CONNECTICUT RIVER HYDRILLA PROJECT: STRENGTH IN REGIONAL COLLABORATION

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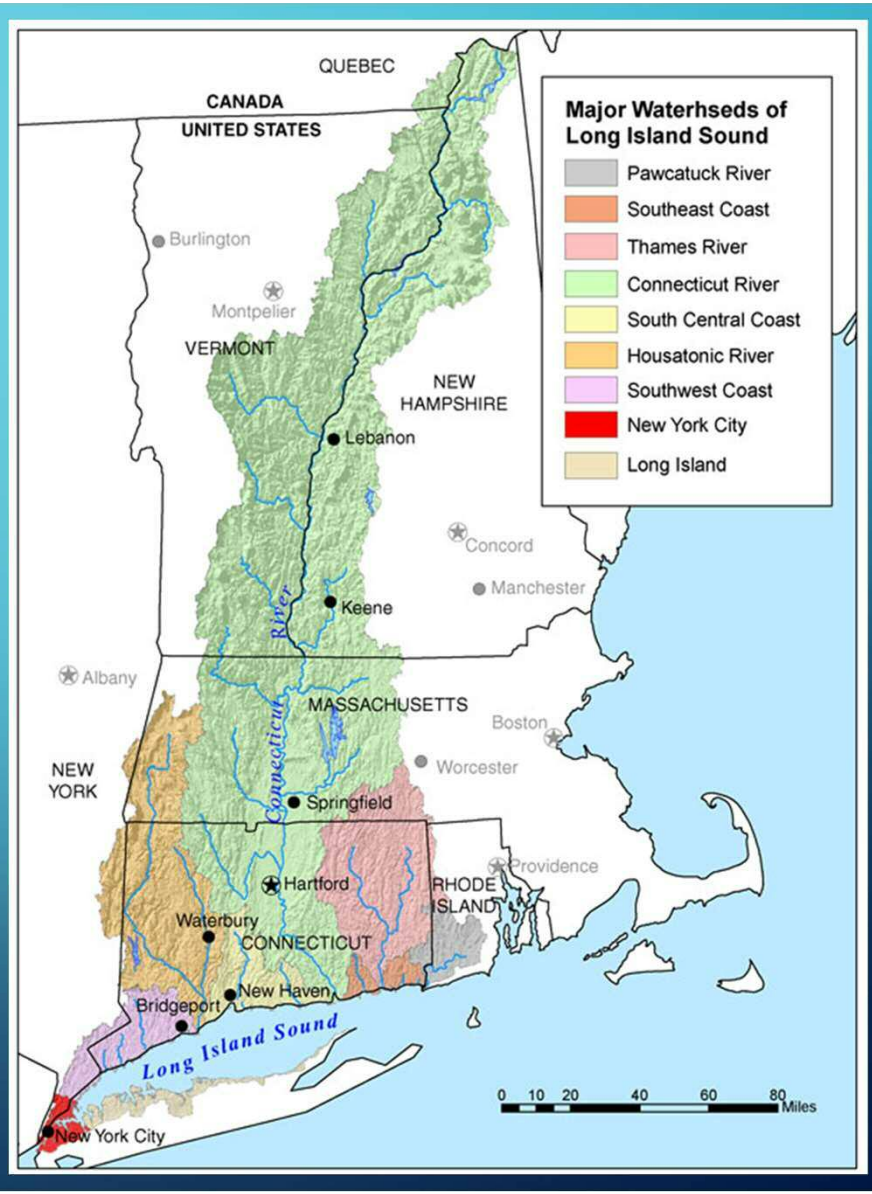
OVERVIEW

- Background
- Genetic testing
- CT River Task Force
- Five Year Management Plan
- Surveys
- AIS Monitors
- Treatment

BACKGROUND

- Hydrilla was discovered in the CT River in 2016
- 2018 Survey conducted by CAES in upper 2/3rds of river
- 2019 Survey conducted by CAES and RiverCOG in lower 1/3rd of river
- Hydrilla north of Long Island Sound to just over Massachusetts border at Agawam



GENETIC TESTING

- Hydrilla found in the CT River was very robust in appearance relative to other specimens of monoecious hydrilla
- Genetic testing funded by NEANS Panel revealed it is a distinct strain of hydrilla

