Invasive Species of the Adirondack Region

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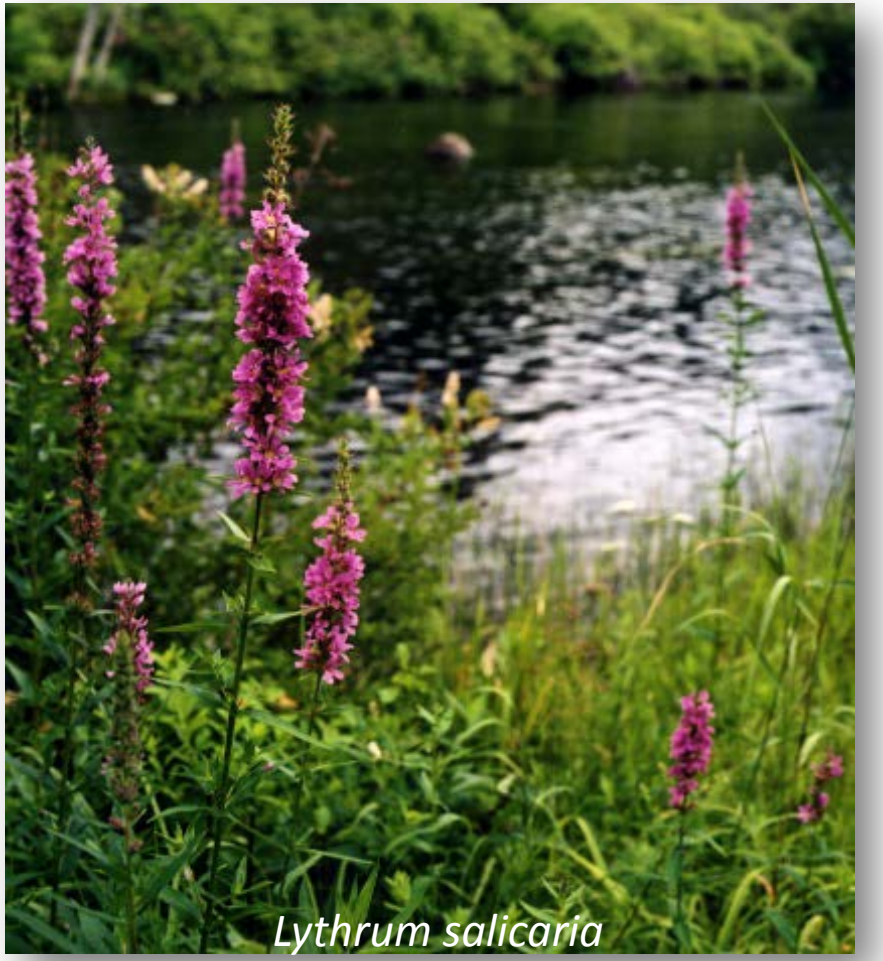
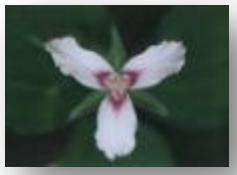
Presentation Outline

- What are invasive species?
- What is the Adirondack Park Invasive Plant Program?
- What are the priority aquatic invasive species in the Adirondacks?
- Black River Watershed
- Which spread prevention tips should you use or recommend?


Lythrum salicaria

What's the difference?

Native Species



- **Species indigenous to a region at the time of European settlement**

Non-native Species (*Exotic, Introduced, Alien*)

- **Accidental or purposeful introduction of a species outside of its historic range**

Invasive Species *(Noxious)*

- **Non-native species that rapidly reproduces and displaces native species causing harm**

Nuisance Species *(Weed)*

- **Species that interferes with human activities**

Our Focus

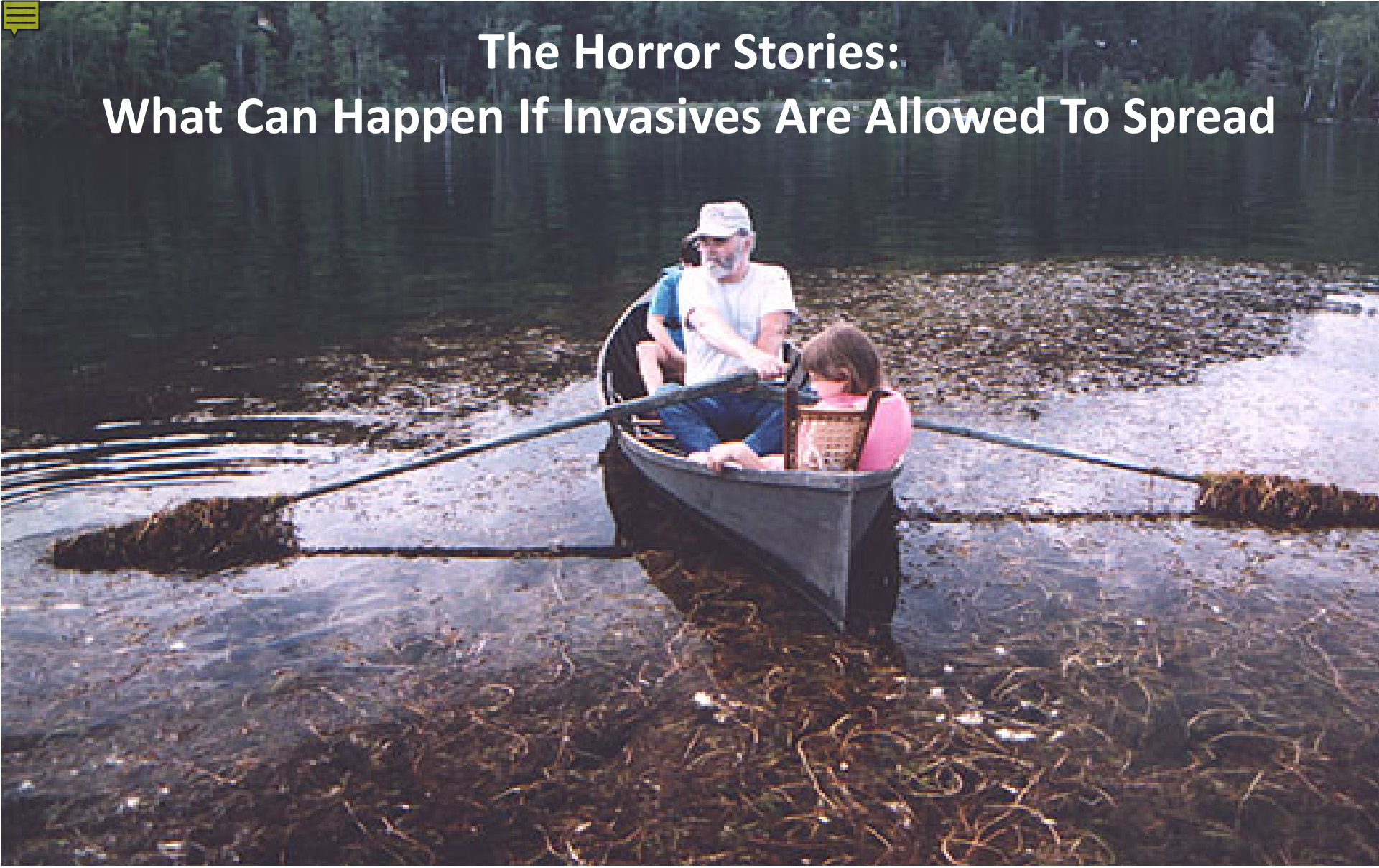
Species that…

- Are not native to the ecosystem under consideration.
- Can reproduce and support self-sustaining populations.
- Can “jump” spatial gaps.
- Cause ecological, economic, or societal harms.

Benefits of Native Plants

- Provide food
- Provide shelter and spawning habitat
- Produce oxygen
- Protect shoreline
- Stabilize sediments
- Reduce turbidity
- Transport nutrients
- Support diversity

The Horror Stories:
What Can Happen If Invasives Are Allowed To Spread



Eurasian watermilfoil, Eagle Lake

Water chestnut, Lake Champlain

Common reed grass, Long Lake

Japanese knotweed, Saranac Lake

Swallow-wort spp., St. Lawrence

Why are some non-natives invasive?

- **They lack predators, parasites, and disease to limit growth**
- ***They produce many small seeds and reproduce early***
- ***They can reproduce both by seed and vegetative growth***
- ***They have few special seed germination requirements***
- **They are "generalists" capable of colonizing a wide range of sites**
- **They monopolize resources such as light and nutrients**
- ***They may produce toxins that suppress the growth of other plants***

Ecological impacts are diverse and frightening

Invasive species are the second leading cause of the loss of biodiversity worldwide, falling short only to habitat destruction

ECOSYSTEM SIMPLIFICATION

- Native Species Displacement
  competition and suppression
- Disrupt Food Chains
  as flora simplifies, so does fauna
- Loss of Biodiversity
  convert local floral biodiversity into single species stands

Knotweed crowding out native spreading dogbane

Impacts continued

ECOSYSTEM PROCESS ALTERATIONS

- Impacted Drainage
- Altered Nutrient Cycles
- Loss in Community Structure and Function

Common buckthorn infestation

SPECIES LOSS

- Major cause or contributing factor in the decline of **42%** of the US species federally listed as threatened or endangered
- Hybridize with natives, change local gene pool
- Bottom line… We are losing our native plants!

