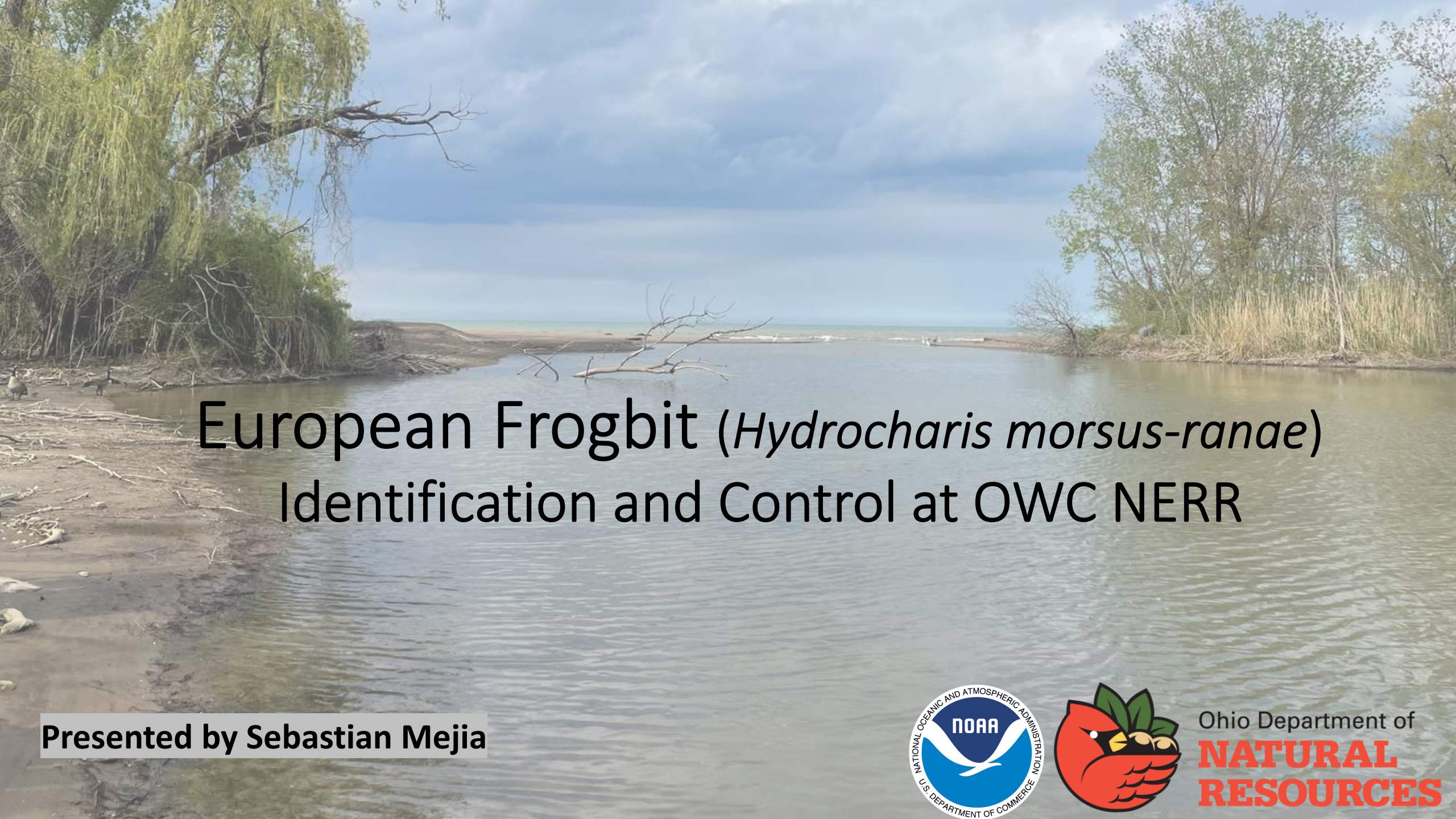


European Frogbit (*Hydrocharis morsus-ranae*) Identification and Control at OWC NERR

Presented by Sebastian Mejia

Ohio Department of NATURAL RESOURCES

Old Woman Creek National Estuarine Research Reserve

NATIONAL ESTUARINE RESEARCH RESERVE

Reserve Information

Designated
1980

Lead Agency
Ohio Department of Natural Resources, Office of Coastal Management
(Visit Site)

Protects
573 acres

Located
Huron, Ohio

Additional Information
Habitats found in this reserve support crappie, blue gill, channel catfish, waterfowl, shorebirds, hawks, and warblers during the fall and spring migrations.

