

A Strategy to Develop and Implement the
Suffolk County
Invasive Species Management Program

Final Report and Recommendations of the
Suffolk County Water and Land Invasive Control
Task Force

December 2006

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Executive Summary

This Report presents a County-wide framework to develop and implement a Suffolk County Invasive Species Management Program focused on reducing the threat of new invasive introductions and managing current invasions. A permanent Invasive Species Advisory Board is needed to guide future management goals and strategies, and measure progress with an annual report to the Legislature, County Executive and the public. By implementing this framework, Suffolk County reaffirms its commitment to protecting the waters and lands of Suffolk County.

Priority Action Items

In two years, by January 2009, provide a status report to the County Executive, Legislature and the public on progress on the following Priority Action Items, as well as problems and additional needs.

Create a Permanent Invasive Species Advisory Board

Create a permanent Invasive Species Advisory Board, to guide future management goals and strategies as invasives problems change and evolve, as well as foster intra-agency coordination

The Advisory Board would keep track of progress through an annual progress report. The annual progress report would be presented to the Suffolk County Environment, Planning and Agriculture Committee, the County Executive, and the public.

Train Existing Staff, and Coordinate Agency Efforts

Develop Best Management Practices and Standard Operating Procedures for the County, in particular for roads, active recreation parks, golf courses and other lands regularly planted, which will: 1) phase out use of invasive species in landscaping, habitat restoration, or species management; 2) actively eradicate or control invasive species where practical; and 3) expand the use of native (or at least non-invasive) species of plants and animals and ecologically sound restoration techniques.

Provide Resources for Staff and Equipment

With over 45,000 acres of open space, Suffolk County needs to train and dedicate staff to invasive species work. We recommend hiring (or moving internally) 1 staff person specifically trained for invasives management in the Department of Public Works, and 4 staff people specifically trained in terrestrial and aquatic invasives management in the Suffolk County Department of Parks, Recreation & Conservation. In addition, hire or commit existing seasonal staff to invasives species work, and make invasives monitoring and management a regular part of the job responsibilities of the Environmental Stewardship program in the Department of Public Works.

Map and Plan for Conservation areas

Map and prepare management plans for high-quality conservation areas, AKA Weed Prevention Areas. Ecological goals should plan for the County to reduce/limit cover of invasives to less than 5% of Weed Prevention Areas, to less than 10% of buffer areas, and to less than 20% of all public lands and waters, within 3 to 5 years.

Prioritize Restoration Activities

With over 45,000 acres of open space, and many more acres of waterways, Suffolk County needs to prioritize management activities and areas. Sections 1 and 8 detail priority areas. However, there is

work to be done all across Suffolk County, and we encourage working with local communities and Legislators in identifying appropriate invasive species work areas.

Adopt an Invasive Species List

An invasive species list is a necessary first step towards making management decisions on County lands as well as in developing strategies to reduce their introduction into Suffolk County. Work with the Long Island Invasive Species Management Area (“LIISMA”), Nassau County, industry representatives, scientists, land managers and other interested stakeholders in creating two lists of invasive species: (1) invasive species that cause significant environmental harm or damage and should not be sold commercially, and which should be managed (monitored and removed) by the County; and, (2) other species for which there is currently insufficient science to determine precise invasiveness at this time, but which are known to be of sufficient concern that they should not be bought or planted by County agencies and should be managed (monitored and removed) on County lands and waters.

Stop the Sale of Invasive Species

“Escaped” ornamental plants are a significant source of invasive species introduction. Pass a local law stopping the sale of some invasive species.

Promote Sale of Native or Non-invasive plants

An important part of an invasive species program is to educate people what they should plant as well as telling people what they should not plant. Create a list of accepted native plants as per community/ecological habitat, or non-invasive alternatives. This list should be promoted as part of public education. The list is also an important part of County restoration and plantings work.

Create Long Island Native Plants Seed bank

Support expansion of the Long Island Native Grass Initiative into a seed bank of native-genotyped plants. This will serve to ensure that local-genotype native plants are available for ecological restoration projects. It could also make seeds available to nurseries for cultivation and sale to homeowners.

Website for Improved Communications with the Public, Inter-Agency Coordination

Work with LIISMA to develop a website to house a central database for list of invasive species, the alternatives plants list, reporting invasives incidence, land managers blog, homeowner information, disposal methods, etc.

Volunteer Program

Develop a volunteer program for invasive species management , including identification and reporting.

Public Education

Develop a coordinated, ongoing public education and outreach campaign for youth and adults. Invasive education should be incorporated into existing State and local educational programs, such as programs for Master Gardeners, pesticide applicators, and teachers at all grade levels, including colleges.

Introduction

Background

In July 2005, Newsday newspaper reported that “Lake Invader” Carolina fanwort (*Cabomba caroliniana*) had taken over Yaphank Lake, in Brookhaven Town. Local residents complained that they were unable to fish, boat or swim in the Lake. Conservationists and land managers worried the fanwort would spread to the Carmans River. An August 2005 Newsday article reported that aquatic invasives had been found in Nassau County ponds as well, and that Nassau County planned to spend \$1.5 million for eradication.

Faced with the human and ecological impacts of unchecked invasives species spread and the cost of doing nothing or only *reacting* as opposed to being *proactive*, the Suffolk County Legislature passed Resolution 985-05, Establishing a Water and Land Invasive Control Task Force to Develop an Invasives Control Program for Suffolk County’s Lands and Waters.

Yaphank Lake was the immediate problem and need. It’s a taste of things to come unless we start planning for it, and acting on it, now. Preventing the spread of invasive plants and animals before they are embedded in an area is the best method of controlling the invasive species problem. In addition, threat abatement and restoration costs more than prevention. Sometimes, abatement and restoration are impossible if the invasive is firmly established and too wide-spread.

The goals of this Report of the Water and Land Invasives Control Task Force is to allow the County to get in front of this issue before it becomes a problem, to face what is coming and be proactive about preventing the problem and finding solutions. It is essential to protect the waters and lands of Suffolk County by creating long-term invasives management policy, and strategies for implementation.

The Problem with Invasive Species

The definition of an invasive species is a plant or animal that is (1) non-native 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.¹ Many of Long Island’s species of plants and animals are non-native. Only a small percentage of these cause the harm necessary to be deemed invasive. This Report, and its recommendations, is only concerned with “invasive” plants and animals found, or likely to soon be found, in terrestrial and aquatic environments in Suffolk County.

The source of data on nativity of species is the New York Flora Atlas (<http://atlas.nyflora.org>) (“Atlas”). The Atlas is an active, continually updated database which includes nativity of species to New York State, and uses the most recent accepted taxonomy. In the absence of a definitive flora of Suffolk County or Long Island (or Long Island/County ecosystems) the Atlas is the most legally and

¹ As defined by Federal Executive Order 13112 (1999), and as adopted by the New York State Invasive Species Task Force in its Final Report (Fall 2005).

politically defensible source for species nativity.² If questions arise about the nativity of individual species, or the harm they cause, they can be evaluated on a case by case basis.

As noted in the Long Island Invasive Species Management Area Plan (“LIISMA Plan”), “Invasive plants and animals are one of the most serious and pervasive threats to native species and ecosystems on Long Island. Invasives spread into natural areas and out-compete, damage and often eliminate native species, and the wildlife that depend on them. Unchecked, invasives will disrupt ecosystem patterns and processes, such as hydrology, nutrient cycling, frequency and intensity of wildfires (necessary to some ecosystems on Long Island), natural succession, and soil erosion. Every ecosystem on Long Island, whether terrestrial or aquatic, is threatened by these biological invasions.

Invasives 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. On farmland, invasives reduce crop yields and interfere with harvest operations. 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 plants 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 services. The services provided by ecosystems, such as clean water, shelter, medicine, and food, ultimately sustain human life.

The threat of invasive plants can be reduced significantly, but will be with us in various forms forever. Some of the negative impacts of invasive plants 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.”³

The Cost

Developing and conducting effective programs for the prevention of new invasions and management of those invasives already introduced will require the commitment of County staff and County resources. In light of the past history of invasive species introductions, both harmful and beneficial, the cost and benefits of this activity must be evaluated and prioritized against current activities, existing staff and resource commitments, and the likelihood of achieving identified objectives. In order to implement the Suffolk County Invasive Species Management Program described herein, County support beyond current levels is needed.

The cost of not acting until the invasive plant or animal is already established will be far greater, however, than the cost of proactively preventing and controlling before the invasive becomes wide-spread. In several instances, if the invasive is allowed to become established, removal and restoration is

² Suffolk County’s efforts will likely be a model for other Counties and/or Invasive Species Management Area (“ISMA”) groups in New York. Use of the Atlas by all political entities and ISMAs in New York State will provide consistency and simplicity essential for policies and regulatory action across the Island and the State.

³ LIISMA Plan, p.1.

impossible. As the New York State Department of Environmental Conservation warned in its 1993 “Nonindigenous Aquatic Species Comprehensive Management Plan” (“1993 NYS Aquatic Plan”):

“When considering an invasive species prevention and control program, it is important to weigh the program costs against the costs of not having a program. The overall costs of the zebra mussel introduction into the Great Lakes has been estimated as 5 billion dollars. The estimated cost of the proposed invasive species prevention and control program is \$350,000 per year [for all of New York State, in 1993 dollars]. The 5 billion dollars spent remediating the impacts of the zebra mussel alone would have paid for an invasive species prevention and control program for 14,000 years.”⁴

Each year, New York State spends about one-half million dollars to control sea lampreys in the Great Lakes. As the “Final Report of the New York State Invasive Species Task Force” (Fall 2005) (“NYS Inv Task Force Report”) noted,

“There is no end in sight for this expenditure.”⁵

Nassau County is spending \$1.5 million on aquatic invasive species eradication efforts in three of its lakes. The cost of not acting will be far greater than the cost of acting proactively and implementing an invasives program now.

Plan Outline

This Report was developed to reduce the introduction of new invasives and manage adverse impacts from current invasives in Suffolk County. Most experts agree that the keys to managing invasive species are prevention of new invasions, early detection and rapid response to new invasions, and control or eradication of existing invasions. The four components of an invasive species program are:

- 1) preventing future introductions;
- 2) planning response measures to future introductions that might occur despite preventative measures;
- 3) limiting the harmful impacts of introductions that have already occurred; and
- 4) educating the public and industry about the issues and concerns relating to invasive species introductions.

The Report follows the lead of its enabling legislation, Resolution 985-05, to reach these goals by laying out strategies to:

- 1) prevent the introduction of invasive species;
- 2) detect and respond rapidly to control [new] populations of invasive species in a cost-effective and environmentally sound manner;
- 3) monitor invasive species populations accurately and reliably;

⁴ 1993 NYS Aquatic Plan, p. 3.

⁵ NYS Inv Task Force Report, p.vii.

- 4) provide for restoration of native species and habitat conditions in ecosystems that have been invaded;
- 5) conduct research on invasive species and developing technologies to prevent introduction;
- 6) promote public education on invasive species;
- 7) foster greater coordination between the pertinent County agencies and the public; and
- 8) the creation of an Advisory Board, if necessary, to continually study prevention, control and remediation efforts necessary to combat invasive species.⁶

The last section includes a discussion of existing County staff and funding resources to implement the above program, and recommends ways to close any potential staff or funding gaps which stand in the way of implementation.

Allies in the Fight against Invasives

In 2001, a group of Long Island's major conservation land managers and stakeholders formed a steering committee to establish the Long Island Weed Management Area ("LIWMA"), now the Long Island Invasive Species Management Area ("LIISMA"). LIISMA covers all of Long Island, including Kings, Queens, Nassau, and Suffolk counties. Founding committee members include representatives from more than 15 Federal, State, and county government agencies and private conservation organizations. In 2002, the groups produced the Long Island Coordinated Invasive Plant Management Plan ("LIISMA Plan"). LIISMA supplements jurisdictional boundaries in favor of natural boundaries that facilitate cooperation, coordination, and implementation of effective invasive management programs. LIISMA enhances and unites individual ownerships and jurisdictions for mapping, planning, monitoring, and conducting weed management and control programs. The organizational goal is to gain efficiency and increase ultimate success by participating in LIISMA.

In 2003, Governor Pataki signed the Senator Marcellino/Assemblyman DiNapoli bill creating the New York State Invasive Species Task Force ("NYS Inv Task Force"). In 2005, the NYS Inv Task Force submitted its report and recommendations.⁷ In 2006, Governor Pataki and the Legislature approved a \$3.25 million line item to support on-the-ground invasive projects throughout New York and to fund Invasive Species Management Areas.⁸

New York State started invasive species management planning much earlier than 2003 due to appearance of large populations of zebra mussels in the Great Lakes and the subsequent blockage of drinking water supply in Michigan by zebra mussels. In 1993, the New York State Department of Environmental Conservation ("DEC"), Division of Fish and Wildlife, produced a Nonindigenous Aquatic Species Comprehensive Management Plan ("1993 NYS Aquatic Plan").⁹ In 2005, DEC's Division of Water prepared "A Primer on Aquatic Plant Management in New York State" ("2005 NYS Aquatic Plan").

⁶ Resolution 985-05, which is included in Appendix A.

⁷ Final Report of the New York State Invasive Species Task Force (Fall 2005), hereinafter referred to as "NYS Inv Task Force Report."

⁸ The FY06-07 \$3.25 million Invasives appropriation includes a minimum of \$1 million for invasive eradication grants and funding for Weed Management Areas such as LIISMA.

⁹ The NYS Inv Task Force Report says the 1993 NYS Aquatic Plan is being updated.

This Report relies heavily on the LIISMA Plan, NYS Inv Task Force Report, and the 1993 NYS Aquatic Plan for strategy and funding recommendations as well as detailed information about current, new and upcoming species of concern, vectors, Federal and State government programs¹⁰, private organization efforts, and eradication methods. Rather than repeating the findings of these other reports, this Report focuses on strategy and funding recommendations applicable to Long Island and Suffolk County in particular.

There is one more up-and-coming contributor to the invasives control effort on Long Island: Nassau County. Nassau is at this time exploring strategy and funding recommendations very similar to those in this Report. Hopefully, when finalized and implemented, Nassau and Suffolk's strategies will support and enhance each other's efforts. It is envisioned that Suffolk and Nassau County will work together on future field projects, updating invasive species lists, and grant applications.

Invasives freely spread across jurisdictional boundaries. The eventual success of any individual agency or landowner's invasive control efforts will be largely determined by the cooperative efforts of all conservation agencies and landowners. This Report lays the groundwork for what will be Suffolk County's part in this conservation effort.

¹⁰ There are many Federal plans and programs, including grant programs, dealing with Invasives. This Report deliberately is not going over them because they are covered so well elsewhere, especially in the NYS Inv Task Force Report. Federal websites offer the most up-to-date information on grant programs.

Summary of Strategies and Action Items

This Report was developed to reduce the introduction of new invasives and manage adverse impacts from current invasives in Suffolk County. Most experts agree that the keys to managing invasive species are prevention of new invasions, early detection and rapid response to new invasions, and control or eradication of existing invasions.

The Report lays the groundwork for the County to work with its partners to implement the following strategies and action items:

1. Prevent the introduction of invasive species

Action Item 1: Map and prepare management plans for conservation areas, so that the County reduces/limits cover of invasives to less than 5% of Weed Prevention Areas, to less than 10% of buffer areas, and to less than 20% of all public lands and waters, within 3 to 5 years.

Action Item 2: Designate Weed Prevention Areas, as a focus for management efforts.

Action Item 3: Work with DEC, LIISMA, the Invasive Plant Council of New York State (IPC) and other invasives agencies and organizations to identify, evaluate, and mitigate the risks of invasives not yet present on Long Island.

Action Item 4: Implement native vegetation protection standards on County parcels, except in cases where the clearing is part of a restoration project. If land clearing is absolutely necessary, stands of non-native vegetation will be considered before areas populated with native vegetation are disturbed.

Action Item 5: Landscaping on County lands (including office grounds and parks) should use native trees, shrubs, groundcover plants and flowers to the maximum extent possible. Non-native plants may be used if they are documented to be non-invasive.

Action Item 6: Remove existing invasive species planted at County sites and replace with suitable native species or non-native plants if they are documented to be non-invasive.

Action Item 7: Minimize turf areas on all County holdings (including office grounds), and replace with suitable native plantings, including trees.

Action Item 8: Create lists of invasives species which will (1) not be sold, and (2) not bought by County agencies and to be removed/controlled on County land. These lists should be reviewed annually by the Advisory Board.

Action Item 9: Stop the sale of invasive species on the do not sell list.

Action Item 10: Promote public education (see Strategy 6 below).

2. Detect and respond rapidly to and control (new) populations of invasive species in a cost-effective and environmentally sound manner

Action Item 1: Emphasize early detection and eradication, in addition to prevention, in invasive management plans and programs at each County site.

Action Item 2: Develop programs at each County site for land managers, volunteers (*e.g.*, Weed Watchers), and visitors to identify and report the occurrence of species on invasive

species list. In addition, look for new species that are anticipated to colonize Long Island and those that are not currently known or anticipated.

Action Item 3: Develop and maintain up-to-date invasives search lists for each County site, identify where invasives are most likely to appear, and alert visitors to watch out for and report new invaders to improve the chance of early detection.

Action Item 4: Establish Rapid Response Teams and develop programs at each County site, as well as Island-wide, to promptly assess the threat posed by newly discovered populations of invasive species and initiate rapid response teams. Programs will include training on invasive identification and control for land managers.

Action Item 5: Work with NYS DEC to develop pre-approval procedures for control projects.

Action Item 6: Eradicate new and recently established populations of invasives that threaten conservation targets and goals. Where total eradication is not possible, suppress and contain infestations to the maximum extent possible.

3. Monitor invasive species populations accurately and reliably

Action Item 1: Work with LIISMA and other coordinating groups to develop a standardized invasive mapping system and standardized invasive monitoring protocols.

Action Item 2: Train and support land managers, volunteers (*e.g.*, Weed Watchers), botanists, user groups, and others to inventory, survey, map, and monitor invasives using the standard protocols.

Action Item 3: Prioritize monitoring activities to first survey WPAs and their buffer areas, and major vectors such as roads and boat launches, as it is practically impossible to fully monitor all public lands and/or species.

Action Item 4: Map Weed Prevention Areas within County lands to facilitate prevention and early detection and rapid response programs.

Action Item 5: Inventory, survey, and map invasives at other County sites. Focus on species that pose the greatest threat (ecological and economic damage, ability to rapidly spread to new areas across gaps in the landscape, etc.). Update annually.

Action Item 6: Build capacity to survey and map invasives within County agencies and organizations using GPS (global positioning systems) and GIS (geographic information systems), including training, procure equipment, obtain funding.

Action Item 7: Provide training on ecological monitoring within County agencies and organizations lacking this instruction.

Action Item 8: Collect baseline field data on existing invasives infestations prior to and following and management practices. Continue monitoring for at least 3 years after infestations are considered eradicated, to ensure re-invasion does not occur.

Action Item 9: Determine if invasives management programs accomplish the Action Items of the annual management plan, including education and training programs. Make changes to this plan and annual plans as needed.

Action Item 10: Determine if the threat of invasive plants is being abated and if the integrity and viability of conservation targets are being maintained or enhanced.

4. Provide for restoration of native species and habitat conditions in ecosystems that have been invaded

Action Item 1: Areas formerly occupied by invasive species should be assessed for the degree of native plant presence on the site or adjacent to it and recommend an acceptable protocol for habitat self-restoration or re-vegetation with plant species appropriate for natural ecosystems.

Action Item 2: Provide training on ecological restoration within County agencies and organizations lacking this instruction.

Action Item 3: Develop and implement effective restoration methods and procedures for areas degraded by invasives.

Action Item 4: Provide a list of accepted native plants as per community/ecological habitat.

Action Item 5: Ensure that locally derived native plant materials are available for ecological restoration projects.

Action Item 6: Provide information and a means to properly dispose of invasive species.

5. Conduct research on invasive species and develop technologies to prevent introduction

Action Item 1: Keep informed on current research and identify, evaluate, and clear new and improved integrated pest management and restoration techniques.

Action Item 2: Utilize existing research to better understand the biology and ecology of invasive plants and the conditions that make ecosystems vulnerable to invasion.

Action Item 3: Utilize existing research and conduct local research if necessary to identify the most effective means of seed harvest and propagation for locally derived native plants to be used in ecological restoration.

Action Item 4: Utilize existing research and conduct research to improve methods for restoring and monitoring ecosystem species composition and function after invasive species control.

Action Item 5: Utilize existing research and conduct research into disposal methods which would properly destroy/dispose of invasive species in order to stop inadvertent spread which could occur through removal.