Impacts of Aquatic Invasive Plants

- Decreased native plant diversity
- Decreased light and oxygenation
- Decreased habitat complexity
- Increased sedimentation and nutrient loading
- Accelerates eutrophication and lake aging
- May affect pH and temperature levels
- Decreased recreational and economic benefits
- Increased management costs and user conflict

Economic impacts are costly

Invasive species cost the U.S. an estimated $137-146 billion each year

Water Chestnut Infestation, Lake Champlain

Milfoil Infestation, Upper Saranac Lake

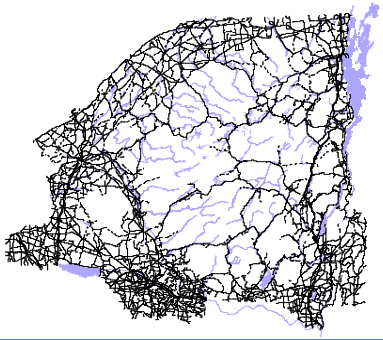
Economic

- Reduced water quality
- Reduced productivity of forestry, fisheries, agricultural and range lands
- Impaired recreational activities; access, boating, birding, fishing, hunting
- Reduced property values
- Negative impact on tourism

Hundreds of thousands of dollars are already being spent in the Adirondacks

How are invasive species introduced and spread?

- **Pathways**
  - Ballast
  - Nurseries / Ornamentals
  - Aquaria / Water Gardens / Pet Trade
  - Illegal stocking
  - Bait
  - School releases
  - Roadways
  - Vehicles / watercraft
  - Canals
  - Clothing / Gear / Equipment
  - Fill, mulch material
  - Disturbance
  - Firewood
- Wildlife
- Wind / Waterways



Roadway Corridors

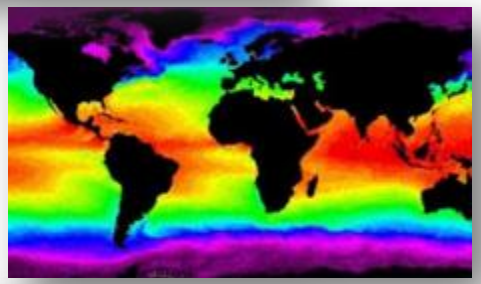
Disturbed Areas

Ornamentals

Watercraft

New Pathways

- Global Trade
- Global Climate Change
- Genetic Engineering
- Bioterrorism
- Internet Sales

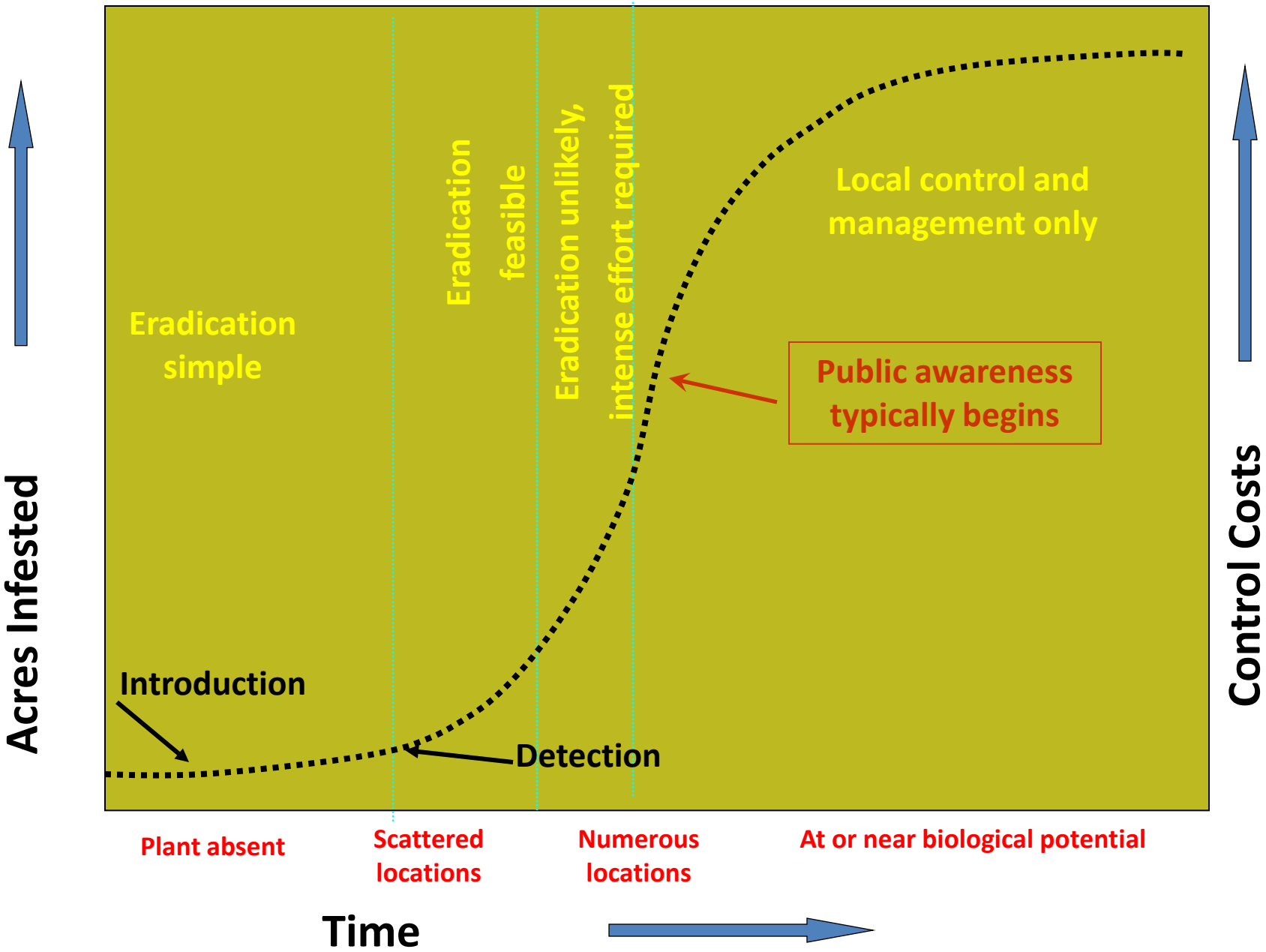


Management Techniques

Plants, Fish, Invertebrates, Mammals, Pathogens

- **Physical**
  - *Handpulling, cutting, digging, mowing, matting*
  - *Barriers*
- **Chemical**
  - *Pesticide, herbicide*
- **Biological**
- **Cultural**
  - *Prescribed grazing and prescribed burning*
  - *Regulations, Quarantines*
  - *Education*
- **Reclamation/revegetation**
- **Do Nothing**

Invasive Plant Increase Over Time and Control Potential



Early Detection and Rapid Response

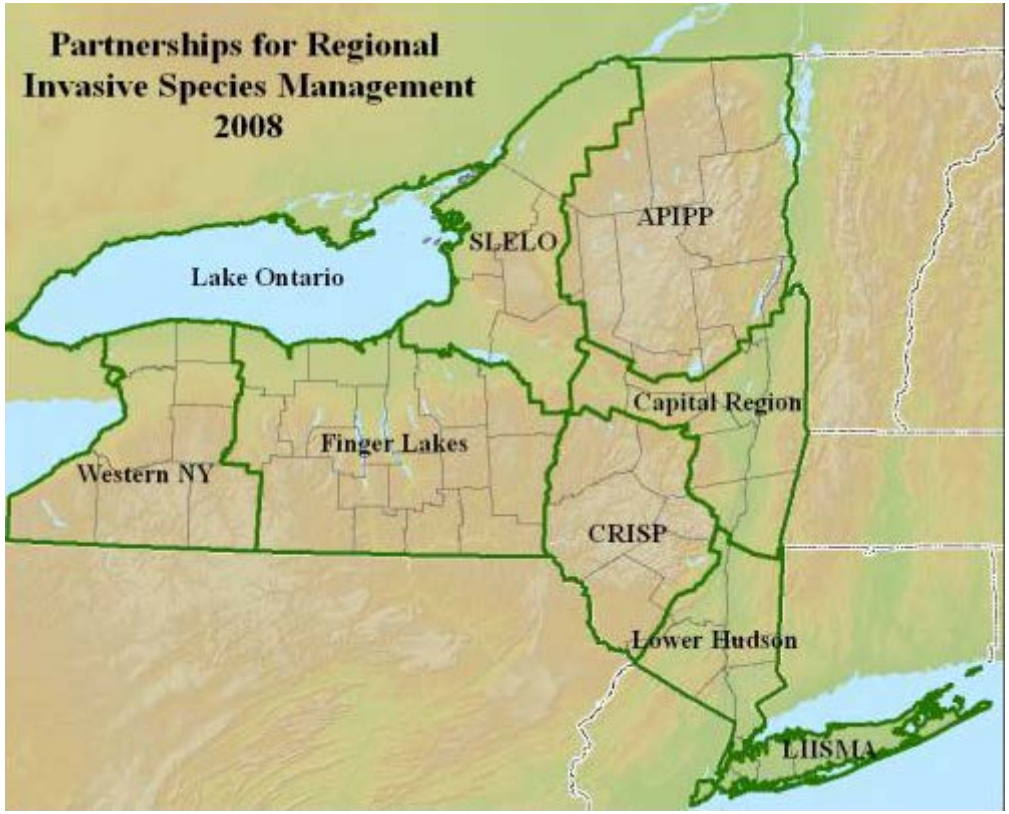
Single Threat, Eradication Simple

Wait and Do Nothing

Massive Infestation, Eradication Unlikely

Prevention, Early Detection, and Rapid Response are the Keys to Successful Eradication!

