Research to Reality:

Attempting Biological Control of White Perch in Oklahoma

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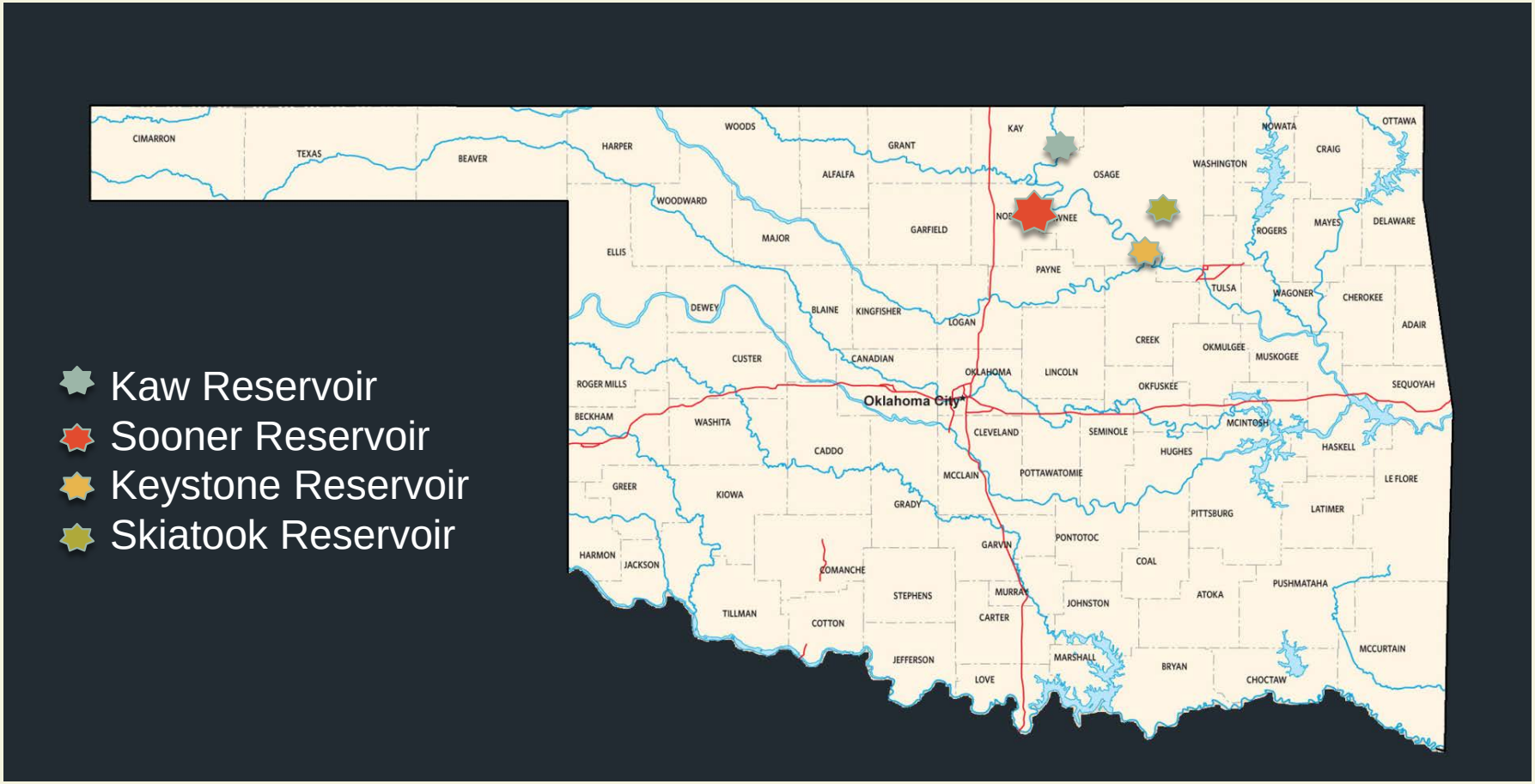
White Perch Background

- Native to marine, estuarine, and freshwater systems along the Atlantic coast
- Semi-Anadromous
- Diets consist of fish eggs, aquatic invertebrates, and fish
- Prolific spawners
- Tend to stunt outside native range
- Impact native fish communities

