

Density of *Dreissenid* mussels at different depths in Torch Lake, 2023

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INTRODUCTION

Background info

What are these mussels?

- Zebra mussels are mollusk native to the fresh waters of Eurasia. Quagga mussels are also a species of freshwater mussel that originated in Ukrainian rivers.

What do these mussels do?

- Filter lots of water and feed on nutrients in the water column.



Previous studies that have helped us and their limitations.

- ❑ Previous intern studies that have led to our study today- didn't focus their study on mussel densities
- ❑ Tip of the mit study (2015)- lacked system/ only looked at few depths
- ❑ Aerial photography- doesn't provide info about mussels
- ❑ DNR study (2015)-were looking for invasive species not specifically mussels
- ❑ Lake michigan study- not Torch Lake

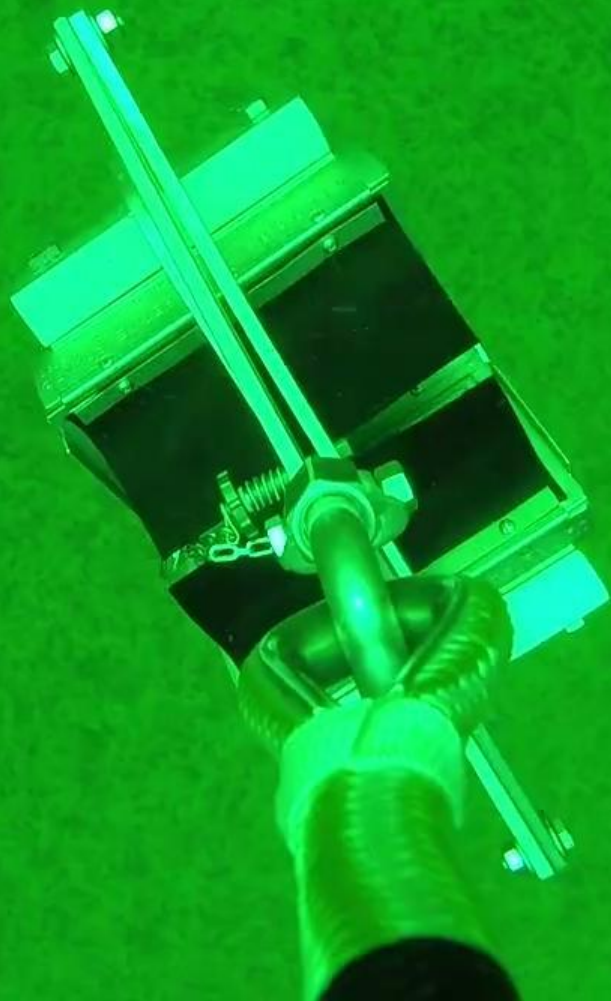
Why are we doing this?

We were trying to answer our three main research questions. These questions are meant to help us try and predict the outcome

1. What depths are Quagga mussels most common in Torch lake?
2. What densities of quagga mussels do we find in Torch Lake?
3. Could the density of mussels be high enough to influence nutrient availability in Torch Lake?
4. Is there any correlation between the presence of quagga mussels, zebra mussels, and GBA?



