Charter Captain Meeting
March 12, 2015

FISHERIES MANAGEMENT..... we make fishing better

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Strawberry Creek Analysis

Strawberry Creek: Questions & Comments Received

- Why does DNR only take Chinook eggs from Strawberry Creek?
- What about other rivers? For example, Root & Kewaunee?
- Questions about the number of fish stocked at Strawberry Creek

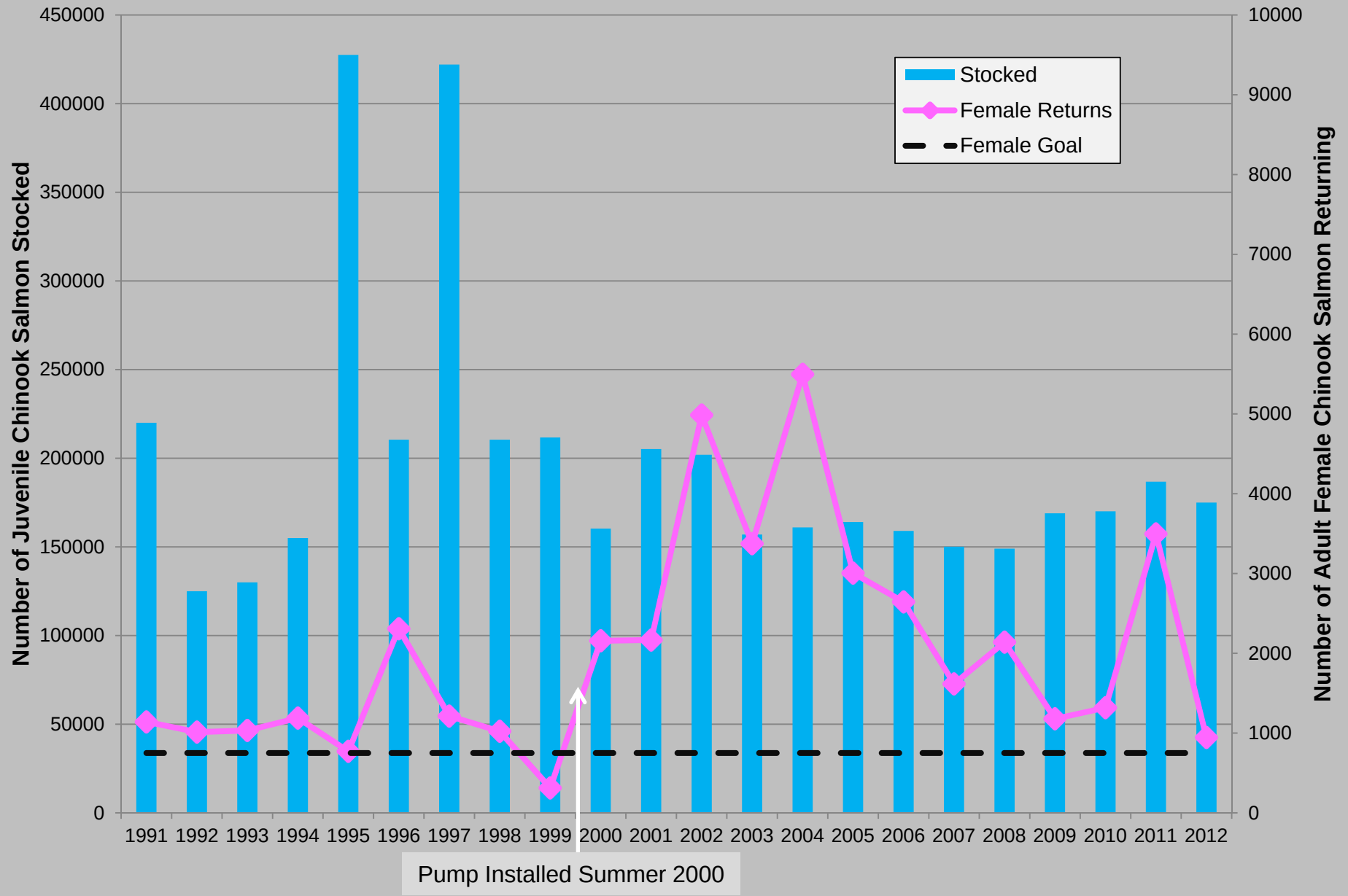
Why a facility devoted entirely to Chinook Salmon?

- Chinook salmon fishery importance
- Longest continuous egg take in Wisconsin (since 1972)
- Only Chinook salmon at this facility
- Long-term Chinook biological data set
- Low rates of disease

Broodstock Management

- Chinook salmon stocked in Strawberry Creek are a product of parents spawned throughout the spawning run
- Chinook salmon stocked at other locations are only a subset of all spawning events
- Why? Wild Rose must hold back early spawners to create similar sized fish, this can only be done for a small number of fish

Chinook Salmon Stocked and Females Returned at Strawberry Creek: 1991-2012



Future Direction: Strawberry Creek

- Continue Strawberry Creek as the primary egg source for Wisconsin Chinook salmon
- Continue Root & Kewaunee egg takes for other species – means they will also serve as a back up for Chinook at Strawberry Creek
- Adjusted Strawberry Creek down to 120,000 fish (2014 first year) from 175,000
- Monitor returns based on new stocking rates, adjust again in 4-6 years if necessary (2018-2020)

Broodstock Management: Comments and Questions Received

- Why does DNR continue to take eggs from mostly 3-year old chinooks? Won't this lead to smaller chinooks for the long-term?
  - Answer: Misunderstanding of age terminology

- Does DNR have a broodstock management plan?
  - Answer: Yes, we will describe it

Chinook salmon life cycle

October – Egg Take

May – stock

1 June – December (grow to 12”)

2 January – December AGE 1 – Shakers (16 to 24”)

3 January – December AGE 2 (28 to 32”)

4 January – December AGE 3 (31 to 36”)

5 January – December AGE 4 (32 to 38”)

Broodstock Management

ANADROMOUS FERAL BROODSTOCK

Anadromous feral broodstock are defined as feral anadromous strains of salmonids with desired genetic traits that:

- led to their being selected for introduction into the Great Lakes,
- or have developed as a result of natural selection in the Great Lakes.

Those populations are managed, as necessary, to maintain those desired traits. The broodstock are captured and spawned as required during spawning "runs" of the feral populations.

COMPONENTS TO OUR BROODSTOCK PLAN

- **ANADROMOUS FERAL BROODSTOCK DEVELOPMENT (established stocks)**
- **ANADROMOUS FERAL BROODSTOCK DEVELOPMENT (new stocks)**
- **ANADROMOUS FERAL BROODSTOCK MAINTENANCE**
- **ANADROMOUS FERAL BROODSTOCK CARE**
- **ANADROMOUS FERAL BROODSTOCK SPAWNING TECHNIQUES**

Maintenance

- Stocked fish should have maximum genetic diversity as possible
- Brood fish should be separate from production fish
- Minimum 50 pairs
- Preferred 250 pairs

Future Direction: Broodstock Management

- Continue to follow DNR Broodstock Management Protocol

Forage Abundance: Questions & Comments Received

- Accuracy of forage surveys?
- Surveys done in same locations each year
- How many years of data?
- Need a more accurate method to asses alewife abundance?
- Need to use charter information to assess alewife abundance.
- Why do we see so many alewife?

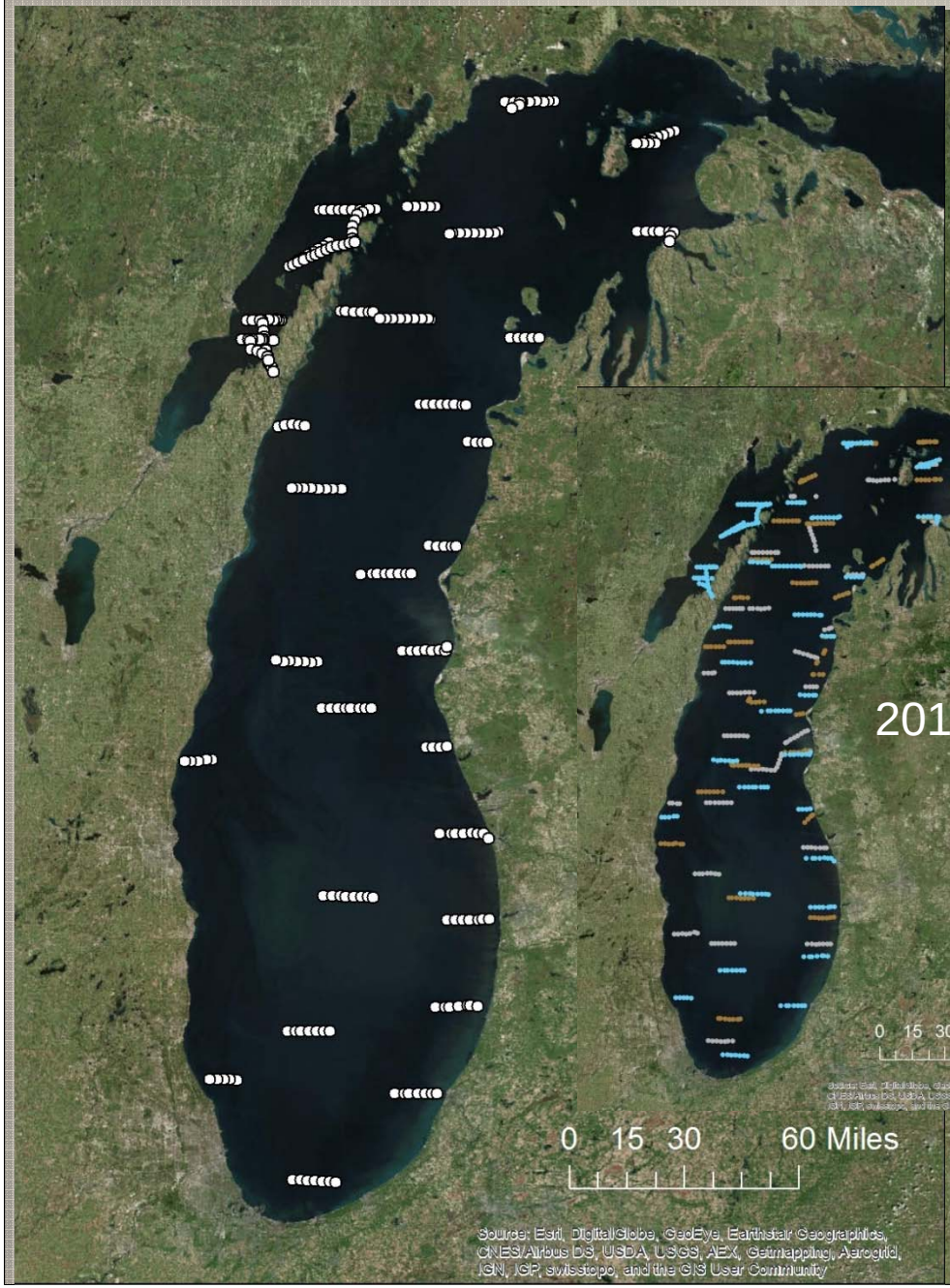
How Accurate is the USGS-MDNR-USFWS Acoustic and Bottom Trawl Survey?

- Accurate enough to use as one variable in the Chinook salmon management process.
- It captures trends well for fish species and age-classes that spend most of their time on the bottom during the day (older alewife, bloater, smelt; all ages of sculpins) (Bottom Trawl).
- Without a doubt the surveys tell us alewife are less abundant now than in the 1960s, 1970s, 1980s, 1990s, or early 2000s
  - The survey results are useful in a qualitative (e.g. low, medium, or high alewife) sense as well as a quantitative sense

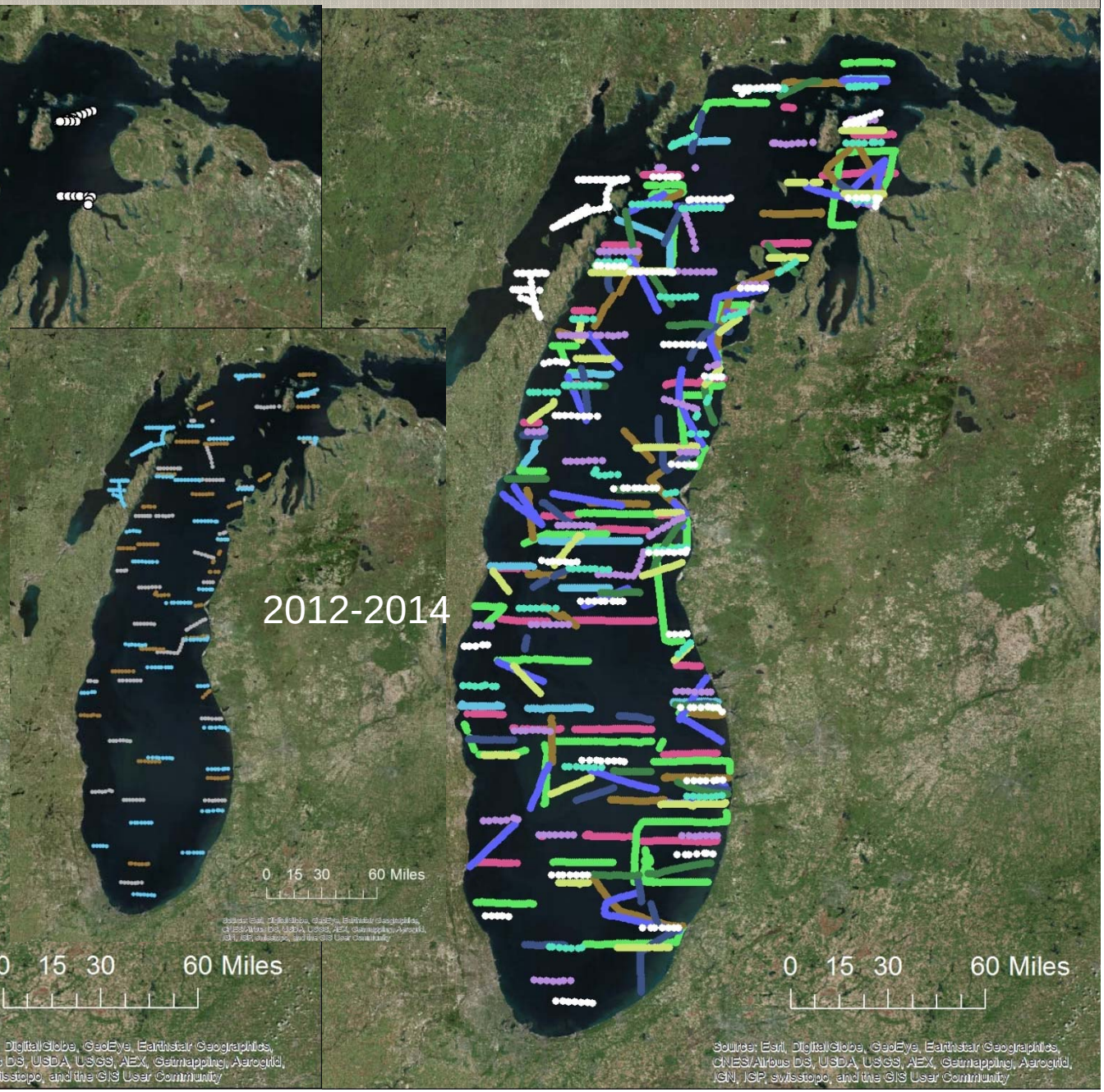
The lake has changed so alewife movement and distribution patterns have changed, while the USGS trawling transects have stayed the same

- Only an issue for the bottom trawl survey- fixed sites are sampled each year because picking “random” sites would tear up nets at an unsustainable rate
  - But since 2013, we have begun sampling deeper depths (430 ft) at 2-3 of our 7 ports
- NOT true for the acoustic survey (see map on next slide)
- There is a value in having a both a fixed (trawl) and randomized (acoustic) survey!

2014 Acoustic Survey



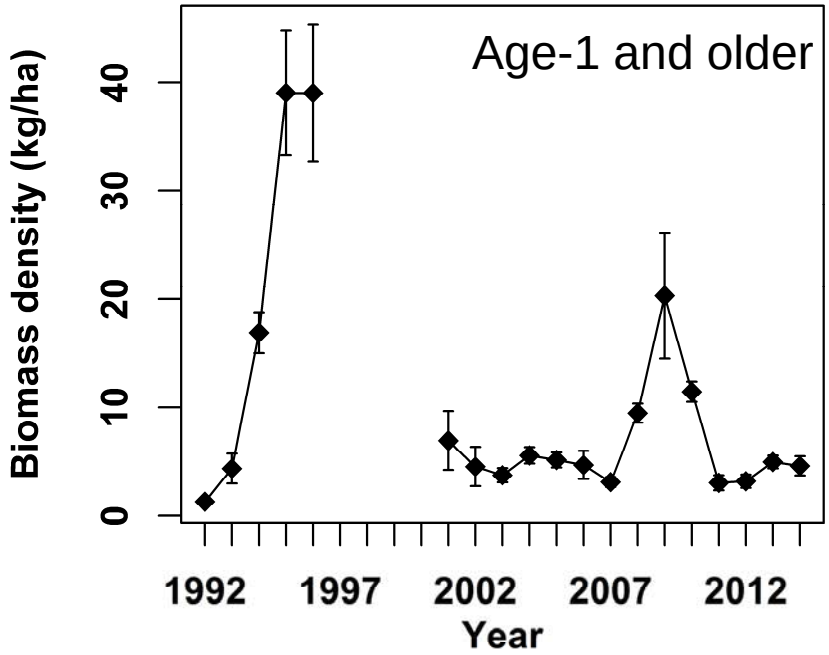
2004-2014 Acoustic Surveys

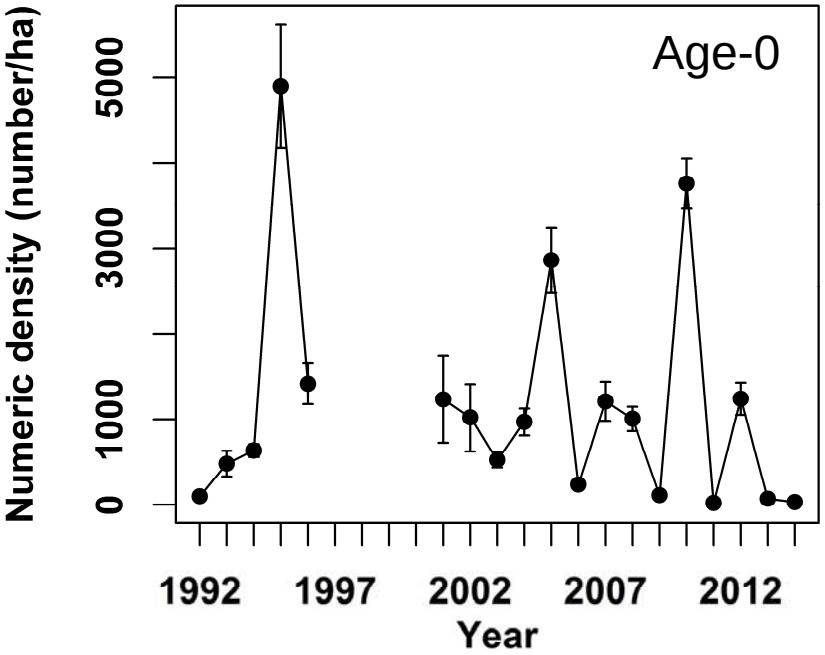


How many years have acoustic and bottom trawl data been collected?

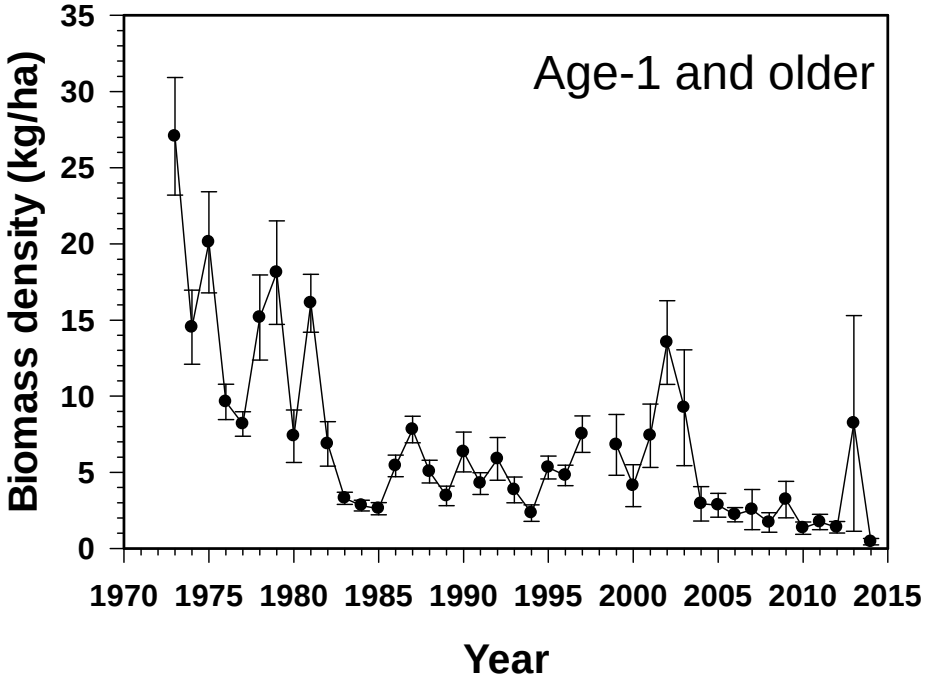
- Bottom trawl
  - Lakewide = 42 years (1973-2014)
  - Saugatuck = 53 years (1962-2014)
- Acoustic
  - 19 years (1992-1996, 2001-2014)

