



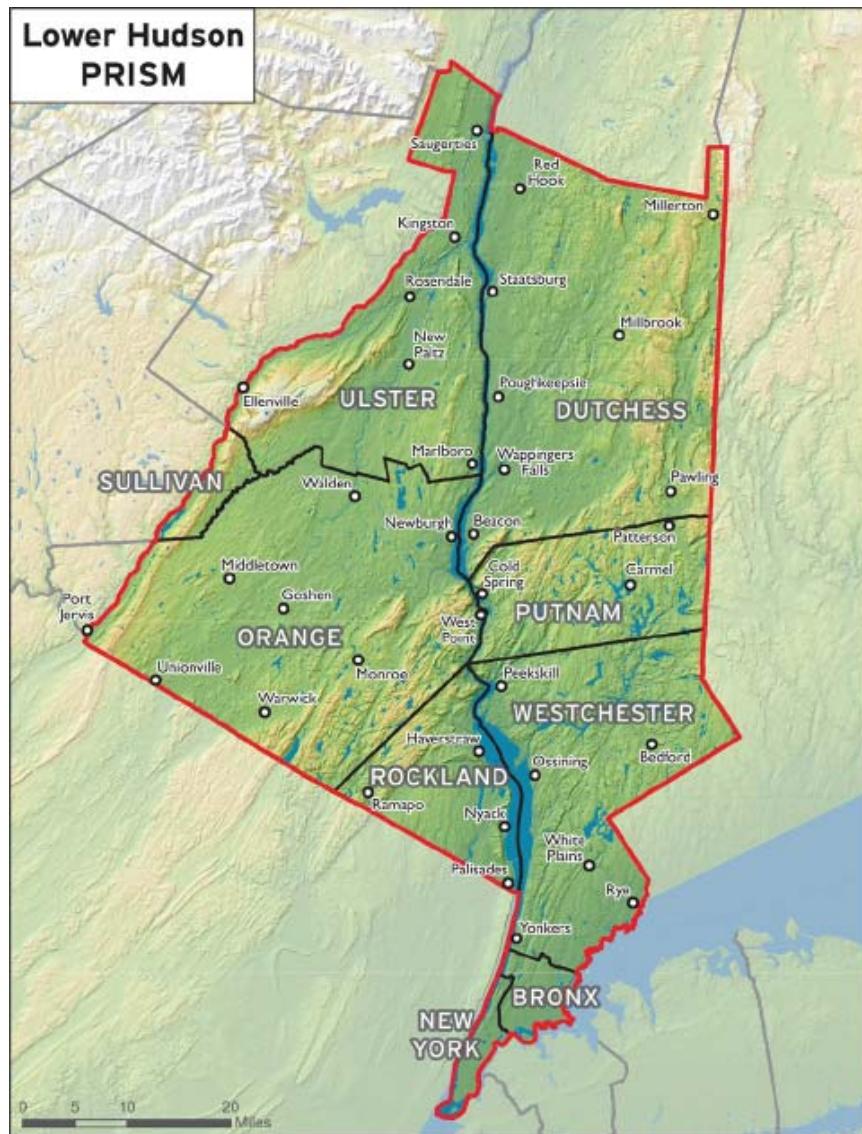
# 2019 ANNUAL REPORT

Lower Hudson Partnership for Regional Invasive Species Management  
2019 Annual Report

Prepared by:

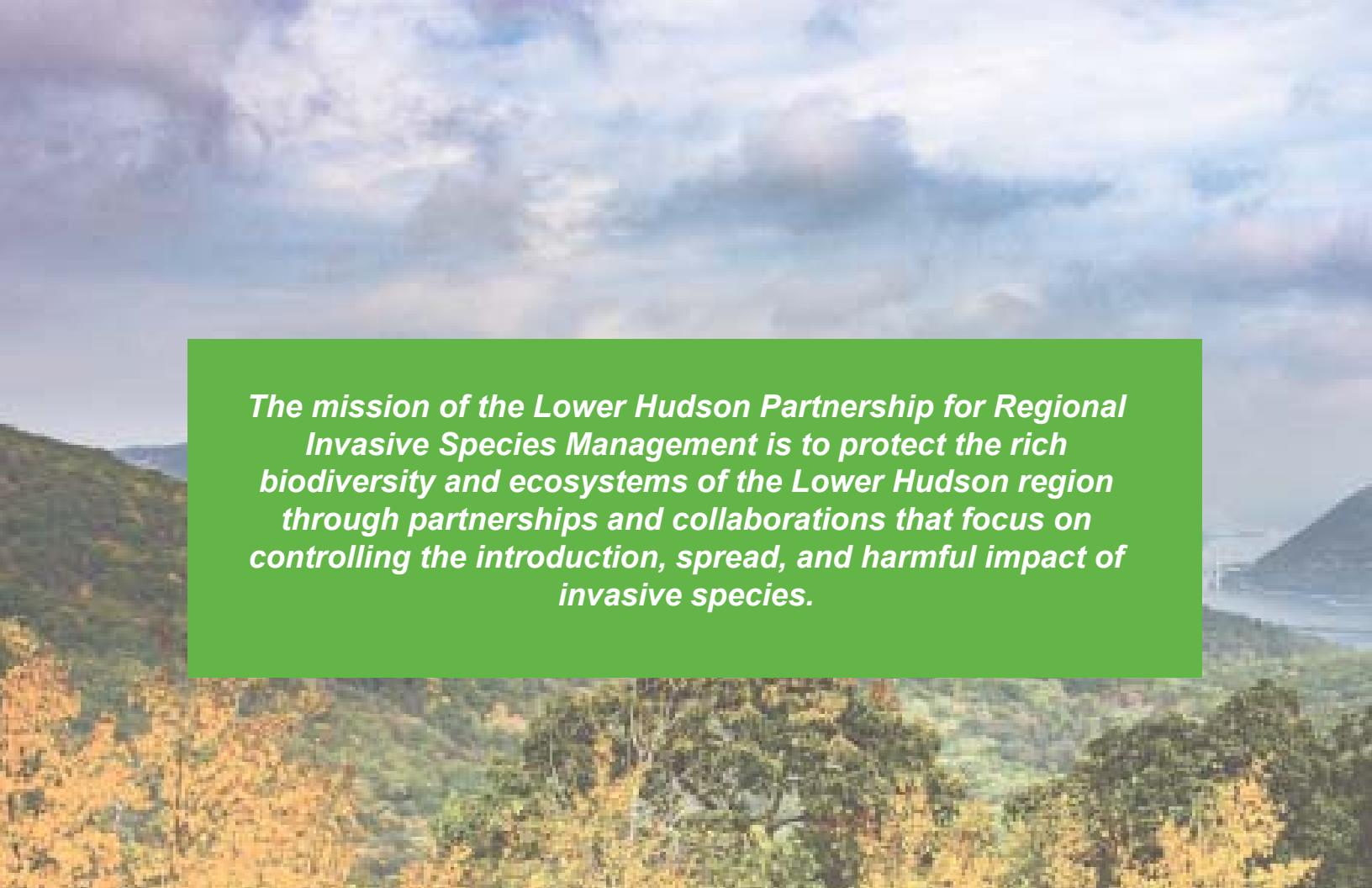
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**LOWER  
HUDSON  
PRISM**

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.



***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.***

### **2019 Steering Committee**

Jennifer Lerner, Cornell Cooperative Extension- Putnam County  
Meredith Taylor, New York City Department of Environmental Protection  
Michael Fargione, Cary Institute for Ecosystem Studies  
Matt Aiello-Lammens, Pace University  
Tom Lewis, Trillium Invasive Species Management INC  
Taro Ietaka, Westchester County Parks

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# Summary of Accomplishments

The LH PRISM and its partners had many significant accomplishments in the ongoing battle against invasive species. Through strategic planning, management efforts, and cooperation with each other, 2019 was one of the most accomplished years yet.

We grew our partnership to 52 organizations which greatly contribute to our overall accomplishments, including the more than 250 eradication projects, post-treatment monitoring, and over 300 opportunities for educating the public through workshops, presentations, and outreach events.

