

Grass Carp Efforts in Lake Erie



**Department
of
Natural
Resources**

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Lake Erie Grass Carp Threat

- Commercial fishing captures
 - Diploid individuals captured in 2012
 - Multiple size classes since 2012
 - Increased captures in 2014, but low in 2015
- Bow-fishermen capture in 2014
- Evidence of natural reproduction in Sandusky River



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- Commercial fishing captures
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 - Multiple size classes
 - Increased captures in 2014, but low in 2015
- Bow-fishermen capture in 2014
- Evidence of natural reproduction in Sandusky River
- **Management goal is to eradicate Grass carp from western Lake Erie**



Hurdles to Grass Carp Eradication

- Information gaps
 - Abundance
 - Spatial distribution
 - Spawning locations
 - Reproductive capacity (diploid vs. triploid)
 - Age and size composition



Hurdles to Grass Carp Eradication

- Information gaps
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 - Reproductive capability (diploid vs. triploid)
 - Age and size composition
- Implementation of eradication efforts
 - Success is dependent upon the unknowns



Addressing the Gaps

- Increased sampling efforts and continued monitoring
 - Working with commercial fishing operations
- Fund and assist with research projects
- Collaborating with regional partners
 - i.e., early life history sampling with USGS and U. Toledo

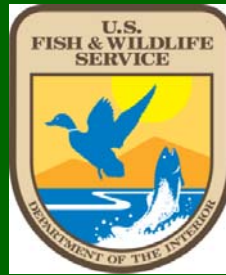




2014 Lake Erie Asian Carp Response Exercise



Collaborating partners:



