

# Invasive Species Strategic Plan 2012-2015

Developed by  
The New York Natural Heritage Program  
in Cooperation with  
the Partners of the  
Long Island Invasive Species  
Management Area



Protecting Our Resources From Invasive Species

# Acknowledgements

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**Photo credits - all photos by Stephen Young except where noted**

**Fox pups, Southampton**

**Montauk Lighthouse**

**Orange Fringed Orchid, East Hampton**

**Linus Pond coastal plain pond, Riverhead**

**Post oak-blackjack oak barrens, Staten Island**

**Saltmarsh, Shelter Island**

**Gateway National Recreation Area, Brooklyn - Photo Gateway NRA**

**Fowler Farms nursery, Southampton – Photo JakeRajs.com**

**Maritime grassland, Southampton**

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# I. Introduction

## A. PRISM Strategic Plan Framework

Thousands of non-native plants and animals have taken hold in New York State in the 400 years since Henry Hudson sailed the Halfmoon up his namesake river. In the centuries before Hudson's exploration, Native American tribes traded and cultivated non-native species such as maize and squash, likely introducing invasive species (IS). While most non-native species are benign or beneficial, perhaps 10 - 15% threaten our environment, agriculture, and health. Invasive species, defined as non-native species that cause significant harm to humans or the environment, are a biological pollution. Invasive species invasions are rapidly increasing due to our global trade and travel. Recent arrivals include sirenix wood wasp, Chinese mitten crab, snakehead fish, and Asian long-horned beetle. Other invasive species are rapidly approaching. Invasive species arrive without their native predators and diseases to control their populations. Biological pollution also includes non-native pathogens such as West Nile virus which has sickened and killed humans and birds and hemorrhagic septicemia virus (VHS) which has killed tens of thousands of fish in NY and other Great Lakes states. Our native species often lack resistance to non-native pathogens and can be rapidly decimated.

Much of the work to track, prevent, eradicate, and control IS invasions falls to the individual states. New York State is addressing this issue on many fronts. Recognizing the growing problem, NYS established an Invasive Species Task Force (ISTF), a multi-stakeholder team of NYS agencies and conservation and trade organizations co-lead by New York State Departments of Environmental Conservation (DEC) and Agriculture and Markets (DAM) (Chapter 324 of the *Laws of New York, 2003*) to explore IS issues and provide recommendations to the governor and legislature by November, 2005. The ISTF report made 12 key recommendations intended to position New York State to effectively address invasive species.

Among the ISTF recommendations was to establish a permanent leadership structure to coordinate with federal, state, and local programs to address the gaps in regulatory and administrative authorities; avoid duplication of efforts; develop integrated and consensus-based program priorities; and identify funding and research needs. The New York Invasive Species Council (NYISC) and NY IS Advisory Committee were since established (Chapter 26 of the *Laws of New York, 2008*) and DEC formed the Office of Invasive Species Coordination in December, 2007 to support and coordinate with these bodies to implement ISTF recommendations.

The ISTF envisioned regional private-public partnerships to strategically deliver core IS management functions including coordinating partners, engaging and training volunteers, educating citizens, establishing early detection and rapid response networks and conducting on-the-ground eradication and control efforts. Eight such Partnerships for Regional Invasive Species Management ([PRISM](#)) are – or will be – formed across NYS.

## B. LIISMA PRISM Description

### 1. Geographic Region

The work of the Long Island Invasive Species Management Area (LIISMA) covers the New York coastal islands of Staten Island and the entire length of Long Island from the New York City counties of Kings (Brooklyn) and Queens east through Nassau County and Suffolk County, including many smaller islands.

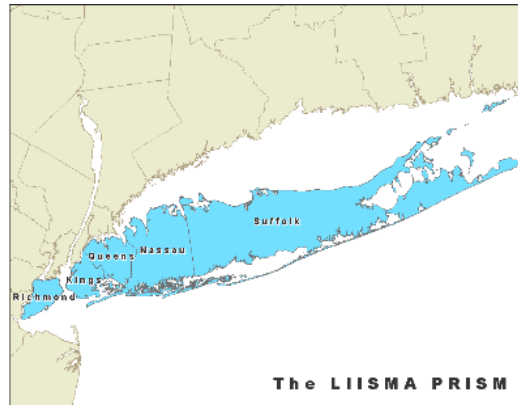


Figure 1. Map of the Counties in the LIISMA PRISM

Table 1. LIISMA PRISM - Population by County - U. S. Census Bureau 2010

Richmond	468,730
Kings	2,504,700
Queens	2,230,722
Nassau	1,339,532
Suffolk	1,493,350
<b>Total</b>	<b>8,037,034</b>

Table 2. LIISMA PRISM - Size and Population of Major Islands

Island Name	Area in Square Miles	Population 2010 Census
Staten Island	59	468,730
Long Island	1401	7,613,385
Long Beach Island	5.1	41,331
Jones Beach Island	8.3	333
Fire Island	8.7	292
Westhampton Island	3.3	< 500
Robins Island	0.68	< 5
Shelter Island	12.5	2392
Gardiners Island	5.2	< 20
Plum Island	1.3	350 daytime only
Fishers Island	4.1	236

The islands of the LIISMA PRISM span 1,510 square miles and include Long Island, Staten Island, and additional smaller islands to the south and east of Long Island and around Staten Island (Table 2). Long Island is the largest island in the continental United States. True to its name, the island is much longer than it is wide, jutting out some 118 miles (190 km) from New York Harbor, with only from 12 to 20 miles (32 km) between the southern Atlantic coast and Long Island Sound (Figure 1).

