

Lower Hudson Partnership for Regional Invasive Species Management 2017 Annual Report

Prepared by

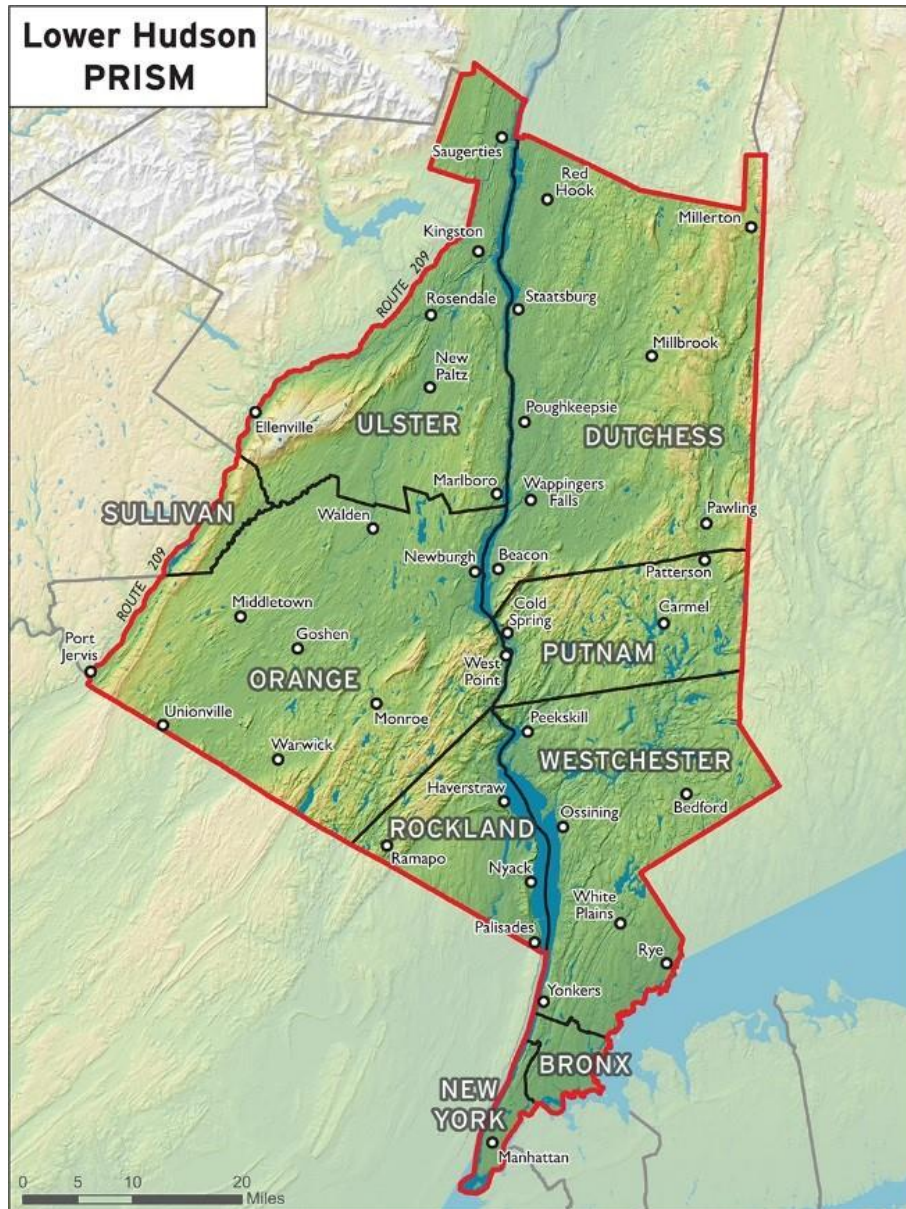
Dr. Linda Rohleder
Samantha Epstein
Lindsay Yoder
Michael Young
Eric Stone

Program Coordinator
Aquatic Invasive Species Program Manager
Assistant Program Coordinator
Terrestrial Invasives Program Manager
Program Educator and Volunteer Coordinator



**LOWER
HUDSON**

PRISM



The Lower Hudson Partnership for Regional Invasive Species Management is hosted by the New York – New Jersey Trail Conference using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

Table of Contents

Section 1: Our Mission	4
Looking Ahead	4
2017 and 2018 Steering Committee	4
Section 2: Summary of Accomplishments	5
Section 3: Progress According to Strategic Plan	7
Capacity Building	6
Conservation Targets	9
Strategic Invasive Species Management	10
Education and Outreach	12
Mitigating Pathways of Invasion	13
Information Exchange	14
Section 4: Contracted Projects	15
New York Botanical Garden	
Invasive Species Summit	15
Scenic Hudson	
Esopus Mile-a-Minute Project	16
Trillium Invasive Species Management Inc.	
Hardy Kiwi: Bedford, New York	19
Sticky Sage	20
Kudzu	22
Ecological Research Institute	
Data Analysis for Blockbuster 2016	22
Cornell Cooperative Extension - Dutchess County	
Blockbuster 2017 Survey Training	23

Hudson River Sloop Clearwater	24
Watercraft Inspection Steward Program	25
AIS Education Outreach Program	25
AIS Volunteer Program	26
Lower Hudson PRISM Assistant	26
Section 5: Partner Successes	27
Intern Projects	
Bronx River Parkway Conservancy - <i>Corydalis incisa</i>	28
The Hudson River Sloop Clearwater - Watercraft Inspection Steward	28
The NY-NJ Trail Conference - Invasives Strike Force AmeriCorps Crew	28
Scenic Hudson - <i>Esopus</i> Mile-a-minute Suppression	28
Section 6: Volunteer Recognition	30
Appendices	
Appendix I: Emerging Invasive Species in the Lower Hudson Valley	31
Appendix II: LHPRISM Signed Partners and Participants	41
Appendix III: LHPRISM Invasive Species Targeted For Eradication	43
Appendix IV: Invasive Species Summit Program	46
Appendix V: Bedford Hardy Kiwi Known Sites Map	47
Appendix VI: Dover Sticky Sage Treatment Map	48
Bibliography	49

Section 1: Our Mission

The mission of the Lower Hudson Partnership for Regional Invasive Species Management is to protect the rich biodiversity and ecosystems of the Lower Hudson region through partnerships and collaborations that focus on controlling the introduction, spread, and harmful impact of invasive species.

Looking Ahead

As we ease into 2018, we build upon the success of 2017. With the renewal of the 5-year contract with the New York State Department of Environmental Conservation, we were able to hire two additional full-time staff. The new Terrestrial Invasive Species Project Manager and Invasive Species Program Educator and Volunteer Coordinator will expand our capacity to rapidly respond to new invasions and support the invasive species goals of our PRISM partners. We are especially excited for new opportunities using conservation detection dogs and drone surveys in 2018 to complement the work of our partners and volunteer base. A dedicated early detection/rapid response crew will allow us to manage region-wide populations of emerging invasive plants while the new website will increase our public visibility and cement our position as the go-to place for regional invasive species information.

2017 Steering Committee

Jonathan Rosenthal, Ecological Research Institute

Jennifer Stengle, Cornell Cooperative Extension- Putnam County

Meredith Taylor, New York City Department of Environmental Protection

Michael Fargione, Cary Institute for Ecosystem Studies

Tate Bushell, Westchester Land Trust

Tom Lewis, Trillium Invasive Species Management INC

2018 Steering Committee

Jennifer Stengle, Cornell Cooperative Extension- Putnam County

Meredith Taylor, New York City Department of Environmental Protection

Michael Fargione, Cary Institute for Ecosystem Studies

Tate Bushell, Westchester Land Trust

Tom Lewis, Trillium Invasive Species Management INC

Krista Munger, Pound Ridge Land Conservancy

Section 2: Summary of Accomplishments

The LHPRISM and its partners had many significant accomplishments in the ongoing battle against invasive species. Through strategic planning, management efforts, and cooperation with each other, the partners made great progress this year. A summary of the PRISM's accomplishments in 2017 are described below:

- LHPRISM now has 41 signed partners who participate and have dedicated 15,069 hours to LHPRISM efforts
- Several new invasives species including Italian arum (*Arum italicum*), Japanese primrose (*Primula japonica*), yellow archangel (*Lamium galeobaldon*), and sapphireberry (*Symplocos paniculata*) were discovered in our region this year.
- We held 66 training sessions where 895 participants learned how to identify, manage or monitor for invasive species.
- The LHPRISM partners and participants held:
 - 160 events educating 3,167 individuals about invasive species
 - 68 presentations which reached 2,640 individuals
 - 29 outreach events which reached 5,528 individuals
- Volunteers played a crucial role this year in achieving our goals. 1,571 volunteers dedicated 14,340 hours to invasive species efforts.
- In addition to volunteers, the LHPRISM partners supported 71 interns who conducted a variety of projects including invasive management, prevention, and education work.
- We also conducted 323 removal projects targeting 172 invasive species by treating 2,116 acres throughout the region.
- The Lower Hudson PRISM has been able to treat all reported populations of 10 out of 37 of our Tier 2 species and completed treatments on several populations of an additional 5 Tier 2 species. We are actively working to treat 40% of our Tier 2 species.

- Together, the LHPRISM participants reported a total of 5,615 invasive species observations to New York's iMapInvasives database with an additional 5,700 observations scheduled for bulk upload.
- Reports were submitted for 131 different invasive species.
- The LHPRISM held an invasive species management and restoration summit organized by New York Botanical Garden that drew nearly 300 attendees and received widespread publicity.

Section 3: Progress According to Strategic Plan

Lower Hudson PRISM Goals

Capacity Building

Goal: The Lower Hudson PRISM has a robust public identity, strong internal structure and a sustainable resource base to continue its mission.

We are continuing to refine the structure of the Lower Hudson PRISM to ensure its long-term function and stability. A large component of maintaining that stability is through the work of the steering committee, which guides our annual work plans and funding allocations. This year, the steering committee reviewed our partner agreement and five-year goals to confirm their relevance and usefulness. No changes were recommended.

At the end of 2017, the partners approved a mission statement for the Lower Hudson PRISM.

“The mission of the Lower Hudson Partnership for Regional Invasive Species Management is to protect the rich biodiversity and ecosystems of the Lower Hudson region through partnerships and collaborations that focus on controlling the introduction, spread, and harmful impact of invasive species.”

The Lower Hudson PRISM is always aiming to grow its network of partners. We created and published a brochure directed at potential new partners highlighting the benefits of becoming a partner in the PRISM. We accepted one new partner in 2017 – Glenn Sungela.

