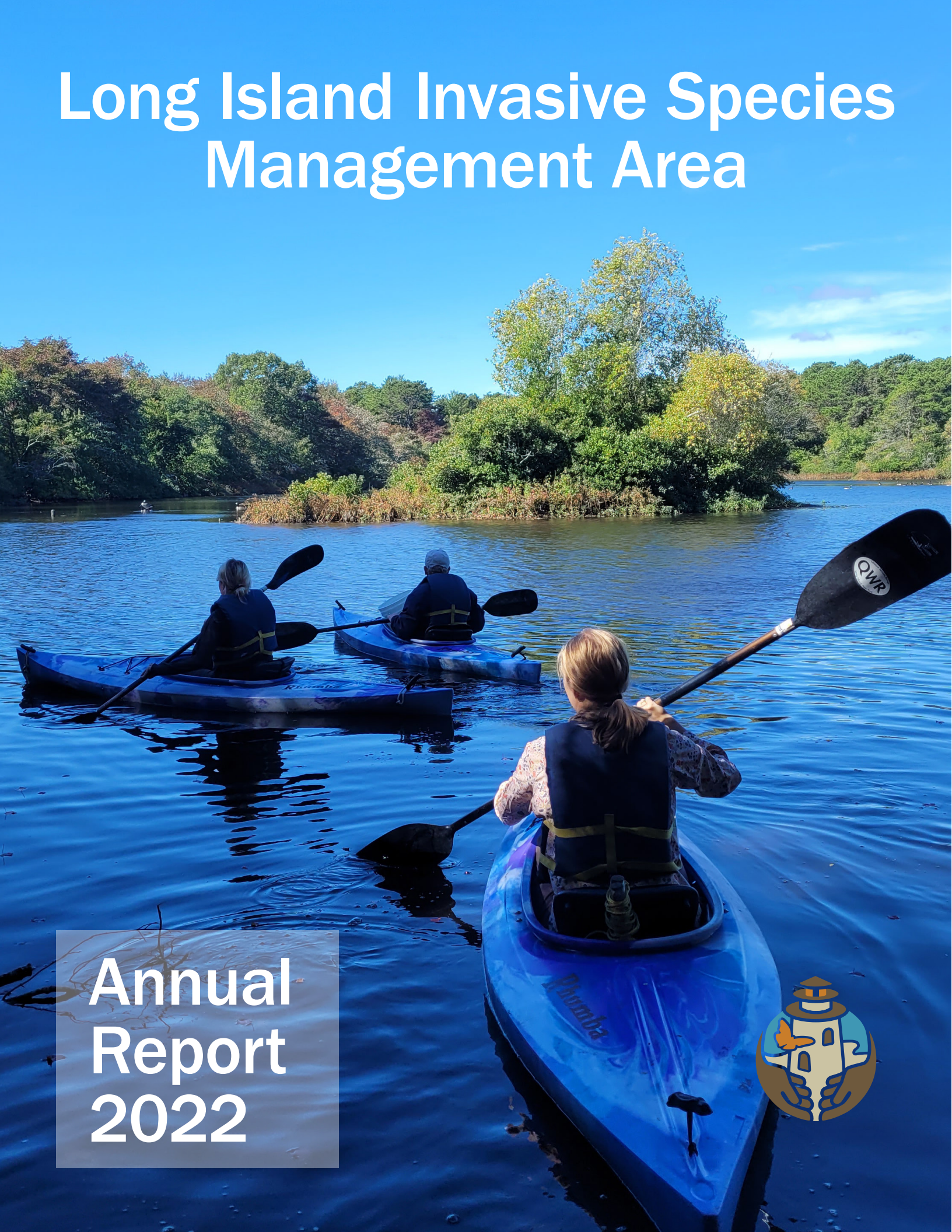
Long Island Invasive Species Management Area



Annual Report 2022

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LIISMA 2022 Annual Report

Acknowledgements

The Long Island Invasive Species Management Area (LIISMA) would like to recognize the tremendous efforts of our many partners to prevent and rapidly respond to the threat of invasive species.

Major funding for LIISMA is provided by the New York State Environmental Protection Fund, as administered by the New York State Department of Environmental Conservation (NYSDEC). LIISMA thanks NYSDEC and Josh Thiel and Dave Adams of the Invasive Species Coordination Section (ISCS) for their ongoing support.

Special thanks to the New York Natural Heritage Program (NYNHP); New York State Department of Agriculture and Markets (NYSAGM); New York State Office of Parks, Recreation, and Historic Preservation (NYS OPRHP); New York City Department of Parks and Recreation; Cornell Cooperative Extension of Suffolk County; Cornell Cooperative Extension of Nassau County; Suffolk County Department of Parks, Recreation and Conservation; Long Island Central Pine Barrens Commission; U.S. Fish and Wildlife Service (USFWS); Long Island Native Plant Initiative (LINPI); and numerous other governmental and non-governmental organizations for their ongoing dedication to preventing and managing invasive species.

Much appreciation is extended to the Sisters of St. Joseph and Peconic Land Trust for providing office space and land for the LINPI greenhouses and founder plot at their Brentwood campus.

This report was prepared by Bill Jacobs, Abigail Bezrutczyk, Melody Penny, and Kassidy Robinson.

Executive Summary

The Long Island Native Plant Initiative (LINPI), host organization for the Long Island Invasive Species Management Area (LIISMA), was awarded a new PRISM contract with the New York State Department of Environmental Conservation (NYSDEC), covering the period from July 1, 2022, to December 31, 2026.

3 Filled **three** new full-time job positions, as follows: Conservation Area (CA) Manager, Early Detection and Rapid Response (EDRR) Manager, and Education and Outreach (EO) Manager. With the LIISMA Program Manager, this brings the number of full-time staff persons to **four**.

64 Conducted **64** surveying and monitoring events and **23** management events over **1,770** acres, which consisted of **10** emerging invasive species surveys and **six** rake-toss surveys of high-priority waterbodies.

22 Controlled seven high-priority invasive species at **22** sites.

9 Survey and management efforts protected nine coastal plain ponds and six additional priority waterbodies totaling **454** acres, which collectively contain **49** rare, threatened, or endangered species and six rare community types.

3 Developed **three** invasive species management plans for the Quogue Wildlife Refuge, Henry L. Ferguson Museum on Fishers Island, and Peconic Land Trust at Broad Cove.

28 Hosted a total of **28** engagement, education, and outreach events. LIISMA education and outreach events were attended by more than **740** people.

27 Coordinated and hosted a one week-long partnered bioblitz, reaching **27** participants with over **1,400** observations of over **600** species.

1 Created **one** New York Invasive Species Awareness Week (NYISAW) promotional video in collaboration with the PRISM education and outreach committee.

32 Developed **32** marine invasive species identification cards with the Long Island Metro Aquatic Invasive Species (LIMAIS) Task Force.

4 Hosted **four** LIISMA Partners Meetings with workshops, and **five** iMapInvasives trainings.

2 Hosted **two** seasonal technicians and two temporary education and outreach staff, alongside **three** full-time staff members.

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Introduction

As a global hub of travel and shipping, New York City and Long Island are highly susceptible to the introduction of invasive species. An invasive species is a species that is non-native to the ecosystem under consideration, and whose introduction causes or is likely to cause harm to the economy, the environment, or human health.

The spread of invasive species is often exacerbated by human behavior. For example, moving watercraft from one waterbody to another without proper cleaning, emptying fish tanks in waterways, or dumping live bait after use, are means of spreading aquatic invasive species (AIS). Similar mechanisms aid in the spread of terrestrial invasive species: transporting untreated firewood for camping, or moving equipment contaminated with invasive plant seeds. Even though efforts have been made to restrict the sale and transport of invasive horticultural species and exotic pets, gaps still exist: people can purchase invasive species online or from other states.

Once introduced, invasive species take advantage of natural areas that are already strained by habitat fragmentation, excessive herbivory, nutrient loading, shifts in disturbance regimes, and climate change.

Invasive species out-compete, damage, and displace native species. This may lead to the local elimination of native plants, wildlife, and ecological communities. This is of particular concern for the globally and state rare species and ecological communities that LIISMA prizes, such as those of coastal plain ponds. Invasive species disrupt ecosystem processes, such as food webs, hydrology, nutrient cycling, fire regimes, and natural succession. With climate change, the range expansion of neonative species, such as the southern pine beetle (*Dendroctonus frontalis*), threatens locally native ecosystems.

The economic and human health costs of invasive species can be severe. The spotted lanternfly (*Lycorma delicatula*), for example, threatens Long Island's wine industry by damaging or destroying grape vines. Along public roads and highways, innumerable invasive trees, shrubs, and vines can restrict visibility and create dangerous roadside hazards. There are other public health risks, such as from caper spurge (*Euphorbia lathyris*), a plant

Haley Gladitsch and Abby Bezrutczyk at Camp Hero State Park.

with sap that can cause serious burns and vision damage.

Invasive species interfere with outdoor recreation and damage scenic landscapes at parks, lakes, rivers, shorelines, and other natural areas that humans enjoy, whether by interfering with recreational fishing, damaging attractive forests and biodiversity, or blocking waterways, as is the case with floating water primrose (*Ludwigia peploides*) in the Peconic River.

The most significant and long-lasting damage is often overlooked: that of diminished ecosystem services. The benefits provided by healthy ecosystems, such as clean water, clean air, flood control, shelter, medicine, and food, ultimately sustain human life.

Resource managers spend large amounts of time and money to control invasive species. Fortunately, the threat and costs of invasive species can be reduced significantly with careful planning, prevention, early detection and rapid response, management, and monitoring. Remaining laser focused on the highest priorities is critical for success.

LIISMA is one of eight Partnerships for Regional Invasive Species Management (PRISMs) in New York State. PRISMs are voluntary partnerships of governmental and non-governmental organizations and individuals that coordinate invasive species management in their region. The LIISMA region covers Staten Island (Richmond County), Brooklyn (Kings County), and Queens (Queens County) in New York City, and Nassau and Suffolk counties on Long Island.

With a mission to conserve biodiversity, wildlife habitat, recreational resources, and agriculture, while protecting human health and safety, LIISMA facilitates cooperation and coordination among landowners, resource managers, and local communities to reduce the threat of invasive species. LIISMA minimizes the costs of invasive species management by preventing and containing, suppressing, or eradicating new invasive species infestations before they become established.

LIISMA Staff at Quogue Wildlife Refuge.

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LIISMA Coordination and Administration

LIISMA is hosted by the Long Island Native Plant Initiative (LINPI), a 501(c)(3) non-profit organization that ensures the protection of Long Island native plants and ecosystems by encouraging the use and availability of genetically local native plant material by seed collection, banking, plant propagation, and education. Invasive species are recognized as having one of the highest impacts on reducing biodiversity and functions of native systems and to this end, the organization undertakes the leadership in managing this group of harmful species for greater conservation. Polly Weigand is the Executive Director and Rusty Schmidt is the President of LINPI.

In 2022, LINPI was awarded a new PRISM contract with NYSDEC, covering the period from July 1, 2022 to December 31, 2026.

LIISMA filled three new full-time job positions, as follows: Conservation Area (CA) Manager, Early Detection and Rapid Response (EDRR) Manager, and Education and Outreach (EO) Manager. With the LIISMA Program Manager, this brings the number of full-time staff persons to four.

Bill Jacobs is the LIISMA Program Manager and a co-founder of LIISMA. Abby Bezrutczyk is the CA Manager, Melody Penny is the EDRR Manager, and Kassidy Robinson is the EO Manager. Also working with LIISMA in 2022 were Haley Gladitsch as Invasive Species Specialist II, Cara Fernandes as Environmental Educator (Temporary), Jackie Briggs as Graphic Designer (Temporary), and Katharine Stirber as a Seasonal Invasive Species Technician.

Achieving Our Goals

LIISMA's work is guided by the eight goals outlined in our strategic plan and the requirements of our PRISM contract with NYSDEC. To begin, LIISMA gathers information about the invasive species found in and around the LIISMA region and identifies conservation targets for protection.

LIISMA's highest priority is to prevent invasive species from becoming established, whether these species are new to the region or new infestations at priority conservation areas. This goal is advanced by addressing the causes of introduction, managing pathways of invasion, monitoring emerging invasive species, managing and protecting priority conservation areas, and educating and engaging professional resource managers, community scientists, and the public to increase awareness, knowledge, understanding, and action.

As new invasive species are detected, LIISMA staff and partners work to contain, suppress, or eradicate them before they spread and become a larger problem. For invasive species that are already established, LIISMA prioritizes and advances management to minimize or eliminate threats to high-priority conservation targets, such as rare species and communities, and recreational resources. After invasive species are managed, LIISMA monitors the success of management and restoration. Typically, restoration is achieved by natural regeneration. Occasionally, seeding and planting of native plants is required. The use of local ecotypes for restoration is supported by LINPI's native plant programs. Local ecotypes are plants whose genetic heritage is of local, wild stock that is native to Long Island.

Goal 1: Gather New Information

LIISMA stays up to date

on various kinds of information, including invasive species' distribution, impacts, and best management practices. This work is key to addressing emerging invasive species, for which information is often lacking or incomplete. LIISMA worked with a variety of local experts, partners, and technologies like iMapInvasives and iNaturalist to help us gather, apply, and share new information in 2022.

Peconic Land Trust's Broad Cove property

LIISMA Staff touring the Dwarf Pine Plains.

iMapInvasives: Surveying, Mapping, and Managing Data

LIISMA uses iMapInvasives and iNaturalist throughout the year to track observations of invasive species, log treatment records, and upload our findings through both the iMap Mobile App and iMap Mobile Advanced (iMMA). With the staff adept at using these technologies, LIISMA hosts training sessions in iMapInvasives and iNaturalist for professional resource managers, community scientists, educators, students, and the public.

Training

In May, LIISMA hosted an iMapInvasives workshop for teachers and sixth grade students in the Baldwin School District over two days. Staff led a virtual training for 50 students, followed by a full-day field trip at the Marine Nature Study Area (MNSA) in Oceanside. There, staff worked with teachers to lead three stations. The first station involved mapping invasive species along a trail with iMapInvasives, particularly looking for common species such as phragmites *(Phragmites australis*), multiflora rose (*Rosa multiflora*), autumn olive (*Elaeagnus umbellata*), and honeysuckle (*Lonicera spp.*). The second station included exploring, birdwatching, and mind-mapping, as the students were focused on the sense of place: what they saw, smelled, heard, and touched. At the third station, the students conducted interviews with LIISMA Program Manager Bill Jacobs and an MNSA biologist, formulating scientific questions and exploring their curiosity. To finish off the day, Haley Gladitsch led a game of "Oh Deer!" back at the Baldwin Middle School, illustrating predator-prey relationships and resource scarcity.

In September, LIISMA led two workshops on aquatic invasive species identification and surveying techniques with advanced iMap tools such as Simple Aquatic Survey Pro (SAS Pro). First, LIISMA staff met with biologists from New York State Parks, Recreation and Historic Preservation (NYS OPRHP) and their seasonal strike team to demonstrate survey methods. LIISMA and parks staff identified an unreported population of water chestnut *(Trapa natans*) in the process (further discussed in Goal 7). Later in September, LIISMA trained staff of the Quogue Wildlife Refuge in SAS Pro and aquatic species identification.

Michael Farina (Town of Hempstead) teaches students about ecology at the Marine Nature Study Area with LIISMA Staff Abby Bezrutczyk, Haley Gladitsch, and Bill Jacobs.

Tier Ranking

LIISMA participated in the iMap User Stories Workshop in March, presenting on LIISMA's use of the New York State Invasive Species Tier List and a Tier List factsheet developed in 2021 for public sharing.

