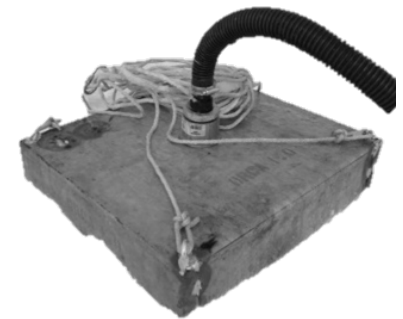# Methods: Egg Pumping
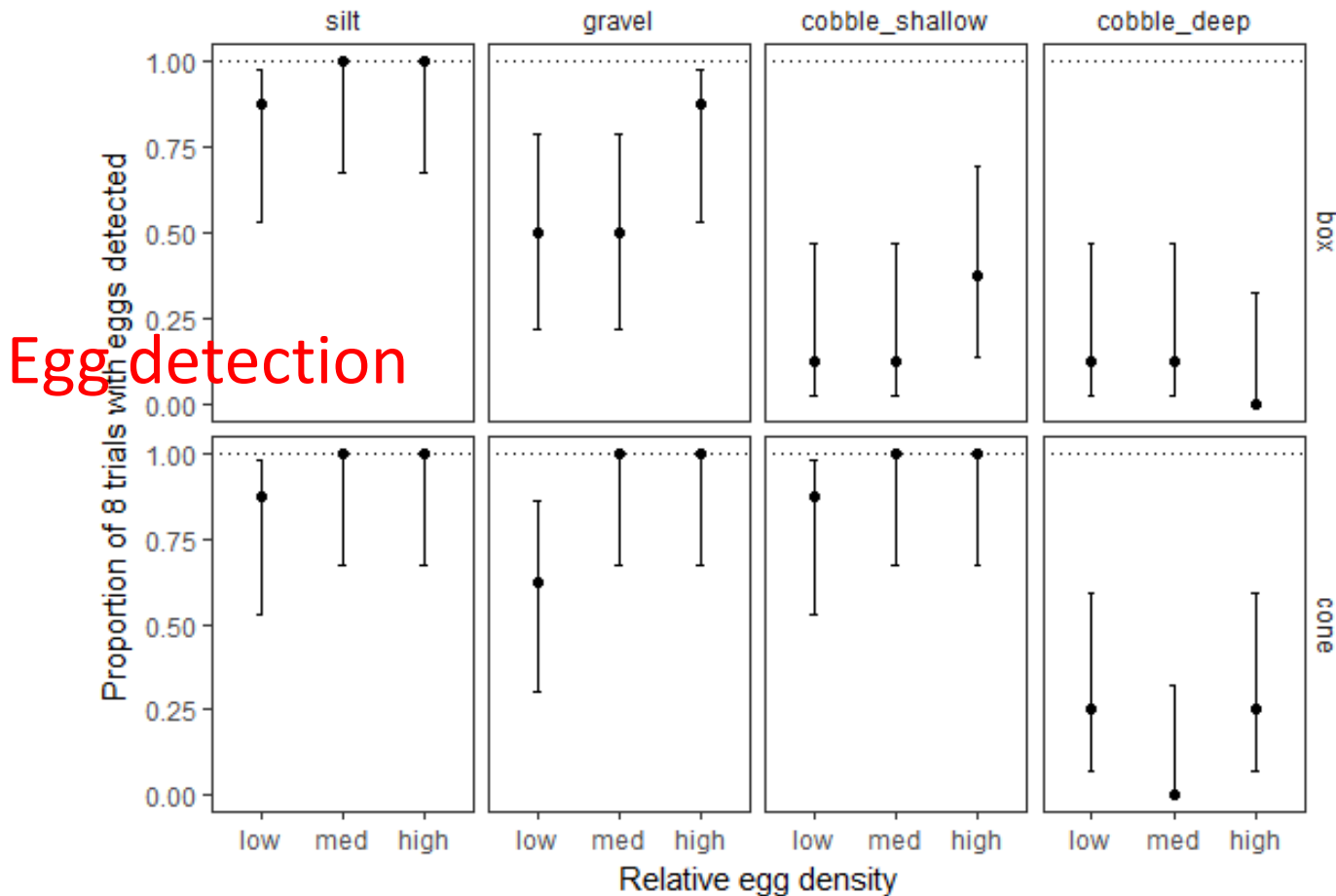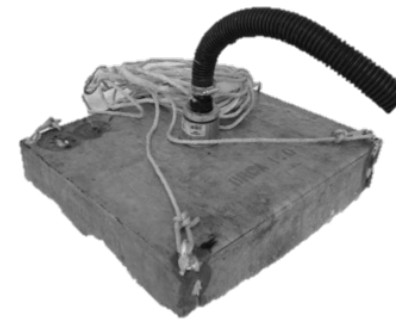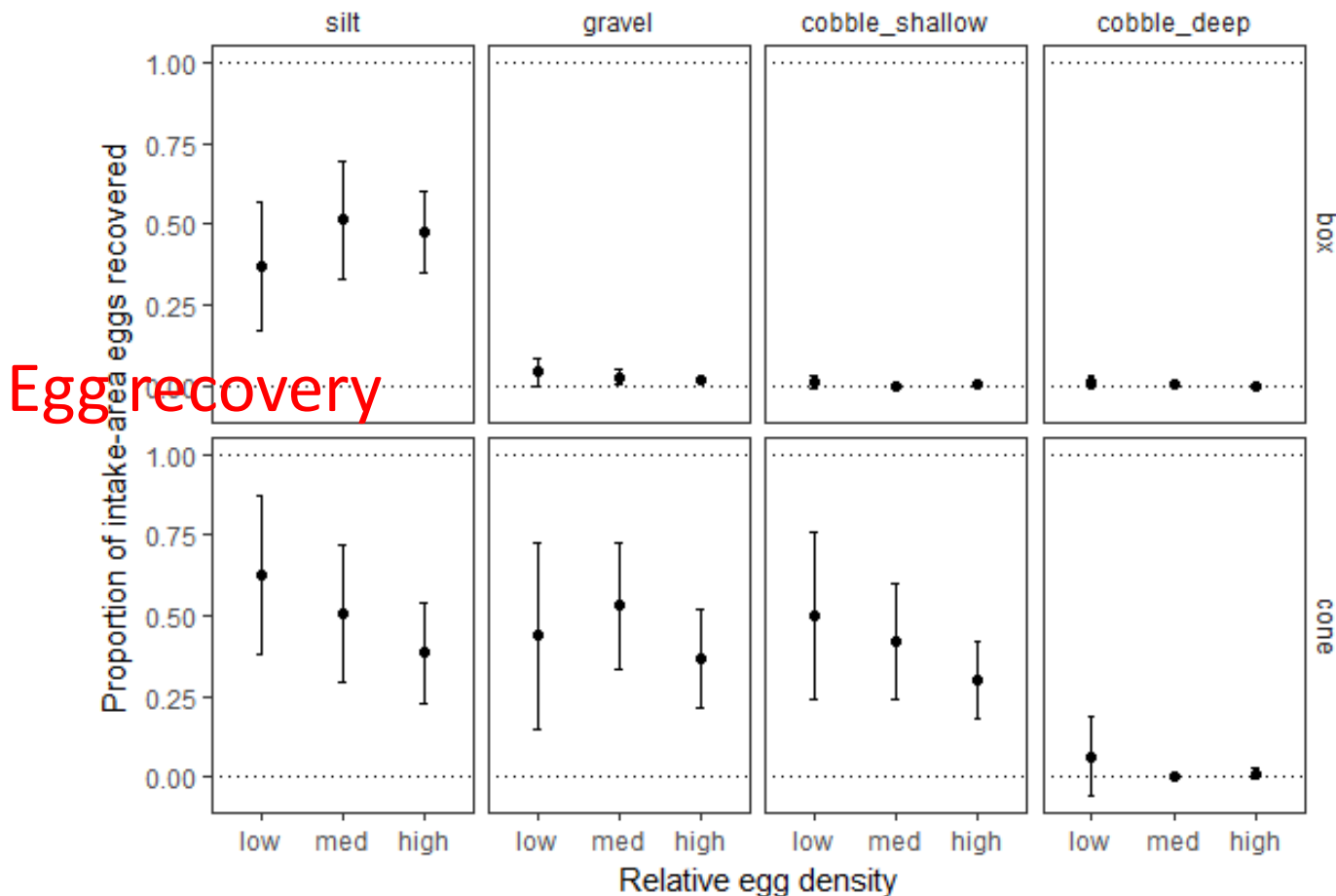
- Substrate matters
- Okay for presence (depending on intake design)

