Hydrilla : A Brief Overview

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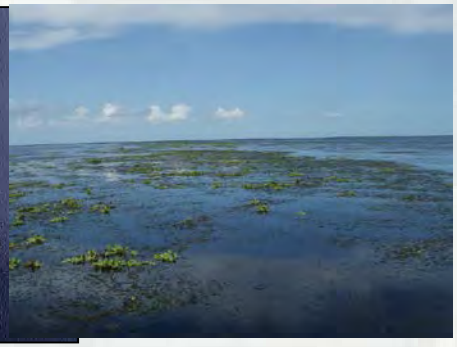
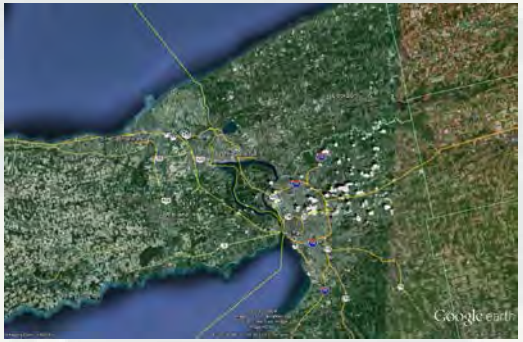




Hydrilla in FL has had a major Environmental and Economic Impact

(several hundred million dollars spent on mgmt.)

-this experience can inform and misinform other regions

PROBLEM STATEMENT

Hydrilla - “The Almost Perfect Weed”

- Ability to cover <u>thousands</u> of contiguous acres

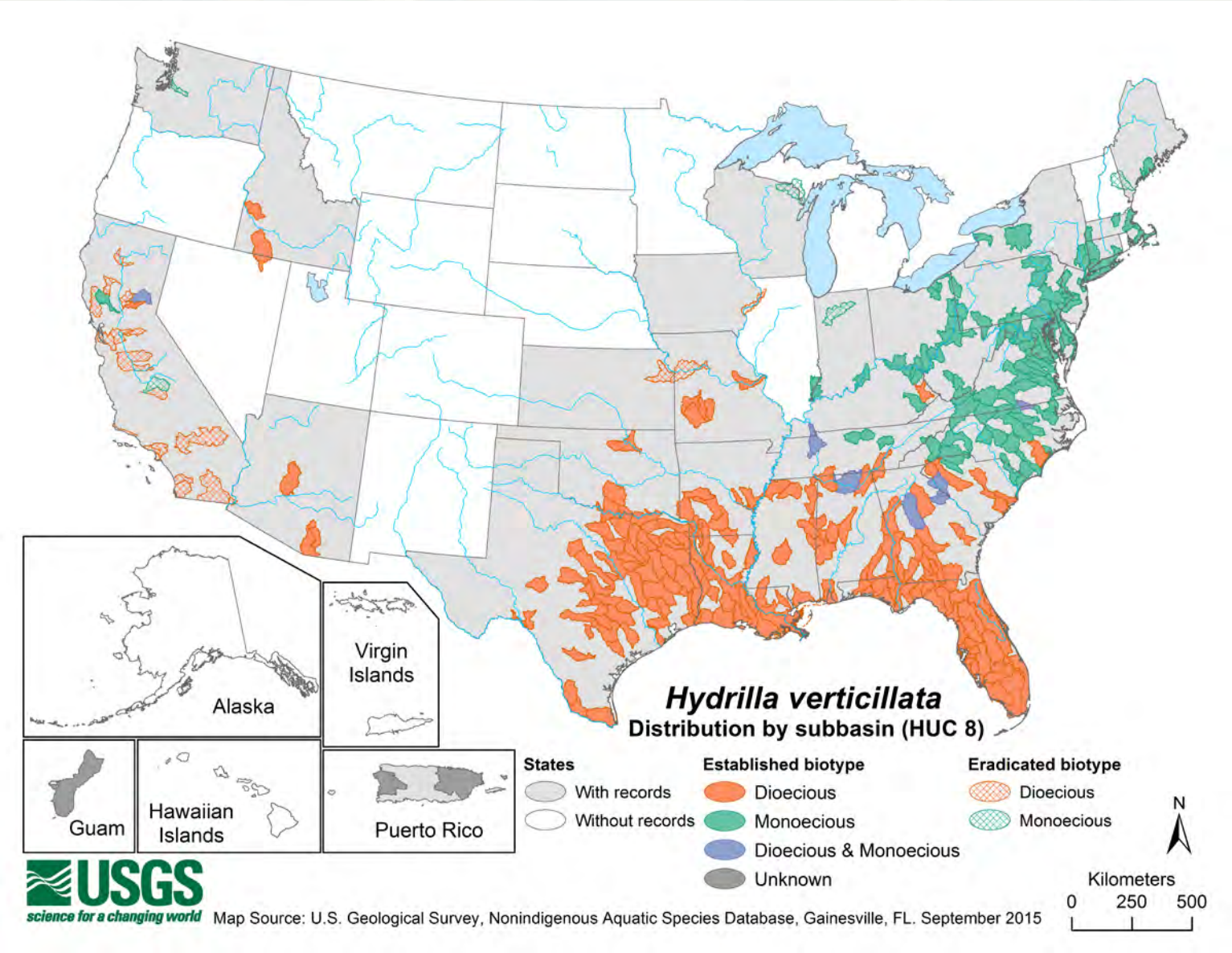
* propagates by fragments, turions, tubers

