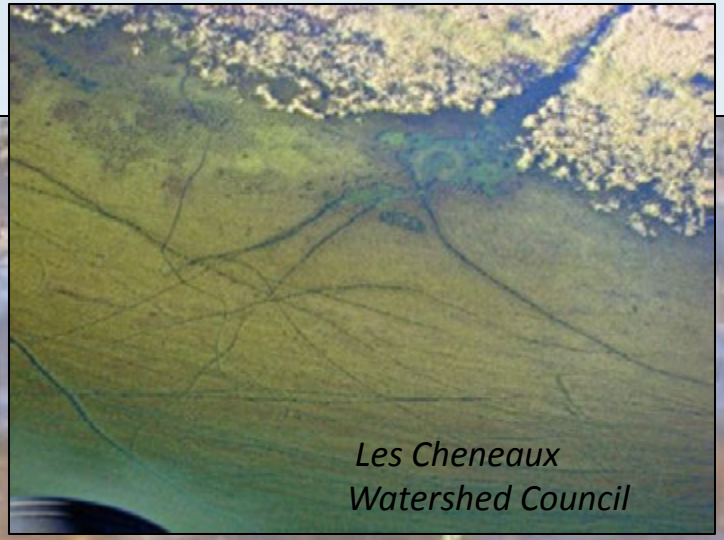
Control, Monitoring, and Effects of Eurasian Watermilfoil

Lake Superior Environmental Monitoring Collaborative

Eurasian Watermilfoil (*Myriophyllum spicatum*)

Pike Bay, Chassell Michigan



Les Cheneaux Watershed Council

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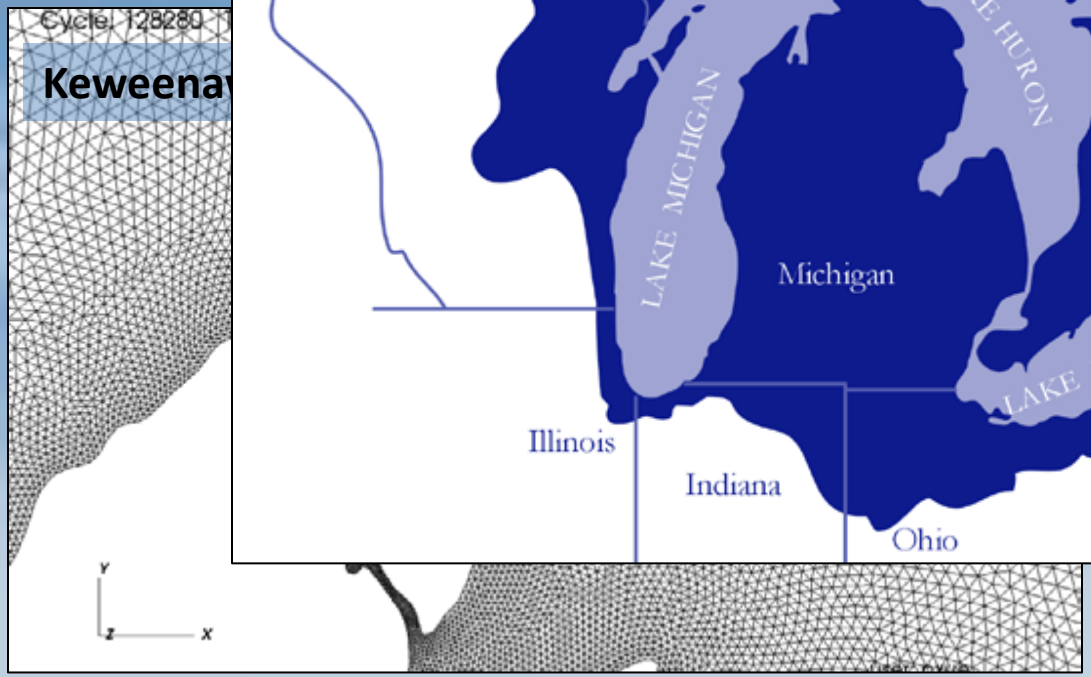
Control, Monitoring, and Effects of Eurasian Watermilfoil



http://www.great-lakes.net/teach/geog/intro/intro_2.html

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Arresting the Spread of Eurasian Watermilfoil in Lake Superior (2014-2015)

USEPA-Great Lakes Restoration Initiative

Principle Investigators

- Casey Huckins, PhD.
- Guy Meadows, PhD.
- Amy Marcarelli, PhD.
- Rod Chimner, PhD.
- Pengfei Xue, PhD.
- Colin Brooks
- Kevyn Juneau, PhD.