We also put considerable emphasis on retaining our existing partners. We aspired to have educational presentations or lectures of particular interest to partners and strive to add more value to our meetings for partners and general attendees alike. For example, at our March meeting we scheduled a viewing of a recorded talk presented by Douglas Tallamy entitled “Are Alien Plants Bad?” to attract potential partners who may be at the novice level regarding invasive species knowledge.

Meeting practices that were identified by partners as valuable were also continued to encourage and enable continued participation. Networking was placed at a high value amongst partners, so generous lunch breaks were scheduled for every meeting to allow ample time for networking between partners. We continued to rotate the meeting locations both geographically around the region and among different weekdays to allow partners who had travel or scheduling constraints to be able to attend. We also paired our July meeting with a morning hike at a local preserve

and allowed remote attendance by running it as a webinar. These changes for the July meeting resulted in an increase in attendance from previous years' July meetings.

Attendance at meetings continues to remain stable at an average of 35 attendees at each meeting.

To increase our partners' capacity to deal with invasive species, we offered training on identification of invasive species through our BlockBuster Surveyor trainings and a Forest Pest workshop. We also continue to encourage and support partners efforts to collaborate on joint efforts. The Forest Pest workshop was a joint effort between Teatown Lake Reservation, Ecological Research Institute, and Cornell Cooperative Extension of Putnam County who organized and conducted the workshop, and the Jay Heritage Center which helped sponsor it. Multiple management projects have also been collaborative efforts between several partner organizations.

Another objective this year was to get more visibility for the Lower Hudson PRISM. Our Publicity committee oversaw the drafting of several press releases and several of our partners were able to get articles published in local papers that mentioned the PRISM 5 times.

Our bi-annual invasive species summit was also held this year (See page 15 for more details) and attracted nearly 300 attendees. The presentations were recorded and posted on the New York Botanical Garden's website. Subsequently, the Society of Ecological Restoration made mention of our summit and provided the link to the recording in their monthly email newsletter. This mention generated over 300 views of the recording in just a week.

Another effort towards visibility was getting the LHPRISM logo posted on partner's websites. Currently 30% of partners have the logo posted on their websites while nearly 40% have the Lower Hudson PRISM URL listed.

We also continued to use Facebook to gain visibility. (See details under Information Exchange goal below).

One of the final objectives for our Capacity Building goal was to secure funding for the PRISM. At the end of 2017, the existing five-year contract to host the PRISM held by the New York-New Jersey Trail Conference came an end. However, the Trail Conference applied again and was awarded the new five-year contract and thus will continue hosting the PRISM. Under the new contract, increased funding was budgeted for staff members: the Program Coordinator, an Educator/Volunteer Coordinator, a Terrestrial Invasive Species Project Manager and the aquatic

program coordinator position as well as four seasonal crew members for control projects and 5 watercraft inspection/AIS survey stewards. This funding ensures a stable, secure program going forward.

A final objective for 2017 under this goal was to create a metrics collection mechanism for partners to report statistics throughout the year. After further discussion with partners, it was agreed that partners would continue to use a Word document template to collect this information.

Conservation Targets

Goal: The Lower Hudson PRISM protects the rich, native biodiversity of the Lower Hudson Valley by focusing on priority targets for conservation.

Our Blockbuster Survey program continued to generate data that helped us to identify highly probable areas for introduction and areas with no or very low levels of invasion. Over time, the data generated by this program will allow us to better define our conservation targets.

One of our primary objectives this year with respect to conservation targets was to work on a stronger definition of Invasive Species Prevention Zones (ISPZ) and a working group was formed to meet this goal. We also scheduled a hike at Schunemunk Mountain State Park, a potential ISPZ, prior to our July meeting so that partners could see the importance of the area first-hand. The working group is continuing to meet and expects to present their work to the PRISM partners in early 2018.

Another objective was to develop a ranking system to prioritize control projects that protect conservation targets. By the end of 2017, a working group focused on creating a prioritization rubric had formed. During the September meeting, PRISM partners were asked if they agreed with the chosen prioritization factors. The working group then developed an application and scoring criteria, which will be used in 2018 to ensure that the AmeriCorps crew will reach all the high priority sites first. The new scoring criteria heavily weights projects that protect conservation target areas such as rare habitats or rare/endangered species. More information about the prioritization rubric can be found at <https://www.lhprism.org/apply-projects-or-funding>.

Strategic Invasive Species Management

Goal: The Lower Hudson PRISM supports and optimizes regional conservation through strategic invasive species management.

Several new invasives species including Italian arum (*Arum italicum*), Japanese primrose (*Primula japonica*), yellow archangel (*Lamium galeobaldon*), and sapphireberry (*Symplocos paniculata*) were discovered and confirmed by the ISF crew.

The Lower Hudson PRISM has been able to treat all reported populations of 10 (out of 37) Tier 2 species and completed treatments on several populations of 5 additional Tier 2 species. We are actively working to treat 40% of our Tier 2 species.

The Lower Hudson PRISM contracted out several large-scale treatment projects to Trillium Invasive Species Management including most of the kudzu sites throughout our region, a population of sticky sage (*Salvia glutinosa*) in Dover NY, and a population of hardy kiwi in Bedford NY. See Section 4: Contracted Projects for more information about these projects.

We also conducted management efforts for several Tier 3 populations with a special focus on those at the edges of the species' distribution in our region.

The ISF Crew was able to detect new species sites as well as many LHPRISM volunteers within our various volunteer programs. These programs include the BlockBuster Survey volunteer program, Invasives Strike Force volunteer surveys of hiking trails, and a Mile-a-minute vine intern program supported by USDA APHIS.

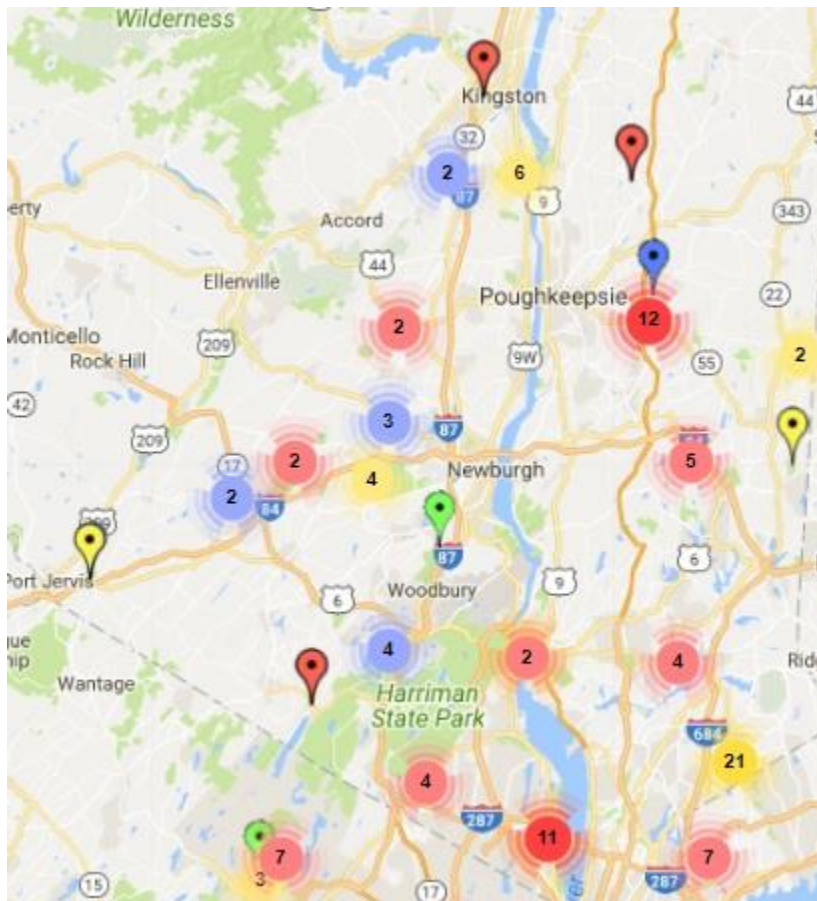
Highlights of the Mile-A-Minute Program

During 2017, the recorded distribution of mile-a-minute vine in our region expanded and several new populations were reported along our border with the Catskills PRISM and CRISP. Additional surveys were conducted in natural areas to the north and west of existing populations to determine the boundaries of the regional infestations.

Lower Hudson PRISM Partner, Scenic Hudson, continued to manage multiple infestation sites at the northern edge of mile-a-minute's range. Their efforts are noted in Section 5.

Through a USDA APHIS grant, a mile-a-minute intern, Alyssa Coleman, was brought on to help coordinate the response to mile-a-minute in the Lower Hudson PRISM. As part of her work, she released 3000 weevils in five sites in four different parks. Three of the sites were previous

locations (Stewart State Forest, Blauvelt State Park, Hudson Highlands State Park) while two of the sites were at a new location (Mianus River Gorge).



Mile-a-minute observations in the Lower Hudson PRISM through EDDMapS. Blue points are negative (not found), red points are positive (confirmed observations), yellow points have been treated and green points are eradicated (no plants for more than 3 years).

Crew Project Prioritization

As mentioned briefly in the Conservation Targets section, our method of prioritization and selection of control projects has been further developed this year with the inception of a prioritization criteria rubric for evaluation of potential projects along with a corresponding application form. Our scoring criteria weighs heavily on the Tier level of the proposed target species, as New York State's tier system. Tier 1 or Tier 2 species would receive the most points. An equal number of points are allocated to be awarded for projects that protect conservation target areas such as rare habitats or rare/endangered species as well as culturally significant species. The likely effectiveness of control is also accounted for in the rubric with approximately

a quarter of the points allotted for that category. The remaining points are distributed among categories for ongoing projects, resources provided by requesting organization, and site access/logistics issues. Lower Hudson PRISM partners also receive a few bonus points in the ranking. Applications were solicited for control projects at the end of 2017 and were evaluated in early 2018 using the scoring criteria.

Education and Outreach

Goal: The Lower Hudson PRISM reaches out to new audiences and delivers education that communicates the positive impacts of invasive species management on ecosystems. The Lower Hudson PRISM offers clear steps for action on personal and community levels.

The Lower Hudson PRISM continued to educate the public on invasive species issues through numerous presentations, trainings, and outreach events including participation at events held by others, all of which actively reached 12,230 people.

Activity	Number in PRISM	Participants
Trainings	66	895
Events	160	3,167
Presentations	68	2,640
Outreach	29	5,528
Total	323	12,230

In addition to active reach, the PRISM partners generated passive educational materials which were viewed by countless participants. These materials included:

- A 15-page invasive species ID booklet by the Winnakee Land Trust
- An Interpretive Bootbrush Station at Madam Brett Park by Scenic Hudson
- Two brochures outlining the work of the Lower Hudson PRISM and Invasives Strike Force by the New York New Jersey Trail Conference
- A Middle School and High School curriculum for identifying, monitoring, and managing invasive plant species by The New York Botanical Garden

- Aquatic Invasive Species brochures and a poster of aquatic invasive species for Lake Sebago by The Hudson River Sloop Clearwater
- Information on common invasive species for Rockland County's Website and signage outlining invasive plant control programs in Rockland Lake, Tallman Mountain and Stony Point State Parks by Glenn Sungela
- Two educational brochures which promoted invasive species management for I Love My Parks Day and The Excelsior Crew by Friend of the Old Croton Aqueduct
- Invasive Forest Pest Resource Binder by Putnam County CCE and Ecological Research Institute Inc.