Together, over 3,100 volunteers offered their time and positive energy last year, contributing 18,500 hours to a range of important activities from surveying and species removal to processing data and drumming up support for our programs. This effort resulted in over 13,000 reports of invasive species being submitted to iMapInvasives, which helps tremendously in informing priority management decisions throughout the region. Our seasonal Invasives Strike Force and Aquatic Invasives Strike Force crews had another banner year as well, removing a combined number of 153,000 plants including 27 Tier 2 or emerging species and water chestnut.

55 articles were written about the work we're doing in the Lower Hudson Valley, including the New York-New Jersey Trail Conference's Conservation Dogs Program.

There were 8 contracts awarded to 7 organizations this year, which focused on education, outreach, detection, and management of invasive species. The New York Botanical Garden, Trillium Invasive Species Management, Inc., Ecological Research Institute, Teatown Lake Reservation, Vassar College, and Cornell Cooperative Extension all completed contracted projects, which are expanded on in sections throughout this report.



**nearly  
11,000**  
*hours spent by partners on  
Lower Hudson PRISM  
activities*

**303**  
*workshops, presentations, &  
outreach events educating over  
17,000  
people about invasive species*

**68** species targeted on  
**1,400** acres

*close to  
13,500  
records submitted to  
iMapInvasives*

**3,100**  
volunteers who  
provided  
**18,500**  
hours of service

# Progress According to Strategic Plan

## Capacity Building

### GOAL 1

**THE LOWER HUDSON PRISM HAS A ROBUST PUBLIC IDENTITY, STRONG INTERNAL STRUCTURE AND A SUSTAINABLE RESOURCE BASE TO CONTINUE ITS MISSION.**

#### OBJECTIVES

- A. Increase our public visibility to have the LHPRIIM be known as the go-to place for regional invasive species information
- B. Maintain our strong internal structure by growing our active membership, sustaining membership and enabling partners to be more fully engaged
- C. Increase partner's capabilities to conduct invasive species management
- D. Foster strong academic relationships

In 2019, we made major strides towards increasing the visibility of the Lower Hudson PRISM as a go-to resource for invasive species management and focused on ways of highlighting program accomplishments to the public. Lower Hudson PRISM and/or our partners' invasive species-focused projects were featured in 60 articles in the press in 2019. In addition to partners' own media releases and respective newsletters, Lower Hudson PRISM released 11 monthly stewardship newsletters that highlighted events hosted by our PRISM partners, reported on accomplishments and highlights of partner projects and Invasives Strike Force activities, and developed monthly species spotlight articles that tied into one of the Invasives Strike Force survey programs, the EcoQuest Challenge.

In an effort to maintain our strong internal membership structure and grow our active membership, we formed a New Partner Working Group that focused on developing a new partner welcome packet and questionnaire in 2019. There were 6 new partners that joined in 2019. The working group also recommended that we try pairing new partners with an existing partner as a mentor to help them understand the strategy, prioritization and work plan of the PRISM they that they could be more fully engaged in meetings. The Meeting Planning Working Group aimed to provide more opportunities for partner projects to be spotlighted at our PRISM partner meetings and allowed for networking/discussion times to be built into the meeting structure to encourage dialogue and collaboration opportunities between partners. During meetings in 2019, we had 8

#### NEW PARTNERS FOR 2019

**Friends of Van Cortlandt Park**  
*represented by John Butler*

**New York Restoration Project**  
*represented by Chris McArdle*

**North Salem Open Land Foundation**  
*represented by Jocko McKean*

**Wallkill Valley Land Trust**  
*represented by Cara Gentry*

**Wave Hill**  
*represented by Barry Kogan*

partners give short Partner Spotlight overviews of their organization and how they are involved with invasive species or native alternatives. Our attendance at partner meetings continues to remain strong with an average of 43.8 attendees at meetings and partners on average attending 3 of the 5 annual meetings.

We expanded opportunities for interns to participate in invasive species control and remediation efforts across our PRISM region as well as have them engage in GIS/mapping analyses and survey-based work. Our partners reported that 154 interns were involved with invasive species projects in 2019. This also highlights the progress made to engage with academic institutions in 2019. Internship announcements were featured on several university job boards including Vassar College and Marist College in Dutchess County, NY and Ramapo College in Mahwah, NJ. In addition, two PRISM-contracted projects (Vassar College and environmental DNA work with Dr. Michael Tessler) supported 5 internships in 2019. Several partner projects also featured high school students and interns in an effort to inspire the next generation of leaders in ecological stewardship. The New York-New Jersey Trail Conference, for example, featured the exceptional work of 4 high school interns who dedicated over 450 hours to invasive species surveying and control efforts in 2019 as well as 10 AmeriCorps members who served as Mile-a-Minute biocontrol program coordinator, Invasives Strike Force rapid response crew, and the Aquatic Invasives Strike Force.

### PROJECT SPOTLIGHT

#### VASSAR COLLEGE: INVASIVE SPECIES MANAGEMENT AND PREVENTION INTERNSHIP

Vassar College was awarded funding for two student interns to focus on invasive species management, monitoring, and outreach. The interns implemented invasive species management plans, utilized best management practices, monitored the response of populations to management, designed presentations for various audiences, created outreach materials, and educated the community through meetings, presentations, outreach events, and citizen science. Highlights include:

- Manual removal of six invasive species and construction of exclosures to protect rare plants
- Partnership with the Invasives Strike Force to remove populations of Tier 2 species *Kalopanax septemlobus* (castor aralia), *Symplocos paniculata* (sapphire berry), *Viburnum dilatatum* (linden viburnum) and *Akebia quinata* (chocolate vine)
- Utilized iNaturalist to contribute 58 observations of 37 species in the Hudson Valley Invasive Species Project
- Weekly monitoring for spotted lanternfly on host invasive *Ailanthus altissima*
- Attended numerous events, led workshops, and gave presentations to more than 230 community members



For the full report on all of the amazing work these interns did, visit [www.lhprism.org/vassarinterns](http://www.lhprism.org/vassarinterns)

# Progress According to Strategic Plan

## Conservation Targets

### GOAL 2

**THE LOWER HUDSON PRISM PROTECTS THE RICH, NATIVE BIODIVERSITY OF THE LOWER HUDSON VALLEY BY FOCUSING ON PRIORITY TARGETS FOR CONSERVATION.**

#### OBJECTIVES

- A. Identify candidate Invasive Species Prevention Zones (ISPZ)
- B. Support management projects which protect rare and endangered species populations.

The concept of Invasive Species Prevention Zones (ISPZ) is used state-wide to designate areas that are largely free of invasive species and which will be managed to ensure are protected from invasion. An Invasive Species Prevention Zone Working Group for the LH PRISM was formed in 2018 to help determine the ISPZ classification definition to be used in our region. This working group began outlining the application process for ISPZ designation in 2019. Much of the working group's discussion in 2019 centered on determining the viability of creating a customized LH PRISM ISPZ classification system that was tailored to the unique regional ecology of the Lower Hudson. Ultimately, the group decided to adopt the classification system used more broadly by the New York State Parks and other PRISM regions. Instead the Lower Hudson PRISM will work to identify Priority Conservation Areas (PCAs) with less stringent criteria. Some of the main objectives in 2020 will be to conduct thorough aquatic vegetation surveys to identify potential aquatic ISPZs (PCAs), create an application form for proposing candidate PCAs and continue to give weight to invasive species management projects and Requests for Proposals (RFP) proposal selections that will benefit conservation targets.

