NEW YORK STATE | Department of Environmental Conservation

Restoration of *Vallisneria americana* Alongside Chemical Control in the Erie Canal

Binational Great Lakes AIS Forum
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NYS Department of Environmental Conservation
In coordination with the NYS Water Resources Institute at Cornell University

Managing Hydrilla in the Erie Canal
A Decade of Effective Control

Erie Canal/Tonawanda Creek Infestation

- First identified in 2012 by U.S. Fish and Wildlife Service
- Tonawanda Creek/Erie Canal Hydrilla Demonstration Project
  - Initiated by U.S. Army Corps of Engineers in 2014
  - Express purpose to demonstrate effective control techniques in a flowing system
  - Multiple control strategies used resulting in significant reduction in infestation
    - Endothall, chelated copper
    - impacted non-target native species

Managing Hydrilla in the Erie Canal
Initiating New Techniques for Continued Success

2024-2025 treatment majority-lead by NYSDEC

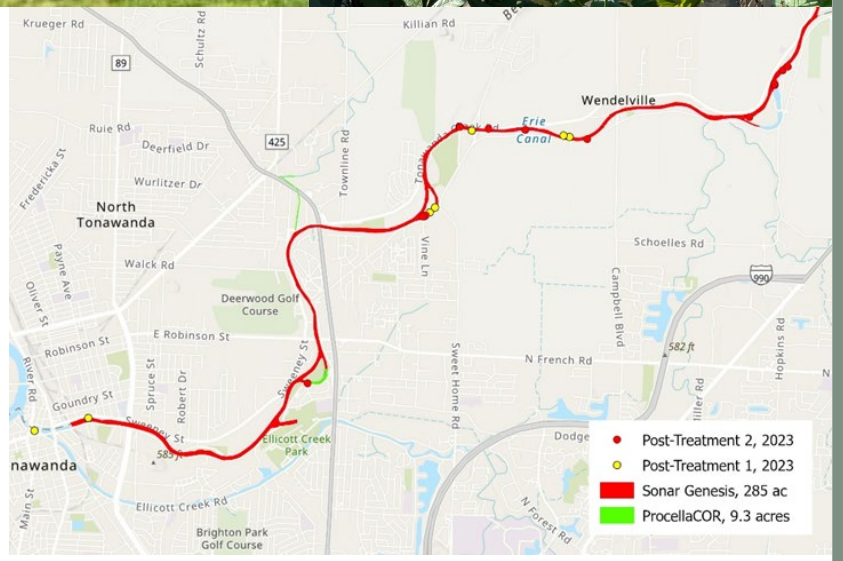
Goal: make progress toward eradication in 2024, reduce impact to non-target species, identify role of restoration

Objectives

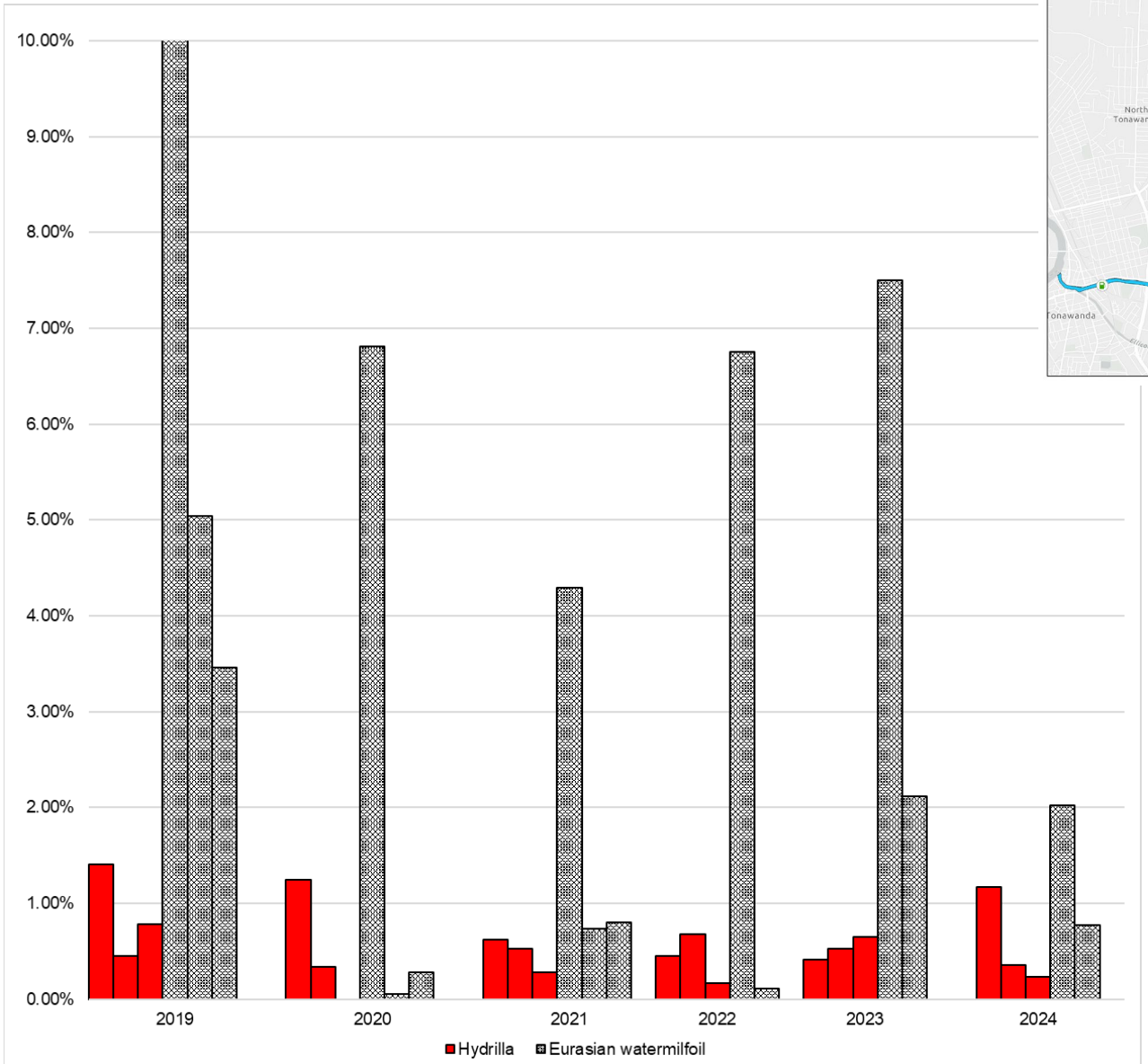
- Pivot to use of systemic herbicides
- Initiate concurrent restoration of *Vallisneria americana* to jumpstart revitalization of native plants/act as potential "biocontrol" after failed pilot attempt in 2023
- Conduct monitoring to evaluate treatment efficacy and/or non-target impacts

