

# Predator/Prey Ratio Analysis & Salmonid Working Group Updates

## Salmonid Working Group:

- Dave Warner, Chuck Madenjian (USGS)
- Jory Jonas, Ben Turschak, Mark Tonello (MI DNR)
- Nick Legler (chair), Iyob Tsehay (WI DNR)
- Brian Breidert, Ben Dickinson (IN DNR)
- Steve Robillard (IL DNR)
- Chuck Bronte, Matt Kornis, Rob Elliott (USFWS)
- Richard Clark (QFC, MSU)
- Barton, Nathan (GTB)
- Czesny, Sergiusz (INHS)
- Clark, Eric (Sault Tribe)

## Key Collaborations:

- Great Lakes Fishery Commission
- Lake Michigan Committee
- Planktivore Working Group
- USFWS Mass Marking Program
- Several agencies & personal provided input, data, etc.
- QFC at MSU



**Chinook Total  
Lake Biomass**

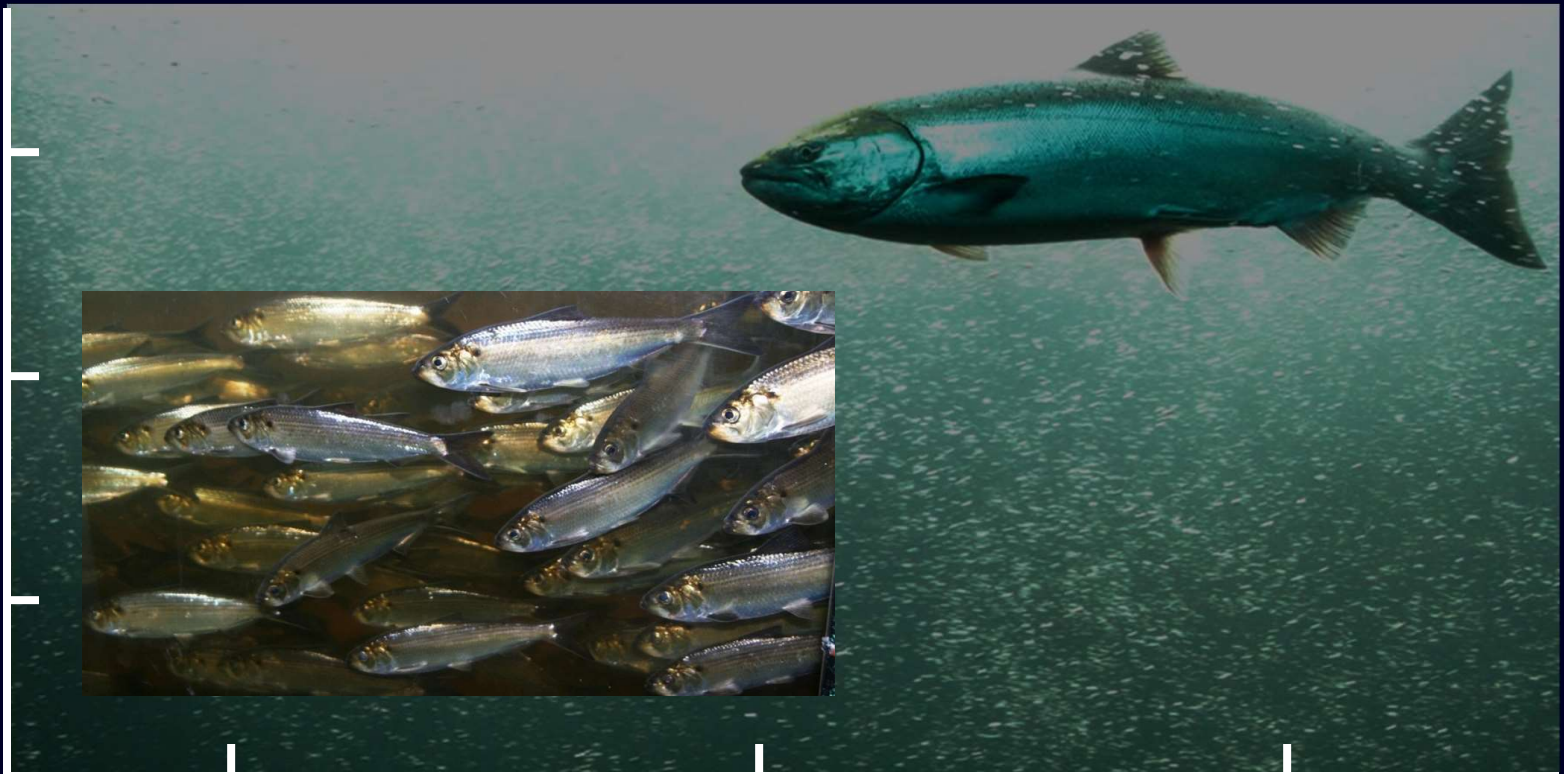
**÷**

**Alewife Total  
Lake Biomass**

**=**

**P/P  
Ratio**

Chinook / Alewife  
(PPR)

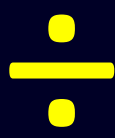


Year X

Year Y

Year Z

**Chinook Total  
Lake Biomass**



**Alewife Total  
Lake Biomass**



**P/P  
Ratio**

Chinook / Alewife  
(PPR)

Year X

Year Y

Year Z

(Hypothetical Data)

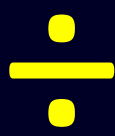


Maybe  
stock  
more  
fish?



Low Ratio

**Chinook Total  
Lake Biomass**



**Alewife Total  
Lake Biomass**



**P/P  
Ratio**

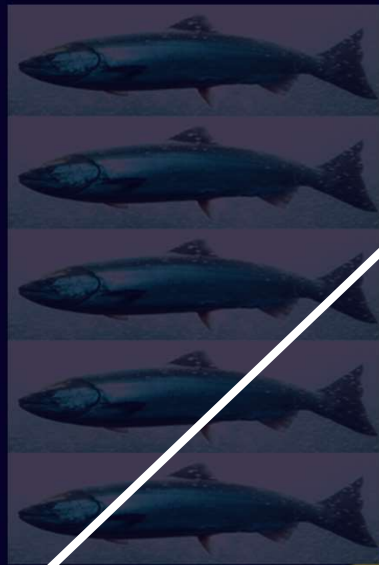
Chinook / Alewife  
(PPR)

Year X

Year Y

Year Z

(Hypothetical Data)



High Ratio



Maybe  
stock  
less  
fish?