Biogeographic Region
Great Lakes

Tidal Range
N/A

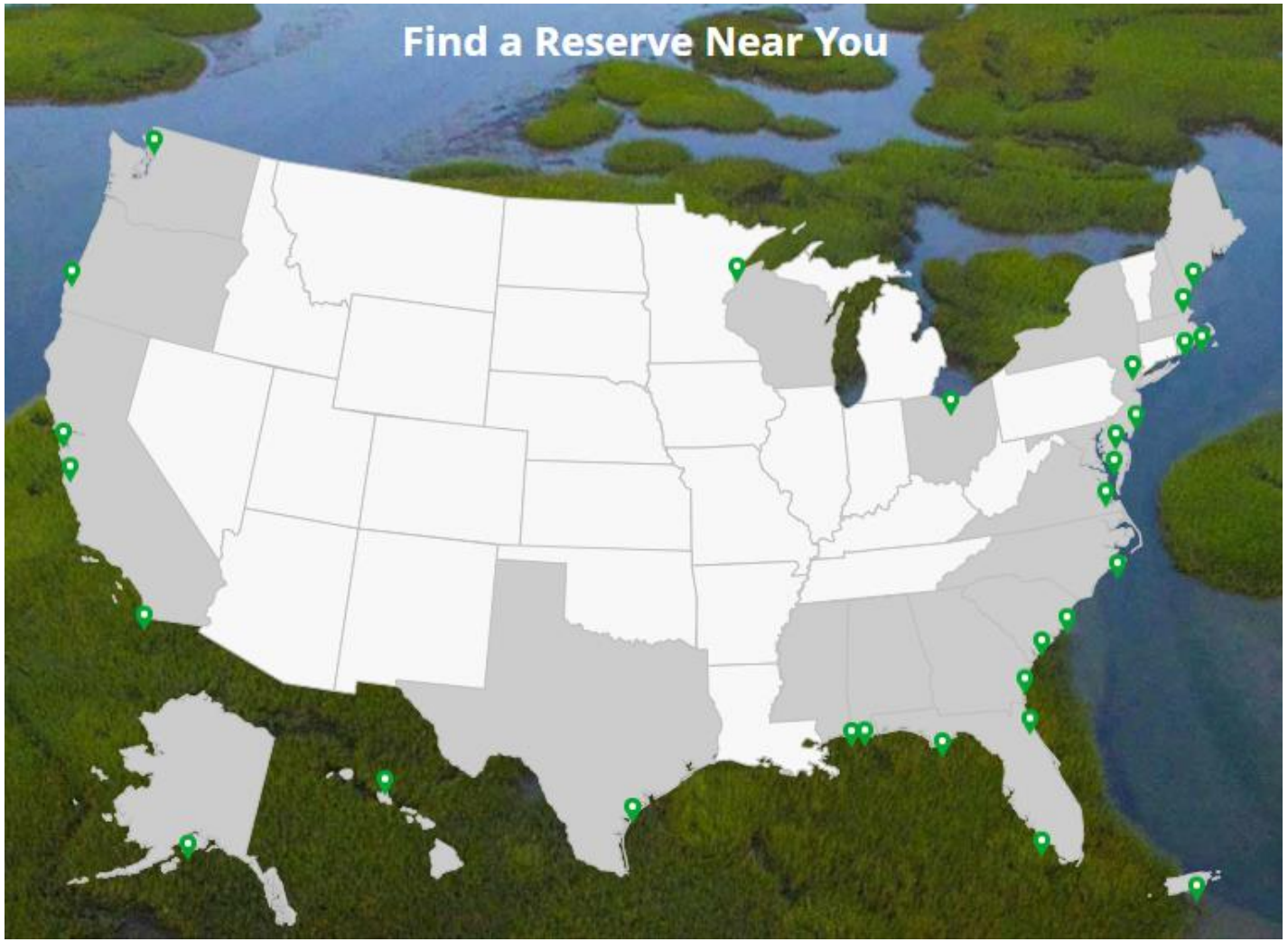
IMPORTANT LINKS

- Reserve Website
- Reserve Handout
- Management Plan
- Site Profile
- Visitor Information
- Reserve Education Page
- I Want to Volunteer