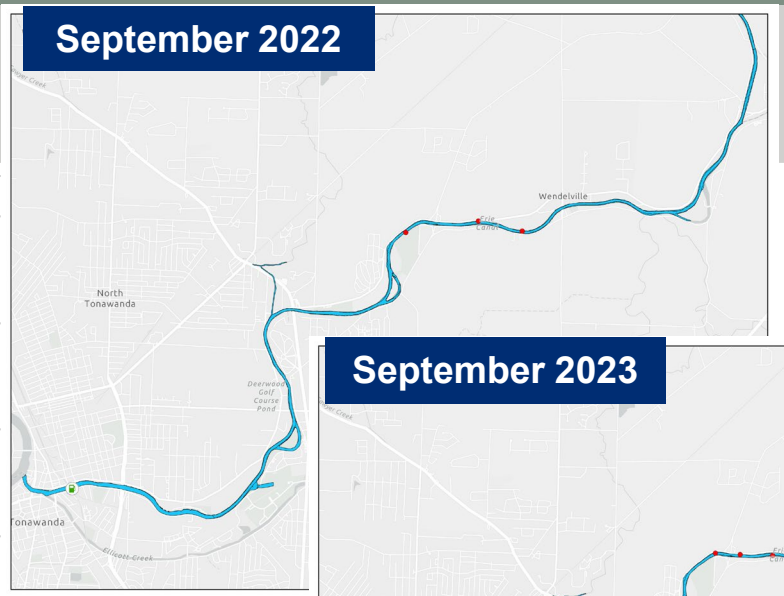
Treatment Plan

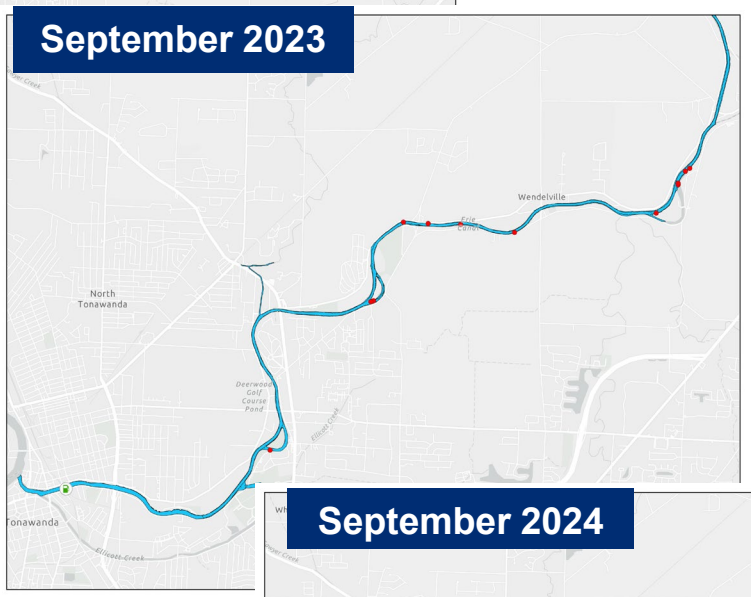
- Metered in-water application: Sonar Genesis (fluridone)
    - Maintain low concentration (2-2.5 ppb) for 90 days
    - July-October
    - 285 acres, ~12 miles
- Single applications of ProcellaCOR EC