- Biological Sciences
- Forest Resources and Environmental Sciences
- Civil and Environmental Engineering
- Great Lakes Research Institute
- Michigan Tech Research Institute

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Arresting the Spread of Eurasian Watermilfoil in Lake Superior (2014-2015)

Four Tasks:

A. Efficacy of control agents

B. Remote sensing and mapping

C. Hydrodynamic Modeling

D. Data Portal

Chassell, MI
(image Google earth)

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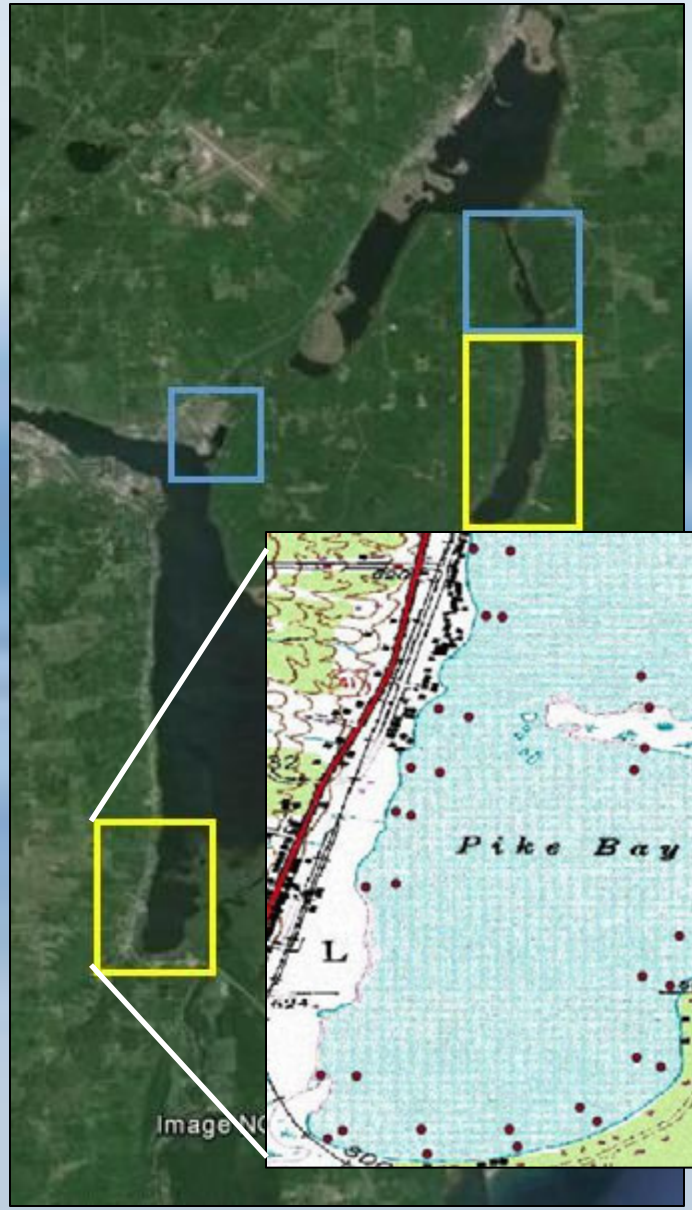
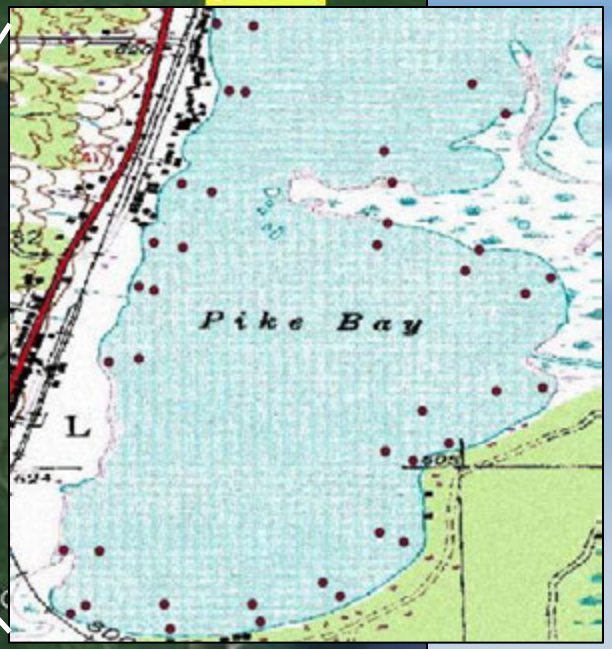
Field Surveys