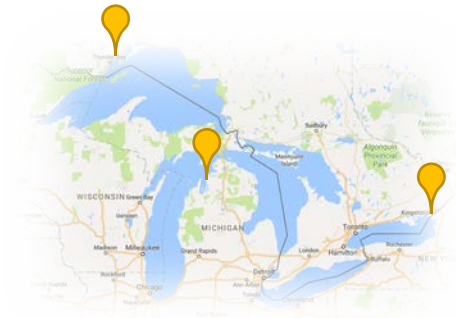Egg detection

Methods: Egg Pumping

- Substrate matters
- Okay for presence (depending on intake design)
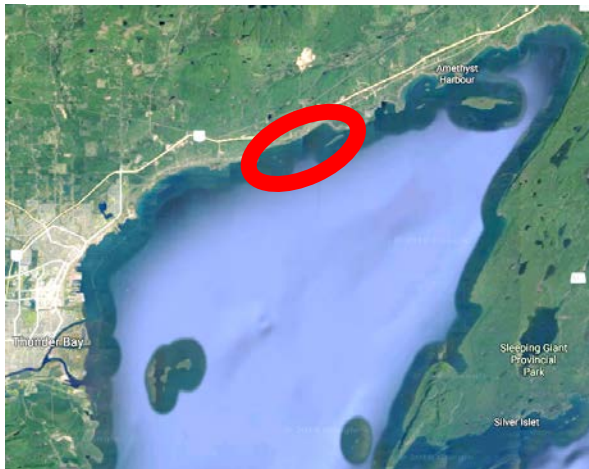

