



**Department of
Environmental
Conservation**

Invasive Aquatic Plant Surveillance in New York

**Regional IAP Surveillance Best Practices Workshop
February 7, 2023**



Lindsay Yoder

AIS Coordinator, Region 9

NYS Department of Environmental Conservation

In coordination with the NYS Water Resources Institute at Cornell University

Program Introductions



NYS Partnerships for Regional Invasive Species Management (PRISMs)

Finger Lakes PRISM (FLI at Hobart and William Smith Colleges)

- Kate Monacelli, Hydrilla Project Manager
 - AIS Field Team (Staff)
 - FLI Plant Detectors: Macrophyte Survey Program (Volunteer)

HOBART AND WILLIAM SMITH COLLEGES



St. Lawrence-Eastern Lake Ontario (SLELO) PRISM (The Nature Conservancy)

- Brittney Rogers, Aquatic Restoration and Resiliency Coordinator
 - Early Detection Program (Staff)

Adirondack Park Invasive Plant Program (The Nature Conservancy)

- Brian Greene, Aquatic Invasive Species Coordinator
 - Early Detection Team (Adirondack Research, Contracted project)
 - Lake Protectors (Volunteer)
 - Lake Management Tracker (Volunteer)



NYS Department of Environmental Conservation (through NYS WRI at Cornell University)

Region 7 (Finger Lakes)

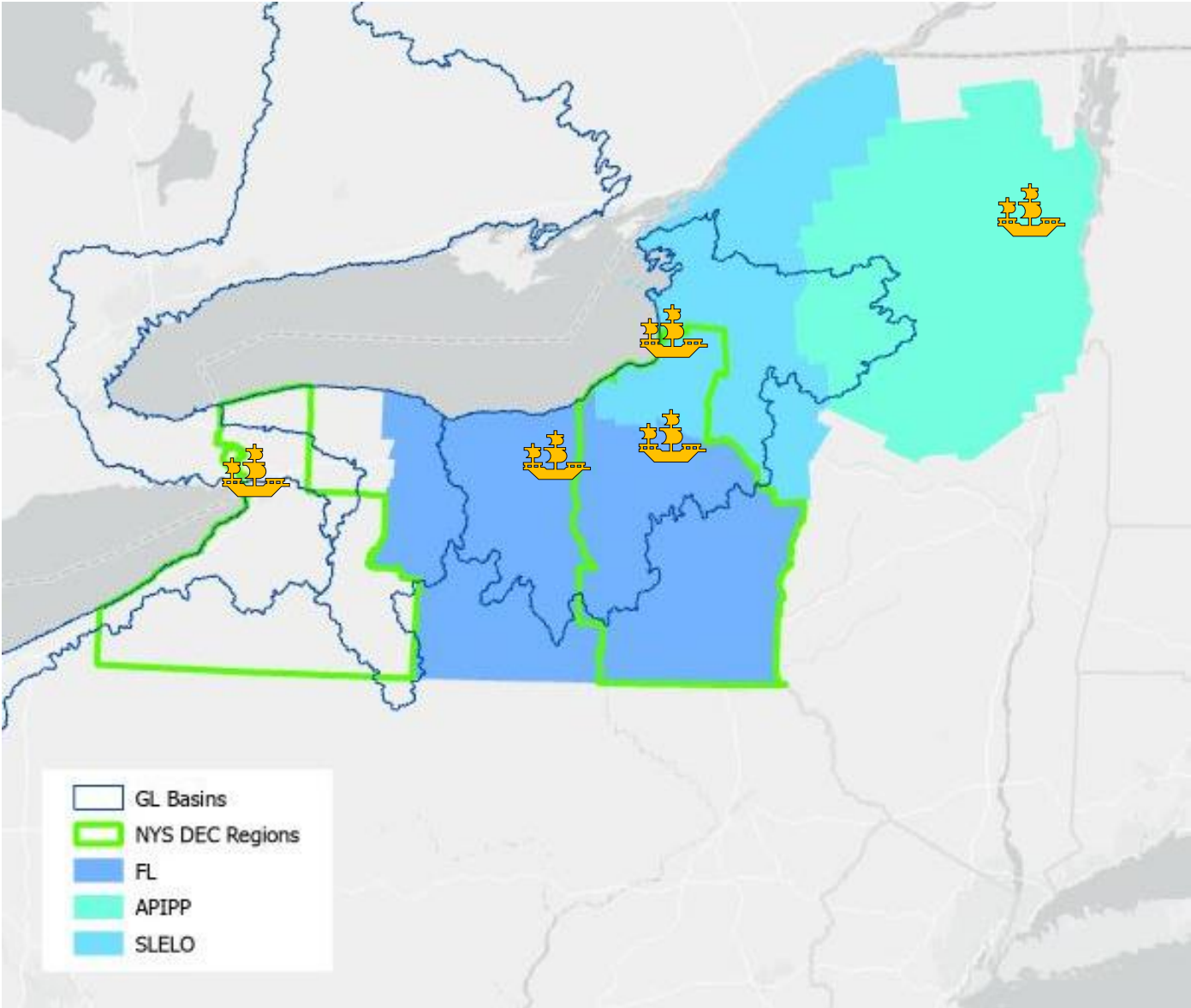
- Michael Robinson, AIS Coordinator
 - AIS Strike Team (Staff)