6. Promote public education on invasive species

Action Item 1: Work with LIISMA to develop a website to house a central database for lists of species that should not be sold, and additional species that should be managed, invasives incidence, land managers blog, homeowner information, etc.

Action Item 2: Develop a coordinated, ongoing public education and outreach campaign for youth and adults. This includes incorporating invasive education into existing state and local educational programs, such as programs for Master Gardeners, pesticide applicators, and teachers at all grade levels, including colleges.

Action Item 3: Develop a speakers bureau to speak at garden clubs, conferences, etc.

Action Item 4: Obtain adequate funding and other resources for invasive education, prevention, and management.

Action Item 5: Partner with other municipalities, groups in public education campaigns.

Action Item 6: Develop a media strategy for regular release of information in local newspapers, TV, etc.

Action Item 7: Post invasive species hitch-hiker warning signs at boat launches and trail heads; provide informational flyers to fishermen and hikers.

Action Item 8: Disseminate alternative plants lists, through newspapers articles, website, garden clubs, etc.

Action Item 9: Promote nurseries that sell natives and landscape professionals who plant natives and are familiar with local genotype restoration.

Action Item 10: Develop Good Garden program, or a similar outreach and education program

Action Item 11: Provide information on proper composting techniques to prevent the spread of invasive species through compost.

Action Item 12: Have County Government serve as an example by removing invasive landscaping species plantings off of County properties.

7. Foster greater coordination between County agencies, and the public

Action Item 1: Create a new Invasives division, or assign responsibility to an existing County agency for invasives work. This Invasives program will be responsible for coordinating within the County as well as outside the County.

Action Item 2: Develop Best Management Practices and Standard Operating Procedures for the County, in particular for roads, active recreation parks, golf courses and other lands regularly planted, which will: 1) phase out use of invasive species in landscaping, habitat restoration, or species management; 2) actively eradicate or control invasive species where practical; and 3) expand the use of native (or at least non-invasive) species of plants and animals, and ecologically sound restoration techniques.

Action Item 3: Provide training on invasive species prevention within County agencies and organizations lacking such instruction. Include methods to help prevent the spread of invasive such as methods to clean land management equipment, the use of only weed-free compost and mulch materials, etc

Action Item 4: Test pilot projects for native roadside plantings or native gardens.

8. Create an Advisory Board, if necessary, to continually study prevention, control and remediation efforts necessary to combat invasive species.

A discussion of existing County staff and funding resources, and recommending ways to close any potential staff or funding gaps which stand in the way of implementation.

Action Item 1: Create a permanent Invasive Species Advisory Board, to guide future management goals and strategies as invasives problems change and evolve, as well as foster intra-agency coordination

Action Item 2: The Advisory Board as well as key agency staff present an annual progress report, to the Suffolk County Environment, Planning and Agriculture Committee, the County Executive and the public, to measure progress.

Action Item 3: Hire (or move internally) 1 staff person specifically trained for invasives management in the Department of Public Works.

Action Item 4: Make invasives monitoring and management a regular part of the job responsibilities of the Environmental Stewardship program in the Department of Public Works.

Action Item 5: Hire (or move internally) 4 staff people specifically trained in terrestrial and aquatic invasives management in the Suffolk County Department of Parks, Recreation & Conservation

Action Item 6: Hire 20 seasonal staff in the Suffolk County Department of Parks, Recreation & Conservation.

Action Item 7: Explore the use of non-conventional, inexpensive manpower options, such as community service programs.

Action Item 8: Develop a volunteer program.

Strategies

1. Prevent the introduction of invasive species

The most efficient, cost-effective and likely-to-succeed way to stop the damage caused by invasive plants is to prevent invasives 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.

The goal of the Suffolk County Invasive Species Management Program is, first, protecting the conservation values of mostly intact native communities, which shall be called in this Report Weed Prevention Areas (“WPAs”). Radiating outwards from these native communities, are buffer areas, and then all public lands and waters.

Prevention includes activities such as education and outreach, prediction of new invasions, exclusion of potential new invaders, inspection and sanitation of vehicles and equipment, and suppression and containment of expansive populations that are likely to spread. Exclusion refers to all activities to stop invasive species from crossing the border of a region or site.

Privately-owned lands are not being addressed in this Report, because they are outside the jurisdiction of Suffolk County. Private homeowners are, nonetheless, a necessary part of the equation. Invasives on public lands and waters have often escaped or been released from privately-owned properties, or are carried onto public lands and waters as “hitch-hikers” by the public. Some important strategies for public education are included in Strategy 8, and we encourage the County to implement these and any other programs they can find. There are also some large tracts of lands and waters owned privately by businesses or non-profit organizations¹¹ where native plantings should also be encouraged.

Many potentially invasive plant species are not yet present on Long Island. These invasives must be stopped from accidentally or intentionally being introduced. Invasives that are already here must be prevented from spreading and invading intact native communities/WPAs.

Prevention needs to occur at multiple spatial scales. This includes looking for and preventing invasions that are new to Long Island, new to County lands and waters, and new to Weed Prevention Areas and buffer areas around them. When determining invasive 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.

The goal is to protect the conservation values of mostly intact native communities/WPAs. The factors involved in determining WPAs include:

- Biological distinctiveness of site
- Natural character of site
- Rare, threatened, or endangered species or communities present
- Good example of community or ecosystem type

¹¹ Such as The Nature Conservancy or the Peconic Land Trust.

Because time and economic resources are limited, it is important to prioritize the management of widespread invasives to the most significant sites and tackle first those invasives that seriously compromise conservation values at sites. Factors involved in determining site-based invasive management include:

- Preventing spread into weed-free zones
- Current and potential impacts to conservation targets and goals
- Value of the sites that the invasive infests or may infest
- Difficulty of control
- Integrates with other management
- Complements other invasive control projects

Priority areas for creating management plans and implementing invasives work would be County Parks at:

Year 1:

Theodore Roosevelt (Montauk)

Cedar Point (East Hampton)

Hubbard (Flanders)

Smith Point

South Haven/Carmans River watershed

Cathedral Pines

Warbler Woods

Year 2:

Blydenburgh (Smithtown)

West Hills (Huntington)

Gardiner (Bay Shore)

Great South Bay creek complex (Babylon and Islip)

Management goals are to prevent the spread of invasives to:

- less than 5% of WPAs (within 3 years)
- less than 10% of buffer areas (within 3 years)
- less than 20% of all public lands and waters (within 3 to 5 years)

Nature Preserves

The County owns many nature preserves, which are protected by law from many types of activities. The goal was to protect these lands from future development of these sites into active recreational areas or even building sites. This plan is intended to complement these goals and protections. Clearing restrictions, especially of native areas, or eradication of invasives from County lands and waters need to be evaluated on a site-specific basis and only when appropriate incorporated into management plans for nature preserves. We recommend all County nature preserves include eradication of invasives and restrict clearing of native areas in their management plans.

At this time, none of the nature preserves have management plans. Clearly, a crucial first step is the creation of these plans, not only for invasives management but for the management of these areas' ecological features.

Education

Education is one of the best tools in preventing the spread of invasive plants, detecting new infestations, reducing purchases of invasives, and in rallying support for controlling infested sites. Greater awareness and understanding from citizens and landowners will lead to increased actions and support in making invasive plants a high priority on Long Island. Education is covered in other Strategy sections, primarily Strategy 6.

Clearing Restrictions of Native Areas

Disturbance, usually human-induced, often leads to the introduction and spread of invasive species. To guard against current and future onslaughts of invasive species, it is crucial to protect areas of native vegetation. For all new County government-related development, no more of a parcel's existing vegetation should be cleared than is necessary for the permitted use. If a County-owned commercial lot is developed anywhere in the County, Suffolk County shall only clear a maximum of 10,000 square feet or 50% of the lot area, whichever is greater. If a County-owned residential lot is developed anywhere in the County, Suffolk County will follow the native vegetation requirements first adopted by the Town of East Hampton¹²:

In residential districts:

<u>Lot area (Square feet)</u>	<u>Maximum Clearing Permitted</u>
Up to and including 10,999	100%
From 11,000 to and including 19,999	10,999 square feet or 75%, whichever is greater
From 20,000 to and including 280,000	10,000 square feet + (lot area x 25%)
Greater than 280,000	80,000 square feet

For existing County government-related development, the following practices will be followed:

- Only native trees, shrubs and groundcover will be planted on County lands (including office grounds and parks).
- Existing invasive species planted at County sites will be removed and replaced with suitable native species.
- Turf areas on all holdings (including office grounds) will be minimized. Turf will be replaced with suitable native plantings, including trees.¹³ This will not impact active recreation areas.

These restrictions do not apply for clearing for restoration purposes, as per conservation and preservation.

¹² Code of the Town of East Hampton, New York Section 255-2

¹³ For native alternatives for turf purposes, see the Brooklyn Botanical Garden website: <http://www.bbg.org/gar2/topics/sustainable/handbooks/lawns/5.html>

Stopping the Sale of Invasive Species

Stopping the sale of some invasive species is a key strategy for prevention.¹⁴ Escaped or released ornamentals are a significant source of infestation. Purple loosestrife (*Lythrum salicaria*) and fanwort are prime examples of plants that have escaped or been released, and caused enormous economic and environmental damage. Creating and enforcing a list of a scientifically-supported invasives plant list which cannot be sold will serve to prevent the continued introduction of these problem plants through one of its major vectors: sales by nurseries, aquaria and pond builders, garden centers, and landscapers. Species on such a list should be based on consensus of stakeholders, and/or scientific documentation, and/or presence of the species on invasive lists in neighboring States. This Task Force recommends prohibiting the sale or distribution of all plants or plant parts, seeds in packets, blends or “wildflower mixes” of species deemed invasive.

This mechanism also serves the purpose of “leveling the playing field” for nurseries who want to do the right thing and not sell invasive plants but feel forced to in order to keep up with competitors who do sell the plants. A ban of the same species by both Suffolk and Nassau Counties serves this purpose even further, by allowing sellers not to feel commercially threatened by sellers across County borders.

Massachusetts and Connecticut both have banned from sale plants deemed invasive. Effective January 1, 2006, Massachusetts banned the importation into the State of more than 140 species of invasive trees, shrubs and plants. The list comes in part from the federal invasive plant list, culling out the plant species that could not survive in Massachusetts anyway. The list also reflects studies done at the University of Connecticut for the MA Invasive Plant Advisory Council, chaired by Massachusetts Nursery and Landscape Association’s (“MNLA”) Executive Director. MNLA’s website has clear and easy-to-use information and links to information about invasives and banned species.¹⁵ Connecticut has banned the sale of 81 species since 2004. (Both States’ lists of banned species and Massachusetts’ criteria are in Appendix B.)

Invasive plant lists identify plants known to be invasive and a detriment to the County’s natural resources. Invasive plant lists are useful provided there are clear and accepted criteria for listing invasive plants. Criteria must include the scientific basis for assessing and categorizing non-native invasive species according to their impact on native species and natural biodiversity.

Several risk assessment systems are used nationwide, including NatureServe, APRS, Invasive Plant Atlas of New England (“IPANE”), and the criteria used in Massachusetts and Connecticut. At this time, there is no preferred method adopted by either LIISMA, New York State or the New York State Invasive Plant Council (“IPC”). Barring consensus on a preferred method, this Task Force recommends the County works with one of these entities in regular assessments of incoming species for invasiveness. This information is necessary in determining appropriate management decisions as well as updating the invasives species ban and management lists. We also strongly recommend that Suffolk County coordinate with Nassau County to have the same ban and management lists.

¹⁴ But it is only one of many strategies. A ban by itself will not solve the invasives problem, and must be part of a long-term, multiple approach plan.

¹⁵ <http://mnla.com/>

Not all invasive species are introduced into the environment through commercial/horticultural sales. Some spread through other means, either environmental (wind, water, birds, etc.) or human mediated (seeds or plant parts in compost, on land management equipment and boats, releases from aquaria, contaminants in nursery stock, etc.). The zebra mussel (*Dreissena polymorpha*) is a well-known example of a species which was inadvertently introduced by this means. Originally a native of Europe, this mussel was introduced into the Great Lakes through ballast water discharges and as noted above, it has and continues to cause significant environmental and economical damage. Although in this example the vector was due to human actions, many vectors are related to non-human activities and are therefore more difficult to control and prevent. Thus, additional efforts and management strategies need to be employed in order to prevent/ reduce such introductions and dispersal by the various vectors.

For the above reasons, this Report recommends two lists: (1) invasive species that cause significant environmental harm or damage and should not be sold commercially, and which should be managed (monitored and removed) by the County; and, (2) other species for which there is currently insufficient science to determine precise invasiveness at this time, but which are known to be of sufficient concern that they should not be bought or planted by County agencies and should be managed (monitored and removed) on County lands and waters.

The Task Force recommends a prohibition of the following actions accompany the “do-not-sell” species: knowingly collect, sell, distribute, propagate or transplant any living and viable portion of any plant species, including plant parts, seeds in packets, blends or “wildflower mixes”. As defined here, “species” includes all synonyms, subspecies, varieties, forms, and cultivars of that species unless proven otherwise by a process of scientific evaluation and accepted by Suffolk County¹⁶. Exceptions should be made for collecting, etc., for educational or scientific purposes.

The Task Force recommends the following actions accompany the “management” species, in addition to the do-not-sell species: they should not be bought or planted by County agencies, and must be managed (monitored and removed) on County lands and waters. In addition, we recommend no other public or private entity in Suffolk County buy or plant management species.

The proposed do-not-sell and management list is at Appendix C. The list was finalized through a series of meetings and with the input of LIISMA, Long Island Nursery & Landscapers Association, Long Island Farm Bureau, Cornell Cooperative Extension, Soil & Water Conservation District, Suffolk County Department of Parks, Recreation & Conservation, Nassau County Department of Parks, Nassau County Department of Public Works, New York City Department of Parks, US Fish & Wildlife Service, and Brooklyn Botanic Garden. While the list does not represent the “wish list” of any individual attendees or agency or industry representative, it does represent a compromise reflecting the varied interests, training and knowledge of the group as a whole. It also represents a vision for better action and coordination for invasive species management.

¹⁶ If a Suffolk County Advisory Board is created, as this Report recommends, the Board would be an appropriate entity to screen scientific evaluations on specific species or cultivars and recommend whether or not it is acceptable.

Removing species from sale may be financially burdensome to the nursery or aquarium industry. One way of easing this burden is to allow a one-year phase out period for the industry to sell its current stock, and a three-year phase out period for larger, woody, herbaceous plants. In addition, marketable alternatives are already available to take the place of listed invasive species. (Please see Appendix D for native alternatives to the most commonly sold plants on the do-not-sell list.)

Public participation

A public education campaign is necessary to reduce public purchase of invasive species, encourage removal of invasives already planted or needing to be removed for other reasons, and suggest native or non-invasive alternatives. In addition, the County may want to develop an “invasives trade-in” program. In an invasives trade-in program a resident may trade invasive species for native or non-invasive alternatives at participating local nurseries to encourage the use of native plants and support nurseries effort in providing native plants. This would help remove many invasive plants from the private sector.

Invasive Species List Review Process

If a Suffolk County Advisory Board is created, as this Report recommends, the Advisory Board should annually review the current invasive species list. The Board would also evaluate suggestions for additions or deletions to the list. Anyone may petition the Advisory Board to add or delete species from the list. The Advisory Board would be an appropriate entity to screen scientific evaluations on specific species or cultivars and recommend further action.

New Invaders

The County should work with federal and State authorities as well as invasive species organizations like LIISMA and IPC to keep track of potential new invaders, and thus be prepared to identify, look for and respond if the species comes to Suffolk County. Partnering with these entities also results in improved coordination and public education efforts.

Enforcement

Enforcement is always the hard part of these kinds of efforts. The most likely entities for enforcement would be the Suffolk County Department of Parks, Consumer Affairs, or the Health Department’s Office of Ecology. The Parks Department and the Office of Ecology would have the training to identify the banned species. In addition, the Health Department’s sanitarians already have enforcement authority for similar activities. The Department of Consumer Affairs has the regulatory authority for on-site inspections, investigating complaints, enforcing the County Code, and educating the public, all crucial functions for this program. Department websites would be a useful source for information about species listed for a ban or for management.

Action Item 1: Map and prepare management plans for conservation areas, so that the County reduces/limits cover of invasives to less than 5% of Weed Prevention Areas, to less than 10% of buffer areas, and to less than 20% of all public lands and waters, within 3 to 5 years.

Action Item 2: Designate Weed Prevention Areas, as a focus for management efforts.

Action Item 3: Work with DEC, LIISMA, the Invasive Plant Council of New York State (IPC) and other invasives agencies and organizations to identify, evaluate, and mitigate the risks of invasives not yet present on Long Island.

Action Item 4: Implement native vegetation protection standards on County parcels, except in cases where the clearing is part of a restoration project. If land clearing is absolutely necessary, stands of non-native vegetation will be considered before areas populated with native vegetation are disturbed.

Action Item 5: Landscaping on County lands (including office grounds and parks) should use native trees, shrubs, groundcover plants and flowers to the maximum extent possible. Non-native plants may be used if they are documented to be non-invasive.

Action Item 6: Remove existing invasive species planted at County sites and replace with suitable native species or non-native plants if they are documented to be non-invasive.

Action Item 7: Minimize turf areas on all County holdings (including office grounds), and replace with suitable native plantings, including trees.

Action Item 8: Create lists of invasives species which will (1) not be sold, and (2) not bought by County agencies and to be removed/controlled on County land. These lists should be reviewed annually by the Advisory Board.

Action Item 9: Stop the sale of invasive species on the do not sell list.

Action Item 10: Promote public education (see Strategy 6 below).

2. Detect and respond rapidly to and control (new) populations of invasive species in a cost-effective and environmentally sound manner

An Early Detection and Rapid Response (EDRR) program is the cornerstone of an effective invasives management program. EDRR focuses field staff's activities in high-quality areas, resulting in conservation of intact native communities in the most cost-effective way. EDRR involves (1) regular monitoring, and (2) planning response measures to future introductions that might occur despite preventive measures.

To be effective, EDRR should be prioritized to first protect the conservation values of WPAs, then of buffer areas, and then of all public lands and waters.

There are two main approaches to EDRR: site-based and species-based. With a site-based approach, all invasive plant species are controlled on a site. An example is the LI Central Pine Barrens, where common invaders such as Japanese barberry and common reed are controlled. Essentially, this is the EDRR approach for native areas and the WPAs. With a species-based approach, new invaders are controlled wherever they occur, including on and off sites. An example is water chestnut, which is controlled wherever it occurs. The species-based approach will apply to buffer zones, public lands, and waters.

Aquatic EDRR

EDRR is much more difficult in aquatic habitats. By the time invasives species are seen and reported they are usually already well-established. Regular monitoring of common gateways, such as boat launches, followed by prompt EDRR action is the best hope of eradication. (See Strategy 3 for more on monitoring.) An exemplary aquatic EDRR program has been put together by the State of Maine. Recognizing the need for quick action, Maine's State laws allows its Department of Environmental Protection to bypass its permit process in order to act quickly. We recommend working with the NYS DEC in improving its permitting process allow for these kinds of situations, whether in aquatic and terrestrial settings. In effect, what is needed is a pre-approval process for certain control methods for given situations.

The monitoring component of EDRR is in Section 3. Priority work areas and staffing recommendations for EDRR are included in Sections 1 and 8.

Action Item 1: Emphasize early detection and eradication, in addition to prevention, in invasive management plans and programs at each County site.

Action Item 2: Develop programs at each County site for land managers, volunteers (*e.g.*, Weed Watchers), and visitors to identify and report the occurrence of species on invasive species list. In addition, look for new species that are anticipated to colonize Long Island and those that are not currently known or anticipated.

Action Item 3: Develop and maintain up-to-date invasives search lists for each County site, identify where invasives are most likely to appear, and alert visitors to watch out for and report new invaders to improve the chance of early detection.

Action Item 4: Establish Rapid Response Teams and develop programs at each County site, as well as Island-wide, to promptly assess the threat posed by newly discovered populations of invasive species and initiate rapid response teams. Programs will include training on invasive identification and control for land managers.

Action Item 5: Work with NYS DEC to develop pre-approval procedures for control projects.

Action Item 6: Eradicate new and recently established populations of invasives that threaten conservation targets and goals. Where total eradication is not possible, suppress and contain infestations to the maximum extent possible.

3. Monitor invasive species populations accurately and reliably

A monitoring program results in: an inventory of current populations, monitoring for changes, and evaluating management results. Monitoring invasives accurately and reliably is important in order to look for new invaders and keep track of and control current invasives. It allows agencies to monitor for changes in existing populations and evaluate management results.

