Invasive Species in the St. Lawrence – Eastern Lake Ontario Region

Presented By
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SLELO-PRISM

St. Lawrence - Eastern Lake Ontario
SLELO PRISM
Partnership For Regional Invasive Species Management

Presentation Topics

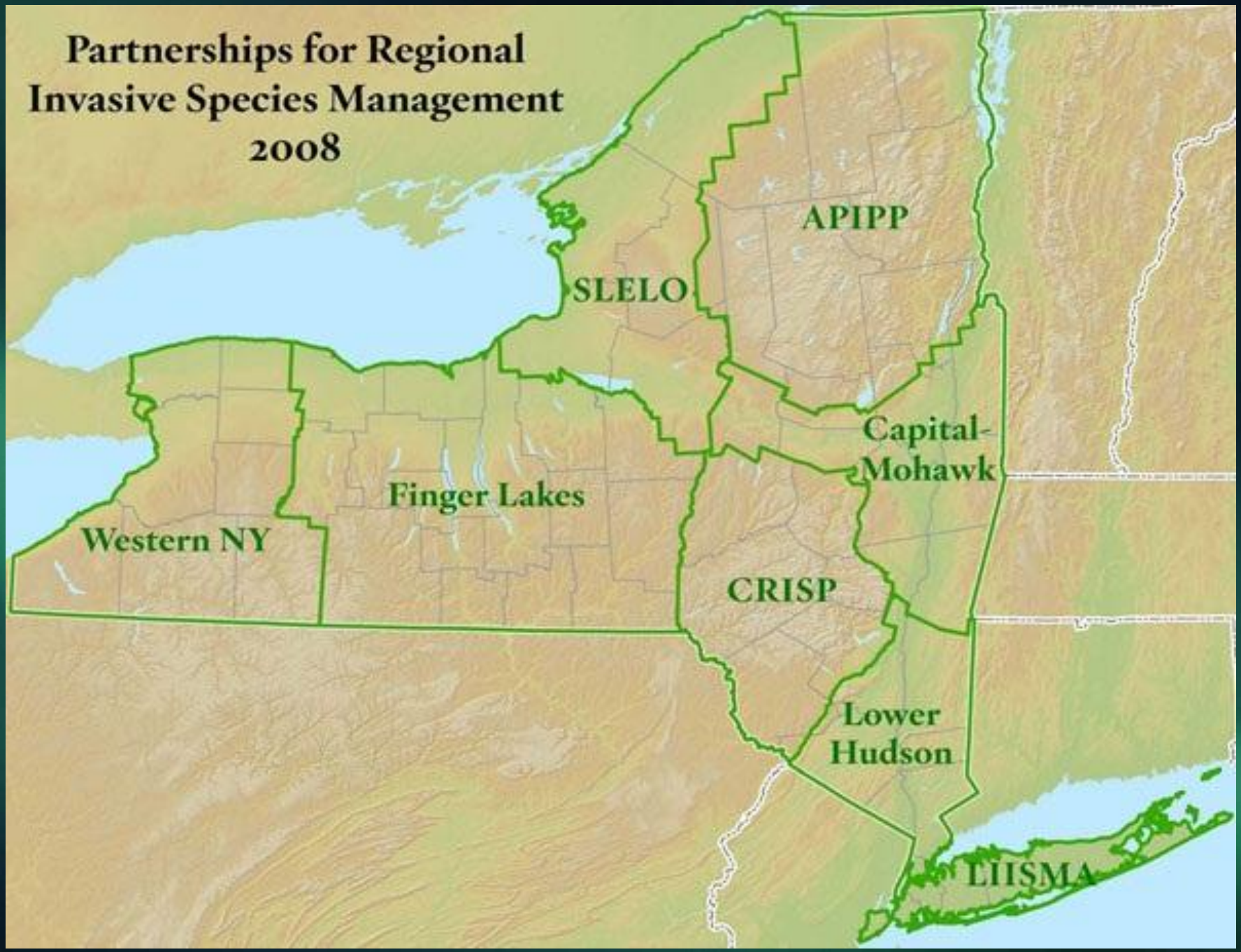
- Introduction to the SLELO-PRISM
- What Are Invasive Species
- Transport Mechanisms & Pathways
- Invasive Species Quick Facts
- Invasive Species Examples
  - Target Management Species
  - Prevention Species
- Local Efforts
- How You Can Make a Difference

What we hope you will take home from tonight's discussion:

- A better overall understanding of invasive species.
- A better understanding of their impacts.
- Knowledge of how we can prevent their introduction or spread.
- A desire to actively participate in the prevention, control & management of invasive species.
- A willingness to "spread the word" about invasives and your PRISM.

St. Lawrence Eastern Lake Ontario Partnership for Regional Invasive Species Management (SLELO-PRISM)

- One of eight planned PRISM's for New York.
- 4th PRISM to be approved by New York State.
- Currently we have 20 partners to include: principles, at-large and cooperating affiliates from a wide range of charters.
- 5-Year Strategic Plan which includes 5 counties.
- Annual Work Plans for Invasive Species


Partnerships for Regional
Invasive Species Management
2008
APIPP
SLELO
Capital-
Mohawk
Finger Lakes
Western NY
CRISP
Lower
Hudson
LIISMA

Optimized by www.ImageOptimizer.net

SLELO PRISM Priorities

- Prevention: Preventing the introduction of new invasive species not currently found in the SLELO region
- ED/RR: Contain, suppress or eradicate species populations upon initial detection.
- Education & Outreach: Educating the general public on various Inv. Spp. issues.
- Community Preparedness: Helping communities be prepared to deal with invasive species.