Region 9 (Western NY)

- Lindsay Yoder, AIS Coordinator
 - AIS Strike Team (Staff)



Where We Work in the GL Watershed



Data Collection and IAP Targets

Varies widely between programs and regions

- iMap Mobile App
- iMap Mobile Advanced (iMMA)
- iMapInvasives Online
- Survey123 for iMapInvasives
 - Simple Aquatic Survey Pro (SAS-Pro)
 - iMapInvasives
- FieldMaps
- iNaturalist

Invasive Species Tiers
Standardized species lists for each PRISM

		Difficulty of Eradication / Cost of Control Abundance (In PRISM plus Buffer)			
		None in PRISM	Low (Eradication/ Full containment may be feasible)	Medium (Strategic management to contain infestations and slow spread in PRISM)	High (Established/widespread in PRISM; only strategic localized management)
Impact (current and future)	Very High or High	TIER 1 <i>Early Detection/Prevention</i> Highest level of early detection survey efforts. Should conduct delineation surveys and assign to appropriate Tier if detected. a) Inside buffer, but not in PRISM b) Outside PRISM and Buffer, but close (eastern North America) c) Far outside PRISM and buffer (not in east NA), but introduction pathway exists	TIER 2 <i>Eradiation</i> Highest level of early detection response efforts. High impact species with low enough abundance and suitable treatment method available to make eradication feasible within the PRISM. Need delineation surveys to determine extent.	TIER 3 <i>Containment</i> Target strategic management to slow the spread, as likely too widespread for eradication, but many surrounding regions could be at risk if left unattended. For plants, use the IPMDAT. Possible eradication candidate only if adequate resources and effective control methods available.	TIER 4 <i>Local Control</i> Eradication from PRISM not feasible; focus on localized management over time to contain, exclude, or suppress to protect high-priority resources like rare species or recreation assets. Be strategic when deciding if / where to control.
	Medium	Evaluate (Medium Impact) Further evaluate impacts and PRISM resources to see if the species should be assigned to one of the other lists. If this species could feasibly become high impact with climatic or other environmental changes, consider moving to the appropriate High Impact row based on abundance. If too little is known, consider moving to "Monitor".			
	Unknown	X	TIER 5 <i>Monitor</i> Species that need more research, mapping, and monitoring to understand their invasiveness. This includes naturalized species and cultivated-only species that are known to be invasive in other regions but are not yet invasive here. Invasiveness may change with environmental or genetic changes. Should monitor populations on a regular basis to see if they are starting to become invasive and assign to appropriate Tier if invasive infestations detected.		

New York State Invasive Species Tiers

- Guide priorities within each PRISM region
- Auto-generating tool based on records + expert knowledge

Species Information			Invasiveness Ranks		Regulatory Status	State Tier	PRISM Tier								
Common Name	Scientific Name	Type	Ecological	Socio-Economic	NYS Part 575	NYS	APIPP	Capital Region	CRISP	Finger Lakes	Lower Hudson	LIISMA	SLELO	WNY	
Variable watermilfoil; broadleaf watermilfoil	<i>Myriophyllum heterophyllum</i>	AP	Very High	Equal outcome	Prohibited	4	4	2	1a	3	2	3	3	1	

