

2021 Final Report

Capital Region PRISM

Project Request for Proposals

Name of Contractor: Edmund Niles Huyck Preserve, Inc.

Name and Title of Contact: Anne Rhoads, Ph.D., Executive Director

Project Title: Next steps in management and monitoring of invasive forest pests and aquatic and terrestrial plants at the Edmund Niles Huyck Preserve

Contract Number: 21-002

Background

The Edmund Niles Huyck Preserve is a 2,072-acre nature preserve and biological field station founded in 1931. Since the adoption of its invasive species management and monitoring plan, the Huyck Preserve has become well-equipped to combat the invasive species that threaten its ecosystems. In 2019 and 2020, funds made available through Capital Region PRISM's RFP allowed the Huyck Preserve to manage and monitor priority species and priority areas through the hiring of seasonal employees and also enabled the initiation of the treatment of hemlock woolly adelgid as prescribed in the Huyck Preserve's invasive species management and monitoring plan. This 2021 project continued active management and monitoring of invasive plants and forest pests and initiated innovative techniques for invasive plant management.

Goals

The 2021 goals for invasive species management were as follows:

- Perform treatment of hemlock woolly adelgid (HWA) at Lincoln Pond, a stand earning the highest priority for protection based on New York State Hemlock Initiative's (NYSHI) prioritization tool.
- Perform the Huyck Preserve's first treatment of emerald ash borer (EAB) to protect the high visibility white ash trees along the Lower Falls Trail, some of which are part of our Citizen Science phenology trail.
- Eliminate species emerging at the Huyck Preserve and possible to eradicate across the PRISM region (Tier 1 and 2).
- Eliminate small, discrete populations of invasive species within the Huyck Preserve that are more widespread regionally.
- Contain Tier 4 invasive populations that are too large or too labor intensive to eradicate for now, but that are relatively discrete and may be prevented from spreading widely across the Preserve.
- Control widespread invasive species in target areas.
- Engage the public to increase awareness of invasive species identification, prevention, monitoring and management through education and outreach activities.
- Initiate innovative methods for invasive species management.

Accomplishments

We hired two seasonal invasive species employees under this RFP to work approximately nine weeks over the season. One assistant was a 2020 graduate of SUNY College at Geneseo. The other was an undergraduate student at SUNY Plattsburgh. An additional assistant was hired using residual staffing funds to complete an education brochure on invasive and native species.

Tools and equipment were purchased to employ innovative techniques for invasive species management including hardware cloth and a weed torch with propane.

Best management practices (BMP's) were followed when managing invasive species. The hemlock woolly adelgid and emerald ash borer treatments were performed by an experienced contractor using well-established BMP's. Invasive plant management was overseen by Huyck Preserve Executive Director Anne Rhoads and performed by Stewardship Coordinator Garrett Chisholm, with seasonal staff using only mechanical methods. When possible, all plant materials (including roots) were removed and bagged. For plants not removed completely, aboveground biomass was removed with a goal of reducing stored energy and eliminating the plant over a longer period. Following this idea, for shrubs too large to pull or dig, stems were cut near the ground and wrapped in black plastic. Herbaceous plants too widespread to eliminate were cut repeatedly. Fieldwork began on June 7, 2021 and managed areas were monitored every two to three weeks to check for regrowth, and subsequent resprouts were removed. Management activities were logged using iMapinvasives and in-house records were kept for each individual or patch including GPS coordinates, photos, size of patch if relevant, dates managed, activities performed, and people involved.

Additional photos of the 2021 management efforts can be found at <https://www.huyckpreserve.org/2021-invasive-species-management-photos.html>.

Priority I – Treat the Lincoln Pond Hemlock Stand for Hemlock Woolly Adelgid and the Lower Falls Trail for Emerald Ash Borer.

1. A significant result of this RFP was the treatment of HWA at Lincoln Pond and EAB at the Lower Falls Trail. The treatment of HWA at Lincoln Pond will help us protect an old-growth stand of trees, the water quality of Lincoln Pond and Lake Myosotis (a public drinking water supply), and the view from and integrity of the second most used trail at the Preserve that also serves as our main trail for education programs. This treatment was imperative in slowing the spread of HWA to other stands at the Preserve and across the region.