What Are Invasive Species ?

- Invasive species are terrestrial and aquatic species of plants, animals, insects and microscopic organisms that are;
  - 1) Non-native to the local ecosystem.
  - 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
  - 3) Are a threat to biodiversity.

Non-Native v.s. Invasive

Burning Bush (*Euonymus alata*)

Non-native – not really invasive!

Sold & planted as an ornamental.

Honeysuckle (Lonicera spp.)

Non-native – highly invasive !

Invasive Species Quick Facts

- Invasive species almost always out-compete, damage or displace *more valuable* native species.
- Invasive species reduce agricultural crop yields and increase agricultural expenses.
- Invasive species are the second largest threat to biodiversity after habitat loss…..
- The economic impact of invasive species in the U.S. is estimated at 120 to 138 billion annually.
- Invasive species are a factor in the decline of 49 percent of all threatened or endangered species.

Invasive Species Quick Facts cont…

- Some invasive species cause serious human health impacts including death:
  - Giant Hogweed – toxic sap that burns the skin. Native to southern Russia introduced to US circa 1903.

  - West Nile Virus - West Nile encephalitis is an infection of the brain - first identified in Uganda in 1937, the virus is commonly found in Africa, West Asia, and the Middle East

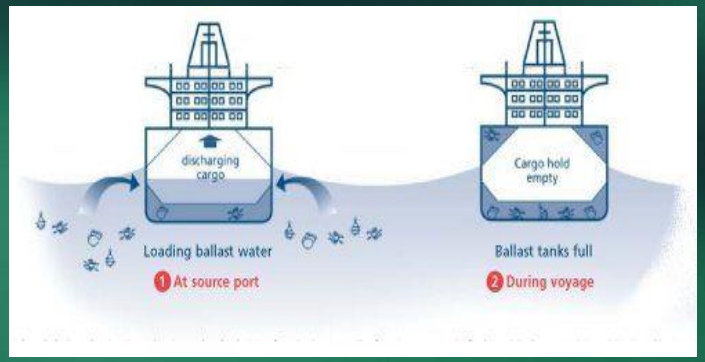
Transport mechanisms and Pathways: (*how do they get here?)*

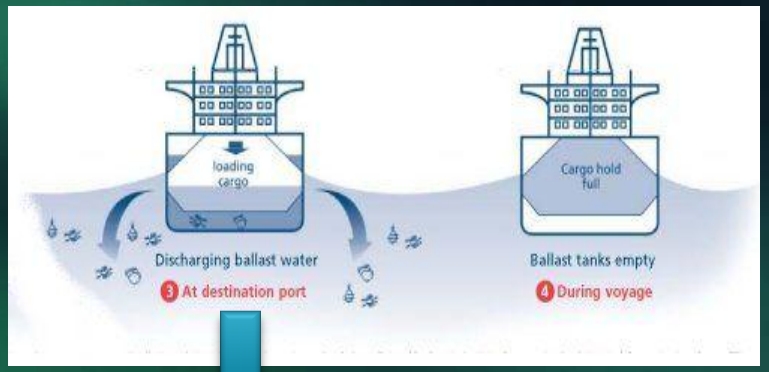
- **There are many ways that inv. spp. are transported – most are related to human activity some are natural.**

- **Natural Pathways include:**
  - **Seed transport by migrating wildlife.**
  - **Carried by wind / wind dispersal.**

Cultural Transport Examples

- Ballast water from commercial shipping.





Critters released into destination waters

Cultural Transport Example

- Ports of entry

There are 13 POE's along the St. Lawrence River in New York Alone.

9 of which are within the SLELO PRISM

Cultural Transport Example

- Roads & Corridors
  - Roads and utility corridors that bisect the landscape move invasive species from one location to another. New road construction, re-construction and maintenance can contribute significantly to the spread of invasive species.

Cultural Transport Example

- Firewood

In NYS it is unlawful to transport firewood more than 50 miles from its source

- Shipping pallets

Must be Heat Treated and stamped “HT”

Cultural Transport Example

- Commercial / Retail

Some aquatic invasives can be linked to the commercial and retail industry. These include the aquarium industry, retail sales in live fish markets and ornamental water garden plant sales. Often, these exotic plant and animals are released into ponds, lakes and streams when the owner no longer wants to care for them or the fish outgrow their surroundings.

