

Invasive Species



Invasive Species Defined

An invasive species is one that is **non-native** to the ecosystem under consideration and whose introduction causes, or is likely to cause, **economic** or **environmental** harm or harm to **human health**.

Economic:

Impacts on agriculture, recreation, wood/forest products, trade/shipping, tourism, utilities (power plants) and management costs.

Environmental:

Impacts on biodiversity, structural diversity, natural processes, aesthetics, ecosystem function and services.

Human Health:

Impacts on soil, water and air quality, flooding, injury, and disease/illness.

Invasive Species Characteristics

- High fecundity
- Aggressively outcompetes more valuable native species
- Free from natural predators
- Second largest threat to biodiversity
- Reduces or degrades habitat or food for native organisms
- Are the leading source of environmental and economic damage across NYS



Photo credits: Left- USEPA from bugwood.org, Right- <http://stopthebeetle.info/>

THE INVASION CURVE

Asset Based Protection
& Long-term Management

**Ideal Time
for
Intervention**

AREA INFESTED →

CONTROL COSTS →

Containment

Eradication

Prevention

Species
absent

Small number of localized
populations; eradication
possible

Rapid increase in distribution
and abundance; eradication
unlikely

Invasive species widespread and abundant; Long-term
management aimed at population suppression and
asset protection

TIME →

Introduction

Pathways of Invasion

Assisted (Man-Made)

- Recreation
 - Boats, canoes, kayaks
 - Hiking
 - Biking
- Transportation
 - Boats & ship ballasts
 - Roads & other infrastructure
- Living Industries
 - Landscaping/horticulture
 - Agriculture
 - Aquarium/pet trades
- Intentional Releases
- Biological Controls
- Government Programs

Natural

- Wind
- Animals
 - Birds and Mammals
 - Insects (oak wilt)
- Rivers & Streams
- Species Characteristics





Recreation as a Pathway

Rusty Crayfish WATCH



- Finger Lakes - largest NY tourism region outside NYC & environs
- Finger Lakes Tourism = \$2.9 billion in 2014
- ¼ of all fishing in NYS=\$1 billion in angler dollars
- Pathways: boots, waders, clothing, automobiles, boats, paddles, lifejackets, bilge water

