

# AGE-0 FISH CHARACTERISTICS IN OXBOW LAKES OF THE LOWER WHITE RIVER, ARKANSAS

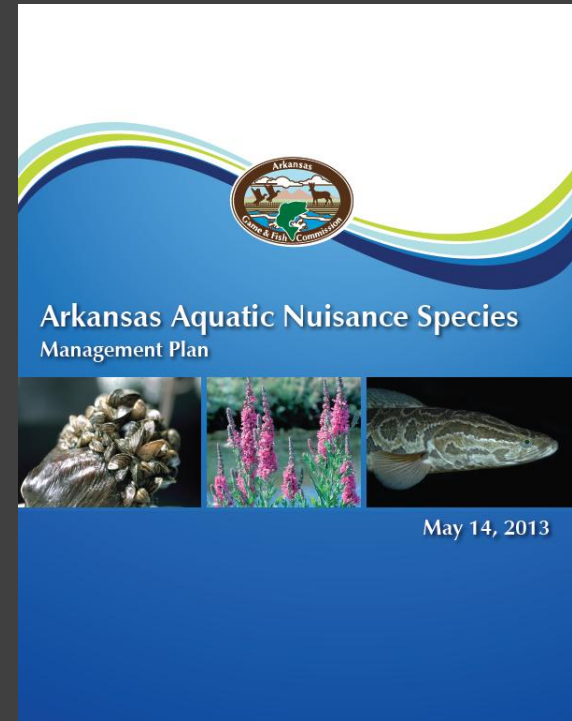
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# Arkansas ANS Management Plan (2013)

- 1) The extent to which the species is invasive and becomes a nuisance
- 2) Economic damage
- 3) Ecological damage
- 4) Harm to human health
- 5) Feasibility of management or control



# “Asian carps”



Bighead carp *Hypophthalmichthys nobilis*



Silver carp *H. molitrix*



Black carp *Mylopharyngodon piceus*



Grass carp *Ctenopharyngodon idella*

# Silver and Bighead Carps

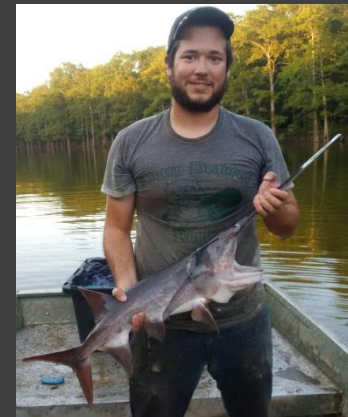
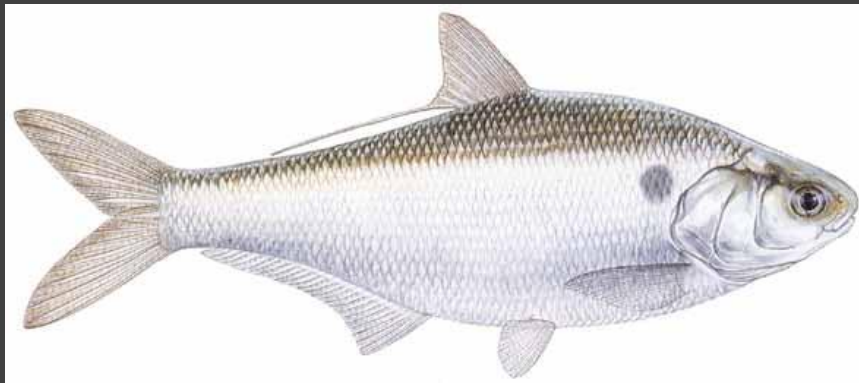
## Introduced to Arkansas in 1973

- **1975:** Found within the White River drainage (Kolar et al. 2005)
- **1980:** Reported within the Arkansas River and White River basins (Freeze and Henderson 1982)
- **1990s:** Range extensions following several years of high flooding in the LMR and its tributaries (Kelly et al. 2011)
- **2000:** Widespread expansion had heightened apprehension over the potential impacts on native fish assemblages
- **2005-2015:** Recorded along the borders of 23 states with self-sustaining populations in the Mississippi, Missouri, Ohio, and Tennessee rivers (Kolar et al. 2005; Schofield et al. 2005; Nico et al. 2016a,b)

# Ecosystem Impacts

Significant dietary overlap with native fish species...