Cultural Transport Example

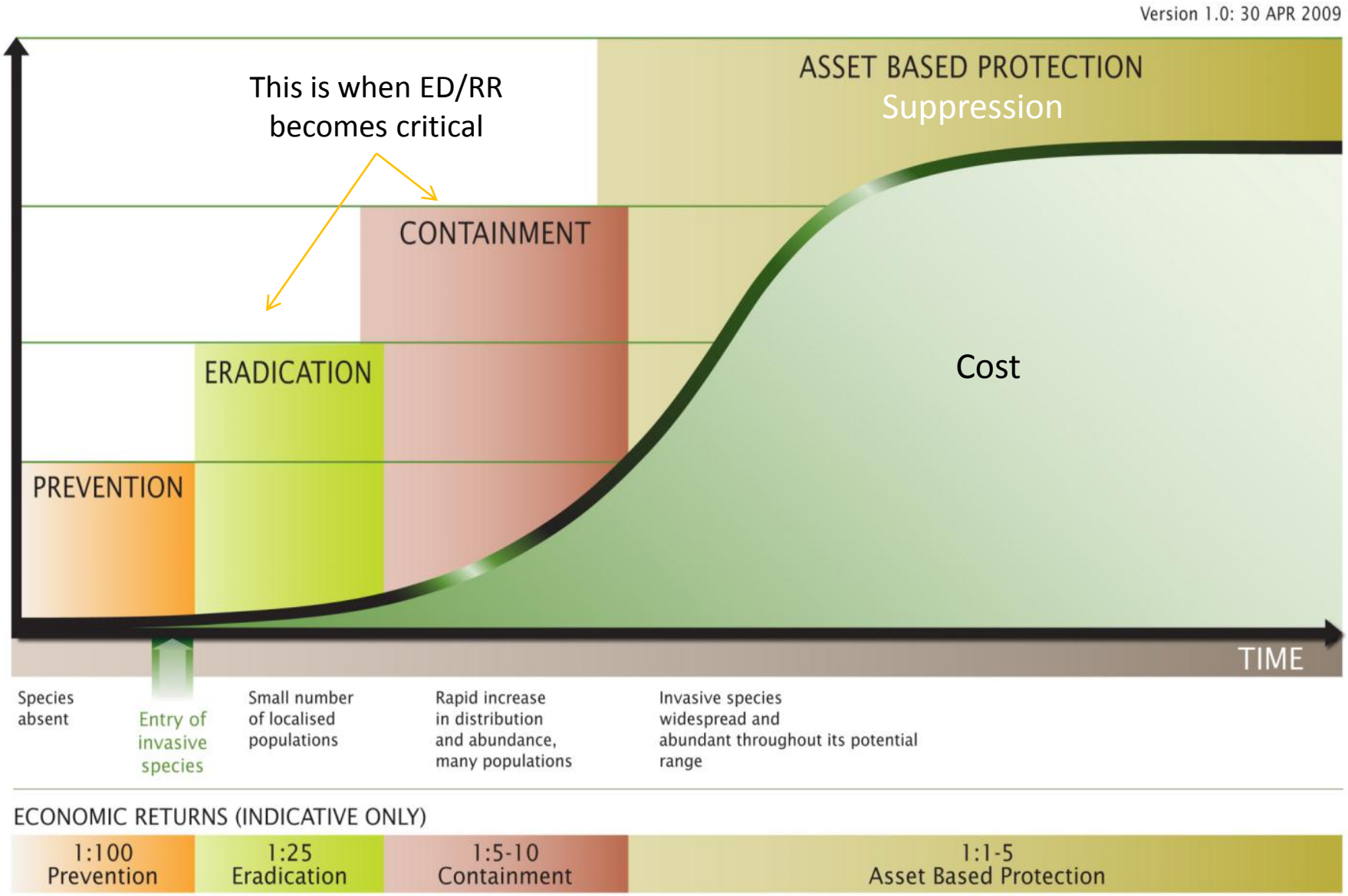
- Recreation

Seeds from invasive species can stow away on hiking boots, waiters, clothing, tires, bumpers, wheel wells or the underside of vehicles and equipment used in recreational activities. These seeds can be transported great distances before falling off in a new location.

Global Transport

Global transport by land and by sea….

GENERALISED INVASION CURVE SHOWING ACTIONS APPROPRIATE TO EACH STAGE



Examples of Invasive Species

- Our PRISM has identified two categories;
  - Target Management Species: (TMS) These are the problematic species that are currently found within the SLELO region and our goal is to eradicate, contain or suppress them.
  - Prevention Species: (PS) These are species that are not found within the SLELO region and our goal is to “prevent” them from entering.

Swallow-wort (*Cynanchum spp.*)

TMS

- **Impacts**
  - Aggressively choke out desirable native species.
  - Interfere with forest regeneration.
  - Pale swallow-wort contains substances that are toxic to deer and other grazers so it offers no food value. It also changes the microbial composition of the soil.
  - Swallow-wort can dominate hay fields.

Leaves: The leaves are opposite in arrangement, oval to wedge-shaped with pointed tips. Generally, the leaves are 2.5" to 4.5" long and 2" wide.
Flowers: Small, star-shaped pink / reddish flowers.
Fruit: The fruit is a smooth, slender, pointed pod that looks much like a milkweed pod.

Can produce 2,000 seeds per square yard.

Best Control: Herbicide application or hand dig.

Japanese Knotweed (*Polygonum cuspidatum*)

Impacts

- Spreads quickly to form dense thickets that exclude native species, reducing species diversity and diminishing an area's value to wildlife.
- Problematic in riparian areas because it can survive floods and rapidly colonize scoured shores and islands.

Leaves: Large - 6 inches long by 3 to 4 inches wide, alternating on stem, broadly oval, pointed at the tip.
Flowers: small, greenish-white flowers in branched sprays in summer.
Fruits: Small winged fruits.

Best Control: Foliar Herbicide application or Cut-Stem or hand dig.

Glossy Buckthorn (*Rhamnus frangula*)

TMS

- **Impacts**
- Very aggressive in wet areas. It produces dense shade that eliminates other trees and ground species.

Leaves: thin, glossy, ovate leaves. The upper leaf surface is shiny.
Flowers: pale yellow flowers with 5 petals. Blooms late May to first frost.
Fruit: green, red, dark purple, pea-sized.