Invasive Aquatic Plant Surveillance

The Power of Three



Rake Toss

Visual

Biomass

Invasive Aquatic Plant Surveillance

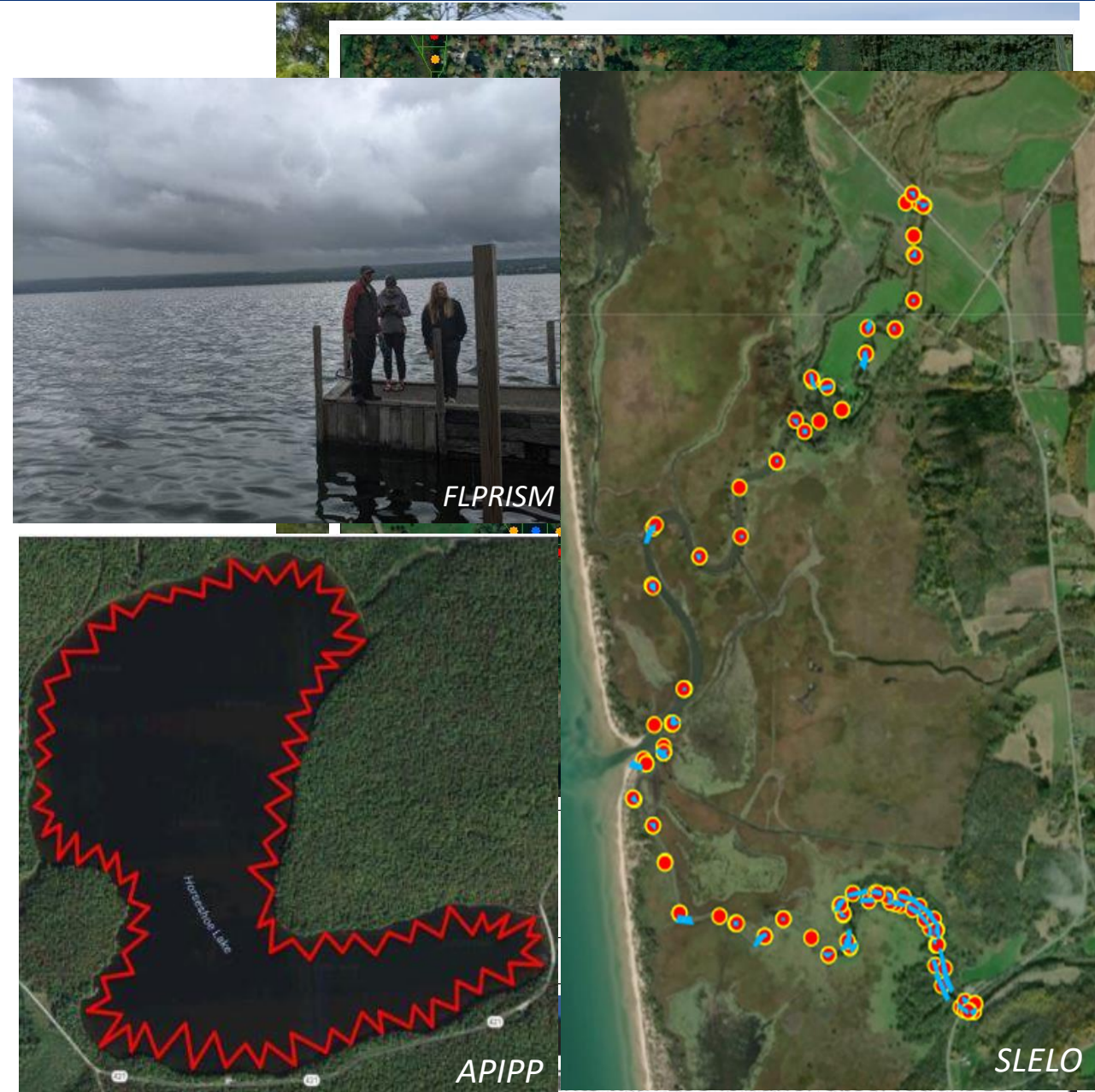
The Power of Three: Rake Toss

Point-Intercept Rake Toss Relative Abundance Method (PIRTRAM): NYS DEC, FLPRISM, APIPP LMT

- Lord and Johnson (2006), expanded on Madsen (1999)
- Random-systematic design (Madsen and Wersal 2017)
- Pros: objective sampling (location), quantitative data, efficient whole-lake monitoring tool, low-cost equipment,
- Cons: If truly systematic/objective, ignores visual observations, requires some technological skill/software, not appropriate for true biomass estimates, destructive

Meander/Non-systematic: FLPRISM MSP, APIPP EDT and LP, SLELO

- Visual scouting technique prior to rake toss OR
- Direct from dock/boat launch
- Non-systematic, random sampling
- Pros: Low-effort on front end, easiest and most useful for early detection of floating/emergent species
- Cons: Subjective, typically non-repeatable, can be significantly more effort than PIM, destructive