The natural landscape of LIISMA was formed at the end of the last ice age when the melting glacier formed huge moraines that make up the islands. The Harbor Hill moraine now makes up the north shore of Long Island and the Ronkonkoma moraine spans the middle of the island. Another moraine formed to the west to create the central portion of Staten Island. These moraines gave rise to a wide variety of landforms and soil types from the deeper, richer soils of the moraines to the sandier, poorer, outwash sands south of the moraines. A series of low hills, kettle ponds and lakes, barrier islands, and salt marshes were also formed. The northern part of Staten Island is composed of serpentine bedrock and bedrock from the Triassic Stockton formation, the Jurassic Palisades sill, and the Triassic Brunswick formation. Todt Hill on Staten Island, at 410 feet, is the highest point in the five boroughs of New York City as well as the highest point on the Atlantic coastal plain south of Great Blue Hill in Massachusetts. Janes Hill on Long Island is slightly lower at 400 feet. These landforms resulted in a wide variety of ecological communities that support an incredible array of plants and animals, including many rare species that are found nowhere else in New York. For example, 87 ecological communities have been documented on Long Island by the New York Natural Heritage Program, which comprise 50 percent of all the ecological communities known in the state. There are six rare communities on Staten Island, two of which occur nowhere else in the state. There are examples in the PRISM from all of the major community systems including marine, estuarine, riverine, lacustrine, palustrine, and terrestrial systems.

## **2. Remaining Open Space**

Human pressures and development in these ecosystems began early as New York City grew and people moved east onto Long Island and south onto Staten Island. The new system of roads, bridges, and parkways facilitated migration, settlement, farming, and the introduction of exotic species. Intense pressure began after World War II as large suburbs were created on the western end of Long Island. Nassau County was the fastest-growing county in the United States from the 1950s to the 1970s. The island is now home to more than 7.5 million residents, making it the most populous island in any U.S. state or territory, and the 17th most populous island in the world, having a larger population than the Japanese island of Hokkaido and the countries of Ireland and Jamaica. Many of the large natural areas on the western end of the island have been developed but small open spaces remain in parks and along the shorelines. Larger natural areas have been preserved and are being managed on the eastern half of Long Island in large state, county, town, and federal preserves and management areas and private preserves. Large stretches of barrier beach along the south shore have been preserved in Gateway National Recreation Area and Fire Island National Seashore. Staten Island has hundreds of acres of open space consisting of federal, state, and city park land including the Greenbelt and the Bluebelt park systems. The Gateway National Recreation Area has five parcels of land on the island. There are two state

parks, two parks managed by the NYS Department of Environmental Conservation, and 156 parcels in New York City parks. These natural areas provide many benefits to humans and nature alike including groundwater recharge, flood control, recreation and nature study, wild foods, forest products, habitats for native plants and animals, carbon sequestration and climate regulation, purification of water and air, crop pollination, nutrient dispersal and cycling, and solace from the human-made world around them.

Agricultural land within LIISMA comprises over 35,000 acres of land within 665 farms and is centered in Suffolk County. Suffolk County is the leading county in New York in wholesale dollar value of local agricultural products according to the New York State Comptroller's Office 2012 report. Agricultural open space provides wildlife habitat and protection against urban sprawl and maintains the rural character of the eastern end of Long Island.

### **3. The History of the LIISMA PRISM**

In 2001 a group of Long Island's major conservation land managers formed a steering committee to establish the Long Island Weed Management Area (LIWMA). Founding committee members included representatives from more than 15 federal, state, and county government agencies and private conservation organizations. LIWMA was funded by The Nature Conservancy's Long Island Chapter and its first coordinator was Bill Jacobs. In 2003 Kathy Schwager became the coordinator and in 2006 the name was changed from LIWMA to LIISMA to better reflect its mission of addressing all invasive species. In 2010 the organization was transferred to The New York Natural Heritage Program, a different Nature Conservancy program, when The Nature Conservancy on Long Island decided to focus only on invasive species prevention and not engage in control activities. Steve Young, the Heritage Program's chief botanist, became the interim coordinator. In July 2012 the sponsorship of the Natural Heritage Program, along with LIISMA, was transferred from The Nature Conservancy to the SUNY College of Environmental Science and Forestry. It is the intent of the Natural Heritage Program to find another organization on Long Island to take over the coordination of LIISMA.

### **4. Partners**

The Long Island Invasive Species Management Area is a voluntary association of public and private land managers working together to prevent the spread of invasive species.

We bring together representatives from more than 50 federal, state, and county government agencies, private conservation organizations, industry and businesses to discuss, share and learn from each other the latest invasives strategies and issues. Below is a list of partners that have interacted with LIISMA.