Egg recovery
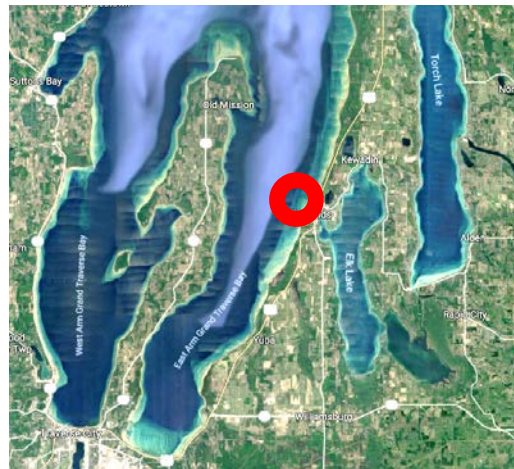
Study Sites

Thunder Bay, ON
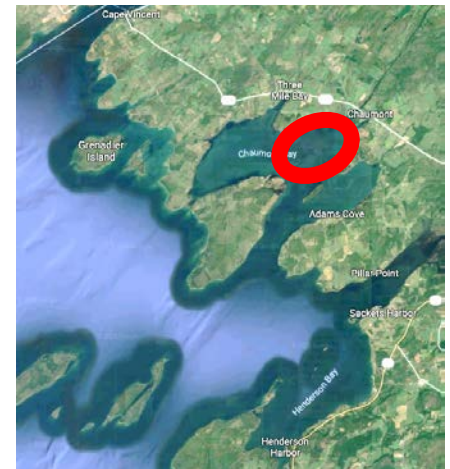Low currents, silty
Mostly mud, some rock

Grand Traverse Bay, MI
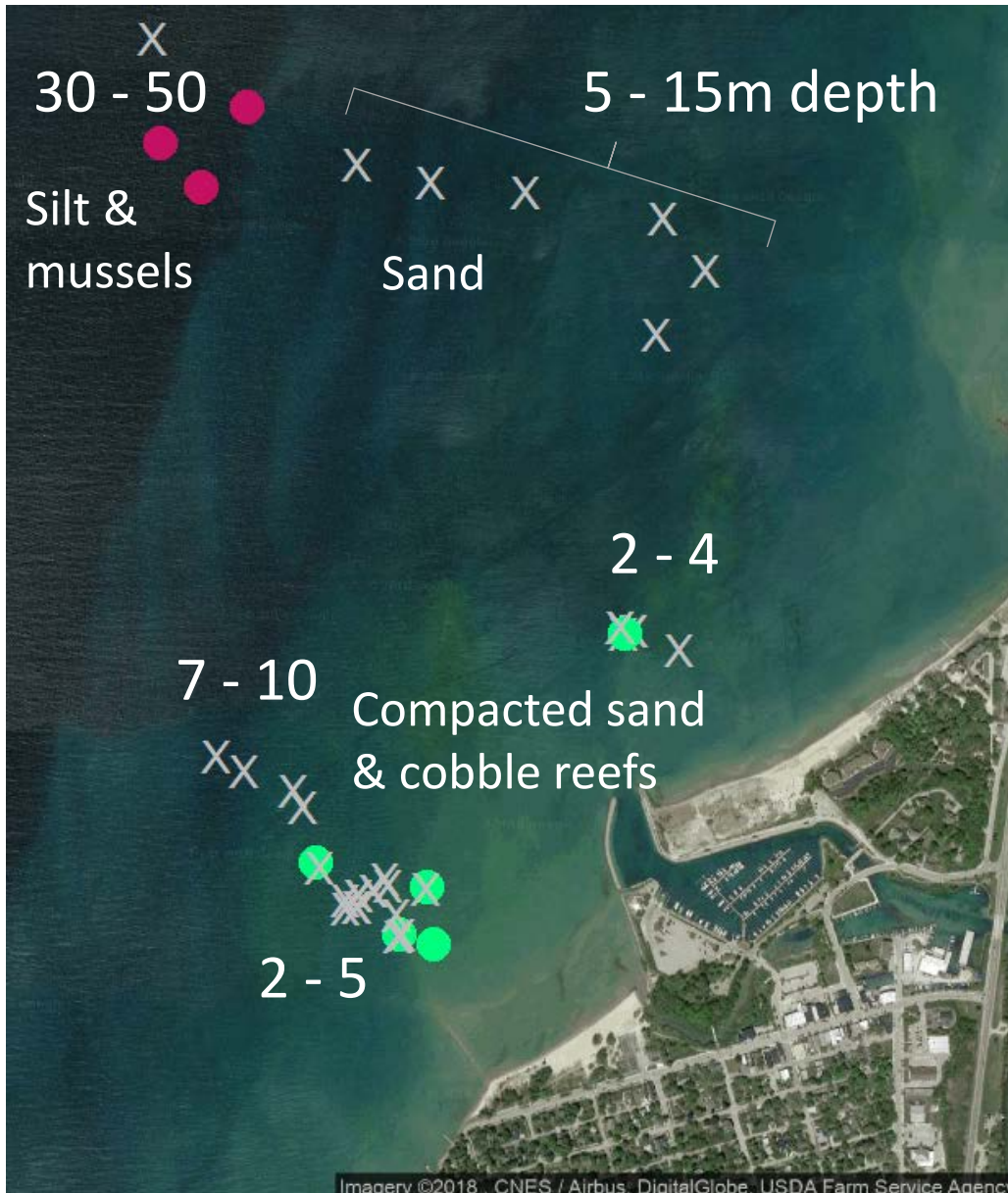Strong currents, clean
Cobble reefs, hard sand