Most of the progress on our Conservation Targets goal was focused on Objective B in 2019. The Lower Hudson PRISM issues an RFP annually to solicit proposals for projects to fund that help accomplish our goals. We also have an application process for management projects to be conducted by the Invasives Strike Force crew, our early detection / rapid response team. In both cases, the scoring rubric for projects selected includes substantial points dedicated to projects which benefit conservation targets. These rubrics demonstrate a clear effort by the LH PRISM to prioritize conservation efforts when considering management projects and RFP proposals. In 2019, the Monitoring



LH-PRISM partner North Salem Open Land Foundation introduced 5th grade students and teachers to the importance of conserving native plants, the dangers of invasives and the importance of pollinators.  
Photo by: Jocko McKean

and Managing Ash project was selected to aid efforts to preserve our now critically endangered native ash trees in the face of the invasive Emerald Ash Borer attack. In addition, six of the Invasives Strike Force Crew projects that were selected in 2019 scored highly in conservation target metrics. Two projects which directly benefited conservation species were conducted. One helped preserve habitat and assisted in research for the New England Cottontail rabbit and another removed the invasive plant black swallowwort which was encroaching on a rare plant population.

The LH PRISM also helped fund an effort aimed at preserving our native ash trees, now considered Critically Endangered (IUCN Red List) as the invasive emerald ash borer sweeps through our region through the Monitoring and Managing Ash (MaMA) project. The MaMA project provided training with clear steps to take to help identify legacy ash trees which having survived Emerald Ash Borer attack may now serve as genetic sources for breeding resistant trees to preserve the species.

### PROJECT SPOTLIGHT

#### ECOLOGICAL RESEARCH INSTITUTE: MONITORING AND MANAGING ASH IN LHPRISM

The Ecological Research Institute's program Monitoring and Managing Ash (MaMA) provides an innovative framework that promotes undertaking particular tasks at each stage of emerald ash borer (EAB) invasion in order to achieve EAB mitigation and, even more importantly, to advance long-term conservation of native ash. Project funding was supplied by LHPRISM specifically to hold training workshops on ERI's Monitoring and Managing Ash (MaMA) program. Most of the workshops featured the establishment of an ash mortality monitoring plot to be included in ERI's MaMA Monitoring Plots Network, which extends through much of New York and beyond.

Nine workshops were held at locations throughout the region, many of which were hosted by PRISM partner organizations including Bedford Audubon Society, CCE Dutchess County, Cary Institute of Ecosystem Studies, CCE Orange County, CCE Ulster County, Green Chimneys, Teatown Lake Reservation, and Vassar College. There were 157 participants, with representatives from 46 organizations, students, and homeowners, resulting in 10 ash monitoring plots being created.

For the full report and more information on the MaMA project, visit [www.lhprism.org/erimama](http://www.lhprism.org/erimama)



*Workshop held at Green Chimneys*



*Field training at the Cary Institute for Ecosystem Studies*

# Progress According to Strategic Plan

## Strategic Management

### GOAL 3

**THE LOWER HUDSON PRISM SUPPORTS AND OPTIMIZES REGIONAL CONSERVATION THROUGH STRATEGIC INVASIVE SPECIES MANAGEMENT.**

#### OBJECTIVES

- A. Develop a protocol for rapid response to a new introduction
- B. Continue to build early detection capacity (terrestrial and aquatic)
- C. Continue to build and refine survey program(s) to fill data gaps and detect new introductions
- D. Continue to work on Lower Hudson PRISM species Tier categorizations to support prioritization efforts
- E. Conduct management projects according to our prioritization guidelines
- F. Monitor recovery of sites where invasive species are managed

At our March meeting the Lower Hudson PRISM partners approved a rapid-response protocol based on the State's Rapid Response Protocol to be followed in the case of new introductions. To support potential rapid response efforts in 2019, the steering committee also discussed the possibility of developing a rapid response reserve fund for Tier 1 species, but decided to not to adopt this additional item into our operating procedures.

We made great strides in terms of building the recruiting and early detection capacity of our aquatic and terrestrial invasive species survey programs in 2019. For example, 2019 saw new highs in almost every major metrics category for the Invasives Strike Force survey program since the program's inception in 2011 including the number of ISF volunteers trained in workshops (107), ISF survey volunteers with completed assignments (133), and ISF surveyor hours (1251). In addition, 27 Invasives Strike Force Blockbuster survey volunteers completed 37 blocks in 2019 which equated to an over 90% rate for survey completions, helping to fill critical data gaps in our PRISM survey region. In its inaugural survey year, the Aquatic Invasives Strike Force Crew surveyed 25 lakes across the region and recorded more than 1,000 occurrences of 9 invasive plants and invertebrates. These record survey numbers in 2019 speak to the efforts we placed into various facets of the program from recruiting and advertising to volunteer engagement, data collection and submission. We also emphasized recruiting volunteers at a variety of

*Citizen science volunteers like Bridget Connolly (left) and Lauren Abderhalden (right) utilize field guides, data sheets and mobile apps like Seek and iNaturalist to help identify and report invasive plants that threaten the integrity of our parks.*

*Photo by: Ira L. Black*



events and in connecting with institutions that may have been under-represented in the past such as with educational institutions and aquatic partners.

The Lower Hudson PRISM also made improvements in our strategies for prioritizing invasive species and corresponding management projects. Several Working Groups refined the Tier categorization list for invasive terrestrial plants, aquatic invasive species and forest pests and published the updated list (<https://www.lhprism.org/document/lower-hudson-species-categorization>) in April 2019. The Tier ranking system is used throughout New York state across PRISMs to indicate invasive species status (Figure 2). In 2019, the steering committee focused efforts on refining management project ranking criteria to place a larger emphasis on priority Tier 2, or emerging, species.

Through the incredible work of the Invasives Strike Force Crew and the collective efforts from our 52 partner organizations, the LH PRISM conducted 269 eradication and management projects targeting 68 different invasive species over 1,366 acres in 2019. The Aquatic Invasives Strike Force Crew performed several water chestnut removals, pulling over 70,000 plants (preventing close to a million seeds from entering waterways). Aquatic survey sites in 2019 were prioritized by analyzing data gaps and New York State Parks Recreation and Historic Preservation requests. 3,600 acres were surveyed for 18 species of aquatic plants and animals, resulting in more than 2,300 data observations. Together, the Aquatic and Terrestrial Invasives Strike Force combined to remove over 163,000 plants. Out of these projects, 24 of 53 Tier 2 species were targeted. More specific information on these management projects can be found in Appendix I. In addition, LH PRISM partners monitored 55 post-treatment sites that spanned 350 acres, highlighting our efforts to monitor recovery of sites where invasive species are managed.



Volunteers survey for aquatic invasives in Hunns Lake, Dutchess County



The Invasives Strike Force treating the Tier 2 species, sapphireberry (*Symplocos paniculata*)

#### INVASIVE SPECIES CATEGORIZATION FOR THE LOWER HUDSON

##### Tier 1: Threat

*Species not yet found in the region, priority management is early detection and prevention*

##### Tier 2: Emerging

*Species established in small, localized areas, priority management is eradication*

##### Tier 3: Established

*Species common or abundant in the region but not surrounding areas, priority management is containment and spread prevention*

##### Tier 4: Widespread

*Species abundant throughout the state, low priority for management unless protecting conservation targets*

##### Tier 5: Watch

*Species not known to be invasive, priority management is research*



(L) ISF Crew members Jackie and Christel gearing up to remove toxic giant hogweed



(R) Irvington volunteers help the Friends of the Old Croton Aqueduct remove invasives  
Photo by: H. Colgate

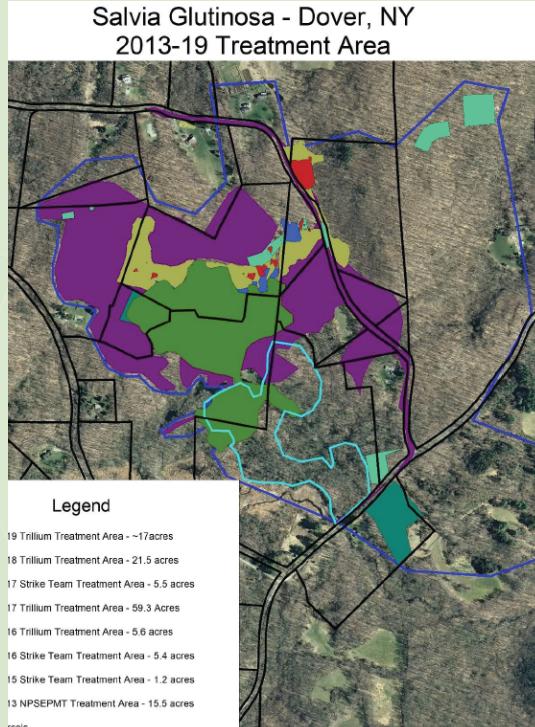
## PROJECT SPOTLIGHT

### TRILLIUM ISM: MANAGEMENT OF HARDY KIWI AND STICKY SAGE

Trillium Invasive Species Management was awarded contracts to continue management of two Tier 2 species, hardy kiwi (*Actinida arguta*) and sticky sage (*Salvia glutinosa*). Treatment of multiple hardy kiwi infestations throughout Bedford, NY began in 2016. Since then, 37 infestations totaling more than 96,000 sq ft have been chemically and mechanically treated, with new sites being added every year due to diligent outreach to homeowners.



