HYDRILLA RESEARCH & DEMONSTRATION PROJECT IN THE CONNECTICUT RIVER

Stakeholder Public Meeting
May 29, 2024
June 4, 2024
June 27, 2024

Keith Hannon, Project Manager
New England District – USACE

Ben Sperry, PhD – Research Biologist
Engineering Research and Development Center (ERDC)

U.S. ARMY

US Army Corps of Engineers®
New England District

PRESENTATION AGENDA

1. Introduction of Project Team and Stakeholders
2. Funding and Regulatory Basis for Action
3. Background of Hydrilla
4. Management Options
5. Herbicide Information/Safety
6. Post-Treatment Monitoring
7. Technical Transfer
8. Questions

INTRODUCTION

1. Project Team
2. Stakeholder Team
3. Research Partners
4. Government Agencies

PROJECT TEAM

Keith Hannon

Project Manager
USACE New England District

Margot Burns

Senior Environmental Planner

Lower Connecticut River Valley Council of Governments

Ben Sperry

Technical lead and aquatic invasive species expert
USACE Engineer Research and Development Center Aquatic Plant Control Research Program

Gregory Bugbee

Associate Scientist Invasive Aquatic Plant Program

The Connecticut Agricultural Experiment Station

STAKEHOLDERS

Lower Connecticut River Valley Council of Governments

Connecticut Resource Conservation & Development Area

EIGHTMILE RIVER WILD & SCENIC WATERSHED

CONNECTICUT RIVER GATEWAY COMMISSION 50 Years ...and counting

Clean Water. Healthy Habitats. Resilient Communities. Connecticut River Conservancy

Friends of Whalebone Cove

CONNECTICUT Marine Trades Association

CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS

RESEARCH PARTNERS

UF IFAS UNIVERSITY of FLORIDA | CENTER FOR AQUATIC AND INVASIVE PLANTS

University of Wisconsin Whitewater

NORTH CAROLINA STATE UNIVERSITY FOUNDED MARCH 7, 1887

NC STATE UNIVERSITY

Sea Grant CONNECTICUT

GOVERNMENT AGENCIES

NEANS
NORTHEAST AQUATIC NUISANCE SPECIES PANEL

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

US Army Corps of Engineers
New England District

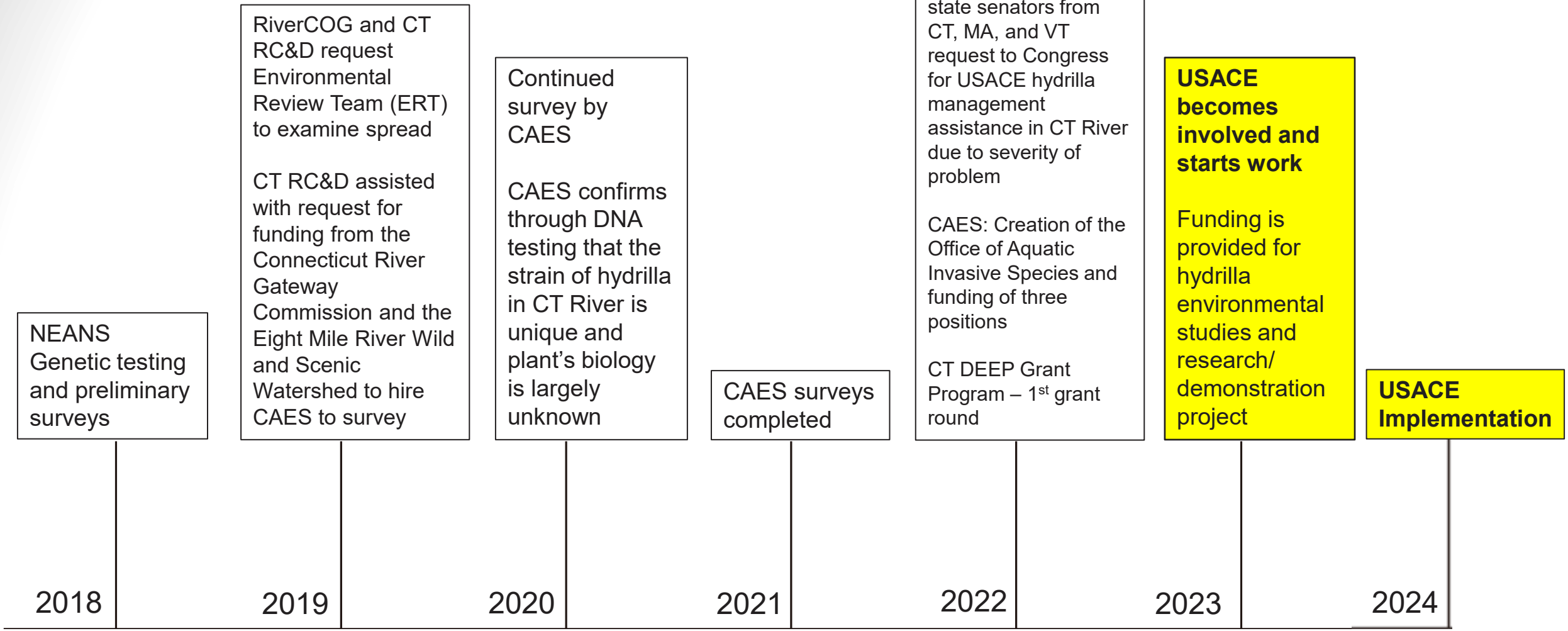
CONNECTICUT ENERGY & ENVIRONMENT

USGS
science for a changing world

FUNDING AND REGULATORY BASIS FOR ACTION

1. CT River Hydrilla Funding Timeline
2. USACE Involvement
3. USACE Demonstration Project

CT RIVER HYDRILLA FUNDING TIMELINE



2016: Hydrilla strain is found in CT River near Glastonbury, CT

US COAST GUARD ASSISTANCE IN 2018

USACE INVOLVEMENT

- New England District (NAE) and Engineer Research and Development Center (ERDC) involvement
  - One team, working together
  - Meet the needs of non-Federal partners, stakeholders, and the public
  - NAE District area of responsibility covers **all New England states**. Our mission is to provide vital engineering services and capabilities to support navigation, environmental protection/restoration, water management, flood damage mitigation and response to national emergencies.
  - ERDC is a science and engineering research organization that specializes in solving complex issues for the Army and the nation.
- ERDC leading the hydrilla research as part of the demonstration project through the Aquatic Plant Control Research Program (APCRP)
- The US Army Corps of Engineers, under Section 104 of the River and Harbor Act of 1958, is authorized to treat hydrilla through the APCRP via Congressional Energy and Water Development appropriations, **FY23 ($6 million) & FY24 ($5 million)**

2022 FUNDING AUTHORIZATION REQUEST

United States Senate
WASHINGTON, DC 20510

May 5, 2022

The Honorable Dianne Feinstein
Chair
Senate Appropriations Subcommittee on
Energy and Water Development
Washington, D.C. 20510

The Honorable John Kennedy
Ranking Member
Senate Appropriations Subcommittee on
Energy and Water Development
Washington, D.C. 20510

Dear Chair Feinstein and Ranking Member Kennedy:

As you consider the Fiscal Year (FY) 2023, Energy and Water Development Appropriations bill, we write to request base funding of $25,000,000 for each of four years to address the eradication of invasive *Hydrilla verticillata* in over 65 miles of the Connecticut River and adjoining coves and tributaries.

This funding would create a Connecticut River Hydrilla Program and rapid response task force that would cover the multistate watershed. Centered in Connecticut, this task force would be led by the Army Corps of Engineers, the Aquatic Invasive Species Program of the Connecticut Agricultural Experiment Station (CAES), the State of Connecticut Department of Energy and Environmental Protection (CT DEEP), and advised by the Northeast Aquatic Nuisance Species (NEANS) panel to create a plan of action that would implement the mitigation and eradication of hydrilla within the Army Corps of Engineers budget and begin Fiscal Year (FY) 2023. Each year's funding would be determined based on the past year's mitigation and eradication results. Early success may reduce the need for significant future outlays of federal funding.

Hydrilla is an aquatic plant that inhabits shallow areas up to 10 feet and in some places much deeper of rivers and streams, including their intertidal freshwater areas, and reservoirs, ponds and lakes. It rapidly reproduces in many ways including cuttings, winter buds or turions, and persistent root structures called tubers. Hydrilla is able to grow very quickly, inches a day and more, can grow in turbid waters with low light conditions and has been found to be moderately salt tolerant. The plants growth spreads across the bottom and reaches through the water column to the surface and spreads in all directions to form impenetrable mats of vegetation to the exclusion of all native plants. The growth limits flood holding capacity of affected waterways and water bodies and inhibits water flow. A cyanobacteria that has been found to live on the underside of hydrilla leaves has been linked to incidents of avian deaths and public health concerns.

Hydrilla is the most feared and pervasive aquatic invasive plant. It has been found through 2018, 2019,2020 and 2021 seasonal surveys by CAES and the Northeast Aquatic Nuisance Species Panel (NEANS) to have spread exponentially in the past six years throughout over 65 miles of the Connecticut River from Agawam, Massachusetts to Essex, Connecticut. This hydrilla poses a great

Richard Blumenthal
United States Senator

Christopher S. Murphy
United States Senator

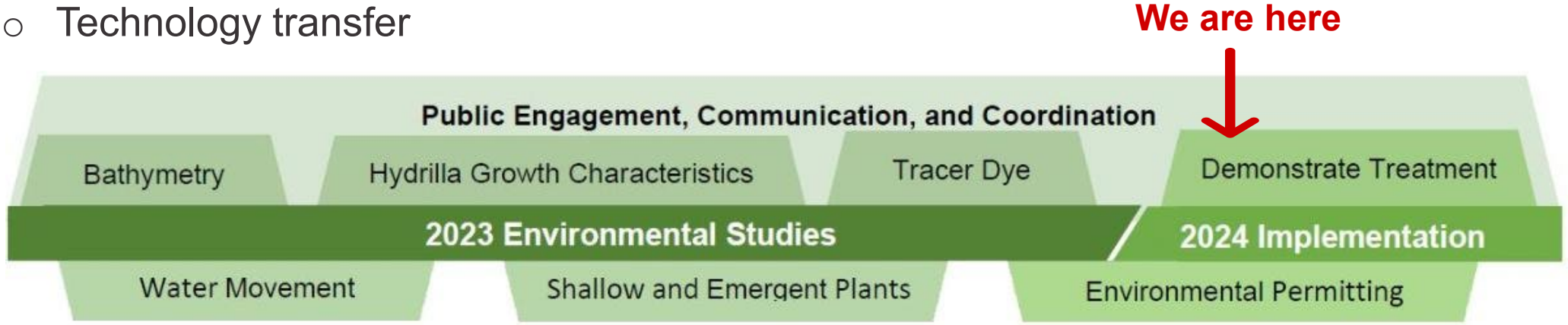
Bernard Sanders
United States Senator

Elizabeth Warren
United States Senator

Edward J. Markey
United States Senator

USACE DEMONTRATION PROJECT: WHAT WE ARE DOING

- **Project Goal**: Protect and restore the CT River, its tributaries, and associated ecological and economic benefits from hydrilla invasion impacts.
- Demonstration project elements:
  - Public engagement, stakeholder notification, and coordination
  - Environmental and technical studies to guide site selection and treatment plan development
  - Federal and state application permitting
  - Demonstrate treatment with herbicides, monitoring, publish results
  - Technology transfer



