# Asian Clam Survey

## Owasco Lake

## August 6, 2019

# Thanks to:

- Ed Wagner, OLWMC Member
- Dr. Adam Effler, OLWMC Director
- Drew Snell, Owasco Lake Watershed Specialist
- Ally Berry, Outreach and Research Specialist for the Owasco Flats Nature Reserve
- Michele Wunderlich, Gary Duckett and Doug Dello Stritto, WQMA
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# Asian Clams:

- Were discovered in Owasco Lake in September 2010.
- Like warm shallow water with sandy sediments.
- Adults can reach a length of about 2 inches (5 cm). Live 3-4 years.
- Shell is yellow-green or brown with concentric rings when alive, looking more black and white once dead.
- Found at the sediment surface or slightly buried.
- Can suspension feed (filter feed) and deposit feed (with their foot) in the substrate.

September 2010

# Asian Clams:

- In Lake George only 3% of clams smaller than 13mm were reproducing.
- Can reproduce at about 60 degrees F.
  - Buoy data show Owasco Lake around 60 degrees F starting around June 8, 2019.
- Timing of reproduction in Lake George is mid-June through mid-November.
- Highest rates in the fall in Lake George.
- Self fertilize.
- Single adult can release an average of 400 juveniles per day and up to 70,000 per year.

# Asian Clams:

- Larval clams are released from adults at about 0.25 mm in size.
- Transported by currents using a mucous “parachute” or hitchhiking.
- Asian clams typically grow between 0.2-0.3 mm per week during the growing season in Lake George.
  - Can get to 6 -10 mm  in 3 to 6 months.
  - Can grow to 10 to 30 mm during their first year depending on food availability and temperatures.

# Asian Clams:

- Can alter food webs.
- Clog raw water intakes with clam shells or by juveniles that are sucked into the intake and grow in the system.
- Release phosphorus and nitrogen into the water through burrowing, feeding from the sediment and their excreta.  Elevated nutrients can cause dissolved oxygen depletion or increased algal growth.

# Asian Clams

- Lake George researchers have observed that winter ice contact with sediments killed Asian Clams.
- Lowest lake levels during a cold snaps:
  - Owasco Lake was at 710.05 feet (asl) with low temperatures of -2 to 2 degrees F from January 30-February 2, 2019.
  - Owasco Lake was at 709.6 feet (asl) with low temperatures 5 to 12 degrees F from February 26-March 1, 2019.
- Lake level the day of the survey was 712.66 feet (asl).

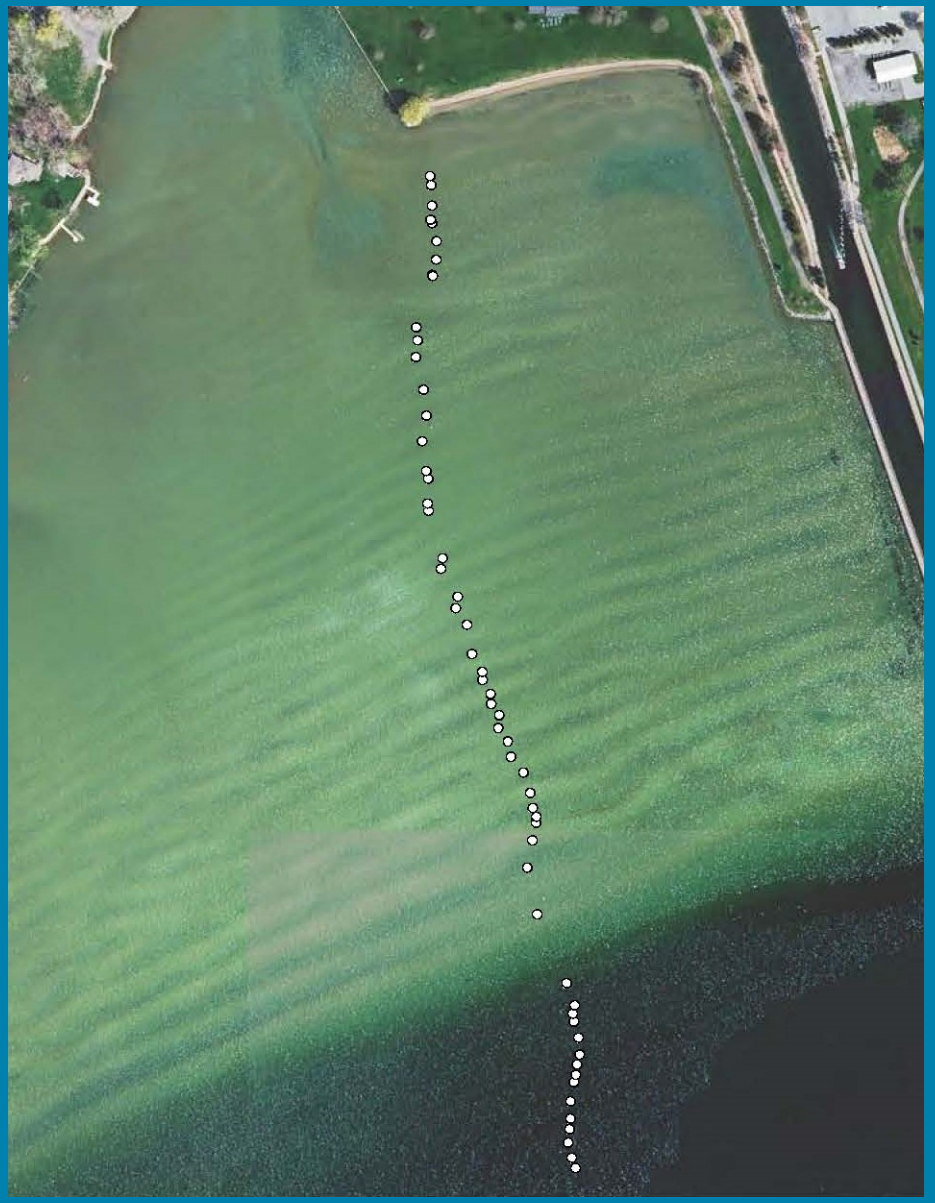
February 2011
Lower 3 clams killed by freezing in shallow water