Chaumont Bay, NY
Bedrock shoals,
Sand/silt flats
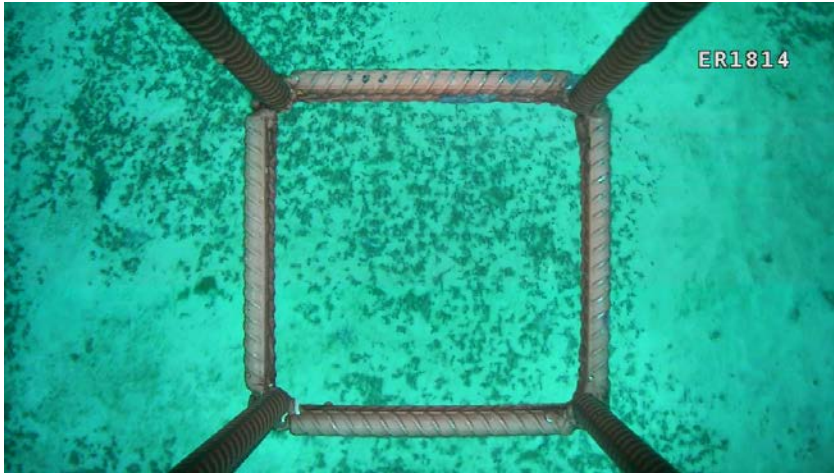

2 mi

Grand Traverse Bay, Lake Michigan

30 - 50

5 - 15m depth

Silt & mussels

Sand

2 - 4

7 - 10

Compacted sand & cobble reefs

2 - 5

Imagery ©2018 , CNES / Airbus, DigitalGlobe, USDA Farm Service Agency

Unknown ID:

- Smaller eggs
- None eyed (late April)
- Possible observations of spawning cisco

Lake whitefish:

- shallow (< 5m)
- around cobble reefs
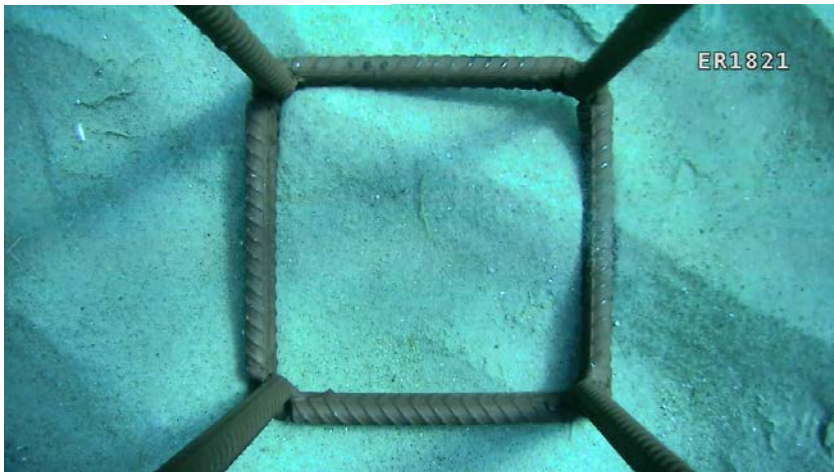
Grand Traverse Bay, Lake Michigan

Silt & mussels

Compacted sand & rock

Sand flats

Cobble reef

Thunder Bay, Lake Superior

Lake whitefish "Cisco"

