

Michigan Steelhead Management and Research

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NRC Meeting

Lansing

Todd Grischke - Assistant Chief, Fisheries Division

Jay Wesley- Lake Michigan Basin Coordinator, Fisheries Division

Jory Jonas- Research Biologist, Fisheries Division



Management Goals

- ▶ Healthy Aquatic Ecosystems and Sustainable Fish Populations
- ▶ Diverse Fishing Opportunities
- ▶ Strategically Focused Assessment and Decision Support Tools



Michigan Steelhead Major Points

- ▶ Active assessment and research for over 50 years
- ▶ Robust and improved steelhead stocking
- ▶ Constituent engagement for decades
- ▶ Declining catch rates related to lower lake productivity and high-water trends
- ▶ Voluntary catch and release ethic strong in Michigan
- ▶ Steelhead populations in Michigan and Great Lakes are not in need of immediate action





Steelhead Management and Research Outline

- ▶ Stocking
- ▶ Public Engagement and Regulations
- ▶ Weir and Creel
- ▶ Importance of Habitat
- ▶ Stocking and Strain Evaluations
- ▶ Origin of Hatchery and Wild
- ▶ Feeding Ecology of Smolts and Influence of Landscape Features
- ▶ Lake Michigan Populations Models
- ▶ On-going and Future Research



Steelhead Stocking

- ▶ 1876 Au Sable River
- ▶ Wild runs became established
- ▶ Sporadic stocking 1900's - 1965
- ▶ 1968 hatchery raceways and weirs established
 - ▶ 1 million fall fingerlings
 - ▶ 0.5 million yearlings





Steelhead Stocking

- ▶ Hatchery smolt length matters
- ▶ Wolf Lake and Thompson State Fish Hatcheries
- ▶ 1980s to 1999 1 million yearlings
- ▶ 2000 to 2015 1.2 million yearlings
- ▶ 2016 to now 1.3 million yearlings



Current Steelhead Stocking

- ▶ Lake Superior 95,000
- ▶ Lake Huron 450,000
- ▶ Lake Michigan 625,000
- ▶ Lake Erie/St. Clair 110,000
- ▶ 350,000 Fall Fingerlings
- ▶ All steelhead mass marked in Lake Michigan and Huron through 2024
- ▶ Hatchery cost of \$2.4 million annually

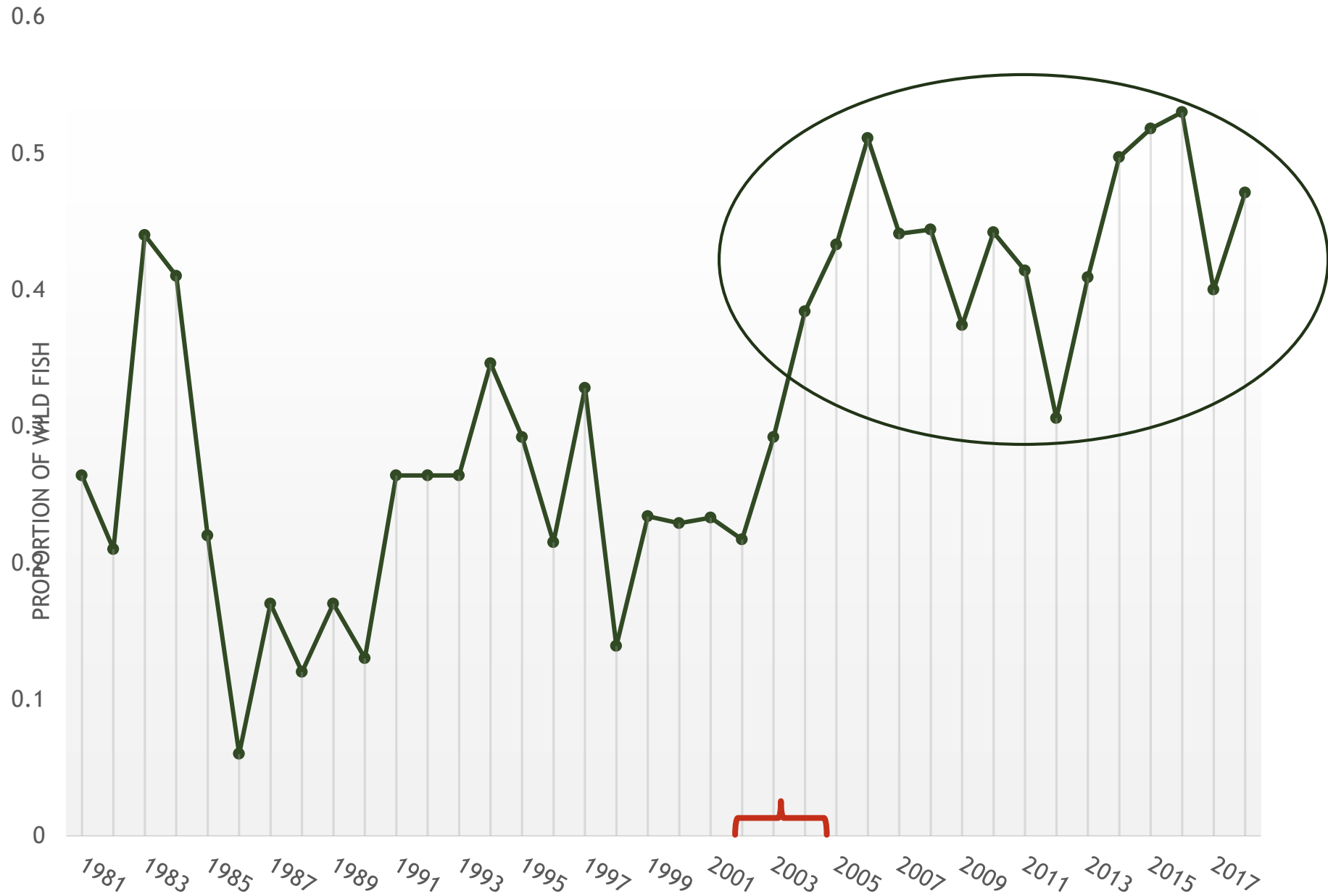


Coded Wire Tag (CWT)





Percent Wild Steelhead in the Lake Michigan Creel





Steelhead Stocking Creates Fisheries

River	Year	Angler Effort in Hours	Number of Angler Trips
Manistee	2016	330,000	62,000
	2003	532,000	108,000
Muskegon	1999-2005	339,000	93,000
Grand	2015	44,000	16,000
St. Joseph	2003	287,000	77,000





Engaging Constituents

- ▶ Angler Surveys
- ▶ Attend Organizational Meetings
- ▶ Fishery Workshops
- ▶ Advisory Committees
- ▶ Conversations and Coffee





What happens when regulations change?

- ▶ Angler expectations
- ▶ Change angler opportunity
- ▶ Angler behavior



Why different steelhead bag limits?

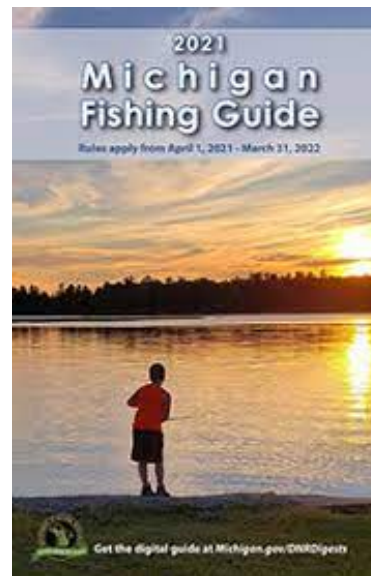
Protect Spawners

Maximize Catch Rates

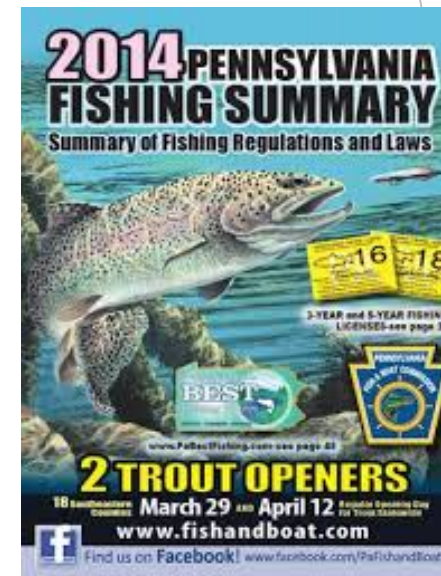
Western States
“Native”



