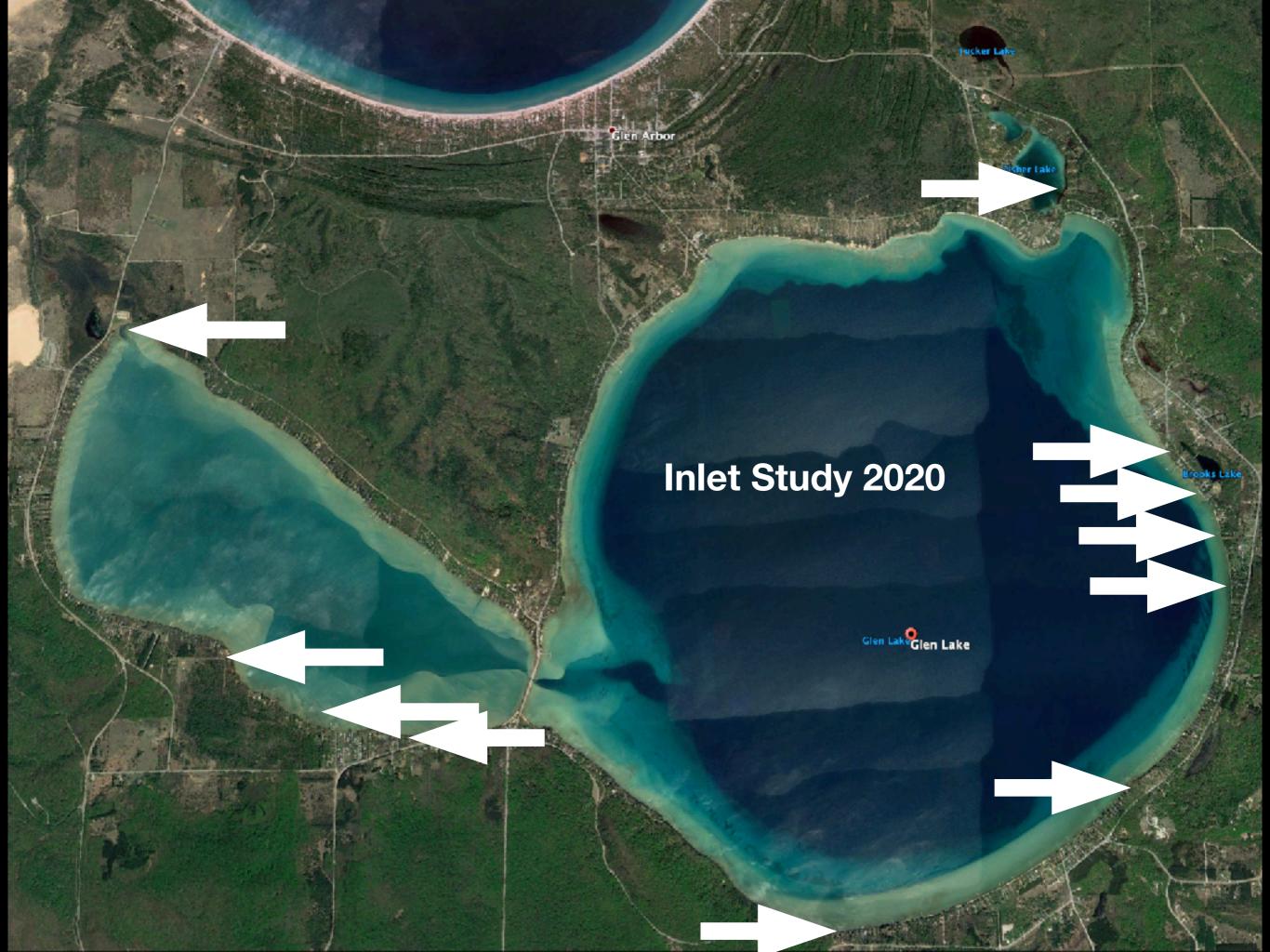


State of the Watershed Report 2020

Respectfully submitted by Rob Karner, Watershed Biologist

Annual Inlet Study 2020 Results

- 11 inlets were monitored for water quality (see map)
- Used Hydrolab to monitor water parameters Dissolved oxygen, pH, temperature, and conductivity
- Results all 11 sites look good and no problems were found