- Highly planktivorous
- More pronounced effects purported for juveniles of native species
- Some competition with adults of some native species
- Ability to switch to smaller or larger planktonic species based on availability (Dong and Li 1994)
- Declines in native species condition coincides with widespread growth of Asian Carps (Irons et al. 2007)



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# Objectives

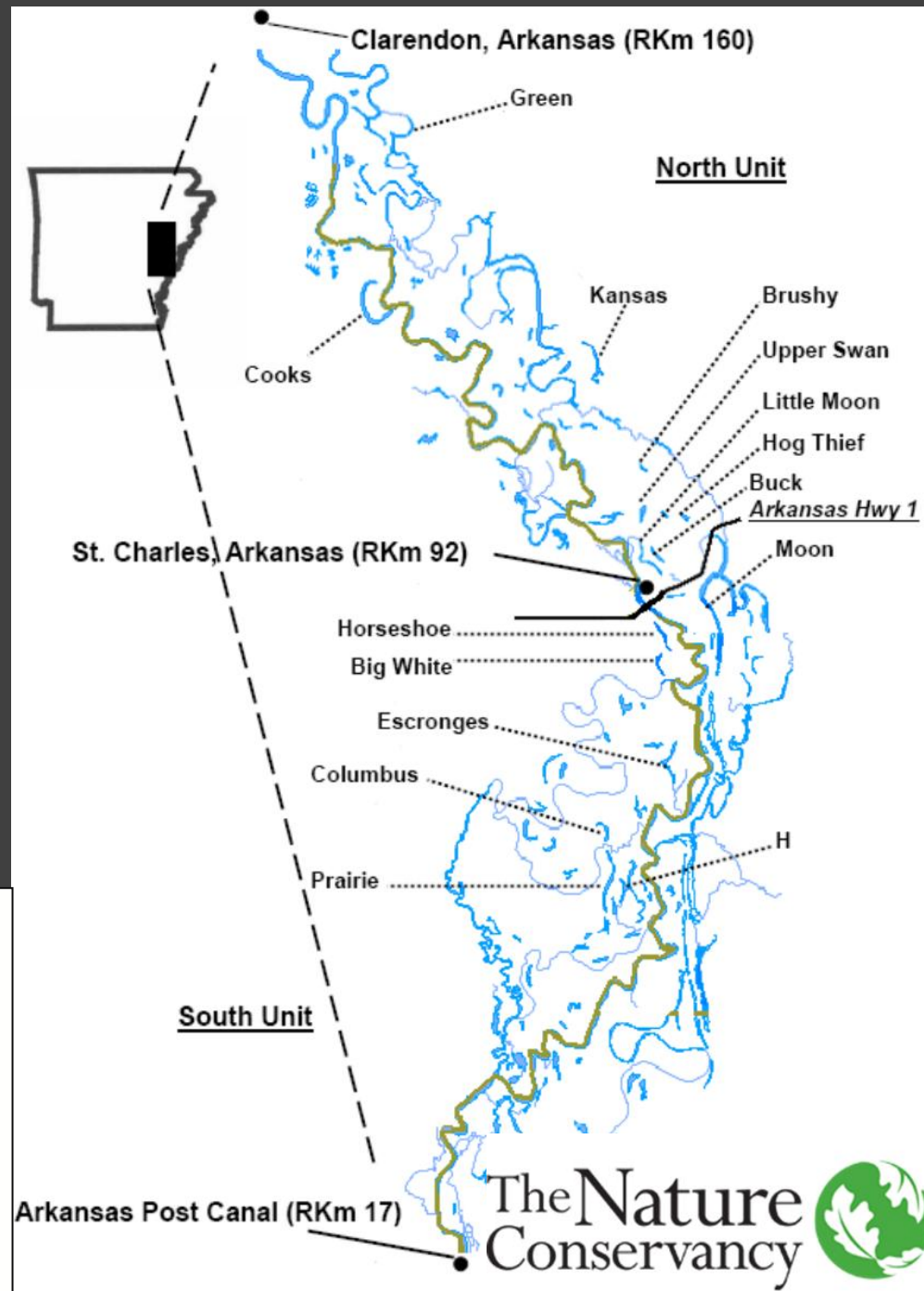
1. Quantify juvenile (age-0) fish characteristics (e.g., abundance, growth, and condition) of selected fish species in lower White River oxbow lakes, and
2. Examine the relationships between juvenile fish characteristics and carp densities in these same lakes.