A confident knowledge of the severity and distribution of invasives is necessary for successful invasive planning and management. The primary goal of invasive inventories and mapping is to accurately identify and delineate lands and waters that contain populations of invasive plants, as well as weed-free zones. These inventories and maps allow land managers to predict areas that are potentially subject to invasion; to understand the ecology of the invasion process; to develop, implement, and evaluate site-

specific invasive management plans; to assess the ecological and economic impacts of invasions; and to increase public understanding and support.

As part of an active EDRR program, regular monitoring of entire WPAs should be conducted at least annually during the growing season, ideally between June and August. The monitoring frequency may be changed based on site-specific needs. For example, if an invasive population was removed, monitoring to assess the results of that control work may need to be done more frequently. Monitoring efforts should first be focused on the boundaries of the WPA and in areas that have experienced disturbance as these are the areas in which invasives are most likely to become established. Buffer zones or the areas immediately surrounding a WPA should be monitored every 2-3 years to assess the spread of the species already present and to detect new species as they move in. Even other areas of public lands not designated as WPAs or buffer zones should be monitored on a regular basis. Every 3-5 years a complete inventory should be conducted to make sure that no NEW species have invaded. At these sites, suppression will be the strategy and EDRR will have to be carried out for species that either have not yet been detected on Long Island or Suffolk County or species in limited distribution on LI whose spread we want to prevent.

A routine monitoring program should be established near potential introduction sites such as trailheads, boat launches and roads. Routine, systematic sampling for current and up-and-coming invasives should be conducted in and near sensitive ecological areas (WPAs), and areas identified as being likely ports of entry for invasives. The purpose of this type of standardized sampling would be for detecting invasives as soon as they enter Suffolk County; detecting changes in ecosystem characteristics that may be indicative of an invasive; and providing baseline ecological data in and near ports of entry or WPAs. The possibility of detecting invasives through changes in ecosystem characteristics may be small. However, a database of baseline ecological data would be useful and necessary for comparative purposes when assessing impacts if an invasives introduction does occur. If the habitat and ecological requirements of a potential introduction were known, specific sampling protocols could be developed to attract and detect that species if introduced. This type of monitoring would again be particularly useful for, and should focus primarily upon, detecting invasives that are already present in surrounding States or regions, but are not known to be present in Suffolk County.

Only a small portion of all the lands and even less of the waters in Suffolk County have been mapped and monitored for invasives. Before an invasives management program may be implemented, it is necessary to map all County lands and waters.¹⁷ Baseline data is needed. These sites need to be surveyed so that they can be classified accurately (WPA, buffer, or public land), and appropriate management plans can be developed.

Regular monitoring (aka “weed sweeps”) should be set up in accordance with prioritized management needs. WPAs should be monitored every year during the growing season of late March to early October. Buffer areas should be surveyed every 2 to 3 years. All public lands and waters should be monitored every 3 to 5 years. Increasing or decreasing the frequency of weed sweeps may be changed based on site-specific management plans needs.

¹⁷ Actual mapping of all lands and waters may occur over time or may be decided not to be done at all due to expert field observations depicting certain areas beyond prevention or restoration efforts.

Two components of a monitoring program are: (1) staff trained to identify invasives, and (2) a database system which is accurate, easy to use and capable of sharing information with other agencies and municipalities.

Staff, including seasonal and volunteers, need to be trained in identifying the worst current and new invasives. Full-time Invasives staff must be able to identify these invasives as well as train and supervise seasonal and volunteer staff.

Database

LIISMA has been monitoring sites in Suffolk County for almost 5 years. We recommend working with LIISMA and other coordinating groups to develop a standardized invasive mapping system and standardized invasive monitoring protocols. Using the Weed Information Management System (WIMS) is suggested because it is already widely used by LIISMA and many land managers undertaking invasives work.¹⁸

Action Item 1: Work with LIISMA and other coordinating groups to develop a standardized invasive mapping system and standardized invasive monitoring protocols.

Action Item 2: Train and support land managers, volunteers (*e.g.*, Weed Watchers), botanists, user groups, and others to inventory, survey, map, and monitor invasives using the standard protocols.

Action Item 3: Prioritize monitoring activities to first survey WPAs and their buffer areas, and major vectors such as roads and boat launches, as it is practically impossible to fully monitor all public lands and/or species.

Action Item 4: Map Weed Prevention Areas within County lands to facilitate prevention and early detection and rapid response programs.

Action Item 5: Inventory, survey, and map invasives at other County sites. Focus on species that pose the greatest threat (ecological and economic damage, ability to rapidly spread to new areas across gaps in the landscape, etc.). Update annually.

Action Item 6: Build capacity to survey and map invasives within County agencies and organizations using GPS (global positioning systems) and GIS (geographic information systems), including training, procure equipment, obtain funding.

Action Item 7: Provide training on ecological monitoring within County agencies and organizations lacking this instruction.

¹⁸ WIMS is a Microsoft Access-based relational database application that is designed to assist natural resource managers in managing their invasive data. WIMS keeps track of three types of data records: invasive occurrences (GPS point locations), assessments (size and status of the invasive infestation to facilitate monitoring over time), and management treatments applied to those invasive infestations. Data can be easily exchanged between multiple users, exported in NAWMA (North American Weed Management Association) standards, and written to shapefiles for mapping in any standard GIS program. A variety of reports can also be easily generated. Additionally, WIMS can be used on a handheld unit (either MS Windows-based Pocket PC or Trimble) with a GPS unit to capture data in the field. When using WIMS on a handheld unit with an ArcPad interface, a site manager can use background imagery and other GIS layers for mapping invasives, then upload the new data into the Access database.

Action Item 8: Collect baseline field data on existing invasives infestations prior to and following and management practices. Continue monitoring for at least 3 years after infestations are considered eradicated, to ensure re-invasion does not occur.

Action Item 9: Determine if invasives management programs accomplish the Action Items of the annual management plan, including education and training programs. Make changes to this plan and annual plans as needed.

Action Item 10: Determine if the threat of invasive plants is being abated and if the integrity and viability of conservation targets are being maintained or enhanced.

4. Provide for restoration of native species and habitat conditions in ecosystems that have been invaded

Some existing invasive infestations can be controlled or even eradicated. Others appear to be beyond any meaningful control but could be managed to confine or control them at tolerable levels. For all sites to be planted or restored, an ecologically-trained person should assess the site, in particular the degree of native plant presence on the site or adjacent to it, and recommend an acceptable protocol. The degree of native plant presence will help determine the possibility of self-restoration or the need for planting to the area.

Throughout this report, the use of native plants is recommended. However, in the field of Conservation Biology, there is an additional level that defines a plant as native called a local genotype. A genotype is the genetic map of a species, as influenced by the local environment in which it inhabits over hundreds of years. Therefore, a local genotype is a species that genetically originates from Long Island as opposed to a plant of the same species, which is grown in another region (a non-native genotype).

The specific use of local genotyped plant species is being increasingly requested/recommended for landscaping and restoration activities and in the horticulture industry by conservation and restoration biology professionals. This new concept continues to gain momentum with increases in recognition of the importance of preserving local genetics within plant species and communities especially in parks, conservation areas, and wildlands.

The use of native genotyped plant species is a practice that we recommend, encourage, and support within restoration and native planting recommendations. Currently, however, the sole use of local genotyped plant species for all landscaping and restoration activities is not entirely practical on Long Island, as there are no marketed sources of local genotyped plant materials (plants or seed). This is due to a lack of demand for these materials since this is a new concept within the restoration and horticulture industries. Therefore, the basic economic theory of supply and demand applies to this situation.

Although demands for such plant materials have been increasing, they have not reached to a point that promotes high production of such nursery stock and seed. Suffolk County is in the position to help create such a demand and encourage production of these plant materials, both financially and educationally. This can be accomplished by the County requesting local genotyped plant materials for use on Suffolk County property for restoration and landscaping purposes. Secondly, the use of such

plants in landscaping activities would serve as an example to the public, thereby fostering demand. Lastly, financial and staff support of the Long Island Native Grass Initiative would help further implement and ideally expand this program to include additional plant species which could be made available to nurseries for production purposes.

Time is necessary for production of the local genotyped plant materials. Therefore, it is recommended that the following guidelines be applied to landscaping and restoration activities on Suffolk County property until native genotyped plants are readily available for use:

- Restoration activities in parkland and conservation areas should rely on the seedbank or salvaged native genotyped plants. These areas should not be planted with non-local native plants as much as practical.
- Landscaping activities on developed Suffolk County property and landscaping recommendations for the public should incorporate native plants or non-invasive plant species.”

A native plant treatment protocol would include site-specific considerations, along the lines of:

For all sites to be planted or restored:
an ecologically-trained person should assess the degree of native plant presence on the site or adjacent to it and recommend an acceptable protocol.

For wildlands or sites and parks adjacent to or dominated by native species:
techniques and protocols be followed for local-genotype and site self-regeneration.¹⁹

For basically intact native wildlands that have been disturbed:
an assessment be made as to the probability of self-restoration or a judgment be made as to use contract growing or other appropriate local-genotype techniques and programs available, such as native plant salvage sites.

For lands with special problems, such as erosion control or ornamental needs for public spaces:
if there is still a native cover on the site or adjacent to it, an assessment should include whether it would be preferable to use non-natives known to be non-invasive.

For lands that are already highly developed:
lacking any native material nearby, employ nursery-grown natives or non-natives documented to be non-invasive.

Once invasives have become established, restoration is difficult, usually takes years to see effects, and in some case may be ecologically impossible or economically unfeasible. For these reasons, the County

¹⁹ The Suffolk County Water Authority is developing a handbook, under the authorship of Karen Blumer, is developing a handbook of best management practices and protocol for landscaping with native plants appropriate for Long Island habitats. The key to the handbook is to help users evaluate the type of site they will be working on so they may select the appropriate approach to designing with, or restoring to, native ecosystems. Due to be available in 2007, the handbook may be an important resource for restoration techniques specifically for Long Island. (Karen Blumer is also a member of this Task Force.)

program should focus on prevention strategies. In most cases, however, where invasives are not too established, restoration to at least manageable levels is achievable. In addition, the residents of Suffolk love their natural landscapes and waterways, and want to see them brought back to usable levels. In recognition of these factors, we urge the County to set aside funding for invasives remediation projects and for restoration projects.

We recommend regular funding for invasive restoration projects every year. This may be done by setting aside a portion of the annual operations and capital budget or by creating a new dedicated funding source. In addition, there are several Federal and State grant programs for restoration work. Grant funding often requires a local match (usually 1:1), so dedicating money for restoration work will allow the County to apply for these grants, and County dollars will be doubled in effect. (Please see Strategy 9 for more about funding options.)

Integrated Pest Management (IPM):

Details of control methods will be decided by site review and planning for a given invasives situation. We recommend that the principles of Integrated Pest Management (IPM) guide the selection of methods used in invasives control projects. IPM is a science-based management system that uses all appropriate methods in a compatible manner to reduce invasive populations to levels below those causing unacceptable ecological or economic consequences. IPM includes a decision-making process that reduces risk to natural resources, the public, and the environment from invasives and invasive management-related strategies. The IPM process incorporates the use of different management tools to formulate the best management strategy for a specific invasives situation. The use of a combination of methods, including education and biological, physical, cultural, and herbicide controls, is environmentally and economically more effective than any single method, and minimizes any potential negative impacts to non-target species and human health. In practice, IPM incorporates monitoring injury levels and treatment strategies into an overall decision-making process tailored to individual pest problems.

The use of biological agents, herbicide, and other controls are subject to various regulatory and statutory restrictions and agency policies. Their inclusion in this plan is not an endorsement, but they are an often necessary tool for fighting invasives. Biological controls and herbicides are typically used as a last resort, when other controls are likely to fail or would cause greater harm to the environment, and action is imperative.

Planting Alternatives

Developing “alternatives lists” are necessary. First, they offer positive solutions to a problem, rather than simply urging that certain species should be avoided and eliminated where already planted (*i.e.*, telling people not to plant certain species). Also, once it has been pointed out that certain species are invasive, there is an obligation to offer people alternatives that meet their needs but which are not invasive. Finally, promoting the use of alternatives in the first place, especially instead of plants which are invasive but do not rise to the level of needing to be banned, prevents or slows the spread of a problem in the long run.

The best alternative to planting invasive plants is to plant native plants. Native plants with a local genotype are preferred. Unfortunately, at this time, native plants with a local genotype are not

available in large quantities. The second choice should be native plants with a non-local genotype. Lastly, if there is no true native plant available as a substitute, non-invasive, non-native plants are an adequate option.²⁰

“Alternatives lists” are most effective when they are tailored to individual audiences. Specifically, home gardeners will benefit most from a list that meets their particular interests and needs. This will also be the case for a variety of other audiences, including landscape installation firms, municipalities, nurseries and business park owners. Another important use is as re-vegetation lists in cases of excessive clearing. Wetland protection (and thus surface and drinking water protection) would be greatly improved with the planting of 100-foot buffers of native plants.

There are many excellent resources already existing with alternative plants lists, which may be adopted and used by the County. The Town of East Hampton’s “Guide to the Native Plants, Natural Plant Communities and Exotic and Invasive Species of East Hampton Town” provides lists of native alternatives by habitat type. The Nature Conservancy’s “Top Invasive Plant Threats and Landscaping Alternatives” provides specific information which should be circulated to homeowners and landscapers.

Promoting alternative plants:

One way Suffolk County can provide for better restoration efforts is by encouraging the growth of native species with local genotypes by local nurseries. At this time, there are relatively few nurseries that sell natives or promote natives over invasive stock, citing not enough demand for natives. By buying native plants for itself, Suffolk County also serves the purpose of creating a regular and sizable market for sellers of natives.

Another way the County can provide for better restoration efforts is by encouraging the training of landscape professionals to shift from planting to habitat self-generation restoration techniques as part of the services they provide. The County then can promote such professionals who have already shifted to these new skills.

Promoting the growth and purchase of native plants:

With an increased awareness of the impact of invasives species and the importance of native plants it is essential to provide native plants to the market which are not only species native but genetically native to Long Island. There is a great void in sources of native plants for restoration, landscaping, roadside plantings, and as nursery stock, on Long Island due to a lack of native seed source and demand by consumers. To rectify this situation, the Long Island Native Grass Initiative, coordinated by the Suffolk County Soil & Water Conservation District, was formed by many governmental and private parties in order to provide a local seed source of native grasses on Long Island. Currently this group is focused on collecting 4 native grass species, but with financial, scientific, and staff support, this program has the potential to expand the focus to numerous plant species, as has been done by other

²⁰ Native plants are always preferred over “merely” non-invasive plants. However, the reality at this time is that true natives (with a local genotype) are not available in large quantities. This Report often refers to “native” plants, but the Task Force recognizes that natives may not always be available and that alternatives are acceptable.

ecotype programs across the United States. Such support would provide a truly native source of seed for nursery plant production and restoration activities.

ROWS:

One very promising area for restoration is right-of-ways (ROWS). Regular work is already being done along hundreds of miles of County roads. Planting native plants would be a significant method of re-introducing natives as well as serving as a public education tool. (Please see Strategy 8 for more on this topic.)

Dam removal:

Some of Suffolk's greatest rivers, most notably the Carmans River, have been dammed. This has resulted in stagnant waters where invasive plants thrive. Dams have also resulted in declining or lost fish stock.²¹ Removing dams and restoring water flow would greatly reduce current invasive plant populations as well reduce the chance of future infestations. Even more significantly for some people, this control method does not require the use of chemicals into the water. Dam removal is often regarded with disfavor by adjacent homeowners. Nonetheless, this is a method that must be considered for its efficacy, low cost, and non-chemical solution.

Two of the most prolific aquatic invasive plants found in Long Island waterways are fanwort (*Cabomba carolinia*) and Eurasian milfoil (*Myriophyllum spicatum*). The two species have similar characteristics in that they are used in aquaria and ornamental ponds, and therefore thrive in still, warm waters. Documented occurrences of fanwort on Long Island are all in impoundments, rather than flowing streams. These impounded ponds and lakes are all unnatural, and are created by now obsolete dams built to turn mills, or create ice ponds or cranberry bogs. Fanwort and milfoil are reported to tolerate some water flow, but they also require warm water temperatures. Long Island streams are characterized by naturally low temperatures because they are fed by water bubbling up from the groundwater where it has been cooled. When streams are impounded, however, the water lies still with no overhead protection from trees, resulting in unnaturally high temperatures. Therefore, removing dams and returning impoundments to streams would change the ecosystem from still, warm aquarium-like conditions back to more natural cool, flowing conditions. Not only would this help reduce invasive plant infestations, it would also improve populations of migratory fish like brook trout, alewives and American eel, and restore the overall river ecosystem.

Dam removal helps control invasive species, restore key fish populations and river ecosystems, and avoid use of chemicals. Furthermore, dam removal often entails fiscal benefits because the one-time cost of removing a dam is typically much less than the lifetime costs of maintaining a dam, coupled with the additional costs incurred when a dam breaches and causes downstream flooding and destruction of property and infrastructure. Successful case studies of dam removal projects abound from across the country, and these successes are ready to be replicated on Long Island.²²

Action Item 1: Areas formerly occupied by invasive species should be assessed for the degree of native plant presence on the site or adjacent to it and recommend an

²¹ The Carmans River was once considered a world-class brook trout river.

²² Local groups involved in dam removal feasibility and removal projects include Environmental Defense, American Rivers, and The Nature Conservancy.

acceptable protocol for habitat self-restoration or re-vegetation with plant species appropriate for natural ecosystems.

Action Item 2: Provide training on ecological restoration within County agencies and organizations lacking this instruction.

Action Item 3: Develop and implement effective restoration methods and procedures for areas degraded by invasives.

Action Item 4: Provide a list of accepted native plants as per community/ecological habitat.

Action Item 5: Ensure that locally derived native plant materials are available for ecological restoration projects.

Action Item 6: Provide information and a means to properly dispose of invasive species.

5. Conduct research on invasive species and develop technologies to prevent introduction

Research is done at the Federal and State levels (in this and other States), by universities and Cornell Cooperative Extension, and there is probably little need for full-time research staff at the County level. There is, however, a need for a County employee to be assigned job responsibility for keeping up with up-and-coming invaders and their habits, and with prevention and control methods. This information must then be disseminated regularly as Standard Operating Procedures (SOPs) and Best Management Practices (BMPs) for County agencies, on a County Invasives website, and used in field projects throughout the County. We also recommend this person make her/himself available as a resource to other municipalities and organizations looking for information on invasives and control methods.

The Task Force noted several areas needing further information which would greatly enhance invasive species management:

New and current invasive species on Long Island: more information is needed about new as well as current invasives. Among the information gaps for some species are levels of invasiveness, assessing possible invasiveness newcomers to the area, and cultivars which may be not be invasive.

Native plant seed bank and nursery: there are not enough native plants with a local genotype are being saved and harvested. A native plant nursery could supply plants for County use as well as for the nursery and landscaping industries. (Section 4 has more on the Long Island Native Grass Initiative, and the potential for expanding that program.)

Proper disposal methods of invasive species pulled from its site: Improper disposal, including disposing of still-viable plants or seed material, spreads invasives. In fact, it is a vector for spreading invasives. Proper disposal methods need to be integrated into management activities, as BMPs' or SOPs.

Compost: Compost is a common part of landscaping. Unfortunately, it is also a common method of carrying invasive plant seeds from one site to another. More research is needed in safe and easy

methods of sterilization of compost. This should be followed by recommendations to composters and landscapers to change their practices.

Native right-of-way (“ROW”) plantings list: This would be incorporated into DPW’s SOPs. Dr. Leslie Weston (Cornell University) has already done considerable work in this area, and her work is an excellent starting point.

Nitrogen: Excessive nitrogen is linked to many outbreaks of invasives, both on land and water. Poorly functioning septic systems and excessive fertilizer use put large amounts of nitrogen into the environment. Implementing septic system alternatives, and replacing cesspools with septic systems or sewers should be investigated and the systems upgraded accordingly.²³ Further information and perhaps better technological fixes and public education options should be looked into for methods of reducing nitrogen into WPAs and waterways.

Invasives to Biofuels: The disposal of invasive species is an on-going issue. One disposal method to explore is by recycling invasives to biofuels. An Invasives-to-Biofuel program would serve to dispose of invasives in a safe and economically advantageous.

Action Item 1: Keep informed on current research and identify, evaluate, and clear new and improved integrated pest management and restoration techniques.

Action Item 2: Utilize existing research to better understand the biology and ecology of invasive plants and the conditions that make ecosystems vulnerable to invasion.