In 2022, LIISMA updated the regional tier list based on new data of invasive species distributions. The changes are listed in the table below:

Common Name	Scientific name	2021 Tier	2022 Tier
Eastern mosquitofish	*Gambusia holbrooki*	1d	1a
Pond loach	*Misgurnus anguillicaudatus*	1d	1a
Banded mysterysnail	*Viviparus georgianus*	1d	1a
Fire ant	*Myrmica rubra*	1d	1b
Slender falsebrome	*Brachypodium sylvaticum ssp sylvaticum*	1d	1d
Giant reed	*Arundo donax*	1a	2
Water spangles	*Salvinia minima*	1b	2
Slender leafy spurge	*Euphorbia virgata*	1d	2
Red swamp crayfish	*Procambarus clarkii*	1d	2
Water hyacinth	*Eichhornia crassipes*	1a	3
Mitten crab	*Eriocheir sinensis*	1d	3
Saltcedar	*Tamarix ramosissima*	1d	3
Invasive arum	*Arum italicum*	2	3
Fuzzy deutzia; pride-of-rochester	*Deutzia scabra*	2	3
Fuller's teasel	*Dipsacus fullonum*	2	3
Caper spurge	*Euphorbia lathyris*	2	3
Perennial pepperweed	*Lepidium latifolium*	2	3
Beech leaf disease nematode	*Litylenchus crenatae mccannii*	2	3
Beale's oregon-grape	*Mahonia bealei*	2	3
Tea crabapple	*Malus hupehensis*	2	3
Holly osmanthus	*Osmanthus heterophyllus*	2	3
Redtip	*Photinia villosa*	2	3
Jumping worms (species unknown)	*Amynthas Metaphire* spp. *species unknown*	1d	4
Emerald ash borer	*Agrilus planipennis*	3	4
Spotted lanternfly	*Lycorma delicatula*	3	4
Toringo crabapple	*Malus toringo*	3	4
Rugosa rose	*Rosa rugosa*	3	4
Goldfish	*Carassius auratus*	5	4
Longhorn tick	*Haemaphysalis longicornis*	5	4
Orange-eye butterfly-bush	*Buddleja davidii*	1d	5
Beautybush	*Kolkwitzia amabilis*	1d	5
Yellow arch-angel	*Lamiastrum galeobdolon*	1d	5
Winter moth	*Operophtera brumata*	1d	5
Stinging nettle	*Urtica dioica*	1d	5
Snowball viburnum	*Viburnum plicatum*	1d	5

Goal 2: Share Information and Other Resouces

Red Eared Slider at Quogue Wildlife Refuge. Photo Credit: Cara Fernandes

The work of LIISMA is made possible

with the support of our many partners. Being able to share updates, resources, challenges, and strategies, strengthens the community towards a common goal. Partners meetings, a successful symposium, monthly newsletters, and inter-organizational collaborations are just a few of the ways LIISMA shared information and resources in 2022.

LIISMA Staff at Quogue Wildlife Refuge. Credit: Cara Fernandes

Partners Meetings

LIISMA partners connected in 2022 over four remote LIISMA Partners Meetings, each beginning with LIISMA updates, followed by roundtable discussions and updates from each attendee. A workshop with two or more presentations per meeting provided additional learning opportunities for all.

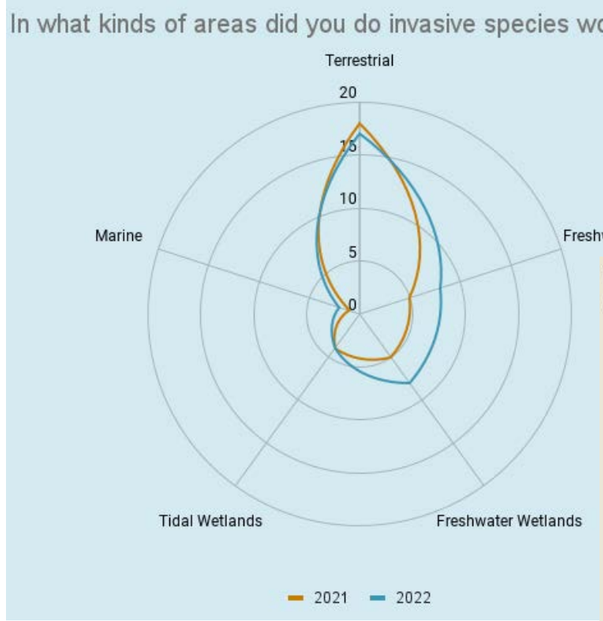
January 21: This virtual meeting hosted 45 attendees, with workshop presentations by Rob Cole on Forest Health, Amanda Furcall on Ecology at Sisters of St. Joseph and Viburnum updates, and David Decker on Phragmites Control with Geotextiles.

May 20: This virtual meeting hosted 28 attendees, with workshop presentations by Enrico Nardone on Seatuck and Phragmites Control, and Fate Syewoagnuan on Post-Treatment Records in iMapInvasives.

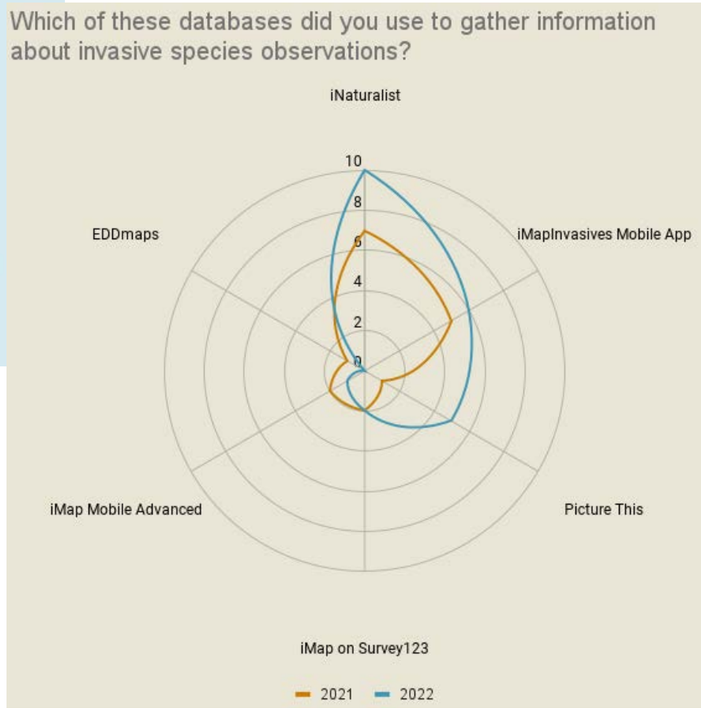
September 16: This hybrid meeting at Fort Totten Park hosted 22 attendees, with a spotlight on NYC Parks presented by Kathleen McCarthy, as well as workshop presentations by Meaghan McCormack on Non-native Marine and Estuarine Species of New York, Stephen Schott on Nonnative Seaweeds in New York Waters, and Naja Kraus on Invasive Giant Hogweed Plants.

December 2: This hybrid meeting at the LIISMA office at the Sisters of St. Joseph Convent in Brentwood hosted 49 attendees, with a spotlight on the Central Pine Barrens Commission. presented by Sabrina Cohn, as well as workshop presentations by Meghan Leverock (North Shore Land Alliance) on Habitat Restoration, and Je-nny Ketterlin and Laura Eaton (US Fish and Wildlife Service) on the Land Manager's Guide to Developing an Invasive Plant Management Plan.

Above: September 2022 partners meeting. Bottom photo featuring Ecological Field Specialist, Sabrina Cohn, presenting for the Central Pine Barrens Commission as a partners spotlight.

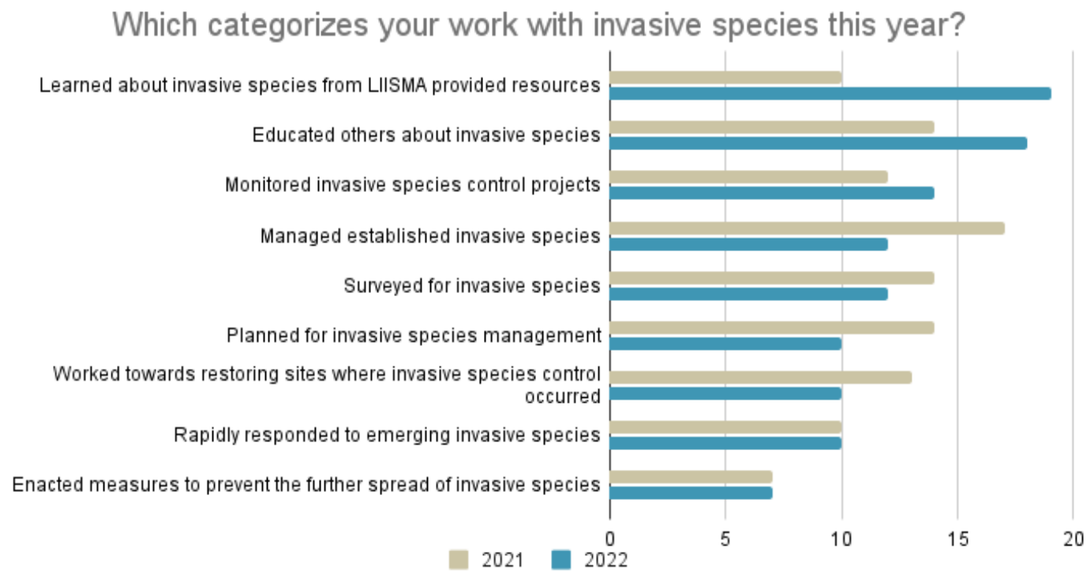


Left: Most partners work in terrestrial ecosystems, consistent with data from 2021.



Right: iNaturalist continues to rank high as an information source, with iMapInvasives following in second. More respondents reported using Picture This for plant identification.

Below: We send a survey to our partners every year to better understand their work with invasive species and how LIISMA can support them. In 2022, we received 27 responses, with some of the answers graphically depicted here.



Resilient Long Island Biennial Symposium

On April 7, 2022, LIISMA and LINPI hosted their third biennial symposium, titled "Resilient Long Island." This was the first of its kind being jointly hosted by both organizations. The event proved to be a great success.

The event took place online as a Zoom Events webinar that hosted 177 attendees, 21 speakers, and 11 sponsors. Additionally, the event hosted two keynote speakers, biologist, pollinator conservationist and award-winning author Heather Holm, and the Director of Horticulture at the Native Plant Trust, Uli Lorimer. The collective goal of this event was to foster an education and awareness to the public of the growing threats surrounding biodiversity loss, climate change, and ecosystem regulation.

Protecting our Ecosystems

First on the list of topics was "Protecting Our Ecosystems." Greg Edinger, Chief Ecologist at the New York Natural Heritage Program (NYNHP), kicked off the day with his presentation, "Ecosystems of Greatest Risk on Long Island." Edinger has led projects for over 25 years classifying, mapping, documenting, and taking inventory of natural communities across New York State. His presentation highlighted the complex ecological features located on Long Island, and the biological threats they face. He made reference to the Long Island Central Pine Barrens Preserve, detailing several ecological communities and their shared stressors, especially those posed by emerging invasive species, such as the highly invasive southern pine beetle.

Next up was Senior Ecologist at the Natural Areas Conservancy, Helen Forgione, with her presentation, "Frameworks for Forest and Wetland Management in New York City." Forgione supervises research that advances the science and practice of managing urban natural areas, as well as the watershed supply and ecological upland and wetland restorations. Her presentation highlighted assessments taken to determine the site conditions of the city's 7,300 acres of natural areas. The data concluded that while much of the forest canopy and midstory are composed of natives, nearly half of what is found on the understory is considered to be invasive. Long-term management strategies are being set forth with goals to implement a comprehensive management system that provides recreation, volunteer opportunities, and green jobs.

Invasive Species Specialist and Project Ecologist for GEI Consultants, Luke Gervase, gave his presentation, "Perennial Pepperweed at West Meadow Beach." Gervase explained the long-term effects that Perennial Pepperweed (*Lepidium latifolium*) has on ecosystems through acting as a "salt pump" that creates an unfavorable environment for other plants and animals in the area that are not used to the salinity in the water or soil. He detailed that the highly invasive plant prefers the upper end of a tidal wetland and that its strong rhizomatous root system is its primary means of reproduction.

Following this, participants had their first breakout session of the day, which included the topics "Case Studies in Native Restoration and Invasive Species Management" and "Restoration Solutions." Both focused on case studies in invasive species management, habitat distribution, and soil remediation techniques while providing examples of the way organizations work to achieve resiliency in their local ecoregions.

Case Studies in Native Restoration and Invasive Species Management

The first subtopic in "Case Studies in Native Restoration and Invasive Species Management" was presented by Nancy Pau, Biologist at the Parker National Wildlife Refuge, and Hannah Grinnell's presentation, "Pepperweed Control in the Great Marsh, MA." Grinnell, an Environmental Studies student, accompanied Pau in developing innovative restoration techniques to ensure that the refuge's coastal habitats can adapt to become more resilient to climate change, while building a community-based stewardship effort to control perennial pepperweed. They detailed the timeline of pepperweed control that has been implemented by staff and volunteers to manage over 3,000 data point locations surveyed, as well as youth-led efforts supporting community outreach and climate awareness.

Next, Horticulturist Heather Coste presented, "Resiliency in a Reclaimed Landscape," highlighting the efforts to remediate Breezy Island at the Bayard Cutting Arboretum in East Islip. Participants learned that the human-made island was originally planted with a mix of native and non-native plants. Over the years following, the site became overtaken by invasives that threatened the varying micro ecosystems found there. Heather has worked since 2017 to restore the island to its "natural" habitat by separating native species by ecosystem needs, removing invasives, restoring soil quality, and reducing external inputs.

The final speaker for this topic, the founder of Dropseed Native Landscapes, Anthony Marinello, presented, "Proliferation of Native Species in the Home Landscape and Native Replacements." Anthony is a native gardener who aims to educate the public on the benefits that native plants have on local food webs, that insects are specific to their host plants, and that native plants provide resilience through evolution. He elaborated that invasive species reproduce away from human cultivation, colonizing our natural areas and providing little to no ecosystem services, thus severing the food web at its source.

Restoration Solutions

The second major topic in our first breakout session was "Restoration Solutions." The first subtopic, "Restoring Nature in the Concrete Jungle," was presented by Assistant Professor of Ecology Evolution and Natural Resources at Rutgers University, Dr. Myla Aronson. Her research focuses on the

Right: An advertisement for the Resilient LI Symposium, highlighting several of the headlining speakers.

patterns of ecological and social drivers of biodiversity in urban landscapes. Her group conducted a case study of 144 cities and concluded that cities are novel ecosystems harboring a mix of native species. She established that nature is important in these spaces because it serves to regulate ecosystem abnormalities such as flooding, water pollution, temperature, air pollution regulation, and habitat resilience. She concluded that we can increase biodiversity through increasing ecological connection, matrix quality, habitat diversity, and native plant vegetation.

Sustainability and Resilience Manager of the city of Madison, Wisconsin, Dr. Jessica Price, led "Long Island Solar Roadmap: Advancing Low Impact Solar in Suffolk and Nassau Counties." Dr. Price served previously as the Renewable Energy Strategy Lead for The Nature Conservancy in New York. There, she worked to advance climate change mitigation and adaptation strategies, in

Instagram post advertising keynote speaker, Uli Lorimer.

cluding leading the creation of the Long Island Solar Roadmap. Their vision hopes to implement rapid development of solar power on Long Island and expand regional access to solar energy. The Nature Conservancy conducted a case study in which low impact sites were mapped out for mid-to-large scale solar installations to develop a set of cohesive strategies in which to lower the local governmental barriers in developing these sites.

Lastly, Professor of Soil Science and Turfgrass Management at Farmingdale State College, Dr. Nicholas Menchyk, presented on, "Managing Soil for Natives, While Mitigating Invasives," where he demonstrated how to map and target soil testing, the effects of chemical control on soil, best management practices, and invasive control options. He elaborated that soil provides nutrient support to plants, controls water flow, filters and protects groundwater supply, stores carbon, and provides a habitat for biodiversity. He noted that there are many disturbed environments on Long Island that defy classification because they are dense and highly compacted with coarse textures, elevated pH levels, and high traces of salt and nutrient concentrations.

Keynote Speaker: Heather Holm

Our first keynote speaker, Biologist, Pollinator Conservationist, and award winning author, Heather Holm, gave her presentation, "Creating and Managing Landscapes for Native Bees." Holm's expertise includes the interactions between native pollinators and native plants. She researches the natural history and biology of native bees and predatory wasps occurring in the Upper Midwest and Northeast regions. Holm's presentation highlighted factors that determine species types, efficacy as pollinators, typical nesting habitats, and life cycles. She stated that common keystone host plants help diversify species and provide critical shelter and habitat for one or more life cycles of these beneficial insects. Holm encourages providing pollinator-friendly gardens that mimic natural processes, incorporating leaf litter, standing dead trees, and natural weed suppression.