In addition, our partners collectively published 11 articles about invasive species or native alternatives that were circulated to an estimated 106,000 people.

The PRISM also continued to utilize the educational posters designed by Cornell Cooperative Extension of Dutchess County in 2016. The posters were showcased at various libraries, parks, and tabling events throughout the year.

Mitigating Pathways of Invasion

Goal: PRISM has a coordinated program to prevent species introduction by focusing on pathways.

This goal aims to address the avenues for introduction into our region. One of the primary ways that aquatic invasive species enter a new area is via watercraft. The Lower Hudson PRISM contracted Hudson River Sloop Clearwater to run our Aquatic Invasive Species Program in 2015, which includes a component designed to mitigate the spread of aquatic invasive species through watercraft inspections. This was the third consecutive year of the program, and the stewards were able to inspect an estimated 1,400 boats at 8 launches for aquatic hitchhikers. An exact amount of boats inspected is not available due to a technology issue which resulted in the loss of hundreds of data points. For more information about the Aquatic Invasive Species Program see Section 4: Contracted Projects.

This year, several of our partners piloted bootbrush stations at their trailheads to educate hikers about the risk of spreading invasive plants and to provide the means to clean their boots. New York City DEP received funding for two bootbrush stations and Scenic Hudson will be adding one

in Beacon, NY. Four new stations have also been added in Sam's Point preserve in Ellenville, NY (Ulster County).

The Lower Hudson PRISM also recruited and managed volunteers who checked surveillance traps for southern pine beetle in our region at 7 locations to help prevent the introduction of this forest pest to our region.

Information Exchange

Goal: The establishment of an information exchange allows Lower Hudson PRISM partners and other professionals to strategically manage and integrate information relevant to the management of invasive species and offer that information to any person, group, agency (partner and non-partner alike).

One of the primary objectives under the Information Exchange goal was to improve the usability and look-and-feel of our website. We contracted with Backoffice Thinking at the end of 2017 to redesign the LHPRISM website and expect the new site to go live at the end of January 2018. Further development will be required, but we expect to have a more modern and accessible website after the launch of this first phase. This should help us make progress on other Information Exchange objectives, including making more content available and providing a platform for partners to gather and share information.

The Lower Hudson PRISM followed through on its plan to increase use of social media to disseminate information. Through strategic sharing of events, articles, videos, and other content, we were able to drive more traffic to the LH PRISM Facebook page and share relevant information with interested parties. Our most popular posts often dealt with landscape ecology and specific species alerts. Although there was only a slight increase in the number of "likes" that the page received, both the average visibility and page visits rose in the last quarter of 2017 when compared to 2016.

The New York Botanical Garden was contracted to host our bi-annual Invasive Species Summit this year with a focus on management. The summit drew nearly 300 attendees and was well received. A recording of the presentations is posted on YouTube. (See Section 4 below for URL)

The final objective in our 2017 Action Plan for the Information Exchange goal was to share more information between partners on experiences managing invasive species. We scheduled a moderated sharing session during our January meeting, and we also conducted a session during lunch time at our Summit which was attended by more than 50 people.

Section 4: Contracted Projects

To extend the reach of our management or eradication efforts, the LHPRISM is able to contract out projects that need more comprehensive work. These final reports are available on our web site at <https://www.lhprism.org/contracted-projects> and are summarized here.

New York Botanical Garden

Invasive Species Summit

The New York Botanical Garden (NYBG), an active PRISM partner, was awarded the funds to host the *Invasive Species Summit: Restoration and Long-Term Management* in November 2017. The event was proposed in effort to meet Goal 6: Information Exchange of the 2017 PRISM Action Plan, and more specifically, objective 6.2, to share information relevant to the management of invasive species from partners within New York State PRISM regions and outside PRISM regions.

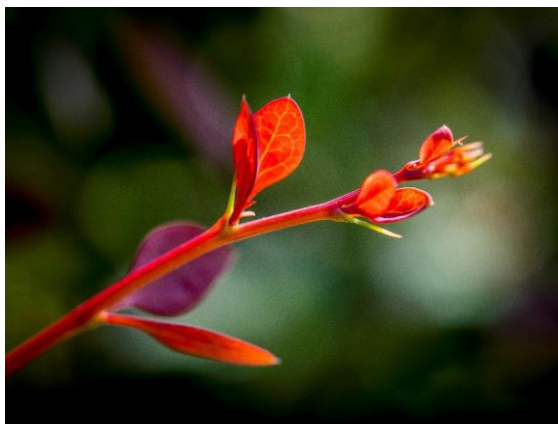


Nearly 300 registrants attended the event, which showcased the importance of long-term management and ecological restoration in managing invasive species.

The program (Appendix IV) included insightful speakers who presented a substantial introduction to ecological restoration, ongoing invasive species management, and restoration projects from three PRISM partners (NYC

Parks, NYBG, and Westchester Land Trust)¹, and examples at different scales. The New York Botanical Garden also provided tables in the lobby for PRISM outreach efforts, including distribution of flyers and display of the Invasive Species Information Panels created by the Cornell Cooperative Extension Dutchess County in 2016. Space was also provided for the LHPRISM to host a networking lunch discussion on best management practices for specific invasive species.

The event was successful in attracting multiple audiences. An image of Japanese barberry² was chosen as the *Invasive Species Summit* image used to market the event. In total, 550 fliers were distributed, 12 marketing emails were sent, and 31,000 Adult Education catalogues were distributed that advertised the event. Additionally, professional continuing education credits were offered for NYS-DEC, LA-CES, ISA, and SER-CERP. Of the



approximate 300 participants who attended the November 3rd event, 20 were PRISM partners, 98 NYBG Members, 12 NYBG Employees, 11 NYBG Volunteers, 10 NYBG School of Professional Horticulture Students, and 141 non-members. Most participants were from New York, with the addition of Connecticut, New Jersey, Pennsylvania, Maryland, Massachusetts, Louisiana, and Florida. A total of 24 participants received professional credits (11 for NYSDEC, 10 for LA-CES, and 3 for ISA.)

The video of the Invasive Species Summit was published on the NYBG YouTube channel and the program summary was posted to the NYBG Blog, “Science Talk” and shared through social media. (https://www.youtube.com/watch?v=G8pLAP_N1u8)

Scenic Hudson

Esopus Mile-A-Minute Project: A Cooperative Partnership Between Scenic Hudson and Trillium ISM

In the fall of 2014, an infestation of Mile-a-minute (MAM) vine (*Persicaria perfoliata*) was identified in the Town of Esopus, NY. This infestation was the first occurrence identified in Ulster County, NY and was one of the most northern infestations in New York State. MAM’s invasiveness is

¹Invasive Species Summit Presenters (left to right): Paddy Woodworth, Art Gover, Kristy King, Tate Bushell, Todd Forrest, and Jessica A. Schuler. Photo credit: Suzanne Clary, Jay Heritage Center.

²Japanese barberry (*Berberis thunbergii*) © Esin Ütün

ranked as “Very High” by NYS. While it is considered an established species by the LHPRISM, this population is located in the northwest corner of the LHPRISM where it is still uncommon. For these reasons, this infestation was cause for significant concern: it represented a considerable threat to the as-yet-uninvaded Catskills region and important conservation lands. The area was surveyed and a proposal for action was developed in 2015. Initial landowner outreach in the winter of 2014-2015 only connected with one property owner, Ted Peck. LH PRISM funding was awarded to support planning, monitoring and management support for the management of Mr. Peck’s property.

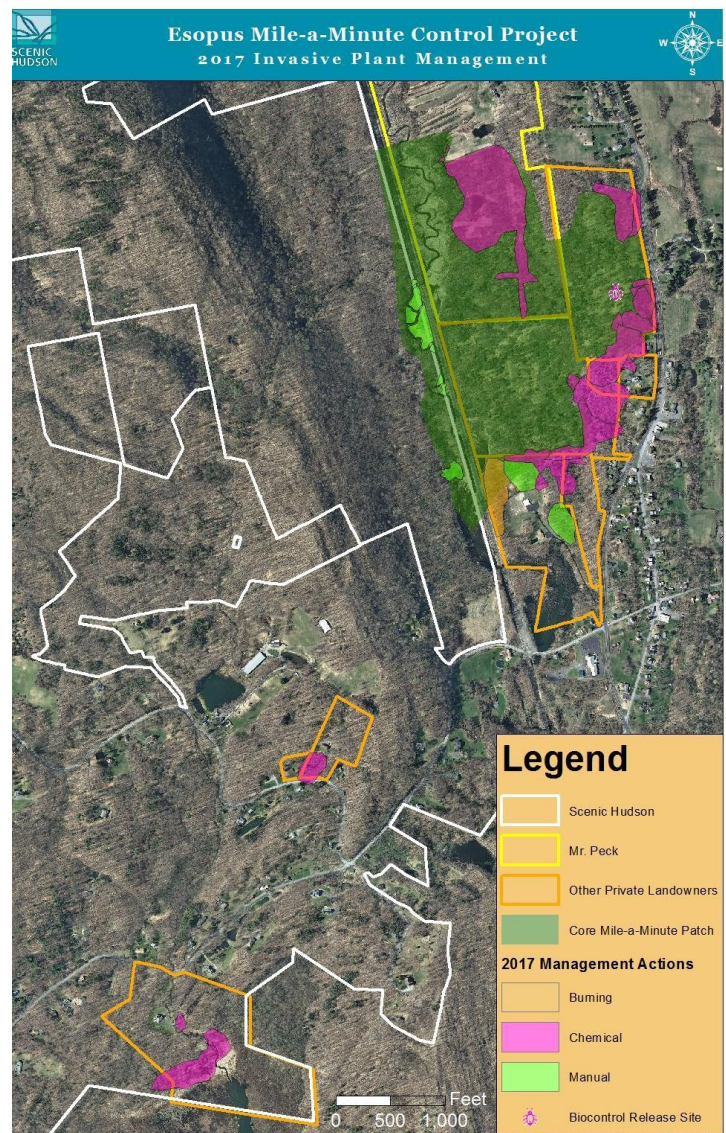
By suppressing MAM at the edge of its expanding range, this project aimed to slow the spread long enough to establish a large and healthy population of the available biocontrol (*Rhinoncomimus latipes*) and more quickly achieve long-term suppression in newly invaded areas.