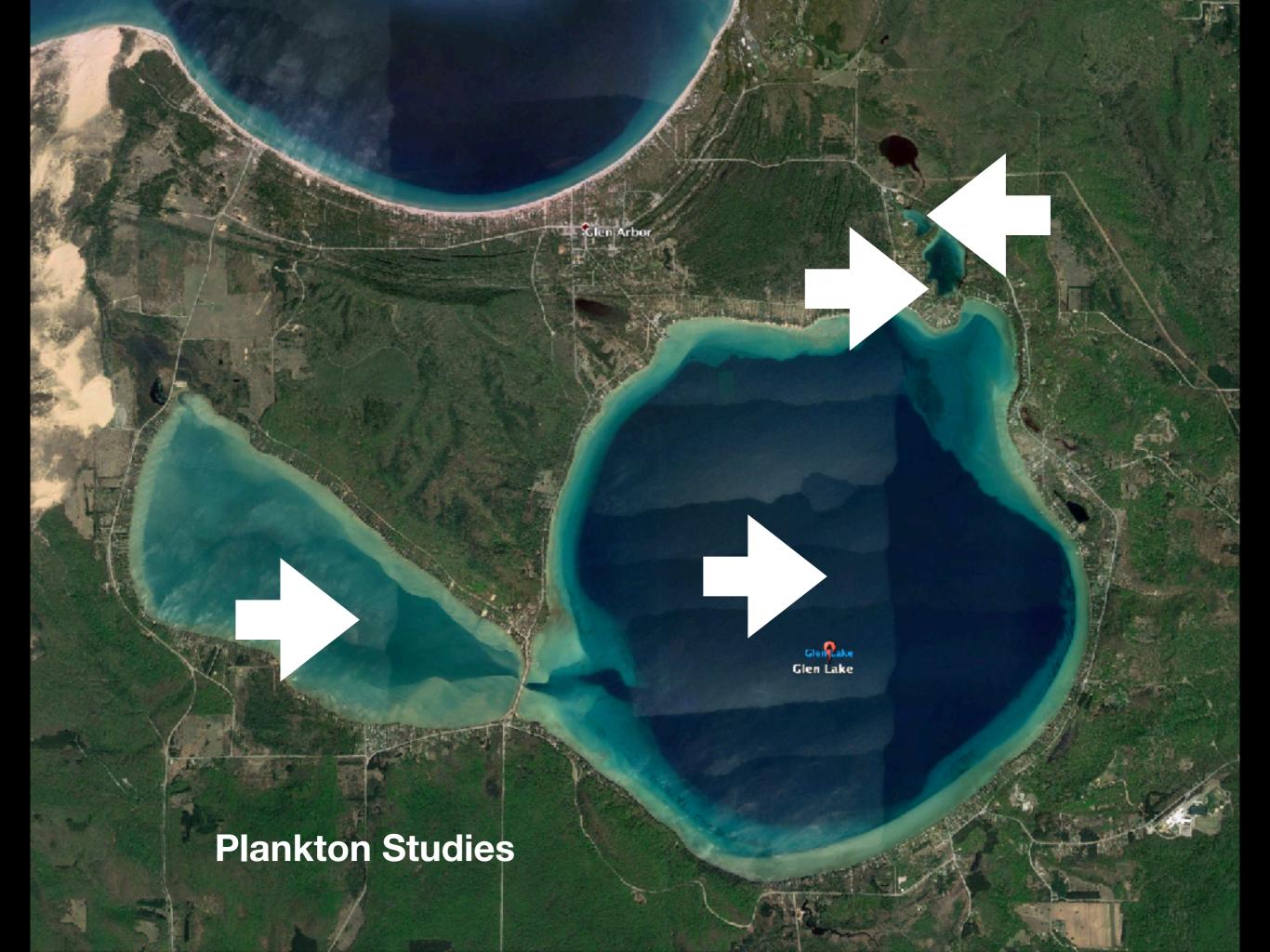
Hydrolab Studies Update

- Hydrolab used to monitor 9 sites (see map) every two weeks year round
- Temperature records set after 8 days of excessive heat in July
- Dead zone (no oxygen) in the deep basin of Big Glen continues to signal trouble



Plankton Studies Update

- Plankton sampled every month in four deep basins from April to November (see map)
- Species diversity seems to be down in all lakes
- Collaboration has begun for Lime Lake on plankton studies

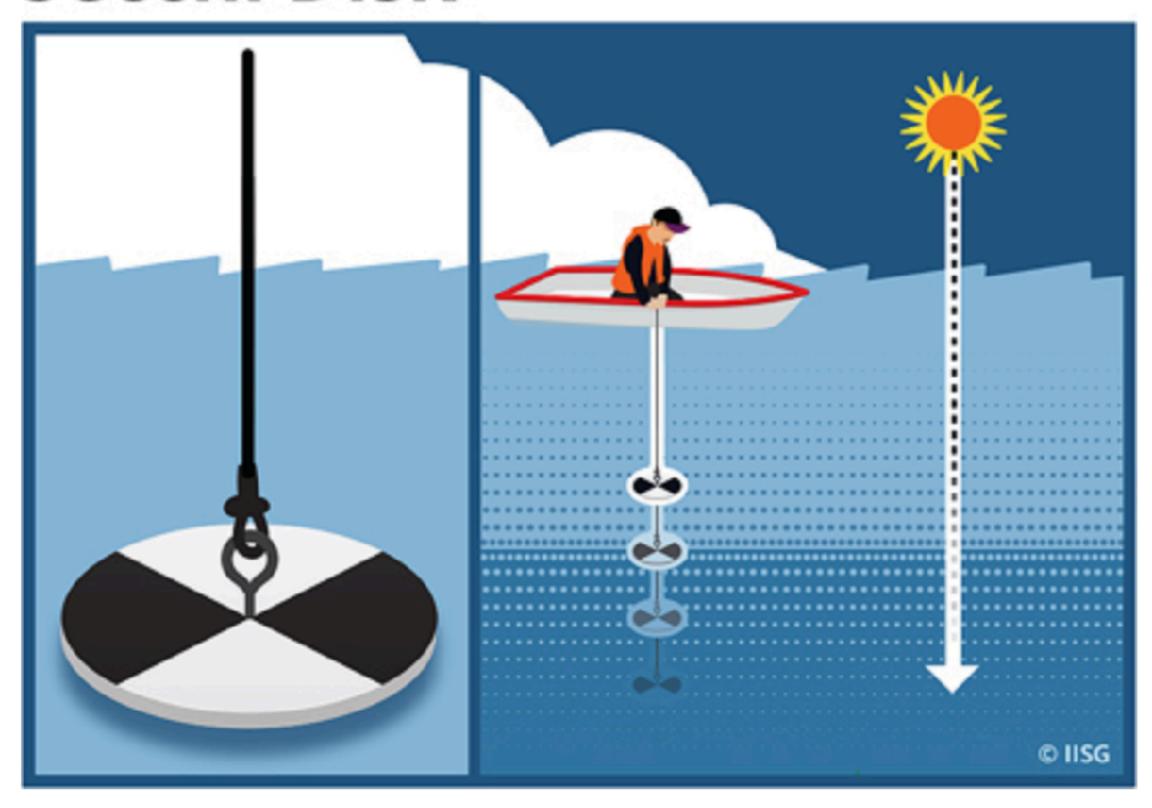




Cooperative Lake Monitoring Program Update

- State funding for this long standing program was not allocated for 2020
- There is promise for future funding and the start up of the program in 2021
- Secchi Disk, Spring and Fall Phosphorous, and aquatic plant surveys are the parameters that are used to monitor water quality

Secchi Disk



Terrestrial Invasive Species Update

- Yellow Iris is spreading
- Phragmities seems to be under control
- Purple Loostrife
- Coltsfoot