Task A: Efficacy of control agents





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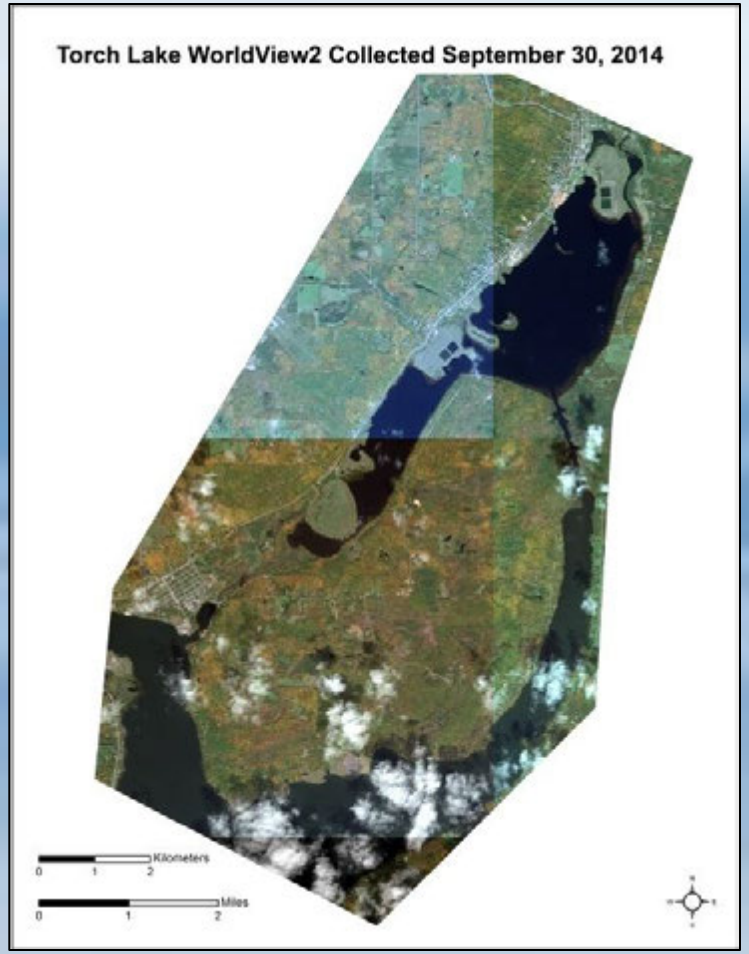
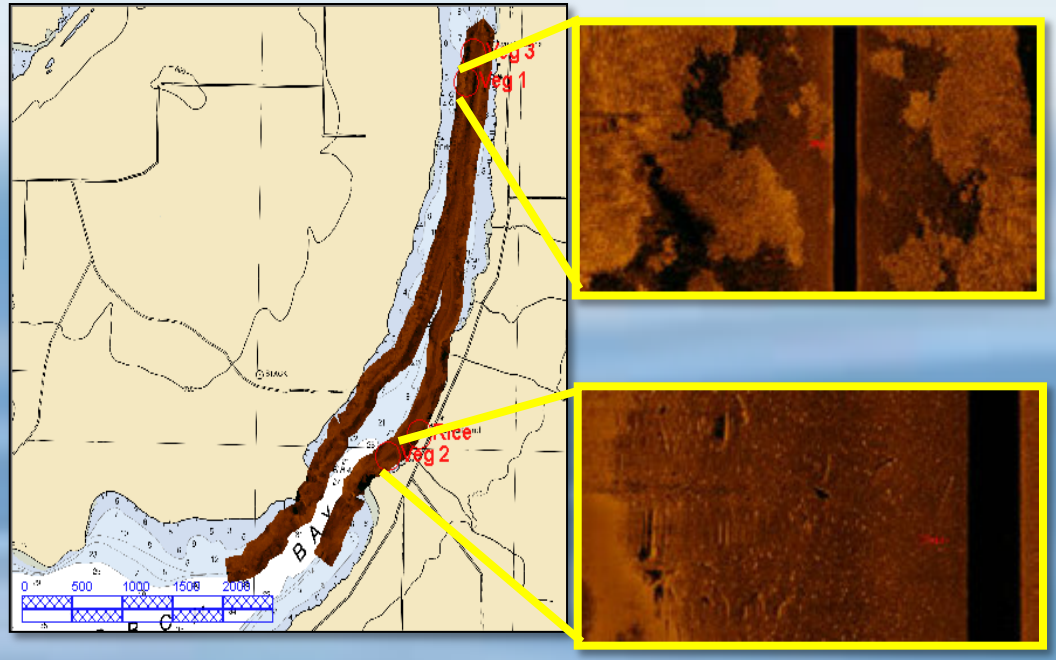
Task B. Remote sensing and mapping