HYDRILLA BACKGROUND

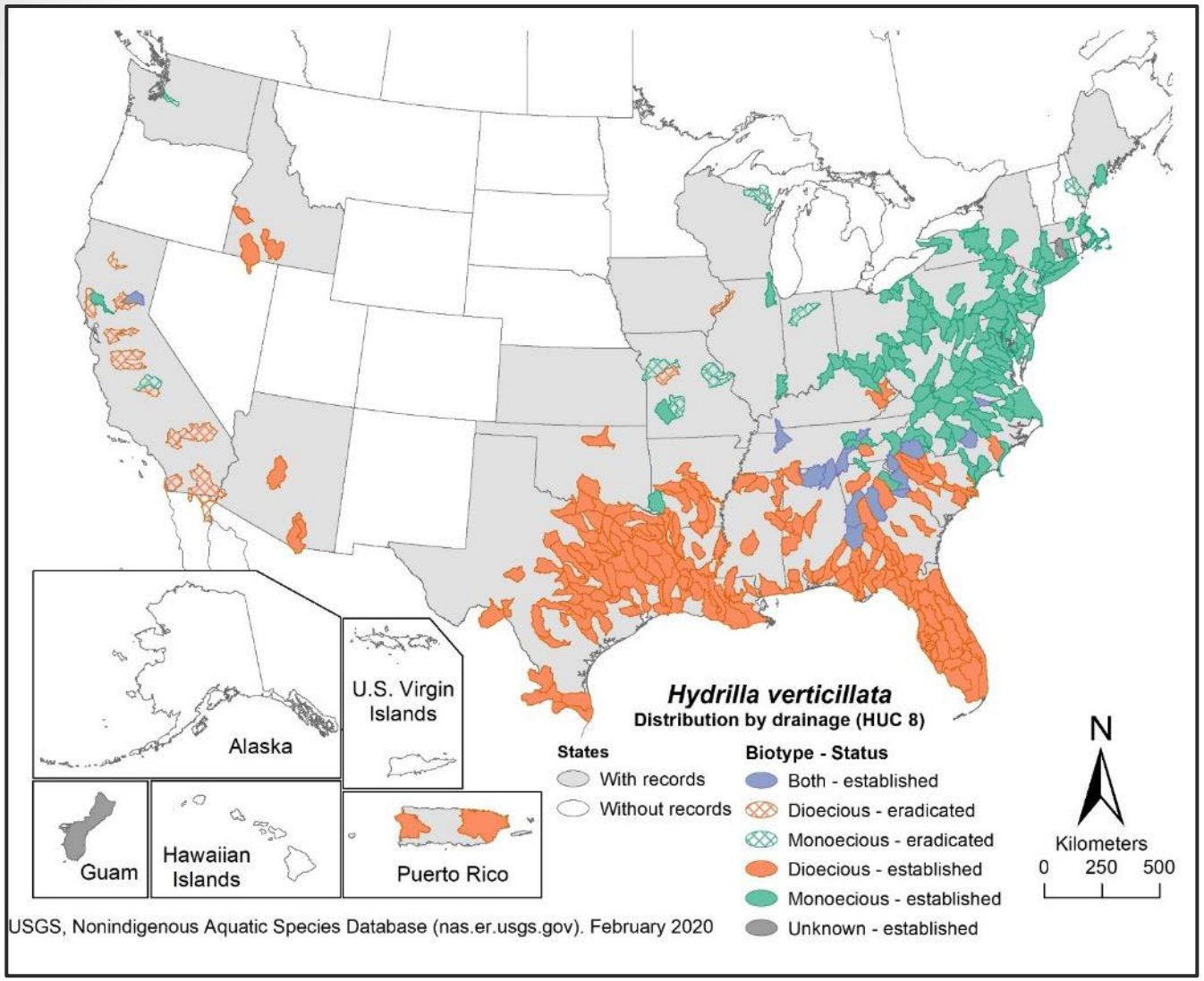
1. Origin
2. US Distribution
3. Connecticut Distribution
4. Images from around Connecticut, aerial view and under water view
5. Reproduction and interesting facts
6. Impacts

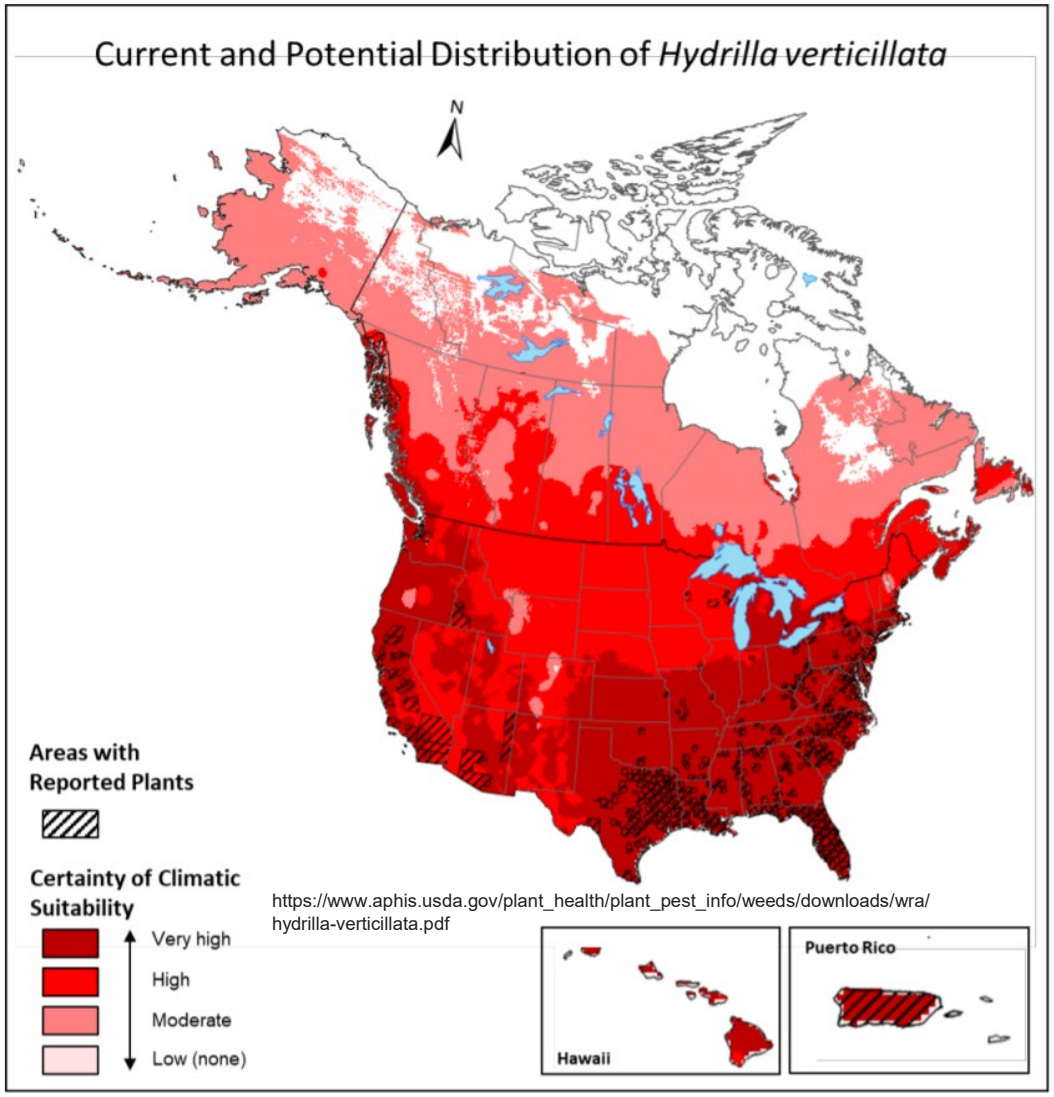
ORIGINS OF HYDRILLA IN UNITED STATES

- Hydrilla is not native to North America and the first strain was first introduced to the U.S. in Florida waters in the 1950s.
  - Tropical fish and aquarium plant dealer in Tampa Bay area released hydrilla in a canal, causing the first plants to become established.
- A second strain of hydrilla is believed to have been introduced in the 1980s in the Potomac River after being confused with native waterweed.

Hydrilla in Florida - Center for Aquatic and Invasive Plants, University of Florida

CURRENT AND POTENTIAL DISTRIBUTION





https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/wra/hydrilla-verticillata.pdf

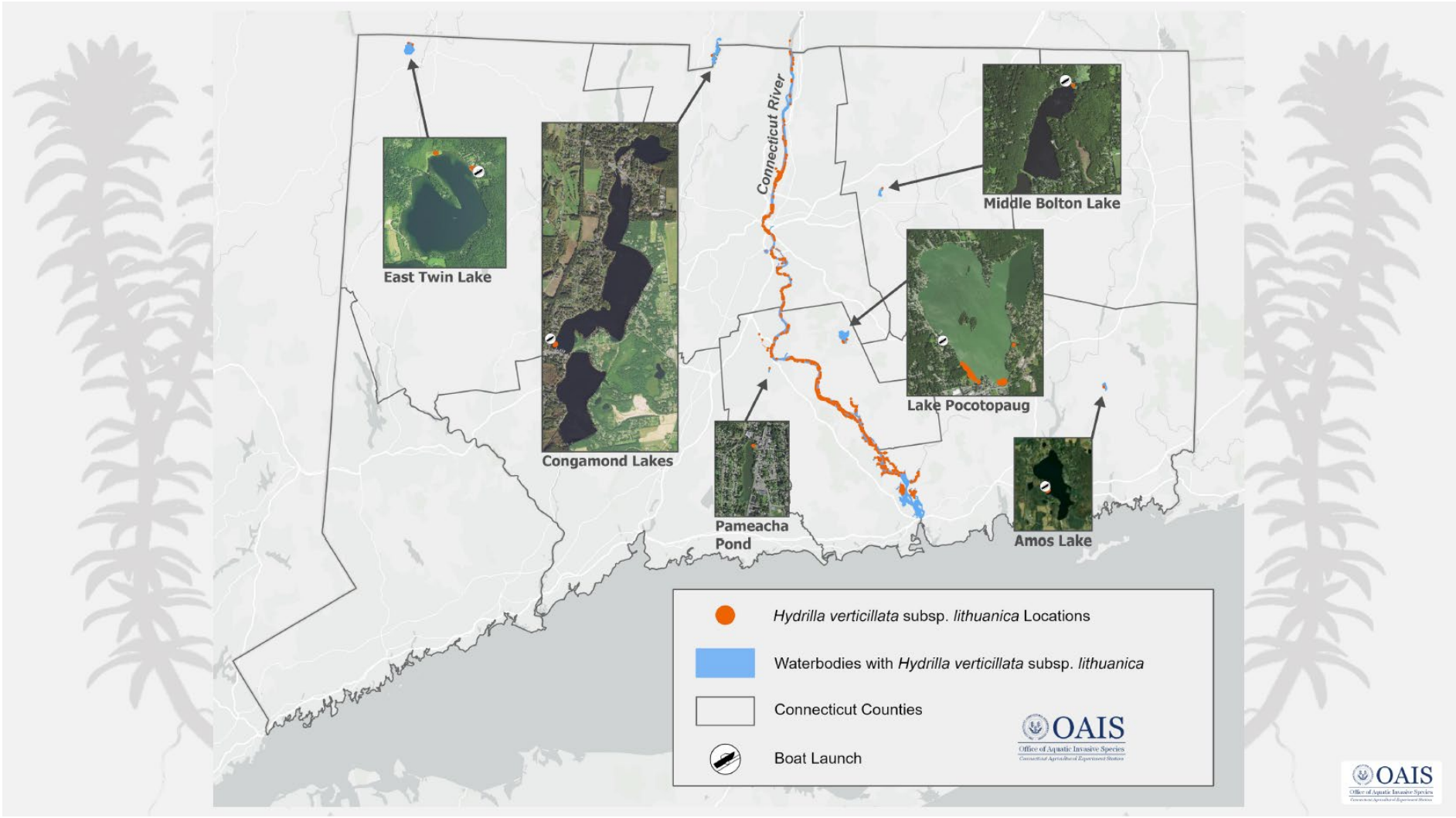
CONNECTICUT RIVER HYDRILLA

- **2016**: Third strain first detected in the CT River in Keeney Cove around Glastonbury, CT
- **2019 and 2020**: CT Ag Experiment Station performed survey from Agawam, MA to the Long Island Sound found hydrilla as far north as Agawam, MA
- **2020**: Connecticut River hydrilla confirmed to be genetically distinct strain (*Tippery, Bugbee, and Stebbins 2020*).
- **2023**: Hydrilla found in six CT lakes
- **2024**: Will hydrilla be found in more lakes?
- **Information on best management practices is needed**