Partnerships for Regional Invasive Species Management (PRISM)



- **Core Functions**
  - *Coordination*
  - *Volunteer Training*
  - *Detection / Response*
  - *Management*
  - *Education*
  - *Citizen science research*
- **Monthly calls**
  - *Last Wednesday of every month*
- **PRISM listserves**

Adirondack Park Invasive Plant Program

The Nature Conservancy
Protecting nature. Preserving life.™

Adirondack parkagency

Mission

To protect the Adirondacks from the negative impacts of non-native, invasive species.

Adirondack Park Invasive Plant Program (APIPP)

Coordinates Two Projects

Terrestrial Invasive Species Project

Aquatic Invasive Species Project

Purple loosestrife

Eurasian watermilfoil

APIPP Objectives

1. **Prevent new invasions.**

   Increase public awareness and involvement to prevent the spread of invasive plant species.

Education

2. **Rapidly detect and eradicate new invasions.**

   Coordinate regional invasive plant inventory and monitoring program utilizing staff and volunteers.

Monitoring

3. **Manage established infestations.**

   Facilitate the management, containment, and control of priority invasive plant infestations.

Management

Regional Partners

Adirondack Mountain Club
Au Sable River Association
Boquet River Association
Clinton and Essex County Master Gardeners
Cornell Cooperative Extension
Darrin Fresh Water Institute
Federal Highways Administration
Franklin County Network of Shoreline Associations
Hamilton County Soil and Water Conservation District
Lake Champlain Basin Program
Lake Champlain Sea Grant
Lake George Association
Lake George Land Conservancy
Paul Smiths College Watershed Stewards Program
Residents Committee to Protect the Adirondacks
Student Conservation Association
SUNY Plattsburgh

Adirondack Volunteers!

Adirondack Council
Adirondack North Country Association
CAP-21
Department of Agriculture and Markets
Garden Club of America
Lake George Park Commission
St. Regis Mohawk Tribe
SUNY ESF Wanakena
Town of Inlet
Town of Webb, DPW
Trout Unlimited
Upper Saranac Lake Foundation

