summer burns may be effective. It may be that late summer burns are more likely to penetrate roots and affect the plant at the most vulnerable time (i.e., when it is moving nutrients from above ground to roots).

5. Burning and flooding with salt water. Successful for restoring salt marshes, but can be expensive depending on the water control devices needed.

6. Flooding. Can control common reed if rhizome is covered with water for four months during the growing season. It is important to ensure that flooding reaches all affected marsh areas for this period.

7. Increase tidal flow and salinity (for controlling common reed in former salt marshes). Successful technique. Requires increasing size of culverts, installing self-regulating tide gates, or otherwise removing the restriction to permit more tidal water exchange. May be enhanced through open marshwater management which involves increasing salt water flooding through selective ditching and ponding. This has resulted in a significant die-back of common reed after four years. Installation of self-regulating tide gates can both increase tidal flooding with salt water and protect low-lying developed areas from storm floods, thereby providing environmental, safety, and economic benefits.

8. Herbicide application. Rodeo, a nonselective herbicide, kills all grasses and broad-leaved emergents. It degrades quickly into natural products, so it is virtually non-toxic to aquatic animals (tested). Apply Rodeo after common reed has tasseled. Since all plants do not tassel at the same time, more than one application is usually required. May require individual plant treatment during follow-up treatments. Expensive.

9. Aerial spraying with burning and/or flooding. Combined techniques seem to provide beneficial results, but expensive.

10. Plastic covers. Mowing the common reed stand, then covering with plastic. Black plastic appears more effective than clear plastic. High temperatures can cause die-off in 3-4 days. Plastic deteriorates over time. Labor intensive; its utility may be limited to small sites. Results have been favorable.

11. Combination of the above with competitive planting. Expensive, but planting may give an edge to the more desirable species.

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