

Tributary Use and Large Scale Movements of Grass Carps In Lake Erie

Travis Brenden¹, Chuck Krueger¹, Cleyo Harris^{1,2},
Chris Vandergoot³

¹Department of Fisheries and Wildlife, Michigan State University

²Michigan Department of Natural Resources

³Ohio Department of Natural Resources

Grass carp (*Ctenopharyngodon idella*)

- First imported to the US in 1960s
- Widespread stocking began in the early 1970s
- In the early 1980s, a procedure for inducing triploidy using temperature or pressure shocking was developed
- Michigan banned stocking of all grass carp in the mid 1980s



Grass carp (*Ctenopharyngodon idella*)

- Grass carp were first collected in Lake Erie in early 1980s
- Collections initially sporadic but have increased lately
- Both diploid and triploid fish have been collected
- Wild reproduction linked to the Sandusky River (Chapman et al. 2013)



2014 Michigan DNR RFP

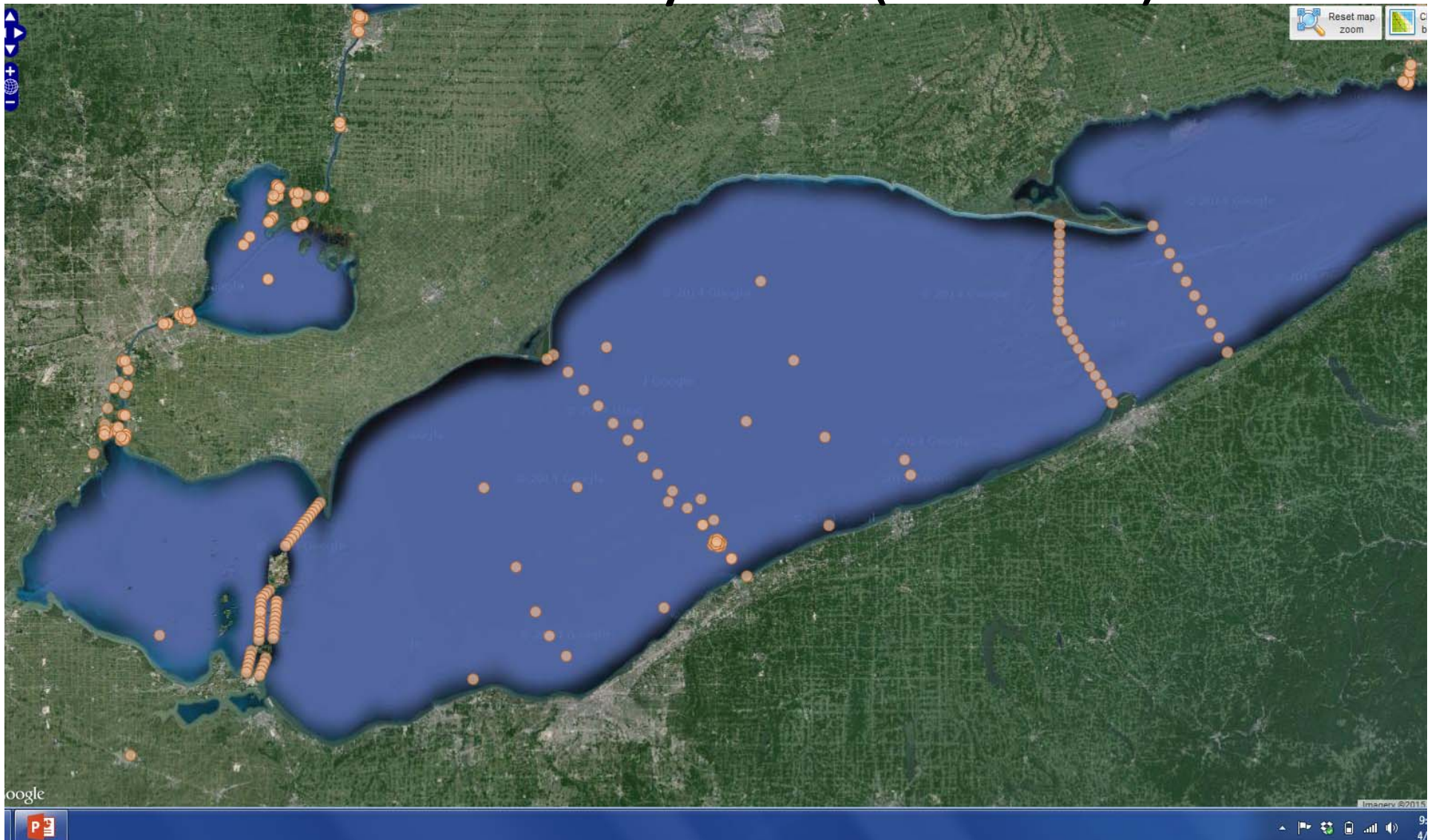
The State has an interest in obtaining information regarding grass carp population dynamics and habitat use in western Lake Erie and connecting tributaries. In particular, the goal of the project is to gain an understanding of the abundance, reproductive capacity (i.e., ploidy status), distribution/habitat use, and areas of spawning for grass carp in that region.