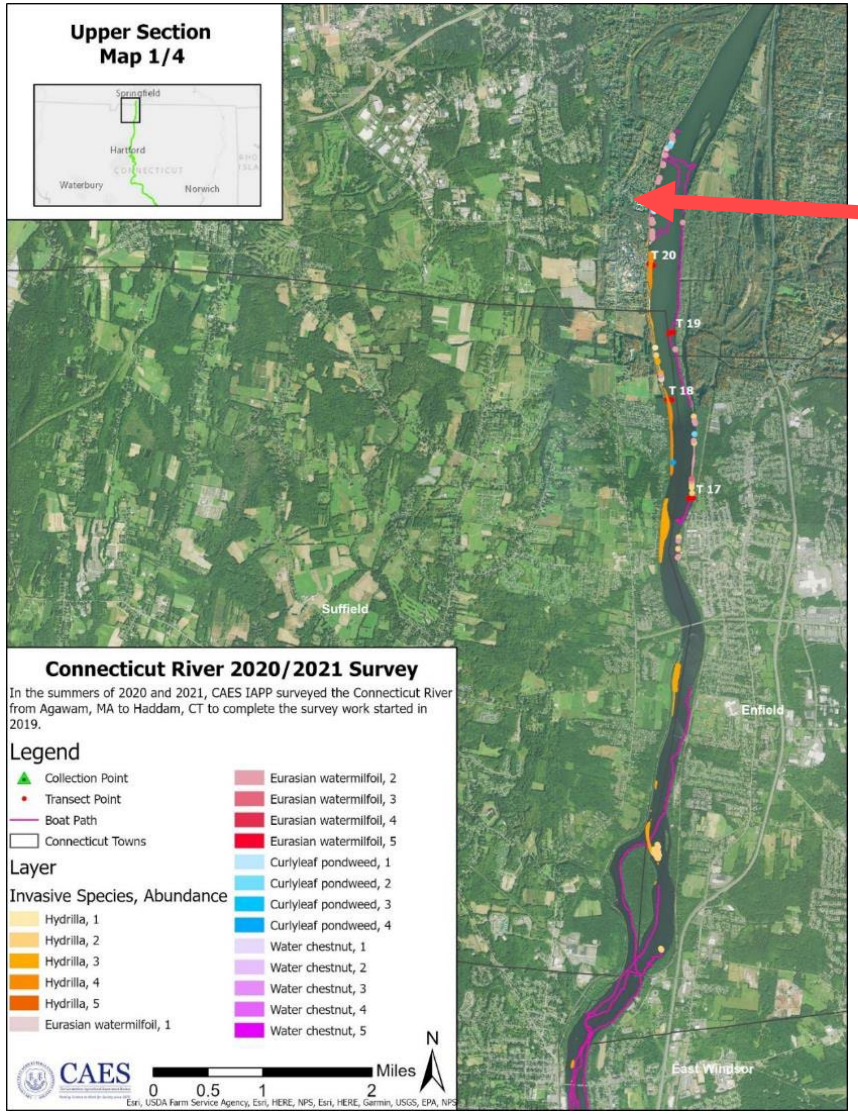
- Stakeholders seeking aggressive control and management response due to CT River importance to the environment and local economy

Hydrilla surveyed from Connecticut River by CAES in 2021:
Invasive Aquatic Plants in the Connecticut River (arcgis.com)

FIRST ESTABLISHMENT OUTSIDE OF CT RIVER SYSTEM



NORTHERN EXTENT - AGAWAM, MA



MATTABESSET RIVER - MIDDLETOWN

Aerial view of Hydrilla - Mattabesset River

KEENEY COVE – GLASTONBURY

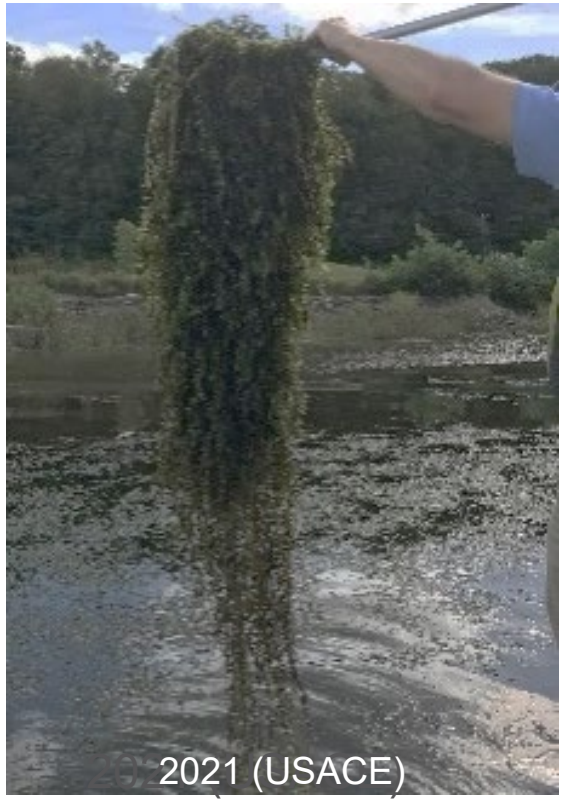
SALMON RIVER – EAST HADDAM

SELDEN COVE - LYME

PORTLAND BOAT WORKS - PORTLAND

HYDRILLA GROWTH CHARACTERISTICS

- Perennial plant that forms dense mats due to rapid growth
- Hydrilla can grow over 25 feet tall and fill the entire water column
- When it reaches the water surface, it continues to grow laterally across the water's surface
- Blocks light and oxygen into the water column
- It can tolerate water salinities of up to 7%
- It is adapted to grow in relatively low light and CO_2 conditions
- Can double in biomass every two weeks during the summer forming a monoculture (dominated by a single species)

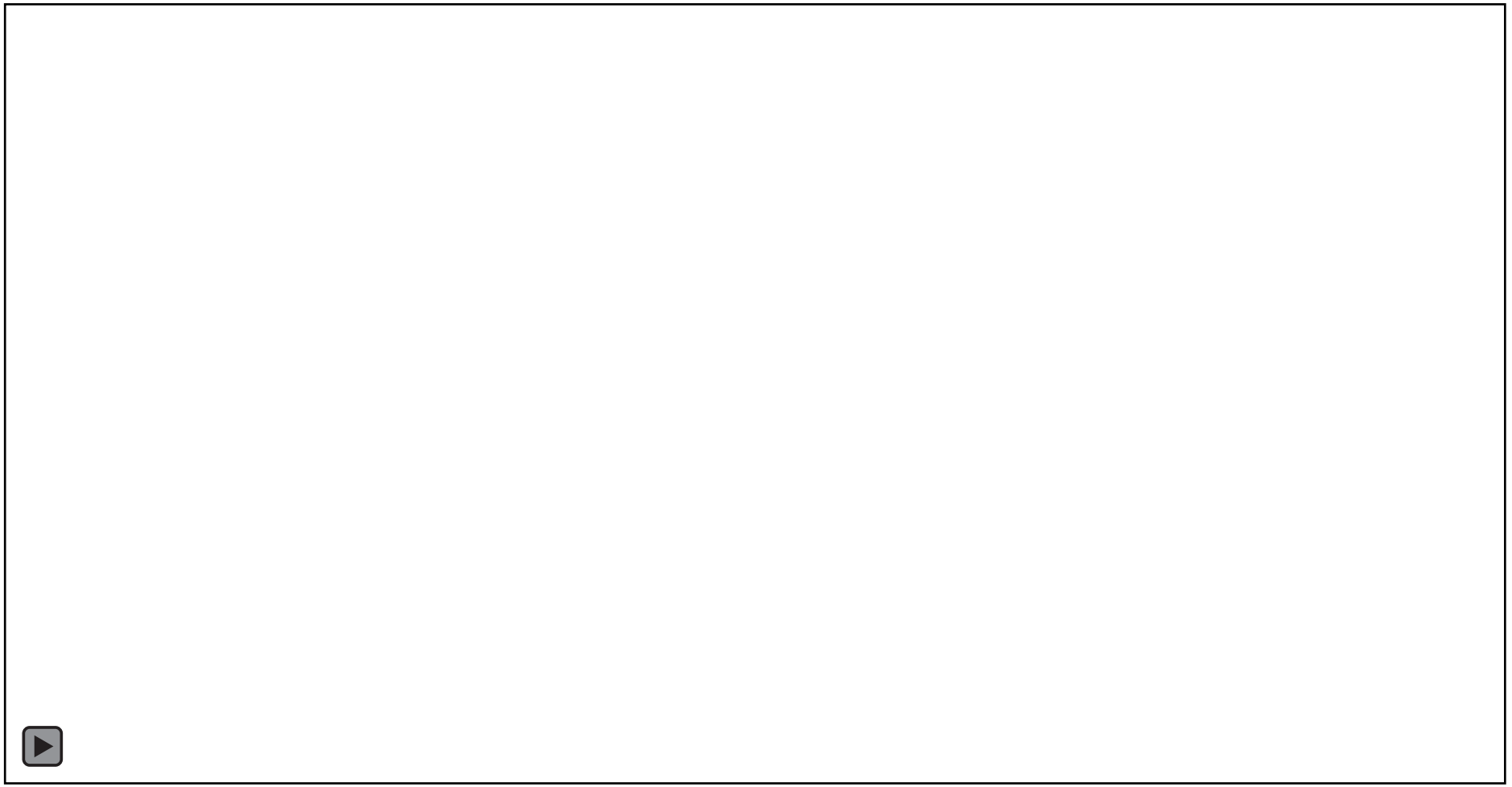


2021 (USACE)

HYDRILLA UNDER THE SURFACE

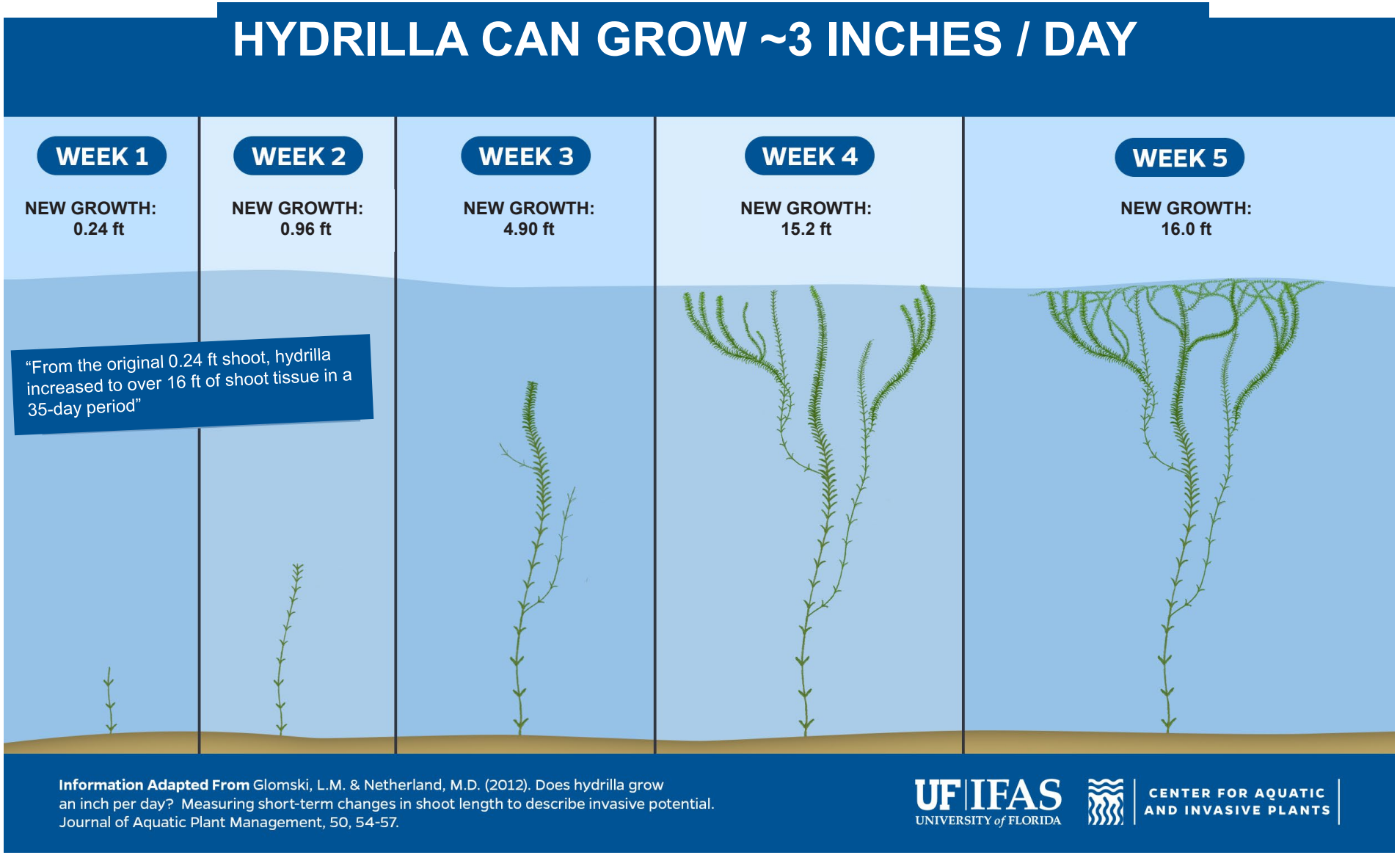
Video clip available to view on the project website