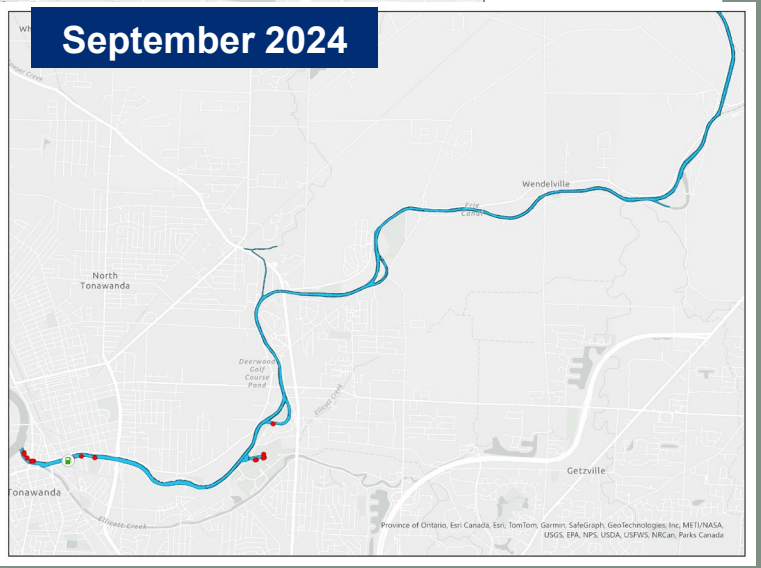


Managing Hydrilla in the Erie Canal
2024 Treatment Results









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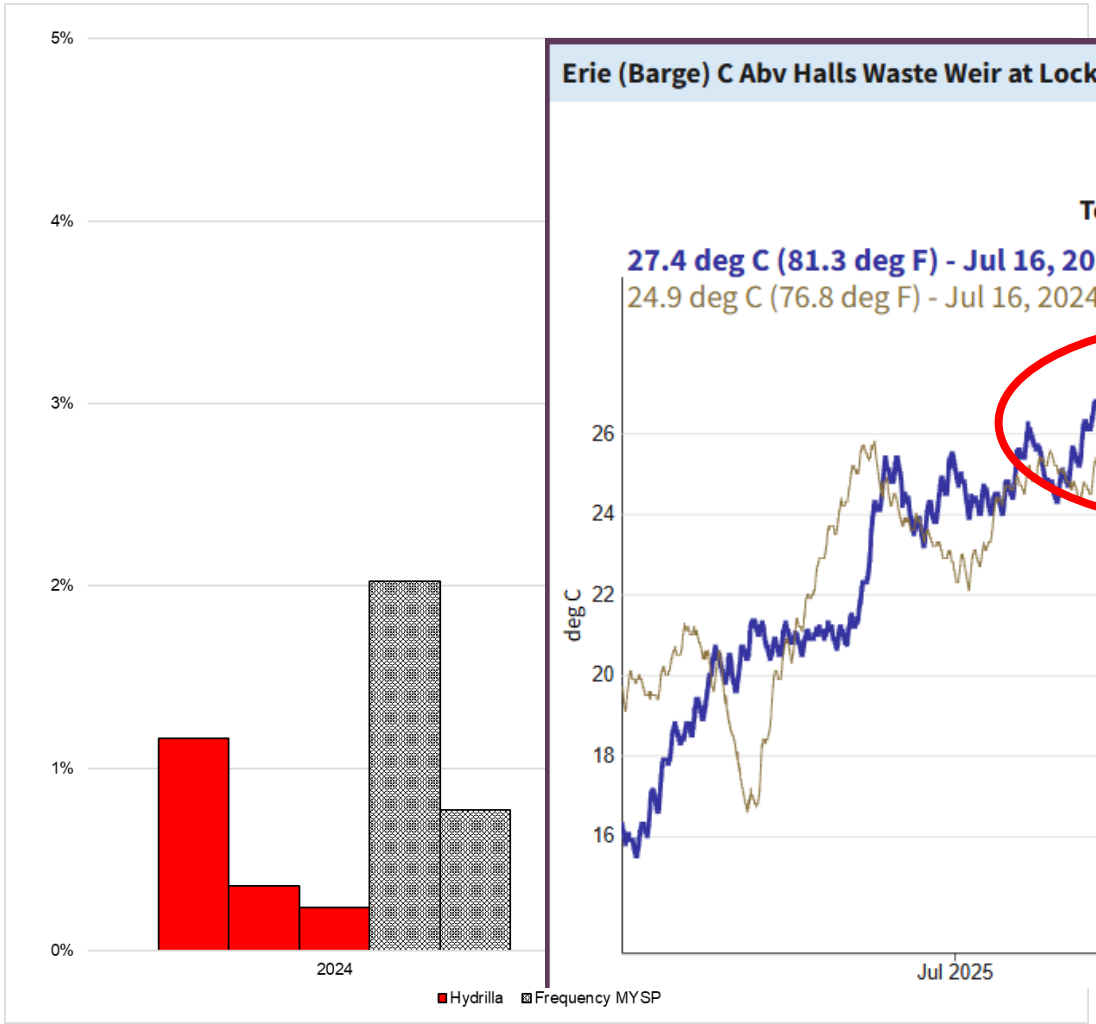
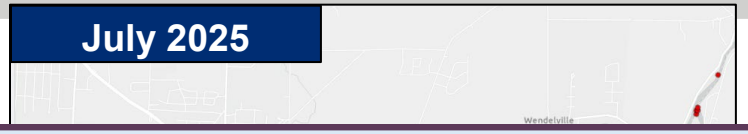
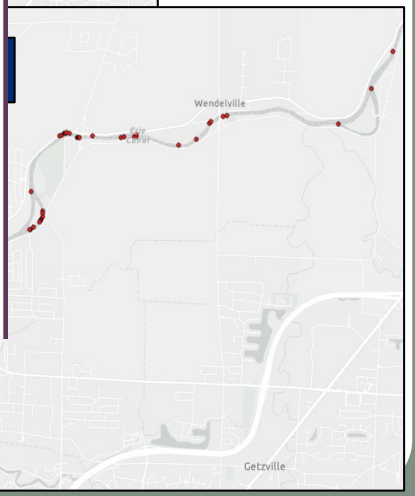
2025 Treatment Results







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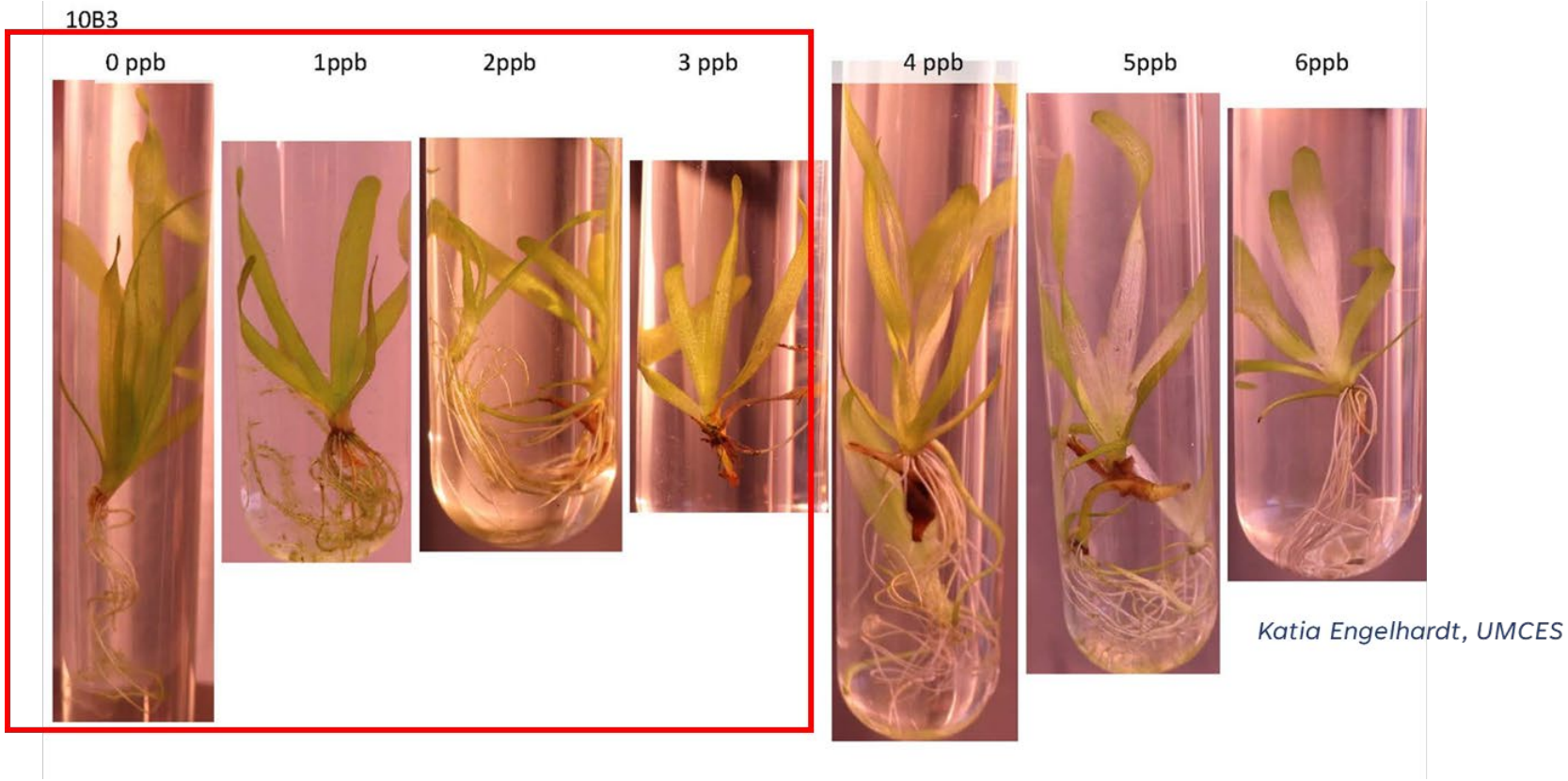
Managing Hydrilla in the Erie Canal
2024-2025 Treatment Results

Impact of herbicide use on native plants?