The expected results from this project are to better support control efforts of grass carp in western Lake Erie by gaining an understanding the distribution and seasonal habitat use of this emerging invasive species.

Objectives

1. Identify tributary use of grass carps in western Lake Erie (*control*)
2. Determine how far upstream fish migrate in tributaries and identify potential spawning sites or areas of aggregation (*control*)
3. Determine the extent of inter-basin movements of grass carps in Lake Erie and potential for expansion into Lakes St. Clair and Huron (*expansion risk*)

Great Lakes Acoustic Telemetry Observation System (GLATOS)



Proposed Methods

- Hydroacoustic tag up to 50 grass carps in 2014 and collect blood for ploidy determination
- In 2015, deploy hydroacoustic receivers in mouths of western basin Lake Erie tributaries (range of sizes) to identify used tributaries
- In 2016, deploy receivers throughout select tributaries to identify points of aggregation and spawning



Current Status

- 12 grass carps have been tagged to date (6 in 2014, 6 in 2015)



Current Status

- 12 grass carps have been tagged to date (6 in 2014, 6 in 2015)
 - 9 in Ohio waters; 3 in Michigan waters
 - Size range: 700 – 1100 mm
 - Ploidy status: 5 of 7 diploid
 - Age range: 4 to 8

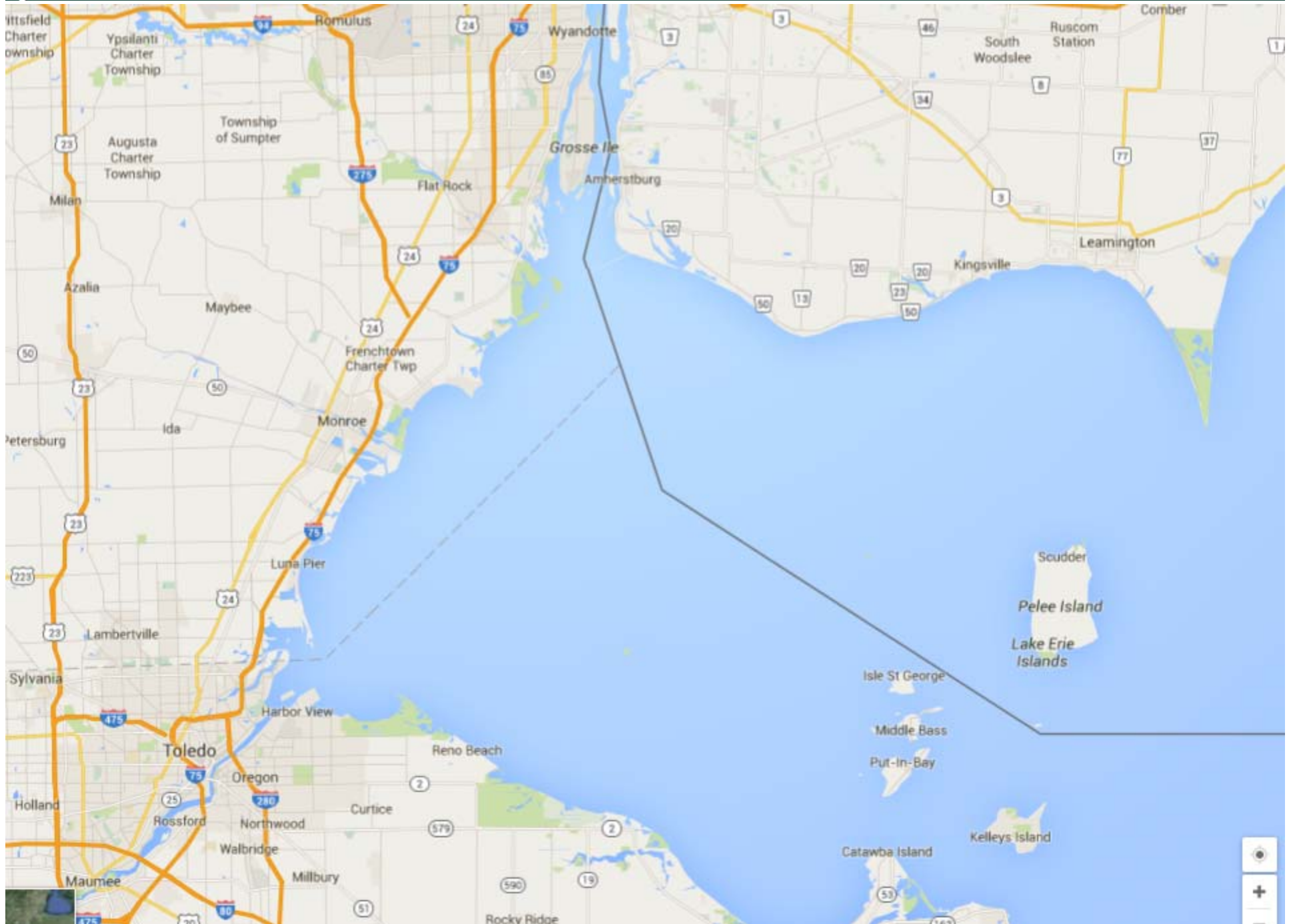


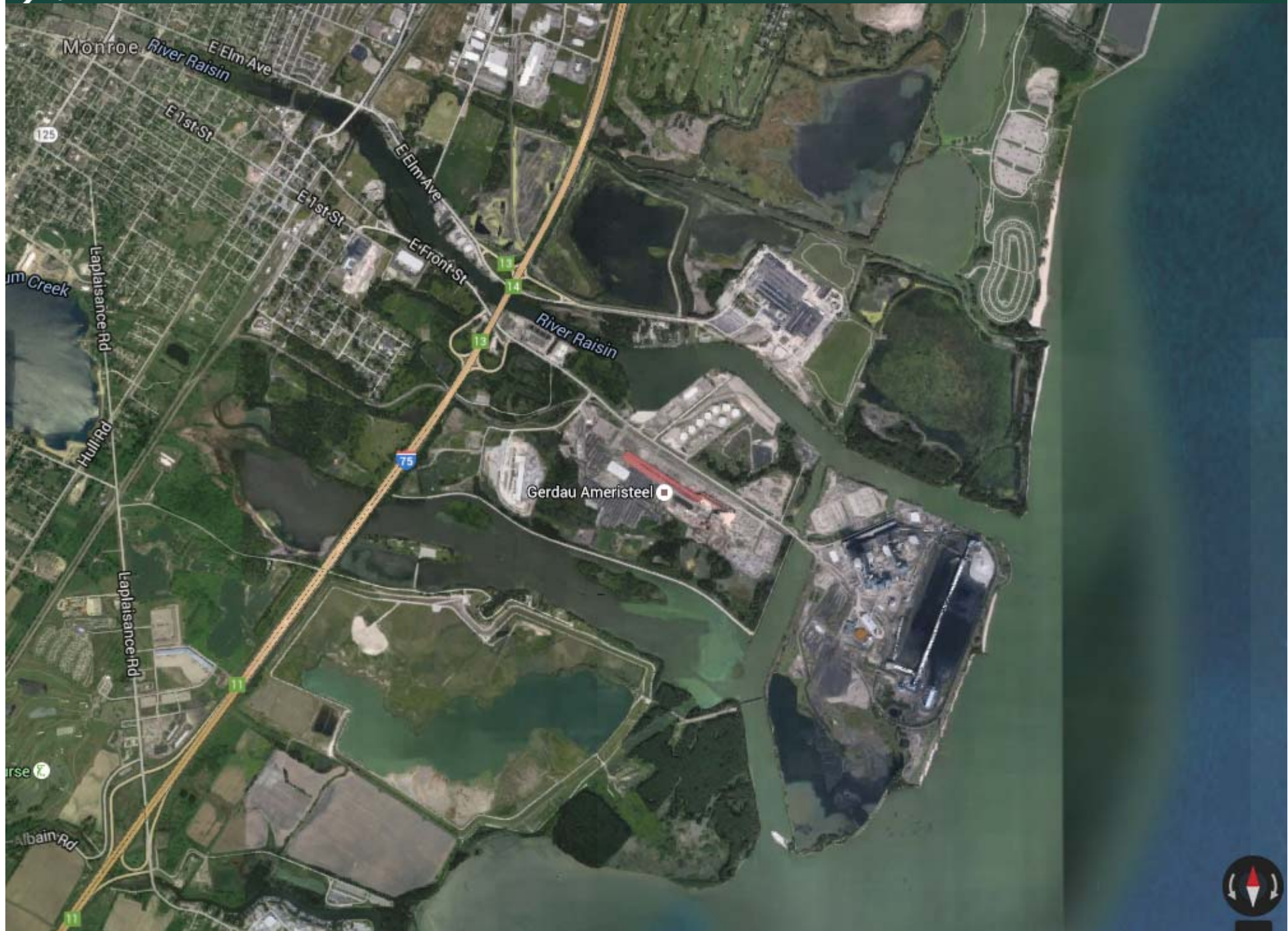
Current Status

- Receiver deployment delayed for one year because of low tagging numbers and to work on methodology