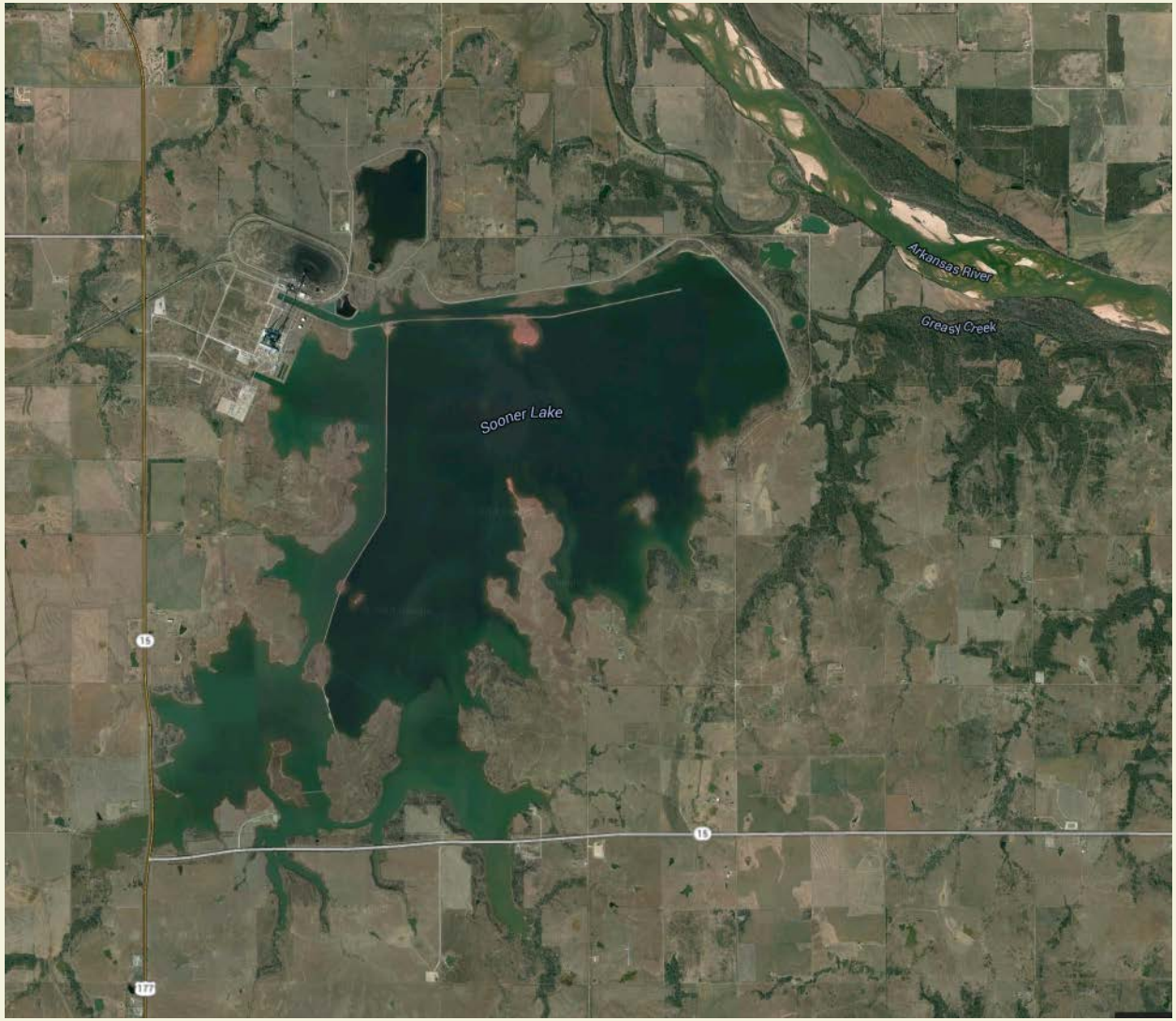
White Perch in Oklahoma

- Oklahoma
  - Kaw Reservoir - 2000
    - First reservoir on the Arkansas River in Oklahoma
  - Keystone Reservoir - 2004
    - Second reservoir on the Arkansas River in Oklahoma
  - Sooner Reservoir - 2006
    - Cooling reservoir created by pumping water form the Arkansas River
  - Skiatook Reservoir - 2015
    - Not on the Arkansas River system
    - Likely a bait bucket introduction

