

# Reproduction of Grass Carp in Lake Erie Tributaries Fall 2018 Update

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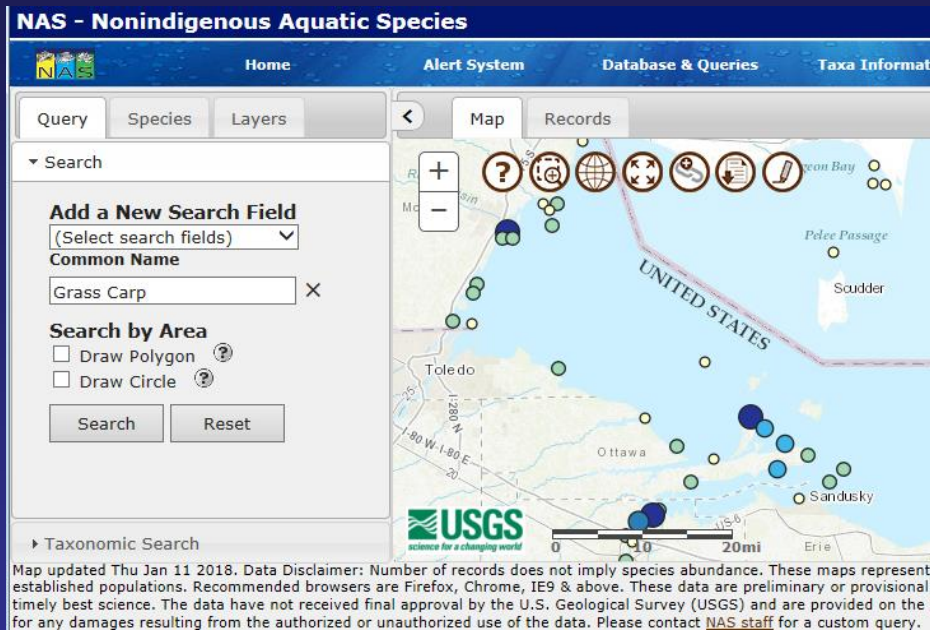
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# History of Grass Carp in Lake Erie

- First Grass Carp captured in Lake Erie in 1985



**1986:**  
**OSUM 69227, 845 mm SL**  
**OSUM 65221, 880 mm SL**

- Method for inducing triploidy developed by J.M. Malone and Son in 1983

**First GC captured in Lake Erie were diploid**

# Spawning in Lake Erie tributaries

- **10 captured in the Sandusky River Oct 2012**
  - Age 1+, 4 verified diploid
  - Otoliths: Sandusky spawned
  
- **2015: caught them in the act!**
  - Holly Embke MS work – fertilized eggs
  - Otoliths: Sandusky spawned
  
- **2017: Double-trouble...**
  - Spawning twice in Sandusky
  - First fertilized eggs from Maumee
  
- **Have they spawned before?**
  - Probably...age estimation of wild-spawned diploid fish underway



