

# Interactions of Rusty Crayfish, Round Goby and Dreissenids on Lake Michigan spawning reefs



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# Acknowledgements

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- Jason Whalen Photography
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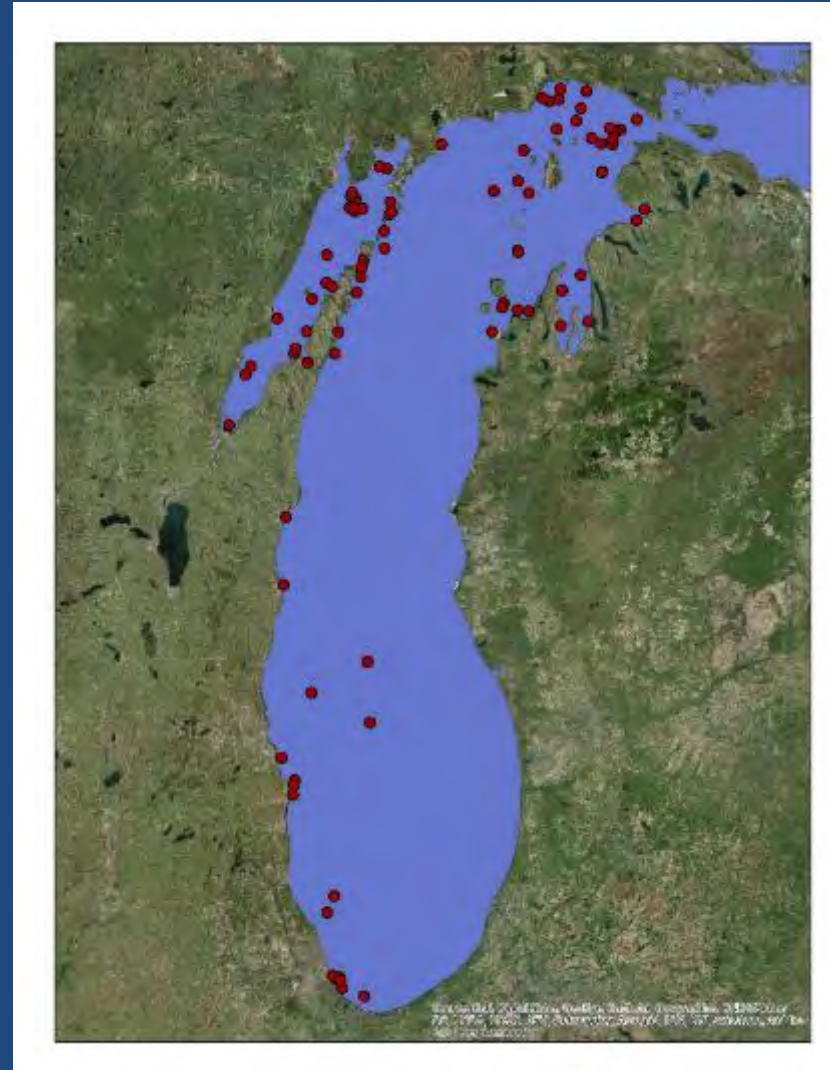
The Nature Conservancy



