

2023 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: Enhancing ecosystem health by managing and monitoring invasive plants and forest pests

Contract Number: 23-002

Background

The Edmund Niles Huyck Preserve is a 2,084-acre nature preserve and biological field station founded in 1931. Since adopting our first invasive species management and monitoring plan in 2019, we have been committed to protecting key areas and communities at the Preserve through active monitoring and management of invasive plants and forest pests. From 2019-2023, funds made available through Capital Region PRISM's RFP have allowed the Huyck Preserve to manage and monitor invasive species including through early detection-rapid response by hiring seasonal employees to assist in this work, treating hemlock woolly adelgid (HWA) annually beginning in 2020, researching new management techniques, and more.

Goals

The 2023 goals for invasive species management were as follows:

- Perform a third round of 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.

- Pursue elimination of species emerging at the Preserve and possible to eradicate across the PRISM region (Tier 1 and 2).
 - Yellow archangel (*Lamiastrum galeobdolon*)
 - Leafy spurge (*Euphorbia esula*)
 - Japanese primrose (*Primula japonica*)
 - Wild chervil (*Anthriscus sylvestris*)
 - Japanese spirea (*Spiraea japonica*)

- Pursue elimination of small, discrete populations of invasive species within the Preserve that are widespread regionally (mainly Tier 4 and 5).
 - Bishop's goutweed (*Aegopodium podagraria*)
 - False spiraea (*Sorbaria sorbifolia*)
 - Norway maple (*Acer planatoides*)
 - February daphne (*Daphne mezereum*)
 - European privet (*Ligustrum vulgare*)
 - Autumn olive (*Elaeagnus umbellata*)

- Burning bush (*Euonymus alatus*)
- Common barberry (*Berberis vulgaris*)
- Common buckthorn (*Rhamnus cathartica*)
- Reed canary grass (*Phalaris arundinacea*)
- Water chestnut (*Trapa natans*)
- Japanese stilt grass (*Microstegium vimineum*) (T3)
- 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.
 - Phragmites (*Phragmites australis*)
 - Pale swallow-wort (*Vincetoxicum rossicum*)
 - Black swallow-wort (*Vincetoxicum nigrum*)
- Control widespread invasive species in target areas.
 - Japanese knotweed (*Reynoutria japonica*)
 - Japanese Barberry (*Berberis thunbergii*)
 - Eurasian watermilfoil (*Myriophyllum spicatum*)
 - Curly-leaf pondweed (*Potamogeton crispus*)
- Engage the public to increase awareness of invasive species identification, prevention, monitoring and management through education and outreach activities and continue to engage volunteers including through the Volunteer Trail Steward program.
- Continue innovative methods for invasive species management.

Accomplishments

We hired two seasonal invasive species employees from UAlbany and SUNY Cobleskill under this RFP to work approximately eight weeks over the season with Huyck Preserve Stewardship Coordinator Garrett Chisholm.

Management work began on June 12, 2023 and managed areas were monitored every two to three weeks to check for regrowth. Subsequent resprouts were removed. Management activities were logged using iMapMobileAdvanced, and in-house records were kept for each individual or patch including GPS coordinates, photos, size of patch, dates managed, activities performed, and people involved.

Total acres searched = 2,084

Total acres Treated = 127

Priority I – Treatment of hemlock woolly adelgid at Lincoln Pond

A major target of this RFP was the treatment of HWA at Lincoln Pond to safeguard the old-growth stand of trees growing along much of the pond's shore, the water quality of Lincoln Pond and Lake Myosotis (a public drinking water supply), and the experience of visitors to the

second most used trail at the Preserve which also serves as our main trail for K-12 education programs. This is the fourth year of HWA treatments at the Huyck Preserve (Table 1). Annual monitoring of HWA in this stand and across the Preserve has happened since 2020, and a formal post-treatment monitoring protocol was begun in 2022. Three, 10m diameter circular monitoring plots were established at each site treated from 2020-2022. The coordinates of the center of each plot was recorded and data was collected on HWA density, hemlock canopy health, and presence of low branches using a binned five-point scale system. Moving forward, plots in treated areas will be monitored the year after treatment and every two years thereafter.