Poster Slam

Following ths, our Poster Slam allowed viewers the opportunity to connect with researchers and local organizations to visualize the work they do. Seven speakers gave presentations whose posters highlighted the topics of resilience and looking forward in our landscapes. Speakers included SUNY Stony Brook PhD student, Ashley Morris, graduate Research Assistant from the NYSDEC Fate Syewoangnuan, Biologist from the Town of Hempstead, Chris Smith, NYSDEC Research Scientist, Dr. Steve Pearson, Landscape Ecologist, Amanda Furcall, Conservation Policy Advocate of Seatuck, Emily Hall, and Ashley Crespo of Nelson Pope Voorhis.

Climate Change

Next was the Climate Change midday discussion. First to speak was Research Ecologist for the USDA Forest Service, Dr. Lindsey Rustad, who presented, "Of Peril and Hope: Reflections on 30 Years of Climate Change Research." She explained that atmospheric CO_2 levels are rising at record levels and that by 2100, we may see up to an 8.1°F global temperature increase. This increase will result in heat trapping gasses, melting of glaciers, rising sea levels, acidification of oceans, and intensifying storms. We will see impacts on the biosphere including increased endangered species, total extinction, civil unrest, climate migrations, and likely armed conflict. We will need to adapt our natural systems while improving food, water, and energy security. Similarly, we will need to establish new infrastructure and public policy to meet these new climate norms.

Following was Chairperson of the Department of Urban Horticulture and Design at Farmingdale State College, Dr. Jonathan Lehrer's presentation, "The Shifting Sands: Climate Change and Plant Distribution." Lehrer's teachings focus on the diversity of ornamental plants and the contemporary challenges that seek to alter the palette of functional landscape species. His presentation explains indisputable changes that affect plant distribution and more changes we can expect going forward, and centered on cold and heat hardiness and why the alterations of these zones in recent decades are a direct result of climate change. He explained that as temperatures continue to rise in southern regions, we will see native species distribution retreat northward as species become stressed in the southern parts of their range. In turn we will see the increased movement of invasive species and the displacement of many of our own native species.

Our second breakout session of the day included the topics "Strategies for Invasive Species" and "Natives and Invasives in Horticulture from Backyard to Landscapes." Both groups strategized the ways in which we can contribute towards the effort to better manage our landscapes by means of direct management, education, action, social involvement, and environmental policy.

Strategies for Invasive Species

Cornell Cooperative Extension Weed Science Specialist, Dr. Andy Senesac, presented the first subtopic in "Strategies for Invasive Species" with "Herbicides: Choosing and Using the Right One for the Job." Senesac's major areas of research include developing weed management strategies for commercial horticultural crop production, landscape, and turf. His program embraces an integrated pest management approach that includes investigating herbicides alongside the biological and cultural approaches to weed management. His presentation focused on encouraging the correct research behind which herbicides are best suited and registered for their corresponding plant species via

utilization of the NYSDEC's online informational portal for the Bureau of Pesticide Management.

Next was Mitch O'Neill with "Empowering Community Scientists and Directing Volunteer Survey Efforts to Facilitate the Early Detection of High Priority Invasive Species." O'Neill serves as a User Support Specialist for iMapInvasives, NYNHP's collaborative invasive species database. He provides training and support to users of iMapInvasives, and works with a variety of individuals and organizations to promote its use as the centralized invasive species database and reporting tool in New York. He highlighted how community scientists can become involved in monitoring for pests through claiming grid squares to monitor for species such as spotted lanternfly. He concluded that community-based scientific efforts offer concrete help for monitoring new pests and ensuring better collaboration between agencies, conservation partners, and database managers.

Following this, Tick Entomologist for the Suffolk County Department of Public Works, Moses Cucura, presented, "Vegetation Management and Tick Control," where he illustrated the varying types of tick species found on Long Island, and how to better identify and manage them. He examines emerging tick management strategies and products through locally held field efficacy trials and provides technical assistance to entities interested in tick management. Moses aims to implement an area wide, tick mitigation program within Suffolk County Parks to assess the feasibility and functional potential for a municipality based tick control program.

Natives and Invasives in Horticulture from Backyard to Landscape

The second concurrent session was "Natives and Invasives in Horticulture from Backyard to Landscapes." Fran Chismar and Tom Knezick of Pinelands Nursery in Columbus, New Jersey, led with their presentation "Bring on the Bugs! The Importance of Native Plants & How to Get Your Neighbors on Board," where they overviewed the typical plant palettes among property owners, and how these combined with the heavy use of chemical treatment, contributes to a loss of biodiversity. Both collaborated their skills and passion for podcasting to create the "Native Plants Healthy Planet" podcast, where they work collaboratively to educate property owners on active and passive techniques to become leaders in sustainable landscaping.

Instagram post advertising keynote speaker, Heather Holm.

Plant Community Ecologist, Dr. Anthony Cullen, presented "The Great Garden Escape – Exploring the Role of Horticulture in the Spread of Invasive Viburnums." Cullen focuses on invasive species and employs an interdisciplinary approach that incorporates spatial modeling and landscape genetics with field based ecology experiments. His presentation highlighted invasive viburnum species linden viburnum (*Viburnum dilatatum*) and Siebold's viburnum (*Viburnum sieboldii*), and the field studies surrounding the change over time of their genetic variation. Dr. Cullen concluded that despite similar invasion timelines, *V. dilatatum* are diversifying, widely adapting as populations are expanding and recovering – despite varying

management practices, while *V. sieboldii* are not experiencing the same diversification.

Lastly, Ecologist and Senior Scientist at the Woodwell Climate Research Center in Plymouth, MA, Chris Neill, presented, "The Science Behind Yard Management to Increase Plant, Insect and Bird Biodiversity." He studies the consequences of deforestation, and expanding agriculture in the Brazilian Amazon Rainforest and works with land managers to restore biodiversity management to grasslands, shrublands and coastal wetlands. He collaborates on a national project that examines how homeowners manage their yards, including how this influences the ecological functions of yards in neighborhoods. He summarized that wildlife friendly, water conserving yards are crucial to preserving biodiversity, and that humans are the primary driving factor behind a lack of habitat resilience in residential landscapes.

Keynote Speaker: Uli Lorimer

Our final keynote speaker was Director of the Horticulture Native Plant Trust, Uli Lorimer, whose presentation was titled, "How Local is Local Enough?" The presentation highlighted that genetic diversity is closely tied to provenance, and that ecotypic plants of a known provenance are adapted to source conditions of a particular region, such as: drainage, soil, and climate change, as well as the localized species that depend on them. He explained that species have orchestrated pollinator relationships that are heavily adapted to one another, and that the primary issue surrounding a lack of native plants is a lack of distribution in the nursery industry, which would require greater education and demand among homeowners to overcome.

This concluded the 21 speakers that headlined our 2022 LIISMA-LINPI Resilient Long Island Symposium in which the common theme was addressed: as a community of researchers, environmental stewards, and property owners, we share a common responsibility to encourage landscape resiliency to mitigate the effects of climate change, habitat displacement, and biodiversity loss. The collective goal of this event was to foster an education and awareness of these impending issues while providing solutions to these environmental problems while management is still feasible. LIISMA would like to extend a special thanks to all who coordinated to make this event possible as well as an extra special thanks to our sponsors listed below. Recordings of many of the sessions can be viewed on the LIISMA YouTube Channel.

Written by Melody Penny

Thanks to our sponsors

Sisters of St. Joseph — Uniting all in God's love — Brentwood, NY
Group for the East End
Atlantic Nurseries, Inc. — Dix Hills, NY — 631-586-6242
Kids Native Plants
Prospect Native Landscapes
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Glover Perennials — Specialty Groundcovers, Perennials, Woodies, Vines and Native Ornamentals
Long Island Natives
Nelson Pope Voorhis — environmental • land use • planning
New York State of Opportunity — Department of Environmental Conservation

Major funding for LIISMA is provided by the New York State Environmental Protection Fund, as administered by NYSDEC.

RESILIENT LONG ISLAND — LIISMA & LINPI • SPRING 2022

Newsletters

In monthly newsletters, LIISMA shares the updates on field work, invasive species alerts, management tips, events, and more, to connect with a wide professional and public audience. All staff contribute to articles so that multiple voices are heard. Several times, sharing the newsletter has spurred important conversations with partners, such as asking further details on the phragmites cutting technique LIISMA has employed, or requesting that LIISMA survey a county park waterbody of concern. This, along with unsolicited positive feedback from recipients, makes LIISMA confident that this effort to share resources with partners is worthwhile.

"Great newsletter, Haley and Abby! Thank you."

"Excellent newsletter and excellent work on invasives!"

"Nice job, very informative!"

INVASIVE SPECIES MANAGEMENT
LONG ISLAND

September 2022

LIISMA Newsletter

LIISMA Partner Spotlight

New York State Office of Parks, Recreation and Historic Preservation

In reminiscing on this year's eventful field season, we look fondly on the experience we shared with our dedicated conservation partners. These memories inspire us to express our gratitude to those partners for the hard work they put into fostering a habitable space for our ecosystems to thrive. The endless perseverance that our partners possess to create balance, inclusion, and hope, in the otherwise chaotic world of invasive species management is something we cherish greatly. In saying this, we would like to introduce you to our first newsletter partner spotlight: New York State Office of Parks, Recreation and Historic Preservation (NYS Parks). Read more >>>

Hybrid LIISMA Partner's Meeting: A Great Success!

We would like to thank NYC Parks for co-hosting our September 15 LIISMA Partners Meeting and Workshop at Fort Totten Park in Queens. This is a wonderful place to meet, and the parks staff are fantastic. Thank you Kristen King, Novem Auyeung, Brady Simmons, and Kathleen McCarthy!

Special thanks to our presenters, Kathleen McCarthy, Meaghan McCormack, Stephen Schott, and Naja Kraus. This was LIISMA's first hybrid in-person and virtual Zoom meeting, and thanks to our hosts, presenters, and everyone's help, the meeting went very well.

The meeting recording is up on YouTube.

Watch the Meeting here

Wertheim Plant Identification Presentation at Wertheim

Thank you to those who attended our workshop at Wertheim National Wildlife Refuge earlier this month! Special thanks to Julia Mei Hanzl and the Wertheim staff for inviting us and providing us with the space to give our presentation. We were pleased to educate about native and invasive plant identification, helping to open eyes to nature all around us.

Fieldwork in Focus: Kudzu Management Training with NYSDEC

You may have heard of kudzu as "the vine that ate the south"– but it's not just a problem in the south anymore. Kudzu was planted for erosion control, and though Long Island's winters prevent kudzu seeds from germinating (for now), the plant's vines are still prolific. For several years, the NYSDEC has sent crews to Long Island to manage this species, and now LIISMA is lending a hand.
Read more >>>

A Successful LINPI Plant Sale!

On September 10-11, the Long Island Native Plant Initiative (LINPI) held their bi-annual Native Plant sale at the LINPI

Right: LIISMA September 2022 Newsletter

Collaborations

Through working groups, committees, task forces, and other regional collectives, LIISMA is often working as part of an interagency team. In some groups, LIISMA plays a key role in the work, decision-making, and support of the group, whereas in others our role is to listen, provide input, and gather knowledge to later share with our constituents. Both forms of participation are valuable.

With regular meetings of the Long Island–Metro Aquatic Invasive Species (LIMAIS) Task Force and subcommittees, regional agencies that work with aquatic invasive species (AIS) come together to develop waterbody prioritization schemes, marine invasive species outreach, professional training, and more. In 2022, the LIISMA-led waterbody prioritization project continued in ranking more than 700 waterbodies in terms of their proximity to invasive species prevention zones and existing invasions, among other factors. LIISMA sought to expand this project by making it visual, applying the prioritization table to ArcGIS Pro to make a reproducible weighted model, and integrating live data from iMapInvasives. While this project is consistently improving, LIISMA continued to apply the results of the prioritization to the waterbody surveys for 2022. This prioritization starts with the waterbodies of highest quality, to promote early detection and rapid response (detailed further in Goal 4). LIISMA led the marine education and outreach subcommittee in developing marine invasive species identification cards, for use by marine staff (detailed further in Goal 8).

Our collaborations with other PRISMs are maintained through frequent meetings; monthly All-PRISM calls, PRISM Leaders meetings, Education and Outreach Committee meetings, and the Terrestrial Coordinators Committee meetings, all keep LIISMA connected with statewide efforts. Working with the Education and Outreach Committee resulted in a custom-animated promotional video for NYISAW 2022 in June, as well as infographics that celebrate the achievements of PRISMs as a whole. Furthermore, LIISMA has advised on the redesign of the NYIS.info website, working to make the resources as usable as possible for both the public and professionals. LIISMA shows leadership in co-chairing the Public (Sunday) Content Committee for the 2023 Invasive Species Statewide Expo.

LIISMA has shared input and advice on NYNHP's lakes and ponds vulnerability working group, and participated in the Invasive Species Advisory Council (ISAC) meetings, regional meetings of the Mid-Atlantic Panel on Aquatic Invasive Species (MAPAIS), and the Northeast Regional Invasive Species and Climate Change (RISCC) Management Network. Supporting these regional groups allows LIISMA to share the latest information with our partners.

Subcontracts

In 2021 and 2022, LIISMA administered five subcontracts totaling $71,450 with community organizations and Cornell Cooperative Extension of Nassau County (CCE-Nassau). Funds were provided by the Environmental Protection Fund, as administered by NYSDEC. Focus was placed on educating resource managers and the public about high-priority invasive species, including spotted lanternfly and small carpet grass (*Arthraxon hispidus*, "arthraxon") and to manage invasive species at priority conservation areas. The subcontracts are described as follows, with the dollar amount of each:

$19,915 - Phragmites Control in West Brook - Seatuck Environmental Association

When the dam failed at West Brook adjoining Connetquot State Park, the fishing pond drained to reveal a wetland filled with native species and valuable wildlife habitat that had been underwater for many decades. However, phragmites that once edged a portion of the pond threatened to encroach on this newly available niche. Subcontract funds were awarded to Seatuck to help protect the ecosystem from becoming an invasive monoculture.

This project was two-fold: it involved hand-pulling emerging phragmites shoots from the former pond basin and engaging a consultant to treat the large, pre-existing stands on the berm and northern edge of the site. This work commenced in July 2021, when Seatuck hosted the first "Phrag Fight" workday during which Seatuck staff and volunteers removed encroaching phragmites. The young plants and rhizomatic pioneers were pulled or dug out, then bagged and removed from the site and disposed of by New York State Parks. Through June, Seatuck conducted eight workdays at West Brook, including several which involved corporate volunteer teams (e.g. Blue Point Brewery, Teachers Federal Credit Union). LIISMA staff participated in a phragmites dig at West Brook for Earth Day alongside several Seatuck volunteers. Sixteen large black garbage bags were filled. Follow-up management is planned for the site.

To address the large stand, Seatuck engaged GEI Consultants as a subcontractor. GEI mapped the phragmites stands with a hand-held GIS device in October 2021 and began the effort to obtain permits and treat the stands in late 2021. This effort will require follow-up treatments in the coming years. The West Brook site is not yet free of phragmites, but with the support of LIISMA, Seatuck has been able to keep it at bay for now. The organization is committed to safeguarding the unique restoration that is underway, and will continue to monitor the site and work to mitigate the threat phragmites poses.

Westbrook Credit: Emily Hall

$14,600 - Non-native Viburnum Research and Control - Sisters of St. Joseph

The purpose of this project was to: a) survey and rapidly manage tea viburnum (*Viburnum setigerum*), an emerging invasive species that requires further research (Tier 5) and b) eradicate wintergreen barberry (*Berberis julianae*) and fuzzy deutzia (*Deutzia scabra*), the only known Tier 2 species on the 212-acre property owned by the Sisters of St. Joseph. Both objectives were met, and valuable information about the invasiveness of tea viburnum and how to best manage it, was gathered.

Forty five acres of woodland were surveyed for tea viburnum and linden viburnum using the QuickCapture app. Amanda Furcall, Haley Gladitsch and Abby Bezrutczyk surveyed and recorded the presence of all invasive viburnums on site. These 45 acres are in the process of being protected by a DEC conservation easement. This survey served to identify conservation areas with the most land stewardship needs in the largely intact pine/oak/heath woodlands.