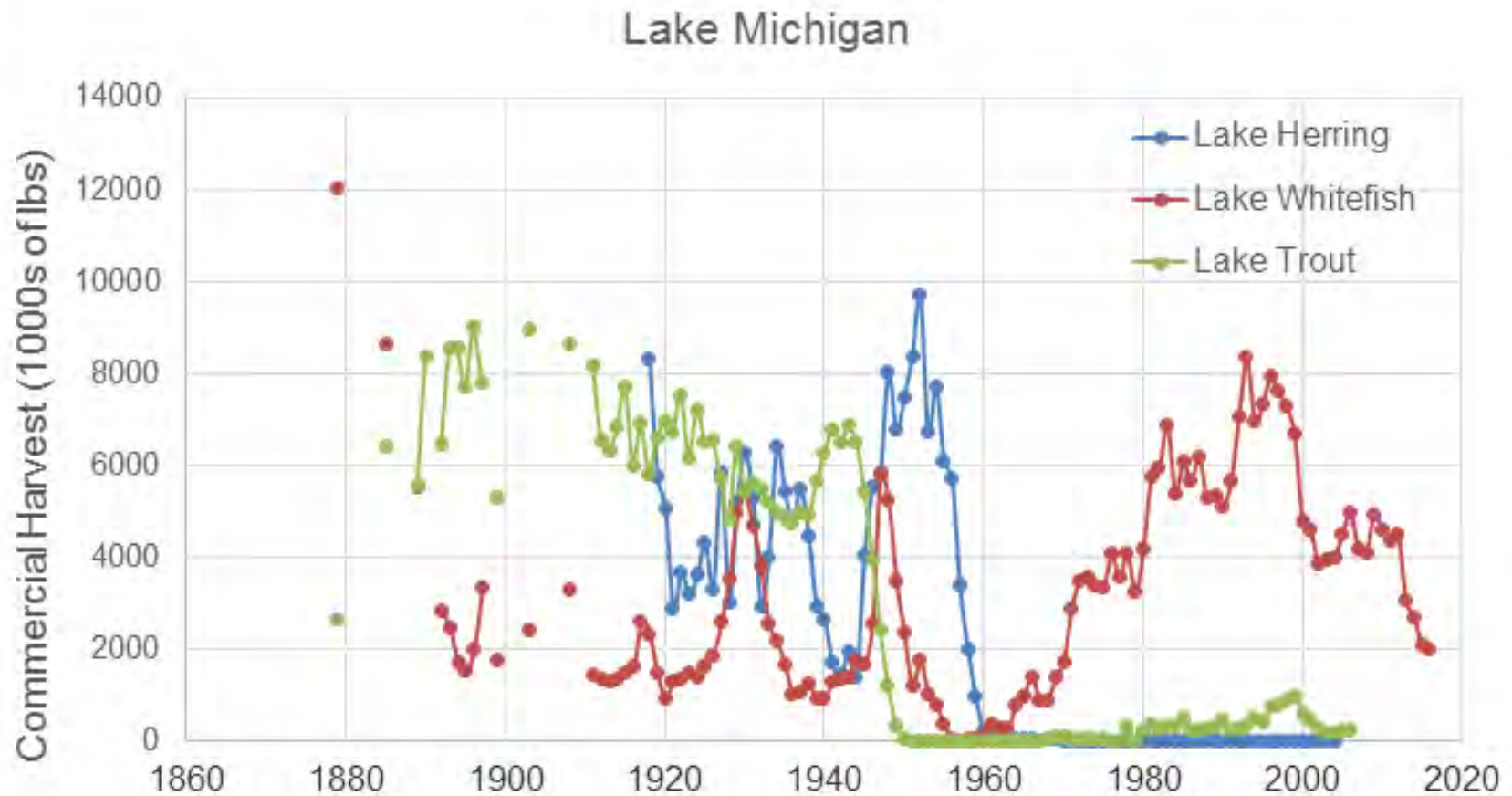
Great Lakes  
RESTORATION



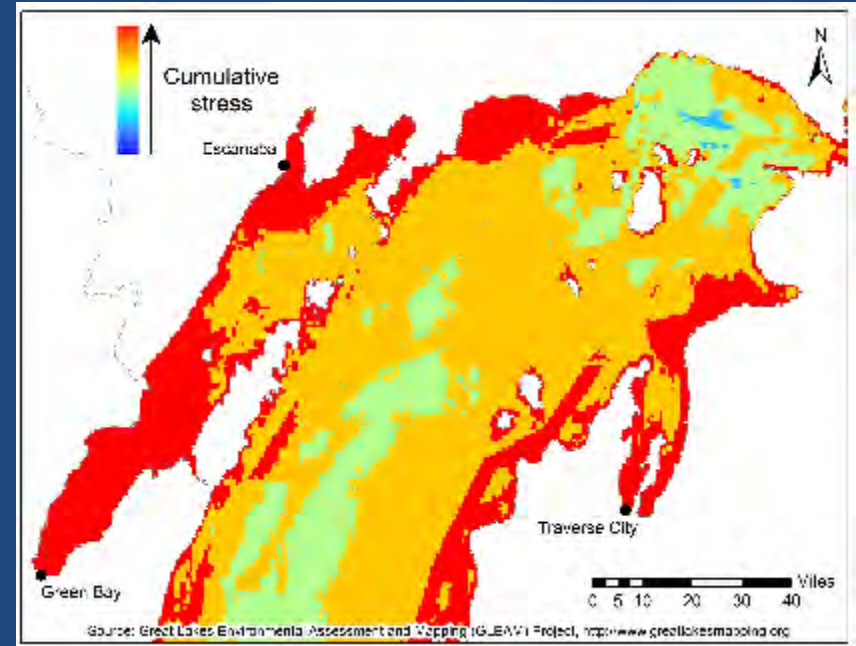
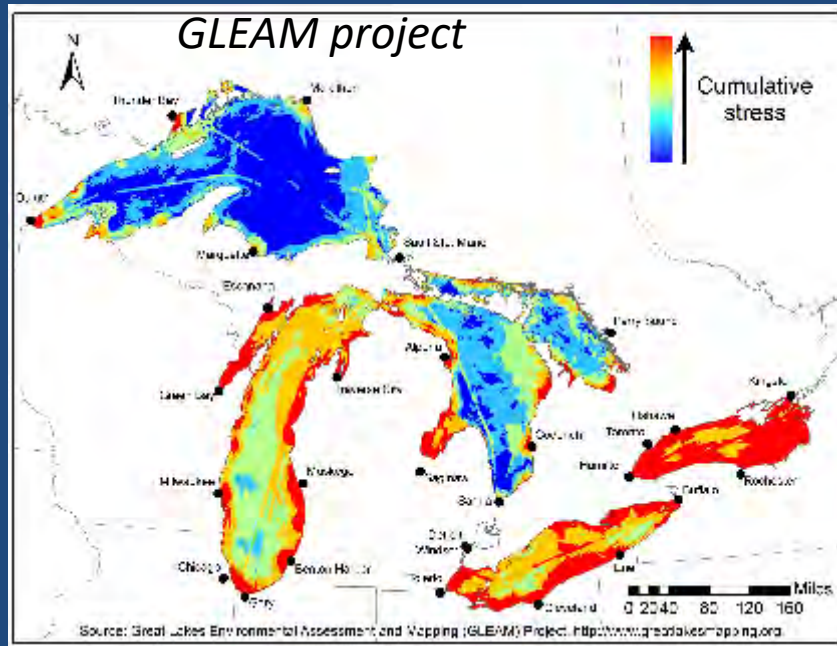
# Spawning reefs are engines of fish production in the Great Lakes



# Fishery decline ...



# Decline in reef habitat condition



# Reef habitat smothered by mussels

Loss of interstitial space from live mussels and shell

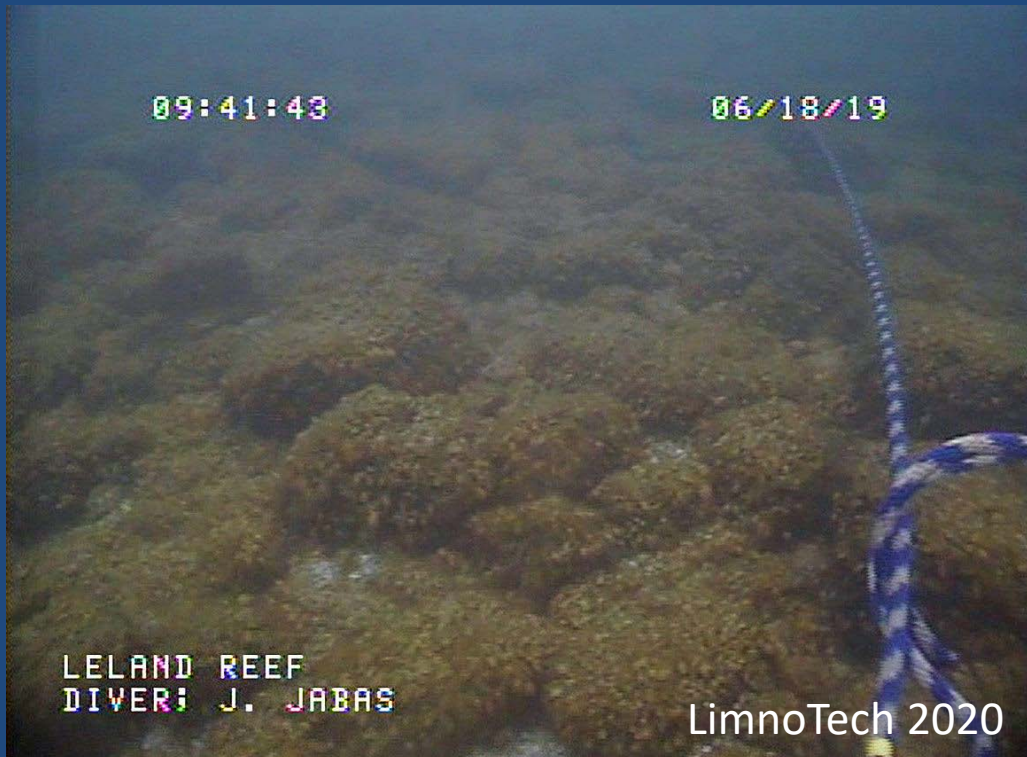
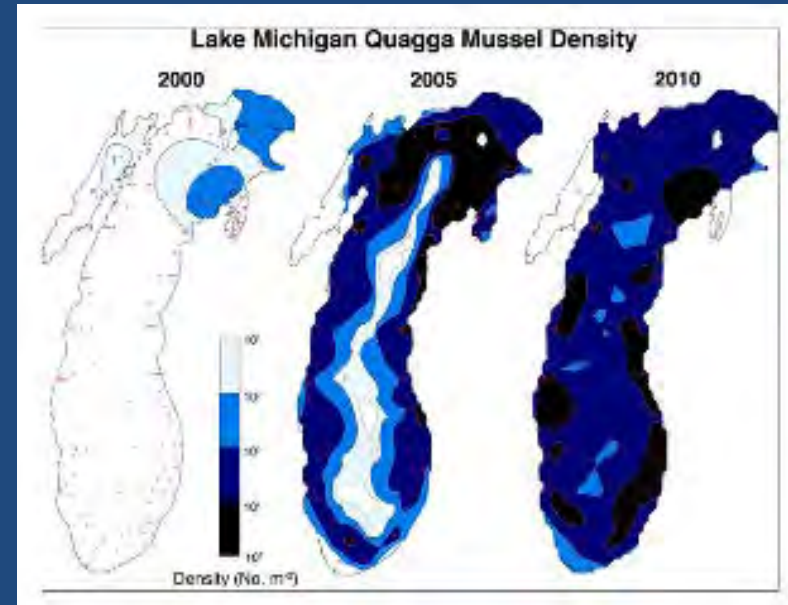