Year	Location	Total Number Trees Treated	Number Trees Treated Basal Bark Spray	Number Trees Treated Injection	Total Number Inches Treated	Inches Treated Basal Bark Spray	Inches Treated Injection
2020	Rensselaerville Falls	410	394	16	6,051	5,839	212
2021	Lincoln Pond	360	350	10	5,946	5,775	171
2022	Lincoln Pond	364	352	12	6,152	5,962	190
2023	Lincoln Pond	366	366	0	5,952	5,952	0

Table 1. Hemlock woolly adelgid treatment history at the Huyck Preserve funded by the PRISM RFP. Only trees >8 inch dbh and with a live crown ratio $\geq 30\%$ are treated. Trees within 15 feet of water are injected with Imidacloprid. All others are treated with basal bark spray using a tank mix of Dinotefuran and Imidacloprid. All trees are tagged and numbered with year of treatment identified with a colored paint splash.



Figure 1. 2023 HWA treatment area on Lincoln Pond

Priority II – Early detection of emerging forest pests

Time was allocated to monitor for spotted lanternfly (Tier 1a, Score N/A), beech leaf disease (BLD) (Tier 1a, Score N/A), spongy moth (Tier 1b, Score N/A) and oak wilt (Tier 2, Score N/A). None of these species were detected at the Preserve in 2023.

Using protocols followed by our EMMA (Environmental Management and Monitoring Alliance) partners, we established a permanent monitoring plot to detect emergence of BLD. The circular plot is approximately 1/10th an acre in size with an 11.3 m radius and a center located at 42.531097, -74.152325. Within the plot, we collected data on mature trees including, dbh, crown class, crown dieback, and crown density. If the species was American beech (*Fagus grandifolia*), we also collected data on percent dead branches, BLD symptoms, and beech bark disease symptoms. Within the larger circular plot, we created a smaller plot with a 3.6 m radius to collect sapling data including species, dbh, and crown dieback. If the sapling was beech, we also collected BLD symptoms and BBD symptoms. A 1x1 m subplot was created at each of the four cardinal directions and data was collected including cover class, woody species present, number of seedlings, and the presence of BLD symptoms. Beech leaf disease was not detected. These assessments will be done annually at this plot.

PRIORITY III-VI - Invasive Plant Management

Plant Species	Year of First Management	Acreage 2023	Number of Populations or Individuals 2023	Average Percent Cover 2023	Range of Percent Cover 2023	Number of Days Managed 2023	Number of Days Monitored 2023	Management Type 2023
Yellow archangel (<i>Lamiastrum galeobdolon</i>)	2019	0.05	6 populations	<5%	<5% to 5%-25%	2	1	Aboveground biomass removed and root systems dug up
Leafy spurge (<i>Euphorbia esula</i>)	2023	0.001	16 individuals	<5%	N/A	2	2	Aboveground biomass removed and root systems dug up
Japanese primrose (<i>Primula japonica</i>)	2023	0.06	5 populations	<5%	<5% to 5%-25%	1	1	Aboveground biomass removed and root systems dug up
Wild chervil (<i>Anthriscus sylvestris</i>)	2023	0.0005	2 individuals	<5%	N/A	1	2	Aboveground biomass removed and root systems dug up
Japanese spirea (<i>Spiraea japonica</i>)	2023	0 Discovered in 2022 but not found in 2023	N/A	N/A	N/A	N/A	3	N/A
Bishop's	2019	0	0	0	0	N/A	3	N/A