Team members treat hardy kiwi in Bedford, NY



Map of sticky sage treatment sites from 2013-2019

The only known infestation of sticky sage in the Lower Hudson region was found in Dover, NY along the Appalachian Trail in 2009, originally estimated at ~80 acres. Since then, the infestation has been mapped at over 180 acres. Various sections of the infestation have been targeted by both Trillium ISM and the Invasives Strike Force since 2016. In 2019, Trillium was engaged to treat 17 acres around a wetland area.

For more information on both of these projects, visit [www.lhprism.org/trilliumsalvia](http://www.lhprism.org/trilliumsalvia) and [www.lhprism.org/trilliumhardykiwi](http://www.lhprism.org/trilliumhardykiwi)

2019 also saw innovative developments. The addition of the New York- New Jersey Trail Conference Conservation Dogs Program to invasive species management efforts should help removal sites be more thoroughly searched and allow those sites to be transitioned into the monitoring phase sooner. In total, the Conservation Dogs program helped survey over 1.5 million square feet, leading to removal of over 2,000 plants.

Dia (an American Labrador Retriever) searched 34 sites and over 1,367,103 ft<sup>2</sup> for Scotch broom, a Tier 2 perennial invasive shrub that poses a threat to our native forest understory. Dia later learned how to identify the Tier 2 invasive grass, slender false brome, which is notoriously difficult to identify due to its visual similarities to other grasses. She found two previously unknown infestation sites in the Lower Hudson PRISM region and one in Western NY.

The Conservation Dogs also learned to detect the Tier 1 species, spotted lanternfly, an insect which not only threatens natural areas but also poses a great risk to crops such as apples, hops and grapes. As the only active human-dog team searching for SLF in the country, they've completed a total of 7 cargo searches and field surveys in partnership with NYS Parks, NYS Department of Transportation, and USDA. In 2020, the program will continue to grow as the dogs learn new invasive species and by refining search methodology, improving government partnerships, and increasing public outreach.



*Dia is leaps and bounds ahead of where she was last year, and can now identify 3 priority species!*

### **PROJECT SPOTLIGHT** **ENVIRONMENTAL DNA SURVEYS FOR EARLY DETECTION OF INVASIVE SPECIES IN THE LOWER HUDSON**

Dr. Michael Tessler was awarded funding to complete eDNA surveys for invasive species in the Hudson River. The work focused mainly on plants, which have not been explored as substantially as animals using this method. Field work consisted of the collection of water samples to be analyzed for DNA and was conducted by colleague Seth Cunningham and two student interns, as well as physical rake-toss surveys performed by the New York-New Jersey Trail Conference Aquatic Invasives Strike Force. 70 samples were collected from 37 sites, with 33 sites sampled at two different times in the season. Invasive aquatic plants detected using metabarcoding included Eurasian watermilfoil (*Myriophyllum spicatum*), *Hydrilla verticillata*, brittle naiad (*Najas minor*), water chestnut (*Trapa natans*), and curly-leaf pondweed (*Potamogeton crispus*). Invasive animals were more easily detected, including rusty crayfish (*Orconectes rusticus*), Asian clam (*Corbicula fluminea*), common carp (*Cyprinus carpio*), zebra mussel (*Dreissena polymorpha*), and the previously unreported tench (*Tinca tinca*).



For the full report on this project, please visit [www.lhprism.org/tessleredna](http://www.lhprism.org/tessleredna)

## INVASIVE SPECIES MANAGEMENT IN THE LOWER HUDSON REGION TIER 2 SPECIES SPOTLIGHTS



### STICKY SAGE (*SALVIA GLUTINOSA*)

Sticky sage is an invasive perennial herbaceous ornamental plant the LHPRIISM has been managing since 2016. Key identification of sticky sage includes: opposite, round toothed, pointed, light green leaves with triangle shaped bases, sticky hairs along the leaves and stem, and yellow flowers along a tall stalk. Sticky sage can grow in a variety of conditions, from full sun to mostly shade and dry to moist soil, has no pests, and can reproduce via underground runners or by attaching its sticky seeds to passing humans or animals. It is advertised that sticky sage can act as a ground cover, which is exactly how it is acting in the Dover infestation (pg. 12). Over 67 acres have been managed all through landowner partnerships.

### JAPANESE SPIREA (*SPIREA JAPONICA*)

Japanese spiraea is an invasive ornamental shrub that caught the LHPRIISM's attention in 2019 when we were asked for management help for a 75+ acre infestation in Putnam Valley. It has alternate, lance shaped, leaves with serrated margins and white to pink flower clusters that grow at the tips of branches. The clustered, brown fruit structure persists through the winter. Like many invasives, it can grow in a variety of habitats including fields, forests, and stream banks, forming dense stands that displace native vegetation. In 2019 at the Putnam Valley site, nearly 850 plants were managed in a 3.17 acre area.



### KUDZU (*PUERARIA MONTANA*)

The “vine that ate the south” is now nibbling at the north. Kudzu, known for its rapid growth and ability to engulf entire trees, has now invaded the Lower Hudson Valley of New York. This vine can be identified by trifoliate, lobed leaves, bristly stems, purple to reddish-purple flowers, and seed pods that are covered with hairs. Kudzu can quickly cover entire areas and shade out anything growing underneath. The LHPRIISM is currently managing 34 sites under the direction of the NYSDEC.

### SCOTCH BROOM (*CYTISUS SCOPARIUS*)

Scotch broom is an invasive ornamental shrub that is widespread in the coastal northwest and is now establishing in the Lower Hudson Valley of NY. It can be identified by its general broom-like shape, small trifoliate leaves, pea-like yellow flowers, hairy seed pods, and square stem that remains green through the winter. Not only can this shrub form dense infestations that displace native vegetation, but it also changes soil characteristics via nitrogen fixation and alters the natural fire regime. A single plant can produce several thousand seeds per year, which are ejected ballistically from the seed pod and remain viable for up to 30 years. The LHPRIISM is managing over 60 infestations of Scotch broom, aided by the Conservation Dogs program and NYS Parks



# Progress According to Strategic Plan

## Education and Outreach

### GOAL 4

*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.*

#### OBJECTIVES

- A. Conduct outreach and education for target audiences.
- B. Disseminate educational materials for forest pests (esp. spotted lanternfly).
- C. Work to coordinate with and promote other existing agency and citizen science projects
- D. Plan, prepare for and participate in NY's Invasive Species Awareness Week
- E. Collect local invasives phenological information and issue seasonal, timed alerts for underreported and early detection species
- F. Support early detection / rapid response efforts with outreach materials

Our partners engaged in an impressive 115 invasives-oriented education and outreach events and 62 invasives-themed presentations in 2019, reaching over 15,000 members of the general public.

