



Appendix A. Mannington Meadows Important Bird Area Riparian Restoration Plan

As part of the Mannington Meadows Important Bird Area Conservation Plan, the New Jersey Audubon Society (NJAS), the United States Fish and Wildlife Service (USFWS), Ducks Unlimited, the United States Department of Agriculture's Farm Services Agency (FSA) and Natural Resource Conservation Service (NRCS), the New Jersey Department of Environmental Protection (NJDEP), and the Mannington Township Environmental Commission have partnered with dedicated private landowners to implement a plan to reduce the amount of *Phragmites australis*, locally referred to as common reed grass, within the Mannington Meadows Important Bird Area (MMIBA).

Need

Phragmites is a genus of aquatic grass that contains species both native and non-native to North America. Recently, a non-native strain has become so successful that it dominates much of the MMIBA, displacing native habitat types. Because of its invasive nature, *Phragmites* is generally considered to be undesirable and reflects a degraded ecosystem. *Phragmites* tends to out-compete native vegetation and often times will establish a monoculture stand (Chambers et al 1999), contiguous along miles of the littoral zone of many water bodies in southern New Jersey. The recent *Phragmites* invasion is also addressed in the Comprehensive Conservation Management Plan for the Delaware Estuary. Action H4.7 under the Habitat and Living Resources section is to "reduce *Phragmites* cover in tidal wetlands". As with many parts of the Delaware Estuary, the majority of the shoreline of the Mannington Meadows is dominated by a non-native strain of *Phragmites*, which has led to a reduction of native habitat types within the MMIBA. Our objective is to increase the diversity of habitat types within the MMIBA by restoring sections of the Mannington Meadows shoreline to native species of vegetation.

Expected benefits

The Mannington Meadows is an important area for waterfowl and supports the largest diversity of duck species in the state (Ted Nichols, NJDEP, pers. comm.). *Phragmites* stands are considered suboptimal habitat because they support a lower density and diversity of macro-invertebrates (Angradi et al 2001) and seed resources than native *Spartina* marshes. Waterfowl utilize the MMIBA as stop-over habitat for rest and fuel during migration and winter. By reducing the amount of *Phragmites* cover and increasing the amount of native vegetation in the MMIBA, we expect that waterfowl will benefit from an increased availability of quality food resources.



Phragmites, however, can provide adequate cover habitat for waterbirds and waterfowl (Kane 2001). In particular, secretive marsh birds, such as bitterns and rails, can benefit from the structure of *Phragmites* and often utilize it for nesting habitat. Therefore, our goal is not to completely eradicate *Phragmites* from the MMIBA, but to reduce its dominance within the ecosystem to a habitat type found within a matrix of native vegetation. We believe that secretive marsh birds will also benefit from an increase in vegetative diversity and available food resources within the MMIBA.

Project Area

The Mannington Meadows IBA is located in Salem County, NJ. The project area is located in the Mannington Township. Habitat restoration will take place on several adjacent tracts of private land and one tract of the Salem River Wildlife Management Area (WMA), covering approximately 40 acres or two miles of shoreline. The project area begins at the Route 540 causeway that crosses Mannington Creek and extends approximately two miles southwest of the causeway (Figure 1). All of the properties are privately owned farmland, except for one residential home and one parcel owned by the state and managed by the NJDEP (Figure 1).

Restoration Plan

Restoration will include conversion of a *Phragmites* monoculture to native vegetation and augmentation of the existing riparian zone. From the agricultural fields to the water's edge *Phragmites*, where it exists, will be removed and native trees, shrubs, and herbaceous vegetation will be planted (Table 1). The riparian buffer will also be augmented by installing forested riparian buffers and grass filter strips.

The preferred means to control *Phragmites* is through application of a glyphosate based herbicide (e.g., Rodeo™ or Glypro™) with a surfactant (e.g., LI-700™) suitable for safe aquatic application. Application may be made via one or a combination of methods: back-pack sprayers, tank and pump applicator mounted on a pick-up truck or a Marsh Master™ (a semi amphibious vehicle) or aerial spraying. Application will take place approximately within one month of September 15 and again at the same time the following year. During September, the growth of common reed is still vigorous and nutrients are being transported from the leaves into the roots, thus facilitating herbicide efficacy. However, other desirable marsh species, such as *Spartina* spp., are generally dormant during September and are usually not significantly affected by the herbicide. Care will be taken during herbicide application to minimize accidental exposure of trees.

The spring following 2 consecutive seasons of herbicide application, a variety of shrubs and trees will be planted along the shoreline (see Table 1). Re-vegetating provides several benefits including: replacement of cover lost due to



removal of *Phragmites*, helps prevent reinvasion by out competing *Phragmites*, increases plant diversity, and provides desirable seed sources for future natural reseeding of adjacent areas. The USFWS' Partners for Fish and Wildlife and Coastal Programs will provide the shrubs and trees. Volunteers from the community, coordinated by the NJ Audubon Society, will do the planting. Species planted will be those with particularly high value for pollinators and migratory birds as well as having at least some tolerance to brackish water in the soil, during infrequent flooding, or in sea spray.