White Perch in Oklahoma



Sooner Reservoir

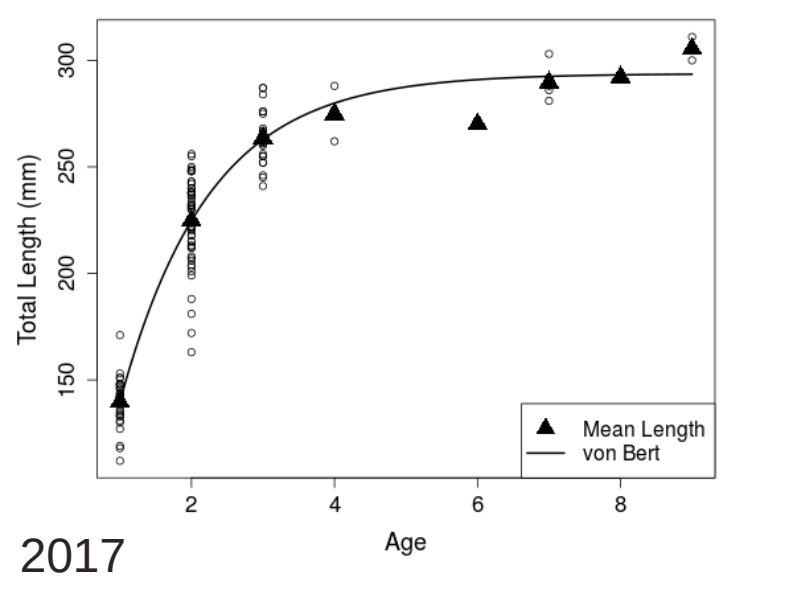


White Perch in Oklahoma

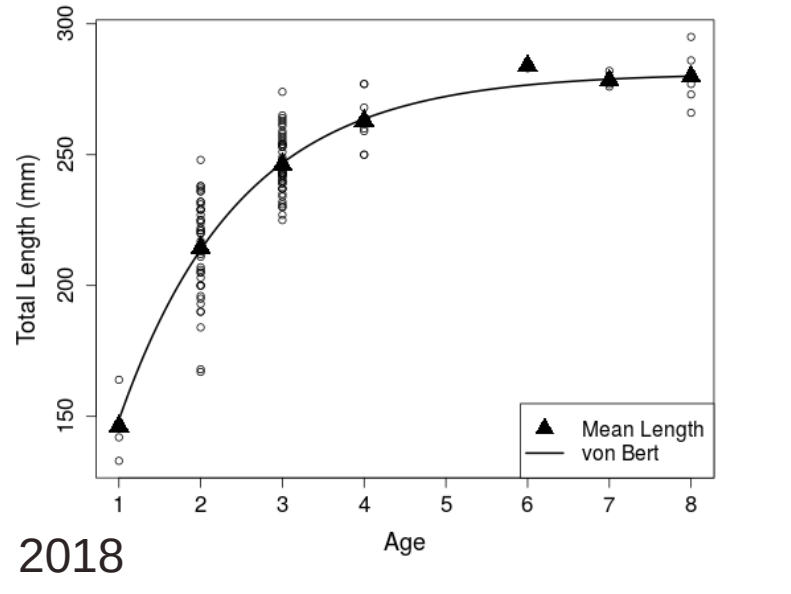
- Past studies have shown egg predation impacts established sport fish populations
  - A recent publication from our Fisheries Research Lab found that White Perch in Sooner Reservoir rarely consumed fish eggs.
  - A limited White Perch diet study on Kaw in the early 2000s found no egg predation.

- Impact on sport fish recruitment
  - Competition with age-0 sport fish species for invertebrates
  - Early spawning by White Perch leads to an early switch to piscivory

