



# Grass Carp Update

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Binational Great Lakes AIS Forum

Ann Arbor, MI

November 9, 2017



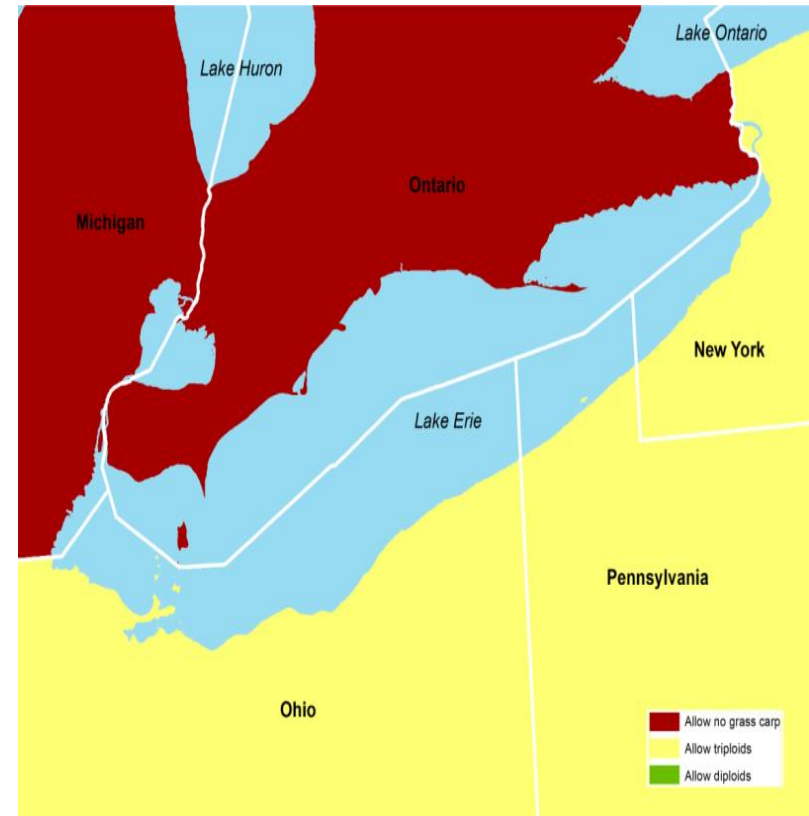
# Lake Erie Fisheries Management



Inter jurisdictional issues are addressed through the **Joint Strategic Plan for Great Lakes Fisheries**

## Lake Erie Committee

- Michigan
- Ontario
- Ohio
- Pennsylvania
- New York



# Lake Erie Committee



- **2012 – Increased reports from Michigan and Ohio commercial fishermen**



- **Asian carp position statement**
  - Use science to inform decision making



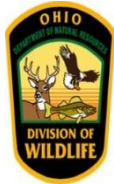
- Identify advanced monitoring and controls options