Video shows what hydrilla looks like **below** the surface



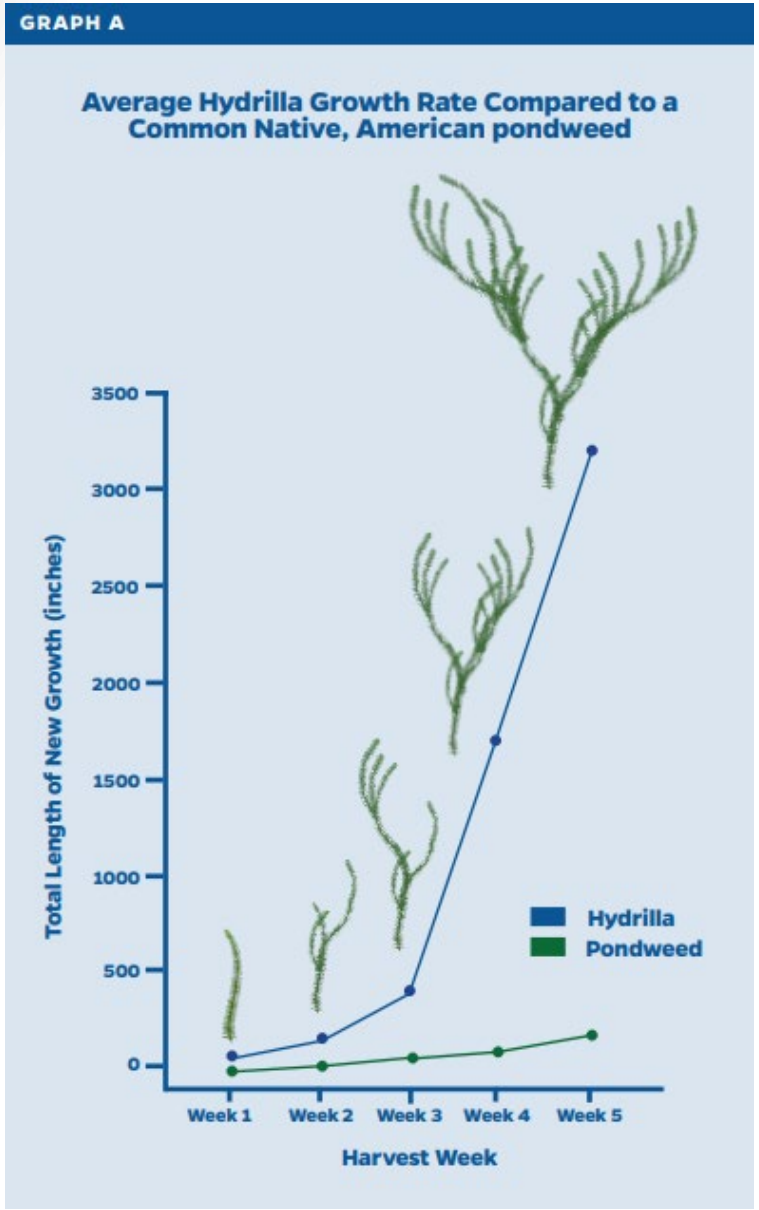
USACE New England District
Underwater Footage of Hydrilla in Connecticut River – Sept. 2023
(0:05-0:30)

HYDRILLA GROWTH IN FIVE WEEKS

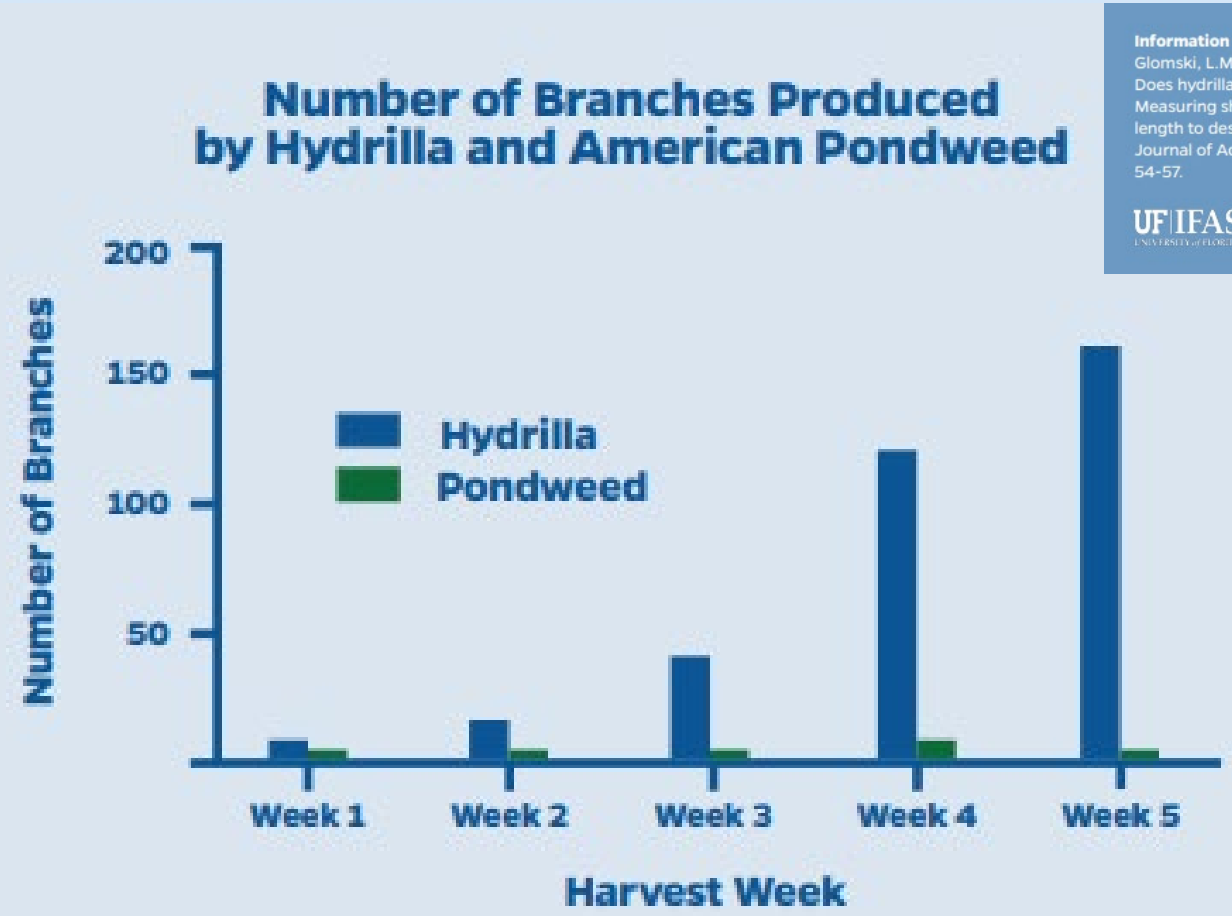


HYDRILLA VS. NATIVE AMERICAN PONDWEED

GRAPH A



GRAPH B



Information Adapted From
Glomski, L.M. & Netherland, M.D. (2012). Does hydrilla grow an inch per day? Measuring short-term changes in shoot length to describe invasive potential. Journal of Aquatic Plant Management, *50*, 54-57.

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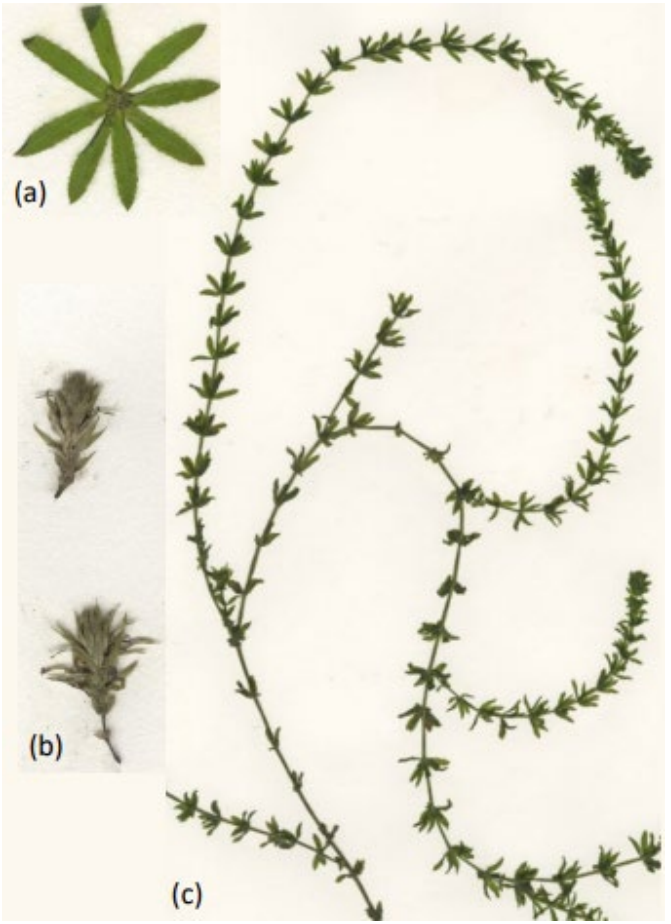
HOW HYDRILLA SPREADS

- Hydrilla only needs approximately 1% of available sunlight penetration to grow
- CT River hydrilla grows very rapidly in the summer when propagules, called **turions**, form on the stems and plant base
- Turions and stem fragments then break away, disperse, and fall to the bottom where they lay dormant until the following spring when they resume growth
- Fragments float and are capable of dispersing via wind and water currents
- Fragments can also be transported by boats and trailers

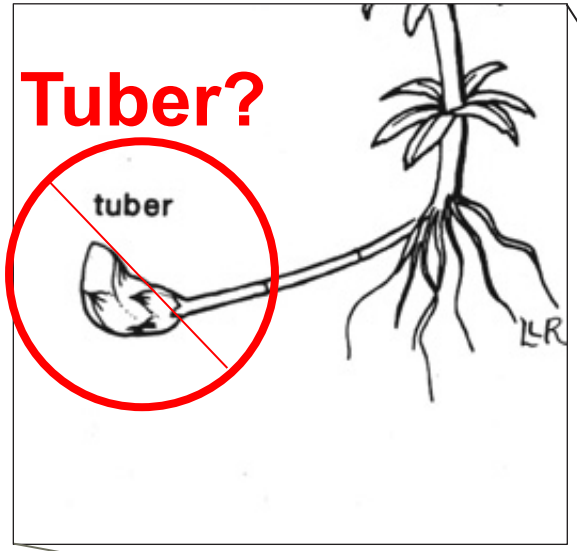
Hydrilla fragment surveyed from CT River by CAES

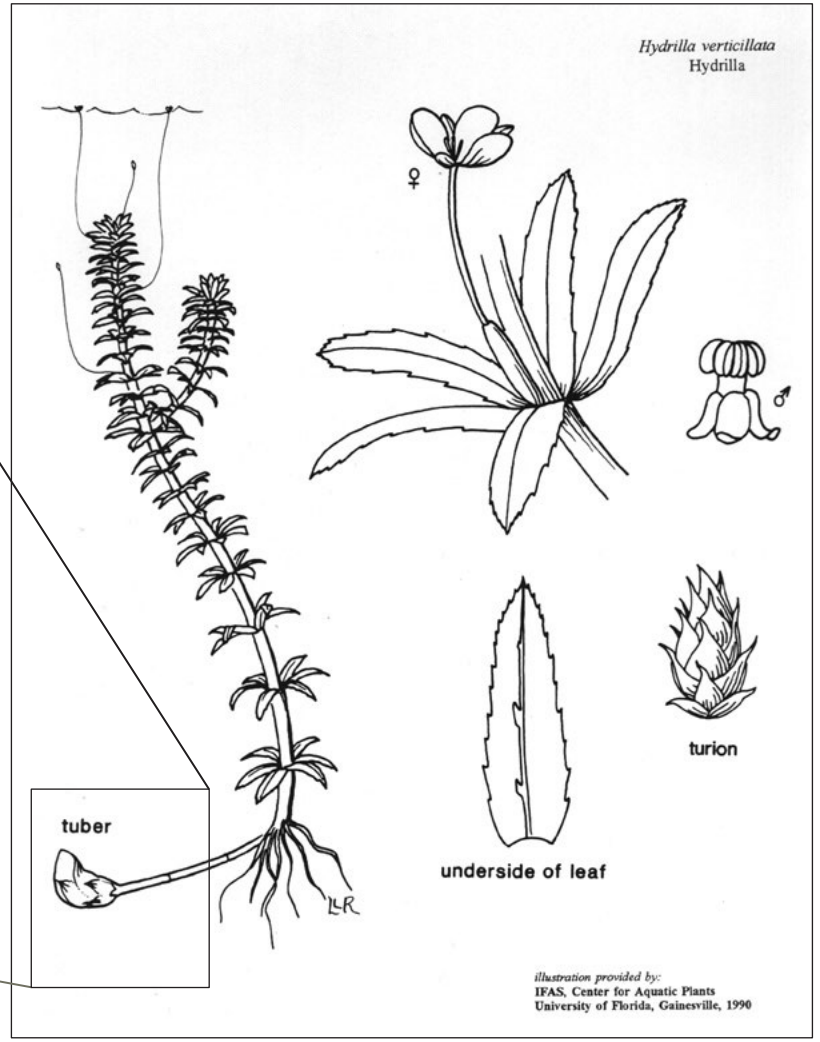


Hydrilla surveyed from Connecticut River by CAES in 2018, and 2019, (a) whorl of leaves; (b) turions; (c) hydrilla fragments.