In the southernmost area of woodlands, significant viburnum infestation was found to be present. Density was particularly high in sites where pitch pines (*Pinus rigida*) have been cut over the last few years due to southern pine beetle infestations. In areas not impacted by southern pine beetle, the invasive viburnum distribution consisted of sparse, but well-established individuals with growth rings indicating 5 or more. It is thought that tea viburnum and linden viburnum existed in the woodland in this sparse pattern until southern pine beetle thinning opened the canopy. The post southern pine beetle treatment areas containing invasive viburnums are generally difficult to access, as forest debris and poison ivy are abundant there. Many of the viburnums were suckering from underneath fallen trees, making uprooting impossible.

The northeastern forest area had scattered individuals and no history of southern pine beetle culling. That forest section is overall, of better quality. In conducting this survey, a number of native viburnums were found in the woodland, including: arrowwood viburnum (*Viburnum dentatum*), smooth blackhaw (*Viburnum prunifolium*) and mapleleaf viburnum (*Viburnum acerifolium*). These species influenced the re-planting done throughout this subcontract.

It was determined that a single cutting of a large plant eliminates seed production for at least one year. This means that managers with limited time or ability to apply herbicide can cut back large viburnums to buy time in managing them. Based on the extensive viburnum populations found in the southern section of the forest, and the difficulty of the terrain, a contracted crew was hired to assist

Treating invasive viburnum in area that was previously managed for southern pine beetle.

with management. The crew cut the viburnums and painted glyphosate on the stumps, as directed by the Land Stewardship Manager.

Following the same methods, the Land Stewardship Manager cut and treated the invasive viburnums in the northeast woodland. One week later, the crew assisted with planting 230 native species to replace what was removed. Planted species included: gray birch (*Betula populifolia*), pitch pine, white oak (*Quercus alba*), scarlet oak (*Quercus coccinea*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), highbush blueberry (*Vaccinium corymbosum*), arrowwood viburnum, and American cranberrybush viburnum (*Viburnum trilobum*).

In fall of 2021, the single individuals of both wintergreen barberry and fuzzy deutzia were cut and painted with glyphosate. Surveying the area for more individuals yielded two more fuzzy deutzia in the area, which were treated as well. As of this

report, neither species have shown evidence of re-emergence, and no additional individuals have been detected on site.

With thanks to the resources provided by this subcontract, Sisters of St. Joseph Convent has made significant steps towards controlling invasive viburnums in the high-quality pitch pine forest. Staff will continue to monitor previously treated viburnum stands and manage any re-emergence. Seed dispersals have been significantly reduced; continually reducing these viburnum populations is achievable.

These methods will be particularly useful if future southern pine beetle culling is needed. In that circumstance, invasive viburnums surrounding the cut area would be treated at or before the time of the cut. Ultimately, this management will allow the heath and scrub oak understory to thrive as part of the woodland patchwork, instead of allowing canopy openings to facilitate migration of the species, and structural change in the forest. As this monitoring and management continues, it will add to the body of land steward testimony supporting the regulation of tea viburnum. This species occurs in many sites throughout Long Island. This site demonstrates the destructive impact the species can have on rare pine barrens ecosystems.

$8,816 - Arthraxon Education and Outreach - Third House Nature Center

Arthaxon is an emerging invasive species on Long Island, with only two known populations. One such population occurs in Montauk County Park, alongside Big Reed Pond, where arthraxon threatens one dozen state rare, threatened, and endangered species. To prevent the spread of this grass, Third House Nature Center proposed the creation of an interpretive sign and boot brush station, with a second sign at the trail entrance. Over the subcontract term, LIISMA has collaborated with Third House on graphic design and content to

Interpretive sign at Montauk County Park has been installed, alerting visitors to small carpet grass and highlighting the native flora and fauna within the park.

maximize the educational capabilities of the sign. Suffolk County Parks has approved the signs and boot brush station. Third House Nature Center has plans to host an unveiling party for the sign at Montauk County Park later in 2022. This project enhances LIISMA's effort to reach partners and the public on the Montauk Peninsula, featuring a LIISMA ISPZ and Invasive Species (IS) Management Complex.

$19,957 - Education and Outreach for Spotted Lanternfly - CCE-Nassau Nature Center

CCE Nassau is engaged in a comprehensive invasive species outreach and education program for the Long Island region. The program targets homeowners, professionals, and community leaders with research-based information resources and innovative strategies to reduce the risk and mitigate the effects of invasive species on the urban environment. CCE-Nassau is focusing efforts on the newly emerging spotted lanternfly, and other species that pose a major threat to the urban and agricultural environment.

CCE-Nassau published 19 social media posts as

part of an invasive species education and awareness social media campaign known as "Invasive Species of the Week." Each week on the CCE-Nassau Facebook page, CCE featured a high-priority invasive species as indicated by the LIISMA Tier System. Each post included details of its description, origin, known presence within the Long Island region, its risk and threat to the region, and how to prevent its spread.

CCE-Nassau educators designed invasive species activity kits for 5-8th grade classrooms with the goal of integration into the existing New York State 5-8 grade science curriculum. These kits are available at no cost, and provide access to a pre-recorded invasive species lecture presented by a CCE-Nassau educator. The kit included materials for each classroom such as an invasive species-themed board game, study cards, access to educational videos and materials, printable handouts, and two additional innovative classroom activities. These classroom activities provide an understanding of New York's approach to invasive species management. These kits will be distributed to schools and classrooms within Nassau County.

CCE-Nassau participated in two major community outreach events hosted by the Town of Oyster Bay and the Hewlett-Woodmere Public Schools Endowment Fund. For the Town of Oyster Bay Cleanup and Marine Expo, CCE-Nassau participated as a marine exhibitor and educated the public on aquatic invasive species and selected terrestrial invasive species, such as the spotted lanternfly. At this event, CCE-Nassau handed out brochures, fact sheets, flyers, and other related information, to provide the public with knowledge of the species and information on how to prevent the spread.

At the Arts Below Sunrise Music and S.T.E.A.M. Festival hosted by the Hewlett-Woodmere Public Schools Endowment Fund, CCE-Nassau educated residents about the prevalence of invasive species within the Long Island landscape, and provided information that would allow citizens to prevent the spread of invasive species. Through both opportunities, CCE-Nassau encouraged engagement to community members through a matching game called "How Do I Hitch a Ride?" which allowed individuals to guess how some high priority invasive species have spread throughout the Long Island area. This game displayed symbols that represented the various ways by which aquatic invasive species enter our environment (such as bait buckets, basal water, boat motors, aquarium dumping and fish markets.) Through these events, CCE-Nassau recorded direct outreach to an estimated 300 individuals spread over a wide demographic of children, teens, and adults.

CCE-Nassau created 5 fliers to deliver to the public and local community stakeholders to build an understanding of high priority invasive species present in the Long Island region. These fliers are expected to be distributed to garden centers, marinas, and other public access information centers within Nassau County.

CCE-Nassau collaborated with the Nassau County Department of Parks, Recreation and Museums to provide public access to information about invasive species present within the county park system. They utilized ArcGIS Story Map technology to provide residents access to "Invasive Species Trails." This technology provides dynamic storytelling and location data along the walking trail to follow the path of invasive species, providing relevant background information regarding each present species, as well as information on how to prevent their spread.

In early June, CCE-Nassau hosted an iMapInvasives workshop at the Science Museum of Long Island. Participants were taught how to track, report, and identify high priority invasive species through the iMapInvasives mobile app and a CCE-Nassau educator-led walking tour. Participants gained a better understanding of New York's approach to eradicating and managing invasive species, and are better equipped to manage invasive species within their own communities.

$8,162 - Grassland Restoration and Invasive Species Management - Friends of Hempstead Plains

The 65-acre Hempstead Plains is all that remains of 40,000 acres of native grassland prairie that once extended through central Nassau County. The plains is a regional, state, and globally significant natural heritage site. It is home to more than 250 species of plants, including six state rare and endangered species. The control of non-native and invasive plant species is the highest priority at this site.

Upon receipt of the LIISMA Contract in June 2021, the Friends of Hempstead Plains (FHP) began planning the work for 2021 and beyond. The Board of Directors, as well as FHP staff, identified invasive bushclover (*Lespedeza spp.*) as the primary target for this funding-supported work. This funding allowed FHP to hire 4 workers, as well as to dedicate supervisory and training time for the Habitat Director, Rob Longiaru.

Since lespedeza is not abundant until later in the growing season, volunteer staff, the habitat director, and Hofstra University interns undertook a targeted hand removal of large woody growth, including autumn olive, various wild cherries (*Prunus spp.*), tree of heaven (*Ailanthus altissima*), and sumac (*Rhus spp.*). Directors and interns marked areas for removal that were completed in March by volunteers. Interns mowed areas with high mugwort (*Artemisia vulgaris*) abundance, and those areas have since been mowed every 6 weeks. The most obvious change has been in the area directly in front of the education center, which as of May began showing signs of very strong native growth and reduced mugwort abundance.

In April and May, the Friends hired three technicians to assist in these removal projects. Their work totaled 48 hours between them and concentrated on tasks that could not be performed with inexperienced volunteers. The Friends hired one of these technicians at a higher wage, due to their advanced plant identification knowledge and possession of a pesticide technicians license, which gave the group flexibility when deciding on when and where to apply herbicide. The Friends have been applying herbicide to areas containing cypress spurge (*Euphorbia cyparissias*) for various years in test plots, so the effort was expanded to a few new locations. The Friends are continuing to monitor for re-emergence.

With the assistance of LIISMA funds allocated towards the work performed in 2021-2022, the Friends engaged 55 new volunteers, many of whom continue to return. Projects such as these help build the reach and capacity of the Friends of Hempstead Plains.

Partner Trainings

On May 26 and 27, LIISMA led 12 interns from the US Fish and Wildlife Service in a training on terrestrial and wetland plant identification at Wertheim National Wildlife Refuge and Sayville National Wildlife Refuge. In September, LIISMA focused on training partners in conducting rake toss surveys with Simple Aquatic Survey Pro, first with the strike team and staff at Connetquot State Park, and later with the staff of the Quogue Wildlife Refuge. Thank you to all who participated!

Goal 3: Prevention

The most cost effective way to limit the damage caused by invasive species is to prevent them from becoming established **in the first place.**

Prevention includes: education and outreach, maintaining healthy and resilient ecosystems, using best management practices to protect water and soil resources, restricting the importation and sale of invasive species, monitoring the distribution of invasive species, cleaning recreational equipment, and limiting the movement of potentially infected materials.

LIISMA offers a wide variety of informative and educational resources to help prevent new infestations of invasive species, including: a website, GIS models and maps, email newsletter, training programs, workshops, and meetings with partners and community members. LIISMA teaches best management practices, surveying and monitoring techniques, management planning, and invasive species identification and management. LIISMA developed and maintains the LIISMA website (www.LIISMA.org) in-house.

LIISMA works with partners to coordinate the protection and management of 12 Invasive Species Prevention Zones (ISPZs). ISPZs are conservation areas greater than 500 acres in size that are dominated by native species and natural communities, with the goal of maintaining the viability and diversity of these areas. Biennial monitoring of ISPZs, paired with the frequent review of invasive species observations through iMapInvasives and iNaturalist, enables LIISMA to understand what emerging invasive species may be within or in the vicinity of these areas.

Melody Penny and Vincent Cerniglia, Town of Huntington Planner, installing spotted lanternfly circle traps in the Town of Huntington..

Invasive Species Prevention Zones (ISPZs)

LIISMA conducted site visits, management, and/or monitoring at eight ISPZs in 2022, as follows:

Brookhaven National Laboratory

Brookhaven State Park

Connetquot State Park

Dwarf Pine Plains/Hampton Hills

Long Pond Greenbelt

Montauk Point State Park (with Camp Hero State Park)

Rocky Point Natural Resource Management Area

Sears Bellows Complex

LIISMA is planning to monitor the remaining four ISPZs in 2023, as follows:

Cedar Point County Park (monitored in 2021)

Fire Island National Seashore

Hither Hills/Hither Woods Complex

David A. Sarnoff State Forest Complex

LIISMA works with partners to coordinate monitoring and management at six IS Management Complexes. IS Management Complexes group the 12 ISPZs and related conservation targets ecologically to facilitate protection and management across agency jurisdictions. In 2022, LIISMA worked at four out of six complexes, as follows:

Central Pine Barrens

Islip Greenbelt

Long Pond Greenbelt

Montauk Peninsula

LIISMA is planning to monitor the two remaining IS Management Complexes in 2023, as follows:

Fire Island Wilderness

Mashomack/Northwest Peninsula

The ISPZs and IS Management Complexes include priority conservation areas and waterbodies under the jurisdiction of various governmental and non-governmental organizations, with some degree of invasive species management being conducted, including management highlighted in this report.

LIISMA worked with the Long Island Metro Aquatic Invasive Species Task Force (LIMAIS) to develop a 33-page guide of marine invasive species identification cards, which can be used both digitally and in

print, to assist marine biologists and members of the public in identifying and reporting marine invasives to prevent their further spread. Species include mitten crab, sea potato (*Colpomenia peregrina*), and lightbulb sea squirt (*Clavelina lepadiformis*).

LIISMA shares information and other resources with partners for the development of signage and boot brush stations, including the development of an interpretive sign about arthraxon, aka small carpet grass, at Montauk County Park in 2022, which will be accompanied by a boot brush station. Funding was provided by NYSDEC and the Environmental Protection Fund through LIISMA subcontracts.

The LIISMA subcontracts provided funding for educational programs at Cornell Cooperative Extension in Nassau County, Friends of Hempstead Plains in Nassau County, and Third House Nature Center in Suffolk County.

Partner Projects

The Town of Brookhaven worked with NYSDEC to continue to allow their treatment, containment, and removal of kudzu (*Pueraria montana*) on a Town-owned parcel. The Town removed bamboo (*Phyllostachys spp.*) from open space in Mastic Beach which was continuing to spread to adjacent residential parcels.

The North Shore Land Alliance managed their Japanese stroll garden that has large stands of bamboo. To prevent the spread of the bamboo, they removed bamboo rhizomes in and outside of the garden.

NYSDEC Region 1 Fisheries prevented the spread of invasive species through the watercraft inspection program application (WISPA) boat steward program, in which they talked to boaters at state-owned launches and discussed proper decontamination of boats.

OPRHP at Bethpage State Park mowed large areas of spotted knapweed (*Centaurea stoebe*) along golf course fairways and in pollinator gardens before seeds were produced, and cut invasive knotweed (*Reynoutria japonica*) before seed would develop to decrease spread.

Abby and Melody manually controlling floating water primrose at Artist Lake, Middle Island, preventing the spread of this species to the nearby Carmans River.

The Quogue Wildlife Refuge continued the practice of cleaning their kayaks if they have been in other waters, and not allowing guest or visitor kayaks and canoes onto the ponds.

The Science Museum of Long Island has focused on confining invasive knotweed to the areas on their property where it has established itself, and attempting to prevent it from spreading to new areas.

Trimbles Nursery educates customers about invasive plants and suggests alternatives.

Goal 4: Early Detection and Rapid Response

Beech leaf disease

Abby searching for phragmites in Long Pond, Southampton

Early detection and rapid response (EDRR)

is a key principle of invasive species management, where “early detection” is the process of observing, detecting, and documenting an invasive species in a location that is otherwise devoid of that particular species presence, and “rapid response” is the process of quickly reacting to the detection once the organism has been authoritatively identified and response options have been assessed. Early detection and rapid response is a coordinated set of actions to find and eradicate potential invasive species in a specific location, before the species population grows to the point where local eradication is no longer feasible.

Historically, people have not always realized the threat of emerging invasive species until it is too late. In many cases, land managers were not aware of an invasive population’s growth becoming a problem until the infestation was impossible to eradicate. The best that managers can hope for at that point is to control population sizes to reduce impact. The goal of EDRR practices is to notice invasive species problems earlier, and take control actions when populations are still relatively small and eradication is feasible.

Slender leafy spurge

Early Detection and Rapid Response

EDRR increases the likelihood that localized invasive populations will be found, contained, and eradicated before they become widely established. EDRR can slow range expansion, and avoid the need for costly long-term control efforts. Effective EDRR depends upon the timely ability to answer critical questions such as:

1. What is the species of concern, and has it been identified correctly?

2. Where is the species located, and how likely will it be to spread?

3. Will the species cause localized harm to native species and wildlife habitat?

4. What actions (if any) should be taken regarding the species?

5. Who has the needed authorities and resources to allow for removal of the species?

6. How will the efforts be funded, managed, and carried forth?

Successful early detection and rapid response programs include:

1. Potential threats being identified in time to allow for risk-mitigation measures to be taken.

2. Newly emerging invasive species being detected in time to allow for efficient and environmentally sound decisions to be made.