Rock
2 - 10

Silt
15 - 30

Silt
5 - 7

Rock
4 - 5

Rock
10 - 15

Rock
3 - 4

25 - 30

Silt
2 - 12
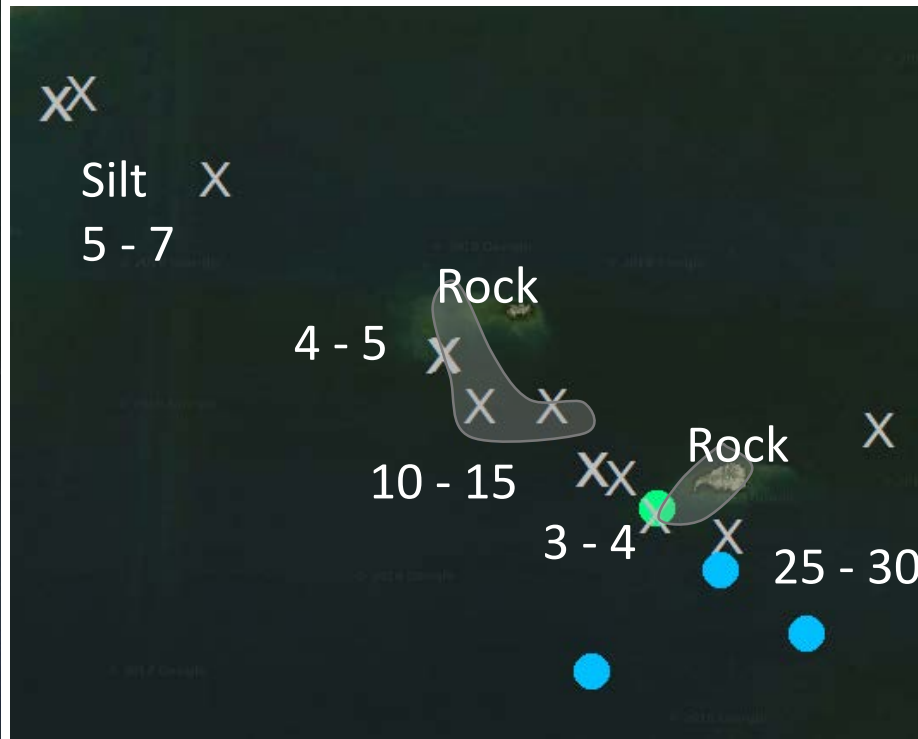
Rock

Rock
2 - 6

Silt
20

Thunder Bay, Lake Superior
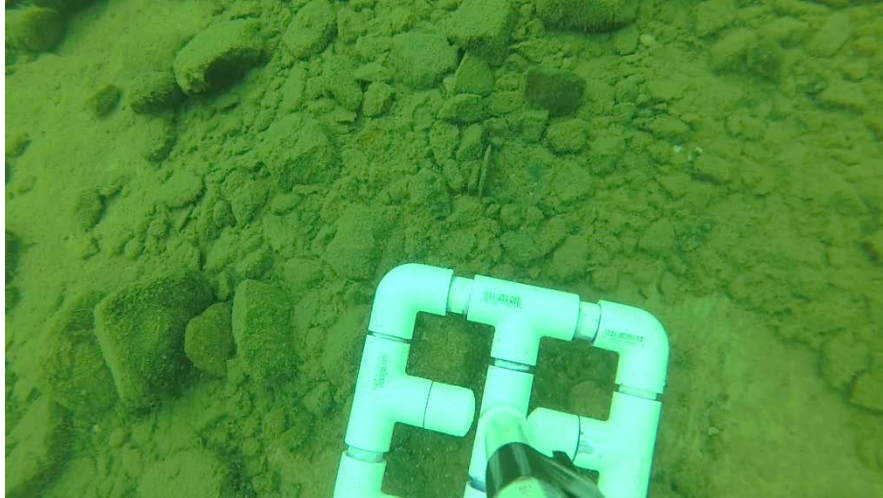