Michigan
“Naturalized and stocked”

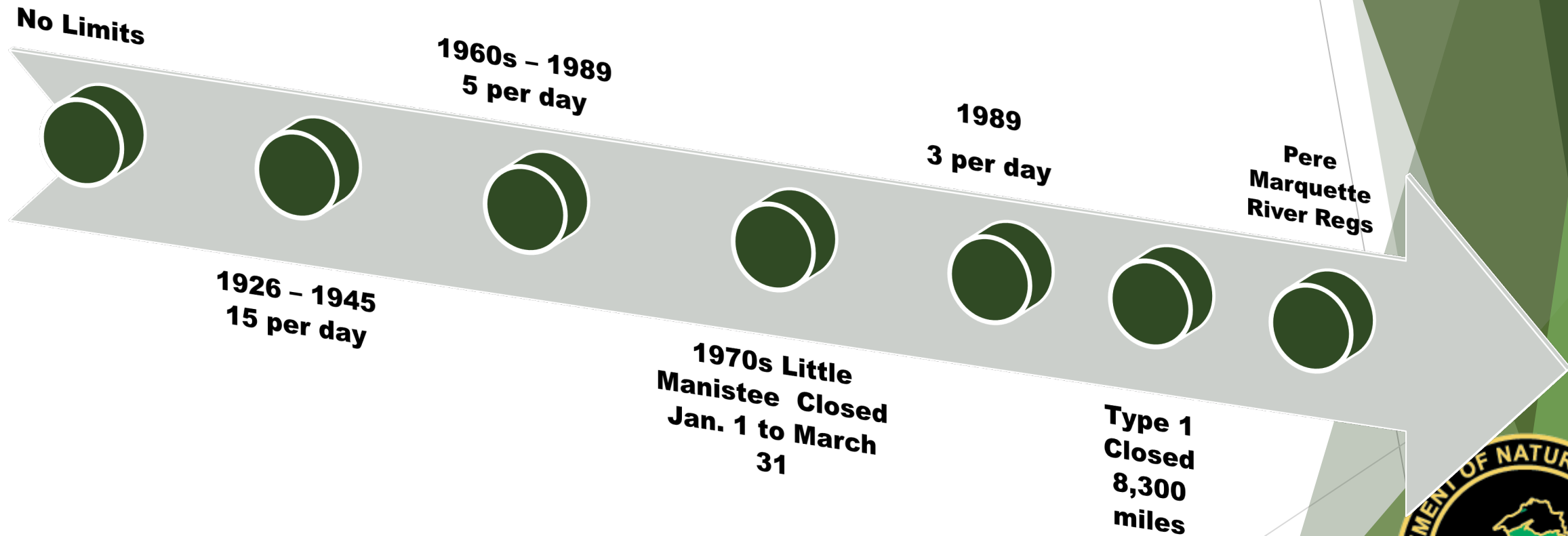


Steelhead Alley
“Stocked”