Sign educating public about proper disposal of bait

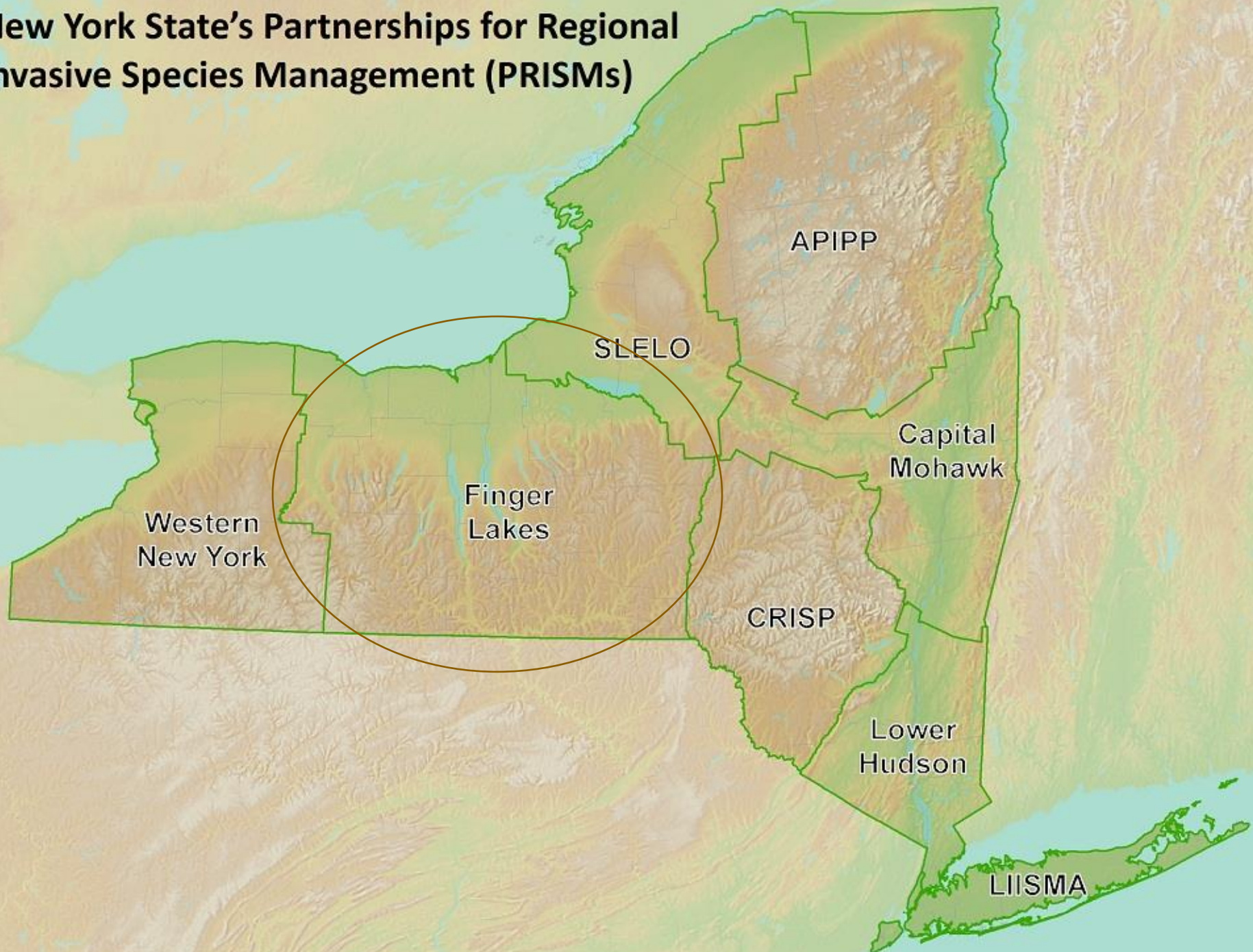


Photo credit: Oregon.gov



WI AIS Law prohibits the transport of water and live fish

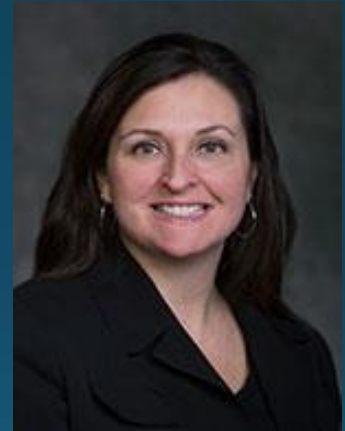
New York State's Partnerships for Regional Invasive Species Management (PRISMs)



Finger Lakes PRISM



- Addresses invasive species in Finger Lakes region
- Helps partners share/leverage limited resources
- Annual small grants program
- Many ways to connect
 - Full partnership meetings
 - Working groups
 - Volunteering
 - Collaboration
 - Small grants
- Builds community awareness & participation



Hilary Mosher
FL PRISM Coordinator

Aquatic Invasives in Honeoye Lake

Zebra Mussel



Eurasian water-milfoil



Curly Pondweed



What else?

Imminent Aquatic Threats to Honeoye Lake

Hydrilla

Water chestnut



Hydrilla verticillata Case Study

- Ecology

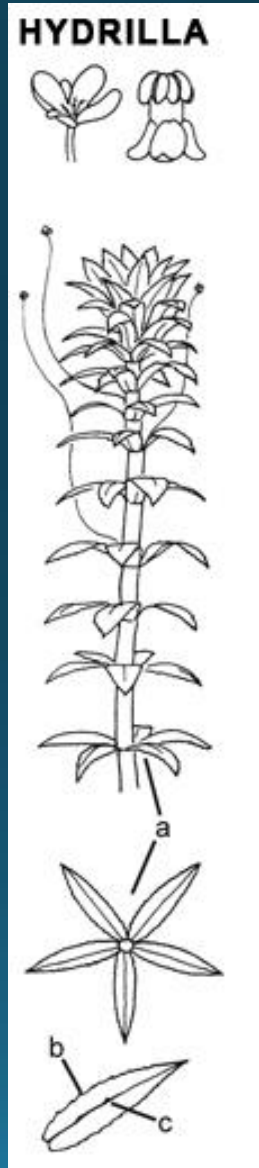
- Rapid growth
- Multiple spreading strategies
- Chokes out native vegetation
- Reduces habitat for fish and wildlife
- Substrate for cyanobacteria?

