Jun 10th, 2:10 PM - 2:30 PM

Green Bay Lake Sturgeon Spawning Fidelity

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Fidelity of Adult Lake Sturgeon to Green Bay Rivers

- Michael Donofrio, Wisconsin DNR
- Dr. Kim Scribner, Michigan State University
- Robert Elliott, U.S. Fish and Wildlife Service
- Dr. Ed Baker, Michigan DNR
- Dr. Brian Sloss, USGS UWSP Coop

Background

- Michigan and Wisconsin DNR and USFWS have been focused on restoring lake sturgeon populations in Lake Michigan.
- This presentation will focus on populations in Green Bay.

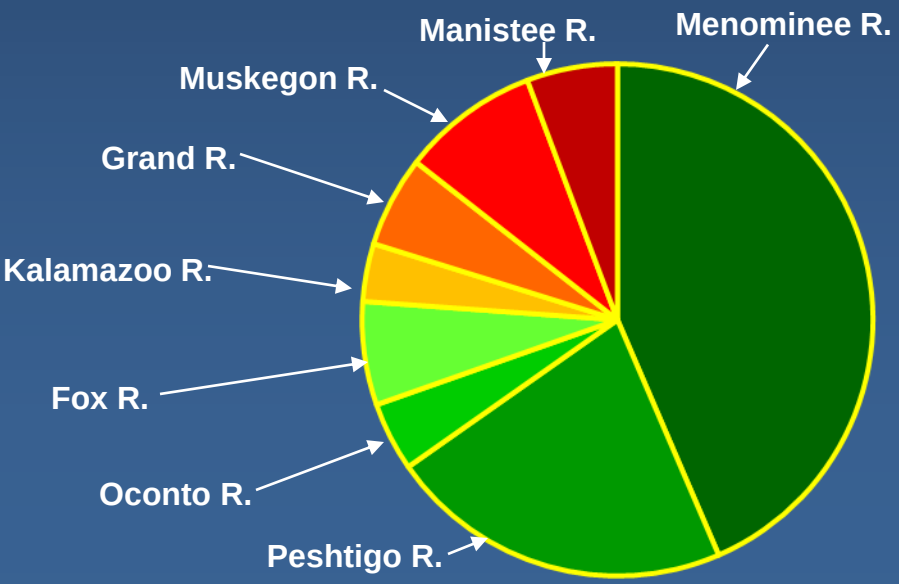
Lake Sturgeon Population Status

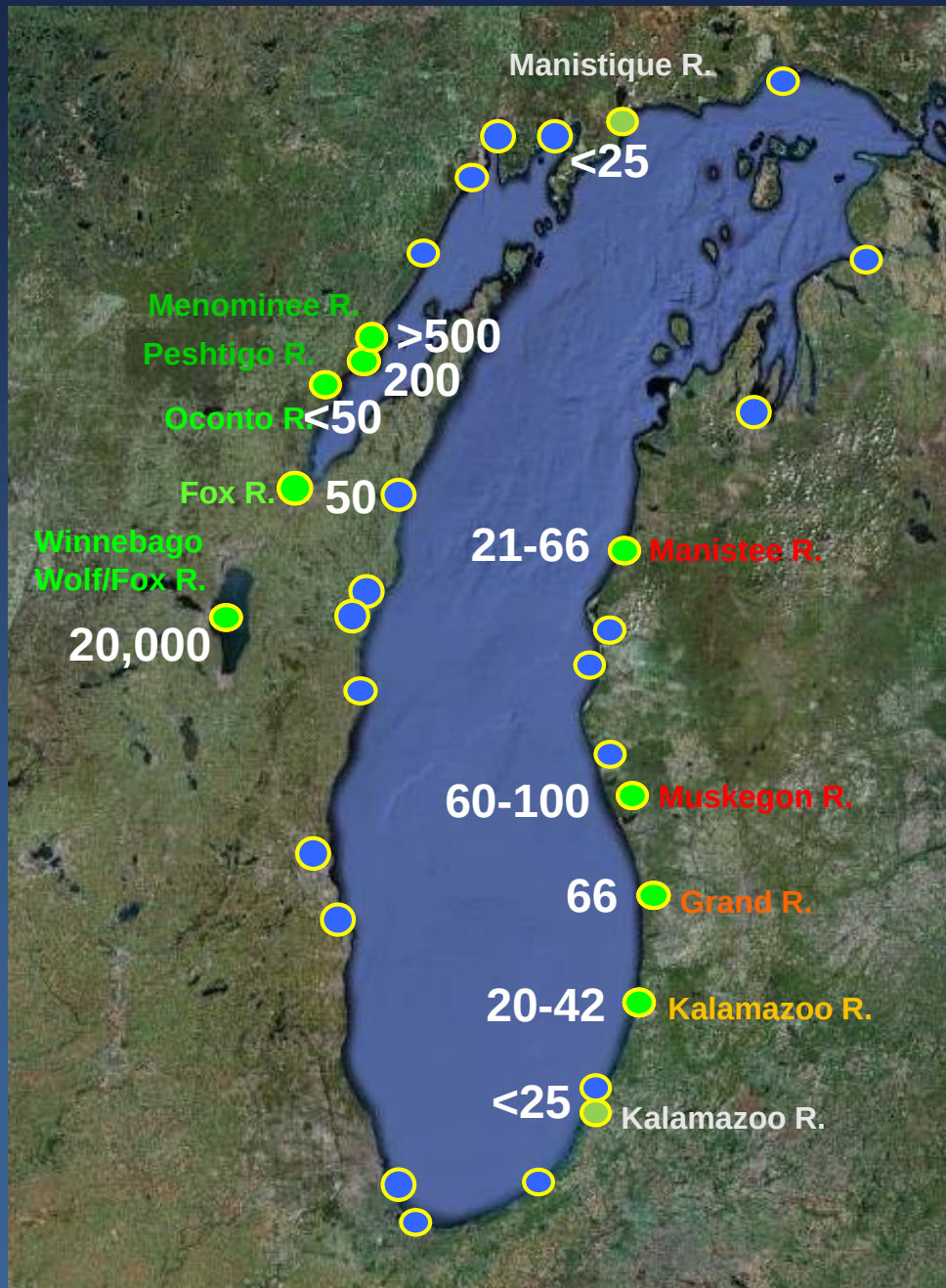
Presumed Historic Distribution

Known Spawning Populations

Estimated Spawning Abundance

(1100 in all L. Michigan Rivers combined)