In the first two years of the project (2015-2016) project collaborators engaged in community outreach, established a management plan for a portion of the infestation and implemented control measures which included brush cutting four acres of land and two miles of access trails, treating fourteen acres with herbicide, (not including area treated by landowners), treating eighteen acres with hand-pulling and mechanical means and releasing 1000 biocontrol weevils.

In 2017, the LHPRISM funded the third-year continuation and expansion of control efforts³.

Scenic Hudson

In 2017, much of the administrative work was taken on by Scenic Hudson, allowing Trillium ISM to focus on more aggressive control efforts. This



³ Scenic Hudson, INC. created this map with data contributions made by Trillium ISM, INC.

included the retrieval of permits for biocontrol from APHIS and herbicide application from the NYSDEC. Scenic Hudson was also responsible for manual control of 2 acres of the Mile-a-Minute infestation. 1.5 acres were controlled by manual pulling, while 0.5 acres were controlled by weed whacking.

500 biocontrol weevils were also released on one private site. Without costly, long-term monitoring it is difficult to assess the success of released biocontrol on the site. In 2015, project collaborators noticed biocontrol was already present in low densities throughout the core patch. Since that time, 2,500 weevils have been released within the center of the core patch, where no management occurred during the duration of the project. It is hoped this area acts as a local biocontrol nursery; boosting their population and therefore encouraging dispersal to nearby MAM infestations.

Scenic Hudson also gave a presentation focusing on the Mile-A-Minute project to the Town of Esopus Environmental Board and was responsible for post-treatment monitoring for the rest of the season.

Trillium ISM

Trillium ISM, Inc. was responsible for the management and control of Mile-A-Minute on 25 acres, including 21 acres of herbicide treatment and 2 acres of hand pulling. Additionally, an experimental targeted flame method was tested on 2 acres. As compared with weed whacking and hand pulling, flame torch treatments appeared to be more effective and required less effort. While they did not appear to be as effective as herbicide treatments, flame torches might provide a reasonable method of management in wetlands or other sensitive habitats. More research is needed to quantify the efficacy of these treatments across multiple sites, but these preliminary trials are promising.

General monitoring was also conducted in late summer to assess outcomes and assess future control options.

Mr. Ted Peck

Mr. Peck, a private property owner who has been with the project since its initiation, applied herbicide to 13 acres of his own property. He will likely continue his efforts as he has a personal goal to eliminate mile-a-minute from his property.

Trillium Invasive Species Management, Inc.

In 2017, Trillium ISM was awarded funding for three contracted invasive species management projects for emerging or Tier 2 species throughout the Lower Hudson Valley, including hardy kiwi (*Actinidia arguta*), sticky sage (*Salvia glutinosa*), and kudzu (*Pueraria montana*).

Hardy Kiwi

Bedford, New York

An infestation of hardy kiwi (*Actinidia arguta*) patches was first identified in 2013 along the route 172 corridor in the Town of Bedford, NY. Subsequent surveys over the following year identified nine distinct patches. This assemblage of infestations occurs on multiple properties of varied use types; public school land, town owned property, fellowship land, and several residential properties. This infestation is the final of three known hardy kiwi infestations in the LHPRISM to have a project formed to eradicate it. Since 2015, Trillium ISM has been involved in the management efforts of hardy kiwi. In 2017, Trillium ISM was contracted to continue control efforts in the Town of Bedford. The Town of Bedford, Bedford 2020, and Bedford Audubon worked to increase outreach to neighboring landowners. Trillium ISM continued control efforts on seven infestations and surveyed new properties, resulting in the discovery of ten new infestations (Appendix V).

Hardy kiwi is ranked by the LHPRISM as an Tier 2 invasive species and its occurrences are considered classic early detection/rapid response scenarios. It is a perennial vine that reproduces by rooting at nodes in contact with soil and by fruiting. Up until recently it has not been common to find fruiting populations escaping into the natural environment, but several populations have been discovered producing fruit and spreading in Westchester County NY and on Long Island. Fruit production is occurring at several locations in this infestation along Route 172. If no control is exercised, it is reasonable to expect this infestation to continue expanding. According to personal correspondence from NYS DEC regarding draft invasiveness assessment, hardy kiwi has been ranked as High. Hardy kiwi is an early detection species with three recorded infestations complexes in the Lower Hudson PRISM – Pound Ridge, Croton and Bedford. This project advances efforts to eradicate the last of the three known infestations.

In 2017 Trillium ISM was able to obtain a wetland permit from the Town of Bedford allowing for control of 3 more sites. Trillium continued control at 6 additional infestations, for a total of 9 treatment sites out of the 19 discovered. Regrowth was observed at all locations from the previous

years and was treated with herbicide except for one due to landowner restriction. This infestation was cut instead in May and September. Previous experience with cutting of kiwi resulted in significant suppression of re-growth, however cutting at this location resulted in vigorous re-growth and it was even able to produce fruit. Given the landowner restrictions and the site conditions (wetland/stream area and steep rocky upland areas), continued cutting is the most reasonable course of action for future years. Throughout the summer four landowners were added to the project scope and ten new infestations were discovered. Where possible, mature vines were cut at the base.

It is recommended that survey efforts be re-doubled and continue to be conducted. This will require further outreach to the property owners.

Sticky Sage

Dover, New York

This project significantly augments an ongoing control effort of an extensive infestation of sticky sage (*Salvia glutinosa*) within the Town of Dover, NY. The infestation was first discovered in 2009 along the Appalachian Trail and was originally estimated at approximately 82 acres. Starting in 2013, management has been undertaken by several crews on various areas within the infestation with initial treatment areas along the Appalachian Trail conducted by the National Park Service.

This is currently one of two confirmed infestation of sticky sage in the LHPRISM. The plant is listed as a Tier 2 species, warranting a rapid response effort. There is little known about the invasiveness of the plant beyond this infestation, where it is found to be capable of growing at high densities in a wide variety of conditions and spreading by seeds which are dispersed by adhering to passing mammals.

This project conducted treatment on as much land as was feasible, initiated the establishment of best management practices for this species and explores the feasibility of eradication of this plant. This infestation appears to have been planted as an ornamental by a previous landowner ~20 years ago. Since that time, it has spread over an extent of 180 acres with varying densities.

At the time of initial discovery, the infestation was estimated to have a general infested area of about 80 acres. Control efforts have been conducted by various parties since 2013 and areas

initially treated in 2013 were reported to have a high control success. However, some of these same areas required repeat treatment in 2016 by Trillium as the infestation had rebounded to a high density. This is likely due to the three-year gap in treatment and indicates that while herbicide treatment is effective on existing plant growth, a viable seed bank exists: continual treatment for several consecutive years is necessary for eradication.

This year represented a significant increase in efforts (Appendix VI) and resources dedicated to controlling this infestation. The goal was to control as much area as possible and determine if eradication is a feasible goal. Approximately 60 acres were treated by Trillium ISM with a foliar application of glyphosate. Acreage treated represented a significant portion of the core of the infestation as well as the western extent of the infestation. Treatment occurred in May, June, July and August; over which time no difference in herbicide efficacy was observed. It was very useful to treat in several week intervals as this allowed crews to observe efficacy of control work and follow-up on any areas that were missed on a previous trip.

The Town of Dover issued a resolution to treat infested road rights-of-way and, as a result, all salvia along Town roads was treated with the help of the New York-New Jersey Trail Conference Invasive Strike Force.

A NYS regulated class 2 wetland exists within the general infested area. In 2017 *S. glutinosa* was observed growing on the edge of this wetland and it is reasonable to expect that the plant is growing within the wetland.

The year saw an increase in landowner participation and a better resolution of the infestation extent. Over the past years many landowners have signed on to allow control work on their property. In 2017, several more land owners in the core area were contacted and permission was secured to work on their properties. Additional landowners were identified as having *Salvia glutinosa* on their properties, on the north and north-eastern extent of the infestation. These landowners should be contacted to ensure complete control of the infestation. Unfortunately, much of the eastern extent of the infestation is not well known; this area needs more survey work and close contact with the owner of a few large parcels.

Based on the area covered in 2017, it is reasonable to expect that the entire known infested area can be treated in 2018 with a modest increase in effort from Trillium and Strike Team crews.

Much of the 2017 treatment area was very dense, it may be expected that 2018 follow-up work in those areas will cover more area-per-time than the initial control work. A goal of complete control will also require outreach to new landowners, survey work on the eastern extent of the infestation and a NYSDEC permit to apply herbicide within the 21.5-acre wetland.

Kudzu

Throughout the Lower Hudson Valley

Treatment of kudzu (*Pueraria montana*) at 23 sites in the Lower Hudson Valley was conducted between October 11, 2017 and October 26, 2017 by Trillium ISM. The cumulative treatment area was 1.77 acres.

Some sites had plants present on adjoining properties. One property owner was contacted, but they had no interest in the program and claimed that they manage it themselves. In addition, two sites had plants present on adjoining properties, but the owners were unable to be contacted.

At one site, a hindrance to treatment was that the parking lot is actively used throughout the day. This area need to be blocked off in advance to perform a complete treatment and should be required for crews moving forward. The note for last year implied a temporary use of area. Unfortunately for this site treatments were not complete. For two other sites the slopes were very steep, and erosion is a concern that needs to be assessed before full treatment can occur. All the other sites had complete treatments and one site showed no plants present.

Ecological Research Institute

Data Analysis for Blockbuster 2016

Ecological Research Institute (ERI) received funding from the Lower Hudson PRISM to analyze the data collected from the 2016 BlockBuster program with the goal of making data collection and analysis easier in future years.

ERI's Jonathan Rosenthal and Dr. Radka Wildova concentrated on the presence or absence of species within High Probability Areas (HPAs), Natural Areas (NAs), and Natural Area Parking Lots/Trailheads (NAPLs) found within each 5 km by 5 km square. By comparing species found at each of these survey sites ERI determined that while HPAs often host species not found at

more natural survey sites, NAs also hosted species not found in the HPA. HPAs harbor the greatest proportions of the blocks' respective NA focal species when the HPA is similar in habitat to the NA, which in the LH PRISM typically means that it contains a woodland component. These findings help guide our survey site selections for the 2018 season. In addition, ERI made recommendations to determine a site's degree of invasion which may be useful in such applications as providing an objective measure of site suitability for Invasive Species Prevention Zone designation.