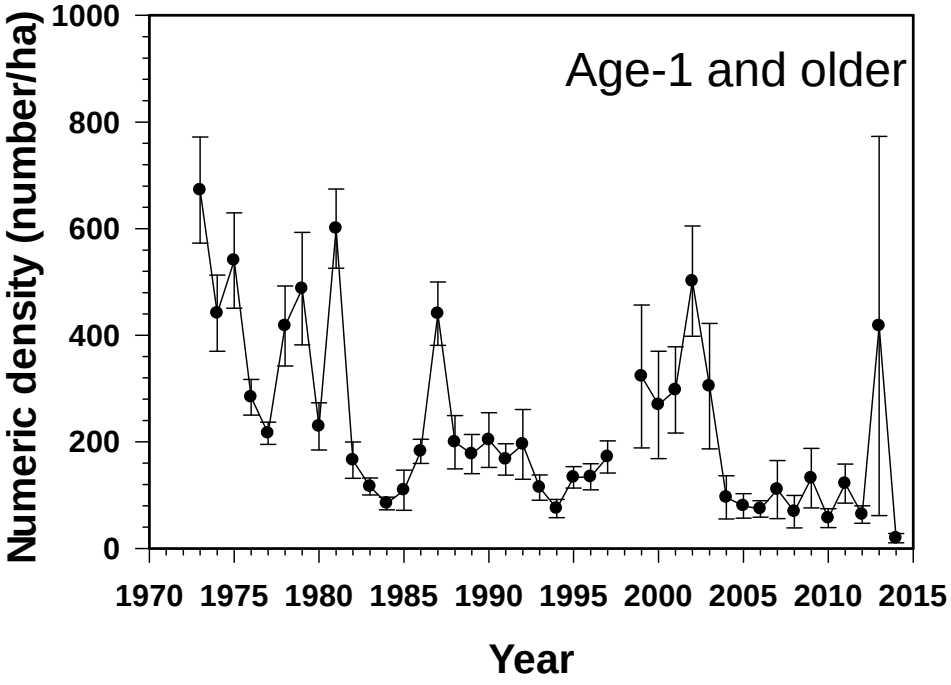
Acoustic Survey Alewife Estimates





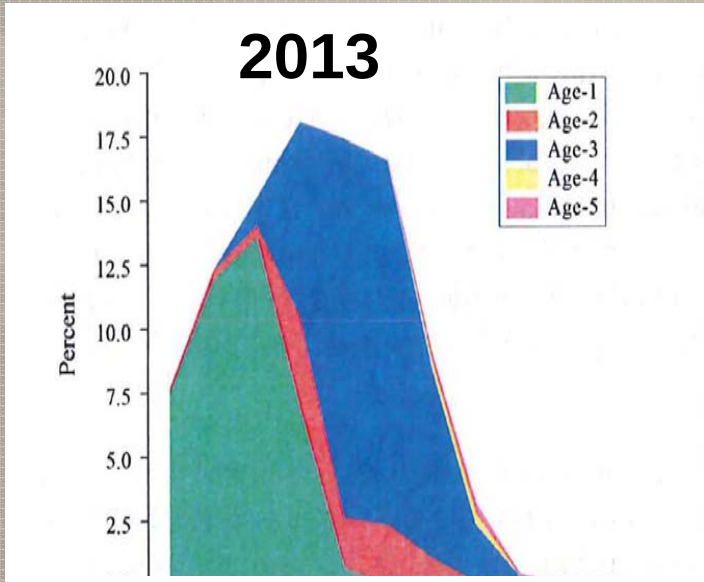
Bottom Trawl Survey Alewife Estimates

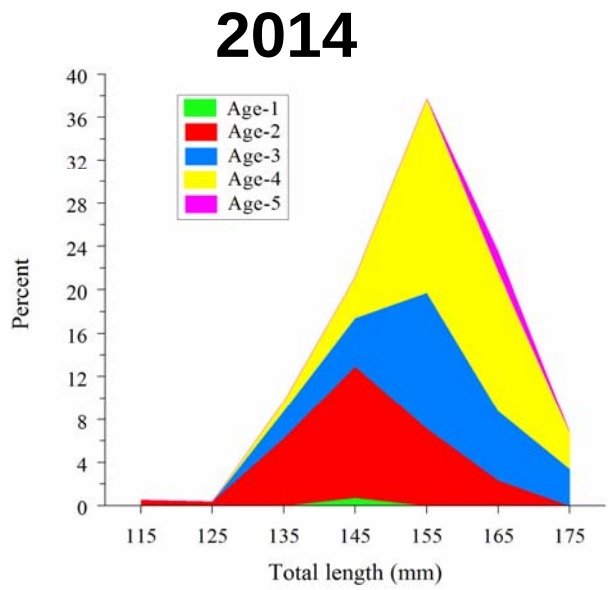


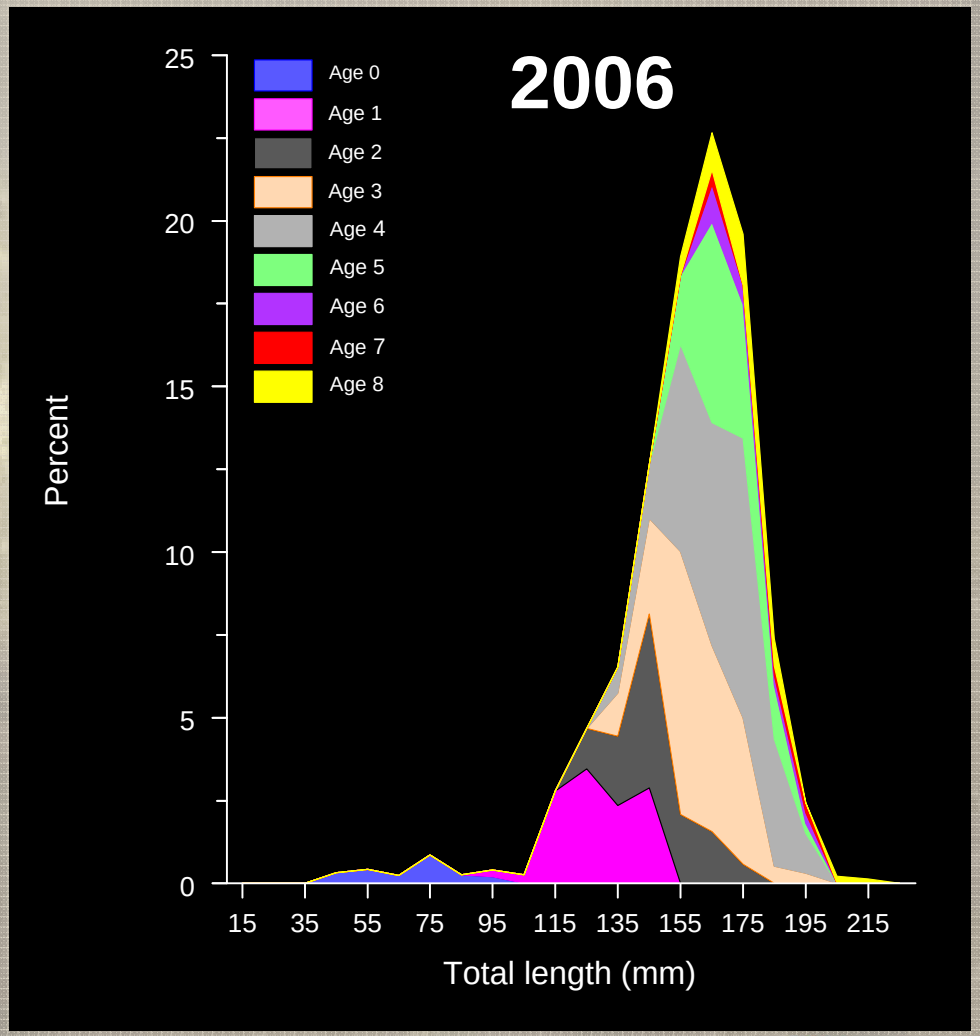


Biomass Estimates Just <u>One</u> of the Factors Considered

Alewife Ages & Lengths (Bottom Trawl)







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Other Factors Considered Regarding Predator/Prey Management

- Biomass estimates of chinook salmon
- Biomass estimates of lake trout
- Stocking numbers of all trout and salmon species
- Weight of Age-3 Chinook salmon
- Length/weight angler caught chinook
- Charter fishery effort and harvest
- Species composition of harvest

Improve Accuracy

- Partners are working on ways to improve estimates – as we normally would any survey!
- Use of underwater drones to better acoustic estimates – will not scare fish, will hopefully be cheaper
- Experimental deep water trawl tows 2013 & 2014
- USFWS Green Bay surveys in 2014

Improve Accuracy

- With fish surveys, greater accuracy is always possible!
- Higher accuracy takes more time and resources
- We believe the surveys are sufficiently accurate to address management needs
- Bottom-trawl survey: a huge trade-off between maintaining unique time-series and modifying it to reflect changing lake must be carefully evaluated!

Could we use sonar information from boats for any purpose? If so, what would be the purpose, how could the data be used? Would you be able to do something with it?

- Depends on the equipment being used
- Quantitative enough for management requires scientific echosounder AND night data collection
- Day data collection (regardless of equipment) will only provide the number and location of fish schools encountered
- Charter captains would need to partner with Wisconsin Sea Grant working with USGS to accomplish this task

Future Direction: Forage Assessment

- Continue to work with USGS and USFWS on improving forage assessments
- Continue to use forage assessments as ONE of the many factors in making management decisions
- Support partnerships with public/charters on collecting forage data if it can be collected in a useable form

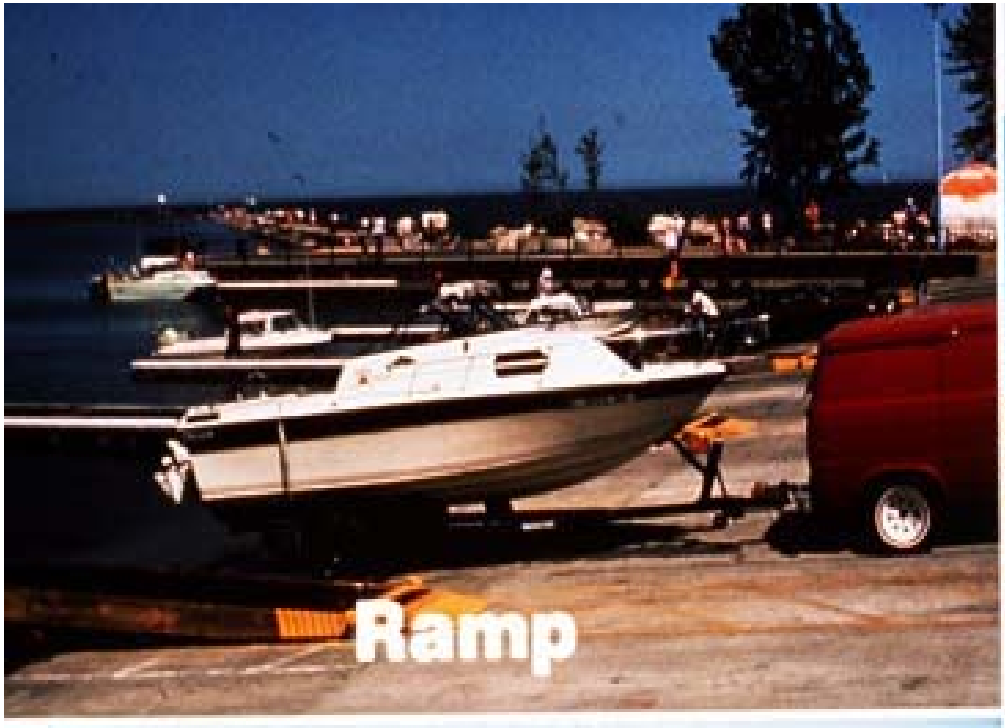
Creel/Fish Harvest Estimates: Comments and Questions Received

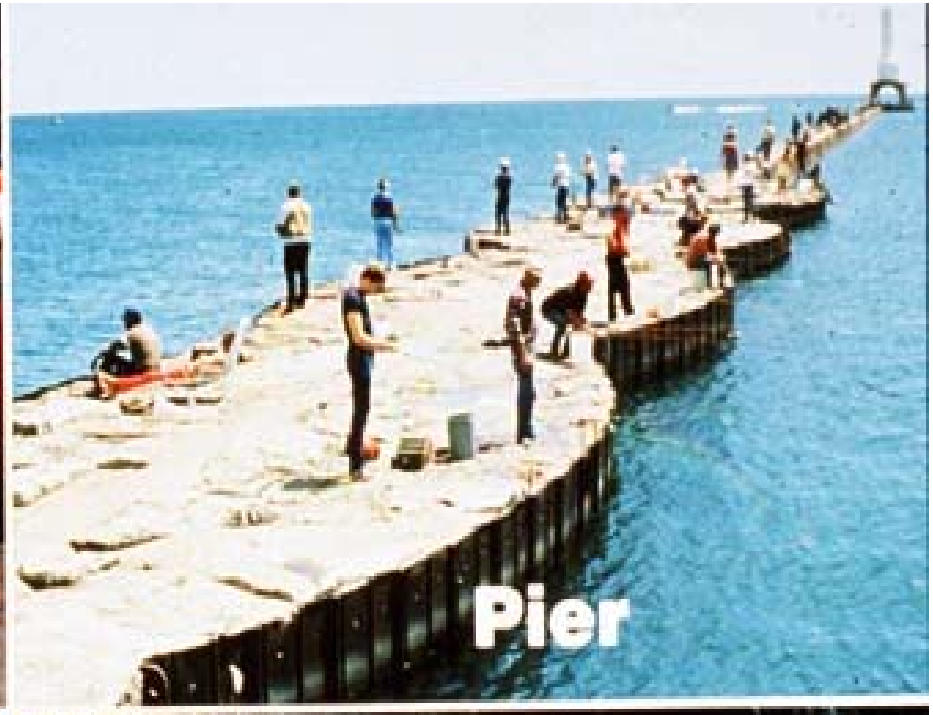
- What are the creel trends, charter trends, etc.?
- How do the creel surveys account for the changing conditions?

Lake Michigan Sport Fishing Surveys

Creel Survey

- Collect information on sport fishing on Lake Michigan
- Modified access point design
- Randomized
- Counts, Interviews and Biological information
- Diet composition
- Fish consumption advisory
- Socio-economic


Ramp


Pier

Shore

Stream

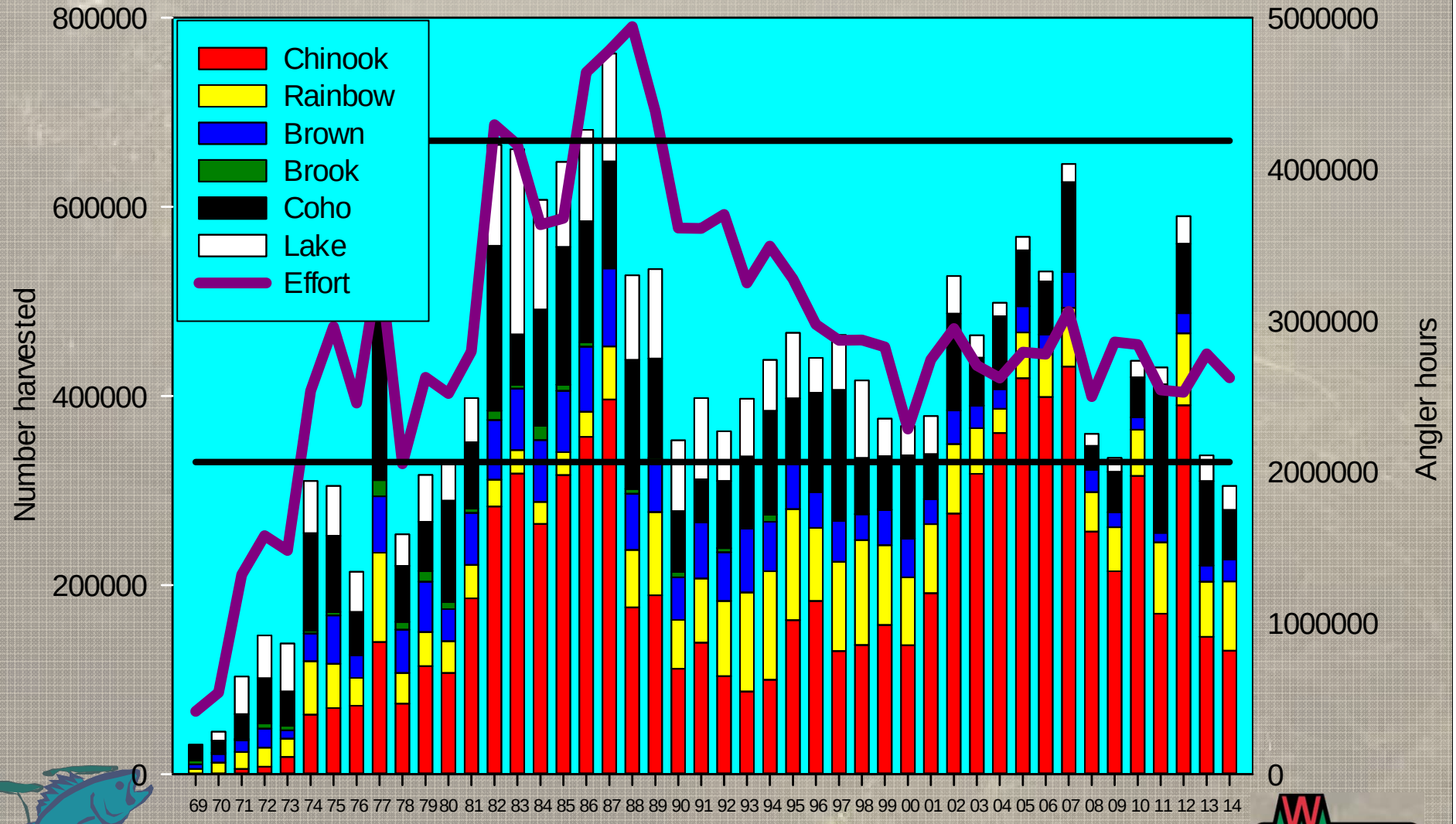
Charter Boat Reporting

- Captains are licensed
- Mandatory monthly reports
- Information obtained included number of anglers, hours fished and number by species caught

Moored Boat Survey

- Randomized mail survey
- Boat registration numbers are obtained to provide mailing list
- 2 – week survey period
- One survey per year

Lake Michigan Salmon and Trout harvest and effort from 1969 to 2014



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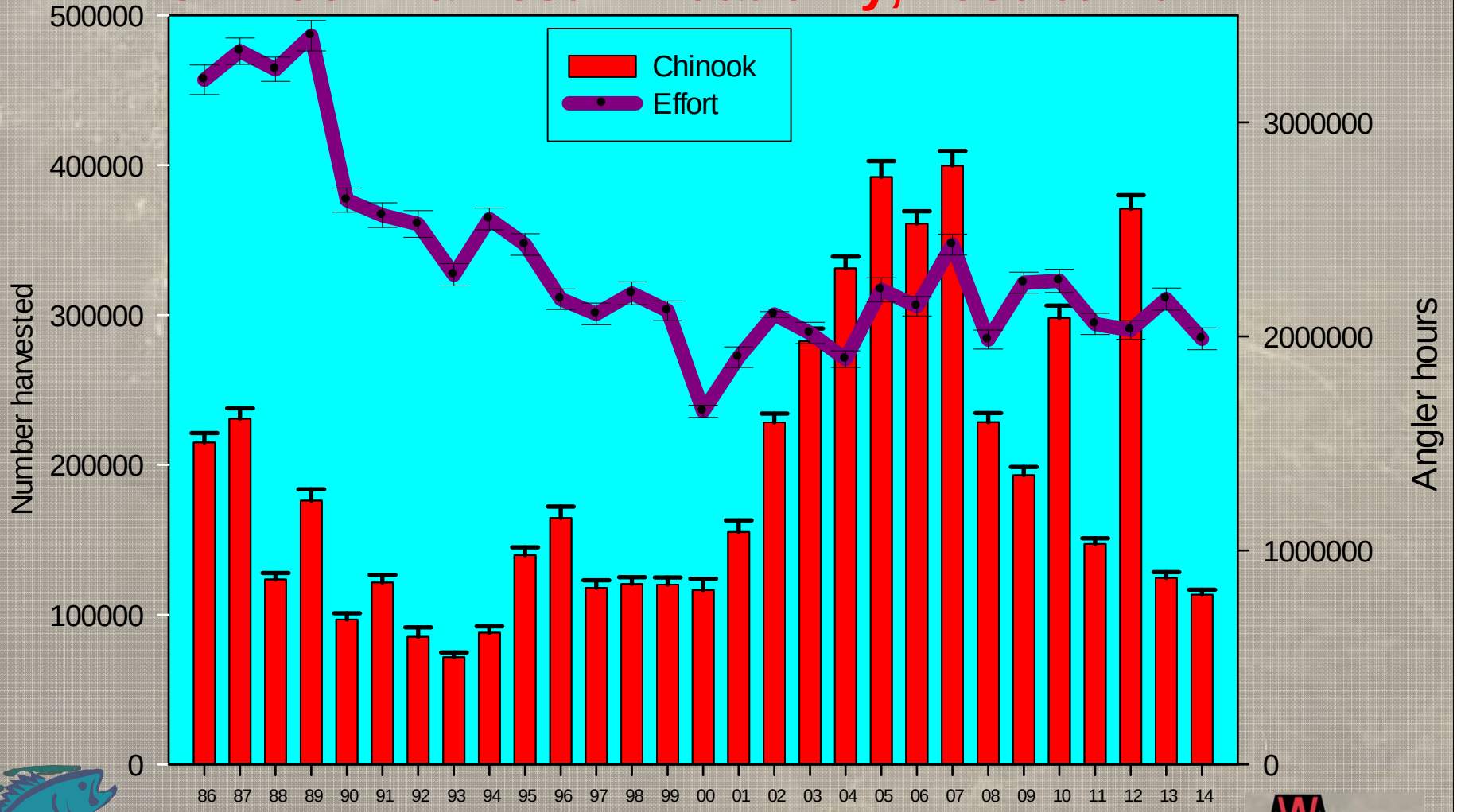
Lake Michigan Effort and Chinook harvest - Boat only, 1986 to 2014



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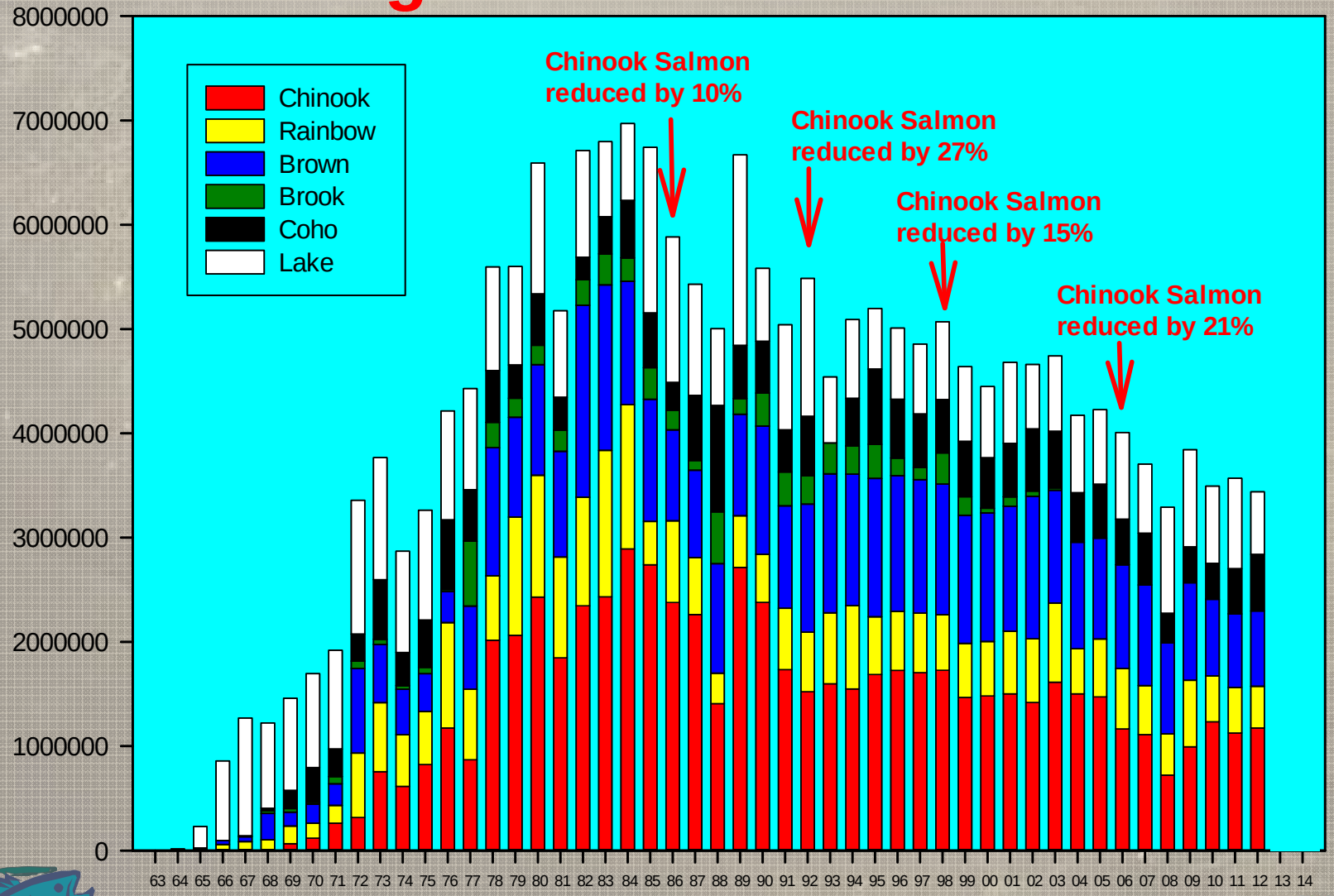
Future Direction: Sport Fishing Surveys