Fisheries and Oceans
Canada



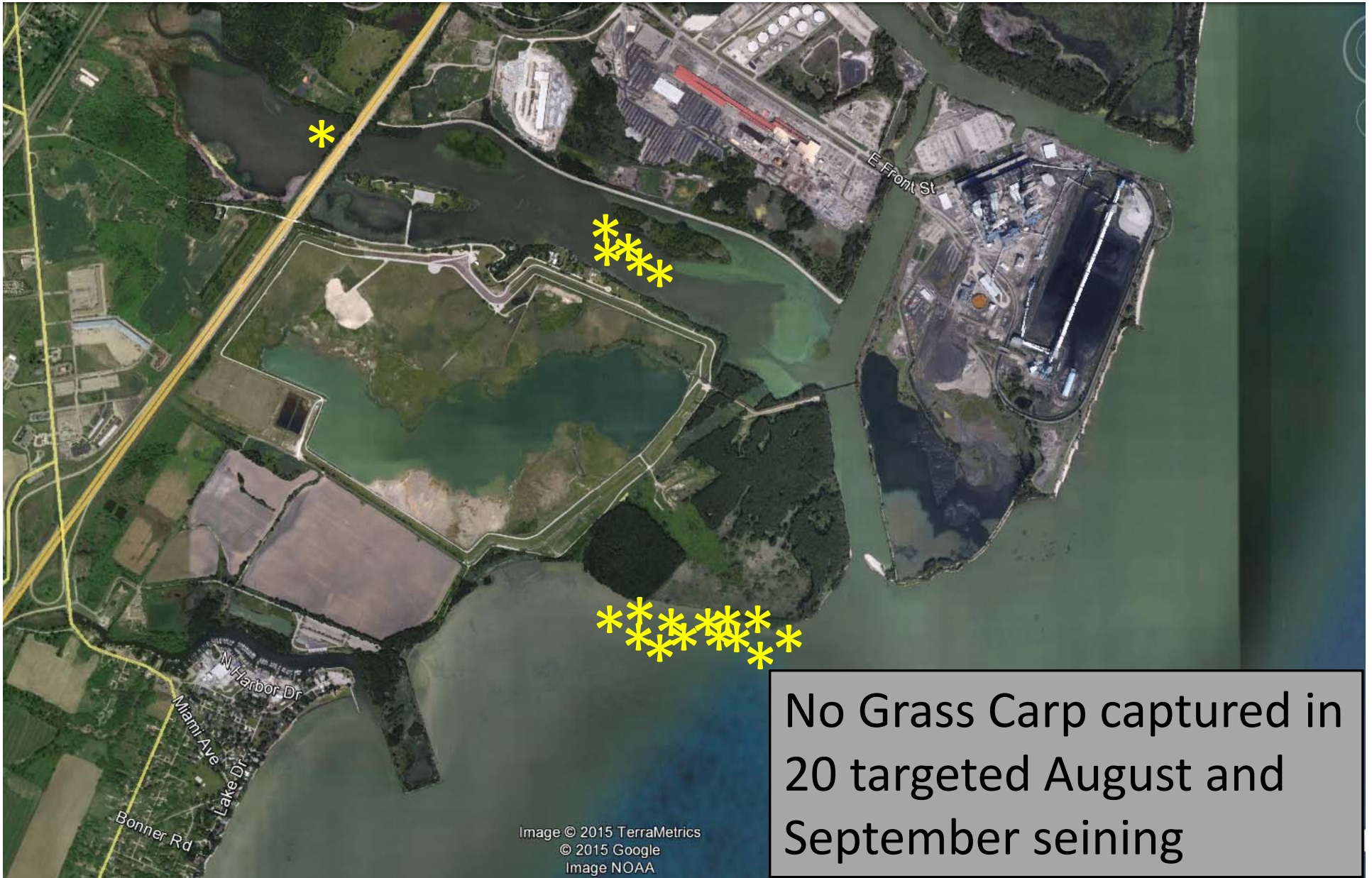
Lake Erie Grass Carp Sampling

Commercial Fishing

Individuals captured in Michigan waters
22 in 2014
5 in 2015



Targeted 2015 Grass Carp Sampling



Evaluation of the Reproductive Status and Natal Origin of Grass Carp in western Lake Erie



Jamin G. Wieringa , Andrew R. Mahon, and Kevin Pangle
Central Michigan University



Study Objectives

- Determine the ploidy status for all grass carp caught in western Lake Erie.
- Determine the natal origins for any grass carp caught in western Lake Erie.
- Identify the utility of genetic surveillance tools (i.e., eDNA) for guiding grass carp sampling efforts in western Lake Erie.

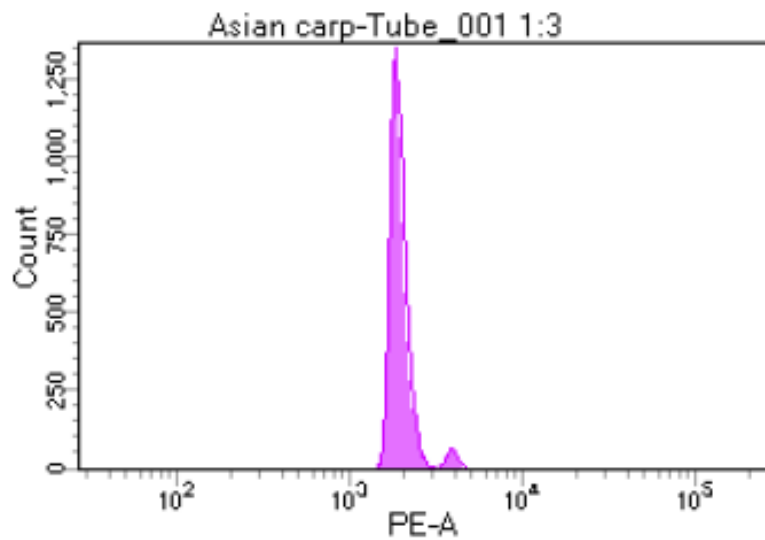
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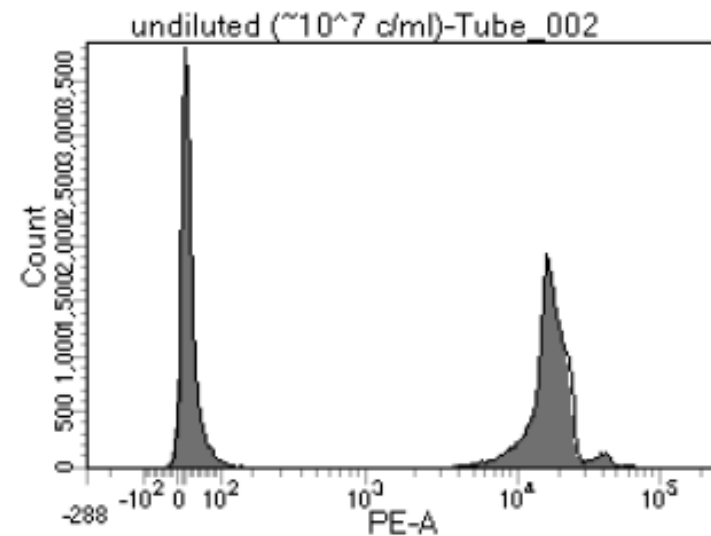
Determining Ploidy Status