Invasive Aquatic Plant Surveillance

The Power of Three: Visual

Top Water: All Programs

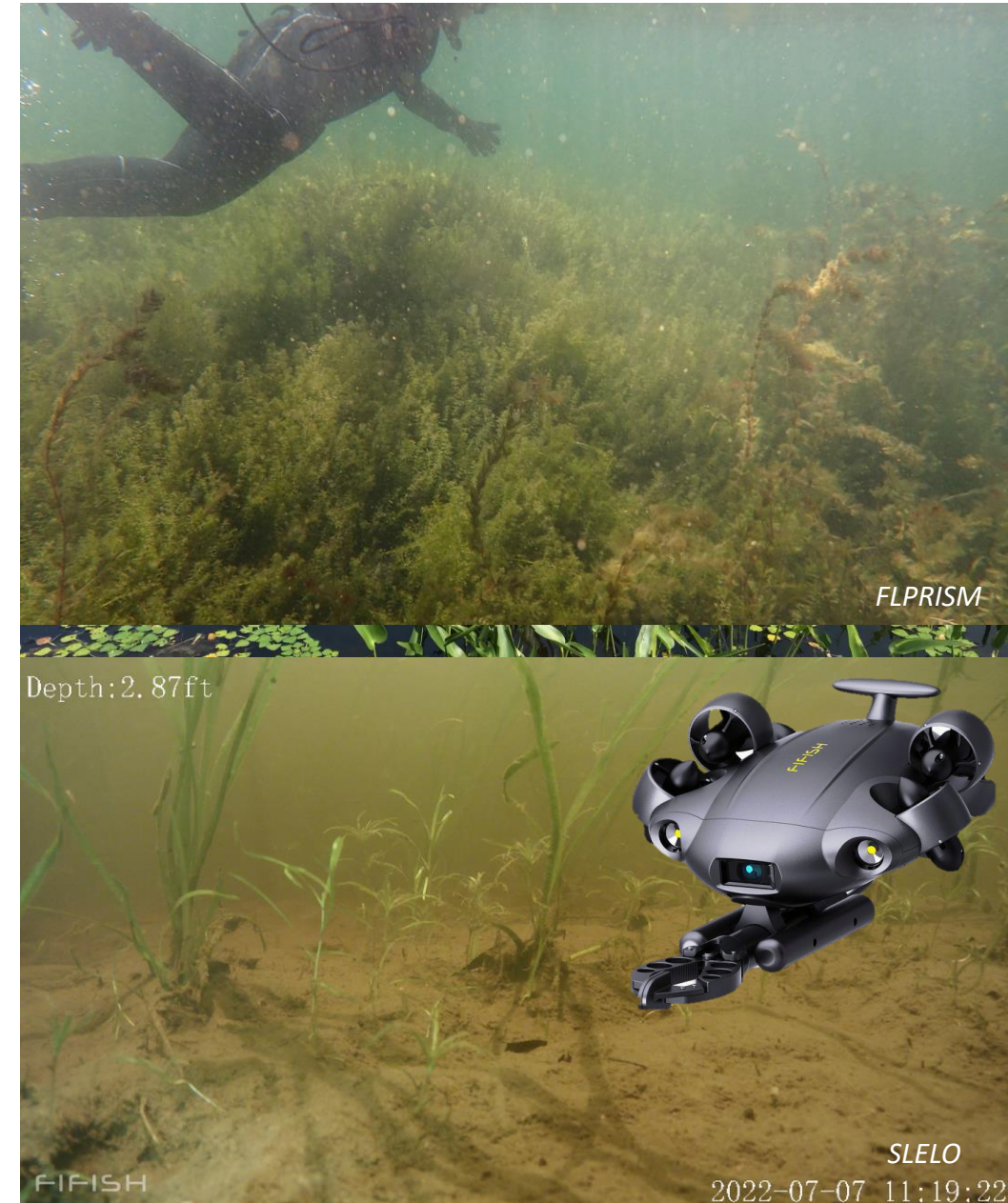
- Typically in conjunction with meander
- Specific to ED of floating and emergent vegetation
- Pros: Cheap, fast, easy, highly effective, nondestructive
- Cons: Purely subjective (location), should not be only tool for SAV

Snorkeling/SCUBA: NYS DEC, FLPRISM

- Meander across specific depths at/near target areas
- Has proven most useful for ED of hydrilla in sparsely populated areas
- Pros: More thorough than performing rake tosses, higher probability of finding target
- Cons: Time consuming, expensive, not quantitative

Underwater ROV: SLELO, NYS DEC

- Deploy from dock or boat near target area
- Pros: Quick snapshot of plant community, best for low abundance areas, may be useful for ED depending on visibility, low long-term cost, nondestructive
- Cons: highly dependent on visibility, difficult to navigate/ID plants if canopy is moderate/dense