(https://portal.ct.gov/CAES/Invasive-AquaticPlant-Program/Herbarium/Hydrilla-verticillata)

DIFFERENCE BETWEEN CT HYDRILLA AND OTHER STRAINS





CT RIVER HYDRILLA

OTHER STRAINS HYDRILLA

Source: Aliki Fornier, Connecticut River Conservancy

HYDRILLA IMPACTS

1. Recreation
2. Economic
3. Ecological

RECREATION IMPACTS

- Loss of waterway usability and recreation
- Compromised marina functions
- Fish production and fishing industry loss
- Boating, swimming, and recreation loss

Hydrilla-impacted marina on Connecticut River, 2020 (CAES)

Hydrilla clogging propeller
Invading the CT River (Connecticut RC&D)

ECONOMIC IMPACTS

- Compromised navigation in areas of the CT River & tributaries
- Compromised access to boat basins/docks & marinas
- **Tourism** can be negatively impacted - use of the river becomes limited late spring through summer & fall months
- Multiple industries rely on a healthy river system
- Potential diminished waterfront **home value**
- Increased **flood risk** – hydrilla can reduce efficient downstream flow of water in the river

Impacts to the "Lifestyle Economy" which has estimated value of $450 million

Tourism market estimated value of $120-$170M throughout 5,000 – 7,000 jobs

(GrowSMART: RiverCOG's Regional Economic Growth Strategy)

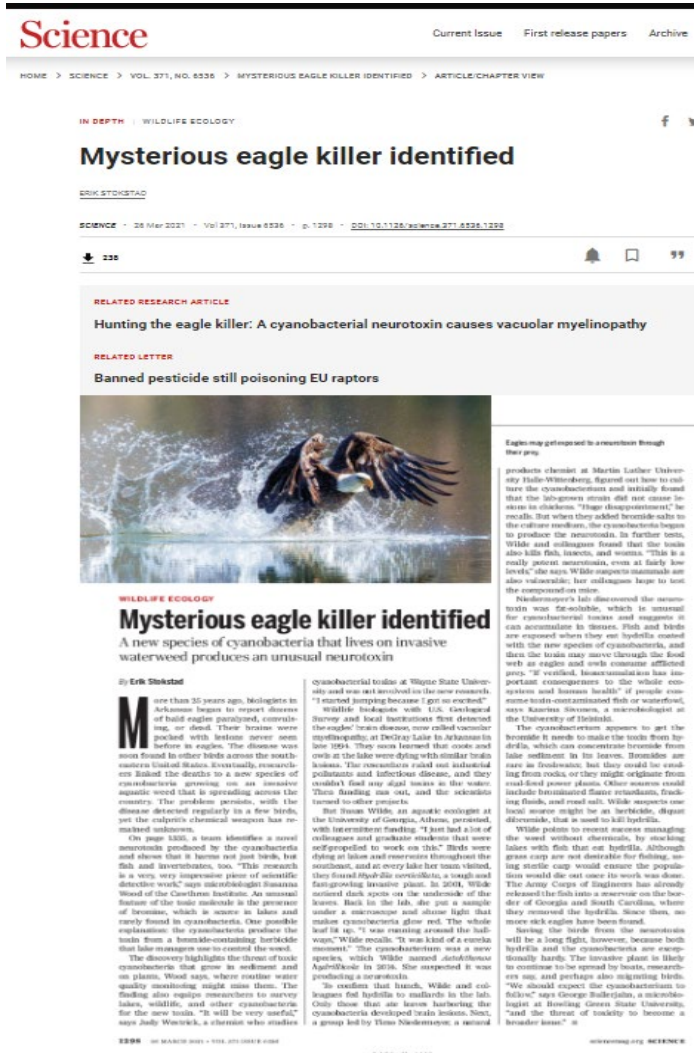
ECOLOGICAL IMPACTS

- Aquatic habitat degradation & reduces native aquatic species populations
- Research shows cyanobacteria growth connected to hydrilla and other aquatic invasives could adversely effect wildlife
- Hydrilla can reduce efficient river flow, increasing mosquito breeding success
- Alters water chemistry and increases water temperature
- Monoculture hydrilla stands prevent or suppress growth of native aquatic plant species, contributing to a loss of biodiversity

Hydrilla Outcompeting Native Aquatic Plants and Reducing River Flow Invading the CT River (Connecticut RC&D)

HYDRILLA IS REPLACING NATIVE EELGRASS

HYDRILLA CAN HARBOR TOXIC ALGAE



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IN DEPTH | WILDLIFE ECOLOGY

Mysterious eagle killer identified

ERIK STOKSTAD

SCIENCE · 26 Mar 2021 · Vol 371, Issue 6536 · p. 1298 · DOI: 10.1126/science.371.6536.1298

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Hunting the eagle killer: A cyanobacterial neurotoxin causes vacuolar myelinopathy

RELATED LETTER

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WILDLIFE ECOLOGY

Mysterious eagle killer identified

A new species of cyanobacteria that lives on invasive waterweed produces an unusual neurotoxin

By Erik Stokstad

More than 35 years ago, biologists in Arkansas began to report dozens of bald eagles paralyzed, convulsing, or dead. Their brains were pocked with lesions never seen before in eagles. The disease was soon found in other birds across the southeastern United States. Eventually, researchers linked the deaths to a new species of cyanobacteria growing on an invasive aquatic weed that is spreading across the country. The problem persists, with the disease detected regularly in a few birds, yet the culprit's chemical weapon has remained unknown.

On page 1336, a team identifies a novel neurotoxin produced by the cyanobacteria and shows that it harms not just birds, but fish and invertebrates, too. "This research is a very, very impressive piece of scientific detective work," says microbiologist Susanna Wood of the Cawthron Institute. An unusual feature of the toxic molecule is the presence of bromine, which is scarce in lakes and rarely found in cyanobacteria. One possible explanation: the cyanobacteria produce the toxin from a bromide-containing herbicide that lake managers use to control the weed.

The discovery highlights the threat of toxic cyanobacteria that grow in sediment and on plants. Wood says, where routine water quality monitoring might miss them. The finding also equips researchers to survey lakes, wildlife, and other cyanobacteria for the new toxin. "It will be very useful," says Judy Westrick, a chemist who studies cyanobacterial toxins at Wayne State University and was not involved in the new research. "I started jumping because I got so excited."

Wildlife biologists with U.S. Geological Survey and local institutions first detected the eagles' brain disease, now called vacuolar myelinopathy, at DeGray Lake in Arkansas in late 1994. They soon learned that coots and owls at the lake were dying with similar brain lesions. The researchers ruled out industrial pollutants and infectious disease, and they couldn't find any algal toxins in the water. Then funding ran out, and the scientists turned to other projects.

But Susan Wilde, an aquatic ecologist at the University of Georgia, Athens, persisted, with intermittent funding. "I just had a lot of colleagues and graduate students that were self-propelled to work on this." Birds were dying at lakes and reservoirs throughout the southeast, and at every lake her team visited, they found *Hydrilla verticillata*, a tough and fast-growing invasive plant. In 2001, Wilde noticed dark spots on the underside of the leaves. Back in the lab, she put a sample under a microscope and shone light that makes cyanobacteria glow red. The whole leaf lit up. "I was running around the hallways," Wilde recalls. "It was kind of a eureka moment." The cyanobacterium was a new species, which Wilde named *Aetokthonos hydrillicola* (Aeth'thonos) in 2016. She suspected it was producing a neurotoxin.

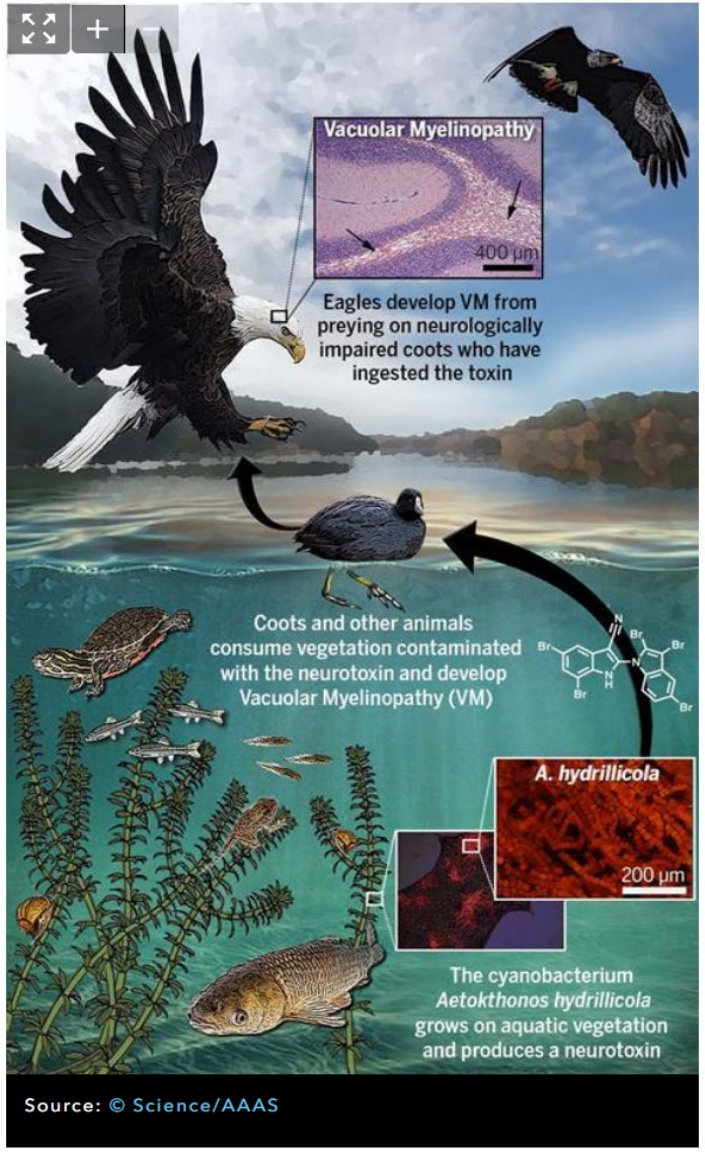
To confirm that hunch, Wilde and colleagues fed hydrilla to mallards in the lab. Only those that ate leaves harboring the cyanobacteria developed brain lesions. Next, a group led by Timo Niedermeyer, a natural products chemist at Martin Luther University Halle-Wittenberg, figured out how to culture the cyanobacterium and initially found that the lab-grown strain did not cause lesions in chickens. "Huge disappointment," he recalls. But when they added bromide salts to the culture medium, the cyanobacteria began to produce the neurotoxin. In further tests, Wilde and colleagues found that the toxin also kills fish, insects, and worms. "This is a really potent neurotoxin, even at fairly low levels," she says. Wilde suspects mammals are also vulnerable; her colleagues hope to test the compound on mice.

Niedermeyer's lab discovered the neurotoxin was fat-soluble, which is unusual for cyanobacterial toxins and suggests it can accumulate in tissues. Fish and birds are exposed when they eat hydrilla coated with the new species of cyanobacteria, and then the toxin may move through the food web as eagles and owls consume afflicted prey. "If verified, bioaccumulation has important consequences to the whole ecosystem and human health" if people consume toxin-contaminated fish or waterfowl, says Kaarina Sivonen, a microbiologist at the University of Helsinki.