- **Mutual Aid Agreement for AIS**

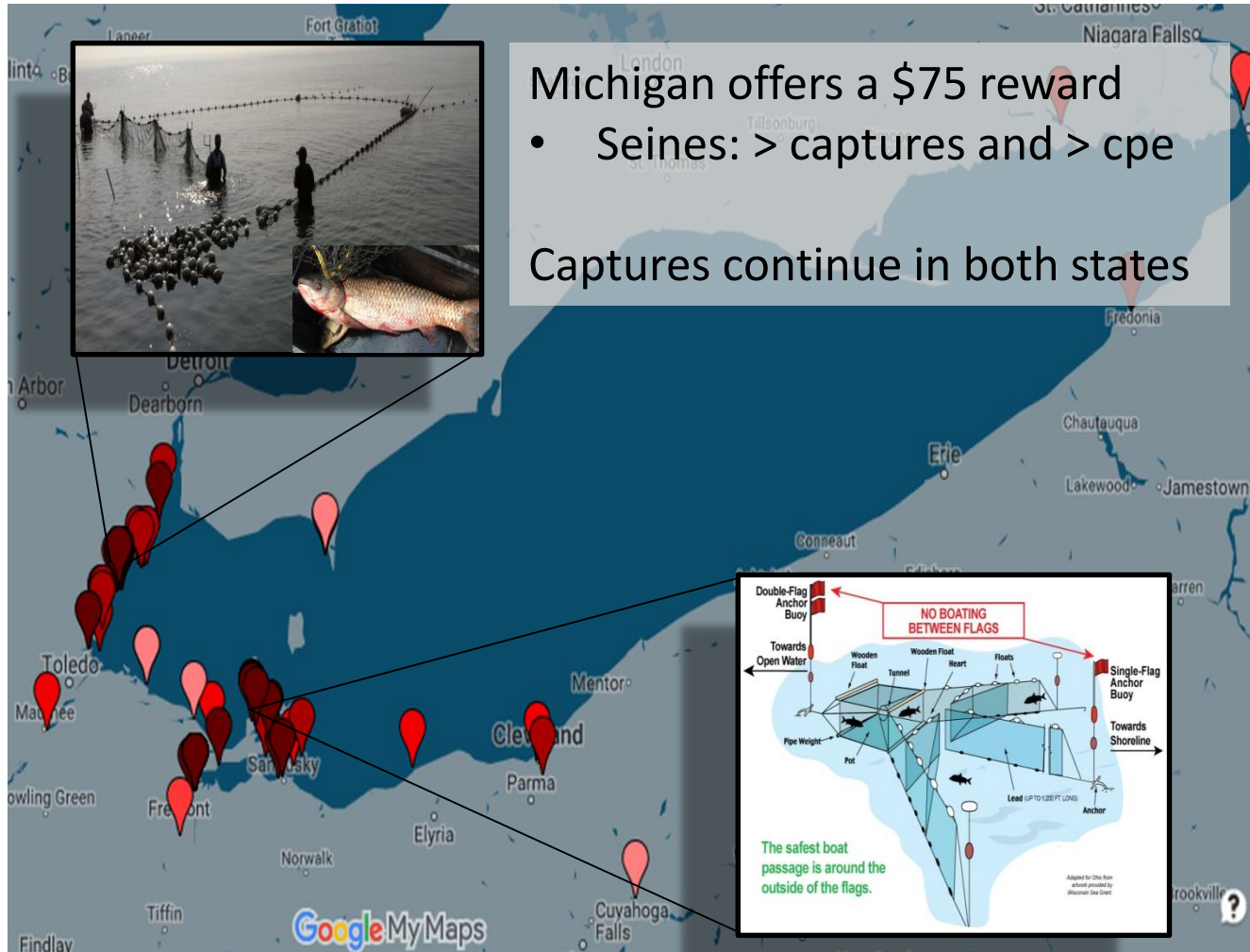


# Lake Erie Committee - strategy



- **Reduce the unknowns with research projects**
  - Current abundance, spatial distributions, spawning locations, reproductive capacity (diploid vs. triploid), age and size composition, and management efficiency/cost
- **Increased sampling efforts and continued monitoring**
  - Work with commercial fishers
- **Collaborating with regional partners**
  - Response planning, Implement Mutual Aid Agreement, Structured Decision Making Framework

