

Summary of Common Questions Concerning *Phragmites* Control

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What is *Phragmites*?

Phragmites australis, common reed, is an aggressive, native, 8-16 foot tall, coarse perennial grass which frequently grows in the moist soils of tidal and nontidal wetlands. It has invaded many marshes throughout the Chesapeake Bay region by forming dense stands which crowd out other native marsh plants. Its status as a facultative wetland species (i.e., adaptable to a variety of wetland types) means that the habitat it occupies is most likely a wetland subject to federal, state, county or municipal regulation. However, *Phragmites* also grows well in moist upland soils.

Does *Phragmites* have any value?

Like all wetland vegetation, *Phragmites* provides food and habitat for some organisms (e.g., rails, muskrats, white-tail deer), serves to stabilize soils against erosion, and improves water quality by filtration and nutrient removal.

Why is *Phragmites* considered to be a problem?

Ecologically, *Phragmites* can be a problem plant because it is an excellent colonizer of disturbed soils and once established it usually crowds out all other wetlands plants. This reduces the ecological value of the wetland by displacing plant assemblages which have better value as habitat, for stabilizing sediment, or improving water quality through nutrient removal. Along shorelines, dense stands of *Phragmites* are objectionable because they obscure water views and encroach on naturalized and ornamental plantings.

Under what conditions should *Phragmites* control be considered?

Since the objection to *Phragmites* is its ability to reduce marsh diversity, the management objective of a control program should be to return wetlands dominated by *Phragmites* to the condition prior to *Phragmites* establishment. Thus, management strategies must include replacement efforts as well as control measures.

Is *Phragmites* a new problem?

Yes. While *Phragmites* is an efficient colonizer of disturbed soils, it does not easily invade vegetated areas. The increase in *Phragmites* correlates well with increased marsh disturbance from activities such as road expansion, ditching, shoreline development, pond construction, wetlands creation, and dredge spoil disposal.

How can *Phragmites* be controlled?

At present, the only practical method for controlling moderate to large populations of *Phragmites* is the use of the EPA approved herbicide Rodeo, active ingredient glyphosate. When used according to the manufacturer's (Monsanto Inc., St. Louis, MO) label instructions, this product has been shown to be safer and more effective than all other alternatives. Additional environmental protection can be afforded by proper timing of application and the selection of conservative application equipment. Recruitment of replacement vegetation is greatly enhanced by removing dead *Phragmites* either by burning or mowing.

What is Rodeo and how does it work?

Rodeo is a very specific product formulation of the herbicide glyphosate which has been approved by the EPA for controlling many species of undesirable plants growing in or near sensitive aquatic environments. Glyphosate (N-(phosphonomethyl) glycine) is a non-selective systemic herbicide that kills or injures actively growing plants when applied to green tissue. The compound is rapidly translocated throughout the plant body where it interferes with the biosynthesis of aromatic compounds at points of growth. Since the specific enzyme inhibited by the action of glyphosate is localized in plastids, only organisms having this pathway and plastids are affected. All plants have plastids and the shikimate pathway; animals do not. Thus, the mode of action of glyphosate is specific to plants.

Abundant toxicological data exists showing glyphosate to be safe when used according to label instructions. In brief, the compound does not bioaccumulate in aquatic food chains and exhibits very low toxicity to achlorophyllous organisms including bacteria, fungi, and animals. Glyphosate is non-volatile, immobilized in most soils, and is rapidly removed from the environment by chemical bonding with soil particles and microbial degradation.

Are there other products that contain glyphosate?

The herbicide glyphosate is the active ingredient of several commercial products including Rodeo, Roundup, Roundup Pro, Roundup Ultra, and Accord.

Can other products containing glyphosate be used to control *Phragmites* in wetland environments?

No. Only the Rodeo product formulation is legal to use in aquatic applications.

How do the various products that contain glyphosate differ?

Many pesticides are manufactured and sold in forms that differ in their physical characteristics (granular, dusts, wettable powders, liquid concentrates, emulsions, aerosols, etc.), concentration of active ingredient, or the presence of other chemical agents such as surfactants. This is done to minimize risk and maximize efficiency. The product Roundup in concentrated form contains 41% of the herbicide glyphosate and 7% surfactant (ref. Monanto Agricultural Sector Customer Relations Center 1-800-332-3111). The product Rodeo contains 53.8% glyphosate and no surfactant; however, the label's mixing instructions require the addition of nonionic surfactant, total concentration 0.5% in the spray mixture. Since it is the surfactant, and not glyphosate, that can potentially harm some aquatic organisms, the lower surfactant concentration of Rodeo is responsible for the reduced toxicity to non-target organisms in aquatic systems, hence its registry for use. Please note, Rodeo must be used with surfactant according to the manufacturer's label instructions. To do otherwise is a violation of the federal label law.

***Phragmites* appears very robust, does it have any weaknesses?**

Yes. *Phragmites*, while a very hardy plant, has two weaknesses which should be exploited in management programs. The first weakness, its poor ability to invade vegetated soils, can be exploited for avoiding *Phragmites* establishment by minimizing disturbance and quickly vegetating sites which have been disturbed. This can be accomplished by seeding, plantings, or management to encourage rapid establishment of other types of plants. Sometimes additional management is needed to suppress any *Phragmites* growth that may occur in small patches. The second weakness is *Phragmites'* tendency to continue growing when many other wetlands plants have entered fall dormancy. Herbicide applications at this time kill *Phragmites* but do not significantly affect adjacent or underlying desirable species, if proper application procedures are followed.

