Phragmites (*Phragmites australis* ssp. *australis*) Removal and Native Plant Recolonization

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Introduction

Phragmites (*Phragmites australis* ssp. *australis)* is a Eurasian-native introduced to the United States between the late 1700s and early 1800s. In the southwest portion of Schmeeckle Reserve on the University of Wisconsin-Stevens Point (UWSP) campus, there was once a Phragmites monoculture (Figure 1) spanning across three wetland pools, a total of 0.4 acres. The aim of this study was to better understand the recolonization of native plant communities after Phragmites removal (Figure 2).

Methods

In Fall 2014 and 2015, stands of Phragmites were treated with the non-selective herbicide Imazapyr. In the winter of 2016, a seedbank study was conducted by collecting soil samples from within the former Phragmites stand. Soil samples were spread across pans in the UWSP greenhouse and seedlings were allowed to grow for identification. In the spring of 2016, a mix of 22.6% native sedges, 3.6% native grasses, and 73.8% native forbs were planted as plugs—a total of 33 species and 8,000 plugs. 5 additional species were added as seeds. Following the planting, re-sprouts of Phragmites were controlled with spot treatments of Imazapyr and manual removal using spade shovels (Figure 3). A plant inventory was conducted in 2017 and again in 2022 to determine the effectiveness of the planting and native plant recolonization.

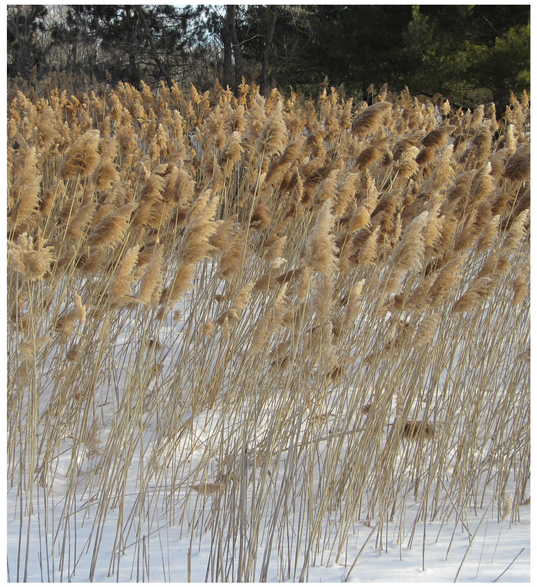

Figure 1. Site prior to Phragmites removal

Figure 2. Same site after removal and planting

Figure 3. Spade shovels were used to cut the Phragmites stems below ground level and damage the rhizomes of the colony. Soil was removed in this photo to expose the rhizome, seen in front of the shovel.

Results

The seedbank study produced 19 species, most of which were non-native, weedy species such as common mullein (*Verbascum thapsus*) and Canada thistle (*Cirsium arvense*). The 2017 inventory yielded 85 species in total, with 66% of the planted species still present. In 2022, 61 species were observed, with 39% of the planted species present (Figure 4). In both inventories, 5 invasive species were identified. The remaining species were volunteer species (Figure 5). Species composition decreased between 2017 and 2022 (Figure 6).

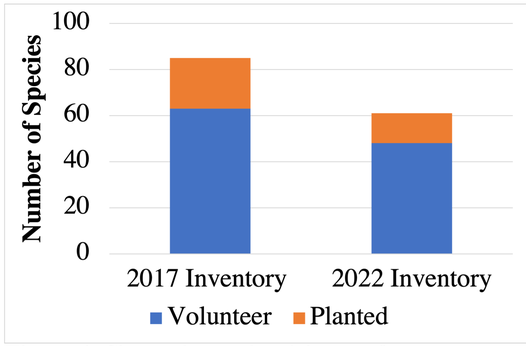

Figure 4. Change in species richness after Phragmites removal and planting

Figure 5. Volunteer species, sweet flag (*Acorus calamus*) recolonization after Phragmites removal

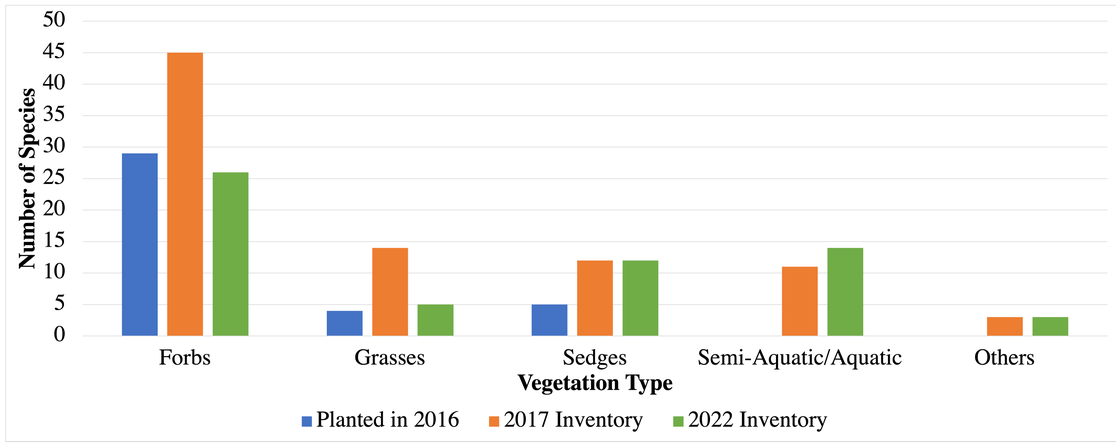

Figure 6. Change in richness of species groups observed between 2017 and 2022

Discussion

One of the main challenges faced was an unseasonably wet year in 2016. On the day after planting, heavy rains caused a 14-inch rise in water level within the planted wetlands, submerging many of the newly installed plants. Water level also remained high due to a reduction in evapotranspiration following removal of the Phragmites stand.

Deer herbivory posed another challenge (Figure 7). Plant families that showed the most resistance to deer grazing included Cyperaceae, Poaceae, and Iridaceae.

After removal of the Phragmites, narrow-leaved cattail (*Typha angustifolia)* and hybrid cattail (*Typha* x *glauca*) began invading open areas of the site. This invasion worsened during 2020-22 because of less frequent management affected by COVID-19 and budget/staffing cuts.

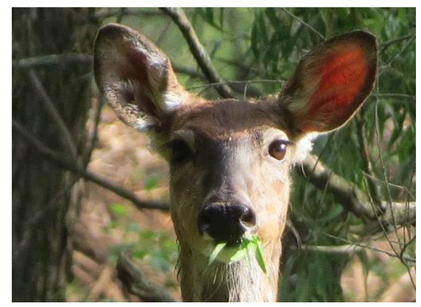

Figure 7. Deer herbivory after planting

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