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# Underwater video surveys for mussels: Citizen Science potential

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Finger Lakes Water Hub

**NYSFOLA, 4<sup>th</sup> May 2018**



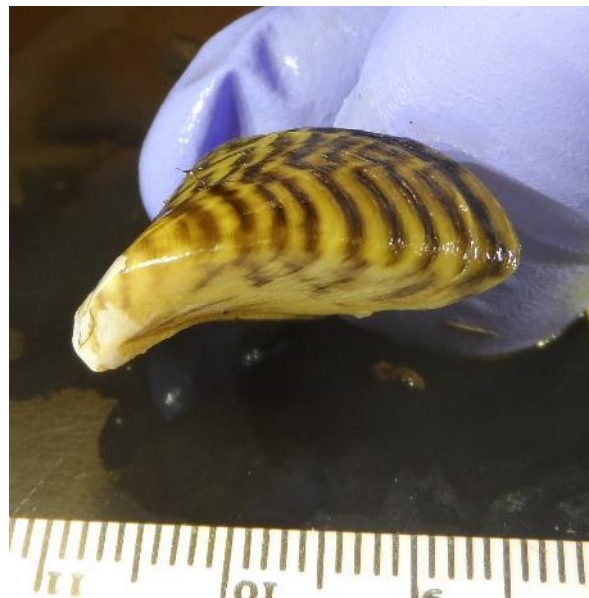
# Presentation Outline

- Purpose
- Finger Lakes
- Equipment
- Surveys
- Analysis
- Results

Skaneateles Lake,  
Photo: Rich Abbott  
Syracuse Water Department

# Purpose of the study

- *Dreissenid* mussels in the three eastern Finger Lakes
  - What kind?
  - Where?
  - How deep?
- Can inexpensive video equipment reliably collect useful images at depths down to 50m?





# Zebra & Quagga Mussels

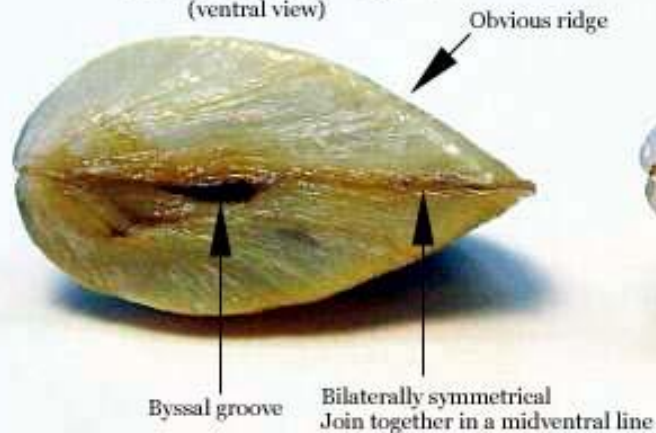
- Likely arrived in ballast water from Europe in late 1980s
- Zebras first – rapidly colonized hard substrate in shallow water
- Quagga second – can exist in soft substrate, deep & cold water
- Both get to around 4 cm (2 inches) but Quagga slower growing
- Implicated in cyanobacteria blooms



# Zebra & Quagga Mussels

*Dreissena polymorpha*

(ventral view)



*Dreissena bugensis*

(ventral view)