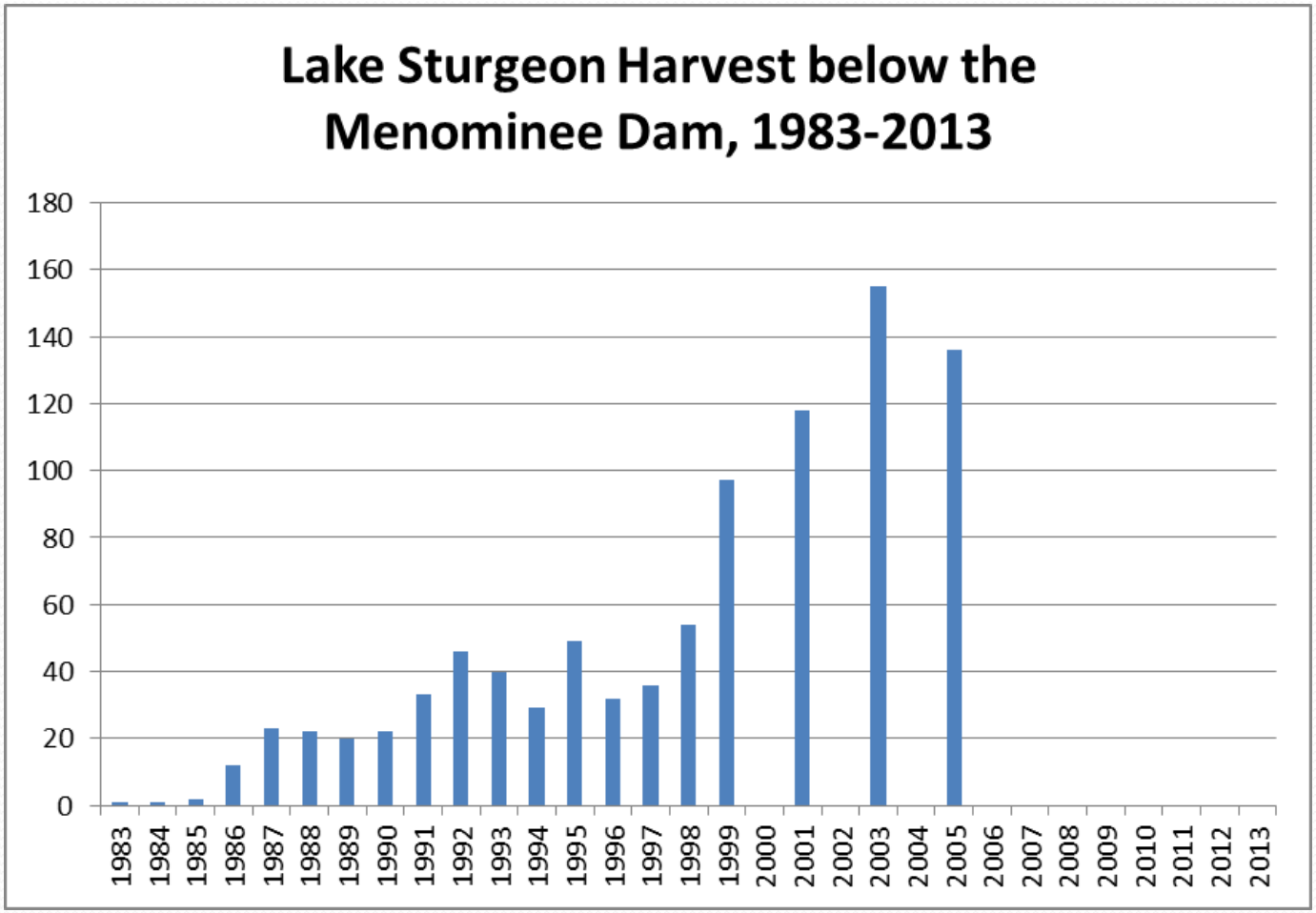




Background

- Michigan and Wisconsin have allowed a hook and line fishery for lake sturgeon on the Menominee River since 1946.
- Mandatory registration began in 1983
- Since 1983, 928 lake sturgeon have been harvested in the lower Menominee River
- Peshtigo, Oconto, and Fox rivers were open for harvest until 1999 but only one harvested sturgeon was registered from these rivers before 1999.

Background


Lake Sturgeon Harvest below the Menominee Dam, 1983-2013
180
160
140
120
100
80
60
40
20
0
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013

Background

Genetic structuring was reported by Patrick DeHaan et al. for the Upper Great Lakes lake sturgeon populations