Timeline

- Fall 2006: first herbicide application of *Phragmites*
- Spring 2007: mow non-native species in existing riparian zone, such as multiflora rose (*Rosa multiflora*). Plant native trees and shrubs in place
- Summer 2007: mow *Phragmites*. Begin monitoring program.
- Fall 2007: second herbicide application of *Phragmites*. Begin planting trees and filter strips in area for riparian augmentation.
- Spring 2008: plant *Phragmites* area with native vegetation. Continue planting trees and filter strips in area for riparian augmentation.
- Fall 2008: complete replanting of *Phragmites* area. Complete planting in riparian augmentation areas.
- 2009 – 2011: continue to monitor project site.

Measures of Success

Likelihood of success is considered high for this project because of the scale and placement of the project. The restoration project begins at the Route 540 causeway, beyond which is freshwater because of the existence of a sluice gate. In addition, the road should serve as an effective barrier to rhizomatic re-colonization of *Phragmites*. Restoration will extend 2 miles downstream and will be coupled with riparian augmentation providing a solid core of source native vegetation and a reliable seed bank. Furthermore, the replanting of trees and shrubs is expected to out-compete *Phragmites* by blocking access to light and resources.

Criteria for success revolve around the establishment of native vegetation. Birds are expected to respond positively, however, avian response will be difficult to isolate. The native plants are expected to provide food resources that will attract birds, but seeds will also disperse, so total avian benefit would be difficult to measure. Therefore, criteria for success will be determined by the extent of *Phragmites* removal and duration of absence of *Phragmites*. The project will be deemed successful if at least 75% of the *Phragmites* is removed from the project site for at least 5 years.



Monitoring

Anecdotal monitoring will be conducted by biologists with the various partner organizations for at least 5 years. Avian response will be monitored via existing surveys conducted by the NJDEP's waterfowl biologist and by NJ Audubon Society's Citizen Scientist Program. In addition, vegetation surveys will be conducted by students at a partner University. Vegetation surveying will continue for at least 2 years post treatment. After 2 years, we may retain another intern or a biologist to continue to monitor the project site qualitatively.

Literature Cited

Angradi TR, Hagan SM, Able KW (2001) VEGETATION TYPE AND THE INTERTIDAL MACROINVERTEBRATE FAUNA OF A BRACKISH MARSH: *PHRAGMITES* VS. *SPARTINA*. *Wetlands*: Vol. 21, No. 1 pp. 75–92.

Chambers R. C., L. A. Meyerson, K. Saltonstall. 1999. Expansion of [*Phragmites australis*](#) into tidal wetlands of North America. *Aquatic Botany*. 64:261–273.

Kane, R. 2001. *Phragmites* use by birds in New Jersey. NJAS Opinion.

Table 1. Potential shrub and tree species for use along the shoreline of Mannington Meadows

Species	Common name	Wetland indicator	Shade	Deer browse resistance	Wildlife value	Height in feet
<i>Amelanchier canadensis</i>	serviceberry	FAC	sun to partial shade	resistant	spring flowers and early summer fruits	15
<i>Aronia arbutifolia</i>	red chokeberry	FACW	sun to partial sun	resistant	summer flowers and late fall fruits	10
<i>Baccharis halimifolia</i>	groundsel tree	FAC	full sun	?	cover	15
<i>Celtis occidentalis</i>	hackberry	FACU	sun to partial sun	moderate	fruits available during winter	40-60
<i>Clethra alnifolia</i>	sweet pepperbush	FACW	partial sun to partial shade	resistant	good nectar source and provides fruits	8
<i>Iva frutescens</i>	Marsh elder	FACW	full sun	?	cover	4
<i>Lindera benzoin</i>	spicebush	FACW	sun to partial shade	resistant	summer flowers and fall fruits	12
<i>Myrica pensylvanica</i>	bayberry	FAC	sun to partial sun	resistant	fruits available during winter	15
<i>Nyssa sylvatica</i>	sourgum	FAC	sun to partial shade	resistant	fruits available in late summer and fall	40-60
<i>Rhus typhina</i>	staghorn sumac	FACU	sun to partial sun	?	fruits available in winter	20
<i>Sambucus canadensis</i>	elderberry	FACW-	sun to partial shade	moderate	fruits available in midsummer	12
<i>Viburnum dentatum</i>	arrowwood	FAC	sun to partial sun	resistant	spring flowers and fall fruits	15
<i>Ilex glabra</i>	inkberry	FACW-	sun to shade	resistant	fruits available during winter	6-8
<i>Juniperus virginiana</i>	eastern red cedar	FACU	full sun	resistant	good cover and fruits available in winter	30-40

Figure 1. Riparian Restoration Project site within the Mannington Meadows IBA, Salem County, NJ.