METHODS

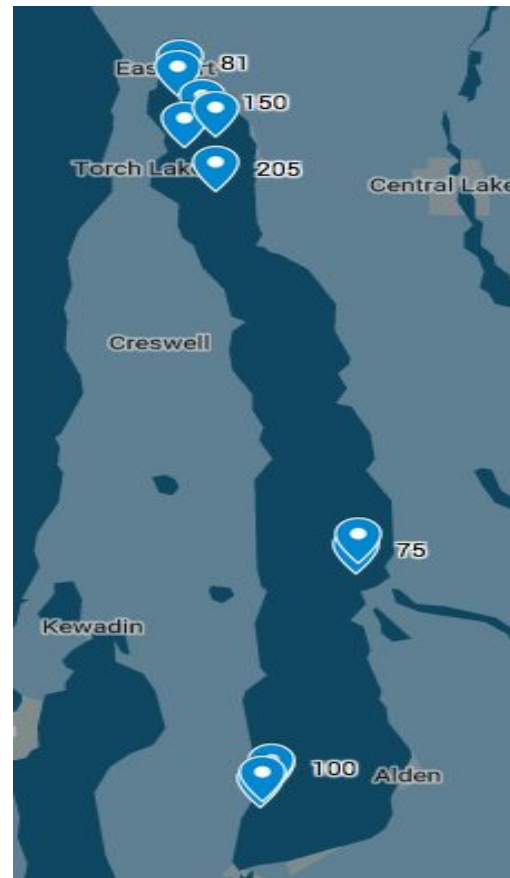


We sampled:

- 5 transects
- depths of 10, 30, 75, 125, and 175 ft
- 2 samples at each depth



2023 Study Design



2022 Sample Locations

Processing system

1. Ponar is emptied into a bin
2. Sample is poured through a sieve
3. Live mussels were put into a container
4. Other species found in sample recorded
5. Bins, sieve, and Ponar rinsed in the lake.

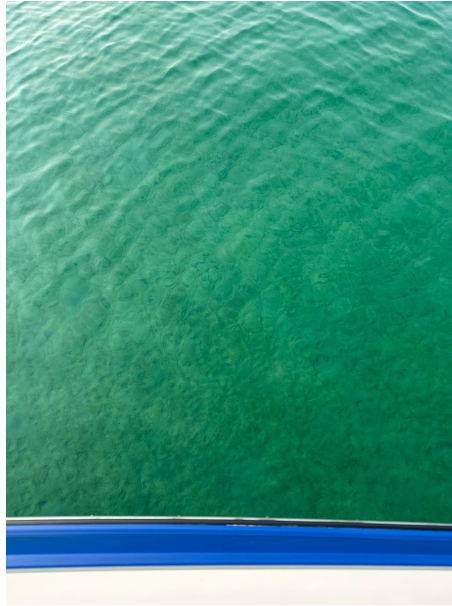


1. Mussels were separated into two categories, zebra and quagga
2. Mussels were then measured and sorted into groups of 5mm.
3. Mussels were preserved in alcohol.

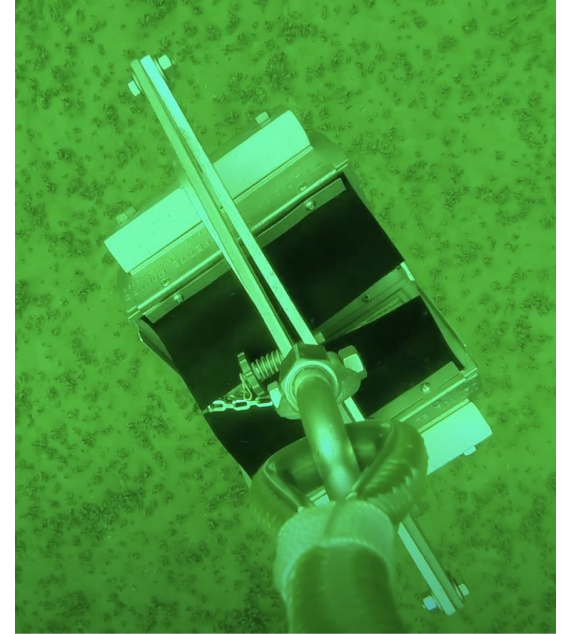


Sediment, GoPro, and GBA

We took photos of the sediment and golden-brown algae.