Is the use of Rodeo for *Phragmites* regulated?

In Maryland, control of *Phragmites* often requires approval by a number of federal, state, county, and municipal agencies because *Phragmites* occurs in wetlands and many wetlands are regulated. For control with herbicides, a toxic use permit from the Maryland Department of the Environment (MDE) is required whose issuance includes review by Maryland Department of Health and Mental Hygiene (DHMH) and Maryland Fisheries Administration (MFA). Application of the herbicides can

only be made by homeowners or someone holding a Class V Aquatic pesticide license issued by the Maryland Department of Agriculture (MDA).

In Pennsylvania, a permit is required for *Phragmites* control if herbicides are being applied in wetlands. The permit is obtained through the Pennsylvania Fish and Boat Commission and the Department of Environmental Protection (DEP). The Bureau of Forestry requires a permit for herbicide applications on state forestland. In addition, lands designated as "Natural Areas" must have that designation removed in order to allow any management of invasive species.

In Virginia, Rodeo can only be applied by state certified pesticide applicators having an Aquatic Pest Control license. This certification is issued by the Virginia Department of Agriculture and Consumer Services. According to the Department, no other permits are required.

What alternatives to herbicidal control have been evaluated?

Removal by excavation - *Phragmites* deeply penetrates many soils and for proper control all *Phragmites* must be removed. This is very expensive and will only be effective if all underground portions are removed during excavation. More importantly, this technique literally destroys the wetland type that was to be restored. The wetland which was the basis for control becomes an open water pond.

Smothering by black plastic - Coverage by black plastic kills plants by depriving them of their ability to make new food, a process which requires light. To be effective for *Phragmites* control, the plants must remain completely covered for a minimum of three growing seasons until all food reserves are depleted and the plant starves. To cover *Phragmites* with plastic requires the area to be cut to a height of less than three inches. Problem 1: Unfortunately, after covering, the plant produces new pointed buds which easily puncture plastic film up to the thickness of swimming pool liners. Problem 2: In the spring and fall, the plastic warms the soil thus making it attractive to small animals like frogs and mice. Large predators like raccoons and foxes tear through the plastic to feed, thereby exposing *Phragmites* to the light it needs. Problem 3: During the summer, the moist soils heat excessively which kills the soil organisms and "good" seed stocks. In summary, this technique does not work and does more harm to the environment than the herbicide alternative.

Repeat harvesting - This technique like black plastic starves plants, not by excluding light, but by continuously removing the green tissues which use light to make the plant's food. To be effective, the *Phragmites* stands must be mowed for a minimum of two growing seasons throughout the growing season as new leaves appear. In principle, this alternative is effective; however, in practice few mowing

machines are available which can work in wetlands during the wet season. Any regrowth of *Phragmites* during these periods renders this technique ineffective.

Flooding - Flooding kills many types of plants. It does not kill many types of wetlands plants unless the water is very deep. *Phragmites* has not been controlled in some areas flooded with 10 feet of water for one year. This treatment did kill other types of desirable wetlands vegetation.

Biological controls - No biological controls have been identified for *Phragmites*.

Burning only - Burning by itself does not work and in fact encourages more vigorous *Phragmites* growth.

What are the elements of a comprehensive *Phragmites* control program?

Despite procedural variations between regulatory agencies, the components of successful management plans are remarkably consistent. Management plans must provide a rationale for controlling *Phragmites*, evaluate existing site conditions which may affect control, describe the procedures to be used, and identify all regulatory requirements.

Management plans should:

1. Identify the management objectives of the site to be treated.
2. Determine whether site characteristics and adjacent land uses are compatible with the management objectives.
3. Evaluate the site for potential regrowth of *Phragmites* following treatment.
4. Evaluate the site to determine if *Phragmites* control by itself is adequate to achieve the desired management objectives (i.e., are other restoration efforts, such as replanting native plants, necessary?).
5. Determine whether site characteristics and adjacent land uses are compatible with the measures to be applied.
6. Conduct an on-site evaluation of resident biota and identify ecological functions of the wetland.
7. Identify all permits and reviews which must be obtained.
8. Define all activities needed to meet project objectives.
9. Establish a time line for these activities.

10. Secure all funding, permits and cooperative agreements necessary to complete the project.

Research Needs

1. Regulation of *Phragmites* must be clarified. It is very difficult to identify the agencies which must approve *Phragmites* control especially at the county and municipal level. The MDE Hazardous and Solid Waste Management Administration Toxic Use permit process is not a problem and provides good oversight and review.
2. Policy needs to be formulated to prevent the inadvertent spread of *Phragmites* by earthmoving machinery and spoil disposal.
3. Marsh management practices need to be reviewed for their effect on *Phragmites* spread. This will require some additional scientific inquiry.
4. The value of *Phragmites* control for onsite mitigation needs to be clarified. My personal opinion is that control should only be accepted as mitigation if wetland restoration or creation is also included as a part of the mitigation plan.
5. An informational resource needs to be made available to the public so that private landowners can find out more about *Phragmites*. A clear, understandable brochure or informational packet should be made available through extension offices or other state services.
6. The underlying biology of *Phragmites* needs to be further studied. Studies should focus on any genetic variations among ecotypes, the reproductive and growth strategies of *Phragmites* throughout its life cycle.