- Economic

- Impacts property values
- Interferes with recreation- swimming, boating, and fishing
- Reduces flow in drainage canals – flooding risk
- Costly to control!!
 - Over \$174M spent in FL to control Hydrilla over past 25yrs
 - ~\$2.5 M/yr to manage hydrilla in SC, \$5 M/yr in NC
 - MA - \$40,000/yr to manage Hydrilla in a single pond in Barnstable Co.!

- Eradication efforts ongoing in Cayuga Inlet , Erie Canal, and Tinker Nature Park

- Early ID critical



Hydrilla in Tinker Nature Park



In Henrietta
Project Cost To Date:
Benthic mats and survey: \$19,000
Grass carp and delivery: \$315
Permit cost: \$200 (expected)
Workshop: 30 participants, \$350 in in-kind training
TOTAL COST: 19,865



DO Nothing Approach?

- States like Florida and NC spend \$20,000,000- \$30,000,000 ANNUALLY just to MOW Hydrilla

- Cayuga Inlet infestation costs \$400,000-\$500,000 annually to treat

How much are you willing to pay?

Tax increase?

Volunteer hours?

Decreased recreation?



<http://en.wikipedia.org/wiki/Hydrilla>

Water Chestnut Case Study

Trapa natans L.

Native To: Europe and Asia

First Observed in NY: 1884

Means of Introduction: Ornamental for garden ponds

Impact: Inhibit boat navigation and decrease habitat diversity



Water Chestnut



New Infestations and Project Cost:

Genesee River –hand-harvest= \$1820.32/day
volunteers and boats

\$1500/day for harvester rental at Cayuga Lake
and Little Sodus Bay

TOTAL COST: \$4,820.32



Managed Infestations and Project Cost:
Braddock Bay- hand-harvest- 7 days, avg
10 volunteers/day * \$23.07/hr volunteer
rate + boats =



**TOTAL
COST:
\$8579.60**

Aquatic/Terrestrial Connection

- Watershed critical to water health
- Stream flow
- Stream/lake temperature
- Nutrient/sediment runoff
- Chemical inputs



Photo: Bill Hecht 2005

Hemlock Woolly Adelgid

Kills hemlocks

Hemlocks:

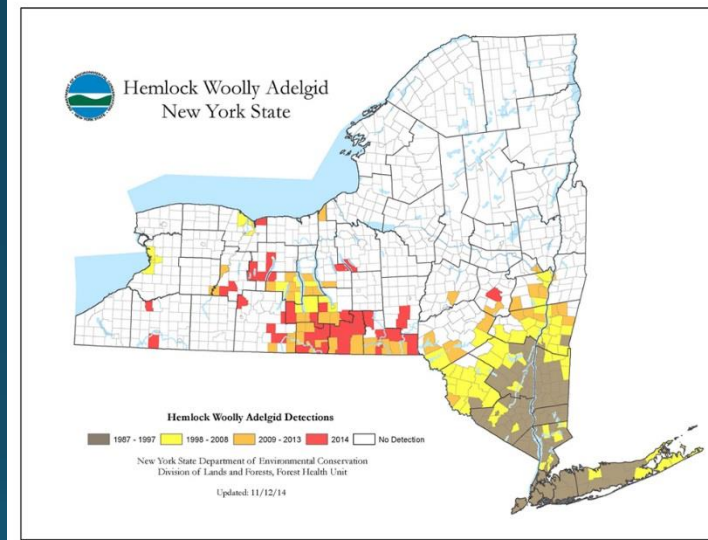
- Shade streams
- Keep water cool
- Even streamflow
- Trout habitat
- Steep slope stability