- Flow cytometry (blood and eye-ball samples)

Diploid

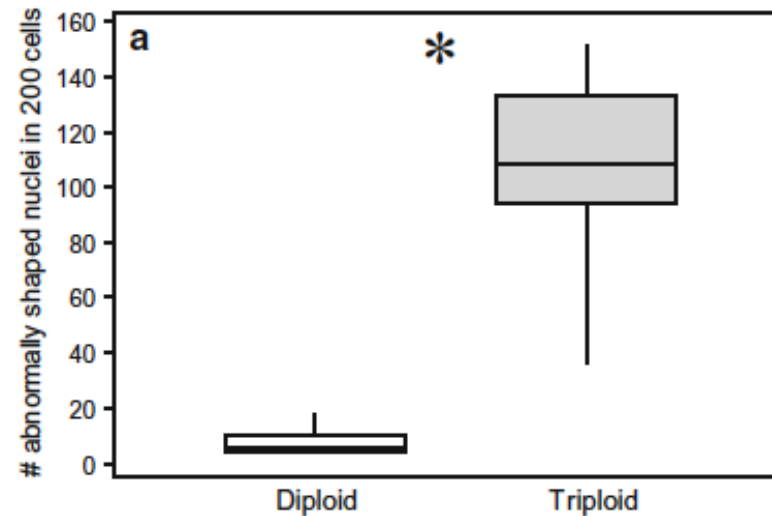
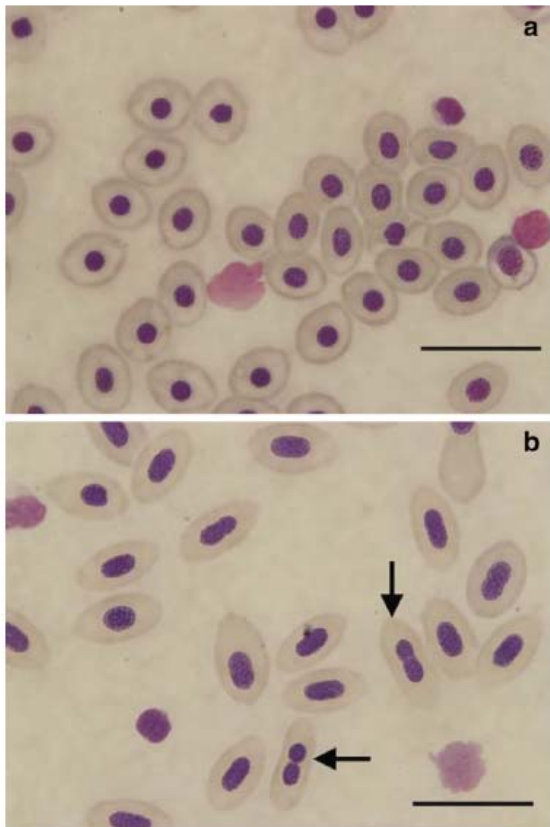