HC SWCD staff assist yellow iris controls

APIPP Activities

Aquatic Invasive Plants in the Adirondacks

Eurasian Watermilfoil

Myriophyllm spicatum

Curlyleaf Pondweed

Potamogeton crispus

Yellow Floating Heart

Nymphoides peltata

Variable leaf Watermilfoil

Myriophyllum heterophyllum

Fanwort

Cabomba caroliniana

Water Chestnut

Trapa natans

European Frog-Bit

Hydrocharus morsus-ranae

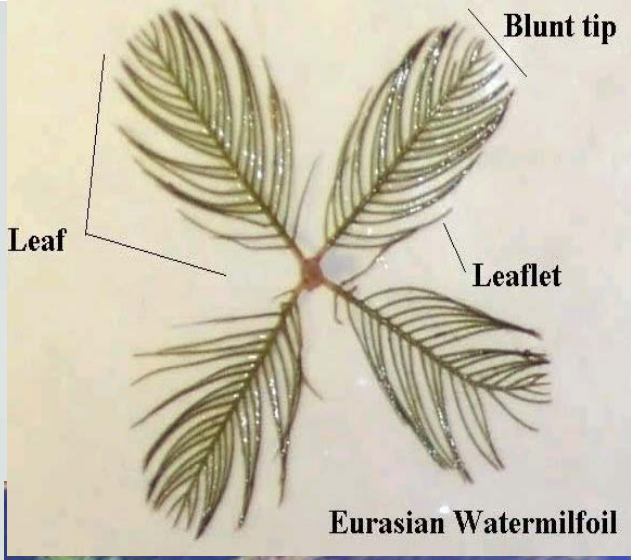
Brittle Naiad

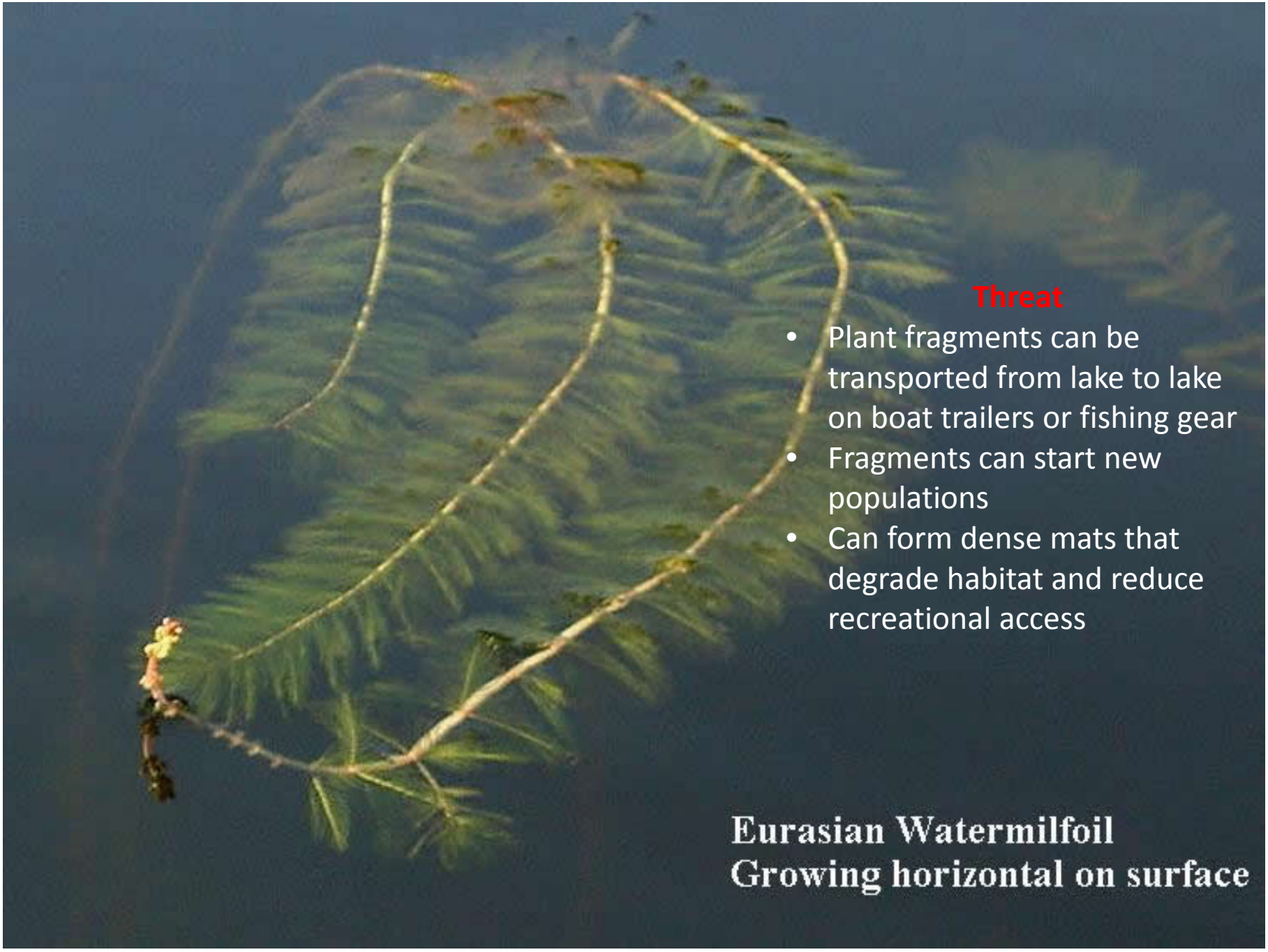
Najas minor

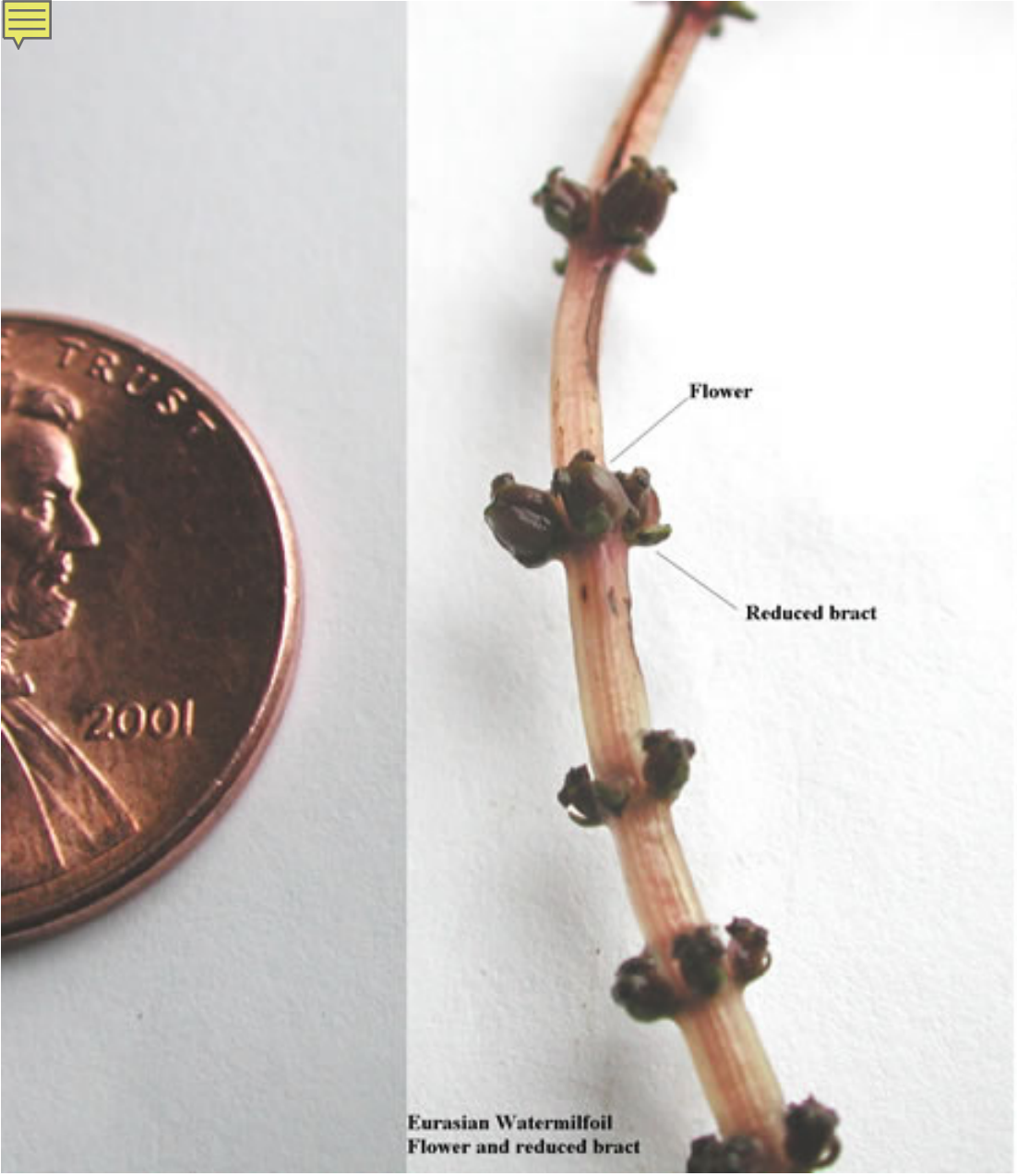
- Submerged perennial
- Four feathery leaves whorled around the stem

- Finely divided leaves
  - >9 leaflets
  - Can reach lengths of 20 feet
  - Branches near the surface

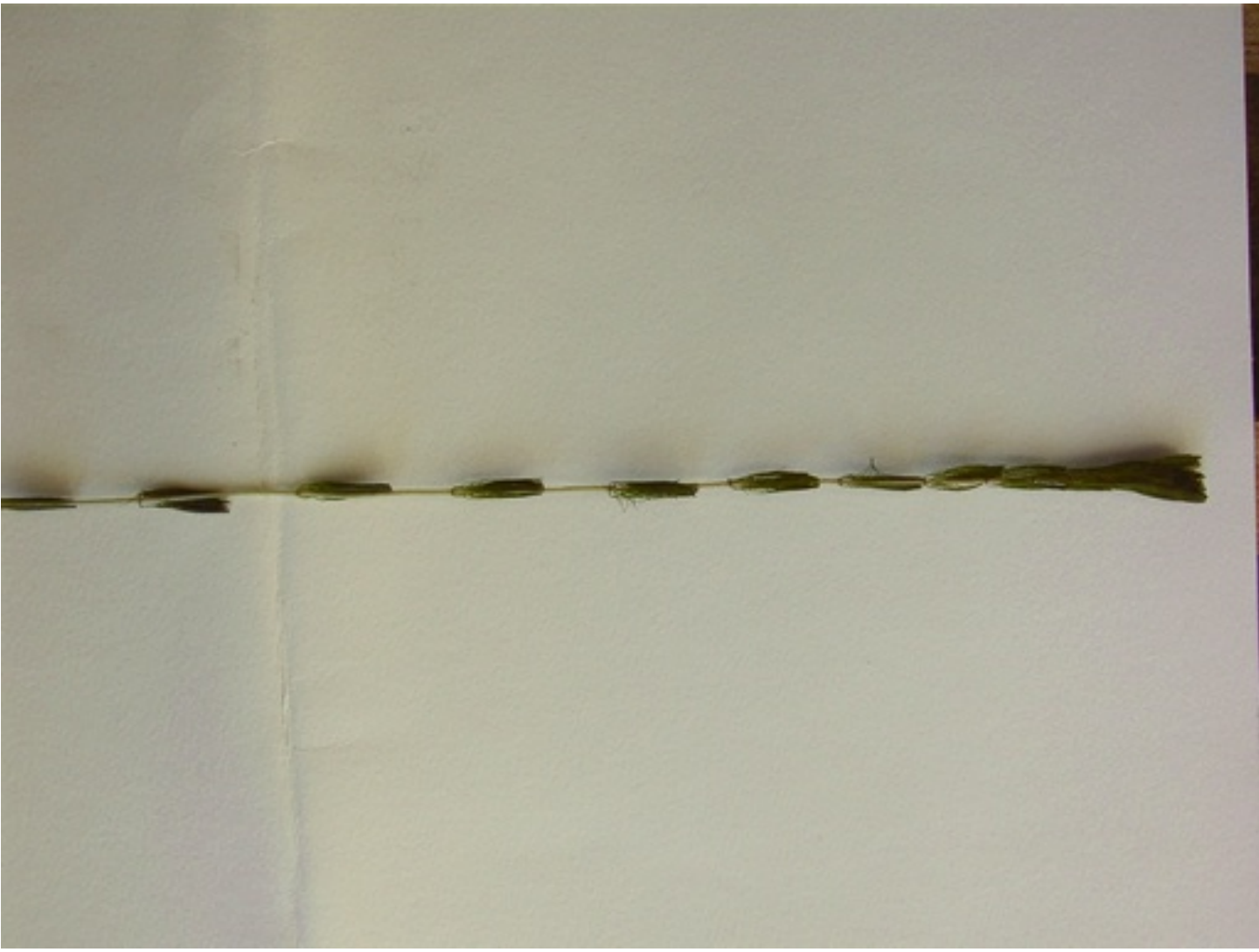
Eurasian Watermilfoil




Threat
• Plant fragments can be transported from lake to lake on boat trailers or fishing gear
• Fragments can start new populations
• Can form dense mats that degrade habitat and reduce recreational access
Eurasian Watermilfoil
Growing horizontal on surface



Except for the native northern watermilfoil, other native watermilfoils have flowers that are smaller than the green bracts, or they lack emergent flowering spikes.