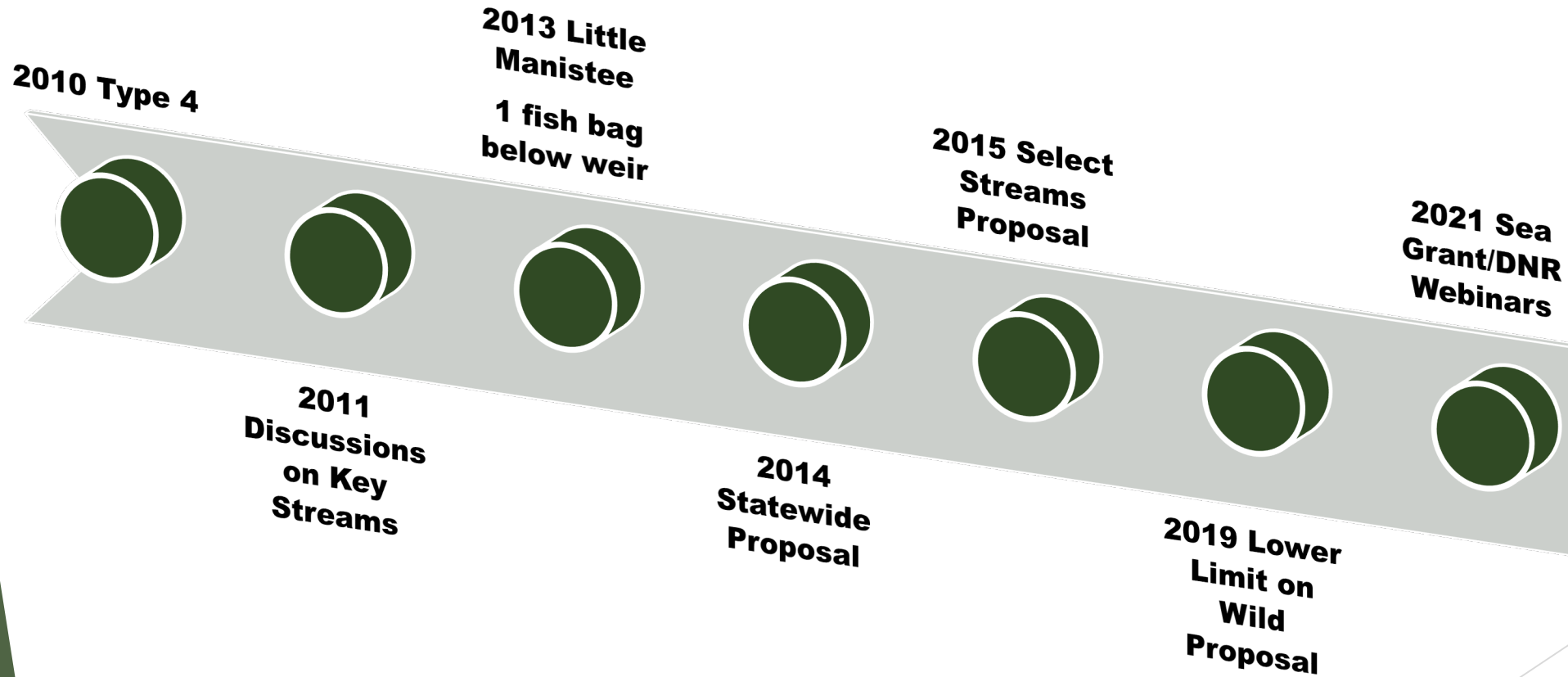


Steelhead Regulations History



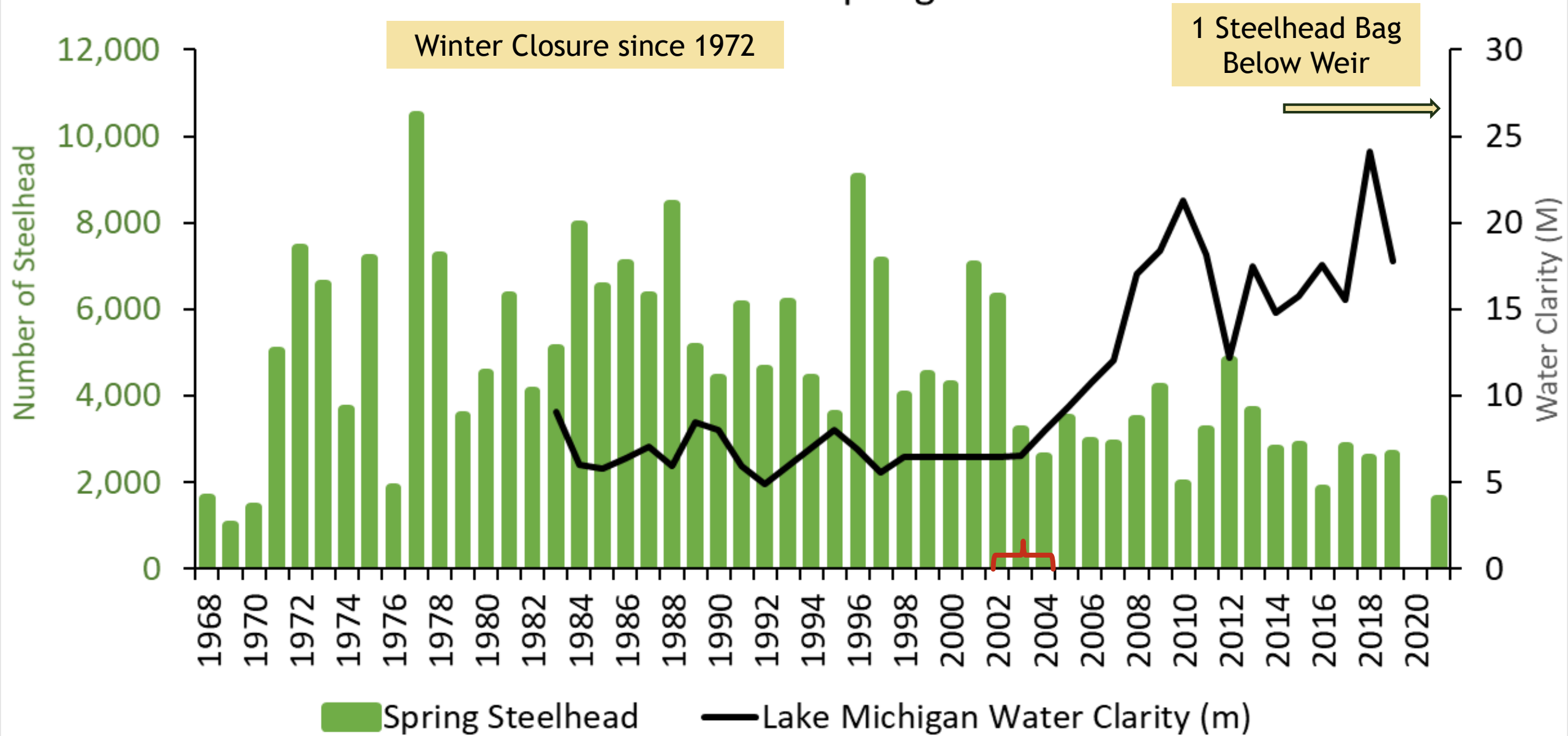


Steelhead Regulations Discussions





Little Manistee Weir Spring Steelhead





Steelhead Regulations in Other States

State	Possession Season	Bag Limit
Michigan	Types 3 and 4 All Year	3
	Types 1 Oct. 1 to April 30	Closed (8,300 miles)
Wisconsin	All Year	5
Illinois	All Year	5
Indiana	All Year	5
Minnesota	All Year	5 Clipped; 0 Unclipped
Ohio	May 16 to August 31	5
	Sept. to May 15	2
Pennsylvania	April 17 to Sept. 6 th	5
	Sept. 7 th to April 16	3
New York	All Year	1 in streams



Steelhead Harvest VS Catch and Release

River	Number Harvested	Number Released	Total Catch	Percent Released
Manistee 2016	14,290	24,269	38,559	63%
Muskegon 1999-2005 (average)	23,065	68,243	91,309	75%
Grand 2015	1,609	2,508	4,117	61%
St. Joseph 2003	7,496	4,546	12,042	38%
Dowagiac 2003	220	776	996	78%





Lake Michigan Steelhead Angler Behavior

General Anglers

- ▶ 58% catch at least 1 steelhead
- ▶ 24% catch more than 1 steelhead
- ▶ Only 4% harvest 1 steelhead
- ▶ 2% harvest more than 1 steelhead.

Charter

- ▶ 9% harvest 1 steelhead
- ▶ ~1.5% harvest more than 1 steelhead



River Steelhead Angler Behavior

Catch (harvest + released steelhead)

River	Year	%1 fish	%>1 fish
Big Manistee	2016	18%	10%
Pere Marquette	2011	6%	4%
Muskegon	1999-2005	31%	11%
St. Joseph	1997-2004	16%	23%

Harvest

River	Year	%1 fish	%>1 fish
Big Manistee	2016	5%	1%
Pere Marquette	2011	1%	0%
Muskegon	1999-2005	17%	11%
St. Joseph	1997-2004	12%	15%



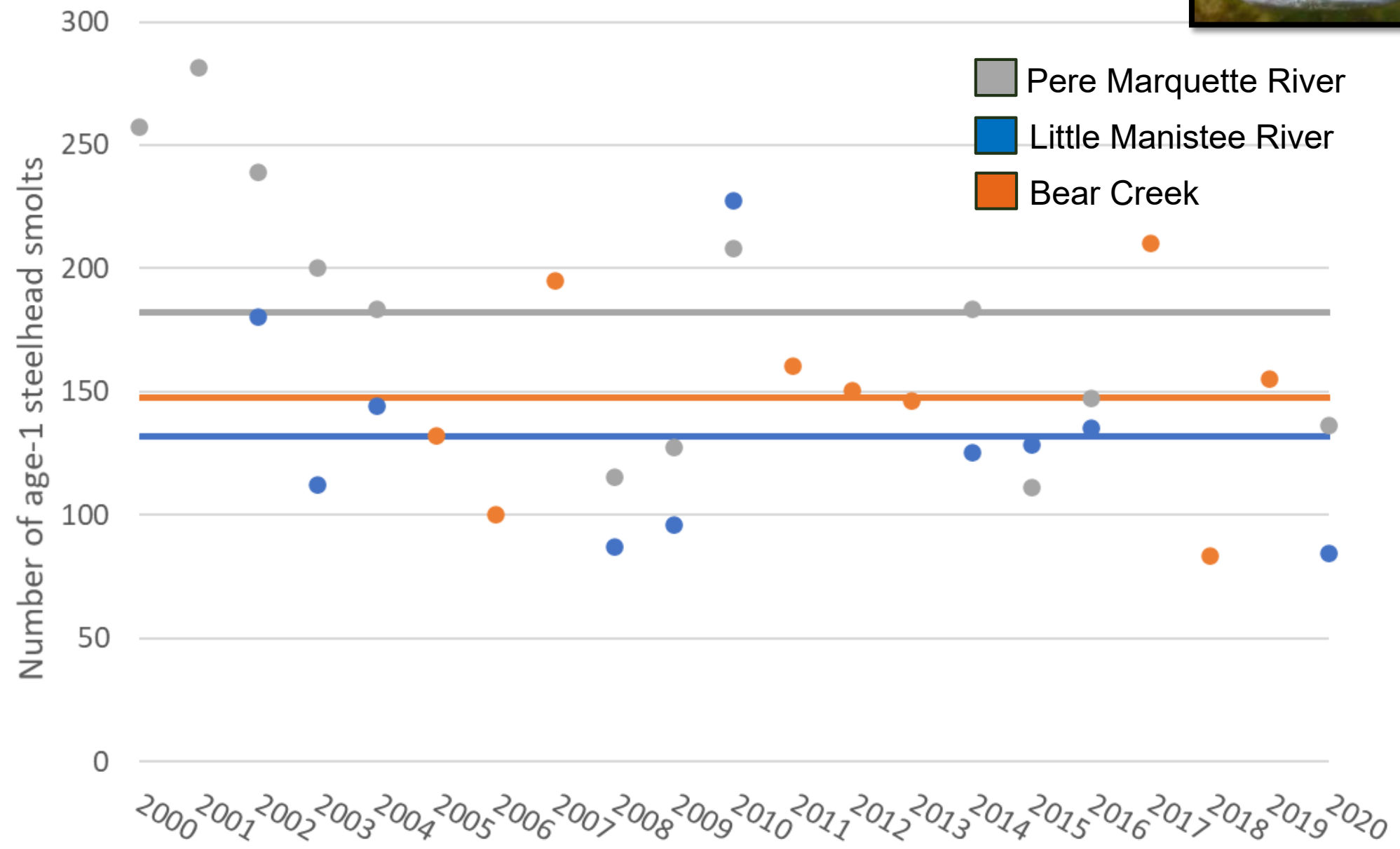
Habitat

- ▶ Promotes Wild Steelhead
- ▶ Connectivity
 - ▶ Dam Removals
 - ▶ Culvert and Bridge Replacements
- ▶ Fish Ladders
- ▶ DNR Fisheries Habitat Grants





