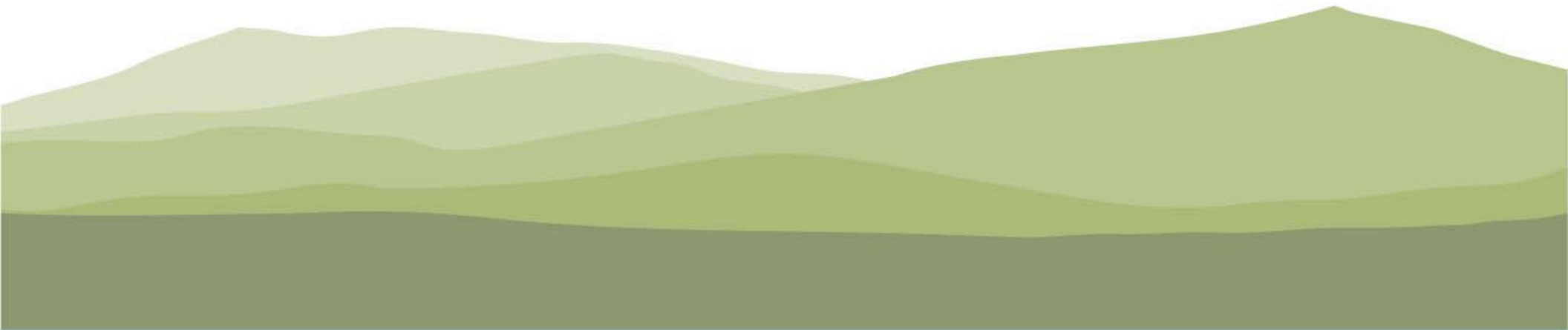


Freshwater Tidal Wetland Restoration John A. Roebling Memorial Park



Mark Gallagher

Vice President

mgallagher@princetonhydro.com

908-237-5660

Roebling Park – Abbott Marshland



Freshwater Wetland Tidal Restoration Goals

1. Reduce and control Phragmites in order to re-establish native marsh vegetation
2. Increase flora and fauna diversity and improve habitat for threatened and endangered species in the marsh
3. Improve recreational opportunities in the marsh by restoring navigable channels and enhancing the viewshed.
4. Improve visitor experience to the park and increase interpretive opportunities cultivating a native plant community in the marsh.

Phase 1 - Restoration

- Herbicide applications will be required in order to achieve eradication.
- Access through site via amphibious spray vehicles and/or boats to apply the herbicide.
- Native vegetation will be re-established.



Marsh at Roebling Park



Phase 1 - Restoration

- Aquatic Pesticide General Permit Issued by NJDEP 6/12/2018.
- Applications submitted to NJDEP for the creation, restoration and enhancement of habitat and water quality values and functions.
 - Flood Hazard Area (FHA) General Permit #4
 - Freshwater Wetlands (FWW) General Permit #16
 - Coastal (CZM) General Permit #24

What is Phragmites?

- *Phragmites australis* (aka common reed) is a species of grass that has a non-native invasive form that creates extensive stands in shallow water or on damp ground.
- Tends to colonize disturbed wetlands and then spreads very rapidly; outcompeting desirable native plant species.
- Forms a monoculture and dense mat resulting in little opportunity for native plants to compete.
- Impairs the natural functioning of the marsh ecosystem by altering its elevations and tidal reach which impacts plant and animal communities.
- Excessive growth can impact recreational activities, i.e. canoeing, birdwatching, etc.

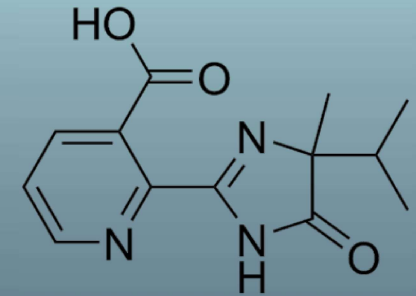
Where does Phragmites come from?

- *Phragmites australis* has been part of the flora of New Jersey since the early 1800's.
- Over last century there has been a dramatic increase in the spread of Phragmites that are in part due to development impacts that resulted in disturbances to wetlands.



Herbicide Application

- Possible eradication methods:
 - Mowing, Burning, Flooding, Solar burning and Grazing.
- Herbicide application is the most effective method to destroy large areas of Phragmites
 - Imazapyr is the active ingredient in the herbicide that will be used to eradicate the Phragmites in the project area.
- Herbicide does not have a noxious smell.
 - To track the locations that have been sprayed, blue dye is mixed with Imazapyr to make it visible.



Eradication of Phragmites Methodology

- The USEPA and NJDEP approved herbicide Habitat (Imazapyr) will be applied via an amphibious vehicle (Marsh Master) at high tide.
- Small areas inaccessible to Marsh Master would be treated with backpack applicators.
- Following herbicide treatment, the Marsh Master would be equipped with a steel lawn roller with a welded angle iron to roll over and crush/snap the common reed stalks. The stalks would be rolled in opposite directions to tray and mulch the stalks.
- The mulch will remain on-site. This methodology is effective for providing a suitable medium for the recruitment of the native seedbank.

