

Monitoring expansion of invasive round goby in the Mohawk River/Barge Canal



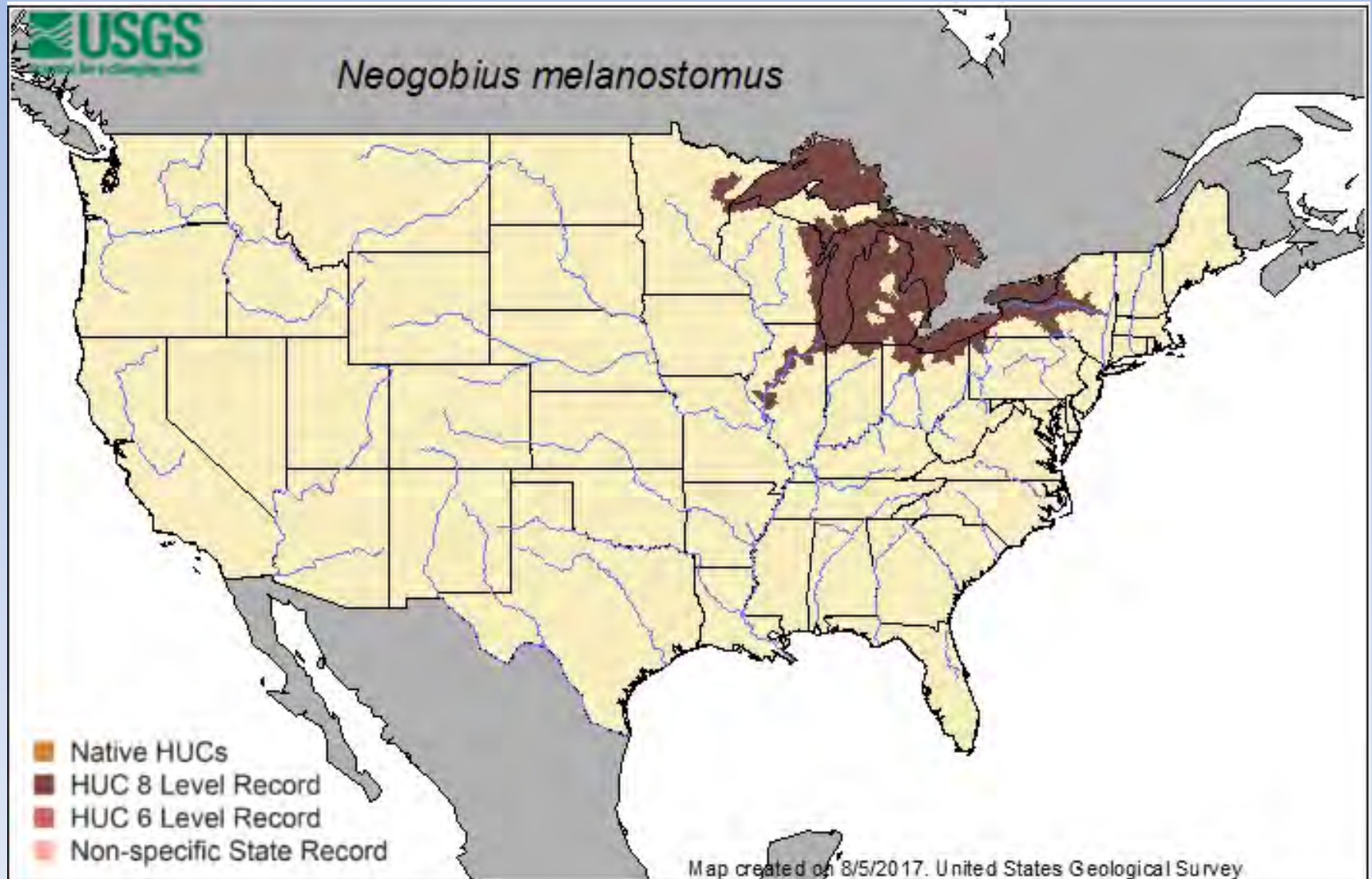
Scott George, Barry Baldigo, Christopher Rees, and Meredith Bartron



