



Hydrilla in the Connecticut River

Gregory J. Bugbee and Summer Stebbins

Invasive Aquatic Plant Program

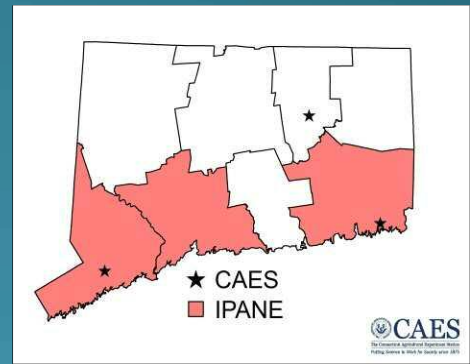
The Connecticut Agricultural Experiment Station

Hydrilla verticillata
(Hydrilla)

Photo by Judy Preston,
CT Sea Grant

Hydrilla

Hydrilla verticillata



Laurie Callahan



Turions



Five leaves to a whorl

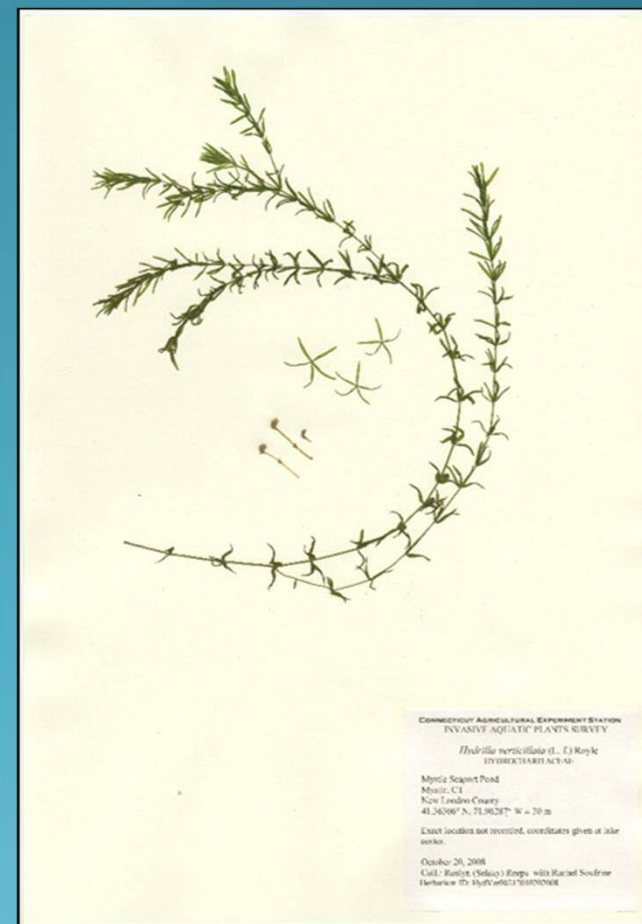
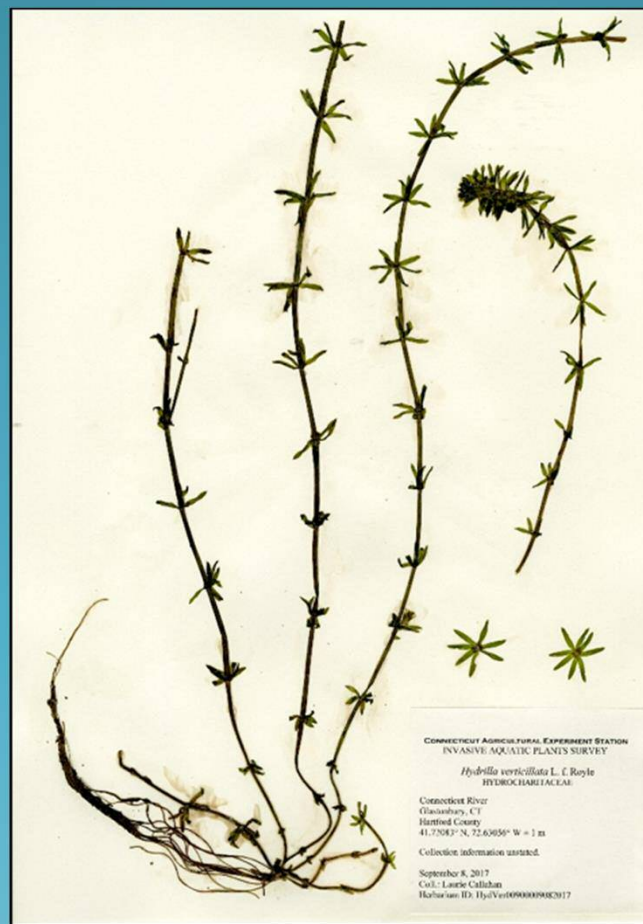
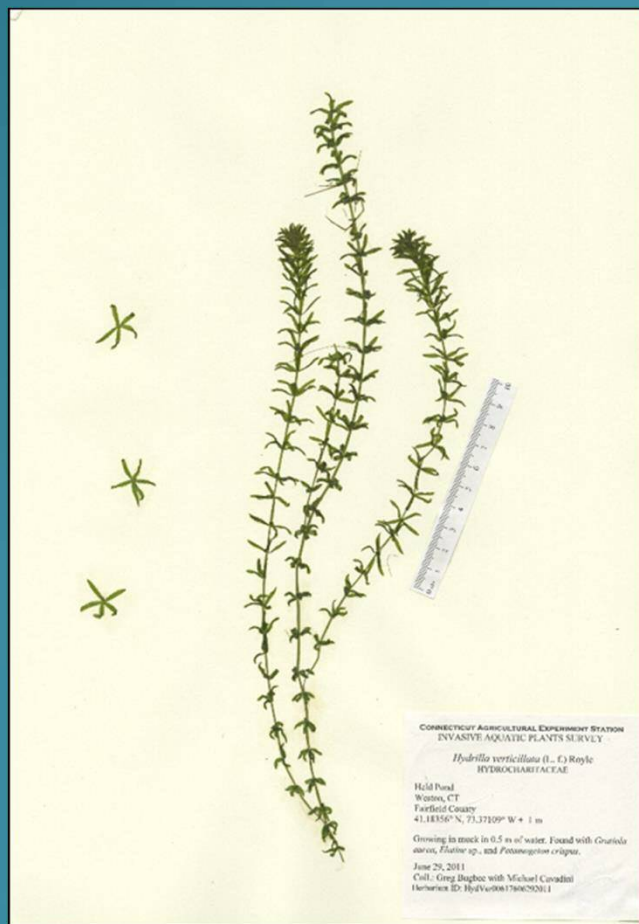