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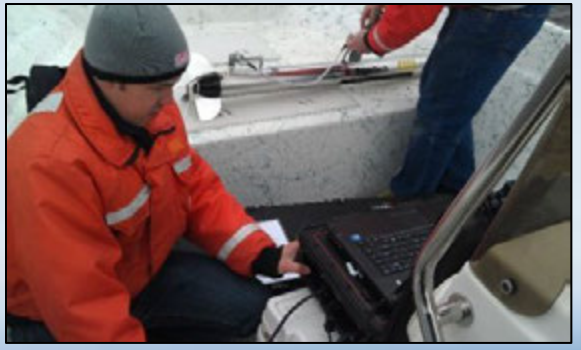
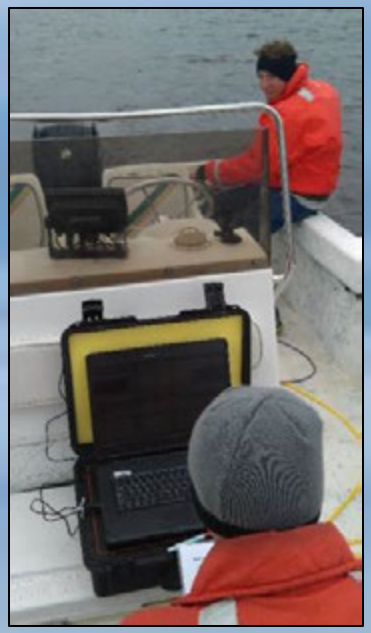
Sonar survey of EWM in Torch Bay





EdgeTech 4125 dual frequency, 400 kHz and 900 kHz towfish

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Satellite & Aerial Imagery of EWM in Waterway

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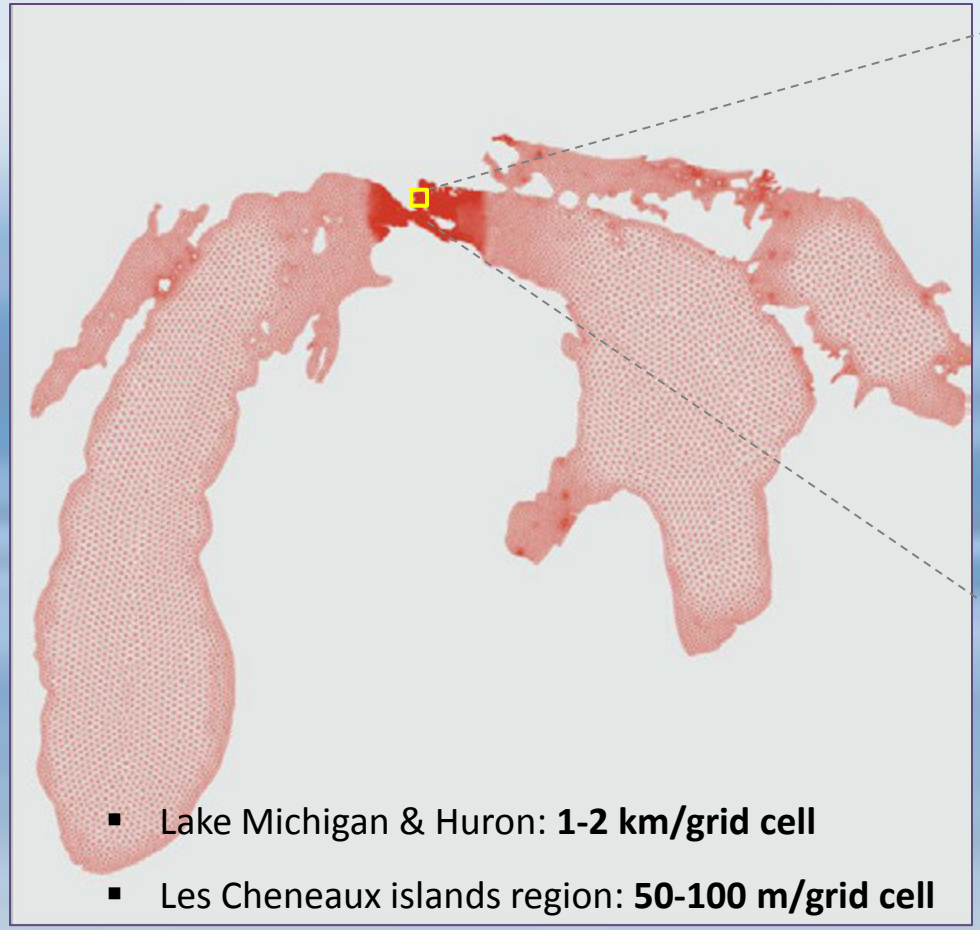
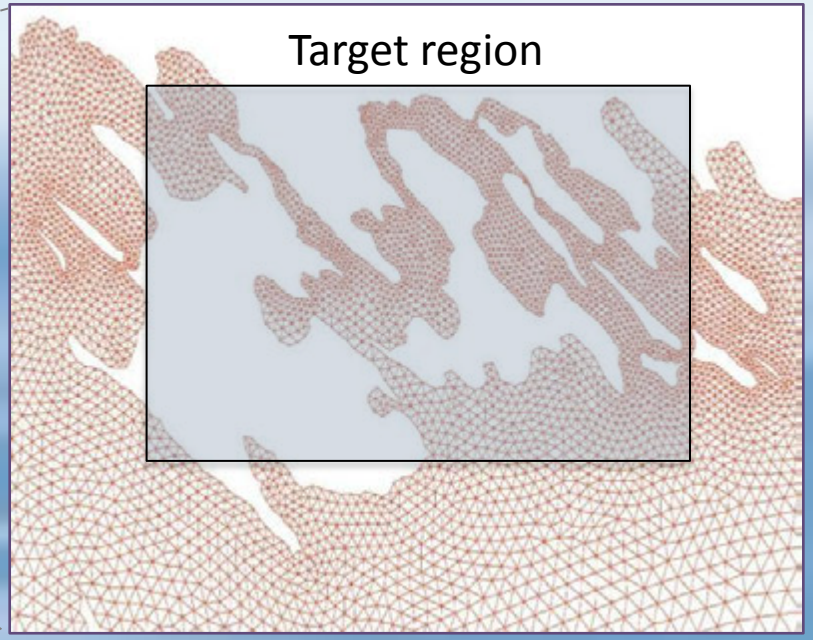
Arresting the Spread of Eurasian Watermilfoil in Lake Superior (2014-2015)