Round Goby Background

- Benthic Eurasian fish native to Ponto-Caspian region
- Spawns multiple times/year, egg predator, concentrates contaminants
- Round Goby established in North America 1990
- Colonized all Great Lakes in 5 years

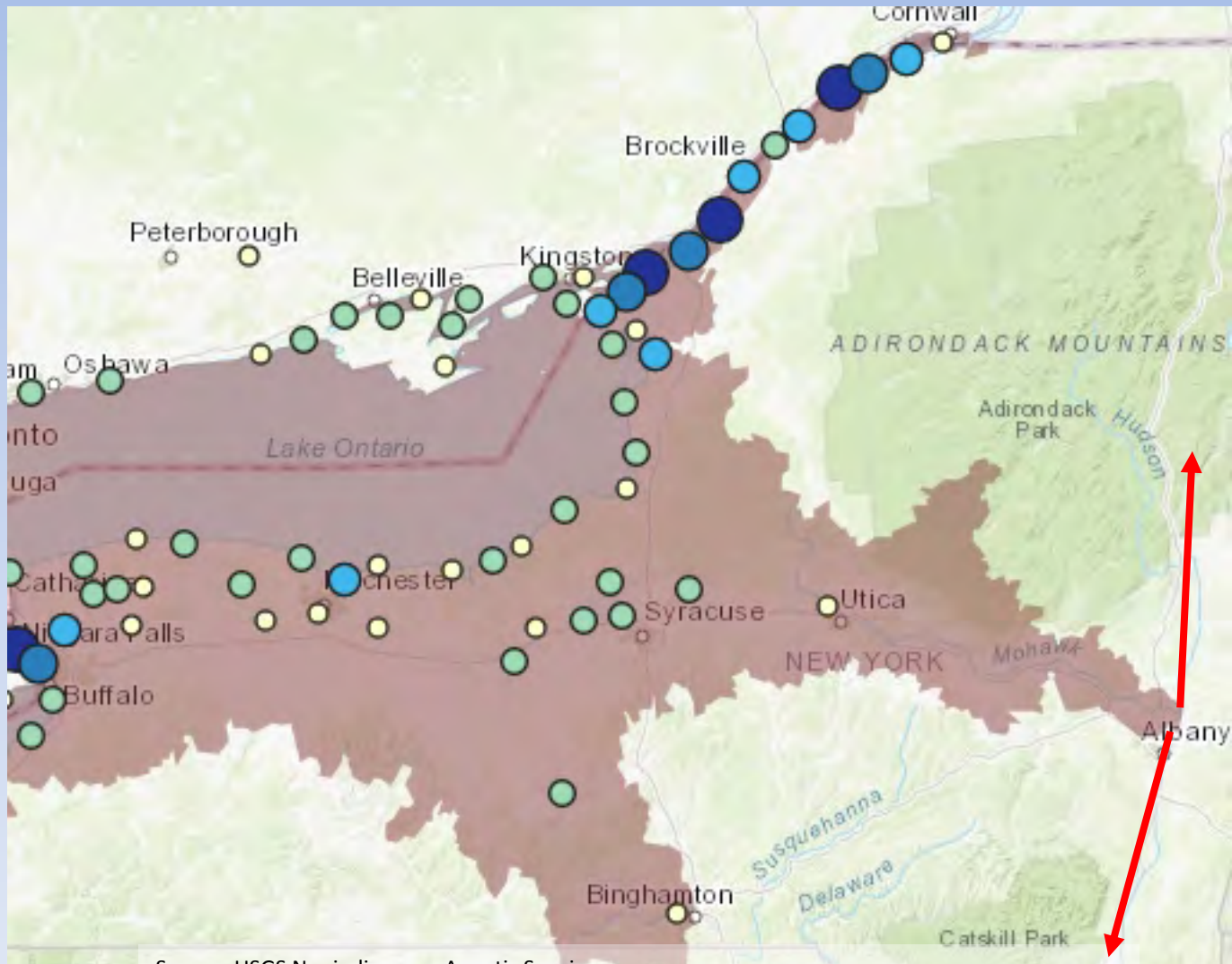
Round Goby Background



Barge Canal/Mohawk River

- Oneida Lake: First Detected → Most Abundant benthic fish in two years
- Angler catches specimen in Barge Canal at Utica in 2014
- Sparks interest in eastward invasion, new watershed potential...