MONITORING DATA

Updated every 10 minutes

Berlin Road Station

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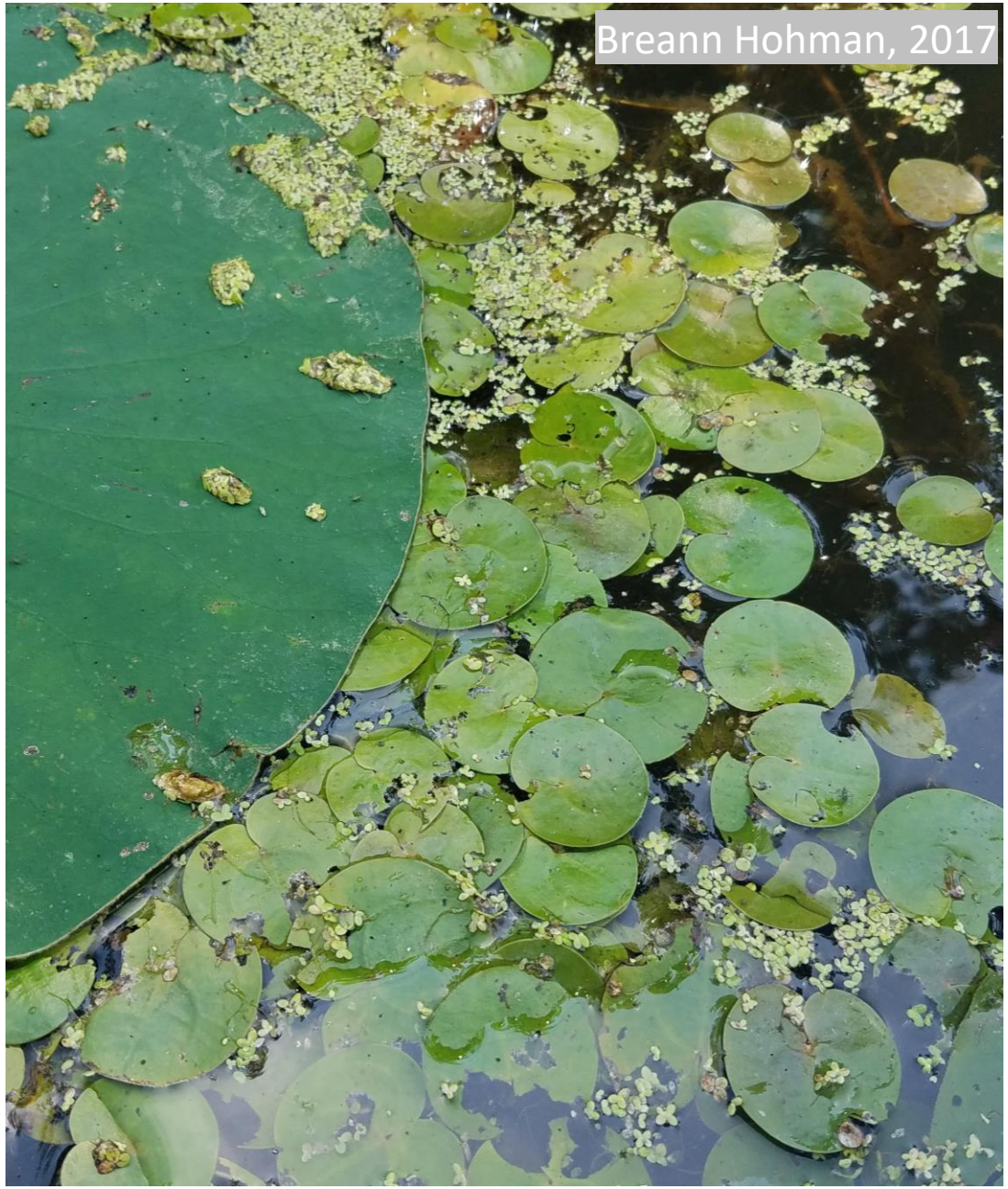
Old Woman Creek National Estuarine Research Reserve