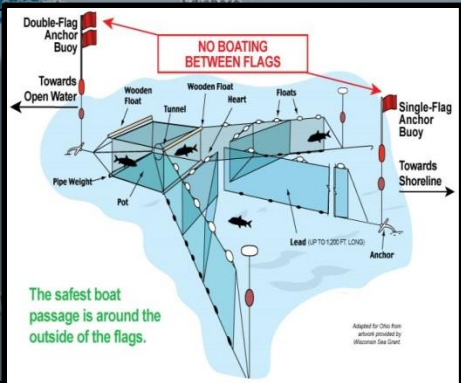
# Working with Commercial Fishers



Michigan offers a \$75 reward

- Seines: > captures and > cpe

Captures continue in both states



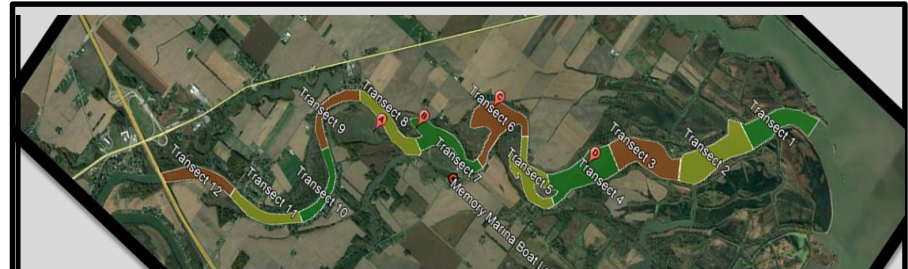
# Planned Management Actions



## 2014 Invasive Carp Response Exercise

- Michigan shoreline, “hot ponds” area
- 96 hrs of electrofishing
- 58 hrs of gill netting
- 2 capture

Funding Source



## 2017 Invasive Carp Response Exercise

- Sandusky River, Ohio
- 26 hrs of electrofishing
- 33 hrs of gill netting
- 8 captures

# Ongoing Research and Monitoring



## Reproductive Status and Natal Origin

- Ploidy analysis and otolith microchemistry



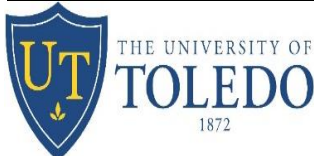
## Tributary Use and Large-Scale Movement

- Great Lakes acoustic telemetry array and real-time receivers



## Timing and magnitude of spawning events

- Ichthyoplankton sampling in the Sandusky and Maumee River



# Additional research and monitoring

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**Asian carp early detection and field monitoring program**