goutweed (<i>Aegopodium podagraria</i>)		Eliminated 2022						
False spiraea (<i>Sorbaria sorbifolia</i>)	2019	0.6	1 population	26%-50%	N/A	5	2	Individuals were hand pulled and root systems dug up when possible.
Norway maple (<i>Acer planatoides</i>)	2019	N/A	1 individual	N/A	N/A	1	1	Stump sprouts were hand pulled.
February daphne (<i>Daphne mezereum</i>)	2019	0 Eliminated 2022	0	0	0	N/A	3	N/A
European privet (<i>Ligustrum vulgare</i>)	2019	0.09	1 population	5%-25%	N/A	1	1	Resprouts cut back at base using loppers
Autumn olive (<i>Elaeagnus umbellata</i>)	2019	10.87	75 individuals	<5%	<5% to 26%-50%	15	1	Small individuals were hand pulled and large individuals were cut back and solarized.
Burning bush (<i>Euonymus alatus</i>)	2019	0.2	7 populations	<5%	<5% to 5%-25%	2	1	Individuals were hand pulled and

								root systems dug up when possible.
Common barberry (<i>Berberis vulgaris</i>)	2019	0.004	9 individuals	<5%	<5% to 5%-25%	3	2	Small individuals were hand pulled and large individuals were cut back and solarized.
Common buckthorn (<i>Rhamnus cathartica</i>)	2022	0.16	36 individuals	<5%	N/A	3	1	Small individuals and resprouts on cut stems were flame treated. Large individuals were cut back to base.
Reed canary grass (<i>Phalaris arundinacea</i>)	2022	0.04	2 populations	<5%	N/A	2	1	The first patch had both the aboveground biomass and roots removed, while the second patch had the seed heads removed
Japanese stilt grass	2023	0.06	1 population	<5%	N/A	3	2	Flame treated

<i>(Microstegium vimineum)</i>								
Water chestnut <i>(Trapa natans)</i>	2019	0.01	1 population	<5%	N/A	2	1	Rosettes removed and plants pulled to roots
Phragmites <i>(Phragmites australis)</i>	2019	0.7	4 populations	76%-100%	5%-25% to 76%-100%	2	1	Plants were broken at the base and pushed over or cut below the waterline when possible.
Pale swallow-wort <i>(Vincetoxicum rossicum)</i>	2019	0.1	7 populations	<5%	<5% to 5%-25%	6	3	Aboveground biomass was removed and root systems dug up.
Black swallow-wort <i>(Vincetoxicum nigrum)</i>	2019	0.6	6 populations	<5%	<5% to 5%-25%	2	1	Aboveground biomass was removed and root systems dug up with just seed pods being removed from the larger patch.
Japanese knotweed <i>(Reynoutria japonica)</i>	2019	1.2	4 populations	51%-75%	26%-50% to 76%-100%	4	3	Three patches had aboveground biomass removed and

								rhizomes dug up and one patch has been treated with hardware cloth.
Japanese barberry (<i>Berberis thunbergii</i>)	2019	1.4	108 individuals	<5%	<5% to 5%-25%	7	2	62 individuals were flame treated and 46 individuals had aboveground biomass removed and roots dug up when possible.
Eurasian watermilfoil (<i>Myriophyllum spicatum</i>)	2019	6.67	1 population	5%-25%	N/A	3	1	Outliers in shallow waters were hand pulled and floating material was collected.
Curly-leaf pondweed (<i>Potamogeton crispus</i>)	2019	6.67	1 population	5%-25%	N/A	3	1	Outliers in shallow waters were hand pulled and floating material was collected.

Table 2. All invasive plants that were managed and monitored at the Huyck Preserve. Moving forward, these data will be used to monitor progress from year-to-year. In future years, percent cover of the species of concern will be evaluated using a narrower range to better allow slight changes to be detected from year to year. Species are given an N/A for range of percent cover if only one population exists.

Priority VII - Innovative Methods

1. Weed torch

A weed torch has been used for management of Japanese barberry, common buckthorn, multiflora rose, autumn olive since 2021. In 2023, we treated the Preserve's first patch of Japanese stiltgrass (Table 2).