CGL Arbor Services (Angelo Schembari) was hired to perform the chemical application which was performed on June 2, 3, and 7, 2021. Trees >8-inch dbh and with a live crown ratio $\geq 30\%$ were treated in an area delineated by Huyck Preserve staff prior to treatment. Treated trees were marked by the contractor using aluminum tags which included a red paint splash indicating the year of treatment. The primary treatment method was directed basal bark spray using imidacloprid and dinotefuran (Safari) insecticides (Fig. 1). 350 trees were treated using basal bark spray, totaling 5,775 inches. Ten trees totaling 171 inches within 15-feet from Lincoln Pond were injected with imidacloprid via Quik-Jet Air tool and Arborplugs.

Select white ash trees with a high likelihood of positive response to chemical treatment were treated using emamectin benzoate injection along the Lower Falls Trail by CGL Arbor Services in June of 2021. Three trees were treated using this method, totaling 29 inches.



Fig. 1 HWA treatment area at Lincoln Pond (L) and application of basal bark spray (R)

Priority II – Eliminate species emerging at the Huyck Preserve and possible to eradicate across the PRISM region (Tier 1 and 2).

1. Five patches of yellow archangel (*Lamium galeobdolon*) were removed in 2019, with only two resprouts occurring in 2020. This year, no resprouts were found. Continued monitoring of yellow archangel will ensure eradication of the species from the Preserve. No additional Tier 1 or Tier 2 species were found in 2021.

Priority III - Eliminate small, discrete populations of invasive species within the Huyck Preserve that are more widespread regionally.

1. No resprouts were found from the original patch of bishop's goutweed (*Aegopodium podagraria*) managed in 2019 and 2020. In the second patch discovered in 2020, almost eighty resprouts were found during initial monitoring. Even with removal of the root system, resprouts continued to appear about every three weeks after initial management began in June. Diligent monitoring and regular management of the 2020 patch will help with the eradication of the population. Additional methods may be employed in the future.

2. In June 2021, 20 young February daphne (*Daphne mezereum*) plants were found and their roots and leaves were removed, showing a 20% reduction in the population from 2020. No resprouts were found during follow-up monitoring.

3. False spiraea (*Sorbaria sorbifolia*) is found in two locations at the Huyck Preserve. The smaller patch of false spiraea at Wheeler Watson cemetery was monitored and managed for resprouts on a biweekly basis. Density of resprouts was reduced after each visit, with no visible above ground biomass by August. After first accomplishing complete above ground biomass removal in 2020, the second, larger patch of false spirea contained much smaller resprouts in summer 2021. Grass weed cutters were used to remove above ground biomass in June and July. With a similar crew, this effort took nine days less than in 2021, showing that management is impacting the population. Extensive root systems will necessitate diligent monitoring and management over multiple years.

4. European privet (*Ligustrum vulgare*) was originally planted along the driveway to the Huyck Preserve's Lake Myosotis. Since management began in summer 2019, shrubs have not flowered or set fruit. Shrubs were cut again in summer 2020 and 2021. Complete shrub removal is a priority.

5. Only seven individuals of autumn olive (*Elaeagnus umbellata*) needed to be managed in 2021, equating to an almost 82% reduction since management began in 2019. Five individuals were incidentally found, cut, and solarized with black plastic.

6. The above and below-ground biomass of the three common barberry (*Berberis vulgaris*) plants that required additional management from 2020 was removed in 2021. No further resprouts were found. Six individuals were incidentally found and treated in 2021, two of which were solarized with black plastic because of their large size.

7. Burning Bush (*Euonymus alatus*) is found in close proximity to the Visitors' Center and Ordway House, where it was once planted. Though solarizing kept the four large individuals managed in 2020 at bay, root sprouts were found in close proximity to the stumps, revealing eradication will not be possible without the complete removal of the root system. Time will be dedicated in early spring 2022 for full removal of remaining root systems.

8. Management and monitoring efforts of water chestnut (*Trapa natans*) on Lincoln Pond have resulted in an almost 90% reduction in the population since initial discovery and management in 2018. A total of eight mature plants were found and removed in 2021. No further individuals were found on monitoring visits during the growing season. Eradication will be possible through close following of BMP's to reduce the long-lasting seed back in the pond bottom.

9. Management of Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*) on Lake Myosotis in 2021 revealed the severe limitations of non-chemical control of these two species. Hand pulling that occurred in 2020 was nearly impossible because of the high water level from significant rain throughout the growing season. Both species were monitored weekly to ensure their populations remained on the north side of the lake, and "rakes" were used when possible to remove biomass. Strict weekly monitoring and management should continue and alternative management techniques should be considered in 2022. It should be

noted that density of the patch appears to be reduced since removal of nearly all above ground biomass in 2020.

