Land Management, Monitoring, & Outreach Student Internships

Overview:

During the summer of 2022, the Fresh Air Fund (FAF), Hudson Highlands Land Trust (HHLT), Vassar College (VC) and Fordham University's Louis Calder Center (LCC) hosted six (6) Invasive Species Management Interns at six (6) preserves (3427 acres). The internships were full time, paid positions that lasted between 8-10 weeks and provided resume-building experiences. The interns performed monitoring and mapping of invasive species that are a high priority at individual sites and/or regionally. They worked to control invasive species in high priority conservation areas using both mechanical removal and biological control. The interns monitored for forest pests by surveying lingering ash plots, establishing beech leaf disease monitoring plots, and monitoring for spotted lantern fly. They worked to educate the general public and targeted audiences about invasive species through social media posts, direct engagement, creating printed materials, providing tours, and creating videos. In addition to the work completed at individual sites, the interns were part of a network. They interacted regularly, visited each site, and served as a resource for each other.

Priority Objectives:

The Fresh Air Fund, Hudson Highlands Land Trust, Louis Calder Center, and Vassar College Internship project helped address the following goals and objectives from Lower Hudson PRISM's 2022 Action Plan:

Capacity Building - By hosting outreach events and developing outreach materials, the interns promoted LHPRISM as the go-to resource for invasive species information. The interns work connected to the EMMA network and engaging potential new partners. The capacity for invasive species management and monitoring at the participating sites was greatly increased. This project helped foster academic relationships by strengthening LHPRISM's connection to Vassar College and Fordham University.

Conservation Targets- The interns managed invasive species at sites with populations of rare and special concern species. The LCC interns worked to preserve the American beech tree by expanding monitoring in the region.

Strategic Management- Interns conducted strategic invasive species management and increased awareness by creating videos about management being done at each site. They expanded and refined survey programs, including the use of standardized protocol for monitoring the emergence of BLD.

Education and Outreach- The interns conducted outreach that was tailored to target audiences such as youth and landscaping professionals. They disseminated educational materials through social media and promoted NY's Invasive Species Awareness Week. They emphasized equity, inclusion, and justice in all aspects of the project.

Mitigate Pathways of Invasion- The interns conducted regular monitoring for SLF. They assisted other EMMA sites with the establishment of BLD plots. They monitored for emerging invasive species.

Information Exchange: The interns created project-related content for social media platforms, demonstrating the impact of the interns' work and providing information about invasive species to a broader audience. The internship project created an information exchange between the four partners and the EMMA network.

Deliverables:

1) Gather a diverse applicant pool- To help develop a diverse applicant pool the positions were advertised generally as well as through student identity groups, Vassar's ALANA center, and to FAF alumni.
2) Hire 6 interns- Garrett Goodrich(VC), Clarrissa Longoria (VC), Sydney King (LCC), Hanna Giedraitis (LCC), Caitlyn Boyle (FAF & HHLT) and David Pullium (FAF & HHLT) were hired as interns.
3) Fieldwork data and documentation- VC interns mapped 60 occurrences of high priority invasive species and completed pre/post management vegetation surveys. LCC interns

established 5 BLD plots. VC and LCC interns monitored for SLF. Interns (VC, FAF, & HHLT) surveyed existing MaMa plots.

4) Volunteer engagement projects and/or outreach events- HHLT interns worked with volunteers to remove invasive species along trails at the Granite Mountain Preserve and the former Garrison Golf Course. The Vassar interns engaged community gardeners to eradicate beefsteak plants. They worked on a pilot project doing invasive species consultations and scouting for emerging invasives for neighbors at 2 adjoining properties. The Calder Center interns led a tour of Calder that highlighted invasive species for Fordham's CSTEP group also presented to Calder's summer undergraduate researchers and EMMA members.
5) Education & outreach videos: Interns created an educational videos about management of a population of *Populus alba* (VC), an educational video about BLD/BBB and SLF monitoring (CC), and a video about spongy moths and spotted lantern fly and making monitoring traps (HHLT & FAF).

Site summaries of Intern Accomplishments

Vassar Preserve

The two interns stationed at Vassar, Garrett Goodrich and Clarrissa Longoria, began work on May 31. They received training in GIS, GPS use, invasive species management, and plant identification. They created an identification guide for emerging invasive plants to prepare themselves for surveying.