CAES IAPP

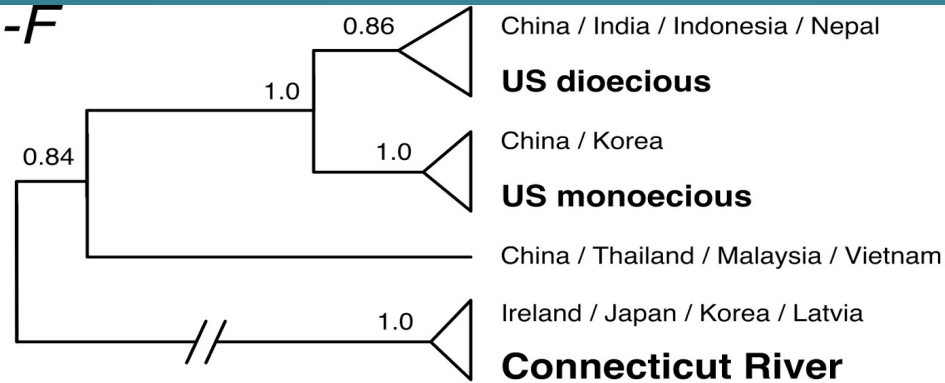


Tubers

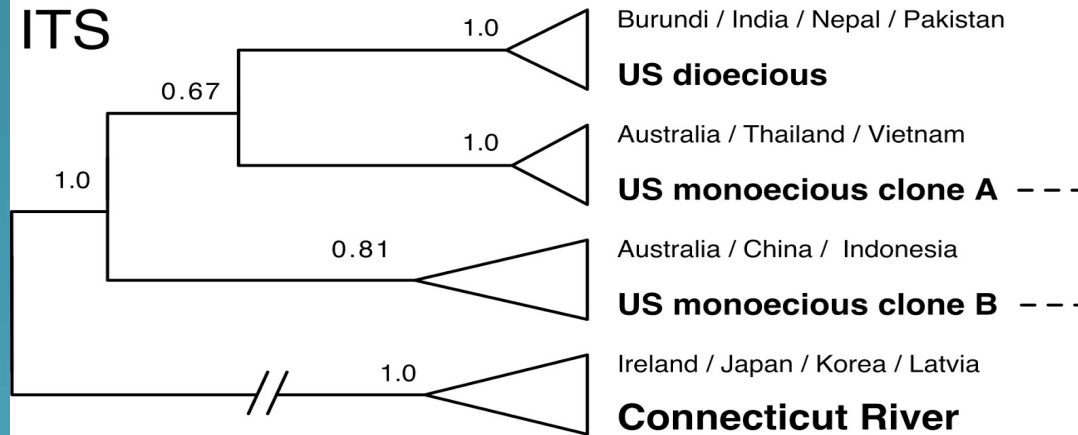




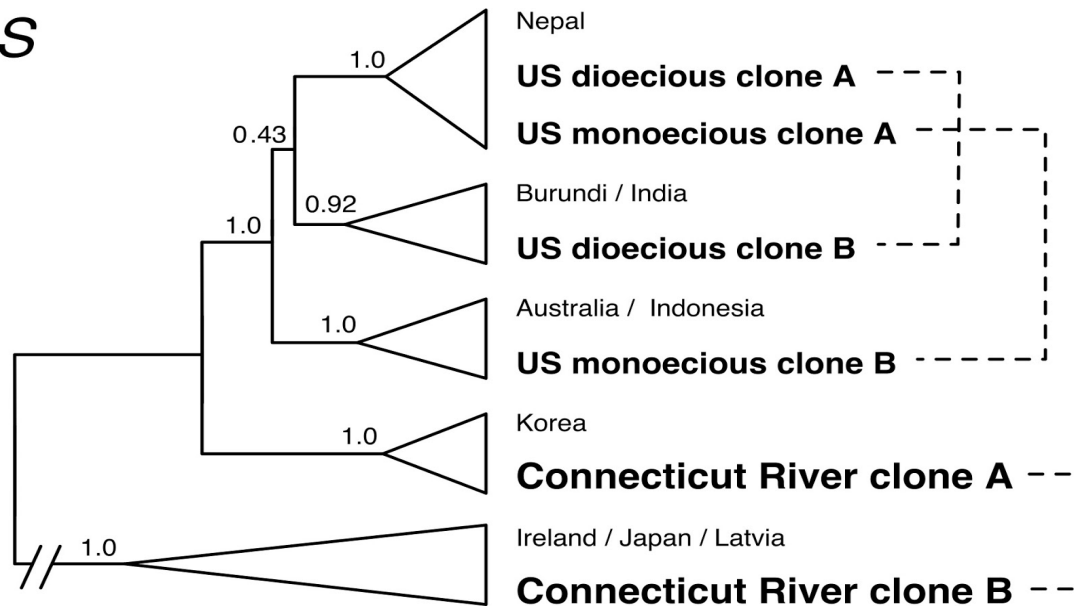