3. Responses to invasive populations that are effective and environmentally mindful, in a collaborative effort to prevent the spread and permanent establishment of invasive species.

4. Adequate and timely information carried forth to decision makers, the public, and agencies of concern in regards to the status of invasive species presence within a given area.

5. Lessons learned from past control efforts as a means to guide current and future efforts.

LIISMA aims to break new ground in prioritizing the early detection and rapid response of new and emerging invasive species. LIISMA gathers, synthesizes, tracks, and shares information on EDRR species and best management practices for partners, landowners, and community members. Furthermore, by implementing invasive species survey, management, and monitoring plans for EDRR species, LIISMA protects ecosystems in the LIISMA region and buffer areas.

LIISMA 2022 Annual Report

New Species Documented

Species that are confirmed and new to county- PRISM

Date range: 12/4/2021-12/9/2022

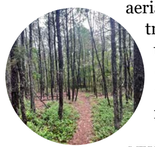
LIISMA	
Species Name	**County of Report**
Banded Mysterysnail	Kings
Beech leaf disease nematode	Kings
Yellow Iris	Kings
Longhorn Tick	Nassau
Chinese Longhorned Beetle	Nassau
Giant Reed	Nassau
Narrowleaf Cattail	Nassau
Beech leaf disease nematode	Queens
Chinese Yam	Queens
Longhorn Tick	Richmond
Beech leaf disease nematode	Richmond
Yellow Iris	Richmond
Leafy Spurge	Suffolk
Himalayan-berry	Suffolk
Japanese Tree Lilac	Suffolk
European Rock Shrimp	Suffolk

Ongoing Efforts to Survey, Monitor, and Manage EDRR Species

In 2022, LIISMA participated in a variety of monitoring and control activities for EDRR species, including southern pine beetle, arthraxon, saltcedar, invasive yam, perennial pepperweed, and floating primrose willow.

Southern pine beetle

Every year, LIISMA assists partners such as the Central Pine Barrens Commission and NYS OPRHP in surveying for southern pine beetle. In 2022, this included responding to several aerial hotspots and mapping the species to expedite control efforts, and assisting partners with aerial drone surveying and ground truthing methodologies. Having trained staff to detect the species, LIISMA is on the lookout for southern pine beetle in all relevant field activities.



NYSDEC cut over 13,000 trees in 2022 to suppress southern pine beetle, working with a variety of partners, including LIISMA, NYS OPRHP, Central Pine Barrens Commission, and Suffolk County Parks.

Arthraxon

LIISMA worked with Third House Nature Center (THNC) in Montauk to assess the extent of arthraxon in Montauk County Park, and subcontracted THNC to engage the public and professionals in preventing its spread. A new interpretive sign for Montauk County Park was designed by the Third House Nature Center under contract with LIISMA and LINPI, with contributions from LIISMA's graphic designer Jacqueline Briggs and the LIISMA staff. The sign will draw attention to the rare native species and communities of the Montauk Peninsula, as well as the threat of a recent invasion by arthraxon. The sign was delivered and installed in September.

An additional population of arthraxon was detected at the Rechler Equities Industrial Park near Gabreski Airport in Westhampton. Rechler Equities agreed to management, and prompted their landscaping crews to hand pull the species from the site before it went to seed. LIISMA hopes to conduct further collaboration with Rechler Equities in ensuring the local eradication of the species.

Perennial pepperweed

LIISMA has stayed in touch with the Town of Brookhaven's dedicated effort to control perennial pepperweed. With one confirmed location for this species in New York, LIISMA supports their management plans and met with GEI Consultants at West Meadow Beach to observe management practices first hand. Additionally, LIISMA followed up on a report of the species at the Marine Nature Study Area in Oceanside. There was no confirmed presence on site, likely due to a misidentification of the species.

Beech leaf disease

LIISMA has developed a list of priority public sites for beech leaf disease nematode (*Litylenchus crenatae-mccannii*) monitoring throughout the region, including state and county parks. As well, LIISMA has developed a beech leaf disease project on iNaturalist to receive instant notifications when members of the public have uploaded images, allowing us to get a better idea of this disease's extent.

Saltcedar

LIISMA responded to iNaturalist reports of saltcedar at Cedar Beach, in the Town of Brookhaven. The species was confirmed to be Tamarisk parviflora, or small flower tamarisk, ranked as a Tier 2 species in New York State. Similarly, small flower tamarisk was confirmed to be present on the southwest shoreline of Conscience Bay, though the species has been monitored for several years and does not appear to be spreading significantly. LIISMA is currently monitoring the species and investigating possible adverse environmental impacts to determine whether control efforts will be necessary.

Giant reed

LIISMA visited Cammans Pond Nassau County Park, responding to a report of giant reed (*Arundo donax*) from iNaturalist. Giant reed, then a Tier 1a species, was detected and sampled. This population was likely planted. LIISMA contacted Nassau County Parks to advise on management of the species.

Slender leafy spurge

LIISMA responded to research grade iNaturalist reports of slender leafy spurge at Crab Meadow Beach in the Town of Huntington. Euphorbia virgata, a Tier 1d species, was detected and reported to iMapInvasives as a first in-county presence record of the species. LIISMA returned to the site to sample the species for further confirmation by NYNHP. LIISMA is investigating the ecological impacts of the species for future management considerations.

Fuller's teasel

LIISMA visited Bethpage State Park in response to research grade iNaturalist reports of Tier 2 species Fuller's teasel (*Dipsacus fullonum)* growing within the restoration meadow. Fuller's teasel was detected and recorded into iMapinvasives. LIISMA is monitoring the site and investigating the impacts of the species for further consideration.

Invasive yam

LIISMA visited Alley Pond Park, Queens, to investigate several reports of invasive yam (*Dioscorea polystachya*) reported to iNaturalist. The team detected invasive yam in four isolated locations trailside, among various other invasives present. LIISMA is currently monitoring the site for future management considerations.

Wintergreen barberry

LIISMA responded to reports of wintergreen barberry at Miller's Pond County Park in Smithtown. Several isolated individuals were detected and recorded into iMapInvasives. LIISMA is considering management recommendations for the site and plans to coordinate management options once landowner contact is established.

Ludwigia Rapid Response Efforts

In October 2021, the Town of Brookhaven was alerted to a patch of invasive *Ludwigia peploides* by NYSDEC Region 1 Fisheries. With rapid management in 2021, follow-up surveys, and management once more in October 2022, LIISMA has helped to contain this infestation.

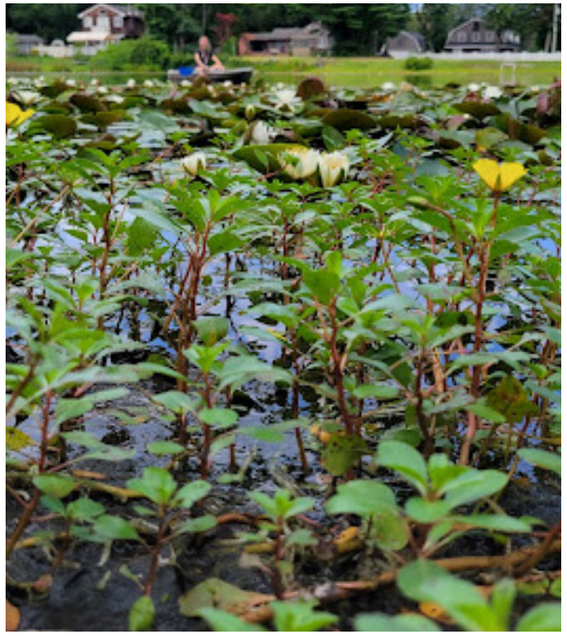
The initial population, located along the northwestern shoreline near the Town of Brookhaven parking lot off of Route 25A, was mapped by LIISMA staff. When the invasive plant was confirmed to be *L. peploides*, LIISMA coordinated with NYSDEC Region 1 Fisheries and the Town of Brookhaven on removal efforts.

In December 2021, rapid action by the involved parties and the quickly issued NYSDEC permit for manual control gave us the head-start to prevent the plant from spreading. LIISMA joined forces in a rapid response to remove this high impact Tier 3 species.

L. peploides is known to form dense, nearly impenetrable mats that can displace native aquatic plants and wetland grasses, reduce wildlife habitat, lower pH and dissolved oxygen in water, interfere with flood control and drainage systems, clog waterways, and impact navigation and recreation. It is thought that the plant may have been spread via boat or kayak used in the Peconic River only a few miles away, or by waterfowl. Signage was installed at the launch site reminding boaters of the risks associated with not properly inspecting and cleaning their watercraft when moving from one water body to another.

Management of the Artist Lake *L. peploides* population is important to prevent its spread to the nearby Carmans River, and the high-quality coastal plain ponds found in the Rocky Point Pine Barrens ISPZ. The site is highly trafficked for fishing, kayaking, and canoeing, so potential for spread beyond this pond is high. The spread of this species would likely impact navigation and recreation if left alone.

LIISMA revisited Artist Lake in July 2022 to follow-up on the manual removal of *L. peploides* and to survey the entire lake. Staff kayaked and walked the shoreline, surveying the perimeter of the lake for newly emerging populations. These surveying efforts proved valuable, as staff encountered a previously unrecorded population at the southeast shoreline of the lake, quickly making plans with our partners for management. In October, 2022, LIISMA manually removed *L. peploides* in the new location, and Region 1 Fisheries led a follow-up control of the first detected population follow-up control In total, twelve 30-gallon bags were removed from Artist Lake in 2022, with plans to continue monitoring and removing the species over the next several years until the infestation is eliminated.



L. peploides at Artists Lake

Partner Projects

Town of Brookhaven has worked with LIISMA and NYSDEC on rapid response for *L. peploides* in Artist Lake, relying on LIISMA to handle the bulk of this work and reporting. The Town also paid for the removal of hundreds of southern pine beetle infested trees in the Central Pine Barrens as part of a rapid response program with NYSDEC and Pine Barrens.

North Shore Land Alliance rapidly responded to an observation of spotted lanternfly in one area of their Humes Preserve, returning daily to survey for them and eliminate any individuals found.

NYSDEC Region 1 Fisheries conducted manual removal of *L. peploides* at Artist Lake, and water chestnut in other affected areas.

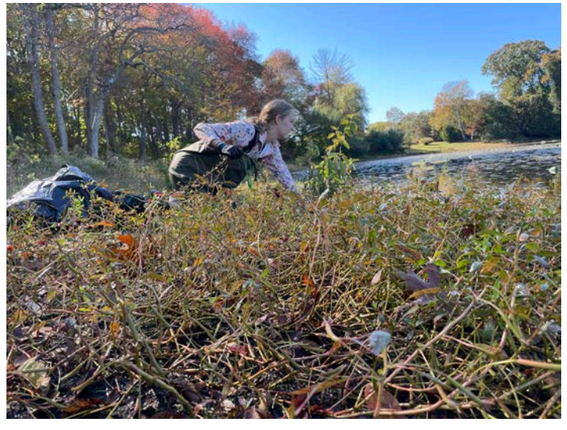
OPRHP at Bethpage State Park conducted a rapid response to the first spotted lanternfly sighting at the park; they mapped the infestation on an iMapInvasives project on iNaturalist, and, with much success, utilized a battery operated vacuum to remove the insects detected. They sought out tree of heaven, and marked individuals for winter removal. They also detected 2 individual mile-a-minute (*Persicaria perfoliata*) plants in the park and removed them immediately.

Seatuck has conducted rapid response to encroaching phragmites at West Brook, a newly established wetland, following a dam failure in 2019. Seatuck recruits volunteers and partners to attend manual control events to remove young shoots from approximately 11 acres of the wetland ecosystem.

Sisters of St. Joseph, Brentwood detected spotted lanternfly on site, and cut and treated tree of heaven.

LIISMA Staff manually remove floating water primrose from the shoreline of Artist Lake.

Floating water primrose, *L. Peploides*, in flower



LIISMA Staff removing floating water primrose manually.

Goal 5: Manage Established Invasions

In 2022, LIISMA actively managed and assisted

with management at several sites, while also supporting our partners through the creation of management plans.

Kudzu infestation in Nassau County.

Abby cutting kudzu vines in preparation for NYSDEC Kudzu team to conduct chemical control at this site.

Pragmites Preliminary Success

Controlling phragmites can be difficult. But as a widespread and high impact species (Tier 4), it is important for LIISMA to control small populations, especially where it co-occurs with rare species and communities. For this reason, managing phragmites in coastal plain ponds has become a top priority for LIISMA; these ecosystems contain some of the highest biodiversity in New York State, and are home to numerous rare plant and animal species. Phragmites is a threat to the rare plants and communities in these ecosystems that rely on a particular pattern of water level rise and fall. Should phragmites fully invade a coastal plain pond, the hydrology can be severely altered, causing the water levels to skew lower, and overtime lead to losses of different plant species.

Haley and Katharine controlling phragmites by spading method at Bellows Pond.

In 2021, the LIISMA team piloted the technique of underwater cutting of small stands of phragmites in a few coastal plain ponds: Big House Pond and Little House Pond in Sears Bellows County Park, and in Long Pond within the Long Pond Greenbelt. This cutting technique, described by the Great Lakes Phragmites Collaborative, involves using gardening shears, scissors, or raspberry cane cutters to cut phragmites at least 6 inches below the waterline and drown them – starving the plants of oxygen to eventually kill them.

In July 2022, LIISMA returned to these sites to conduct follow up cutting and monitoring – and were pleasantly surprised. In Big House Pond the team documented an 85% reduction of phragmites. In Little House Pond where less than 10 stems were detected in 2021, zero phragmites stems were found in 2022.

Upon returning to the larger patches of phragmites in the middle of Long Pond in the Long Pond Greenbelt, the team – with help from the Town of Southampton – found a 91% reduction of phragmites, from 910 to only 85 very thin, short stems. Much of the area was completely free of phragmites. Following these preliminary results, the LIISMA team is eager to continue to monitor and manage these stands for several years in an effort to suppress, contain, or eradicate phragmites at these sites.

In 2022, LIISMA employed a spading technique for managing a small stand of phragmites along the shoreline of Bellows Pond in Sears Bellows County Park. As the name suggests, this involves using a spade or shovel to sever the phragmites rhizome at a 45° angle at the base of each stem. By simply inserting, cutting, and removing the spade, soil disturbance is minimized and native vegetation protected. The team removed roughly 300 stems in July, and another 369 stems in October. A biodiversity survey of the area was recorded to determine the percentage of native cover present at the pond's shoreline. LIISMA is looking forward to assessing the results of this effort next year.

Ongoing Efforts to Manage Existing Infestations

Ludwigia peploides

As previously mentioned (see Goal 4) LIISMA has been working alongside the Town of Brookhaven and NYSDEC Region 1 Fisheries in the control of a recent infestation of *L. peploides* at Artist Lake in Middle Island. The site is the only known existing location of L. peploides on Long Island and will be under active management by LIISMA and partners for several years to follow.

NYSDEC Giant Hogweed crew member demonstrating manual control techniques.

Giant Hogweed

In June 2022, LIISMA met with the NYSDEC Giant Hogweed Control Program Crew to observe giant hogweed (*Heracleum mantegazzianum*) monitoring and management protocols on Long Island, with the intent that LIISMA may adopt some giant hogweed monitoring sites in the future.

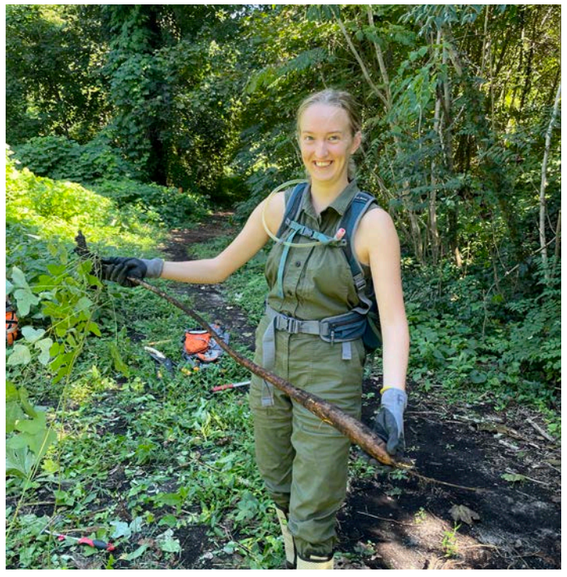
Swallow wort

In July 2022, LIISMA performed control efforts of pale swallow wort (*Vincetoxicum rossicum*) in Otis Pike Preserve, in Manorville. Two known infestations were previously mapped by LIISMA, and the necessary permits were obtained for its removal. One of those known infestations was removed by LIISMA in July, with plans to revisit the site for further monitoring and continued management of the second known infestation on the southeastern edge of the park.