White Perch in Sooner



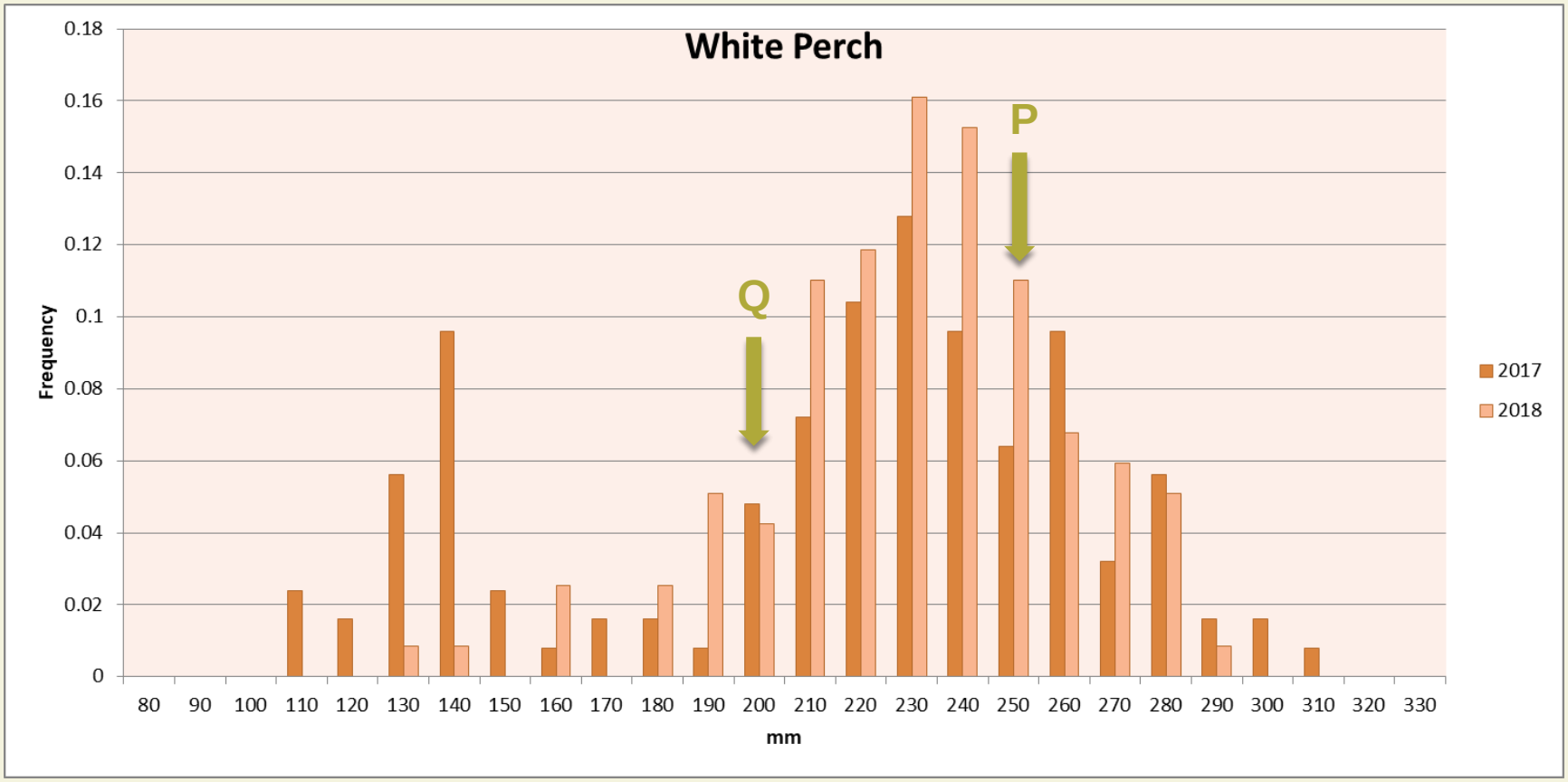
2017



2018

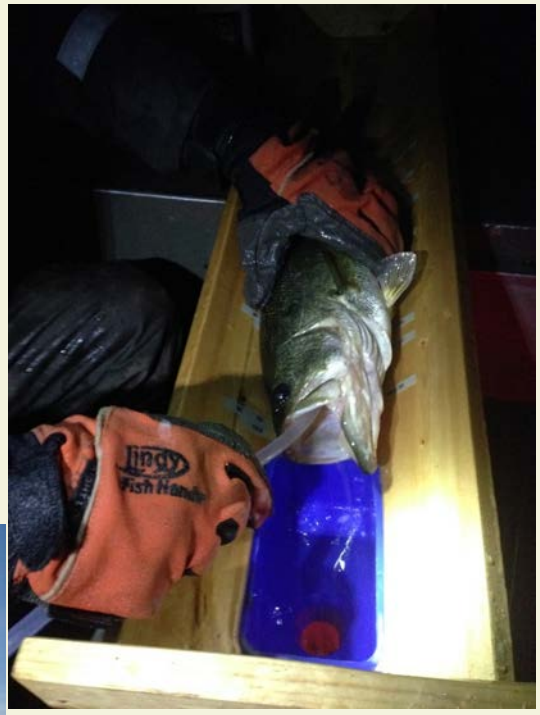
- Rapid Growth Rates
  - Non-native populations are often stunted.
- Average Condition
- High Proportional Size Distribution

White Perch in Sooner

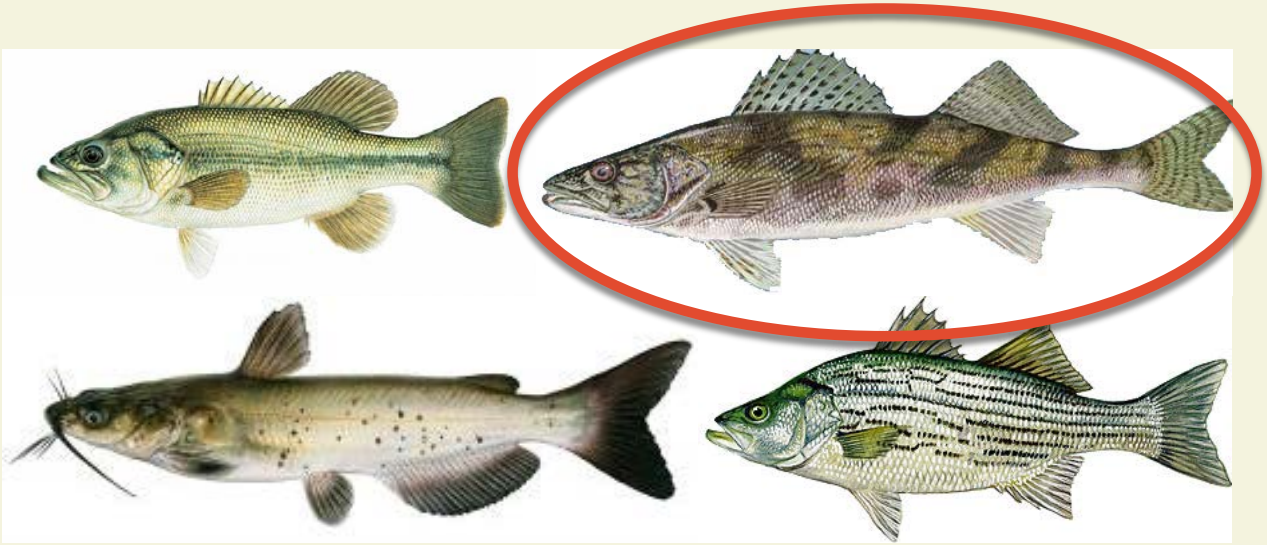


If only we were meaning to do this….

Diet Study 2015-2016



Finding the Right Predator



Species	N	Min TL	Avg TL	Max TL
Channel Catfish	1	84	84	84
Hybrid Striped Bass	3	71	75.67	80
Largemouth Bass	6	27	83.58	218
Saugeye	66	20	55.02	98

Finding the Right Predator

Dunn's multiple comparison results for foraging success for white perch between Saugeye PSD length groups	
Comparison	**Adjusted p-value**
Preferred - Quality	1
Preferred - Stock	0.54718
Quality - Stock	0.94547

Research to Reality

- How do we want to manipulate Saugeye in Sooner?
- How are we going to evaluate our progress?
- Do we have good benchmark metrics to begin with?
- What are we going to consider success?
- What other considerations need to be made?

Where to from here?