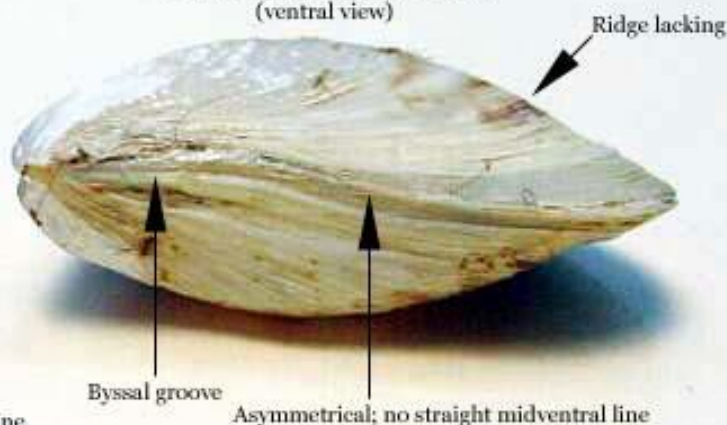
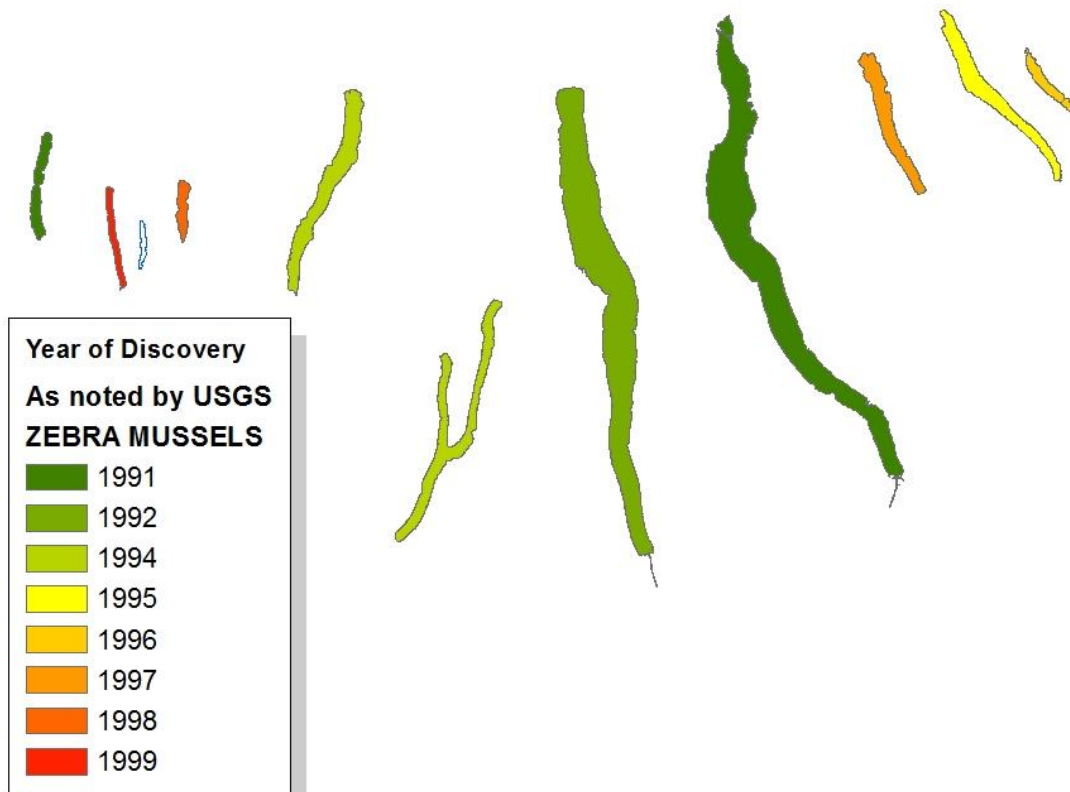


Photo by Myriah Richerson

# *Dreissenids* in the Finger Lakes





# *Dreissenids* in the Finger Lakes



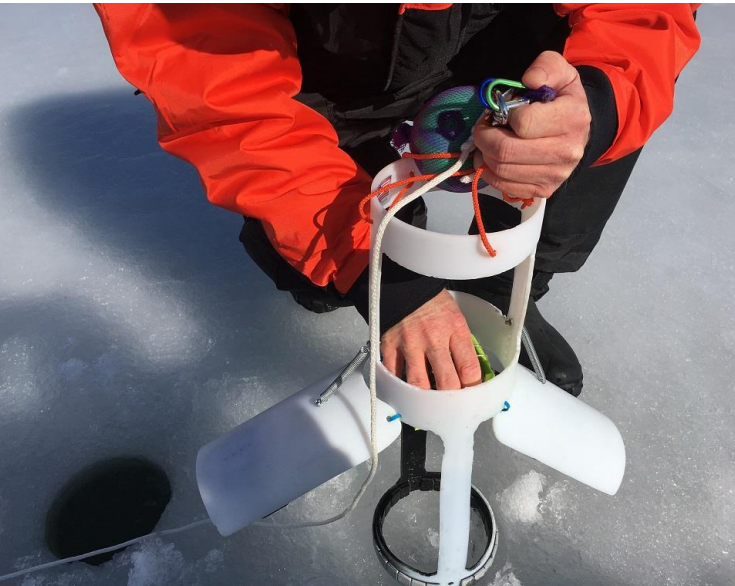


# Equipment



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# Equipment



Photos: A. Prestigiacomo, NYS DEC

# Equipment Costs

Item	Cost
Chassis (Milk Crate, Plastic Pipe etc)	Zero
Waterproof Video Camera	\$50
Waterproof LED lights	\$25
Rope	\$20
Instruments (Temperature, Depth)	\$60
Ballast, glue, zip ties	\$25
<b>Total</b>	<b>\$180</b>