Photo: J. Whalen

# Since 2005, non-native egg predators have dominated in seeded egg bag samples

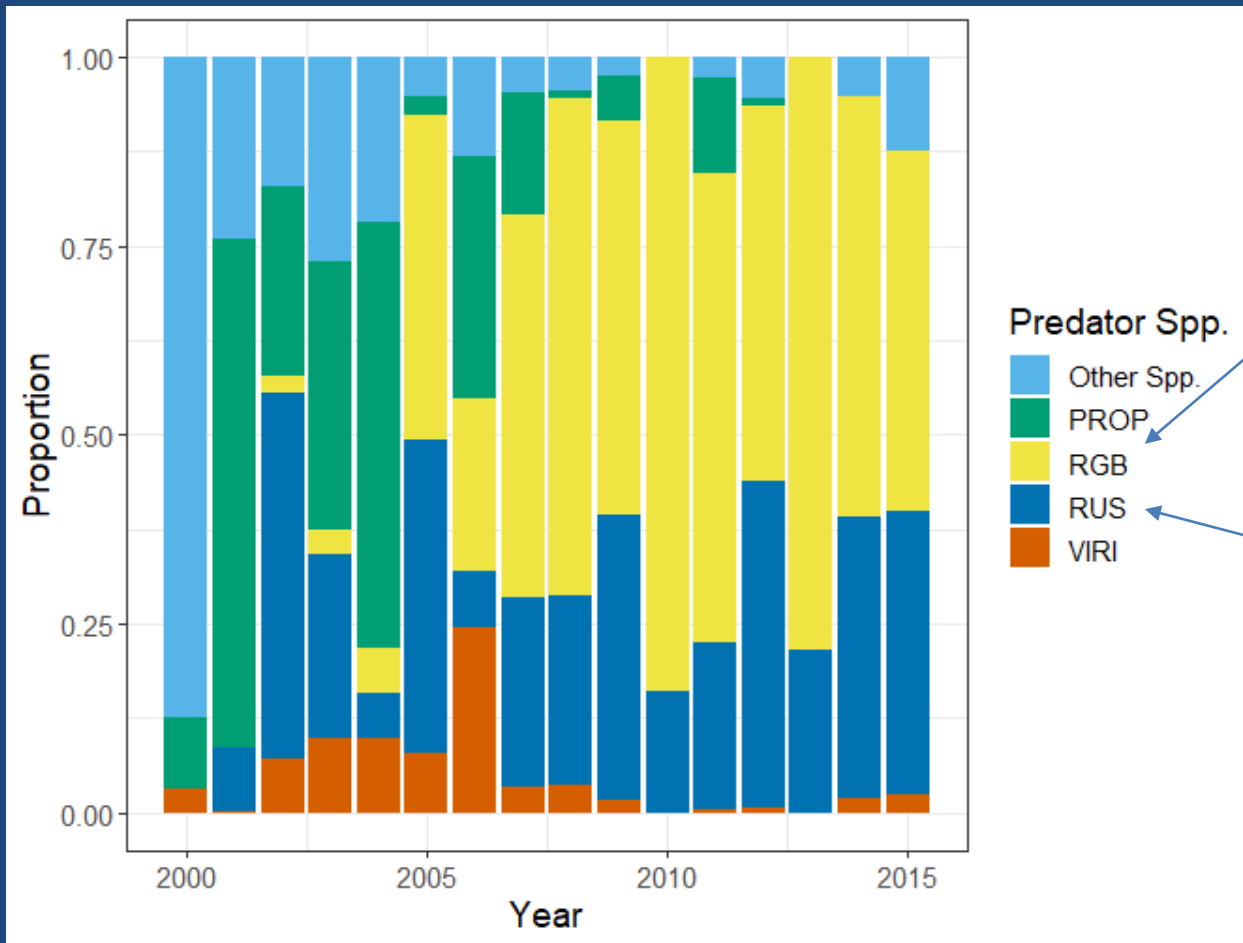


Photo: J. Whalen



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Northern Lake Michigan  
Unpublished MDNR data, courtesy of J. Jonas