Wild Steelhead Smolt Abundance





Management Summary

- ▶ Diverse and Healthy Fishery Goals Maintained
- ▶ Stocking Quality Steelhead
- ▶ Wild Production Contributions
- ▶ Regulations Consistent with Diverse Fishing Opportunities
- ▶ Habitat Enhancement Opportunities
- ▶ Wild Smolt Production Stable



Research Summaries

Published studies have informed:

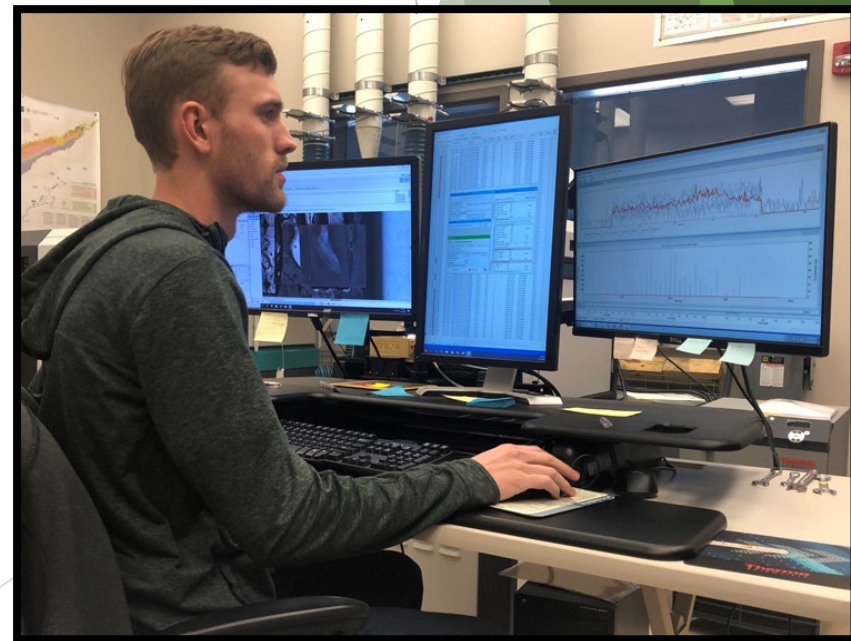
- ▶ Stocking locations (upstream or downstream)
- ▶ Strain performance Skamania-summer run vs. Michigan-winter run.
- ▶ Genetic composition.
- ▶ Egg take practices at weirs.
- ▶ Knowledge of diseases and pathogens.
- ▶ Origins of hatchery and wild steelhead with otolith microchemistry.
- ▶ Feeding ecology of steelhead smolts.



Research Summaries

Ongoing efforts tell us:

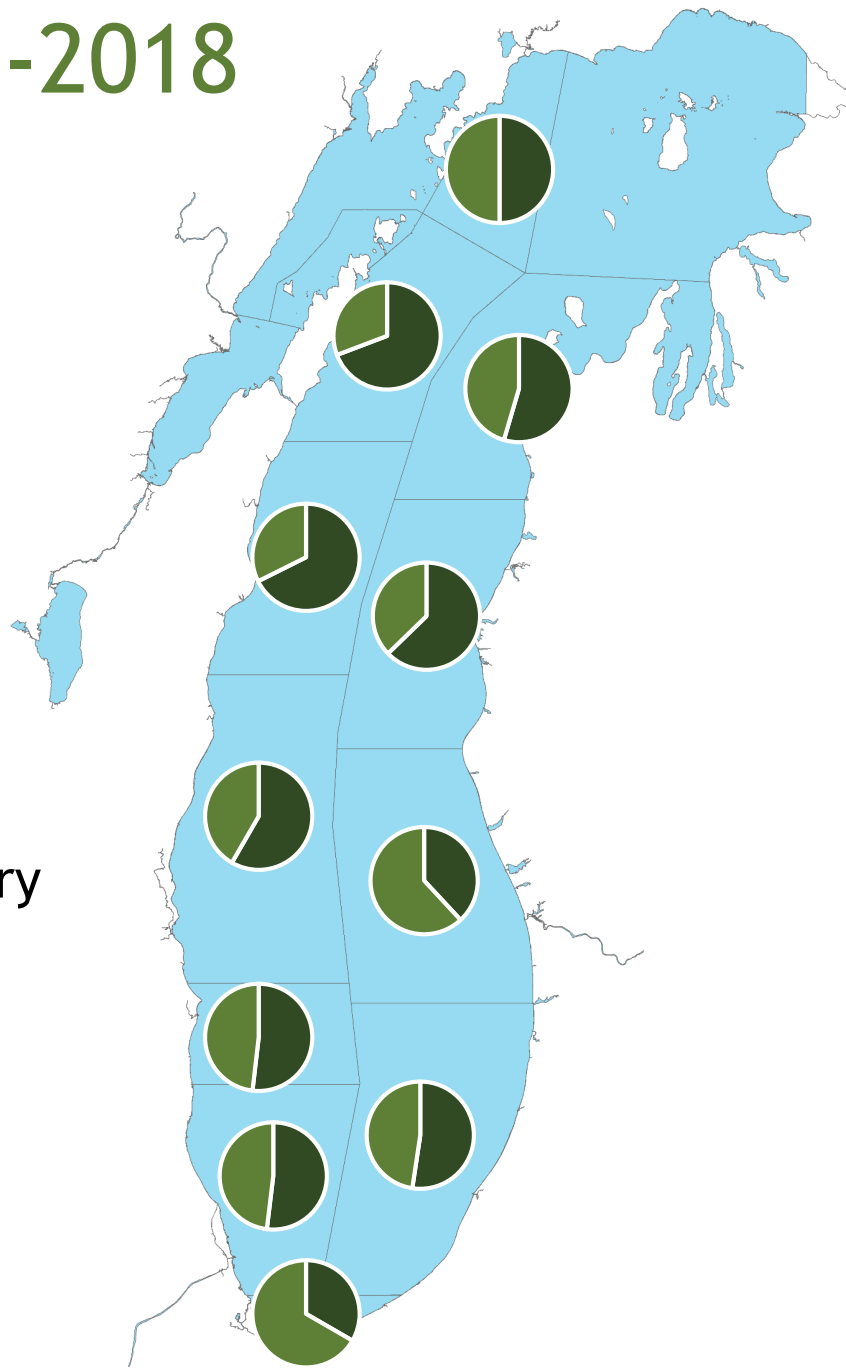
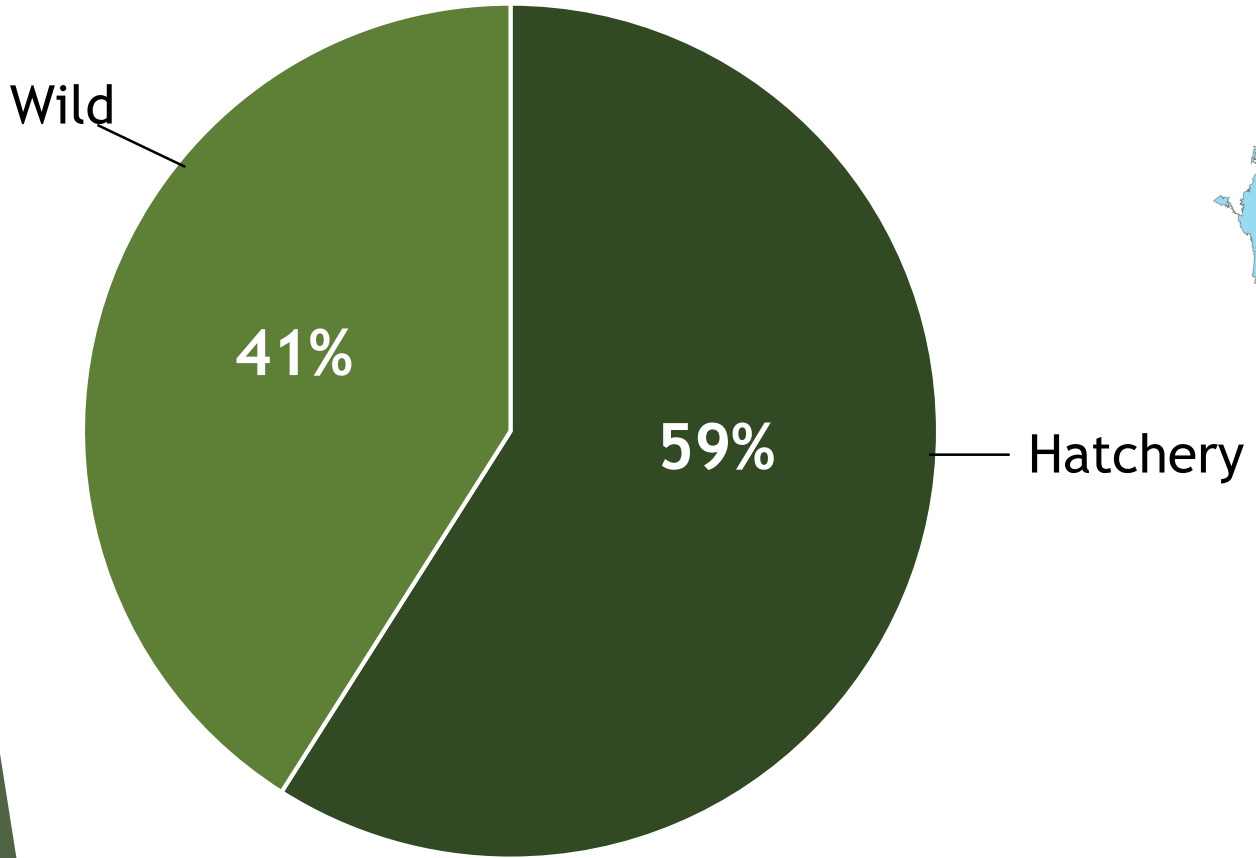
- ▶ Distribution and composition of steelhead in Lake Michigan.
- ▶ Estimates of abundance, biomass, mortality rates and consumption of steelhead in Lake Michigan.
- ▶ Growth and size at age are not declining.
- ▶ Survival of stocked steelhead is declining.