Invasive Aquatic Plant Surveillance

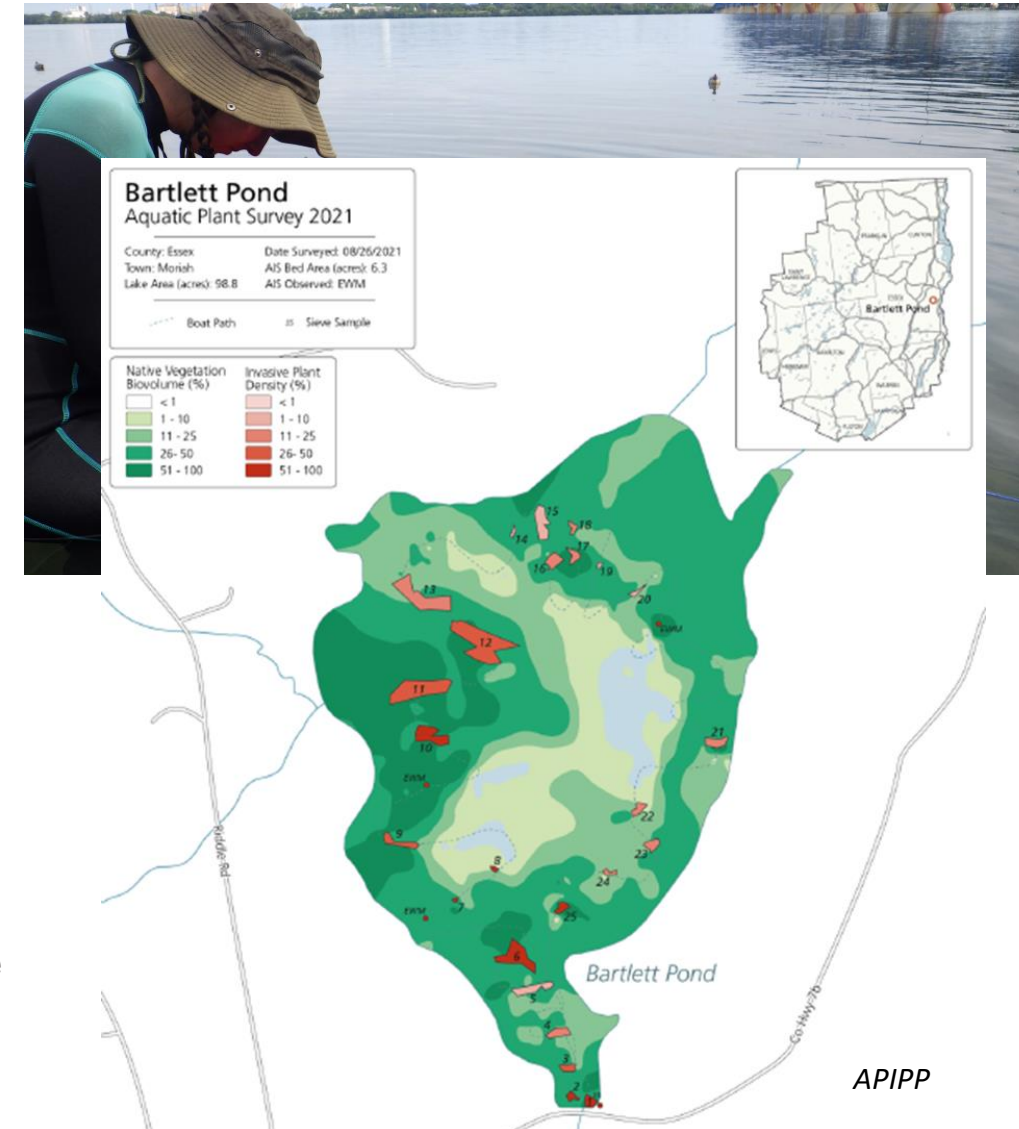
The Power of Three: Biomass

Quadrat Sampling: NYS DEC Region 9

- Record overall and individual species % cover, average plant height, substrate type, quantitative
- Species identified via snorkel or viewscope
- Pros: Higher probability of locating target (if in/near quadrat)
- Cons: highly dependent on visibility, can be extremely time consuming depending on hydrology, difficult to navigate/ID plants if canopy is moderate/dense

Hydroacoustics: NYS DEC, FLPRISM, APIPP EDT

- Use of SONAR and Biobase software to generate heat maps for vegetative cover, bottom hardness, bathymetry
- Traverse whole lake or littoral zone in a zig-zag pattern
- Best used to assist with site selection
- Pros: Software free (up to 20GB) for government, universities, NGO, determine site feasibility in real-time/eliminate unnecessary sampling points, nondestructive
- Cons: cannot distinguish between species, labor intensive (time, data processing)