## **Local Organizations That Act Locally**

### Local Towns and Cities

- City of New York Parks and Recreation
- Town of Brookhaven
- Town of East Hampton
- Town of Hempstead
- Town of Oyster Bay
- Town of Southampton

### Counties

- Nassau County Parks
- Suffolk County Parks
- Suffolk County Soil and Water Conservation District

### Nature Centers and Local Environmental Groups

- Eastern Long Island Audubon Society
- Friends of Hempstead Plains
- Friends of Long Pond Greenbelt
- North Shore Land Alliance
- Peconic Estuary Program
- Prospect Park Alliance
- Staten Island Greenbelt

## **Organizations That Act Locally or Across the PRISM**

### Universities

- Columbia University
- Cornell University
- Hofstra University
- Long Island University
- Queens College
- Rutgers University
- SUNY Stony Brook

### Botanical Gardens

- Brooklyn Botanic Gardens
- Planting Fields Arboretum State Historic Park

### Private Environmental Consultants

- GEI Consultants
- Nelson, Pope, and Voorhis

### Other Organizations

- Adirondack Mountain Club Long Island
- Hiking Long Island
- Long Island Botanical Society
- Long Island Farm Bureau
- Long Island Native Plant Initiative
- Quality Parks
- The Nature Conservancy Long Island Chapter



## **New York State Agencies and Organizations That Act Across the PRISM**

Audubon New York  
Cornell Corporate Extension  
Long Island Central Pine Barrens Commission  
Long Island Sound Study  
Office of Invasive Species Coordination  
New York Flora Association  
New York Invasive Species Council and Advisory Committee  
New York Natural Heritage Program  
New York State Ag and Markets  
New York State DEC  
New York State DOT  
New York State Invasive Species Clearinghouse  
New York State Office of Parks, Recreation, and Historical Preservation

## **National Agencies and Organizations That Act Locally Or Across The PRISM**

National Park Service  
National Sea Grant  
US Department of Energy (Brookhaven National Lab)  
US Department of Agriculture - APHIS  
US Environmental Protection Agency  
US Fish and Wildlife Service

## **Green Industry and Nurseries**

Glover Perennials  
Half Hollow Nursery  
Hicks Nursery  
Ireland Gannon Association  
Long Island Flower Growers Association  
Long Island Nursery and Landscape Association  
Marders Nursery  
Nassau Suffolk Landscape Gardeners Association  
New Leaf Landscape Maintenance  
Pinewood Perennials  
Plant Connection Inc.  
SustainableBusiness.com

## II. LIISMA PRISM MISSION

Our mission is to conserve biodiversity, wildlife habitat, recreation resources, scenic quality, and crop production, while protecting human health and safety, by facilitating cooperation and coordination among land managers and owners to reduce the threat of invasive species.

## III. LIISMA PRISM VISION

Within three years LIISMA will have the capacity to serve as the coordinator and facilitator for cooperative invasive species management and address all invasive species issues within the PRISM. Partners will have the tools to prevent new invasions from affecting the PRISM's rich natural heritage, including parks, nature preserves, wildlife refuges, waterways, and farmland. Invaded areas will be managed for maximum benefit to agricultural, horticultural, native ecosystems, and biodiversity. Public awareness and participation will be increased to a level where most interested residents understand the issues.

## IV. OVERVIEW OF THE THREAT

The New York State Invasive Species Task Force defines an invasive species as a species 1) nonnative to the ecosystem under consideration, and; 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health. In the latter case, the harm must significantly outweigh any benefits.

Invasive species are one of the most serious and pervasive threats to native species and ecosystems in the PRISM. Invasive species spread into natural areas and out-compete or damage native species, often leading to the local elimination of native plants and the wildlife that depend on them. In addition to displacing native plants and wildlife, invasive species disrupt ecosystem patterns and processes, such as food webs, hydrology, nutrient cycling, frequency and intensity of wildfires, natural succession, and soil erosion. Every ecosystem in LIISMA is threatened by this biological invasion.

Invasive species interfere with outdoor recreation in parks, waterways, and other natural areas by crowding out the diverse blend of plants and wildlife that people come to see and enjoy. Aquatic invasives interfere with recreation, fishing, and commercial harvests in freshwater and marine systems. Some invasives, like giant hogweed, even pose a public health risk by causing photo dermatitis and even blindness if the sap gets into the eyes. On farmland, weeds reduce crop yields and interfere with harvest operations. Invasive species may affect the efficiency of green infrastructure for flood control in areas like the Blue Belt of Staten Island. Along public roads and highways, invasive trees, shrubs, and vines restrict visibility and create dangerous roadside hazards.

By reducing biological diversity, diminishing ecosystem resources, posing public health risks, and burdening agriculture, tourism, fisheries, and outdoor recreation industries, invasive species are inflicting serious economic damage. In response, land managers spend significant amounts of time and money to control these invaders. However, the most significant and long-lasting damage is too often overlooked or unaccounted for – that of diminished ecosystem benefits to humans. The benefits provided by ecosystems, such as clean water, flood control, shelter, medicine, and food, ultimately sustain human life.

The threat of invasive species can be reduced significantly, but will be with us in various forms forever. Some of the negative impacts of invasive species are likely to be permanent. This is a condition to be managed, not a one-time problem to be overcome and forgotten. Land managers face a serious long-term challenge to develop and conduct effective programs to prevent new invasions and manage invaded ecosystems.