**Ecological Risk Assessment of Grass Carp for the Great Lakes Basin**



**Early detection and monitoring program**

- Ichthyoplankton and adult sampling in Sandusky and Maumee rivers and bays



**Optimizing electrofishing settings for grass carp**

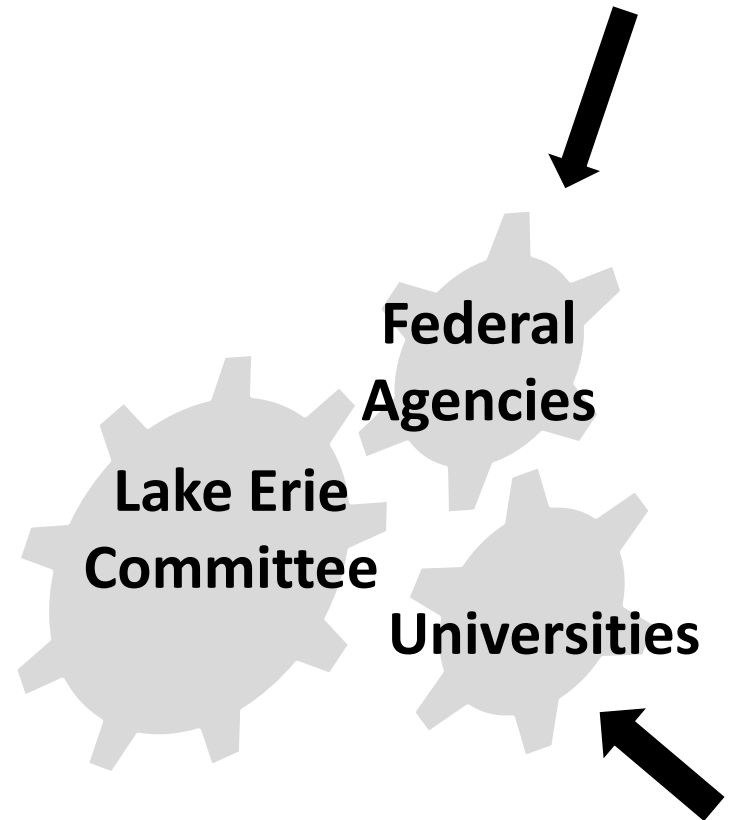


# Initiating a Structured Decision Making Exercise

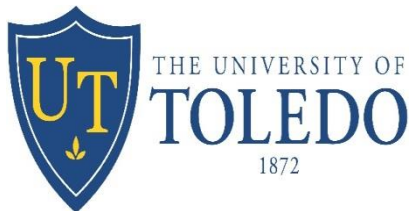
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## Bring groups together to:

1. Establish goals and objectives using the best available information
2. Collaboratively carry out management actions



# Cooperating Partners



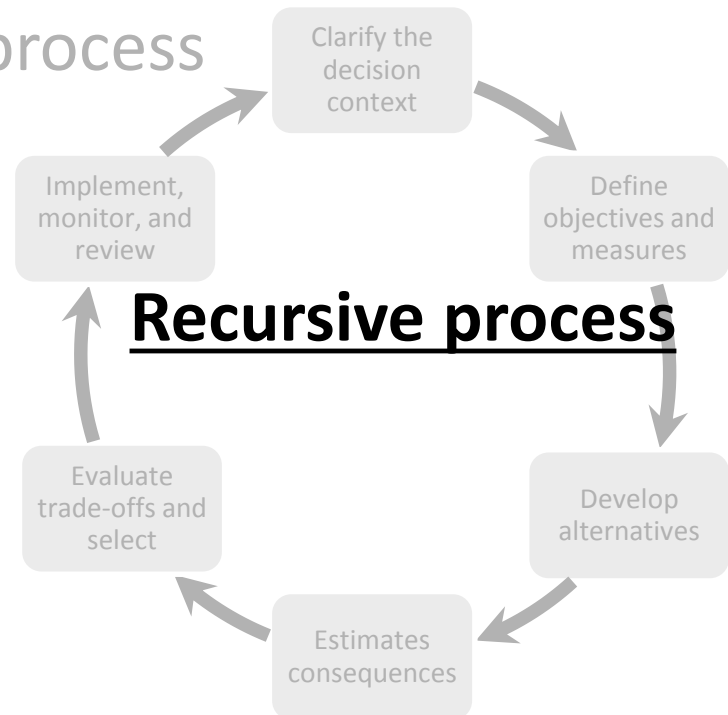
# Structured Decision Making

Incorporates available information and stakeholders values

Provides a formal structure for making decision in a transparent and collaborative process