Barge Canal/Mohawk River

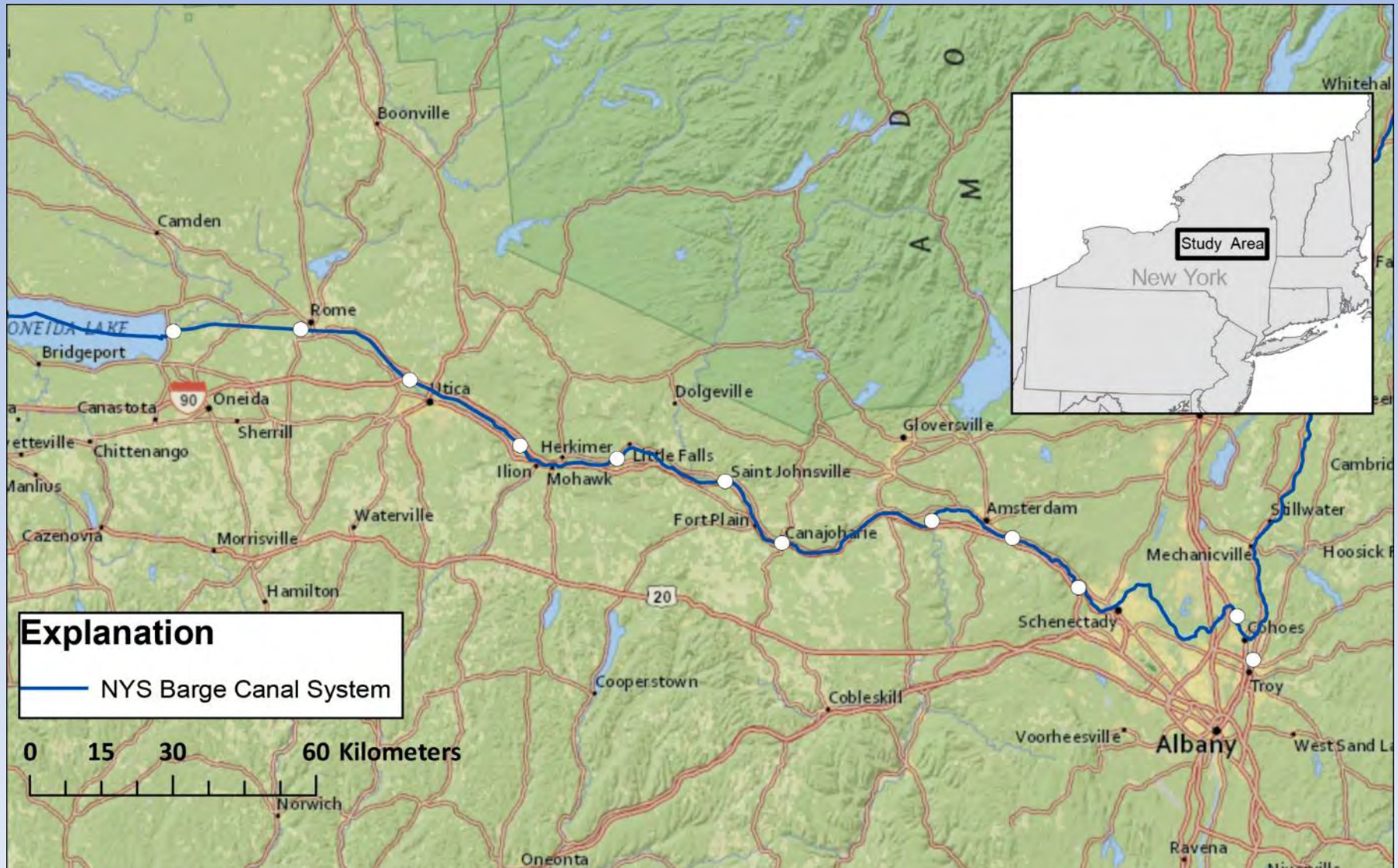


Source: USGS Nonindigenous Aquatic Species:
<https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=713>

Study Objective & Design

- Determine best early detection technique & quantify rate of expansion
- Comparison of trawling, trapping, seining and eDNA
- 12 sites on Barge Canal between Oneida Lake and Hudson River sampled twice annually, 2016-2017

Study Objective & Design



Fish Sampling Methods

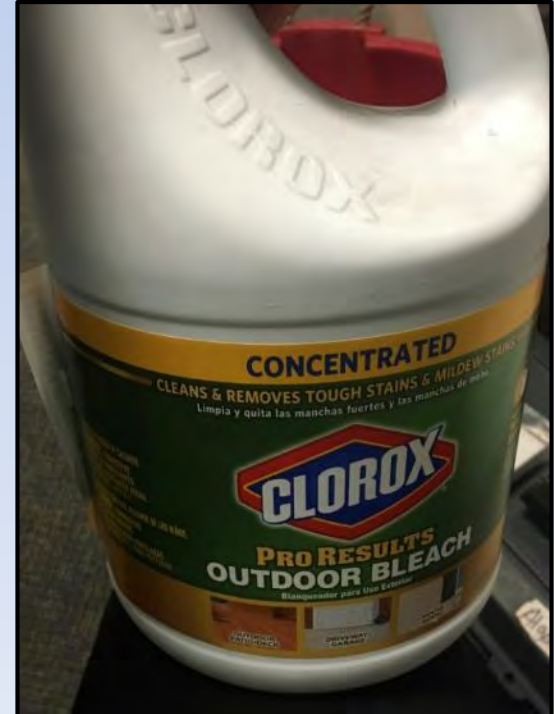
- 30 foot bag seine, 3 pulls rotating around a fixed point on shore at each site
- Gee minnow traps baited with cheese and dog food, 2 traps per site, 1 night soak
- Mini-Missouri/Siamese benthic trawl, three pulls of 175 meters at each site

Fish Sampling Methods



eDNA Field Methods

- Two replicates of 2-L vacuum pumped through 1.5 μ m GFF collected at each site, frozen on dry ice
- Decontaminate all gear at next site with 10% bleach & rinse well with site water
- Sampled from furthest-closest to known population