  - tubers can remain quiescent for years (seed)

* Low light and CO_2 compensation points

- High growth rates
- <u>Biotypes with different invasion strategies</u>

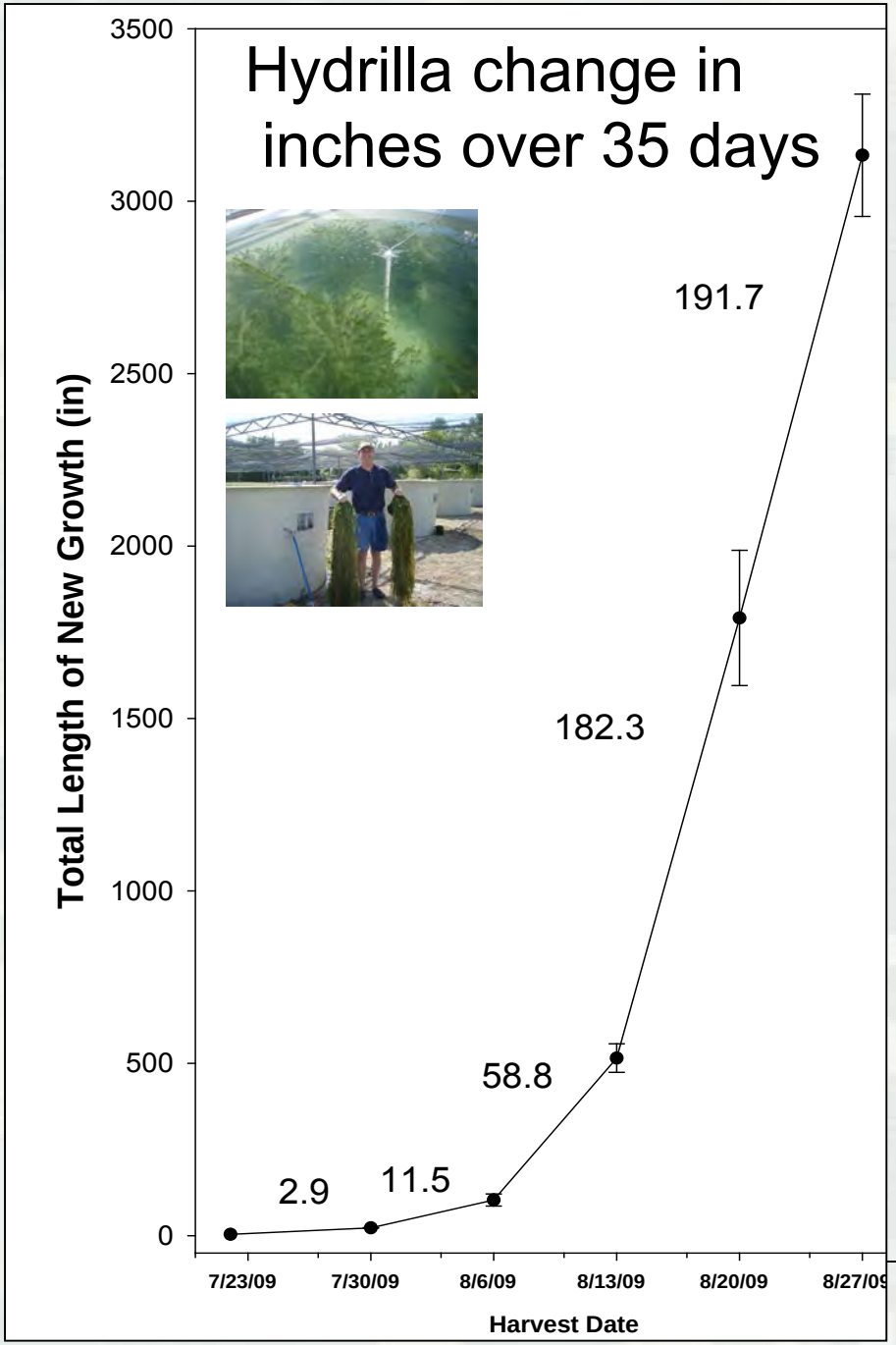
Two Biotypes of Hydrilla are Showing Distinct Invasion Patterns in the US