**Chinook Total  
Lake Biomass**

**÷**

**Alewife Total  
Lake Biomass**

**=**

**P/P  
Ratio**

Chinook / Alewife  
(PPR)

Year X

Year Y

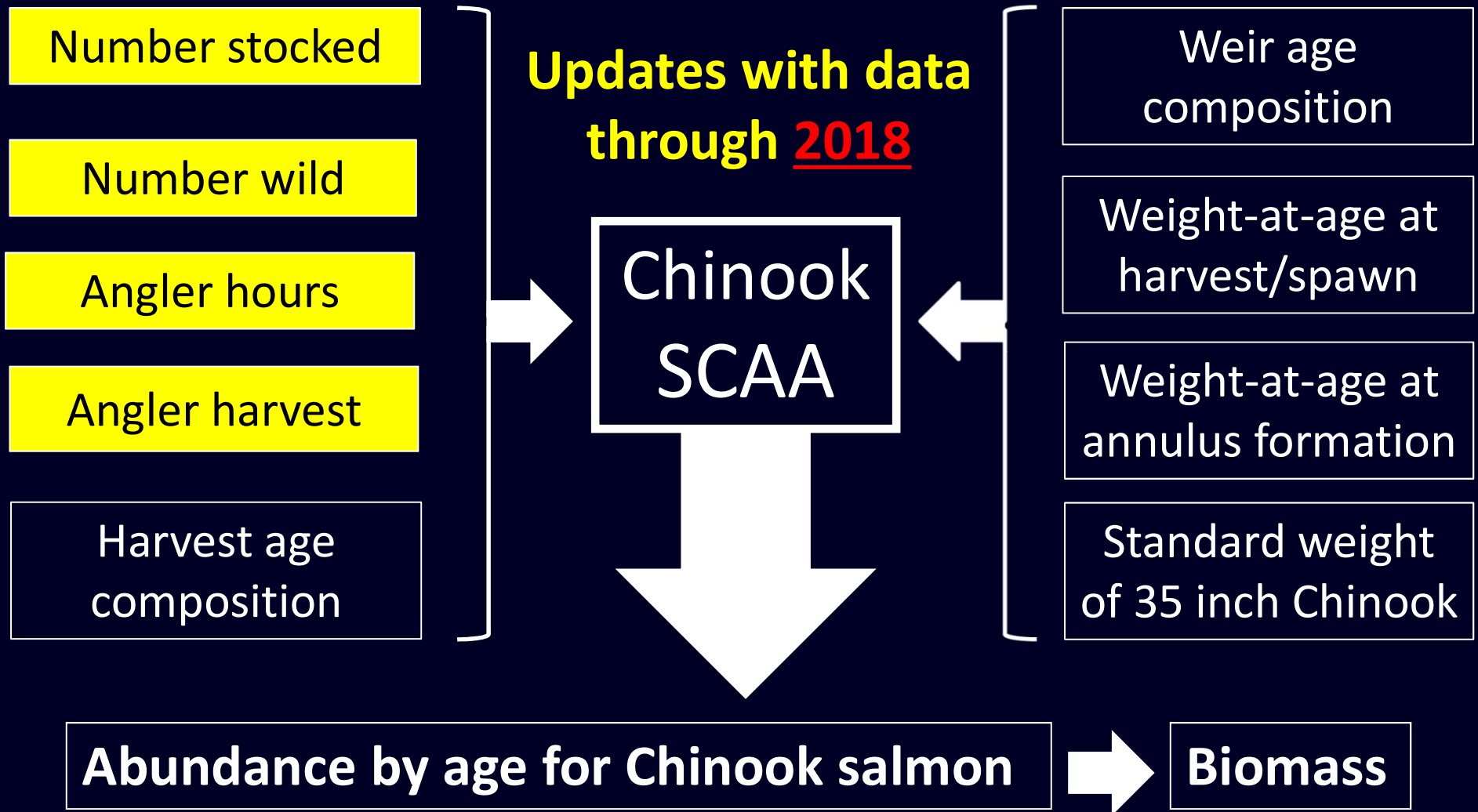
Year Z

(Hypothetical Data)