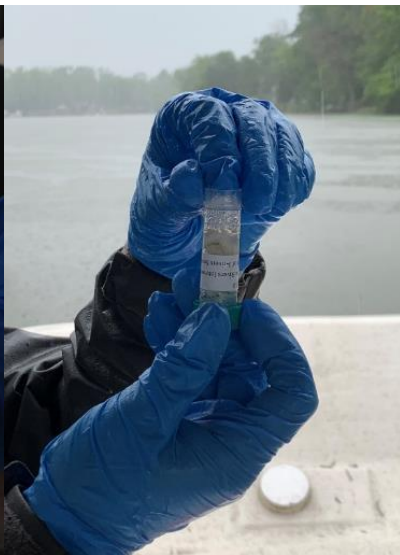
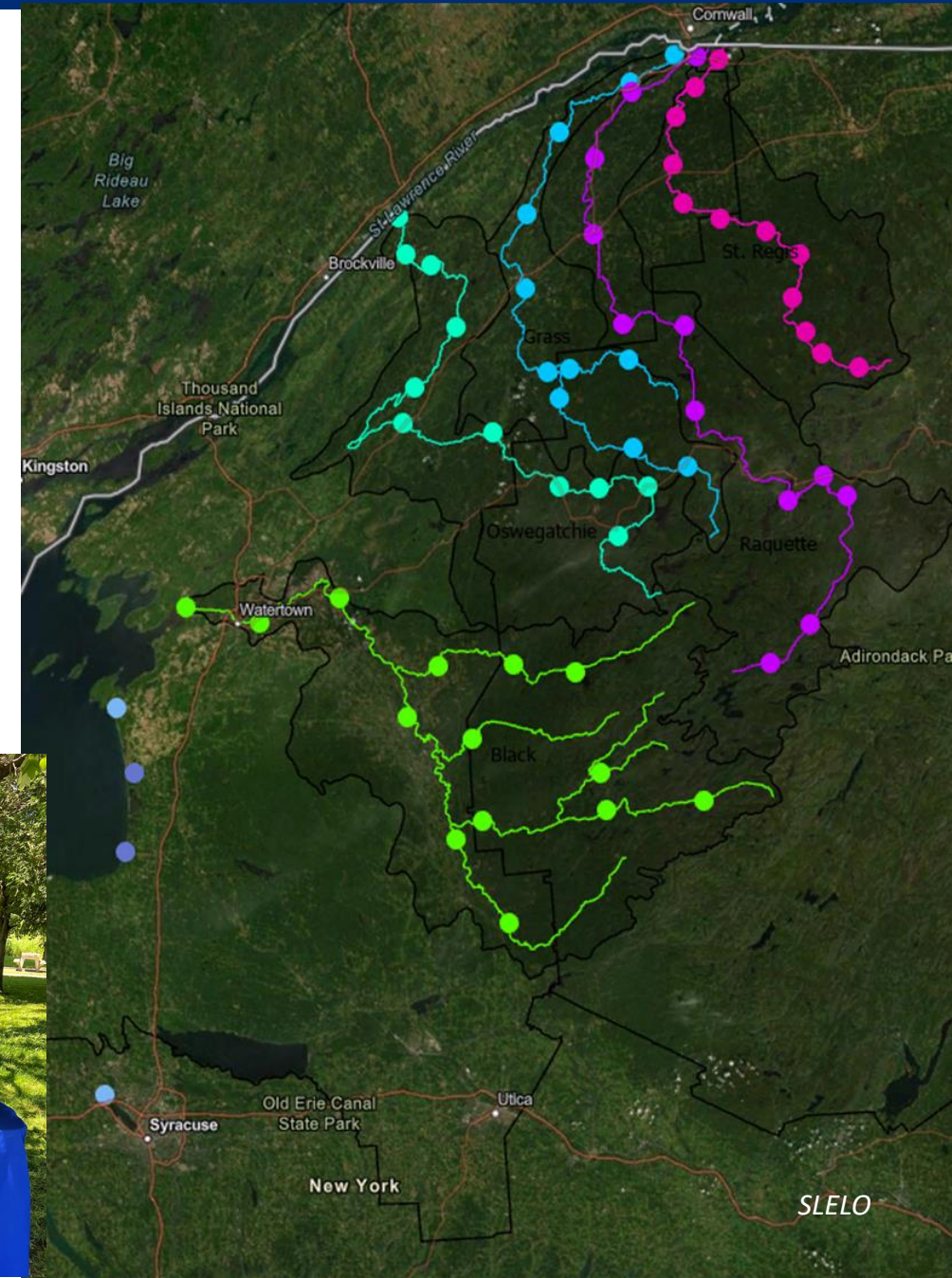


Invasive Aquatic Plant Surveillance

Utilizing New Technologies

eDNA: NYS DEC, SLELO, APIPP

- Historically more geared toward animal targets, expanding into plants
- Hydrilla major priority
- NYS DEC working to develop eDNA lab/protocols
- SLELO and APIPP collaborative project in 2022
 - Eurasian watermilfoil, hydrilla, fanwort
 - 168 total samples from 66 sites in 5 watersheds