Lake whitefish
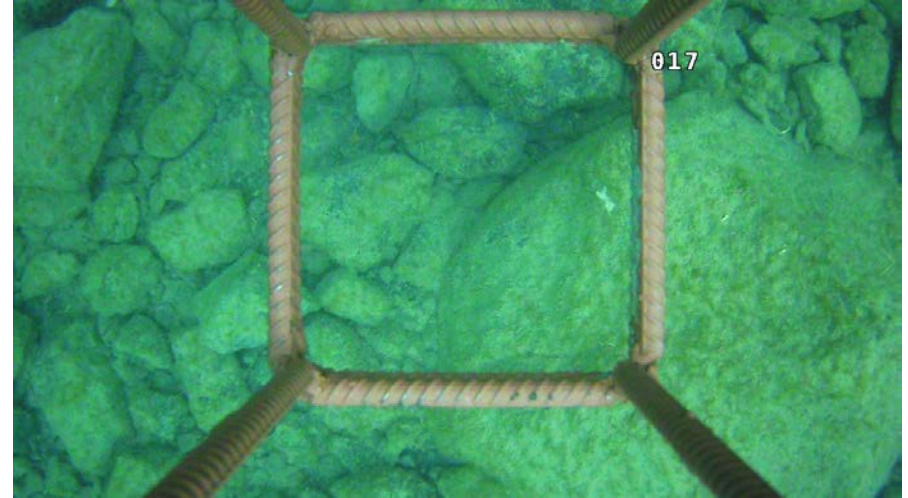
- Shallow (< 5m)
- Rock

"Cisco"

- Deep (most > 20m)
- Mud/silt

Thunder Bay, Lake Superior
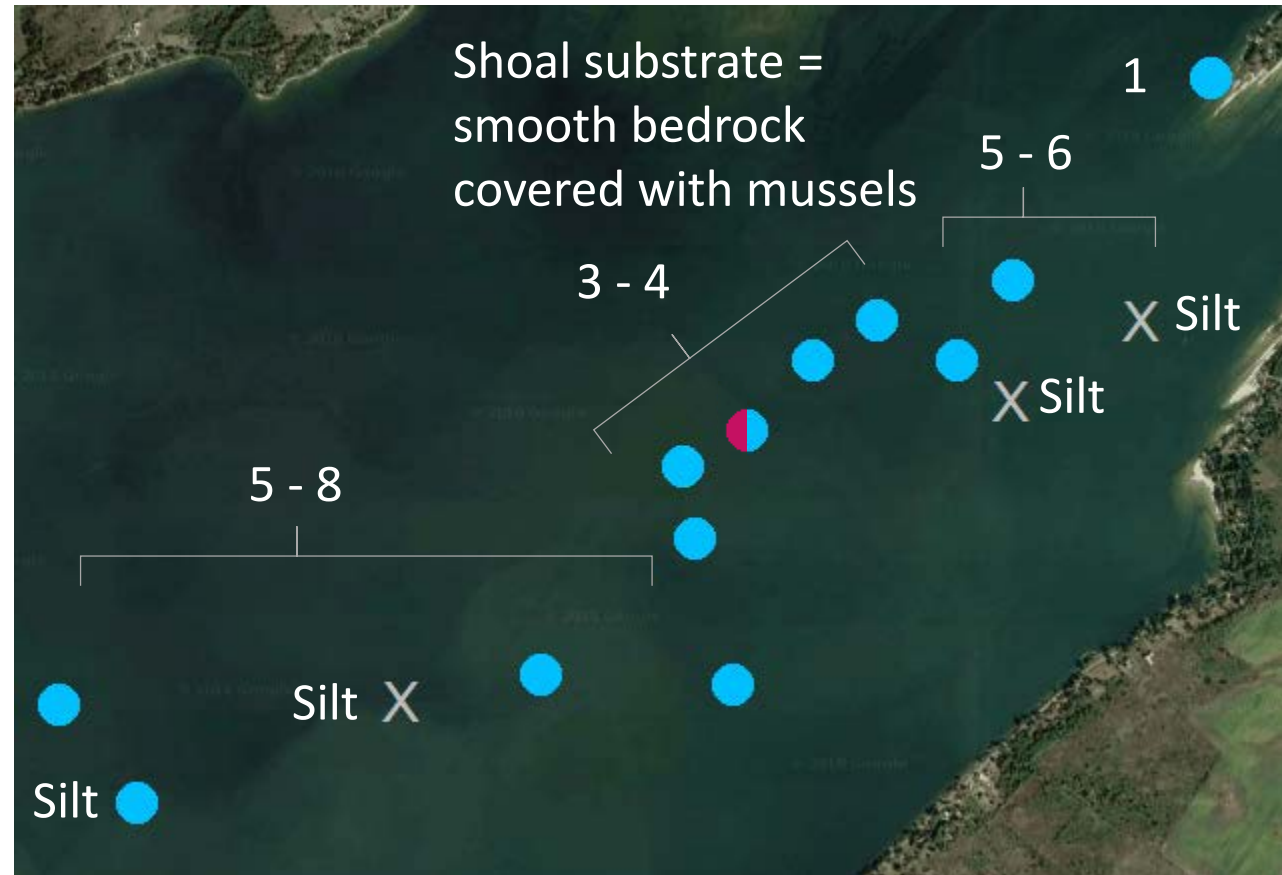
Shallow, rocky