The seeds remain viable in the soil for two to three years.

Best Control: Cut-stump treatment using *20 – 25% Glyphosate* has been effective.

TMS

Hand-out

Giant Hogweed (*Heracleum mantegazziamum*)

Impacts

- Giant hogweed has two major impacts: ecological and human health.
- It suppresses growth of benficial native plants.
- Direct skin contact with giant hogweed induces extreme photosensitivity, which can lead to severe burns and scarring and may cause blindness if sap comes into contact with the eye.

History: -Native to southern Russia.
-In 1901 botanist's discovered the plant and brought seeds back to Europe.
-Seeds distributed to enthusiasts.
-Entered U.S. circa 1905.

Control: -Systemic herbicide application early in season.
-Cut stump just below the ground.
-Umbel removal (with seeds)

June 20 - 3 days post giant hog-weed exposure on right calf

June 22--it's getting bigger and it is very uncomfortable. Feels good bandaged up.

June 23 - and getting bigger

June 24 -- and bigger

June 25 and badder

June 26 - a little lighter

June 27 a.m. things are looking up!

June 28

June 29 it stings!

July 1 - it stings more!

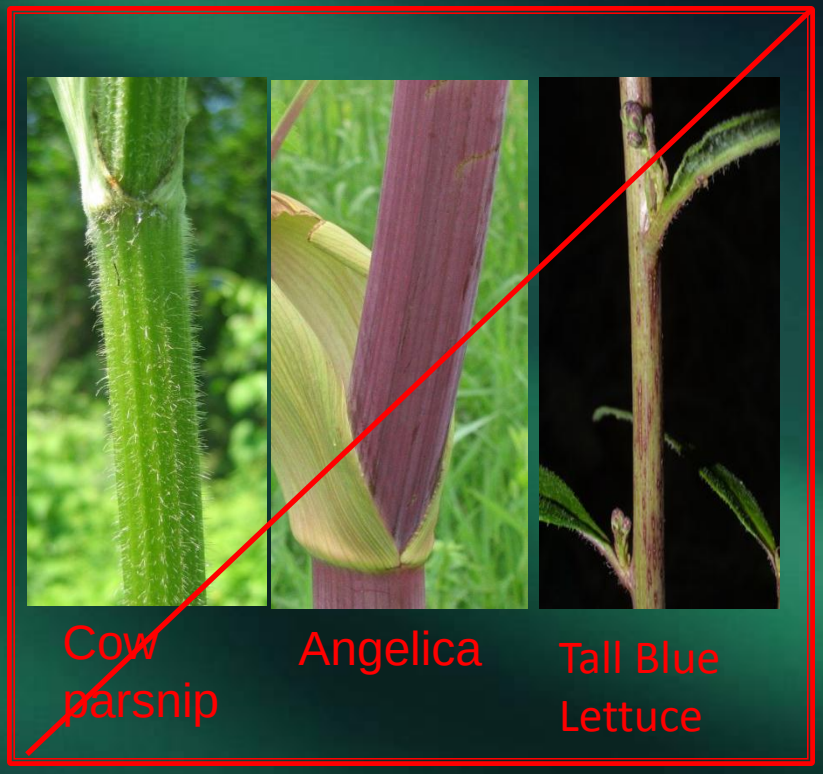
July 5 getting there!

I was exposed to giant hogweed sap on my right calf on Thursday, June 17 We were handling the plants to get them out of an area frequented by children. Next time KEEP OUT tape will be called in to keep the kids away.
The blisters dripped fluid so copiously I had to wear a handkerchief around my ankle to keep the floor dry. July 4 there was still some fluid on the dressing but things are definitely looking up. I can think about wearing those hasmat suits again. Ugh.
Prednisone was very effetive at removing discmfort and abating symptoms. I wonder if the intense systemic itch I am experiencing is my body's allergy response system kicking in after being displaced by the prednizone.

Photo credit: Bob Kleinberg

Giant Hogweed has <u>both</u> purple blotches & coarse hairs

Other look-a-likes have one or the other.



THE GARDEN

AN

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cans).—A form with small dark purple flowers. Central Europe. *Var. Bernardi.*—Tall, three to seven flowered; slender spur of petal not more than half as long as lamina. Corsica. *Var. nivea.*—A form with white flowers. *Var. paraplesia.*—With large dark violet flowers. Transylvanian Alps. *Var. platysepala.*—The sepals of this form are shorter and more obtuse than in the type. *Var. Sternbergi* (A. haenkeana).—A dwarf alpine form with small leaf divisions and bright lilac-purple flowers, larger than in the type. Central Europe. *Var. subalpina.*—With the foliage of the type and flowers of Sternbergi. Pyrenees and mountains of Central France. *Var. transilvanica.*—Similar to A. Sternbergi, except that the whole plant is glabrous. Flowers bright blue. Transylvanian Alps.

(To be continued.)

Heracleum mantegazzianum.

