

Best practices to control non-native, invasive *Phragmites* within the Jordan River Corridor (Utah, USA)

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This document was informed by the experience of practitioners working in wetland and riparian areas in the region, including those working with the Jordan River Commission and Division of Forestry, Fire and State Lands.

Introduction

Controlling *Phragmites* (*Phragmites australis* subsp. *australis*) is a common goal of many land managers working in wetland and riparian areas in North America. In this document we summarize best practices for controlling *Phragmites* from our experience and those of practitioners working on the Jordan River in UT. We plan to update this document as we make progress treating *Phragmites* on public and private lands along the Jordan River so that it will be a relevant resource for those working to control *Phragmites* on the Jordan River.

Non-native, invasive *Phragmites australis* subsp. *australis*

The *Phragmites* species we reference in this document is the non-native, invasive subspecies that is not originally from North America and has aggressive characteristics. Almost all of the *Phragmites* in northern Utah is *Phragmites australis* subsp. *australis*. This subspecies outcompetes and replaces diverse native plant communities which sustain diverse resident and migratory wildlife species. *Phragmites* encroaches into the river channel and up the banks of the Jordan River, impeding human and wildlife access along and to the river. The native subspecies, *Phragmites australis* subsp. *americanus*, does not grow as densely and may have subtle morphological differences (e.g., leaf sheath falls off easily in the native subspecies; it stays tightly attached to the dead culm in the non-native subspecies).



How to prioritize sites

The criteria below may be useful in identifying areas to prioritize *Phragmites* control and restoration.

These criteria were developed by the *Phragmites Working Group for the Jordan River*.

Critical need — areas where ecosystem functions and services are at great risk and demand immediate attention

Protection — areas where ecosystem functions and services are of high quality but need management to maintain this status

Leveraged efforts — areas where control efforts would build upon other investments along the Jordan River

How to control *Phragmites*

- We recommend integrating mechanical (i.e., mowing), chemical (i.e., herbicide), and revegetation strategies to control *Phragmites* on the Jordan River. Research shows that the application of these three strategies is much more effective than one of these techniques alone.
- Typically, *Phragmites* will need to be controlled with mechanical and chemical treatments within the same year, for 3–5 years. Revegetation will likely be needed to assist in the recovery of native plants.
- Other strategies to control *Phragmites*, such as grazing and water control, may apply in some places on the Jordan River, however due the nature of the Jordan River system (e.g., highly developed, regulated flows), these strategies may be less applicable.

Treatment timeline for Phragmites control

June – July	July – September	October – April
Mowing ^a	Herbicide ^b	Mowing ^c
		Revegetation ^d

*The above table shows a coarse timeline for controlling Phragmites. **This timeline should be repeated each year until Phragmites is controlled (typically this will take 3–5 years).** The timing of these treatments may vary due to the weather from year to year and the location of the restoration site.*

a: Mowing in June or July can improve access for spraying and reduce seed production. This step is optional. Take precautions to avoid disrupting nesting birds.

b: Appropriate timing for spraying may vary within a given site. Drier areas may need to be sprayed in July before plants are drought-stressed (see note below about drought stress). Phragmites growing in wet areas likely can be sprayed in August and September. Spraying later in the season has been shown to yield better long term control.

c: This mowing treatment will break up the standing dead Phragmites and will allow light to reach the soil surface (important for germination of native plants).

d: Revegetation (e.g., sowing seeds, planting trees) adjacent to small patches of Phragmites can be pursued in the first year of control. Revegetation within dense Phragmites stands should be pursued only when significant progress has been made in reducing Phragmites cover and biomass. Care should be taken to avoid spraying or mowing newly revegetated areas. Generally, the best time to revegetate is in the fall or spring when conditions are cool and moist.

Important considerations for the timing of treatments

- **Spray Phragmites with herbicide before it becomes drought-stressed.** When the plant is stressed it has a weakened ability to metabolize the herbicide. Drought stress can present as obvious or subtle yellowing of the leaves. Context clues, like the current drought status, or distance to water can help determine if the plant is drought-stressed. Be aware that there may be a shorter window to spray Phragmites that is growing further from water.
- **Do not mow Phragmites within one month of an herbicide treatment, before or after.**
- **Be sure to spray Phragmites before the first frost.**



Recommended herbicide mixture

You must follow all labels and calibrate your spray equipment.

- Aquatic-approved glyphosate; use the high end of the labeled rate (e.g., RoundUp Custom at 3 Qt/acre, or 1.5% solution for handheld spot spray)
- Aquatic-approved, non-ionic surfactant (e.g., LI-700 at labeled rate)
- Ammonium sulfate (8 to 17 lbs per 100 gallon spray solution)
- Clean water
- Dye (at the labeled rate)

Aquatic-approved imazapyr herbicides are also an option, but they are more expensive, persist in the soil (potentially affecting desirable seedlings), and have more label restrictions. Consider using imazapyr, if the label allows, in areas where glyphosate has been used for many years to prevent herbicide resistance from developing.

Other considerations

- Create work corridors to allow vehicles and people to efficiently access the restoration site. This may involve removing some Russian olive, tamarisk, and Phragmites.
- Consider bank erosion— in some places it may not be appropriate to remove Phragmites if its removal will accelerate erosion that will negatively affect infrastructure.
- To prevent clonal expansion of small Phragmites stands, consider hand pulling Phragmites runners.

Phragmites treatment methods, equipment, and materials

Mowing — to reduce seed production, improve access, and remove dead biomass

Equipment	Useful when...
Brushcutter (e.g., Stihl FS 561 C-EM with tri-bladed brush knife attachment)	Small area; poor vehicle access
Marsh Master or Softtrak with mower	Large area; mostly flat
Skid steer with mowing attachment	Patches of all sizes
Mini excavator with mowing attachment	Steep slopes



Herbicide spraying — to kill the plant

Equipment	Useful when...
Backpack sprayer	Small area; short or sparse Phragmites; poor vehicle access
Argo (amphibious vehicle)	Wet areas (but avoid deep standing water); tall Phragmites
UTV	Dry conditions
Drone	High vantage point nearby; poor access by foot and vehicle
Marsh Master or Softtrak	Large area; mostly flat
Boat (e.g., Jon boat)	Poor access from land



Revegetation — to assist in the recovery of native plant species and prevent Phragmites reinvasion

Plant materials

Seed

Potted trees, shrubs, grasses, forbs

Cuttings

Sod mats

For more information about revegetation see “Best practices for revegetation along the Jordan River (Utah, USA) following control of invasive plant species”.

For more information about the Jordan River Cooperative Weed Management Area please contact Rae Robinson, Jordan River Vegetation Project Coordinator, at raerobinson@utah.gov.