What Makes Hydrilla Unique Amongst Submersed Plants

Hydrilla can exploit new habitat

It often grows in areas that were previously non-vegetated



	Week 2	Week 3	Week 4	Week 5
Laterals	13 ± 6	43 ± 11	109 ± 29	127 ± 38
New Stems	6 ± 1	34 ± 13	71 ± 16	110 ± 63
Runners	1 ± 1	3 ± 2	9 ± 6	35 ± 20

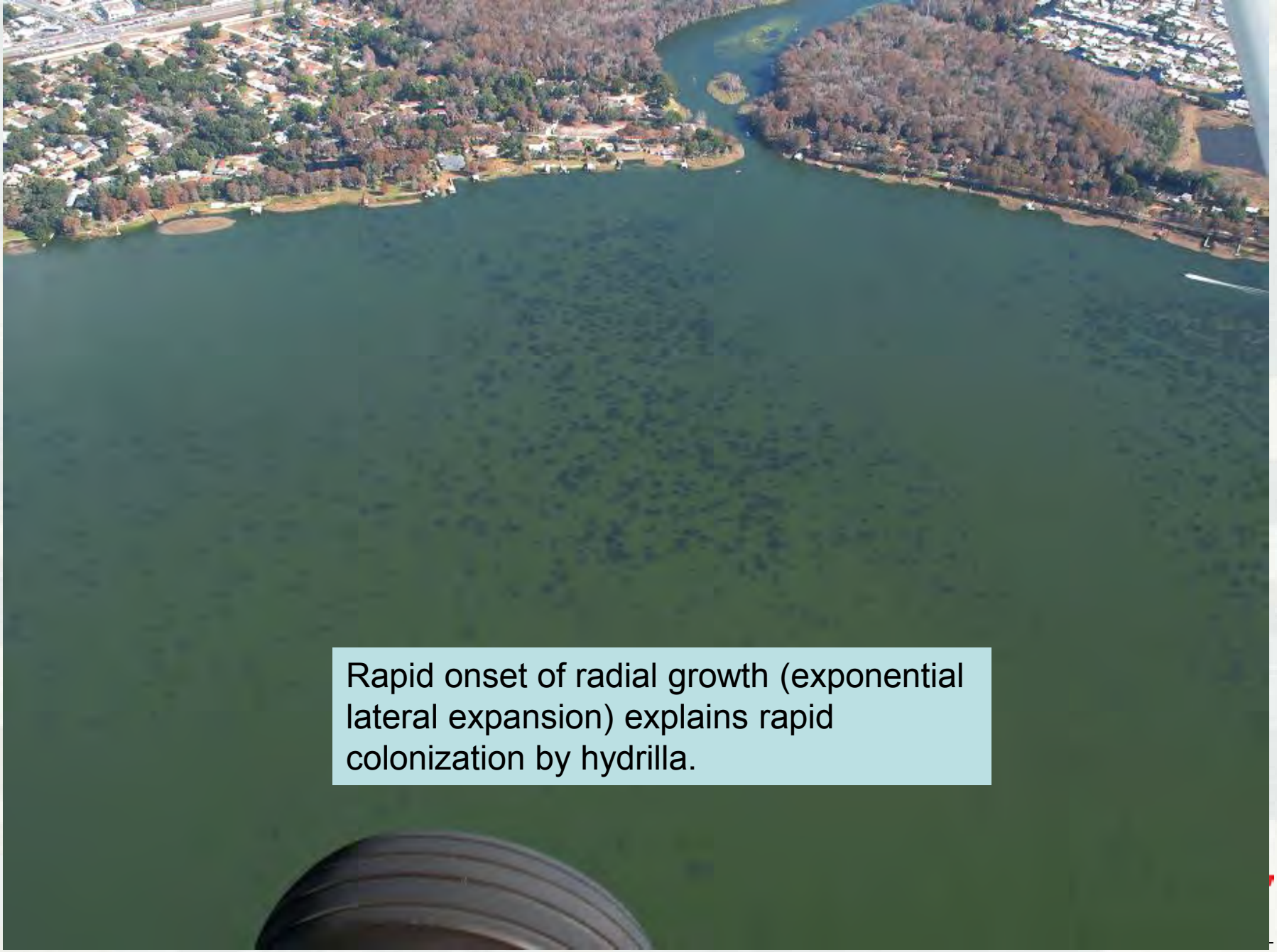
-A single 9 inch shoot resulted in over 3200 inches of growth in 5 weeks