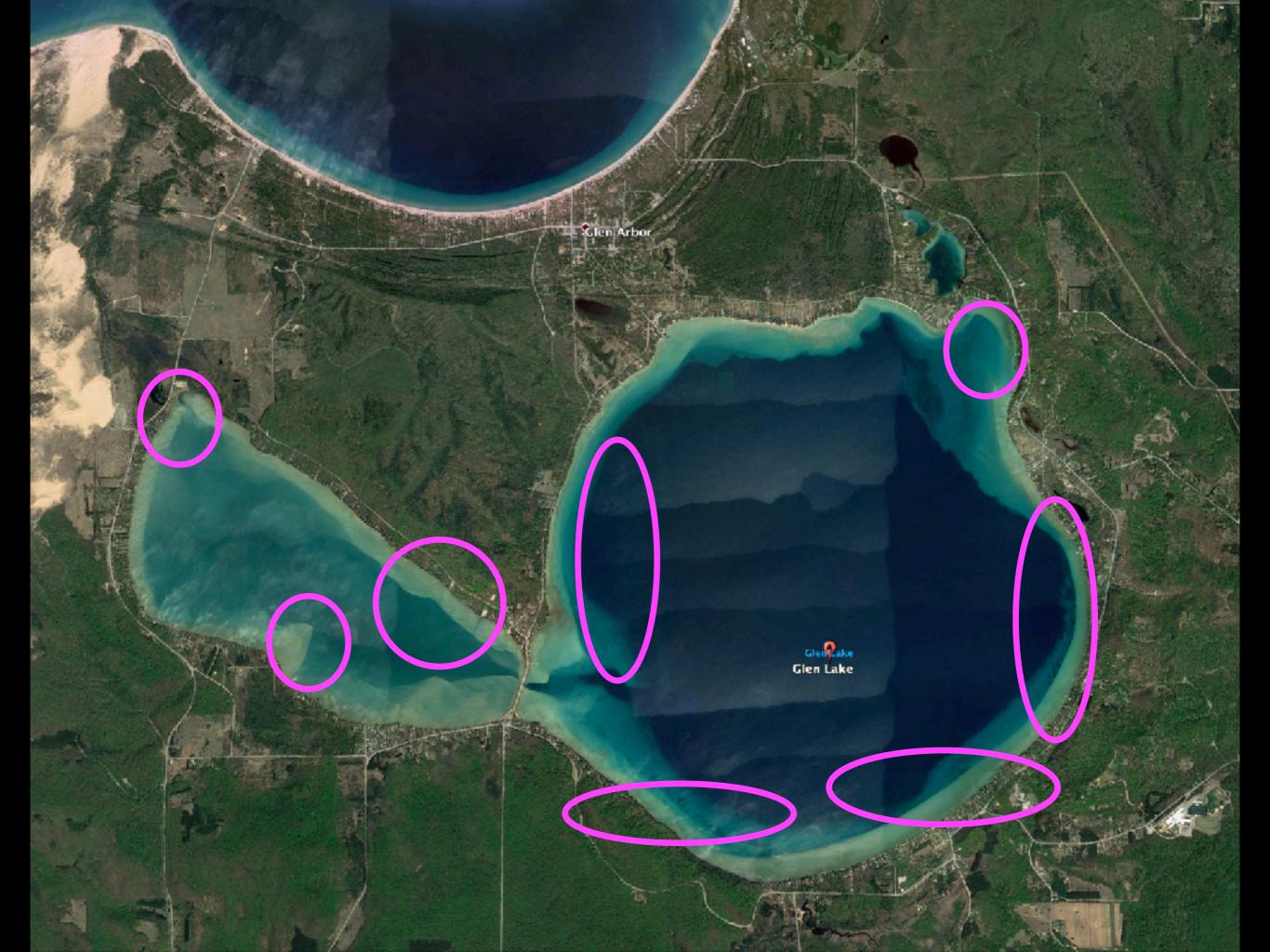
Aquatic Invasive Species Update

- Curlyleaf Pondweed
- Native aquatic plants are in good shape
- Eurasian Water Millfoil, Starry Stonewort, and Hydrilla are the most likely to invade



Aquatic Garden Monitoring Update

- GLA monitors all aquatic gardens in the Glen, Brooks, and Fisher Lakes
- No invasive found in 2020!
- Monitoring also by rake toss and shoreline survey via drone







Discovery Boat Update

- No 2020 in-person program
- Virtual program on Glen Lake YouTube Channel
- Plans to resume program in 2021
- Thanks for financial support from the Besio Family



The Glen Lake/Crystal River Watershed Overlay District...

6 views • 1 week ago



Discovery Boat - Snails and Clams of Glen Lake

6 views • 2 weeks ago



Discovery Boat - Geology of Glen Lake/Crystal River...

2 views • 2 weeks ago



Discovery Boat -Phosphorous Sampling on...

2 views • 3 weeks ago



Discovery Boat - Swimmer's Itch Prevention

30 views · 3 weeks ago



Glen Lake Association -Staff Interviews

No views - 3 weeks ago



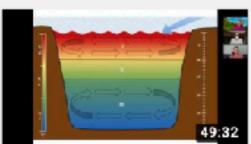
Discovery Boat - Swimmer's Itch on Glen Lake

1 view • 3 weeks ago



Discovery Boat - Plankton in Glen Lake

No views · 3 weeks ago



Discovery Boat - Monitoring the Chemistry of Glen Lake

1 view • 4 weeks ago



Glen Lake/Crystal River Watershed Overlay District

34 views • 1 month ago



Discovery Boat - Plankton Tow

3 views • 1 month ago



Glen Lake/Crystal River Watershed Overlay District...