Untreated:

- Warmer water
- Sediment in lake
- Fish issues

Treat:

- Chemical stopgap
- Develop biocontrol

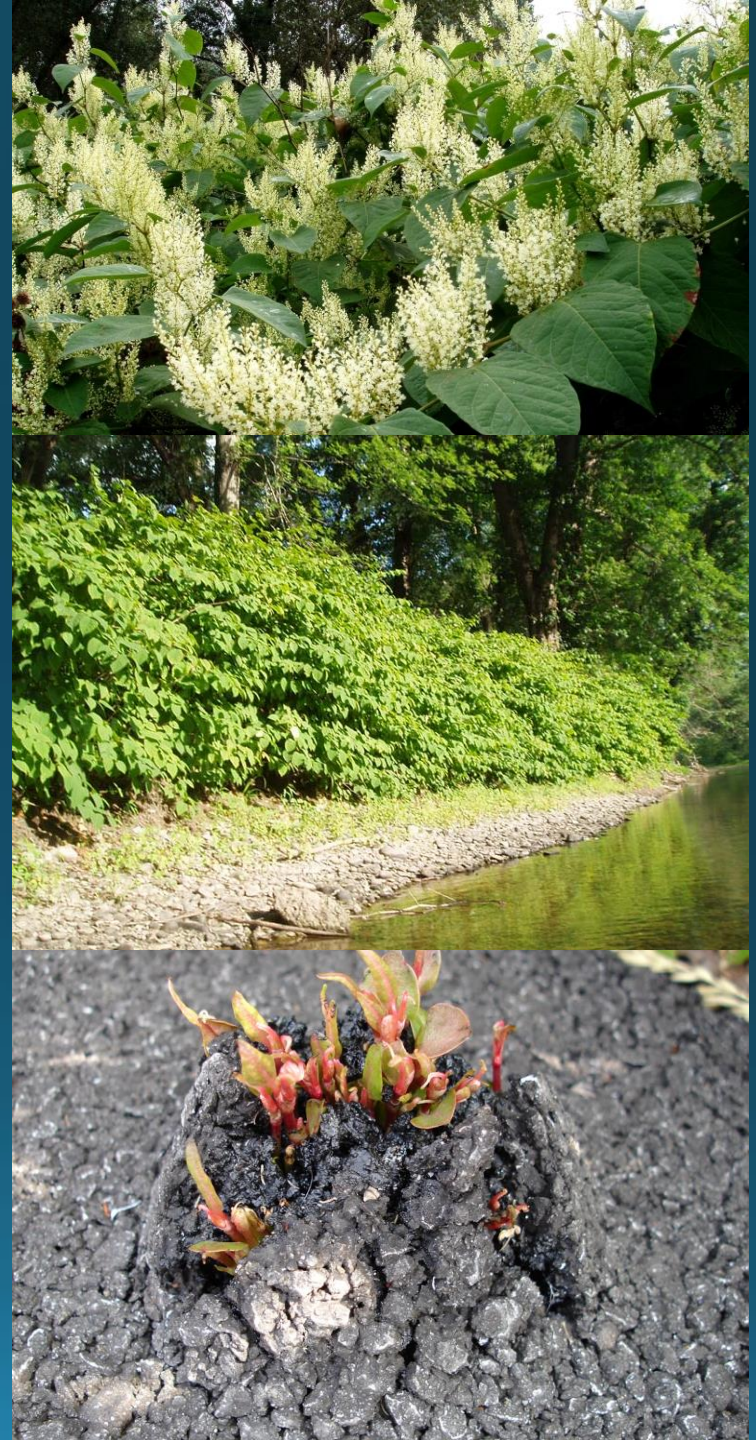


Photos: Top & Bottom- Mark Whitmore; Middle- NY DEC



Japanese Knotweed

- Widespread
- Alters stream flow
- Reduces shade to streams
- Property damage
- Virtually indestructible
- Spreads by fragments
- Control expensive