Triploid



Determining Ploidy Status

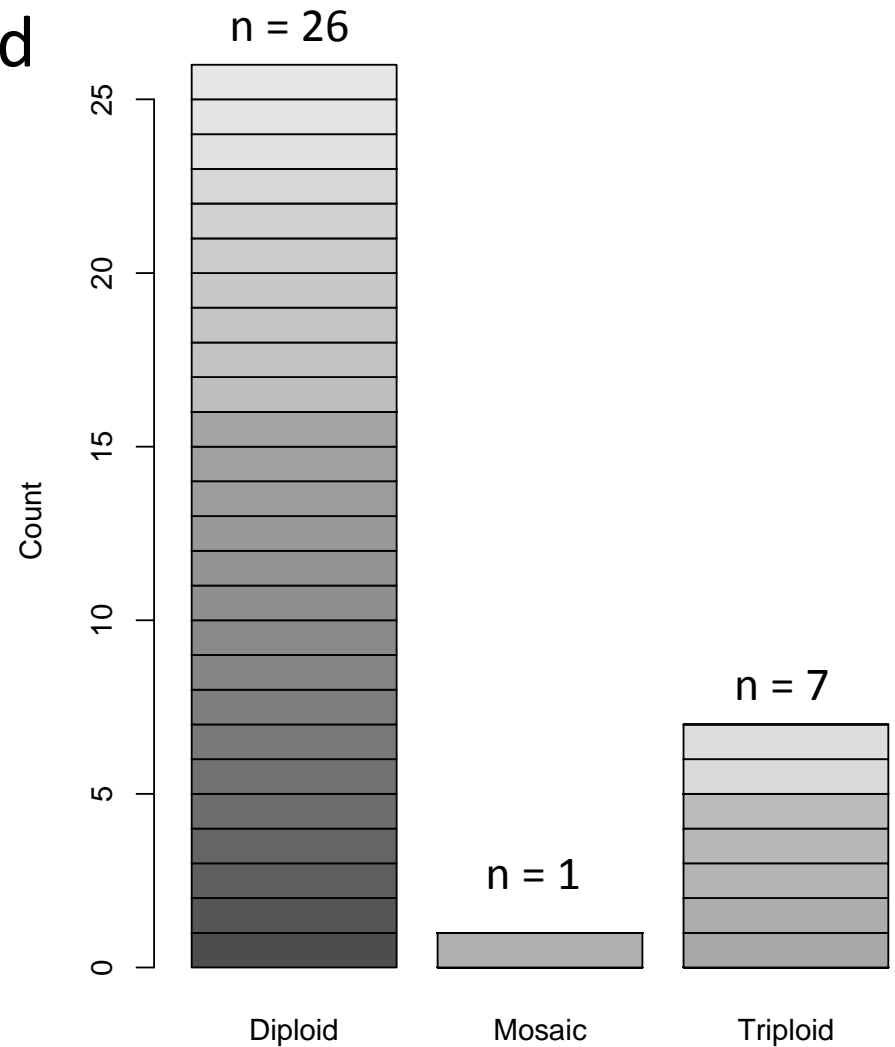
- Flow cytometry (blood and eye-ball samples)
- Blood stain microscopy



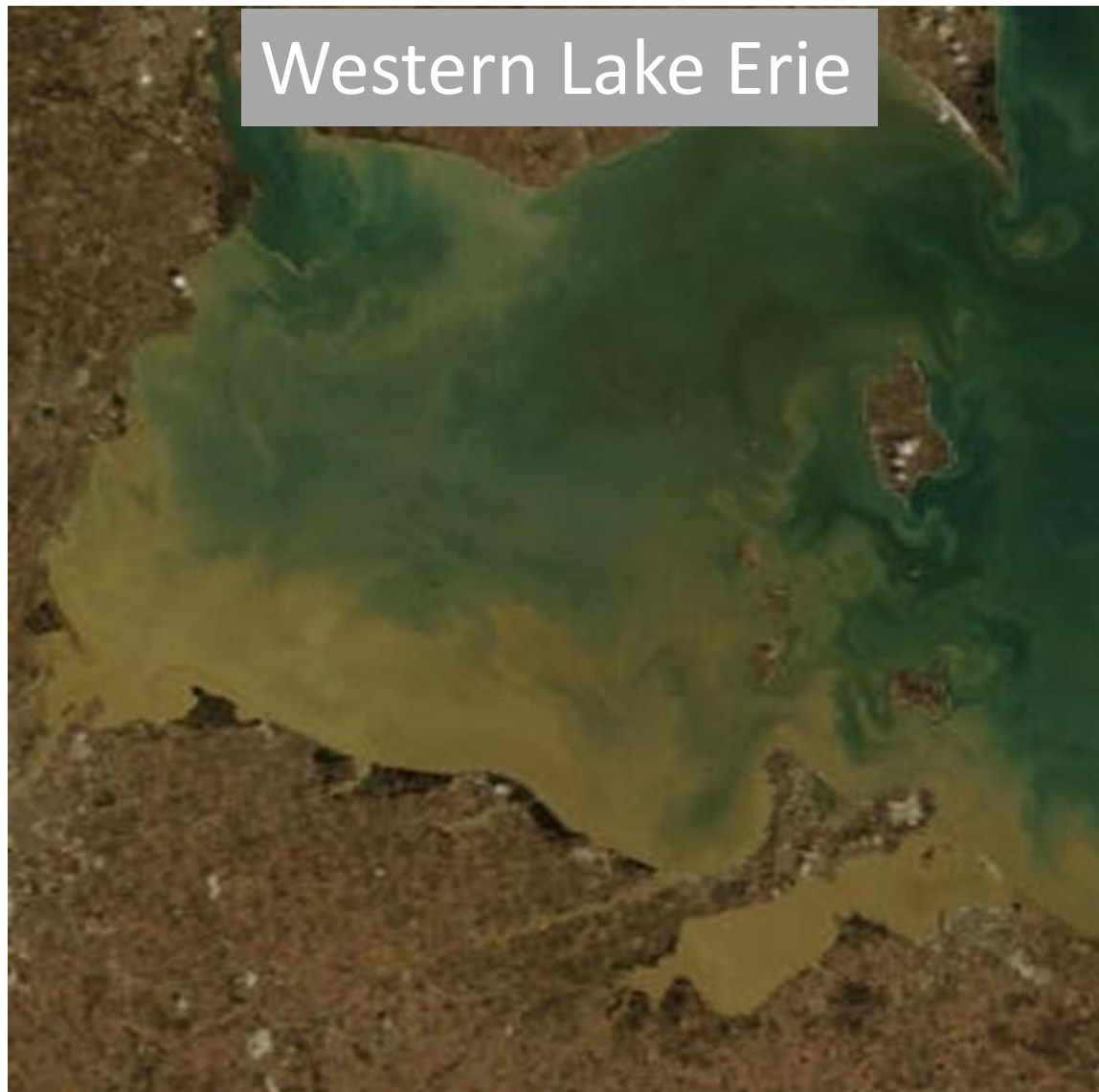
Krynak, K.L., Oldfield, R.G., Dennis, P.M., Durkalec, M., and Weldon, C. 2015. A novel field technique to assess ploidy in introduced Grass Carp (*Ctenopharyngodon idella*, Cyprinidae). *Biological Invasions* 17:7 1931-1939.