Katia Engelhardt, UMCES

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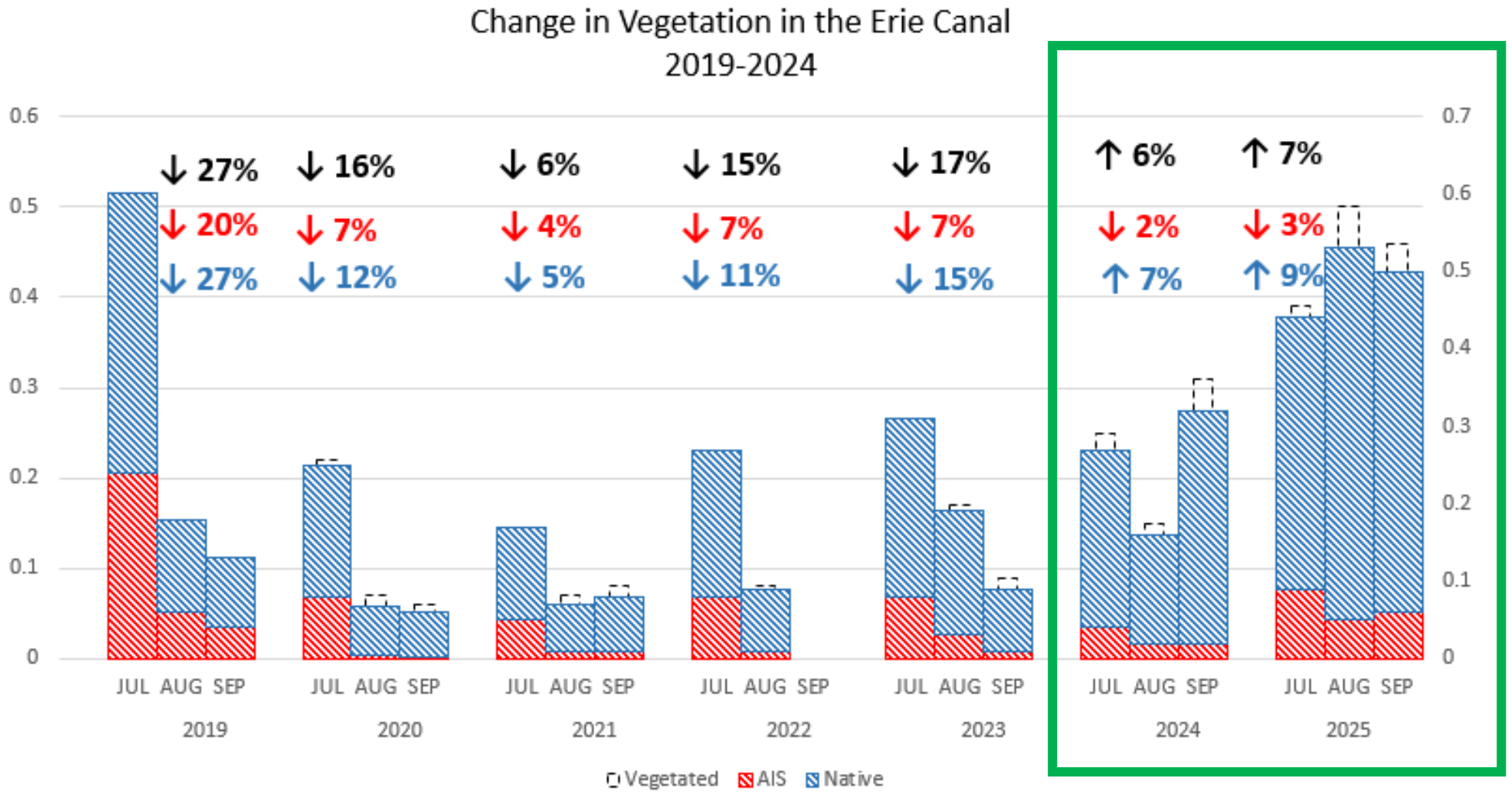