# Study Area

## Dale Bumpers White River National Wildlife Refuge (WRNWR)

- 65,000 ha bottomland hardwood forest floodplain habitat
- Downstream of Clarendon
  - Rkm 16-161
- ~360 floodplain lakes >2 ha
  - 100s of lakes <2ha

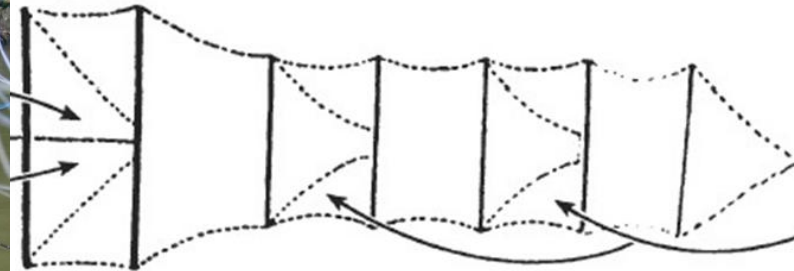




# Multi-Gear Fish Collections



Fyke Net  
Top View



Funnel  
Throats



Done in replicate in all study lakes during July-August and  
October-November 2017

# Target species

## Species Examined

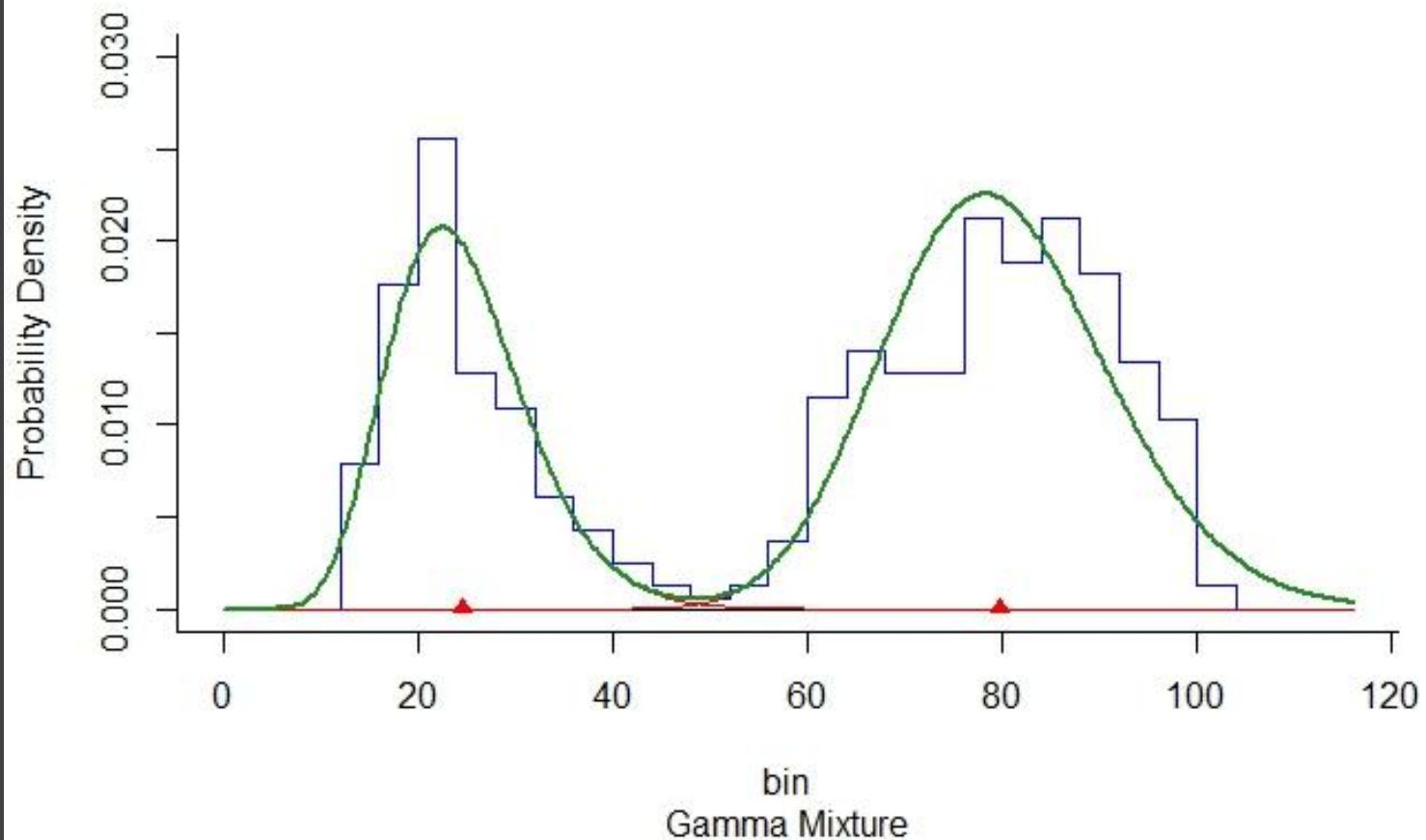
- Assessing nine (9) “target species”:
  - Four piscivores
    - *Micropterus salmoides*, *M. punctulatus*, and *Pomoxis spp.*
  - Two planktivores
    - *Dorosoma cepedianum* and *D. petenense*
  - Two omnivores
    - *Lepomis macrochirus* and *L. humilis*
  - One common cyprinid (omnivorous)
    - *Notropis texanus*
- Representatives from most major trophic guilds and a common cyprinid