# Egg predation by invasive species (Impediment to native fish recruitment on spawning reefs)

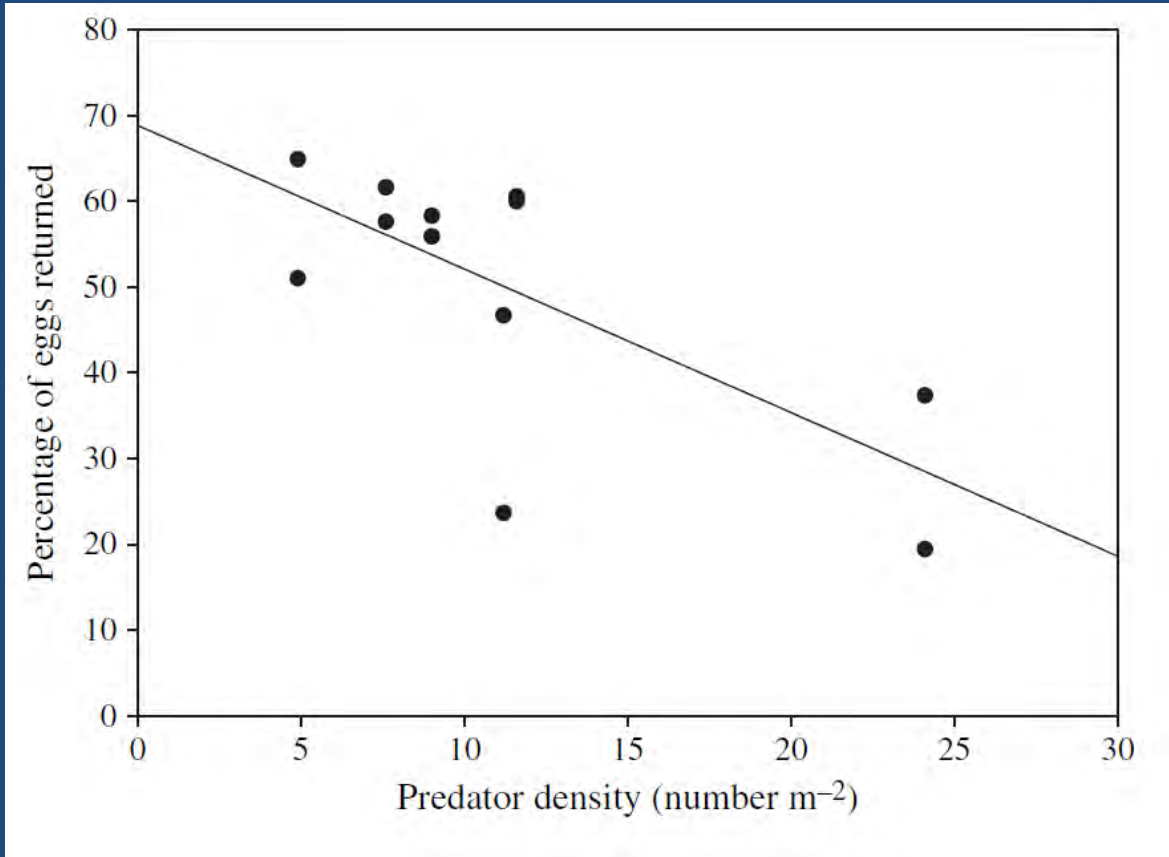
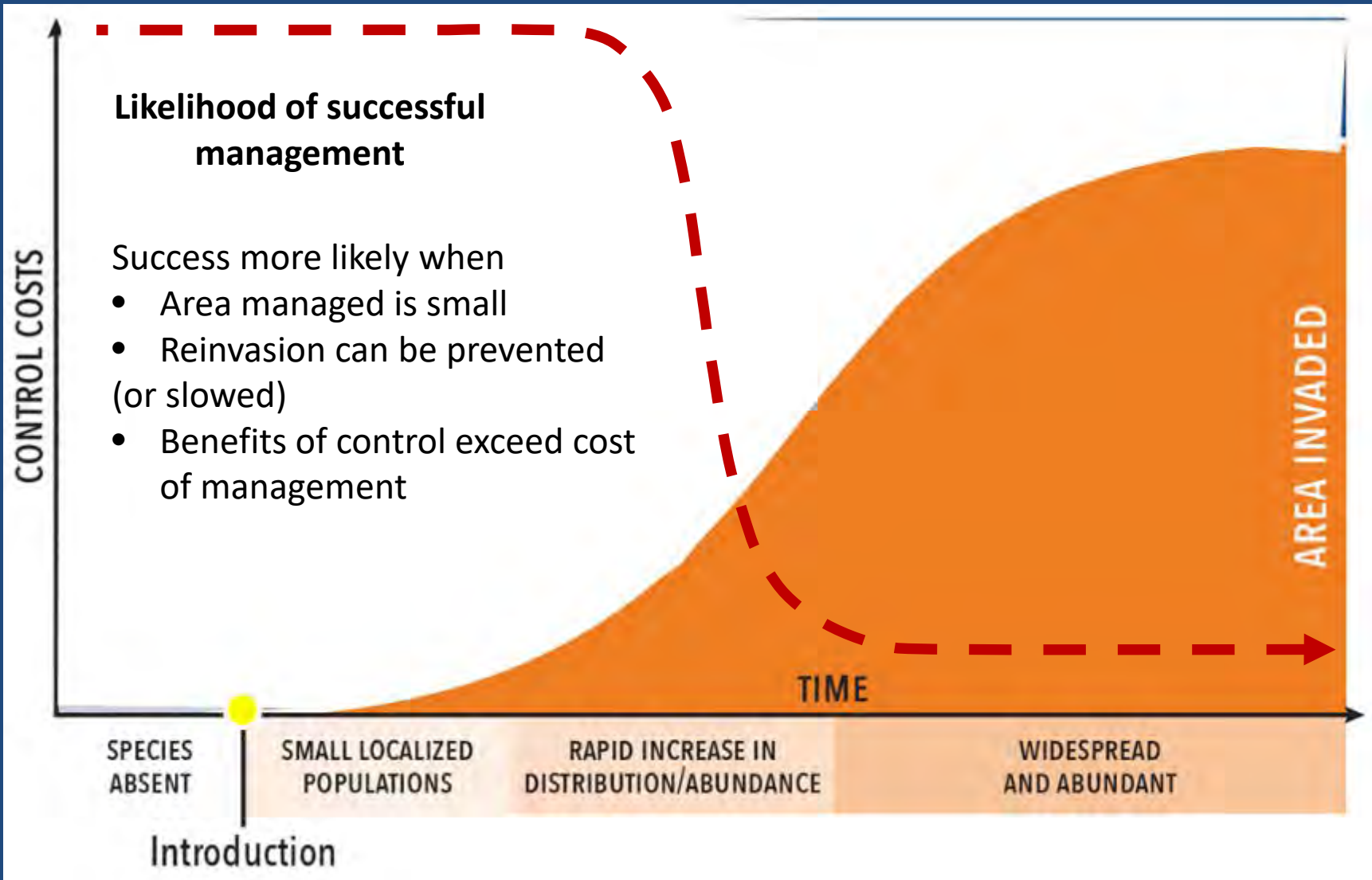
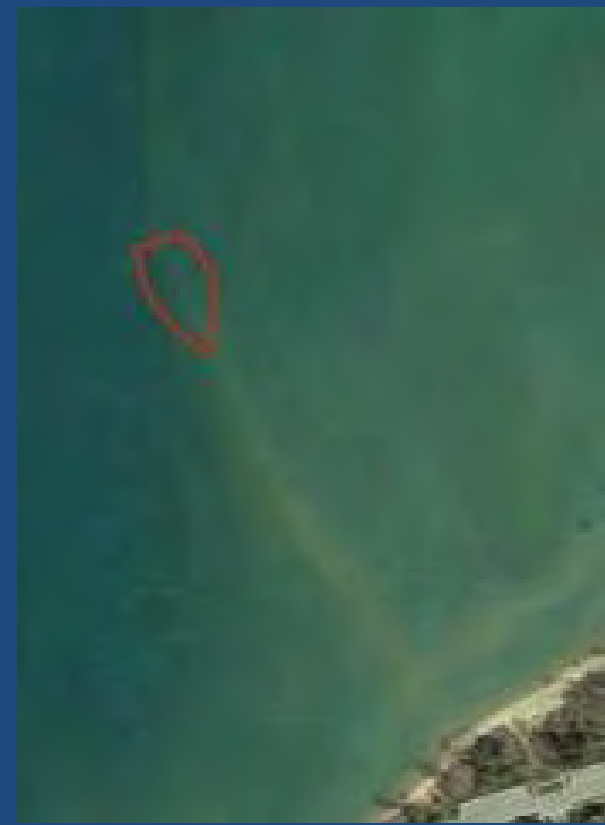
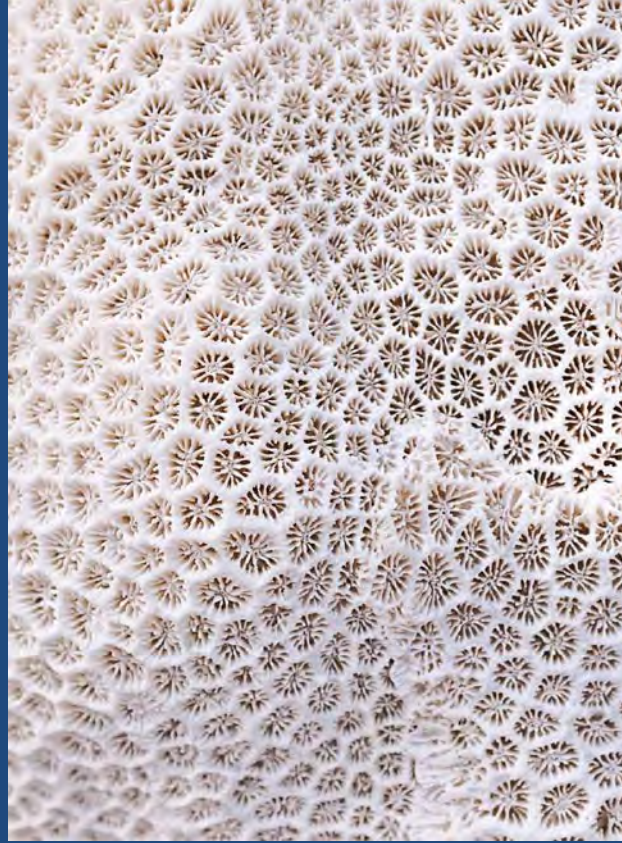