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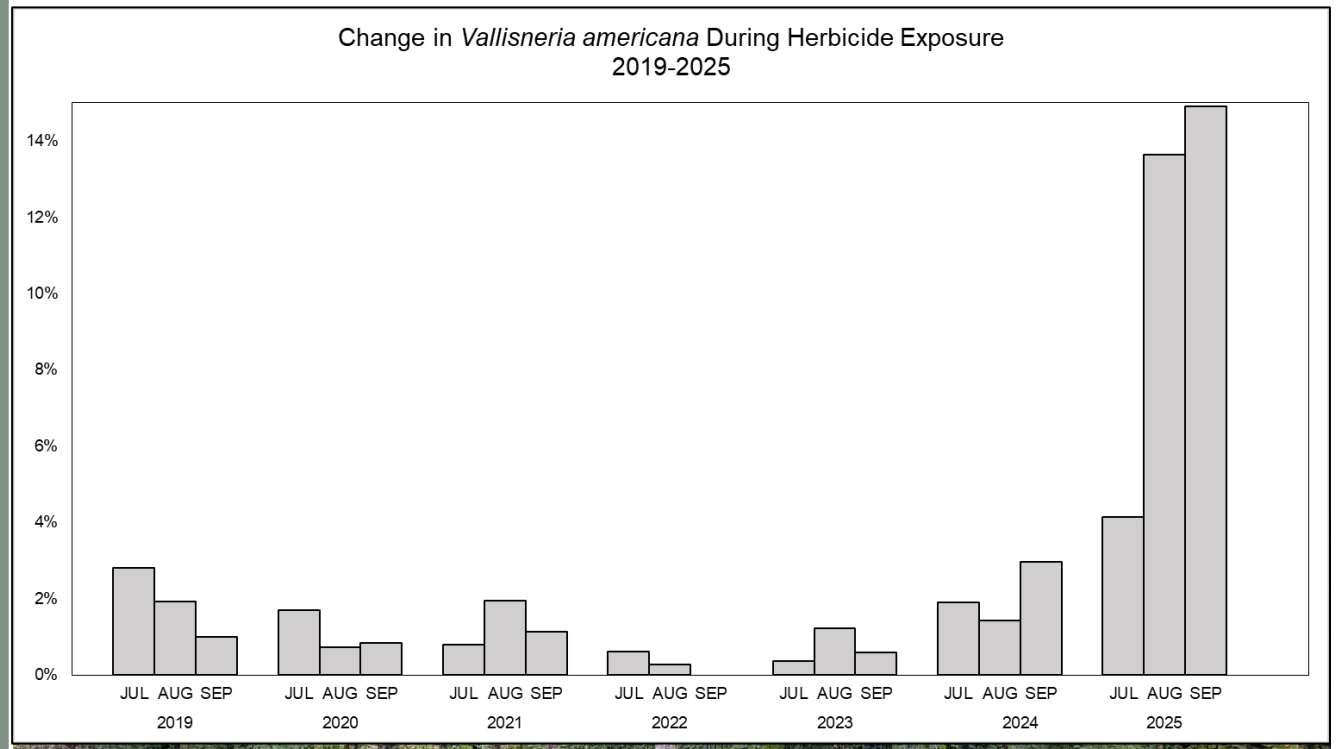
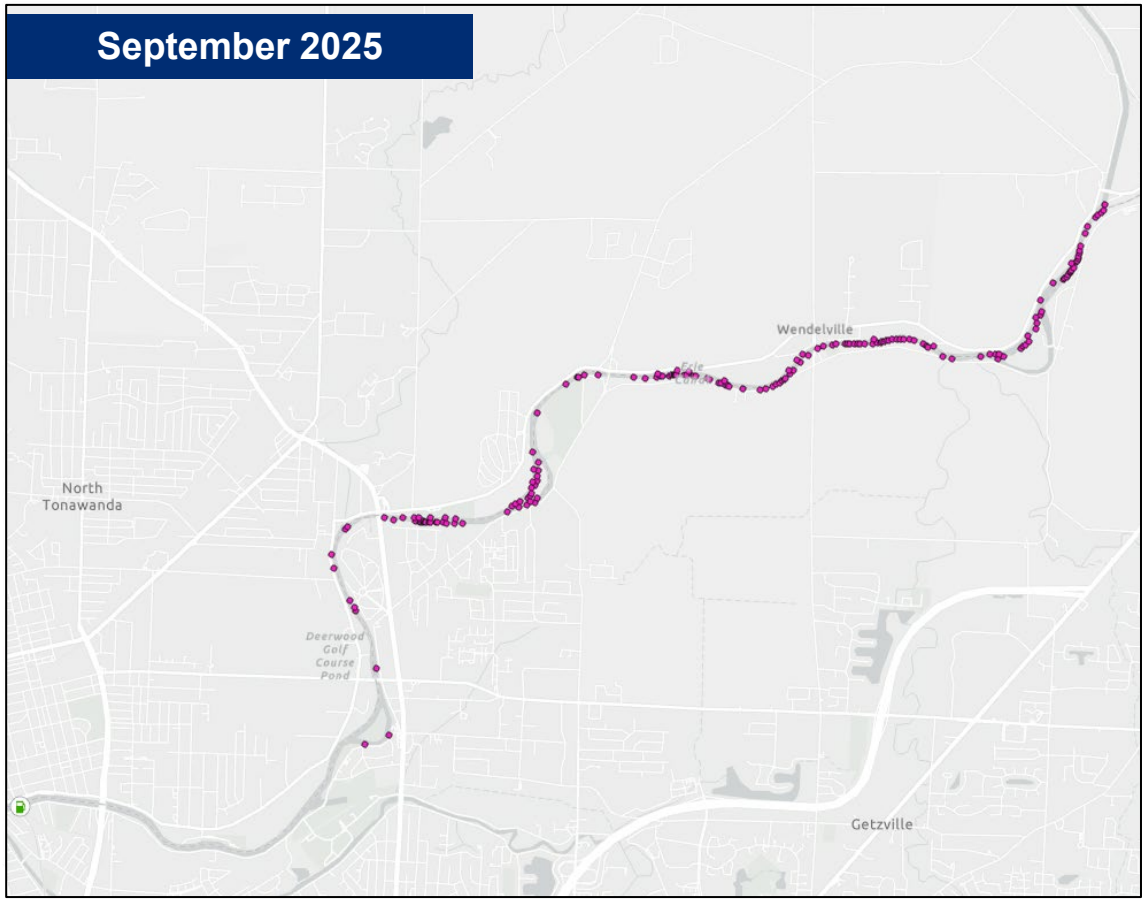
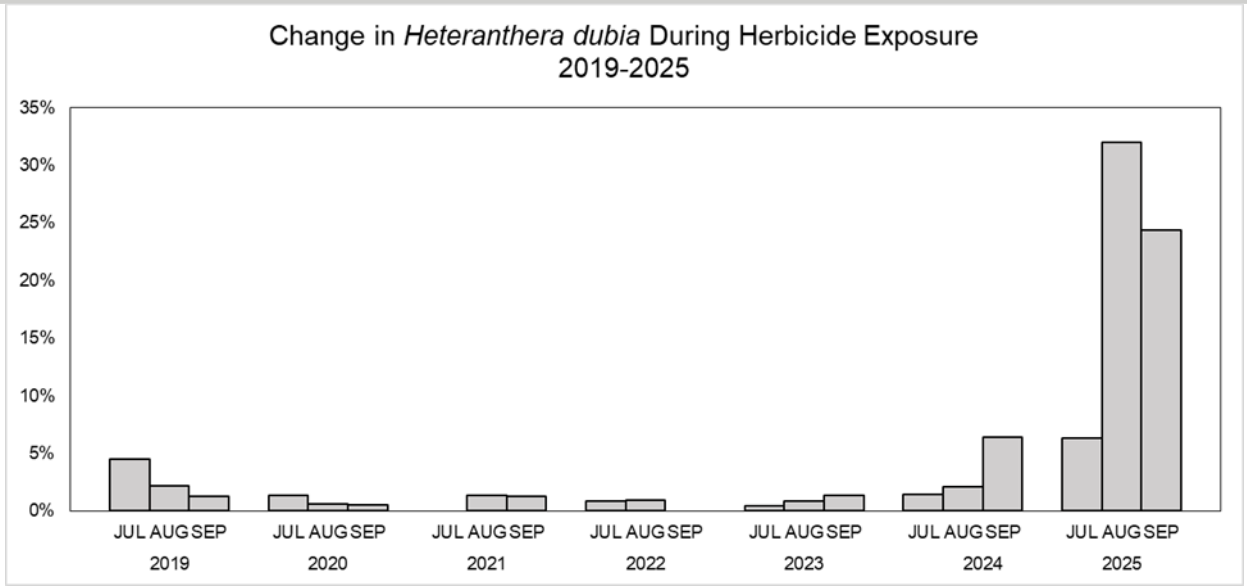