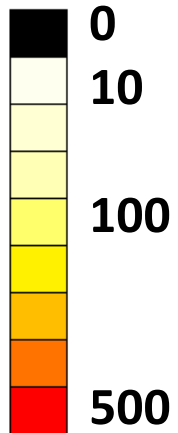
Island perimeter

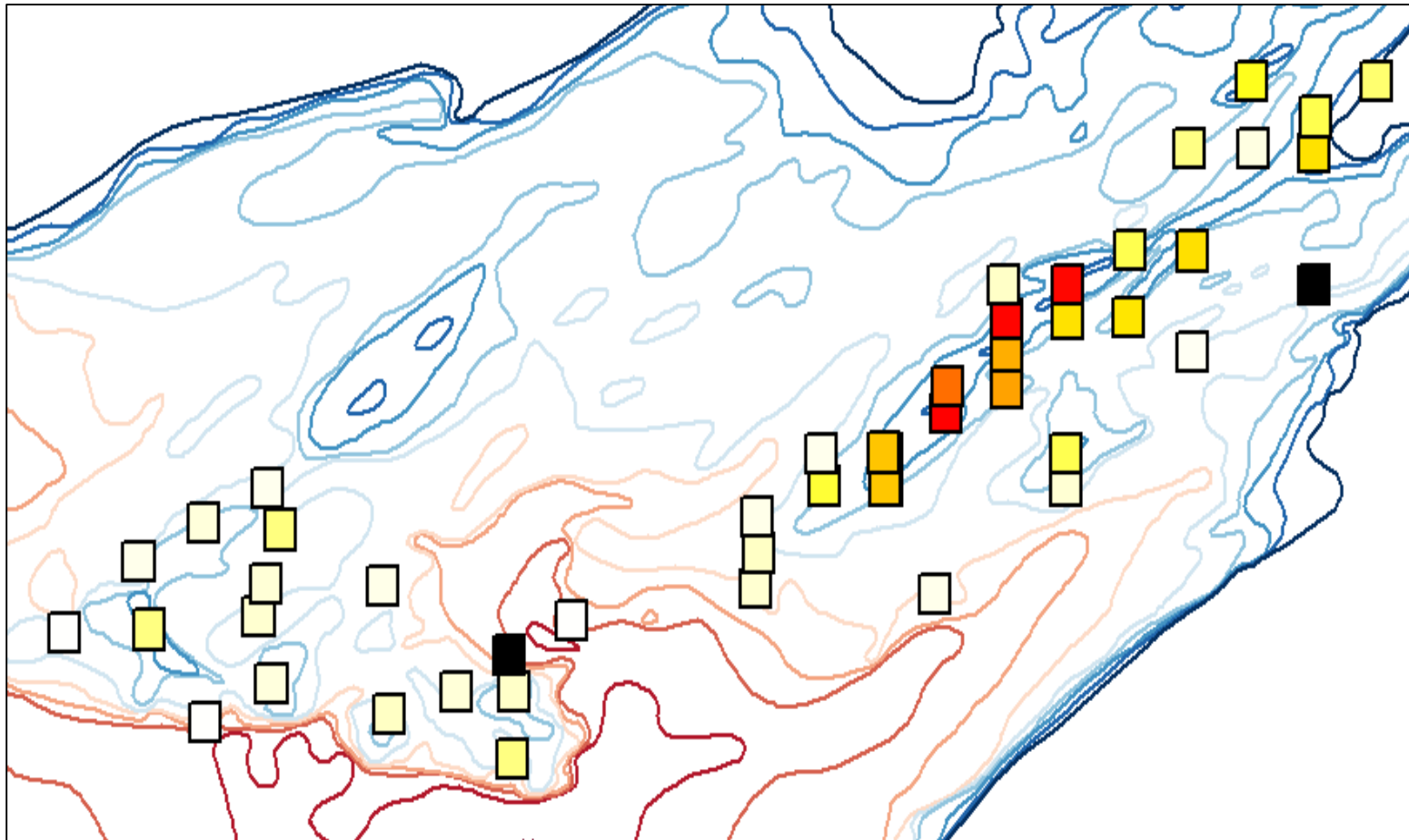**Deep, silt**

Chaumont Bay, Lake Ontario
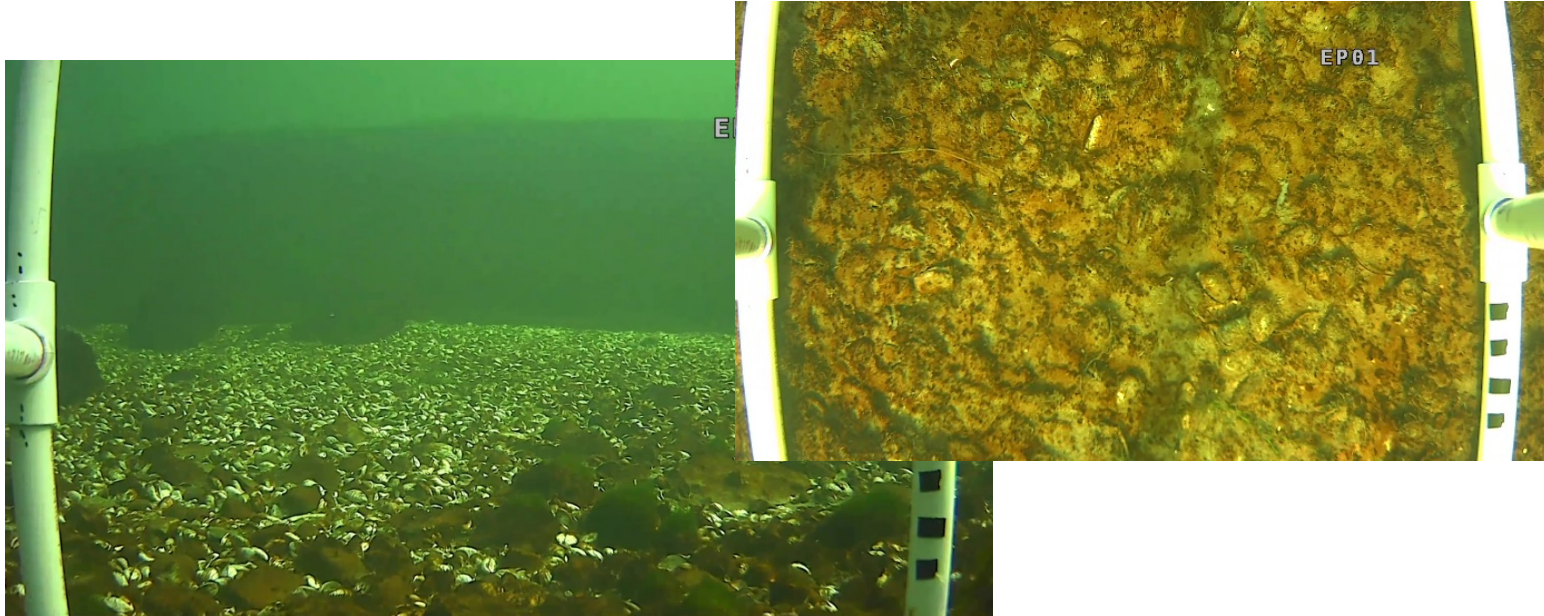
Chaumont Bay, Lake Ontario

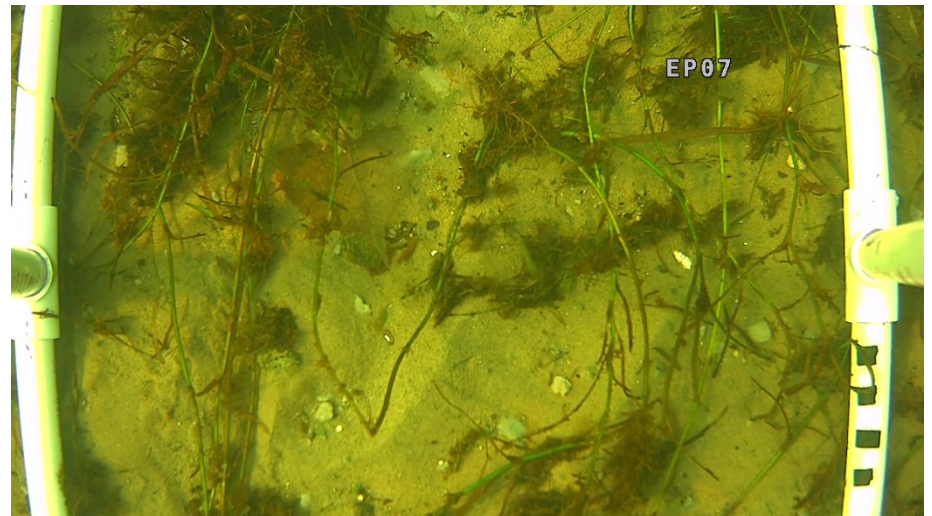Highest spawning intensity (egg deposition rate) on shallow shoals

