

2022 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: Monitoring and managing forest pests and invasive plants to enhance ecosystem health

Contract Number: 22-005

Background

The Edmund Niles Huyck Preserve is a 2,072-acre nature preserve and biological field station founded in 1931. Since 2019, the Huyck Preserve has made strides to accomplish the goals put forth in its invasive species management and monitoring plan. From 2019-2021, 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. In 2020, the Huyck Preserve began managing forest pests: in 2020 and 2021 funds were used to treat hemlock woolly adelgid in two of the Preserve's highest priority hemlock stands, and in 2021 emerald ash borer treatment took place. This 2022 project allowed the Preserve to continue to progress this important work of focused management and monitoring of invasive plants and forest pests including the expansion of HWA treatment at the Preserve's highest priority hemlock stand.

Goals

The 2022 goals for invasive species management were as follows:

- Perform a second 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.
- Perform early detection monitoring of emerging forest pests.
- 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 and continue to engage volunteers including through the Volunteer Trail Steward program.
- Continue innovative methods for invasive species management.
- Enhance disposal of invasive plants by building a compost station.

Accomplishments

We hired two seasonal invasive species employees under this RFP to work approximately seven weeks over the season. One assistant was a 2021 graduate of SUNY Albany. The other was an undergraduate student at SUNY Cobleskill.

Supplies were purchased to accomplish several goals. We built a compost station to safely compost invasive plants according to the best disposal practices in our Invasive Species Management and Monitoring Plan. Propane was purchased to continue our work testing the efficacy of using a weed torch on targeted plant species.

Best management practices (BMP's) were followed when managing invasive species. The hemlock woolly adelgid treatment was 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. Some shrubs that had been cut and solarized in prior years were removed to the roots this year to prevent sprouting. Herbaceous plants too widespread to eliminate were cut repeatedly. Fieldwork began on June 13, 2022 and managed areas were monitored every two to three weeks to check for regrowth. 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 2022 management efforts can be found at <https://www.huyckpreserve.org/invasive-species-management-photos.html>.

Priority I – Treatment of hemlock woolly adelgid at Lincoln Pond

1. A important focus of this RFP was the treatment of HWA at Lincoln Pond. Expanding the treatment of HWA at Lincoln Pond started in 2021 helps 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. This trail is also the main route along which school field trips hike.

CGL Arbor Services (Angelo Schembari) was hired to perform the chemical application which was performed on June 13 and 14, 2022. 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 white paint splash indicating the year of treatment. The primary treatment method was directed basal bark spray using a tank mix of imidacloprid and dinotefuran (Safari) insecticides (Fig. 1). 352 trees were treated using basal bark spray, totaling 5,962 inches. Twelve trees totaling 190 inches within 15-feet from Lincoln

Pond were injected with imidacloprid via Quik-Jet Air tool and Arborplugs.