Task C. Next Generation Hydrodynamic Modeling



- Lake Michigan & Huron: **1-2 km/grid cell**
- Les Cheneaux islands region: **50-100 m/grid cell**



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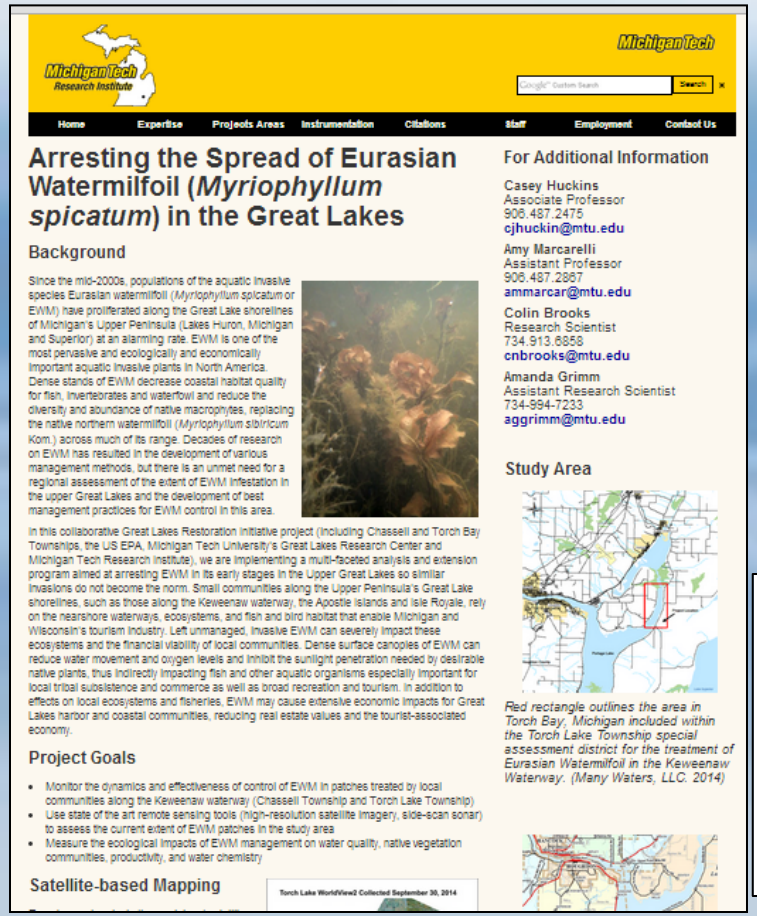
Task D. Data Portal & information clearing house

www.mtri.org/eurasian_watermilfoil.html



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Arresting the Spread of Eurasian Watermilfoil (*Myriophyllum spicatum*) in the Great Lakes