## V. UNDERLYING CAUSES AND PATHWAYS

The causes of our invasive species problems are many but ultimately they can almost always be attributed to humans. Exotic species just doing what they do best and have no intrinsic evil intent. They did not ask to be moved to new locations but efficiently exploit new pathways and locations that are made available to them. Exotic species enter the islands through many pathways on many different vectors. For example, globalization has resulted in greater **trade, transport, travel, and tourism**, all of which can facilitate the introduction and spread of species that are not native to Long Island. Good examples are the introduction of invasive animals and plants by the pet trade and by the sale of exotic foods. We have **world travelers and commodities** arriving in large numbers in the New York City area, one of the largest ports of entry in the country. Every day these ships, planes, and travelers provide new opportunities to introduce new species, and our huge infrastructure of **roads, trails, rights-of-way, and pathways** facilitate their spread. **Recreational fishing** and the movement of bait and watercraft among waterways is a common means of spreading aquatic invaders. **Other recreational activities** that involve movement of people and vehicles among natural areas can transport invasive species to new locations and provide the disturbance for their establishment. **Soil transport** involved in the ever-present infrastructure development and maintenance transports invasive plant propagules within the PRISM and to other parts of the region. Even though efforts have been made to restrict the **sale and transport of invasive horticultural species**, our major pathway, many of them are still available online or brought in from other states. A list of banned species may be found at:

[http://www.nyis.info/index.php?action=liisma\\_pages&page=legislation](http://www.nyis.info/index.php?action=liisma_pages&page=legislation). Nursery stock may also be the inadvertent transport mechanism for invasive insects and fungi.

Once on the islands, new exotic species can become invasive because our **natural areas are already stressed and in declining health** caused by increased herbivory, nutrient loading, fragmentation, past disturbance, climate change, and their small size. Changes in land use and poor land management open the door to the biological invasions. A **lack of public education** about invasive species prevents new discoveries from being made or makes it harder to garner

support for needed programs. There are often **insufficient funds and personnel** to tackle the invasions once they have begun and control efforts are difficult over land with many owners. All of these causes have been or must be addressed in order to have any effect in controlling invasive species that threaten the precious natural areas, farmlands, and open space of LIISMA and the human and natural benefits they provide.

## VI. GOALS, OBJECTIVES AND STRATEGIES

This framework of goals, objectives, and strategies is an update from strategic plans that have been written by LIISMA in the past. Here, it is written in a logic model outline format developed by the Department of Environmental Conservation and Cornell Cooperative Extension. Goals, objectives, and strategies are similar to ones developed in other PRISMs since many of the issues are the same but there is also information specific to LIISMA as our programs and projects are sometimes different.

### **Goal 1. Gather New Information**

A successful invasive species program depends upon complete and accurate information in order to make the best decisions and prioritize work.

**OBJECTIVE:** by July 2015 20 of our partners will have a staff member who participates in the iMAP Invasives program (an all-taxa New York invasive species mapping database). They will be able to map invasive species observations, surveys, and assessments and enter treatment information.

**Strategies:** Encourage all partners and organizations involved in invasive species to use iMAP. Provide iMAP training to partners on a regular basis. Require partners to use iMAP in projects funded by LIISMA. Provide incentives for partners to put information into iMAP.

**Outputs:** Requirements to use iMAP in all funded projects will be included in requests for proposals. Two iMAP training workshops will be conducted each year. Partners that enter data into iMAP will be highlighted and publicized in a fun manner. Competitions will be created to enter the most data into iMAP.

**Outcomes:** It will provide increased knowledge of the distribution of invasive species in LIISMA to aid the work of the Scientific Review Committee. It will help refine Early Detection and Rapid Response (EDRR) lists. It will provide information for successful planning and management. It will increase public understanding and support for the program. It will help understand the ecology and demography of invasive species.

**OBJECTIVE: by July 2015 identify and help fund new prevention, management, disposal, monitoring, and restoration techniques including native plant harvesting and propagation and the use of remote sensing and modeling.**

**Strategies:** The research committee will suggest appropriate research needed, prioritize projects, and review project proposals. They will keep track of projects underway or completed and post them to the website.

If funds are available, fund at least one research proposal per year.

**Outputs:** A prioritized list of research projects will be produced, delivered to the OISC for consideration by the NY Invasive Species Council for funding, and posted on the LIISMA website.

One citizen science project to support academic research will be funded.

**Outcomes:** Research projects will be prioritized.

It will be easier for researchers to know what projects they should propose and work on.

New information and techniques will be available for invasive species projects.

**OBJECTIVE: by April 2013 perform a preliminary review of all low-abundance exotic species present in the PRISM to decide which ones should be field surveyed and assessed for invasiveness. Produce an early detection species list for LIISMA.**

**Strategies:** Form a subcommittee to review the species.

Develop criteria for selecting species for further review by the SRC.

Review all species in the list.

Provides a list to the SRC for further ranking.

Compile a list of early detection species present in LIISMA.

**Outputs:** A set of criteria is developed to select species.

A list of species to rank is finalized.

An early detection list.

**Outcomes:** All species that might become invasive are selected so they can be ranked by the SRC.

Potential invasive species will be prevented from becoming a problem in the future.

**OBJECTIVE: by April 2013 update the list of species that are approaching the region.**

**Strategies:** Check IMAP and information from surrounding states to refine the list.

Update the list and post on the LIISMA website.

Put alerts up on the website for each species.

**Outputs:** An updated list of species approaching the region will be available to the public.

Information about the species are posted on the website.

**Outcomes:** Information about potential invaders is more readily available.  
People can search for them in the field with better information.  
Early detection and eradication is more feasible.

**OBJECTIVE: by July 2014 map all 45 common invasive species that have not yet been mapped as extant in LIISMA.**

**Strategies:** Publicize species to be mapped and keep track of people who agree to map them.  
Reward mappers when the goal is achieved for the species they are mapping.