Action Item 3: Utilize existing research and conduct local research if necessary to identify the most effective means of seed harvest and propagation for locally derived native plants to be used in ecological restoration.

Action Item 4: Utilize existing research and conduct research to improve methods for restoring and monitoring ecosystem species composition and function after invasive species control.

Action Item 5: Utilize existing research and conduct research into disposal methods which would properly destroy/dispose of invasive species in order to stop inadvertent spread which could occur through removal.

6. Promote public education on invasive species

Education is among the most important factors in motivating people, businesses and institutions to address the invasive species problem. High-quality materials and tools targeted to different audiences by appropriate leaders are necessary. The media needs to be encouraged to report regularly, particularly during planting and growing season, on invasives and non-invasive alternatives.

Target audiences are: the public, public land managers and decision-makers, industry professionals, private landowners of large tracts of land.

²³ This may be funded by the Drinking Water Protection Program’s Sewer System fund.

Topics that need to be communicated regularly in an easy to understand and easy to implement way are: the threat of invasive plants, non-invasive alternatives, IPM, and the need to use caution in activities that may intentionally or unintentionally move invasive plants (“hitch hikers” on boats, shoes, equipment, vehicles).

The public must begin to understand the nature of the invasive species problem, the significance of the impacts, and how human activities contribute to proliferation of the problem. It is difficult to rally support beyond those who are close to the issue when the core of the public is unaware of the issue. Consequently, a public education and awareness campaign is a critical component in a strategy for dealing with invasive species.

Education and outreach can be accomplished through a variety of approaches. Public schools, websites, list serves, the conventional communications media, workshops, educational materials, and in-person presentations can all sensitize the public, agency members and elected representatives to the invasive species issue. Furthermore, Suffolk County has ample opportunity to inform the traveling public via signage at its parks, golf courses, and shore areas. A “walk-and-talk” program at County Parks would allow regular, direct communication between Parks staff and the public.

Website

Websites are an important tool in giving and getting information. An effective website would house a central database of invasives incidence, land managers blog, residential information, lists of invasives plants and native and non-invasive alternatives, and treatment options. The website of the Invasive Plant Atlas of New England (“IPANE”)²⁴ is a very good example of an easy-to-navigate website with sophisticated features. The County should consider partnering with groups like LIISMA or IPC to create and maintain a website. Joint projects like this serve common communication goals and share field work, thereby reducing expenditures (both financial and effort) for each entity. Some key functions the website should provide: a database that contains Island-wide information on invasive species occurrences, monitoring and management. The website would provide information about the lists of species that should not be sold, and additional species that should be managed. Additional functions include a land manager’s blog, weed identification and management information, and links to other websites. The website should allow access to the database, which can be queried to create maps and enable weed reports to be submitted online.

One way of reaching the public may be through a “Good Garden” truck program. Similar to the Good Humor trucks that circle residential areas, the Good Garden truck would circle residential areas adjacent to public lands and waters, during the planting and growing seasons (approximately mid-March to mid-June). The operator, in an easily recognized truck, would stop to help residents identify plants in their yards, especially invasive plants, recommend removal and planting alternatives appropriate to the garden. The truck may even be able to sell native alternatives on the spot, to make planting recommended alternatives easier.

Part of public awareness and outreach should involve the holding of a conference or symposium to draw in expertise from the Northeast to share knowledge and concerns about invasive species.

²⁴ <http://invasives.eeb.uconn.edu/ipane/index.htm>

Speaking at public forums, such as conferences and garden clubs, should be a part of Invasives staff job responsibilities. Large public events, like civic meetings near public lands, garden clubs, boat shows, sport shows, agricultural forums, and aquaria, are venues to reach large audiences.

Signage in ports of entry to public lands and WPAs would inform about invasives in general and caution about invasive “hitch-hikers.” Invasives are often carried from place to place on shoes, vehicles, maintenance equipment, boat propellers, and trailers. Prominently displayed placards/posters at boat launches and trail heads would urge people to look for and dispose (in garbage cans, not on the ground or into the water) any plants they find. A specific control measure to prevent the spread of aquatic plants is to provide water hoses at boat launches to allow boaters to rinse vegetation and other materials from their boats when removing a boat from the water.²⁵

Promoting native alternatives for planting would be a simple way to reduce buying invasives. Part of a public education effort would be to distribute alternative plants lists and promote nurseries which sell natives and landscape professionals who are familiar with invasives, natives and habitat self-restoration techniques.

There are some large tracts of lands and waters owned privately by businesses or non-profit organizations²⁶. These entities, especially near public lands and waters, should be encouraged to plant natives.

One way to involve and encourage participation by growers, sellers and landscapers would be by awarding certification for industry participants who primarily sell or promote natives plants. Prominently displayed in nurseries or places of business, this would also serve as a public education tool.

Partner with Other Public Education Initiatives:

Many existing invasive species management programs have educational components. Such efforts include informational materials like brochures, identification cards, and stickers, and also websites like Sea Grant’s Aquatic Nuisance Species Clearinghouse.²⁷ They also include technical training for volunteers, especially in identification of invasives. Habitattitude urges buyers not to dump their aquatic plants or animals into public places. Habitattitude is a national initiative developed by the Aquatic Nuisance Species (“ANS”) Task Force in partnership with the Pet Industry Joint Advisory Council, U.S. Fish and Wildlife Service, Sea Grant and NOAA, and recently joined by Suffolk County’s Peconic Estuary Program. Habitattitude urges buyers not to dump their aquatic plants or animals into public places and has a website, and has developed materials for pet stores and aquarium stores to display.²⁸ The Stop Aquatic Hitchhikers web site is part of the ANS Task Force public awareness campaign and is sponsored by the U.S. Fish and Wildlife Service and the U.S. Coast Guard.

²⁵ Please see the 1993 NYS Aquatic Plan for more simple, common-sense measures for reducing invasives movement between water bodies.

²⁶ Such as The Nature Conservancy or the Peconic Land Trust.

²⁷ <http://www.aquaticinvaders.org/>

²⁸ <http://www.habitattitude.net/news/display.php?id=341>

Both LIPA or SCWA regularly send mail to their customers and may be interested in including invasives information into the envelope as well.

Action Item 1: Work with LIISMA to develop a website to house a central database for lists of species that should not be sold, and additional species that should be managed, invasives incidence, land managers blog, homeowner information, etc.

Action Item 2: Develop a coordinated, ongoing public education and outreach campaign for youth and adults. This includes incorporating invasive education into existing state and local educational programs, such as programs for Master Gardeners, pesticide applicators, and teachers at all grade levels, including colleges.

Action Item 3: Develop a speakers bureau to speak at garden clubs, conferences, etc.

Action Item 4: Obtain adequate funding and other resources for invasive education, prevention, and management.

Action Item 5: Partner with other municipalities, groups in public education campaigns.

Action Item 6: Develop a media strategy for regular release of information in local newspapers, TV, etc.

Action Item 7: Post invasive species hitch-hiker warning signs at boat launches and trail heads; provide informational flyers to fishermen and hikers.

Action Item 8: Disseminate alternative plants lists, through newspapers articles, website, garden clubs, etc.

Action Item 9: Promote nurseries that sell natives and landscape professionals who plant natives and are familiar with local genotype restoration.

Action Item 10: Develop Good Garden program, or a similar outreach and education program

Action Item 11: Provide information on proper composting techniques to prevent the spread of invasive species through compost.

Action Item 12: Have County Government serve as an example by removing invasive landscaping species plantings from County properties.

7. Foster greater coordination between County agencies, and the public

Greater coordination between County agencies, and between the County and non-County partners (the public, other public and private land managers, groups doing invasives work such as LIISMA and IPC) would reduce duplication of effort and enhance individual efforts. When dealing with such a large geographical area and with a problem which ignores political and ownership boundary lines, coordination is essential.

At this time, there is at this time no central department or division responsible for invasives work, or for coordinating invasives work by multiple agencies in the County (the Parks Department, Department of Public Works, the Office of Ecology (Department of Health), and the Soil & Water Conservation District all do invasives work). This may be solved by creating a new multi-agency

Invasives (or Natural Resources) program. Or by giving authority and responsibility to one agency (most likely the Parks Department) for coordination, plantings lists, information, etc.

Best Management Practices (BMPs) and Standard Operating Procedures (SOPs) need to be developed and adopted by County agencies working on County lands and waters. Suffolk County owns and manages thousand of acres of lands and waters. Parks, roads, and buildings are regularly planted. In addition, it works in rivers and bays. Opportunities exist throughout these agencies to: 1) avoid the use of invasive species in landscaping, habitat restoration, or species management; 2) actively eradicate or control invasive species where practical; and 3) expand the use of native (or at least non-invasive) species of plants and animals and ecologically sound restoration techniques.

Training is needed on basic invasive species prevention procedures within County agencies and organizations lacking such instruction. This would include methods to clean land management equipment, use of only weed-free compost and mulch materials, etc

By purchasing native plants for its own use, Suffolk County also serves the purpose of creating a regular and sizable market for sellers of natives. At this time, there are relatively few nurseries which sell or promote natives over invasive stock, citing not enough demand for natives. Suffolk would provide that market while at the same time leading by example.

An inadvertent beneficial outcome of Suffolk County's leadership on this issue may be increased interest and participation by other municipalities and private land owners.

Websites are a useful tool for coordinating intra-agency and inter-agency efforts. It can also coordinate County efforts with other public and private land managers. As mentioned in the public education section above, a good website would also serve agency coordination. It could house a central database of invasives incidence, land managers blog, and treatment options. Ideally, anyone would be able to report incidence of invasives into the database. A land managers' blog would allow sharing information about treatment options, their efficacy, etc. The website of the Invasive Plant Atlas of New England (IPANE)²⁹ is a very good example of an easy to navigate website with sophisticated features.

Improve coordination with other governmental entities

Coordinate with NYS agencies working on LI. Such as NYS DOT, DEC or OPRHP.

Locally, coordinate with Nassau County (who is going through a similar invasive species management planning effort at this time) and Towns and Villages.

Other entities include:

LIRR ROWs

SCWA

LIPA ROWs

BNL

²⁹ <http://invasives.eeb.uconn.edu/ipane/index.htm>

Action Item 1: Create a new Invasives division, or assign responsibility to an existing County agency for invasives work. This Invasives program will be responsible for coordinating within the County as well as outside the County.

Action Item 2: Develop Best Management Practices and Standard Operating Procedures for the County, in particular for roads, active recreation parks, golf courses and other lands regularly planted, which will: 1) phase out use of invasive species in landscaping, habitat restoration, or species management; 2) actively eradicate or control invasive species where practical; and 3) expand the use of native (or at least non-invasive) species of plants and animals, and ecologically sound restoration techniques.

Action Item 3: Provide training on invasive species prevention within County agencies and organizations lacking such instruction. Include methods to help prevent the spread of invasive such as methods to clean land management equipment, the use of only weed-free compost and mulch materials, etc

Action Item 4: Test pilot projects for native roadside plantings or native gardens.

8. Create an Advisory Board, if necessary, to continually study prevention, control and remediation efforts necessary to combat invasive species.

Including a discussion of existing County staff and funding resources, and recommending ways to close any potential staff or funding gaps which stand in the way of implementation.

This Report strongly recommends the creation of a permanent Invasive Species Advisory Board. Realizing that invasives are a current and a future problem, the Advisory Board would guide future management goals and strategies as invasives problems change and evolve. The Advisory Board would serve the purpose of helping prioritize agencies efforts. The Advisory Board would help review and coordinate all the County agencies doing invasives work. The Advisory Board would be especially useful in providing review for defining a list of invasives species to be banned or controlled. We recommend the Advisory Board include County agency staff and members of environmental and civic groups.

Measuring Progress:

The Advisory Board would keep track of progress. We recommend the Advisory Board as well as key agency staff prepare an annual progress report. The annual progress report would be presented to the Suffolk County Environment, Planning and Agriculture Committee and the County Executive. It would also be available to the public.

Staffing Recommendations:

“Proper management of the introduction of invasive aquatic species and their potential impacts will require the commitment of staff and resources. In light of the past history of invasive aquatic species introductions, both harmful and beneficial, the cost and benefits of this activity must be evaluated and prioritized against current activities, existing staff and resource commitments, and the likelihood of achieving identified objectives. Long term, effective prevention and control of invasive aquatic species introductions as well as managing the abundance of and impacts of those invasive species already

introduced will require [County] funding support beyond current levels in order to implement the plan described herein.”³⁰

This Report urges Suffolk County to protect its investment in its lands and waters and its residents’ quality of life, and to adequately fund and implement an invasive species management program.

Suffolk County currently does not employ any staff dedicated to invasives species management of the County’s over 46,000 acres of open space acres and even more acres of underwater lands. In the Parks Department, adding up all the paid, seasonal and volunteer hours currently working on invasives species totals about 2 FTEs. All of these people have other job responsibilities than invasives control. There are no staff trained specifically for invasives identification, management planning and control.

Department of Public Works:

DPW has responsibility for a number of areas which are regularly planted and maintained, and which therefore are possible vectors for invasives, or which could alternatively be used to re-introduce natives to the area. These areas include: County buildings, roads, maintenance facilities, and regular work with local beautification groups.

There are three major vectors for invasives into County lands and waters: roads and railroads/trains (ROWs), boats (covered in Strategy 7), and trails (covered in Strategy 7), which should be addressed in order to prevent dispersal of invasive species.

A major vector for invasives into County open spaces are roads. This is for two reasons: 1) they are planted regularly with non-native, sometimes even invasive species³¹, and 2) some of them intersect or are adjacent to County parklands. Roads are planted and mowed regularly. Substituting native alternatives would give a number of benefits: environmentally sensitive, local character, ecologically diverse, erosion control, wildlife habitat, with reduced use of water, chemicals, mowing, and fertilizer. They are an ideal candidate for pilot projects for native plantings. Planting with natives would both reduce non-native plants in the area (and their spread) it would also re-introduce natives. (See Appendix D for Examples of Native Roadside Groundcovers.)

U.S Department of Transportation Federal Highway Administration has a very good website called The Roadside Use of Native Plants³². The website includes Native Plants for Landscape Use in New York³³ and planting and management plans.

Because changing roadside plantings to native species is not easy and is relatively untried in Suffolk County, pilot projects may be a good way to start an eventual change to roadside planting decisions. DPW and the NYS Department of Transportation³⁴, could come up with three 5-acre pilot project

³⁰ 1993 NYS Aquatic Plan

³¹ Arguably the most famous example of this is kudzu, which was planted to stabilize roadsides and ended up as “the plant that ate the South.” Kudzu is now seen in patches on Long Island.

³² <http://www.fhwa.dot.gov/environment/rdsduse/index.htm>.

³³ <http://www.fhwa.dot.gov/environment/rdsduse/ny.htm>

³⁴ Darrel Kost is the local remediation specialist for NYSDOT, and a good resource for this kind of project.

sites by 2007.³⁵ Pilot projects and, eventually, broader native plantings may be chosen by adjacency of the road to WPAs and buffer areas:

1. County Roadways where invasives are currently spreading to WPAs
2. County Roadways bordering the rest of the WPAs
3. County roadways next to open space (county parks, state parks, town parks, etc)

A potential funding source would be the National Scenic Byways Program for NYSDOT to implement on North Fork Trail Byway (Rte 25 on the North Fork).

Priority areas for DPW invasives work would be roads adjacent to County holdings, such as: CR 51, 105, 104, 21, Wm Floyd Parkway, and Montauk Highway (County-owned sections).

Such a pilot project implemented on roads traversed by countless people daily, serves as an excellent public educational tool. It would also demonstrate Suffolk County's dedication to preserving/conserving public resources.

We recommend hiring (or allocating current staff to full-time invasives work) 1 full-time person to DPW. This person's job responsibilities would include overseeing field staff, invasives management planning and implementation, and native alternatives planning and maintenance. To adequately capture the necessary level of experience and training, the person should be hired for a Grade 19 position's qualifications.

Invasives work should be a regular part of the job responsibilities of the Environmental Stewardship program within the Parks Department and the Storm Water Management and Remediation unit in the Department of Public Works. In 2005, the Stewardship team was increased from four to sixteen individuals to handle the clean-up of illegal dumping, inappropriate and illegal uses of public lands, and the protection of the land's important natural features. Their job responsibilities should include surveying for and removal of invasive species and native plant pilot project implementation and maintenance.

While DPW is a well-equipped Department, we recommend buying two Geographical Positioning Systems (GPS) system units for their invasives surveying and monitoring work.

Department of Parks, Recreation & Conservation:

Parks is responsible for all the lands and waters owned by Suffolk County, which is over 46,000 acres of land and even more of rivers, creeks and bays. Implementation of an invasives control program requires additional resources of staff, equipment and supplies. We recommend hiring (or allocating existing staff to full-time Invasives work) 4 new permanent staff, 20 seasonal staff, and, as needed, contractors with expertise in eradication for a given situation.

Permanent staff would ideally consist of at least one terrestrial invasives specialist and at least one aquatic (freshwater and marine) invasives specialist. To adequately meet their job responsibilities we

³⁵ Another excellent resource for information is Dr. Leslie Weston, who is currently working with the NYS DOT to evaluate native species for use along roadsides as low maintenance, invasive suppressive alternatives.

recommend the staff be hired at 2 positions at a Grade 19 and 2 positions at a Grade 14. Job responsibilities would include conducting literature research to identify potential invasive species introductions, and to determine how their introduction could be detected and prevented. He/she would also develop detailed species-specific plans for invasive species control, develop BMPs, coordinate with other agencies as required, screen samples submitted by the public for invasive organisms, and assist in planning and accomplishing monitoring programs. Leading and coordinating seasonal and volunteer staff is crucial to fulfilling field activities. Staff members would participate in public educational programs.

One suggestion for enforcement of the recommended invasive species ban is having trained Parks Department staff randomly check sellers' businesses (including nurseries and pet stores). This effort may be coordinated with Parks Police.

We recommend permanent staff generate an annual report to the public of the activities of the unit and the status of invasive species of concern. Another primary responsibility within its first year of operation would be to generate a set of SOPs to be followed by County agencies. These SOPs would insure that County activities were not introducing or spreading invasive species.

During the summer months, seasonal staff are necessary for on-the-ground and in-the-water work. We recommend 20 seasonal staff be hired. Job responsibilities would include screen samples, mapping and monitoring, and early detection and rapid response efforts to remove invasives. Seasonal staff are, of course, much easier and less expensive to hire.

Priority areas for creating management plans and implementing invasives work in the first two years of are on page 9.

Some non-conventional sources for free seasonal staff are:

The Community Service Program provides as an alternative sentence a supervised program in which participants perform various positive and constructive services for charitable community organizations and towns.

The Sheriff's Office also has a Farm Program for work on the County and Cornell Cooperative Extension farm, in Yaphank.³⁶ This program should be investigated to see if it may be expanded to include other County lands.

Volunteers can have tremendous impact on the outcome of a local invasive species problem and must be considered in any successful strategy. It is important to recognize that a volunteer workforce will function in proportion to the amount of training and support provided by lead agencies. Organization and guidance are of critical importance. The identification of priority species and instructional information about survey, detection and record keeping can exponentially enhance County efforts to detect and record the presence of invasives at a minimal cost.

³⁶ <http://www.co.suffolk.ny.us/webtemp3.cfm?dept=36&id=1954>

Invasives work requires specialized equipment and we recommend buying 12 Geographical Positioning Systems (GPS) system units for their invasives surveying and monitoring work, two 4-wheel drive pickup trucks for field work, weed wrenches and a brush hog for species removal.

Equipment is often shared between DPW and Parks, and this will keep costs down or shared between the Departments.

Funding Opportunities:

Federal and State grants for both planning activities as well as on-the-ground field work are available. Grant funding often requires a local match (usually 1:1). We recommend the County regularly put aside money for invasives restoration projects every year. Given the number of acres to be managed, the amount for invasives work, and natural resource management in general, should probably be in the amount of about \$3-6 million/year. This may be done by setting aside a portion of the annual operations and capital budget or by creating a new dedicated funding source. Dedicating money for restoration work will allow the County to apply for these grants, and County dollars will be doubled in effect. In addition, partnering with other entities doing invasives work on Long Island will stretch County funds and staff's efforts.

Some current public funding opportunities:

New York State:

Efforts over the last 3 years at the State level have resulted in new funding grants programs, including:

- NYS Aquatic Nuisance Species grants (DEC website link:

<http://www.dec.state.ny.us/website/dfwmr/habitat/erad.html>). In 2005, the County successfully applied for a \$50,000 grant for aquatic invasives removal in the Peconic Estuary.