DeHaan et al 2006

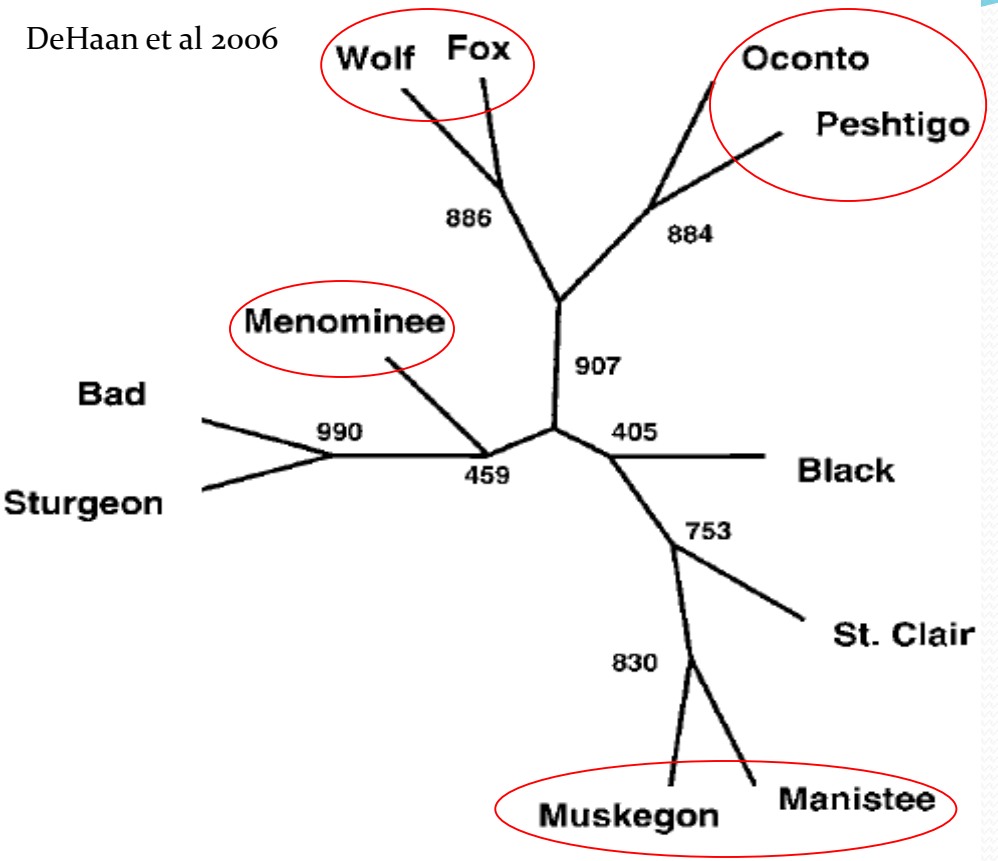


FIGURE 4.—Neighbor-joining tree based on Cavalli-Sforza and Edwards' (1967) chord distance that describes the genetic affinities among 11 lake sturgeon populations, upper Great Lakes basin, 1999–2003. Bootstrap values associated with specific nodes represent the number of replicates out of 1,000 where these groupings were evident.

Background

Bott et al. 2009 described the genetic assignments of lake sturgeon harvested from the Menominee River. Most were identified to the Menominee river population but 19% were assigned to other Upper Great Lakes populations

Background

Given the small, spawning population size in most Green Bay Rivers; there was concern about impacts of Menominee River harvest on other river populations.

Spawning Population Estimates:

- **~ 50 Fox River**
- **~ 50 Oconto River**
- **> 200 Peshtigo River**

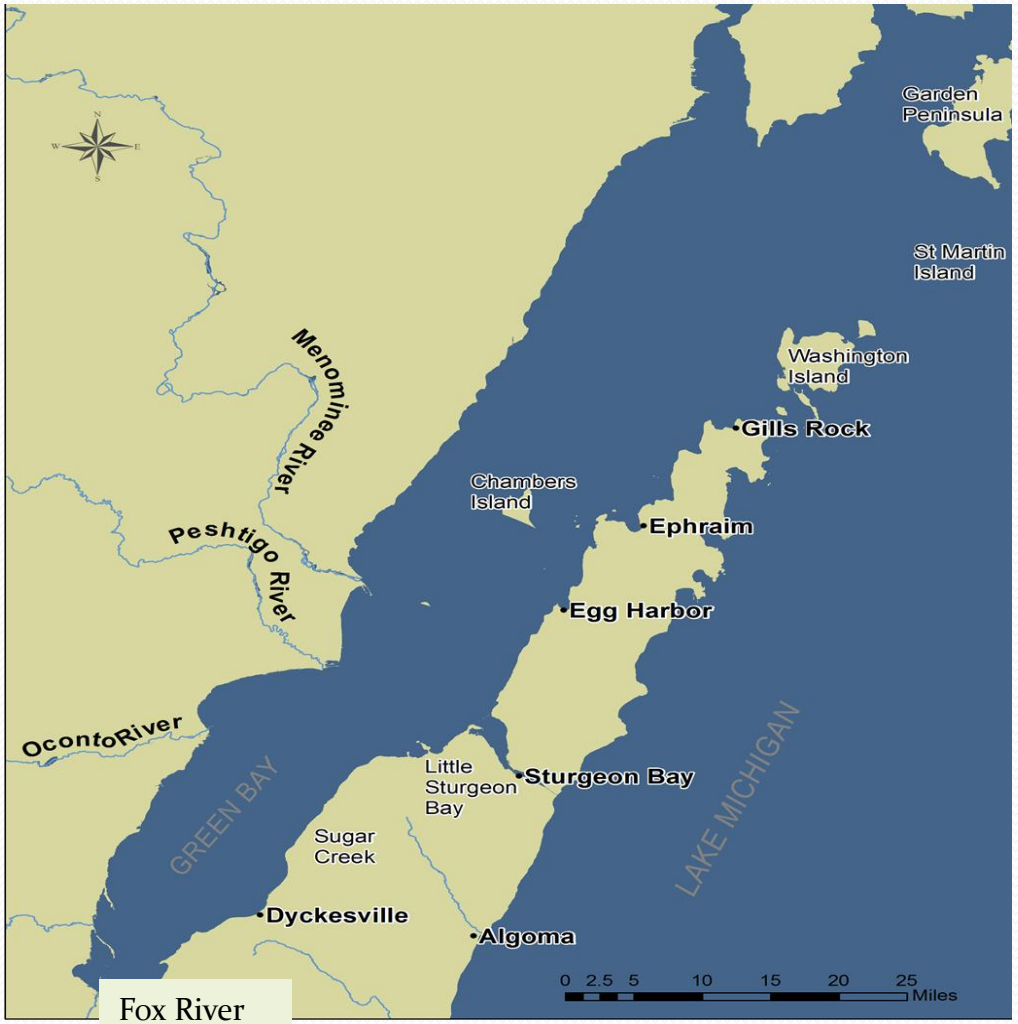
Elliott and Gunderman 2008

Project Objectives

We not only wanted to determine the Upper Great Lakes population assignments of spawning lake sturgeon in 4 rivers in Green Bay; but also examine spawning river movement and fidelity for those spawning fish