## PrOACT framework

- Problem definition
- Objectives
- Alternatives
- Consequences
- Tradeoffs

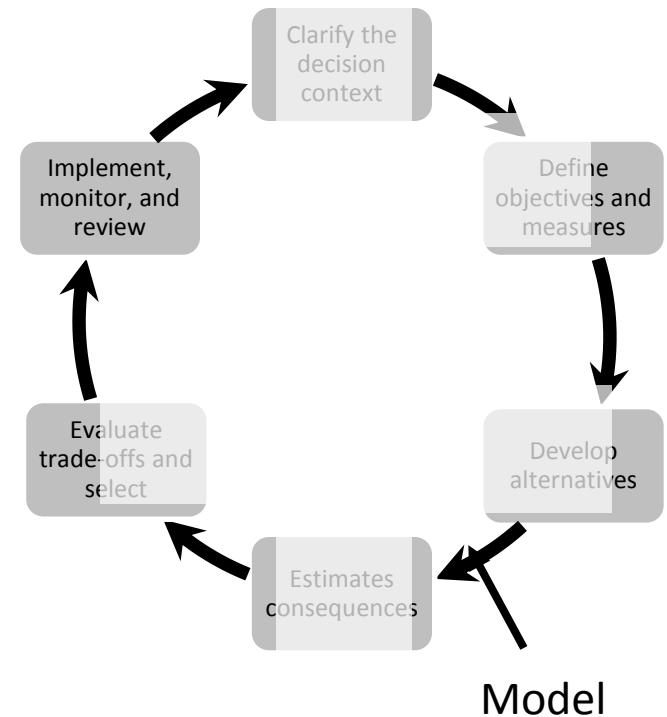


# SDM workshops

Michigan State University hosted three workshops

Participants from 13 entities

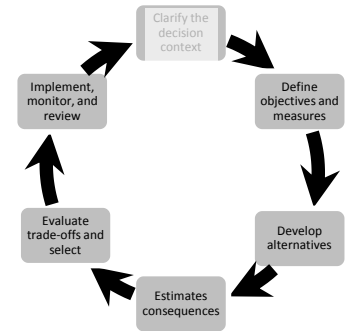
1. December 2016 – set foundation
2. June 2017 – refine SDM components
3. September 2017 – consequences and tradeoffs



# Clarify the decision context

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**Develop a strategy for  
controlling Grass Carp in  
Lake Erie to socially and  
environmentally acceptable  
levels**



# Define objectives and measures

## 1. Fulfill public trust and responsibility

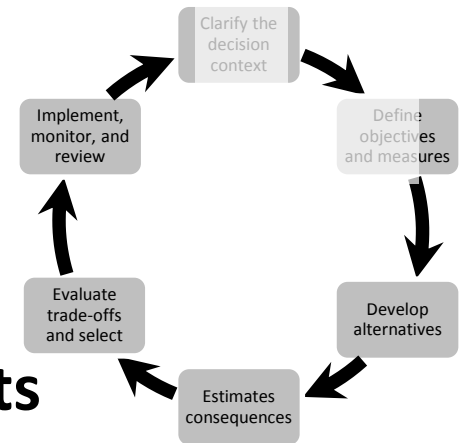
- Minimize risk of spread/abundance
- Minimize ecosystem engineering impacts

## 2. Minimize management associated costs

- Minimize dollars spent

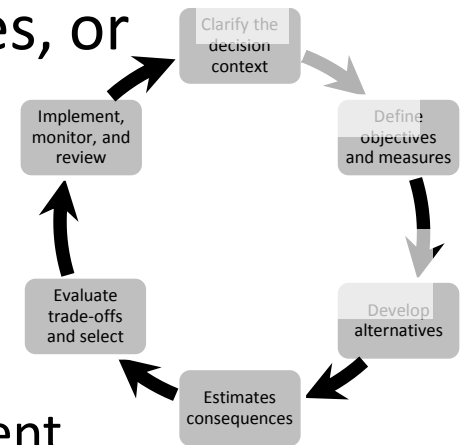
## 3. Minimize collateral damage

- Avoid economic stress to stakeholders
  - Recreational and commercial
- Avoid affects on native ecosystems
  - Migratory fishes, T & E species, and public sentiment