Variable-leaf watermilfoil

Myriophyllum heterophyllum

- Submerged perennial
- Featherlike leaves
- Leaves arranged in whorls of 4-6 around the stem
- 5-14 leaflets
- Bottle brush appearance
- Stem usually red
- Thick flowering spikes stick out of the water as much as 6 inches (more than twice that of native milfoils)

Threat

- Plant fragments can be transported from lake to lake on boat trailers or fishing gear
- Fragments can start new populations
- Can form dense mats that degrade habitat and reduce recreational access

Water Chestnut

- Native to Eurasia
- Floating annual
- Feathery, submersed leaves
- Triangular, toothed, floating leaves that are glossy

- Visible bulbous bladders
- Forms rosettes
- Reproduction by seed and fragmentation

Water chestnut nutlets

Threat

- Impenetrable mats can cover large expanses of water
  - Alters water quality and clarity
  - Eliminates the growth of native aquatic plants
  - Makes boating, fishing, and swimming hazardous

- Native to South America
- Submerged perennial
- Fan-like leaves
- Leaves branched and attached to the stem on petioles, appearing whorled
- Small, white, emergent flowers in late summer
- Reproduction by seed and fragmentation
- Popular aquarium plant

Fanwort

Threat

- Can form extremely dense stands and clog waterways, stifling water flow and impairing recreational activities

Curlyleaf Pondweed

- Native to Europe, Africa, Australia
- Submerged perennial
- Rigid, reddish-green, oblong leaves
- Leaves finely toothed, wavy edges
- Flat, reddish-brown stem grows from 1-16 ft
- Reproduction from winter buds, called turions

Threat

- New plants form under ice cover during late winter, making it one of the first plants to emerge in early summer
- Plant die-offs in midsummer may cause a critical loss of oxygen

European Frog-bit

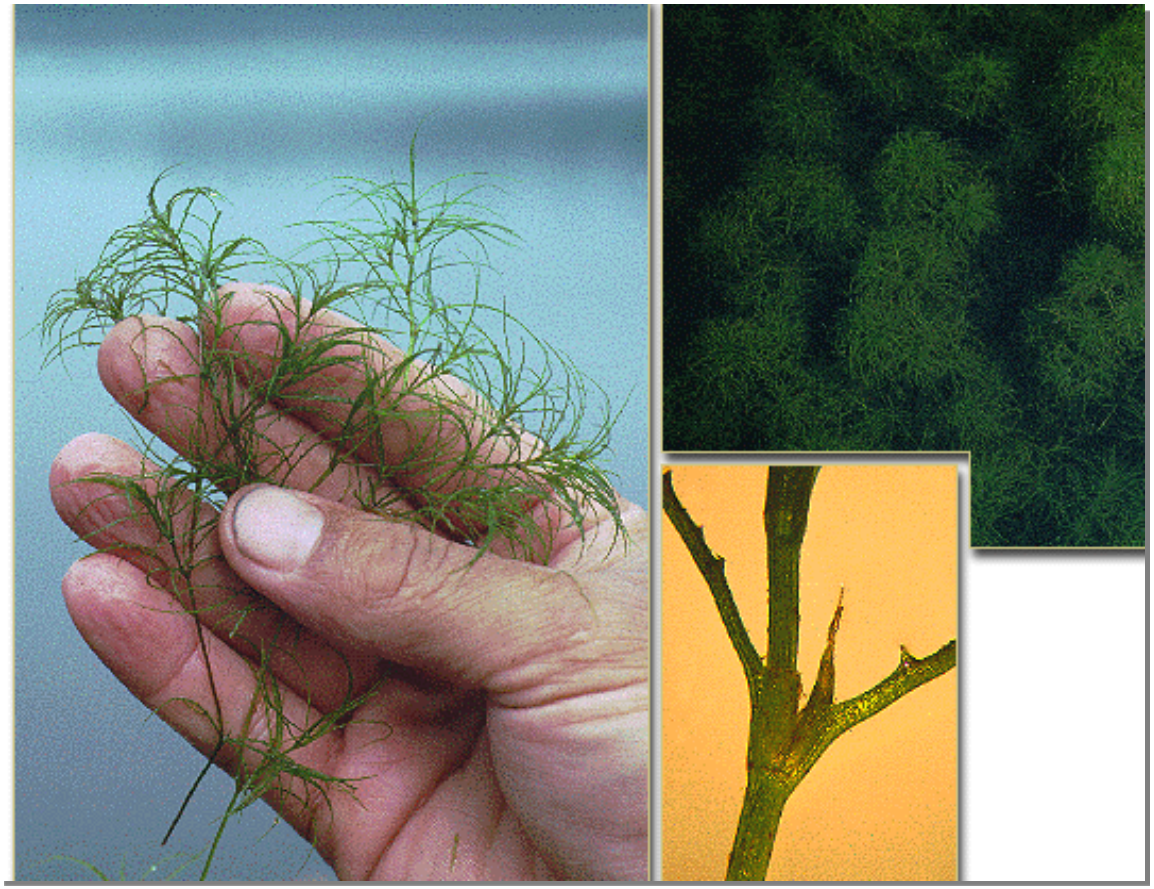
- Free-floating annual
- Round, leathery leaves
- Undersides of leaves may be dark purple
- White flowers with yellow centers
- Reproduction by stolons (horizontal stems) which produce daughter plants that can break free and float to new locations, turions

Threat

- Rapid vegetative spread
- Forms dense mats which can limit light penetration and inhibit recreational use

Brittle Naiad

Najas Minor



- Native to Eurasia, Africa
- Herbaceous annual
- Dense clusters
- Leaves curved, thread-like with visible serrations
- Leaves long, pointed, oppositely arranged on highly branched stem
- Extremely brittle
- Reproduction from stem fragments or from small seeds which grow along its stem

Threat

- Can inhibit the growth of native aquatic plants
- Can make fishing or boating access difficult

Southern Naiad

Najas guadalupensis

- Submerged annual
- Native to the US, considered invasive in some places
- Stems long with many branches
- Leaves dark green to greenish-purple, ribbon-like, opposite or in whorls of 3, mostly less than ½ inch long and 1/8 inch wide
- Very tiny teeth can be seen along leaf margins with a hand lens
- Reproduction by seeds and fragmentation

Threat

- Can inhibit the growth of other native aquatic plants
- Can make fishing or boating access difficult

Swollen Bladderwort

Utricularia inflata

Threat

- Can inhibit the growth of other native aquatic plants
- Can make fishing or boating access difficult

- Native to the US, considered endangered in NY State
- Carnivorous plant
- Delicate, highly branched, finely divided underwater leaf-like stems with small seed-like bladders
- Emergent snapdragon-like yellow flowers
- Distinctive spoke-like whorl of 4 to 10 wedge-shaped floating leaves, 4-9 cm long, supports the flower stalk
- Reproduction by fragmentation and seeds

Hydrilla

- Native to Asia
- Submerged perennial
- Visibly toothed leaves
- Leaves grow in whorls of 4-8, 5 most common
- Undersides of leaves may have one spine or more
- Midrib of each leaf often reddish
- Reproduction by potato-like tubers that may remain dormant for several years in the sediment, seeds, fragmentation, turions

Threat

- Spreads rapidly
- Can completely clog waterways and restrict water flow – threat to aquatic ecosystems and recreational resources

Didymo, AKA “Rock Snot”

New Zealand

- Microscopic algae
- Tan, light brown or brown clumps or ropy strands
- Feels rough, cottony or fibrous (NOT slimy)
- Can form thick solid mats (1-4 inches) on rocks or swift-flowing river or stream bottoms
- Can cling (unseen) to waders, boots, boats, clothing, lures, hooks, fishing line and other equipment and remain viable for several weeks under seemingly dry conditions

Delaware River

Threat

- Alters composition of aquatic insect communities
- Degrades aesthetic quality of pristine streams
- May impact infrastructure such as clogging irrigation intake pipes
- Potential long-term impacts on fish communities