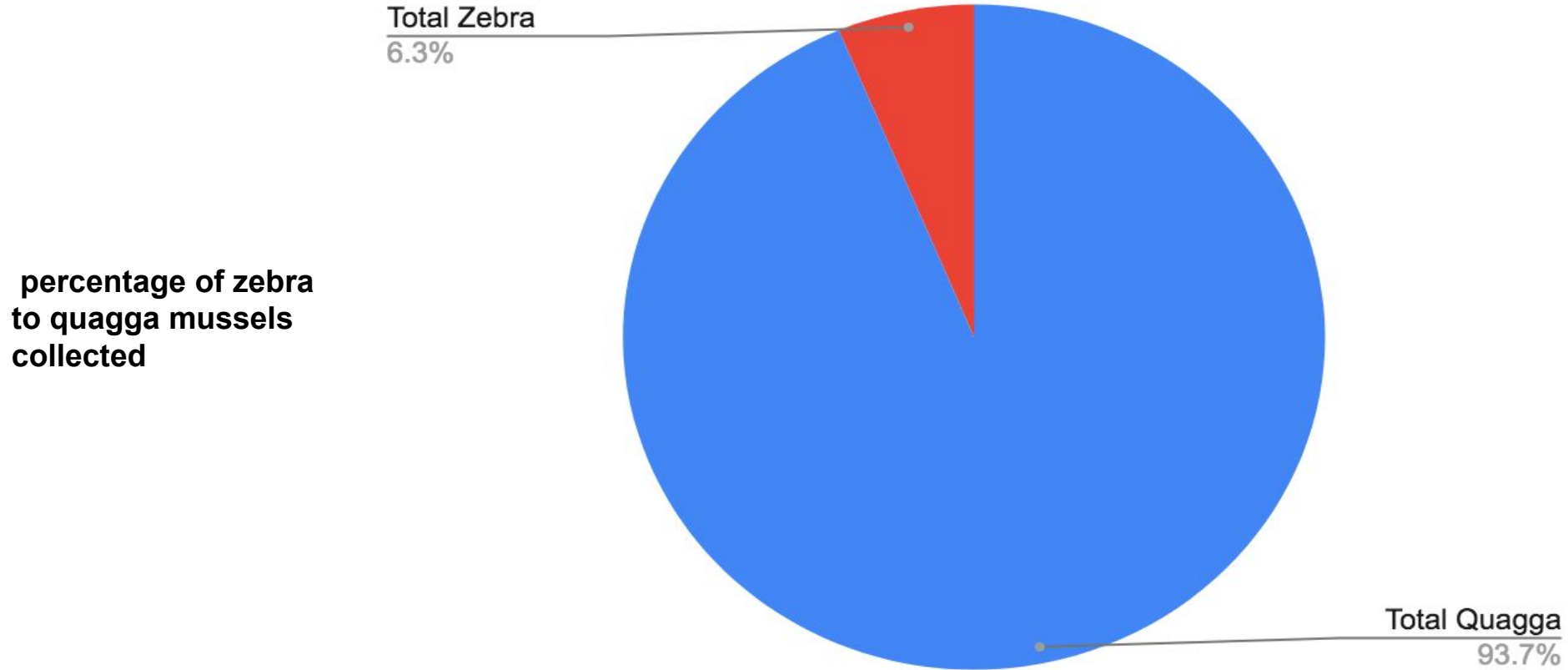


We took GoPro
footage



RESULTS + CONCLUSION

% Zebra vs % Quagga



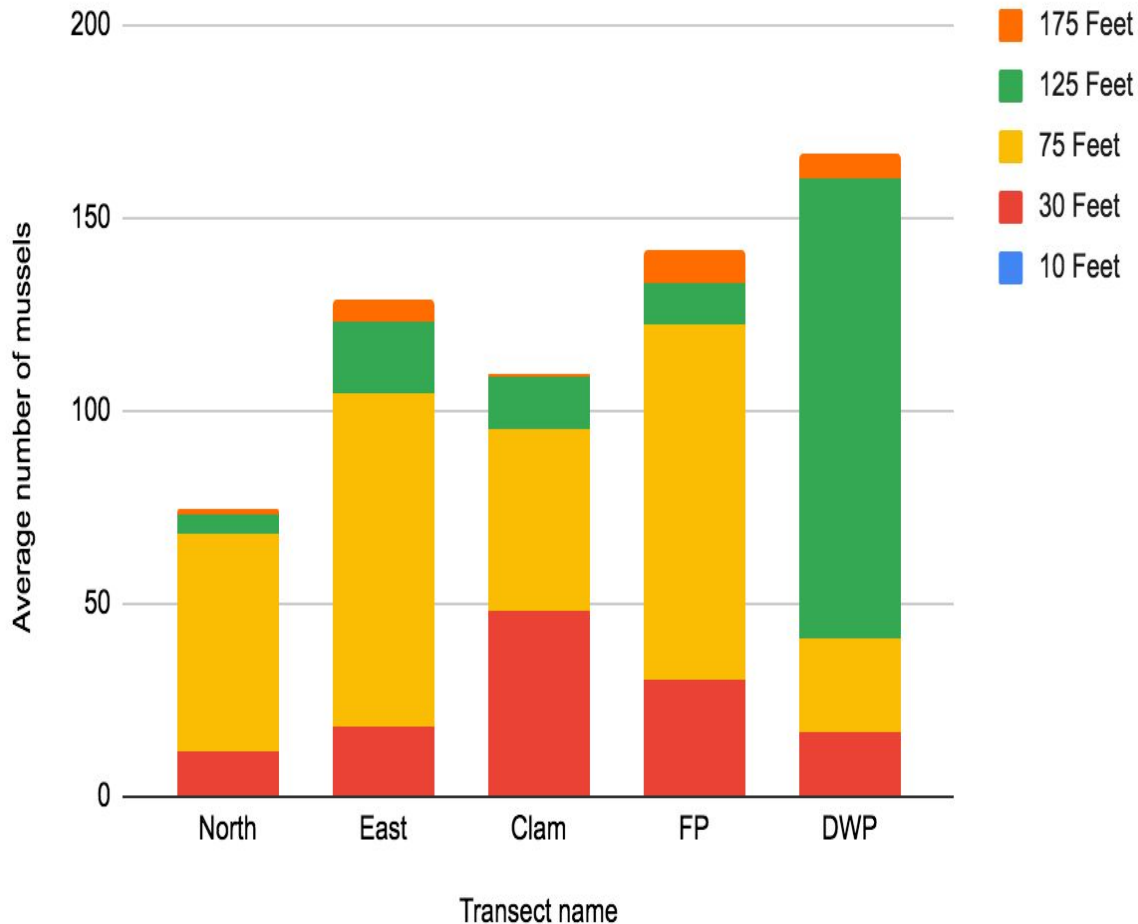