Percent Wild Steelhead 2016-2018 Microchemistry

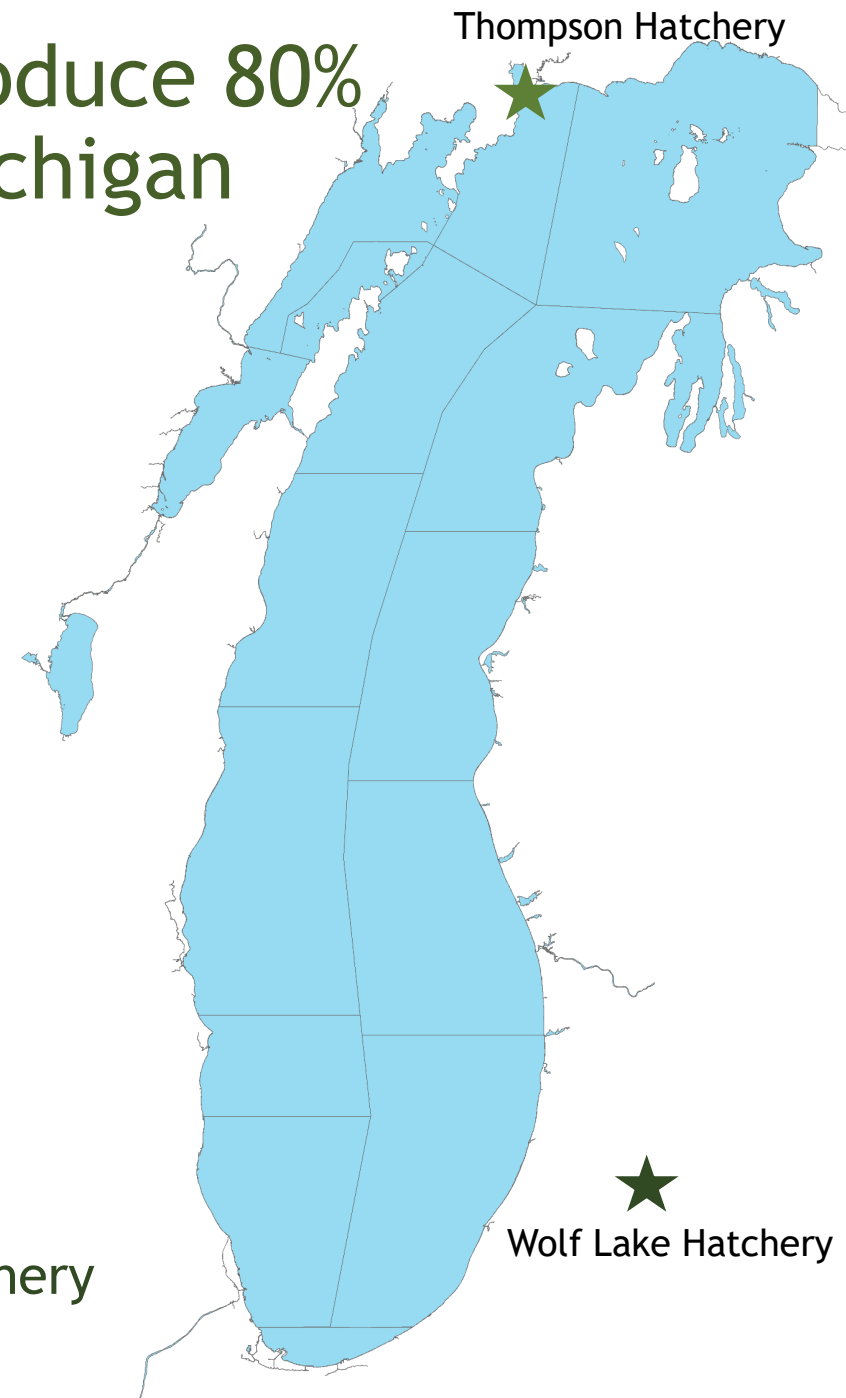
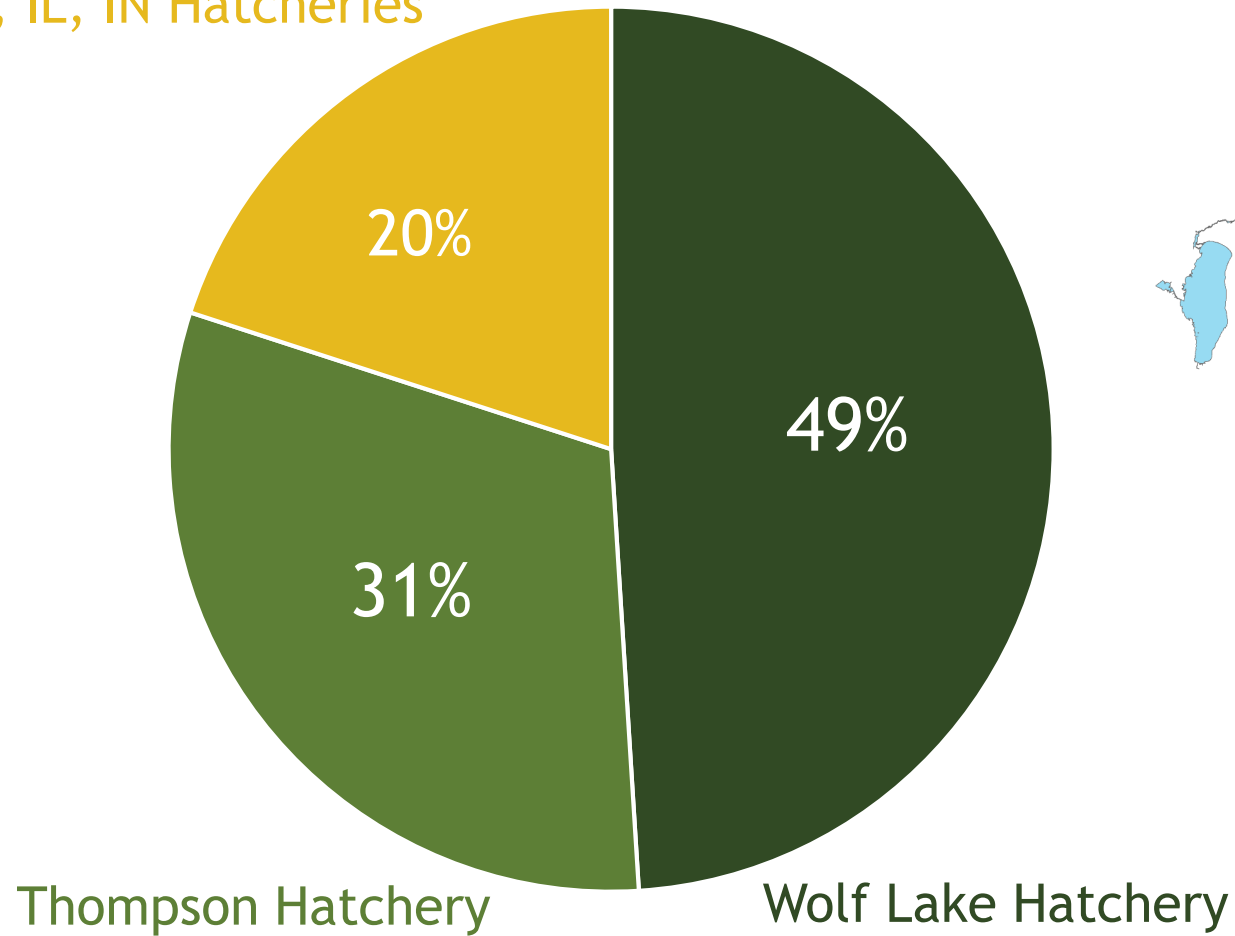
• N = 1,415