Ploidy Results

- Total of 34 Grass Carp analyzed
- 76% diploid
- 21% triploid

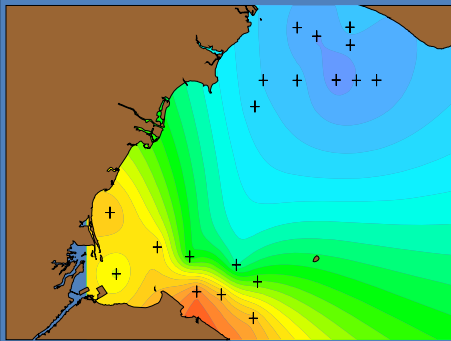


Otolith Microchemistry: Understanding Plume Dynamics

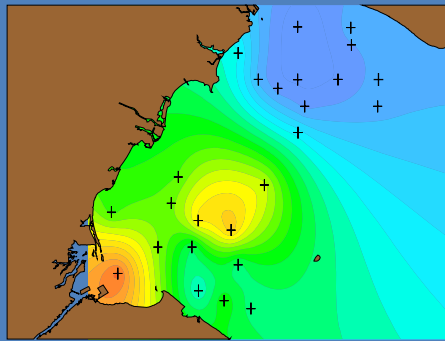


Weekly Sr Concentration, Spring 2006

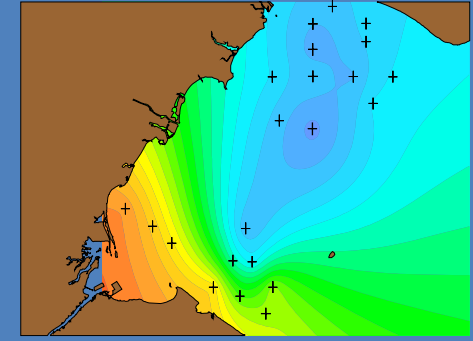