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Evidence for a genetically distinct strain of introduced *Hydrilla verticillata* (Hydrocharitaceae) in North America

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ABSTRACT

The invasive aquatic weed hydrilla [*Hydrilla verticillata* (L.f.) Royle] exists in North America as two genetically and morphologically distinct strains, with the dioecious strain mostly found in the southern United States and the monoecious strain being more northern, including previously known sites in Connecticut. In 2016 an additional hydrilla population was located in a portion of the Connecticut River in Hartford County, Connecticut, with unusual morphological features relative to other Connecticut populations. Hydrilla plants from this population were subjected to genetic testing, and their molecular sequences for one chloroplast (*trnL-F*) and two nuclear gene regions (internal transcribed spacer and phytoene desaturase) were compared against published data. The Connecticut River hydrilla plants are distinct from all known North American plants, representing a novel introduction, likely from northern Eurasia. The genetic novelty of this recent introduction may present additional ecological and management challenges beyond what has been encountered for hydrilla to date.

Key words: aquatic plants, invasive species, ITS, molecular phylogenetics, *PDS*.

INTRODUCTION

Hydrilla verticillata (L.f.) Royle ("hydrilla") is a submersed aquatic angiosperm of ecological and economic importance. Globally it is among the most noxious invasive aquatic plants because of its ability to adapt to a variety of

the dioecious strain resembles plants from India (Madeira et al. 1997, 2007, Benoit et al. 2019) and also matches plants more recently introduced to South America (L. C. Lucio, unpub. data; Zhu et al. 2017, Benoit et al. 2019).

Molecular data from the chloroplast *trnL-F* marker initially established the phylogenetic distinctness of monoecious and dioecious strains in North America (Madeira et al. 1997, Madeira et al. 2007). Subsequent data from the nuclear ITS and *PDS* regions additionally documented the existence of widespread hybridization among hydrilla lineages worldwide, including many native populations in Eurasia and Australia (Benoit et al. 2019). Combined nuclear and chloroplast data present clear evidence that hydrilla plants worldwide harbor considerable genetic variation, which is correlated to some extent with biogeography (Benoit et al. 2019). Both the monoecious and dioecious strains in North America are predominantly triploid (Harlan et al. 1984, Langeland 1989), and their molecular sequences likely reflect a past hybridization event involving parental lineages native to Asia (Benoit et al. 2019).

Specimen collection data support a native range for hydrilla that extends from Eurasia to Australia, and samples from these regions are genetically distinct and diverse (Pieterse et al. 1984, Madeira et al. 1997, Madeira et al. 2007, Zhu et al. 2015, Efremov et al. 2017, Zhu et al. 2017, Williams et al. 2018, Benoit et al. 2019). Isolated but long-established populations apparently also are native in central Africa, Ireland, and central Europe (Cook and Lüönd 1982, Madeira et al. 2007). In contrast, plants introduced to North and South America, South Africa, and New Zealand

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NEANS PANEL MEETING JUNE 3-5, 2019

- Springfield, MA
- Focus on hydrilla in the Connecticut River
- Afternoon workshop “Hydrilla Training”
- Followed by a day in the field lead by USACE

NEANS PANEL HYDRILLA TRAINING WORKSHOP

-**Connecticut River Hydrilla: survey efforts to date** Jim Straub, MA Department of Conservation and Recreation Greg Bugbee, CT Department of Environmental Services

-**How to use PIS, tuber bank monitoring, and hydroacoustic mapping** Dean Jones, University of Florida

-**Big system monitoring strategies** Chris Doyle, SOLitude Lake Management

-**Treatment strategies and considerations** Mike Greer, US Army Corps of Engineers, Buffalo District