Intermediate

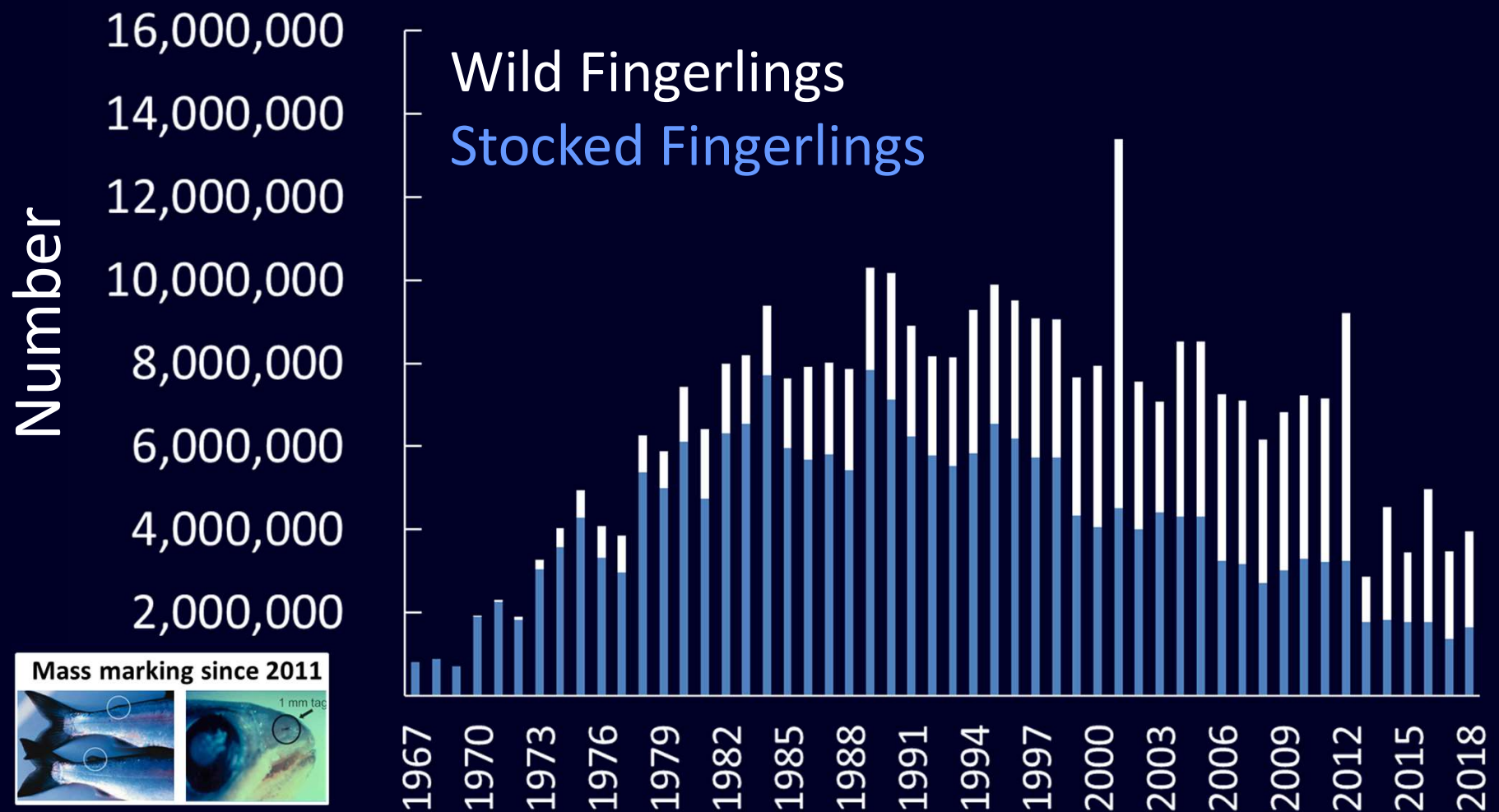
# Statistical Catch at Age Model (SCAA)



Tsehaye, I., M. L. Jones, J. R. Bence, T. O. Brenden, C. P. Madenjian, and D. M. Warner. 2014. A multispecies statistical age-structured model to assess predator–prey balance: application to an intensively managed Lake Michigan pelagic fish community. *Canadian Journal of Fisheries and Aquatic Sciences* 71:1-18.