- NYS Invasives grants through the Environmental Protection Fund program. This is a new program which is currently developing its grant requirements.

County funding:

Needs to be increased for staff, equipment and capital projects

We recommend re-authorizing the Drinking Water Protection Program (a ¼% sales tax) to re-allocate its funding distributions to include Land Management which would pay for invasive species management on County lands and waters. Another option is the creation of a park district to fund management activities.

Partnering with other private and public efforts, especially for Federal grants:

Some of these entities are already implementing invasives programs. Partnering with them would allow both entities to get their work done for less money.

LIISMA

Nassau County

US Fish & Wildlife Service

NYS DEC

Long Island Pine Barrens Commission

Brookhaven National Laboratory's Foundation for Ecological Research (FERN)

Action Item 1: Create a permanent Invasive Species Advisory Board, to guide future management goals and strategies as invasives problems change and evolve, as well as foster intra-agency coordination

Action Item 2: The Advisory Board as well as key agency staff will present an annual progress report, to the Suffolk County Environment, Planning and Agriculture Committee, the County Executive and the public, to measure progress, including:

Action Item 3: Determine if invasives management programs accomplish the recommendations of the annual action plan, including education and training programs. Make changes to this plan and annual action plans as needed.

Action Item 4: Determine if the threat of invasive plants is being abated and if the integrity and viability of conservation targets are being maintained or enhanced.

Action Item 5: Use an adaptive management approach to increase the effectiveness of invasive species control and restoration efforts.

Action Item 6: Hire (or move internally) 1 staff person specifically trained for invasives management in the Department of Public Works.

Action Item 7: Make invasives monitoring and management a regular part of the job responsibilities of the Environmental Stewardship program in the Department of Public Works.

Action Item 8: Hire (or move internally) 4 staff people specifically trained in terrestrial and aquatic invasives management in the Suffolk County Department of Parks, Recreation & Conservation

Action Item 9: Hire 20 seasonal staff in the Suffolk County Department of Parks, Recreation & Conservation, for invasives management work, including invasive species removal, disposal, education events, planting, literature compilation, research and mapping.

Action Item 10: Explore the use of non-conventional, inexpensive manpower options, such as community service programs.

Action Item 11: Develop a volunteer program to help implement invasive species management program.

Appendix A: Suffolk County Enabling Resolution 985-05

Intro. Res. No. 1968-2005

Laid on Table 8/23/2005

Introduced by Legislator O'Leary

RESOLUTION NO. 985 –2005, TO ESTABLISH A WATER AND LAND INVASIVES CONTROL TASK FORCE TO DEVELOP AND IMPLEMENT AN INVASIVES CONTROL PROGRAM FOR SUFFOLK COUNTY'S LANDS AND WATERS

WHEREAS, non-native invasive plants and animals in our waters and lands can displace native species and alter natural ecosystems, and are considered to be the second leading cause of species extinction and endangerment worldwide; and

WHEREAS, these invasive plants and animals can negatively impact agriculture, industry, recreation and human health; and

WHEREAS, these invasive plants and animals negatively impact County residents' ability to swim, fish, boat, hike, and other activities involving the County's natural resources, and thus impact residents' quality of life; and

WHEREAS, during the twentieth century, invasive species were responsible for documented losses of 97 billion dollars to the U.S. economy; and

WHEREAS, in Suffolk County, the invasive, non-native species *Cabomba caroliniana* (Fanwort), used extensively in aquariums, has already caused severe damage to Yaphank Lake, interfering with the recreational and aesthetic uses of that lake, and will cost hundreds of thousands of dollars to ameliorate; and

WHEREAS, preventive actions to stop the spread of invasives before they start to take hold is far more cost-effective than trying to remedy the problem afterwards; and

WHEREAS, action must be taken to prevent other invasive non-native plant and animal species from causing damage to the lands and waters of Suffolk County; and

WHEREAS, a coordinated public/private effort is needed but has not yet been organized to develop and implement an invasive species control policy or strategies; and

WHEREAS, it is essential to protect the waters and lands of Suffolk County by creating a Water and Land Invasives Control Task Force to set a long-term invasives control policy, and strategies for implementation, for Suffolk County; now, therefore, be it

1st **RESOLVED**, that the special Suffolk County Water and Land Invasives Control Task Force is hereby created to develop a long-term plan for dealing with current and future invasive issues in County waters and lands; and be it further

2nd **RESOLVED**, that this Water and Land Invasives Control Task Force shall prepare a report to the Legislature and the County Executive that provides specific recommendations regarding:

- 1) preventing the introduction of invasive species;

- 2) detecting and responding rapidly to control populations of invasive species in a cost-effective and environmentally sound manner;
- 3) monitoring invasive species populations accurately and reliably;
- 4) providing for restoration of native species and habitat conditions in ecosystems that have been invaded;
- 5) conducting research on invasive species and developing technologies to prevent introduction;
- 6) promoting public education on invasive species;
- 7) fostering greater coordination between the pertinent County agencies and the public; and
- 8) the creation of an Advisory Board, if necessary, to continually study prevention, control and remediation efforts necessary to combat invasive species.

and be it further

3rd **RESOLVED**, that this Water and Land Invasives Control Task Force shall consist of the following thirteen (13) members:

- 1) the Presiding Officer, or his or her designee;
- 2) the County Executive, or his or her designee;
- 3) the Director of the Suffolk County Department of Parks, Recreation, or Conservation, or his designee;
- 4) the Commissioner of the Suffolk County Department of Public Works, or his designee;
- 5) the Chair of the Environment, Planning & Agriculture Committee, who shall serve as Chair;
- 6) a specialist in terrestrial invasives, to be selected by the Suffolk County Legislature;
- 7) a specialist in marine invasives, to be selected by the Suffolk County Legislature;
- 8) two (2) representatives from a recognized environmental organization, one (1) to be selected by the Majority Leader of the Suffolk County Legislature, and one (1) to be selected by the Minority Leader of the Suffolk County Legislature, provided that these two representatives shall not be from the same recognized environmental organization;
- 9) two (2) representatives from a recognized civic organization, one (1) to be selected by the Majority Leader of the Suffolk County Legislature, and one (1) to be selected by the Minority Leader of the Suffolk County Legislature, provided that these two representatives shall not be from the same recognized civic organization;

10) a representative from Cornell Cooperative Extension; and

11) a representative from the County Soil & Water Conservation District;

and be it further

4th RESOLVED, that the Water and Land Invasives Control Task Force shall hold its first meeting no later than thirty (30) days after the oaths of office of all members have been filed, which meeting shall be convened by the Chairman of the Water and Land Invasives Control Task Force, for the purpose of organization and the appointment of a vice chairperson and a secretary; and be it further

5th RESOLVED, that the members of said Water and Land Invasives Control Task Force shall serve without compensation and shall serve at the pleasure of their respective appointing authorities; and be it further

6th RESOLVED, that the Water and Land Invasives Control Task Force shall meet at least once per month, keep a record of all its proceedings, and determine the rules of its own proceedings with special meetings to be called by the Chairperson upon his or her own initiative or upon receipt of a written request therefor signed by at least three (3) members of the Water and Land Invasives Control Task Force. Written notice of the time and place of such special meetings shall be given by the secretary to each member at least four (4) days before the date fixed by the notice for such special meeting; and be it further

7th RESOLVED, that seven (7) members of the Water and Land Invasives Control Task Force shall constitute a quorum to transact the business of the Water and Land Invasives Control Task Force at both regular and special meetings; and be it further

8th RESOLVED, that the Water and Land Invasives Control Task Force may submit requests to the County Executive and/or the County Legislature for approval for the provision of secretarial services, travel expenses, or retention of consultants to assist the Water and Land Invasives Control Task Force with such endeavors, said total expenditures not to exceed Five Thousand (\$5,000.00) per fiscal year, which services shall be subject to Legislative approval; and be it further

9th RESOLVED, that clerical services involving the month-to-month operation of this Water and Land Invasives Control Task Force, as well as supplies and postage as necessary, will be provided by the staff of the County Department of Public Works; and be it further

10th RESOLVED, that the Water and Land Invasives Control Task Force may conduct such informal hearings and meetings at any place or places within the County of Suffolk for the purpose of obtaining necessary information or other data to assist it in the proper performance of its duties and functions as it deems necessary; and be it further

11th RESOLVED, that the Water and Land Invasives Control Task Force may delegate to any member of the Water and Land Invasives Control Task Force the power and authority to conduct such hearings and meetings; and be it further

12th RESOLVED, that the Water and Land Invasives Control Task Force shall cooperate with the Legislative Committees of the County Legislature and make available to each Committee's use, upon request, any records and other data it may accumulate or obtain; and be it further

13th RESOLVED, that this special Water and Land Invasives Control Task Force shall submit a written report of its findings and determinations together with its recommendations for action, if any, to each member of the County Legislature and the County Executive no later than one hundred eighty (180) days subsequent to the effective date of this Resolution for consideration, review, and appropriate action, if necessary, by the entire County Legislature; and be it further

14th RESOLVED, that the Water and Land Invasives Control Task Force shall expire, and the terms of office of its members terminate, six (6) months after the oaths of office have been filed with the Clerk of the County Legislature, at which time the Water and Land Invasives Control Task Force shall file a report with the Legislature, and deposit all the records of its proceedings with the Clerk of the Legislature; and be it further

15th RESOLVED, that this study shall not be performed by any outside consultant or consulting firm unless explicit approval and authorization for such consultant or consulting firm is granted pursuant to a duly enacted resolution of the County Legislature; and be it further

16th RESOLVED, that this Legislature, being the State Environmental Quality Review Act (SEQRA) lead agency, hereby finds and determines that this resolution constitutes a Type II action pursuant to Section 617.5(c)(20) and (27) of Title 6 of the NEW YORK CODE OF RULES AND REGULATIONS (6 NYCRR) and within the meaning of Section 8-0109(2) of the NEW YORK ENVIRONMENTAL CONSERVATION LAW as a promulgation of regulations, rules, policies, procedures, and legislative decisions in connection with continuing agency administration, management and information collection, and the Suffolk County Council on Environmental Quality (CEQ) is hereby directed to circulate any appropriate SEQRA notices of determination of non-applicability or non-significance in accordance with this resolution.

DATED: September 27, 2005

APPROVED BY:

/s/ Steve Levy
County Executive of Suffolk County
Date: October 3, 2005

Appendix B: Massachusetts Criteria for Evaluating Non-Native Plant Species for Invasiveness

The Massachusetts Invasive Plant Advisory Group (MIPAG) defines invasive plants as *non-native species that have spread into native or minimally managed plant systems in Massachusetts. These plants cause economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.* As defined here, "species" includes all synonyms, subspecies, varieties, forms, and cultivars of that species unless proven otherwise by a process of scientific evaluation.

The following criteria are being used to objectively evaluate and categorize plant species suspected of being, or with the potential to become, invasive in Massachusetts. They were developed by the George Safford Torrey Herbarium at the University of Connecticut and a subcommittee of the Massachusetts Invasive Plant Group representing science, nursery, and conservation professionals.

The criteria enable the separation of plants into the following categories:

- *Invasive Plants in Massachusetts*
- *Likely Invasive Plants in Massachusetts*
- *Potentially Invasive Plants in Massachusetts (species not currently known to be naturalized in Massachusetts, but that can be expected to become invasive within minimally managed habitats within the Commonwealth)*

For a species to be included on the list of species determined to be **Invasive, Likely Invasive or Potentially Invasive** in Massachusetts, it must be substantiated by scientific investigation (including herbarium specimens, peer-reviewed papers, published records and other data available for public review) to meet specific criteria. The process of reviewing individual plant species for their invasiveness in Massachusetts is ongoing and may result in a change in status pending new data and further review.

Tabular summary of criteria to be met

Criteria that must be met	
Base criteria	1-4
Invasive	1-9
Likely Invasive	1-5, at least one of 6-9, at least one of 10-12
Potentially Invasive	1-4, (not 5), 13-15

For a species to be designated as “INVASIVE”, “LIKELY INVASIVE” or “POTENTIALLY INVASIVE” it must to meet certain base criteria (#1-4 below). The species must:

1. Be nonindigenous to Massachusetts.
2. Have the biologic potential for rapid and widespread dispersion and establishment in minimally managed habitats.
3. Have the biologic potential for dispersing over spatial gaps away from site of introduction.
4. Have the biologic potential for existing in high numbers away from intensively managed artificial habitats.

If a species does not meet all four of the previous criteria, stop here. The species cannot be listed at this time.

If a species meets all four, go on to #5.

5. Be naturalized in Massachusetts (persists without cultivation in Massachusetts)

If a species meets Criteria 1-4 and Criterion 5, it may be considered “INVASIVE ” or “LIKELY INVASIVE” in Massachusetts. Go to Criteria 6-9.

If it does not meet Criterion 5, it may be considered “POTENTIALLY INVASIVE” if it meets Criteria 13-15.

6. Be widespread in Massachusetts, or at least common in a region or habitat type(s) in the state.

7. Have many occurrences of numerous individuals in Massachusetts that have high numbers of individuals forming dense stands in minimally managed habitats

8. Be able to out-compete other species in the same natural plant community.

9. Have the potential for rapid growth, high seed or propagule production and dissemination, and establishment in natural plant communities.

If a species meet the initial five Criteria and Criteria 6-9 it may be considered a “INVASIVE” species in Massachusetts.

If a species meets the initial five Criteria, but does not meet all of Criteria 6-9 at this time, it may be considered a “LIKELY INVASIVE” species in Massachusetts if in addition it meets at least one of the following three Criteria (#10-12).

10. Have at least one occurrence in Massachusetts that has high numbers of individuals forming dense stands in minimally managed habitats

11. Have the potential, based on its biology and its colonization history in the northeast or elsewhere, to become invasive in Massachusetts.

12. Be acknowledged to be invasive in nearby states but its status in Massachusetts is unknown or unclear. This may result from lack of field experience with the species or from difficulty in species determination or taxonomy.

If the species meets the basic criteria for invasiveness (Criteria 1-4) but is not naturalized in Massachusetts (Criterion 5), the species may be considered “POTENTIALLY INVASIVE” in Massachusetts if it meets the following three criteria (#13-15):

13. The species, if it becomes naturalized in Massachusetts, based on its biology and biological potential, would pose an imminent threat to the biodiversity of Massachusetts **and**

14. Its naturalization in Massachusetts is anticipated, **and**

15. The species has a documented history of invasiveness in other areas of the Northeast.

Source: Final Report: “The Evaluation of Non-Native Plant Species for Invasiveness in Massachusetts” Massachusetts Invasive Plant Advisory Group, February 28, 2005

Connecticut and Massachusetts Invasive Species Lists

Connecticut Invasive Plant List

Source: <http://www.hort.uconn.edu/cipwg/>

CT Invasive Plants Council

January 2004

Ordered by Common Name

Statement to accompany list – January 2004: This is a list of species that have been determined by floristic analysis to be invasive or potentially invasive in the state of Connecticut, in accordance with PA 03-136. The Invasive Plants Council will generate a second list recommending restrictions on some of these plants. In developing the second list and particular restrictions, the Council will recognize the need to balance the detrimental effects of invasive plants with the agricultural and horticultural value of some of these plants, while still protecting the state's minimally managed habitats.

In May 2004, Public Act 04-203 banned a subset of the January 2004 list making it illegal to move, sell, purchase, transplant, cultivate, or distribute banned plants.

@ column indicates growth form or habitat: **A** = Aquatic & Wetland; **G** = Grass & Grass-like; **H** = Herbaceous; **S** = Shrub; **T** = Tree; **V** = Woody Vine

Explanation of symbols after Common Name:

(P) indicates Potentially Invasive (all other plants listed are considered Invasive in Connecticut)

***** denotes that the species, although shown by scientific evaluation to be invasive, has cultivars that have not been evaluated for invasive characteristics. Further research may determine whether or not individual cultivars are potentially invasive. Cultivars are commercially available selections of a plant species that have been bred or selected for predictable, desirable attributes of horticultural value such as form (dwarf or weeping forms), foliage (variegated or colorful leaves), or flowering attributes (enhanced flower color or size).

indicates species that are not currently known to be naturalized in Connecticut but would likely become invasive here if they are found to persist in the state without cultivation

BAN column indicates ban date: **2003** = banned under PA 03-136; **2004** = effective October 1, 2004; **2005** = effective October 1, 2005; **N/A** = invasive or potentially invasive plants not banned under PA 04-203

COMMON NAME	@	SCIENTIFIC NAME	SYNONYMS	BAN
American water lotus (P)	A	<i>Nelumbo lutea</i> (Willd.) Pers.	American lotus-lily	2005
Amur honeysuckle	S	<i>Lonicera maackii</i> (Rupr.) Maxim.		2004
Amur maple (P)	T	<i>Acer ginnala</i> L.		N/A
Autumn olive	S	<i>Elaeagnus umbellata</i> Thunb.		2004
Bell's honeysuckle	S	<i>Lonicera X bella</i> Zabel	Belle honeysuckle	2004
Bittersweet nightshade (P)	H	<i>Solanum dulcamara</i> L.	Climbing nightshade	2004
Black locust*	T	<i>Robinia pseudo-acacia</i> L.		N/A
Black swallow-wort	H	<i>Cynanchum louiseae</i> Kartsch & Gagnoli	Vincetoxicum or <i>Cynanchum nigrum</i>	2004
Border privet (P)	S	<i>Ligustrum obtusifolium</i> Sieb. & Zucc.		2005
Brazilian water-weed (P)	A	<i>Egeria densa</i> Planchon	Anacharis; Egeria	2003
Bristled knotweed (P)	H	<i>Polygonum caespitosum</i> Blume	Smartweed	2004
Brittle water-nymph (P)	A	<i>Najas minor</i> All.	Eutrophic water-nymph	2005
California privet (P)	S	<i>Ligustrum ovalifolium</i> Hassk.		N/A
Canada bluegrass (P)	G	<i>Poa compressa</i> L.		2004
Canada thistle (P)	H	<i>Cirsium arvense</i> (L.) Scop.		2004
Coltsfoot	H	<i>Tussilago farfara</i> L.		2004
Common barberry	S	<i>Berberis vulgaris</i> L.		2004
Common buckthorn	S	<i>Rhamnus cathartica</i> L.		2004
Common kochia (P)	H	<i>Kochia scoparia</i> (L.) Schradler	Summer cypress; Fireweed	2004
Common reed	G	<i>Phragmites australis</i> (Cav.) Trin.	Phragmites	2004
Common water-hyacinth* (P)	A	<i>Eichhornia crassipes</i> (Mart.) Solms		N/A
Crested late-summer mint (P)	H	<i>Elsholtzia ciliata</i> (Thunb.) Hylander	Elsholtzia	2004
Crispy-leaved pondweed	A	<i>Potamogeton crispus</i> L.	Curly or Curly-leaved pondweed	2003
Cup plant (P)	H	<i>Silphium perfoliatum</i> L.		2004
Cypress spurge (P)	H	<i>Euphorbia cyparissias</i> L.		2004
Dame's rocket	H	<i>Hesperis matronalis</i> L.		2004
Drooping brome-grass (P)	G	<i>Bromus tectorum</i> L.	Cheatgrass	2004
Dwarf honeysuckle* (P)	S	<i>Lonicera xylosteum</i> L.	European fly-honeysuckle	2005
Eulalia* (P)	G	<i>Miscanthus sinensis</i> Anderss.	Chinese or Japanese silvergrass	N/A
Eurasian watermilfoil	A	<i>Myriophyllum spicatum</i> L.		2003
European privet (P)	S	<i>Ligustrum vulgare</i> L.		N/A
European waterlover (P)	A	<i>Marsilea quadrifolia</i> L.	Water shamrock	2005
False indigo (P)	S	<i>Amorpha fruticosa</i> L.		2004
Fanwort	A	<i>Cabomba caroliniana</i> A. Gray		2003
Fig buttercup	H	<i>Ranunculus ficaria</i> L.	Lesser celandine	2004
Flowering rush (P)	A	<i>Butomus umbellatus</i> L.		2005
Forget-me-not	A	<i>Myosotis scorpioides</i> L.	True forget-me-not; Water scorpion-grass	2005
Garden heliotrope (P)	H	<i>Valeriana officinalis</i> L.	Valerian	2004
Garden loosestrife* (P)	H	<i>Lysimachia vulgaris</i> L.		2005
Garlic mustard	H	<i>Alliaria petiolata</i>	auth. = (Bieb.) Cavara & Grande	2004
Giant hogweed (P)	H	<i>Heracleum mantegazzianum</i>	auth. = Sommier & Lavier	2004