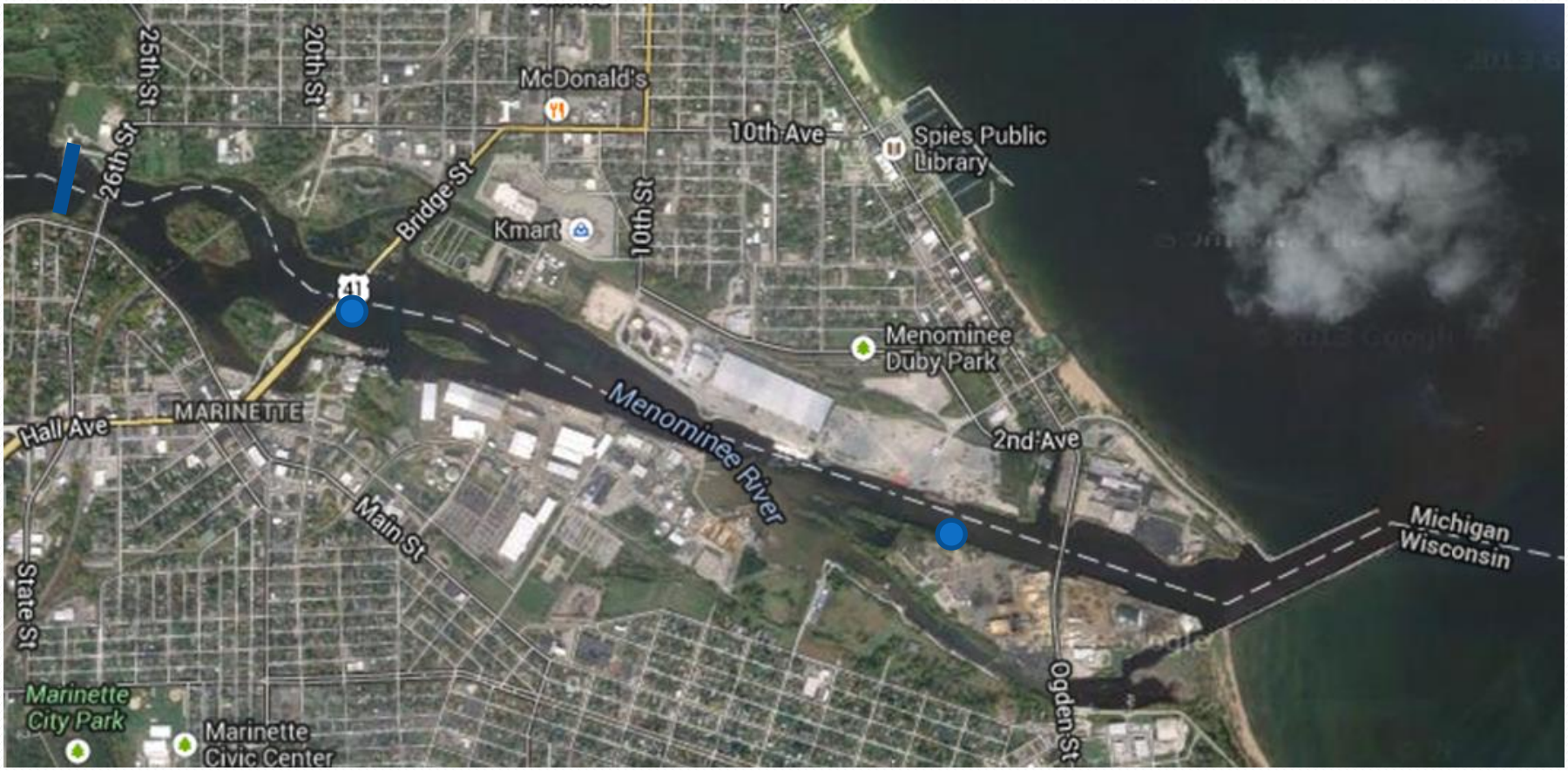
Study Area

- Menominee River
- Peshtigo River
- Oconto River
- Fox River



Fox River

Menominee River



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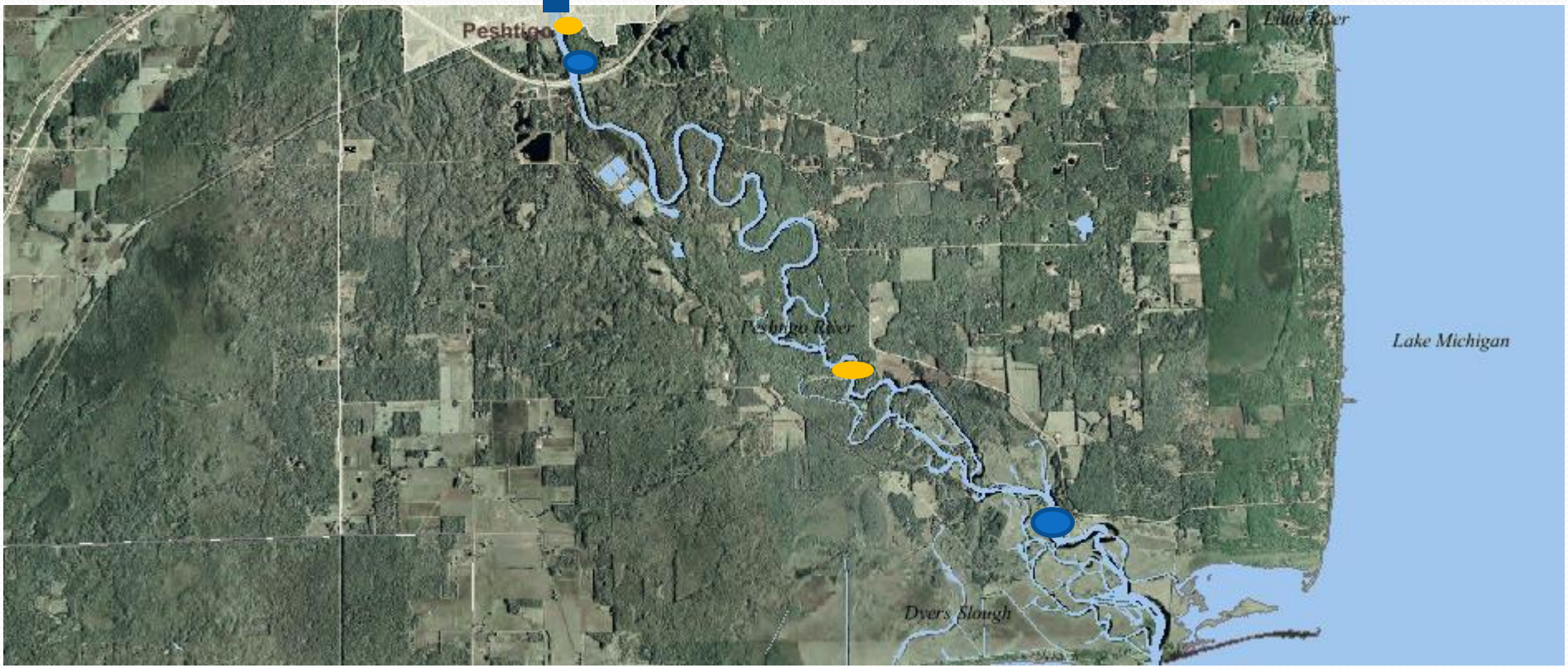
Peshtigo River