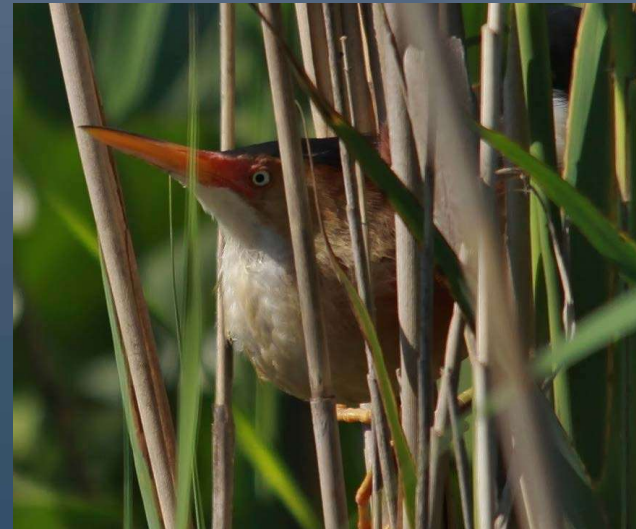


Is it Safe to Apply Herbicide to Wetlands?

- Imazapyr has been extensively studied and when properly applied it has NO impact to Water Quality, Aquatic animal life, birds, or mammals, including people.
- Imazapyr is a systematic herbicide that works by preventing plants from producing a necessary enzyme, acetolactate synthase (ALS), which is not found in animals, and therefore, works selectively on plants.
- Imazapyr is included in the EPA's lowest toxicity category to fish, animals, invertebrates, birds and mammals.
- Imazapyr does NOT bioaccumulate in animal tissues.
- Imazapyr IS broken down in the water by sunlight and has a half-life ranging from 3-5 days (as per Wisconsin DNR).

How will the goals of this project be achieved?

- This is a stewardship project in which the first step is the removal of Phragmites. The long term goal is to reduce its ability to recolonize the marsh.
- Replacement of Phragmites with native plant communities will
 - Enhance plant diversity
 - Enhance wildlife habitat
 - Enhance water quality



Project Timeline

- Herbicide will be applied by a NJ licensed and experienced pesticide applicator once ALL NJDEP permits are issued.
- Herbicide will be applied ONLY during safe, non-windy weather conditions.
- Herbicide will NOT be broadcasted throughout the entire marsh.
- Herbicide application will be specific to Phragmites dominated areas.

Project Schedule

John A Roebling Memorial Park - Freshwater Tidal	178 days	6/1/2018	2/4/2019
Common Reed Rolling and Clearing	15 days	1/15/2019	2/4/2019
Herbicide Control of Common Reed	15 days	11/29/2018	12/19/2018
Treatment	15 days	11/15/2018	12/5/2018
Permitting	8 days	6/1/2018	6/12/2018
Public Outreach	60 days	9/17/2018	12/7/2018
Public Meetings	60 days	8/15/2018	11/5/2018
Floristic Quality Assessment	90 days	8/1/2018	12/3/2018
Hydrological Monitoring	90 days	8/1/2018	12/3/2018
Evaluation for Planned Wetlands (EPW)	90 days	8/1/2018	12/3/2018
Plan Development	51 days	6/1/2018	8/10/2018
Permitting	130 days	6/1/2018	11/28/2018
DRCC	45 days	8/27/2018	10/25/2018
NJDEP Coastal GP 24	70 days	8/13/2018	11/15/2018
NJDEP FWW GP 16	70 days	8/13/2018	11/15/2018
NJDEP FHA GP 4	70 days	8/13/2018	11/15/2018

Floristic Quality Assessment

- A Floristic Quality Assessment will be conducted before and after invasive management activities in order to evaluate the following:
 - Plant communities,
 - Identify areas where invasive and non-native plant species are displacing native species,
 - Recolonization of the site via recruitment of the native seedbank,
 - Guide Phase II restoration efforts



Evaluation of Planned Wetlands (EPW)

- ✓ An Evaluation of Planned Wetlands (EPW) functional wetland assessment is being prepared to quantitatively document functional uplift resulting from the proposed restoration activities at Roebling Park.
- ✓ The EPW will be used to:
 - Identify key wetland functions/values to be enhanced restored.
 - Assess these functions and values in the pre-construction (existing) condition.
 - Assess uplift of these functions and values in the post project implementation condition.

Hydrologic Monitoring

- Hydrologic Monitoring is currently being conducted.
- The monitoring will help identify the tidal stage elevations.
 - Freshwater tidal marsh vegetation is dependent on tidal stage and flooding duration.
- Information obtained from the monitoring will inform the Phase II design by identifying areas where the tidal flooding has been impeded.

Project will meet the County's Goals

The implementation of the eradication of Phragmites and the natural resources assessments that are currently underway will help achieve the County's 4 goals

1. Reduce and control Phragmites
2. Increase flora and fauna diversity
3. Improve recreational opportunities in the marsh
4. Improve visitor experience to the park



SCIENCE
ENGINEERING
DESIGN



QUESTIONS?



Mark Gallagher

Vice President

Princeton Hydro, LLC

mgallagher@princetonhydro.com

908-237-5660

THANK
YOU!

PRINCETONHYDRO.COM