- Continue to conduct all three sport fishing surveys (creel, charter and moored boat)
- Continue to modify surveys to accurately capture fishing information
- Work with Charter industry to implement a electronic reporting system (see upcoming slides)

Lake Michigan Sport Fishing Surveys

RESULTS

Lake Michigan Salmon and Trout stocking numbers 1969 to 2014



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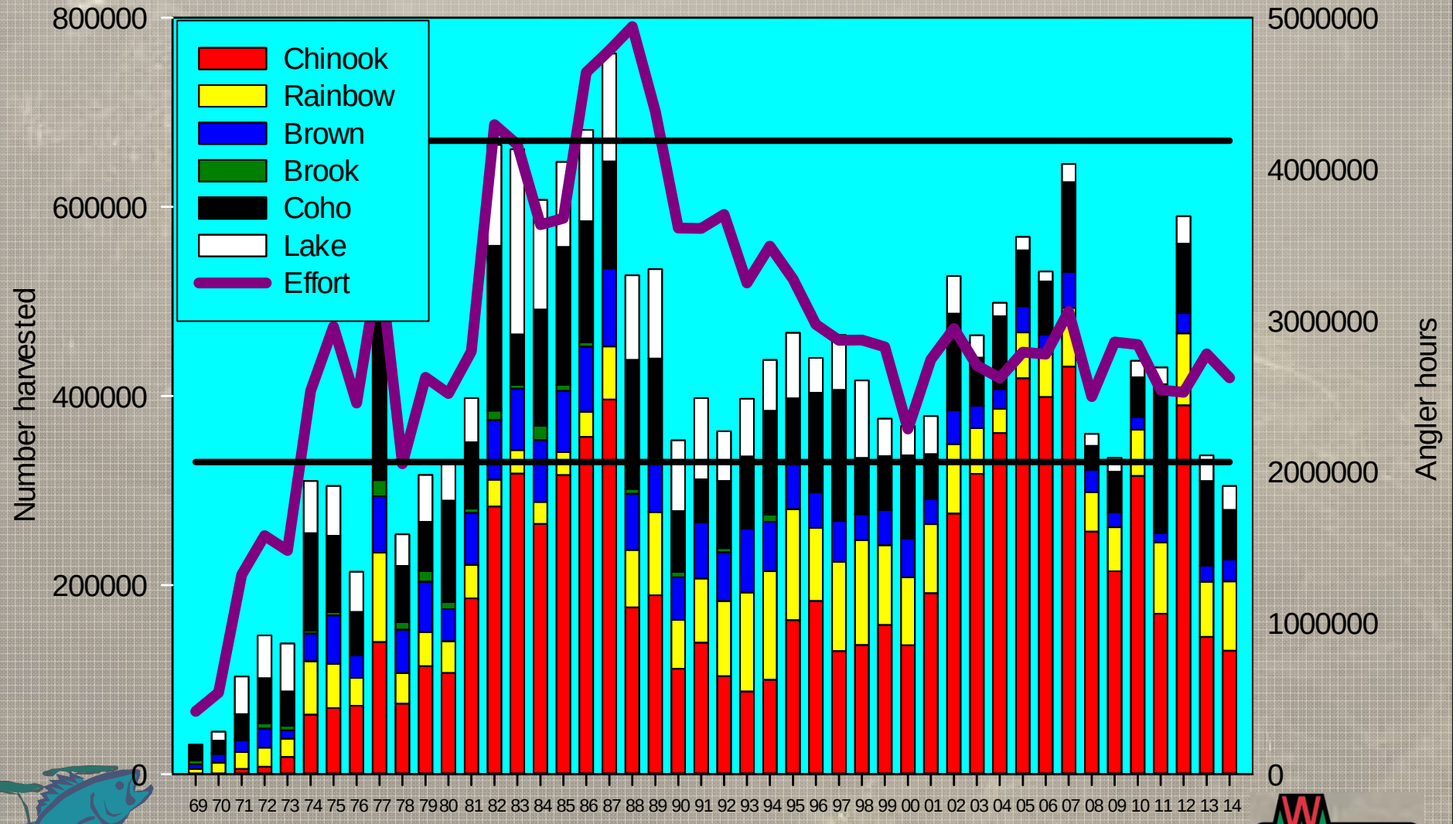

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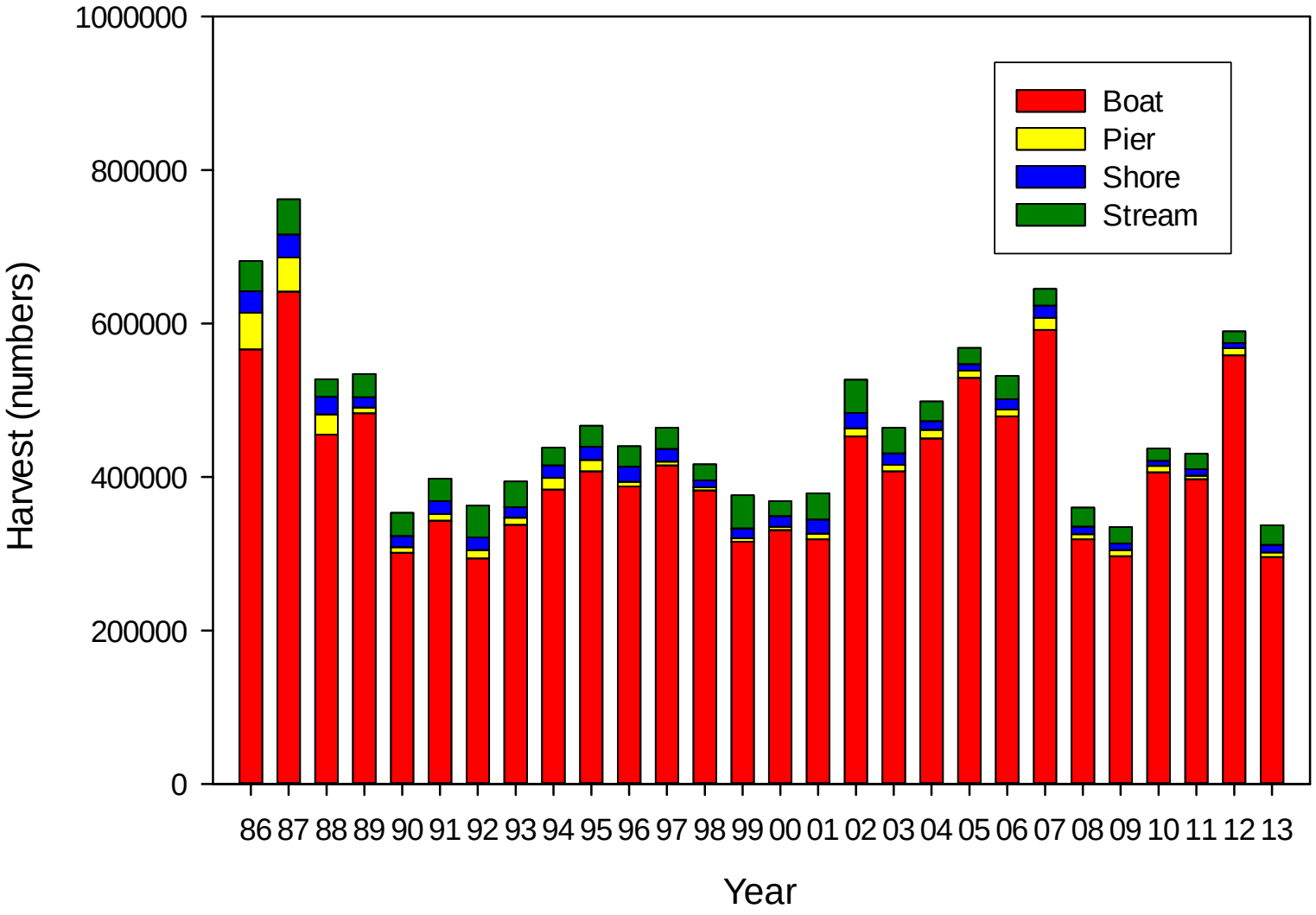
Lake Michigan salmon and trout harvest by year and fishery type, 1986 - 2013



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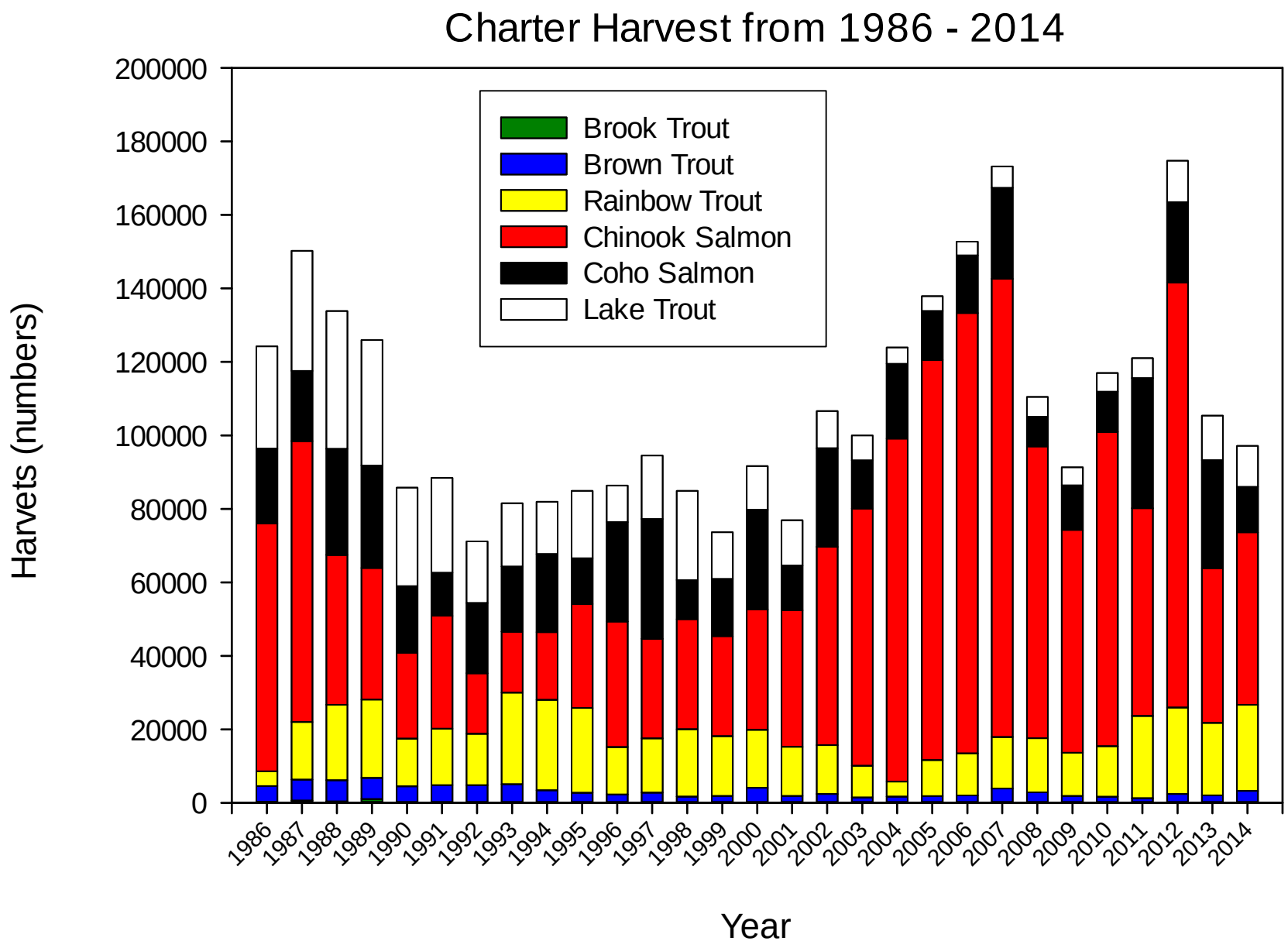
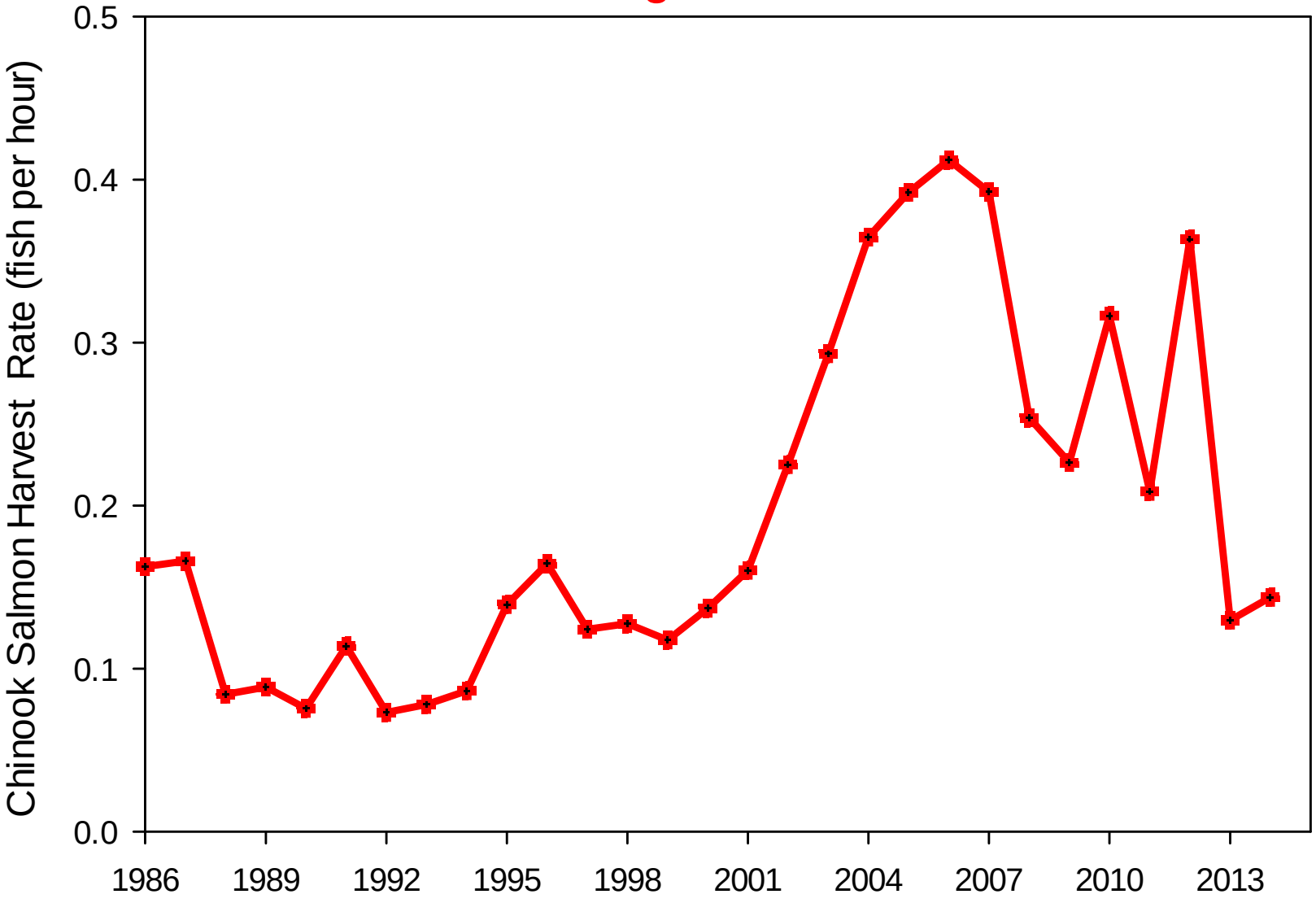

Charter Harvest from 1986 - 2014
Harvets (numbers)
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
Brook Trout
Brown Trout
Rainbow Trout
Chinook Salmon
Coho Salmon
Lake Trout
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year

Chinook Salmon Charter Harvest Rate
Lake Michigan 1986 - 2014



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Fish Movement: Comments and Questions Received

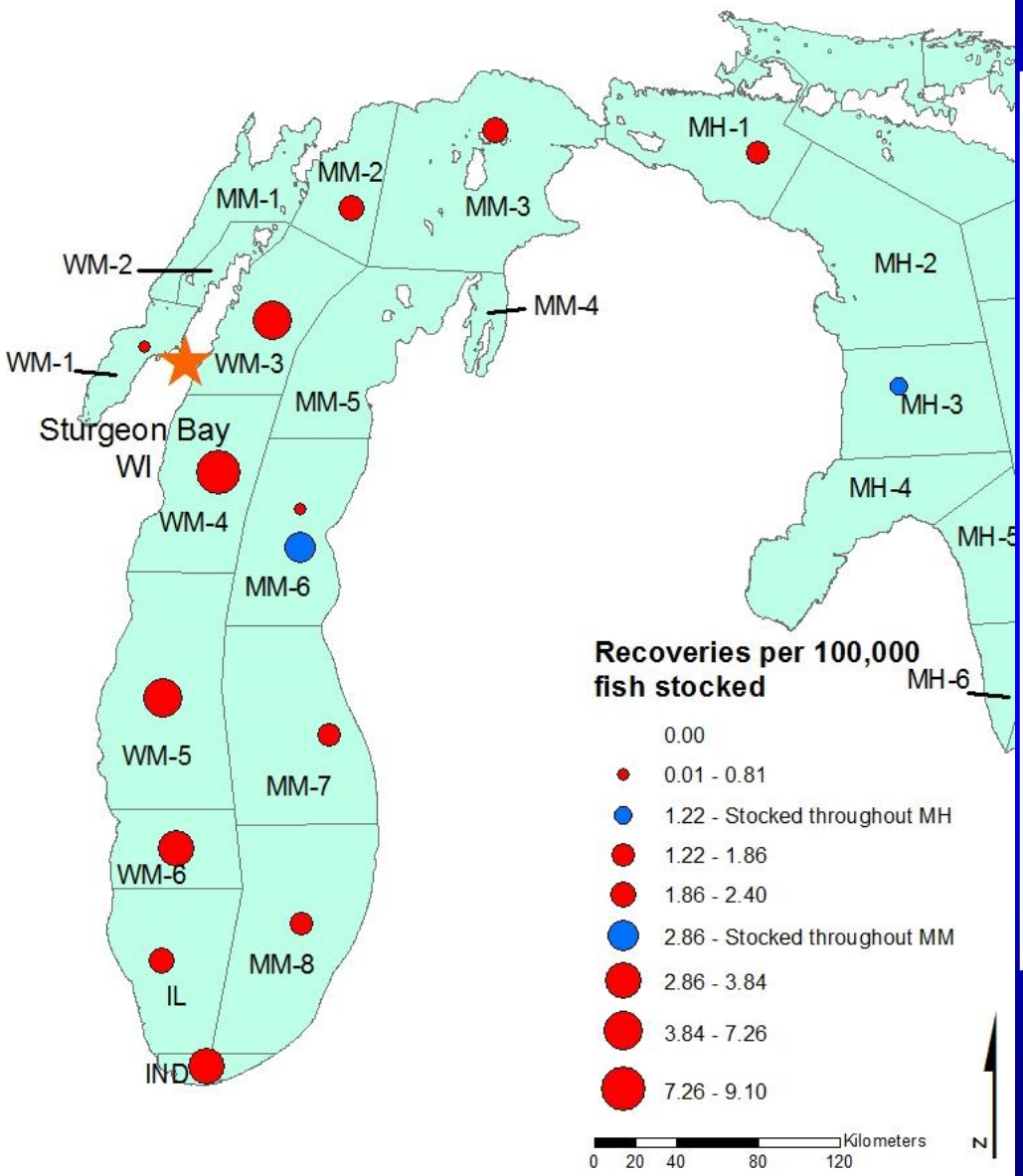
- Natural reproduced fish move out mid-summer and are unavailable to Wisconsin anglers

- Late summer fishing suffers because of reduced stocking

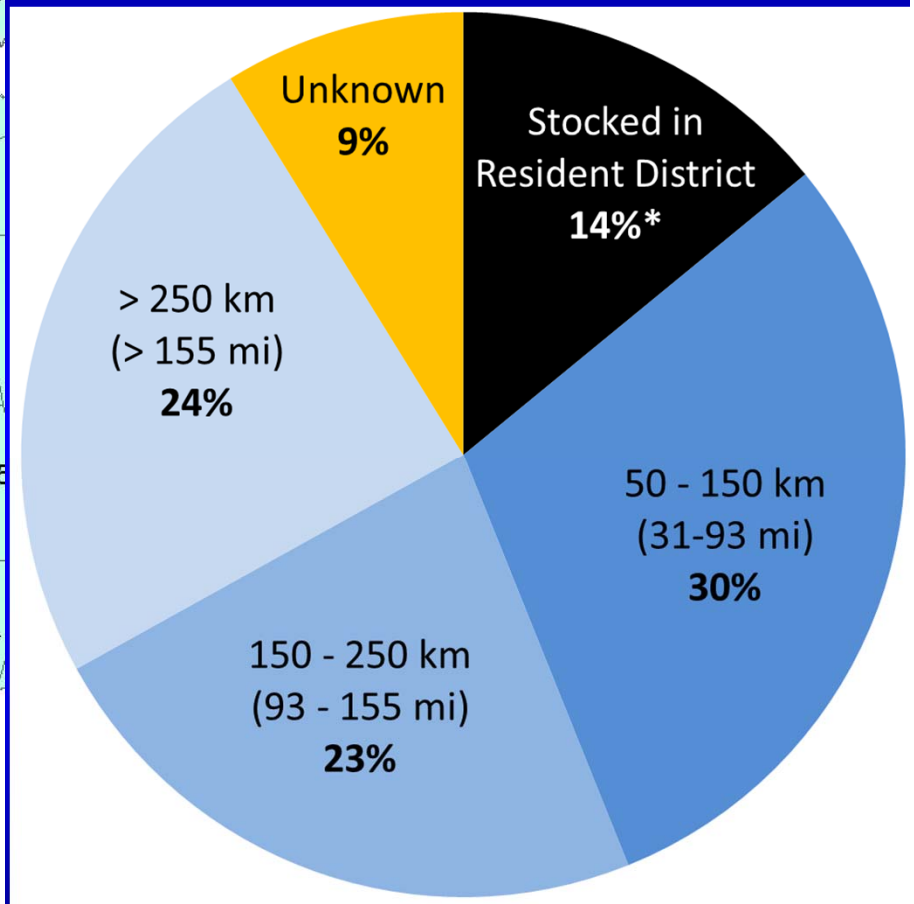
Overall Chinook Salmon Movement Patterns From Select Ports