trnL-F



ITS



PDS



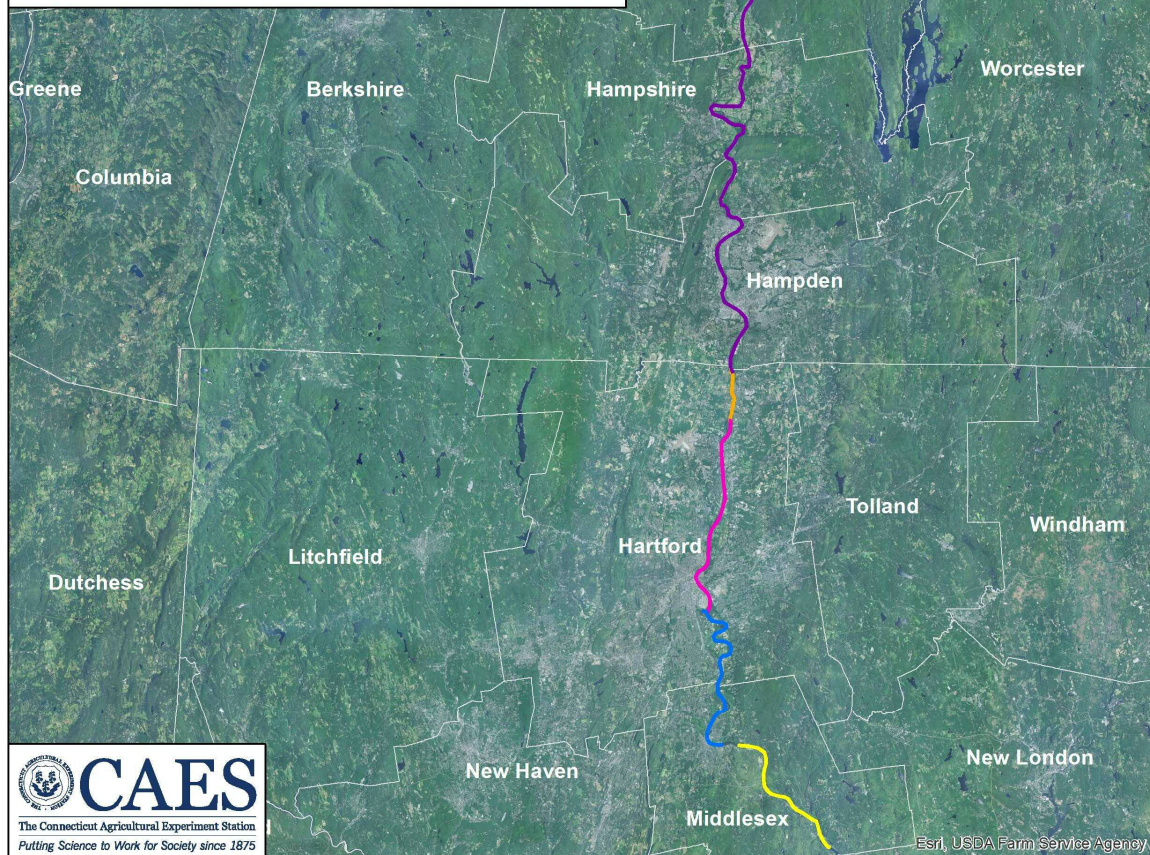
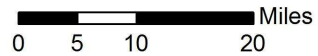
Hydrilla Survey Connecticut River