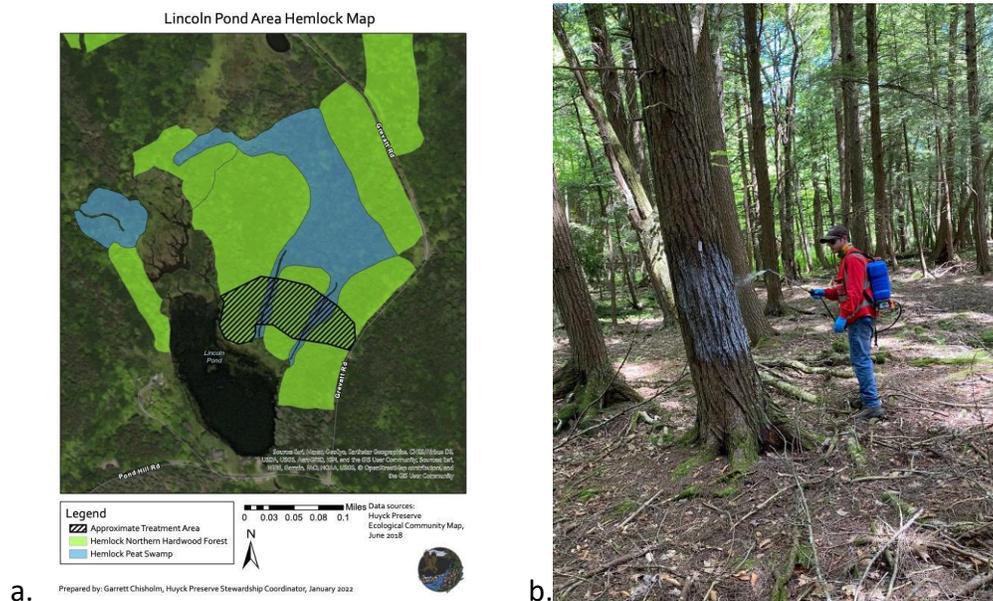


Fig. 1 (a.) June 2022 hemlock woolly adelgid treatment map at Lincoln Pond and (b.) contractor applying basal bark spray at Lincoln Pond stand

Priority II – Early detection of emerging forest pests

1. Time was allocated to monitor for spotted lanternfly (Tier 1a, Score N/A), beech leaf disease (Tier 1a, Score N/A), and oak wilt (Tier 2, Score N/A). None of these were found at the Preserve in 2022. One adult spongy moth (Tier 1b, Score N/A) was detected and destroyed at the Lake Myosotis Beach on June 17, 2022.

Priority III – Pursue elimination of species emerging at the ENHP and possible to eradicate across the PRISM region (Tier 1 and 2): yellow archangel (Rank N/A, Score N/A)

1. Five patches of yellow archangel (*Lamiastrum galeobdolon*) were removed in 2019, with only two resprouts occurring in 2020, and no further resprouts in 2021. One resprout in the previously managed patch was found and removed this year. Two new patches below the Hamlet of Rensselaerville, in the general region of the original patches were discovered and removed in 2022. Monitoring will continue next year.

Priority IV – Pursue elimination of small, discrete populations of invasive species within the ENHP that are more widespread regionally (Tier 4 and 5)

Terrestrial

1. For a second year in a row, no resprouts were found from the original patch of bishop's goutweed (*Aegopodium podagraria*) managed at Lake Myosotis in 2019 and 2020. In the second patch discovered at a property acquired in 2020, 19 resprouts were found during initial

monitoring this year. Even with removal of the root system, 23 resprouts were found during the second monitoring visit. Subsequent monitoring did not reveal further resprouts. Still, this is a better result than was had in 2021 where an initial population of 80 plants was found at the beginning of the season. This “2020 patch” will need to be regularly managed with diligent monitoring to help with eradication of the population.

2. Four resprouts of the only known February daphne (*Daphne mezereum*) population at the Huyck Preserve were found and their roots and aboveground biomass removed. This equates to an 80% reduction in the population from 2021 (a significant improvement compared to the 20% reduction from 2020-2021). 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. Three resprouts were found on the first visit, another three on the second, but there was no visible aboveground biomass by July. The reduction in individuals from year-to-year gives us hope that this population is close to eradication.

Management of the larger patch of false spirea using grass weed cutters saw a 20% reduction in percent cover in 2021, so this technique was used again in 2022. Larger root systems were removed when feasible. This technique will need to occur over multiple years to reduce the size of the patch.

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 back again in 2022. Notably, the upper portion of each shrub appears to be dead and resprouts are now only found at the shrubs’ bases.

5. Of the 70 known individuals of autumn olive (*Elaeagnus umbellata*), 47 did not come back in 2022 after management in prior years. The remaining 23 individual resprouts were hand pulled (small individuals) or cut back and solarized (large individuals) in 2022. Seven previously undetected individuals were located in 2022 and managed by October.

6. No resprouts were found on the four original common barberry (*Berberis vulgaris*) plants managed in 2019, 2020, and 2021. One previously undetected individual, discovered along the Ten-Mile Creek below the Hamlet of Rensselaerville, was treated and solarized with black plastic in 2022. Past management has shown that solarization in year one followed by complete removal of the root ball in year two is the best management practice for this species. Therefore, the root ball for this individual will be removed next year.