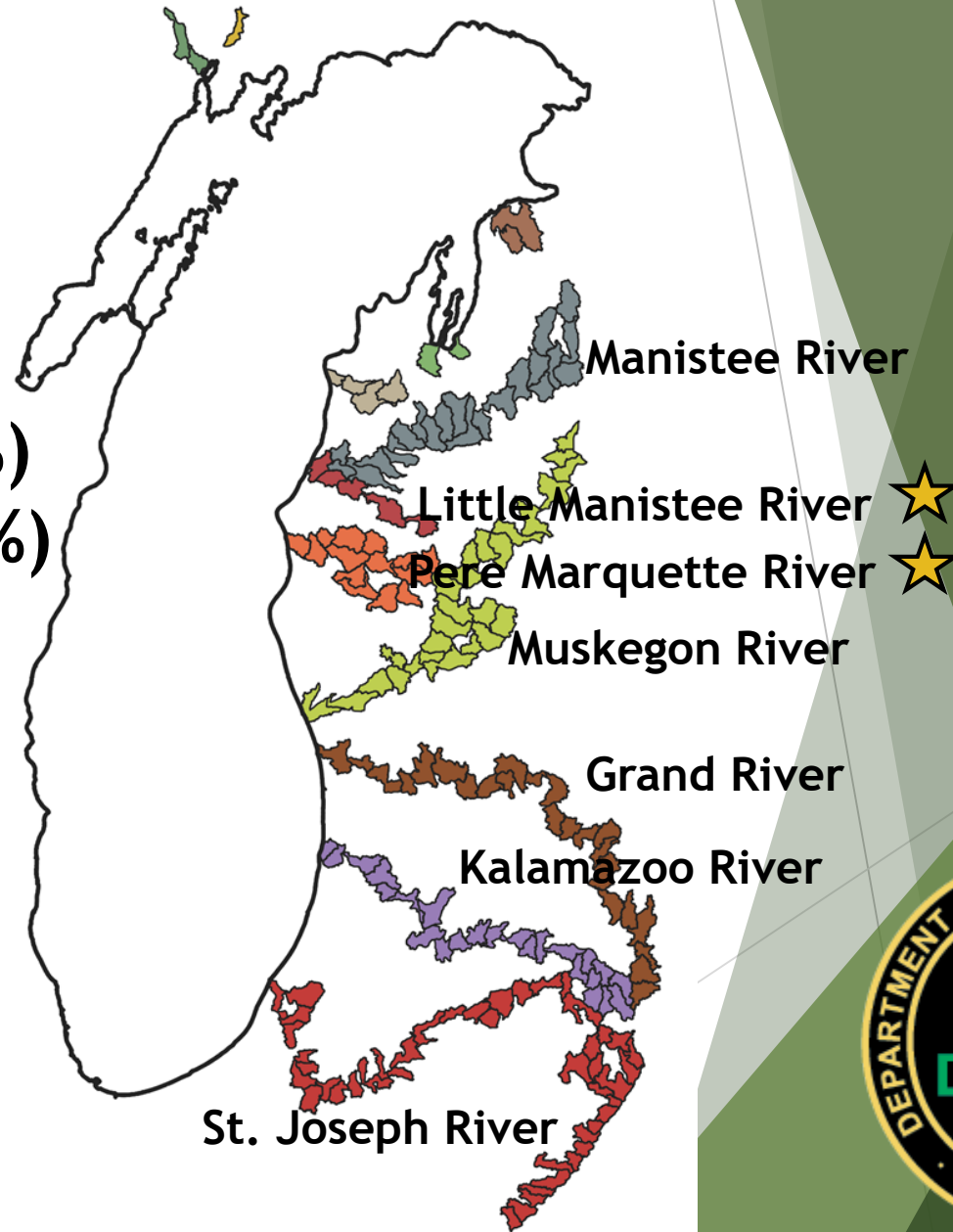
State of Michigan Hatcheries Produce 80% of Stocked Steelhead in Lake Michigan

WI, IL, IN Hatcheries



Sources of Wild Steelhead Caught in Lake Michigan

80% {
Little Manistee River (25%)
Pere Marquette River (18%)
Kalamazoo River (17%)
Muskegon River (11%)
St. Joseph River (9%)





Steelhead smolt production model predictions:

- ▶ Modeled estimates of smolt production are available.
- ▶ Verify high level findings with microchemistry.

Highest producers are:

- Little Manistee River
 - Pere Marquette River
- ▶ Differences with otolith microchemistry in less productive systems remain to be explored.





Fidelity and straying in rivers:

- ▶ 95% fidelity to natal streams.
- ▶ Habitat protection is important.