2. Hardware cloth

In 2021, a project was designed to test the effectiveness of hardware cloth in Japanese knotweed management. The project began with the removal of aboveground biomass and hardware cloth was then laid out across one of the two patches at the core of the Preserve (hardware cloth plot) near the eastern shore of Lake Myosotis. The other patch had aboveground biomass removed but no hardware cloth installed (mechanical management plot). Four study plots were created in both the hardware cloth and mechanical management plots.

In 2023, the number of individual stems in each plot was counted and their heights recorded in July and August. Following each collection, the mechanical management plot had its aboveground biomass removed. Rhizomes were also removed when possible.

After three years, there are more and taller stems in the experimental plot compared to the plot where regular mechanical control is taking place. On average, there has been no significant change in stem number or height in the experimental plot from 2022 to 2023. Although there has been no change in number of stems in the mechanical plot from 2021-2023, the plants were significantly shorter in 2023. Although the plants do not reach the height or diameter of typical unmanaged plants outside of the study, the experimental plants are producing flowers. After three years, it does not appear that hardware cloth management is effective at controlling Japanese knotweed. In fact, at the start of the monitoring period, mechanical treatment appears to be more effective at decreasing plant height and stem number.

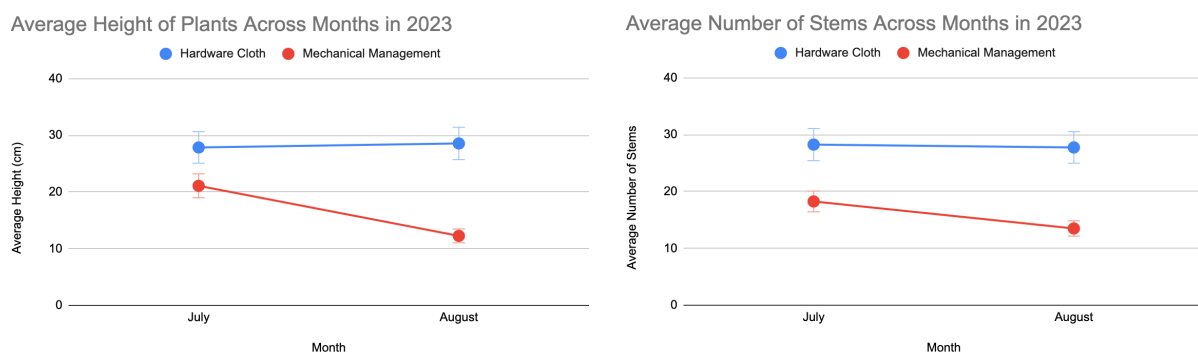


Figure 2. Average height and number of Japanese knotweed stems in the experimental and mechanically controlled plots across months in 2023.

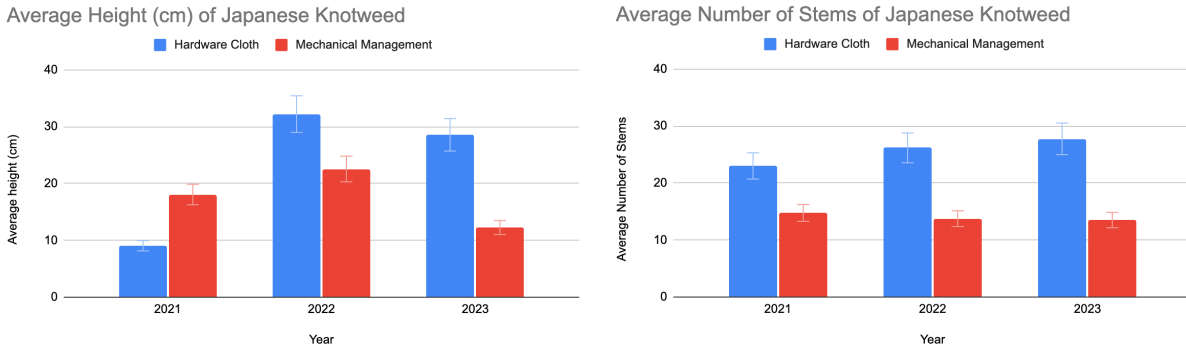


Figure 3. Average height and number of stems of Japanese Knotweed in August 2021-2023.