Grass Carp otolith  
J. Miner

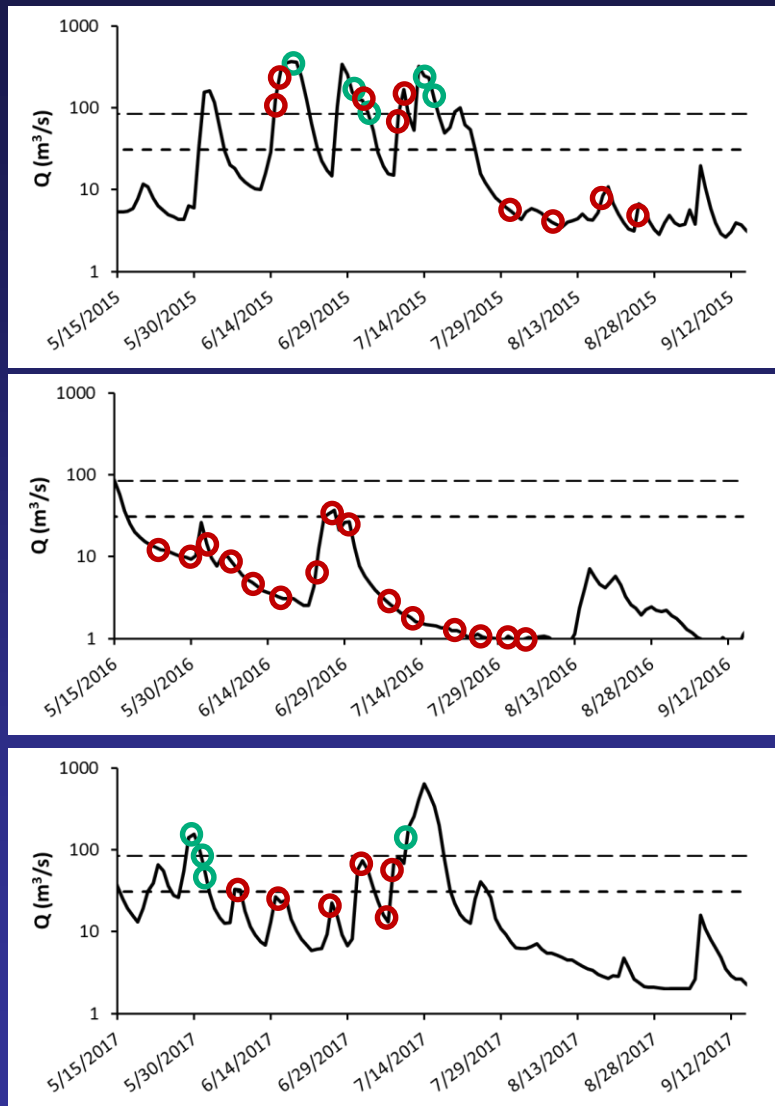


Grass Carp egg, Sandusky 2017  
H. Embke



Grass Carp embryo, Maumee 2017  
M. Tomczak

# When do they spawn?



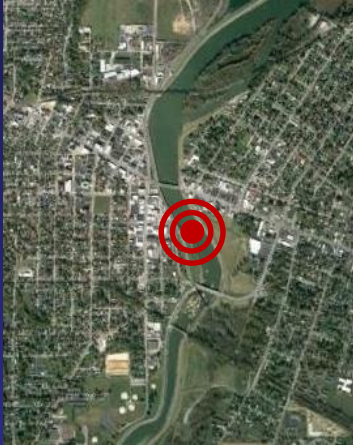
- High flow events, mid-May – Mid July
- Peaks or Descending limbs of hydrographs



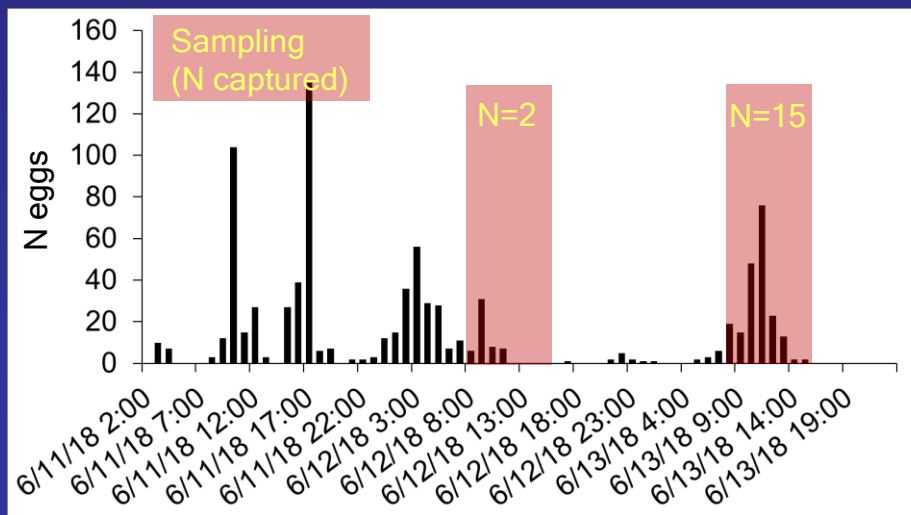
- Sampled, collected eggs
- Sampled, did not collect eggs

# Where do they spawn?

## Sandusky: Fremont, OH



- 2018 control event corresponded with spawning event
- Spawning area **verified**; modeling method **validated**



## What else did we learn from 2018?

### *Sandusky*

- Two spawning events: May 23-25, June 11-14  
May event **1 week earlier** than 2017  
Further expansion of spawning window  
Egg count incomplete, but probably several thousand  
**comparable to 2017**