Plant ID


Verticillatum


Elodea


Eurasian milfoil


Northern milfoil


Coontail


Bladderwort

Aquatic Invasive Plants in New York State

Water Lettuce

Pistia stratiotes

Starry Stonewort

Nitellopsis obtusa

Brazilian Elodea

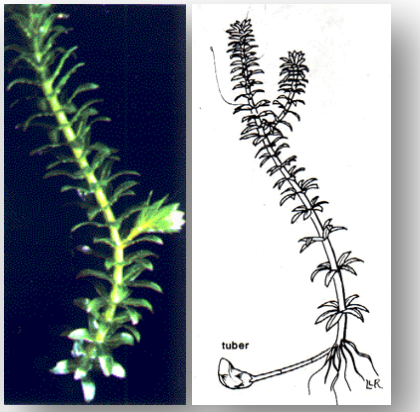
Egeria densa

Water Hyacinth

Eichhornia crassipes

Parrotfeather

Myriophyllum aquaticum



Hydrilla

Hydrilla verticillata

Aquatic Invasive Animals and Pathogens

Spiny waterflea

Tench

Zebra mussel

Asian clam

VHS Fish Virus

Round goby

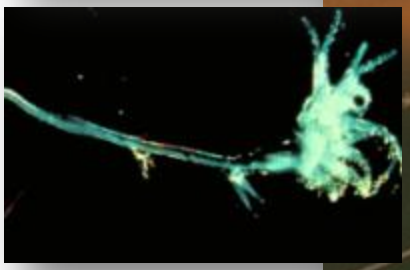
Zebra Mussel

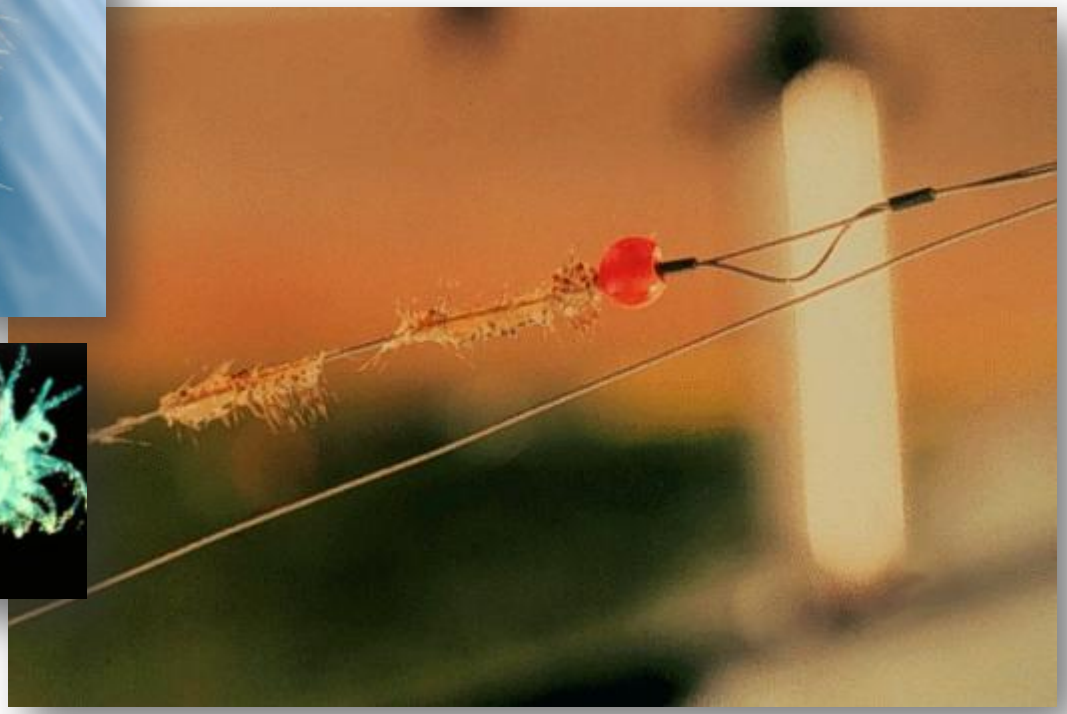
- Filter-feeding freshwater bivalve mollusk
- ¼” to 1 ½“ long
- D-shaped with light and dark brown stripes
- Lake Champlain, Lake George

Threat

- Attach to most surfaces including sand, silt, and harder substrates
- Displace native species
- Sharp shells
- Nuisance to humans
- Affect clarity, content, and ultimately the food chain of aquatic ecosystems

Spiny Waterflea





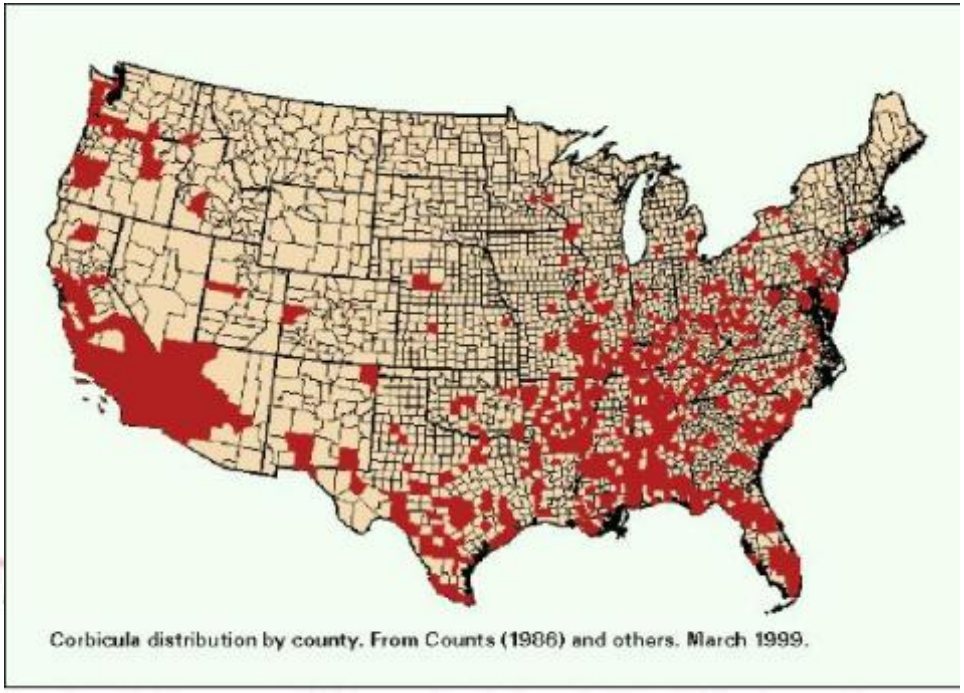
- Tiny crustaceans
- Less than ½” long
- Long, sharp, barbed tail
- Collect in gelatinous globs on fishing equipment and lines
- Great Sacandaga Lake, Sacandaga Lake, Peck Lake

Threat

- Predators of small zooplankton, an important food for young native fishes
- Reproduce rapidly
- Eggs capable of lying dormant all winter, resisting drying and freezing
- Smaller fish cannot readily consume them (sharp spines)

Asian Clam

Corbicula fluminea



http://sofia.usgs.gov/sfrsf/rooms/species/invasive/intro/corbiculamap.gif

- Freshwater bivalve mollusk
- Outside shells yellow-green to brown with elevated concentric rings
- Inside shells may be light purple
- Adults usually less than 1 ½“ in length
- Warmer, shallower areas near shore
- Lake George

Threat

- Displaces native mollusks that are often already threatened
- Reduces biodiversity
- Alters food chain
- May cause algae blooms
- Damages equipment and clogs industrial and commercial water systems
- Fast growing, spreads quickly