Fall 2018 Surveys

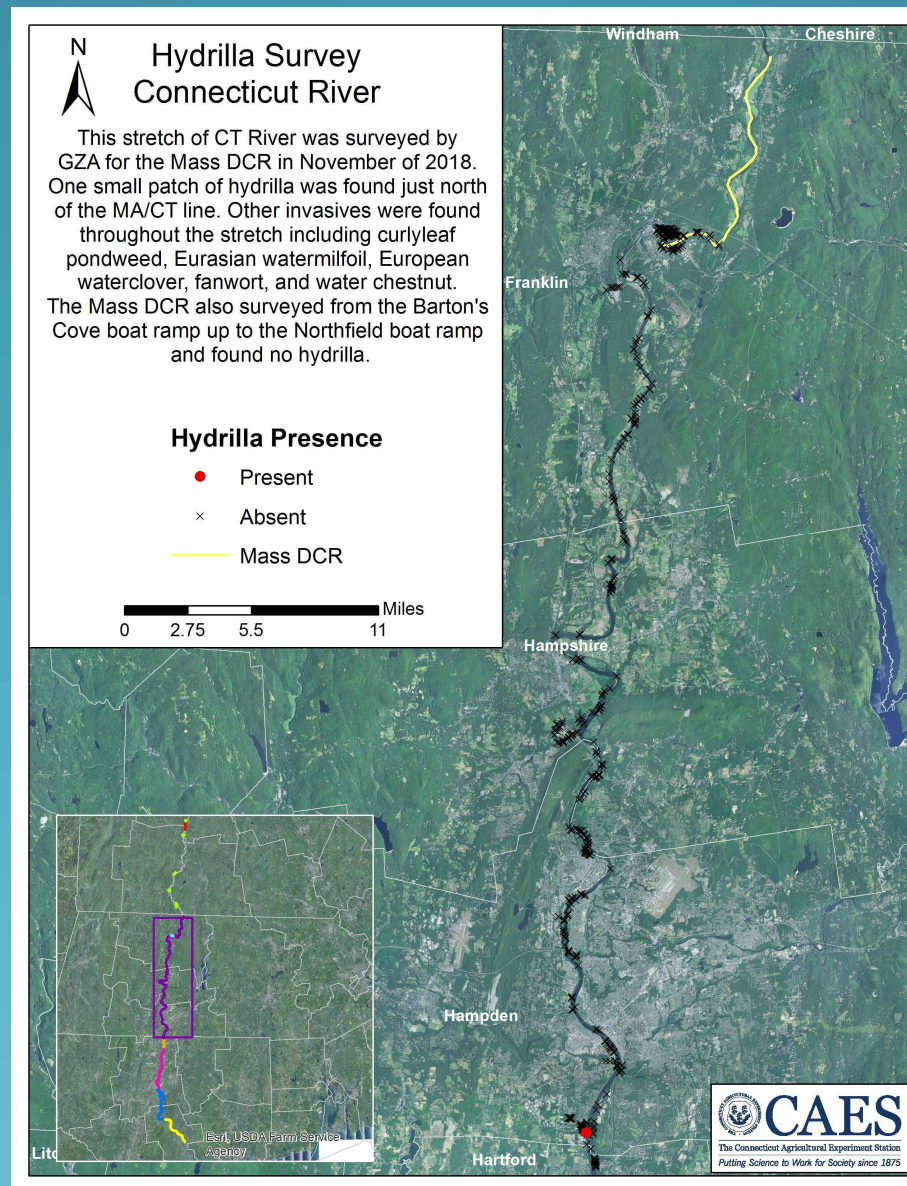
Surveyor

- Amy Smagula, NHDES; Meg Modley, LCBP
- GZA and Mass DCR
- Heidi Himes, USFWS; Dave Sagan, Silvio O. Conte*
- Kim Jensen, VTDEC*
- Margot Burns, RiverCOG; Judy Preston CT Sea Grant*
- Greg Bugbee, CAES; Margot Burns, RiverCOG*
- Laurie Callahan, SEVTAIS Project
- Laurie Callahan; Ann Bove