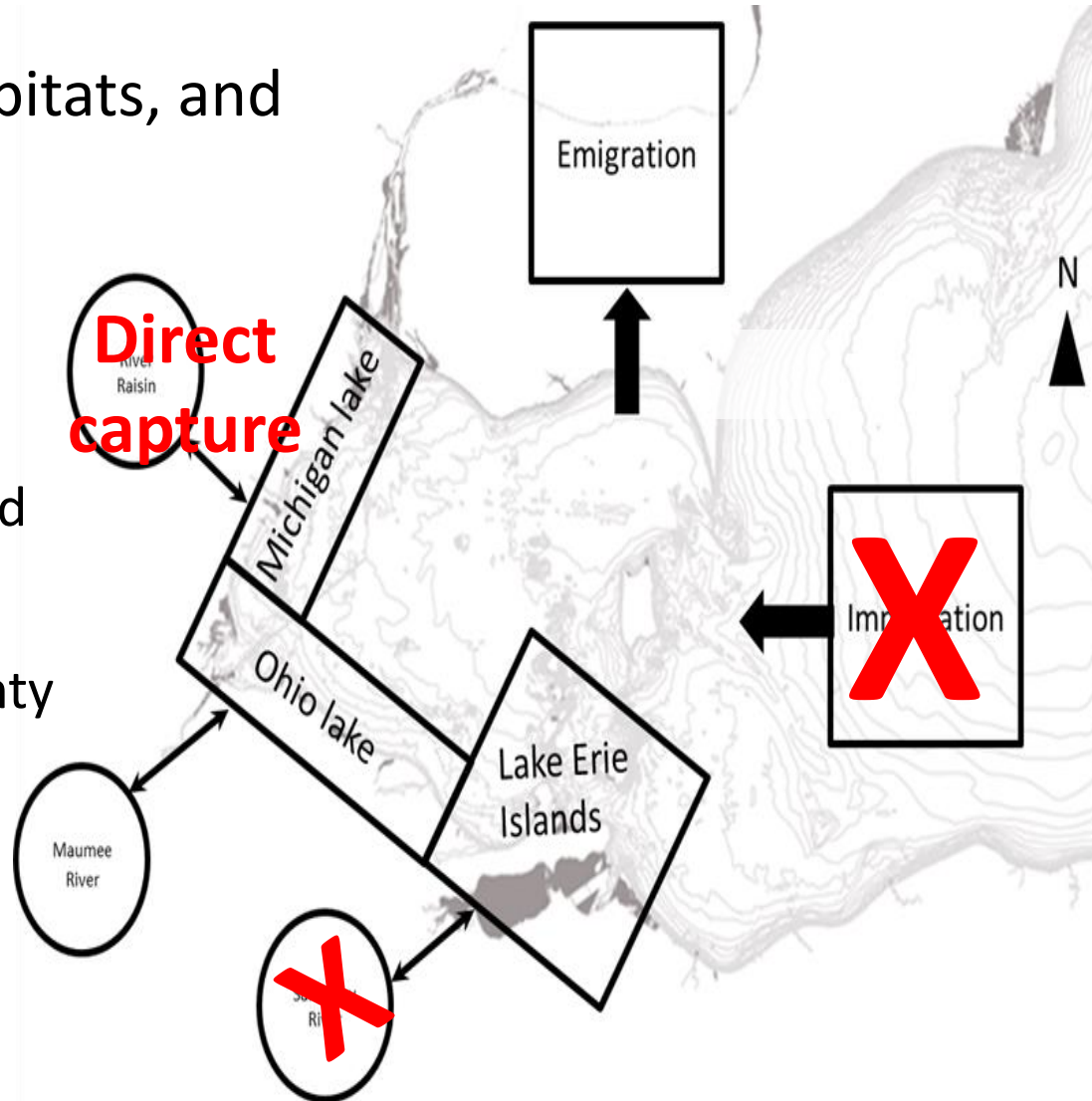
# Management action alternatives

- **Removal** – Direct capture, harvest incentives, or chemical controls
  - Increase total mortality
- **Barriers** – Behavioral or physical
  - Reduce spawning effort and therefore recruitment
- **Flow modifications** – Control structures or channel modifications
  - Reducing frequency of high flow events necessary for reproduction