21 views • 1 month ago



Discovery Boat - The Fish of Glen Lake

7 views • 1 month ago



Discovery Boat - Aquatic Plants of Glen Lake

No views • 1 month ago



Watershed Overlay District Presentation 2020

8 views • 1 month ago

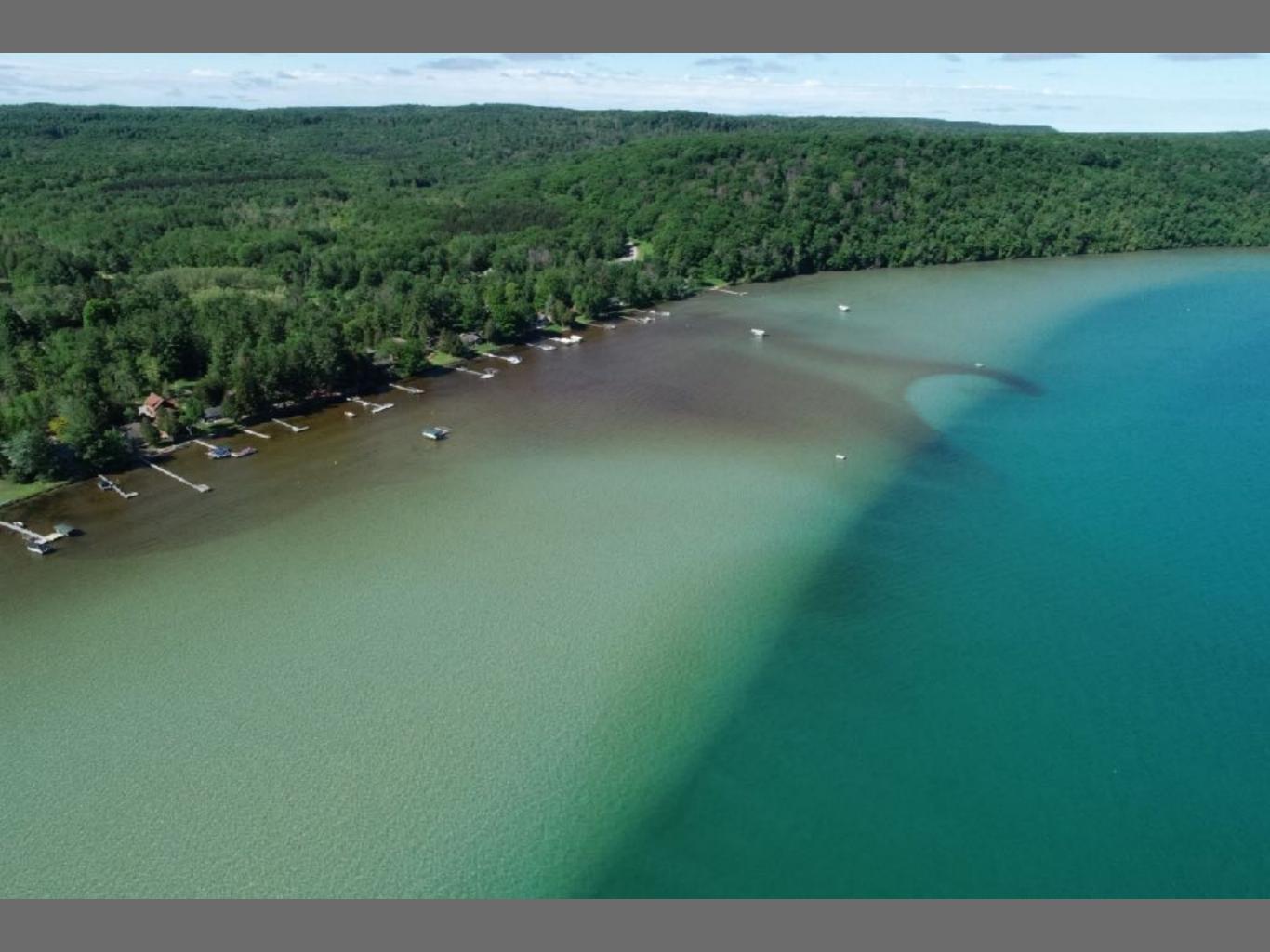


Recreation on Glen Lake -Winter Paddle on the Cryst...

177 views • 6 months ago

Hatlem Creek Subwatershed Update

- Pond is being monitored for fill rate
- Next planned dredge is 2029
- Plans to modify the current dam are underway
- Naturally occurring tannins cause the water to turn brown after significant rain events but siltation has been greatly reduced due to the dredge project



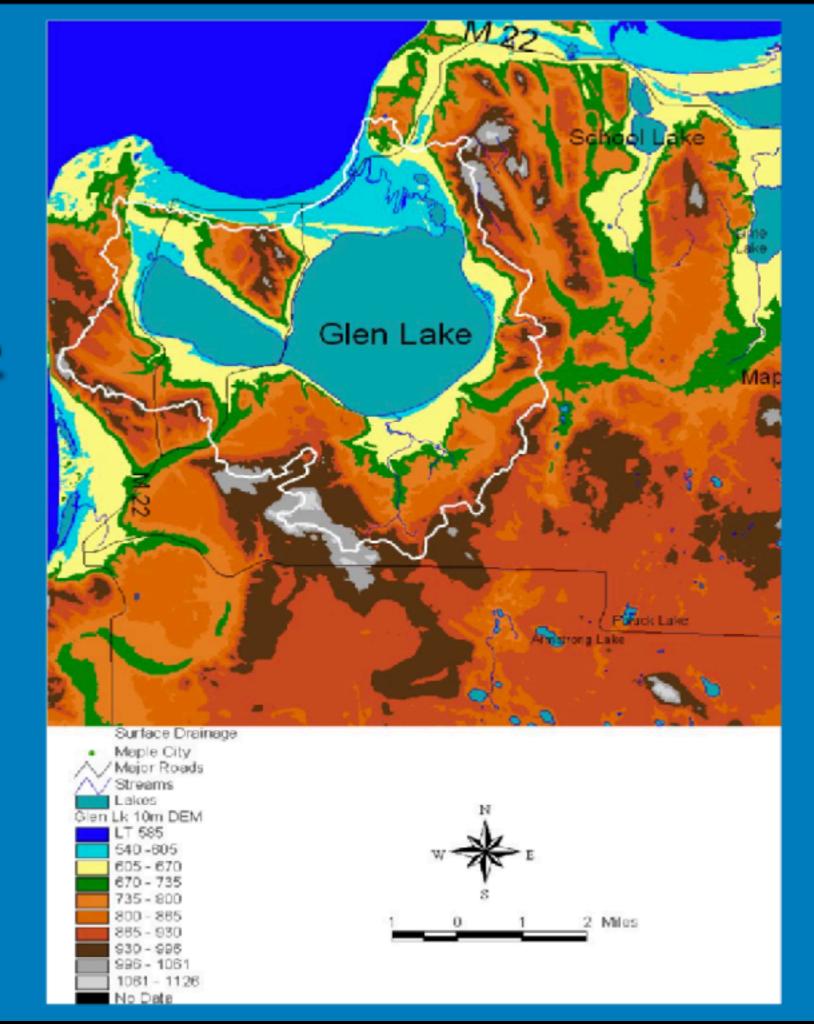
Watershed Protection Plan Update State Program

- 10 year old plan is being updated and will be finalized in 2021
- 12 member Steering Committee is working to gather data and give input for new plan
- An updated plan will help position the GLA for future grantfunded for projects
- A \$25K grant is helping the GLA offset costs to update the plan