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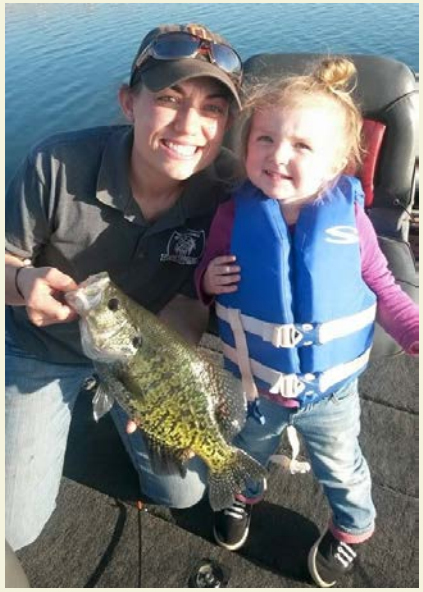
Current Use of Saugeye

Crappie Management

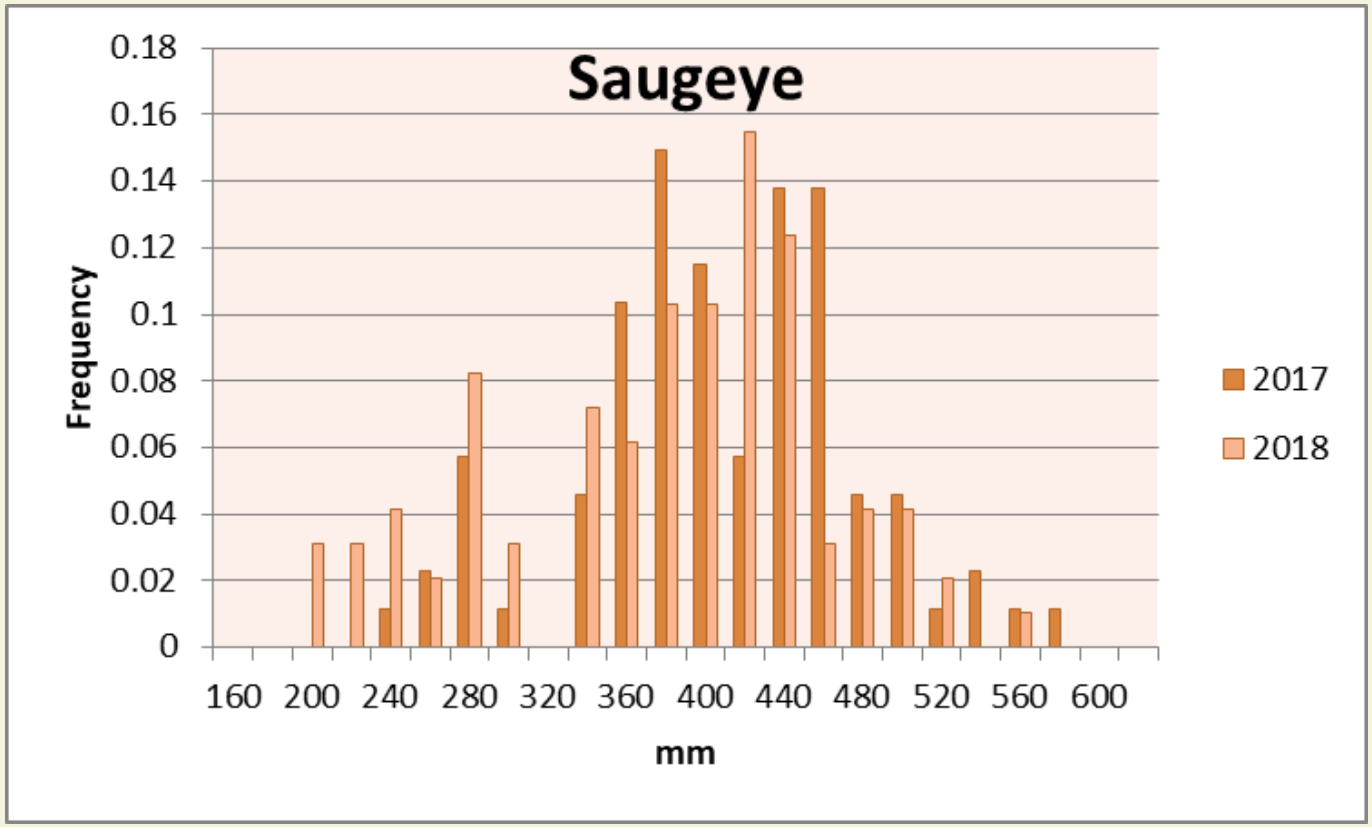


- 18 inch minimum
  - Provides higher density of large fish who consume a higher proportion of crappie