Chinook Salmon Captured at Sturgeon Bay, WI

Origin of stocked Chinook Salmon captured during the open water fishery at Sturgeon Bay, WI (2012-2014)



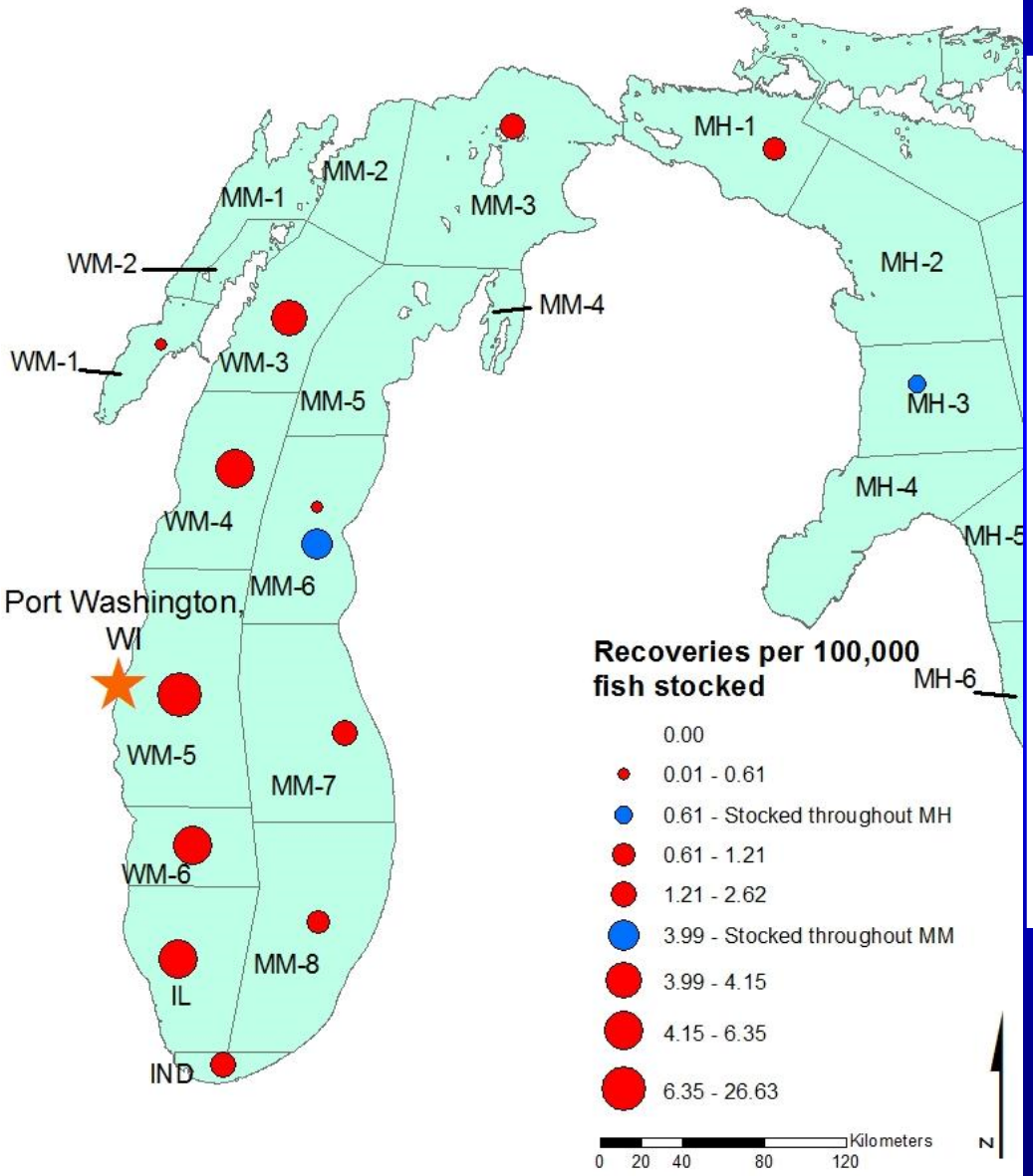
Distance from stocking district for open-water recovered Chinook salmon



* Both WM1 and WM3 are considered 'resident districts'. All other distances measured to WM3.

Chinook Salmon Captured at Port Washington, WI

Origin of stocked Chinook Salmon captured during the open water fishery at Port Washington, WI (2012-2014)



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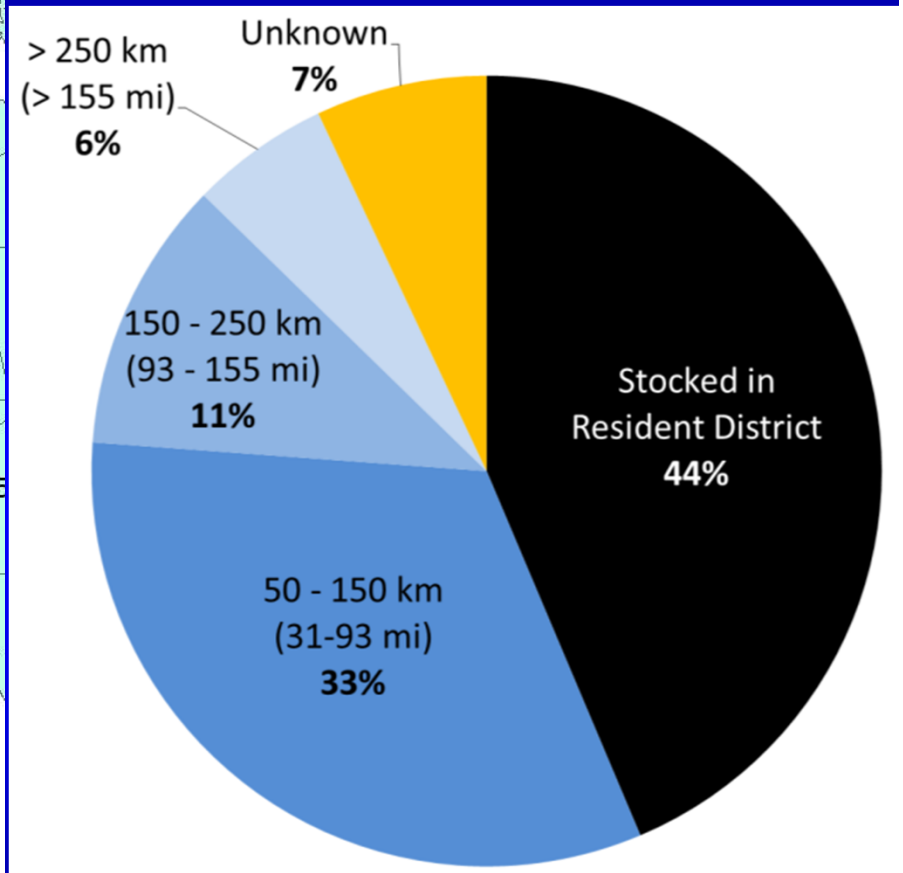
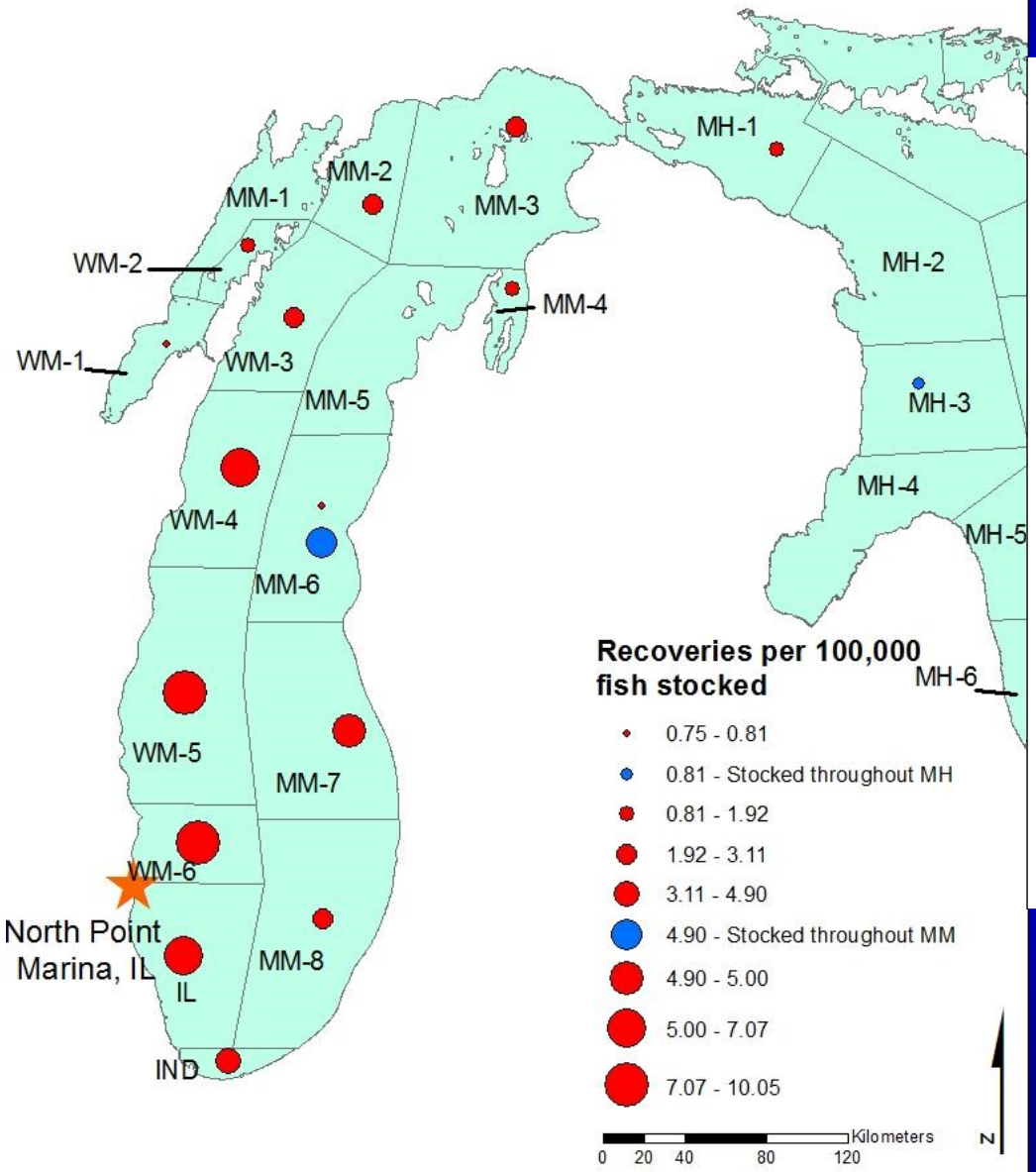
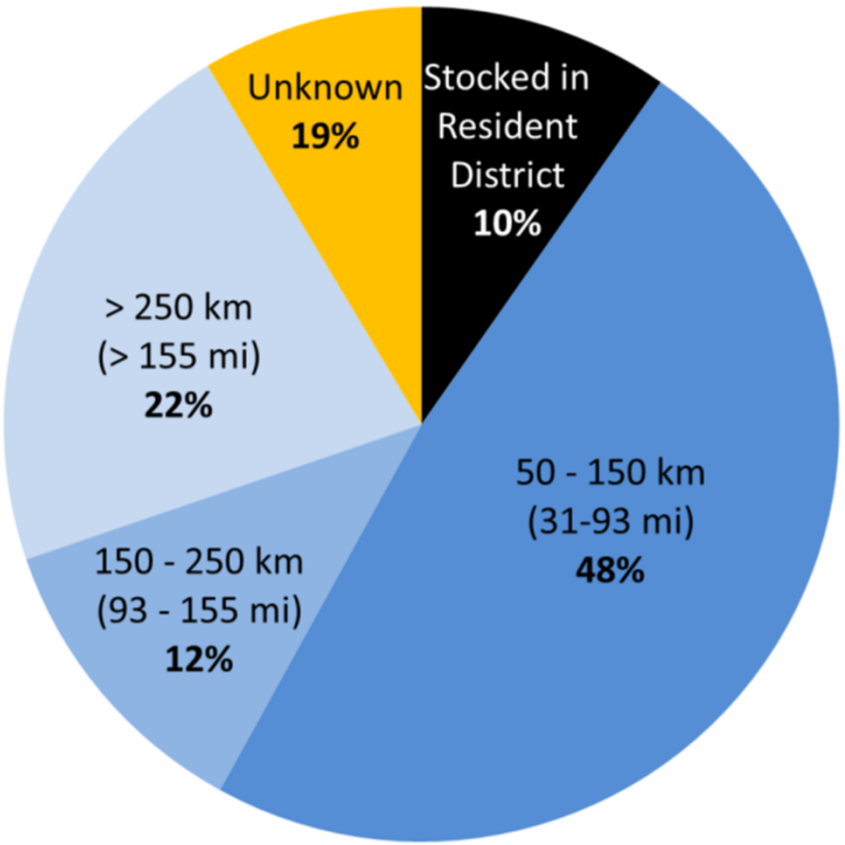


Chinook Salmon Captured at North Point Marina, IL

Origin of stocked Chinook Salmon captured during the open water fishery at North Point Marina, IL (2012-2014)

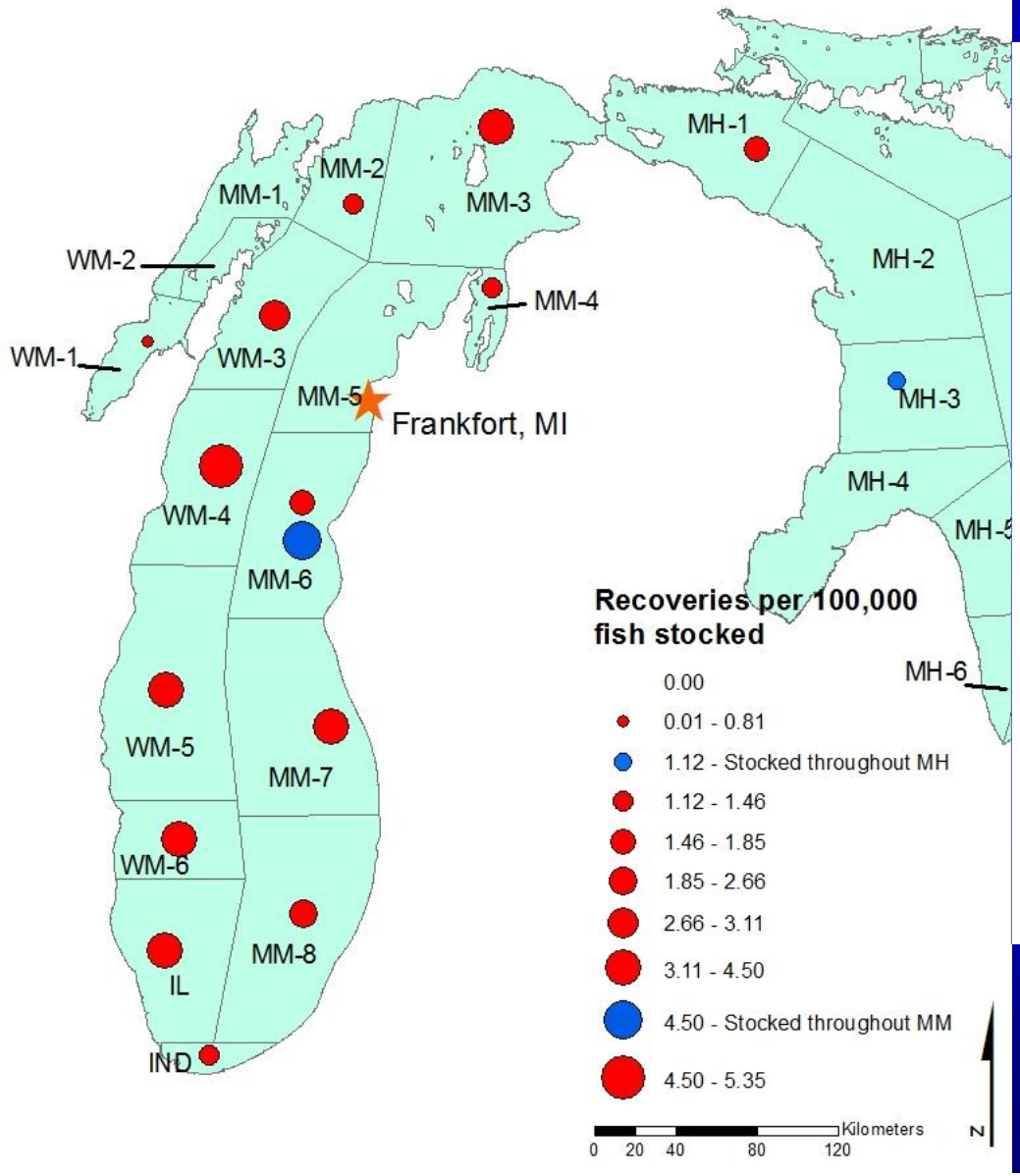


Distance from stocking district for open-water recovered Chinook salmon

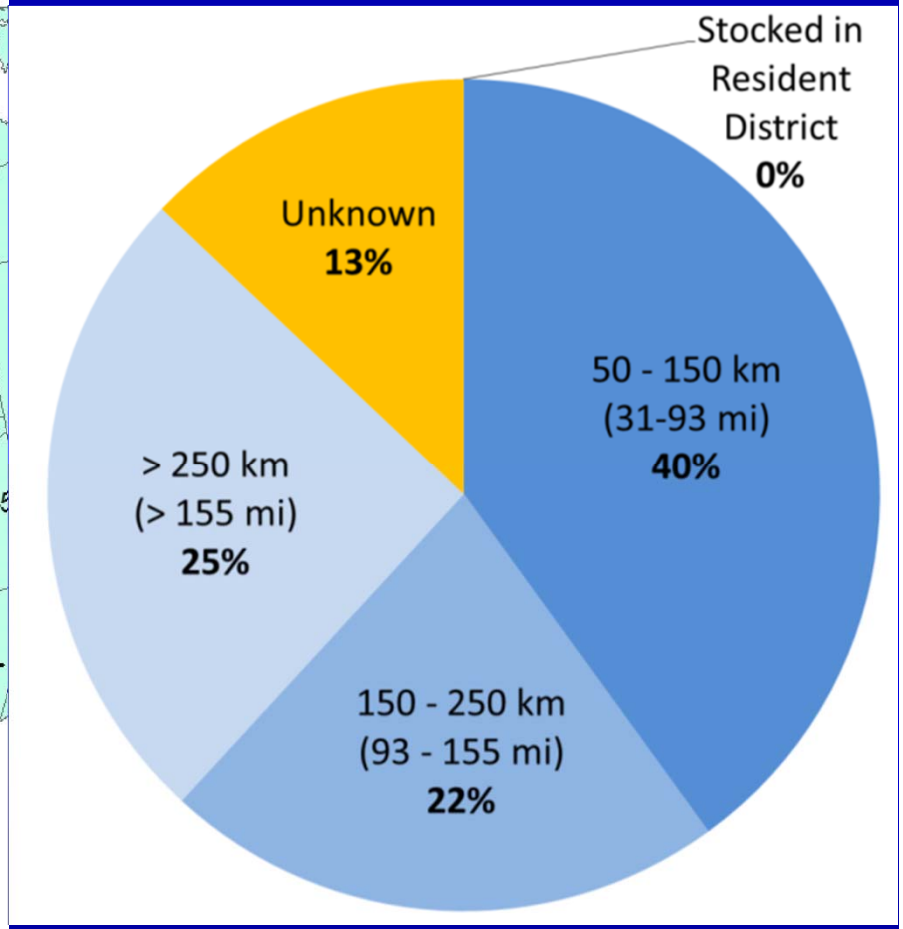


Chinook Salmon Captured at Frankfort, MI

Origin of stocked Chinook Salmon captured during the open water fishery at Frankfort, MI (2012-2014)

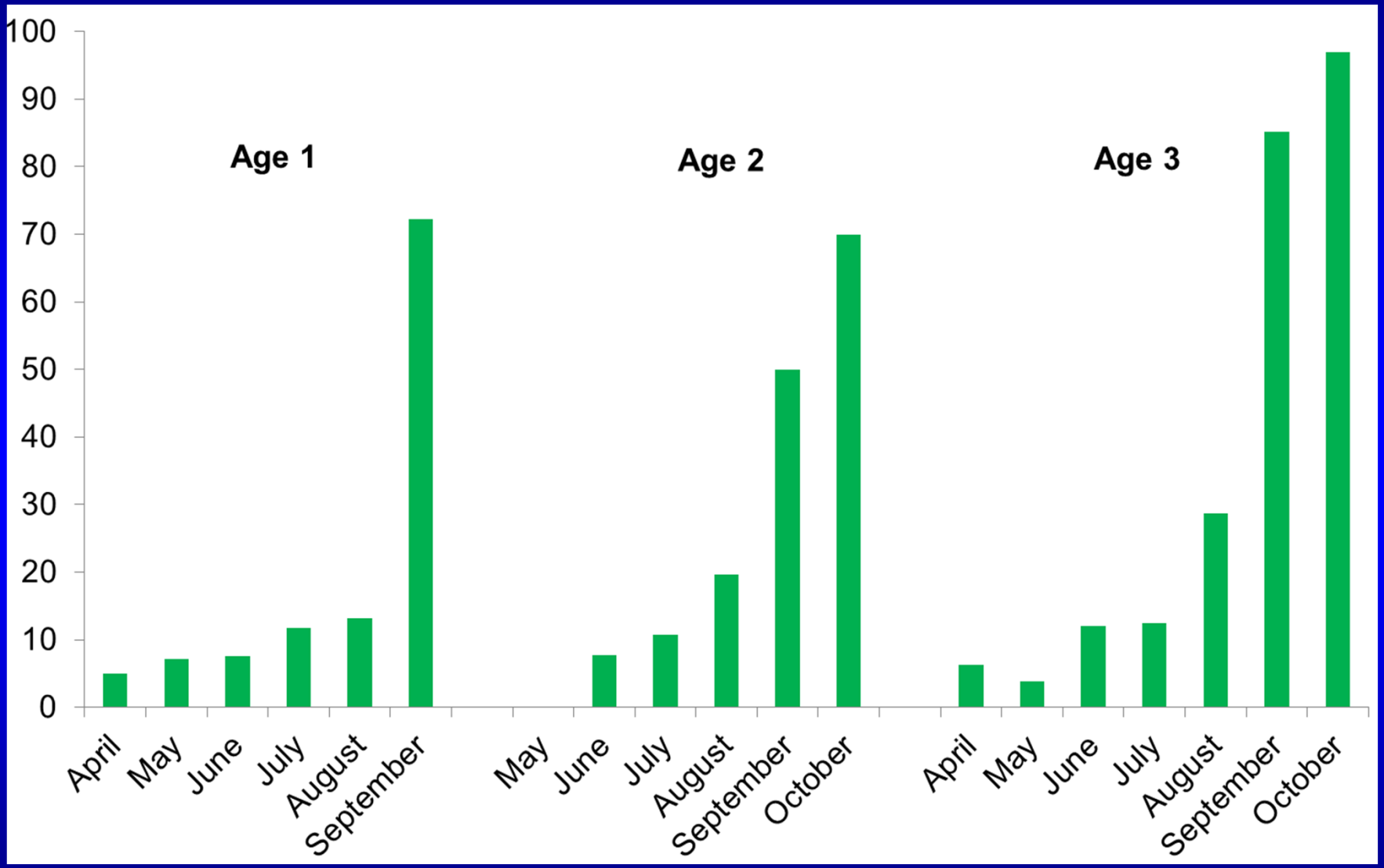


Distance from stocking district for open-water recovered Chinook salmon



Chinook Salmon Movement Patterns by Month (2011 Year Class Only)