Glen Lake -Crystal River Watershed

Surface Drainage

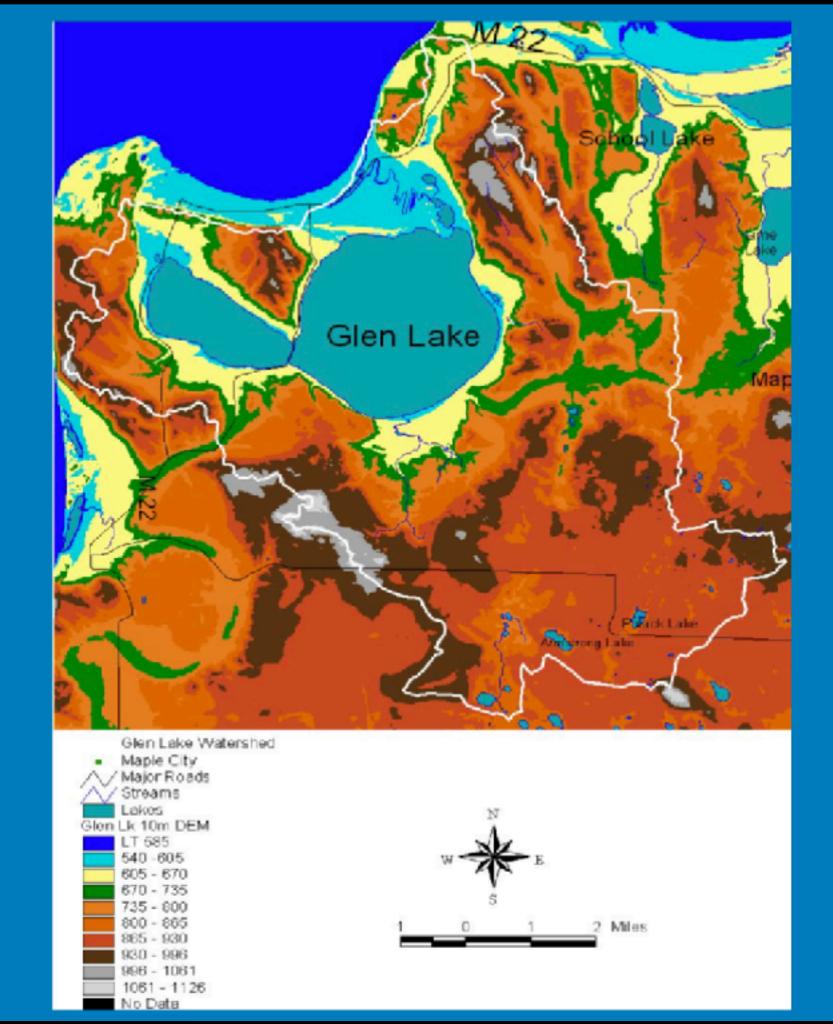
32.2 Sq Miles



Glen Lake -Crystal River Watershed

Groundwater

59.7 Sq Miles

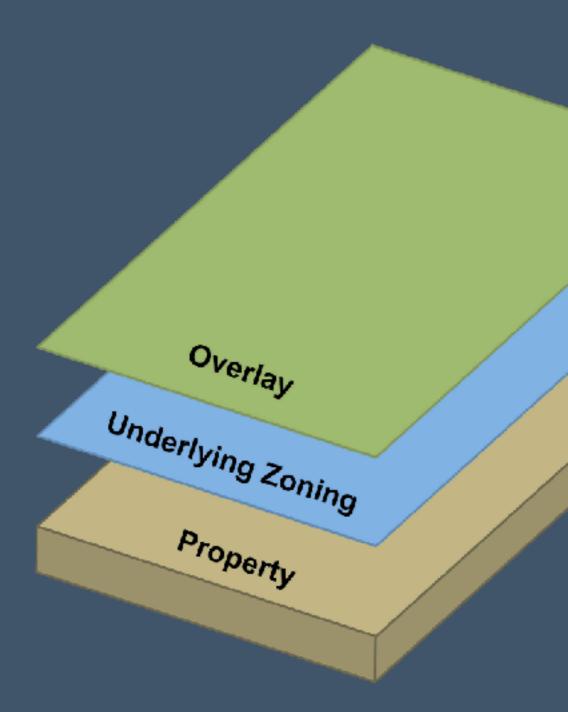


Watershed Protection Project Overlay District

- This three-year collaborative effort will help guide future development in our watershed
- Goal: To protect both surface and ground water
- Involves all four townships in our watershed Glen Arbor, Empire, Kasson, and Cleveland
- Planning commissions of the four townships will begin to work on the provisions of the overlay this fall with help of a hired consultant