Put and Take Fisheries

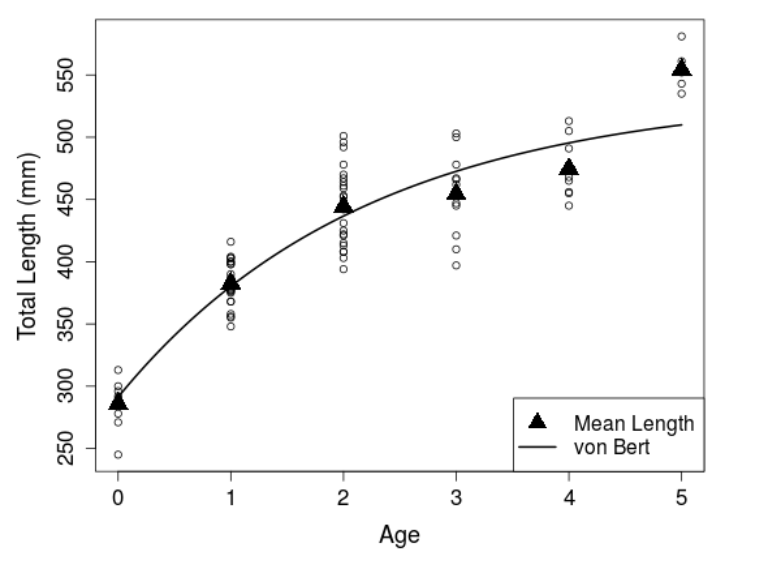
- 14 inch minimum
  - Prevents stockpiling of male fish who may never reach 18 inches.

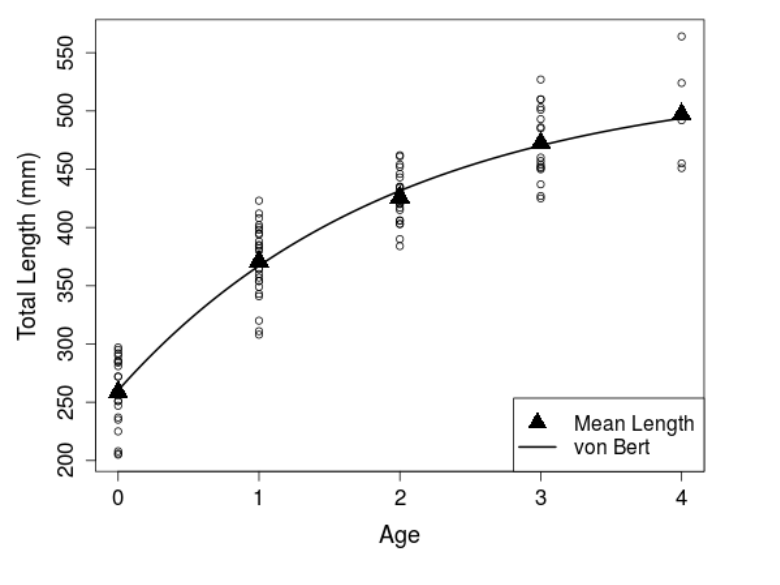
Saugeye in Sooner



- PSD-Q is good
- Fish are being cropped off at preferred size
  - 18 in minimum

Saugeye in Sooner





- K = 0.45 to 0.50
- Around 35% annual mortality
- Good catch rates
  - Especially compared to Nebraska Lakes where initial exploration of white perch biological control were explored

Saugeye in Sooner

- We want more Saugeye
- Don’t have the data for sophisticated modeling
  - Hybrid species is ideal here
- Size doesn’t matter
- Don’t want to increase the minimum length limit
  - Simplicity of regulations
  - Angler opportunity
  - Time lost in rule making process
- Double our stocking rate from 20 to 40 per acre

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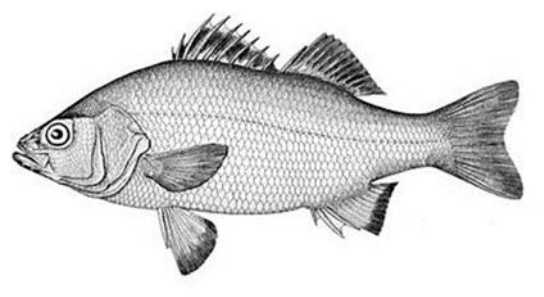

Progress Evaluation

- Long-Term Evaluation
  - 5 years plus
  - Saugeye are taking 3 years to reach harvestable size
- Annual Fall Gillnetting
  - Size Structure
  - Growth Rates
  - Relative Abundance
  - Mortality

- Within the management goals of our Region
  - Using objective based approach rather than straight SSP

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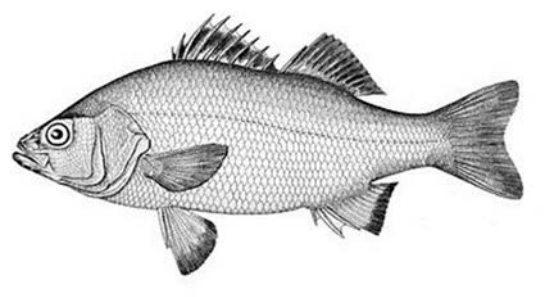
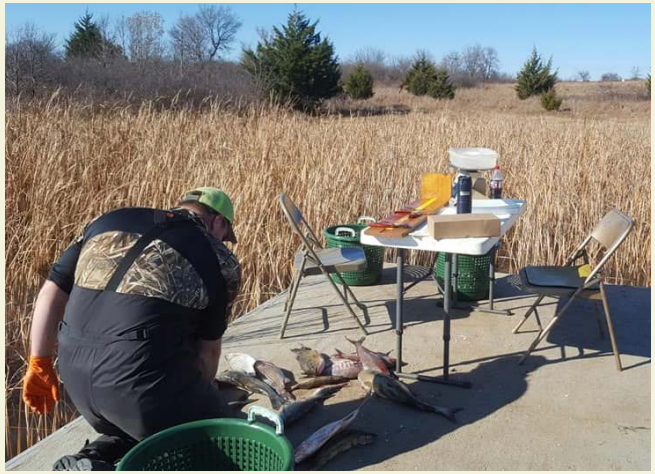