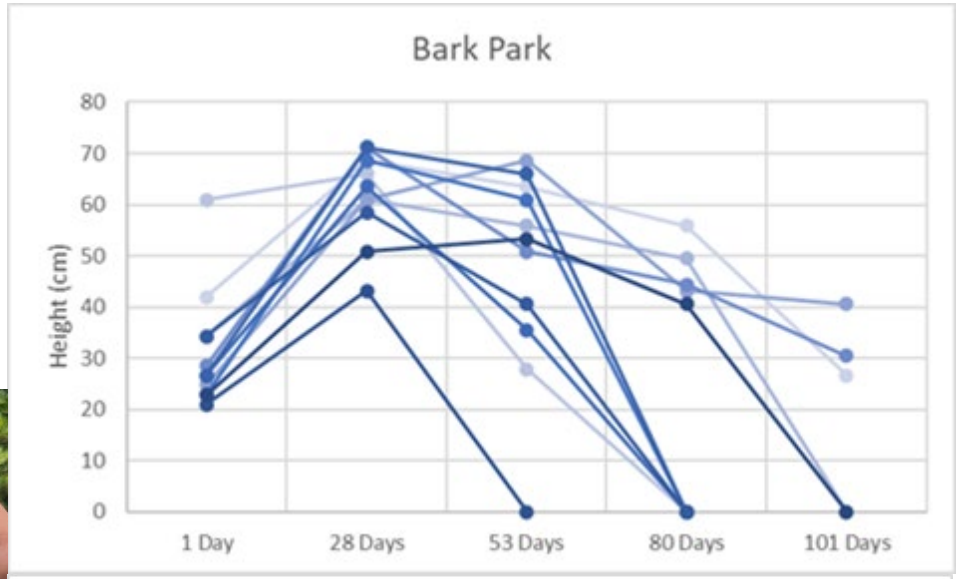
4% → **15%** of all samples

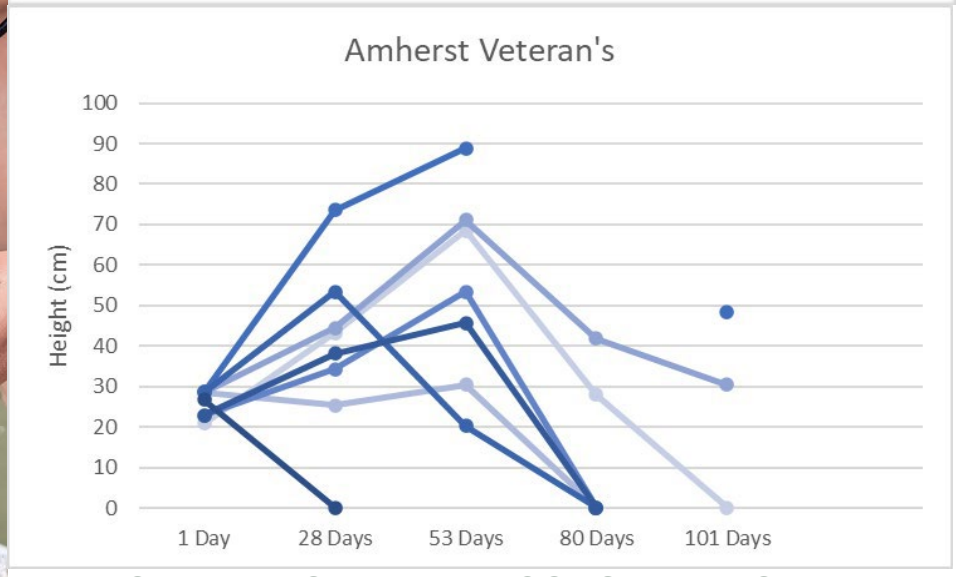
10% → **33%** of vegetated samples

Managing Hydrilla in the Erie Canal
2024-2025 Treatment Results



2023 Pilot Project





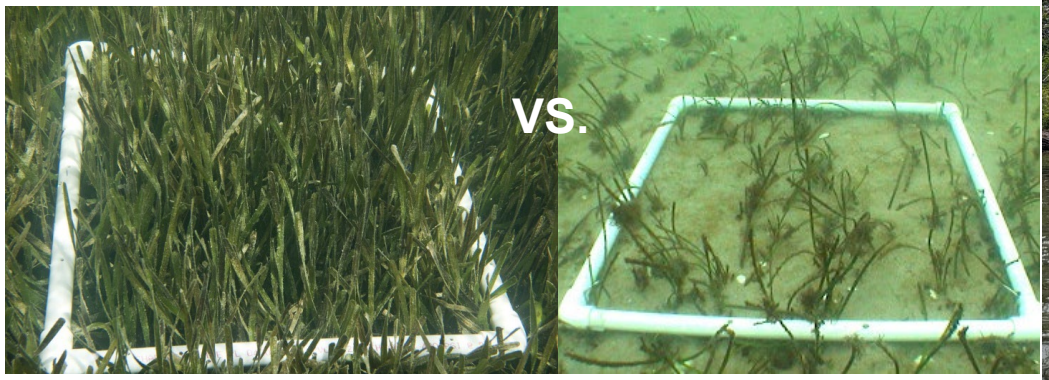
2024: Initiated Large-scale Aquatic Plant Restoration Program

Partnered with North Tonawanda Botanical Garden to acquire greenhouse space

- Able to expand cultivation program significantly, growing out in larger vessels and utilizing more natural, “low tech” techniques

Wild Stock Collection

- Collected *Vallisneria americana* from two distinct sites in the Niagara River
- 40-50 plants from each site along 50 m transects using designated protocol to limit disturbance to habitat (>30% coverage of 1m^2 quadrats)



2024: Initiated Large-scale Aquatic Plant Restoration Program

Decontamination and Planting for Long-term Cultivation

- Decontaminated wild stock plants using bleach solution, dechlorination (times vary depending on species)
- Plants separated by site and specimen ID until genotyping could occur
- Planted in single plants in 4-inch pots with unmodified topsoil and sand, placed in stock tanks filled to top of pots (water gradually added as plants grew)
- Extra plants were also planted in larger containers for experimental observation (primary method utilized in 2025)

2024: Initiating a Large-scale Aquatic Plant Restoration Program

Decontamination and Planting in the Field

- Decontaminated wild stock plants using bleach solution, dechlorination (times vary depending on species)
- 5 plants placed into 4”x6” burlap bags with topsoil, cobble
- Used disintegrating landscape stakes to install plants in a grid pattern (5 per 25ft^2) within constructed cages at four sites within the Erie Canal

2024: Initiating a Large-scale Aquatic Plant Restoration Program

Monitoring

- Plants were measured at the time of planting, followed by monthly measurements in both the field and the greenhouse to monitor growth, survival, and clonal reproduction throughout the season
- Secondary measurements of DO, pH, temp, turbidity
- The first round of clones produced were removed and placed into larger buckets on greenhouse tables to encourage growth and create larger “stockpile” of turions

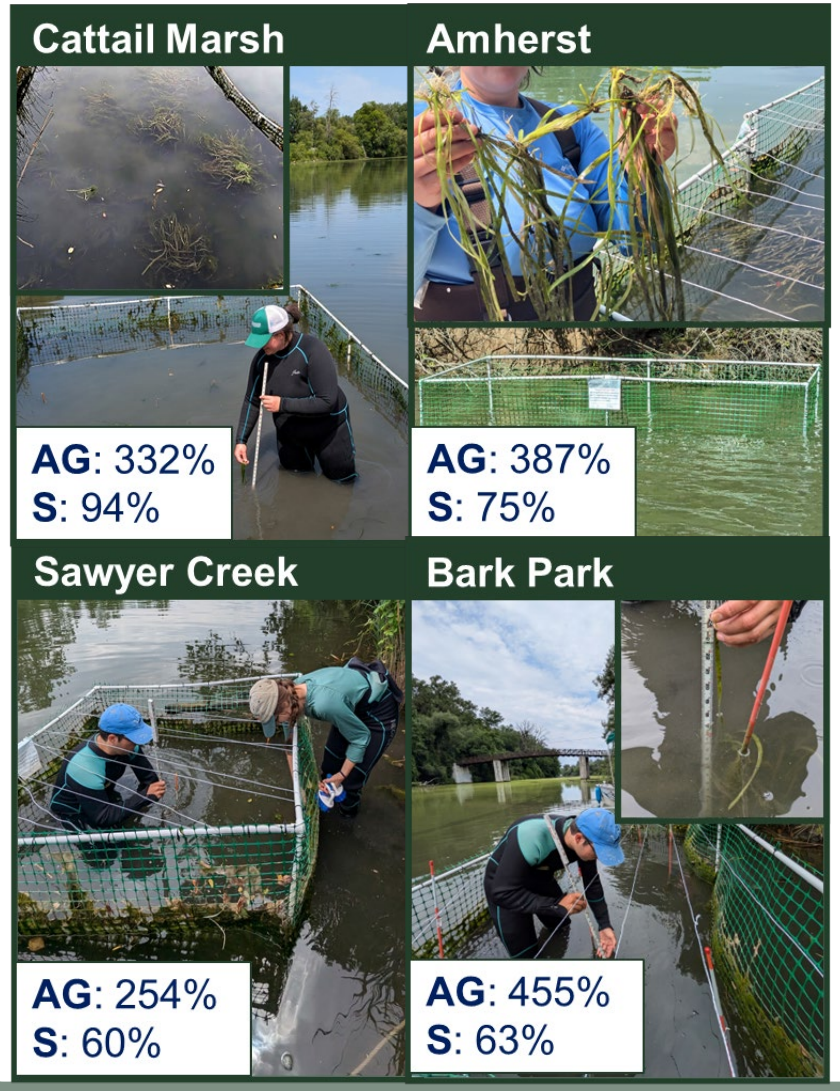
2024: Initiating a Large-scale Aquatic Plant Restoration Program