Background

Since the mid-2000s, populations of the aquatic invasive species Eurasian watermilfoil (*Myriophyllum spicatum* or EWM) have proliferated along the Great Lake shorelines of Michigan's Upper Peninsula (Lakes Huron, Michigan and Superior) at an alarming rate. EWM is one of the most pervasive and ecologically and economically important aquatic invasive plants in North America. Dense stands of EWM decrease coastal habitat quality for fish, invertebrates and waterfowl and reduce the diversity and abundance of native macrophytes, replacing the native northern watermilfoil (*Myriophyllum sibiricum* Kom.) across much of its range. Decades of research on EWM has resulted in the development of various management methods, but there is an unmet need for a regional assessment of the extent of EWM infestation in the upper Great Lakes and the development of best management practices for EWM control in this area.

In this collaborative Great Lakes Restoration Initiative project (including Chassell and Torch Bay Townships, the US EPA, Michigan Tech University's Great Lakes Research Center and Michigan Tech Research Institute), we are implementing a multi-faceted analysis and extension program aimed at arresting EWM in its early stages in the Upper Great Lakes so similar invasions do not become the norm. Small communities along the Upper Peninsula's Great Lake shorelines, such as those along the Keweenaw waterway, the Apostle Islands and Isle Royale, rely on the nearshore waterways, ecosystems, and fish and bird habitat that enable Michigan and Wisconsin's tourism industry. Left unmanaged, invasive EWM can severely impact these ecosystems and the financial viability of local communities. Dense surface canopies of EWM can reduce water movement and oxygen levels and inhibit the sunlight penetration needed by desirable native plants, thus indirectly impacting fish and other aquatic organisms especially important for local tribal subsistence and commerce as well as broad recreation and tourism. In addition to effects on local ecosystems and fisheries, EWM may cause extensive economic impacts for Great Lakes harbor and coastal communities, reducing real estate values and the tourist-associated economy.

Project Goals

- Monitor the dynamics and effectiveness of control of EWM in patches treated by local communities along the Keweenaw waterway (Chassell Township and Torch Lake Township)
- Use state of the art remote sensing tools (high-resolution satellite imagery, side-scan sonar) to assess the current extent of EWM patches in the study area
- Measure the ecological impacts of EWM management on water quality, native vegetation communities, productivity, and water chemistry

Satellite-based Mapping

Torch Lake WorldView2 Collected September 30, 2014

For Additional Information

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Study Area

Red rectangle outlines the area in Torch Bay, Michigan included within the Torch Lake Township special assessment district for the treatment of Eurasian Watermilfoil in the Keweenaw Waterway. (Many Waters, LLC. 2014)