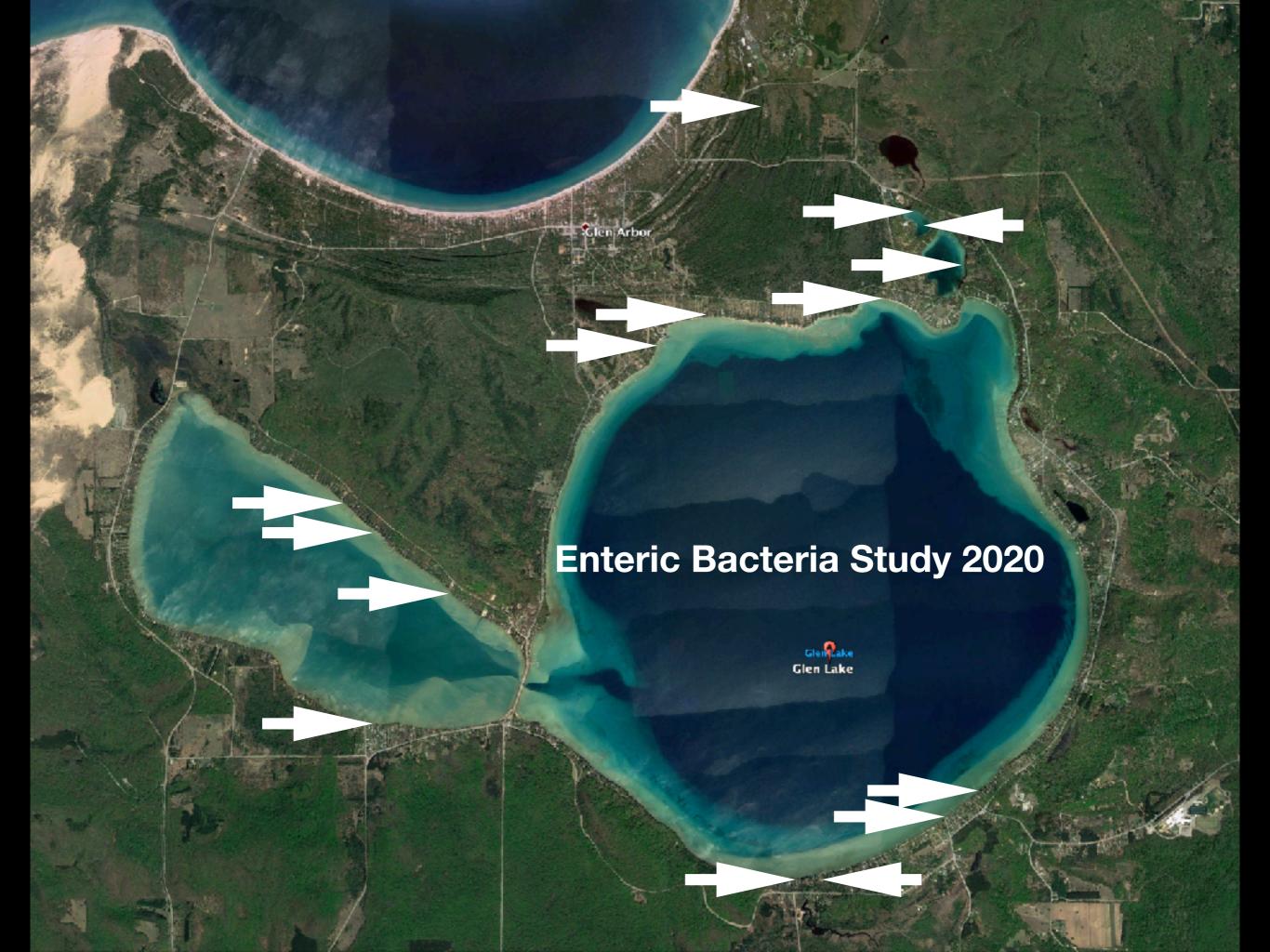
The Overlay District

- In an overlay district, development must:
 - Meet all the conditions of the underlying zoning district and
 - The supplemental provisions of the overlay district



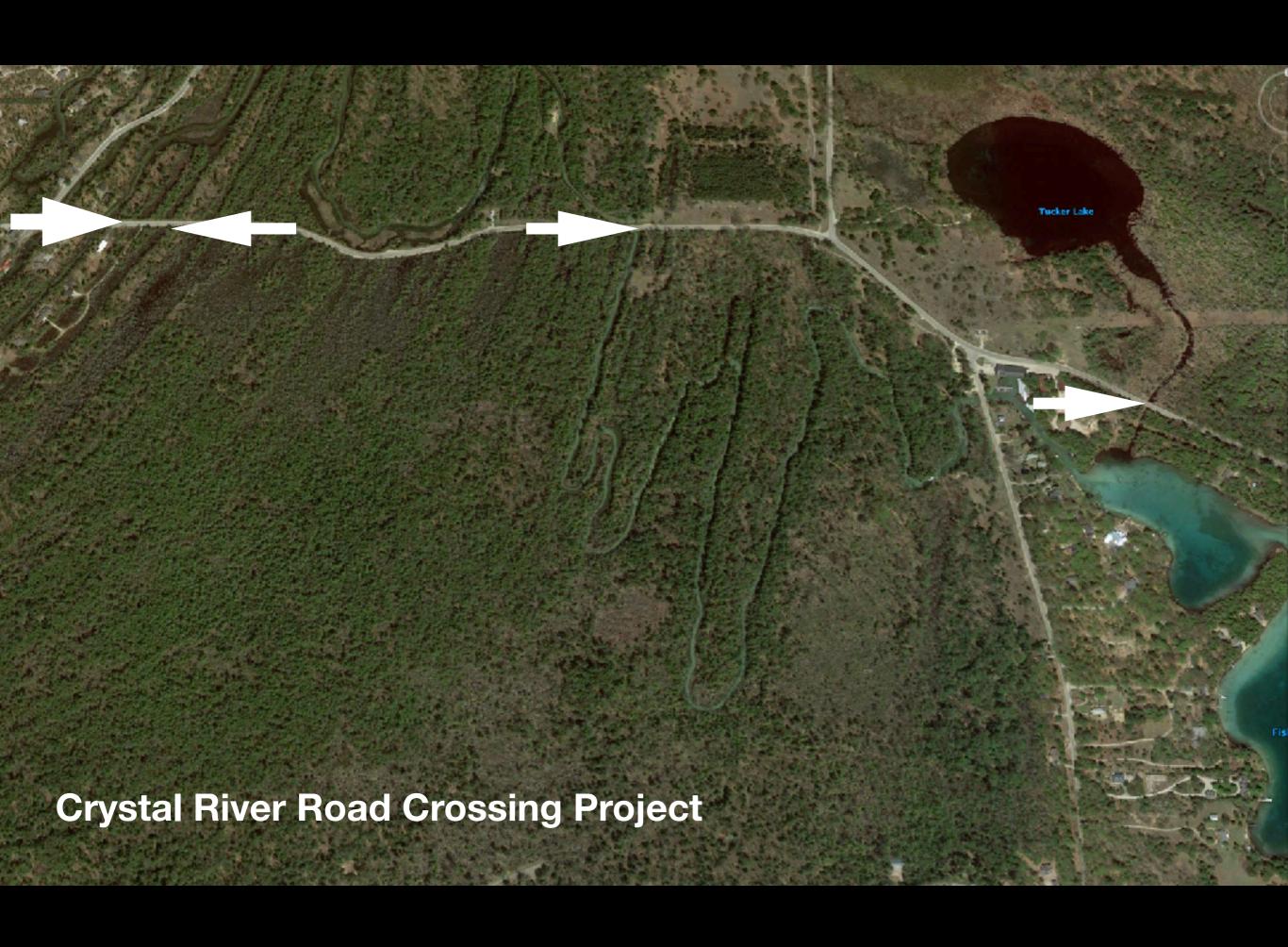
Enteric Bacteria Study 2020 Update

- 15 volunteers at 15 different sites around the watershed (see map)
- Test the ground water (well) and surface water (lake/stream) for septic influences
- Test septic system functionality via drone and infrared camera
- Multi-lake and three-year study