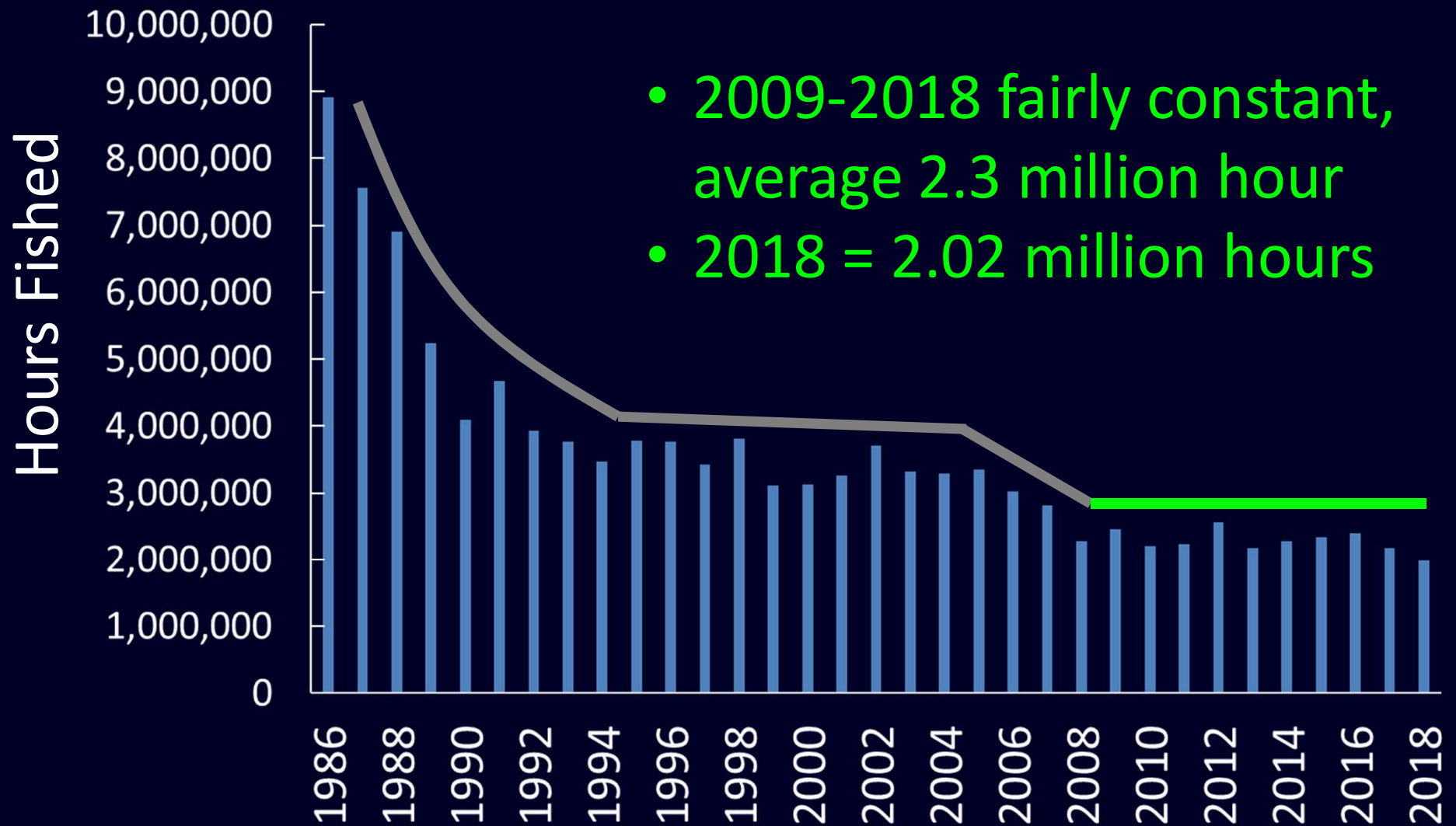


# Number of Chinook Fingerlings in Lake Michigan (stocked & wild; 1967-2018)



Recent estimates of % wild at age 1 have consistently been around 50% (e.g., high 2013 = 64.8%; low 2014 = 38.6%; 2018 = 60.4% ).

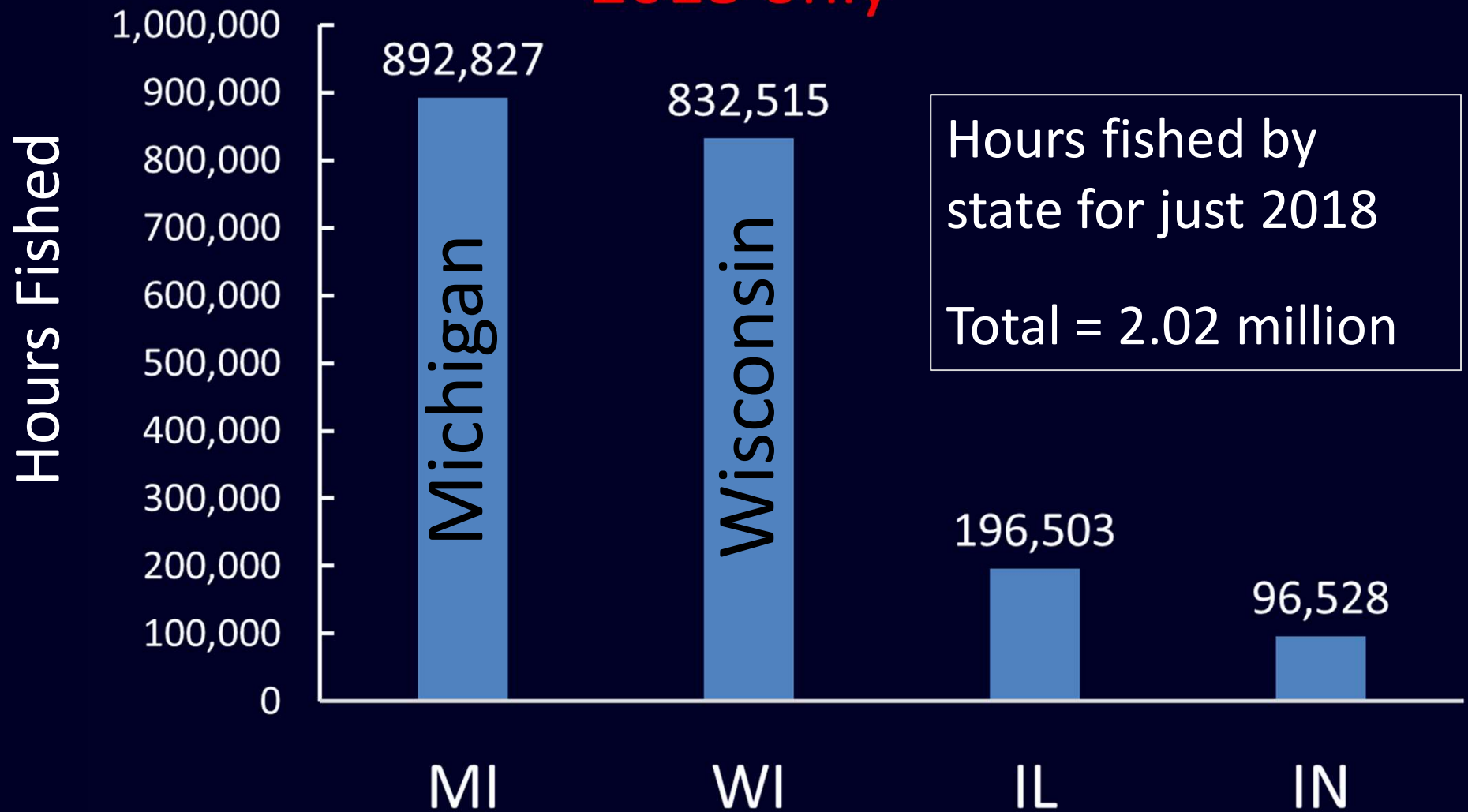
# Targeted Angler Effort for Salmon/Trout Lake MI (boat only; charter & non-charter; all states)





