

How to restore *Phragmites*-invaded wetlands

Christine Rohal, Keith Hambrecht, Chad Cranney, Karin Kettenring

WHY CONTROL *PHRAGMITES*?

Phragmites grows in tall, dense stands that shade out native plants. It spreads rapidly and overtakes important habitat for shorebirds and waterfowl, reducing the availability of nesting, loafing, and foraging areas. *Phragmites* makes large areas of wetlands inaccessible to wildlife and humans alike.

WHERE TO CONTROL *PHRAGMITES*

It is not always possible to effectively control all *Phragmites* on your property. Choose healthy, robust patches that you will be able to access for multiple years. Treating patches near established native plants will help protect important native habitat, and will promote passive native plant recruitment following control.

CONTROL TIMELINE

1. (optional) In year one, mow, cut, or intensively graze in June, at least 1 month before herbicide application, to prevent seed production.
2. Spray with glyphosate in August-September.
3. If patch was unmowed in summer, or grew back significantly, mow, cut, trample, or burn *Phragmites* in fall or winter (allowing 1 month for herbicide to take effect first).
4. Repeat for 3 consecutive years, spot treating the regrowth. Following year 3, monitor *Phragmites* in treated area, and continue spot treating as needed.

CRUCIAL TIPS

- The timing of herbicide application is very important. It should be applied just before the plant goes dormant, between tasseling and first frost. The best herbicide timing depends on location and is weather-dependent, but it usually occurs during August and September in Northern Utah.
- The plant must be healthy to thoroughly take up the herbicide. Avoid spraying *Phragmites* that is drought-stressed. Don't mow or graze *Phragmites* within 1 month of spraying, before or after.

- Avoid trampling recently sprayed *Phragmites* as much as possible. Crushed *Phragmites* is less likely to effectively transport herbicide to the roots which is needed for effective control.
- Disrupting bird nesting with *Phragmites* control could violate the Migratory Bird Treaty Act.
- Always calibrate your spray equipment to ensure the proper amount of herbicide is being applied. Too little, or too much, will result in less effective treatment.



WATER MANAGEMENT IMPROVES CONTROL OUTCOMES

- Water control, if available, is a very useful tool. Water can be used to help grow the *Phragmites* and make it healthy before spraying, which improves herbicide effectiveness.
- After mowing or burning, flooding sites as deep as possible can help decompose the *Phragmites* litter.
- Once native vegetation is established, following a natural hydrologic cycle (lots of water in spring, phasing to little or no water in early summer i.e. mid-May/early June) will help the native plants establish and reduce *Phragmites* spread. Leaving shallow water on an area all summer and into the fall will promote *Phragmites* germination and growth.
- Following treatment years, drought stressing treated areas will help prevent the return of *Phragmites* and promote the establishment of drought-tolerant plants such as pickleweed and saltgrass. However, if the objective is to reestablish emergent plants such as bulrushes, deeper water will be required.

MANAGING *PHRAGMITES* TO REDUCE SPREAD

- If you cannot mow, well-timed herbicide spraying will at least prevent the plant from spreading, though natives are unlikely to establish in the dense, dead *Phragmites* stands.
- Areas that you are unable to treat with herbicide can be drought-stressed to prevent spread through patch expansion and seed production.
- Grazing is another useful tool to reduce *Phragmites* seed production and slow down the expansion of clones.

Herbicide Mixture

We recommend 0.75 gallons (3 qt) glyphosate with 0.1 gallons (13 oz) surfactant per acre + water. With a 100 gallon tank and a spray rate of 20 gallons per acre, this is equivalent to 3.75 gallons (15 qt) glyphosate, 0.5 gallons surfactant (2 qt), and 95.75 gallons of water.

ESTABLISHING NATIVE PLANTS

- *Phragmites* patches that are older or distant from established native plants may have depleted native seed banks, leading to poor native plant recruitment following control. Active revegetation is the best option to most quickly establish plants that can outcompete *Phragmites*. Dense native plant cover reduces the moist, bare soil conditions *Phragmites* seeds need to germinate.
- Don't waste money on native plant revegetation, at least for the first year, until you can see how much natural recovery you will get. Otherwise follow-up herbicide may kill what you have just planted.
- To create an optimal native seed bed prior to sowing, removal of *Phragmites* litter is beneficial.



- Revegetation using native plant seeds is the most cost-effective method, as opposed to planting plugs or mats.
- Source native seeds from at least 3 sites in order to increase genetic diversity, which will improve their establishment and help prevent *Phragmites* from coming back.
- When planting bulrushes, seeds need to be sown in fall to break seed dormancy naturally, or need to be pre-treated with bleach or chilling if sown in spring.
- To keep seeds from washing away, apply a tackifier.
- Seeds need moist to shallowly flooded soil (≤ 2 inches) to germinate. Native plants will be the most vulnerable in the first month. Choosing restoration areas with water control will help maintain conditions necessary for plant establishment.
- Pre-treated seeds should be sown in late spring, when soil temperatures are warmer, and the ground is still moist.
- Once established, alkali bulrush prefers fluctuating water levels, while threesquare and hardstem bulrush like saturated to shallow (≤ 2 inches) flooding.
- ***For details on revegetation protocols, contact Dr. Karin Kettenring, karin.kettenring@usu.edu***

S.J. & JESSIE E. QUINNEY
COLLEGE of
NATURAL RESOURCES

UtahStateUniversity
ECOLOGY CENTER

UTAH
AGRICULTURAL
EXPERIMENT STATION



This document was informed by the graduate research of Chad Cranney, Brittany Duncan, David England, Rachel Hager, Emily Martin, and Christine Rohal as part of the Kettenring Wetland Ecology Lab at USU, and was developed in collaboration with Utah Division of Wildlife Resources and Utah Division of Forestry, Fire & State Lands.

This research was supported by: Community Foundation of Utah; Delta Waterfowl; Ducks Unlimited Canada; Environmental Protection Agency; Friends of Great Salt Lake; Intermountain West Joint Venture; Kennecott Utah Copper Charitable Foundation; Salt Institute; Society of Wetland Scientists; Southshore Wetlands & Wildlife Management, Inc.; U.S. Fish & Wildlife Service; USU Ecology Center and Office of Research & Graduate Studies; Utah Agricultural Experiment Station; Utah Division of Forestry, Fire & State Lands; Utah Division of Water Quality; Utah Division of Wildlife Resources; Utah Waterfowl Association; Utah Wetlands Foundation; Wetland Foundation.

We thank the managers and landowners who provided access to properties and helped with treatment implementation for our experiments.

This document can be cited as: Rohal, C., K. Hambrecht, C. Cranney, and K. Kettenring. 2017. How to restore *Phragmites*-invaded wetlands. Utah Agricultural Experiment Station Research Report 224, Logan, UT. 2pp.