Where are they most common?

Most common at 75 ft.(except at deep water point)

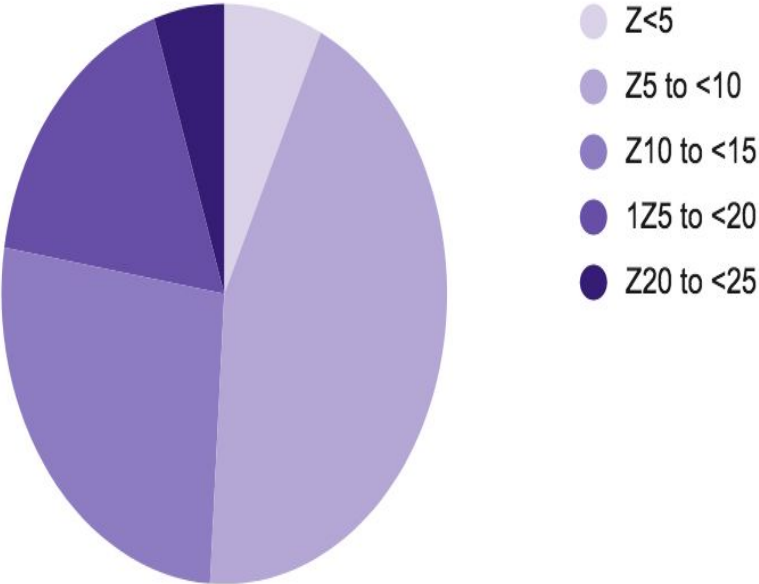
Where are they least common?