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Oconto River

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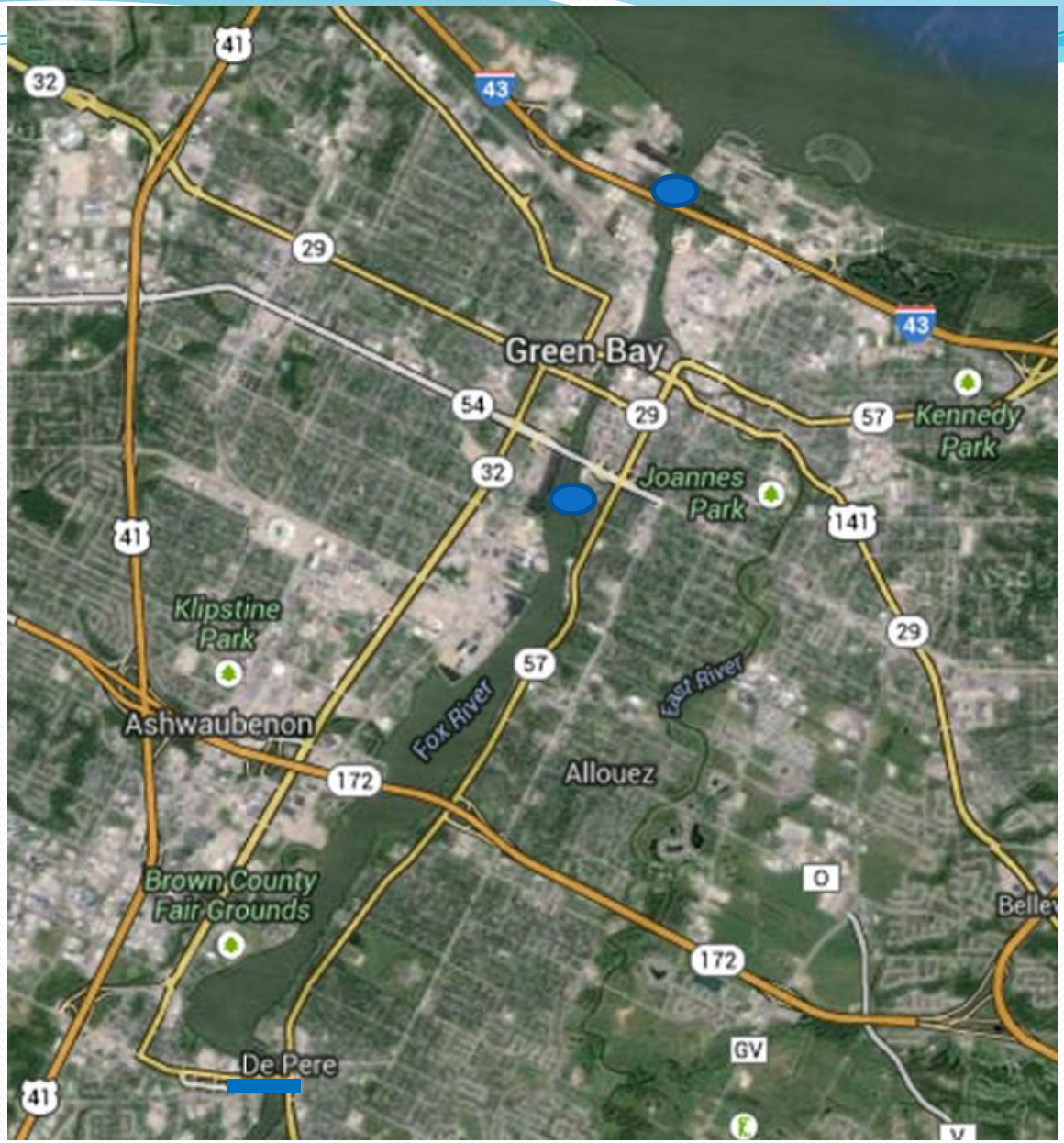
Fox River



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Methods- capture

At known spawning sites in April and May **2011-13**, we used:

- DC Electrofishing Boat at Menominee and Oconto rivers
- Dip nets at Peshtigo and Fox rivers

Methods- surgery

- Adult sturgeon were surgically implanted with Vemco V16-6H-R04k coded pingers
- Tags had a 20 – 60 second off time and a life expectancy of 8-10 years
- Tags were inserted through a small (2 inch) mid-ventral incision
- Suture material was Vicryl brand and surgical materials were disinfected with Chlorhexiderm