Week 2



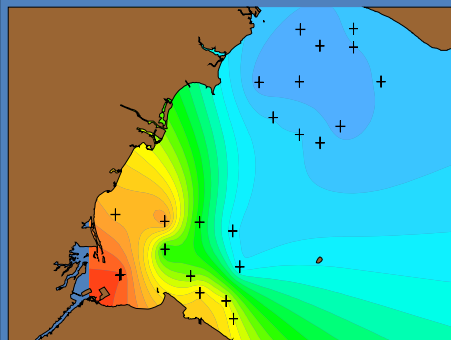
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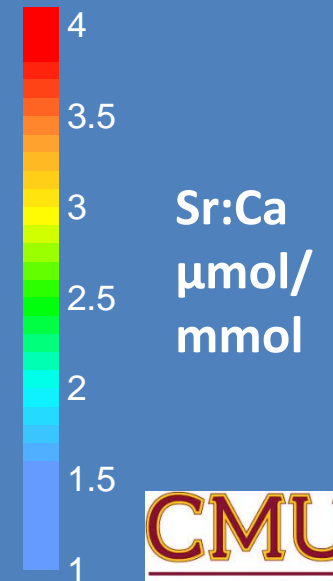
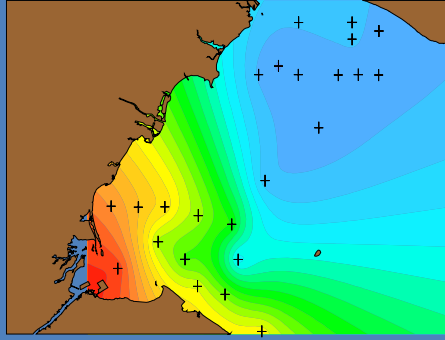
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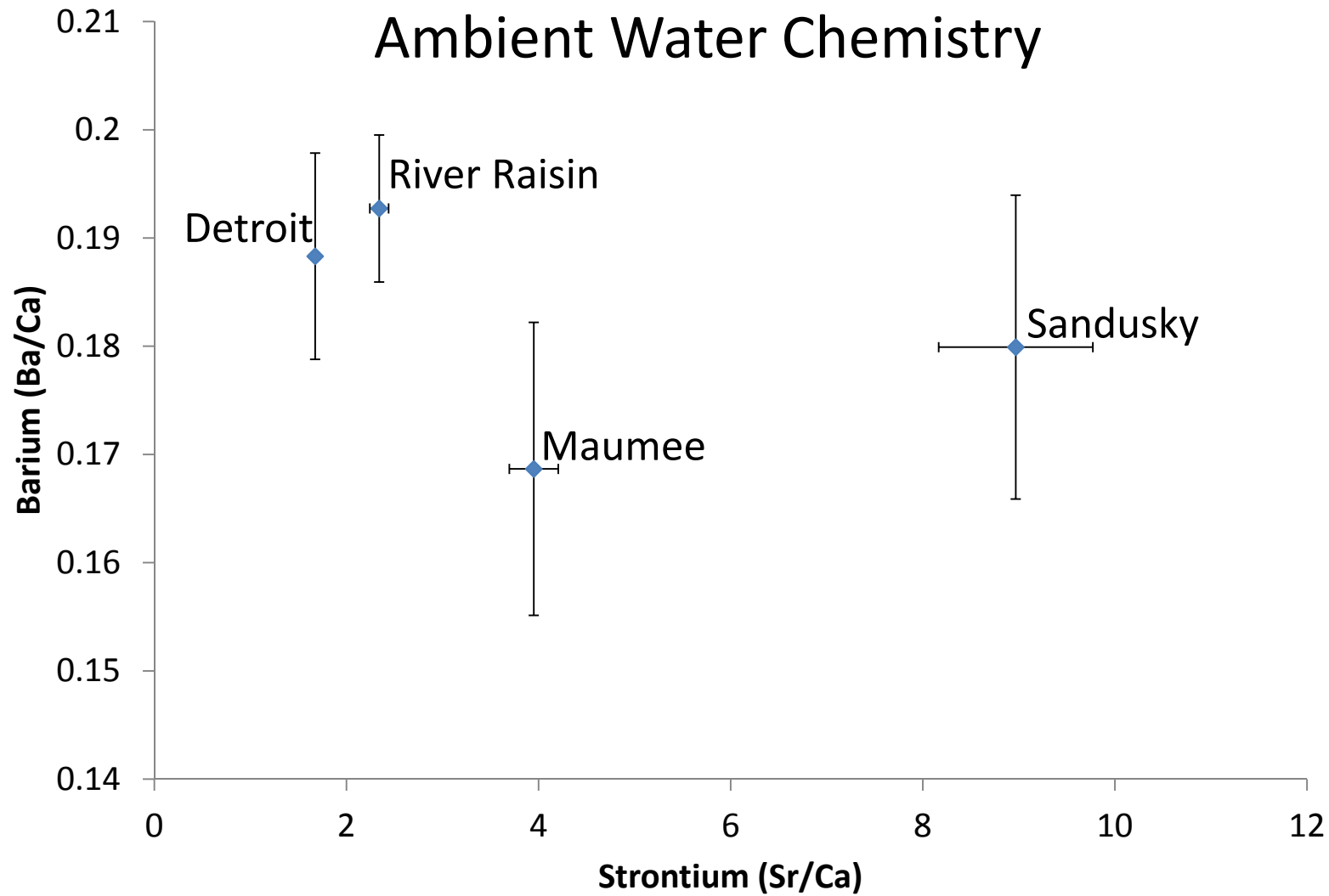
Week 5