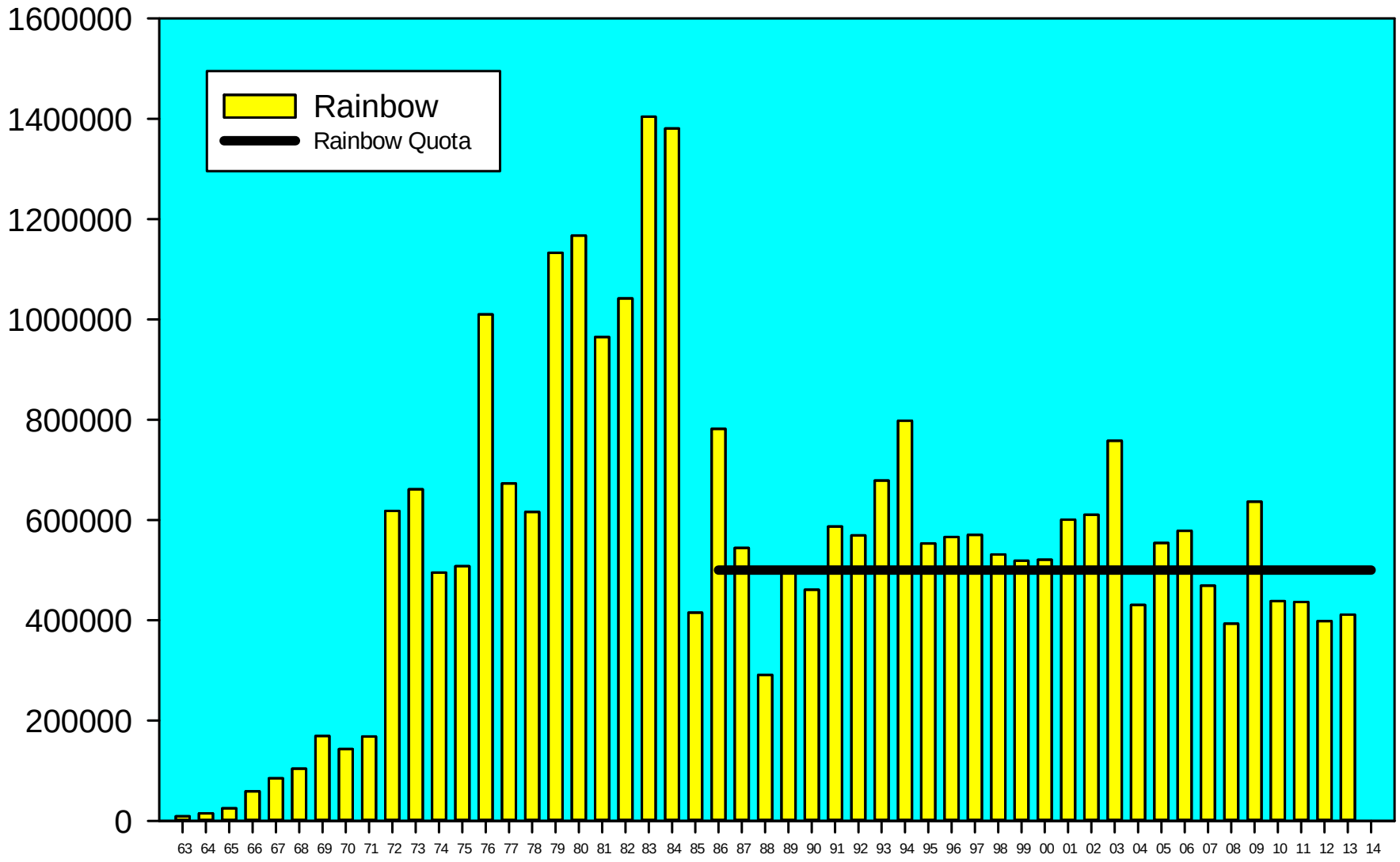
Percent of Chinook Salmon Recovered from Stocking District



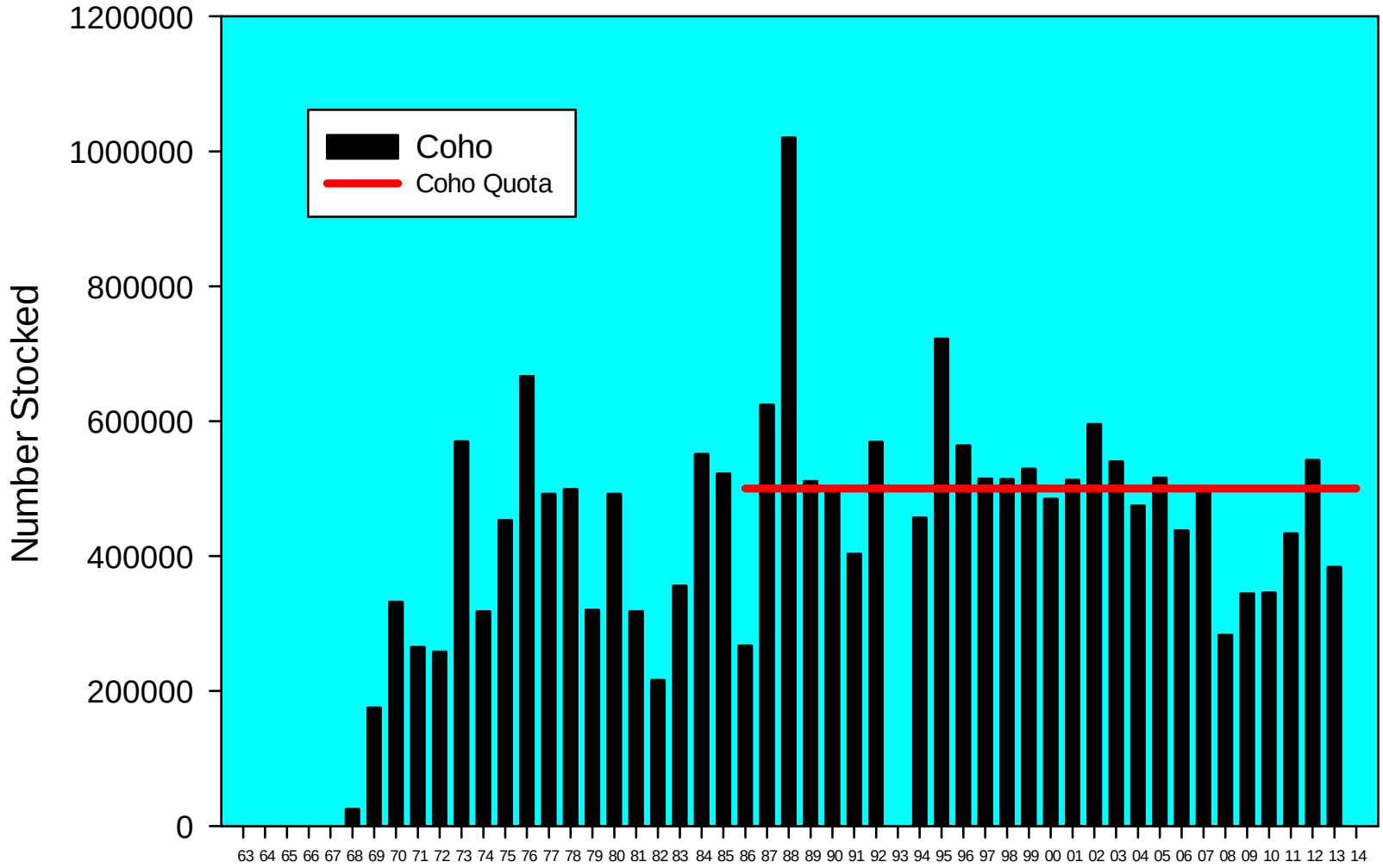
Rainbow and Coho Stocking: Comments and Questions Recieved

- What are the goals?
- Why are we not meeting the goals?
- What can be done?
- How about using private hatcheries?

Rainbow stocking quotas and number stocked 1969 - 2014



Coho Salmon stocking quotas and number stocked 1969 - 2014



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Private Sources

- Private brood stock is not available and it is not-legal for the state to allow private collection of gametes from Great Lakes trout & salmon – State Statute
- There is no additional funds to pay for fish from private sources
- Likely would not be much interest from private sector due to limited profitability

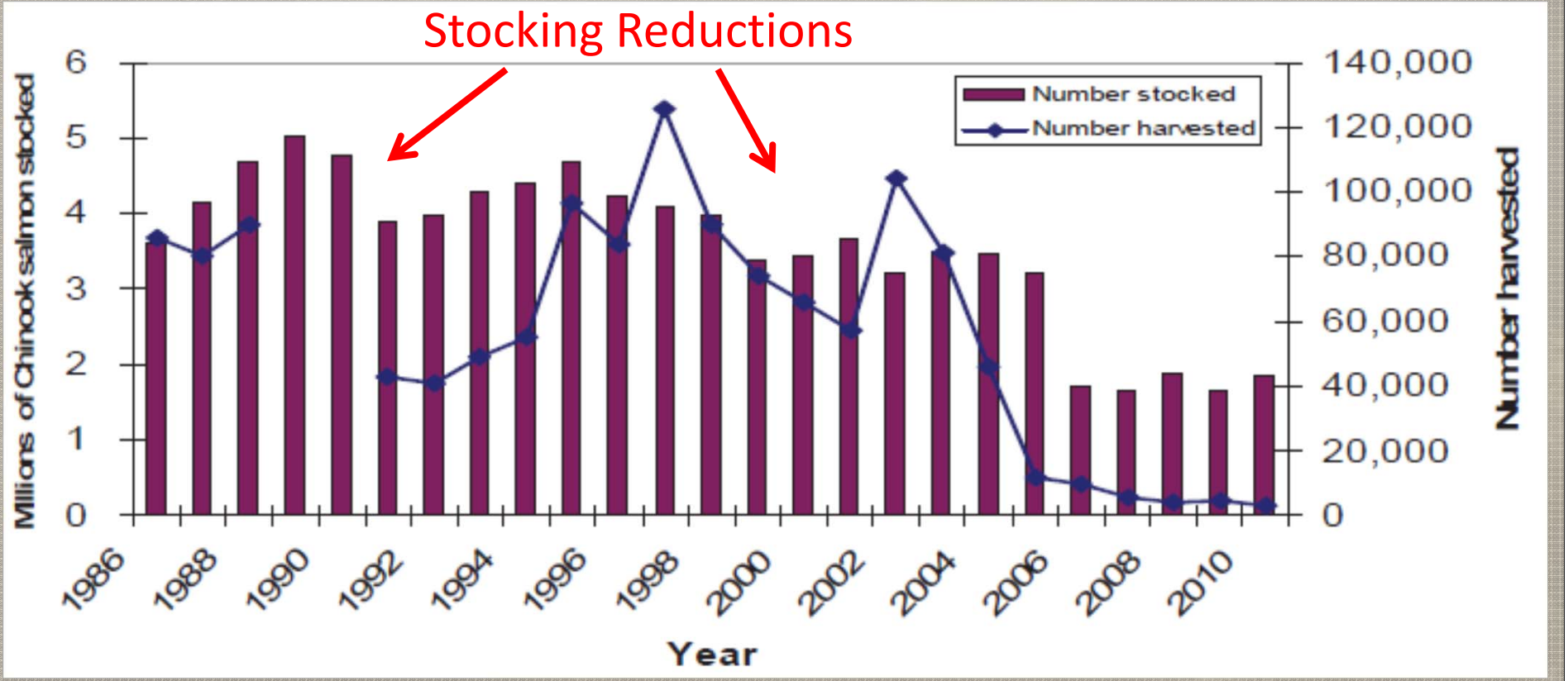
Kettle Moraine Springs Fish Hatchery

- 2014 – 2015 – 14 million from legislature
- 2016 – 2017 – 14 million from legislature (in budget)
- USGS well tests commencing in May, pumping in June
- New hatchery will be partial reuse hatchery
- New hatchery will likely raise the following
  - All steelhead – 500,0000
  - Coho salmon – around 200,000 to 500,000
  - Chinook salmon – maybe?
  - Quarantine facility – brood stock building for Skamania

Lake Huron: Comments and Questions Received

- What are the impacts to Lake Michigan from Lake Huron's collapse?
- Other related questions

Lake Huron



Number Stocked

Number Harvested

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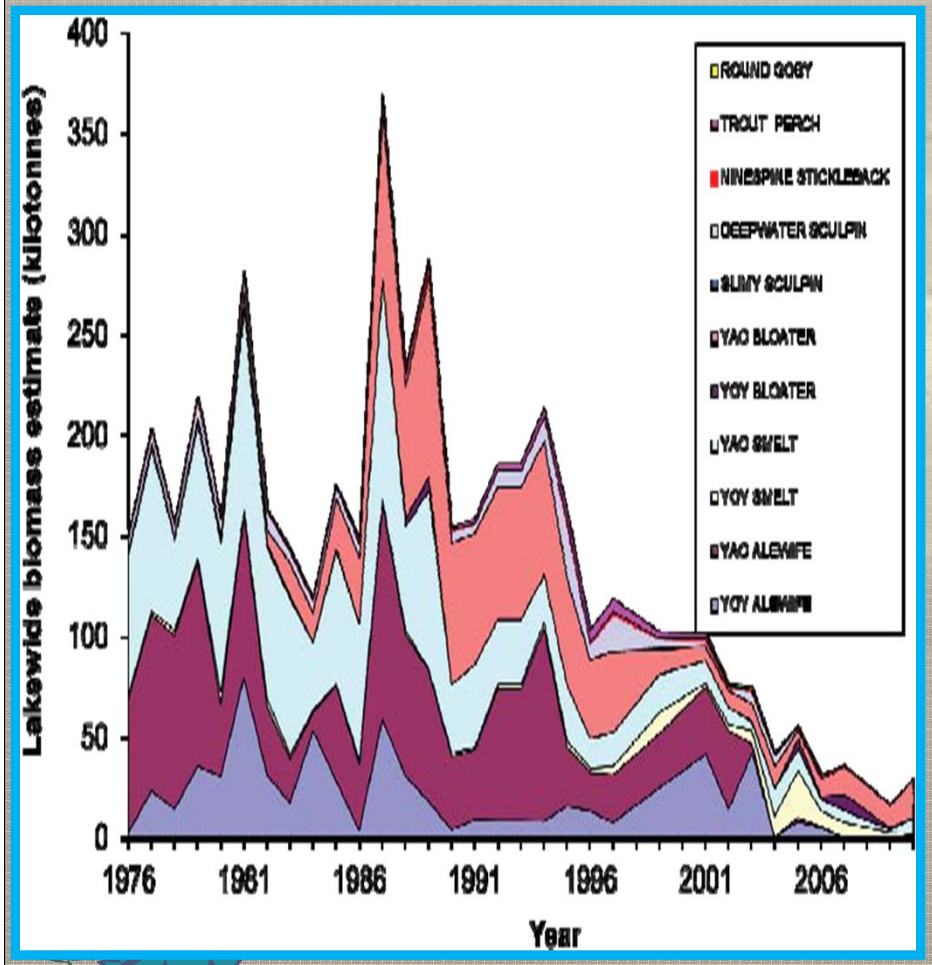
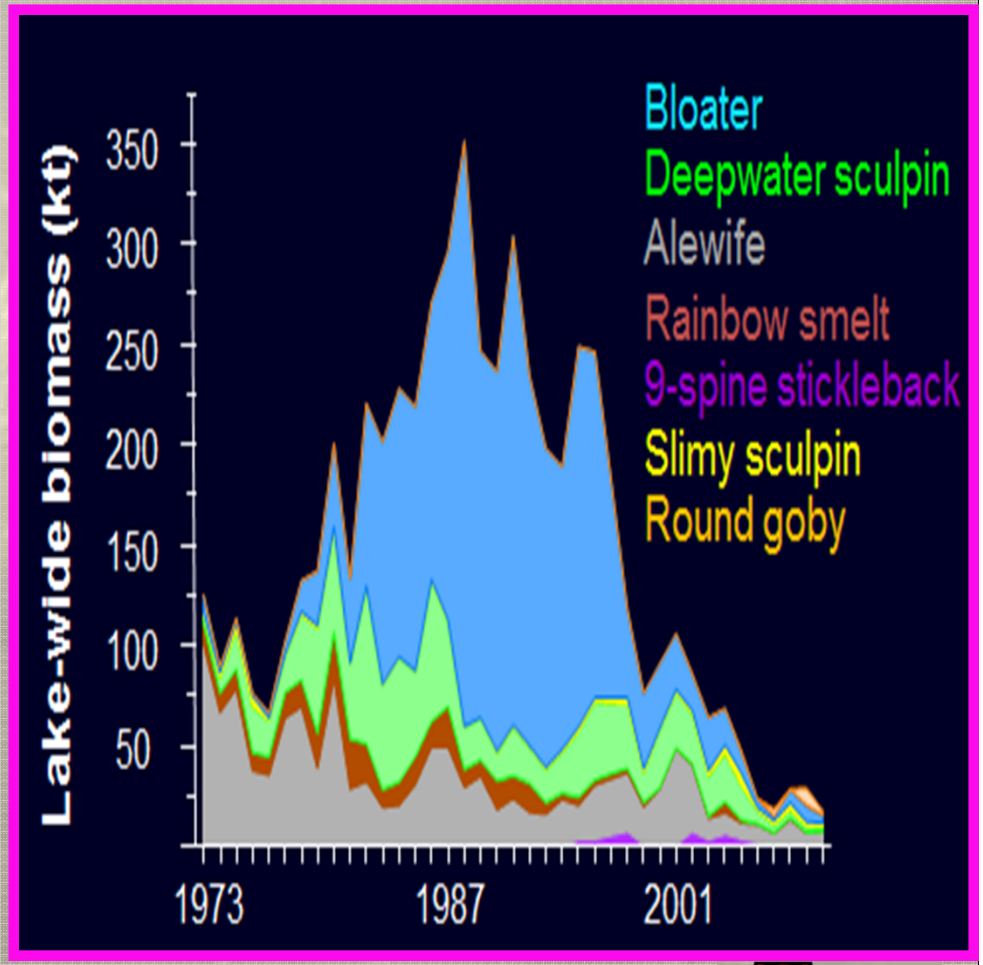
Is what happened in Lake Huron going to happen in Lake Michigan (or is it happening already)?





Lake Huron vs. Lake Michigan

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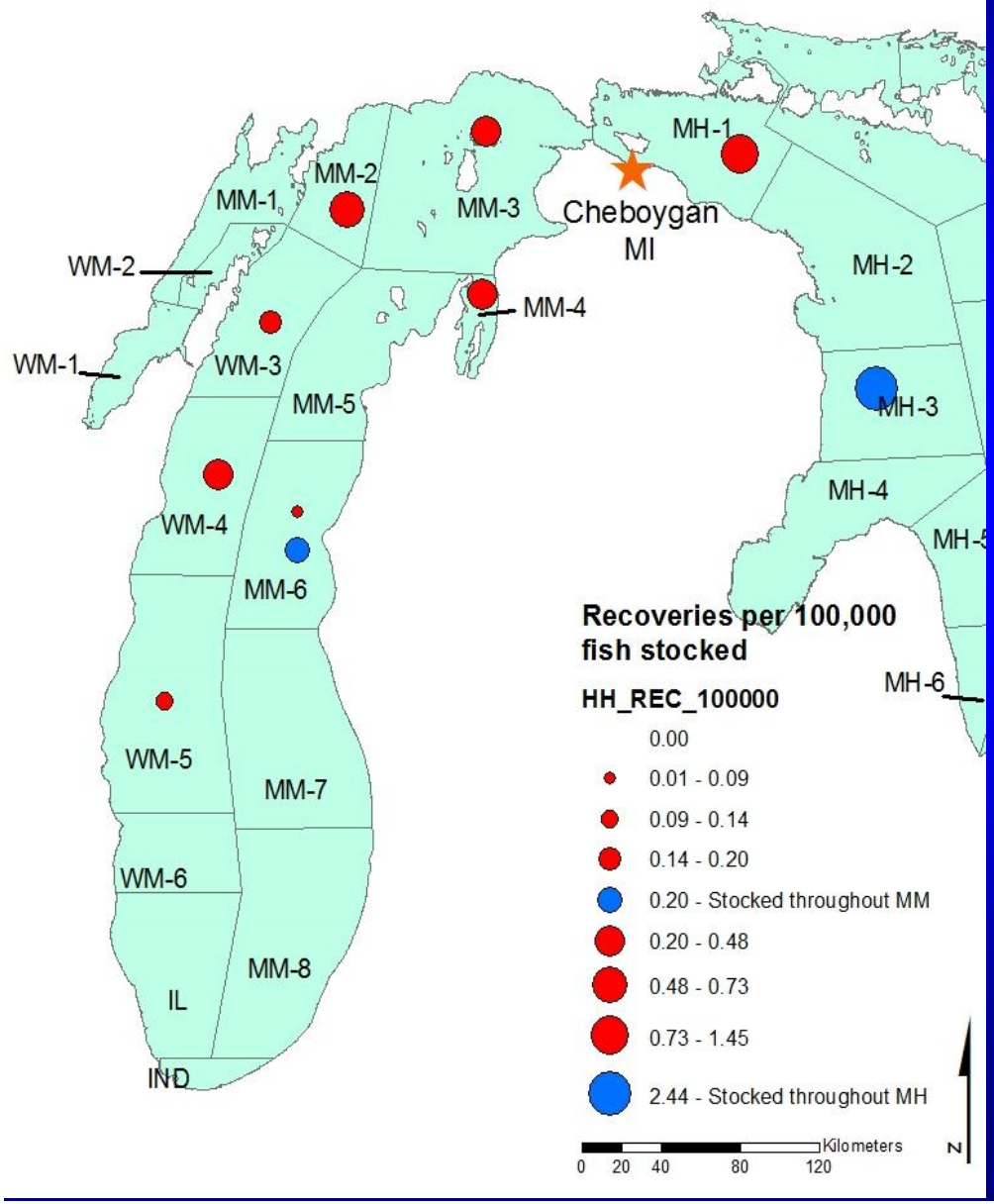
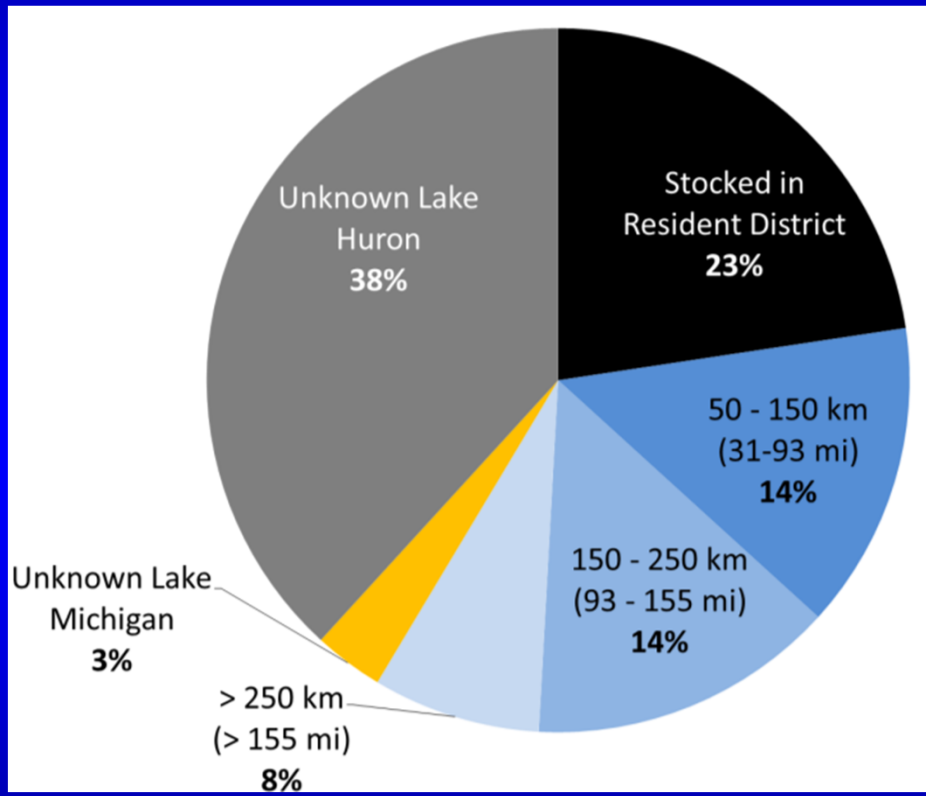
Chinook Salmon Captured at Cheboygan, MI