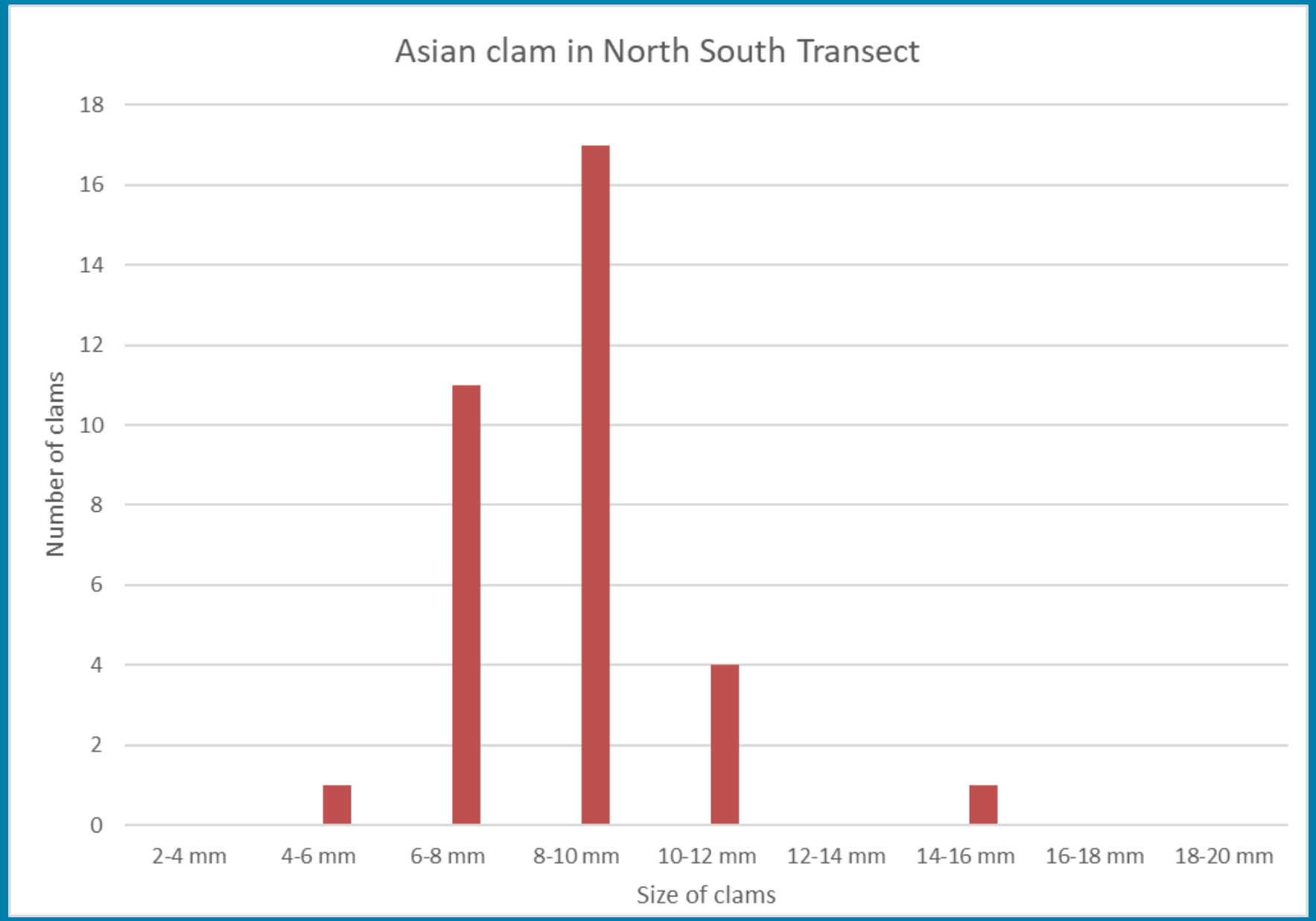

Asian Clam Survey
Sample Points
2019
0 100 200 300 400 500 600
Feet

CAYUGA COUNTY
Water Quality Management Agency

# West Side off of Deauville Island, 2019:

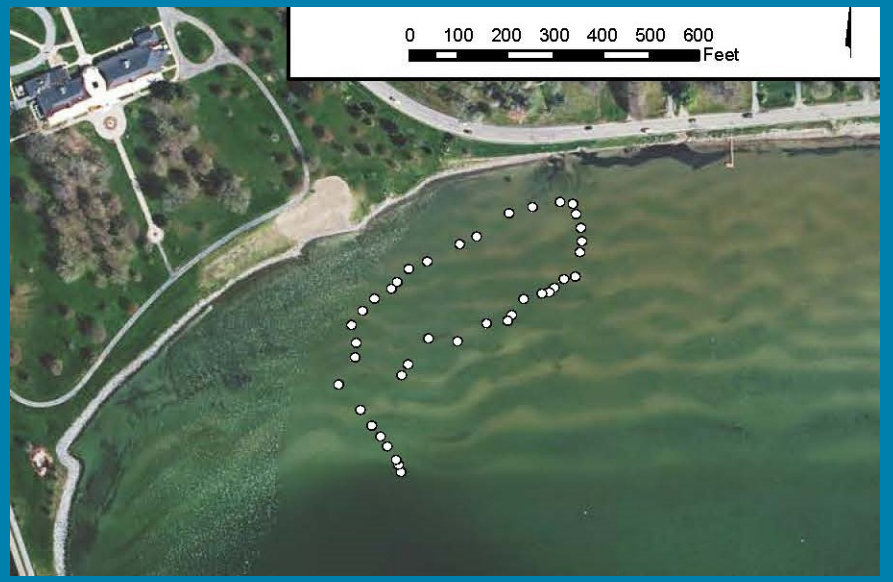
- Transect from shore toward buoy.
- 29 out of the 34 of the clams found were smaller than 10 mm (85%).
- Only one was of reproductive size; found in 3 feet of water.
- In 2019, samples had 3 clams or less.
  - 30% in 2018, 40% in 2016 and 11% in 2017 samples with clams had more than 20.
  - All samples in 2015 had less than 7 clams and 90% of samples in 2014 had less than 10 clams.
  - 2018 had high numbers of 4-6 mm and 6-8 mm.  2019 had more clams that were 6-8 mm and 8-10 mm.
- Most likely young of the year.