The cyanobacterium appears to get the bromide it needs to make the toxin from hydrilla, which can concentrate bromide from lake sediment in its leaves. Bromides are rare in freshwater, but they could be eroding from rocks, or they might originate from coal-fired power plants. Other sources could include brominated flame retardants, fracking fluids, and road salt. Wilde suspects one local source might be an herbicide, diquat dibromide, that is used to kill hydrilla.

Wilde points to recent success managing the weed without chemicals, by stocking lakes with fish that eat hydrilla. Although grass carp are not desirable for fishing, using sterile carp would ensure the population would die out once its work was done. The Army Corps of Engineers has already released the fish into a reservoir on the border of Georgia and South Carolina, where they removed the hydrilla. Since then, no more sick eagles have been found.

Seeing the birds from the neurotoxin will be a long fight, however, because both hydrilla and the cyanobacteria are exceptionally hardy. The invasive plant is likely to continue to be spread by boats, researchers say, and perhaps also migrating birds. "We should expect the cyanobacterium to follow," says George Bullerjahn, a microbiologist at Bowling Green State University, "and the threat of toxicity to become a broader issue."



Science. 2021 Mar 26;371(6536):eaax9050. doi: 10.1126/science.aax9050.

Hunting the eagle killer: A cyanobacterial neurotoxin causes vacuolar myelinopathy

Steffen Breinlinger [#1], Tabitha J Phillips [#2], Brigette N Haram [2], Jan Mareš [3 4 5], José A Martínez Yerena [3 5], Pavel Hrouzek [4 5], Roman Sobotka [4 5], W Matthew Henderson [6], Peter Schmieder [7], Susan M Williams [8], James D Lauderdale [9], H Dayton Wilde [10], Wesley Gerrin [2], Andreja Kust [3], John W Washington [6], Christoph Wagner [11], Benedikt Geier [12], Manuel Liebeke [12], Heike Enke [13], Timo H J Niedermeyer [#14], Susan B Wilde [#15]

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PMID: 33766860 PMCID: PMC8318203 DOI: 10.1126/science.aax9050

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NEWS

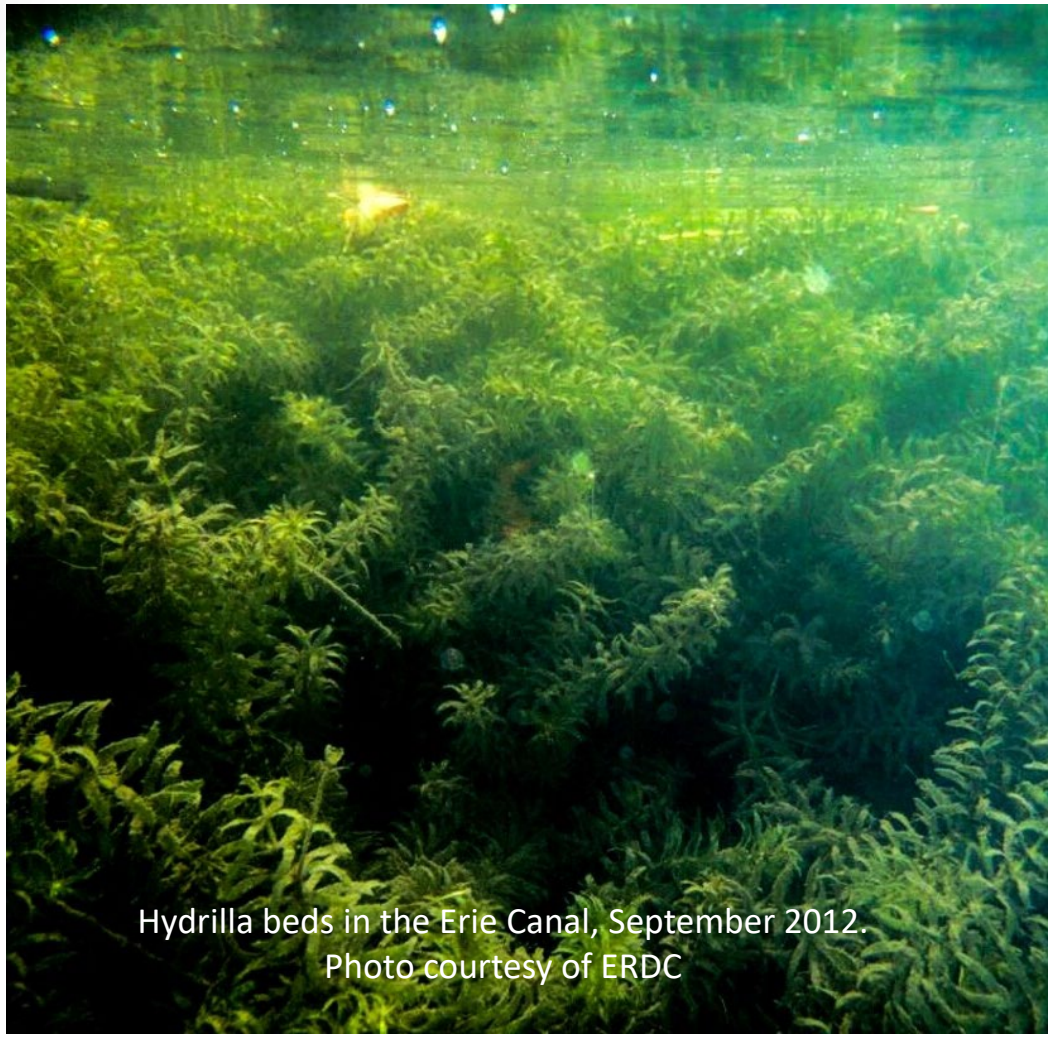
Case closed on decades old mystery of American bald eagle deaths

BY REBECCA TRAGER | 26 MARCH 2021

MANAGING HYDRILLA

1. Management options
2. Herbicide information/safety
3. ERDC Demonstration Project

USACE HYDRILLA MANAGEMENT HISTORY



Hydrilla beds in the Erie Canal, September 2012.
Photo courtesy of ERDC

- USACE has been involved in hydrilla management since the 1960s
- Hydrilla control measures are a major focus of USACE's Aquatic Plant Control Research Program

MANAGEMENT OPTIONS

WHY ARE HERBICIDES BEING STUDIED?

- **Chemical herbicides are most effective, selective, and economical to reliably control hydrilla infestations**
- Established treatment history: herbicides have been used by USACE to control hydrilla since the 1960s
- Treats large areas quickly
- Applications control further plant spread
- Herbicides are regulated and readily available
- **Other methods to stop hydrilla to-date are minimally effective and physical and mechanical methods do not stop further plant spread**

HERBICIDE COMPLIANCE REQUIREMENTS

- **Public safety top priority**
- **USACE only uses EPA and CT DEEP approved herbicides**
- Aquatic herbicides have undergone rigorous testing and safety approvals by the EPA for use in aquatic environments – well understood
- Compliant with CT DEEP: NDDB, CT Fisheries, & Pesticide Management Programs

<u>CT DEEP Application Restrictions/Requirements:</u>

  - No application during river flooding
  - No applications through June to ensure freshwater eelgrass is available for spawning herring
  - Post-treatment monitoring for state listed aquatic plants

- **<u>Registered aquatic herbicides can be used to selectively control invasive plants and they do not pose significant safety risks</u>**

ENVIRONMENTAL SAFETY

- When used, aquatic herbicide begins to dissipate, dilute, and degrade immediately
- Following dilution, aquatic herbicide degradation occurs through environmental processes by microbes, sunlight, and/or changes in water chemistry
- The herbicide does not persist in the environment
- No long-term closures or restricted access is currently anticipated, other than immediate site locations during on-site treatment
- Boating and fishing activities may resume immediately following application

MANAGEMENT OPTIONS

Best selective control option is the use of aquatic herbicide

CT RIVER HYDRILLA DEMONSTRATION PROJECT

Ben Sperry, PhD – Research Biologist
USACE Engineer Research and Development Center (ERDC)

ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

AQUATIC PLANT MANAGEMENT TEAM

- Conduct R&D to provide operational guidance to CE Districts and partner Federal, state, and local agencies for improved management of invasive aquatic vegetation
- Serve as subject matter experts to other agencies for aquatic plant control issues
- Collaborate with other entities to develop/evaluate management tools for use in the US

ERDC
ENGINEER RESEARCH & DEVELOPMENT CENTER

THE PLANT: CLADE C HYDRILLA (CT HYDRILLA)

- Genetically distinct strain discovered in 2016
- Very little applied management research conducted to date
- Will require management to maintain needs of users, local economies, and fish & wildlife
- Potential to spread to outside systems
- Applied research approach = determination of optimal control methods and provide science-based management guidance to key agency personnel

THE SITE: CONNECTICUT RIVER

- Extremely large
- Many users
- Tidally influence
- Hydrodynamically complex - site-specific water exchange characteristics

THE UNKNOWN: RESEARCH GAPS

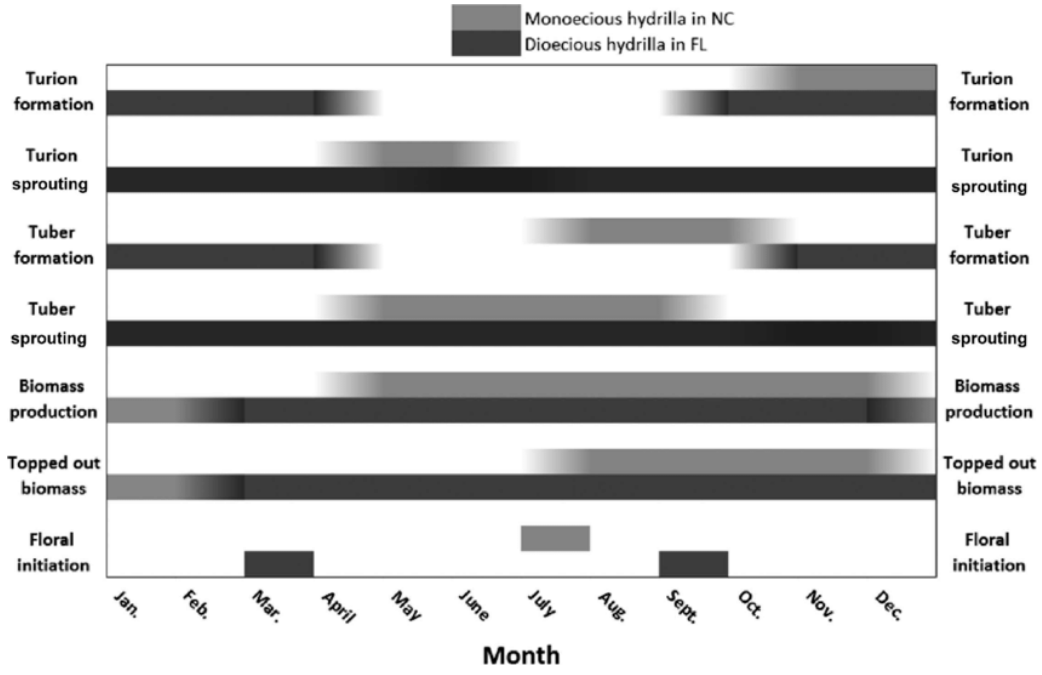
- Detailed understanding of growth and reproduction under varying environmental conditions
- Water exchange dynamics in the CT River
- Management timing in conjunction with phenological “weak points” in the life cycle
- Identification of the most effective and selective herbicides:
  - Application rates
  - Exposure time requirements
  - Application techniques to optimize control

1) WATER EXCHANGE AND HERBICIDE APPLICATION TECHNIQUES

- Tracer dye (Rhodamine WT) studies
- Site-specific water exchange rates
- Herbicide delivery technique evaluation