7. Burning bush (*Euonymus alatus*) is found along a water access road off of Pond Hill Road and at Ordway House, where it was once planted. Solarizing kept the four large individuals located on the access road and managed in 2021 at bay, but root sprouts were found in close proximity to the stumps this year. Time was dedicated in 2022 to removing the entirety of the root systems. Although the root ball was removed in 2019, small individuals that appear to be sprouting from

remaining fine roots or from a seed bank were hand pulled at Ordway House.

8. Three individual Norway maple (*Acer planatoides*) trees were identified and removed using a chainsaw along Lake Trail East. Monitoring by the Executive Director and the Stewardship coordinator did not find any other individuals. Resprouting will be monitored in 2023.

9. The seed heads were removed and bagged from a patch of reed canary grass (*Phalaris arundinacea*) on Lincoln Pond. Due to the size of the patch, removal took approximately sixteen hours. Per best management practices, in 2023, reed canary grass will be added to the list of species receiving flame treatment beginning in spring.

10. Common buckthorn (*Rhamnus cathartica*) is found in locations along the Ordway Trail, Lake Trail East, and Pond Hill Road. Eight patches of seedlings were flame treated with assistance from Volunteer Trail Steward Scott Keating. Twelve mature individuals were using a reciprocating saw and flagged to be flame treated in 2023 (see innovative methods section).

Aquatic

1. After a steady decline in water chestnut (*Trapa natans*) since initial detection in 2019 and annual management since, this year 35 individual rosettes were found during our first monitoring of the population in June. This is a 338% increase from 2021 and might be the result of continued growth from the seed bank or an influx of propagules or individuals from water bodies above the Huyck Preserve (e.g. at Partridge Run Management Area). After removal, one additional rosette was found and removed later in the season.

Significantly, an individual water chestnut rosette was found for the first time on Lake Myosotis, most likely traveling from Lincoln Pond via the Ten-Mile Creek. After removal, no additional individuals were found. Ten-Mile Creek was monitored, and no other individuals were detected. Monitoring for early detection on Lake Myosotis will be a high priority moving forward.

Priority VI – 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 previously managed pale swallow-wort (*Vincetoxicum rossicum*) were hand-pulled and roots were dug up along the Wheeler Watson Trail with the goal of eradication. Since management in 2021, one of the smaller patches did not return.

A new patch was incidentally discovered by the Stewardship Coordinator in the core of the Preserve. After consultation with Capital Region PRISM's Kristopher Williams, substantial time was spent digging up the entirety of the root systems. No further resprouts were found by the end of the growing season. This patch will be monitored and managed as needed in future years.

Seed pods were hand pulled and bagged from the previously managed larger patch along the Valley Trail located off of Partridge Path. This work was done with the assistance of the Preserve's

high school Wildlife Ecology Research summer program students. The goal for the Valley Trail population is containment, but this continues to be a challenge with a focus on mechanical control, staff capacity, and the fact that part of the patch is on a neighboring, unmanaged property.

2. In 2022, the four known patches of black swallow-wort (*Vincetoxicum nigrum*) were hand-pulled and roots were dug up. After similar management in 2021, the largest patch was reduced by 20% by the start of the 2022 field season. Two new patches were discovered along Hale Road in 2022. The aboveground biomass was eliminated from one of the patches but the other was too large. Instead, seed pods were removed from the patch and individuals along the edge were hand pulled and root systems dug up in an attempt to contain the patch. Eradication of large patches of swallow-wort is proving to be our biggest challenge under a protocol that does not use chemicals. A strategy for management of the second patch will need to be considered for 2023.