Photo: J. Whalen



# Suppression of established species is hard





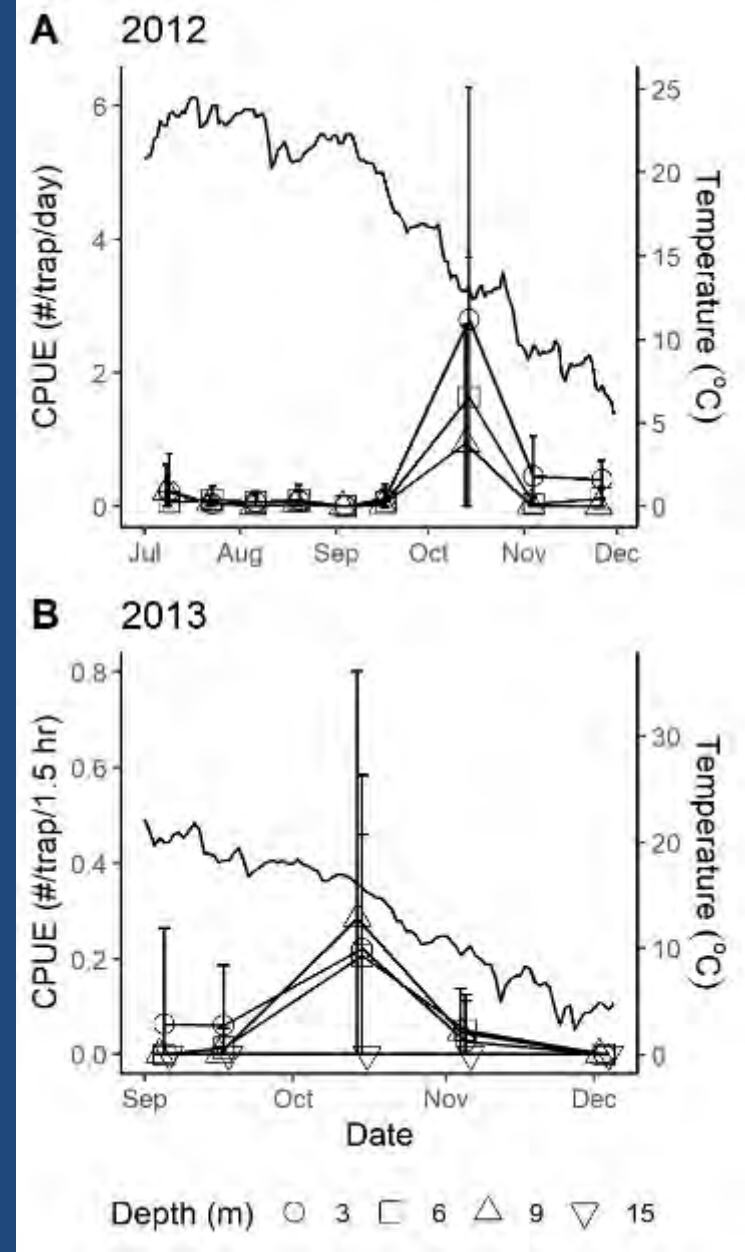
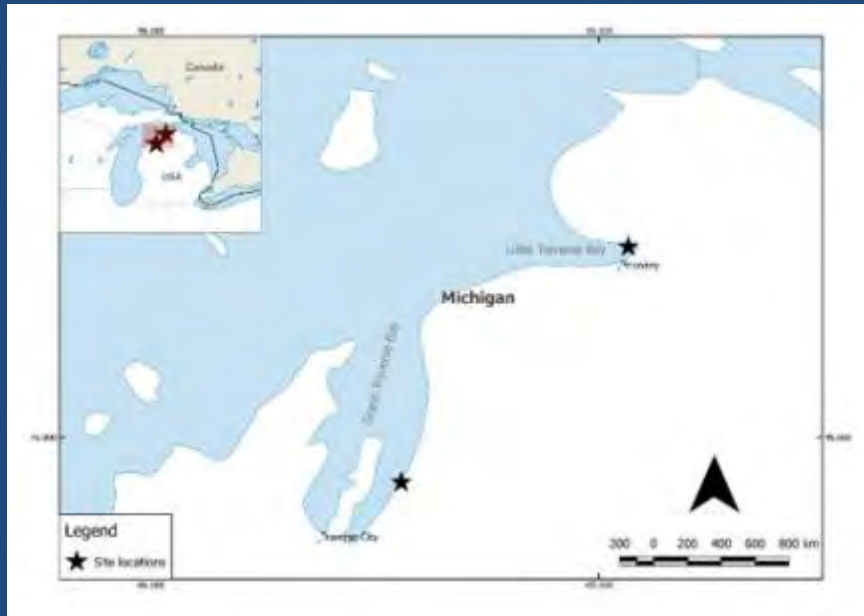
## Great Lakes spawning reefs

- Localized critical habitat
- Scale of benefits provided to Great Lakes Fisheries far greater than area of each reef
- For fall spawners potentially shorter suppression window (egg maturation)

# Crayfish suppression



- Intensive trapping (Sept – Nov)
  - across reef and buffer area
  - prior to fall spawning
- Barriers around reef and buffer
- And declining water temperatures may help slow recolonization