Benchmarks

- Question: At the end of 2016 did we have good benchmarks to implement change immediately?
  - Answer: No
- Sometimes SSP has it's shortcomings.
- 2017 and 2018 Fall Gillnetting
  - Used a more objective based approach
  - Assessed data quality after each outing



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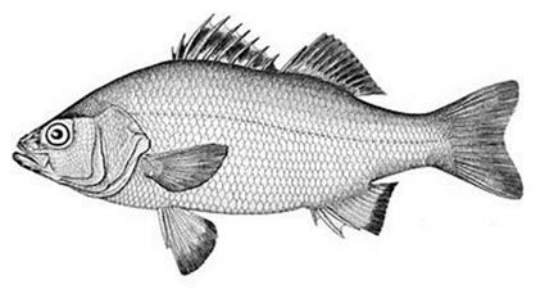
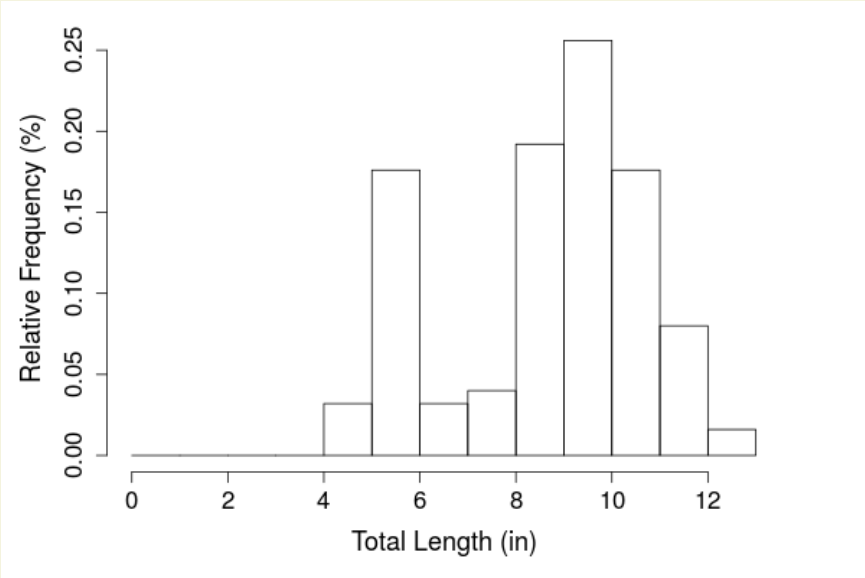
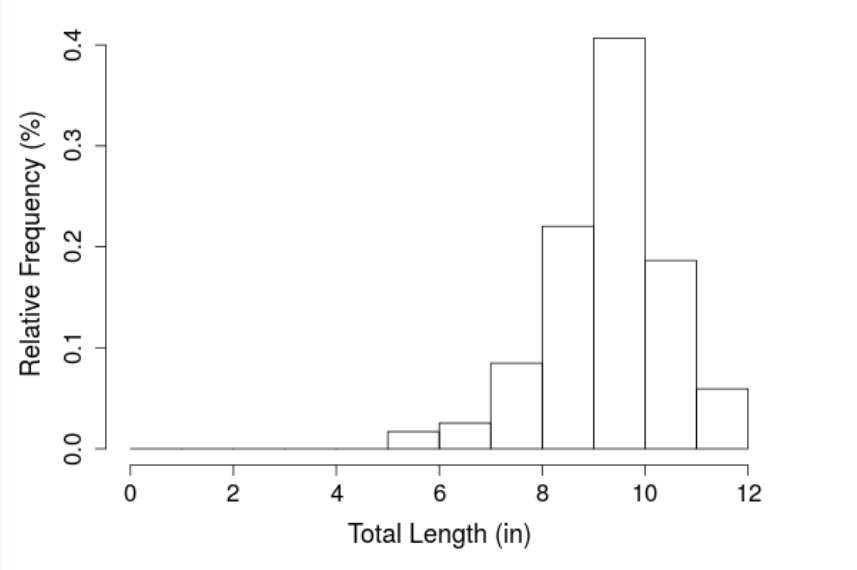


What is Success?

- Lower Catch Rates of White Perch
- Improved White Perch Size Structure
  - Can we actually get any better?
  - Implications for other reservoirs.