**Outputs:** At least 5 observations are mapped for each species.

**Outcomes:** The LIISMA list of approaching species will be more accurate since it will not include species already on Long Island.

The maps will reflect a more accurate distribution of common invasives.  
Effort will not be expended searching for approaching species that are already here.

**OBJECTIVE: by July 2013 test the National Invasive Species Forecasting System (a modeling project devised by NASA) to select high probability areas to survey select terrestrial invasive plants. Develop a list of sites to survey.**

**Strategies:** Use the National Invasive Species Forecasting System to test selected species.  
Evaluate the output and see if it is useful.  
Develop a list of sites to field check for selected species.

**Outputs:** A map of sites to survey is produced.

**Outcomes:** These maps will allow land managers to protect areas that are potentially subject to invasion.

It will greatly improve our effectiveness in surveying for species approaching the region.  
It will result in cost-effective eradication.

**OBJECTIVE: by July 2015 surveys are done for at least 5 approaching species per year using the National Invasive Species Forecasting System and a system of high probability areas to search.**

**Strategies:** Use the maps produced by the forecasting system to prioritize sites to survey.  
Use paid and volunteer surveyors to look for approaching species.  
Enter survey information into IMAP.

**Outputs:** Surveys take place at priority sites that have a high probability of finding the species.  
Data on surveys entered into IMAP.

Volunteers are educated about approaching species.  
A yearly report is written about the results of the surveys.



**Outcomes:** We will find out in the earliest possible time frame if approaching species are showing up in LIISMA.

Control efforts can take place at the low end of the invasion scale while populations are small.

New invasions can be prevented.

More surveys will be entered into IMAP.

The data models can be tested and refined.

**OBJECTIVE: by April 2013 produce a category list of invasive species present in the PRISM.**

**Strategies:** Continue to use biologists to research plant and animal invasiveness.

Give newly ranked state species a rank for LIISMA.

Write up a checklist to use to continue ranking species for LIISMA as personnel changes.

Publish new LIISMA rankings on the LIISMA website.

Finalize cultivar ranking system and forms.

Compile the information to produce a list of common, early detection and approaching region species.

**Outputs:** An prioritized and categorized list of species with invasive rankings is produced and posted on the website.

A Scientific Review Committee procedures checklist is written.

LIISMA rankings are updated on the website.

A finalized ranking system for cultivars is written.

**Outcomes:** Assigned rankings can be used to prioritize survey and control work.

Prioritization will protect targets from the most harmful species.

New exotic species found on Long Island are ranked quickly.

## **Goal 2. Share Partner Information and Resources**

We will establish lines of communication so everyone knows who is working on invasives, how they are managing them, and what they are restoring or protecting. Partners will be able to use this knowledge to collaborate on projects by sharing resources.

**OBJECTIVE: by July 2013 all partners will know what invasive projects are in progress, who is working on them, what management practices are being used, and what targets are being restored or protected.**

**Strategies:** Create a tab on the LIISMA website to display information in a spreadsheet.  
Provide for roundtable discussions at bimonthly meetings.  
Post projects on the list-serve as needed.  
Highlight selected projects on the website.

**Outputs:** A spreadsheet of projects is posted on the website.  
Six roundtable discussions occur each year.  
Ten project activities are posted on the list-serve.  
Six projects are highlighted on the website.

**Outcomes:** There is increased partner knowledge of what is happening in the PRISM.  
There is increased communication about projects.  
There is more efficient use of partner time.

**OBJECTIVE: by July 2013 all partners will be able to access past project information, reports, and studies from partners and other organizations.**

**Strategies:** Find out how to collaborate with the invasive species clearinghouse on information dissemination.  
If LIISMA needs to do it, find a person who will gather information and keep website up-to-date.  
Make a tab on the LIISMA website that archives and displays this material.

**Outputs:** The Invasive Species Clearinghouse is contacted and a discussion takes place about how information is to be stored and shared.  
A person is funded to keep the website up-to-date.  
A new tab and design is created on the LIISMA website.

**Outcome:** There is increased partner knowledge of how invasive species issues have been addressed by different organizations.  
There is decreased duplication of effort between LIISMA and the invasive species clearinghouse.

**OBJECTIVE: by July 2014 all partners will know the best management practices for each invasive species ranked high or very high and present in or threatening their locale.**

**Strategies:** Fund a project to assemble information for all high-ranked invasive species and post on the LIISMA website on the management page.

**Outputs:** Guides describing BMPs for all high-ranked species are created on the website.

**Outcomes:** There is less duplication of trial and error.  
There is more efficient use of resources.  
There is better and faster control of invasives.

**OBJECTIVE: by July 2015 partners will increase information sharing by recruiting new partners or reengaging former ones.**

**Strategies:** Write a plan for engagement and assign duties to partners.  
Invite prospective and former partners to LIISMA meetings and events.  
Visit preserves and attend public meetings of prospective and former partners to understand invasive issues.  
Offer funding and volunteers to prospective and former partners.

**Outputs:** The recruitment plan is written and duties assigned.  
Five prospective organizations are called and invited to LIISMA meetings and/or events.  
Ten preserves or facilities are visited by active partners.  
Ten public meetings are attended by active partners.

**Outcomes:** Increased collaboration among partners.  
Increased information sharing among partners.  
Increased work on invasive species by prospective organizations.