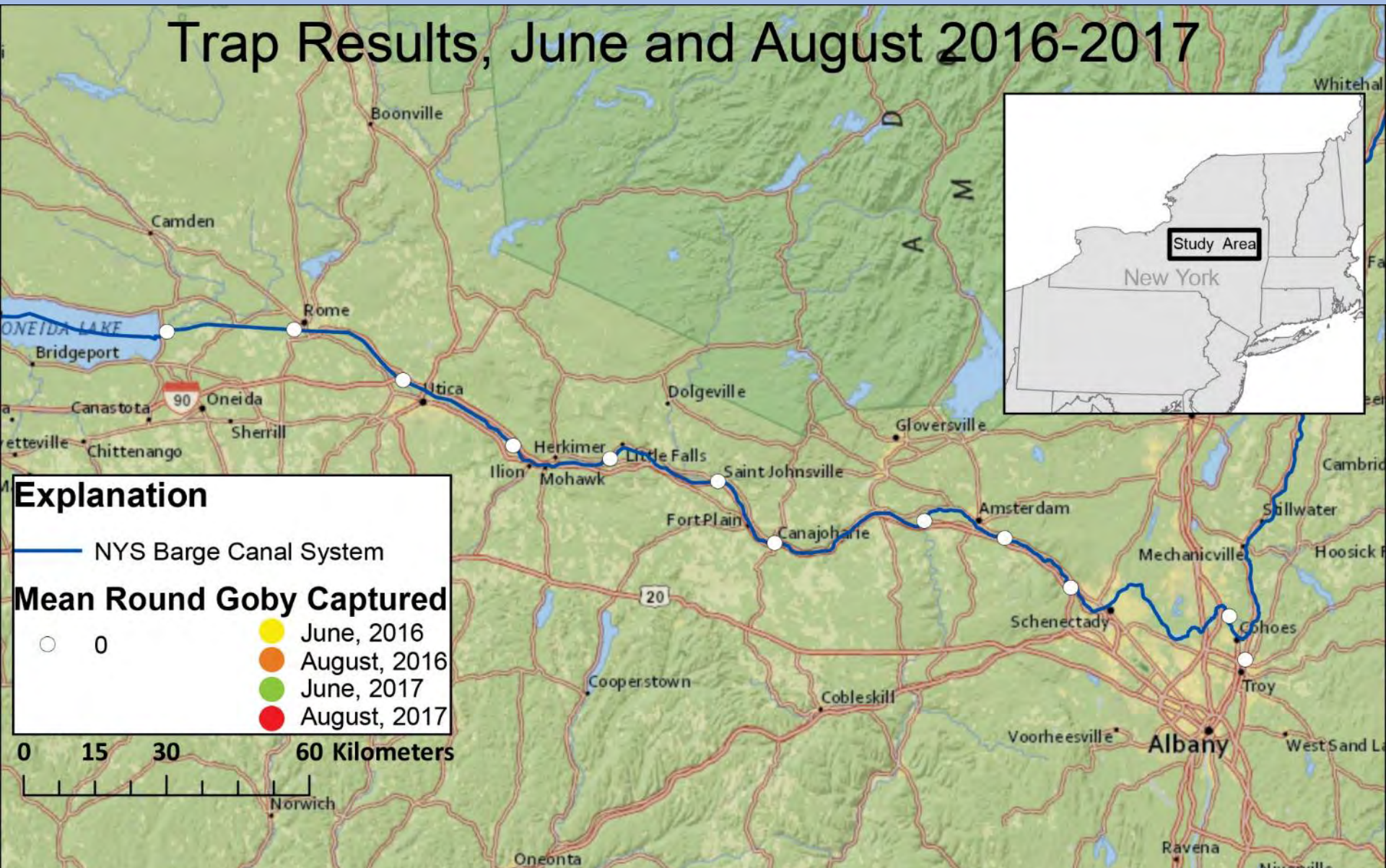


eDNA Laboratory Methods

- Filtered DNA extracted using Qiagen DNeasy Blood and Tissue Kit, 200 μ l elution volume
- Fluorescent probe-based marker from Co-oxidase I (modified from Nathan et al 2015)
- Assay calibration curves from synthetic standard exhibited 99% PCR efficiency and 0.994 r-squared
- Each filter run in octet (8 PCR replicates) with duplicate 6 point standard curves on each plate
- Negative controls, positive controls and IPC