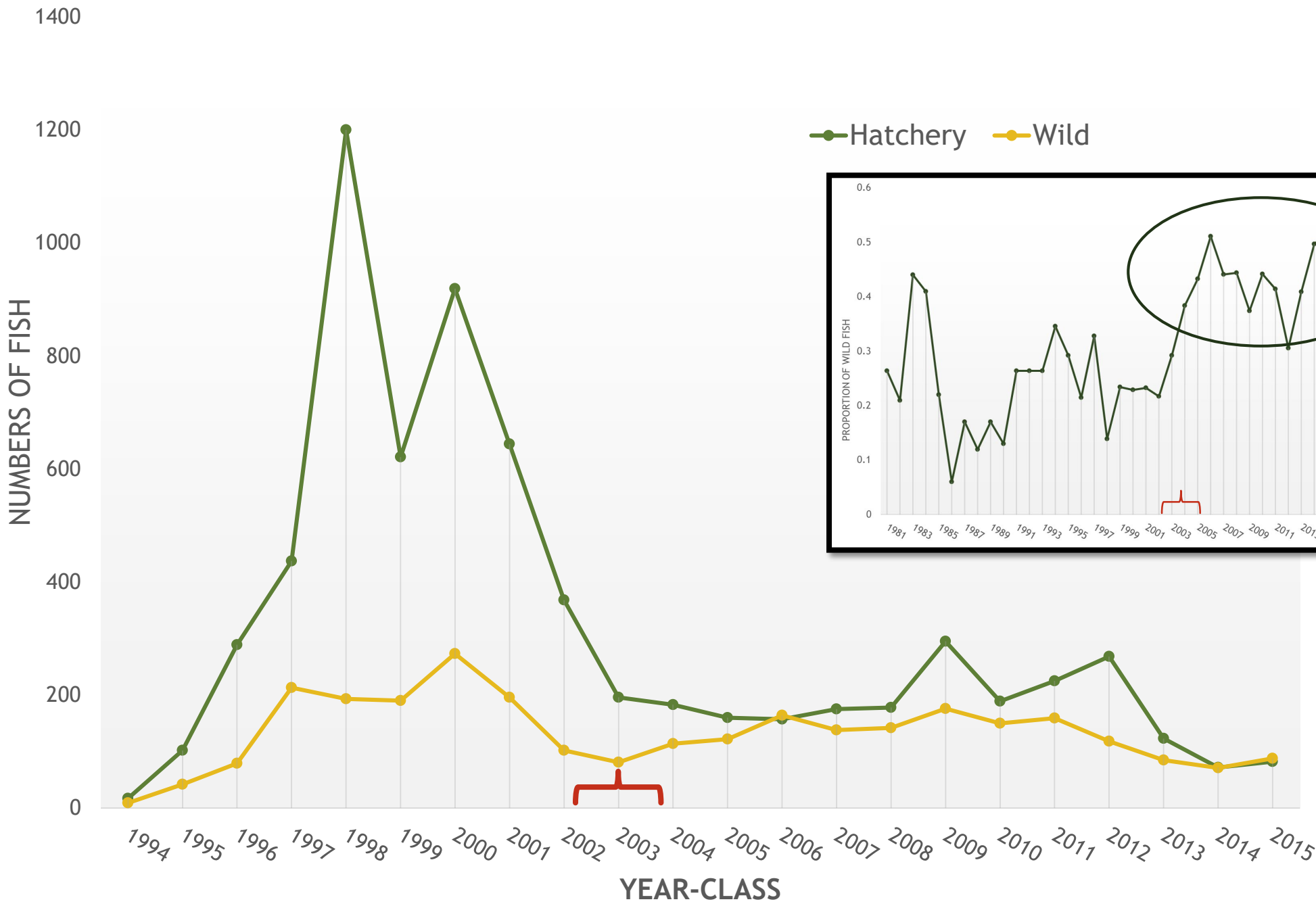
Spawning mortality and frequency of repeat spawning:

- ▶ Mortality in streams is 4-6 times higher than in Lake Michigan.
- ▶ Over 50% of returning adults are virgin spawners.
- ▶ Survival to repeat spawn can range 3-58%.
- ▶ Few fish spawn more than 2 times.