The first half of their internship focused on preparing for the Strike Force by conducting a broad survey of greenspaces to detect populations of Tier 2 and Tier 5 species. They mapped the populations of emerging invasives that were previously managed at our site- *Kalopanax septemlobus* (castor aralia), *Symplocos paniculata* (sapphireberry), *Akebia quinata* (chocolate vine), and *Actinidia arguta* (hardy kiwi). They discovered a new population of *Akebia quinata* on the campus golf course. On Vassar's main campus they discovered nine previously undocumented species that are listed by LHPRISM as tier two (*Koelreuteria paniculata* [goldenraintree], *Saphora japonica* [Japanese pagoda tree], *Prunus subhirtella* [higan cherry], *Styrax japonicus* [Japanese snowball], *Spiraea japonica* [Japanese spirea]) or Tier 5 species (*Cercidiphyllum japonicum* [katsura tree], *Cornus kousa* [kousa dogwood], *Lamium galeobdolon* [Yellow Archangel], and *Macleaya cordata* [plume poppy]). *Lamium galeobdolon* and *Cercidiphyllum japonicum* were found growing outside of landscaped areas. *Lamium galeobdolon* was the only newly detected priority species exhibiting invasive habits in established plant communities. *Macleaya cordata* was observed exhibiting invasive habits in unmaintained landscaped areas on campus. We made recommendations to the Arboretum Committee and Director of Grounds to remove Tier 2 species used for landscaping as soon as possible. On the Preserve the interns discovered a previously undocumented tier two species, *Perilla frutescens* (beefsteak plant), which occurred in one relatively small population in and around the community gardens. A population of a Tier 5 species, *Populus alba* (white poplar), was discovered acting invasively in an early successional habitat on the Preserve.

The interns' work supported the management of early emerging invasives. They assisted the Invasive Strike Force with the management of populations of *Kalopanax septemlobus,*

Symplocos paniculata, Akebia quinata, *Populus alba,* and *Lamium galeobdolon.* The interns manually managed populations of *Actinidia arguta*, *Perilla frutescens*, *Macleaya cordata, Reynoutria japonica* (Japanese knotweed), *Rhodotypos scandens* (jetbead), *Artemisia vulgaris* (mugwort), and *Cynanchum louiseae* (black swallowwort). They assisted with the release of *Rhinocominus latipes,* the mile-a-minute weevil, hoping to establish a population that can be used as a source of biocontrol for other populations of *Persicaria perfoliata* (mile-a-minute) at Vassar.

In addition to surveying and mapping the high priority invasive species, the interns worked on several monitoring projects. They completed pretreatment vegetation surveys. They monitored the existing MaMa ash plots. They also worked with the interns from the Calder Center to set up a beech leaf disease plot and conducted weekly spotted lantern fly monitoring.

In preparation for the Strike Force, the interns contacted neighbors to educate them about invasive species and obtain permission to treat populations of *Akebia quinata* that were growing on a shared fence line. To manage the population of *Perilla frutescens* in the community gardens, the interns worked with the community garden leadership to develop and implement a communication plan. They created educational content and signs to inform the gardeners about managing *P. frutescens*. The interns also educated the Vassar Grounds Department by creating signs about *Macleaya cordata*. They created an educational video about *Populus alba.* The interns also began a pilot project doing invasive species consultations and scouting for emerging invasives for neighbors with adjoining properties.

EMMA and Calder Center

The two Calder interns, Sydney King and Hanna Giedraitis, began their internship on June 6. For the month of June they spent much of their time attending live webinars on invasive species as well as multiple pre-recorded webinars and training on Beech Leaf Disease and the iMapInvasives Strike Force. To supplement this, they compiled research on both Beech Bark Disease (BBD) and Beech Leaf Disease (BLD). They attended two in-person training sessions, one for the set-up of BLD/BBD plots and another for the monitoring and maintenance of Spotted Lanternfly (SLF) Traps. Sydney and Hanna worked together to create a BLD and SLF information binder as a 'one-stop-shop' resource for future invasive species interns. As for outreach, Sydney created social media posts for Species Awareness Week and for the invasive species work that she and Hanna were doing this summer. They assisted in removing established invasive species; such as, *Reynoutria japonica* and *Artemisia vulgaris* from Calder's newly created pollinator garden. While working in the garden they surveyed both native (iNaturalist) and invasive species (iMapInvasives). While surveying, Hanna found *Akebia quinata* (Tier 2), and removed it from our garden. The Calder Center hosted a meet up of the interns across sites and discussed possible collaborations.