Origin of stocked Chinook Salmon captured during the open water fishery at Cheboygan, MI (2012-2014)

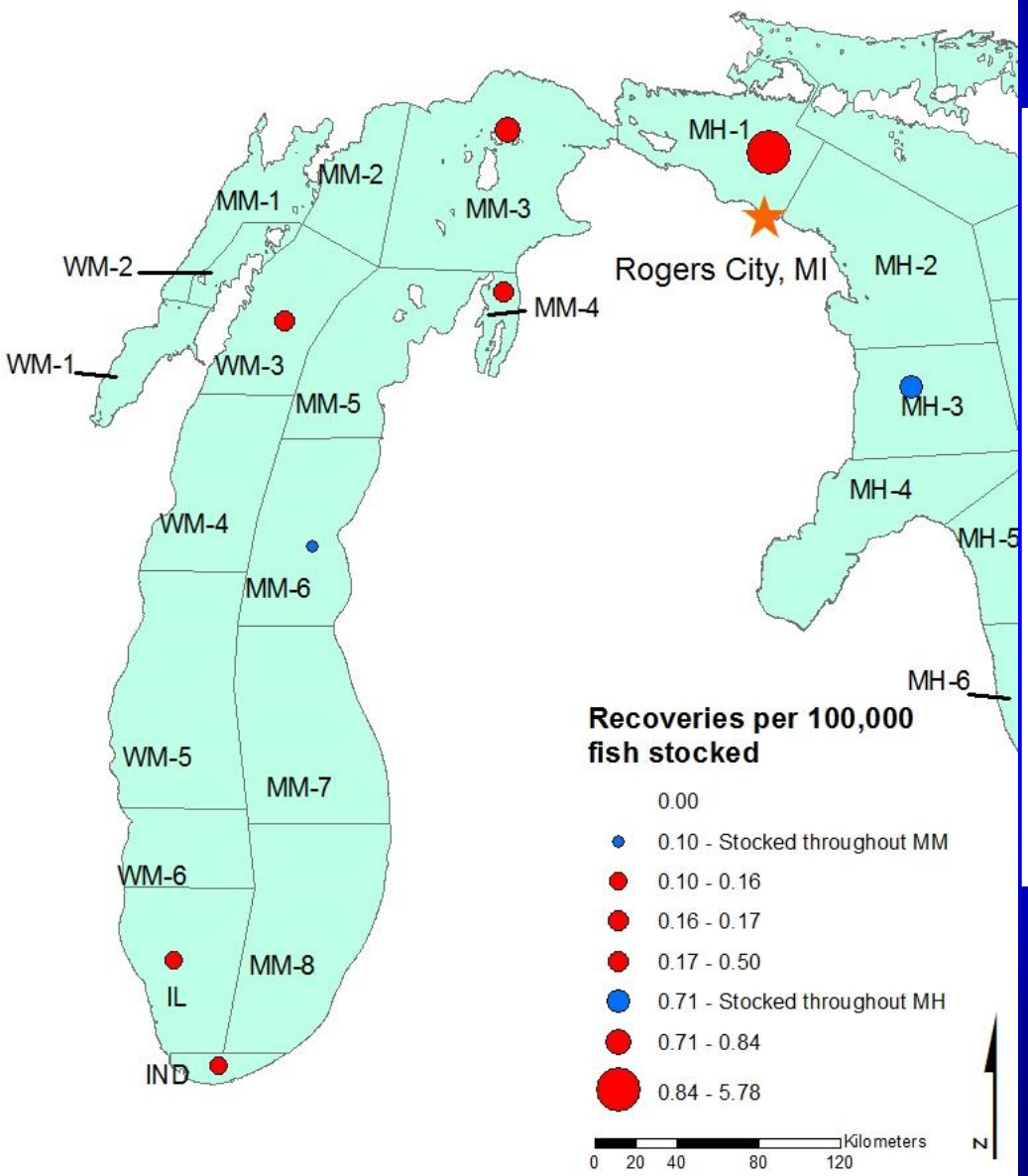


Distance from stocking district for open-water recovered Chinook salmon

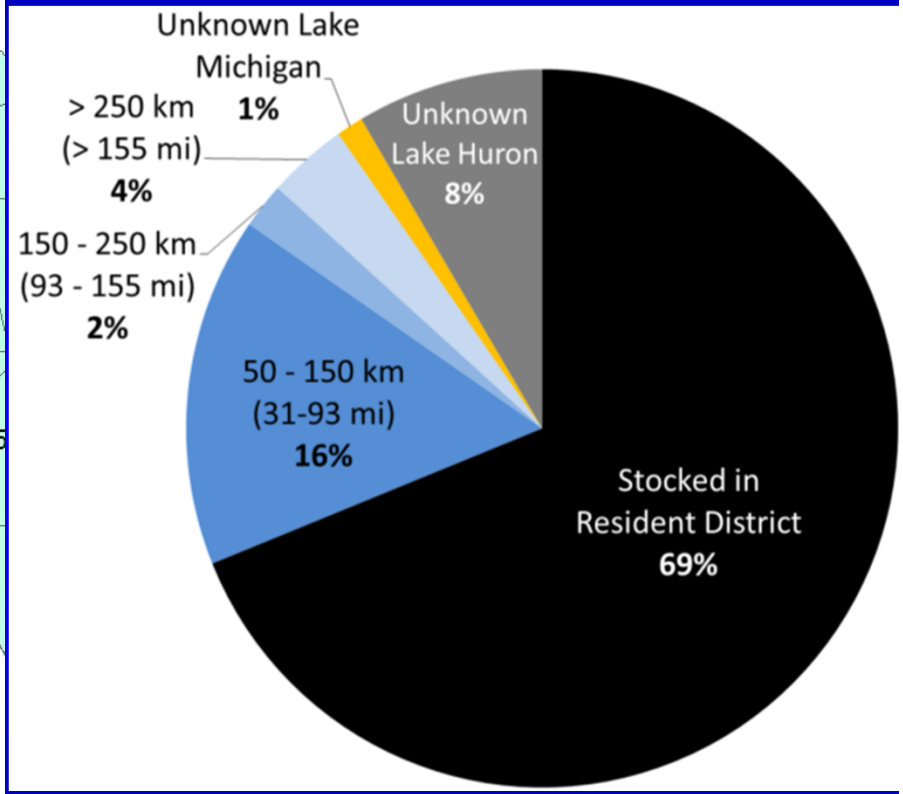


Chinook Salmon Captured at Rogers City, MI

Origin of stocked Chinook Salmon captured during the open water fishery at Rogers City, MI (2012-2014)

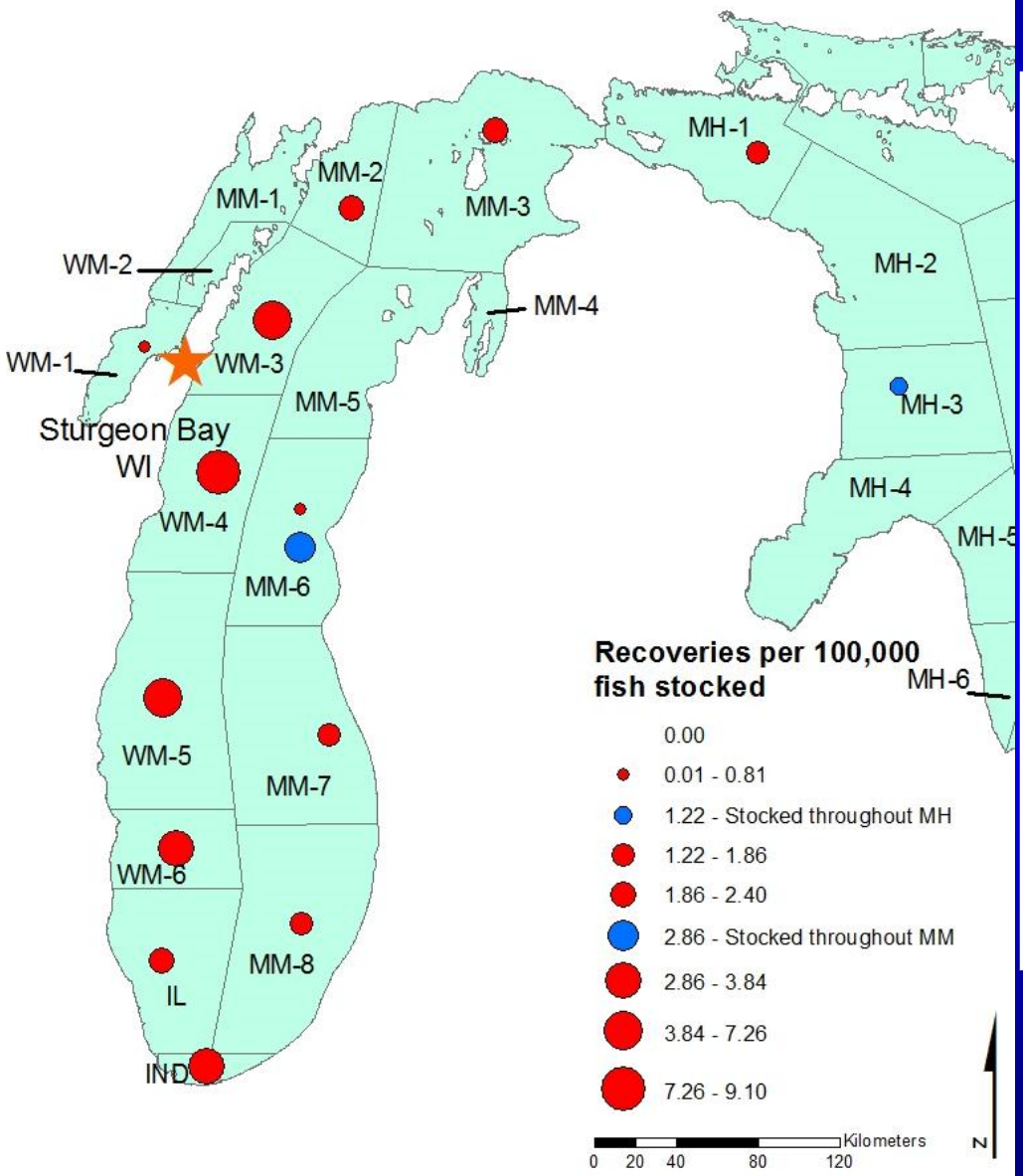


Distance from stocking district for open-water recovered Chinook salmon

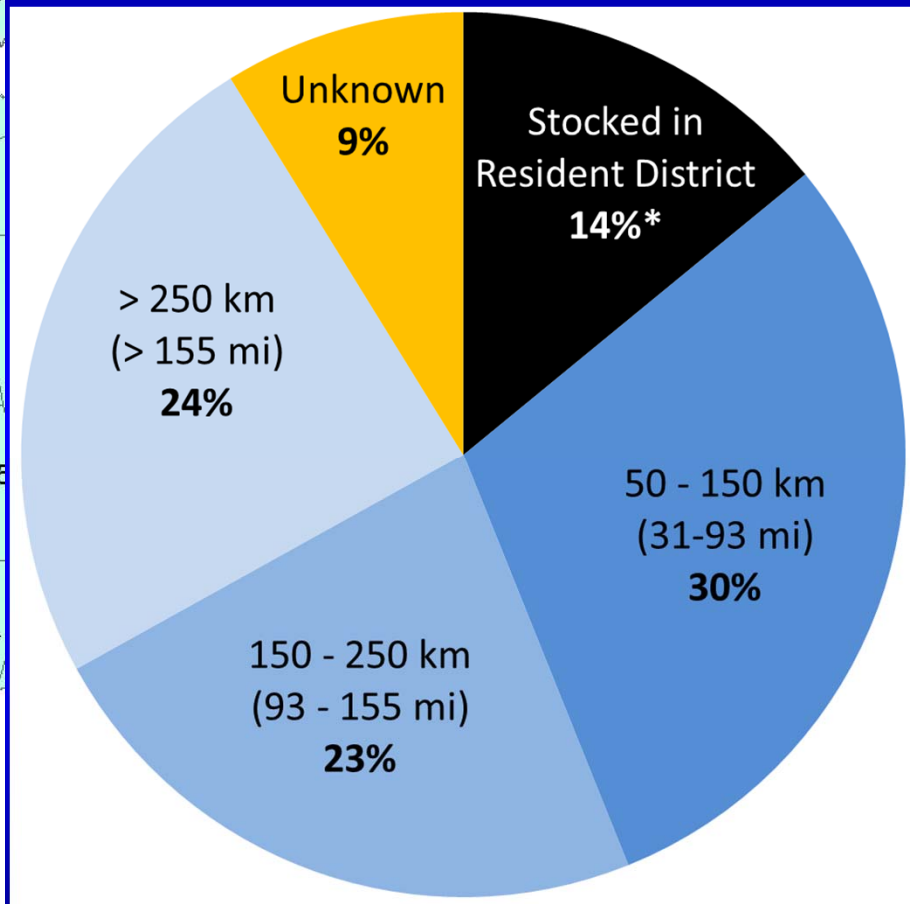


Chinook Salmon Captured at Sturgeon Bay, WI

Origin of stocked Chinook Salmon captured during the open water fishery at Sturgeon Bay, WI (2012-2014)



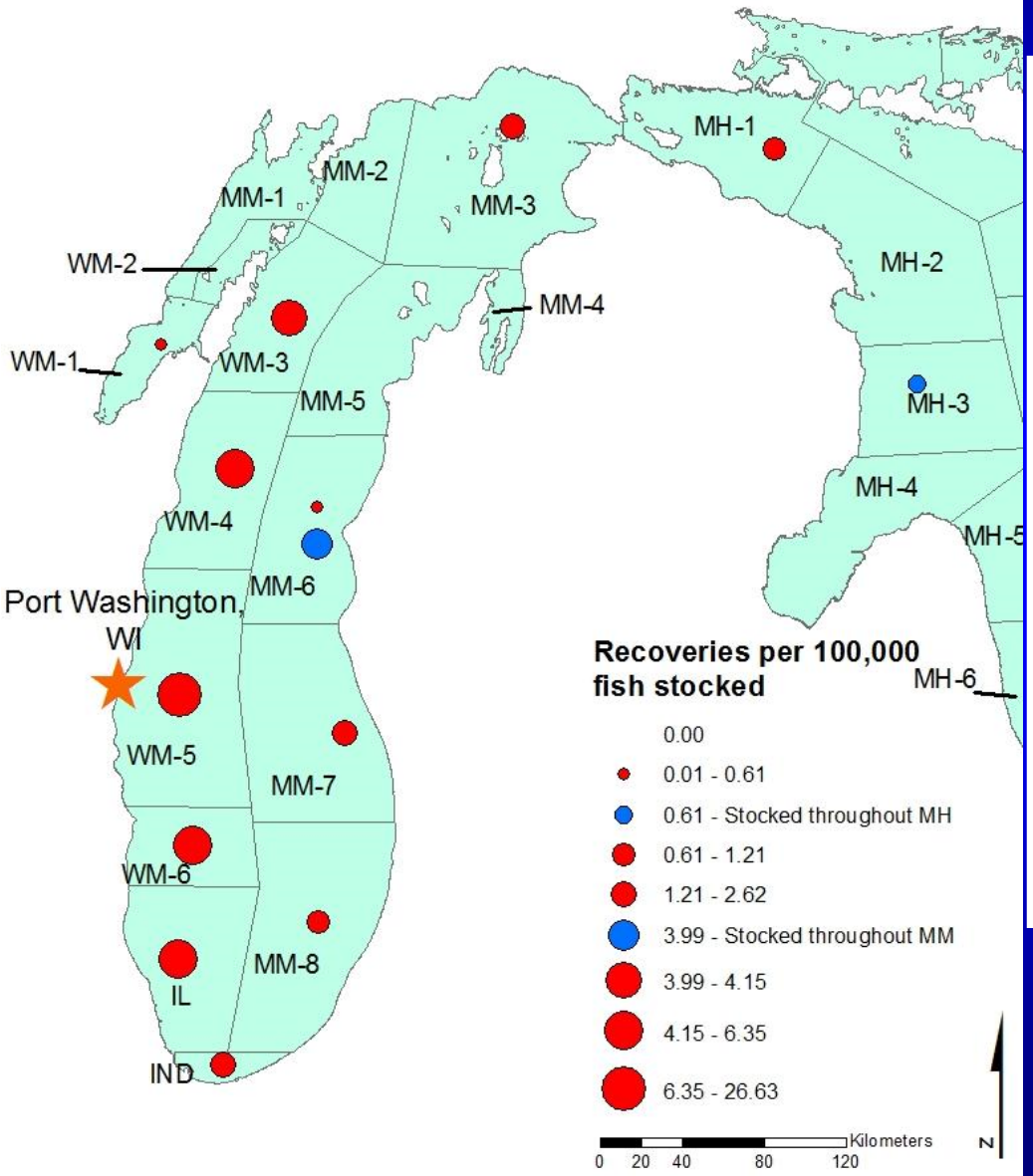
Distance from stocking district for open-water recovered Chinook salmon



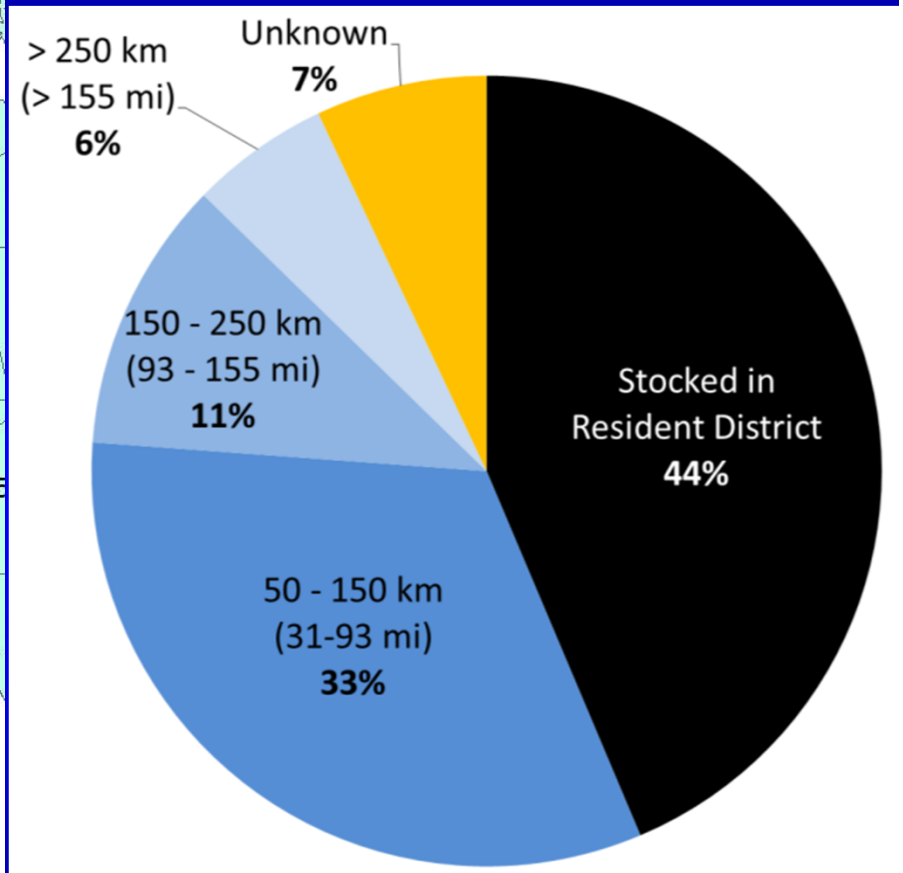
* Both WM1 and WM3 are considered 'resident districts'. All other distances measured to WM3.

Chinook Salmon Captured at Port Washington, WI

Origin of stocked Chinook Salmon captured during the open water fishery at Port Washington, WI (2012-2014)



Distance from stocking district for open-water recovered Chinook salmon



Lake Michigan Charter Boat reporting

Electronic system

Lake Michigan
Charter Boat reporting

- Issue brief was presented to the Fisheries Management Board
- Work with Charter Captains to develop a system
- Integrate into existing Commercial system
- Basics for system must include
  - Electronic system – smartphone, internet
  - Eliminate data entry by DNR staff
  - Must be trip based
  - Data entry prior to docking
- Benefits include real-time data and accessibility by Charter captains

Harbor/Tributary Fishing: Comments and Questions Received

- Why aren't chinook returning to harbors?
- Why are tributaries runs less?
- Have stocking practices changes?