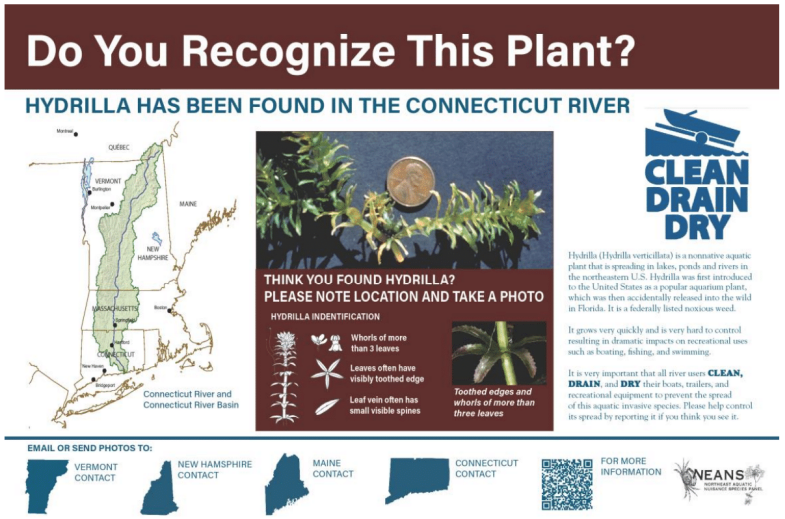
-**Outreach and education as a management tool** Catherine McGlynn, NY State Department of Environmental Conservation

-**Hydrilla in the Connecticut River: impacts in the Northeast and the Lake Champlain Basin** Meg Modley, Lake Champlain Basin Program

HYDRILLA WORKSHOP: DISTRIBUTION OF OUTREACH MATERIALS

- Designed and funded by NEANS Panel

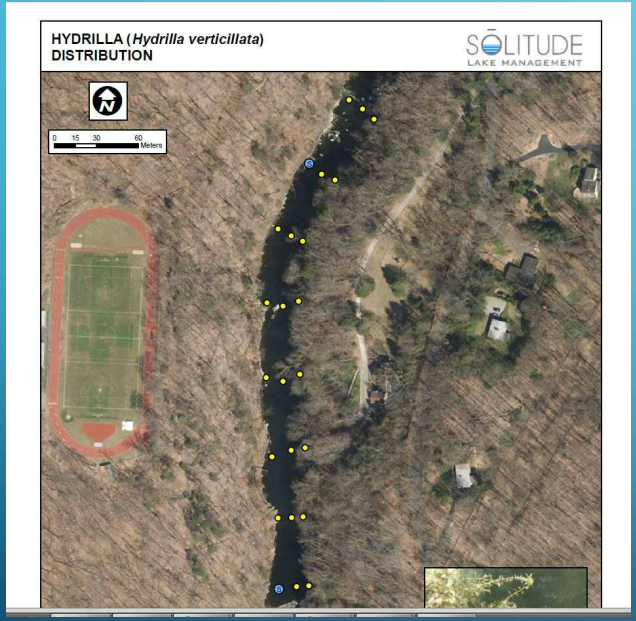
Consistent outreach materials created



Consistent Hydrilla survey techniques with US Army Corps of Engineers assistance

- June 2019 NEANS Panel meeting USACOE came to assist in developing consistent survey protocol for Connecticut River Hydrilla population – reviewed survey tracking software options
- States agreed to survey the entire River (50 meter overlay shared with all state partners) every 200 meters and every 50 meters when positive specimen ID.