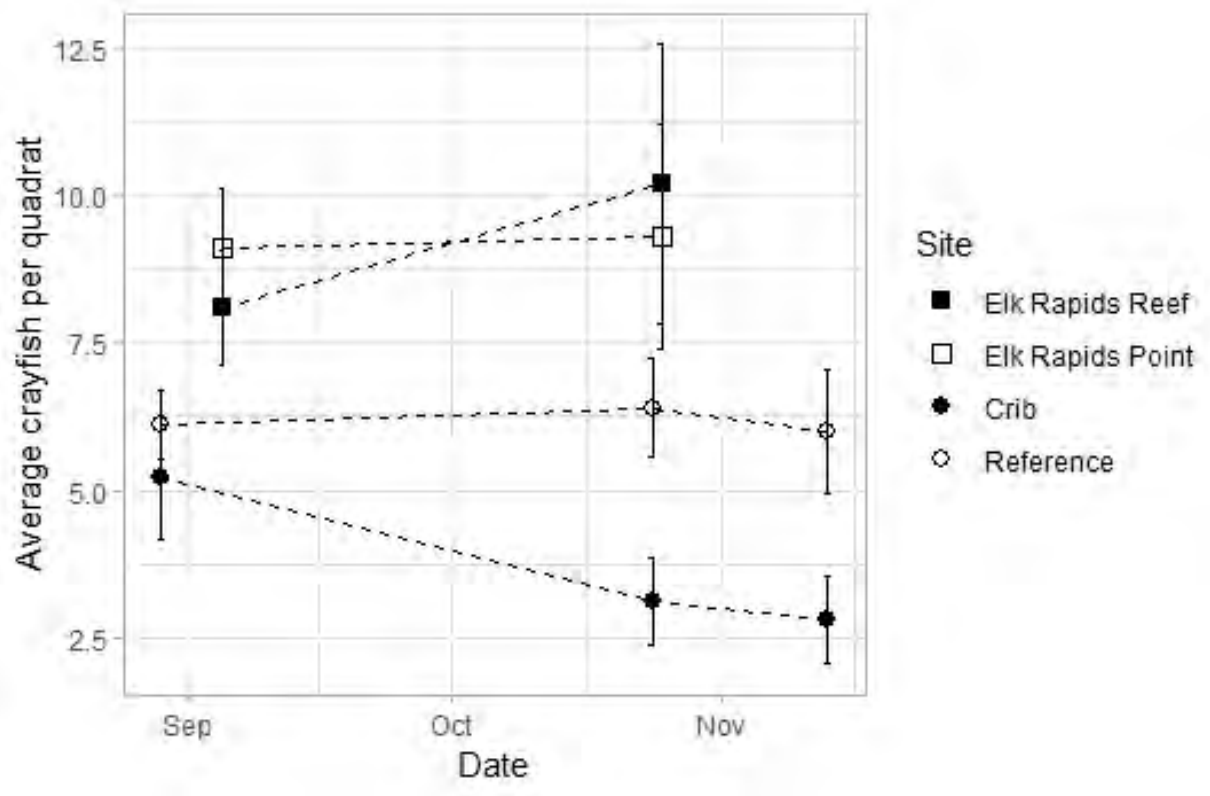




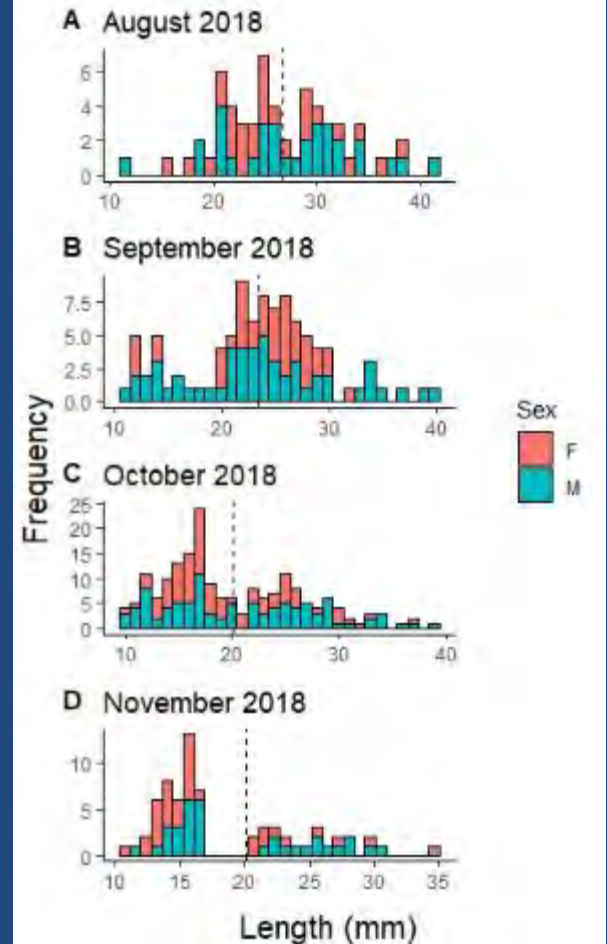
Google earth

Photos: J. Whalen

# 2018 Suppression Little Traverse Bay

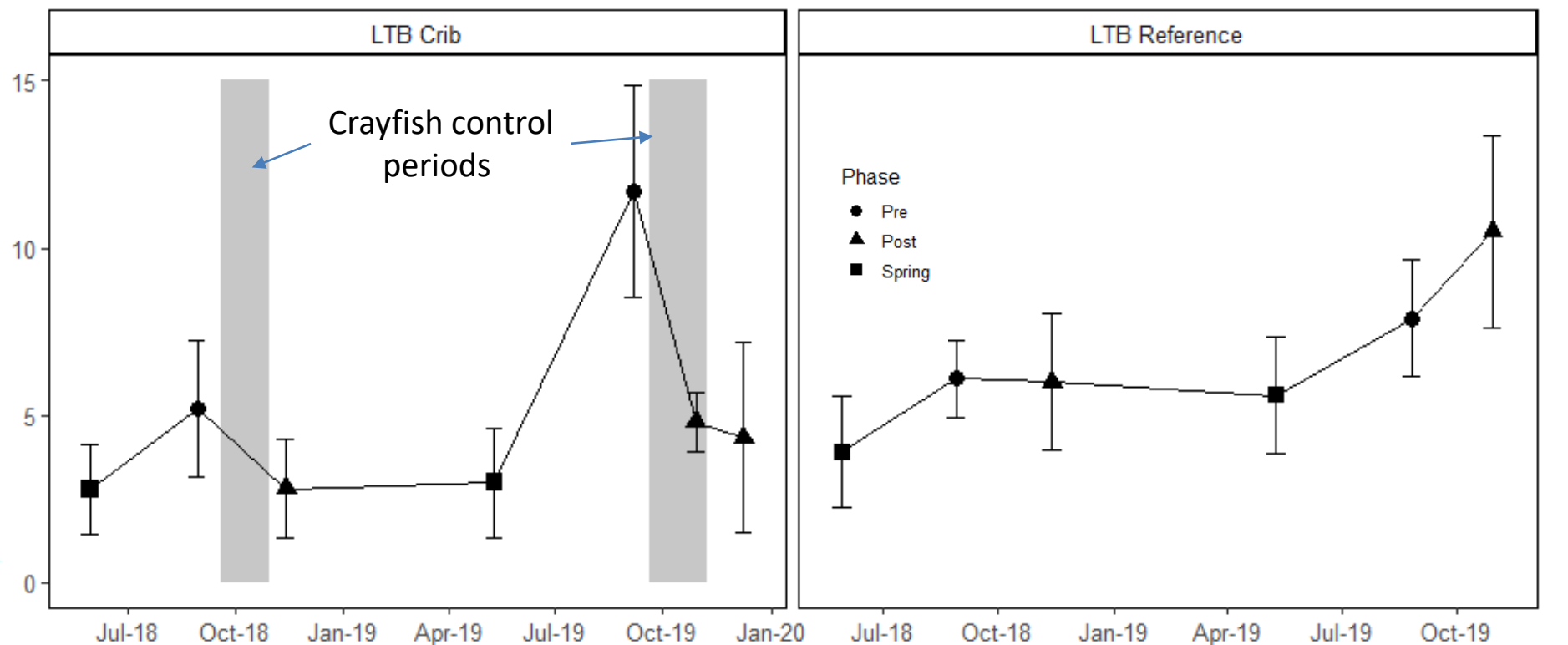


Quadrat densities

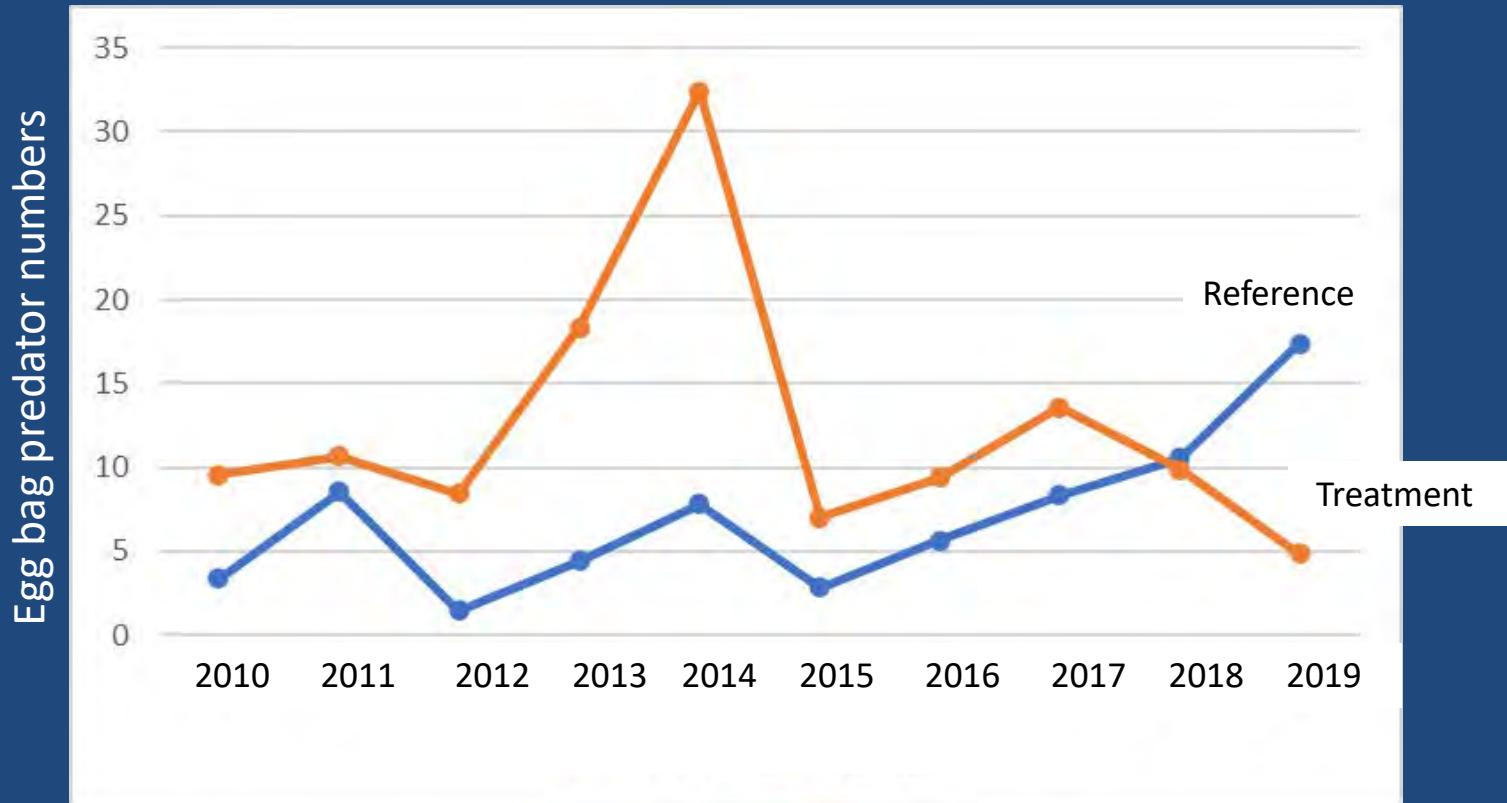


Length frequency of quadrat crayfish

# Rusty crayfish density Little Traverse Bay (2018-2020)

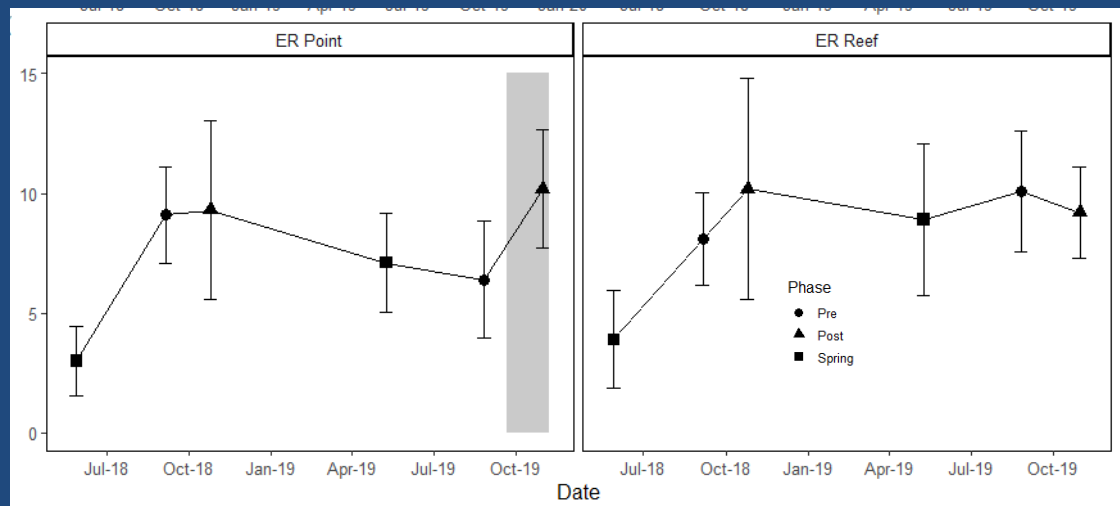


# Egg bag predator numbers (Little Traverse Bay)



# But....

- Suppression not sustained at second site
- Large effort required
- Effort and barriers difficult to sustain - especially when November gales come early
- Technology transfer to large-scale management operation will be difficult
- *“A work in progress”*