Crystal River Road Stream Crossing Project Update

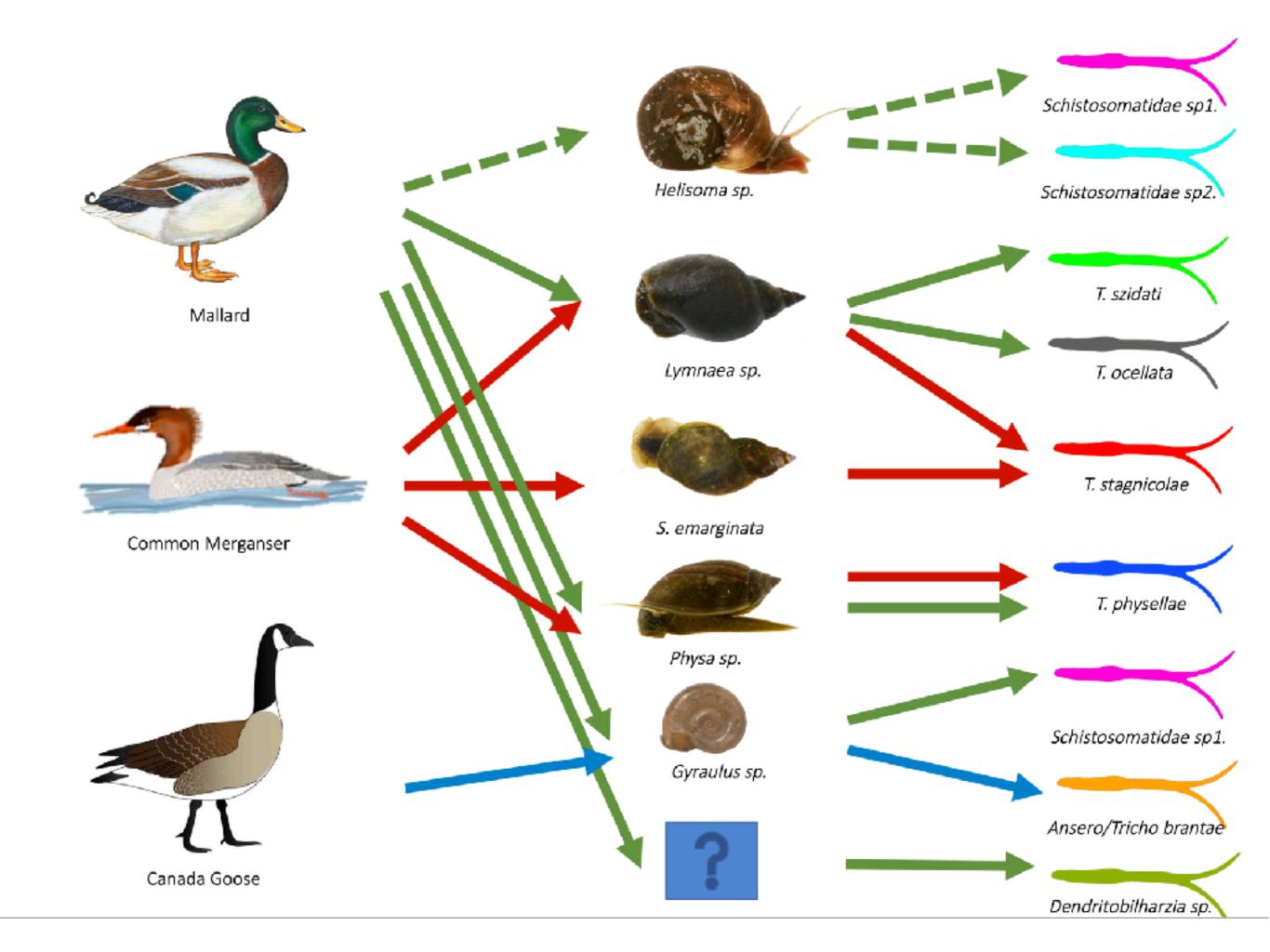
- Four new bridge spans to replace culverts
- Improve rive health, fish habitat and native fish passage
- Improve safety for paddlers
- Grand Traverse Band of Ottawa and Chippewa Indians is leading the project with analysis, design, and funding support



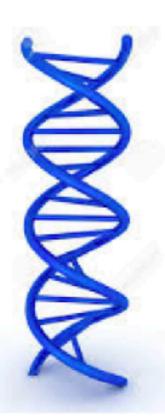
Swimmer's Itch Research Update

- Glen Lake, Lake Leelanau, and Walloon Lake are in the study
- Each lake has ten sites where water samples are taken weekly
- Study runs from May through October
- Goal: Determine parasitic profile of lakes







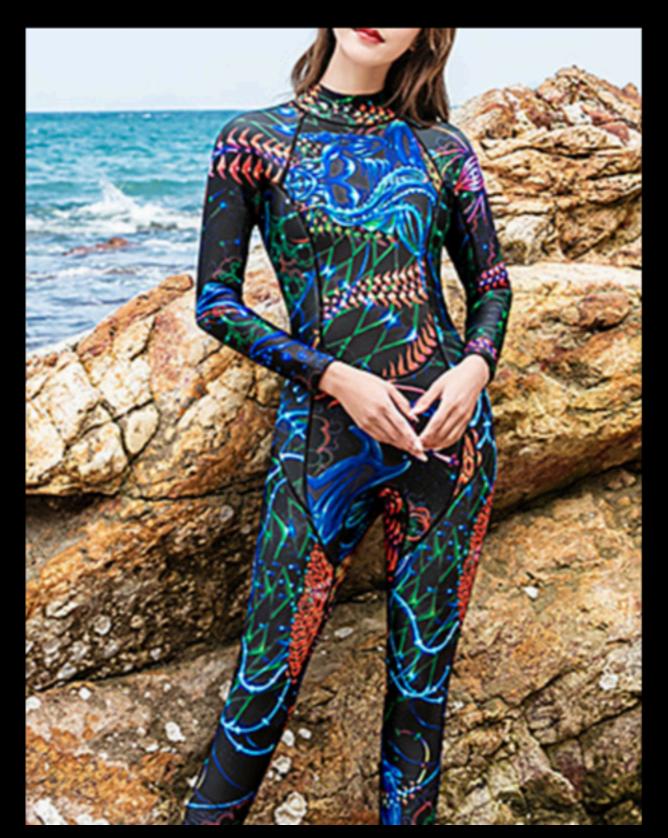




Swimmer's Itch Prevention Update

- Multi-media effort to promote prevention of itch
- A variety of prevention strategies are being promoted
- Possible 2021 research may be undertaken to measure the effectiveness of each strategy
- The heart of the prevention strategy is swimming smart