# Cohort determination

P=0.00022

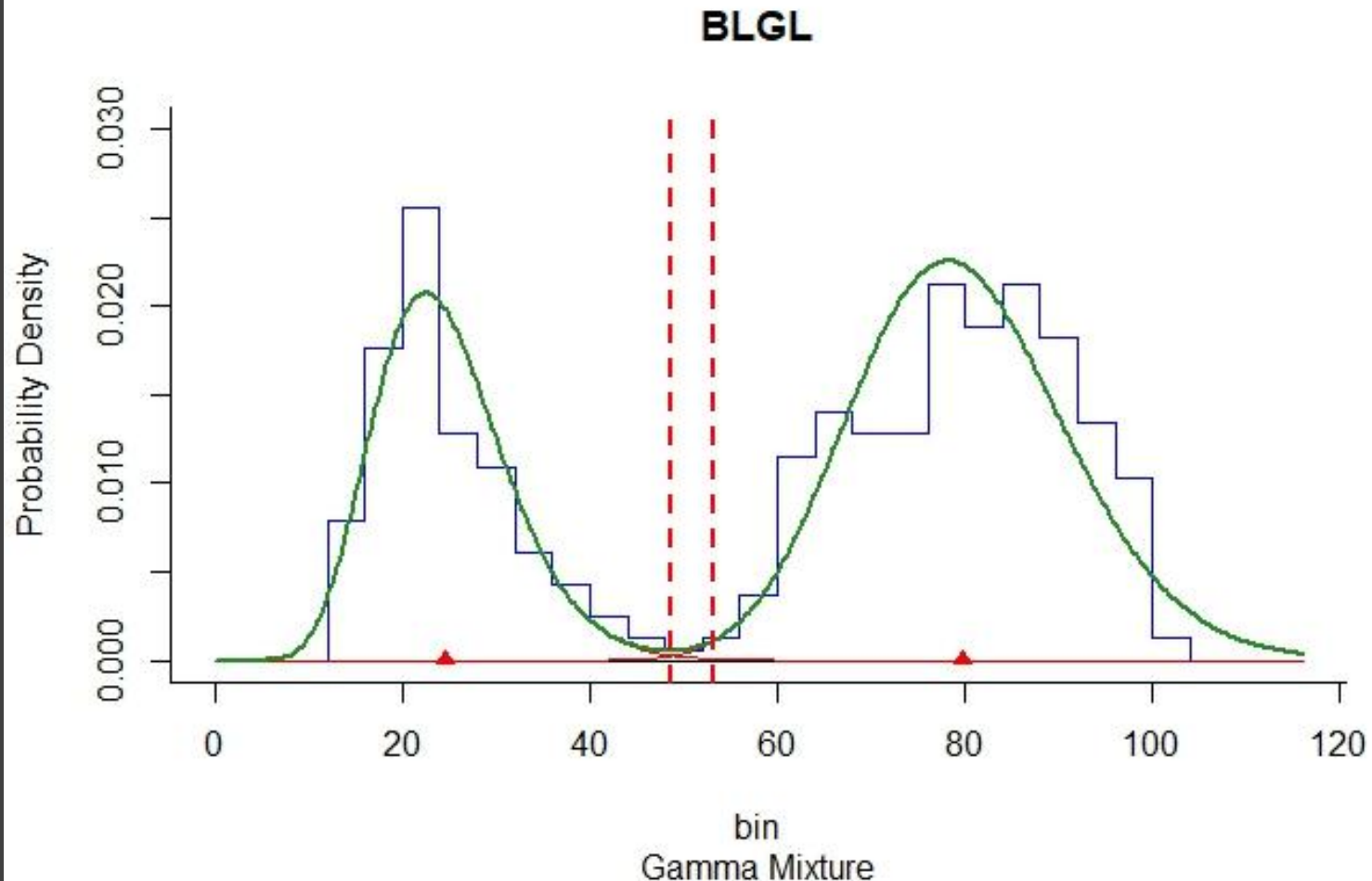
**BLGL**





# Cohort determination

P=0.00022



# Age-0 maximum length from summer data only

- Crappie spp. – 100+ mm
- Bluegill – 49 mm
- Gizzard Shad – 120 mm
- Largemouth Bass – 130 mm
- Orangespotted Sunfish – 40 mm
- Spotted Bass – 116 mm
- \*Threadfin Shad – 100 mm
- \*Weed Shiner – 100 mm

*\*Small-bodied species- cohort determination problematic*



# Silver Carp rank abundances

## from previous talk

Lake	Summer	Fall	Mean Rank*
Cooks	4.1	1.3	2.7
Prairie	4.1	2.8	3.4
Kansas	5.4	3.4	4.4
Escronges	3.3	7.9	5.6
Columbus	4.5	9.1	6.8
Little Moon	8.0	7.0	7.5
Hog Thief	8.4	6.9	7.6
H	8.0	9.6	8.8
Moon	10.1	8.1	9.1
Green	11.1	8.0	9.6
Buck	8.5	11.6	10.1
Brushy	12.3	9.4	10.8
Big White	10.4	11.5	10.9
Horseshoe	11.1	10.8	10.9
Upper Swan	10.8	12.8	11.8