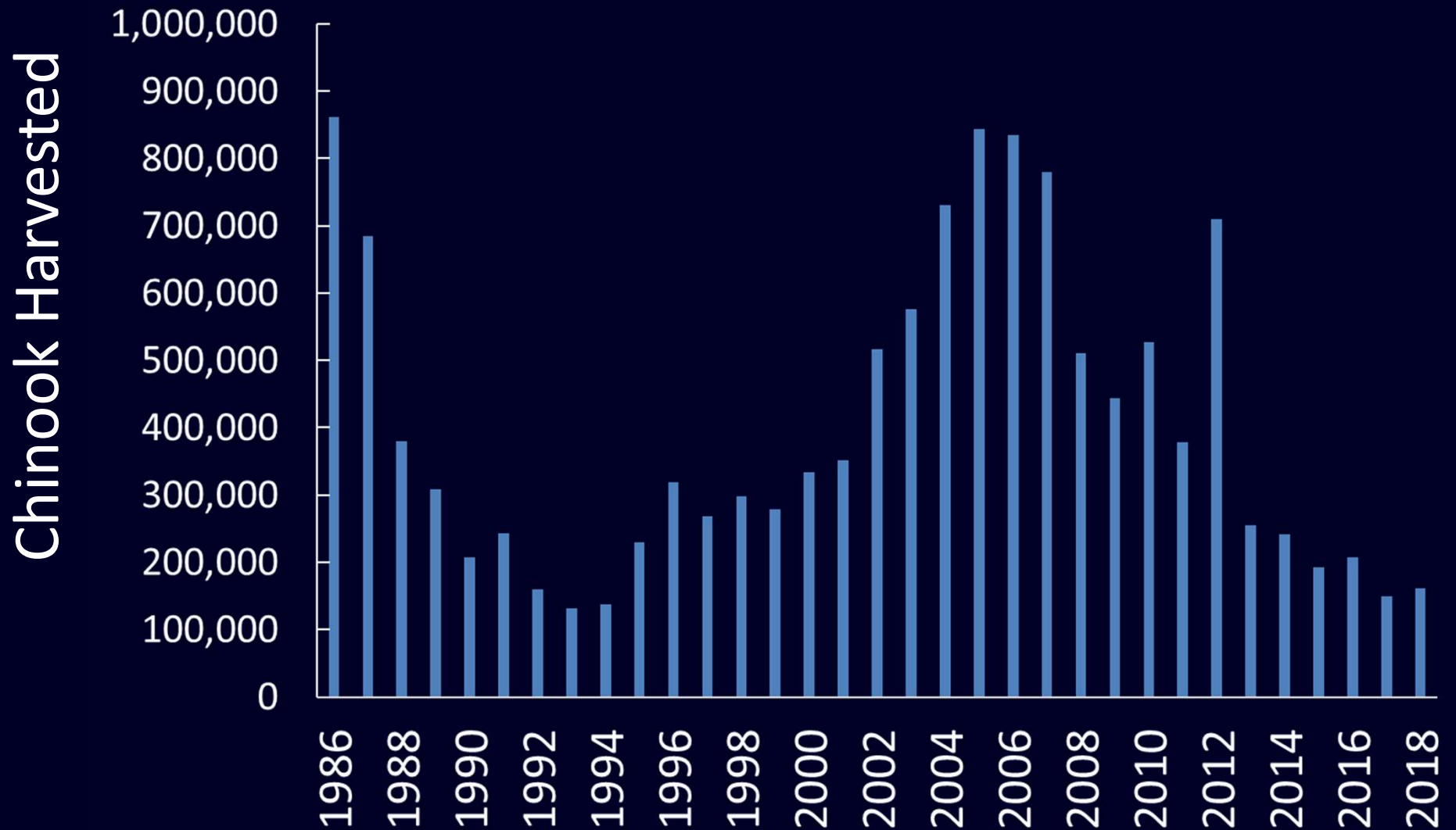
# Targeted Angler Effort for Salmon/Trout Lake MI (boat only; charter & non-charter; all states)

2018 only



# Numbers of Chinook Harvested

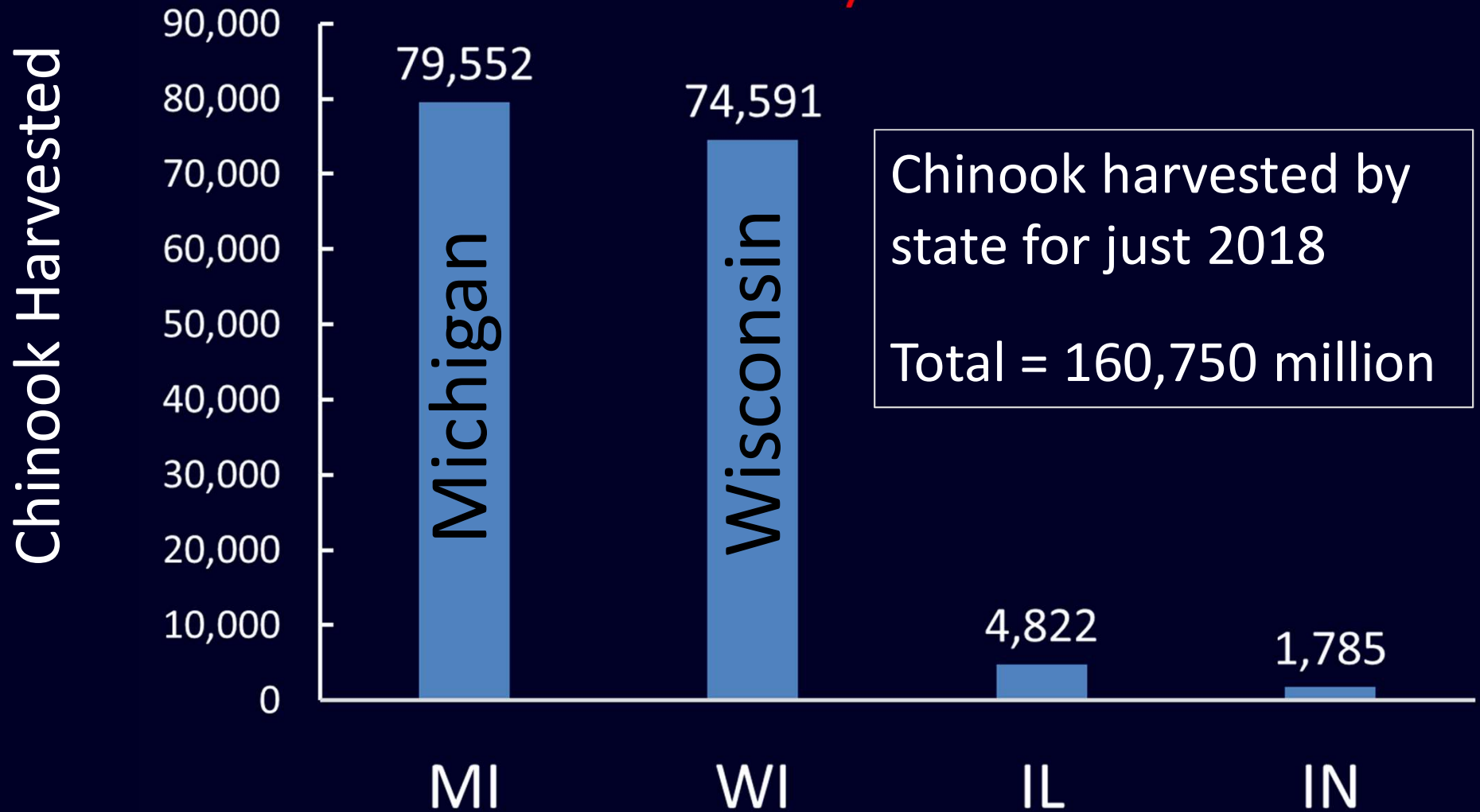
Lake MI (all types of fishing except stream; all states)