Kudzu

Kudzu flower.

In 2022, LIISMA collaborated with NYSDEC Kudzu Control Program to adopt over a dozen known kudzu sites under active monitoring and management on Long Island. LIISMA staff assisted NYSDEC Kudzu Control staff in performing recommended "surgical root crown removals" to target individual plants on smaller sites, and vertical vine cutting and flagging on larger sites to ready the sites for cut-stump herbicide treatments provided by NYSDEC herbicide applicators.



Abby holding a large kudzu taproot that she dug up.

Working Together

Water Chestnut Removal with NYSDEC Region 1 Fisheries

In June 2022, LIISMA assisted NYSDEC Region 1 Fisheries, 19th District Nassau County Legislator Steve Rhoads, partners, and volunteers in two water chestnut removal events. An estimated 100 bags in total were removed from Mill Pond in Wantagh, and Upper Twin Pond in Massapequa.

Invasive Species Volunteer Events: Phragmites Removal at West Brook

In April 2022, LIISMA assisted the Seatuck Environmental Association and Save the Great South Bay with phragmites removal at the site of the former West Brook Pond, a tributary of the Connetquot River, between the Connetquot River State Park Preserve and Bayard Cutting Arboretum State Park in Great River. LIISMA was proud to support Seatuck through the subcontract award and on volunteer days such as this.

Invasive Species Volunteer Events: Hempstead Plains Earth Day Event

LIISMA assisted the Friends of Hempstead Plains in an invasive species removal effort at Hempstead Plains Preserve in Garden City for their Earth Day volunteer event. Multiflora rose and invasive honeysuckle were among some of the invasive species controlled by manual removal at this event. An invasive species removal subcontract was granted approval to Hempstead Plains Preserve by LIISMA in 2021, and following this, LIISMA has been glad to assist in removal efforts at this living laboratory.

Management Plans

Fisher's Island: Henry L. Ferguson Land Trust

Fishers Island, located in the Town of Southold, Suffolk County, New York, is a 9-mile-long by 1-mile-wide Atlantic coastal plain island. The island is home to an abundance of diverse species of flora and fauna, including several rare species, such as purple milkweed (*Asclepias purpurascens*, S2S3), seaside sandwort (*Honckenya peploides*, S3) and snowy egret (*Egretta thula*, S2S3). According to NYNHP, Fishers Island has the greatest density of rare species in proportion to its size anywhere in New York State (Steve Young, Chief Botanist). Due to its history of livestock agriculture, much of the island had previously been clear cut for grazing, with minimal to no primary forests present today. To protect natural habitat and to promote the native and rare species of the island, managing invasive species in priority locations is of utmost importance.

Haley and Katharine at Chocomount Cove, Fishers Island. Credit: Melody Penny

Of Fishers Island's 2,688 acres, more than 350 acres are held in trust by the Henry L. Ferguson Museum (HFM), including the majority of the island's trails. In June 2022, the LIISMA team

conducted an invasive species survey of two sites within the care of the Henry L. Ferguson Land Trust. The first of which was Chocomount Cove, which the team divided into three sections: successional maritime forest trail, a successional old field meadow, and Chocomount Cove beach, made up of several maritime habitats.

Chocomount Trail winds through a successional maritime forest of black cherry (*Prunus serotina*), oak (*Quercus spp.*), and red maple (*Acer rubrum*) trees, and leads to a successional old field. The LIISMA team surveyed and mapped invasive species currently invading the field to help develop a management and restoration plan. The field opens to Chocomount Beach, a marine intertidal gravel/sand beach and salt marsh where there is a small stand of phragmites. Growing on the shoreline with the phragmites is a robust population of seaside sandwort, with a New York State Rank of S3 (typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State). Due to the low abundance of phragmites and the high quality of the shoreline, developing a plan to eradicate the invasive reed from the site is of high priority

A small stand of phragmites located and mapped in Field Maps by LIISMA Staff.

LIISMA Staff managed a small population of phragmites at Chocomount Cove Beach, Fishers Island.

The second site surveyed was Property 37, a tidal wetland invaded by invasive knotweed and phragmites. The team used the iMapInvasives to survey the two properties, which informed prioritization and invasive species management recommendations.

Following the Fisher's Island visit, the team devised a detailed management plan for the Henry L. Ferguson Land Trust. For effective and economical invasive species management, LIISMA prioritized areas of highest ecological importance, and sites where invasive species presence is low, and management is feasible. In general, successful invasive species management requires a variety of integrated and adaptive management approaches, including early detection and rapid response, cultural control, manual and mechanical control, biological control, and lastly, chemical control. LIISMA looks back fondly on this experience and forward to continued work with the Henry L Ferguson Museum's Land Trust to make strategic recommendations on the management of these invasive species.

Broad Cove: Peconic Land Trust

Broad Cove, located in the Town of Riverhead, Suffolk County, New York, is a 100-acre waterfront parcel on Flanders Bay that was once a duck farm. The site was purchased by the Peconic Land Trust in December 2021. The site is protected in perpetuity for wildlife habitat, passive recreation, water quality protection, and climate change resiliency. The site is adjacent to Indian Island, a Suffolk County Park that has known nesting populations of long-eared bats (*Myotis septentrionalis*; S1, G2G3). Due to its proximity to Indian Island, Broad Cove is considered a potential nesting habitat for these state and globally rare bats.

On August 2, 2022, the LIISMA team conducted an invasive species rapid assessment of Broad Cove, accompanied by Josh Halsey and Jessie McSwane-Marcus of the Peconic Land Trust, and Jade Blennau of the Peconic Estuary Partnership.

LIISMA observed several ecological communities at Broad Cove, including successional southern hardwoods (variant), successional old field, successional maritime forest, maritime red cedar forest, and a mosaic of estuarine intertidal communities. Much of the area shows signs of human disturbance from past land uses.

Following the Broad Cove visit, the LIISMA team devised a management plan for Peconic Land Trust, prioritizing high areas of ecological importance and sites where invasive species presence is low, and management is feasible. LIISMA outlined a variety of integrated and adaptive management approaches, and outlined high priority management targets that utilized site maps to emphasize small infestations of high impact invasive species on otherwise healthy sites. In this section, key areas of ecological importance were highlighted alongside the target species listed for eradication, containment, or suppression. LIISMA advised that these sites should be given high priority for treatment, to prioritize areas where ecological importance is high and management is feasible.

In addition to high priority management targets, a list of low priority management targets were compiled. These are common invasive species to Long Island that are widespread and less feasible to eradicate completely. LIISMA emphasized a focus on preventing the spread of these species by monitoring and managing their spread into new, quality areas, with control recommendations for reference. Lastly, LIISMA advised Peconic Land Trust on the harmful implications surrounding newly emerging invasive species such as spotted lanternfly and southern pine beetle, as some species in the vicinity of the Broad Cove property have the potential to spread to the site and cause detrimental impacts. LIISMA looks forward to continued collaboration and partnership with the Peconic Land Trust and Peconic Estuary Program to make strategic recommendations on the management of invasive species, and the protection of conservation targets.

Broad Cove, a Peconic Land Trust Property in Riverhead

Bill Jacobs, Abby Bezrutczyk, and Melody Penny hosting an aquatic invasive species workshop for Quogue Wildlife Refuge staff.

Quogue Wildlife Refuge

The Quogue Wildlife Refuge is a 305-acre nature preserve located in Quogue, New York. The refuge features a diverse array of native terrestrial and aquatic plants, animals, and ecological communities. The refuge staff and volunteers provide care and housing to permanently injured wildlife, as well as local environmental education, and land stewardship.

Invasive species, such as phragmites, pose a threat to the conservation goals and natural habitats of the refuge. In 2020 and 2021, LIISMA conducted two site visits and compiled management advice to help tackle this issue. The final Quogue Wildlife Refuge Management Plan was completed in April 2022, with assistance from LIISMA Graphic Designer, Jacqueline Briggs, and contributions from LIISMA staff.

In September 2020 and July 2021, the LIISMA team conducted invasive species surveys of high-quality natural areas in the refuge that are most at risk of damage by invasive species.LIISMA documented the characteristic plant species at each community where invasive species presented a significant threat. The team outlined a variety of integrated and adaptive management approaches, including: early detection and rapid response, cultural control, manual and mechanical control, biological control, and lastly, chemical control.

A list of site based priority zones were mapped and detailed according to the ecological regions that function there and the native species that cohabitate those regions. Management advice centers around the protection of ecological communities in high quality areas that are most threatened by encroaching invasive species, and the eradication, containment, or suppression of invasive species where management is the most feasible, rather than targeting heavily infested areas that are already degraded. LIISMA thanks the Quogue Wildlife Refuge for their partnership, both in proactively managing invasive species and hosting invasive species outreach events.

Partner Projects

The Town of Brookhaven removed perennial pepperweed at West Meadow Beach. The town also had tree removal work done at several parcels that focused on removing black locust (*Robinia pseudoacacia*), catalpa (*Catalpa spp.*), and tree of heaven, with an estimated 20 trees removed from two sites. In addition, they mowed invasive knotweed, and had invasive ivy (*Hedera helix*) vines cut and removed from a parcel in Manorville.

The Friends of Hempstead Plains has been targeting established patches of mugwort, invasive lespedeza, and various woody shrubs and trees. They have performed extensive lespedeza hand removals since 2021, with mild success. Constant mowing of heavily infested mugwort areas have shown progress, with a gradual abundance of native species progressing over time.

The Friends of the Long Pond Greenbelt managed invasive knotweed with repetitive cutting as part of a NYSDEC project.

The Henry L. Ferguson Museum targeted black swallow wort (*Vincetoxium nigrum*) with biocontrol agents Hypena opulenta that produced a second generation during August. They also managed glossy buckthorn (*Frangula alnus*) via cutting, and phragmites and knotweed via mowing and herbicide.

The Nassau County Soil and Water Conservation District set up an invasive species project area for the Muttontown Preserve. They removed an estimated 30 burning bush (*Euonymus alatus*) from the site, in the process of clearing space for trails.

Melody Penny and Naja Kraus (NYSDEC) practicing root crown removal of Kudzu.

The National Parks Service - Fire Island National Seashore removed invasive sand sedge (*Carex kobomugi*) using a shovel and digging deep down into the rhizomes, then placed the individuals in bags, and double bagged them.

The North Shore Land Alliance responded to an expanding population of invasive knotweed by planning multiple volunteer days, cutting back all vegetation. Other targeted species included: phragmites, garlic mustard (*Alliaria petiolata*), stiltgrass, invasive knotweed, lesser celandine (*Ficaria verna*), silvergrass, mile-a-minute, mugwort, wineberry (*Rubus phoenicolasius*), wisteria (*Wisteria sinensis*), porcelain berry (*Ampelopsis brevipedunculata*), bittersweet, multiflora rose, invasive bushclover, bamboo, burning bush, invasive ivy (*H. helix*), and tree of heaven. Management focused primarily on manual and mechanical methods of removal, with occasional herbicidal treatments as necessary.

NYSDEC Region 1 Fisheries conducted water chestnut manual pulls at Massapequa, Wantagh Mill and Swan Ponds.

NYS OPRHP at Bethpage State Park identified and mechanically removed invasives from about 1.5 acres of land, including invasive ivy (*H. helix*), box-leaved holly (*Ilex crenata*), round-

leaved bittersweet, glossy buckthorn, multiflora rose, porcelain berry, spotted knapweed, mugwort, Norway maple (*Acer platanoides*), honeysuckle, and linden viburnum. In addition, about a half-acre area of invasive knotweed was cut two times (May and August), for the second consecutive year.

The Quogue Wildlife Refuge removed more than 20 phragmites stems from the island on Old Ice Pond by digging up rhizomes. They also cut down invasive honeysuckle and wild olive (*Elaeagnus angustifolia*), and managed glossy buckthorn using a weed wrench.

The Science Museum of Long Island occupies Leeds Pond Preserve, a 36-acre site in Plandome. They have several invasive species on their grounds, including phragmites, porcelain berry, mile-a-minute, multiflora rose, round-leaved bittersweet, Norway maple, burning bush, and invasive knotweed. They have been pulling and cutting the porcelain berry, round-leaved bittersweet, mile-a-minute, Norway maple and burning bush.

LIISMA Staff Bill Jacobs and Haley Gladitsch working with Jacqueline Fenlon of Southampton to control phragmites at Long Pond.

Following foliar applications of kudzu by NYSDEC, and mechanical removal by a contractor using a forest mulcher, they have also been surgically removing kudzu root crowns.

Seatuck has managed established stands of phragmites at West Brook by applying larger scale removal efforts.

Sisters of St. Joseph, Brentwood continued invasive viburnum management through the LIISMA subcontract, finding success in the treatments. Southern pine beetle remained a high priority, with 37 trees cut for suppression and more surveys to follow. Volunteers and staff worked to control additional invasive species on the property, including wisteria, burning bush, bamboo, and five fingered aralia (*Eleutherococcus sieboldianus*).

Westhampton Garden Club gathered volunteers to cut back multiflora rose at Connetquot River State Park. Working for two hours, they cut back about 100 yards of vines and branches.

Goal 6: Restoration and Protection

Buttonbush

After invasive species are removed from a treatment area

the degraded area may be re-colonized by the same or different invasive species. To restore treatment areas to healthy ecosystems, LIISMA generally favors natural regeneration, whereby native plants regrow naturally from seeds or other reproductive plant parts that germinate and grow on the site. Such natural regeneration is often cheaper and ecologically preferable. In some cases, however, there is not enough native seed in the seedbed or in the vicinity for native plant populations to recover. In such cases, actively seeding and planting native plants can improve the success of restoration. Restoration may also involve assisted natural regeneration, which is a blend of passive restoration and active planting.

For times when active restoration may be required, LINPI is uniquely positioned to cultivate and provide local genotypes of native plants for restoration.

In 2022, LIISMA staff conducted 23 management events over 1,770 acres, all of which relied on natural regeneration for restoration. These sites included nine coastal plain ponds and six additional priority waterbodies totaling 454 acres, together containing 49 rare, threatened, or endangered species and six rare community types.
In the course of surveying and management, LIISMA staff are on the lookout for native and rare species, submitting observations to NYNHP if found. For example, LIISMA staff discovered horned beak sedge (Rhynchospora inundata) at a management site – a species with only three known populations in the state, with its last sighting in 2005. LIISMA is proud to have an eye for invasive species, but also towards native rare species of conservation value.

Black eyed susan

Partner Projects

The Friends of Hempstead Plains recently re-established a rain garden and bioswale which was overrun with invasive growth due to lack of attention. It was originally installed by Nassau Community College, and included an array of native grasses known to be observed at the Hempstead Plains. In November, the Nassau County Soil and Water Conservation District donated funds and labor to purchase the plants, and to reinvent the bioswale. Management was conducted by a Girl Scouts troop and other volunteers in September and October.

The Friends of the Long Pond Greenbelt planted native plants in restored areas.

The Henry L. Ferguson Museum planted beach plum (*Prunus maritima*) and other species in a small area where bush honeysuckle and an asphalt roadway had been removed, in hopes of expanding a maritime shrubland of native plants. They continued improving habitat in a wet meadow by removing undesirable plants and restoration planting.

The Nassau County Soil and Water Conservation District restored rain gardens around the county by clearing invasive mile-a-minute, porcelain berry, and mugwort. They replanted about 200 native plants total across five rain gardens.

The North Shore Land Alliance advanced three restoration projects. At Wawapek Preserve in Cold Spring Harbor, large forestry mulching and clearing of a highly infested area near the entrance to the preserve was followed by an installation of native plant and tree species. At Iselin Preserve in Upper Brookville, plans are developing to forestry mulch a meadow that is highly invaded with mugwort, followed by a planting of native grasses and wildflowers. Lastly, at Williams Preserve in Lattingtown, mechanical and manual removal of invasives throughout property by contractors and volunteers will be followed by native plant installations once a habitat management plan is drafted.