Target Terrestrial Invasive Plants

Purple Loosestrife

Lythrum salicaria

Common Reed Grass

Phragmites australis

Garlic Mustard

Alliaria petiolata

Japanese Knotweed

Polygonum cuspidatum

Yellow iris

Giant hogweed

Swallow-worts

Asiatic bittersweet

Pests and Pathogens

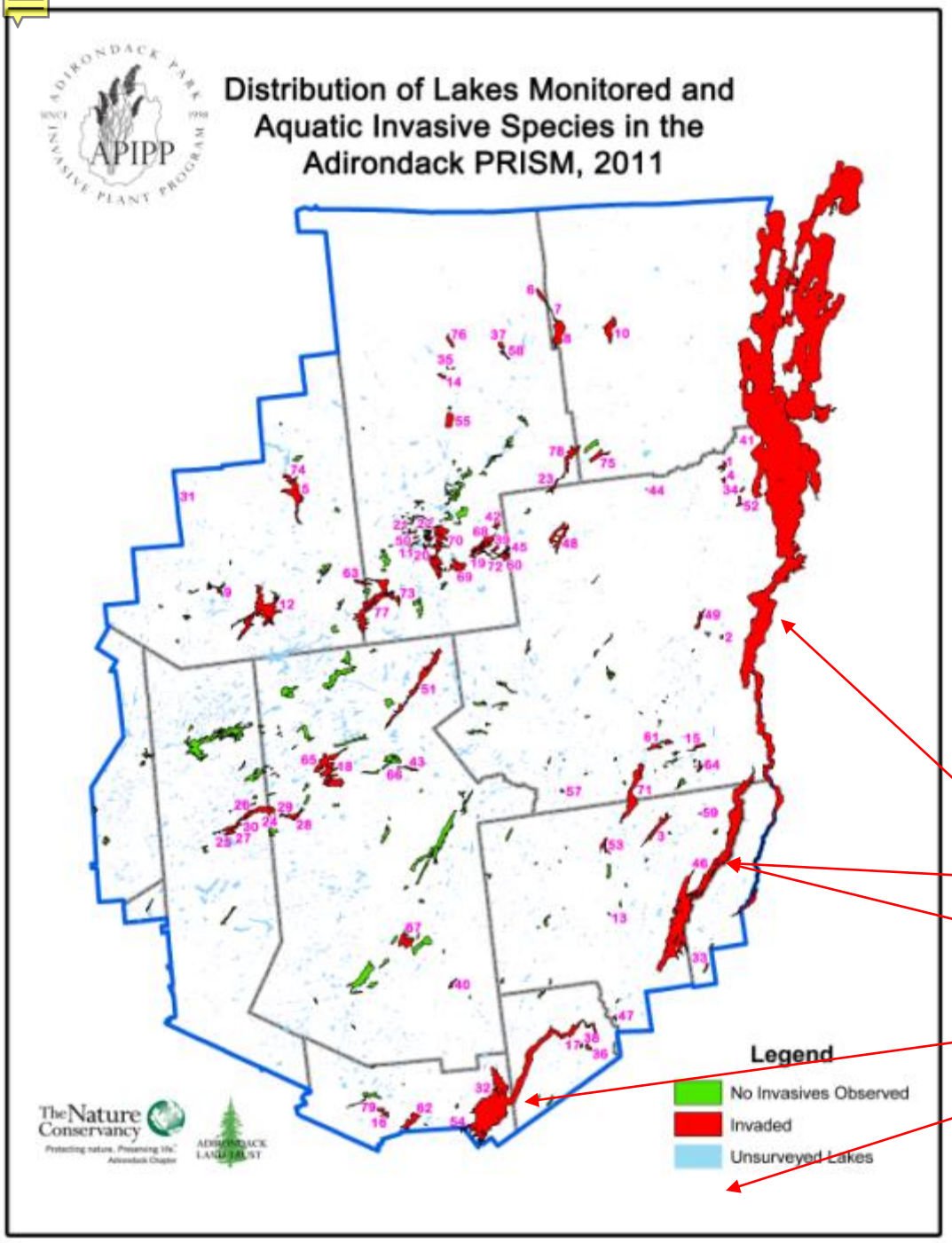
Emerald ash borer

Sirex woodwasp

Hemlock wooly adelgid

Asian longhorned beetle

Lakes Surveyed and Plant Distribution



Total Number of Waters Infected
79

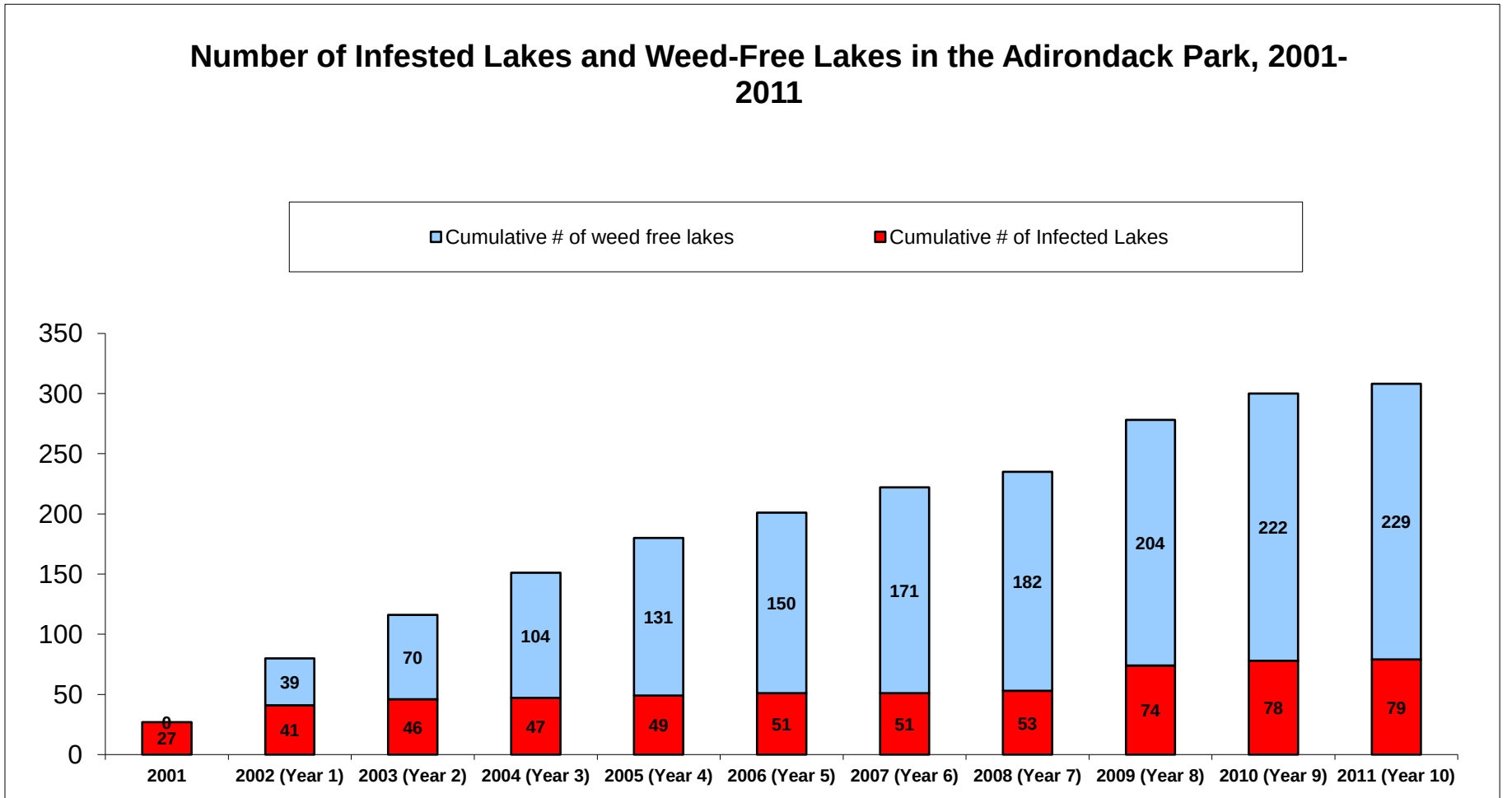
Total Number of Volunteers
531

Total Number of Lakes Surveyed
273

-Zebra mussel
-Asian clam

-Spiny waterflea
-Didymo

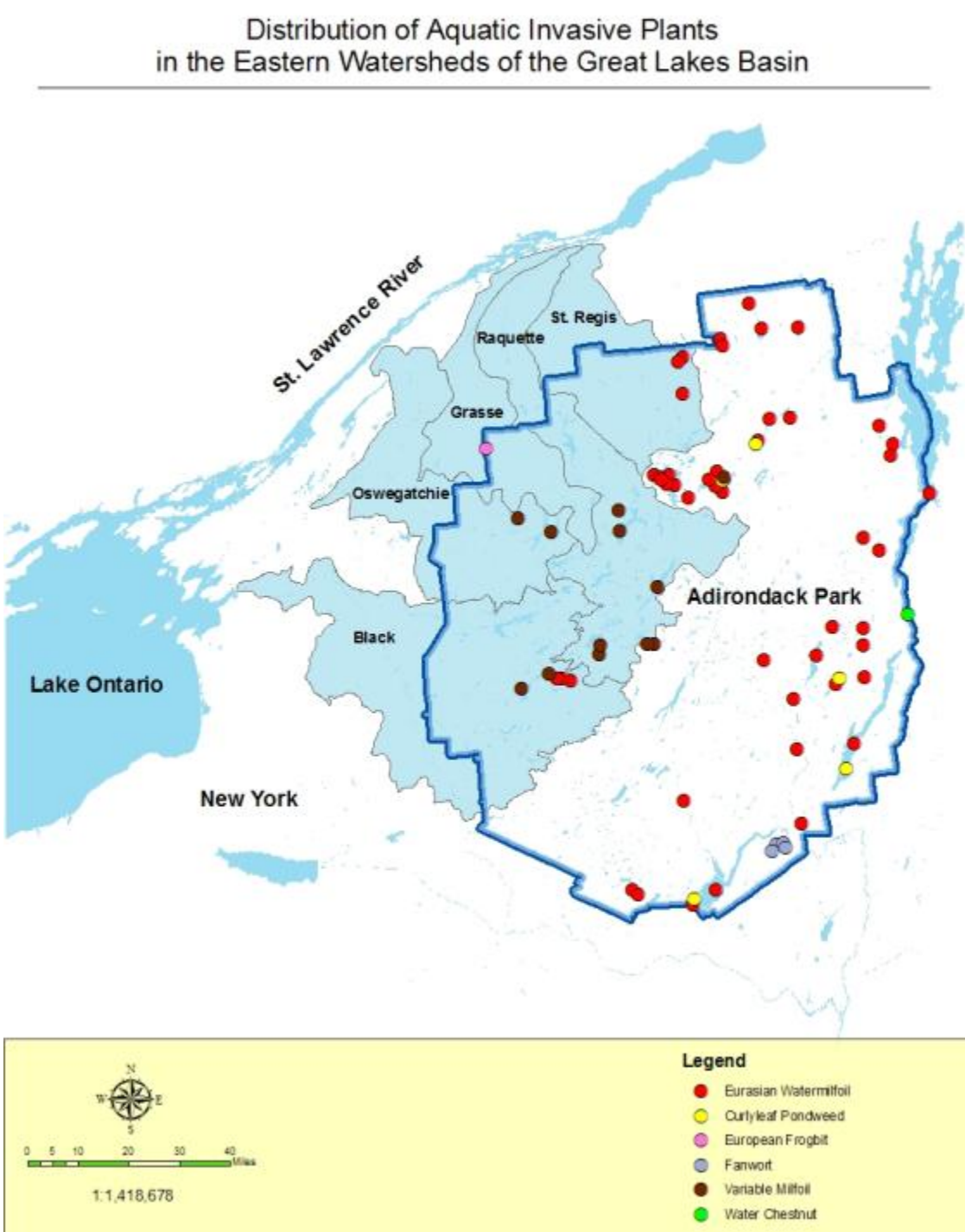
Opportunity Exists



2 out of 3 waters surveyed are free of aquatic invasive plants

Black River Watershed

- Fulton Chain
  - First Lake: VLM
  - Second Lake: EWM, VLM
  - Third Lake: VLM
  - Fourth Lake: EWM, VLM
  - Fifth Lake: EWM, VLM
  - Sixth lake: EWM, VLM
  - Seventh lake: EWM, VLM



Programs in Development

- Adirondack Watershed Steward Program

- Regional Response Teams

What Can We Do?