**OBJECTIVE: by July 2013 all partners will be aware of funding sources for invasive species projects.**

**Strategies:** LIISMA administration will gather and distribute all invasive species funding opportunities.

**Outputs:** All partners have received every funding opportunity that has been seen by LIISMA.

**Outcome:** More funding will be available for invasive species work.  
Partners will be more engaged in projects.  
Invasive species will be controlled better and faster.

**OBJECTIVE: by July 2015 our partner organizations and LIISMA will be able to share volunteers, equipment, and educational materials.**

**Strategies:** Partners will publicize volunteer projects so volunteers from other organizations can participate.

Partners will publicize educational events on the LIISMA listserv, Facebook, and Volunteer Match website so other partners can share exhibits and educational materials as well as volunteers to assist with events.

LIISMA and partners will use the term “Nature Protectors” to label volunteers who work on invasive species and publicize that name when calling on volunteers.

**Outputs:** The LIISMA listserv, Facebook, or Volunteer Match websites are used to publicize volunteer opportunities and volunteers are registered by LIISMA and names posted on the website under “Nature Protectors” tab.

The LIISMA listserv, bimonthly meetings, Facebook page, and website are used to publicize all invasive species events.

**Outcomes:** Organizations will have more opportunities to use volunteers and educational materials.

Volunteers will have an identity with a group that serves many organizations.

Volunteer coordination and work on invasives will be more efficient.

More properties with invasives can be addressed.

### **Goal 3. Prevent New Invasions**

The most efficient and cost-effective way to stop the damage caused by invasive species is to prevent them from becoming established in the first place. Prevention is the first line of defense and the highest priority in protecting lands and waters from degradation.

Prevention needs to occur at multiple spatial scales. Many potentially invasive species are not yet present in the PRISM and they must be stopped from accidentally or intentionally being introduced. Invasives that are already here must be prevented from spreading and invading Invasive Species Prevention Zones.

Prevention includes activities such as education and outreach, prediction of new invasions, and the exclusion of potential new invaders. Exclusion refers to all activities to stop invasive species from crossing the border of a region or site.

**OBJECTIVE: by July 2014 complete a pathways analysis for the PRISM and assign all key species of the approaching region, high and very high-ranked, and low-abundance species to the most important pathways.**

**Strategies:** Hire a person to write a pathways analysis using the National Invasive Species Council Guide.

Work with the SRC to assign species to pathways.

Post the analysis and species assessments on the LIISMA website.

**Outputs:** A pathways analysis is produced that assesses the most likely pathways of introduction for each species under consideration.

Selected key pathways are assigned one or more species.

**Outcomes:** The most important pathways are known for each priority species.

Surveys, education, and control efforts can be directed to the highest priority pathways and vectors.

**OBJECTIVE: support state and federal efforts to prevent the introduction of invasive species to LIISMA.**

**Strategies:** Encourage public agencies to incorporate invasive species awareness and training into plans and activities.

Coordinate with state and federal agencies to distribute information to prevent invasions and assist with prevention projects as needed and able.

**Outputs:** Prevention education and prevention projects are coordinated with LIISMA partners.

**Outcomes:** Prevention education and prevention projects are carried out faster and more efficiently with the help of LIISMA partners.

**OBJECTIVE: continually support Suffolk and Nassau counties' efforts to enforce the do-not-sell lists. Help produce the state 4-tier lists.**

**Strategies:** Help train County personnel to identify invasive species that are on the lists.  
Help counties keep their websites up-to-date.  
Review state prohibited lists of invasive species.

**Outputs:** Enforcement of do-not-sell lists is carried out by appropriate authorities.  
Accuracy of Long Island plants on state lists is reviewed by LIISMA before lists are published.

**Outcomes:** Banned plants are not sold in nurseries.  
The State lists contain no errors that might cause problems in the future.  
The public is more knowledgeable about regulated plants and there is less desire to buy them.

**OBJECTIVE: by July 2014 coordinate with other PRISMs and IMAP to develop a strong early-warning system to prevent new invasions.**

**Strategies:** Report new invasives at monthly calls and quarterly PRISM coordinator meetings.  
Set up alerts on IMAP.  
Forward information on new invasives to PRISM coordinators.  
Promptly map new invasive species close to other PRISMs so they will trigger alerts.

**Outputs:** Information is communicated among coordinators at least 12 times a year.  
Each coordinator will set up at least one alert.  
Coordinators make available all information about new species that have entered their PRISM.

**Outcomes:** New invasive species are mapped quickly.  
There will be better knowledge about distribution of new invasive species.  
There will be faster reaction times on prevention measures for new invasive species.  
More communication about new invasive species will take place among coordinators.

## **Goal 4. Rapidly Detect and Respond to New Invaders**

Early detection and rapid response (EDRR) can manage invasive species that have bypassed prevention programs. LIISMA EDRR efforts will emphasize regular surveillance, early detection, prompt assessment, and rapid to control new invaders (eradication, containment, exclusion or suppression).

Early detection involves activities to identify and report new or recently established populations. Rapid response includes all activities to assess, contain/exclude, eradicate or monitor an infestation of an invasive species. The first step in the process after assessment is to complete the Invasive Plant Management Decision Action Tree (IPMDAT) for each infestation to decide which response is appropriate. Containment/exclusion aims to prevent infestations of invasive species from spreading to uninfested areas. Eradication includes all activities to completely eliminate an invasive species or particular infestation from an area if it is the preferred action. Rapid response may also include quickly blocking pathways of invasion.