FIELD TRAINING FOR AQUATIC PLANT SURVEYS

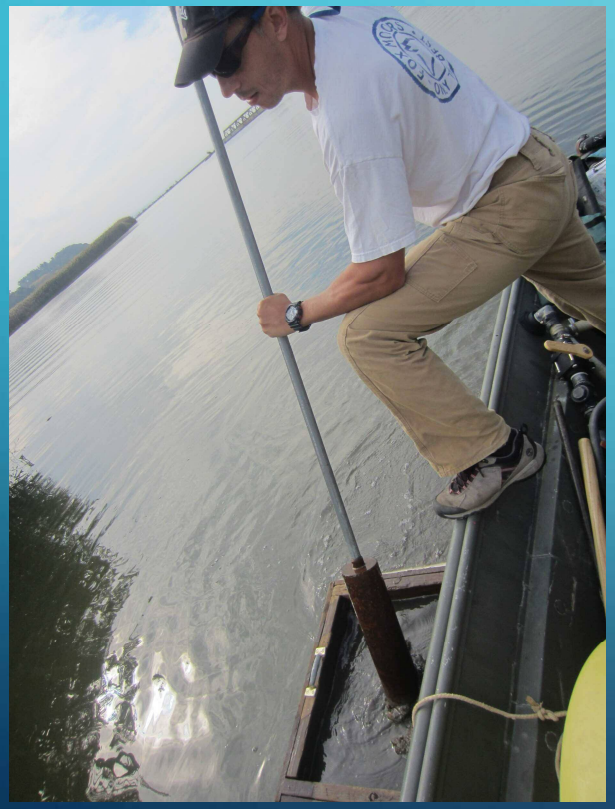


FIELD TRAINING: TUBER DENSITY MONITORING

Consistent Hydrilla survey techniques with US Army Corps of Engineers assistance

- States agreed to conduct presence/absence tuber sampling where populations are found. Discussed tuber sampling equipment with USACOE. More intensive tuber sampling will be conducted where management is considered.