 - Trial deployments were conducted in the Huron, Raisin, Sandusky, and Maumee Rivers in 2015 for preliminary observations and for range testing
 - Receiver was also deployed at Plum Creek (hot pond)
 - More tributaries and a larger range of tributary sizes will be monitored in 2016
 - Deployment of receivers in select tributaries will occur in 2017

Detections to Date

- 1 fish tagged in Michigan waters has been observed on 3 occasions in Plum Creek (hot pond)





Detections to Date

- 1 fish tagged in Michigan waters has been observed on 3 occasions in Plum Creek (hot pond)
- Several fish tagged in Ohio waters have been detected at the western basin array (close to where they were tagged)



Detections to Date

- 1 fish tagged in Michigan waters has been observed on 3 occasions in Plum Creek (hot pond)
- Several fish tagged in Ohio waters have been detected at the western basin array (close to where they were tagged)
- 1 fish tagged in Michigan waters was located in the Sandusky River and detected at the western basin array



★ Tagging Site ● Areas of Relocation ● Acoustic Receiver

Future Plans

- Receiver deployment in tributaries in 2016 and 2017
- Analyze data and complete project in 2018
- Continue tagging grass carp in Michigan and/or Ohio waters that become available (contingent on support from the Lake Erie Committee)

Need for Additional Tagging

The expected results from this project are to better support control efforts of grass carp in western Lake Erie by gaining an understanding the distribution and seasonal habitat use of this emerging invasive species.

- 2014 coordinated sampling effort illustrated the difficulty in collecting grass carp in open waters
- Study is being conducted to identify spawning tributaries and areas of aggregation as possible control sites
- Power to identify control sites is directly linked to numbers of tagged fish

Need for Additional Tagging

Shetter, D.S. 1949. A brief history of the sea lamprey problem in Michigan waters. Progressive Fish Culturist

“Complete knowledge of the life history and requirements of the lamprey is necessary for effective control. Some unsuspected weak link in the life cycle which offers means for control or eradication may be uncovered by further investigation.”

Lake Erie Committee Position Statement on Asian Carp (grass carp included in the statement)

Decisions and management actions should be guided by effective long-term strategic vision and planning, coordination and communication, and emerging science to ensure consistent, effective, and acceptable management of risk among all jurisdictions.

Need for Additional Tagging

- Efforts to control sea lamprey in the Great Lakes have demonstrated the importance of identifying spawning areas
- Considerably plasticity in spawning traits based on studies conducted in bigheaded carps (Coulter et al. 2013)
- If grass carp exhibit similar plasticity or move considerable distances, range of potential spawning areas could be greater than thought