COMMON NAME	@	SCIENTIFIC NAME	SYNONYMS	BAN
Giant knotweed (P)	H	<i>Polygonum sachalinense</i>	auth. = F. Schmidt ex Maxim.; <i>Fallopia s...</i>	2004
Giant salvinia* (P)	A	<i>Salvinia molesta</i> Mitchell complex		2005
Glossy buckthorn	S	<i>Franquia alnus</i> Mill.	European buckthorn; <i>Rhamnus franquia</i>	N/A
Goutweed	H	<i>Aegopodium podagraria</i> L.		2005
Ground ivy (P)	H	<i>Glechoma hederacea</i> L.	Run-away robin; Gill-over-the-ground	2004
Hairy jointgrass (P)	G	<i>Arthraxon hispidus</i> (Thunb.) Makino	Small carpgrass	2004
Hydrilla	A	<i>Hydrilla verticillata</i> (L.f.) Royle		2003
Japanese barberry*	S	<i>Berberis thunbergii</i> DC.		N/A
Japanese honeysuckle*	V	<i>Lonicera japonica</i> Thunb.		2005
Japanese hops (P)	H	<i>Humulus japonicus</i> Sieb. & Zucc.		2004
Japanese knotweed	H	<i>Polygonum cuspidatum</i> Sieb. & Zucc.	<i>Fallopia japonica</i>	2004
Japanese sedge* (P)	G	<i>Carex kobomugi</i> Owhi		2004
Japanese stilt grass	G	<i>Microstegium vimineum</i>	auth. = (Trin.) A. Camus	2004
Jimsonweed (P)	H	<i>Datura stramonium</i> L.		2004
Kudzu (P)	V	<i>Pueraria montana</i> (Lour.) Merr.	<i>Pueraria lobata</i>	2004
Leafy spurge	H	<i>Euphorbia esula</i> L.		2004
Mile-a-minute vine	H	<i>Polygonum perfoliatum</i> L.		2004
Moneywort* (P)	H	<i>Lysimachia nummularia</i> L.	Creeping jenny	N/A
Morrow's honeysuckle	S	<i>Lonicera morrowii</i> A. Gray		2004
Multiflora rose	S	<i>Rosa multiflora</i> Thunb.		2004
Narrowleaf bittercress	H	<i>Cardamine impatiens</i> L.		2004
Norway maple*	T	<i>Acer platanoides</i> L.		N/A
Onerow yellowcress (P)	A	<i>Rorippa microphylla</i>	auth. = (Boenn. ex Reichenb.) Hyl. ex A. & D. Löve	2005
Oriental bittersweet	V	<i>Celastrus orbiculatus</i> Thunb.	Asiatic bittersweet	2004
Ornamental jewelweed* (P)	H	<i>Impatiens glandulifera</i> Royle	Tall impatiens	2004
Pale swallow-wort	H	<i>Cynanchum rossicum</i> (Klee.) Borisi	<i>Vincetoxicum rossicum</i>	2004
Parrotfeather (P)	A	<i>Myriophyllum aquaticum</i>	auth = (Vell.) Verdc.	2005
Perennial pepperweed	H	<i>Lepidium latifolium</i> L.	Tall pepperwort	2004
Pond water-starwort (P)	A	<i>Callitriche stagnalis</i> Scop.		2005
Porcelainberry* (P)	V	<i>Ampelopsis brevipedunculata</i>	auth. = (Maxim.) Trautv.	N/A
Princess tree (P)	T	<i>Paulownia tomentosa</i>	auth. = (Thunb.) Steudel; Empress-tree	2004
Purple loosestrife	A	<i>Lythrum salicaria</i> L.		2005
Ragged robin (P)	H	<i>Lychnis flos-cuculi</i> L.		2004
Reed canary grass	G	<i>Phalaris arundinacea</i> L.		N/A
Reed mannagrass (P)	G	<i>Glyceria maxima</i> (Hartman) Holmberg	Tall mannagrass	2004
Rugosa rose* (P)	S	<i>Rosa rugosa</i> Thunb.	Beach, Salt spray, Jap., or Ramanas Rose	N/A
Russian olive (P)	S	<i>Elaeagnus angustifolia</i> L.		2004
Scotch thistle (P)	H	<i>Onopordum acanthium</i> L.		2004
Sheep sorrel (P)	H	<i>Rumex acetosella</i> L.		2004
Slender snake cotton (P)	H	<i>Froelichia gracilis</i> (Hook.) Moq.	Cottonweed	2004
Spotted knapweed	H	<i>Centaurea biebersteinii</i> DC.	<i>Centaurea maculosa</i>	2004
Star-of-Bethlehem (P)	H	<i>Omithogalum umbellatum</i> L.		N/A
Sycamore maple (P)	T	<i>Acer pseudoplatanus</i> L.		2004
Tansy ragwort* (P)	H	<i>Senecio jacobaea</i> L.	Stinking Willie	2004
Tatarian honeysuckle (P)	S	<i>Lonicera tatarica</i> L.		2005
Tree of heaven	T	<i>Ailanthus altissima</i> (Mill.) Swingle		2004
Variable-leaf watermilfoil	A	<i>Myriophyllum heterophyllum</i> Michx.		2003
Water chestnut	A	<i>Trapa natans</i> L.		2003
Water lettuce* (P)	A	<i>Pistia stratiotes</i> L.		2005
Watercress (P)	A	<i>Rorippa nasturtium-aquaticum</i>	auth. = (L.) Hayek; <i>Nasturtium officinale</i>	2005
White poplar (P)	T	<i>Populus alba</i> L.		2004
Wineberry (P)	S	<i>Rubus phoenicolasius</i> Maxim.		2004
Winged euonymus*	S	<i>Euonymus alatus</i> (Thunb.) Sieb.	Burning-bush	N/A
Yellow floating heart* (P)	A	<i>Nymphoides peltata</i> (Gmel.) Kuntze		2005
Yellow iris	A	<i>Iris pseudacorus</i> L.		2005

Massachusetts Prohibited Plant List

Source: http://www.mass.gov/agr/farmproducts/proposed_prohibited_plant_list_v12-12-05.htm

**Effective January 1, 2006: The importation of the plants listed below are banned by the listed [importation ban] date. The one and three year propagation ban phase-out dates listed -are allowed only on plants that have entered the state *prior to the listed importation ban date* and remain in the channels of trade within the Commonwealth

NOTE: After the listed 'propagation ban' date; the sale, trade, purchase, distribution and related activities for that plant are prohibited.

Latin	Common	Importation Ban	Propagation Ban
Acer platanoides	Norway maple	July 1, 2006	January 1, 2009
Acer pseudoplatanus	Sycamore maple	July 1, 2006	January 1, 2009
Aeginetia		January 1, 2006	January 1, 2006
Aegopodium podagraria	Bishop's goutweed; bishop's weed; goutweed	July 1, 2006	January 1, 2009
Ageratina adenophora	crofton weed	January 1, 2006	January 1, 2006
Ailanthus altissima	<u>Tree of Heaven</u>	January 1, 2006	January 1, 2006
Alectra Thunb.		January 1, 2006	January 1, 2006
Alliaria petiolata	Garlic mustard	January 1, 2006	January 1, 2006
Alternanthera sessilis	Sessile joyweed	January 1, 2006	January 1, 2006
Ampelopsis brevipedunculata	Porcelain-berry; Amur peppervine	January 1, 2006	January 1, 2006
Anthriscus sylvestris	Wild chervil	January 1, 2006	January 1, 2006
Arthraxon hispidus	Hairy joint grass; jointhead; small carpetgrass	January 1, 2006	January 1, 2006
Asphodelus fistulosus	onion weed	January 1, 2006	January 1, 2006
Avena sterilis	animated oat	January 1, 2006	January 1, 2006
Azolla pinnata	mosquito fern	January 1, 2006	January 1, 2006
Berberis thunbergii	Japanese Barberry	July 1, 2006	January 1, 2009
Berberis vulgaris	Common barberry; European barberry	January 1, 2006	January 1, 2006
Cabomba caroliniana	Carolina Fanwort; fanwort	January 1, 2006	January 1, 2006
Cardamine impatiens	Bushy rock-cress; narrowleaf bittercress	January 1, 2006	January 1, 2006
Carex kobomugi	Japanese sedge; Asiatic sand sedge	January 1, 2006	January 1, 2006
Carthamus oxyacantha Bieb.	wild safflower	January 1, 2006	January 1, 2006
Caulerpa taxifolia		January 1, 2006	January 1, 2006
Celastrus orbiculatus	Oriental bittersweet; Asian or Asiatic bittersweet	January 1, 2006	January 1, 2006
Centaurea biebersteinii	Spotted knapweed	January 1, 2006	January 1, 2006
Chrysopogon aciculatus	pilipiliula	January 1, 2006	January 1, 2006

<i>Commelina benghalensis</i>	Benghal dayflower	January 1, 2006	January 1, 2006
<i>Crupina vulgaris</i>	common crupina	January 1, 2006	January 1, 2006
<i>Cuscuta</i>	Dodder	January 1, 2006	January 1, 2006
<i>Cynanchum louiseae</i>	Black Swallow-wort; Louise's swallow-wort; Autumn olive	January 1, 2006	January 1, 2006
<i>Cynanchum rossicum</i>	European swallow-wort; pale	January 1, 2006	January 1, 2006
<i>Digitaria abyssinica</i>		January 1, 2006	January 1, 2006
<i>Digitaria scalarum</i>	African couch grass	January 1, 2006	January 1, 2006
<i>Digitaria velutina</i>	velvet fingergrass	January 1, 2006	January 1, 2006
<i>Drymaria arenarioides</i>	alfombrilla	January 1, 2006	January 1, 2006
<i>Egeria densa</i>	Brazilian waterweed; Brazilian eloda	January 1, 2006	January 1, 2006
<i>Eichhornia azurea</i>	anchored waterhyacinth	January 1, 2006	January 1, 2006
<i>Elaeagnus umbellata</i>	Autumn Olive	January 1, 2006	January 1, 2006
<i>Emex australis</i>	three-cornered jack	January 1, 2006	January 1, 2006
<i>Emex spinosa</i>	devil's thorn	January 1, 2006	January 1, 2006
<i>Epilobium hirsutum</i>	Hairy willow-herb; Codlins and Cream	January 1, 2006	January 1, 2006
<i>Euonymus alatus</i>	Winged euonymus; Burning Bush	July 1, 2006	January 1, 2009
<i>Euphorbia esula</i>	Leafy Spurge; Wolf's Milk	January 1, 2006	January 1, 2006
<i>Euphorbia cyparissias</i>	Cypress spurge	January 1, 2006	January 1, 2006
<i>Festuca filiformis</i>	Hair fescue; fineleaf sheep fescue	January 1, 2006	January 1, 2006
<i>Frangula alnus</i>	European buckthorn; glossy buckthorn	January 1, 2006	January 1, 2006
<i>Galega officinalis</i>	goatsrue	January 1, 2006	January 1, 2006
<i>Glaucium flavum</i>	Sea or horned poppy; yellow horn poppy	January 1, 2006	January 1, 2006
<i>Glyceria maxima</i>	Tall mannagrass; reed mannagrass	January 1, 2006	January 1, 2006
<i>Heracleum mantegazzianum</i>	Giant hogweed	January 1, 2006	January 1, 2006
<i>Hesperis matronalis</i>	Dames Rocket	January 1, 2006	January 1, 2006
<i>Homeria</i>	Cape tulip	January 1, 2006	January 1, 2006
<i>Humulus japonicus</i>	Japanese hops	January 1, 2006	January 1, 2006
<i>Hydrilla verticillata</i>	Hydrilla; water-thyme; Florida elodea	January 1, 2006	January 1, 2006
<i>Hygrophila polysperma</i>	Miramar weed	January 1, 2006	January 1, 2006
<i>Imperata brasiliensis</i>	Brazilian satintail	January 1, 2006	January 1, 2006
<i>Ipomoea aquatica</i> Forsk.	Chinese waterspinach	*Permit required - contact Department *January 1, 2006	*Permit required - contact Department January 1, 2006
<i>Iris pseudacorus</i>	Yellow Iris	July 1, 2006	January 1, 2007
<i>Ischaemum rugosum</i>	murain-grass	January 1, 2006	January 1, 2006
<i>Lagarosiphon major</i>	oxygen weed	January 1, 2006	January 1, 2006
<i>Lepidium latifolium</i>	<u>Broad-leafed pepperweed; tall pepperweed</u>	January 1, 2006	January 1, 2006
<i>Leptochloa chinensis</i>	Asian sprangletop	January 1, 2006	January 1, 2006
<i>Ligustrum obtusifolium</i>	Border privet	January 1, 2006	January 1, 2006
<i>Limnophila sessiliflora</i>	ambulia	January 1, 2006	January 1, 2006
<i>Lonicera japonica</i>	Japanese honeysuckle	July 1, 2006	January 1, 2009
<i>Lonicera maackii</i>	Amur honeysuckle	July 1, 2006	January 1, 2009

Lonicera morrowii	Morrow's honeysuckle	July 1,2006	January 1, 2009
Lonicera tatarica	Tatarian honeysuckle	July 1,2006	January 1, 2009
Lonicera x bella [<i>morrowii</i> x <i>tatarica</i>]	Bell's honeysuckle	July 1,2006	January 1, 2009
Lycium ferrocissimum	African boxthorn	January 1, 2006	January 1, 2006
Lysimachia nummularia	Creeping jenny; moneywort	July 1, 2006	January 1, 2009
Lythrum salicaria	Purple loosestrife	January 1, 2006	January 1, 2006
Melaleuca quinquenervia	melaleuca	January 1, 2006	January 1, 2006
Melastoma malabathricum		January 1, 2006	January 1, 2006
Microstegium vimineum	Japanese stilt grass; Nepalese browntop	January 1, 2006	January 1, 2006
Mikania cordata	mile-a-minute	January 1, 2006	January 1, 2006
Mikania micrantha	mile-a-minute	January 1, 2006	January 1, 2006
Mimosa diplotricha		January 1, 2006	January 1, 2006
Mimosa invisa	giant sensitive plant	January 1, 2006	January 1, 2006
Mimosa pigra L.	catclaw mimosa	January 1, 2006	January 1, 2006
Miscanthus sacchariflorus	Plume grass; Amur silvergrass	July 1,2006	January 1, 2007
Monochoria hastata	monochoria	January 1, 2006	January 1, 2006
Monochoria vaginalis	pickerel weed	January 1, 2006	January 1, 2006
Myosotis scorpioides	Forget-me-not	July 1,2006	January 1, 2007
Myriophyllum aquaticum	Parrot-feather; water-feather; Brazilian water-milfoil	January 1, 2006	January 1, 2006
Myriophyllum heterophyllum	Variable water-milfoil; Two-leaved water-milfoil	January 1, 2006	January 1, 2006
Myriophyllum spicatum	Eurasian or European water-milfoil; Spike water-milfoil	January 1, 2006	January 1, 2006
Najas minor	Brittle water-nymph; lesser naiad	January 1, 2006	January 1, 2006
Nassella trichotoma	serrated tussock	January 1, 2006	January 1, 2006
Nymphoides peltata	Yellow floating heart	January 1, 2006	January 1, 2006
Opuntia aurantiaca	jointed prickly pear	January 1, 2006	January 1, 2006
Orobanche L.	broomrape	January 1, 2006	January 1, 2006
Oryza longistaminata	red rice	January 1, 2006	January 1, 2006
Oryza punctata	red rice	January 1, 2006	January 1, 2006
Oryza rufipogon Griffiths	red rice	January 1, 2006	January 1, 2006
Ottelia alismoides	duck-lettuce	January 1, 2006	January 1, 2006
Paspalum scrobiculatum	Kodo-millet	January 1, 2006	January 1, 2006
Pennisetum clandestinum	kikuyugrass	January 1, 2006	January 1, 2006
Pennisetum macrourum Trin.	African feathergrass	January 1, 2006	January 1, 2006
Pennisetum pedicellatum Trin.	kyasuma-grass	January 1, 2006	January 1, 2006
Pennisetum polystachyon	Mission grass	January 1, 2006	January 1, 2006
Phalaris arundinacea	Reed canary-grass	January 1, 2006	January 1, 2006
Phellodendron amurense	Amur cork-tree	January 1, 2006	January 1, 2006
Phragmites australis	Common reed	January 1, 2006	January 1, 2006
Polygonum cuspidatum	Japanese knotweed; Japanese arrowroot	January 1, 2006	January 1, 2006
Polygonum perfoliatum	Mile-a-minute vine or weed; Asiatic Tearthumb	January 1, 2006	January 1, 2006

<i>Potamogeton crispus</i>	Crisped pondweed; curly pondweed	January 1, 2006	January 1, 2006
<i>Prosopis pallida</i>	kiawe	January 1, 2006	January 1, 2006
<i>Prosopis reptans</i>	tornillo	January 1, 2006	January 1, 2006
<i>Prosopis strombulifera</i>	Argentine screwbean	January 1, 2006	January 1, 2006
<i>Prosopis velutina</i>		January 1, 2006	January 1, 2006
<i>Pueraria montana</i>	Kudzu; Japanese arrowroot	January 1, 2006	January 1, 2006
<i>Ranunculus ficaria</i>	Lesser celandine; fig buttercup	January 1, 2006	January 1, 2006
<i>Ranunculus repens</i>	Creeping buttercup	January 1, 2006	January 1, 2006
<i>Rhamnus cathartica</i>	Common buckthorn	January 1, 2006	January 1, 2006
<i>Robinia pseudoacacia</i>	Black locust	January 1, 2006	January 1, 2006
<i>Rorippa amphibia</i>	Water yellowcress; great yellowcress	January 1, 2006	January 1, 2006
<i>Rosa multiflora</i>	Multiflora rose	January 1, 2006	January 1, 2006
<i>Rottboellia cochinchinensis</i>	itchgrass	January 1, 2006	January 1, 2006
<i>Rubus fruticosus</i>	wild blackberry complex	January 1, 2006	January 1, 2006
<i>Rubus moluccanus</i>	wild blackberry	January 1, 2006	January 1, 2006
<i>Rubus phoenicolasius</i>	Wineberry; Japanese wineberry; wine raspberry	January 1, 2006	January 1, 2006
<i>Saccharum spontaneum</i>	wild sugarcane	January 1, 2006	January 1, 2006
<i>Sagittaria sagittifolia</i>	arrowhead	January 1, 2006	January 1, 2006
<i>Salsola vermiculata</i>	wormleaf salsola	January 1, 2006	January 1, 2006
<i>Salvinia auriculata</i>	giant salvinia	January 1, 2006	January 1, 2006
<i>Salvinia biloba</i>	giant salvinia	January 1, 2006	January 1, 2006
<i>Salvinia herzogii</i> de la Sota	giant salvinia	January 1, 2006	January 1, 2006
<i>Salvinia molesta</i>	giant salvinia	January 1, 2006	January 1, 2006
<i>Senecio jacobaea</i>	Tansy ragwort; stinking Willie	January 1, 2006	January 1, 2006
<i>Setaria pallidifusca</i>	cattail grass	January 1, 2006	January 1, 2006
<i>Setaria pumila</i>		January 1, 2006	January 1, 2006
<i>Solanum tampicense</i>	wetland nightshade	January 1, 2006	January 1, 2006
<i>Solanum torvum</i>	turkeyberry	January 1, 2006	January 1, 2006
<i>Solanum viarum</i>	tropical soda apple	January 1, 2006	January 1, 2006
<i>Sparganium erectum</i>	exotic bur-reed	January 1, 2006	January 1, 2006
<i>Spermacoce alata</i>	borreria	January 1, 2006	January 1, 2006
<i>Striga</i> Lour.	witchweed	January 1, 2006	January 1, 2006
<i>Trapa natans</i>	Water-chestnut	January 1, 2006	January 1, 2006
<i>Tridax procumbens</i>	coat buttons	January 1, 2006	January 1, 2006
<i>Tussilago farfara</i>	Coltsfoot	January 1, 2006	January 1, 2006
<i>Urochloa panicoides</i>	liverseed grass	January 1, 2006	January 1, 2006

Appendix C: Long Island Invasive Plant List

November 2, 2006

This is a list of species that have been determined to be invasive on Long Island by the Long Island Invasive Species Management Area. The Final Report of the Suffolk County Water and Land Invasive Control Task Force recommends the Do Not Sell list of species will not be sold in Suffolk County. The Report also recommends both Do-Not-Sell and the Management Lists be managed for (monitor, eradicate) and are not bought or planted by County agencies.