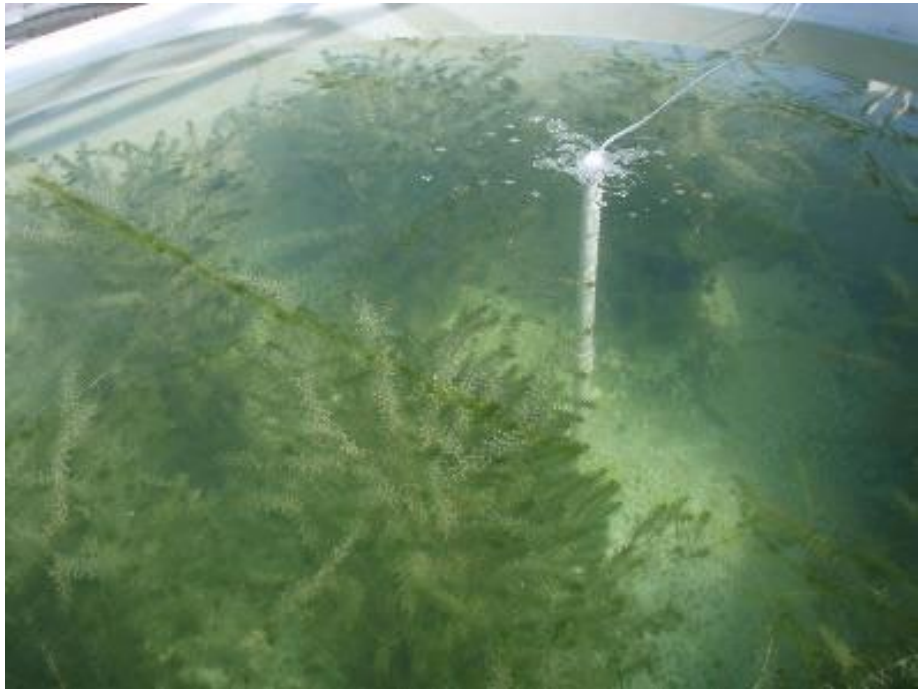
2) PLANT PHENOLOGY

- Life cycle research
- Record major reproduction and growth events
- Identify weak points for management interventions



3) HERBICIDE ASSAYS - MESOCOSMS

- Plant/herbicide exposure relationships



CONCENTRATION-EXPOSURE TIME RELATIONSHIPS

- Aquatic herbicide treatment success depend on two related factors:
  - 1.) Herbicide concentration in contact with target plants (5 to 5000 ppb)
  - 2.) Length of time target plant is exposed to dissipating herbicide concentrations (hours to months)

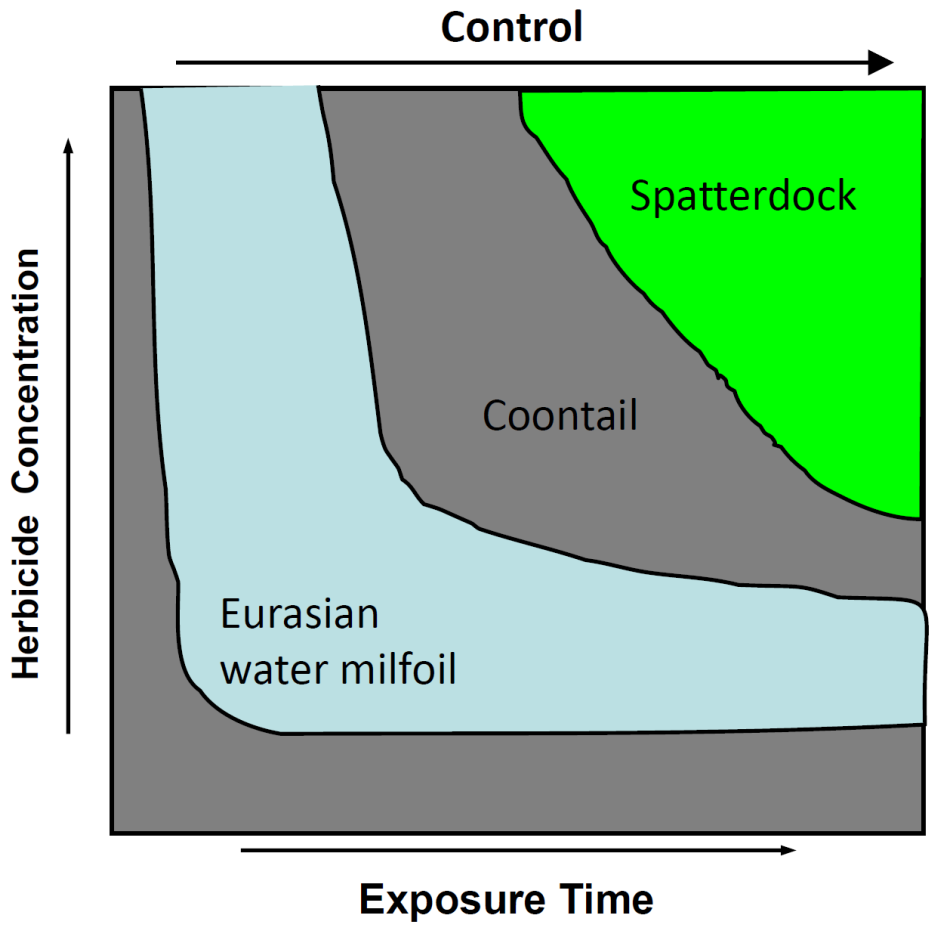
- Applications to entire water bodies (whole-system) typically result in long exposure times since dissipation is less of a factor (focus on long ET herbicides)

- Applications to flowing-water or partial system treatments typically experience greater water exchange over a short period of time and result in short exposure times.

- Failure to achieve target concentration and exposure time will result in reduced control

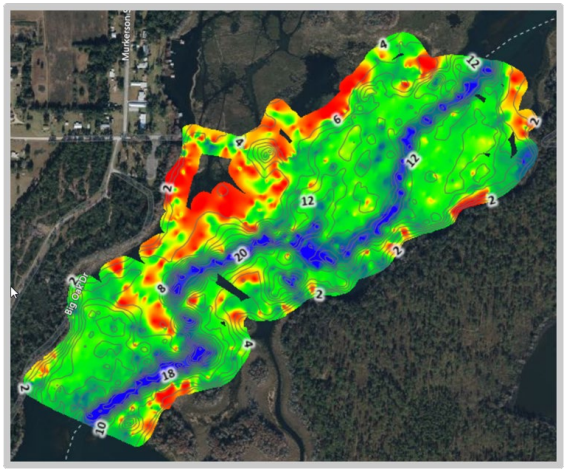
CONCENTRATION EXPOSURE TIME (CET) AND SELECTIVITY

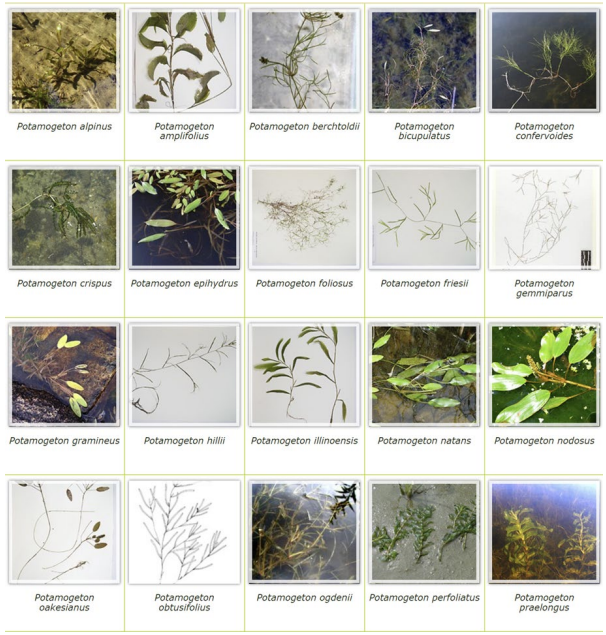
- Each plant species has a unique “CET profile” or dose-sensitivity to each herbicide



4) HERBICIDE TREATMENT DEMONSTRATIONS

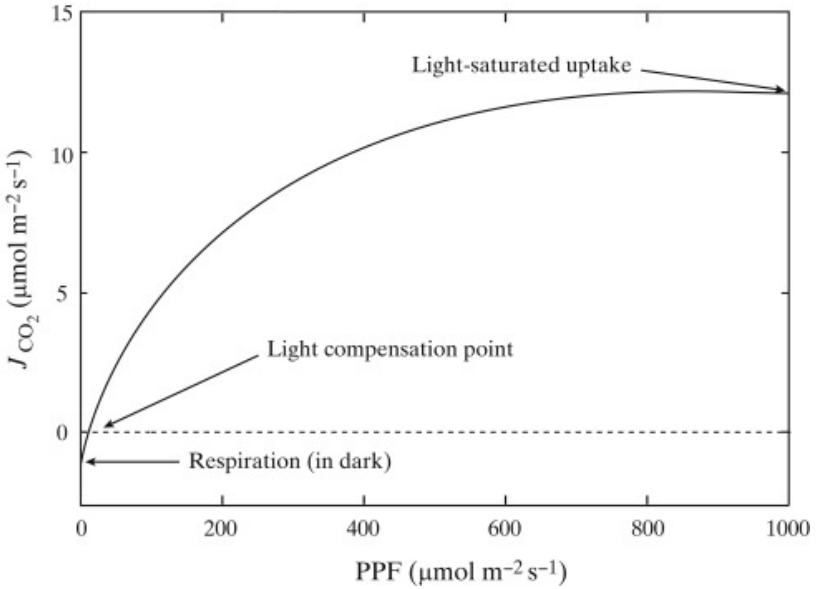
- Base on small-scale data for efficacy and selectivity
- Small plot evaluations
- Measure aqueous herbicide concentrations, plant control, non-target plant response

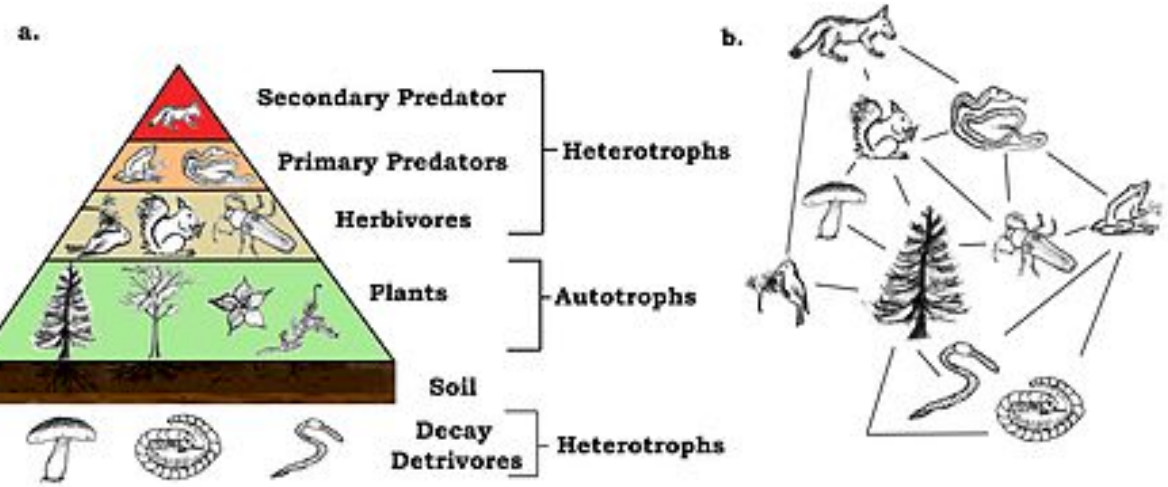




5) PLANT BIOLOGY AND ECOLOGY

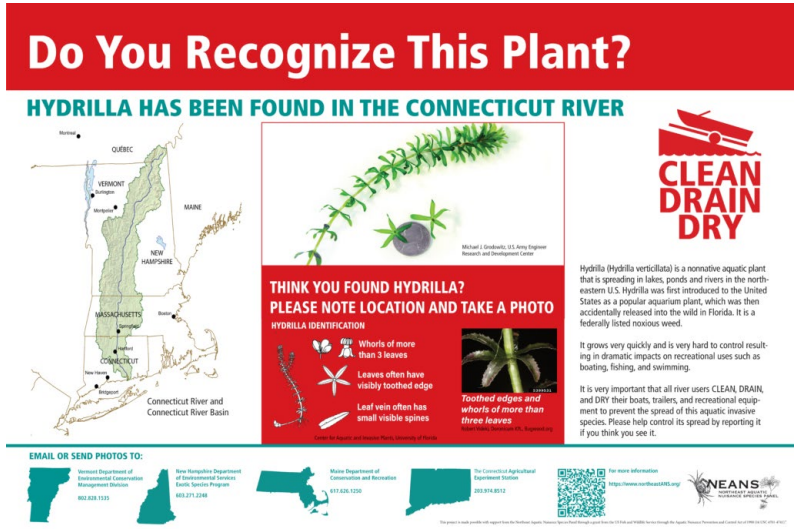
- Competitiveness with native plants
- Turion production dynamics
- Hybridization potential
- Environmental impacts on growth
  - Temperature
  - Salinity
  - Light





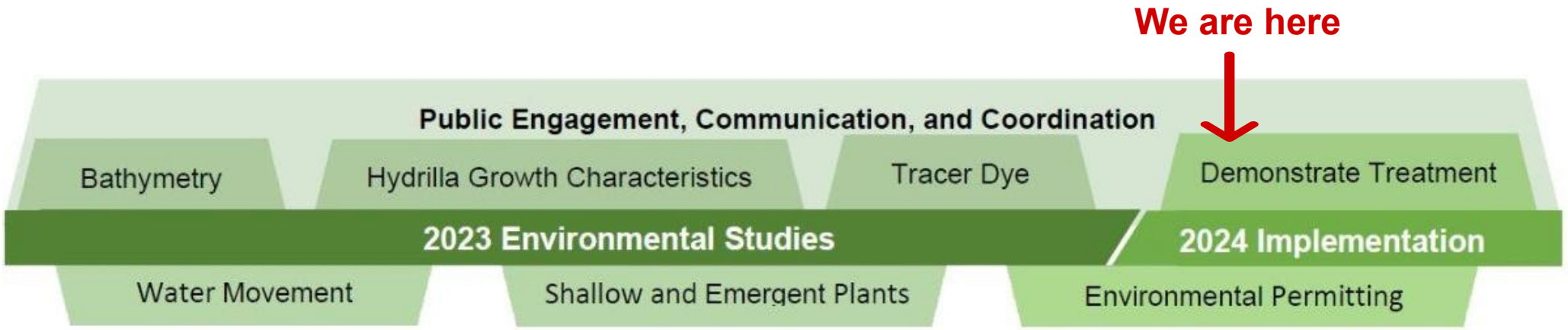
6) END-USE GUIDANCE/TECHNOLOGY TRANSFER

- Master guidance document
- Resource management workshops
- Containment and management protocols



WHERE ARE WE NOW?