Cornell Cooperative Extension - Dutchess County

Blockbuster 2017 Survey Training

Cornell Cooperative Extension-Dutchess County (CCEDC) led the Blockbuster training in 2017 for the Lower Hudson PRISM organization. CCEDC updated training materials based on the 27 LHPRISM target species for 2017 and trained regional Master Gardener Volunteers to be experts for the counties in the region. In cooperation with LHPRISM staff, CCEDC worked with each CCE and LHPRISM partner in the region to recruit community volunteers for the 2017 Blockbuster program, and to deliver education to the volunteers who will then executed the survey.

Updated training materials for 2017 included the Recruitment and Identification presentation and the field guide. A flyer and web content were created and communicated on the CCE websites. Additionally, new presentations were created to review data collection and survey protocol and to describe a new smart phone application Survey123 created by volunteers from New York-New Jersey Trail Conference.

A Train the Trainers workshop held May 23 at CCE Dutchess County was attended by educators from the 6 CCE's, 1 educator from NYBG, and 7 LHPRISM or NYNJTC members.

CCE educators in each county presented the recruitment presentation to various audiences including their Master Gardener volunteers and local garden clubs. Together, the CCEs were able to present the information to over 250 Master Gardeners and garden club members in effort to recruit them for the Blockbuster program.

Seven 4-hour full training workshops were offered by the CCE educators in each county and one was held at the New York Botanical Garden throughout June. The number of volunteers trained this year was 111 with 96 blocks assigned, with 32 total blocks completed. This greatly exceeded

to 2017 goal of 60 volunteers, however it is a reduction from the 2016 numbers where 114 volunteers completed 70 blocks. CCE leaders followed up with trainees from their counties to check on status and encourage their completion, but several volunteers experienced situations which made them unable to complete the surveys.

While the number of blocks completed declined, the training and support provided by the CCE leaders greatly improved the quality of data as compared to previous years, including the discovery of new populations of emerging species.

Hudson River Sloop *Clearwater*

Hudson River Sloop Clearwater, Inc. (Clearwater) was awarded funding in March 2017 to continue the Aquatic Invasive Species Program which was developed in March 2015. This multifaceted program works to educate a wide variety of people throughout the Hudson Valley including, but not limited to, boaters, anglers, lake association members, and the general public about aquatic invasive species (AIS) identification and spread prevention, and to promote citizen science by getting locals involved in AIS early detection surveying. Clearwater's AIS Program includes the:

- Watercraft Inspection Steward Program
- Education and Outreach Program
- Volunteer Training/Surveying Program

This program was started at a critical time for the Hudson River. Over the years, storms have decimated the native plant populations in the Hudson River leaving the river bottom primed for new plant introductions. While native species such as eelgrass (*Vallisneria americana*) have been attempting to rebound, aquatic invasive plants have taken advantage of the sparsely populated river bottom.

The first step in mitigating the spread of invasive species such as hydrilla is to educate the public about species identification, impacts, management options, and spread prevention methods. The Hudson River is currently home to over 120 aquatic invasive species (AIS), many whose introduction could have been prevented through clean boating practices and proper aquarium disposal. Some of these species, such as water chestnut, have been here for over 100 years. Others, including hydrilla, are new to the Hudson River Valley. It is our responsibility to contain

these newly emerging species and prevent those that have not yet entered the region from becoming established.

Watercraft Inspection Steward Program

Watercraft inspection stewards are becoming more common across New York and the United States as invasive species become a more widely recognized environmental problem. One of the most common modes of spread for aquatic invasive species is via boats, trailers, and boating equipment. Many species can survive for extended periods outside of water, giving them countless opportunities to “hitchhike” from one waterbody to another. These stewards help to

prevent the spread of aquatic invasive species at the source.



This year, Clearwater was able to expand the program to from two stewards to three that each worked four days/week. The target area for the Watercraft Inspection Steward Program included 9 boat launches: Croton Echo, Croton Senasqua, Highland, Kingston, Ossining, Saugerties Glasco, Saugerties Malden, and Staatsburg. This was a difficult year for the Watercraft Inspection Steward Program. Two stewards abandoned the position before the

start of the season, one person was let go, and two more left by the end of July. Only one of the launches, Highland, was manned throughout the entire season. We also began the season using NYSDEC tablets with a new data collection app, WISPA (Watercraft Inspection Steward Program Application). Unfortunately, due to tablet malfunctions, we lost hundreds of data points.

Despite these tribulations, valuable data was still captured. 583 boats were inspected and over 1,400 individual boaters were reached. Overall, 89 percent of boaters were willing to participate in inspections and 70 percent were aware of the Clean, Drain, and Dry protocol. Only 9 percent of boats harbored aquatic hitchhikers!

AIS Education and Outreach Program

Educating the public about invasive species is the first step to preventing their spread. Program Coordinator Samantha Epstein held and attended a wide variety of events to reach the widest

range of people possible, including invasive species removal events, AIS identification and survey trainings, tabling events, and hands-on workshops. She was able to reach 2,672 teachers, students, Lake Association members, boaters, anglers, town and village officials, and more at 39 events.

AIS Volunteer Program

Invasive species become much more difficult to manage as they become more widespread. Clearwater is working to prevent hydrilla, among other species, from becoming widespread by conducting early detection surveying across the Lower Hudson PRISM region. Eradication can still be possible if a species is found early enough. Clearwater's AIS Volunteer Program promotes citizen science by training people to identify and survey for some of the most invasive aquatic plants in the region.

These trainings are hands-on, allowing volunteers to see first-hand what the plants look like and how to differentiate them from their native (and sometimes invasive) lookalikes. After seeing the plants, volunteers are brought to the water where they are given all of the necessary equipment, including data sheets, a field guide, a GPS, and a weed rake. This year, Clearwater focused its trainings on larger groups including Lake



Associations. 8 trainings were held and 10 waterbodies were surveyed. One survey of Lake Tiorati in Harriman State Park led to the discovery of water hyacinth, an emerging invasive in the area.

Clearwater looks forward to continuing to grow the AIS program by expanding the steward program, holding more trainings and volunteer outings, as well as attending more tabling events to spread the overall mission of the Lower Hudson PRISM.

Lower Hudson PRISM Assistant

The 2017 LHPRISM Assistant was funded by the LHPRISM budget under a Ramapo College contract. The LHPRISM Assistant, Lindsay Yoder, was successful in assisting in invasive species efforts including, but not limited to, directing the BlockBuster Survey program volunteers while accepting and organizing incoming survey data, advertising events throughout the region, and coordinating the southern pine beetle monitoring program.

The LHPRISM Assistant was responsible for organizing the 103 BlockBuster Surveyors and ensuring that surveyors had everything they needed to complete and submit their survey assignments. Management efforts included constant email and newsletter communications, attending trainings to instruct surveyors on how to operate the smart phone application, assigning block maps, aiding surveyors in plant identification and GPS operation, and accepting submitted survey data components. Lindsay monitored the incoming survey data from the new smart phone application daily and was responsible for quality checking instances of species found on the Emerging Species list. Lindsay would thank volunteers for their efforts and offer tips to a successfully survey, and distributed volunteer T-shirts to those who completed blocks.

In June and July, the LHPRISM participated in an effort to monitor for Southern Pine Beetle (SPB), an invasive insect emerging in our area. Coordination of this monitoring project involved working with Jessica Cancelliere and Tom Schmeelk at the NYSDEC to prepare assignments, supplies and maps, and train volunteers. 8 volunteers who were assigned to check 14 SPB traps located throughout the region. Overall, the SPB monitoring project struggled to draw volunteers this season. The monitoring effort was a total of 67 volunteer hours that contributed to the detection of SPB at Bear Mountain, Schunnemunk, Roosa Gap, Shawangunk Ridge, and Minnewaska State Forests.

Assistant responsibilities also included posting any LHPRISM partner-hosted events or invasives-related events to the LHPRISM website calendar as well as advertising LHPRISM projects and accomplishments on the Facebook page.

Section 5: Partner Successes

Our 45 LHPRISM partnering organizations are the ones on the front lines fighting invasive species in the Lower Hudson valley. Without the hard work and determination of our partners, their interns and our dedicated volunteers, the success of the LHPRISM would not be possible. All LHPRISM projects and efforts are essential to protecting and preserving our native landscapes; here are a few highlights of superlative success by our partners and volunteers.

Intern Projects

The Bronx River Parkway Reservation Conservancy - *Corydalis incisa*

Josh Miller, Brendan Gabriel, Bianca Hudson, and Sam Tyo, Iona College students, all worked to better understand incised fumewort (*Corydalis incisa*) in the Lower Hudson PRISM. This included individual studies on 2017 distribution, the role of ants in *C. incisa* dispersal, and *C. incisa* germination. In addition to the work done by the Iona college students, Jay Burstein, Isabelle Capello, Dayan Malley, and Yuka Nakano, students at Bronxville High School, studied *C. incisa*'s growth cycle so it may be better managed in the field.

The Hudson River Sloop Clearwater - Watercraft Inspection Steward

Hudson River Sloop Clearwater started an Aquatic Invasive Species (AIS) Program in April 2015, with the goal to educate the public about aquatic invasive species and get citizens involved in invasive species surveying and spread prevention. The driving force behind the AIS Program is Clearwater's Watercraft Inspection Steward Program, which kicked off at the end of May and went through August.

Clearwater Stewards were positioned at nine boat launches: Norrie Point (Staatsburg), Croton (2 launches), Ossining, Highland, Esopus, Saugerties (2 launches) and Ulster, where the stewards taught recreational boaters about AIS identification, impacts, and spread prevention through clean boating practices. Stewards also provide voluntary boat inspections to remove any invasive species from boats on the weekends. In 2017, seven stewards (Shannon Malone, Ian Detweiler, Trent Reed, Jason Aguirre, De Abam-DePass, Mary Sweeny, and Matt Kesseli) participated in the program over the course of the season while another intern, Carlin Wakefield, assisted the Aquatic Invasive Species Program in other ways.

The NY-NJ Trail Conference - Invasives Strike Force AmeriCorps Crew

The 2017 Invasives Strike Force (ISF) crew was comprised of Spencer Barrett (Crew Leader), Matt Simonelli (Crew Member), Daniel Pollard (Crew Member) and Ryan Goolic (Crew Member). The ISF crew recorded treatment of 108,840 plants within 37 parks, preserves and private lands throughout New York State and Northern New Jersey. The crew led or assisted in a number of on-going projects targeting emerging species within the Lower Hudson PRISM, including sticky sage (*Salvia glutinosa*) in Dover, NY, Japanese angelica tree (*Aralia elata*) in the Red Hook, NY area, scotch broom (*Cytisus scoparius*) within Harriman and Bear mountain

State Parks, giant hogweed (*Heracleum mantegazzianum*) within the entire PRISM and slender false brome (*Brachypodium sylvaticum*) at Wappingers Creek in Dutchess County.