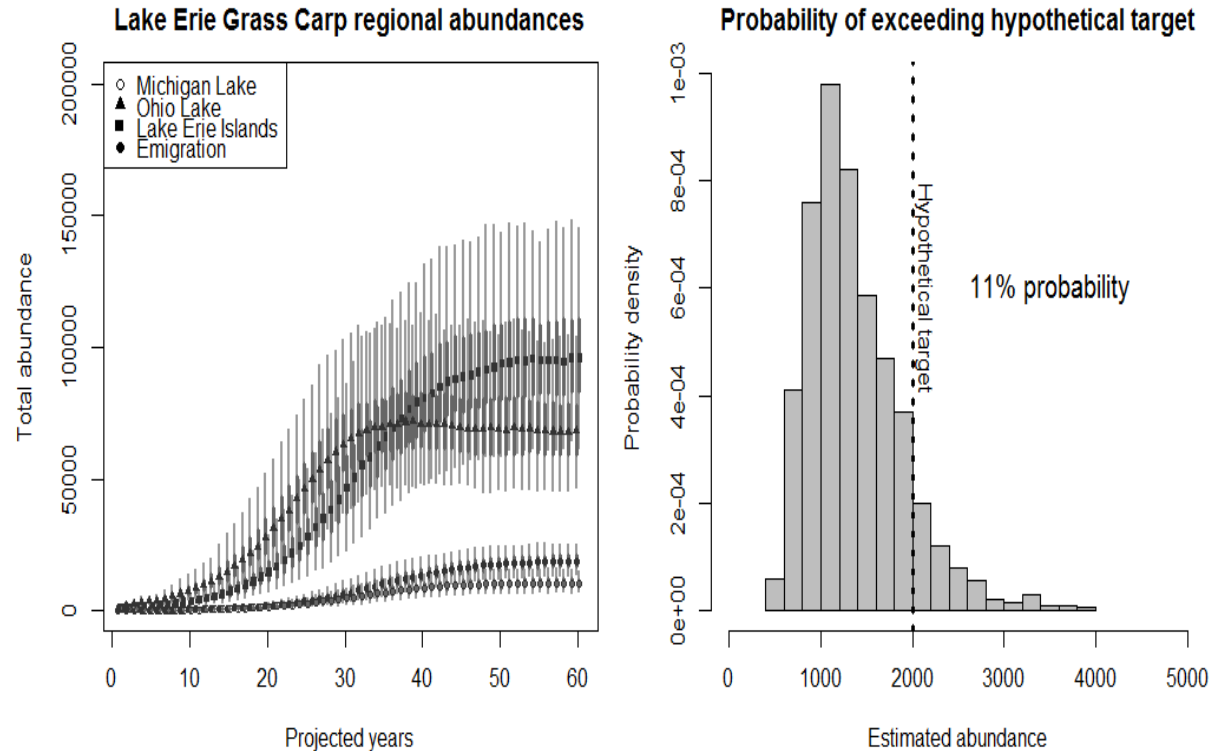
# Population model

- Three regions, two habitats, and four seasons
- Matrix population model
  - Project abundance at age
  - Used Lake Erie data and prior literature information
  - Incorporated uncertainty through binomial and Poisson distributions
- Evaluate spatially and temporally specific management actions





# Population model



- Estimate region and season specific abundance
- Probabilistically evaluate management effect

# Evaluate Management Scenarios

## 1. No management action

## 2. General removal action

- Planned management actions and commercial removal across seasons and habitats

## 3. Concentrated removal action

- Planned management actions and commercial removal concentrated in seasons and areas with high catchability

## 4. Concentrated removal action + barrier

- Addition of a seasonal behavioral barrier in the Sandusky River



MDNR



[www.popularmechanics.com](http://www.popularmechanics.com)