- Frogbit first found at OWC in 2017
- Mechanical and chemical control
- Frogbit Volunteer Task Force

Frogbit Basics

- Native to Europe and N. Asia
- Shallow, slow-moving, free-floating
- Vigorous growers - dense mats
- Modes of reproduction
  - **Asexual = turions**
  - Sexual = seeds
- Various modes of dispersal
  - Wildlife, boats, natural flow



Anatomy of Frogbit

- Flower
- Rosette
- Leaves
- Stolon
  - Turion – modified stolon bud
- Fruit - Berry

Fruit with seeds

August 2021

Anatomy of Frogbit

- Flower
- Rosette
- Leaves
- Stolon
  - Turion – modified stolon bud
- Fruit - Berry

Anatomy of Frogbit

- Flower
- Rosette
- Leaves
- Stolon
  - Turion – modified stolon bud
- Fruit - Berry

Ramet

Field Identification

August 2021


August 2021


August 2021


August 2021


August 2021


August 2021


August 2021


Breann Hohman, 2017


Magee Marsh
Eugene C. Braig IV, 2019


Magee Marsh
Eugene C. Braig IV, 2019


North Pond SNP
Warren Dunegan, 2021

Most Effective Method of Control: Mechanical

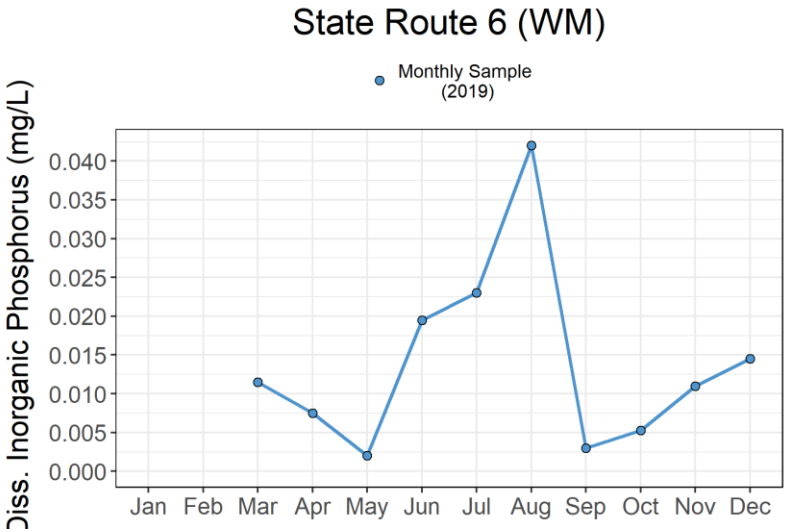
- Public pulls from April-Sept.
  - Volunteers, staff, other groups
- Low-cost tools and equipment
  - Kayaks, canoe, rakes, buckets, etc.

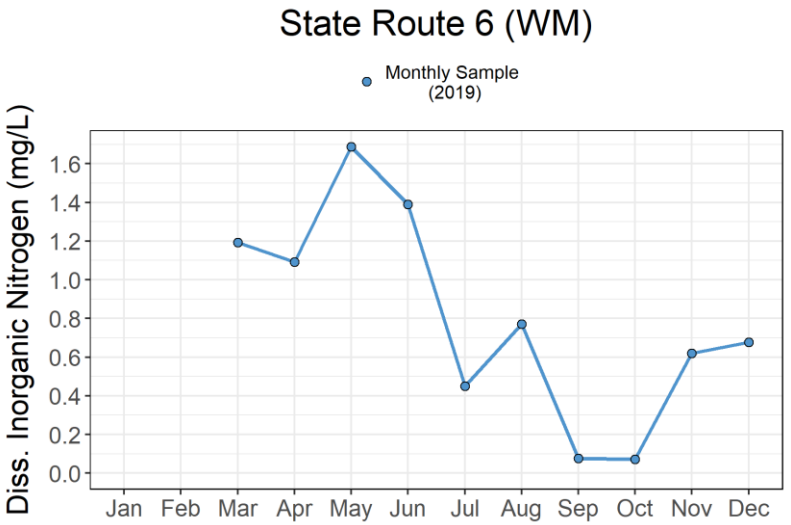
Breann Hohman, 2017

Beneficial Use Study at Old Woman Creek

- Goal: Phytoremediation
  - Quantify [N] & [P] in plant tissue
  - # of Rosettes = mass (kg) = [N] & [P]
  - Bioindicator of heavy metals
- Threshold for N and P tolerance
  - Analysis of the resistance… to N and P