NYS OPRHP at Bethpage State Park planted over 100 species of native plants in the cleared 1.5-acre area where invasives had been overgrown.

Red maple seedlings at Sears Bellows County Park

Left to Right: Sabrina Cohn (Central Pine Barrens Commission), Diana Lynch (Suffolk County Parks) , Samantha Acampora (Central Pine Barrens Commission), and Abby Bezrutczyk (LIISMA) surveying for southern pine beetle at Southaven County Park.

Two large beds (half the area) were tilled to prepare for planting, while the remaining plantings were planted in preexisting, untilled soil.

The Quogue Wildlife Refuge removed garlic mustard and mugwort from their pollinator garden and replaced it with a variety of native plants. Invasive plants such as honeysuckle and wild olive surrounding the small, man-made pond were removed, and replaced with sweet pepperbush (*Clethra alnifolia*).

The Science Museum of Long Island replanted areas with a mix of native trees, following the removal of kudzu and burning bush.

Seatuck has worked to continue to remove invasive species including invasive knotweed, multiflora rose, and English ivy (*Hedera helix*) on the Penataquit Creek. Seatuck then worked with partners to plant native trees and plants alongside the stream. Over time, as these plants establish themselves (and invasives are controlled), a healthy, natural, riparian buffer will reestablish, which will help protect the creek's water quality and provide important habitat for native wildlife.

Sisters of St. Joseph, Brentwood contracted the planting of 80 native trees and shrubs after clearing of invasive plants, including Norway maple and English ivy. While drought stressed the new plantings, natural regeneration of native plant species on the site show promising signs of improvement.

Melody setting up biodiversity survey using hoops as quadrats.

Goal 7: Surveying and Monitoring

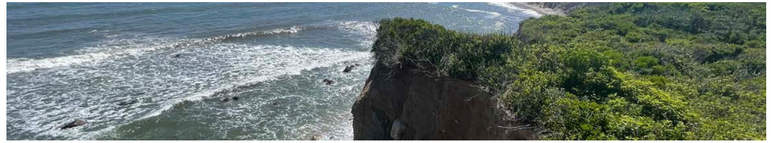
With numerous points of entry and nearly 700 invasive species already established on Long Island,

strategic surveying and monitoring is of the utmost importance for LIISMA.

In 2022, LIISMA conducted species-specific surveying for emerging invasive species in the region, and site-specific surveying to understand the presence and extent of any invasive species within ISPZs and Natural Heritage Sites.

Left: Pink lady's slippers

Abby at Camp Hero State Park



Conservation Areas

Pine Barrens Invasive Species Management Complex

With southern pine beetle spreading across the Long Island Central Pine Barrens, LIISMA surveyed and monitored for the pest in key areas throughout the season. In August, the staff surveyed sections of Brookhaven State Park to ground-truth hotpots identified on aerial surveys. In September, LIISMA staff joined NYS OPRHP staff to assist with drone surveys of the park, detecting several new infestations. Various LIISMA partners conducted extensive monitoring and control efforts for southern pine beetle.

In an effort to connect partners from various organizations, LIISMA staff toured the forest of the Brookhaven National Laboratory – also heavily impacted by southern pine beetle – and learned about the fire management program there that enhances forest health.

Apart from southern pine beetle, the pine barrens are also plagued by various species of ticks. In June, LIISMA staff participated in the Cornell Cooperative Extension's Annual Tick Blitz, collecting tick samples from flags in Brookhaven State Park. Earlier in May, LIISMA staff joined Dr. Alexis White from the Suffolk County Department of Health to survey for ticks at Sayville National Wildlife Refuge – the site of our finding of the gulf coast tick in 2021. No additional gulf coast ticks were detected on this visit, however male lone star ticks were found.

Montauk Invasive Species Management Complex

In July, LIISMA ventured to Montauk for invasive species surveying at Amsterdam Beach, and Camp Hero State Park. While many common terrestrial invasive species were found in both parks, LIISMA was able to highlight emerging invasive species populations at the site level, and emphasize quality areas necessary for protection from invasive species within the parks. Staff findings and recommendations were delivered to State Parks.

Melody searching for aquatic invasive species at Wertheim.

Duck Pond, Peconic River County Park

Waterbody Monitoring

In 2020 and 2021, LIISMA, working alongside LIMAIS, developed a waterbody prioritization tool that was put into action in the 2021 field season and continued in 2022. LIISMA staff conducted baseline monitoring for eight of the highest priority waterbodies in the region – those with the highest ecological and recreational value.

The team started the monitoring in June, with shoreline training at Peconic River County Park, and hiking to Grassy Pond, Duck Pond, and Jones Pond. As per previous observations in 2020, phragmites were still present in Grassy pond, however Duck and Jones were free of phragmites or other aquatic invasive species. In July, surveying continued with Sears Pond, in Sears Bellows County Park. While no submerged aquatic invasive species were detected, a very small (fewer than 20 stems) stand of phragmites was detected on the southwest shoreline, and removed via cutting. A kayak survey on Conscience Bay, Setauket, was conducted in August to search for perennial pepperweed. Staff kayaked the perimeter of the waterbody, with access courtesy of the Peconic Land Trust. No perennial pepperweed was observed.

Later, a survey of Artist Lake revealed a population of *L. peploides* in addition to the northwest population already mapped and under management. Subsequent work with town and NYSDEC partners began to address the newfound population, further detailed in Goal 4. Aware of the spread-potential for this species, the LIISMA team surveyed nearby waterbodies, including the headwaters of the Carmans River in Cathedral Pines County Park, and Lower (Lily) Lake, finding no additional populations.

Yuriy Litvinenko and state parks invasive species strike team survey Main Pond with Melody Penny and Abby Bezrutczyk.

In September, LIISMA focused on training partners in aquatic invasive species identification and surveying. First, the team met with NYS Parks staff and their seasonal strike team at Connetquot State Park. The demonstration survey at Main Pond revealed a previously undetected population of water chestnut, with initial removal occurring the following week. Lastly, LIISMA trained the staff of the Quogue Wildlife Refuge in AIS survey methods. A short presentation on common AIS and the survey method preceded 10 rake tosses on Old Ice Pond. Aside from a very small stand of phragmites, no aquatic invasive species were detected.

Site	Waterbody	LIMAIS Rank	Acres	Invasive Species Detected by LIISMA
Peconic River County Park	Grassy Pond	4	60	Phragmites (previously detected)
	Duck Pond	5		None detected
	Jones Pond	5		None detected
Sears Bellows County Park	Sears Pond	5	15	Phragmites (new detection)
Artist Lake	Artist Lake	6	30	*Ludwigia peploides, Myriophyllum aquaticum*
Carmans River	Lower (Lily) Lake	6	20	*Cabomba caroliniana*
Connetquot State Park	Main Pond	6	20	*Trapa natans* (new detection)
Quogue Wildlife Refuge	Ice Pond	3	10	None detected

Katharine Stirber and Haley Gladitsch monitoring for invasive species.

Partner Projects

The Town of Brookhaven paid contractors to survey sites at West Meadow Beach, Mastic Beach, and Cedar Beach (approximately 250 acres), in addition to an ongoing survey for perennial pepperweed at West Meadow Beach. Town land managers completed invasive species overviews on virtually all visited parcels, noting changes that have occurred since prior visits. This year they took particular interest in invasive lespedeza and miscanthus, making visual note of the presence of these species. Tree removal work was completed at several parcels targeting black locusts, catalpa, and tree of heaven. They have also worked with NYSDEC to obtain permits to remove purple loosestrife from regulated wetlands.

CCE-Suffolk conducted a survey of invasive privet (*Ligustrum spp.*) species at a Suffolk County park, with a second survey forthcoming this fall, after removal of many privet plants.

The Friends of the Long Pond Greenbelt monitored areas where autumn olive was managed via cutting and mowing, and found that those management methods were not working well.

The Henry L. Ferguson Museum hosted LIISMA staff in surveying two locations for invasive plants and provided recommendations for control. LIISMA staff determined that about 0.4 acres are infested by knotweed and 0.5 acres are infested by phragmites.

The National Parks Service - Fire Island National Seashore conducted surveys for invasive sand sedge and took GPS points of the locations, specifying whether they were individuals or big group clusters. They surveyed about 200 acres of beach along the toe of the dune.

The North Shore Land Alliance surveyed for spotted lanternfly in early fall, targeting areas with a high abundance of tree of heaven across all their preserves (approximately 100 acres). They used iNaturalist to document occurrences of spotted lanternfly. They also surveyed for beech leaf disease, particularly on preserves with large stands of beech trees (*Fagus spp.*, about 50 acres). They prioritized monitoring mile-a-minute in the spring and summer. Previous methods of management in the past included manual removal and mile-a-minute weevil (*Rhinoncomimus latipes*) release. They continued manual removal and observed that the weevils that were released were still present in the mile-a-minute infestation sites. Alternatively, herbicide application was used in some sites. Upon consideration, they decided to continue with the management methods utilized in the past, with continued monitoring in mind for the future.

NYSDEC Region 1 Fisheries conducted total aquatic vegetation surveys in a point intercept rake toss method and SAS Pro. They also conducted visual surveys of *L. peploides* following herbicide treatment in the Peconic River, with continued management and monitoring planned.

OPRHP at Bethpage State Park surveyed gardens, roadsides, and sensitive ecosystems throughout the park for multiflora rose, tea viburnum, round-leaved bittersweet, mugwort, thistle (*Cirsium arvense*) , linden viburnum, bindweed (*Convolvulus arvensis*), invasive knotweed, honeysuckle, honeysuckle bush, English ivy, glossy buckthorn, box-leaved holly (*Ilex crenata*), stiltgrass, phragmites, yellow iris (*Iris pseudacorus*), spotted knapweed, porcelain berry, Norway maple, black locust. They surveyed for spotted lanternfly and tree of heaven throughout the park when first identified on the property in August. In addition to surveying, they monitored areas where invasives were removed, and continued to cut back new growth where large trees and vines were cut down.

The Quogue Wildlife Refuge collaborated with LIISMA to assess the 305 acre preserve; LIISMA provided the Refuge with an invasive species management plan which they are using as a guideline for their work.

The Science Museum of Long Island has revisited areas that were previously infested with porcelain berry, multiflora rose, and round-leaved bittersweet to cut back regrowth. In areas that were previously infested with kudzu, following NYSDEC herbicide application and mechanical removal, they have revisited those areas to remove kudzu root crowns that had sprouted again.

Seatuck has been working with Greentree for a number of years to survey and create a management plan for invasive species on the approximately 400 acre property.

Suffolk County Community College started a gardening club on campus, with one of the activities as searching for invasive species. This includes searching for spotted lanternfly, tree-of-heaven, and mile-a-minute weed.

The Westhampton Garden Club worked at Heckscher State Park to cut back autumn olive to prepare for state parks to remove the plants.

Melody Penny, Haley Gladitsch, and Abby Bezrutczyk at Camp Hero State Park

Spotted Lanternfly

In advance of spotted lanternfly adult phenology, LIISMA worked with partners to install several spotted lanternfly monitoring traps across the island. Many thanks to Sabrina Cohn of the Central Pine Barrens Commission, Victoria Bustamante of the Third House Nature Center, Rob Longiaru of the Town of Hempstead, Christian Granelli and Vincent Cerniglia of the Town of Huntington, and Amanda Furcall of the Sisters of St. Joseph for setting up and monitoring traps.

Goal 8: Education and Outreach

Sunset on Fishers Island

It Takes a Team

As a PRISM, LIISMA has a unique role for invasive species engagement and outreach. Communicating both with professional partners and the public has been a top priority for LIISMA from the beginning, not only to form connections to undertake invasive species management, but also to inspire invasive species-smart actions that can prevent or limit the spread of invasive species in the first place. While Long Islanders have been labeled less knowledgeable about invasive species issues compared to residents in other areas of the state, LIISMA's efforts in 2022 have made great strides to turn the tide.

LIISMA welcomed an education and outreach team in two roles, with Cara Fernandes serving as a part-time Temporary Environmental Educator, and Jaquelyn Briggs as a Temporary Graphic Designer. Through running the newsletter and social media, organizing NYISAW events and promotions, and assisting partners with graphic design skills, Cara and Jackie raised the bar for education and outreach at LIISMA.

LIISMA's efforts stayed focused on the target of our communications plan: encouraging members of the public to adopt behaviors that reduce the threat of invasive species. In expanding LIISMA's audience, raising general awareness, enhancing appreciation for our natural areas, providing tools and avenues for involvement, LIISMA has worked to strategically and comprehensively advance engagement and outreach.

Expanding Audience

Because invasive species can affect all sectors of society, and anyone can accidentally contribute to their spread, being able to reach new people about invasive species is important. In 2022, LIISMA successfully connected with new organizations and individuals through events and social media.

Outreach Events: Connecting with New Audiences

LIISMA education and outreach events were attended by more than 740 people.

The LIISMA-LINPI biennial symposium titled Resilient Long Island reached both professional and public audiences on topics relating to invasive species, native plants, restoration, climate change, pollinators, and everything in between with 22 presenters. The varied topics were a strength of this event, as it pulled in landscape professionals, gardeners, educators, naturalists, and more. This virtual event reached 177 participants over a full day of presentations, poster discussions, and networking events. Further information on the symposium can be found in Goal 2.

Connecting with new partners is another way LIISMA reached new audiences in 2022. In March, a presentation at American Fisheries Society NY Chapter Meeting allowed LIISMA to engage with anglers, with a presentation highlighting the importance of cleaning, draining, and drying watercraft. Likewise, LIISMA's panel presentation with the Peconic Land Trust reached 62 new people, as Abby and Haley presented on invasive species threats to our native forests as part of a panel. This presentation received great audience feedback, many of whom stayed an extra 15 minutes to ask questions.

Through tabling events, LIISMA was able to engage in a friendly, face-to-face way with the public. Tabling at Quogue Wildlife Refuge's Earth Day Event in April, the Farmingdale State College Plant Sale in May, and the LINPI plant sale in September engaged hundreds of people.

"Thanks for a truly fantastic presentation last week. One of the best Zoom talks I can remember!"

"Also would like to give a virtual high five to you and the rest of the crew for putting on such a great conference given the circumstances. Organizing a zoom meeting of that magnitude must not have been easy, great job!!!"

"That was a well put together, very informative day. Great job!"

"I loved the Symposium! The speaker choice was excellent, and I learned a lot."

"Thank you very very much for the great event!"

"Just [a] great conference all around! Thank you all."

"I wanted to thank you for all the assistance and felt that the symposium was top notch. All of the speakers were wonderful and the information presented was useful and timely!"

"Your presentation was visually stunning"

"I'm jealous of your slides"

"Nicely done!"

Social Media

LIISMA used social media as a tool to advertise events or weekly educational posts with a goal of consistency, engagement, and useful information.

1129 Facebook Followers (+203) 22% increase

586 Instagram Followers (+138) 31% increase

569 Twitter Followers (+17) 3.0% increase

TikTok Followers 1640 (+6) 0.3% increase

Raising Awareness

Covering countless taxa, ecosystems, and pathways, invasive species can be a complicated topic to teach about. Through frequent communications over newsletters, as well as partnered projects and presentations culminating in New York Invasive Species Awareness Week, LIISMA was able to educate a wide range of audiences.

Newsletter

The LIISMA newsletter serves many purposes: updating our partners about our field activities, alerting the public to emerging invasive species, giving tips on species identification, advertising local and LIISMA events, and disseminating job opportunities and resources – all in an engaging style. All staff members contribute to articles. LIISMA takes pride in this monthly endeavor, and has received positive feedback that confirms that our efforts are worthwhile for raising awareness.

Educational Events

LIISMA was pleased to host both in-person and virtual educational events in 2022, starting in March with a presentation on Emerging Horticultural Invaders as part of Cornell Cooperative Extension's Winter Webinar Series, with 47 attendees. In August, LIISMA contributed a workshop to the Conservation and Ethics for Teens program at the Ernst Nature Center, with discussion on invasive crabs among 8 participants. August also held LIISMA's spotted lanternfly webinar, as part of the Community Science Long Island series, hosted by Long Island Sound Study, South Shore Estuary Reserve, Seatuck, NY SeaGrant, and Peconic Estuary Partnership. This webinar engaged 18 attendees on spotted lanternfly ecology and reporting. Lastly, in September, LIISMA staff presented on basic native and invasive plant identification at the Wertheim National Wildlife Refuge, to 5 eager participants.