Week 6



Determining Natal Origin

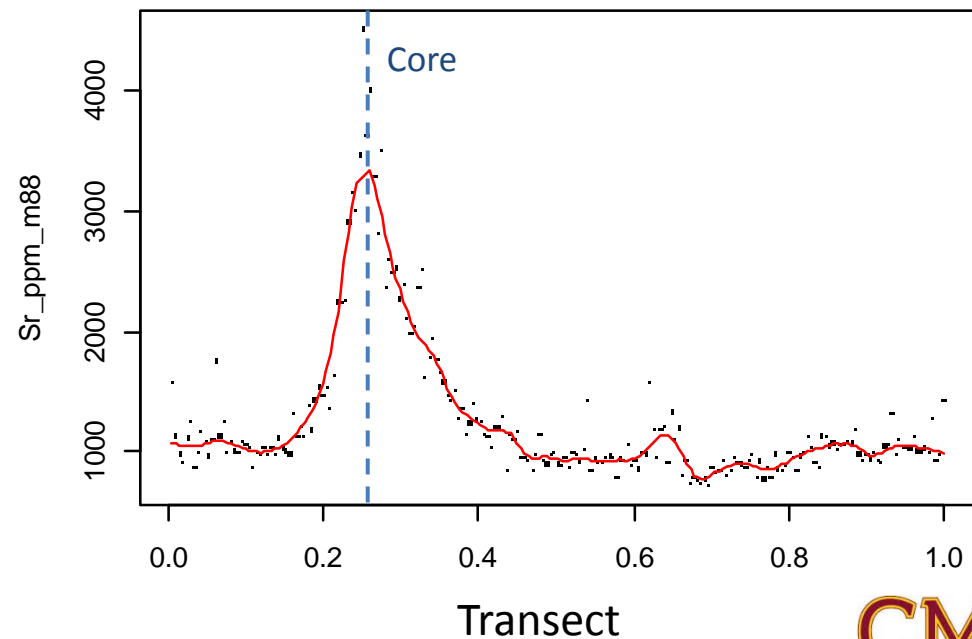
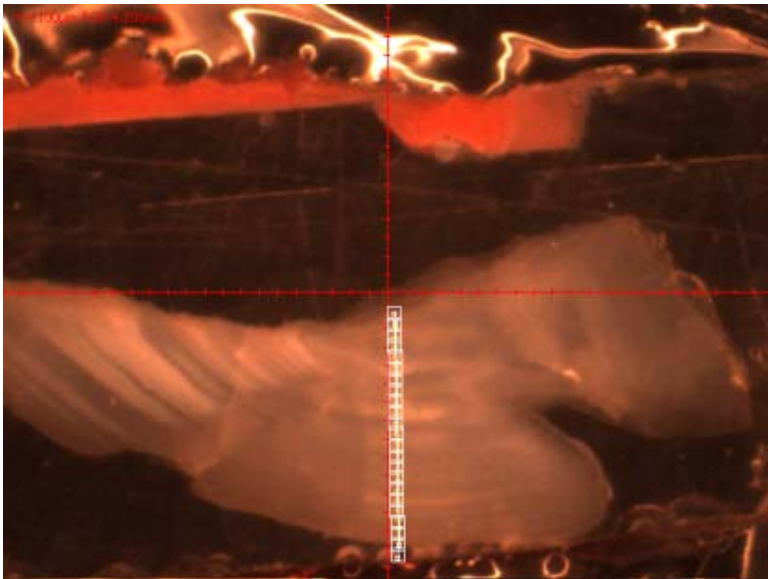


Determining Natal Origin

- 11 samples have been collected and analyzed
- 11 still to be analyzed

Captured near Monroe, MI

9yr old fish, 99 cm (39 in.), diploid individual



Tributary Use and Large-Scale Movement of Grass Carp: Patterns to Inform Control Efforts in Western Lake Erie



Questions?



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