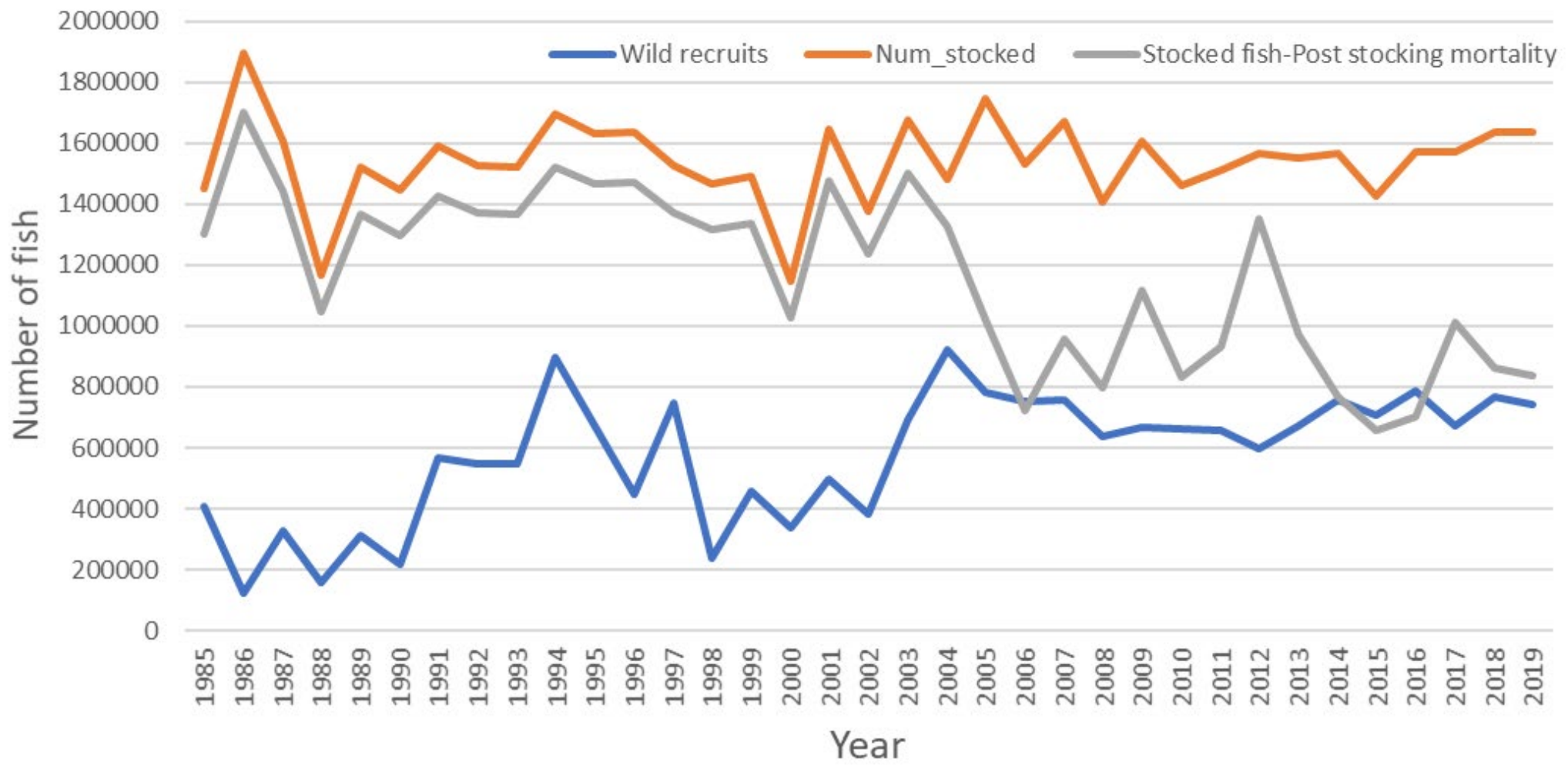




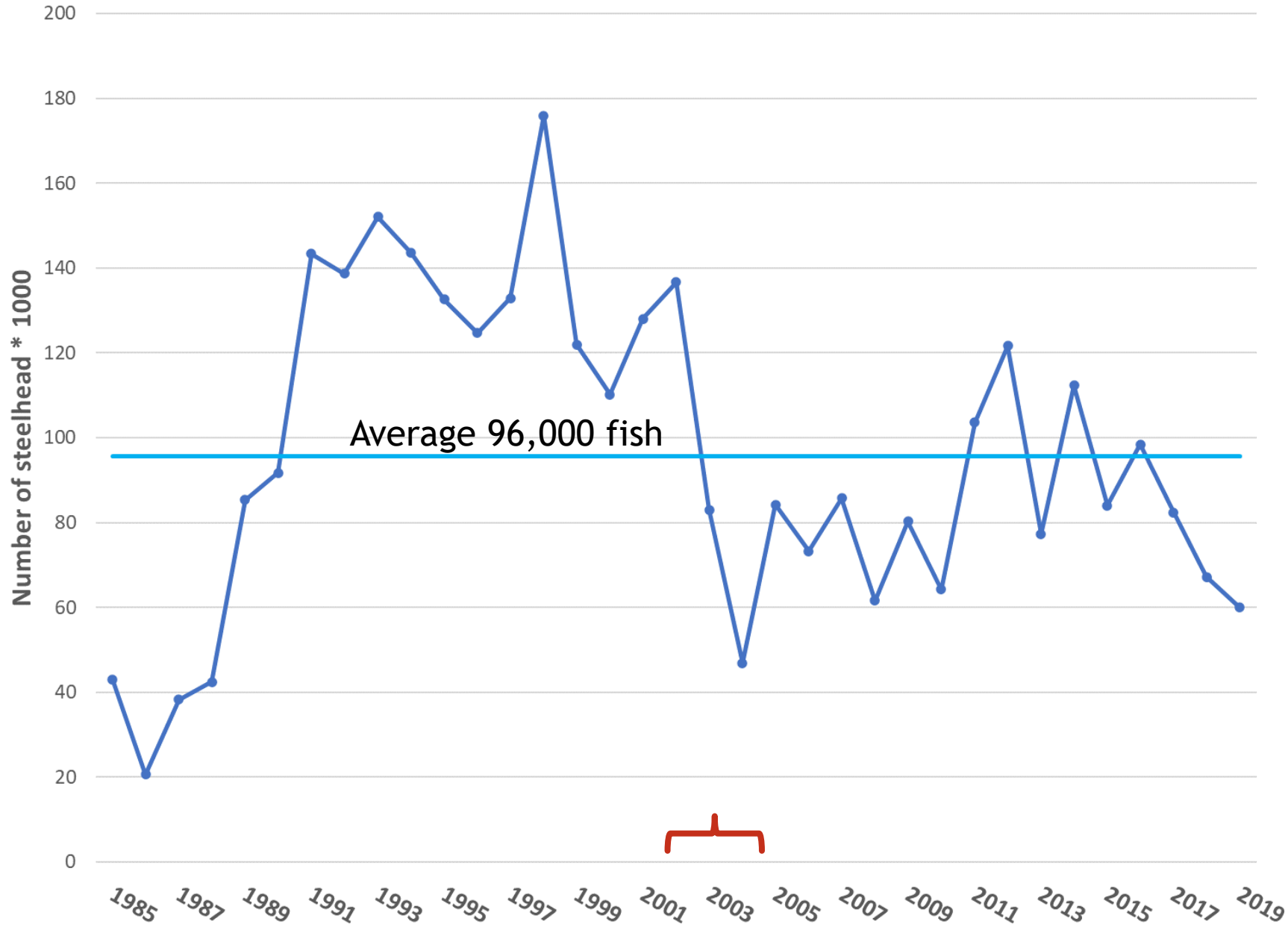
Survival concerns for stocked steelhead-based on creel biodata returns



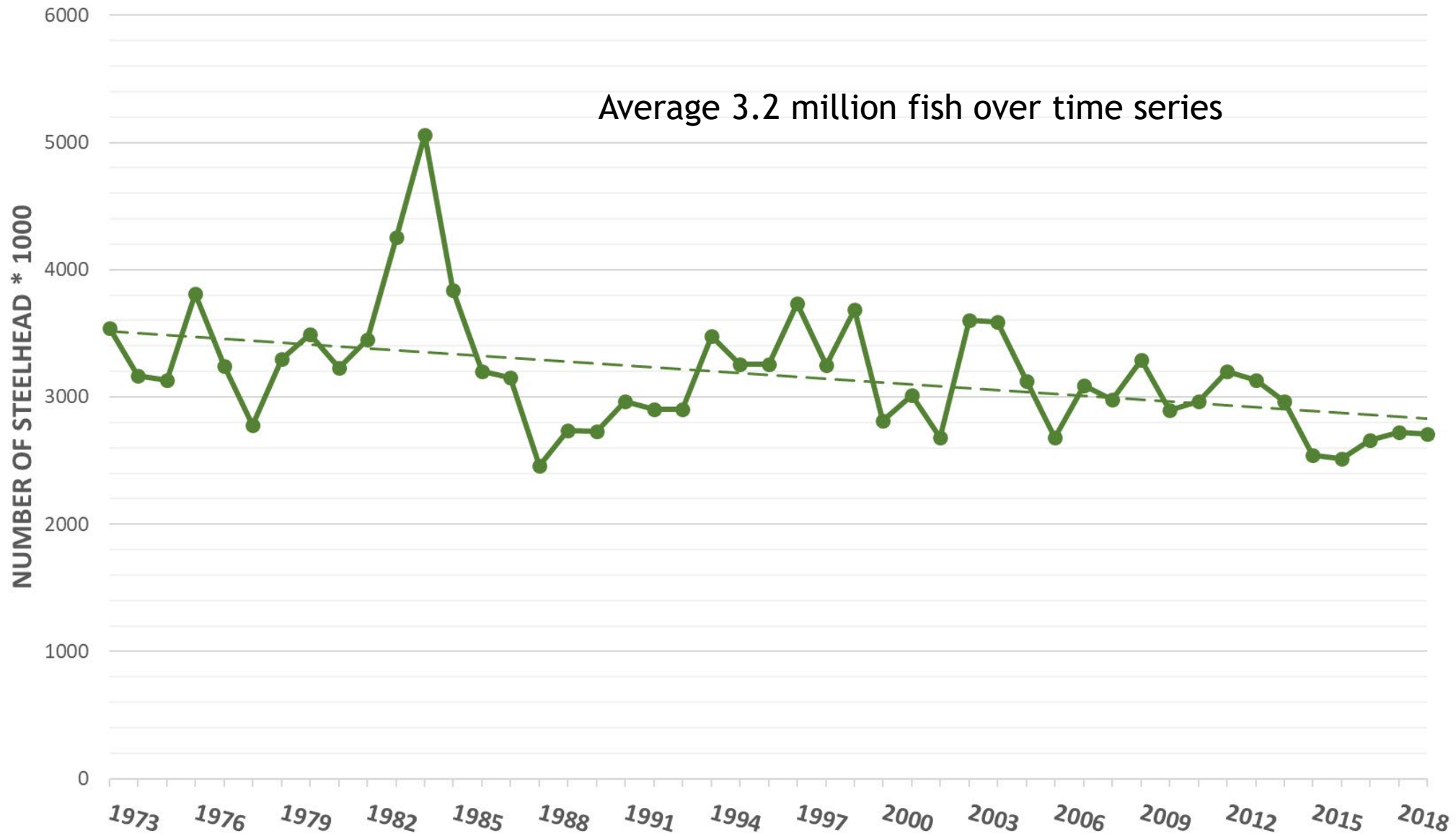
Survival of Stocked Steelhead and Recruitment



Recreational fishing Lake Michigan



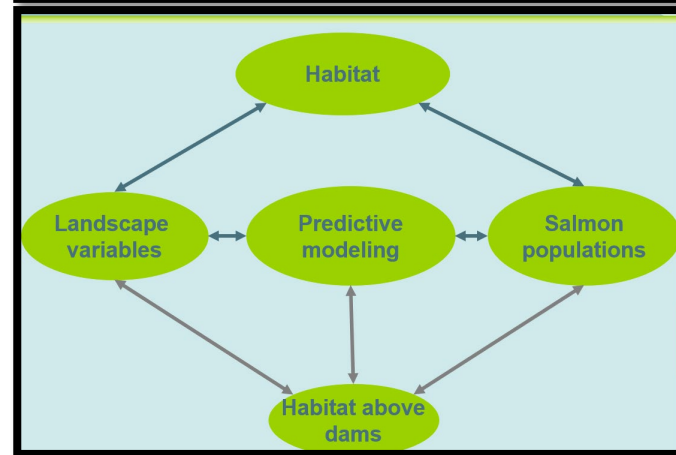
Predicted Lake Michigan Steelhead Population Trend





Ongoing and Future research:

- ▶ Mortality sources for young stocked and wild steelhead.
- ▶ Recruitment bottlenecks. (predation on young steelhead)
- ▶ Predicting smolt numbers using environmental and landscape factors.
- ▶ Informing management when knowledge gaps exist for steelhead.



Overall Summary

- ▶ Public trust responsibilities; Diverse angling community
- ▶ Continuum of research, assessment, and management
 - ▶ Confidence in data
 - ▶ Opportunity to be proactive
- ▶ Regulation cause & effect, Expectations
- ▶ Most recent deliberations: little support for further restrictions
- ▶ Amendment supported by select group of anglers
- ▶ Immediate action is not preferred option



Thank you

► Questions?