Early detection and eradication need to occur at multiple spatial scales. This includes detecting and eradicating invasions that are new to Long Island and new to Invasive Species Prevention Zones (ISPZs).

**OBJECTIVE: by July 2013 complete the EDRR checklist.**

**Strategies:** Use the OISC's Rapid Response Framework for Invasive Species and others to produce a checklist of responses to the detection of a new invasive species. Run different scenarios through the checklist to test it and revise as necessary. Communicate with OISC changes in the approach under consideration in reasons why the changes are being considered.

**Outputs:** A finalized checklist is produced.  
At least five new species are documented in the checklist.

**Outcomes:** There is better documentation of what has happened in the process of responding to any species.  
Responders can see if they have completed all the steps necessary to respond efficiently and completely.

**OBJECTIVE: by July 2015 continue to survey for low-abundance species.**

**Strategies:** Use the list of low-abundance species that has been compiled to prioritize species to survey.  
Hire a survey team before the field season starts.  
Enter the survey data into IMAP and publicize results.

**Outputs:** A list of species to control is produced.  
Recommendations for control are produced for each species.  
Surveys and observations are available in IMAP.  
A report is written about the work and posted on the LIISMA website.



**Outcomes:** More knowledge is gained about low-abundance species.  
Control work is prioritized.  
More information about low-abundance species is available in IMAP.  
Demographic and ecological information can be used by the SRC to assess species.

**OBJECTIVE: by July 2015 respond annually to the most serious PRISM infestations as prioritized by the low-abundance and approaching region surveys.**

**Strategies:** Using prevention survey data and subsequent early detections, fund a contractor to prioritize infestations to treat using invasive species rankings and the Whippet system (a novel tool for prioritizing invasive plant populations for regional eradication <http://www.ncbi.nlm.nih.gov/pubmed/20832930>).  
Before the field season starts, hire an organization that can treat the prioritized infestations.

**Outputs:** A prioritized infestation list will be produced each February preceding the treatment season.  
All sites are prioritized using the Whippet system.  
A request for proposals will be issued for a treatment team by March of the treatment season.  
Treatments of all prioritized infestations take place during the treatment window.

**Outcomes:** Early detection and eradication of new infestations minimizes ecological damage, saves significant time and money, and will be more successful than attempts to eradicate older expansive infestations.

**OBJECTIVE: by July 2015 provide rapid response funds to ISPZs and other organizations to respond to new infestations of high-priority for LIISMA and new infestations that threaten high-priority targets.**

**Strategies:** Preserves and prevention zones must have invasive species plans written and the IPMDAT completed for each plant species before proposals are submitted. Animal and insect infestations must go through a similar decision process depending upon the species.  
LIISMA will prioritize projects based on its priorities and upon proposals submitted by organizations.  
Using survey data from ISPZs and preserves, single or multi-year funds are provided to managing organizations to help eradicate new invasive species infestations.

**Outputs:** Invasive species plans and IPMDAT are completed for newly detected species.  
All prioritized invasive species infestations that have been designated for eradication by the IPMDAT are treated.

**Outcomes:** These significant natural areas are protected from new invasions and priority targets are preserved.

**OBJECTIVE:** by July 2014, develop recommendations for streamlining the permit process for managing invasive species.

**Strategies:** Work with the OISC and DEC permits staff to recommend regulatory enhancements that would speed up the permit process and lower the cost.  
Make sure projects include funds for the permitting process.

**Outputs:** A new permit process that makes control easier and faster.

**Outcomes:** A rapid response that is fast enough to control infestations effectively and safely.  
Less money and time is spent on the permit process and more on control.

## **Goal 5. Manage Established Infestations**

Once invasive species have become established it is critical to identify high-priority targets and other resources that need to be protected, and then to prioritize management actions including eradication, containment, exclusion or suppression using such tools as the invasive species decision tree, IPMDAT. We will help partners undertake management projects to preserve the integrity of agricultural, recreational, and natural ecosystems and maintain priority targets. When determining invasive species management goals, it is important to focus on protecting resource values, such as managing for a rare species or suite of species, rather than on merely eliminating invasive species. Appropriate management techniques should be applied.

**OBJECTIVE: by July 2014 complete the invasive species plans for all ISPZs.**

**Strategies:** Decide which ISPZ plans need updating or completion.

With the management committee produce a schedule for getting them done.

Decide which plan format to use.

Hire a facilitator that will help organizations complete their plans and the decision tree (IPM DAT).

**Outputs:** All ISPZs produce their plans and decision trees and post them on the LIISMA website.

**Outcomes:** Invasive species work will be prioritized for all ISPZs.

Prevention and control work will be more cost efficient.

New species will be prevented from gaining a foothold in the ISPZ.

**OBJECTIVE: by July 2015 fund priority projects to control established invasive species in ISPZs and other preserves to protect high-priority targets.**

**Strategies:** Solicit proposals for management projects, including eradication, containment, exclusion, and suppression, as well as cultural control (e.g. managing habitat to resist invasion), managing invasion pathways, education, and implementing best management practices.

Require the IPMDAT to be completed BEFORE a project is planned and submitted for funding.

Try to include a project using new techniques.

The management committee will prioritize and fund projects based upon their ability to protect high priority targets.

Encourage the use of volunteers and citizen science projects.

Require the use of best management practices when they are available.

**Outputs:** At least five projects are funded each year.

Reports are written about the projects and results posted on the LIISMA website.

Participants present results at a bimonthly LIISMA meeting.