*Hydrilla Found



Hydrilla only found along MA/CT border



Hydrilla Survey Connecticut River

Surveyed on August 30, 2018
By Margot Burns and Judy Preston

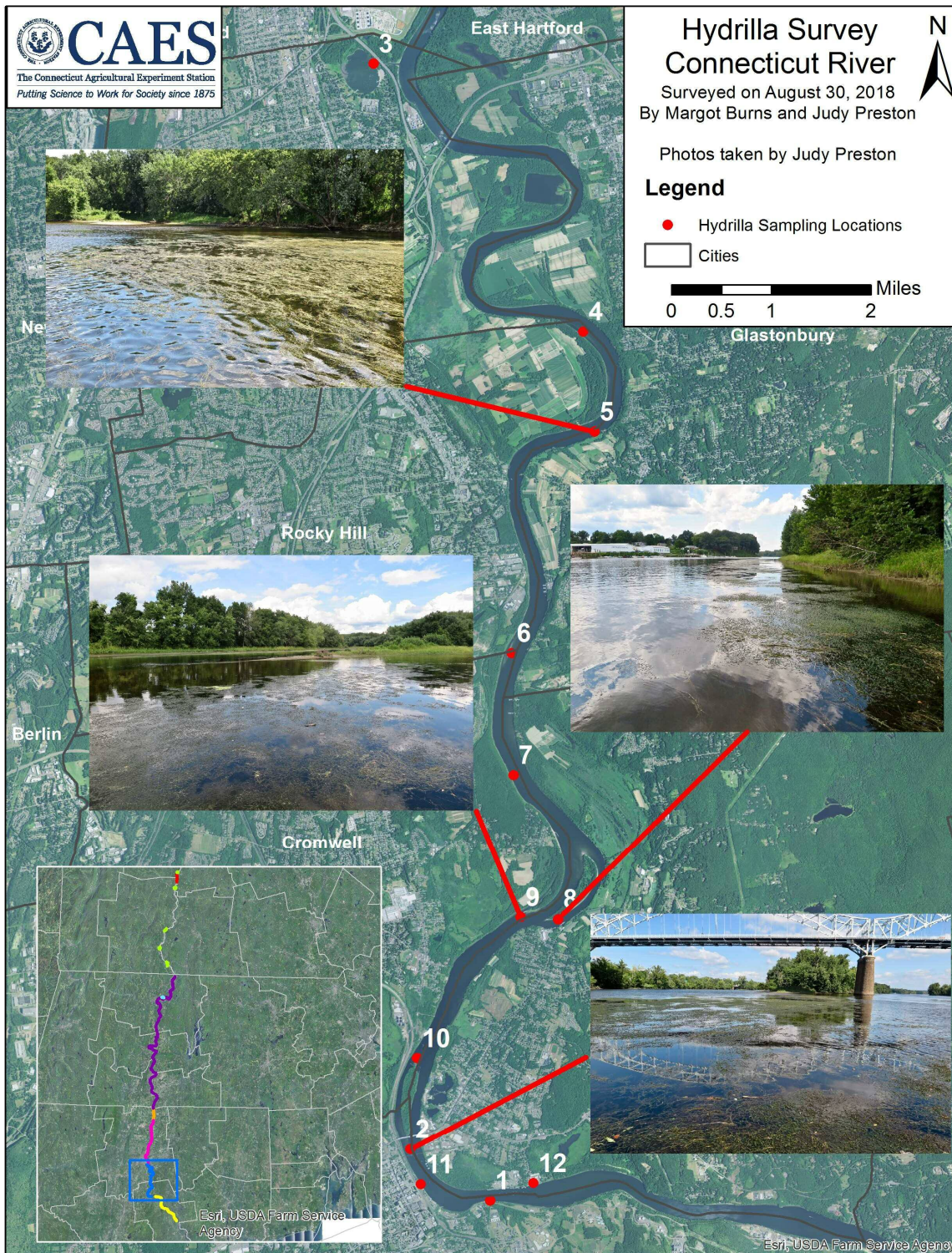
Photos taken by Judy Preston

Legend

● Hydrilla Sampling Locations

□ Cities

0 0.5 1 2 Miles



Keeney Cove - East Hartford, CT

Laurie Callahan, 6/26/18



Hydrilla Survey Connecticut River

Surveyed on October 1-2 and 31, 2018
By Greg Bugbee, Margot Burns,
Summer Stebbins, and Riley Doherty