FIELD TRAINING FOR TUBER DENSITY SURVEYS

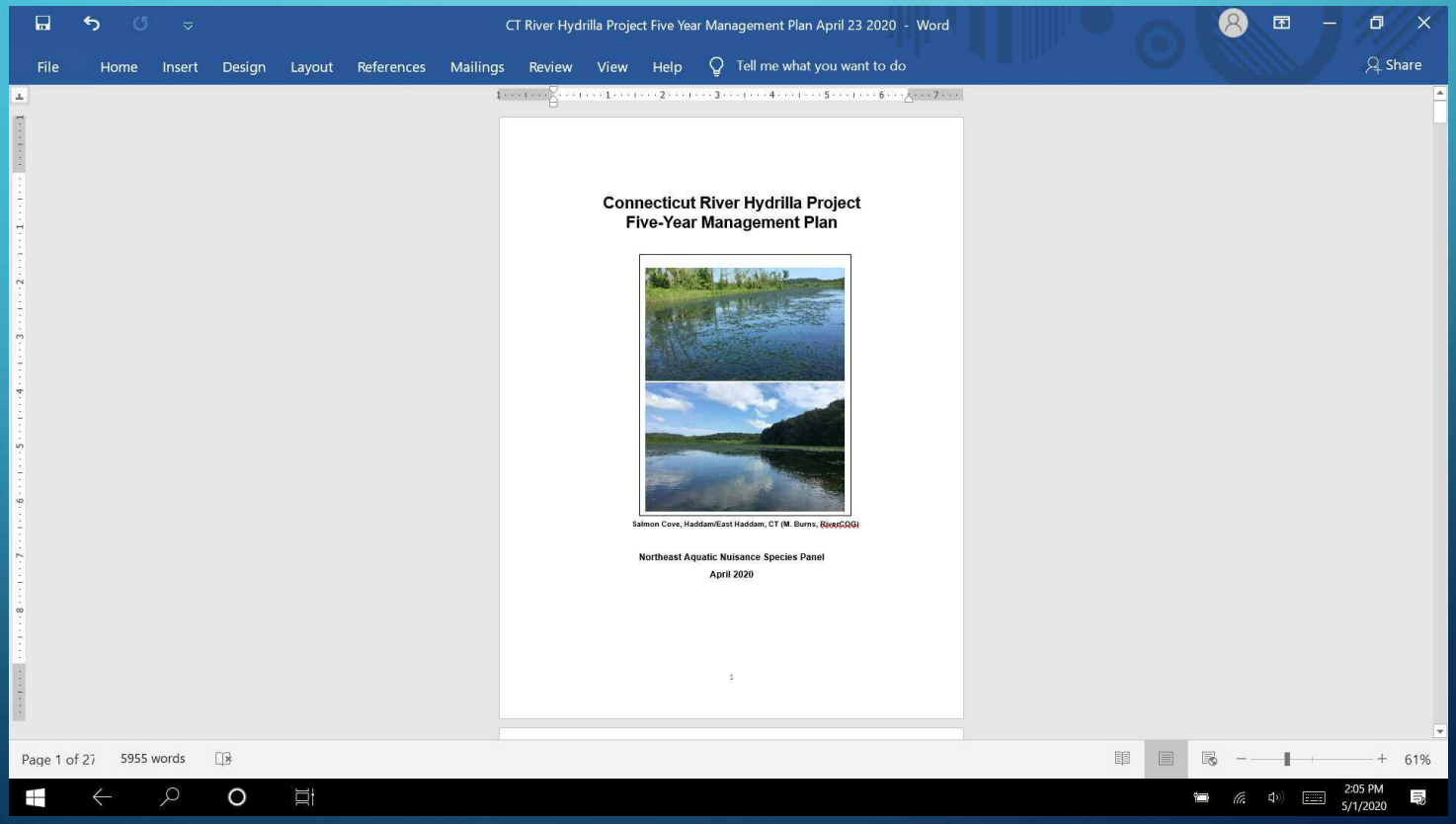


CONNECTICUT RIVER HYDRILLA TASK FORCE

- NEANS Panel
  - Panel Coordinator
  - CAES
  - MA DCR
  - NH DES
  - NYS DEC
  - VT DEC
  - LCBP

- CT DEEP
- USACE and USFWS
- Connecticut River Conservancy, Lower Connecticut River COG, Connecticut Sea Grant

CT RIVER HYDRILLA PROJECT FIVE-YEAR MANAGEMENT PLAN



2020 SURVEY

- September 21st
- Upper 2/3rds of Connecticut portion of CT River
- 5-7 boats
- 12-15 Task Force members
- Combination of point intercept and polygon methods
- Main stem and select coves and inlets

2020 SURVEY

- USFWS Jacob Cochran is designing a data collector app for the survey
- Each team will have a tablet with the app
- MA DEP David Wong will conduct data analysis
- NYSDEC AIS Team is creating GIS grids with intersect points for survey sampling

AIS MONITORS PROGRAM

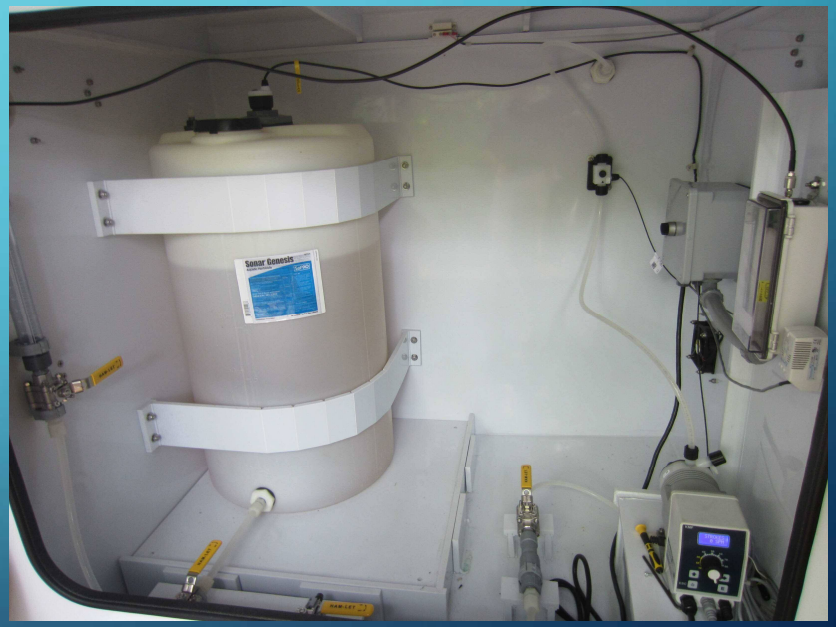
2021-2022

- Proposed funding source- NFWF Long Island Sound Futures Grant
- Monitors at 5 to 7 boat launches on Connecticut River
- Tablets with AIS Monitor Program app (AMPA)/standardized survey
- Education and outreach materials provided by NEANS Panel
- Memorial Day Weekend to Columbus Day Weekend
- Oversight provided by Connecticut River Conservancy

PLAN: MANAGEMENT OPTIONS

- No action
- Physical
- Biological
- Chemical

- NEANS Panel recommendation: chemical



TREATMENT

Pilot Study for Chemical Treatments

- Proposed Funding Source: $100k Woodard and Curran Impact Grant submitted in March
- Three cove inlet locations/One control site

ANNUAL REPORT

- Summary of work performed by the Task Force will be issued at the end of each project year with recommendations for the following season

- Adaptive management is key

POTENTIAL FUTURE PLANS

- Expansion of AIS monitor program
- Full scale treatment
- Habitat suitability modeling
- Analysis of boater movement and AIS awareness
- Research on non-target impacts


The Middletown Press


Thank you!
Connecticut River Conservancy