IN the year 1892 two botanists living at Florence—Mr. N. Levier, a doctor of medicine, of Swiss birth, and Mr. Sommier, a French amateur—explored the Central Caucasus, traversing the range from Koutais to Batalpachinsk. The aim of their travels was a botanical exploration, and it resulted in the discovery of a good number of species new to science. Several of these were of horticultural interest, and we have grown them in the Jardin Alpin d'Acclimatation, viz.:—

Androsace raddeana	Potentilla foliosa
Anemone alpina var. aurea	,, Levieri
Anthemis macroglossa	,, Sommieri
Artemisia sericea	,, svanetica
Astragalus Sommieri	Ranunculus abchasicus
Carlina longicaulis	,, ginekobolus
Chamæmelon rupestre	,, Sommieri
Corydalis glareosa	Rosa svanetica
Echinops raddeanus	Saxifraga caucasica
Geum latifolium	,, coreifolia
Gnaphalium caucasicum	,, purpurascens
Heracleum Freynii	,, scleropoda
,, mantegazzianum	Scabiosa correvoniana
,, caucasicum	Senecio conipes
,, glabratum	,, platyphylloides
,, pachyrrhizum	,, primulæfolius
Hypericum Sommieri	Silene kulsanensis
Jurinea pumila	,, subuniflora
Onaphalodes Lojkæ	Vincetoxicum scandens, &c.
Potentilla adjarica	

A considerable number of species have not been determined or described, as they were collected in the form of seed only. The seeds have been sown in the Jardin Alpin d'Acclimatation at Geneva, and later will be cultivated in the garden of La Linnæa at Bourg St. Pierre, where there is a space of rock garden specially reserved for the plants of the Caucasus. Many of them have done very well, but none has produced such an effect as the soon-to-be-renowned Heracleum mantegazzianum (Sommier and Levier), on account of its gigantic proportions and its monumental aspect. This plant in our Geneva garden, or, rather, in its auxiliary department at Lancy (for it is too large to find space at Plainpalais), has given superb results. It is certainly the largest species of its genus, and one of the finest plants for an isolated position. Our plants are grown from seed collected in the Caucasus on the banks of the Sekon, in Abkhasia. They were sown in the spring of 1893 and did not vegetate till 1894, but already in 1896 we obtained in our garden at Lancy a specimen whose stem was 8 feet high and whose umbel had a diameter of 4 feet, the leaves being 3 feet long from the base of the petiole to the tip of the leaf.

HERACLEUM MANTEGAZZIANUM IN A PRIVATE GARDEN IN ITALY.

According to Dr. Levier, to whom we sent a portion of the umbel, the plant must have borne something like 10,000 flowers. It supplied us with the seed which we were able to distribute to the trade and to amateurs, and also to its discoverers, Messrs. Levier and Sommier, who grew it at Florence and at Bormio. In the latter place it assumed an altered character, for, instead of having very large leaves and a tall stem bearing a single umbel, the stem was shorter and divided from the base with a much greater number of umbels.

HERACLEUM MANTEGAZZIANUM AT HOME IN THE ABKHASIAN CAUCASUS.

The description of this remarkable plant has appeared in the *Nuove Giornale Botanico Italiano*, vol. ii., April, 1895, where it is stated to be the giant of an already very large race, and also one of the handsomest of its genus. Its cultivation is an easy matter. It likes deep, rich soil that is cool and damp. It is only in these conditions that it will attain its greatest size, but even in those that are less favourable it will do fairly well. We have observed that the finest plants are those whose roots have not been in any way cut or mutilated, and especially whose tap-root is uninjured. It is best to avoid transplantation: the finest plants are those that are self-sown.

HENRY CORREVON.

NOTES ON LILIES.

LILIUM TESTACEUM.

A DELIGHTFUL Lily is this and seen at its best when grouped in the manner so well portrayed recently (p. 108) in THE GARDEN. Apart from its beauty, the fact that it succeeds so well in most gardens is another great point in its favour, for no special care and attention are needed. Thanks to the various horticultural publications, but more particularly to THE GARDEN, the cultural requirements of

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Phragmites (*Phragmites australis*)

TMS

- Impacts
  - Large stands create a monoculture by choking out native plants. This impact can lower marsh plant and animal diversity.
  - Thick root mats that trap sediments, changing the water's movement through the ecosystem often creating drier conditions;
  - Dense growth of the common reed reduces habitat for native species such as wading birds and waterfowl.

Control: Control methods include the use of herbicides, mowing, disking, dredging, flooding, draining and burning. The most widespread and successful approach is the foliar application of glyphosate

Purple Loosestrife (*Lythrum salicaria)*

TMS

- Impacts
  - Can result in the suppression of the resident plant community and the eventual alteration of the wetland's structure and function.
  - Large stands jeopardize various threatened and endangered native wetland plants and wildlife by eliminating natural foods and cover.
  - Dense plant establishments in irrigation systems has impeded the flow of water.

Control: Bio-Control: The leaf-feeding beetles (*Galerucella* spp) reduce the growth and reproduction of purple loosestrife

Aquatic Species

TMS

Water Chestnut *(Trapa natans)*

TMS

Hand-out

- Impacts
  - This fast-growing, floating perennial herb forms large mats that completely dominate surface waters.
  - Renders open waters unavailable to recreation.
  - Shades out native aquatic vegetation.
  - Reduces oxygen levels for fish and encourages sedimentation by restricting silt movement.
  - Hard, pointy seeds can penetrate shoe leather.

Eurasian Water Milfoil
(*Myriophyllum spicatum*)

TMS

- Impacts
  - Dense stands of Eurasian milfoil inhibit recreational uses like swimming, boating, and fishing.
  - Some stands have been dense enough to obstruct industrial and power generation water intakes.
  - Reduces shoreline property values.
  - Negatively impacts aesthetics.