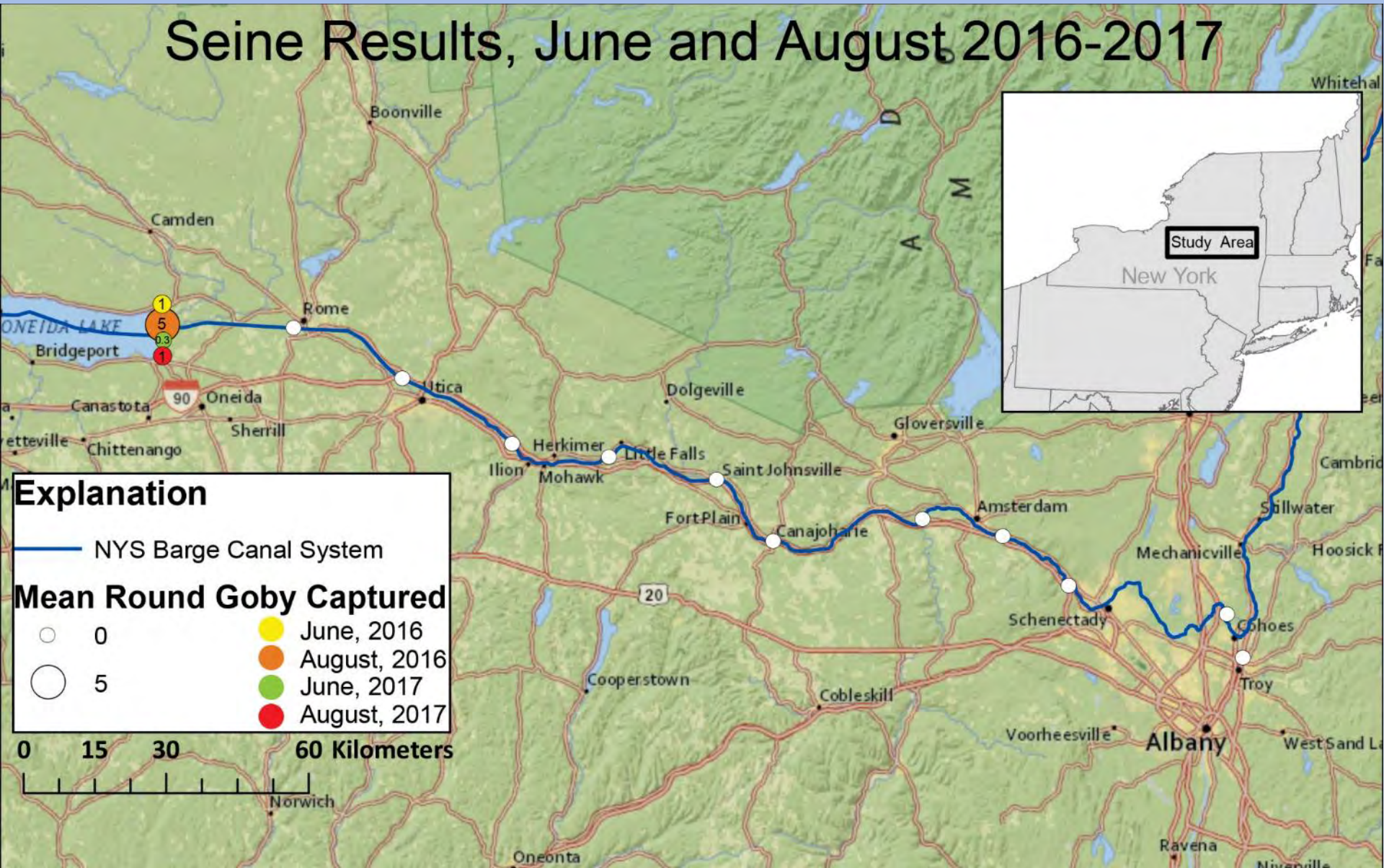
Trap Results

Trap Results, June and August 2016-2017



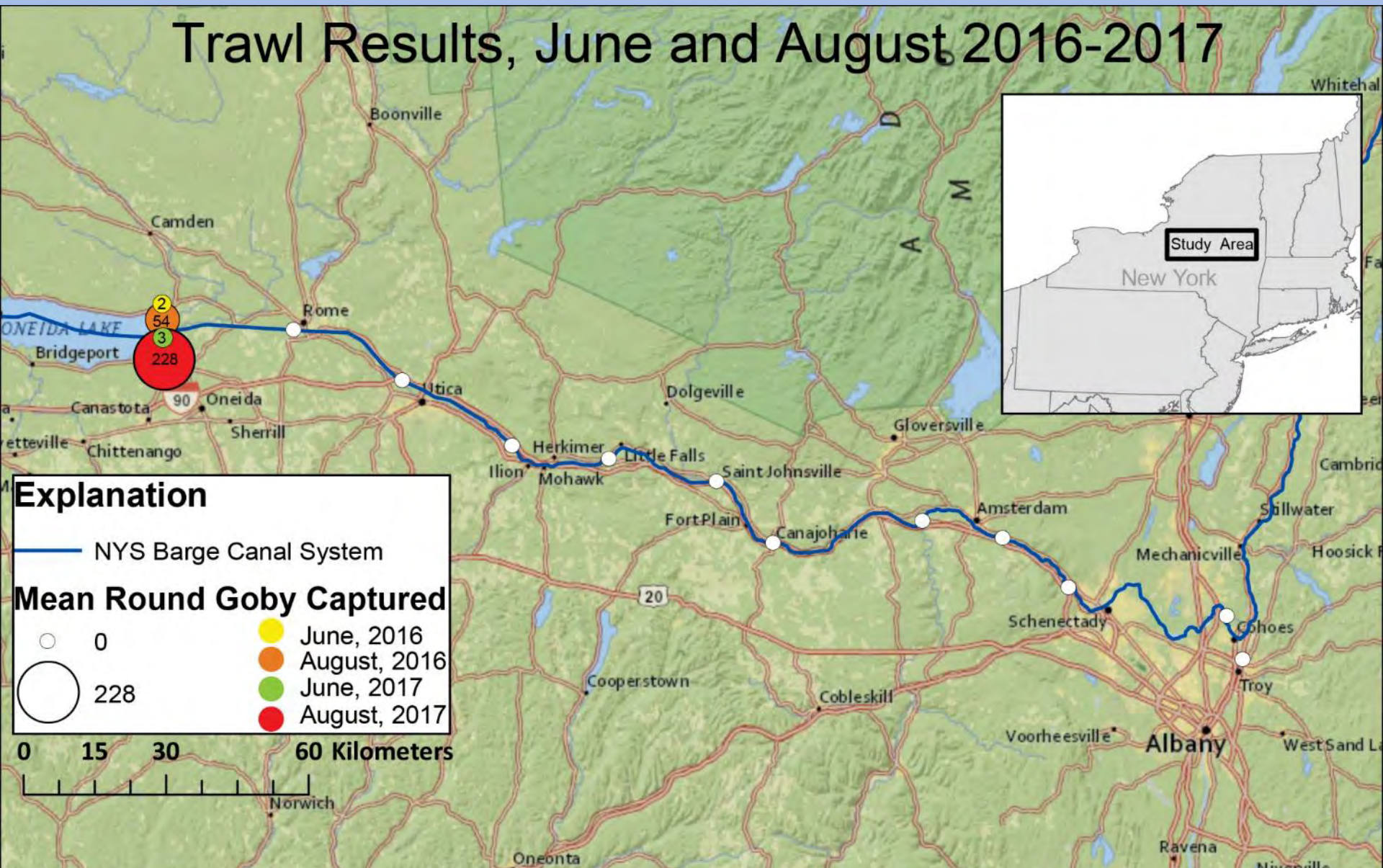
Seine Results

Seine Results, June and August 2016-2017



Trawl Results

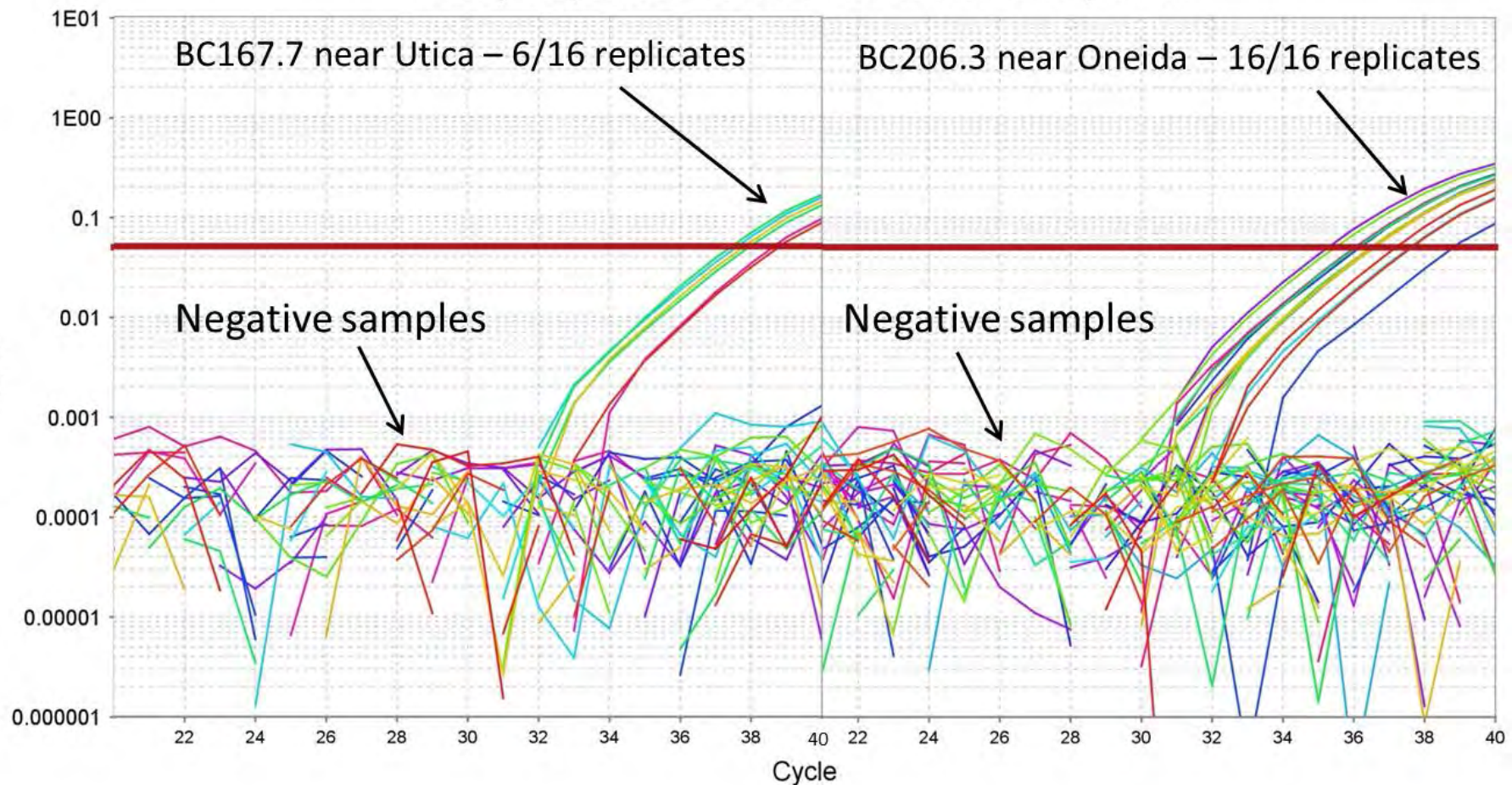
Trawl Results, June and August 2016-2017



eDNA Results

eDNA Results, June and August 2016-2017

Samples/sites Positive for Round Goby DNA



Conclusions

- Little-to-no Round Goby expansion
- eDNA appears to be more sensitive screening tool for populations that are in low abundances
- Simpler and more cost effective than traditional fish sampling methods
- Can we say anything about abundance from qPCR results?



Questions?



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