Glomski and Netherland 2012 JAPM

~ 5000 ft of hydrilla / m²
~ 20 million ft / acre

ERDC

Innovative solutions for a safer, better world



Rapid onset of radial growth (exponential lateral expansion) explains rapid colonization by hydrilla.

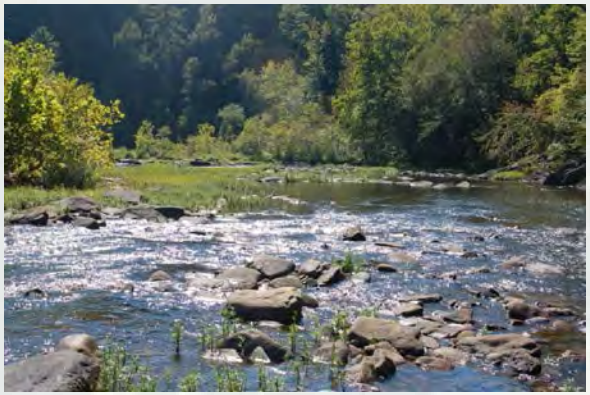
Why be concerned about Mhydrilla ?

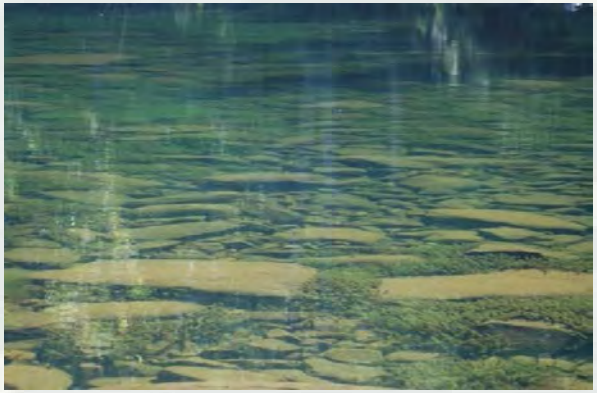
- There is no worldwide analogue to the 1000's of natural lakes in the Northeast and Midwest US
  - Well-established native SAV
  - Heavy human use & economic value
  - Well-established APM industry
    - Significant pressure to implement management
  - Strong disincentive for use of grass carp
- Do not add hydrilla to this mix

Colonization of Flowing Water

Mhydrilla has proliferated in Several Wild and Scenic Rivers

- Would have considered these low probability sites
- Considered a threat to unique macroinvertebrate and fish communities



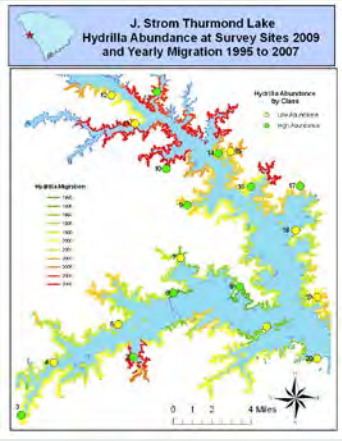


Other Flowing Water Sites:
-Potomac River, Ohio River, Cayuga Inlet, Erie Canal, Croton River
-Represent the most challenging management scenarios

Mhydrilla - a Reservoir Specialist ?

- Significant infestation of southern reservoirs-
  - GA, SC, NC, VA
  - High energy, water level fluctuation, turbidity
  - Tuber sprouting and growth synchronized to favorable environmental conditions
  - Adapted to drawdowns
  - Disturbance specialist ?
- Why don't we hear more about it ?
  - Heavy use of GRASS CARP in Mid-Atlantic Reservoirs (e.g. Duke Energy)

Dio and Mon Hydrilla in Guntersville, AL



Should we be concerned about northern reservoirs?