Macrophyte Control Options

Macrophytes: are rooted aquatic plants such as Eurasian Milfoil, pondweeds, brittle niad, etc…

Milfoil weevil (*Euhrychiopsis lecontei*)

Biological Control:

Milfoil weevil (*Euhrychiopsis lecontei*)

- Native to North America.
- Prefers Eurasian milfoil to native milfoil.
- Associated with declines of Eurasian milfoil in lake Boneparte, NY.
- Cultivated in laboratories & ponds.

Control Options for other macrophytes.

Mechanical harvesting
fragmentation

Manual Hand-pulling
Effective and selective

Benthic/Bottom barriers
Small areas

Chemical herbicides
repeated applications
O2 problems

Lake drawdown
freezing in winter

All Are temporary

PS

Prevention “Watch-List” Species

- These are species that are not found within the SLELO region and our goal is to “prevent” them from entering.

Mile-A-Minute Vine (*Polygonum perfoliatum*)

PS

- Impacts:
- Native to Eastern Asia, the rapid rate of growth (up to six inches a day) allows this plant to climb over natives and smothering them.
- Seeds of mile-a-minute are dispersed by birds, ants, small mammals, and by water, remaining buoyant for 7-9 days. Mile-a-minute generally colonizes open or disturbed areas such as edges of woods, streams, and roads.

Control

Prior to seed development these vines can be removed by hand or treated with applications of herbicides containing glyphosate or clopyralid.

Kudzu (*Pueraria lobata*)

PS

- Impacts:
  - Native to southern Japan and southeast China, this plant climbs over trees or shrubs and grows so rapidly that it kills them by heavy shading / smothering.

Kudzu leaves tend to have a lobe on one or both sides of the leaf – poison ivy looks similar with no lobes.

Control

Kudzu can be controlled with foliar applications of a systemic herbicide containing glyphosate or Triclopyr.

Kudzu can also be controlled with prescribed burning.

Didymo (*Didymosphenia geminate*)

PS

- Impacts:
  - This microscopic algae forms thick "attached" mats that completely cover long stretches of stream beds, altering stream conditions and choking out many of the organisms that live on the stream bottom, which can affect trout and other fish by limiting their food.

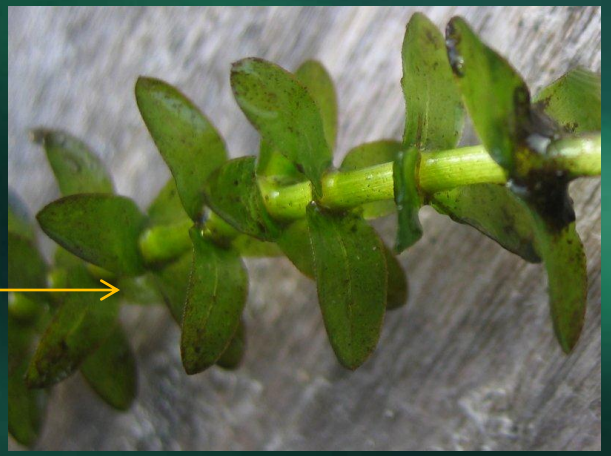
Control: Prevention is key!
There are currently no known methods for controlling or eradicating Didymo once it infests a stream segment.

Hydrilla (*Hydrilla verticillata*) PS

- Impacts:
  - Aggressively spreads and dominates native, beneficial, aquatic plants.
  - Renders surface waters unusable for passive recreation and fishing.
  - Winter dieback may reduce dissolved oxygen levels.

Control:
1. Prevention
2. Aquatic herbicides
3. Lake level draw down.

Hydrilla has 4-5 or more leaves per whorl.
Elodea has 3 leaves per whorl



Asian Carp (*Ctenopharyngodon spp.*)

PS

- Impacts:
  - There are three species of Asian carp that are considered invasive and a threat to the Great Lakes, the bighead, silver and black carp.
  - Bighead and silver carp are voracious eaters. They consume plankton—algae and other microscopic organisms—stripping the food web of the key source of food for small and big fish. Asian cap can grow to 110+ pounds


Bighead

Control:

1. Prevention
2. Pathway Mitigation
3. Rotenone in closed system!
4. Electric fish barriers


Silver


Black

Asian Clam (*Corbicula fluminea*)

PS
Hand-out

- Impacts:
  - Fouling of complex power plant and industrial water systems.
  - Alters benthic substrates and competes with native species for limited resources.
  - Economic: In the USA, has caused millions of dollars worth of damage to intake pipes used in the power and water industries

Control:
1. Spread prevention.

Found In
Otisco Lake
Owasco Lake
Lake George
NY.

New Zealand Mud Snail (*Potamopyrgus antipodarum*) PS

- Impacts:
  - Reproduces quickly and in high densities.
  - Can impact the food chain of native trout.
  - They Alter the physical characteristics of stream ecosystems.

Control:
1. Spread prevention, ie. Ballast regulations and boat/trailer/boot wash.

Hemimysis (*Hemimysis anomala*)

PS

- Impacts:
  - Potential to disrupt the aquatic food chain.

Has been found offshore of the Oswego Harbor And in Oneida Lake

Control:

1. Ballast water regulations

Hemlock Wooly Adelgid (*Adelges tsugae*)

- Impacts:
  - May have significant impacts on hemlock trees. Hemlock decline and mortality typically occur within 4 to 10 years after infestation.