At the sticky sage eradication project in Dover, NY, the ISF crew, with the assistance of Trillium Invasive Species Management Inc., was able to treat 70.4 acres of the known 82.5 acres which have plants present. This is up from the 5.63 acres the ISF crew treated in 2016.

At the *Aralia elata* containment project in the Red Hook, NY area, the crew was able to treat 6,293 stems over an area of 3.97 acres. This is up from 144 stems over 1.76 acres in 2016.

In 2017 the ISF crew continued their efforts to remove scotch broom from Harriman and Bear Mountain State Parks. In Harriman S.P., all 32 sites managed for scotch broom were monitored for plants. 27 had plants found and had control work performed on them, with 4,059 plants treated over 4.25 acres. The remaining 5 sites were not treated due to accessibility issues. In Bear Mountain State Park, all 16 of the managed sites were monitored for plants, with 14 sites having plants found and control work performed, with 1,103 plants treated over 1.28 acres. The remaining 2 sites had no plants found and will be entering monitoring phase.

The ISF crew took part in managing the known Giant Hogweed sites within the Lower Hudson Valley PRISM. 20 sites were monitored, with 9 having plants present. 134 plants were either dug out or chemically treated over an area of 1.38 acres. 5 sites had no plants found for the first year, 2 sites had no plants found for the second year in a row and 4 sites had no plants found for the third year in a row and are now considered to have had Giant Hogweed eradicated from them.

It was the first year in which slender false brome (*Brachypodium sylvaticum*) was detected in the Lower Hudson Valley PRISM. With the assistance of Steve Young, Chief Botanist for the New York Heritage Program, the crew scouted for slender false brome along Wappingers Creek. Control work was performed over an area of 0.298 acres, with 162 plants manually removed.

Scenic Hudson - Esopus Mile-a-minute Suppression

The town of Esopus represents one of the leading edges of mile-a-minute spread. Scenic Hudson has been managing a large infestation with weed whacking, hand-pulling, fruit removal, directed flame, herbicide, biocontrol, and outreach to the town environmental board for several

years now. Funded partially by the PRISM, this multi-year project had three interns in 2017, Megan Johnson, Steven Naukum, and Will Marian, who performed manual removal and other tasks to manage the infestation.

Section 6: Volunteer Recognition

A total of 1,571 LHPRISM volunteers dedicated 14,340 hours to help combat invasive species and help preserve the native habitats of our region. Much of what the LHPRISM accomplishes could not be done without the hard work and dedication of our invaluable volunteers. The following is a few spotlight features of some outstanding volunteer efforts. The LHPRISM would like to extend a huge thank you to all our volunteers who were out surveying, pulling, and plotting against invasive species throughout 2017!

Ann and Jerry Barry went above and beyond with their work on the Invasive Species Program's BlockBuster Surveys in 2017. In addition to surveying their own 3-mile by 3-mile square in Rockland County for invasive plants, the Suffern, N.Y., residents went out of their way to join other surveyors in the field to learn the survey process and help us get valuable data on the spread and distribution of invasive species. They volunteered more than twice as many hours as anyone else in the Blockbuster Program, and we are incredibly grateful for their help in ensuring its success throughout Rockland County.

Over the past year and a half, Irene Voce and Tom Hobbick have shown sustained dedication and enthusiasm for our Invasive Species program. Beginning as Invasive Strike Force surveying volunteers, these Suffern, N.Y., residents have assisted with various aspects of our invasives program by actively surveying for our target species. Together, they have committed over 440 hours to performing critical data entry for our 2016 Blockbuster program, creating new smartphone survey apps for our 2017 Blockbuster and ISF programs, and engaging in training sessions for volunteers. They continue to be engaged by helping to develop more efficient methods to manage the information and data that we receive across our different programs, including helping to redesign our database. Tom and Irene have been instrumental in broadening our scope of how we use our tools to increase volunteer engagement and in ongoing development of tech solutions for our program operations.

Appendix I: Emerging Invasive Species in the Lower Hudson Valley

The following list is a brief report of emerging invasive species observed and, in most cases, treated by the LHPRISM partners. These emerging species are ones that were recently introduced but not yet widespread in the region. Some of the following were included on the 2017 BlockBuster Survey focal list, and their survey observations will be noted below.

Cytisus scoparius **Scotch broom**



The New York-New Jersey Trail Conference's Invasive Strike Force (ISF) treated 35 of the 38 sites within Harriman State Park totaling 3.91 acres, with 1 site entering the monitoring phase. ISF and NYS OPRHP treated 16 of the 16 known scotch broom sites within Bear Mountain State Park. A total of 9.65 acres were treated within the LHPRISM. The Harriman and Bear sites represent the major known areas of Scotch Broom infestations and will continue to be targeted during the 2018 season.

Scotch Broom was a focal species for in 2017 BlockBuster Survey, no observations were reported by volunteer surveyors; however one new infestation was found by others.

Corydalis incisa

Incised fumewort



In 2017, the partners of the Lower Hudson PRISM treated incised fumewort over an area of 3.125 acres. With 2 acres being completed by the Bronx River Parkway Reservation Conservancy in the Mount Vernon area, 1 acre being treated by New York Botanical Garden within the NYBG Forest and 0.125 acres treated by Teatown Lake Reservation on Teatown lands.

Alnus glutinosa

European Alder



Bronx River Parkway Reservation Conservancy (BRPRC) performed treatment for European alder within a 10 acre site.

European alder was a focal species for in 2017 BlockBuster Survey, 3 observations were reported.

Actinidia polygama

Silver Vine



During the 2017 season a total of 2.22 acres were treated within the PRISM. The major site of activity was in Mt Kisco, NY where, with the combined efforts of the New York-New Jersey Trail Conference's ISF crew and Trillium Invasive Species Management Inc., a total of 1.91 acres were treated. The remaining Silver Vine sites were within Sterling State Forest where 0.31 acres were treated by the New York State Parks seasonal Strike Team.

Actinidia arguta

Hardy Kiwi

Two sites within the PRISM had treatments performed for Hardy Kiwi during the 2017 season. Trillium Invasive Species Management Inc. treated 3 acres in Bedford, NY. While the New York-New Jersey Trail Conference's ISF crew treated 0.07 acres at the Brinton Brook Sanctuary in Croton, NY.

Hardy kiwi was a focal species for in 2017 BlockBuster Survey, no observations were reported.

Symplocos paniculata

Sapphire-berry



Sapphire-berry was a new addition to the emerging species list in 2017 based on observations from intern Will Koneval of The Invasives Project- Pound Ridge who found 2 large infestations in the Pound Ridge, NY area. A total of 10.80 acres were treated by the ISF crew during the 2017 season, with continued efforts planned for the 2018 season.

Arthraxon hispidus

Small Carpetgrass



During the 2017 season the NYNJTC ISF crew performed control work at two sites within the PRISM totaling 0.02 acres impacted.

Small carpetgrass was a focal species for in 2017 BlockBuster Survey, no observations were reported; however one additional site was found by the ISF crew during their treatments and was also controlled.

Brachypodium sylvaticum

Slender False Brome



Slender false brome was a new addition to the emerging species list in 2016 with the discovery of populations along Wappingers Creek in Dutchess County. During the 2017 season the NYNJTC ISF crew performed control over 0.30 acre at two sites. Additional surveying and control along Wappingers Creek is planned for the 2018 season.

Italian arum

Arum italicum



Italian arum was a new addition to the emerging species list in 2017. The New York Botanical Garden performed removals over 1 acre within the NYBG Forest and also spearheaded documentation of the discovery via a journal article in the New Phytologist. Since publication of the first find, an additional 6 locations within the LHPRISM have been documented.

Heracleum mantegazzianum
Giant Hogweed



During the 2017 season the NYNJTC ISF crew managed 20 sites for giant hogweed. Out of those 20, treatment was necessary only on 9 sites totaling 1.38 acres. 11 out of 20 sites have now shifted to the monitoring phase, with 7 sites having no plants found for either the last year or 2 years and 4 sites having no plants found for the last 3 or more years. The sites with no plants found for the last 3 or more years are now considered eradicated.

Hydrilla verticillata
Water Thyme

During the 2017 season SOLitude Lake Management performed control of water thyme over 2.75 miles of the Croton River.

Lespedeza cuneata
Chinese Bush-clover



During the 2017 season the NYNJTC ISF crew performed treatment of Chinese bush-clover over 0.23 acres within Ramapo Mountain State Forest in New Jersey. Based on the proximity to New York State, along with the park's popularity, this site was intended to help prevent this species from making its way north into New York State.

Chinese bush-clover was a focal species for in 2017 BlockBuster Survey, one observation was reported.

Phellodendron amurense
Amur Corktree



During the 2017 season Amur corktree was treated in only 1 location, the Otter Creek Preserve. Control was performed by the NYNJTC ISF crew, with only a single planted treated. During the 2018 season this species will be targeted more widely for control efforts.

Amur corktree was a focal species for in 2017 BlockBuster Survey, no observations were reported.

Photinia villosa
Oriental Photinia

Control work for Oriental photinia was performed at sites all across the Lower Hudson PRISM during the 2017 season. Work was performed by both the NYNJTC ISF crew and Teatown Lake Reservation and totaled 2.33 acres.

Pueraria Montana
Kudzu



During the 2017 season Trillium Invasive Species Management Inc. along with the NYNJTC ISF crew performed control and monitoring of Kudzu at 30 sites across the Lower Hudson PRISM. 23 of those sites still had plants present, and control work performed on them totaling 1.77 acres. All the sites are still in the monitoring or control phase, with none reaching the level of eradication yet.

Kudzu was a focal species for in 2017 BlockBuster Survey, no observations were confirmed.

Rhodotypos scandens
Black Jetbead



During the 2017 season 4.91 black jetbead was controlled across our region. The NYNJTC ISF crew controlled 2.50 acres. Rye Nature Center controlled 2 acres. Mianus River Gorge controlled 0.25 acre. Scenic Hudson controlled 0.16 acre.

Black Jetbead was a focal species for in 2017 BlockBuster Survey, 10 observations were reported.

Salvia glutinosa
Sticky Sage



During the 2017 season control work for sticky sage was performed over 70.43 acres. The bulk of this work was completed in the Dover, NY area, with 70.40 acres treated by the NYNJTC ISF crew and Trillium Invasive Species Management Inc. One additional site in Pound Ridge, NY was completely treated as well. Work will continue on the large infestation in Dover during the 2018 season.



Viburnum dilatatum
Linden Arrowwood

As a common garden plant Linden arrowwood has been found escaping all across the Lower Hudson PRISM. During the 2017 season the NYNJTC ISF crew treated 9.44 acres across 7 sites. The NYS Parks seasonal Strike Team treated 2.00 acres within Harriman State Park.

Linden arrowwood was a focal species for in 2017 BlockBuster Survey, 2 observations were reported.