1. NEPA Environmental Assessment
2. Demonstrate herbicide treatment: what, where, and when



HERBICIDE APPLICATION

Application:

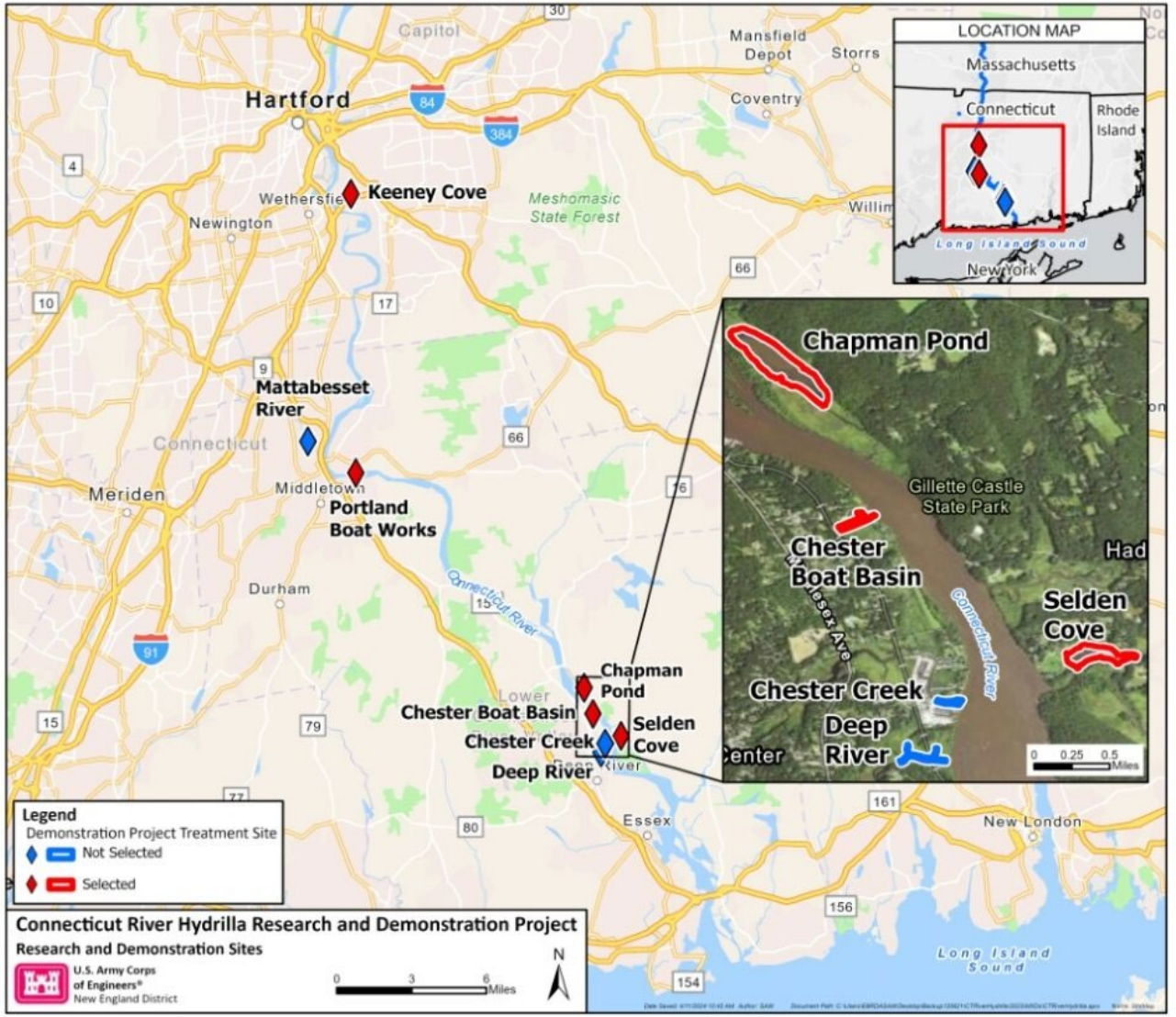
- Same injector-hose method used for dye studies
- Applied by CTDEEP-certified applicators

Concentration: EPA-approved label rate

Site	Selected Herbicide	Treatments
Chapman Pond	florpyrauxifen-benzyl	1
Chester Boat Basin	diquat dibromide & dipotassium of endothall	1
Keeney Cove	florpyrauxifen-benzyl	1
Portland Boat Works	diquat dibromide	2
Selden Cove	dipotassium of endothall	1

WHAT WILL HAPPEN AND WHERE?

- **What:** USACE will apply EPA-registered aquatic herbicides at five selected sites
- **Where:**
  1. Selden Cove (16 acres)
  2. Chester Boat Basin (4.4 acres)
  3. Chapman Pond (66 acres)
  4. Portland Boat Works (0.6 acres)
  5. Keeney Cove (70 acres)



2024 SCHEDULE: WHEN AND WHERE?

Herbicide Application Schedule

- Subject to change – dependent on water levels in river, flooding, storm events, etc.
- Up-to-date schedule will be posted and maintained on USACE project website

(website link available on last slide)

*Pending Flood Stage in the River & CT DEEP permits – high water or delayed permits will alter the schedule

*Herbicide Treatment Schedule - CT River Hydrilla - July/Aug 2024							
Site	**July 8-12**	**July 15-19**	**July 22-26**	**July 29 - Aug 2**	**Aug 5-9**	**Aug 12-16**	**Aug 19-23**
Keeney Cove	treatment						
Chapman Pond			treatment				
Selden Cove				treatment			
Chester Boat Basin					treatment		
Portland Boat Works					treatment		treatment

Post-treatment monitoring commences at each site through the fall 2024 – and summer/fall 2025

POST-TREATMENT MONITORING

1. Post-treatment monitoring focus
2. Development of post-treatment monitoring plan
3. When?
4. Why?

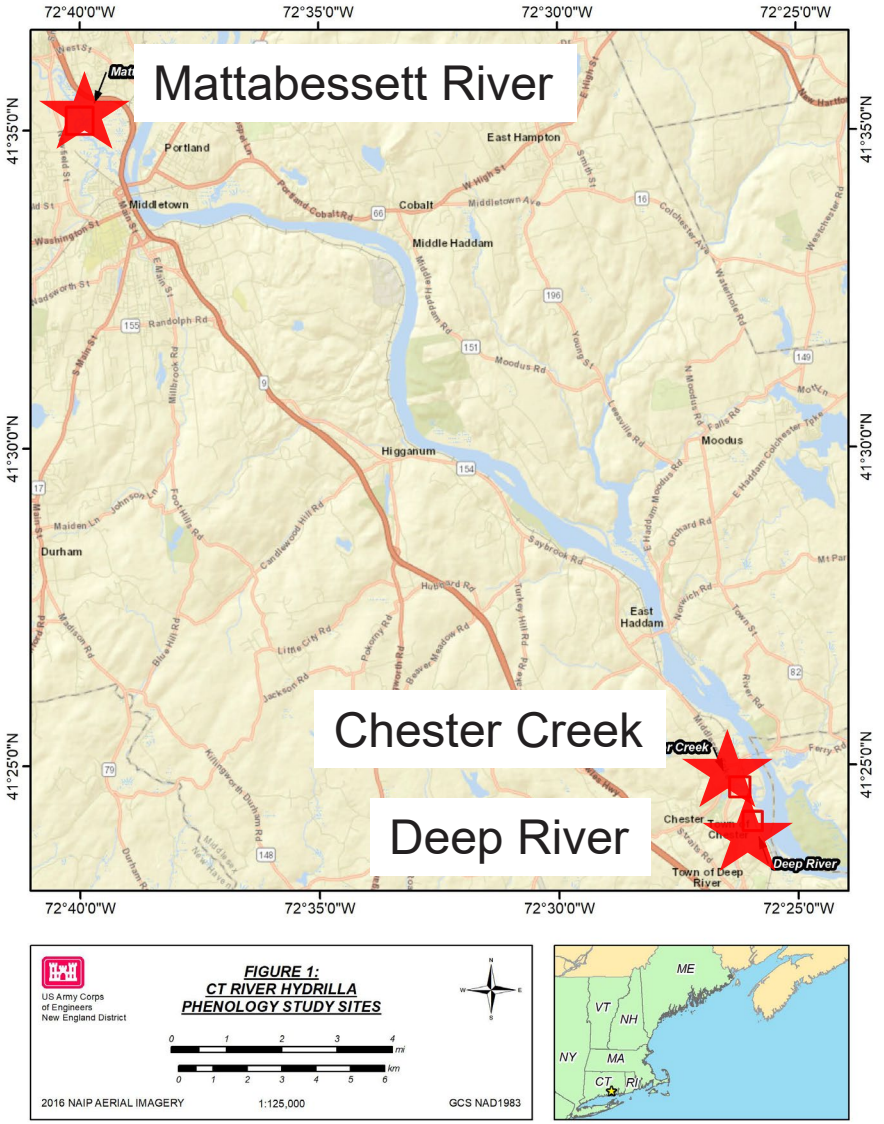
POST-TREATMENT MONITORING FOCUS

- Herbicide concentrations
- Native plant response
- Hydrilla suppression
- Water chemistry
- Hydrodynamics (dye study)
- Threatened and endangered plant species monitoring
- Post-treatment monitoring at each of the five treatment sites, **for up to two years** (i.e., two growing seasons)

Air boat used to conduct plant surveys at low water levels - USACE

CONTINUED FIELD SAMPLING EFFORTS

- Deep River, Chester Creek, and Mattabesset River: continued phenology sampling in 2024
- Obtain baseline and biological information about hydrilla strain unique to CT
- **These locations could become future treatment sites**



TECHNOLOGY TRANSFER

USACE will analyze the demonstration project data, develop a treatment plan, and share the plan with agencies and organizations working to control hydrilla:

- Federal agencies / regional task forces
- State agencies
- Municipalities
- Marina operators
- Non-profits
- Lake associations
- Permitted individuals

There will be additional public meetings to share the demonstration project results

OPEN DISCUSSION / QUESTIONS?

Questions about hydrilla invasion on the CT River or the USACE Demonstration Project?

- Public concerns about priorities for management actions?
- Gather feedback on proposed actions
- Other questions?

NAE District hydrilla website:
https://www.nae.usace.army.mil/Missions/Projects-Topics/Connecticut-River-Hydrilla/

NAE District project CT River demonstration project Storymap:
https://storymaps.arcgis.com/stories/ac89d2534fa0490db6c8718191411bd1

Point of Contact Email:
CTRiver-Hydrilla@usace.army.mil

CT RIVER HYDRILLA DEMONSTRATION PROJECT

Thank You!