Prioritization and Site Selection

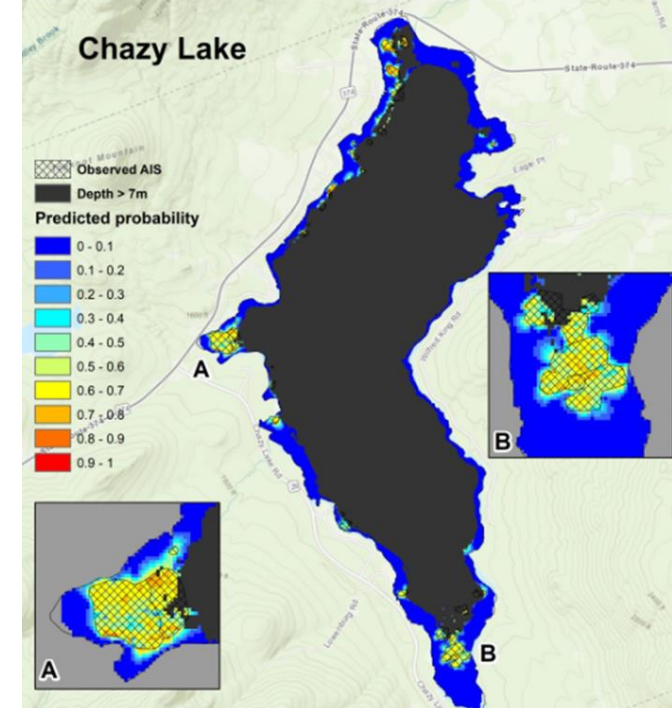
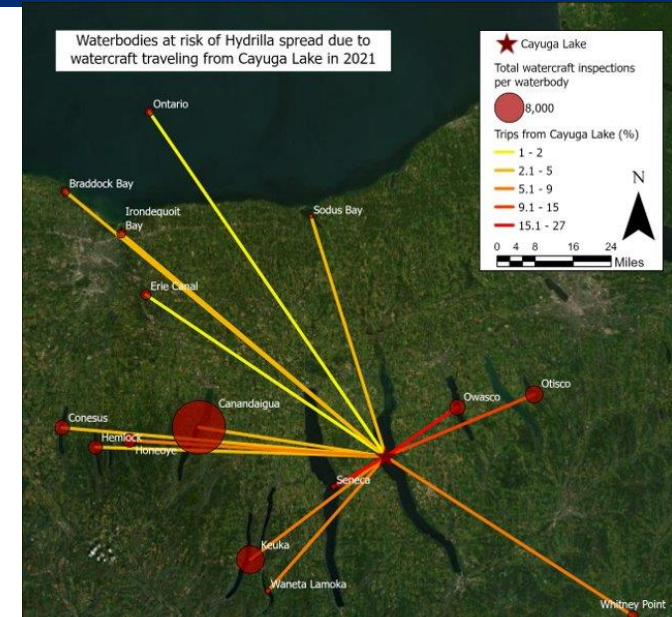
So little time, so many lakes

Regional

- Regional **prioritization matrices** created for Western NY, Hudson Valley, Long Island/Metro
- Prioritize known infestation sites, sites within proximity to known infestations, near boat launches/marinas
- Utilize results from NYS Watercraft Inspection Steward Program
- Designate and focus on **Highly Probable Areas within Priority Conservation Areas (PCAs)**
- **Within-lake Vulnerability Analysis**
 - Developed for APIPP to be released in Spring 2023

Statewide

- **Aquatic Invasive Species Pond and Lake Vulnerability Prioritization for New York**
 - Developed by NYNHP
 - Online tool to select risk thresholds for introduction, establishment, and impact
 - Select a subset of lakes to focus monitoring efforts
 - <https://www.nynhp.org/projects/aquatic-invasive-prioritization/>



Aquatic Invasive Species Pond and Lake Vulnerability Prioritization for New York



Region

1. Risk of Introduction

2. Risk of Establishment

Step Two

Select proxy invasive species to consider. Then, adjust the sliders to set the suitability thresholds for each selected proxy species.

The 8 proxy species represent key functional groups of aquatic invasive species.

Each lake and pond is classified as having low, medium, or high model probability of suitability to each species based on species distribution models. Selecting low for the suitability threshold for any species will result in all lakes and ponds being selected.

When multiple species are selected, the resulting Lakes at Risk of Establishment will include all lakes and ponds that meet the criteria for ANY species selected.