Priority IV. Contain Tier 4 invasive populations that are too large or too labor intensive to eradicate for now, but that are relatively discrete and may be prevented from spreading widely across the Preserve.

1. Small patches of pale swallow-wort (*Vincetoxicum rossicum*) were hand-pulled and roots were dug up along the Wheeler Watson Trail with the goal of eradication. Since 2019, this patch has seen a 20% reduction in size as a result of hand pulling efforts. The larger patch along the Loop One Trail was approximately 30% managed by cutting back above ground biomass before seed set. This work was done with the assistance of a week-long stewardship crew. The goal for Loop One Trail is containment, but this will not be possible without an increase in our workforce.

2. In 2021, four patches of black swallow-wort (*Vincetoxicum nigrum*) were hand-pulled and roots were dug up. One of these patches had not been managed in 2020 due to size, but we were able to see a complete elimination of its above-ground biomass in 2021.

3. All four patches of phragmites (*Phragmites australis*) were managed in 2021 by cutting stems below the waterline when possible, and all other plants were broken at the base and pushed over. With subsequent monitoring, two patches needed repeated management approximately 30 days later due to their rapid growth. Experimental management in 2020 using swatches of carpeting continued to be successful as it continued to prevent that portion from regrowing in 2021.

Priority V. Control widespread invasive species in target areas

1. Intensive mechanical management of two patches of Japanese knotweed (*Reynoutria japonica*) began in 2019 and was repeated in 2020. On three occasions, both patches were cut to the ground and all biomass bagged and removed. This protocol was followed in 2021 until our hardware cloth study was begun (see innovative efforts section). The two additional patches discovered in 2020 continued to be managed through biomass removal.

2. Management of Japanese barberry (*Berberis thunbergii*) in 2021 consisted of removing or cutting back approximately 40 individual plants from the most heavily-trafficked trails at the Preserve, especially along Lincoln Pond Trail and Lake Trails East and West. This species was a focus for our week-long high school stewardship crew, so significant progress was made. Bushes were cut back to the base and, when possible, roots were removed.

Priority VI. Innovative Efforts

1. Weed Torch

Per recommendations through our partners in EMMA (Environmental Management and Monitoring Alliance), a weed torch was purchased and used to assist in invasive species management. Stewardship Coordinator Garrett Chisholm was trained in using a weed torch by Budd Veverka at Mianus River Gorge. Following recommendations by Budd and BMP's outlined by Lower Hudson (LH) PRISM, the weed torch was used for management of Japanese and common barberry, multiflora rose, and autumn olive in areas of ecological significance and high visibility around Lake Myosotis and Lincoln Pond. Individual plants were cut back to the base using loppers and, after 30 days, resprouts were sprayed with water and then briefly "blasted" using the weed torch (Fig. 2). Follow-up monitoring occurred another 30 days after flame treatment, and no further resprouts were identified. The location of each plant that was flame treated was marked using fluorescent pink tape to ensure they can be monitored again in early spring 2022.



Fig. 2 Multiflora rose before, during, and after flame treatment (L-R)

2. Hardware Cloth and Japanese Knotweed

A project was designed to test the effectiveness of hardware cloth in Japanese knotweed management. Regular management of the two patches at the core of the Preserve following BMP's outlined in our invasive species management at the beginning of the season. On July 13, 2021, above-ground biomass was removed and hardware cloth was laid out across one of the two patches at the core of the Preserve (experimental plot). The other patch had above-ground biomass removed but no hardware cloth installed (control plot). Four study plots were created in both the experimental and control plots (Fig. 3).



Fig. 3 Experimental Japanese knotweed plot after removal of above-ground biomass (L) and after installation of hardware cloth (R)

After 30 days, the number of individual stems in each plot was counted and their heights recorded. Initial results showed there to be more stems but shorter individuals in the experimental plot compared to the control plot (Figs. 4 and 5). Both of these responses may be a reaction to stress caused by the hardware cloth, but more information will be gathered through future monitoring. Results from monitoring over a period of years will guide future management of Japanese knotweed at the Preserve and provide valuable information to partners at PRISM and EMMA as well as community members. If effective, the use of hardware cloth would dramatically decrease the labor involved in manual knotweed management, provide an alternative to chemical management, and be especially valuable in more remote stands.