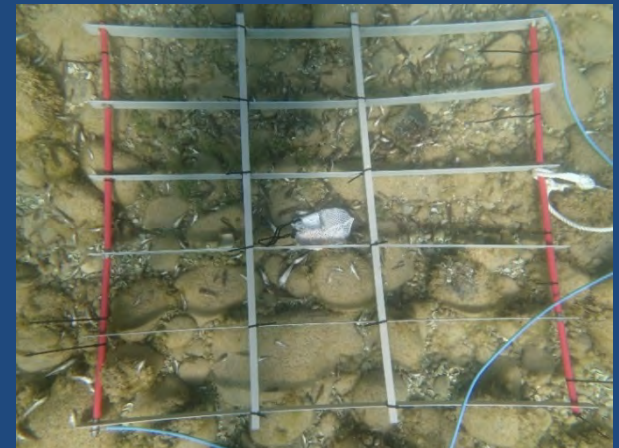
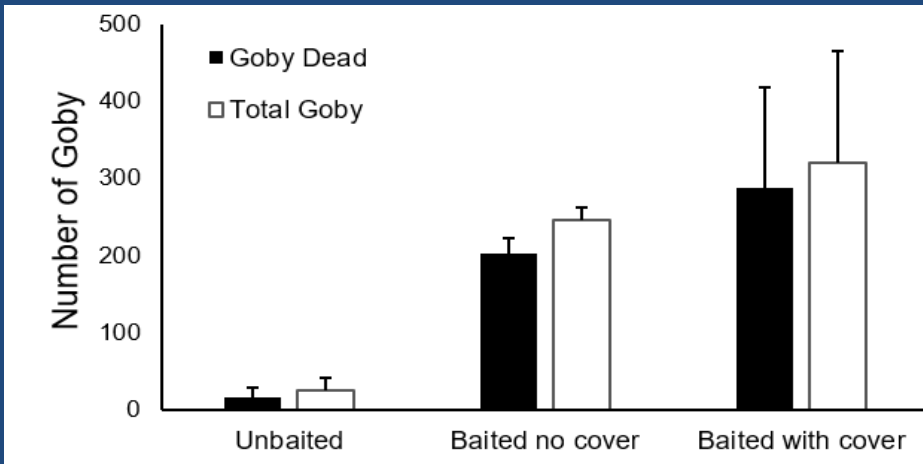
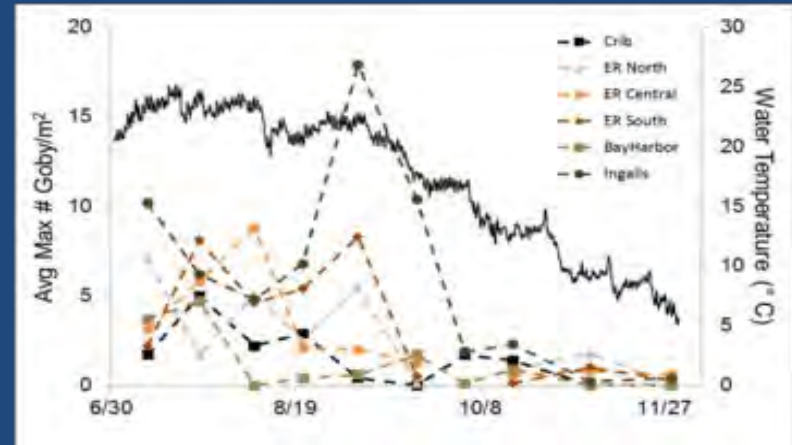


# Gobinator

- Observe similar fall behavior patterns
- Testing benthic electric suppression tool

Aim:

Determine if we can rapidly and cost effectively remove round goby off spawning reef and large enough buffer area to prevent recolonization prior to winter



*Collaboration with Jacksons Gross (UC Davis)*

# Good Harbor Reef Dreissenid Suppression

- Invasive Mussel Collaborative
- Experimental open water treatment of mussels on Good Harbor Reef
- Builds off work by University of Wisconsin-Milwaukee and Park service



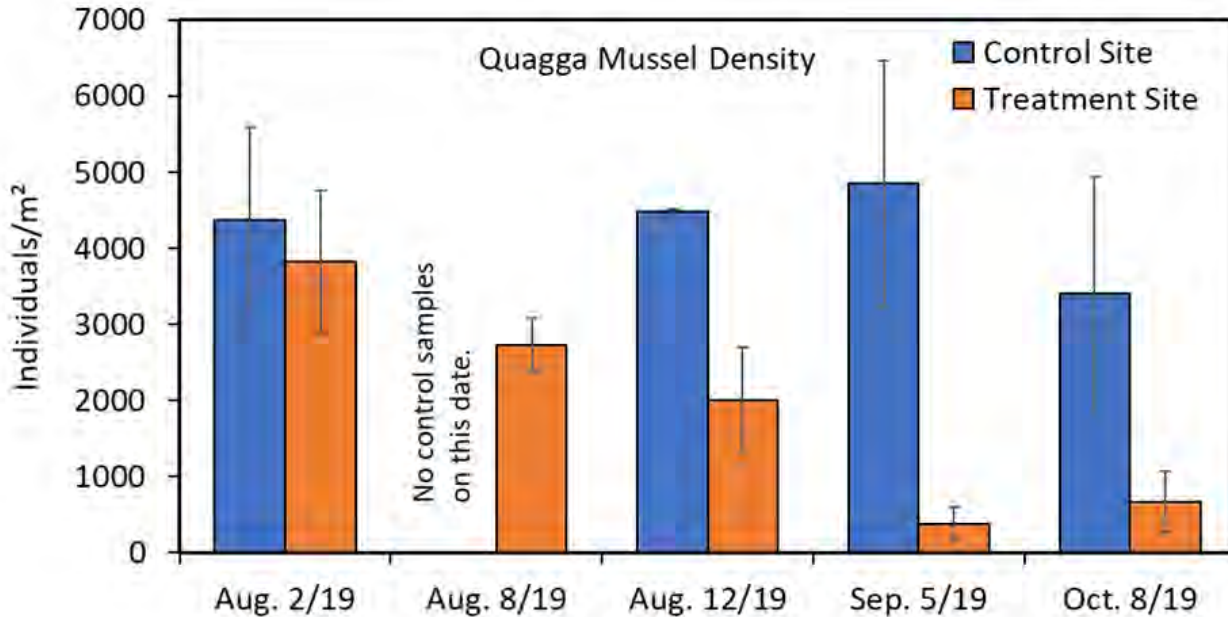
## Good Harbor Bay Dreissenid Mussel Control Demonstration Project Final Project Report

Prepared for:  
Great Lakes Commission  
and  
Invasive Mussel Collaborative Partners  
November 2020



# Experimental mussel treatment

Zequanox<sup>®</sup> biocide deployed beneath tarpaulins  
8 hr contact time

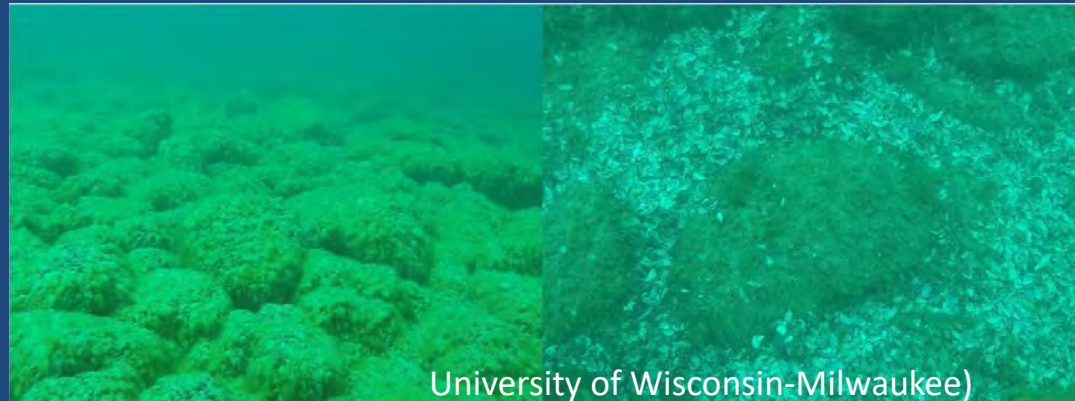


University of Wisconsin-Milwaukee)



<https://invasivemusselcollaborative.net/research-and-projects/imc-pilot-project-draft/>

Next step: How do we scale up?



University of Wisconsin-Milwaukee)



## Conclusions

- Making progress and results appear promising
- But the key challenge is whether we can scale suppression methods to facilitate larger scale management operations

Photo: J. Whalen



Thank you  
Questions