3. All four patches of phragmites (*Phragmites australis*) at Hennicke and Hagaman Marshes were managed in 2022 by cutting stems below the waterline when possible. All other phragmites plants were broken at the base and pushed over. With subsequent monitoring, one patch needed repeated management approximately 30 days later due to rapid growth with no further management needed for the remaining patches. Experimental management in 2020 using swatches of carpeting continued to be successful in preventing that portion from regrowing in both 2021 and 2022. However, this technique is impractical and would have its own negative ecological consequences if executed across an entire population.

Priority VII – Control widespread invasive species in target areas.

Terrestrial

1. Intensive mechanical management of two patches of Japanese knotweed (*Reynoutria japonica*) began in 2019. This year, an experimental technique was continued that was started in 2021 (see innovative methods section). Two additional patches discovered on property acquired in 2020 continued to be managed through biomass removal.

2. The area around Lincoln Pond is the center of the Preserve's Japanese barberry infestation. Management of Japanese barberry (*Berberis thunbergii*) in 2022 consisted of removing or cutting back approximately 39 individual plants from the Lincoln Pond Trail and performing a flame treatment 30 days later (see innovative methods section). Individual plants from along Lake Trails East and West and Upper and Lower Falls Trails were cut back to the base and, when possible, roots were removed.

Aquatic

1. Lower water levels on Lake Myosotis in 2022 caused by excessively dry conditions facilitated management of Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*). We were able to hand pull the entirety of the aboveground biomass for both species. Monitoring was performed weekly. The previously known and managed patch had

not grown in size; in fact, it appeared smaller this year because low water levels prevented growth in shallower water. No additional patches were detected. Strict weekly monitoring and management should continue in 2023 to ensure a reduction in the overall size of the patch.

Priority VIII – Innovative Methods

1. *Weed torch*

A weed torch was used for management of Japanese and common barberry, multiflora rose, and autumn olive in 2021 and 2022. Common buckthorn was added to this treatment regime in 2022. Areas of ecological significance and high visibility around Lake Myosotis and Lincoln Pond were the focus of this work in 2021 and 2022. Monitoring revealed that 35% of individual Japanese barberry plants treated in 2021 did not return in 2022. Because of this success, two additional high-density patches of Japanese barberry were flame treated in 2022. This included 39 individuals of Japanese barberry around the Eldridge Research Center. Common buckthorn was cut back in fall of 2022 along the Ordway Trail, Lake Trail West, and Pond Hill Road, to be flame treated in spring of 2023. When flame treated, individual plants were cut back to the base 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. Monitoring and treatment will continue as needed next season.

After two years using this method, the weed torch has proven to be an effective tool against these species. Compared to the time needed to dig large individuals out by the roots, the cut and torch method appears to be efficient and effective, though monitoring next year will provide more data on death rate by year two.



Fig. 2 (a.) Invasive Species Assistant Carrson Widen spraying water on a Japanese barberry before flame treatment and (b.) Stewardship Coordinator flame treating Japanese barberry

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) (Fig. 3). Four study plots were created in both the hardware cloth and mechanical management plots.



Fig. 3 (a.) Japanese knotweed in the mechanical management plot in June 2022 before initial management and (b.) Japanese knotweed growing through the hardware cloth in June

Every 30 days in June, July, and August, the number of individual stems in each plot was counted and their heights recorded. Results showed that the hardware cloth plants saw significant growth from June to August. Of course, because of cutting, the mechanical management plot showed a decrease in growth over time. Interestingly, the hardware cloth plants started the season significantly shorter than the mechanical management plants (Fig. 4). Growing conditions in the two plots may be part of the explanation, but this stunting phenomenon is likely the result of the hardware cloth treatment, since this patch grew to “normal” heights prior to the start of this experiment in 2021. The fact that mechanically managed plants were shorter in August than in July was likely the result of reduced available energy for growth caused by removal of aboveground biomass throughout the season.