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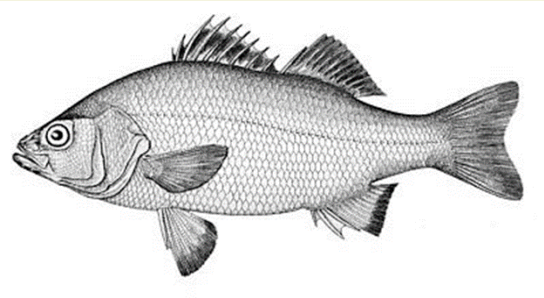
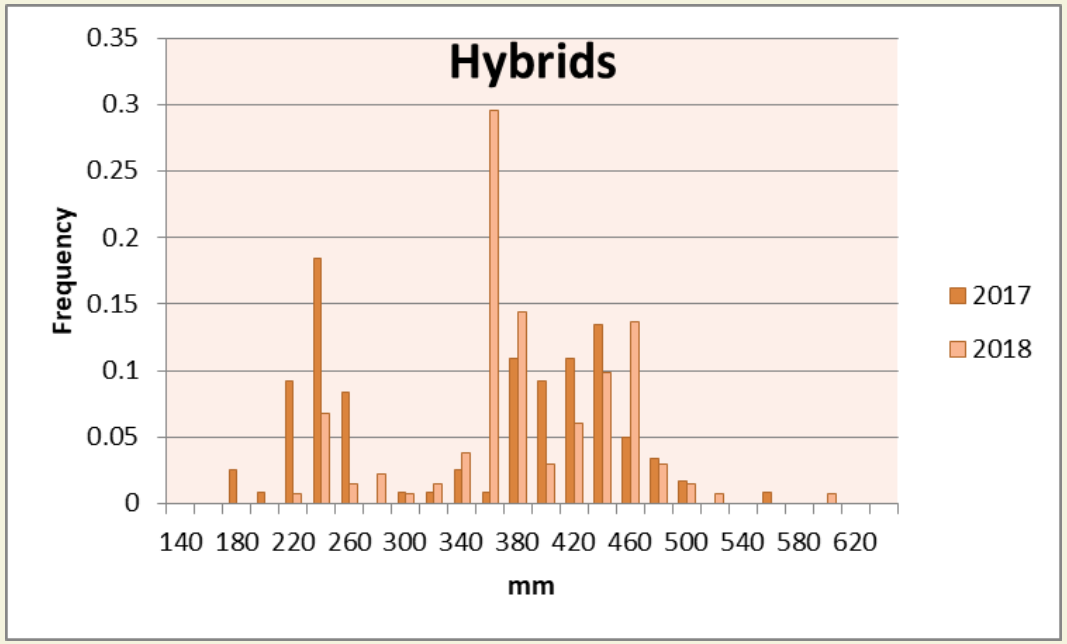


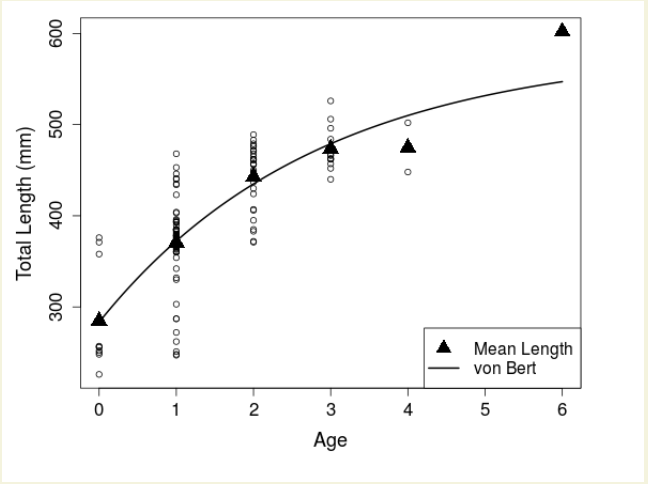
Other Considerations

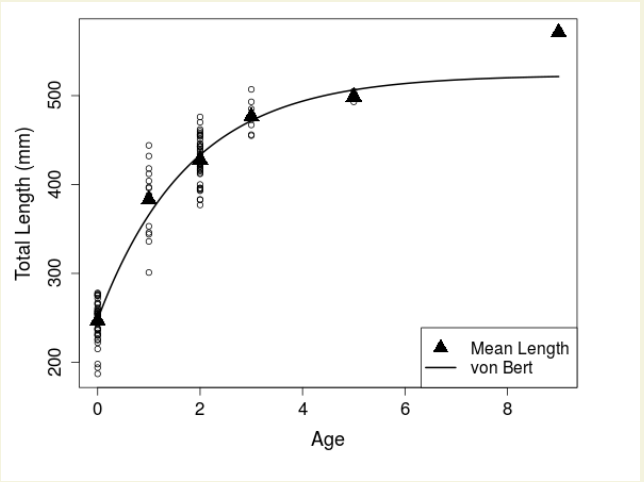
- Forage Limitations
  - Adding more predator mouths to feed

- Adjust rates of other stocked predators
  - Hybrid Striped Bass
    - Reduce from 10 to 5 per acre
  - Striped Bass
    - No future stockings

Hybrid Striped Bass







- High Profile Fishery
  - Will require close monitoring.

Summary

- Diet study concluded in 2016
- Obtained baseline data 2017 and 2018
  - Previous SSP data wasn't tight enough for evaluation
- Alter stockings starting in 2019
  - Double Saugeye stockings to 40 fish/acre
  - Half Hybrid stockings to 5 fish/acre

- Evaluate annually using an objective based approach rather than SSP
  - Minimum five years
  - Adaptive Management

If you can’t beat em…

Eat ‘em!

Questions?


ADF QUALITY
SAE PREFERRED
ADF QUALITY
SAE QUALITY
KOOLS ADF
KOOLS ADF
KOOLS ADF
MEMBRANE
LMB
QUALITY
LMB