RASH GUARD- TEENS

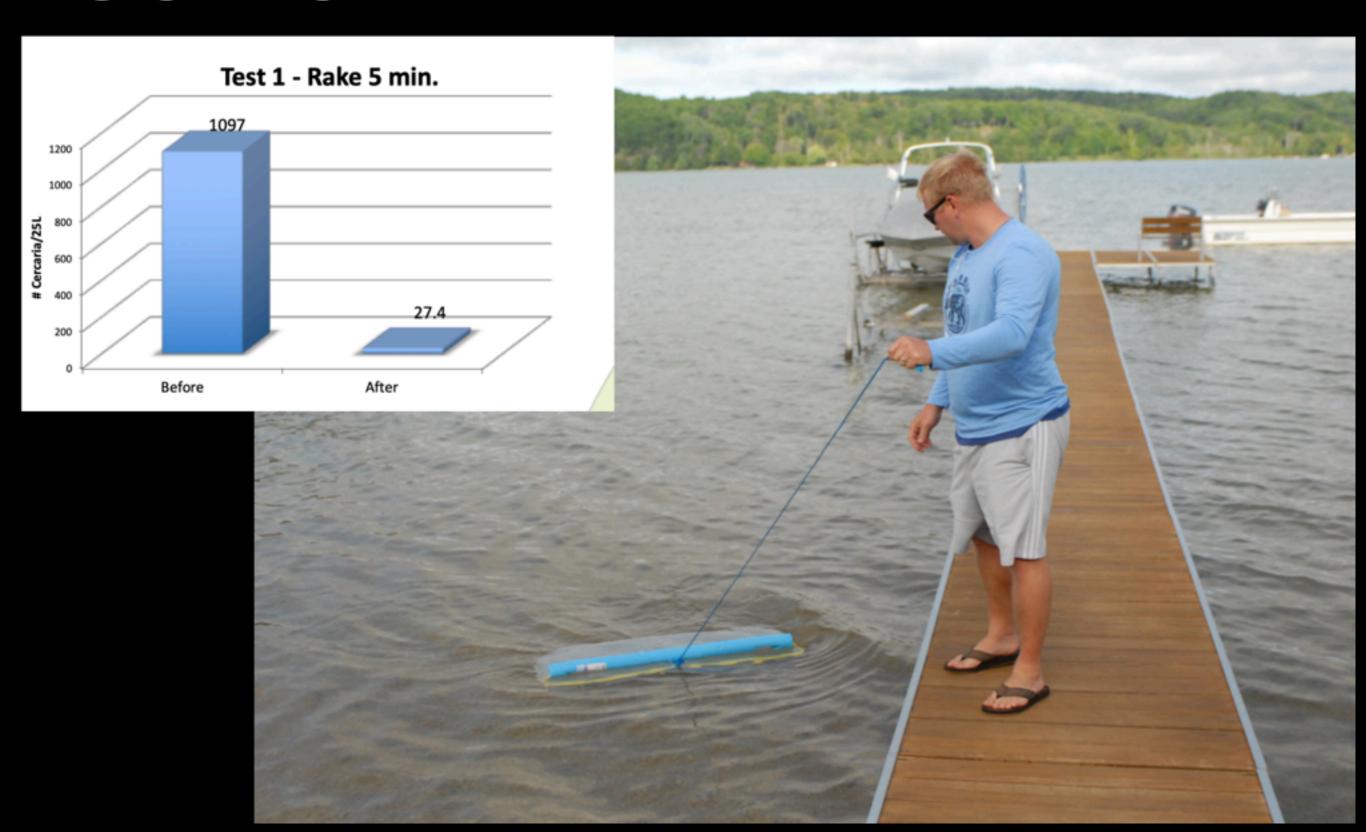


USE SKIMMER



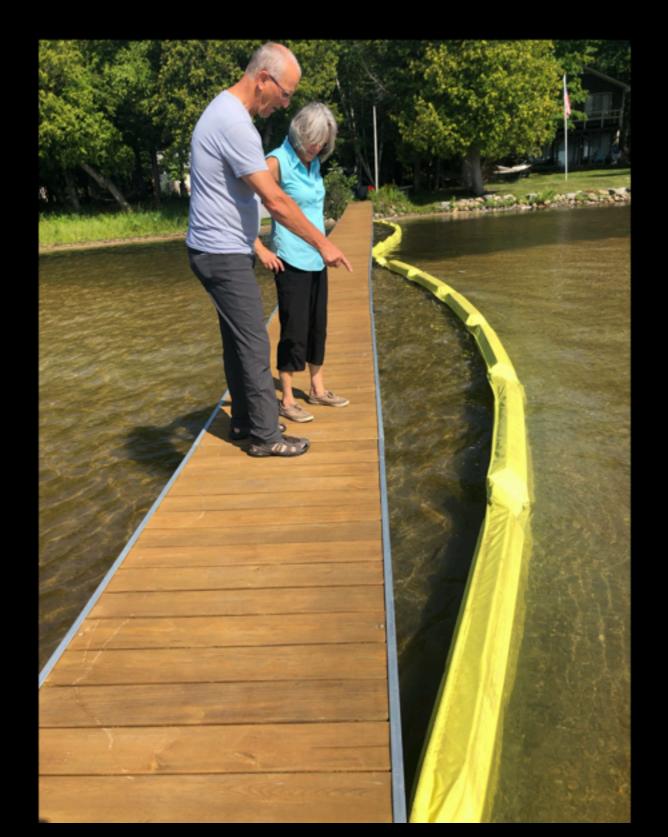
SWIMMER'S ITCH PREVENTION

USE SKIMMER



SWIMMER'S ITCH PREVENTION

USE BAFFLE



Shoreline Surveys 2020 Update

- A new experimental shoreline survey was conducted on the north shore of Big Glen to determine if coltsfoot can be mapped
- State of Michigan Department of EAGLE has chosen Glen Lake's shoreline survey as the "model" for establishing guidelines for other lakes to use
- Data analysis from the 2017 and 2019 surveys is ongoing.
- Next shoreline survey will be in 2021







Experimental Drone Work Update

- Timing of drone work for coltsfoot was done during bloom and no infestations were found
- Next step? Fly drone over shoreline after bloom when leaves are huge
- Other small infestations were found "Donkey Tail Spurge" and "Yellow Iris" and "Autumn Olive"



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