### *Maumee*

- Two spawning events: June 11-14, June 23-27  
Egg count incomplete, but probably in the hundreds  
**higher than 2017**

## What are we doing about it?

- **Verification** of spawning area and **validation** of method supports further actions:
  - Modeling spawning areas in the Maumee **requires developing hydraulic model**
  - Coordinated Electrofishing during spawning works
- Sampling other rivers
  - **No eggs in Portage or Huron**
  - Otolith microchemistry/oxygen isotope analysis will inform where else to look



## What are we doing about it?

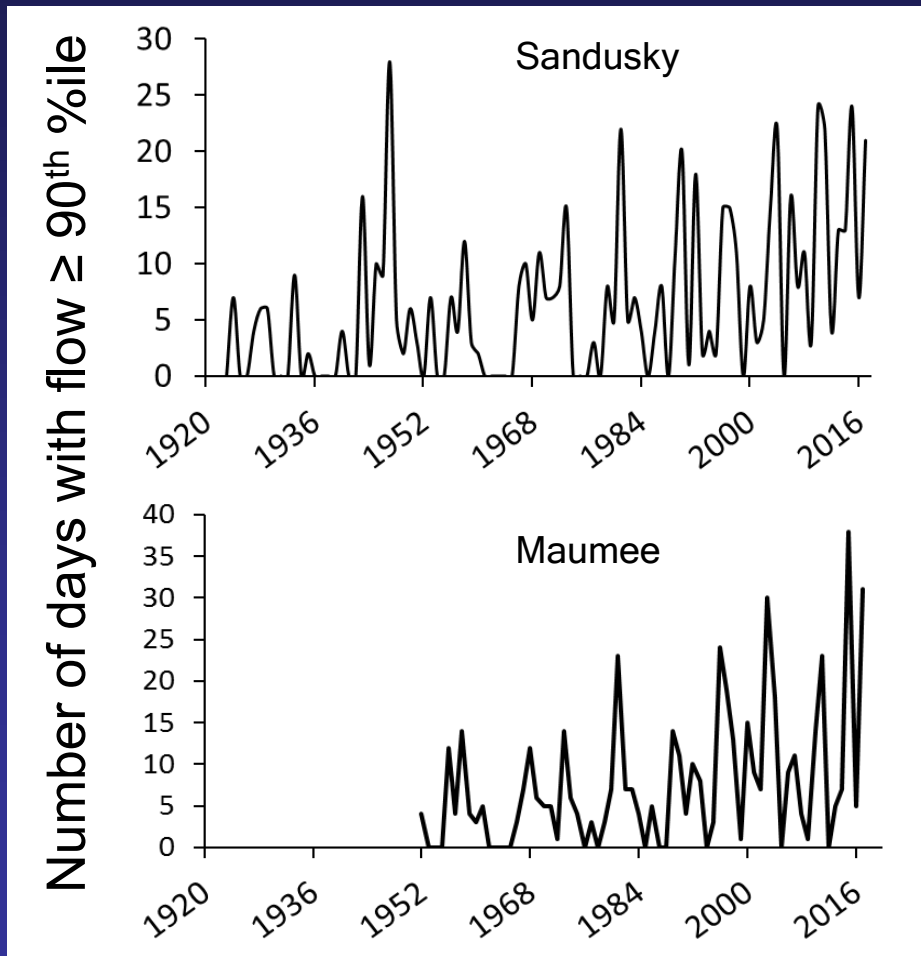
- Larval sampling  
Only life stage not captured
- Determine if sampling occurs upstream of former site of Ballville dam
- Identify **control strategies** and where and when to use them





# What does the future hold?

Frequency of high-flow events is increasing



## Likely culprits

- Tiling
- Increased field size  
no buffers
- Separation of storm  
and sanitary  
sewers
- Climate change?

# Acknowledgments

**UToledo:** Embke, King, Laszlo, Mayer, Mullikin, Qian, Tomczak  
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**MIDNR:** Francis, Harris, Herbst  
**FWS:** Thompson, Briggs  
**DFO:** Colm, Cudmore, Marson

**USGS Ecosystems Mission Area, Invasive Species Program  
Great Lakes Restoration Initiative**



Tomczak  
Black Carp

King  
Grass Carp

Mullikin  
Bighead Carp

Laszlo  
Silver Carp