Viburnum plicatum
Japanese Snowball

During the 2017 season Japanese snowball was treated by the NYNJTC ISF crew at Pinecroft Meadow Preserve. The treatment totaled 0.00057 acres.

Viburnum sieboldii
Siebold's Arrowwood



The NYNJTC ISF crew performed treatment at 4 sites for Siebold's arrowwood totaling 0.34 acres. Siebold's arrowwood was a focal species for in 2017 BlockBuster Survey, 1 observation was reported.

Wisteria floribunda
Japanese Wisteria

The NYNJTC ISF crew removed Japanese wisteria from 0.05 acres at Old Croton Aqueduct Park.

Wisteria sinensis
Chinese Wisteria

Rye Nature Center performed control over 1 acre for Chinese wisteria. NYNJTC ISF crew performed control over 0.26 acre.

Appendix II: LHPRISM Signed Partners and Participants

Partners listed in bold are elected from the membership to serve on the Steering Committee.

Signed Partners

1. Bedford Audubon Society
2. Black Rock Forest Consortium
3. The Bronx River Parkway Reservation Conservancy
- 4. Cary Institute of Ecosystem Studies**
5. Constitution Marsh Audubon Center & Sanctuary
6. Cornell Cooperative Extension – Dutchess County
7. Cornell Cooperative Extension – Orange County
- 8. Cornell Cooperative Extension – Putnam County**
9. Cornell Cooperative Extension – Rockland County
- 10. Ecological Research Institute**
11. Friends of the Great Swamp
12. The Friends of the Old Croton Aqueduct
13. Glenn Sungela
14. Hike New York
15. Hudson Highlands Land Trust
16. Hudsonia
17. Hudson River Sloop Clearwater
18. Jay Heritage Center
19. Mianus River Gorge, Inc.
20. The Native Plant Center, a program of Westchester Community College Foundation
21. Natural Areas Conservancy
22. The New York Botanical Garden
- 23. New York City Department of Environmental Protection**
24. New York City Department of Parks & Recreation
- 25. New York-New Jersey Trail Conference**
26. Pace University
- 27. The Pound Ridge Land Conservancy Inc.**
28. Putnam County Soil and Water Conservation District
29. Rye Nature Center
30. Saw Mill River Audubon
31. Scenic Hudson, Inc.
32. SOLitude Lake Management
33. Teatown Lake Reservation
34. The Invasives Project - Pound Ridge
35. Three Arrows Cooperative
- 36. Trillium Invasive Species Management, Inc.**
37. Village of Tuxedo Park
38. Walter Daniels
39. Westchester County Parks, Recreation, Conservation

40. Westchester Land Trust

41. Winnakee Land Trust

Participants

42. Christopher Mangels

43. Groundwork Hudson Valley

43. New York State Department of Environmental Conservation Region 3 – Lands & Forests

44. New York State Office of Parks, Recreation, and Historical Preservation

45. Orange County Land Trust

46. Palisades Interstate Park Commission

47. Three Lakes Council

48. Wave Hill

49. West Point US Military Academy

Appendix III: LHPRISM Partner Invasive Species Targeted For Eradication

Scientific Name	Common Name	Acres Treated
<i>Acer palmatum</i>	Japanese maple	0.96993
<i>Acer platanoides</i>	Norway maple	2.45433
<i>Actinidia polygama</i>	silver vine	1.61313
<i>Aegopodium podagraria</i>	bishop's goutweed	30.13988
<i>Ailanthus altissima</i>	tree-of-heaven	11.01138
<i>Alliaria petiolata</i>	garlic mustard	38.97685
<i>Alnus glutinosa</i>	European alder	0.20000
<i>Ampelopsis brevipedunculata</i>	porcelainberry	83.96975
<i>Arabidopsis sp.</i>	rock cress	0.75000
<i>Aralia elata</i>	Japanese angelica tree	19.68929
<i>Artemisia vulgaris</i>	mugwort	3.79860
<i>Arthraxon hispidus</i>	small carpetgrass	0.00506
<i>Berberis thunbergii</i>	Japanese barberry	61.15944
<i>Cardamine impatiens</i>	narrowleaf bittercress	1.48163
<i>Celastrus orbiculatus</i>	Oriental bittersweet	48.49836
<i>Chelidonium majus</i>	celandine	0.18225
<i>Clematis terniflora</i>	sweet autumn virginsbower	0.25000
<i>Corydalis incisa</i>	incised fumewort	0.28646
<i>Cynanchum louiseae</i>	black swallowwort	11.59912
<i>Cytisus scoparius</i>	Scotch broom	9.98559
<i>Deutzia scabra</i>	fuzzy pride-of-Rochester	0.01688

<i>Elaeagnus umbellata</i>	autumn olive	3.23761
<i>Epipactis helleborine</i>	broadleaf helleborine	0.00005
<i>Euonymus fortunei</i>	winter creeper	1.61258
<i>Euonymus alatus</i>	burning bush	15.84058
<i>Ficaria verna</i>	fig buttercup	0.60000
<i>Forsythia intermedia</i>	showy forsythia	0.71775
<i>Frangula alnus</i>	glossy buckthorn	1.16133
<i>Hedera helix</i>	English ivy	0.26131
<i>Heracleum mantegazzianum</i>	giant hogweed	0.52363
<i>Humulus japonicus</i>	Japanese hops	0.43135
<i>Hydrilla</i>	hydrilla	1.00000
<i>Ilex crenata</i>	Japanese holly	0.00578
<i>Ligustrum sp.</i>	privet	2.79863
<i>Ligustrum obtusifolium</i>	border privet	2.64881
<i>Lonicera japonica</i>	Japanese honeysuckle	42.85801
<i>Lonicera sp.</i>	honeysuckle	1.85950
<i>Microstegium vimineum</i>	Japanese stiltgrass	17.13220
<i>Miscanthus sinensis</i>	Chinese silvergrass	3.26080
<i>Morus alba</i>	white mulberry	0.83835
<i>Pachysandra</i>	pachysandra	0.25000
<i>Phalaris arundinacea</i>	Reed canarygrass	0.20506
<i>Phellodendron amurense</i>	amur corktree	0.04000
<i>Philadelphus coronarius</i>	sweet mock orange	0.18000
<i>Photinia villosa</i>	Oriental photinia	0.55800
<i>Phragmites australis</i>	common reed	30.20000

<i>Pleioblastus sp.</i>	dwarf bamboo	0.15638
<i>Polygonum cuspidatum</i>	Japanese knotweed	6.45338
<i>Polygonum persicaria</i>	lady's pepperthumb	3.40000
<i>Polygonum perfoliatum</i>	mile-a-minute	27.69348
<i>Pueraria montana</i>	kudzu	0.25000
<i>Rhodotypos scandens</i>	black jetbead	41.15884
<i>Rosa multiflora</i>	multiflora rose	25.36526
<i>Rubus phoenicolasius</i>	wineberry	20.10314
<i>Salicornia virginica</i>		0.14063
<i>Salvia glutinosa</i>	sticky sage	5.74650
<i>Spiraea prunifolia</i>	bridalwreath spirea	0.13500
<i>Syringa vulgaris</i>	common lilac	0.30713
<i>Trapa natans</i>	water chestnut	7.00000
<i>Viburnum dilatatum</i>	linden vibernum	3.40224
<i>Viburnum sieboldii</i>	Siebold's vibernum	0.09281
<i>Vinca minor</i>	common periwinkle	0.69863
<i>Wisteria sinensis</i>	Chinese wisteria	1.08281

Appendix IV: Invasive Species Summit Program

prioritization. Based on biology of the species and resources available, prescriptions and timetables are developed, and workdays assigned. The park provides staff, and Field Services and Penn State provide training in species identification and field operations such as spot application of herbicide, as well as effort during the work events. Through 10 seasons of effort, the process has been constantly revised to strike the balance between addressing pressing ecological needs and attracting and retaining dedicated personnel.



Tate Bushell and Jessica A. Schuler
Director of Stewardship with the Westchester Land Trust, and Director of the Thain Family Forest NYBG, respectively

Invasive Species Management and Ecological Restoration Lessons from Urban to Suburban Environments

Two regional organizations, NYBG and Westchester Land Trust, have developed invasive species management and ecological restoration programs in the past decade. While their approaches are similar, there are programmatic differences and scales to each project completed during this time. Explore the development of both programs that are set in different environments, one urban and one suburban. Learn how to establish goals, prioritize, implement projects, overcome challenges, and develop an understanding for the long-term commitment to managing invasive species, restoring ecosystems, and monitoring. No project is too small or too invaded—we can all contribute to managing our ecosystems and restoring for ecological resilience.

LEARN MORE

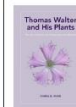
For additional information on invasive species and ecological restoration visit the Invasive Species Summit LibGuide at the Mertz Library: nybg.org/iss

ECOQUEST NOVEMBER 2017: INVESTIGATE INVASIVES!

Help NYBG document as many of these destructive invasives as possible by November 30. Join NYBG's EcoQuest Challenge at nybg.org/EcoQuest

NYBG PRESS

THE BEST NEW BOOKS IN BOTANY™



NEW RELEASE:
Thomas Walter and His Plants: The Life and Works of a Pioneer American Botanist
Memoirs of the New York Botanical Garden, Volume 116, Heritage Series, Number 2
By Denise D. Ward

To place your order, visit nybgpress.org

NYBG

INVASIVE SPECIES SUMMIT:
RESTORATION AND LONG-TERM MANAGEMENT

FRIDAY, NOVEMBER 3, 2017
ROSS HALL

NEW YORK BOTANICAL GARDEN



PROGRAM

9:15–10 a.m.	Check-in and Coffee
10 a.m.	NYBG Welcome Todd Forrest, Arthur Ross VP for Horticulture and Living Collections, NYBG
10:15 a.m.	Lower Hudson PRISM Welcome Linda Rohleder
10:30 a.m.	Removal is Not (Usually) Enough! Paddy Woodworth
11 a.m.	Restoration Success in a Densely Urban Environment Kristy King
11:30 a.m.	So Many Weeds, So Little Time Art Gover
12–12:30 p.m.	Panel Discussion Moderated by Todd Forrest
12:30–2 p.m.	Lunch Break Lower Hudson PRISM Networking Lunch, M232
2–3:15 p.m.	Lessons from Urban to Suburban Environments Tate Bushell and Jessica Schuler
3:15–4 p.m.	Discussion



Co-Presented with the Lower Hudson Partnership for Regional Invasive Species Management

The Invasive Species Summit was contracted by the Lower Hudson PRISM using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation.

CEUs available for ISA, AIA, LA-CES, DEC, and SER-CERP

PRESENTATION DESCRIPTIONS



Paddy Woodworth
Author, journalist, lecturer, and cultural and environmental tour guide

Removal is Not (Usually) Enough!