3. On May 12, 2023 we entered into a separate memorandum of understanding with Capital Region PRISM for the execution of a project introducing *Hypena opulenta* at the Huyck Preserve in an attempt to explore its viability as a biological control agent for black and pale swallow-wort. Working with PRISM staff, two insect monitoring and release cages were installed on the Preserve's Valley Trail (42.3222N, 74.91W) within an approximately 20-acre patch of pale swallow-wort. Ten 1x1 m monitoring plots were created. Baseline data in the monitoring plots was collected on May 25, 2023. Two shipments of *Hypena opulenta pupae* were received and released into separate cages on June 23, 2023 (37 pupae) and June 30, 2023 (40 pupae). Emergence of moths was monitored weekly. In total, six moths emerged, but there was no sign of egg laying or defoliation of swallow-wort. On August 29, 2023 tents were removed and the project ended for the year. *Hypena* pupae are known to have a high rate of failure. It is thought that the wet weather this summer contributed to the failure at least in part through the spread of a fungal outbreak observed on some of the pupae.

Priority VIII – Education, Outreach, and Volunteers

Wildlife Ecology Research Program - The Stewardship Coordinator held a lecture and workday for nine high school students participating in the Preserve's Wildlife Ecology Research program in July. The focus of the lesson was on the risks of invasive species and on monitoring and management. Students were taught how to use iMapinvasives. The group spent a partial day managing Asiatic bittersweet on the shore of Lake Myosotis.

Stewardship Internship - Four high school students participated in this week-long program in July. This program was held entirely in the field, and students learned how to properly identify, monitor, and manage a variety of invasive species. The program directly exposed students to the field of conservation and helped them understand the best management practices associated with invasive species. Students monitored and managed Asiatic bittersweet, Japanese knotweed, false spirea, European privet, Eurasian watermilfoil, and curly-leaf pondweed.

UAlbany Field Trips - The Stewardship Coordinator held two lectures and guided hikes followed by two work days in September for a group of 32 UAlbany Invertebrate Ecology students. The focus of the lectures and guided hikes was around invasive forest pests, their impacts on the landscape, and how to monitor and manage them. The work days focused on managing Asiatic bittersweet along Grevatt Road.

Other Volunteer Activities and Guided Hikes -

- Bittersweet Work Day - The event, run as part of our Earth Day program in April, has become an annual program. Participants learn about invasive species and Asiatic bittersweet and use hand tools to cut back an infestation. We have a contest for who can find the biggest vine.
- Signs of Spring Guided Hike - An April event focused on phenology with a portion of the hike dedicated to educating attendees on the phenology of invasive species
- Fall Foliage Hike - An October hike held by the Stewardship Coordinator. Invasive species were identified and attendees were educated around their spread in the fall.
- Corporate Team Day - Eighteen employees from Regeneron Pharmaceuticals visited for their annual "Day for Doing Good." The volunteers managed Asiatic bittersweet along Pond Hill Road and Grevatt Road. A presentation on invasive species identification and management was also given by the Stewardship Coordinator prior to the fieldwork.
- Adopt-a-Trail Program - Twelve volunteers have adopted trails at the Preserve and help manage Tier 4 species such as Asiatic bittersweet, multiflora rose, and Japanese barberry and monitor Tier 1 and Tier 2 species.

Summary

After the Huyck Preserve's fifth field season supported by the PRISM RFP, our monitoring and management of invasive plants and forest pests has had a measurable impact. We are responding to new, emerging species and populations, and following-up on past management to reach our goals. Each year, we adjust our management practices based on the successes and challenges of the prior year. Through enhanced data collection using iMapMobileAdvanced, we are even better positioned to log and detect year-to-year changes in our managed populations so we can continue to best prioritize projects and make efficient use of our time and resources.