Chaumont Bay, Lake Ontario
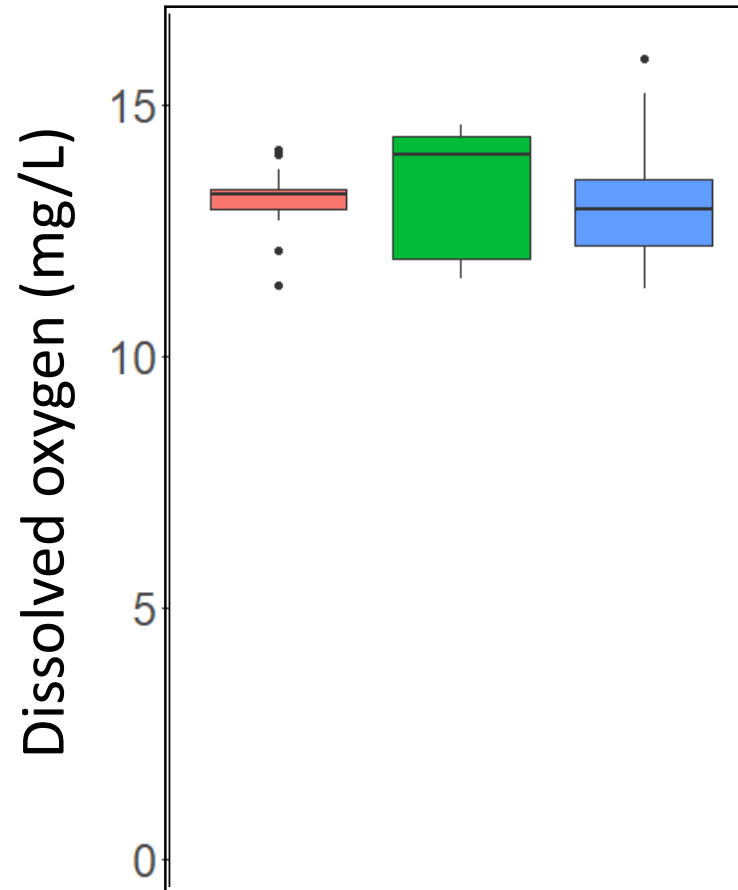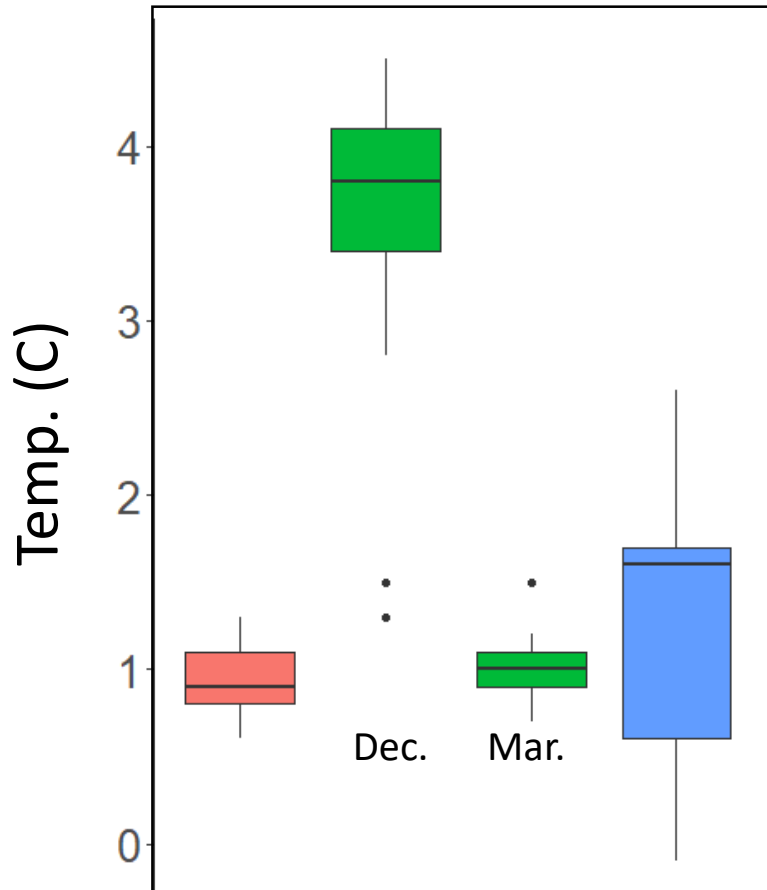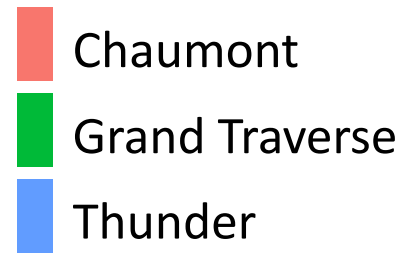
Chaumont Bay, Lake Ontario

Bedrock shoals & mussels

Sand/silt

Benthic Conditions

Summary

• Different populations = different spawning strategies

• Cisco historically abundant, spawned everywhere, did many smaller populations specialize in different habitats?

• Why aren't cisco spawning in historical spawning bays in Lake Ontario?