At the start of the 2022 season, the hardware cloth plots had more stems than the mechanical management plots (Fig. 5). The number of stems in the hardware cloth remained relatively constant from June to July and dropped significantly from July to August. In other words, the plants in the hardware cloth plot had grown but had fewer stems by August. We are unsure if this decline is the result of the hardware cloth killing individuals, or if this is showing impacts of the dry season or a natural decline in stems late in the growing season. The mechanical control had a steady decline in the number of stems from June to August at least in part because of repeated cutting (Fig. 5). Of note, some of the plants in the hardware cloth went into flower despite being an average of only 40 cm in height. To prevent further spread, flowers were removed but all other biomass was left.

We are limited in drawing clear conclusions since both plots are being managed and no true control plot exists. An unmanaged plot would allow us to better understand patterns in growth, number of stems, and flowering, but we are unwilling to allow a plot to grow and spread unchecked.

Average Height of Plants Across Months in 2022

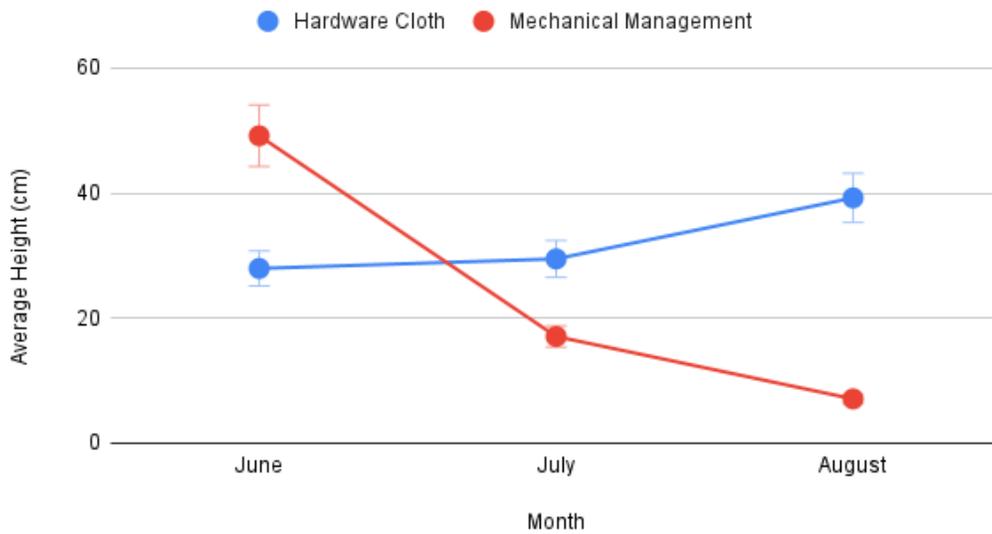


Fig. 4 Average height of Japanese knotweed plants across months in hardware cloth and mechanical management plots in 2022