Species on the Do Not Sell list	
<i>Alliaria petiolata</i>	Garlic mustard ^T
<i>Ampelopsis brevipedunculata</i>	Porcelain-berry ^{T*}
<i>Anthriscus sylvestris</i>	wild chervil ^T
<i>Aralia elata</i>	Japanese angelica tree ^T
<i>Artemisia vulgaris</i>	mugwort, common wormwood ^T
<i>Cabomba caroliniana</i> A. Gray	Carolina fanwort; Cabomba
<i>Cardamine impatiens</i> L.	Narrowleaf bittercress ^T
<i>Caulerpa taxifolia</i>	the marine "killer algae"
<i>Celastrus orbiculatus</i>	Oriental bittersweet ^T
<i>Centaurea maculosa (biebersteinii)</i>	Spotted knapweed
<i>Cirsium arvense</i>	Canada thistle
<i>Cynanchum louiseae / nigrum (AKA Vincetoxicum nigrum)</i>	Black Swallow-wort
<i>Cynanchum rossicum (AKA Vincetoxicum rossicum)</i>	Pale Swallow-wort
<i>Egeria densa</i>	Brazilian water weed
<i>Eleagnus angustifolia</i>	Russian olive ^{T*}
<i>Eleagnus umbellata</i>	Autumn Olive ^{T*}
<i>Euphorbia cyparissias</i>	Cypress spurge
<i>Euphorbia esula</i>	Leafy spurge
<i>Froelichia gracilis</i> (Hook.) Moq.	Cottonweed
<i>Glaucium flavum</i> Crantz	sea poppy, yellow horned poppy
<i>Glossostigma diandrum</i>	Mudmat
<i>Heracleum mantegazzianum</i>	Giant hogweed
<i>Hesperis matronalis</i> L.	Dame's rocket
<i>Humulus japonicus</i>	Japanese Hops
<i>Hydrilla verticillata</i>	Hydrilla
<i>Hydrocharis morsus-ranae</i>	European Frog-bit
<i>Impatiens glandulifera</i> Royle	Tall impatiens; purple balsam
<i>Lepidium latifolium</i>	Tall pepperweed, perennial pepperweed
<i>Lespedeza cuneata</i>	Chinese lespedeza ^{T*}
<i>Ligustrum obtusifolium</i> Sie.&Zucc	Border privet ^{T*}
<i>Lonicera bella</i>	Bell's honeysuckle ^T
<i>Lonicera japonica</i>	Japanese honeysuckle ^{T*}
<i>Lonicera maackii</i>	Amur honeysuckle ^T

<i>Lonicera morrowii</i>	Morrow's honeysuckle ^T
<i>Lonicera tatarica</i>	Tartarian honeysuckle ^T
<i>Lonicera xylosteum</i> L.	Dwarf, Fly honeysuckle ^T
<i>Ludwigia hexapetala</i>	Water primrose
<i>Ludwigia peploides</i>	Floating primrose-willow; water purslane
<i>Lythrum salicaria</i>	Purple loosestrife ^{T*}
<i>Microstegium vimineum</i>	Japanese stilt grass ^T
<i>Myosotis scorpioides</i> L.	Forget-me-not (aquatic)
<i>Myriophyllum aquaticum</i> (Vell.) Verdc (AKA <i>M. brasilense</i>)	Parrot feather, Brazilian water milfoil
<i>Myriophyllum spicatum</i> L.	Eurasian water milfoil
<i>Najas minor</i> Allioni	Eutrophic water-nymph
<i>Nelumbo nucifera</i>	pink lotus
<i>Nymphoides peltata</i>	yellow floating heart
<i>Paulownia tomentosa</i>	Princess Tree ^{T*}
<i>Phalaris arundinacea</i> L.	Reed Canary-grass ^T
<i>Phragmites australis</i>	Common reed grass (nonnative genotype) ^T
<i>Polygonum cuspidatum</i>	Japanese knotweed ^T
<i>Polygonum perfoliatum</i>	Mile a minute vine ^T
<i>Polygonum sachaliensis</i> (Fallopia)	Giant knotweed ^T
<i>Potamogeton crispus</i> L.	Curly leaf pondweed
<i>Pueraria montana</i> var. <i>lobata</i>	Kudzu ^T
<i>Ranunculus ficaria</i>	Lesser celandine ^{T*}
<i>Rhamnus cathartica</i>	Common buckthorn ^{T*}
<i>Rosa multiflora</i>	Multiflora rose ^{T*}
<i>Rubus phoenicolasias</i> Maxim.	Wineberry ^{T*}
<i>Salvinia molesta</i>	Giant salvinia
<i>Senecio jacobaea</i>	Tansy ragwort; stinking willie ^T
<i>Silphium perfoliatum</i> L.	Cup-plant ^T
<i>Trapa natans</i>	Water chestnut
<i>Vitex rotundifolia</i> L. f.	Beach vitex; roundleaf chastetree ^T

^T = Terrestrial species

* = commercially sold

Species on the Management list (agencies should not plant, and should remove/manage if present)	
<i>Acer ginnala</i>	Amur maple
<i>Acer platanoides</i>	Norway maple
<i>Acer pseudoplatanus</i>	Sycamore maple
<i>Aegopodium podagraria</i> L.	Goutweed
<i>Agrostis stolonifera</i>	Creeping bentgrass
<i>Ailanthus altissima</i> (Mill.) Swingle	Tree-of-heaven
<i>Aira caryophylllea</i> L.	Silver hairgrass
<i>Akebia quinata</i> (Houtt.) Dcne.	Chocolate vine
<i>Allium Vineale</i>	Field garlic
<i>Alnus glutinosa</i>	European(black) alder
<i>Amorpha fruticosa</i>	False indigo

<i>Arthraxon hispidus</i>	arthraxon
<i>Bambusa, Dendrocalamus, Phyllostachys, etc.</i>	Bamboo (several genera, many species)
<i>Berberis thunbergii</i>	Japanese barberry
<i>Berberis vulgaris</i>	Common barberry; European barberry
<i>Bromus tectorum</i>	Cheat grass / drooping brome
<i>Butomus umbellatus</i>	Flowering Rush
<i>Callitriche stagnalis Scop.</i>	Water Chickweed
<i>Carex kobomugi</i>	Japanese sedge, Asiatic sand sedge
<i>Cercidiphyllum japonicum</i>	Katsura tree
<i>Cirsium palustre</i>	Marsh thistle
<i>Clematis terniflora</i>	Yam-leaf (autumn) clematis
<i>Coronilla varia</i>	Crown vetch
<i>Datura stramonium L.</i>	Jimson-weed
<i>Dioscorea batatas (oppositifolia L.)</i>	Chinese yam
<i>Eichhornia crassipes</i>	Water hyacinth (if naturalized)
<i>Elsholtzia ciliata</i>	Elsholtzia- crested latesummer mint
<i>Epilobium hirsutum</i>	Hairy willow herb; Codlins and cream
<i>Eragrostis curvula</i>	weeping love Grass
<i>Euonymus alatus</i>	Winged Euonymus
<i>Euphorbia lathyris</i>	Caper spurge
<i>Festuca filiformis</i>	Hair fescue; fineleaf sheep fescue
<i>Galega officinalis L.</i>	Professor Weed; Goat's rue
<i>Geranium nepalense Sweet</i>	Nepalese Crane's-bill
<i>Geum vernum</i>	Spring avens
<i>Glechoma hederacea L.</i>	Gill-over-the-ground
<i>Glyceria maxima (Hartman) Holmburg</i>	Tall (American, Reed) manna grass
<i>Hedera helix</i>	English ivy
<i>Hemerocallis fulva</i>	Day lily
<i>Imperata cylindrica</i>	Cogon grass
<i>Ipomea hederacea</i>	Ivy-leaved morning glory
<i>Iris pseudacorus L.</i>	Yellow iris
<i>Kochia (Bassia) scoparia (L.) Schrader</i>	Summer cypress
<i>Ligustrum ovalifolium Hassk.</i>	California privet
<i>Ligustrum sinense Lour.</i>	Chinese privet
<i>Ligustrum vulgare L.</i>	European privet
<i>Lobelia chinensis</i>	Chinese lobelia
<i>Lolium arundinaceum (Schreb.) S. Darbyshire;</i> <i>Festuca arundinacea (Schreb.)</i>	Tall fescue
<i>Lychnis flos-cuculi L.</i>	Ragged Robin
<i>Lysimachia clethroides</i>	gooseneck yellow loosestrife
<i>Lysimachia nummularia L.</i>	Moneywort
<i>Lysimachia vulgaris L.</i>	Garden loosestrife
<i>Marsilea quadrifolia L.</i>	Water shamrock
<i>Miscanthus sacchariflorus</i>	Plume grass; Amur silvergrass
<i>Miscanthus sinensis</i>	Eulalia; Chinese silver grass
<i>Morus alba</i>	white mulberry

<i>Myriophyllum heterophyllum</i> Michx. - southern US native	Variable-leaf water milfoil-southern US native
<i>Nasturtium amphibium</i> (L.) Ait. f.; (<i>Rorippa amphibia</i> L. Bess.; <i>Sisymbrium amphibium</i> L.)	Water yellowcress; great yellowcress
<i>Nasturtium officinale</i> R. Br. Ex Ait(<i>Rorippa nasturtium-aquaticum</i> (L) Hayek)	Watercress
<i>Onopordum acanthium</i> L.	Scotch thistle
<i>Ornithogalum umbellatum</i> L.	Star of Bethlehem
<i>Phellodendron amurense</i>	Amur Cork Tree
<i>Phellodendron japonicum</i>	Japanese Cork Tree
<i>Pinellia ternata</i>	Crowdipper, green dragon
<i>Pistia stratiotes</i>	Water lettuce
<i>Poa compressa</i> L.	Canada Blue-grass
<i>Polygonum aubertii</i> (<i>Fallopia</i>)	Silver lace/fleece vine
<i>Polygonum caespitosum</i> Blume	Low (bristled) smartweed
<i>Populus alba</i>	White Poplar
<i>Pyrus calleryana</i>	Bradford Pear
<i>Ranunculus repens</i>	Creeping buttercup
<i>Rhamnus frangula</i> (<i>Frangula alnus</i>)	Smooth buckthorn (European alder-bush)
<i>Rhodotypos scandens</i>	Jetbead
<i>Robinia pseudoacacia</i>	Black locust
<i>Rosa rugosa</i> Thunb.	Japanese (rugosa) rose
<i>Rubus laciniatus</i>	Evergreen Blackberry
<i>Rumex acetosella</i>	Sheep sorrel, sourgrass
<i>Salix cinerea</i>	Gray florist's willow
<i>Solanum dulcamara</i>	Climbing Nightshade
<i>Spiraea japonica</i>	Japanese spirea
<i>Stratiotes aloides</i> L.	Water soldiers, water-aloe
<i>Styrax japonicus</i>	Japanese snowbell
<i>Tanacetum vulgare</i>	Common tansy
<i>Tribulus terrestris</i>	puncture vine
<i>Tussilago farfara</i> L.	Coltsfoot
<i>Valeriana officinalis</i> L.	Garden heliotrope
<i>Verbena bonariensis</i>	Purpletop verbain
<i>Veronica beccabunga</i> L.	Brooklime
<i>Viburnum opulus</i> var. <i>opulus</i>	European Cranberry Bush
<i>Viburnum setigerum</i>	Hance Tea viburnum
<i>Vinca minor</i>	Periwinkle
<i>Wisteria sinensis</i> (<i>floribunda</i>)	Chinese wisteria

Species Information for the LI Invasive Species Plants, including assessment of invasiveness and prohibited list status in nearby States

Latin Name	Common Name	Form	Habitat	NatureServe	NewEngland IPANE	MA	CT	LI List	MA	CT	NH
				Invasive Assessment				Prohibited list status			
				inv=invasive, L=Likely, P=Potentially, dnl=do not list at this time				dns=Do not sell yes=prohibited m=manage/do not plant			
<i>Acer ginnala</i>	Amur maple	T	U	Md/Ins	inv		P	m		yes	
<i>Acer platanoides</i>	Norway maple	T	U	Hi/Med	inv	inv	inv	m	yes	no	yes
<i>Acer pseudoplatanus</i>	Sycamore maple	T	U	Md/Ins	inv	inv	P	m	yes	yes	
<i>Aegopodium podagraria</i> L.	Goutweed	H	W	Md/Ins	inv	inv	inv	m	yes	yes	
<i>Agrostis stolonifera</i>	Creeping bentgrass	G	U					m			
<i>Ailanthus altissima</i> (Mill.) Swingle	Tree-of-heaven	T	U	Md/Lo	inv	inv	inv	m	yes	yes	yes
<i>Aira caryophyllaea</i> L.	Silver hairgrass	G	O	Md/Ins	inv			m			
<i>Akebia quinata</i> (Houtt.) Dcne.	Chocolate vine	V	O	Md/Lo	Gr1_local	dnl		m			
<i>Alliaria petiolata</i>	Garlic mustard	H	U	Hi/Md	inv	inv	inv	dns	yes	yes	yes
<i>Allium Vineale</i>	Field garlic	H	U		inv			m			
<i>Alnus glutinosa</i>	European(black) alder	T	U, O	Hi/Md	inv			m			
<i>Amorpha fruticosa</i>	False indigo	S	W		inv		P	m		no	
<i>Ampelopsis brevipedunculata</i>	Porcelain-berry	V	U	Md/Lo	inv	L	P	dns	yes	no	watch
<i>Anthriscus sylvestris</i>	wild chervil	H	O		inv	L		dns	yes		
<i>Aralia elata</i>	Japanese Angelica Tree	T	U		Gr3_watch			dns			
<i>Artemisia vulgaris</i>	mugwort, common wormwood	H	U, O					dns			
<i>Arthraxon hispidus</i>	arthrxon	G	O, W		inv	P	P	m	yes	yes	
<i>Bambusa, Dendrocalamus, Phyllostachys, etc.</i>	Bamboo (several genera, many species)	G	U					m			
<i>Berberis thunbergii</i>	Japanese barberry	S	U	Hi/Md	inv	inv	inv	m	yes	no	yes
<i>Berberis vulgaris</i>	Common barberry; European barberry				inv	L	inv	m	yes	yes	yes
<i>Bromus tectorum</i>	Cheat grass / drooping brome	G	O	High	inv		P	m		yes	
<i>Butomus umbellatus</i>	Flowering Rush	H	W	Md/Lo	inv		P	m		yes	yes

<i>Cabomba caroliniana</i> A. Gray	Carolina fanwort; Cabomba	A	L, R		inv	inv	inv	dns	yes	yes	yes
<i>Callitriche stagnalis</i> Scop.	Water Chickweed	A	R, W	Md/Ins	inv		P	m		yes	
<i>Cardamine impatiens</i> L.	Narrowleaf bittercress	H	U	Low	inv	L	inv	dns	yes	yes	
<i>Carex kobomugi</i>	Japanese sedge, Asiatic sand sedge				inv	P	P	m	yes	yes	
<i>Caulerpa taxifolia</i>	the marine "killer algae"	A	M					dns	yes		
<i>Celastrus orbiculatus</i>	Oriental bittersweet	V	U	Hi/Md	inv	inv	inv	dns	yes	yes	yes
<i>Centaurea maculosa</i> (biebersteinii)	Spotted knapweed	H	O		inv	L	inv	dns	yes	yes	watch
<i>Cercidiphyllum japonicum</i>	Katsura tree	T						m			
<i>Cirsium arvense</i>	Canada thistle	H	O	Hi/Md	inv		P	dns		yes	watch
<i>Cirsium palustre</i>	Marsh thistle	H	O,W,U		inv			m			
<i>Clematis terniflora</i>	Yam-leaf (autumn) clematis	V	U		Gr1_local			m			
<i>Coronilla varia</i>	Crown vetch	H			Gr1_local			m			
<i>Cynanchum louiseae</i> / <i>nigrum</i> (AKA <i>Vincetoxicum nigrum</i>)	Black Swallow-wort	H	U, O		inv	inv	inv	dns	yes	yes	yes
<i>Cynanchum rossicum</i> (AKA <i>Vincetoxicum rossicum</i>)	Pale Swallow-wort	H	U, O	Hi/Md	inv	L	inv	dns	yes	yes	yes
<i>Datura stramonium</i> L.	Jimson-weed	H	C, O	Hi/Lo	inv		P	m		yes	
<i>Dioscorea batatas</i> (<i>oppositifolia</i> L.)	Chinese yam	V	U	Hi/Lo			P	m			
<i>Egeria densa</i>	Brazilian water weed	A	L, R	Hi/Md	inv	L	P	dns	yes	yes	yes
<i>Eichhornia crassipes</i>	Water hyacinth (if naturalized)	A	L,R	High	inv		P	m		no	
<i>Eleagnus angustifolia</i>	Russian olive	S	O	High	inv	dnl	P	dns		yes	watch
<i>Eleagnus umbellata</i>	Autumn Olive	S	O	High	inv	inv	inv	dns	yes	yes	yes
<i>Elsholtzia ciliata</i>	Elsholtzia- crested latesummer mint	H	U		inv		P	m		yes	
<i>Epilobium hirsutum</i>	Hairy willow herb; Codlins and cream				inv	L		m	yes		
<i>Eragrostis curvula</i>	weeping love Grass	G	O	Med/Low				m			

<i>Euonymus alatus</i>	Winged Euonymus	S	U	Md/Ins	inv	inv	inv	m	yes	no	yes
<i>Euphorbia cyparissias</i>	Cypress spurge	H	O	Hi/Lo	inv	L	P	dns	yes	yes	
<i>Euphorbia esula</i>	Leafy spurge	H	O	Hi/Md	inv	inv	inv	dns	yes	yes	
<i>Euphorbia lathyris</i>	Caper spurge	H	O					m			
<i>Festuca filiformis</i>	Hair fescue; fineleaf sheep fescue					L		m	yes		
<i>Froelichia gracilis</i> (Hook.) Moq.	Cottonweed	H	O		inv		P	dns		yes	
<i>Galega officinalis</i> L.	Professor Weed; Goat's rue	H / S	O					m	yes		
<i>Geranium nepalense</i> Sweet	Nepalese Crane's-bill	H	U					m			
<i>Geum vernum</i>	Spring avens							m			
<i>Glaucium flavum</i> Crantz	sea poppy, yellow horned poppy	H	C, O		inv	inv		dns		yes	
<i>Glechoma hederacea</i> L.	Gill-over-the-ground	H	W	Md/Ins	inv		P	m		yes	
<i>Glossostigma diandrum</i>	Mudmat	A	L					dns			
<i>Glyceria maxima</i> (Hartman) Holmburg	Tall (American, Reed) manna grass	G	W		inv	L	P	m	yes	yes	watch
<i>Hedera helix</i>	English ivy	V	U	Hi/Md	Gr1_local			m			
<i>Hemerocallis fulva</i>	Day lily	H	O	Md/Lo	Gr1_local			m			
<i>Heracleum mantegazzianum</i>	Giant hogweed	H	W, O	Md/Lo	inv	L	P	dns	yes	yes	yes
<i>Hesperis matronalis</i> L.	Dame's rocket	H		Md/Lo	inv	inv	inv	dns	yes	yes	
<i>Humulus japonicus</i>	Japanese Hops	H, V	W, U		inv	L	P	dns	yes	yes	
<i>Hydrilla verticillata</i>	Hydrilla	A	L, R	Hi/Md	inv	L	inv	dns	yes	yes	yes
<i>Hydrocharis morsus-ranae</i>	European Frog-bit (aquatic)	A	L		inv			dns			yes
<i>Impatiens glandulifera</i> Royle	Tall impatiens; purple balsam	H	W	Md/Lo	inv		P	dns		yes	
<i>Imperata cylindrica</i>	Cogon grass	G		High				m			
<i>Ipomea hederacea</i>	Ivy-leaved morning glory							m			
<i>Iris pseudacorus</i> L.	Yellow iris	H	W		inv	inv	inv	m	yes	yes	yes
<i>Kochia (Bassia) scoparia</i> (L.) Schrader	Summer cypress	H	C, O		inv		P	m			yes
<i>Lepidium latifolium</i>	Tall pepperweed, perennial pepperweed	H	C, O	High	inv	inv	inv	dns	yes	yes	
<i>Lespedeza cuneata</i>	Chinese lespedeza	H	U, O	Md	Gr1_local			dns			