  Wan et al. 2006
- Metals: Co, Cr, Cu, Fe, K, Mn, Ni, Pb, Zn
  - Bioaccumulation of macro- and trace elements…Polechońska and Samecka-Cymerman 2016





Chemical Treatment

- Treatment at OWC
  - Propeller© , contact herbicide
  - 1 acre, 12oz, surface spray
  - No adjuvant/surfactant
- Systemic herbicide likely needed
  - Pros and Cons
- Table from EFB Collaborative

Table 2. Summary of herbicide active ingredients used for European frog-bit (*Hydrocharis morsus-ranae* L.) control. For each active ingredient, example trade names, mode and speed of action, time until susceptible plants exhibit visual symptoms, time until susceptible plant control, and the cited literature is listed. Information regarding specific trade names can be found on their Specimen Labels.

Herbicide	Mode of Action	Speed of Action	Time to Visual Symptoms	Time To Achieve Control	References
Diquat (e.g., Reward®)	Contact	Fast	Several hours	<1 week	(UF/IFAS 2018; AERF 2018)
Endothall (e.g., Aquathol®)	Contact	Fast	< 1 week	1 – 3 weeks	(UF/IFAS 2018; AERF 2018)
Flumioxazin (e.g., Clipper ®)	Contact	Fast	3 – 5 days	7 – 14 days	(UF/IFAS 2018)
2, 4-D (e.g., Navigate®)	Systemic	Fast	Several hours – 1 day	Few days	(Mudge and Netherland 2014; UF/IFAS 2018; AERF 2018)
Triclopyr (e.g., Renovate®)	Systemic	Slow	< 1 day	Several weeks	(WDNR 2012; UF/IFAS 2018; AERF 2018)
Imazapyr (e.g., Habitat®)	Systemic	Slow	2+ weeks	2 – 6 weeks	(UF/IFAS 2018; AERF 2018)
Imazamox (e.g., Clearcast®)	Systemic	Slow	1 – 3 weeks	2 – 6 weeks	(Mudge and Netherland 2014; UF/IFAS 2018; AERF 2018)
Penoxsulam (e.g., Galleon®)	Systemic	Slow	1 – 3 weeks	Several weeks – months	(WDNR 2012; Mudge and Netherland 2014; AERF 2018)
Glyphosate (e.g., AquaPRO®)	Systemic	Slow	2 – 3 days	> 3 weeks	(UF/IFAS 2018)

European Frog-bit Collaborative

Home | What is EFB? | About the Collaborative | Adaptive Management Framework | Resources | Contact Us

European Frog-bit Collaborative

Connecting stakeholders to advance research on and management of European frog-bit in the Great Lakes

Notable Publications

USDA Weed Risk Assessment (2017)

- Estimated unmitigated risk
  - Establishment/Spread Potential
    - Risk=14, “High Risk, Major Invader”
  - Impact Potential
    - Risk=3.2, “contribute to hypoxic conditions, heavily shade water column, reduce biodiversity”
  - Geographic Potential
    - Risk=14, “61% of US suitable for est.”

US FWS Eco Risk Screening (2019)

- Overall Risk Assessment: High
  - History of Invasiveness: High
  - Climate Match: High
  - Certainty of Assessment: Med.