Least common at 10 ft. least amount total at the north transect.

Number of mussels per depth per transect

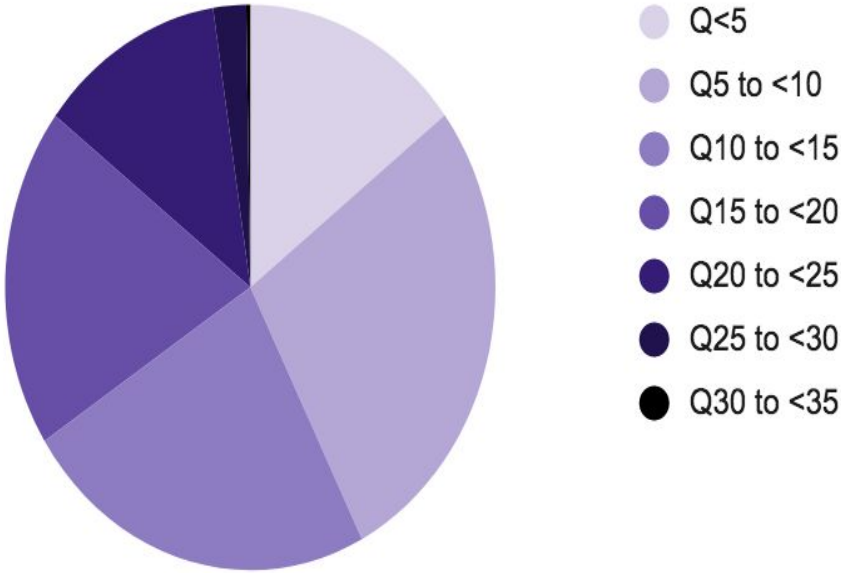


Average Zebras found in each size cate...



average zebras found in each size category

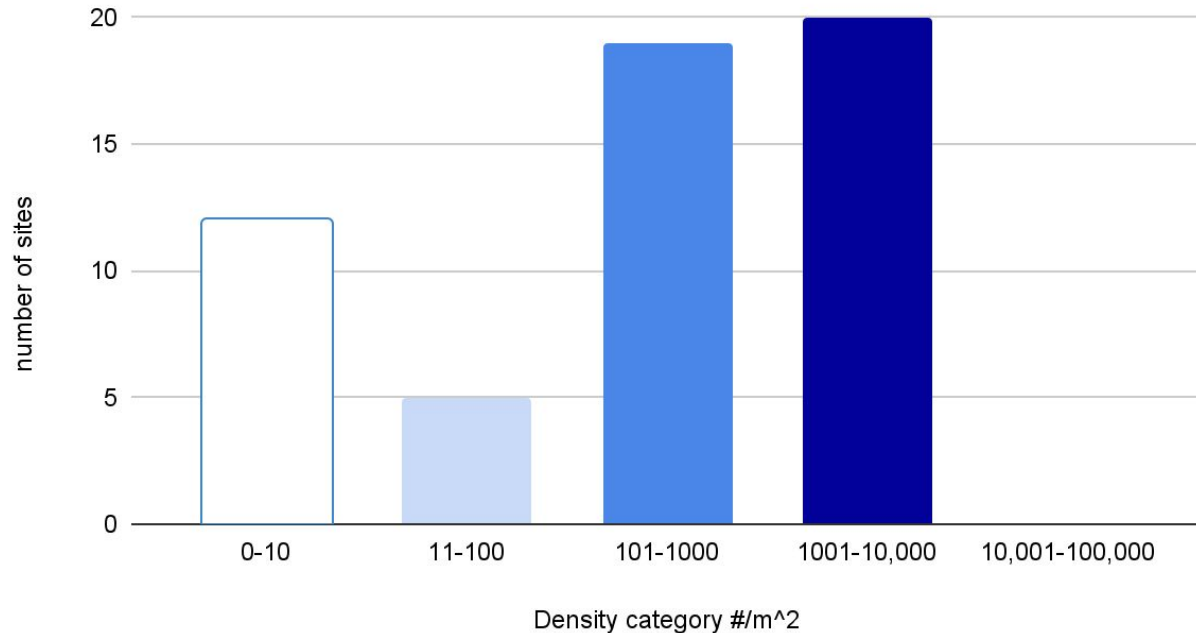
Average Quaggas found in each size ca...