Control:
Insecticides via soil drench, trunk injection or foliar applications of Imidacloprid

Feral Swine (*Sus scrofa Linnaeus*)

- Impacts:
  - They can host parasites and diseases that threaten humans, domestic livestock and wildlife.
  - They can cause extensive damage to forests, agricultural lands and water resources via rutting.

Control:

1. **Live traps**
2. **Hunt/shoot**

Hand-out x 5

2-Forest Pests
Not found In the SLELO Region
but on the watch list!

Asian Long-horned Beetle (ALB)

(Anoplophora glabripennis)

Prevention Spp.

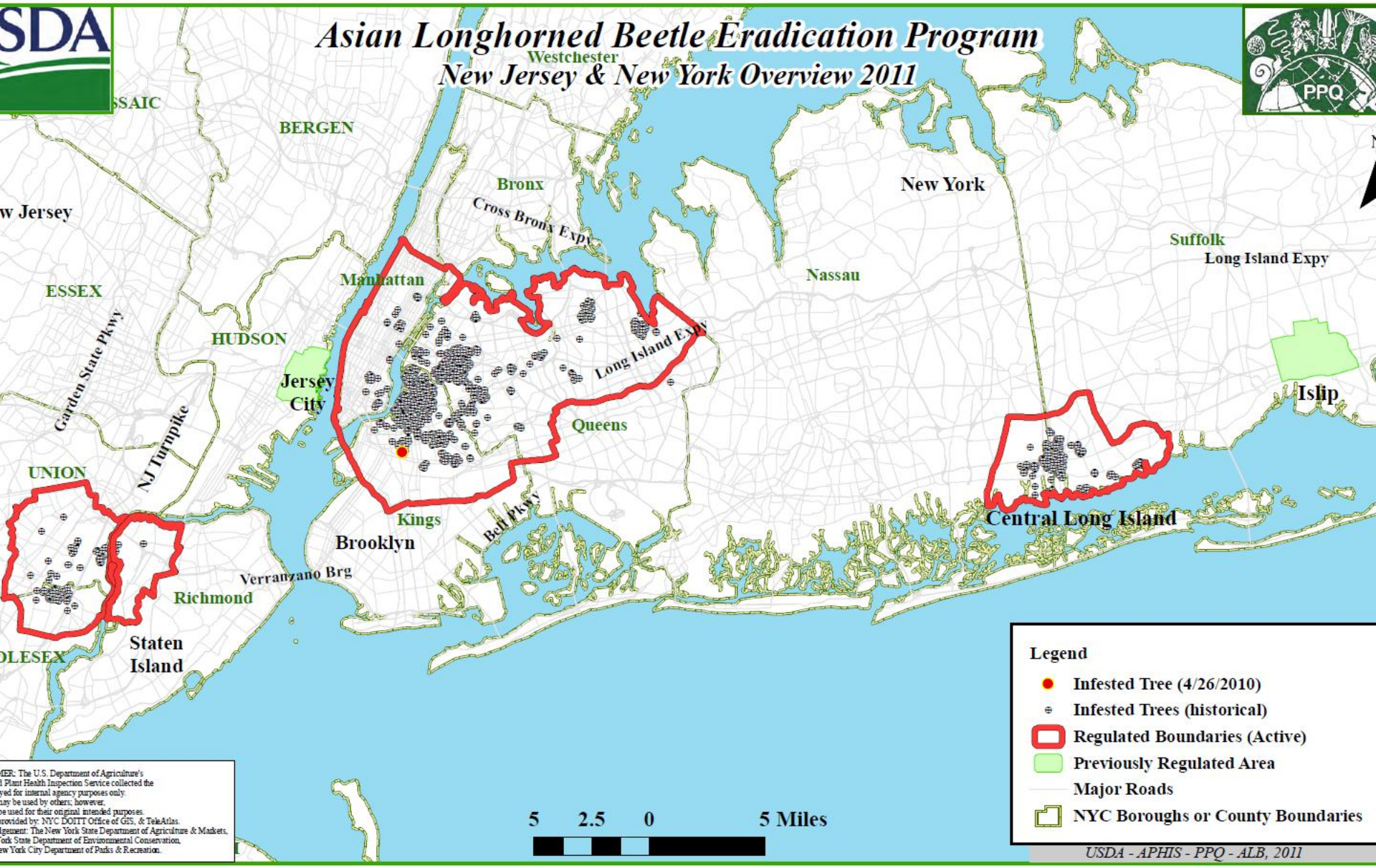
Management Spp.