Legend

▲ Collection Point

□ Cities

Hydrilla Abundance

× Zero

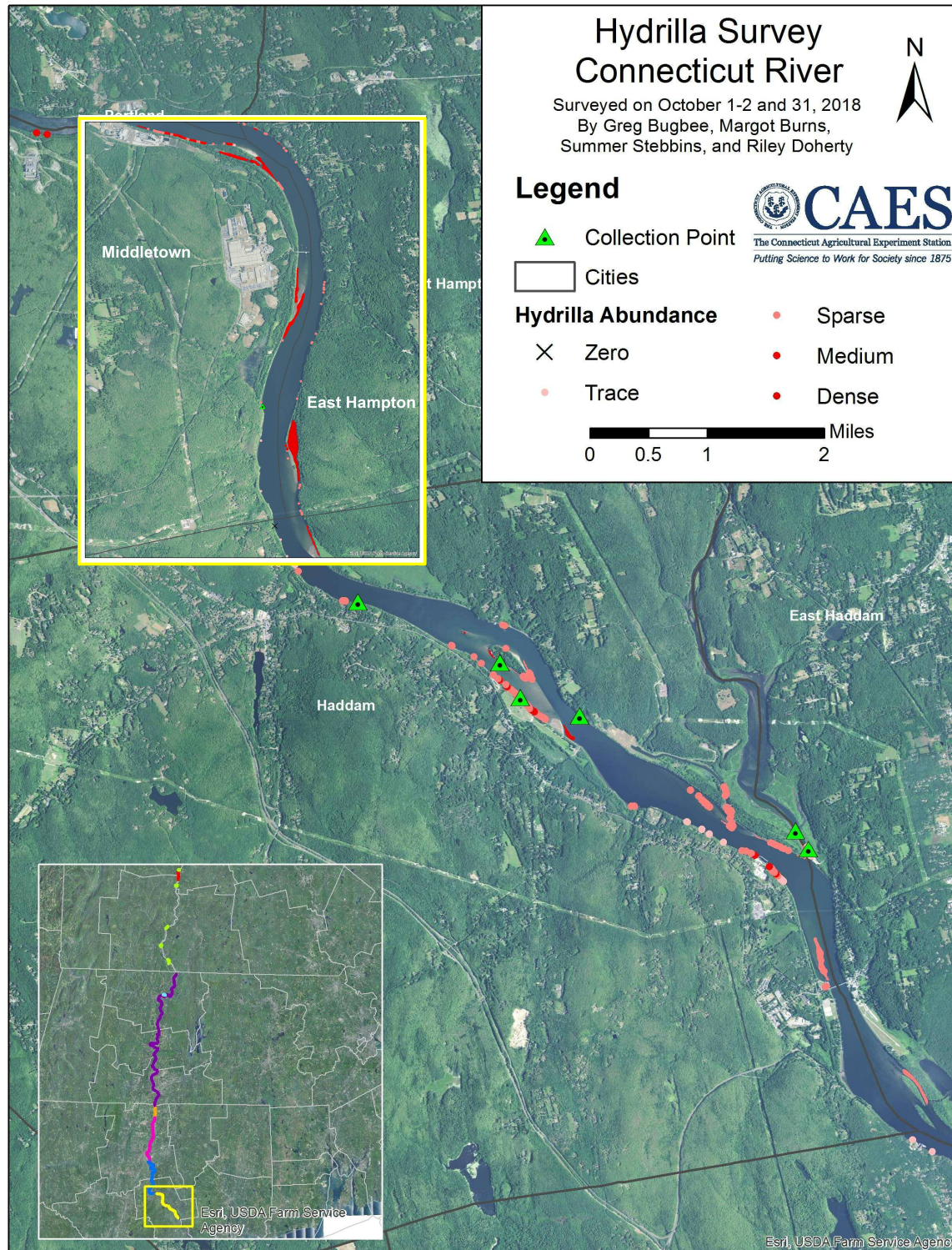
● Trace

● Sparse

● Medium

● Dense

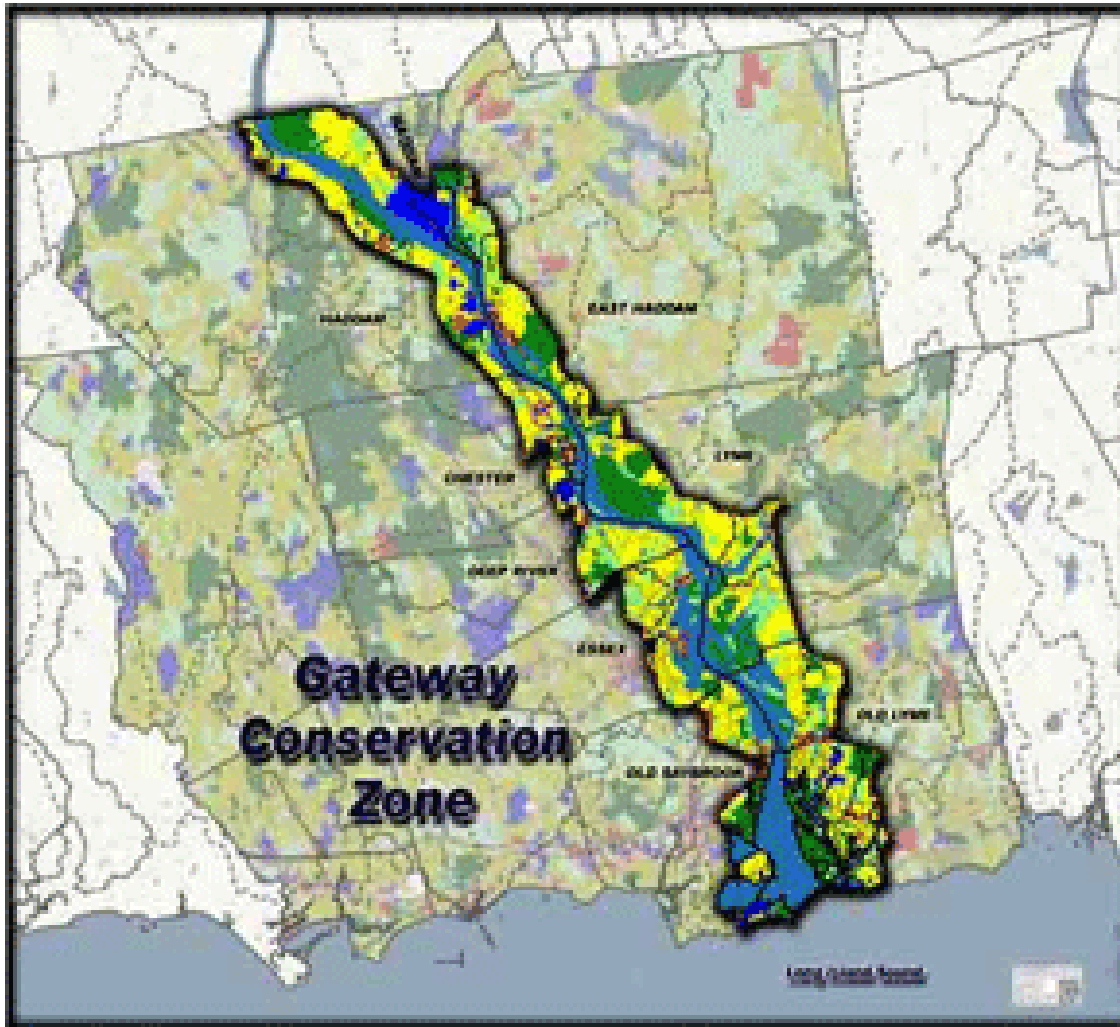
0 0.5 1 2 Miles



East Hampton, CT



Gateway Zone



- Shoreline and Major Coves
- 31 miles of survey

**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*) 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 (ITS and *PDS*) 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: hydrilla, invasive species, aquatic plants, Hydrocharitaceae, ITS, *PDS*, molecular phylogenetics.

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 environments and outcompete native vegetation (Langeland 1996, Haller 2014). In North America, hydrilla consists of two 'strains', or 'biotypes': a monoecious strain and a dioecious strain, the latter comprising only female individuals in the introduced range (Ryan et al. 1995). Phylogenetic evidence from chloroplast (*trnL-F* region) and nuclear gene regions (internal transcribed spacer [ITS] and phytoene desaturase [*PDS*]) has demonstrated that the introduced hydrilla strains in North America were derived from two distinct sources. The monoecious strain most closely matches hydrilla plants that are native to Korea, whereas 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; Lucio LC, unpublished; Zhu et al., 2017).

Molecular data from the ITS and *PDS* regions have enabled a more thorough understanding of phylogenetic structure among hydrilla populations worldwide, including the two invasive North American strains. In addition to revealing extensive genetic variation, correlated to some extent with biogeography, the combined chloroplast and nuclear sequence data revealed a pattern of genetic mixture among geographically disparate populations, in both native and non-native ranges of hydrilla (Benoit et al. 2019). Both the monoecious and dioecious strains are predominantly triploid (Harlan et al. 1984, Langeland 1989), and their molecular sequences

Questions?

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