# Surveys

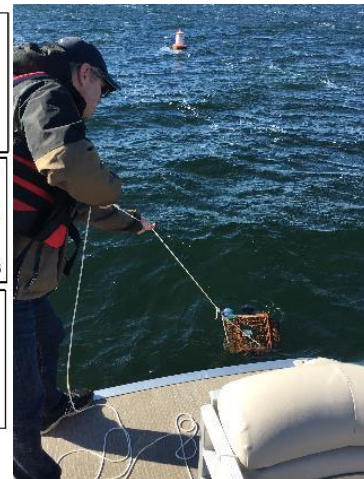
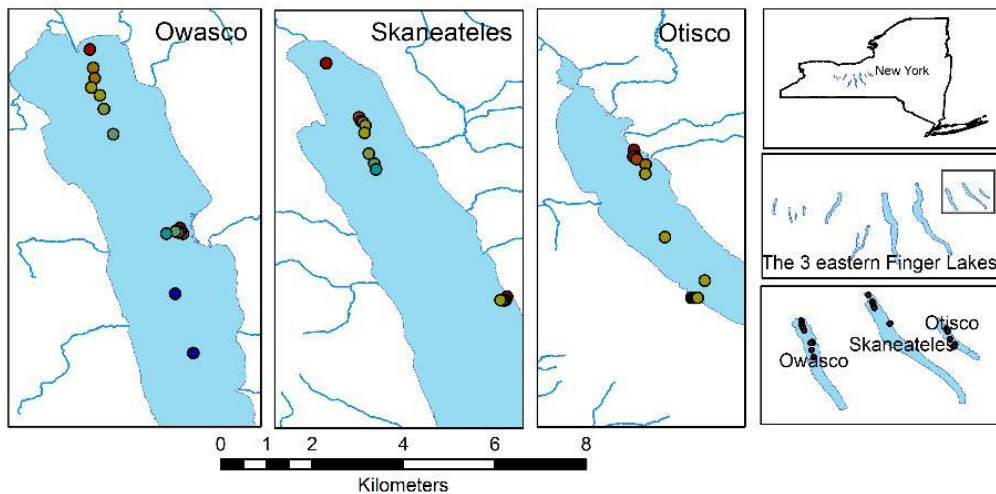


Photo: A. Prestigiacomo

# Results



# Sample Videos

## Owasco Lake

- Survey sites at depths down to 49 m (160 ft)
- Thermocline at 21m
- Multi-generational mussels
- Mussel movement & excretion
- Zebra vs Quagga?

[Downlooking](#)