The total number of acres treated and species addressed are tabulated.

**Outcomes:** Invasive species infestations will be reduced.  
Priority targets will be preserved.  
New information about control techniques will be available to update best management practices.  
Cooperation among organizations will be fostered.

## **Goal 6. Restore Sites Where Invasive Species Management and Control Have Occurred**

After invasive species are removed from treatment areas it opens up a niche that will be filled by other species. In order to prevent other invasive species from returning and filling that niche restoration using native species may need to take place. Proper planning and techniques need to be followed.

**OBJECTIVE: by July 2015 evaluate all projects annually for restoration needs and restoration will take place when necessary.**

**Strategies:** Make sure all LIISMA-funded projects have a restoration component if necessary. Encourage other partners to evaluate the need for restoration on large projects. Make restoration information available on the LIISMA website including lists of plants available and provider contacts. Encourage partner cooperation with the Long Island Native Plant Initiative (LINPI) to evaluate restoration needs and provide plant material.

**Outputs:** All control projects have restoration plans if needed. LINPI is providing expertise and plants to LIISMA partners who need it. All restoration information is posted on our website.

**Outcomes:** Restoration will take place on all large projects. There will be increased cooperation between LINPI and partners and more local stock will be used in restoration efforts. Restoration will prevent new invasives from expanding and increase protection efforts. There will be increased partner knowledge about restoration. Partners can obtain the most recent restoration information on our website.

## **Goal 7. Monitor Changes And Evaluate Management Results**

Post project results need to be measured to evaluate the success of our projects. This is essential to show funders that their money has been well spent, if restoration is necessary, and if techniques need to be changed or improved. Assessment and treatment data should be stored in the appropriate module of the iMap invasives database.

**OBJECTIVE:** by July 2015 include a monitoring component for all control and restoration projects and post results for public viewing.

**Strategies:** All LIISMA-funded projects will be required to have a monitoring component. Encourage other partner projects to include a monitoring component to their projects. Monitoring schemes will be reviewed by qualified experts. Make monitoring information and an expert list available on the LIISMA website. Post project monitoring results on the LIISMA website. Enter monitoring information into the IMAP module for each project.

**Outputs:** All LIISMA proposals will have a monitoring component that is funded. Monitoring information and results will be available for all projects in IMAP and on the LIISMA website.

**Outcomes:** More projects will be monitored. More information about successes and failures will be available to everyone. Adjustments to techniques can be made based upon results. Control projects will become more efficient and cost-effective as feedback helps future management techniques adapt to new information provided by monitoring.

## **Goal 8. Increase Public Education and Outreach**

Effective education and outreach is critical to increasing invasive species knowledge for partners and the public. Increased knowledge and publicity will help garner support and funding for invasive species programs, recruit volunteers for prevention and control programs, and increase efficiency of invasive species projects and efforts. Education is one of the best tools in preventing the spread of invasive species, detecting new infestations, and in rallying support for controlling infested sites. Greater awareness and understanding from people and organizations such as farmers, land managers, landowners, landscape architects, botanists, and the green industry will lead to increased actions and support in making invasive species a high priority in the PRISM.

**OBJECTIVE: by May 2013 the education committee will gather education and outreach ideas from many sources, including partners, Cornell invasives outreach personnel, and PRISM coordinators, to compile and prioritize a list of possible projects based upon need.**

**Strategies:** Hire a person or use an intern to research the web, other literature, and other PRISMs and partners for types of education and outreach projects that have been done or they would like to have done. Encourage novel ideas. Use existing materials and programs whenever feasible and coordinate with other PRISMs and statewide invasive education and outreach partners. Compile a list of projects and make it available for comment to partners at a bimonthly meeting. The education committee will prioritize the list based upon feedback of partner needs and LIISMA priorities.

**Outputs:** A prioritized list of education and outreach projects is produced.

**Outcomes:** We will know what needs to be funded first.  
Projects will be linked to the most need.  
New ideas may produce breakthrough projects.

**OBJECTIVE: by July 2015 support at least three priority education and outreach projects or events per year.**

**Strategies:** Using the priority list developed by the education committee, the committee will decide how and when to carry out the projects or events. Either fund a contract or organize an ad hoc committee of partners and volunteers to carry out the projects. Evaluate the success of the projects and publish the results.

**Outputs:** At least three projects or events take place annually based upon need.  
All project evaluations are made available for others to learn from.  
The number of educational materials distributed is tallied.

**Outcomes:** The public and partners will have a better understanding of invasive species issues and actions needed to address them.



**OBJECTIVE:** by July 2015 increase the profile of LIISMA so people who are interested in invasive species issues in the PRISM know that LIISMA is their primary source for invasive species information.

**Strategies:** Develop a procedure for writing and distributing press releases.

Keep the website up-to-date and add new materials described in this plan.

Keep the Facebook page current and lively.

Buy a display board and attend events and programs where displaying LIISMA information is relevant.

Produce an inexpensive LIISMA information card to give out at events with our website and phone number.

Encourage partners to talk about LIISMA at relevant events.

**Outputs:** Ten press releases are distributed per year.

The website is updated each month with new information.

The Facebook page is updated continually with information from the listserv.

1000 information cards are produced.

A log of website visits, Facebook likes, and events attended is compiled and distributed to partners each meeting.

**Outcomes:** More people will become familiar with LIISMA and its mission and become educated about invasive species.

More ideas will be generated from more participants and more funding opportunities may become available.