Prevent the Spread of Invasive Plants

- Be Informed
- Learn to Identify
- Detect Early
- Report Infestations

Aquatic Invasive Species Spread Prevention: What's Out There

- Shoreowner education
- Signage (boat launch)
  - State
  - Municipal
  - Private
- Stewards (boat launch)
  - Paid
  - Volunteer

- Stations (boat wash)
  - Lake George
  - Upper St. Regis
- Stations (disposal)
  - Buck Pond
  - Lake Flower
  - Lake Placid

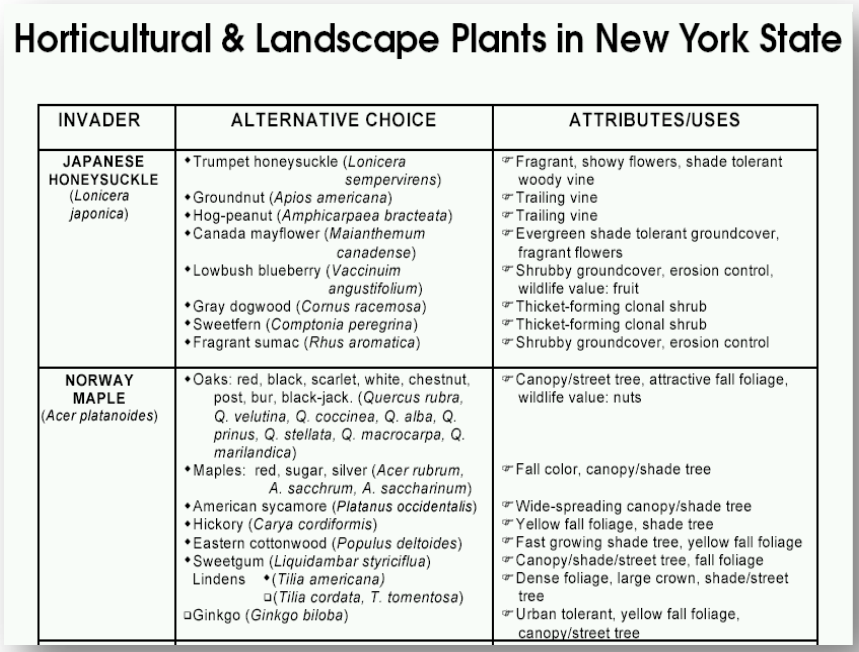
- Surveys
  - Paid
  - Volunteer
- Policies (laws)
  - Local
  - State

Aquatic Invasive Species Spread Prevention

Check your boat before you float!

- Anglers:
  - Never release live bait fish into a water
  - Never move fish from one water to another without the proper permits
  - Clean out / disinfect live wells
  - Check, clean, and dry all clothing, boots, and gear
- Boaters:
  - Avoid boating through dense plant beds
  - Check, clean, and dry boat, gear, and equipment

Terrestrial Invasive Plant Spread Prevention



Horticultural & Landscape Plants in New York State

INVADER	ALTERNATIVE CHOICE	ATTRIBUTES/USES
JAPANESE HONEYSUCKLE (*Lonicera japonica*)	•Trumpet honeysuckle (*Lonicera sempervirens*) •Groundnut (*Apios americana*) •Hog-peanut (*Amphicarpaea bracteata*) •Canada mayflower (*Maianthemum canadense*) •Lowbush blueberry (*Vaccinuim angustifolium*) •Gray dogwood (*Cornus racemosa*) •Sweetfern (*Comptonia peregrina*) •Fragrant sumac (*Rhus aromatica*)	☞Fragrant, showy flowers, shade tolerant woody vine ☞Trailing vine ☞Trailing vine ☞Evergreen shade tolerant groundcover, fragrant flowers ☞Shrubby groundcover, erosion control, wildlife value: fruit ☞Thicket-forming clonal shrub ☞Thicket-forming clonal shrub ☞Shrubby groundcover, erosion control
NORWAY MAPLE (*Acer platanoides*)	•Oaks: red, black, scarlet, white, chestnut, post, bur, black-jack. (*Quercus rubra, Q. velutina, Q. coccinea, Q. alba, Q. prinus, Q. stellata, Q. macrocarpa, Q. marilandica*) •Maples: red, sugar, silver (*Acer rubrum, A. sacchrum, A. saccharinum*) •American sycamore (*Platanus occidentalis*) •Hickory (*Carya cordiformis*) •Eastern cottonwood (*Populus deltoides*) •Sweetgum (*Liquidambar styriciflua*) Lindens •(*Tilia americana*) ▫(*Tilia cordata, T. tomentosa*) ▫Ginkgo (*Ginkgo biloba*)	☞Canopy/street tree, attractive fall foliage, wildlife value: nuts ☞Fall color, canopy/shade tree ☞Wide-spreading canopy/shade tree ☞Yellow fall foliage, shade tree ☞Fast growing shade tree, yellow fall foliage ☞Canopy/shade/street tree, fall foliage ☞Dense foliage, large crown, shade/street tree ☞Urban tolerant, yellow fall foliage, canopy/street tree

- Gardeners / Landscapers:
  - Promote the use of native plants and weed-free seed, mulch, and fill
  - Never compost terrestrial invasive plants
- Hikers / Campers
  - Brush off boots, clothing, and gear
- Contractors / Highway Departments:
  - Remove any plant seeds or fragments and mud from vehicles

Spread Prevention: Pests and Pathogens

Dear New York Park & Campground Visitor,
Please read the important information below from the New York State Department of Environmental Conservation and the New York State Office of Parks, Recreation and Historic Preservation concerning important information for your next visit to a Park or Campground in New York State.

Don't Move Firewood!
Bringing your firewood with you?

Most people don't realize they move bugs along with their firewood. You could be spreading diseases from insect invaders that can quickly kill large numbers of trees. Our forests are at risk from the transport of firewood infested with tree killers.

Help STOP THE SPREAD of these pests:
- Leave firewood at home, do not transport it to campgrounds or parks.
- Use only firewood from local sources.
- If you bring firewood, burn ALL of it before leaving your campsite.

For more information go to: www.dec.ny.gov (search word: firewood).

Firewood Regulation

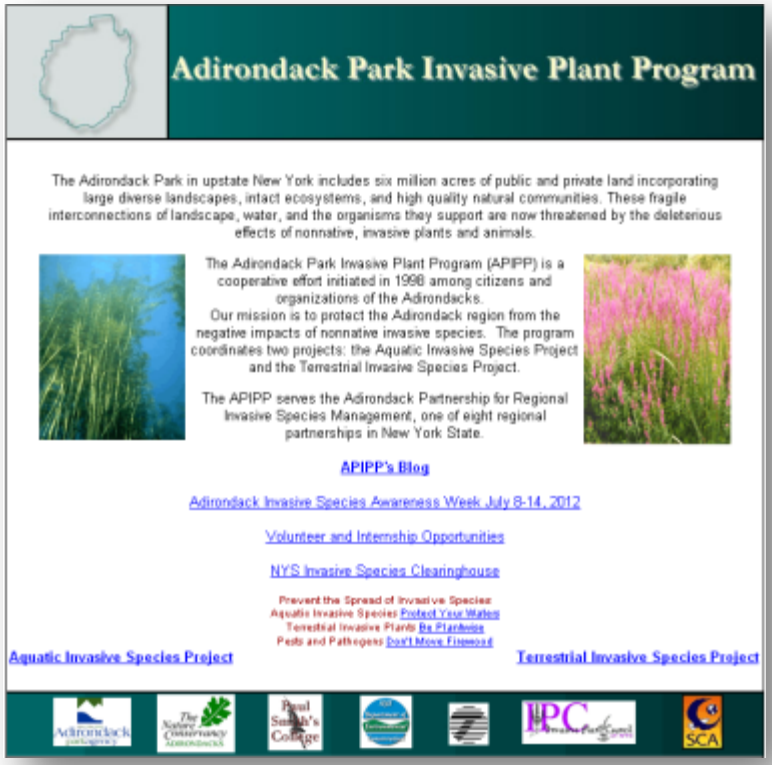
Conclusions

- Invasive species have tremendous environmental and economic costs
- People's activities introduce and spread invasive species
- Prevention and early response are critical
- Volunteer effort is essential to inventory and control
- People are part of the problem…..and part of the solution!!

Program Blog and Website

adk-invasives.blogspot.com

www.adkinvasives.com



Message Board

- Aquatic Plant ID Training for Volunteers
  - June 21, Bolton Landing
  - June 26, Paul Smiths
  - June 28, Inlet
- Emerald Ash Borer First Responder
  - June 29, Keene Valley
- 7th Annual Adirondack Invasive Species Awareness Week, July 8-14
  http://adkinvasives.com/InvasiveSpeciesAwarenessWeek.html
- Terrestrial Invasive Plant Management Demonstration
  - July 21, Saranac Lake
  - August 1, North Creek
  - August 21, Old Forge
- Aquatic Invasive Animal Training for Volunteers
  - August 2, Indian Lake
- Eurasian Watermilfoil Management Summit
  - August 16, Brant Lake

Acknowledgements

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