This scenario is bitterly familiar to conservationists struggling against invasive plants: a site is cleared, at great effort and cost, five years later the same site is twice as infested as previously. Failure to apply holistic principles of ecological restoration during and after removal often makes the last state worse than the first. But can restoration really work, in our age of accelerating global change? After a decade researching restoration sites and practices across the globe, Woodworth argues that restoration is making major technical advances, and has more support among the public and policy-makers than ever before. He will discuss restoration successes (and failures!).



Kristy King
Director of Natural Areas Restoration and Management in the Forestry, Horticulture, and Natural Resources Division of the New York City Department of Parks and Recreation

Restoration Success in a Densely Urban Environment

Urbanization is occurring at a rapid rate, with studies showing homogenization of urban vegetation as invasive species outcompete natives. These findings perpetuate the concept that natural urban areas are highly degraded and of low value, but local perspectives show that urban natural areas contain high proportions of native species and plant communities, ecosystem service provision is high, and restoration of degraded areas is possible. While invasive species remain a threat, research shows that restoration practices in New York City are successful, including positive findings on native plant communities, soil health, and wildlife outcomes. This talk will touch on all of these topics, colored by practitioner understanding of best practices, workforce development, community engagement, and site prioritization.



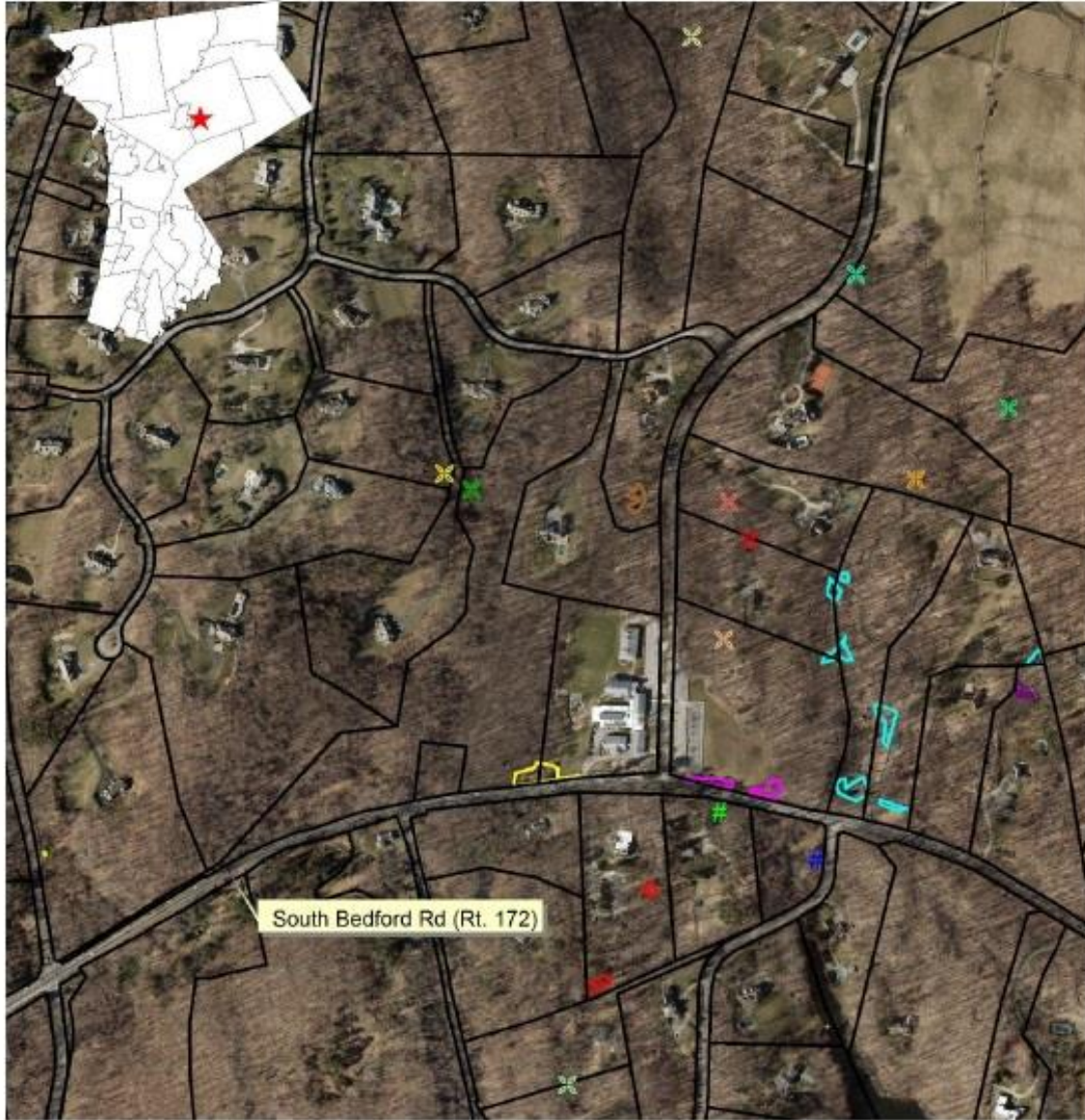
Art Gover
Research Associate, Penn State Wildland Weed Management, Penn State and Pennsylvania Bureau of Parks

So Many Weeds, So Little Time!

The Pennsylvania State park system is limited to regional-level Field Services staff to implement invasive species and habitat management operations in 122 different properties. In conjunction with an ongoing project at Penn State, candidate parks collaborate to develop a park-wide location-by-species

Appendix V: Bedford Hardy Kiwi Known Sites

**Town of Bedford
All known occurrences of hardy kiwi - 2017**



Parcel boundary source -
Westchester GIS
2013 Orthophoto source -
NYSGIS

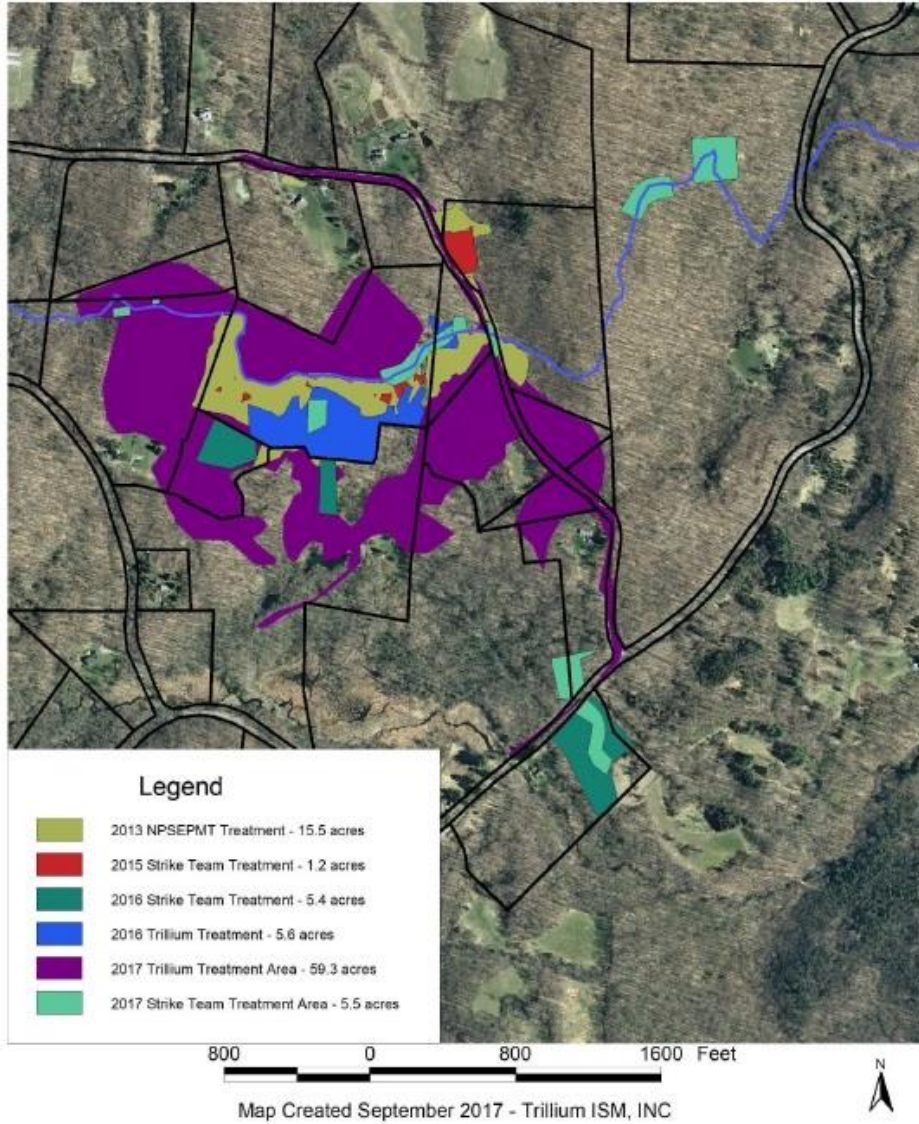
500 0 500 1000 Feet



Map Created December 2017 - Copyright Trillium ISM, INC

Appendix VI: Dover Sticky Sage Treatment Map

Salvia Glutinosa - Dover, NY



Bibliography

- Epstein, Samantha; Yoder, Lindsay; "Aquatic Invasive Species Program 2017 Final Report" Hudson River Sloop Clearwater, Inc., 2017. Beacon, NY
- Lewis, Thomas. "2017 Final Report Bedford, NY Hardy Kiwi Control Project." Trillium Invasive Species Management, Inc. 2017. Esopus, NY.
- Lewis, Thomas. "2017 KUDZU TREATMENT SUMMARY" Trillium Invasive Species Management, Inc. November 2017. Esopus, NY.
- Lewis, Thomas. "2017 Final Report Dover, NY Salvia glutinosa Control Project" Trillium Invasive Species Management, Inc. 2017. Esopus, NY.
- Nardi-Cyrus, Nate, "2017 Final Report Esopus Mile-a-Minute Control Project", Scenic Hudson, 2017. Beacon, NY
- "Restore: Monthly News Roundup from the Society for Ecological Restoration", Society for Ecological Restoration, January 15th, 2018.
<<http://myemail.constantcontact.com/Restore-Newsletter-January-2018.html?soid=1101952074862&aid=0-scUwL1EJw>>
- Rosenthal, Jonathan; Wildova, Radka PhD., "Fine-tuning data-collection and analyzing data already amassed – making the Blockbuster as useful as possible", 2017, New Paltz, NY
- Tomaselli, Joyce deVries, "2017 Blockbuster Training Summary Report", Cornell Cooperative Extension Dutchess County, 2017,