Agricultural Invasive Species



Herbicide resistant
weeds in crops
Craig Hicks, USDA APHIS



Spotted Wing Drosophila
in Raspberries
*Joseph Moisan-De Serres,
Québec's MAPAQ*

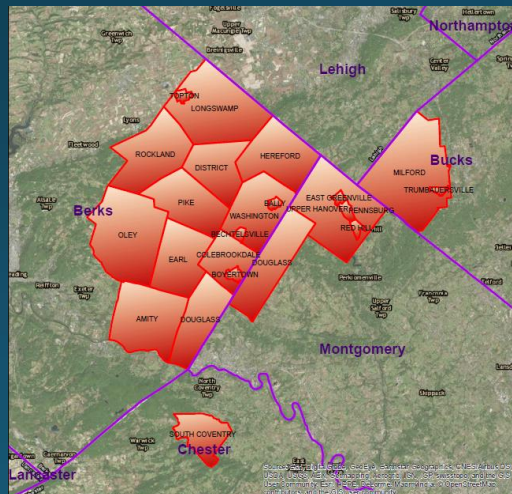


UM Extension

Brown Marmorated Stinkbugs on Tomato
Univ. of Maryland Extension

New Threat: Spotted Lanternfly

- Recently found in PA
- 65 host species
- Fruit, logging, forestry industries threatened
- Natural hitchhiker
- Watch for this insect!



Early Detection/Rapid Response

- Important to know potential invasives in your landscape
 - Act as early detectors by spotting and reporting invasive species
- Use of iMapInvasives as a detection tool
 - Facilitates the management and sharing of information
 - Supports early detection of new populations



iMapInvasives
Sharing information for strategic management

Basic and
Train-the-Trainer



**Calling all citizen scientists, educators and volunteers
concerned about invasive species!**

Management Strategies

- We can not afford a 'sit and wait' tactic to invasive species mgmt
- Proactive approach provides the best chance for eradication and the lowest cost
- Need an early detection/rapid response plan
- If something doesn't look right, it probably isn't! Is it invasive?!

New York State
Department of Environmental Conservation
Division of Lands & Forests
Bureau of Private Land Services (PLS)



Bureau of Private Land Services

Emerald Ash Borer Management Response Plan

January 12, 2011
Version 6.0

Developed jointly by:

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Japanese knotweed growing through asphalt

PROTECT YOUR WATERS Anglers and Boaters

Help STOP the Spread of Aquatic Invasive Species and Fish Diseases

Fish diseases such as viral hemorrhagic septicemia (VHS) and invasive species such as the zebra mussel and Eurasian watermilfoil can be spread through the use of boating and fishing equipment that has not been properly cleaned, dried, or disinfected prior to its use in another water body. Help stop the spread of these noxious species and diseases by adhering to the following simple guidelines:

- 1** **INSPECT** your boat, trailer and other fishing and boating equipment and remove all mud, plants and other organisms that might be clinging to it. **Never** release plants, fish or animals into a body of water unless they came out of that body of water.
- 2** **DRAIN AND DRY** everything that came into contact with water. Many aquatic invasive species and fish diseases are microscopic and can be transported in as little as a drop of water. Dry equipment for at least 48 hours before using it in another water body. Gear that is difficult to dry may require even longer drying times. Be sure to completely drain your boat, including bilge wells and live wells.
- 3** **DISINFECT** equipment if you cannot or do not have the time to dry it before using it in another water body. Effective disinfectants include water over 140°F (hotter than most hot tap water), 2% bleach solution (2 ounces of household bleach mixed with 1 gallon of water), or household cleaners such as Fantastik®, Formula 409®, or Spray Nine® that contain the ingredient alkyl dimethyl benzyl ammonium chloride. For all materials, follow label instructions and be sure to soak equipment for a minimum of 10 minutes. Dispose of all disinfectant solutions away from surface waters in accordance with local restrictions. For additional information, contact your local DEC office or go to www.dec.ny.gov.

Be on the lookout for these aquatic invasive species of concern



www.dec.ny.gov

New York State Department of Environmental Conservation

I NY



QUESTIONS?



Photo credits: Katie Lovering