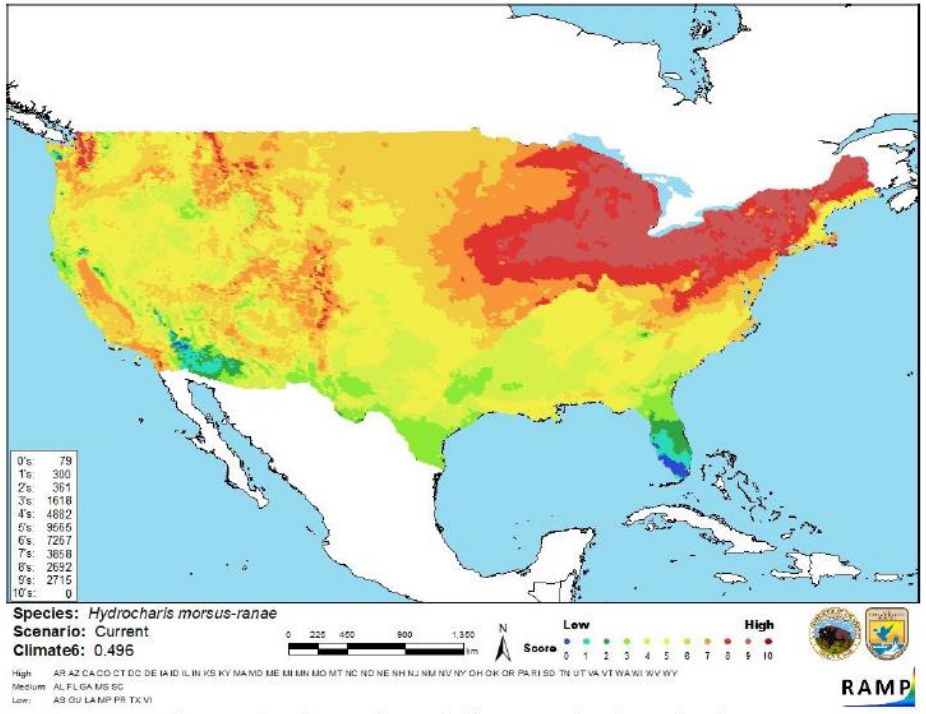
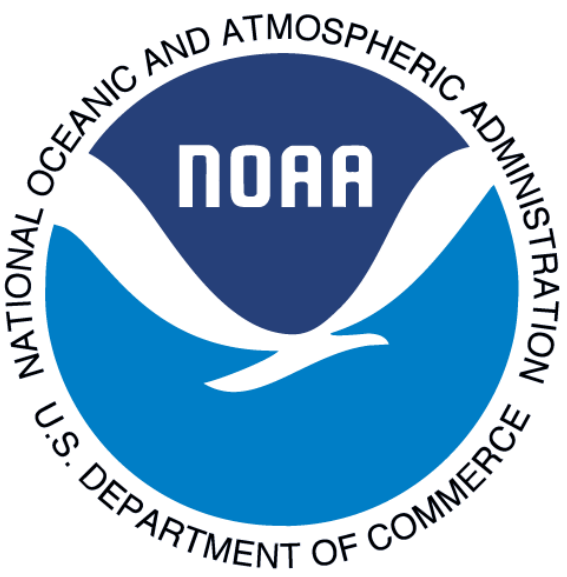


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Hydrocharis morsus-ranae* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and Jacono and Berent (2018a). 0 = Lowest match, 10 = Highest match.

Other Notable Publications

- A Revision of the genus hydrocharis (Cook and Lüönd 1982)
- The Biology of Canadian Weeds… (Catling et al 2003)
- European Frog-bit: A Technical Review… (Nault and Mikulyuk 2009)
- Invasive European frogbit in North America…(Zhu et al. 2018)


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE


OLD
WOMAN
CREEK
NATIONAL ESTUARINE RESEARCH RESERVE

Thank you!

Sebastian Mejia

Stewardship Coordinator

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Smithsonian MAGAZINE

SMART NEWS

New Research

‘World’s Worst Invasive Weed’ Sold at Many U.S. Garden Centers

Banned by federal and state regulators, many invasive plants are still being sold at garden centers, nurseries and online retailers nationwide

David Kindy

Daily Correspondent

August 20, 2021

['World's Worst Invasive Weed' Sold at Many U.S. Garden Centers | Smart News | Smithsonian Magazine]

One particularly problematic plant is European frogbit, which is banned in Wisconsin and other states. The lily pad-like species was once used as an ornamental planting but was outlawed because of its ability to take over ponds and choke out other vegetation.

“Once introduced, natural dispersal is also possible given its ability to overwinter and spread rapidly,” Amanda Smith, an invasive species specialist with the Wisconsin Department of Natural Resources, tells Kent Tempus of the Green Bay Press Gazette.