Lake Michigan Sport Fishing Surveys

Harbor and Stream RESULTS

FISHERIES MANAGEMENT..... we make fishing better

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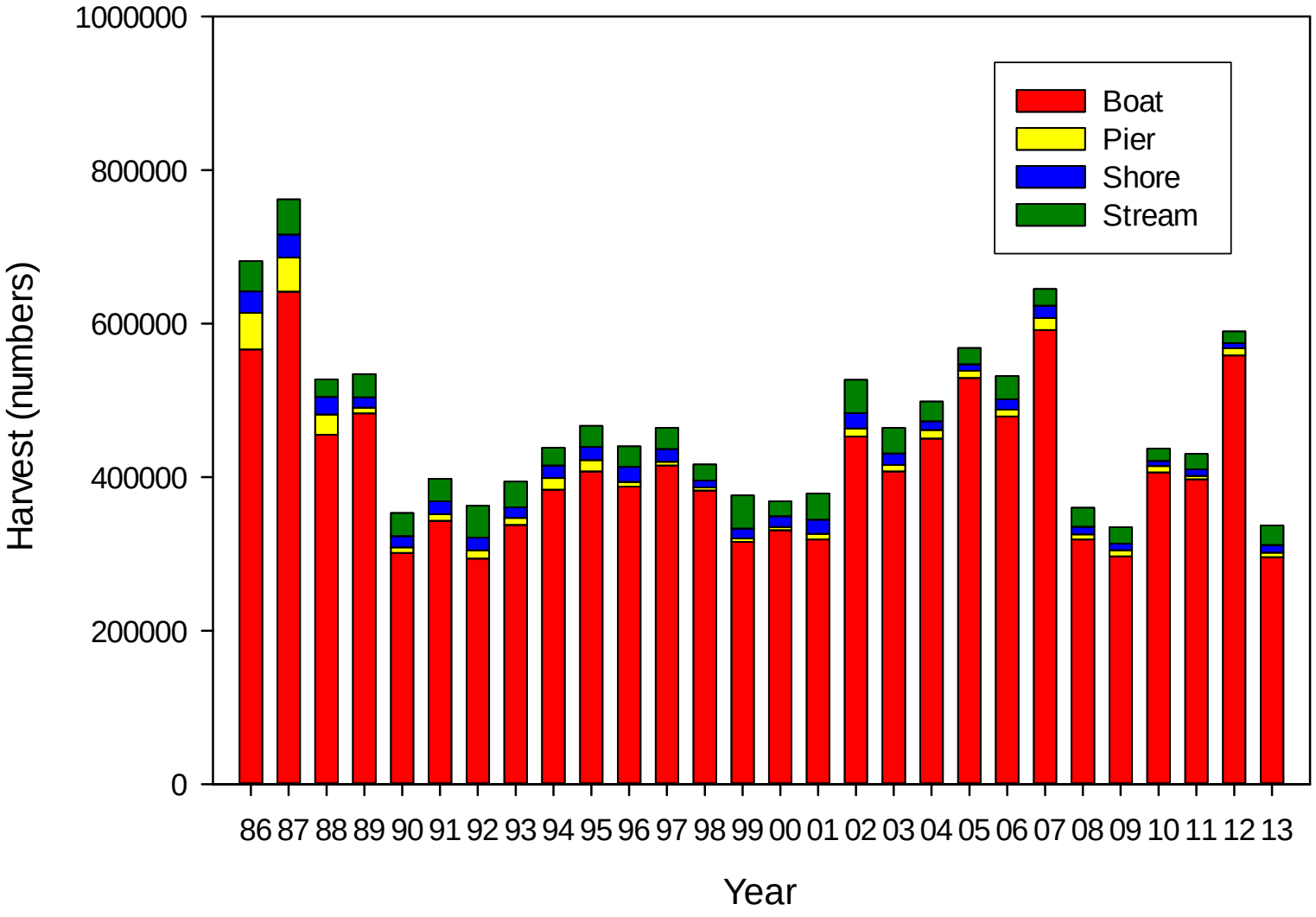
Stocking Practices

- Stocking protocols have not changed much over the past 15 to 20 years
- We attempt to stock Chinook, coho and rainbows in streams where possible
- Brown trout usually get stocked in lower river areas and harbors
- Stocking locations and numbers have remained relatively constant the past 10 years

Lake Michigan salmon and trout harvest by year and fishery type, 1986 - 2013



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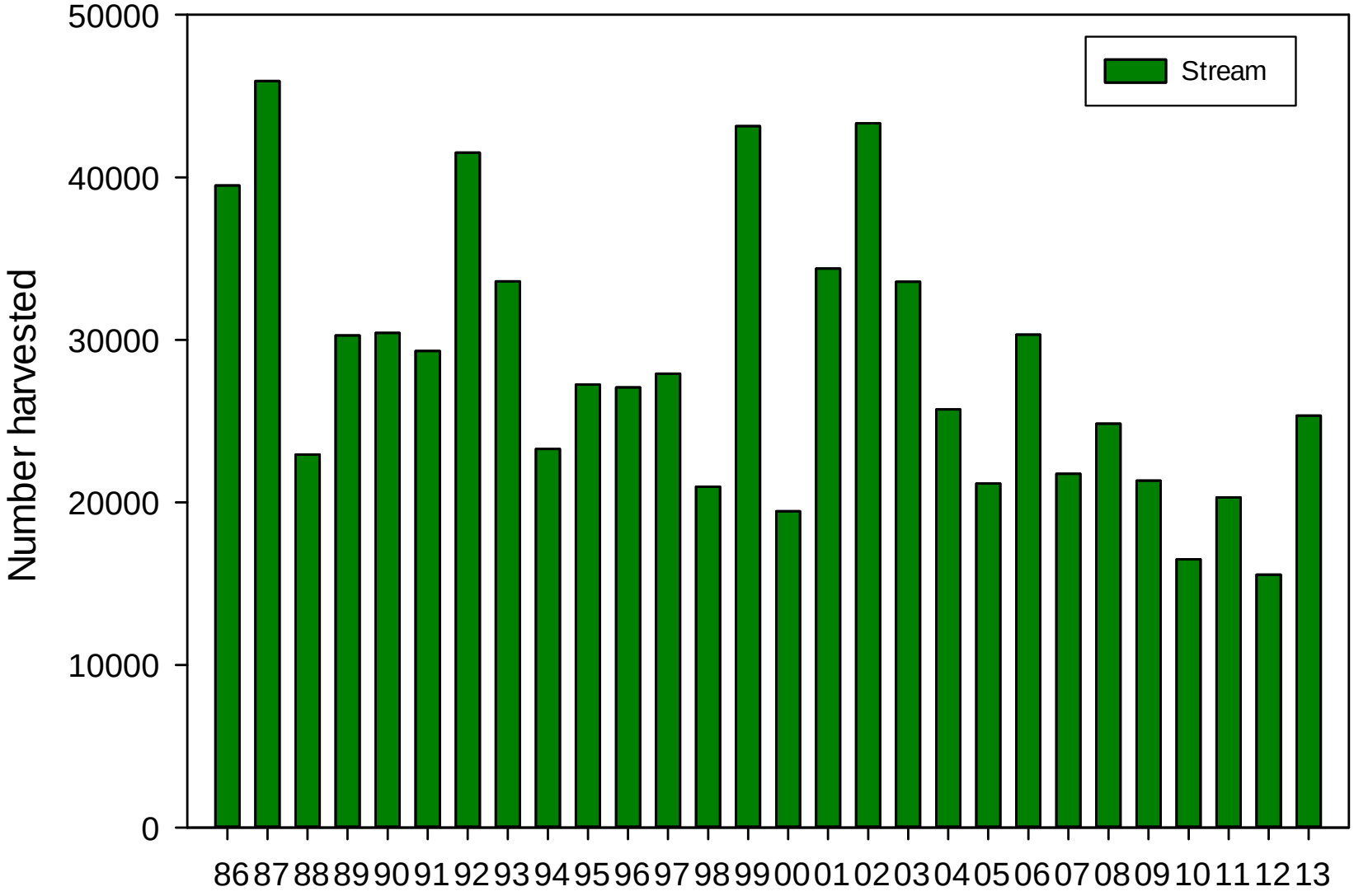
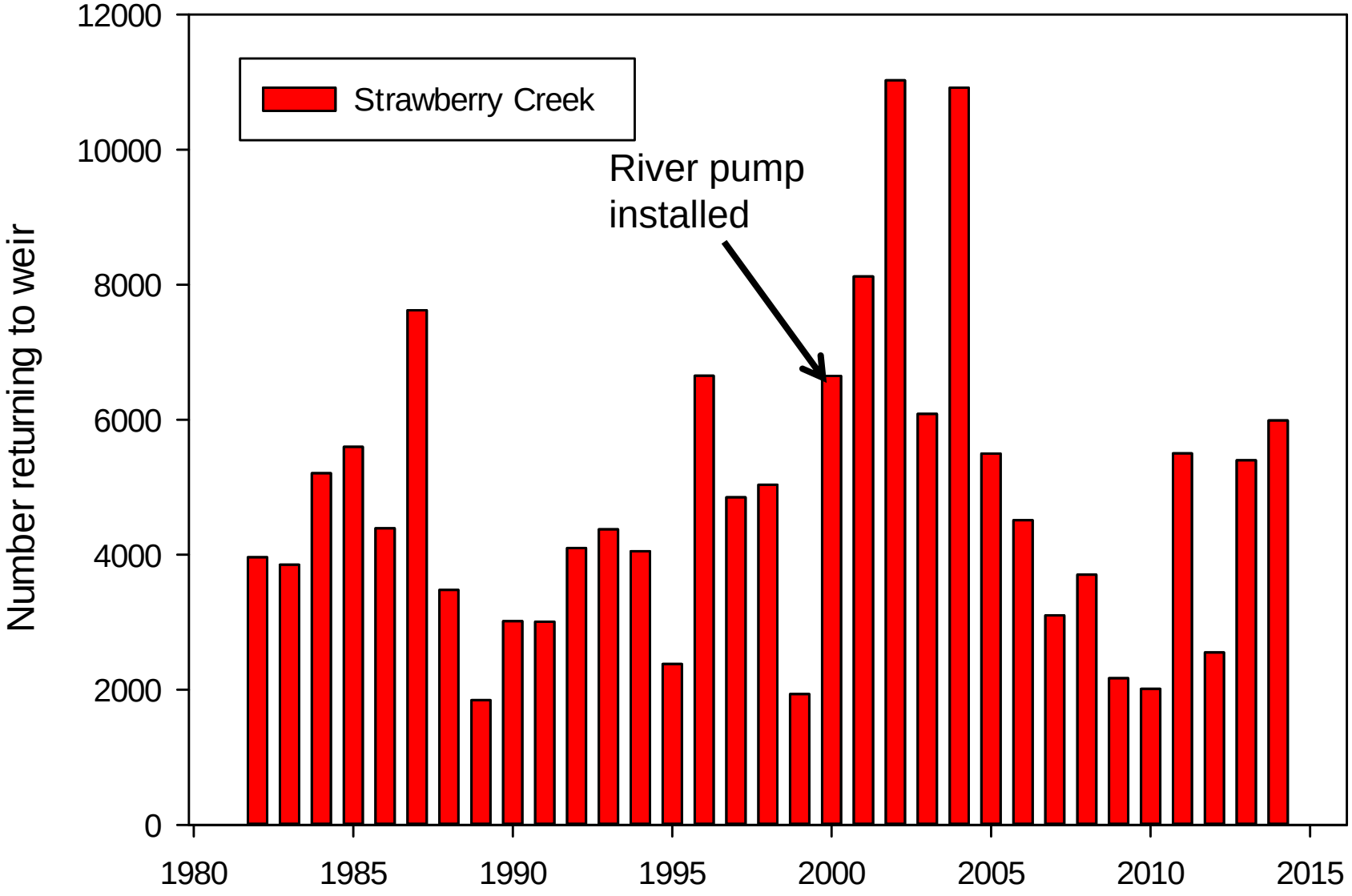
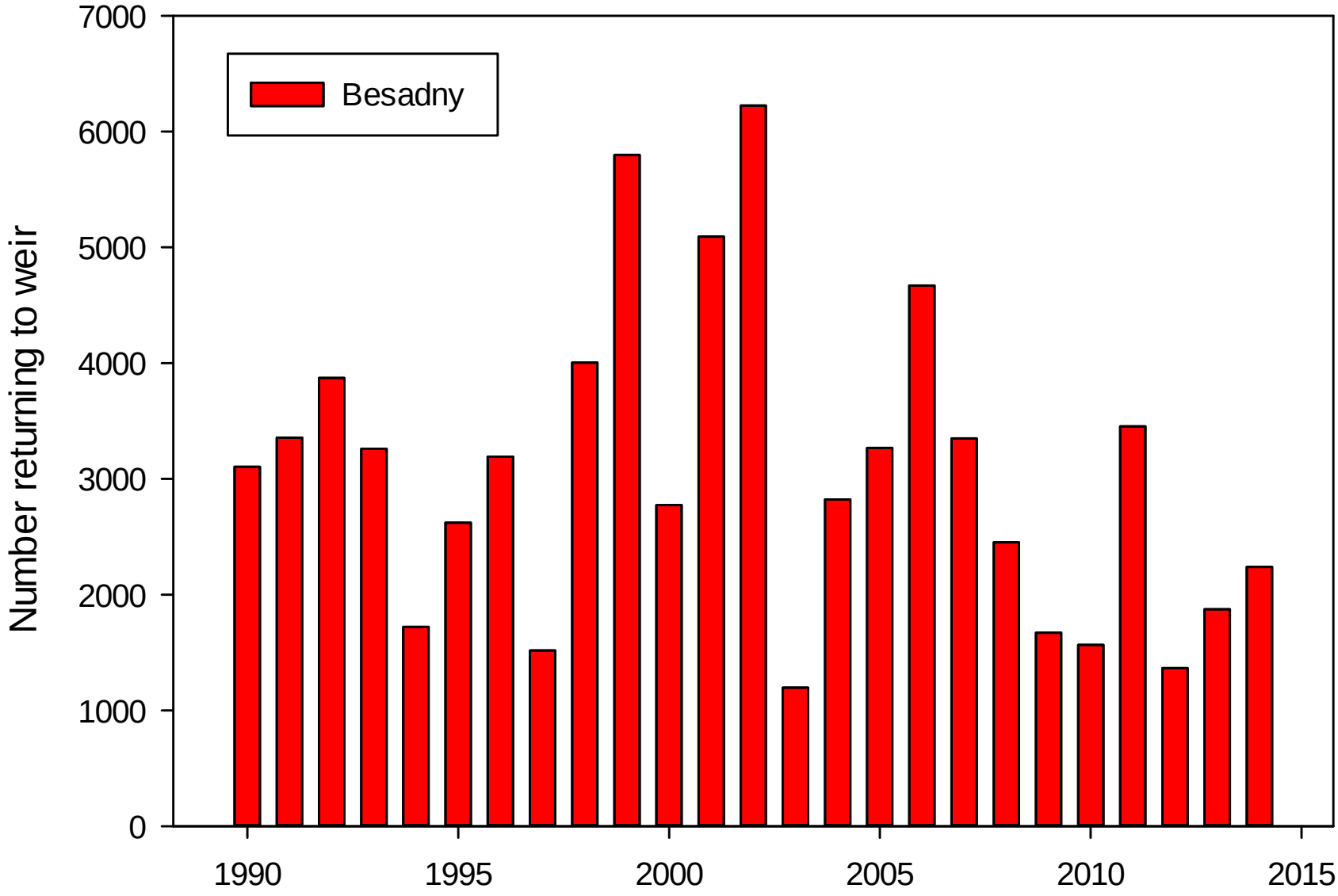
Lake Michigan salmon and trout harvest by year for Stream only, 1986 - 2013



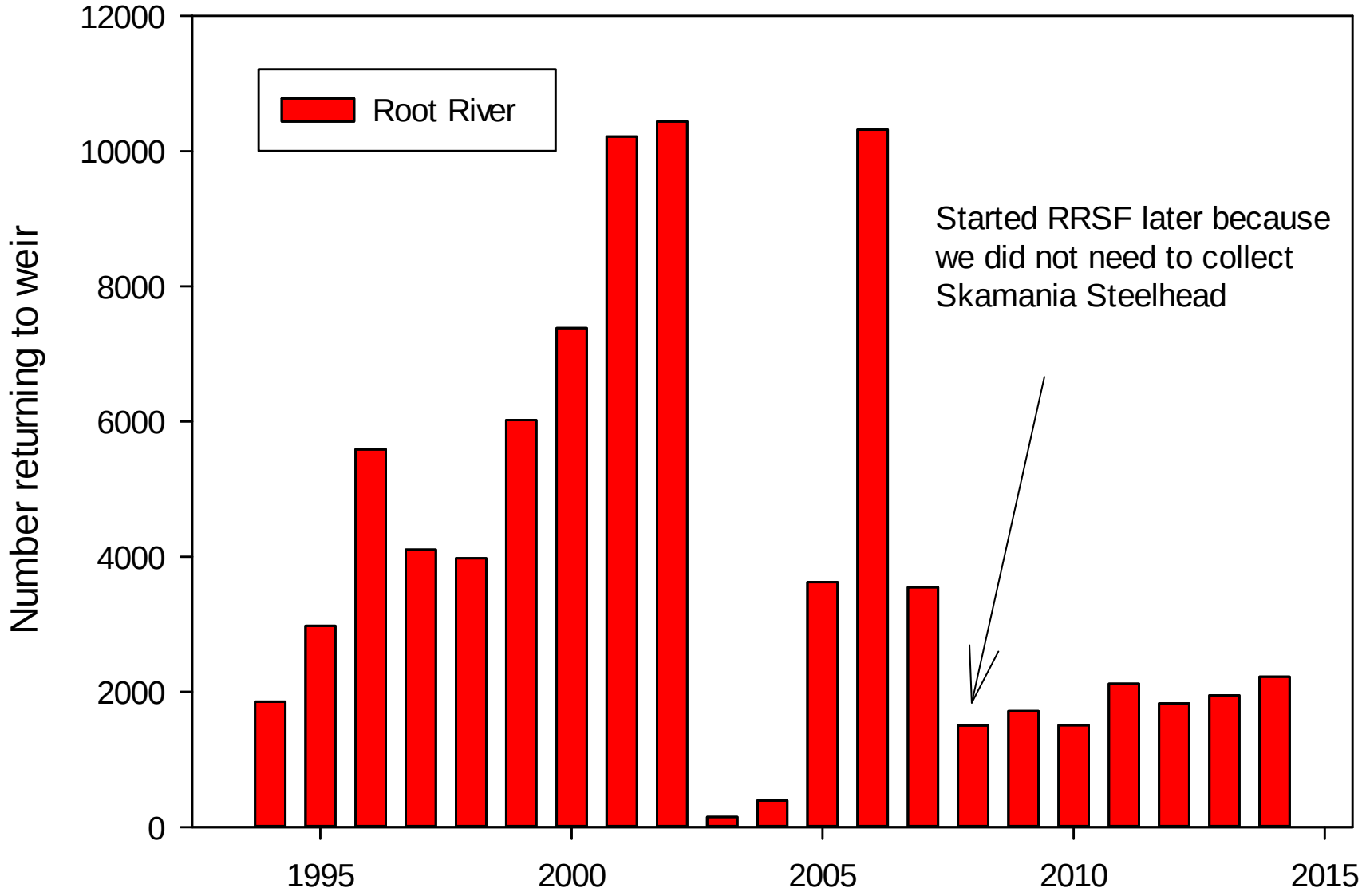
Chinook Salmon returning to Strawberry Creek Weir



Chinook Salmon returning to Kewaunee River



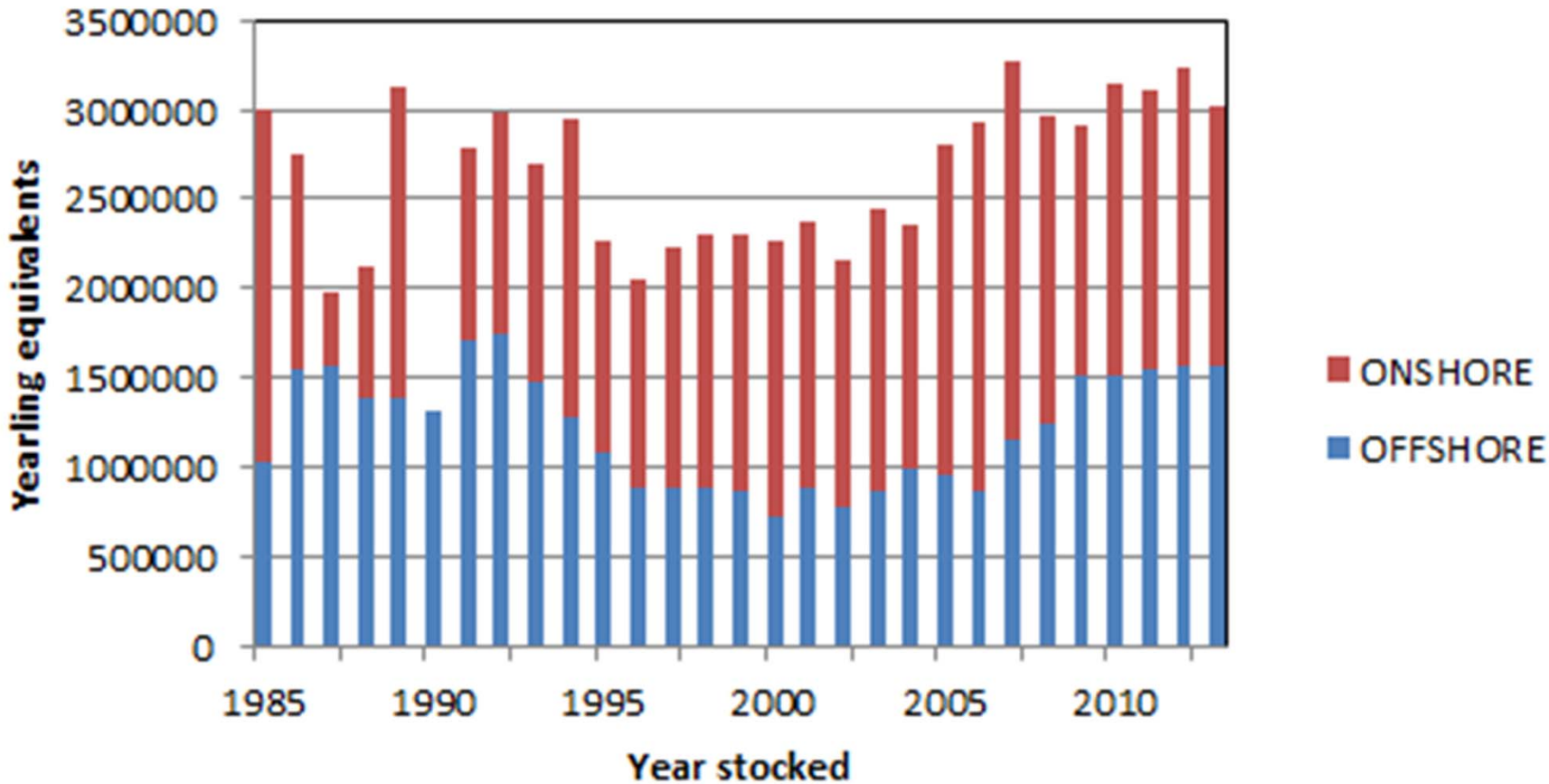
Chinook Salmon returning to Root River



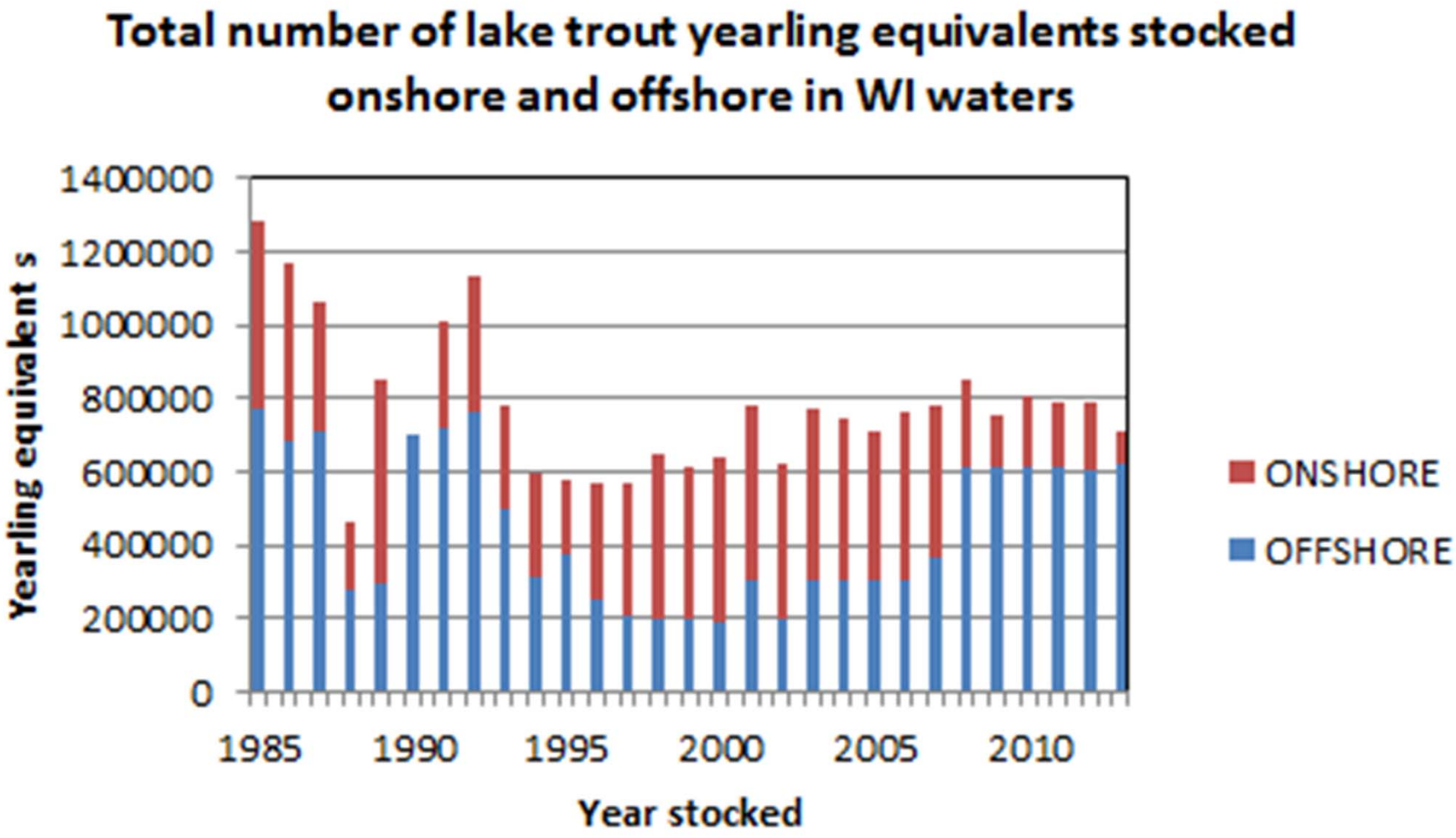
Lake Trout: Comments and Questions Received

- Stocking too many lake trout.
- Stocking less lake trout near shore and more offshore – concern is that these trout are inaccessible to anglers.