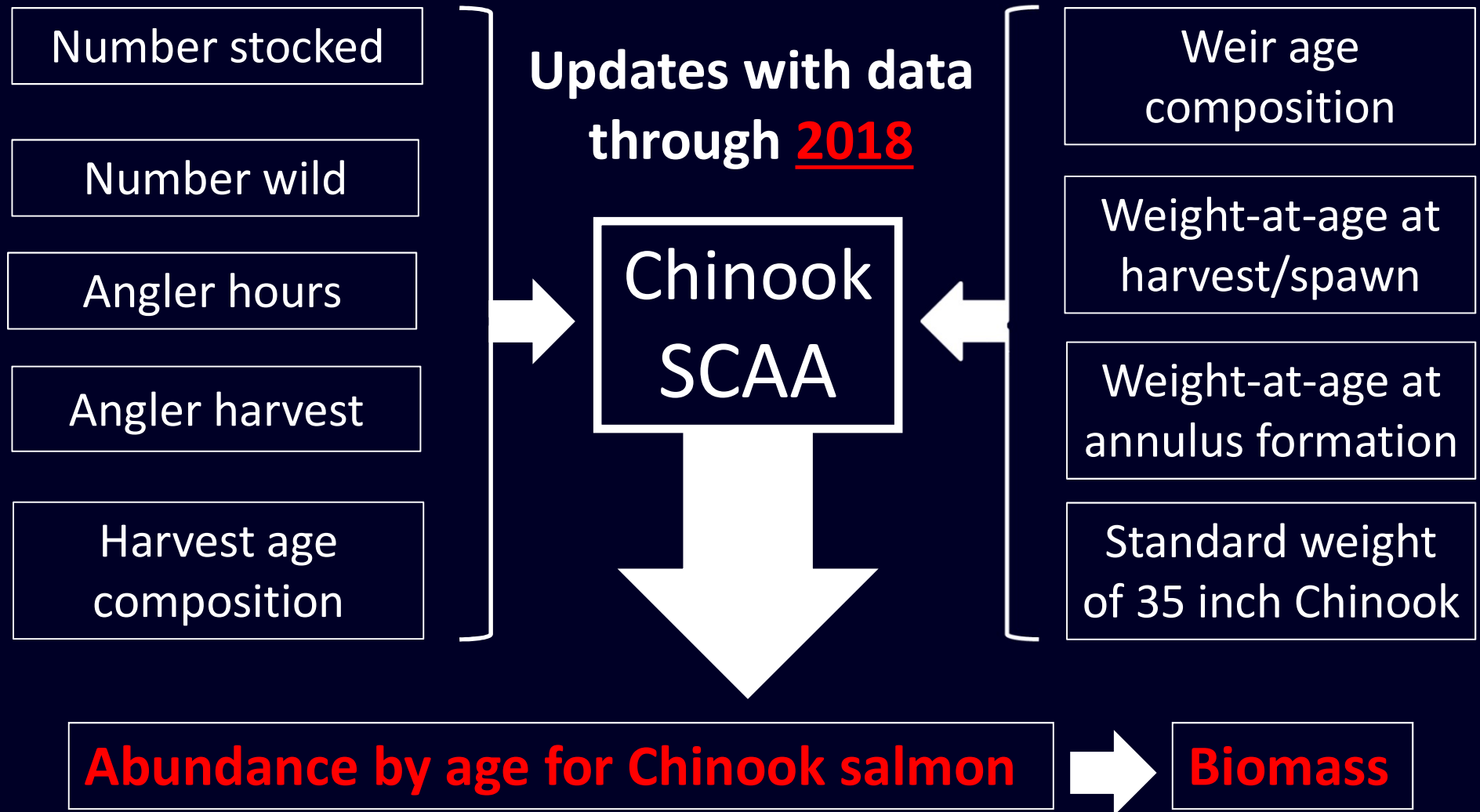
# Numbers of Chinook Harvested

Lake MI (all types of fishing except stream; all states)