Average Number of Stems Across Months in 2022

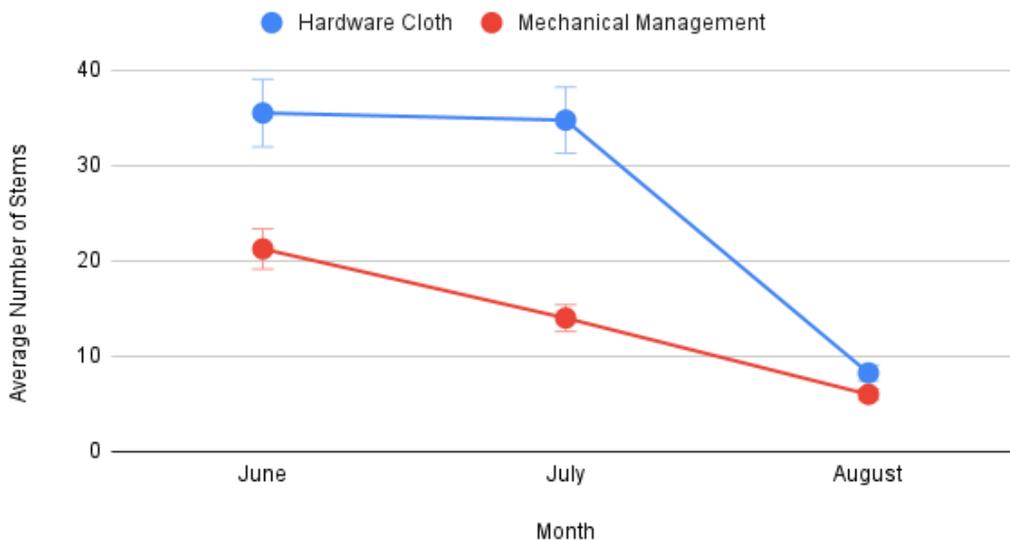


Fig. 5 Average number of Japanese knotweed stems across months in hardware cloth and

mechanical management plots in 2022

Priority IX – Compost station

Funds were allocated to purchase wood to construct a compost station for the disposal of invasive plant species that can safely be composted. The station was built by the Stewardship Coordinator and Buildings and Grounds Supervisor at the Preserve's shale bank which serves as our invasive species disposal area (Fig. 6). The station will be lined with heavy black plastic and then covered with a thick black tarp to dispose of invasive species that cannot be left in place and do not require incineration. This system should be more effective than solarizing in plastic bags, which we have found problematic because moisture trapped in bags allows plants to survive.



Fig. 6 New compost station for solarizing invasive plants

Priority X – Education, Outreach, and Volunteers

Education is one of the Huyck Preserve's core mission areas. In 2022, invasive species management was a focus of education programs and public events which were back to running at full capacity after the height of the pandemic. The Stewardship Coordinator held a lecture and workday for high school students in the Wildlife Ecology Research program. 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 pale and black swallow-wort.

The Preserve held its first Invasive Species Symposium on July 9th, where invited speakers representing various aspects of the invasive species field presented short talks to the public. Speakers included George Robinson, Ph.D., Professor Emeritus SUNY Albany, Jennifer Dean, Ph.D., NY Natural Heritage Program, Jonathan Titus, Ph.D., Professor Emeritus SUNY Fredonia and 2022 Huyck Preserve SRF, Steve Pearson, Ph.D., NYS DEC, Caroline Marschner, NYS Hemlock

Initiative, Robert Cole, NYS DEC Forest Health, Jason Denham, NYS DEC Bureau of Invasive Species and Ecosystem Health, Kristopher Williams, Capital Region PRISM.

The Stewardship Coordinator held two lectures and guided hikes followed by two work days in October and November 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 the Lincoln Pond Trail.

Though we have some volunteer response to invasive species work days, our most regular engagement with volunteers is through our Volunteer Trail Steward program. Fourteen stewards, each with their own adopted trail segment, have been trained to do light invasive species management and monitoring when out on their regular inspections. Most stewards visit their trails once per month and do such work as cutting back Asiatic bittersweet, multiflora rose, and Japanese barberry. One steward was instrumental as an assistant to the Stewardship Coordinator when working on flame treatment of common buckthorn.

Additional Results of Monitoring in 2022

Leafy spurge (*Euphorbia virgata*) (Tier 1a, Score 75.90), Japanese primrose (*Primula japonica*) (Tier 1a, Score N/A), wild chervil (*Anthriscus sylvestris*) (Tier 2, Score 78.75), Japanese spirea (*Spiraea japonica*) (Tier 2, Score 62.34), and hybrid cattail (*Typha x glauca*) (Tier 2, Score N/A) were found through a large-scale survey performed as a separate project in 2022. Some management began in 2022, and these species will be incorporated into our Invasive Species Management and Monitoring plan being updated this winter and will be managed in the 2023 field season.

Summary

The Huyck Preserve continues to make strong progress in accomplishing its invasive species management goals. After four field seasons, we have learned a lot about best management practices and the challenges of managing invasive species across over 2,000+ acres. This winter we will use what we have learned to update our Invasive Species Management Plan first drafted in 2019, incorporating proven management techniques, disposal methods, and updated species maps. Our work continues to inform the public and other organizations through outreach efforts, education programs, and public events and would not be possible without the support of Capital Region PRISM.