Total number of lake trout yearling equivalents stocked onshore and offshore in Lake Michigan, 1985-2013



WISCONSIN
DEPT. OF NATURAL RESOURCES



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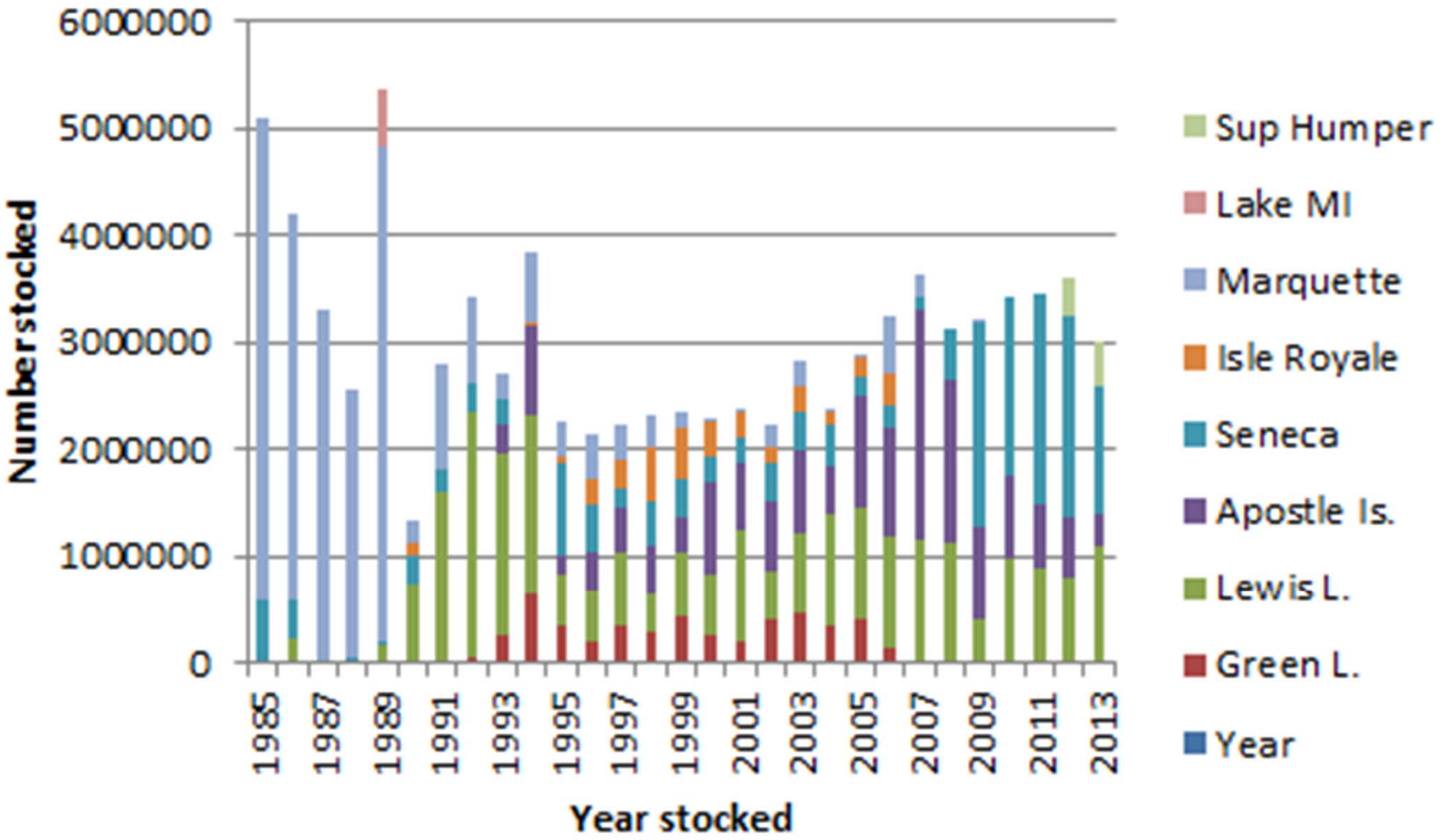
WISCONSIN DEPT. OF NATURAL RESOURCES



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WISCONSIN DEPT. OF NATURAL RESOURCES

Future Direction: Lake Trout

- Work with Lake Michigan Committee to insure Lake Trout stocking numbers match the implementation strategy
- Use CWT information to determine contribution of offshore stocks to angler catch
- Assess and revise implementation strategy in 2020

Chinook salmon stocking strategy

Chinook Salmon Actual Numbers to stock 2015

	Number to Stock	Planned Yearlings		Projected Yearlings	Equivalents Yearlings	Planned Fingerlings	Projected Fingerlings	Equivalent Fingerlings
Wisconsin 2012 Quota	1,164,000							
Planned 37.8 % reduction	723,700							
Coho Salmon Equivalents	31,250	500,000		400,000	3.2			
Rainbow Trout Equivalents	29,167	170,000	CC	135,000	2.4			
		170,000	GN	135,000	2.4			
Lake Trout Equivalents	24,138					250,000	110,000	5.80
FINAL NUMBER	808,255							
FINAL PERCENT	30.6							
Total number to be stocked	808,255							
Total number for Strawberry Creek	150,000							
Total number for rest of locations	658,255							
Number of locations	8							
Total number per location	82,282							

STEP 1

County	Charter Boat trips (number) - Sep-Oct average (2004-2013)	Directed effort (hours) from Creel survey - Sep-Oct average (2004-2013)	Harvest rate (fish/hour) from Creel survey - Sep-Oct average (2004-2013)	Coded Wire Tag
Kenosha	127	36,509	0.04329	
Racine	63	33,164	0.08225	
Milwaukee	130	55,342	0.09140	
Ozaukee	277	37,395	0.12586	
Sheboygan	328	27,022	0.06799	
Manitowoc	78	46,146	0.16576	
Kewaunee	263	58,300	0.15961	
Southern Door - Strawberry Creek				
Northern Door				
Oconto/Marinette	3	14,714	0.04481	
TOTAL	1,269	308,591	0.78097	0.00

County	STEP 2					
	Normalized Charter Boats	Normalized Directed effort	Normalized Harvest rate	Normalized Coded Wire Tag	Sum	Final Percentage
Kenosha	0.1001	0.1183	0.0554		0.2738	0.0913
Racine	0.0496	0.1075	0.1053		0.2624	0.0875
Milwaukee	0.1024	0.1793	0.1170		0.3988	0.1329
Ozaukee	0.2183	0.1212	0.1612		0.5006	0.1669
Sheboygan	0.2585	0.0876	0.0871		0.4331	0.1444
Manitowoc	0.0615	0.1495	0.2122		0.4233	0.1411
Kewaunee	0.2072	0.1889	0.2044		0.6006	0.2002
Southern Door - Strawberry Creek						
Northern Door						
Oconto/Marinette	0.0024	0.0477	0.0574		0.1074	0.0358
TOTAL	1	1	1	0	3	1

Ozaukee – 277 Charter trips / 1,269 total trips = 0.2183%

	Step 3	STEP 4		
	Strategy accounts for 25% of stocking	Reduction based on equal number per county		
County	25%	Base stocking number is 75% of total allotment	Strategy comprises 25% of stocking number	Total stocking number per county
Kenosha	15,020	61,711	15,020	76,732
Racine	14,396	61,711	14,396	76,107
Milwaukee	21,877	61,711	21,877	83,588
Ozaukee	27,461	61,711	27,461	89,173
Sheboygan	23,757	61,711	23,757	85,469
Manitowoc	23,217	61,711	23,217	84,929
Kewaunee	32,943	61,711	32,943	94,654
Southern Door - Strawberry Creek				120,000
Northern Door		30,000	0	30,000
Oconto/Marinette	5,892	61,711	5,892	67,604
TOTAL	164,564	523,691	164,564	808,255

Ozaukee County 16.69% * 164,564 = 27,461

Total stocking number = 493,691 (75%) + 164,564 (25%) + 150,000 = 808,255

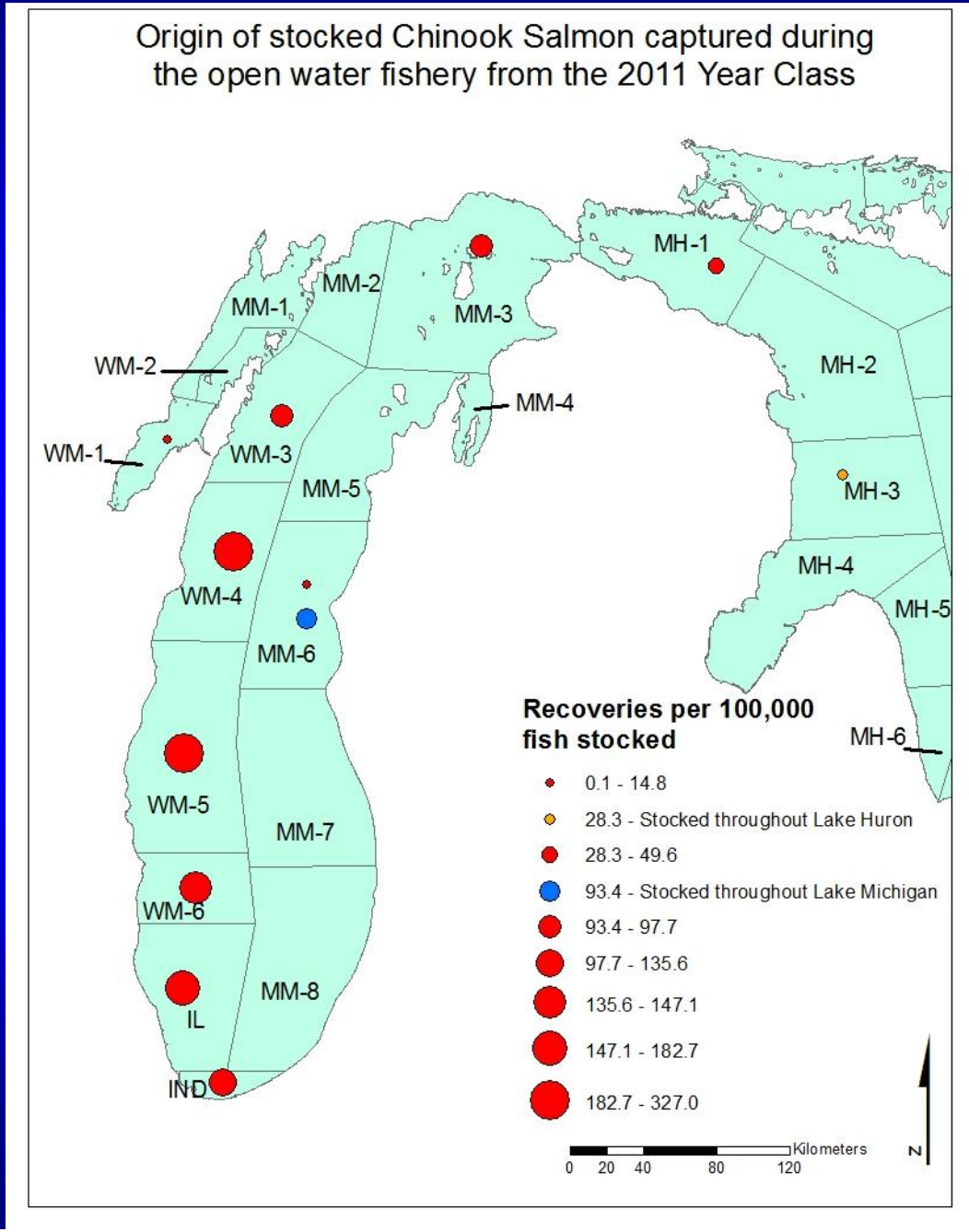
	Step 3	STEP 4			
	Strategy accounts for 25% of stocking	Reduction based on equal number per county			
County	25%	Base stocking number is 75% of total allotment	Strategy comprises 25% of stocking number	Total stocking number per county	Change from 2014
Kenosha	15,020	61,711	15,020	76,732	-187
Racine	14,396	61,711	14,396	76,107	769
Milwaukee	21,877	61,711	21,877	83,588	542
Ozaukee	27,461	61,711	27,461	89,173	124
Sheboygan	23,757	61,711	23,757	85,469	-696
Manitowoc	23,217	61,711	23,217	84,929	1414
Kewaunee	32,943	61,711	32,943	94,654	-488
Southern Door - Strawberry Creek				120,000	0
Northern Door		30,000	0	30,000	0
Oconto/Marinette	5,892	61,711	5,892	67,604	-1478
TOTAL	164,564	523,691	164,564	808,255	0

Net Pens: Comments and Questions Received

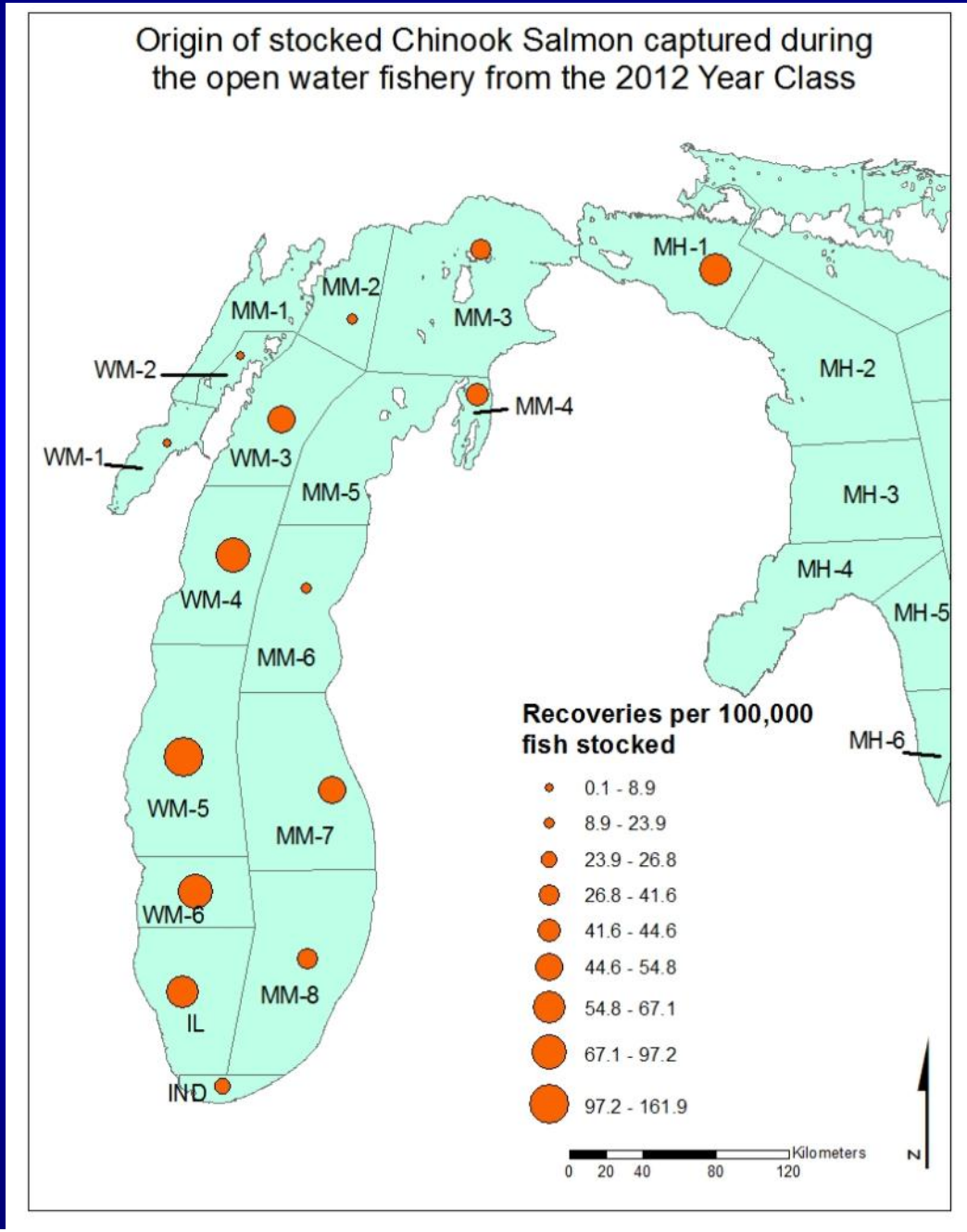
- Should we use more net pens to increase survival?

Estimated Contribution of Stocked Chinook Salmon to the Fishery by Stocking District

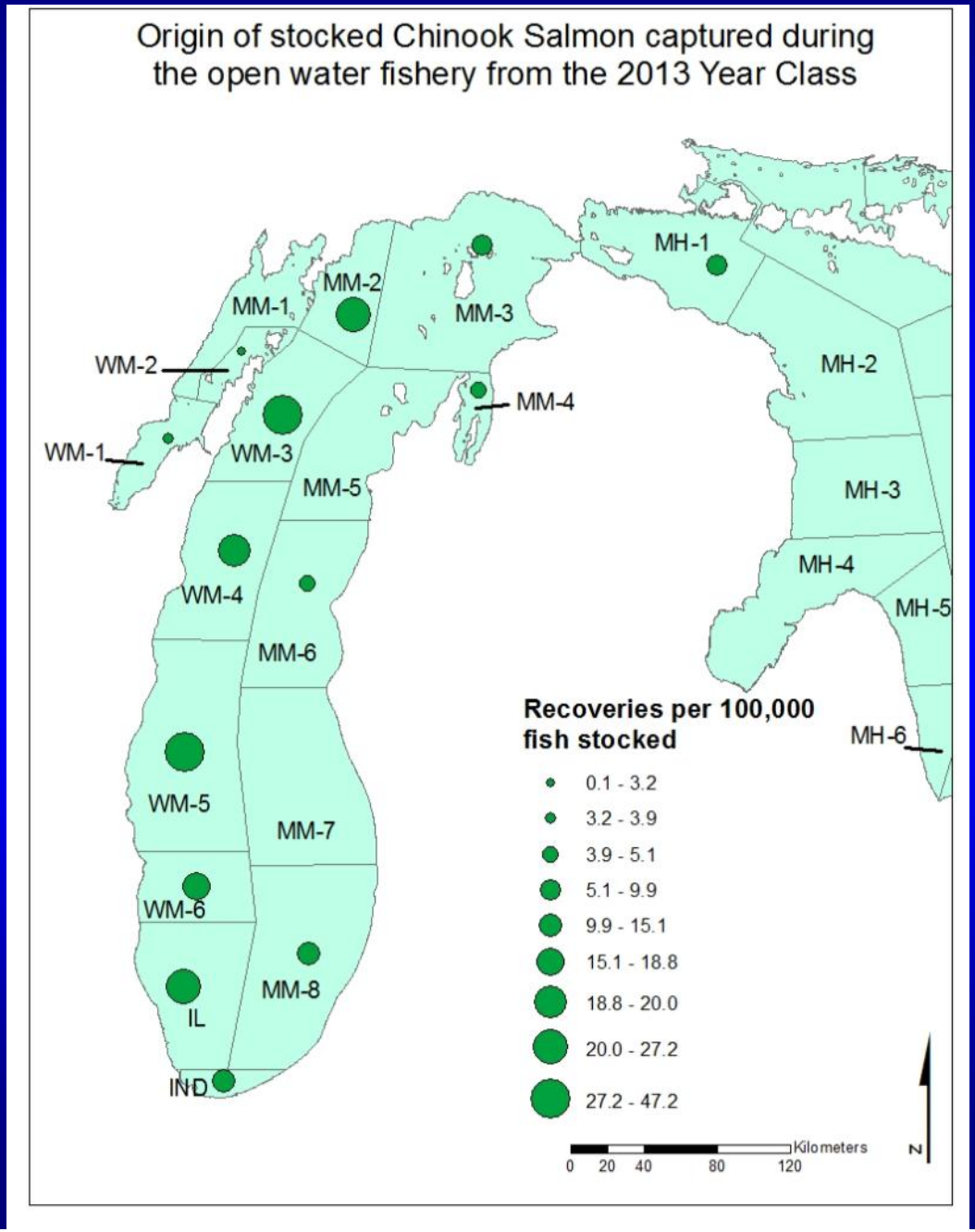
Recoveries per 100,000 Fish Stocked – Stocking District



Recoveries per 100,000 Fish Stocked – Stocking District



Recoveries per 100,000 Fish Stocked – Stocking District



Locations of Net Pens in Michigan Waters of Lake Michigan

1) Boardman
2) Manistee River
3) Big Sable River
4) Muskegon River
5) Grand Haven
6) Holland
7) Black River
8) Saugatuck
9) St. Joseph

Stocked, held, fed & released

Future Direction: Net Pens

- Do not want to make drastic changes to an already successful program without good evidence
- Net pen research study at Kewaunee and Root river
- Net pen use at Menominee River and Northern Door County due to poor returns – Identified management need

Future Direction: Net Pens

- Net pen use at Port Washington – Plans and permit were applied for before new information came out

- Draft policy to be approved internally and then go out for public review – we will let you know when the review process starts

2 day license information

- ½ goes to Great Lakes Trout and Salmon Stamp
- ½ goes to general Fish & Wildlife Account