↑  
Increasing carp abundances

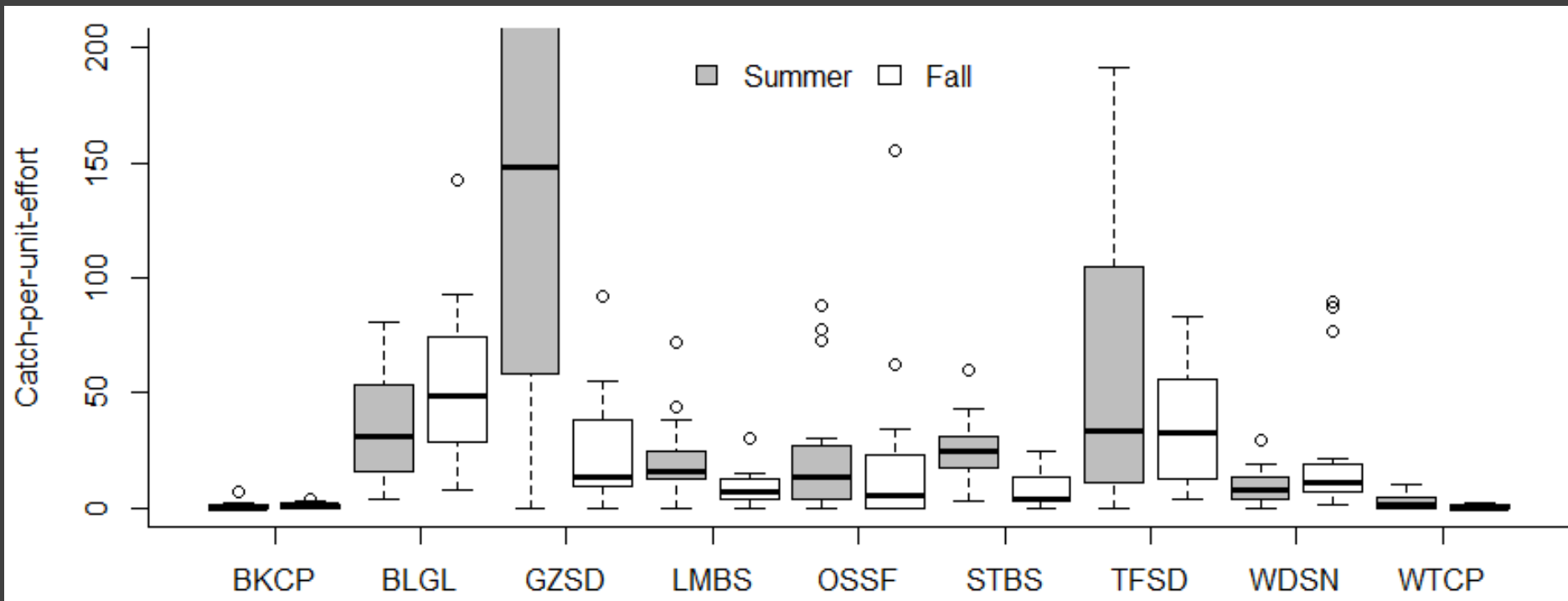
\*averaged across all gears and both seasons