Multiple new educational brochures, posters and videos were created by our partners, including Asian jumping worm and spotted lanternfly educational material, video tutorials on mechanical removal procedures of common invasive plants and on aquatic invasive plant identification, and new signage regarding pollinator pathways and invasive species near boot brush stations. There was also a concerted effort to promote the use of iMapInvasives and iNaturalist as effective citizen science and learning tools at events in our area. Altogether, we reported over 13,400 invasive species observations to iMapInvasives in 2019 either directly or through bulk upload. These numbers and initiatives represent the tremendous unified efforts of our partners to reach a broad audience in our communities through education and outreach and provide the requisite support and guidance on the reporting of invasive species in the Lower Hudson region.

New working groups were formed around participating in New York State Invasive Species Awareness Week, forest pest education, and municipal and commercial interests. One target audience for education and outreach was industry professionals, who were trained in invasives identification and management.



*Invasives Species Citizen Science Coordinator Brent Boscarino leads a training on invasive species ID, impacts and pathways with a local lake association. Pictured here is a Japanese angelica tree (a Tier 3 species in the Lower Hudson PRISM*

Dr. Rohleder, Lower Hudson PRISM coordinator, conducted 3 sessions training 41 participants with 100% of attendees rating the course as worthwhile in post evaluations.

There was a targeted emphasis on forest pest monitoring and education. Spring awareness and media communication initiatives were centered around the spotted lanternfly including creating and disseminating a spotted lanternfly article and a newly designed poster (created by Cornell Cooperative Extension – Putnam and Dutchess County, respectively), as well as the MaMA Project's focus on the emerald ash borer. Project leaders ran 9 different ash borer-specific training sessions that reached over 150 community members in various locations throughout the LH PRISM region.

We also updated our educational workshop materials for our Invasives Strike Force survey volunteers. We added a substantial "Introduction to Invasive Species" section to our standard and intermediate workshop training materials in an effort to provide a deeper context as to why invasive species are so disruptive to ecosystems, as well as to convey that invasive species are not just relegated to plants, but also includes a wide variety of taxa. We purposefully built in more time to train volunteers in the use of the mobile apps, Seek and iNaturalist, to help build volunteer confidence in plant ID and introduce our volunteers to a wider citizen science network than just our ISF program.

In March, we added the iNaturalist-based EcoQuest Challenge to our Invasives Strike Force citizen science survey options. This scavenger hunt-style program enabled us to put out a call to search for a target invasive species whose identifying features became more conspicuous in a given month. For most months, we paired this target invasive species with a native species visible during the same period. Over a span of nine months of running these monthly challenges, nearly 1,000 volunteer observers logged close to 2,000 invasive species observations in and around our PRISM region. For each of the target species, we also created new "Species Spotlight" articles on our PRISM website which will serve as good, detailed references for the public moving forward. Time and attention to their arrangement on our website will be paid in early 2020. Through data mining efforts we reviewed and accepted iNaturalist observations from the LH PRISM region into a Lower Hudson PRISM Regional Invasive Species project resulting in over 2,800 observations documented with photographs. This dataset will be extracted and conveyed to iMapInvasives for import. iNaturalist observations contribute to our early detection efforts in areas not typically covered by our standard and intermediate surveys, such as in people's backyards or in open spaces that are not along our trail systems. In addition, these photographs provide important visual evidence of the timing of certain phenophases that we can monitor from year to year.



Brent also worked with students grades pre-K through 5 from a local school on invasives species ID and discussion. The kids were amazing invasives detectives and are excited to take the next step in becoming native/biodiversity ambassadors on their campus and in their homes!

We also placed a larger effort on youth engagement initiatives, education and outreach. New curriculum and program materials were created in invasive species ecology, phenology and hemlock woolly adelgid monitoring. These new materials were included both in field trips and campus visits to local K-12 schools in 2019. These included a full-day field trip to Bear Mountain with over 100 students and faculty members from the River Edge School district in Suffern, NY, multiple school-based programs with the Randolph School in Wappingers Falls, NY, and several school groups visiting the Cary Institute forests in Millbrook, NY. The Bulkwang Korean Buddhist temple in Tappan, NY (seen above) has engaged with a long-term restoration project in Harriman State Park. We are guiding the youth group to participate in monthly work days removing invasive species and planting local native seeds, and we also made a presentation to the congregation as a whole on the importance of native plants, the issues with invasive species and Leave No Trace ethics.



## PROJECT SPOTLIGHT

### CORNELL COOPERATIVE EXTENSION- DUTCHES COUNTY: FOREST PEST EDUCATION

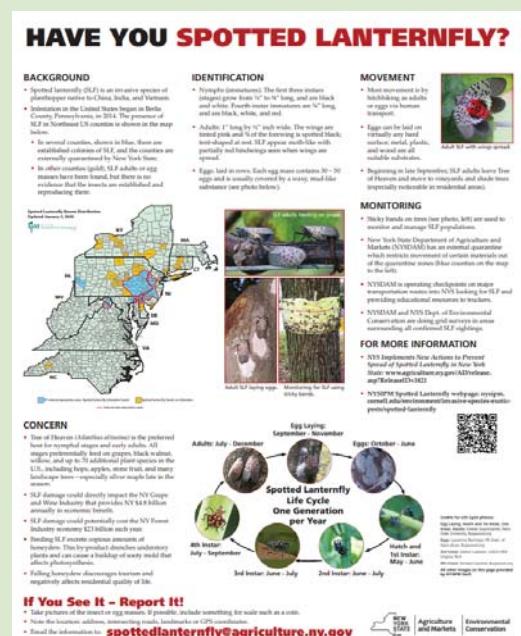
CCE Dutchess County led the charge in raising awareness about spotted lanternfly (SLF), Asian longhorned tick (ALT), and the underreported jumping worms (*Amyntas spp.*) throughout the Lower Hudson Valley through numerous outreach initiatives and survey training for community scientists.

## Workshops

- Four workshops with 29 attendees from NYS Parks, non-profit organizations, and CCE Master Gardeners
  - Trained volunteers in identifying forest pests, host species, and biological components
  - Continued communication throughout the season with reminders and timely phenological markers

## **Outreach**

- Produced “Have You Spotted Lanternfly” posters to be displayed at numerous events throughout Invasive Species Awareness Week, reaching 639 people
  - Master Gardener volunteers distributed fact sheets and displayed poster at the Dutchess County Fair, reaching 550 people and resulting in 25 new reports of invasive jumping worms into iMapInvasives
  - CCEDC’s 4H Dragons and Damsels Entomology club displayed information on SLF at the NY State Fair, reaching over 300 people
  - Project featured in the CCEDC’s Dutchess Dirt newsletter with a circulation of 2,100 readers



For the full report of all the incredible work accomplished by CCE Dutchess County, visit [www.lhpri.org/forestpesteducation](http://www.lhpri.org/forestpesteducation)

# Progress According to Strategic Plan

## Mitigate Pathways of Invasion

### GOAL 5

*PRISM HAS A COORDINATED PROGRAM TO PREVENT SPECIES INTRODUCTION BY FOCUSING ON PATHWAYS.*

#### OBJECTIVES

- A. Identify top priority pathways for the Lower Hudson
- B. Advocate for listing additional prohibited/regulated species in Part 575
- C. Mitigate the spread of aquatic invasive species by boaters
- D. Monitor for regional forest pests (e.g. southern pine beetle, spotted lanternfly)
- E. Mitigate pathway associated with movement of heavy equipment.
- F. Mitigate pathway of spread from commercial sales

The sale of non-native and invasive plants as ornamentals has been identified as a major pathway for invasion. In November, a Part 575 working group was formed in order to mitigate this pathway by advocating for the listing of additional prohibited and regulated species in New York. The working group selected incised fumewort (*Corydalis incisa*, Tier 2), sapphireberry (*Symplocos paniculata*, Tier 2), Bradford pear (*Pyrus calleryana*, Tier 3), castor aralia (*Kalopanax septemlobus*, Tier 2), golden rain tree (*Koelreuteria paniculata*, Tier 2), and Scotch broom (*Cytisus scoparius*, Tier 2) to write proposals for and submit to the DEC in 2020. These species were strategically chosen to aid in eradication efforts and/or to contain spread to other areas of New York. Another avenue we have been pursuing in order to mitigate this pathway is promotion of native alternatives. Our partners reported good sales and promotion opportunities for native plants in 2019.