Data Collected

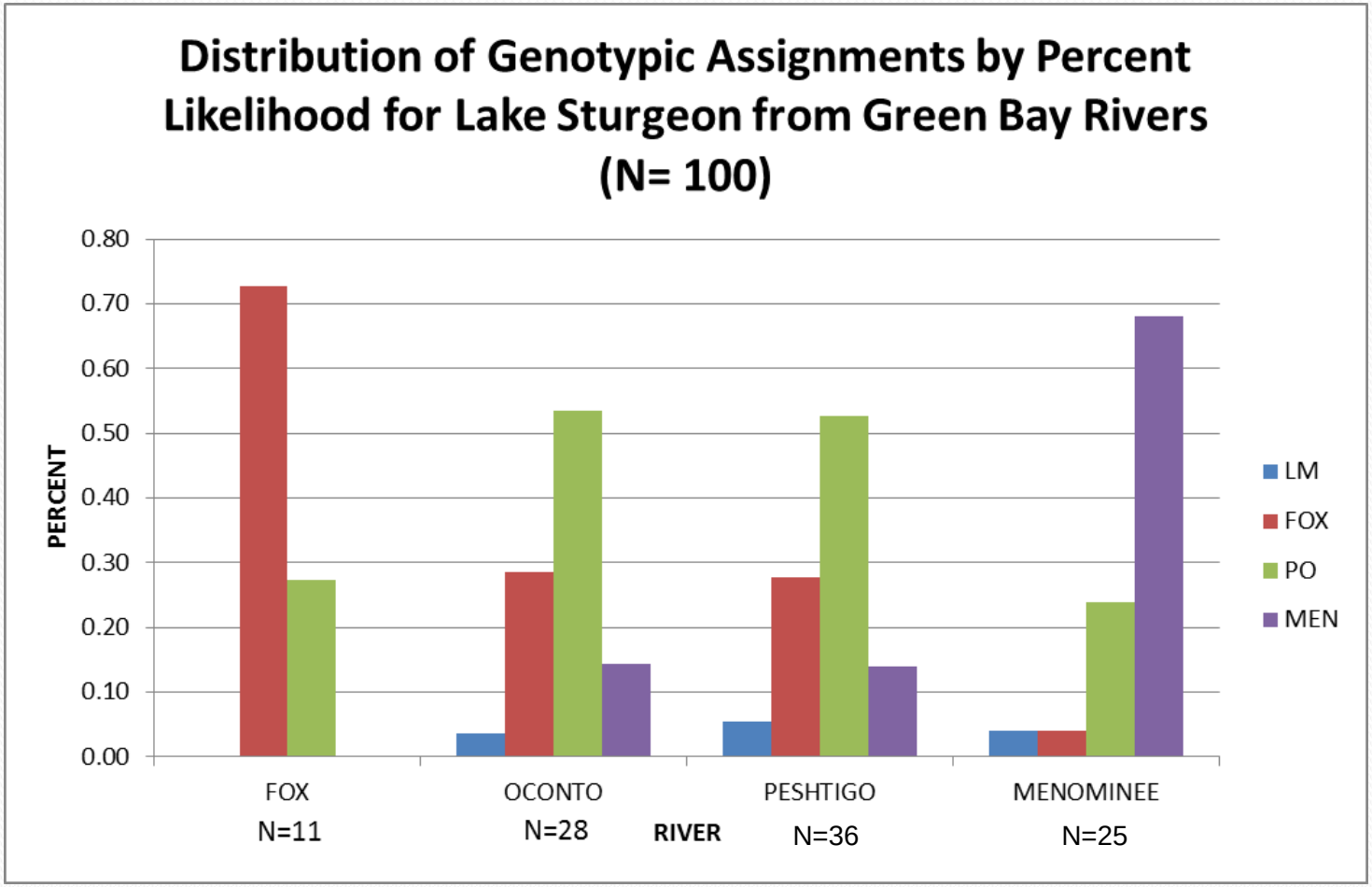
- Length, weight, sex
- Date, Location
- Recapture information
- Tissue sample
- PIT and Floy tag
- Sonic transmitter ID

Methods- receiver downloads

- July 2011
- October 2011 (battery)
- June 2012
- October 2012 (battery)
- June 2013
- October 2013 (battery)

Methods- genetic analysis

- Tissue samples were collected from each sturgeon and sent to MSU for analysis
- Adult lake sturgeon were genotyped and assigned to most likely population of origin (Lower Michigan, Menominee, Peshtigo-Oconto, or Fox-Wolf) using 12 recognized loci.
- Percent likelihood was determined based on the loci assignments.