Choose proxy species of interest

- Water Chestnut: floating plant
- Hydrilla: submerged plant
- Eurasian Watermilfoil: submerged plant
- Starry Stonewort: submerged algae
- Northern Snakehead: fish
- Rusty Crayfish: benthic arthropod
- Spiny Waterflea: planktonic arthropod
- Zebra Mussel: benthic bivalve

Hydrilla suitability threshold



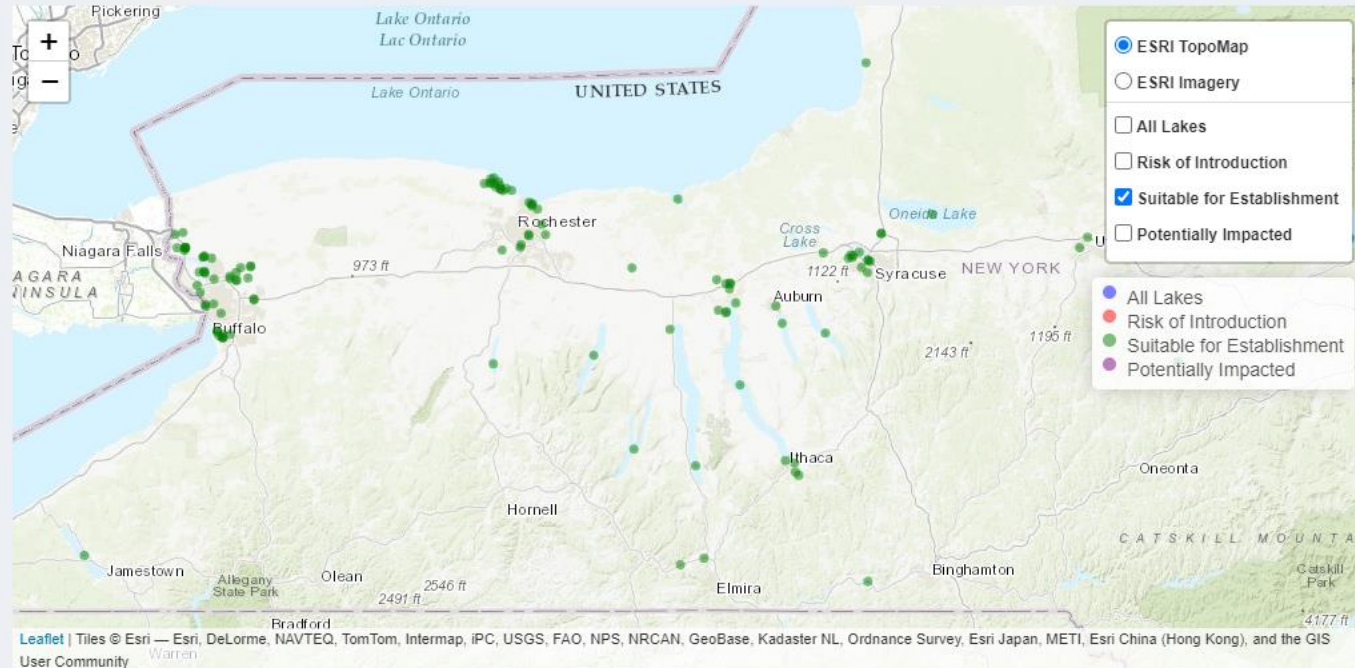
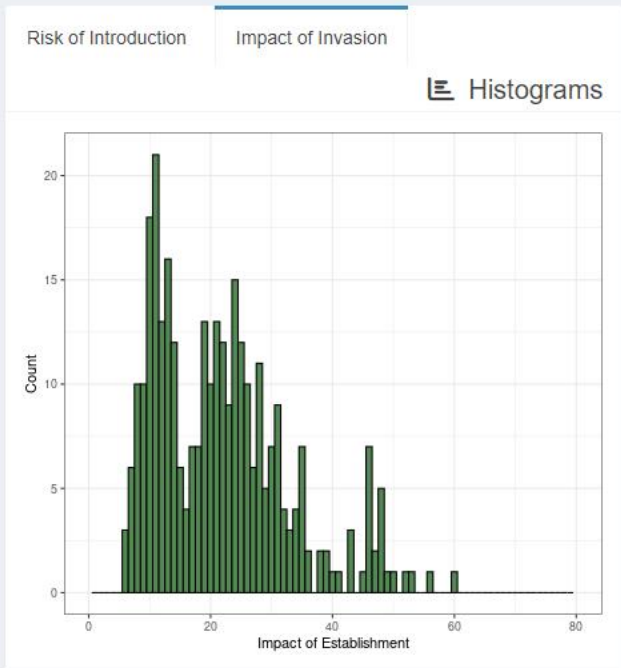
3. Potential Impact of Invasion

8683
NY Lakes

324
Lakes at Risk of Introduction

316
Lakes Suitable for Establishment

0
Lakes Potentially Impacted



Final Thoughts



Thank you!

Andrew Tucker Lindsay Chadderton Ceci Weibert

Brian Greene Kate Monacelli Michael Robinson Brittney Rogers

Cathy McGlynn, NYS AIS Coordinator

Contact: Lindsay.yoder@dec.ny.gov