Are the Great Lakes Susceptible to Mhydrilla ?

- Concern has been limited to date, but consider the experience with elodea in Lake Baikal, Russia

  -Elodea has also become highly invasive in Alaska

"The spatial distribution of elodea in the coastal areas of Lake Baikal is affected by: temperature, soft silty sediments, water chemistry, water turbidity and the absence of wave turbulence down to the bottom.

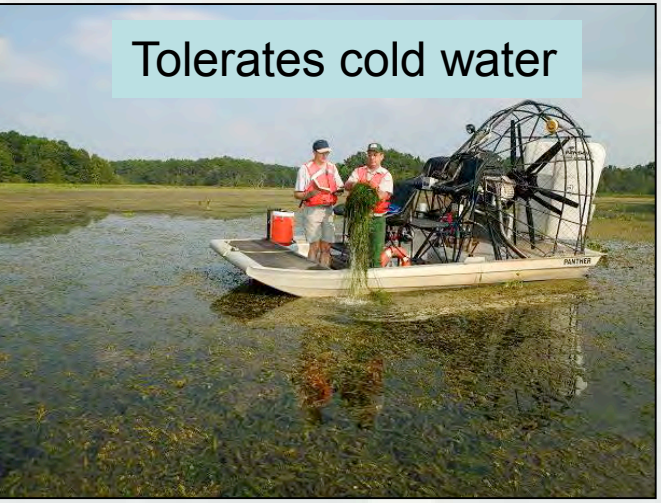
Roley and Newman (2008) – geographic proximity is the greatest predictor for spread of Eurasian watermilfoil

Improved Understanding of the Biology of Mhydrilla is important

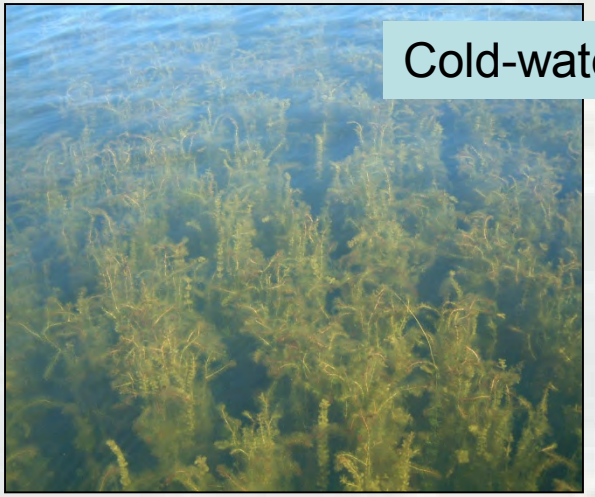
- **Mhydrilla** – Korean lineage (38th parallel)
  - Adapted to Northern Latitudes
  - Polyploid, exhibits heterosis (Benoit 2011)
- Strong recent focus on tuber biology (NCSU)
- Need to focus on factors that influence growth
  - Both Northern and Southern Regions
- Great Lakes Restoration Initiative –
  - funding provided for Great Lakes Mhydrilla risk assessment

The Key Question:

Does Mhydrilla Pose a Greater Threat to Northern Waters Than Other Invasive SAV ?



Hydrilla



Eurasian Milfoil

Curlyleaf Pondweed

We Don’t Know & We Can’t Really Know Without Letting Mhydrilla Spread and Compete

Field Observations and Lab Trials

- Mhydrilla is not “cold tolerant”
- Burst of growth when water temps & day lengths are favorable
  - Think Vallisneria and not Eurasian milfoil
- Timing of tuber sprouting & growth are not coupled
  - Buffalo, NY – early June = 90% sprouting
  - Plants do not emerge until later in June
- Mhydrilla is well-suited to northern climates due to life-history advantages
  - E.g. timing of tuber production and sprouting

Mhydrilla Summary

- Performance in glacial lakes/great lakes
  - **UNKNOWN** – 1000's of vegetated lakes = BIG TARGET
- Eradication Programs = **multiple** years
  - Easy to CONTROL but hard to MANAGE
- Disjunct Introductions remain **Likely**
  - Cayuga, Erie Canal, Croton, next ?
- Riverine Establishment = **> chance** of natural lake introduction
- Reliance on Grass Carp – Highly **unlikely**