2018 only

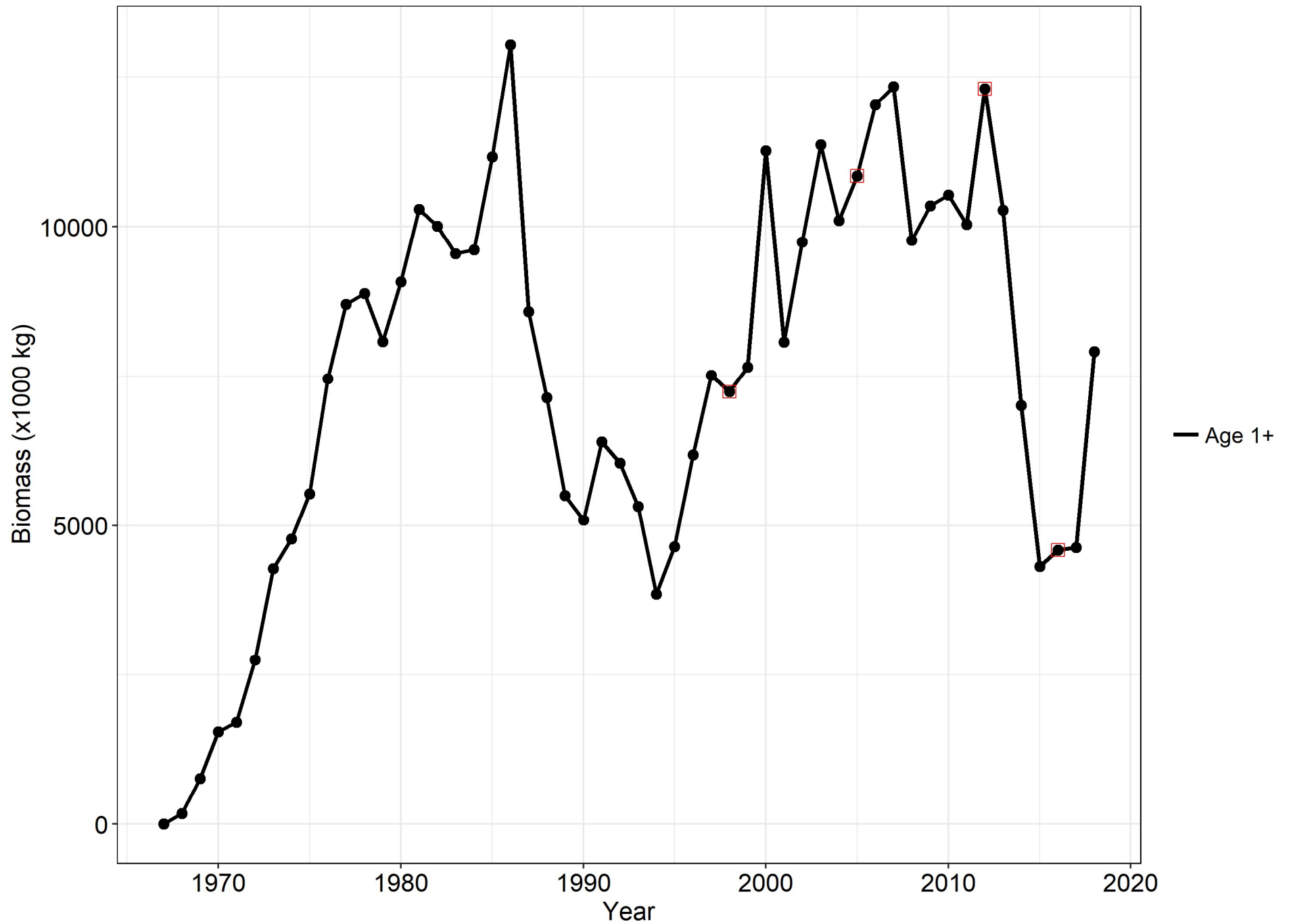


# Statistical Catch at Age Model (SCAA)



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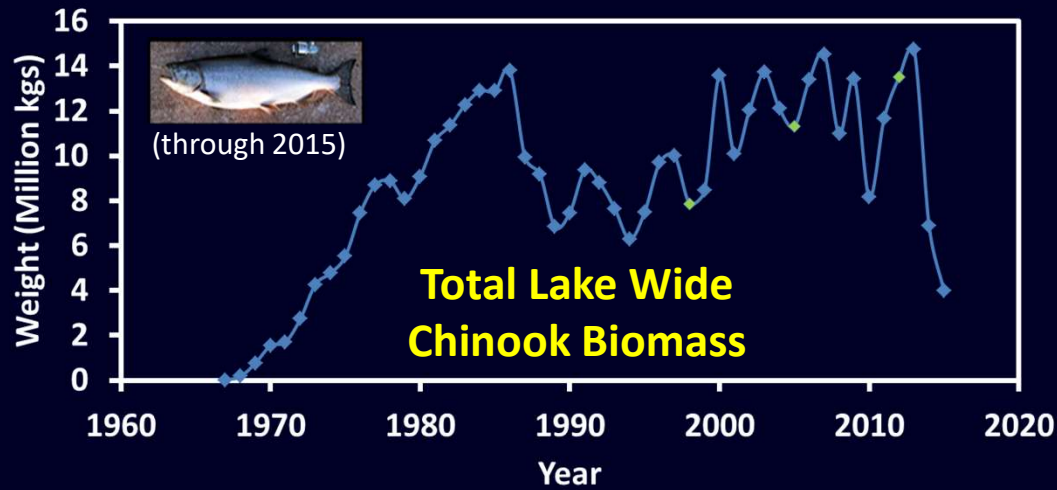
Chinook Salmon Biomass (data through 2018)