# Outcomes and Implementation

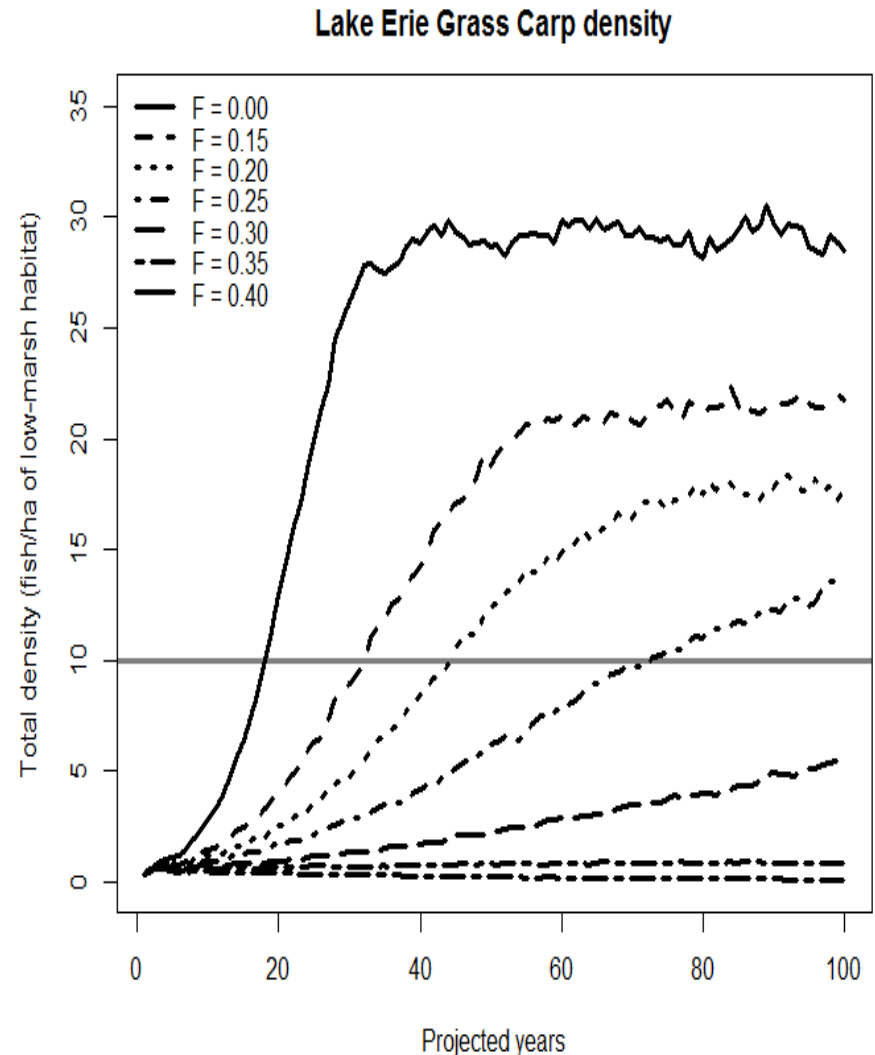
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- **Management action takeaways**
  - Removal may be effective – increased effort in strategic locations
  - Barriers may be effective – costs and implementation must be evaluated
- **Key uncertainties**
  - Demographic parameters – survival and stock-recruitment
  - Seasonal movements
  - Catchability estimates – across gear types, seasons, habitats
  - Funding and effort

# Setting a Removal Target

How many fish must be removed annually to stop population growth?

- Assume population size of 2,000
- Annual survival = 0.75
- Direct capture on age 3+ fish
  - 600 mm or greater
- **Fishing mortality = 0.35**
- **390 fish/year**



# Collaborative Efforts Moving Forward

## Dedicated effort to grass carp response

- Planned and rapid responses actions
- Partnership with commercial fishermen



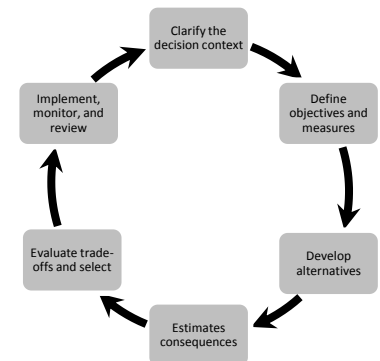
## Continue ongoing research and monitoring

- Ploidy analysis, otolith microchemistry, early life history sampling in tributaries, telemetry study, and gain life history information



## Reconvene SDM working group in to 2018

- Update SDM components as new information is gathered
- Evaluate competing management action scenarios



# Questions?



MICHIGAN STATE  
UNIVERSITY



<http://michigan.gov/invasivecarp>

<http://ohiodnr.gov/asiancarp>