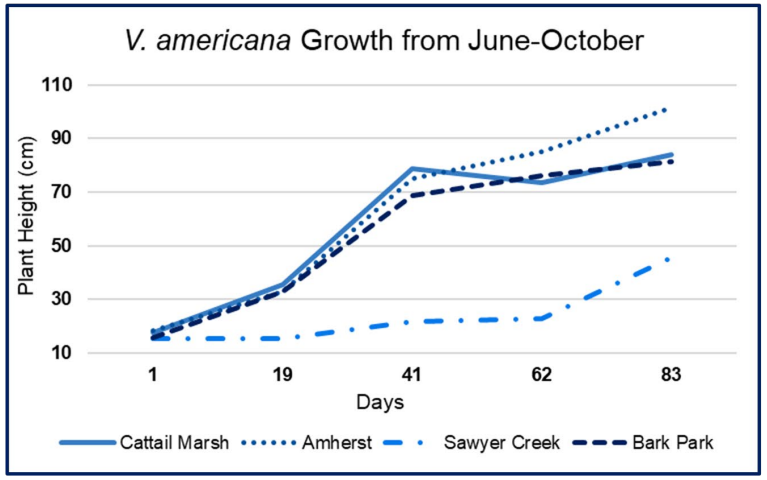
Results: Greenhouse Cultivation

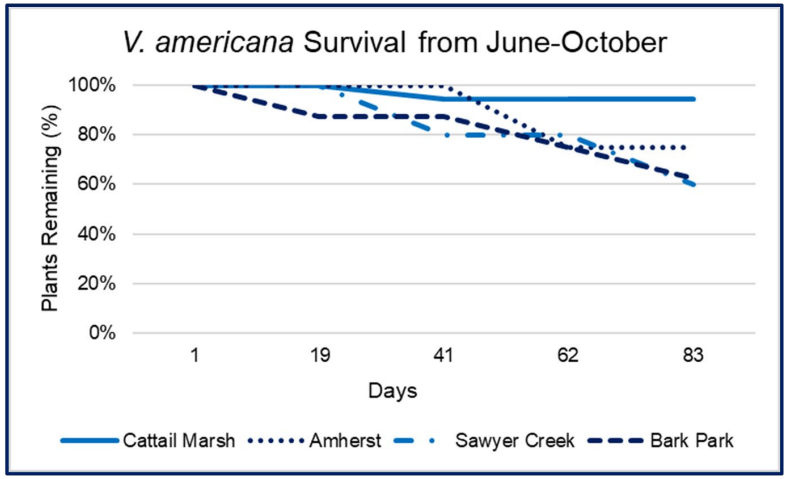
	102nd St	BISP
SURVIVAL	83%	90%
AVERAGE GROWTH (Δ in height)	74%	101%
AVERAGE END HEIGHT	**10.8”**	**8.2”**
CLONAL REPRODUCTION	83%	92%
TURION PRODUCTION	3.9	10.4

2024: Initiating a Large-scale Aquatic Plant Restoration Program

Results: Field Planting

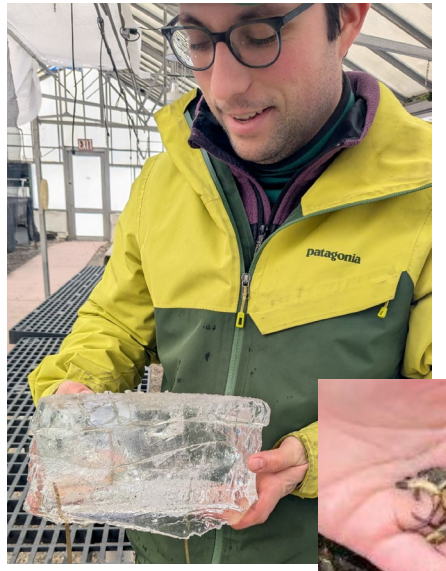


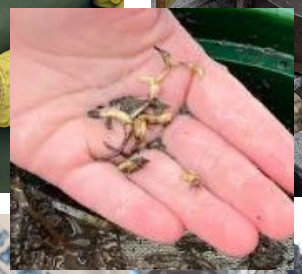




2025: Incorporating Lessons Learned and the First Harvest

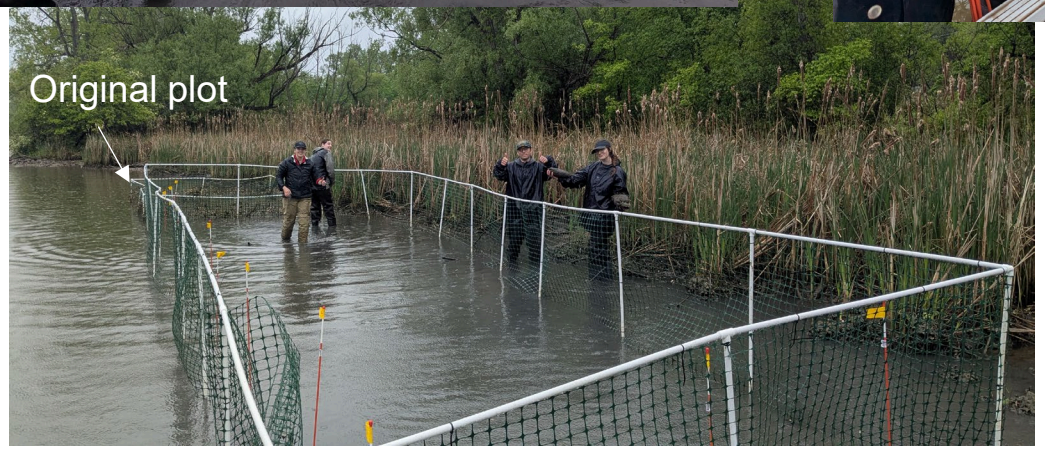
- First harvest occurred in February 2025, allowing for full winter senescence and max turion production (closed greenhouse from November-February)
- Harvested turions from 78 specimens from Feb-March meeting various fates
  - Storage experiment: germination rates at 8, 12, and 16 weeks in refrigerated storage (<50°)
  - Replanted in pots for genotyping/cultivation
  - Prepared for live planting (plant from turion>larger transplant)
- Clear distinction in productivity between 4in pots and larger vessels (more space->better performance overall)
- Leaf melting/chlorosis in many plants mid-season (Chlorine? Fluoride? Light availability?)