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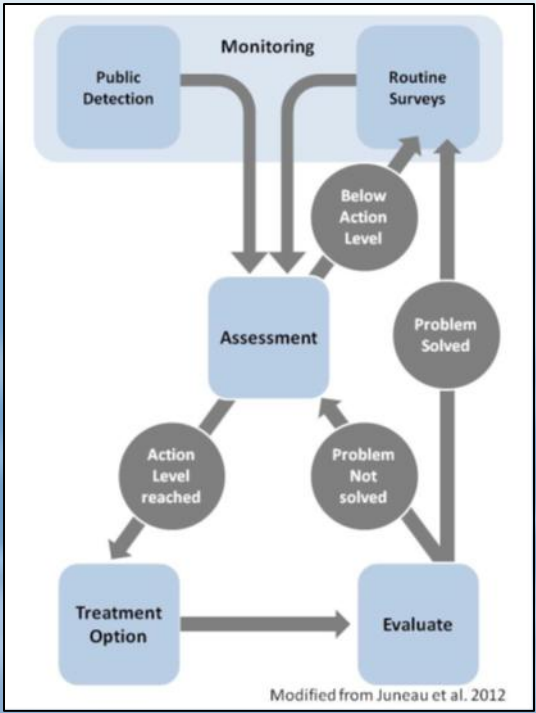
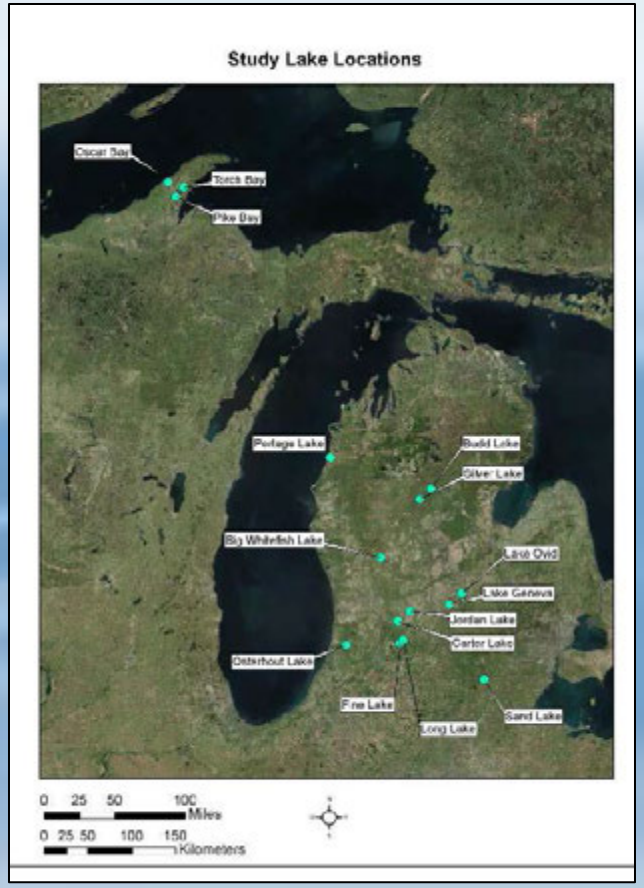
MTU Grant: *Innovative and multifaceted control of invasive Eurasian and hybrid watermilfoil using integrative pest management principles (2015-2016)*

Michigan Invasive Species Grants Program (MISGP)

Principle Investigators

- Casey Huckins, PhD.
- Amy Marcarelli, PhD.
- Erika Hersch-Green, PhD
- Kevyn Juneau, PhD.
- Colin Brooks





- Biological Sciences
- Great Lakes Research Institute
- Michigan Tech Research Institute
- PLM Lake & Land Management Corp (Jason Broekstra)
- SePRO Corporation (Jake Britton)
- Many Waters, LLC (Barb Gajewski)
- Lake Superior Stewardship Initiative

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Great Lakes Research Center

MTU Grant: *Innovative and multifaceted control of invasive Eurasian and hybrid watermilfoil using integrative pest management principles (2015-2016)*

Project Objectives:

Analysis of existing environmental and plant community data - lake attributes and history of herbicide management in Michigan.

Analysis of genotype diversity and patterns of hybridization of watermilfoil in relation to herbicide resistance.

PlanTest bioassays of EWM sensitivity to 2,4-D, triclopyr and fluridone – coupled with genetic analysis

Design and implement integrative and novel management that controls invasive watermilfoil while maintaining native aquatic communities.

1. Enhance ability to predict spread and establishment of invasive watermilfoil via remote sensing and modeling by incorporating recreation use and lake attributes to provide an integrated risk prediction of coastal and inland invasion.
2. Partner with outreach and education groups to deter new introductions of IWM and inform the public of value of native plant communities.