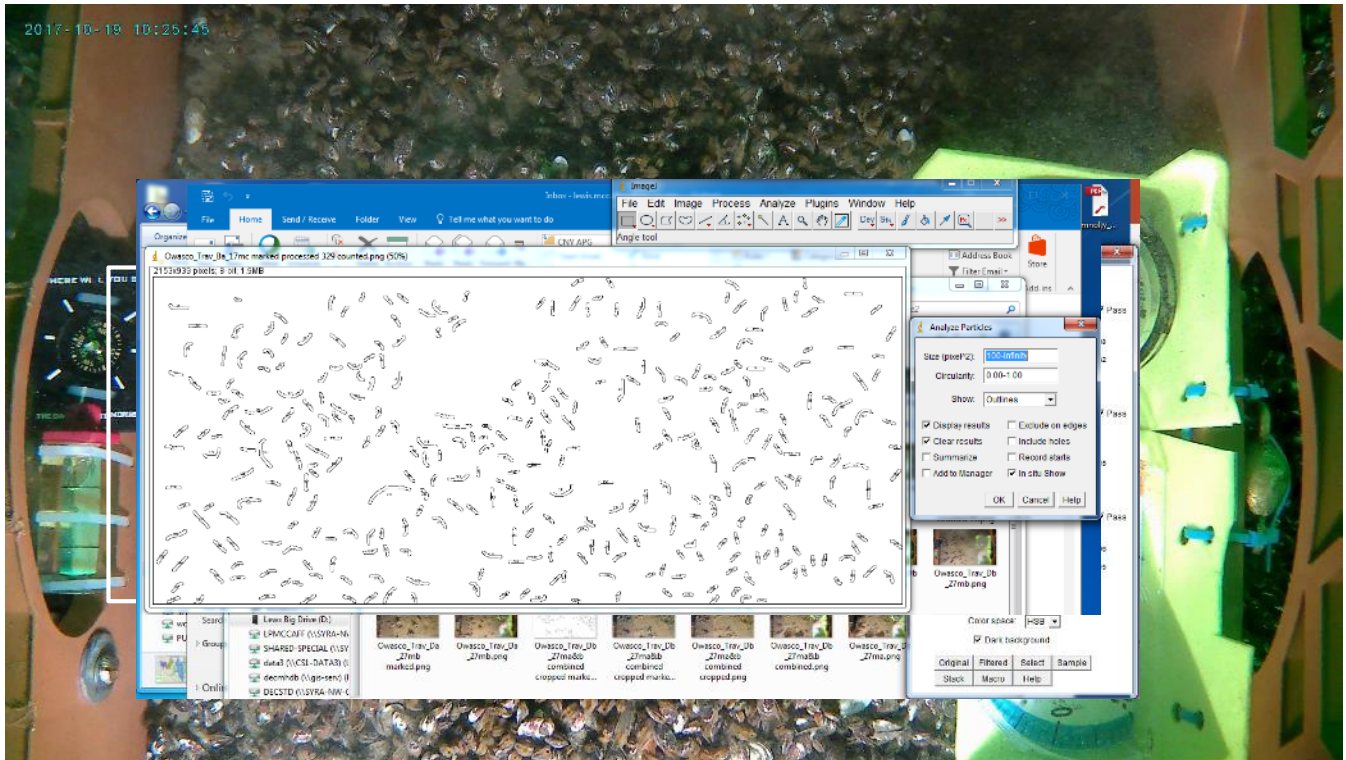
[Sideloooking](#)



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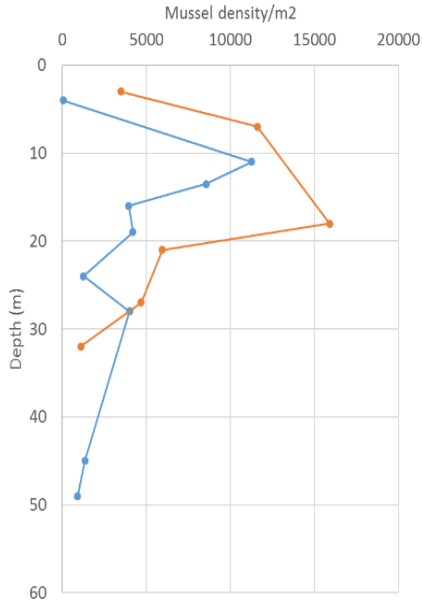
# Analysis



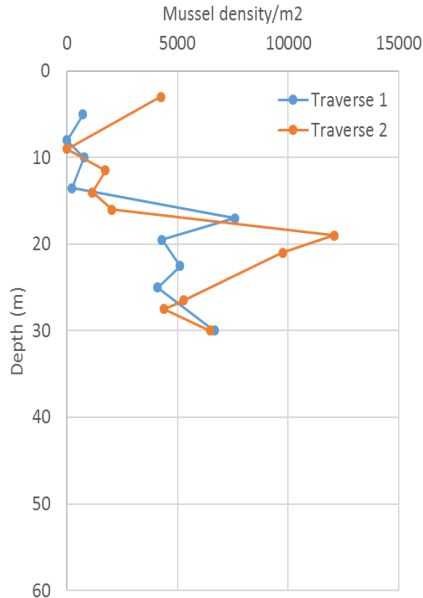


# Results

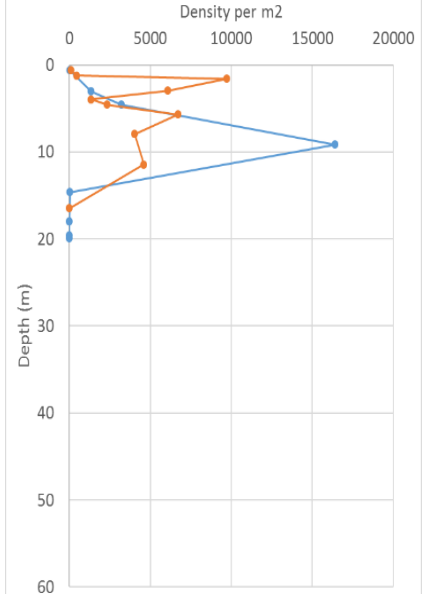
Depth/Mussel density in Owasco Lake  
19th October 2017