<i>Ligustrum obtusifolium</i> <i>Sie.&Zucc</i>	Border privet	S	U		inv	L	P	dns	yes	yes	yes
<i>Ligustrum ovalifolium</i> <i>Hassk.</i>	California privet	S	U		inv	dnl	P	m		no	
<i>Ligustrum sinense</i> <i>Lour.</i>	Chinese privet	S			inv	dnl		m			
<i>Ligustrum vulgare</i> <i>L.</i>	European privet	S	U	Hi/Md	inv	dnl	P	m		no	watch
<i>Lobelia chinensis</i>	Chinese lobelia	A	L, R	Md/Ins				m			
<i>Lolium arundinaceum</i> (<i>Schreb.</i>) <i>S. Darbyshire</i> ; <i>Festuca arundinacea</i> (<i>Schreb.</i>)	Tall fescue	G	O	Hi/Md				m			
<i>Lonicera bella</i>	Bell's honeysuckle	S	U, W	Hi/Md	inv		inv	dns	yes	yes	yes
<i>Lonicera maackii</i> "Rem Red"	honeysuckle	S	U		inv	P	inv	dns	yes	yes	watch
<i>Lonicera morrowii</i>	Morrow's honeysuckle				inv	inv	inv	dns	yes	yes	yes
<i>Lonicera japonica</i>	Japanese honeysuckle	V	U, W	Hi/Md	inv	inv	inv	dns	yes	yes	yes
<i>Lonicera tatarica</i>	Tartarian honeysuckle	S	U		inv	L	P	dns	yes	yes	yes
<i>Lonicera xylosteum</i> <i>L.</i>	Dwarf, Fly honeysuckle	S	U		inv	dnl	P	dns		yes	
<i>Ludwigia hexapetala</i>	Water primrose							dns			
<i>Ludwigia peploides</i>	Floating primrose- willow; water purslane	A	L, R					dns			
<i>Lychnis flos-cuculi</i> <i>L.</i>	Ragged Robin	H	O		inv		P	m		yes	
<i>Lysimachia clethroides</i>	gooseneck yellow loosestrife	H						m			
<i>Lysimachia nummularia</i> <i>L.</i>	Moneywort	H	W		inv	inv	P	m	yes	no	watch
<i>Lysimachia vulgaris</i> <i>L.</i>	Garden loosestrife	H	W		inv		P	m		yes	
<i>Lythrum salicaria</i>	Purple loosestrife	H	W		inv	inv	inv	dns	yes	yes	yes
<i>Marsilea quadrifolia</i> <i>L.</i>	Water shamrock	H, A?	L		inv		P	m		yes	
<i>Microstegium vimineum</i>	Japanese stilt grass	G	U, W	Hi/Md	inv	L	inv	dns	yes	yes	watch
<i>Miscanthus sacchariflorus</i>	Plume grass; Amur silvergrass					L		m	yes		
<i>Miscanthus sinensis</i>	Eulalia; Chinese silver grass	G	O W?	Hi/Lo	inv	dnl	P	m		no	
<i>Morus alba</i>	white mulberry	T	U		Gr3_watch	dnl		m			
<i>Myosotis scorpioides</i> <i>L.</i>	Forget-me-not (aquatic)	H	W		inv	L	inv	dns		yes	

<i>Myriophyllum aquaticum</i> (Vell.) Verdc (AKA <i>M. brasilense</i>)	Parrot feather, Brazilian water milfoil	A	L, R	Hi/Md	inv	L	P	dns	yes	yes	yes
<i>Myriophyllum heterophyllum</i> Michx. - southern US native	Variable-leaf water milfoil-southern US native	A	L, R		inv	inv	inv	m	yes	yes	yes
<i>Myriophyllum spicatum</i> L.	Eurasian water milfoil	A	L, R	High	inv	inv	inv	dns	yes	yes	yes
<i>Najas minor</i> Allioni	Eutrophic water-nymph	A	L		inv	L	P	dns	yes	yes	yes
<i>Nasturtium amphibium</i> (L.) Ait. f.; (<i>Rorippa amphibia</i> L. Bess.; <i>Sisymbrium amphibium</i> L.)	Water yellowcress; great yellowcress					L		m	yes		
<i>Nasturtium officinale</i> R. Br. Ex Ait(<i>Rorippa nasturtium-aquaticum</i> (L) Hayek)	Watercress	H	W		inv	dnl	P	m		yes	
<i>Nelumbo nucifera</i>	pink lotus							dns			
<i>Nymphoides peltata</i>	yellow floating heart	A	L		inv	L	P	dns	yes	yes	yes
<i>Onopordum acanthium</i> L.	Scotch thistle	H	O		inv		P	m		yes	
<i>Ornithogalum umbellatum</i> L.	Star of Bethlehem	H	U		inv		P	m		no	
<i>Paulownia tomentosa</i>	Princess Tree	T	U, C		inv		P	dns		yes	
<i>Phalaris arundinacea</i> L.	Reed Canary-grass	G	W		inv	inv	P	dns	yes	no	watch
<i>Phellodendron amurense</i>	Amur Cork Tree	T	O			L		m	yes		
<i>Phellodendron japonicum</i>	Japanese Cork Tree	T	O		Gr3_watch			m			
<i>Phragmites australis</i>	Common reed grass (nonnative genotype)	G	W, C		inv	inv	inv	dns	yes	yes	yes
<i>Pinellia ternata</i>	Crowdipper, green dragon	H						m			
<i>Pistia stratiotes</i>	Water lettuce	A	L, R?		inv		P	m		yes	
<i>Poa compressa</i> L.	Canada Blue-grass	G	U	Hi/Lo	inv		P	m		yes	
<i>Polygonum aubertii</i> (Fallopia)	Silver lace/fleece vine	V	U, O					m			
<i>Polygonum caespitosum</i> Blume	Low (bristled) smartweed	H	U		inv		P	m		yes	
<i>Polygonum cuspidatum</i>	Japanese knotweed	S	U,O,W		inv	inv	inv	dns	yes	yes	yes
<i>Polygonum perfoliatum</i>	Mile a minute vine	V, H	U		inv	P	inv	dns	yes	yes	

<i>Polygonum sachaliensis</i> (<i>Fallopia</i>)	Giant knotweed	H	U,O	Hi/Md	inv	dnl	P	dns		yes	
<i>Populus alba</i>	White Poplar	T	U	Hi/Lo	inv	dnl	P	m		yes	watch
<i>Potamogeton crispus</i> L.	Curly leaf pondweed	A	L,R	Md	inv	inv	inv	dns	yes	yes	yes
<i>Pueraria montana</i> var. <i>lobata</i>	Kudzu	V	U	Md	inv	L	P	dns	yes	yes	watch
<i>Pyrus calleryana</i>	Bradford Pear	T	U,O	Md/Ins				m			
<i>Ranunculus ficaria</i>	Lesser celandine	H	U, W	Md/Lo	inv	inv	inv	dns	yes	yes	
<i>Ranunculus repens</i>	Creeping buttercup				inv	L		m	yes		
<i>Rhamnus cathartica</i>	Common buckthorn	S	U	Hi/Md	inv	inv	inv	dns	yes	yes	yes
<i>Rhamnus frangula</i> (<i>Frangula alnus</i>)	Smooth buckthorn (European alder-bush)	S	U, W		inv	inv	inv	m	yes	no	yes
<i>Rhodotypos scandens</i>	Jetbead	S	U	Md/Lo				m			
<i>Robinia pseudoacacia</i>	Black locust	T	U		inv	inv	inv	m	yes	no	watch
<i>Rosa multiflora</i>	Multiflora rose	S	U	Md/Lo	inv	inv	inv	dns	yes	yes	yes
<i>Rosa rugosa</i> Thunb.	Japanese (rugosa) rose	S	C	Low	inv	dnl	P	m		no	
<i>Rubus laciniatus</i>	Evergreen Blackberry	S/ V	O					m			
<i>Rubus phoenicolasias</i> <i>Maxim.</i>	Wineberry	S	U		inv	L	P	dns	yes	yes	
<i>Rumex acetosella</i>	Sheep sorrel, sourgrass	H	U		inv		P	m		yes	
<i>Salix cinerea</i>	Gray florist's willow							m			
<i>Salvinia molesta</i>	Giant salvinia	A			inv			dns	yes	yes	
<i>Senecio jacobaea</i>	Tansy ragwort; stinking willie	H	O	Low	inv	L	P	dns	yes	yes	
<i>Silphium perfoliatum</i> L.	Cup-plant	H	U		inv		P	dns		yes	
<i>Solanum dulcamara</i>	Climbing Nightshade	H, V	U, W				P	m		yes	
<i>Spiraea japonica</i>	Japanese spirea	S	U, O	Hi/Md				m			
<i>Stratiotes aloides</i> L.	Water soldiers, water- aloe	A	L?					m			
<i>Styrax japonicus</i>	Japanese snowbell	S/T						m			
<i>Tanacetum vulgare</i>	Common tansy			Low				m			
<i>Trapa natans</i>	Water chestnut	A	L, R	Md	inv	inv	inv	dns	yes	yes	yes
<i>Tribulus terrestris</i>	puncture vine	V						m			
<i>Tussilago farfara</i> L.	Coltsfoot	H	U, W		inv	L	inv	m	yes	yes	
<i>Valeriana officinalis</i> L.	Garden heliotrope	H	U		inv		P	m		yes	
<i>Verbena bonariensis</i>	Purpletop verbain	H/S	O					m			

<i>Veronica beccabunga L.</i>	Brooklime	H	W		inv			m			
<i>Viburnum opulus var. opulus</i>	European Cranberry Bush	S			Gr3_watch			m			
<i>Viburnum setigerum</i>	Hance Tea viburnum	S						m			
<i>Vinca minor</i>	Periwinkle	H	U	Low	Gr1_Local			m			
<i>Vitex rotundifolia L. f.</i>	Beach vitex; roundleaf chastetree	S	C					dns			
<i>Wisteria sinensis (floribunda)</i>	Chinese wisteria	V	U	Md/Lo				m			
Total do not sell / prohibited species											
								63	140	79	35
Total m, watch, no											
								92	0	15	13
Grand total											
								155	140	94	48

Appendix D: Native Alternatives to the Most Commonly Sold Plants on the LIISMA Do-Not-Sell List

Alternatives suggested to meet type (tree, shrub, vine) desired. Brochures similar to “Plants for a Livable Delaware” and “Alternatives for Invasive Plant Species” (Edited by Timothy M. Abbey, The Connecticut Agricultural Experiment Station for the Connecticut Invasive Plant Working Group).

Commonly Sold Species on the Do Not Sell List		Native Alternatives
<i>Ampelopsis brevipedunculata</i>	Porcelain-berry	virgin's bower (<i>Clematis virginiana</i>), trumpet creeper (<i>Campsis radicans</i>), trumpet honeysuckle (<i>Lonicera sempervirens</i>), Virginia creeper (<i>Parthenocissus quinquefolia</i>), American wisteria (<i>Wisteria frutescens</i>)
<i>Eleagnus angustifolia</i> , <i>E. umbellata</i>	Russian olive, Autumn olive	strawberry bush (<i>Euonymus americanus</i>), wax-myrtle (<i>Myrica cerifera</i>), meadowsweet (<i>Spiraea latifolia</i>) mapleleaf viburnum (<i>Viburnum acerifolium</i>), arrow-wood viburnum (<i>Viburnum nudum</i>), mountain laurel (<i>Kalmia latifolia</i>), black haw (<i>Viburnum prunifolium</i>)
<i>Lespedeza cuneata</i>	Chinese lespedeza	butterflyweed (<i>Asclepias tuberosa</i>), joe-pye weed (<i>Eupatorium dubium</i>), black-eyed Susan (<i>Rudbeckia fulgida</i>), big blue stem (<i>Andropogon gerardii</i>), or Indian grass (<i>Sorghastrum nutans</i>)
<i>Ligustrum obtusifolium</i> Sie.&Zucc	Border privet	groundsel tree (<i>Baccharis halimifolia</i>), shadbush (<i>Amelanchier arborea</i>), red chokeberry (<i>Photinia pyrifolia</i>), rhododendron (<i>Rhododendron carolinianum</i>), great laurel (<i>Rhododendron maximum</i>), inkberry (<i>Ilex glabra</i>), winterberry (<i>Ilex verticillata</i>)
<i>Lonicera bella</i> , <i>L. maackii</i> "Rem Red", <i>L. morrowii</i> , <i>L. tatarica</i> , <i>L. xylosteum</i> L.	Bell's honeysuckle, honeysuckle, Morrow's honeysuckle, Tartarian honeysuckle, Dwarf fly honeysuckle	spicebush (<i>Lindera benzoin</i>), highbush blueberry (<i>Vaccinium corymbosum</i>), arrow-wood viburnum (<i>Viburnum dentatum</i>), inkberry (<i>Ilex glabra</i>), winterberry (<i>Ilex verticillata</i>), shadbush (<i>Amelanchier arborea</i>), mapleleaf viburnum (<i>Viburnum acerifolium</i>)
<i>Lonicera japonica</i>	Japanese honeysuckle	virgin's bower (<i>Clematis virginiana</i>), trumpet creeper (<i>Campsis radicans</i>), trumpet honeysuckle (<i>Lonicera sempervirens</i>), Virginia creeper (<i>Parthenocissus quinquefolia</i>), American wisteria (<i>Wisteria frutescens</i>)

<i>Lythrum salicaria</i>	Purple loosestrife	swamp milkweed (<i>Asclepias incarnata</i>) sweet pepperbush (<i>Clethra alnifolia</i>), purple coneflower (<i>Echinacea purpurea</i>), gayfeather (<i>Liatris spicata</i>), grass-leaved blazing star (<i>Liatris pilosa</i>), green-headed coneflower (<i>Rudbeckia laciniata</i>), New York ironweed (<i>Vernonia novaboracensis</i>), spotted Joe-Pye weed (<i>Eupatorium maculatum</i>)
<i>Paulownia tomentosa</i>	Princess Tree	serviceberry (<i>Amelanchier canadensis</i>), shadbush (<i>Amelanchier arborea</i>), redbud (<i>Cercis canadensis</i>), flowering dogwood (<i>Cornus florida</i>), American holly (<i>Ilex opaca</i>), red mulberry (<i>Morus rubra</i>), spicebush (<i>Lindera benzoin</i>), and sassafras (<i>Sassafras albidum</i>)
<i>Ranunculus ficaria</i>	Lesser celandine	wild ginger (<i>Asarum canadense</i>), Foamflower (<i>Tiarella cordifolia</i>), wild geranium (<i>Geranium maculatum</i>), heart-leaf Alexanders (<i>Zizia aptera</i>), bloodroot (<i>Sanguinaria canadensis</i>), green-and-gold (<i>Chrysogonum virginianum</i>)
<i>Rhamnus cathartica</i>	Common buckthorn	shadbush (<i>Amelanchier arborea</i>), highbush blueberry (<i>Vaccinium corymbosum</i>), arrow-wood viburnum (<i>Viburnum dentatum</i>), nannyberry (<i>Viburnum lentago</i>), inkberry (<i>Ilex glabra</i>), winterberry (<i>Ilex verticillata</i>), red chokeberry (<i>Photinia pyrifolia</i>), black chokeberry (<i>Photinia melanocarpa</i>)
<i>Rosa multiflora</i>	Multiflora rose	Carolina rose (<i>Rosa carolina</i>), swamp rose (<i>Rosa palustris</i>), Virginia rose (<i>Rosa virginiana</i>)
<i>Rubus phoenicolasias Maxim.</i>	Wineberry	northern blackberry (<i>Rubus alleghaniensis</i>), lowbush blueberry (<i>Vaccinium angustifolium</i>), highbush blueberry (<i>Vaccinium corymbosum</i>), flowering raspberry (<i>Rubus odoratus</i>), winterberry (<i>Ilex verticillata</i>), red chokeberry (<i>Photinia pyrifolia</i>), black chokeberry (<i>Photinia melanocarpa</i>)

Appendix E: Examples of Native Roadside Groundcovers

Native Groundcovers that were consistently well-established, weed suppressive, and aesthetically-appealing in Landscape and Roadside Trials*												
Common Name	Genus & species cv. or syn.	WSR^(a) Type^(b)	Habit	Zone	Height Spread	Origin	Aesthetics	Sun	Water	Soil	Salt Tolerance (a)	Roadside Performance (b)
Heath aster, Snow flurry aster	<i>Aster ericoides</i> 'Snow Flurry'	G P	Dense, clump forming	3-9	3-6" 3-12"		Covered with thousands of flowers in Sept.	Full sun to partial shade	Drought tolerant	Well-drained		
Alumroot (Coral bells)	<i>Heuchera americana</i> 'Chocolate Veil'	G P	Clump forming	4-9	18-24" 12"	Eastern US	Deep red foliage, delicate pink flowers	Shade	Moist	Moist, fertile		
Moss phlox	<i>Phlox subulata</i> 'Emerald Blue'	G P	Mat forming	3-9	4-6" 24"	North-eastern US	Profusion of early spring blue blooms, evergreen	Full sun	Moist	Well-drained loam	F/G	G
Fragrant sumac	<i>Rhus aromatica</i> 'Gro Low'	F W	Erect, dense, woody	4-9	2' 6-8'	Eastern North America	Red berry-like fruit persisting in winter, glossy foliage	Full sun to light shade	Drought tolerant	Well-drained		

* excerpts from Cornell University's Allstar Groundcovers! Website at

<http://www.entomology.cornell.edu/Extension/Woodys/CUGroundCoverSite/GroundcoverMain.html>

Over 100 species were field tested by Cornell University, the four species listed above were cited in Dr. Weston's Jul 2006 ASHS Poster entitled *Herbaceous Groundcovers for Weed Suppression and Aesthetic Appeal in Landscapes and Roadsides* and are native in New York State according to the Revised Checklist of New York State Plants by R.S. Mitchell and G.C. Tucker. 1997. New York State Museum.

a WSR-Weed Suppressive Rating, Salt Tolerance, and Roadside Performance: F = fair, G = good, and P = poor

b Type: P = perennial, G = grasslike, and W = woody

Appendix F: Sources of Information

Websites

BLM Invasive Weeds Toolkit (western U.S.):
www.or.blm.gov/prineville/weed/weed_ed.htm
Includes ideas for educational resources.

Brooklyn Botanic Garden:
www.bbg.org/sci/nymf

Center for Invasive Plant Management (western U.S.):
www.weedcenter.org
Includes ideas for educational resources for teachers and students.

Connecticut Invasive Plant Working Group:
including the Connecticut List and Criteria
Source: <http://www.hortuconn.edu/cipwg>

Habitattitude:
<http://www.habitattitude.net/>

Invasive Plant Atlas of New England (IPANE):
<http://invasives.eeb.uconn.edu/ipane/index.htm>

Invasive Plants, Changing the Landscape of America: Factbook:
<https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation/Invasive/intro.html>

Invasive Plant Council of New York State (IPC):
www.ipcnys.org

Massachusetts Invasive Plants Advisory Group:
<http://massnrc.org/mipag/>

Massachusetts Nursery & Landscape Association:
<http://mnl.com/>

The Nature Conservancy:
tncweeds.ucdavis.edu/

National Coalition Against the Misuse of Pesticides:

www.beyondpesticides.org/

National Invasive Species Council:
invasivespecies.gov

National Park Service Wildlife and Plants Web Page:
www.nature.nps.gov/wv/

New York Flora Atlas
<http://atlas.nyflora.org>

New York State Dept of Environmental Conservation
Nonindigenous Aquatic Species Comprehensive Management Plan:
<http://www.dec.state.ny.us/website/dfwmr/habitat/noninsp.pdf>

Protect Your Waters:
<http://www.protectyourwaters.net/>

Roadside Use of Native Plants:
U.S Department of Transportation Federal Highway Administration
<http://www.fhwa.dot.gov/environment/rdsduse/index.htm>
Native Plants for Landscape Use in New York
<http://www.fhwa.dot.gov/environment/rdsduse/ny.htm>

South-East Exotic Pest Plant Council
<http://www.se-epcc.org>

Publications

Invasive Plants: Weeds of the Global Garden. Marinelli, J. 1996. Brooklyn Botanic Garden Publications, Handbook #149 in the 21st Century Gardening Series. Science Press. ISBN # 0-9-45352/95/6

Halting the Invasion: State Tools for Invasive Species Management. 2002. Environmental Law Institute, Washington, D.C. www.eli.org

Invasive Plants, Changing the Landscape of America: Factbook. Federal Interagency Committee for the Management of Noxious and Exotic Weeds. Washington, D.C. (Also available at the web site listed above.)

*Plants for a Livable Delaware
Controlling Backyard Invaders*

Produced by the Delaware Nature Society, the University of Delaware, the Delaware Nursery and Landscape Association, and the Delaware Department of Agriculture.

<http://ag.udel.edu/extension/horticulture/pdf/PLD.pdf>

http://www.state.de.us/planning/livedel/information/ln_native.shtml

Alternatives for Invasive Plant Species

Edited by Timothy M. Abbey, The Connecticut Agricultural Experiment Station for the Connecticut Invasive Plant Working Group