During the month of July, Sydney created a survey that was sent to EMMA sites and PRISM partners in regards to the set up of BLD/BBD plots on their properties. Hanna sent out a similar survey to EMMA sites in regards to monitoring SLF. They assisted in establishing six BLD/BBB plots at five sites; NYBG, Franny Reese State Park (Scenic Hudson), Louis Calder Center, Vassar College, and North Salem Open Land Foundation. Hanna surveyed Franny Reese State Park, North Salem Open Land and Vassar for SLF and provided the site managers with

information and a short training on how to survey for SLF. At Calder, both interns surveyed and mapped the property for *Ailanthus altissima* (Tree of Heaven) and created plots for surveying SLF. In addition, Hanna installed three SLF traps and began to monitor for SLF using iMapInvasives. SLF was not recorded at Calder.

The interns continued surveying the Calder Center property for various invasive species and tracking them on the iMapInvasives app. As for outreach, both interns led a tour of Calder for Fordham's CSTEP group (URM STEM students), during which they identified various invasive species and talked about the monitoring efforts at Calder. In a presentation to the group, the interns discussed what it was like to be an intern and their work with BLD and SLF this summer. The interns also presented their work to Calder's summer undergraduate researchers and EMMA members. The BLD/SLF binder that was created by the interns was shared with the EMMA member sites as well. Sydney and Hanna created an educational video on BLD/BBB and SLF monitoring.

Fresh Air Fund and Hudson Highland Land Trust

The two interns stationed at the Hudson Highland Land Trust (HHLT) and the Fresh Air Fund, Caitlyn Boyle and David Pullium started on June 14th.

At Sharpe Reservation, the interns worked on various projects including removing invasive species [*Berberis thunbergii* (barberry) and *Rubus phoenicolasius* (wineberry)] encroaching on .25 miles Sharpe trail system making trails navigable to Fresh Air Fund campers. They monitored and collected data on our hemlock stands and made recommendations for future treatments. In the same area they collected data on the fourth year of our MaMa ash plot. Only one remaining ash tree remains in healthy condition in this plot. They worked to remove *Trapa natans* (water chestnuts) in Adele Pond as part of a multi-year project and monitored other water bodies for *Trapa natans*. It was detected in 2021 in Deer Lake and due to early detection has been able to be controlled, early detection allowed us to eradicate it in Grace Pond. They revisited historic *Persicaria perfoliata* infested areas and found they have mostly disappeared due to vigorous growth of new native vegetation and the impact from a healthy population of mile-a-minute weevil. The weevil was not introduced but appeared on its own. They worked in our 1,000 acre Wilderness Management Unit to map out an 8 acre population of *Berberis thunbergii* (Japanese barberry) that has been traveling along stream corridors. This map creates a baseline so we can understand how barberry is expanding in this mostly native vegetated unit. It will also allow us to manage the leading edge that is encroaching on some areas where rare native ephemerals grow. They continued to work on removal of *Cynanchum louiseae* along the leading edge of pathways to entry. They discovered BLD on site and established a formal plot. In the same area it was not detected in 2021 and was only found on a few leaves of a few trees. But it was present. Ongoing monitoring will continue to observe the impact of this disease. They continued monitoring of tier 2 plant species, currently none have been found. They created a video on spongy moths and spotted lantern fly and making traps for future monitoring. They also worked on interpretive signage that will be used in various areas including our 9 acre wildlife refuge once the epicenter of tier 3 species now prevalent on the property. It is now mostly native plants and pollinator meadows.

At HHLT's Granite Mountain Preserve, the interns collaborated with local volunteers to remove burning bush (*Euonymus alatus*), yellow archangel (*Lamium galeobdolon*), black swallowwort (*Cynanchum louiseae*), garlic mustard (Alliaria petiolata), mugwort (Artemisia vulgaris), Japanese barberry (*Berberis thunbergii*), and wineberry (*Rubus phoenicolasius*) along the Preserve's approximately 5 miles of trails which helped make them more accessible to hikers and visitors. The black swallowwort removal helped to ensure the integrity of recreational infrastructure at the Preserve and in some areas, early detection and removal has helped suppress the population. In addition, the yellow archangel removal helped to target a population of concern due to its proximity to a waterbody. After attending the BLD workshop, the interns monitored the beech trees on site. Finally, the interns helped to manage multiflora rose (*Rosa multiflora*) and japanese barberry (*Berberis thunbergii)* along the stream and trails at HHLT's newest preserve, the former Garrison golf course, and collaborated with more local volunteers, strengthening our outreach to the community.

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