In their first year as a full 5-month Conservation Corps crew, the Aquatic Invasives Strike Force participated in the Watercraft Inspection Steward Program, where they educated more than 1,200 boaters across 9 priority boat launches on the Hudson River and inspected over 800 boats to prevent the spread of aquatic invasives. This equated to 89% of boaters allowing inspections, with 2% of inspections revealing aquatic hitchhikers. The surveys also revealed that only 50% of boaters proactively take any preventative measures. This indicates that the lack of decontamination facilities is clearly a barrier for boaters to follow the state-wide Clean, Drain, and Dry protocol and highlights the importance of establishing boat wash stations along the Hudson River.



AISF Crew member Kathleen teaches a boater about AIS spread prevention

## PROJECT SPOTLIGHT

### CONSERVATION DOGS SEARCH FOR SPOTTED LANTERNFLY



Although we had planned to support volunteer trap monitoring programs, the NYSDEC did not run programs for either spotted lanternfly (SLF) or southern pine beetle in 2019. However, two of the NYNJTC Conservation Dogs, Dia and Fagen, were trained to detect spotted lanternfly in 2019 and have already completed 4 SLF surveys and searches in cooperation with USDA, NYS DEC and NYS DOT.

Vehicles travelling out of quarantined areas are extremely susceptible to harboring spotted lanternfly egg masses. By assisting in vehicle searches the trained Conservation Dogs in vehicle searches will aid in keeping this pest out of the Lower Hudson Valley and away from our prized grape, hops, and apple crops.



Dia and Fagen have also impressed the media by demonstrating their search ability in forested areas, which is a critical component in increasing visibility for invasive species issues.



# Progress According to Strategic Plan

## Information Exchange

### GOAL 6

*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).*

#### OBJECTIVES

- A. Continue work on our website improving usability and design
- B. Hold an Invasive Species summit
- C. Encourage strong presence at the National Invasive Species conference
- D. Continue to increase information available on our web site
- E. Increase use of social media to disseminate information
- F. Share more information between partners on experiences managing invasive species.
- G. Make existing education and outreach resources available on web site

On November 15, the New York Botanical Garden and LH PRISM hosted a Call to Action: Protecting Earth's Biodiversity, a regional summit that featured three keynote addresses from prominent invasive species experts and biodiversity advocates. The afternoon also featured case studies presented by Lower Hudson PRISM partners that focused on ways of emphasizing local participation and action in our communities and ways of getting involved in invasive species management and biodiversity protection. The Summit drew over 470 community members and provided ample opportunities for forging partnerships and volunteer connections in the Lower Hudson region.

In addition to this summit, 12 Lower Hudson PRISM partners presented at the North American Invasive Species Management Association (NAISMA) in Saratoga Springs in October 2019, once again reflecting the level of engagement and efforts of our partners to be ambassadors for invasive species management and education in our region. Lower Hudson PRISM staff presented on "Food web interactions and early detection of two aquatic invasive species the invasive bloody-red shrimp, *Hemimysis anomala*, and the round goby, *Neogobius melanostomus*" and "New Invaders of Lower Hudson Region: *Salvia glutinosa*, *Arum italicum*, and *Symplocos paniculata*", ran a workshop on "Invasive Species Identification and Management" with pesticide continuing education credits, and



*Dr. Doug Tallamy delivering his keynote presentation*

organized and moderated a session on New Invaders of the Northeastern US.

Lower Hudson PRISM staff are currently in the process of editing and organizing best management practices for 65 invasive species to upload to our website. These BMPs were originally developed by Molly Marquand LLC under contract with the Lower Hudson PRISM in 2018, and we anticipate having them publicly accessible in February 2020.

Great strides were made in 2019 in terms of our Facebook presence and participation. Our Facebook page had a total of 78 new daily likes, 16,369 weekly engaged users and 100,166 weekly total reaches in 2019. This is almost double the returns in these categories in 2018 and 2017 (59,7,676 and 54,122 in 2018 and 51,7,796 and 71,416 in 2017). We hope to continue to grow our social media presence in 2020 as well as update our website to include links to important education and outreach materials developed by our partners.

### **PROJECT SPOTLIGHT** **NEW YORK BOTANICAL GARDEN: 2019 INVASIVE SPECIES SUMMIT**

The New York Botanical Garden was awarded funding to host and organize the 2019 Invasive Species Summit which was an extraordinary success, reaching more than 470 attendees. The audience was engaged and inspired, with many participants commenting positively after the program noting that it was a true call to action. Keynote speakers included renowned author Doug Tallamy, Ph.D., Randy Westbrooks, Ph.D. and eight of our incredible LH PRISM Partners:

Carolynn Sears, Ph.D., The Invasives Project-Pound Ridge

Chris McArdle, New York Restoration Project

Diane Alden, Friends of the Old Croton Aqueduct

Kevin Peraino, Jay Heritage Center

Christopher Gow, Village of Tuxedo Park

Keri VanCamp, Vassar College

Budd Veverka, Mianus River Gorge Preserve

Linda Rohleder, Ph.D., New York-New Jersey Trail Conference



The NYBG worked closely with professional organizations to offer multiple continuing education credits, including ISA-CEUs, ASLA-CES, SER-CECs, and NY DEC CNLPs.

For the full report on this project, including a recording of the event, visit  
[www.lhprism.org/nybgsummit](http://www.lhprism.org/nybgsummit)

## Partner Spotlights

Facilitating collaborative partnerships between partner organizations and agencies is an essential role of the Lower Hudson PRISM. In addition to many of the projects mentioned in this report, here are a few awesome examples of the teamwork happening throughout the region.



Diane Alden and the Friends of the Old Croton Aqueduct led another successful invasives removal for I Love My Park Day, assisted by the NYNJTC Invasives Strike Force, Trillium ISM, PlanItWILD, Suburban Native, LLC, and Teatown Lake Reservation  
Photo by: Sara Campbell



PRISM partners Hudson Highlands Land Trust and Fresh Air Fund's Sharpe Reservation jointly supported interns that created a fun and educational video on Japanese barberry and removal techniques  
Photo by: Nicole Wooten