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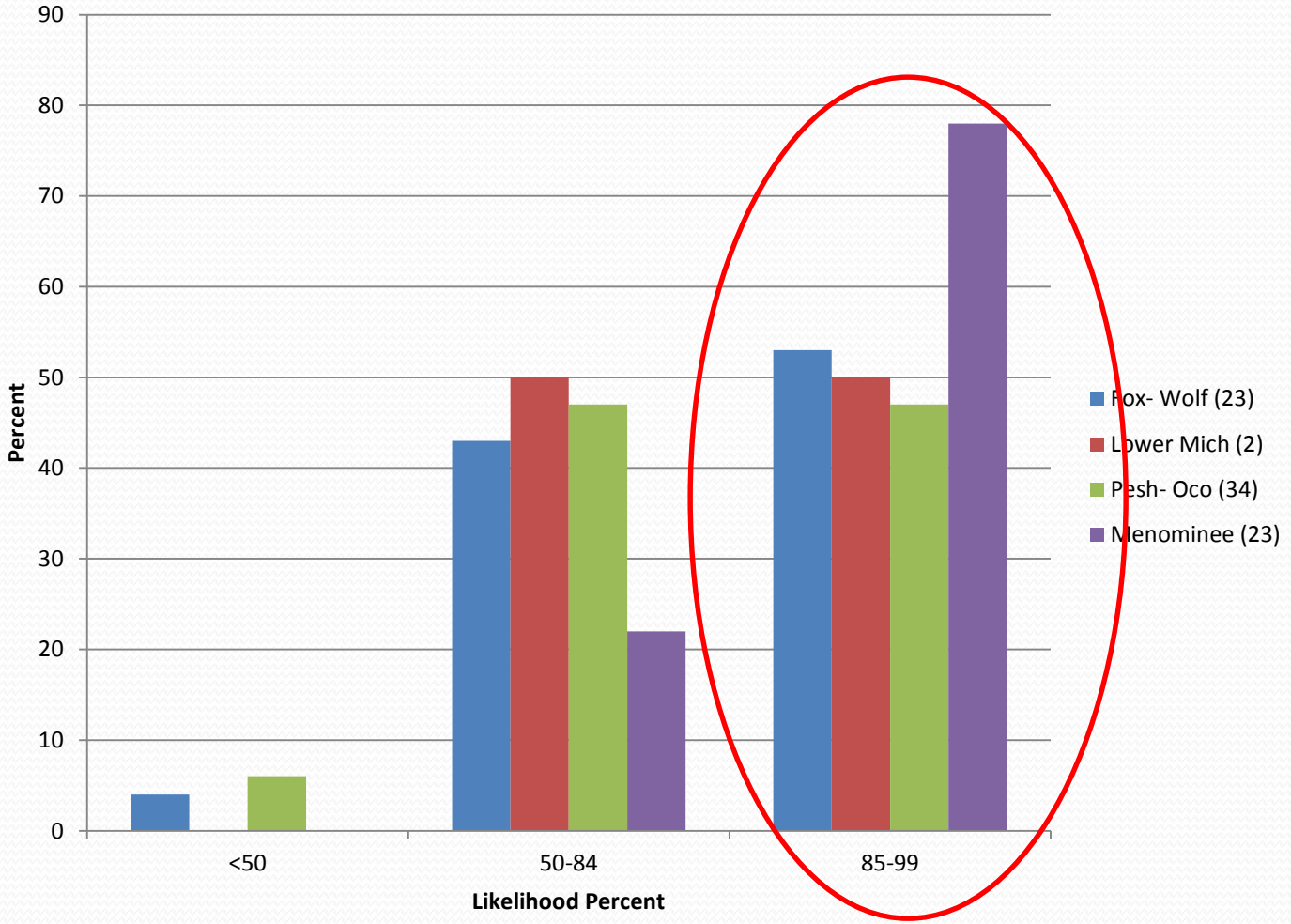

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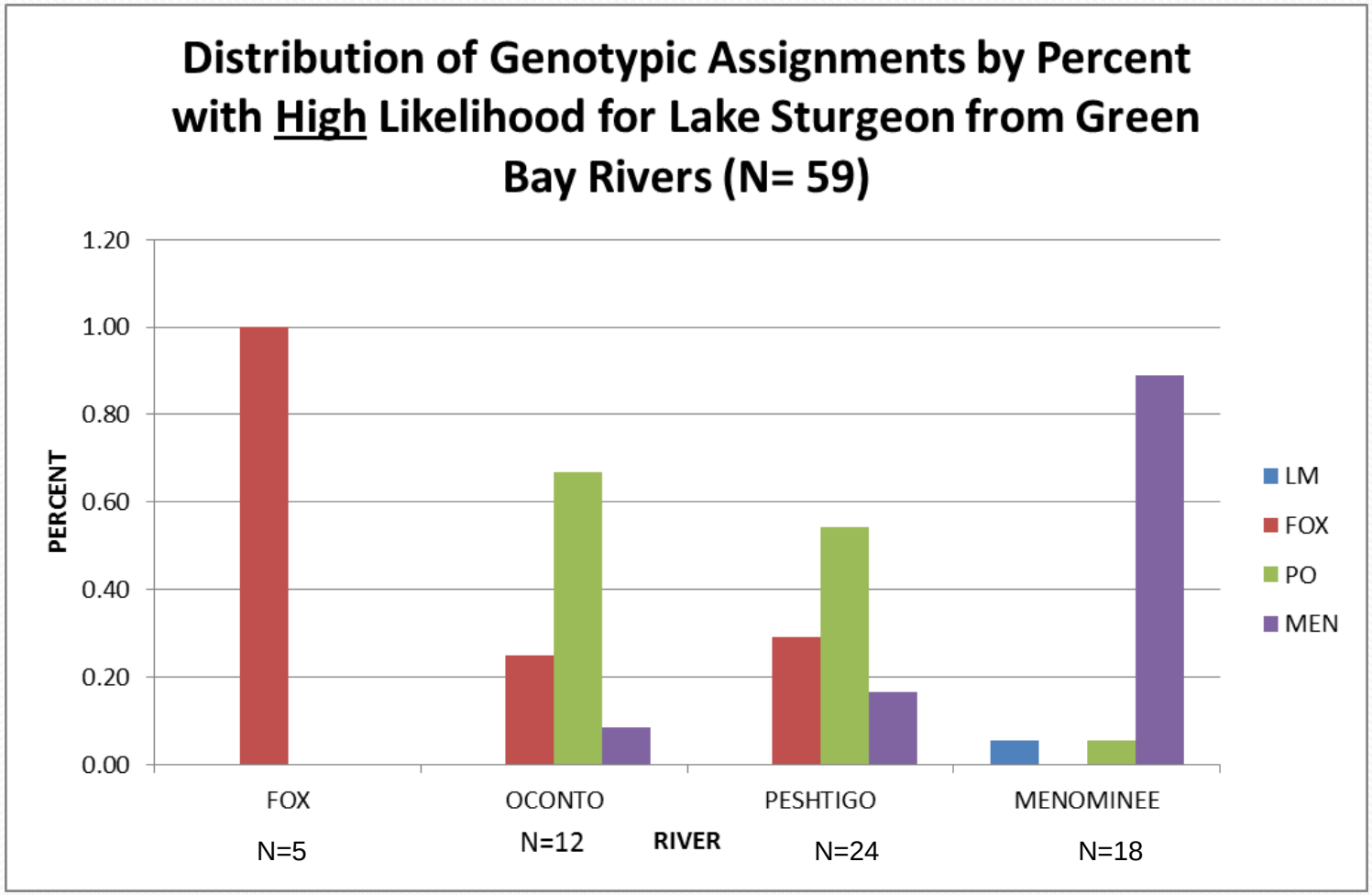
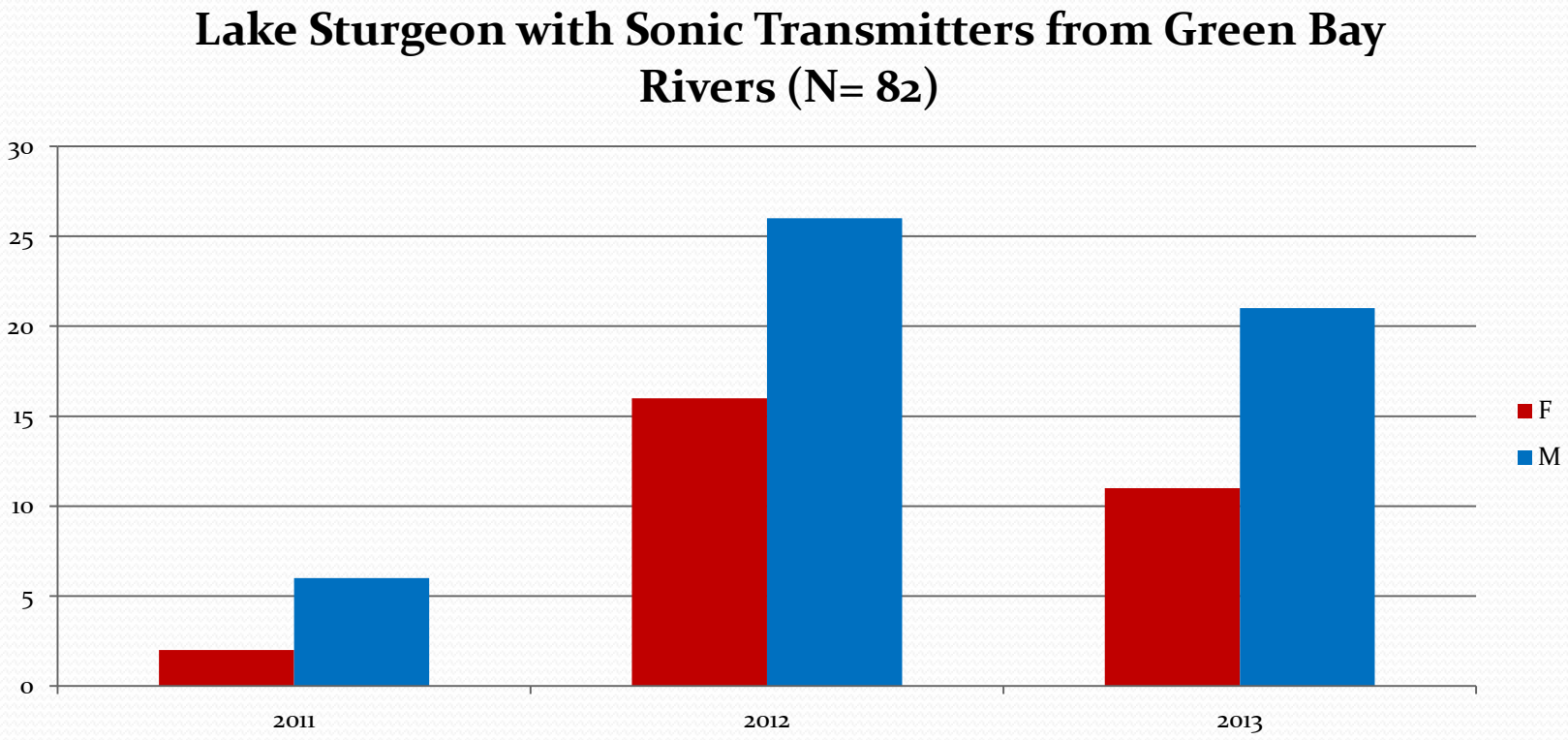