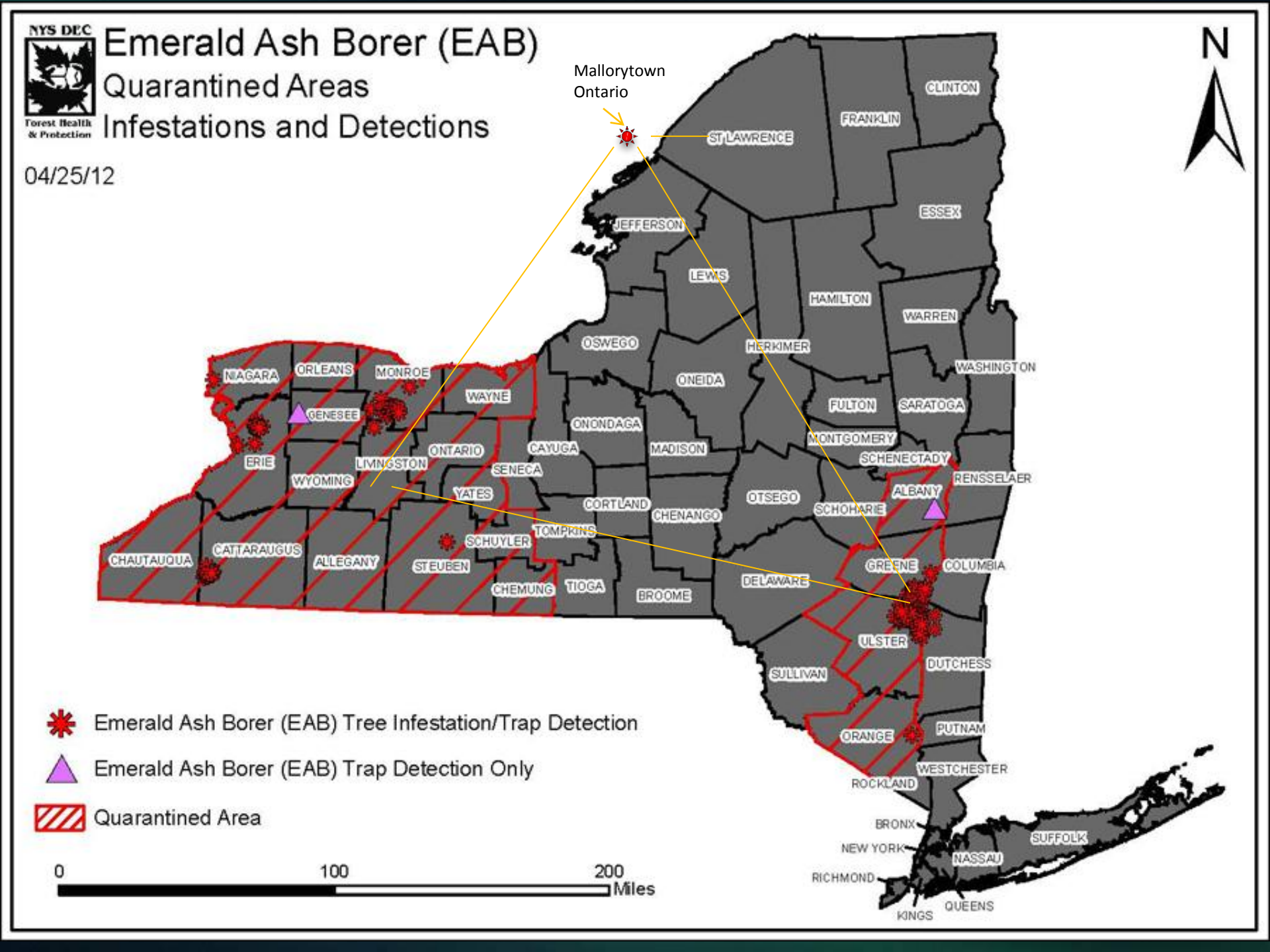
Pass Around Samples

Emerald Ash Borer (EAB)

(Agrilus planipennis)

usda.gov/plant_health/plant_pest_info/as | NYIS | USDA - APHIS - APHIS ... | usda.gov | HTTP 404 Not Found




NYS DEC
Forest Health & Protection
Emerald Ash Borer (EAB)
Quarantined Areas
Infestations and Detections
04/25/12
Mallorytown
Ontario
N
CLINTON
FRANKLIN
ST LAWRENCE
ESSEX
JEFFERSON
LEWIS
HAMILTON
WARREN
OSWEGO
HERKIMER
WASHINGTON
ONEIDA
NIAGARA
ORLEANS
MONROE
WAYNE
FULTON
SARATOGA
GENESEE
ONONDAGA
MONTGOMERY
ONTARIO
CAYUGA
MADISON
SCHENECTADY
ERIE
LIVINGSTON
SENECA
RENSSELAER
WYOMING
ALBANY
YATES
OTSEGO
CORTLAND
SCHOHARIE
CHENANGO
TOMPKINS
SCHUYLER
CHAUTAUQUA
CATTARAUGUS
ALLEGANY
STEUBEN
GREENE
COLUMBIA
CHEMUNG
TIOGA
DELAWARE
BROOME
ULSTER
DUTCHESS
SULLIVAN
ORANGE
PUTNAM
WESTCHESTER
ROCKLAND
BRONX
SUFFOLK
NEW YORK
NASSAU
RICHMOND
QUEENS
KINGS
Emerald Ash Borer (EAB) Tree Infestation/Trap Detection
Emerald Ash Borer (EAB) Trap Detection Only
Quarantined Area
0
100
200
Miles

Community Preparedness For Emerald Ash Borer & Asian Long-horned Beetle

- Conduct Public Tree Inventories (streets & Parks).
- Plan ahead for inoculation or pesticide treatment of trees.
- Plan ahead for possible removal and replacement of trees.

Pro-Active:
Inoculate with pesticides:
Costs range from $3.50 per inch DBH – do it yourself to $6.25 per inch DBH- contracted out.

That's about $59.50 to $106 per tree every 2-3 years.

Re-Active:
Tree Removal & Replanting:
Typical range for removal & stump grinding = $500 to $1200 per tree.

Typical range for new tree purchase & planting = $80.00 to $350.00

Next

Local Efforts

Followed by

How You Can Make A Difference

www.sleloinvasives.org

St. Lawrence - Eastern Lake Ontario
SLELO PRISM
Partnership For Regional Invasive Species Management