"Terrific. Frightening. Enlightening. Inspiring. Thanks for all your work."

Melody Penny representing LIISMA at the LINPI plant sale.

New York Invasive Species Awareness Week (NYISAW)

Poster Contest: In March 2022, LIISMA invited all kindergarten to 12th grade students in the LIISMA Region to participate in the New York Invasive Species Awareness Week Poster Contest to showcase their creativity and express their thoughts on conservation and invasive species impacting our area. LIISMA received 119 poster submissions with fantastic artwork on dozens of species, including spotted lanternfly, mitten crab, mute swan (*Cygnus olor*), emerald ash borer, burmese python (*Python bivittatus*), rock snot (*Didymosphenia geminata*), wisteria, and more. LIISMA selected 10 winners and sent them prizes provided by the New York State Department of Agriculture and Markets (NYSAGM).

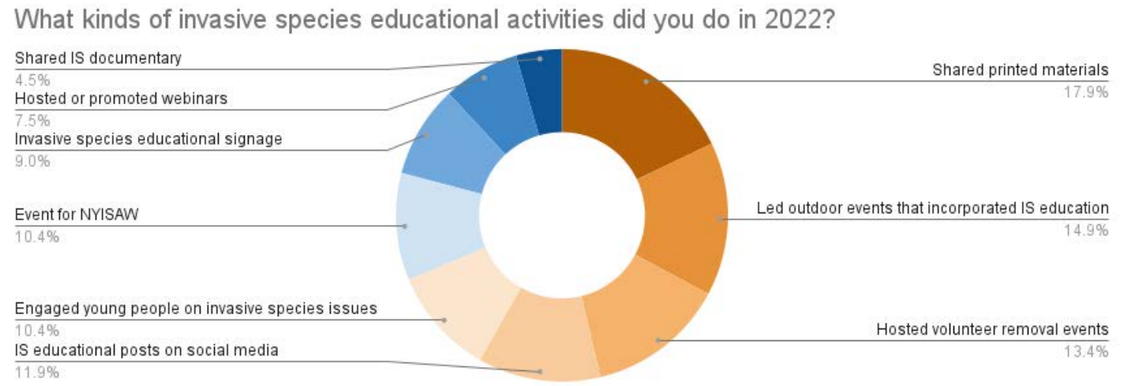
Bioblitz: Co-hosted for the second year in a row with the Long Island Sound Study, South Shore Estuary Reserve, Seatuck, NY Sea Grant, and Peconic Estuary Partnership, this event had 27 participants with over 1400 observations of over 600 species.

Melody Penny and Maggie Muzante (LINPI) at the Farmingdale State College Plant Sale. (and Tom DeMayo of NYS Ag and Markets in the long horned beetle suit)

Video: LIISMA is proud of the custom animated NYISAW promotional video by Jackie Briggs, in collaboration with the PRISM education and outreach committee. This video, focusing on NYISAW in general and spotted lanternfly in particular, received 190 views.

Social media: Nine social media posts across Facebook, Instagram, and Instagram stories reached a total of 1761 people

NYISAW Events: 12 events, 11 of which were in-person, were hosted by LIISMA or partners in the region. These events attracted 104 attendees total.



How LIISMA partners educated each other about invasive species in 2022.

Media Appearances

LIISMA had two media appearances in 2022. In April, Abby and Melody were interviewed by Fire Island News while helping Seatuck control phragmites at West Brook with volunteers for Earth Day.

In June, LIISMA assisted with a water chestnut pull for NYISAW at Wantagh Mill Pond, organized by DEC Region 1 Fisheries. Abby is pictured in a kayak on the right in this article from the Long Island Herald.

Measuring Success

Measuring the success of invasive species efforts has been a long continuing conversation, both at the state level through the PRISM Education and Outreach Committee, and within LIISMA itself. One of the ways LIISMA has gauged invasive species awareness in 2022 is using online quizzes. Installed by Cara Fernandes in August, the quizzes "How Invasive Aware Are You?" and "What Invasive Species is This?" are a fun way for adults and students to test their knowledge within the LIISMA website.

Action Icons

LIISMA encourages the public to take action when it comes to invasive species. This starts with mapping or reporting invasive species, making smart shopping choices to choose native plants over non-native or invasive plants, managing invasive species that exist on your property, and lastly preventing the spread of invasive species by cleaning your gear.

Providing Tools and Avenues for Involvement

To help foster invasive species-aware actions among the public, LIISMA provides tools, resources, and ways people can get involved. In 2022, LIISMA worked with partners to develop identification resources, an educational sign and boot brush station, new factsheets, and engaged with students and teachers – all working to build a community around a shared mission.

As LIISMA followed up on detections of saltcedar in various shoreline locations in Suffolk County, the staff identified a need for up-to-date, shareable information about this species. Cara and Jackie developed a factsheet as a communication tool for LIISMA and its partners.

LIISMA worked with the Long Island Metro Aquatic Invasive Species Task Force to develop a 33-page guide of marine invasive identification cards, both digitally and in print, to assist marine staff and members of the public in surveying. Some of these species include mitten crab, sea potato, and lightbulb sea squirt, among others. This group has prioritized such species, grouping them by ones that are already highly abundant, the ones expected to become more abundant with climate change, and lastly, ones that are in low abundance and high importance for monitoring. This project is the first step to enable prevention, education, monitoring, and early detection and rapid response for marine invasive species.

LIISMA is pleased to assist teachers and students who reach out for invasive species resources. In January, LIISMA met with students at Northport Middle School who were doing a project on public policy related to spotted lanternfly, and answered their classroom interview questions. In April, LIISMA staff additionally met with Columbia University graduate students in support of their class project on red eared sliders (*Trachemys scripta elegans*) and invasive species management. Later in May, LIISMA staff developed a program with Baldwin Middle School teachers on invasive species mapping in coastal ecosystems. Beginning with a virtual training for 55 sixth grade students, followed by a field day at the Marine Nature Study Area in Oceanside, the event included mapping invasive species with iMap, mind-mapping drawing activity, and conducting interviews with LIISMA and MNSA staff. Haley led a lively game of "Oh Deer!", illustrating population dynamics between deer, wolves, and resources, back at Baldwin Middle School to finish off the day.

Students of Baldwin Middle School learning at the Marine Nature Study Area.

Staff Training

LIISMA staff have been eager to learn about new topics throughout the year to enhance their effectiveness in each role.

January

NEAPMS Virtual Conference, Abby attended.

RISCC Symposium, Abby and Haley attended.

iMMA Updates Meeting and Training, Abby and Haley attended.

February

Oh Deer! How Deer Shape Forests in the Catskills & Beyond, Abby and Haley attended.

March

Organisms in Trade Symposium, hosted by Steve Pearson, Cathy McGlynn, and others, focusing on engaging with the public on adopting behaviors, the illegal pet trade and enforcement, inspections relating to AIS, alternatives to life releases, and more. Abby and Haley attended.

Sedge Identification: Abby and Haley viewed.

April

A Biocultural Approach to Integrating Indigenous Knowledge with Western Science for Invasive Species Management and Policy, hosted by NAISMA. Abby attended.

Threatened and Endangered Species Training hosted by FWS and DEC, focusing on piping plover monitoring and other species (least tern, black skimmer, roseate tern, American oystercatcher, herons, and rare plant seabeach amaranth), Abby, Haley, and Melody attended.

May

iMMA Data Review Training. Abby, Haley, and Melody attended.

LIMAIS Advanced iMap Training. Abby, Melody, Haley, and Bill attended.

June

Abby and Haley obtained certification in Wetland Delineation through Rutgers, completing three courses in Wetland Plant Identification, Hydric Soils, and Wetland Field Delineation, and passing the final exam.

November

Connecticut Invasive Plant Working Group Virtual Symposium. Abby and Melody attended.

Cornell Cooperative Extension In-Service in Ithaca. Abby attended.

December

NAISMA Biocontrol Summit. Abby and Melody attended

Appendix

The following tables summarize data submitted to iMapInvasives in the LIISMA Region in 2022, courtesy of the iMapInvasives Team.

Species that are confirmed and new to county- PRISM
Date range: 12/4/2021-12/9/2022

LIISMA	
Species Name	**County of Report**
Banded Mysterysnail	Kings
Beech leaf disease nematode	Kings
Yellow Iris	Kings
Longhorn Tick	Nassau
Chinese Longhorned Beetle	Nassau
Giant Reed	Nassau
Narrowleaf Cattail	Nassau
Beech leaf disease nematode	Queens
Chinese Yam	Queens
Longhorn Tick	Richmond
Beech leaf disease nematode	Richmond
Yellow Iris	Richmond
Leafy Spurge	Suffolk
Himalayan-berry	Suffolk
Japanese Tree Lilac	Suffolk
European Rock Shrimp	Suffolk

Number of Unique Species Reported (presence data only)
Date range: 12/4/2021-12/9/2022

	Statewide	LIISMA
Number of Species Reported	240	103

Summary Numbers: Presence and Not-Detected Records by Data Entry Method
Date Range: 12/4/2021-12/9/2022
Confirmed and Unconfirmed Presence Records

	Presence					Not Detected				
	Online	Mobile App	Bulk Upload	NS Survey123	Custom Jurisdiction Apps	Online	Mobile App	Bulk Upload	NS Survey123	Custom Jurisdiction Apps
Statewide	2,258	8,601	11,203	2,049	9,239	1,424	11,863	3,003	58	2,792
LIISMA	271	201	546	67	250	26	39	12	4	227

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Top Ten Species Reported: Presence (confirmed and unconfirmed), Not-Detected, Treatment
Date range: 12/4/2021 to 12/9/2022

Presence Detected	Statewide		LIISMA	
1	Eurasian Water-milfoil	5,343	Asian Shore Crab	106
2	Curly Pondweed	2,227	Green Crab	86
3	Starry Stonewort	1,799	Japanese Honeysuckle	71
4	Water Chestnut	1,484	Oriental Bittersweet	62
5	Common Carp	1,325	Multiflora Rose	58
6	European Common Reed	1,157	Carolina Fanwort	53
7	Sea Lamprey	973	Common Wormwood	47
8	Japanese Knotweed	862	Border Privet	46
9	Carolina Fanwort	812	European Common Reed	44
10	Broadleaf Water-milfoil	757	Mile-a-minute-weed	43

Not-Detected	Statewide		LIISMA	
1	Garlic Mustard	873	Beech leaf disease nematode	13
2	Hydrilla	759	Spotted Lanternfly	13
3	European Common Reed	734	European Common Reed	11
4	Beech leaf disease nematod	519	Floating Seedbox	10
5	Longhorn Tick	347	Longhorn Tick	10
6	Hemlock Woolly Adelgid	323	Common Frogbit	9
7	Spotted Lanternfly	265	Common Water-hyacinth	9
8	Japanese Knotweed	256	Curly Pondweed	9
9	Carolina Fanwort	252	Hydrilla	9
10	Common Water-hyacinth	200	Parrot Feather Water-Milfoil	9

Treatment	Statewide		LIISMA	
1	Japanese Knotweed	151	Common Reed	9
2	Water Chestnut	140	Water Chestnut	6
3	Garlic Mustard	80	Floating Seedbox	2
4	Sticky Sage	42	European Swallow-wort	1
5	Japanese Barberry	41	Holly Osmanthus	1
6	Common Reed	39		
7	Japanese Stiltgrass	37		
8	Scotch Broom	25		
9	Castor-Aralia	24		
10	Tree-of-Heaven	23		

Reason for Not Detecting
Date Range: 12/4/2022-12/09/2022

	Statewide	LIISMA
Presumed eliminated due to treatment	1,801	6
Habitat No Longer Exists	6	0
Low Detectability (wrong timing, season, low abundance, etc.)	23	0
Species has never been detected here previously	1,075	18
Not defined	18,046	285

Summary Numbers: Presence, Not-Detected, Searched Areas, Acres of Searched Areas by PRISM
Date range: 12/4/2021-12/9/2022

	Presence		Not-Detected Records	Searched Areas	Acres of Searched Areas
	Confirmed	Unconfirmed			
Statewide	27,731	2,076	20,867	24,750	101,075
LIISMA	1,140	63	309	347	3,384

The acres of searched area field is a calculation from GIS.

Top Ten organizations submitting Presence and Not-Detected Records
Date range: 12/1/2021-12/9/2022
** Confirmed and Unconfirmed

	Statewide				LIISMA	
	Organization name	Total Records	Presence**	Not-Detected	Organization name	Total Records
1	Adirondack Park Invasive Plant Program (APIPP)	6,107	3,449	2,658	Long Island Invasive Species Management Area (LIISMA)	779
2	Finger Lakes Institute (FLI)	5,651	5,152	499	New York State Department of Environmental Conservation (NYSDEC)	295
3	New York State Department of Environmental Conservation (NYSDEC) (NY)	5,593	4,797	796	New York Natural Heritage Program (NYNHP) - NY	245
4	United States Geological Survey (USGS) - Nonindigenous Aquatic Species (NAS) (NY)	4,391	4,391	0	United States Geological Survey (USGS) - Nonindigenous Aquatic Species (NAS) (NY)	161
5	Adirondack Research LLC	2,443	472	1,971	New York State Office of Parks Recreation and Historic Preservation (NYS OPRHP)	148
6	Capital Region PRISM (CRP)	1971	1760	211	New York State Integrated Pest Management (IPM) Program (Cornell)	17
7	New York State Office of Parks Recreation and Historic Preservation (NYS OPRHP)	1,690	1,139	551	Town of Southampton	9
8	Greenburgh Nature Center	1,645	1,644	1	Pine Barrens Commission	7
9	Lower Hudson (LH) PRISM	1,385	888	497	No Organization Affiliation (NY)	5

2022 LIISMA Partners

1. Avalon Park and Preserve
2. Baldwin Middle School
3. Brentwood Public Library
4. Brookhaven National Lab
5. Brooklyn Bridge Park
6. Cornell Cooperative Extension of Suffolk County
7. Cornell Cooperative Extension of Nassau County
8. Dropseed Native Landscapes
9. Central Pine Barrens Commission
10. Cornell University
11. Cotton-Hanlon, Inc.
12. Ecosystem Planning and Restoration
13. Farmingdale State College
14. Friends of Flax Pond
15. Friends of Hempstead Plains
16. GEI Consultants
17. Henry L. Ferguson Museum Land Trust
18. Locust Grove Estate
19. Long Island Botanical Society
20. Long Island Native Plant Initiative
21. Long Island Sound Study
22. Nassau County Community College
23. National Park Service
24. Native Plant Trust
25. Natural Areas Conservancy
26. NE RISCC
27. Nelson Pope Voorhis
28. New York City Department of Parks
29. Northport High School
30. North Shore Audubon Society
31. North Shore Land Alliance
32. North Shore Wildlife Sanctuary
33. New York City Department of Environmental Protection (NYCDEP)
34. New York Invasive Species Research Institute (NYISRI)
35. New York State Office of Parks, Recreation, and Historic Preservation (NYS OPRHP)

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36. New York Natural Heritage Program (NYNHP)
37. New York State Department of Agriculture and Markets (NYSAGM)
38. New York State Department of Environmental Conservation (NYSDEC)
39. New York State Department of Transportation (NYSDOT)
40. Peconic Estuary Partnership
41. Peconic Land Trust
42. Pennsylvania Department of Conservation of Natural Resources (DCNR)
43. Prospect Park Alliance
44. Quogue Wildlife Refuge
45. Residents Forward
46. Rutgers University
47. Saint Kateri Conservation Center
48. St. Lawrence University
49. Seatuck Environmental Association
50. Sierra Club Long Island
51. Sisters of Saint Joseph
52. Suffolk County Parks,Recreation and Historic Preservation
53. Suffolk County Water Authority
54. Suffolk County Vector Control
55. SUNY Stony Brook
56. U.S. Fish and Wildlife Service
57. U.S. Forest Service
58. The Nature Conservancy
59. Third House Nature Center
60. Town of Brookhaven
61. Town of Hempstead
62. Town of Huntington
63. Town of East Hampton
64. Town of Southampton
65. Three Village Community Trust
66. United States Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS)
67. Vermont Department of Forests, Parks and Recreation
68. Village of Mamaroneck
69. Woodwell Climate Research Center