Distribution of Genotypic Assignments by Percent with High Likelihood for Lake Sturgeon from Green Bay Rivers (N= 59)
PERCENT
1.20
1.00
0.80
0.60
0.40
0.20
0.00
FOX
OCONTO
PESHTIGO
MENOMINEE
N=5
N=12
N=24
N=18
RIVER
LM
FOX
PO
MEN

Results- general information



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Results- general information

Active transmitters in 82 adult sturgeon

- 23 Menominee River (16 males and 7 females)
- 22 Peshtigo River (13 males and 9 females)
- 27 Oconto River (17 males and 10 females)
- 10 Fox River (7 males and 3 females)

65% males and 35% females.

Results- general information

Most sturgeon (63%) left each river within 30 days and have not been subsequently detected:

- 8 Menominee River (4 males and 4 females)
- 15 Peshtigo River (7 males and 8 females)
- 21 Oconto River (11 males and 10 females)
- 8 Fox River (5 males and 3 females)

However, 51% of the males and 86% of the females.

An expected example?

- 33755
- Ripe Male
- Fox River
- assigned to Fox-Wolf Population
- likelihood assignment of 75%.
- Surgery on 5/07/13

- Left Fox, 5/10/13
- Return to Fox on 7/18
- Regularly detected in Fox from July- mid October

Always an anomaly!

- 27055
- Ripe Male
- Oconto River
- Assigned to the Fox-Wolf Population
- likelihood assignment of 90%.
- Surgery on 5/22/13

- Left Oconto, 6/3/13
- Detected at Men, 7/13
- Entered Fox in 8/13
- Back to Men 9/13

Or Two/Three!

- 19552 and 19560
- Ripe Males
- Peshtigo River
- 552 assigned to Men Pop. 560 assigned to Pesh Pop.
- likelihood assignments of 98% (Me) and 73% (Pesh).
- Surgery on 5/25/11
- Left Peshtigo 6/11
- Menominee hits in Spring of 2012 and 2013

2014 and beyond

- Conducted surgery on 15 more adult sturgeon in the Fox River during Spring of 2014
- Submit tissue samples from 72 additional sturgeon to MSU for genetic analysis
- GLFWRA grant will expire on September 30, 2014
- WDNR staff will continue to maintain and download receivers in the 4 rivers through 2024

Acknowledgments

WDNR, MDNR and FWS staff

Specifically, WDNR- Tammie Paoli, Cory Wienandt, Ron Rhode, Steve Hogler, Rod Lange, Chip Long, Steve Surendonk and Brad Ryan

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