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

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

Economic impacts are costly

Water Chestnut Infestation, Lake Champlain

Milfoil Infestation, Upper Saranac Lake

- 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**
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

- **Eradication simple**
- **Eradication feasible**
- **Eradication unlikely, intense effort required**
- **Local control and management only**
- **Public awareness typically begins**

**Time**
- **Plant absent**
- **Scattered locations**
- **Numerous locations**
- **At or near biological potential**

**Acres Infested**
- **Introduction**
- **Detection**

**Control Costs**
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
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
APIIPP Objectives

1. **Prevent new invasions.**
   Increase public awareness and involvement to prevent the spread of invasive plant species.

2. **Rapidly detect and eradicate new invasions.**
   Coordinate regional invasive plant inventory and monitoring program utilizing staff and volunteers.

3. **Manage established infestations.**
   Facilitate the management, containment, and control of priority invasive plant infestations.
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
APIPP Activities

Training

Surveys and Mapping

Early Detection and Monitoring

Rapid Response and Management

Education and Outreach

Coordination and Information Exchange
Aquatic Invasive Plants in the Adirondacks

Eurasian Watermilfoil
Myriophyllum 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
• Eurasian Watermilfoil
  • 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
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
**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*

- 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

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

- 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

**New Zealand**

**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

Eurasian milfoil

Northern milfoil

Elodea

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
- $\frac{1}{4}''$ to $1 \frac{1}{2}''$ 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

- 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*

Japanese Knotweed
*Polygonum cuspidatum*

Garlic Mustard
*Alliaria petiolata*
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

Number of Infested Lakes and Weed-Free Lakes in the Adirondack Park, 2001-2011

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

• 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

Check your boat before you float!
Terrestrial Invasive Plant Spread Prevention

- **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

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**Horticultural & Landscape Plants in New York State**

<table>
<thead>
<tr>
<th>INVADER</th>
<th>ALTERNATIVE CHOICE</th>
<th>ATTRIBUTES/USES</th>
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<tbody>
<tr>
<td><strong>JAPANESE HONEYSUCKLE</strong></td>
<td>Trumpet honeysuckle (Lonicera sempervirens)</td>
<td>Fragrant, showy flowers, shade tolerant woody vine</td>
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<tr>
<td>(Lonicera japonica)</td>
<td>Groundnut (Arachis hypogaea)</td>
<td>Training vine</td>
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<td></td>
<td>Hog-peanut (Ampelopsis brevedentata)</td>
<td>Training vine</td>
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<tr>
<td></td>
<td>Canada mayflower (Miokanthemum canadense)</td>
<td>Evergreen shade tolerant groundcover, fragment flowers</td>
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<tr>
<td></td>
<td>Lowbush blueberry (Vaccinium angustifolium)</td>
<td>Shrubby groundcover, erosion control, wildlife value: fruit</td>
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<tr>
<td></td>
<td>Gray dogwood (Cornus racemosa)</td>
<td>Thicket-forming shrub</td>
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<tr>
<td></td>
<td>Sweetfern (Comptonia peregrina)</td>
<td>Shrubby groundcover, erosion control</td>
</tr>
<tr>
<td></td>
<td>Fragrant sumac (Rhus aromatica)</td>
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</tbody>
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| **NORWAY MAPLE**            | 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) | Canopy/street tree, attractive fall foliage, wildlife value: nuts               |
| (Acer platanoides)          | Maple: red, sugar, silver (Acer rubrum, A. saccharum, A. saccharinum) | Fall color, canopy/shade tree                                                  |
|                             | American sycamore (Platanus occidentalis)    | Wide-spreading canopy/shade tree                                               |
|                             | Hickory (Carya cordiformis)                  | Yellow fall foliage, shade tree                                                |
|                             | Eastern cottonwood (Populus deltoides)        | Fast-growing shade tree, yellow fall foliage                                  |
|                             | Sweetgum (Liquidambar styraciflua)            | Canopy/shade/shrub tree, fall foliage                                         |
|                             | Linden: (Tilia americana)                    | Dense foliage, large crown, shade/shade tree                                  |
|                             | Ul. Tilia cordata, Y. foliosa                | Urban tolerant, yellow fall foliage                                            |
|                             | Ginkgo (Ginkgo biloba)                       | Canopy/street tree                                                            |
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
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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