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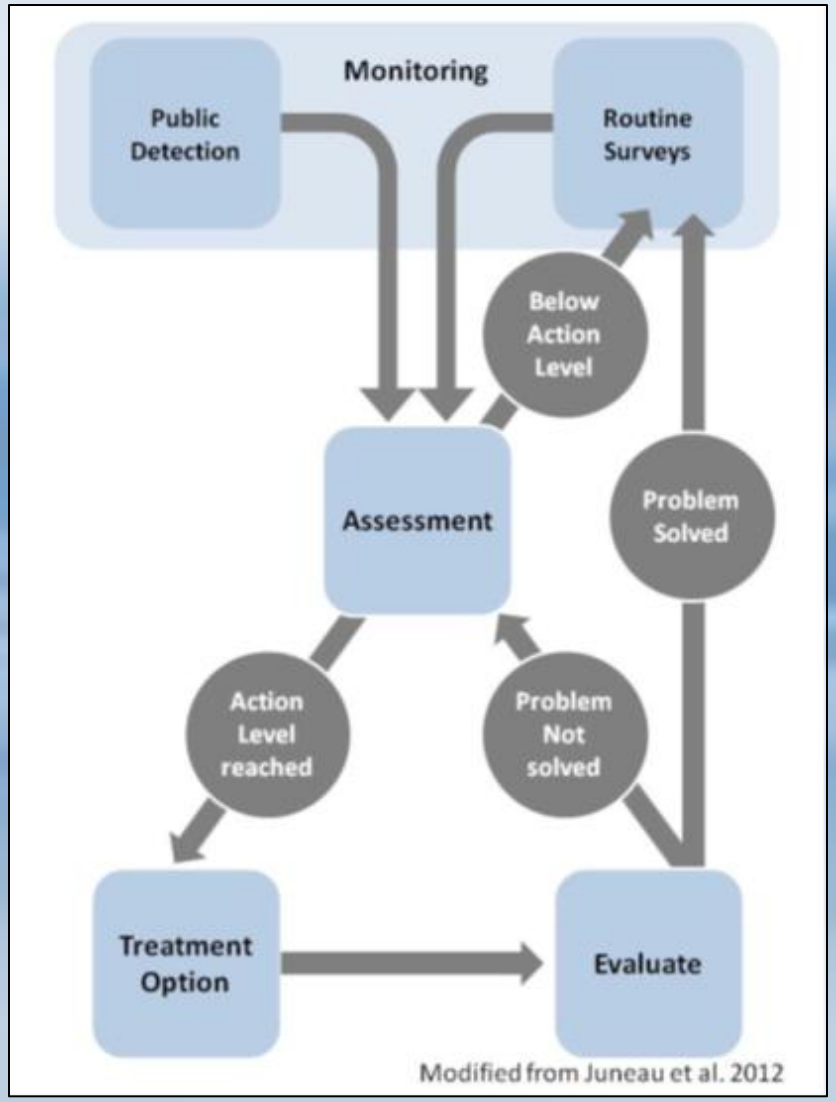
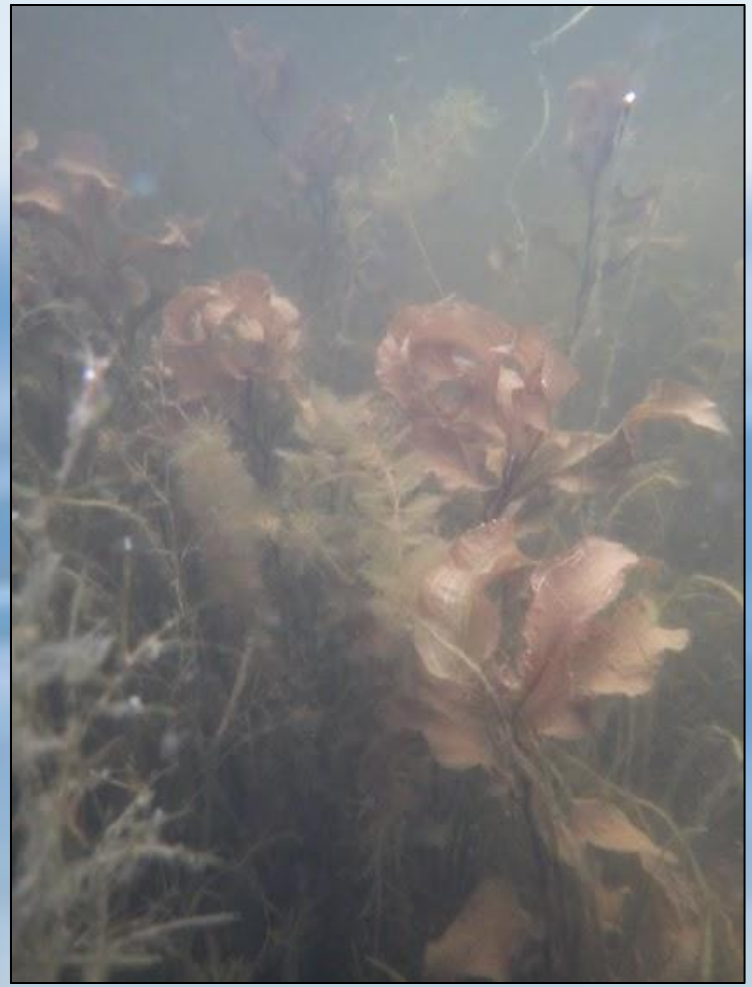
MTU Grant: *Innovative and multifaceted control of invasive Eurasian and hybrid watermilfoil using integrative pest management principles (2015-2016)*





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