average quaggas found in each size category

What densities are in Torch Lake?

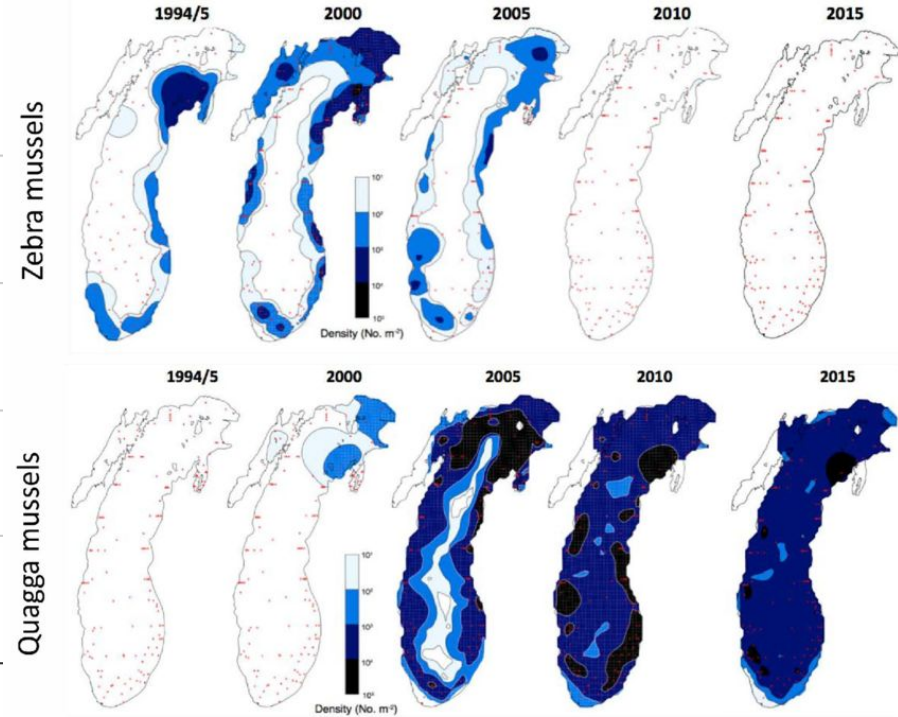
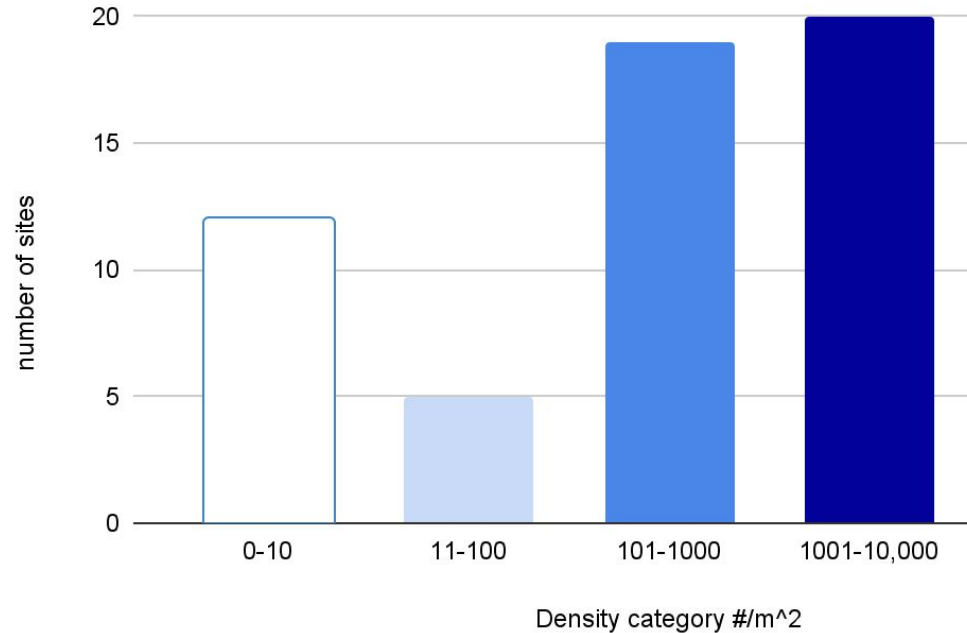
Densities found in Torch Lake