Alewife Age 1+ Biomass

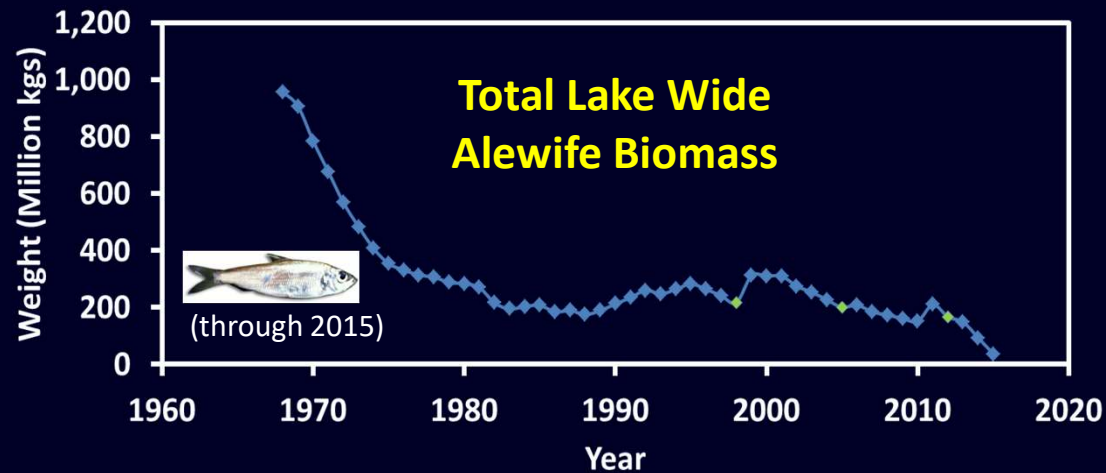






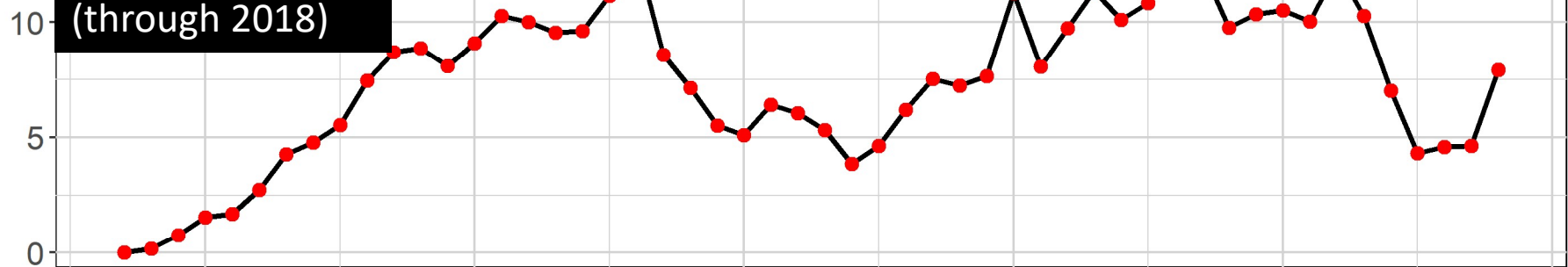
÷

= PPR



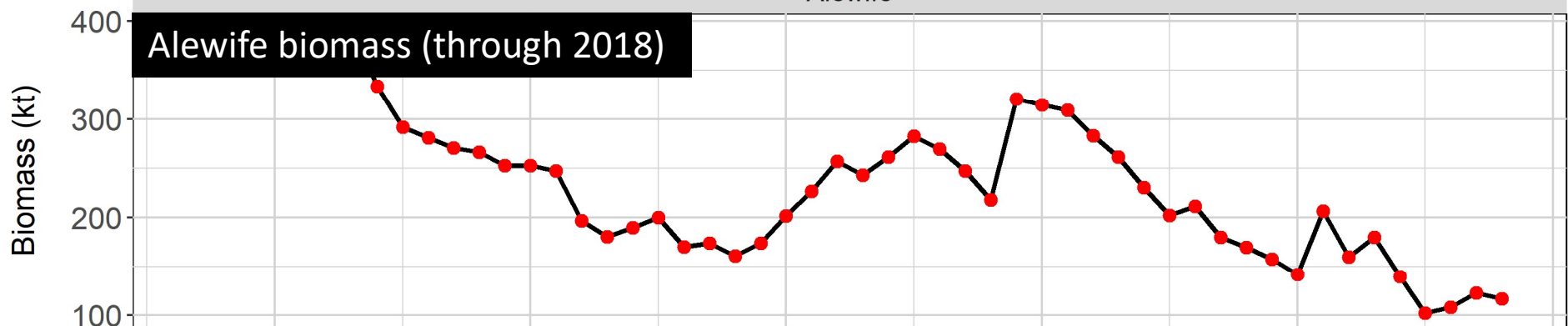
### Chinook

Chinook biomass  
(through 2018)



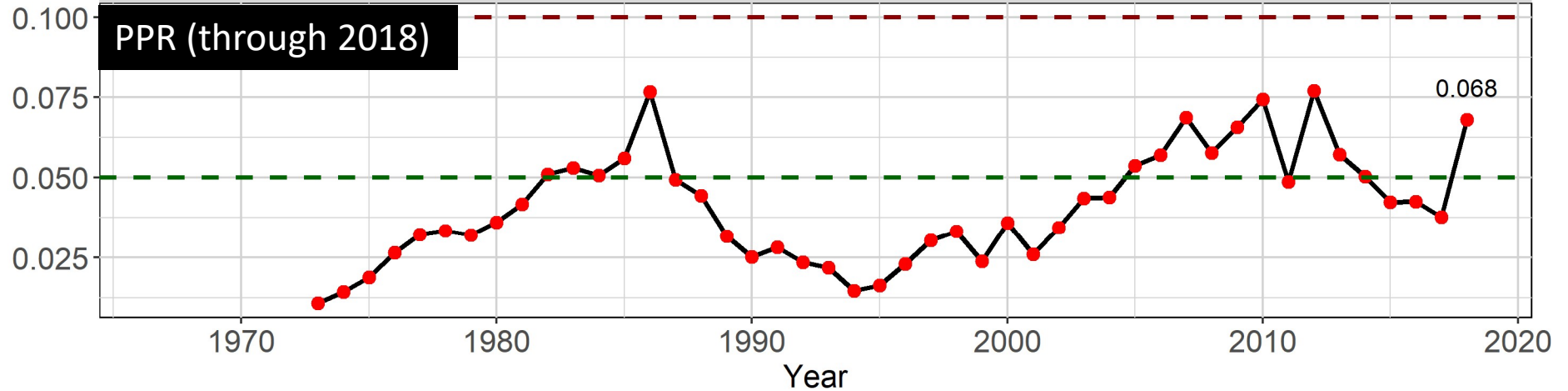
### Alewife

Alewife biomass (through 2018)



### PPR

PPR (through 2018)



# A simple but important point about the PPR...



14,744,683 kg  
Chinook salmon  
(like in 2013)

÷



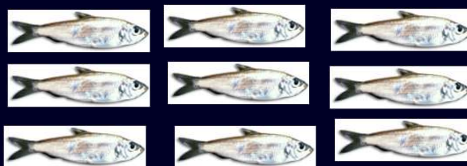
294,893,662 kg  
Alewife  
(hypothetical)

= 0.05



3,980,384 kg  
Chinook salmon  
(like in 2015)

÷



79,607,686 kgs  
Alewife  
(hypothetical)

= 0.05