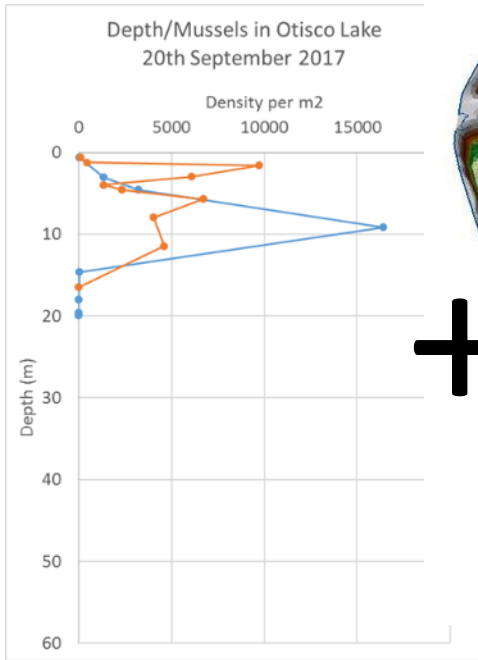
Depth/Mussel density in Skaneateles Lake  
24th September 2017



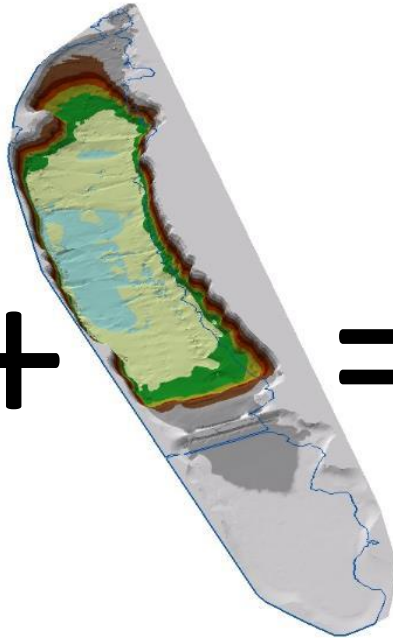
Depth/Mussels in Otisco Lake  
20th September 2017



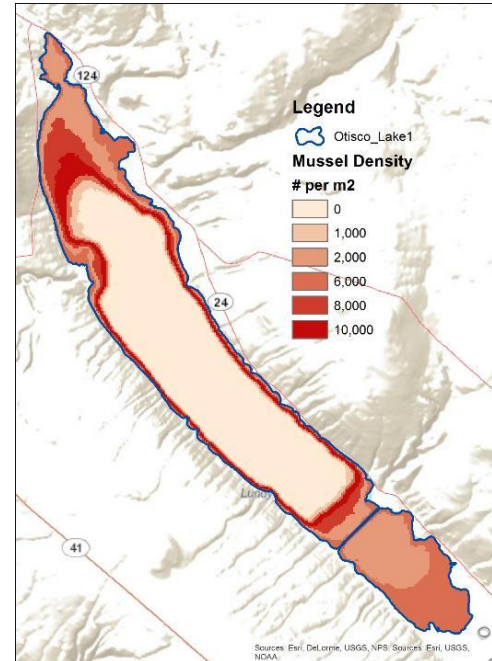
# Results



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# Results

- Approx.  $2.4 \times 10^{10}$  mussels in Otisco Lake
- Given:
  - Lake volume of  $7.9 \times 10^{10}$  liters
  - Filter rate of 1 liter per day per mussel
- Mussels capable of filtering  $\frac{1}{3}$  lake volume each day

# Citizen Science

Benefits of underwater video surveying

- Find out if your lake is affected by AIS
- Useful information for:
  - Management (stewardship, treatment)
  - Modeling
  - Planning (9E, TMDL?)



# Citizen Science

Activity	Beginner	Intermediate	Expert
Buy and build the video rig	X	X	
Surveys	X		
Video analysis	X	X	X
Graphing, reporting	X	X	
GIS Processing			X

# Thank You

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