- No mussels in highest category lots of mussels in two categories before

What densities are in Torch Lake?

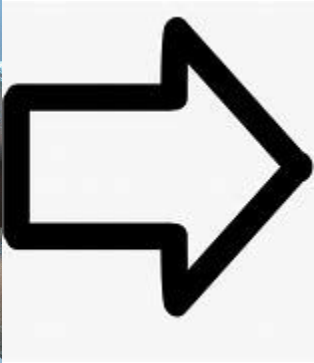
Densities found in Torch Lake



Densities are a bit less in torch lake than in lake michigan.

We can't correlate GBA to mussels

We can't truly correlate GBA to mussels because we didn't study that.



DISCUSSION

Quaggas are here to stay

- Quaggas are here to stay.
- We estimate that they are roughly 30 billion strong and know that they are found in almost every depth and corner of Torch Lake.
- a Quagga mussel that has reached reproductive maturity (8-9mm) filters a liter of water a day.
- Able to filter roughly 30 billion liters of water each day. This is enough to filter all of Torch Lake in a week.
- Most of the mussels collected were relatively small, around 10-15 mm. Yet, these mussels grow to sizes greater than 35mm. This probably means that this mussel population is growing and quickly at that.
- A single mature female can have a 30,000 successful offspring per year.



Take these actions

A: Increase public awareness of the Clean, Drain, Dry initiative especially for tourists.

B: Continue the No Fertilization campaign to prevent any algal blooms.

C: Do not try and collect native species to protect them you will only be hurting them.

D: Educate people that Quaggas are in the lake even though we can't see them. If they know that they are there then they could potentially help the problem.

Recommendations for future study

1. What is the connection between GBA and quagga mussels?
2. Is there a correlation between boat traffic and the lack of quagga mussels in shallower water?
3. What is the actual true number of Quagga mussels in Torch Lake.
4. What else can the Video evidence tell us that the Ponar data cannot.



Citations

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Brown, Aaron, et al. “Life at the Bottom of Torch Lake and Lake Bellaire .” Three Lake Association , 2022.

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- Paddle Antrim



TLA Photo Slideshow

Weather



Daily Photo



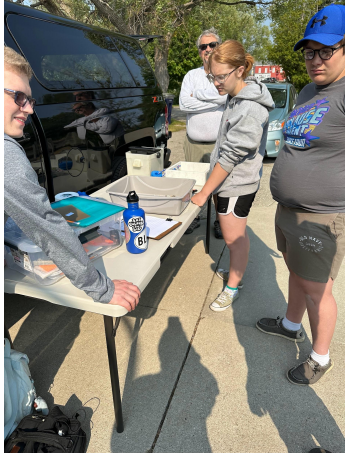
Ponar



Processing



Measuring



Silly Moments