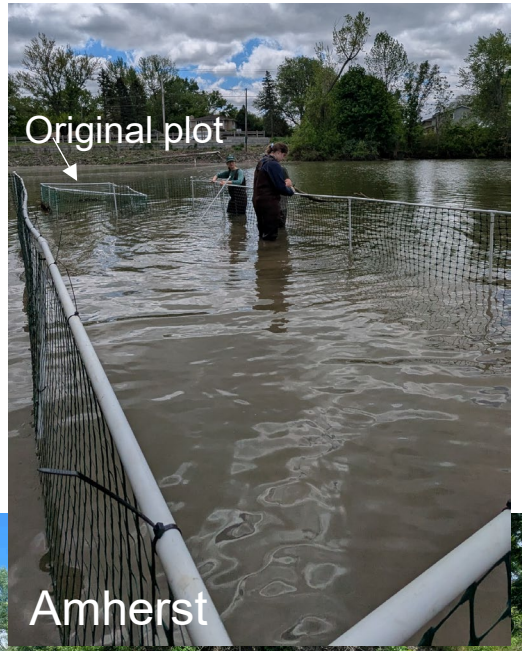


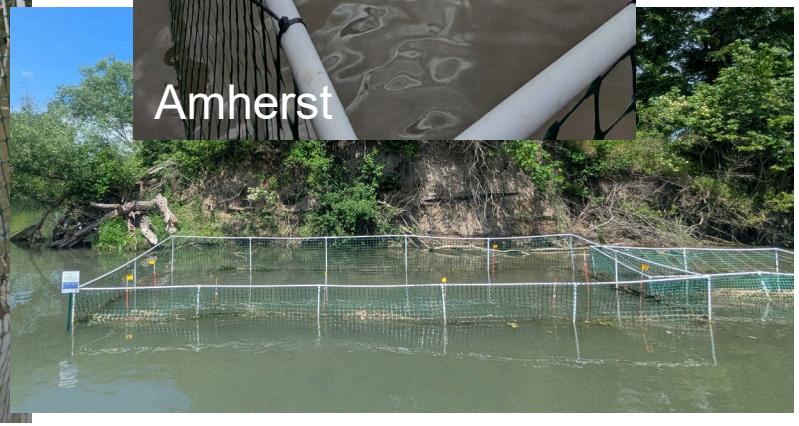


2025: Returning to the Field

- New, expanded plots for 2025 in most successful sites (Cattail Marsh, Amherst)
- Additional plots that matched characteristics of previous successes (light availability, clay soils)







2025: Returning to the Field

Resurgence of 2024 Founder Colonies


frog eggs, June 2024


Cattail Marsh, August 2024


Amherst, August 2024


Cattail Marsh, July 2025


Amherst, August 2025

2025: Results

- Higher overall growth rate, survival in the field (planted from turion, earlier establishment, warmer temps)

	Cattail Marsh	Amherst
SURVIVAL	100% (94% in 2024)	100% (78% in 2024)
AVERAGE GROWTH **(Δ in height)**	937% (332% in 2024)	1034% (378% in 2024)
AVERAGE END HEIGHT	**20.75”** **(25” in 2024)**	**28.3”** **(29.5” in 2024)**

- Higher overall survival and height in greenhouse plants (of those that germinated)
- Still experienced chlorosis/melting mid-season

	102nd	BISP
GERMINATION	87%	73%
SURVIVAL	85% (83% in 2024)	95% (78% in 2024)
AVERAGE GROWTH **(%increase/day)**	16.78%	12.76%
AVERAGE END HEIGHT	**17”** **(10.8” in 2024)**	**11”** **(8.2” in 2024)**

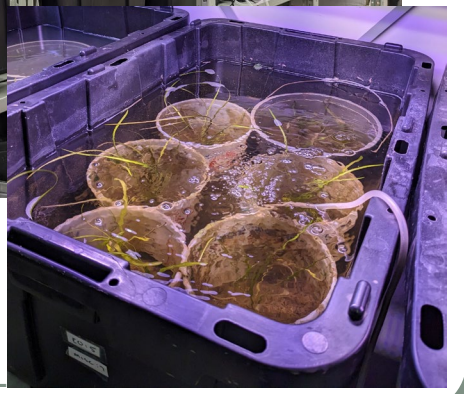
Community Engagement

Looking ahead

- Continue exploring additional species for restoration
- Coming soon: analysis of genotypic influence on factors contributing to plant productivity
  - Relationship between dry biomass (g), # leaves, # plants on turion production, weight, length etc -> subsequent relationship between turion weight/length on 2026 performance
  - Determine best few genotypes, start growing in larger vessels and reduce need for individual specimen tracking
- Troubleshooting chlorosis problem (which may or may not be influencing turion production?)
  - Fluoride: reverse osmosis filter
  - Manage heat: fill tanks, use risers to lift pots near surface early in the season after table germination
- **Large format planting over hydrilla beds**
- Before and after field observations/in and out of plot observations: macroinvertebrates, fish
- Installation of floating cages for more passive restoration of *Vallisneria*, coontail
- Homeowner Certified Habitat Program

Key Insights/Takeaways

- For wild collection, collect as soon as temps allow (60-65), plants 2-3 inches (or less) with minimal root growth
- Cultivation ultimately can be very simple/low-tech
  - A tank, tap water, some soil and buckets
- Harvest can occur anytime after growing season ends, but bear in mind your overwintering plans (refrigeration, soil overwintering, year-round trickery)
- Higher success rate with both survival and production with larger vessels, deeper tanks
- Even higher success rate if able to transplant new wild stock into “laboratory” setting before moving to greenhouse
  - Still pretty simple, just add lights and aeration
- Similarly to pot size in greenhouse, cage size appears to make a difference (anecdotally)
  - Plants did not survive single plant cages in 2023
- If able, removing cages after 2 seasons may be beneficial (cages seem to hinder true spread potential)
- All of this work was conducted in essentially lentic conditions, so your mileage may vary depending on flow



Thank you!

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Dr. Katia Englehardt, UMCES

Dave Conti, North Tonawanda Botanical Garden

Dr. Cathy McGlynn, NYS DEC

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