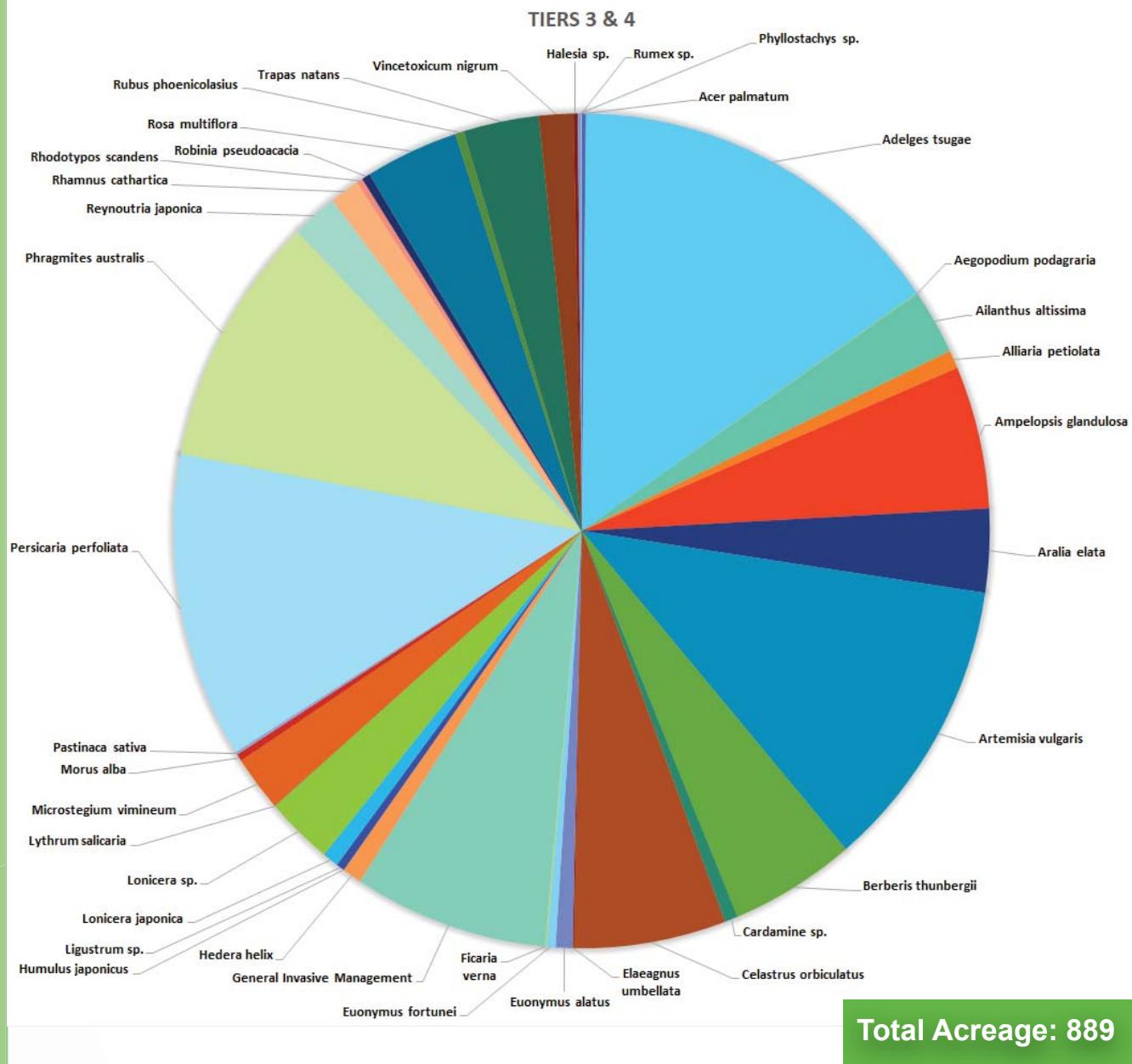
LH PRISM partner Cornell Cooperative Extension- Putnam County's Jen Lerner (left) engaged in an outreach event wearing a spotted lanternfly costume at PRISM partner Green Chimney's Pancake Breakfast



(L to R) The Aquatic Invasives Strike Force partnered with NYS State Parks to remove over 30,000 water chestnut plants from Rockland Lake, assisted the NYS DEC Croton River Hydrilla Control Project by snorkeling for hydrilla fragments, and aided the U.S. Army Corps of Engineers on a water chestnut study in the Hudson River

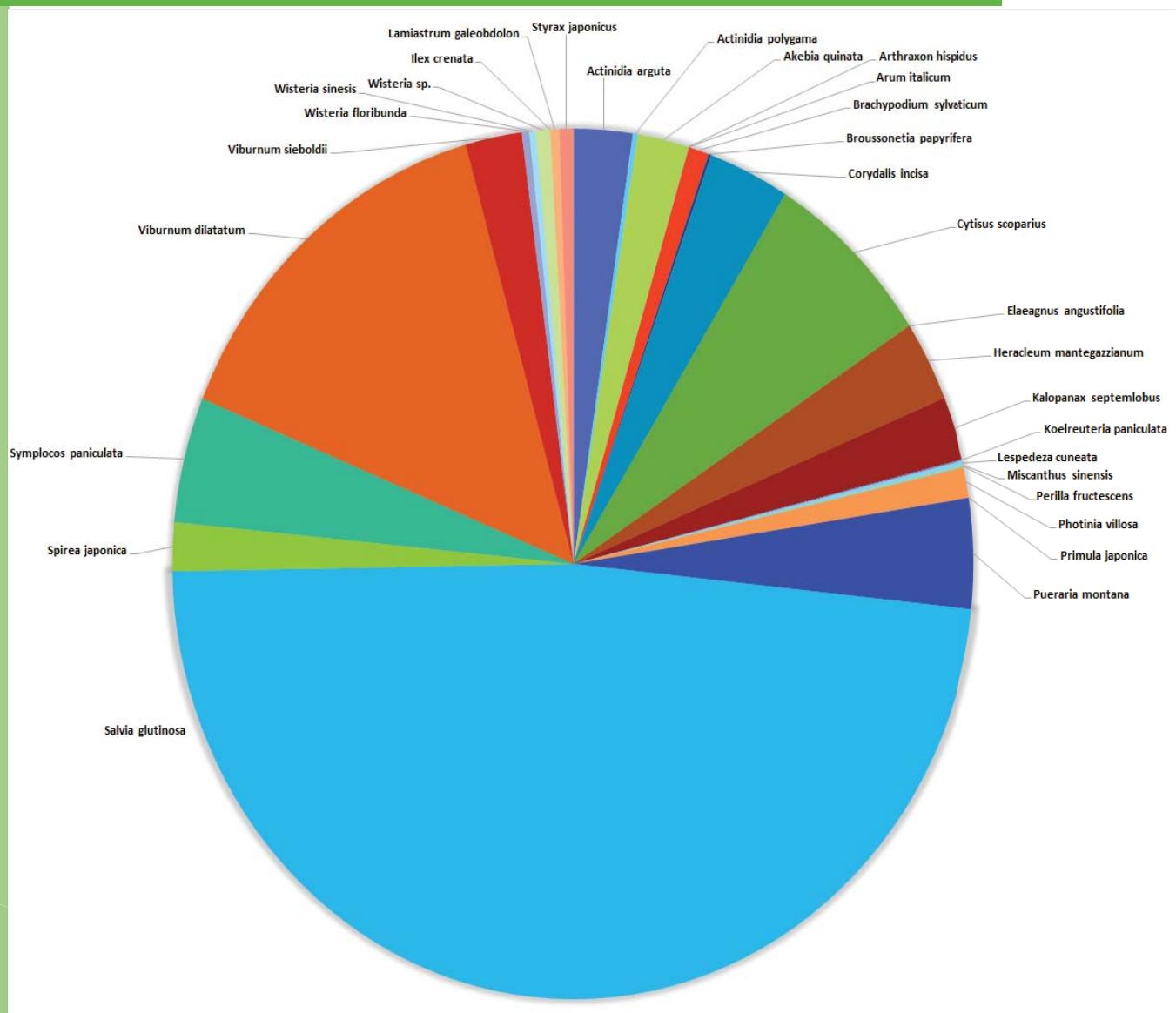
## Appendix I. Widespread and Established Species Management by Acreage

Management actions for all species tiers were conducted across the LH PRISM by numerous partners. Included in this Appendix are graphs detailing the breakdown of management per species as well as detailed accounts for Tier 2 species.



Established (Tier 3) and Widespread (Tier 4) invasives treated in the Lower Hudson region. Mile-a-minute, mugwort, and phragmites were the most treated plants, as well as the forest pest Hemlock wooly adelgid.

## Appendix I. Emerging and Watch Species Management by Acreage



Total Acreage: 178

Emerging (Tier 2) and Watch (Tier 5) invasives treated in the Lower Hudson region. Sticky sage, Linden viburnum, and scotch broom were the invasive plant species with the most treated acreage.