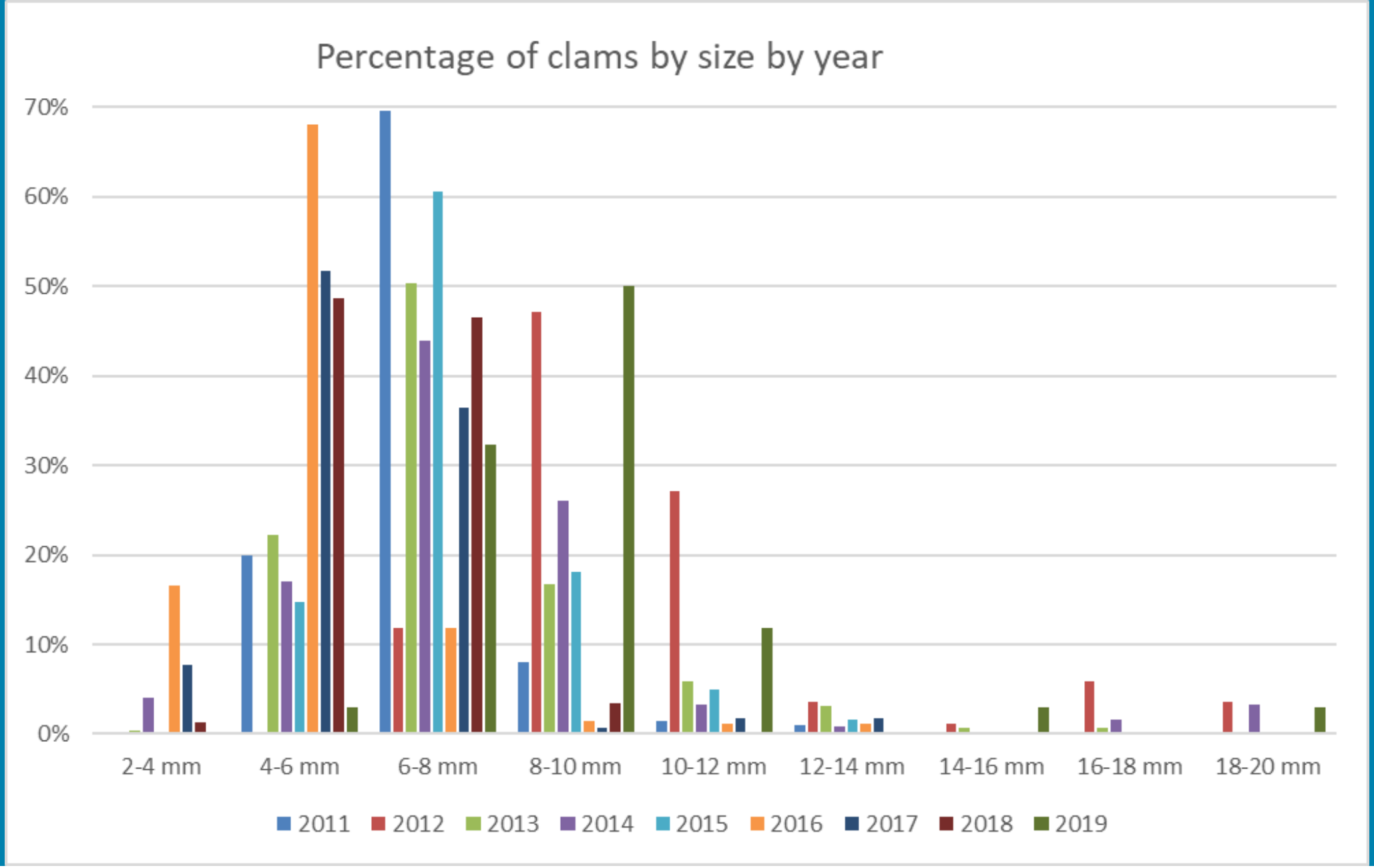


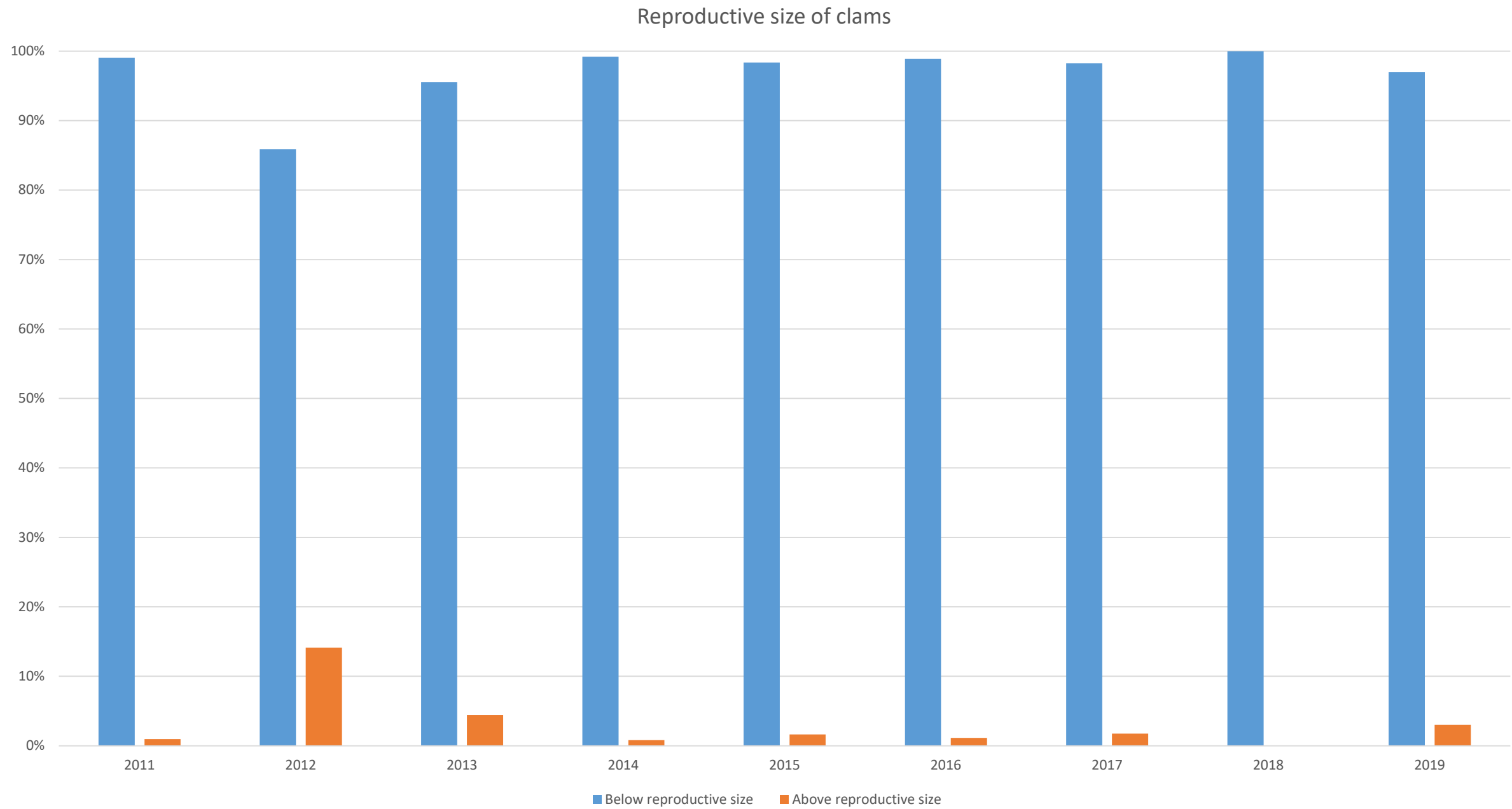

Asian clam in North South Transect
18
16
14
12
10
8
6
4
2
0
Number of clams
2-4 mm
4-6 mm
6-8 mm
8-10 mm
10-12 mm
12-14 mm
14-16 mm
16-18 mm
18-20 mm
Size of clams

# East Side off of Pavilion Beach, 2019:

- One living clam found out of the 40 samples taken; found in 3.5 feet of water.
  - 6 clams found in two samples in 2018 less than 10 mm in size.
- Largest clam found, 18.81 mm.
  - 6 out of 15 clams found in 2014 were larger than 16 mm.
- No reproductive size clams in 2015, 2016 and 2018.
- Survival is poor on this side of Emerson Park.




Percentage of clams by size by year
70%
60%
50%
40%
30%
20%
10%
0%
2-4 mm
4-6 mm
6-8 mm
8-10 mm
10-12 mm
12-14 mm
14-16 mm
16-18 mm
18-20 mm
2011
2012
2013
2014
2015
2016
2017
2018
2019




*based on Lake George research

# Quantitative Sample:

- 2011: 1018 clams per $m^2$
- 2012: 429 clams per $m^2$
- 2013: 1,462 clams per $m^2$
- 2014: 1,018 clams per $m^2$
- 2015: 511 clams per $m^2$
- 2016: 2,632 clams per $m^2$
- 2017: 1,023 clams per $m^2$
- 2018: 877 clams per $m^2$
- No dense populations in 2019

- Lake George: up to 6,000 per $m^2$

# Observations:

- One clam found on east side.
- The clams found off Deauville Island Beach were likely young of the year.
- Both sides had clams that were of reproductive size.
- No dense populations this year.
- Past surveys have shown that drawdown appears to cause 100% mortality of clams in areas where the substrate was exposed during the winter. Seems to be the case this year too.

# Darrin Freshwater Institute Research:

- Hypothesis: *Chaetogaster limnaei* adversely affect the Asian clam population with respect to size distribution and relative abundance.
- Have been observed eating the offspring of Asian clams inside adult clams
- May alter the population structure of Asian clams
- Will infect Asian clam within a short time period in a scale experiment
- Can transfer from one clam to another in a small scale lab experiment
- County Planning staff took clam samples in 2015 and 2018 sent them to Darrin Freshwater Institute for research and DNA analysis. None of the parasites were found in Owasco Lake samples. Will request analysis in 2020.

# Questions?