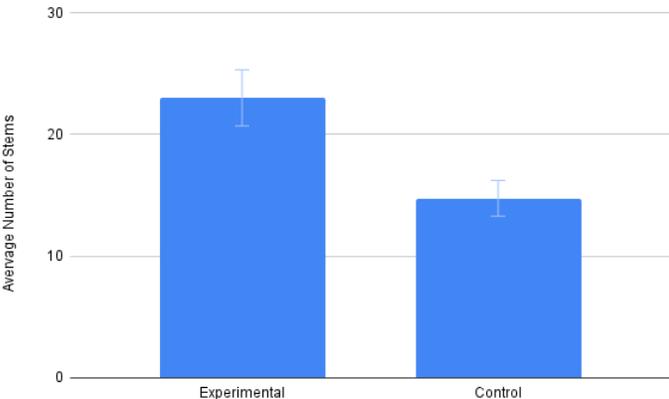


Fig. 4 Average number of stems of Japanese knotweed in experimental and control plots

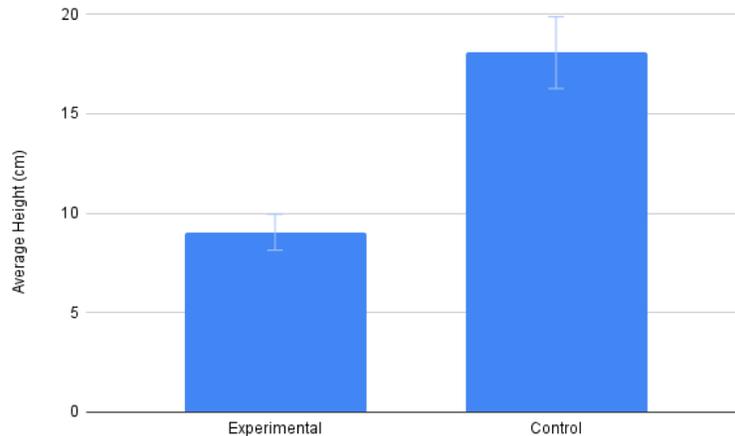


Fig. 5 Average height (cm) of Japanese knotweed individuals in experimental and control plots

Priority VI. Education and Outreach

Education is one of the Huyck Preserve’s core mission areas. With fewer Covid-19 restrictions in 2021, we incorporated invasive species management into more education programs and public events. A paddle event on Lake Myosotis in June focused partially on the invasive species that inhabit the lake and its surrounding forest edge. Stewardship Coordinator Garrett Chisholm visited Nature Study for elementary students in July with a lesson around invasive species. Students examined Asiatic bittersweet and began to understand how invasive species can be introduced. A public hike held in collaboration with NYSHI in October focused on hemlock woolly adelgid identification and threats.

Perhaps the most significant educational opportunity created in 2021 was the introduction of our new Stewardship Internship for High School Students. This program was focused entirely on invasive species identification, monitoring, and management. Not only did the program provide the students’ first experience with invasive species and their threat to biodiversity, it provided a productive workforce to support the invasive species team. The group’s work made a real difference to the health of the Preserve’s natural communities during the five-day program as they were able to tackle larger populations of invasive plants (Asiatic bittersweet, multiflora rose, Japanese barberry, and Eurasian watermilfoil), than would have been possible with a smaller crew.

We also continued education around invasive species through our Adopt-a-Trail program where we have 14 volunteer trail stewards monitoring our 12+ miles of trails and performing light trail maintenance which includes invasive species management. A list of watch species for the Huyck Preserve including Capital Region PRISM Tier 1 and Tier 2 species was created and shared with the volunteer trail stewards during their spring training.

Finally, a brochure was created by a seasonal staff member and regular staff to educate visitors about invasive plants and native alternatives. This brochure will be available at the Preserve's Visitors' Center and through public events.

Summary

Invasive species monitoring and management has become an integral part of operations at the Huyck Preserve, and education around invasive species has been seamlessly incorporated. The 2021 RFP allowed the Huyck Preserve to continue with the invasive species management and monitoring started in 2019 and make the necessary adjustments to management to augment our own understanding and inform others undertaking similar efforts across the region. The Preserve continued to see tangible results; after three years of management, treatment outcomes are demonstrating the importance of continuous efforts, which, at the scale found at the Preserve, would not be possible without seasonal employees. We continue to learn from previous management and each year are working closer to meeting our goals for invasive species control and eradication.