## Appendix II. Management of Emerging Species

<p><i>Actinidia arguta</i> Hardy kiwi</p> 	<p>Hardy kiwi was managed at Brinton Brook Sanctuary by the ISF in 2019. 4 individual plants + an unknown number of foliar sprayed plants were managed in an area of 0.16 acres.</p> <p>Trillium ISM also managed 4 acres of hardy kiwi in Bedford, NY.</p> <p>A total of 4.16 acres was managed across the LH PRISM.</p>
<p><i>Actinidia polygama</i> Silver vine</p> 	<p>Silver vine was managed at both known locations by the ISF in 2019. 226 plants were managed in a 0.155 acre area in Sterling Forest and 229 plants were managed in a 0.195 acre area at Yeshiva Farm Settlement for a total of 445 plants managed over 0.35 acres.</p>
<p><i>Akebia quinata</i> Chocolate vine</p> 	<p>A 0.229 acre infestation of chocolate vine was foliar sprayed by ISF at Vassar College, but treatment seemed ineffective, likely because a surfactant was not used. North Salem OLF also managed 0.25 acres of chocolate vine in Halmi Preserve, for a total of 0.479 acres managed.</p>
<p><i>Arthraxon hispidus</i> Small carpetgrass</p> 	<p>A small population of small carpetgrass was managed by the ISF in 2019. A 0.012 acre area was managed at Shrub Oak Memorial Park.</p>

## Appendix II. Management of Emerging Species

<p><i>Arum italicum</i> Italian arum</p>  <p>Photo credit: nwcb.wa.gov</p>	<p>A 0.0007 acre area of Italian arum was managed by Randall's Island park.</p>
<p><i>Brachypodium sylvaticum</i> Slender false brome</p> 	<p>749 plants were managed in 1.45 acres by the ISF at Wappingers Creek. This is the only known population in the LH PRISM. The known infestation size is expanding with scouting efforts assisted by the Conservation Dogs program.</p>
<p><i>Broussonetia papyrifera</i> Paper mulberry</p> 	<p>Paper mulberry was managed at Croton Point Park by the ISF in 2019. In total, 298 plants were managed within 0.18 acres.</p>
<p><i>Corydalis incisa</i> Incised fumewort</p> 	<p>The ISF removed 79.5 lbs of incised fumewort in 0.36 acres at Nature Study Woods in 2019. The Bronx River PRC also managed 5 acres at Bronx River Reservation, Teatown managed 0.25 acres at Teatown Lake Reservation Wildflower Woods, and Westchester County Parks managed 0.15 acres in Mt. Vernon. A total of 5.764 acres was managed.</p>

## Appendix II. Management of Emerging Species

<p><i>Cytisus scoparius</i> Scotch broom</p> 	<p>The ISF managed Scotch broom at various locations. Most of the sites were in Harriman State Park, where 29,430 plants were managed in 11.78 acres. 5,694 plants were also managed in 0.43 acres at Ralph E. Ogden Foundation for a total of 35,124 plants managed in 12.21 acres. NYS Parks also managed scotch broom at Harriman State Park</p>
<p><i>Eleagnus angustifolia</i> Russian olive</p>  <p>Photo credit: nature-and-garden.com</p>	<p>Randall's Island managed 0.001 acres of Russian olive at Randall's Island Bronx Kill.</p>
<p><i>Heracleum mantegazzianum</i> Giant hogweed</p> 	<p>All known giant hogweed sites were managed by the ISF, DEC, and Trillium ISM over various sites. In total, giant hogweed was managed over 3.41 acres of land in the LH PRISM.</p>
<p><i>Kalopanax septemlobus</i> Castor aralia</p> 	<p>The ISF managed 4.07 acres of castor aralia and Vassar College managed 0.1 acres for a total of 4.17 acres managed at Vassar College.</p>

## Appendix II. Management of Emerging Species

<p><i>Koelreuteria paniculata</i> Golden raintree</p> 	<p>Trillium ISM managed 0.1 acres of golden raintree in Newburgh, NY.</p>
<p><i>Lespedeza cuneata</i> Chinese bush-clover</p> 	<p>The ISF managed an unknown number of Chinese bush-clover within 0.027 acres at Cranberry Lake and 0.014 acres at Iona Island. NYS Parks managed 0.25 acres in Harriman for a total of 0.291 acres managed.</p>
<p><i>Miscanthus sinensis</i> Chinese silver grass</p> 	<p>The ISF managed 6 Chinese silver grass plants across various sites totaling 0.035 acres managed.</p>
<p><i>Perilla frutescens</i> Beefsteak plant</p>  <p>Photo credit: marylandbiodiversity.com</p>	<p>Randall's Island managed 0.0005 acres of beefsteak plant at Randall's Island Urban Farm and Westchester Land Trust managed 0.1 acres at Otter Creek Preserve for a total of 0.1 acres managed.</p>

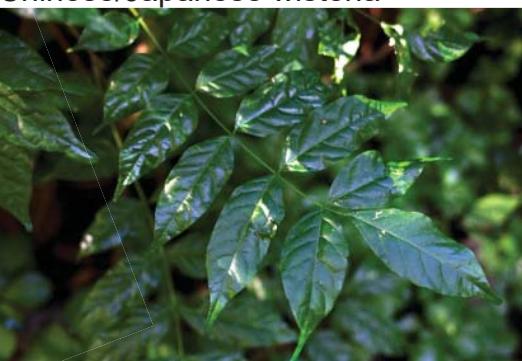
## Appendix II. Management of Emerging Species

<p><i>Photinia villosa</i> Oriental photinia</p> 	<p>The ISF managed oriental photinia at 6 sites (Carolins Grove, Cranberry Lake, Mianus River Gorge, Sachs Park, Teatown Lake Reservation, and Zofnass), totaling 754 plants managed over 2 acres. Most notably, 648 plants were managed on 0.7 acres at Teatown Lake Reservation.</p>
<p><i>Primula japonica</i> Japanese primrose</p> 	<p>Teatown Lake Reservation managed 0.001 acres of Japanese primrose in Yorktown, NY.</p>
<p><i>Pueraria montana</i> Kudzu</p> 	<p>The ISF managed kudzu at various sites for a total of 336 + an unknown number foliar sprayed managed over 5.21 acres. Trillium ISM also managed 2 acres of kudzu, totaling 7.21 acres managed.</p>

## Appendix II. Management of Emerging Species

<p><i>Salvia glutinosa</i> Sticky sage</p> 	<p>The ISF and Trillium ISM managed an unknown number of sticky sage plants over 67.59 acres in a Dover, NY neighborhood and along the Appalachian Trail. This is one of the only known infestations of sticky sage in the northeast.</p>
<p><i>Spirea japonica</i> Japanese spirea</p> 	<p>The ISF managed 843 Japanese spirea plants over 3.17 acres in the Three Arrows Cooperative Society neighborhood.</p>
<p><i>Symplocos paniculata</i> Sapphireberry</p> 	<p>The ISF managed 8.113 acres of sapphireberry at Carolins Grove, Cranberry Lake, Mianus River Gorge, Sachs Park, and Vassar College. Vassar College also managed 0.1 acres of sapphireberry at Vassar College, totaling 8.213 acres managed.</p>

## Appendix II. Management of Emerging Species

<p><i>Viburnum dilatatum</i> Linden viburnum</p> 	<p>Linden viburnum was managed by the ISF at 12 different locations over 24.45 acres (Brinton Brook Sanctuary, Carolins Grove, Cranberry Lake, Harriman, Granite Mountain, Issacson Preserve, Mianus River Gorge, Old Croton Aqueduct, Sachs Park, Teatown Lake Reservation, Vassar College, Zofnass Preserve). Most notably, a dense infestation was treated in Harriman State Park. 11,667 plants within 12.38 acres were treated there. Scenic Hudson also treated 1 acre at Franny Reese State Park, for a total of 25.45 acres managed.</p>
<p><i>Viburnum sieboldii</i> Siebold's viburnum</p> 	<p>Siebold's viburnum was managed by the ISF at 5 different locations over 2.96 acres (Brinton Brook Sanctuary, Old Croton Aqueduct, Shrub Oak Memorial Park, Teatown Lake Reservation, and Vassar College). NYS Parks also managed 1.04 acres at the Old Croton Aqueduct for a total of 4 acres managed.</p>
<p><i>Wisteria spp.</i> Chinese/Japanese wisteria</p> 	<p>Wisteria spp. were treated by the ISF at 3 different locations over 0.49 acres (Rye Nature Center, Cary Institute, and Old Croton Aqueduct). Teatown also managed 0.5 acres at their Three Lakes Trail Kiosk Area and Friends of Rye Nature Center managed 1 acre at Rye Nature Center for a total of 1.99 acres managed.</p>