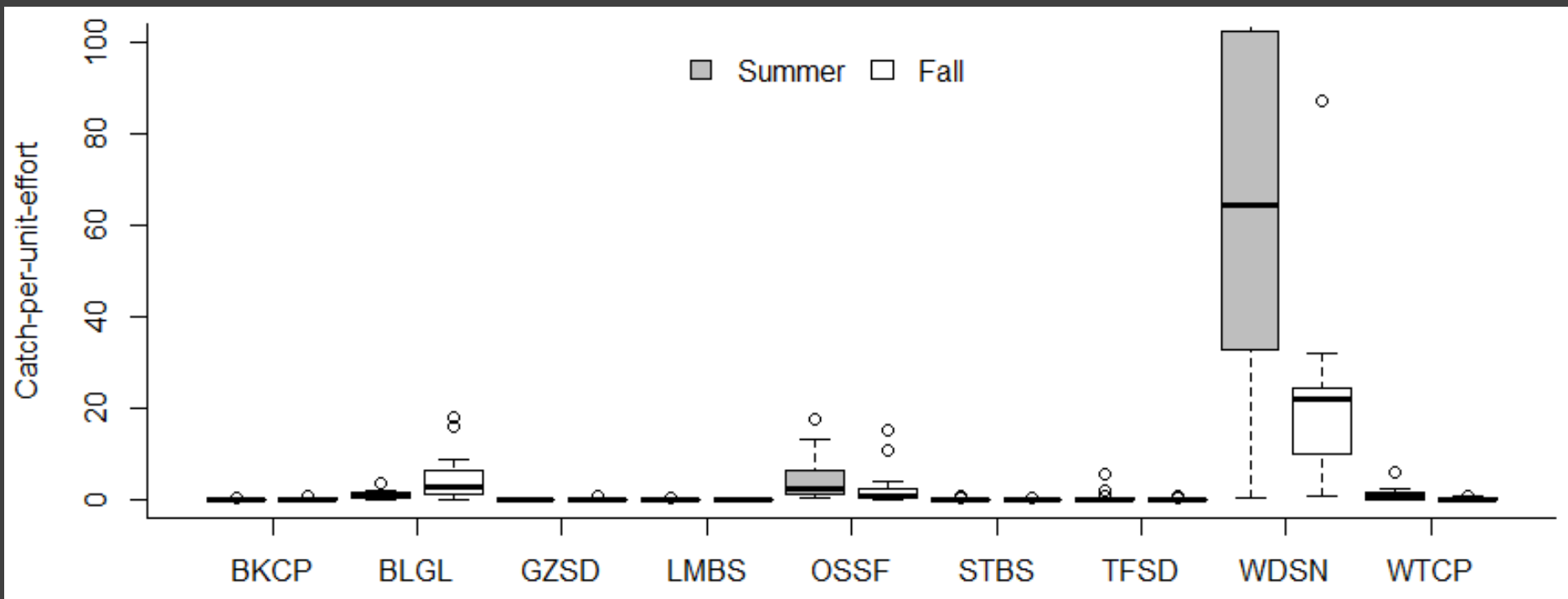
# Results



# Electrofishing CPUE



# Mini-fyke CPUE





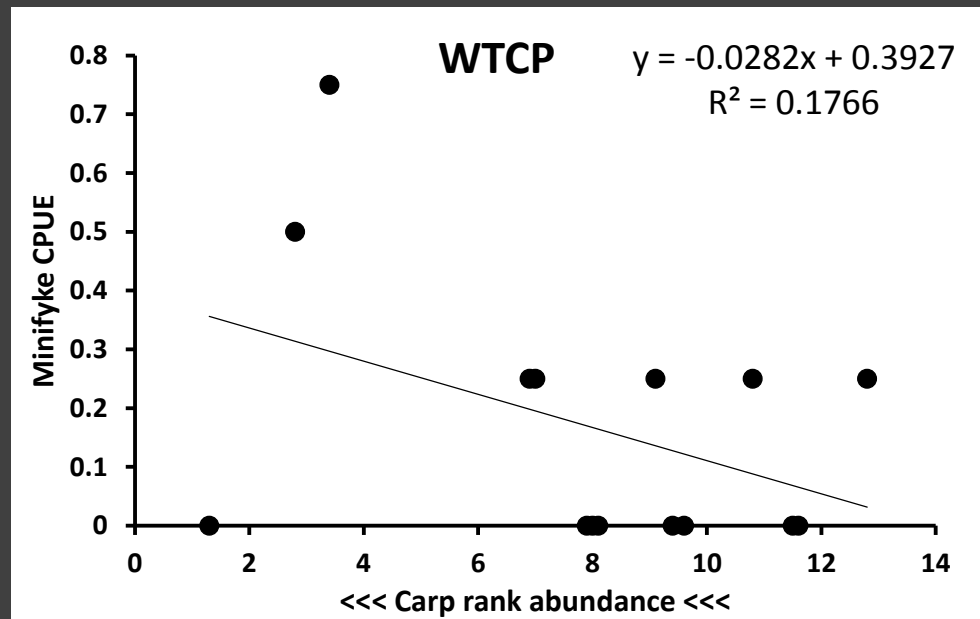
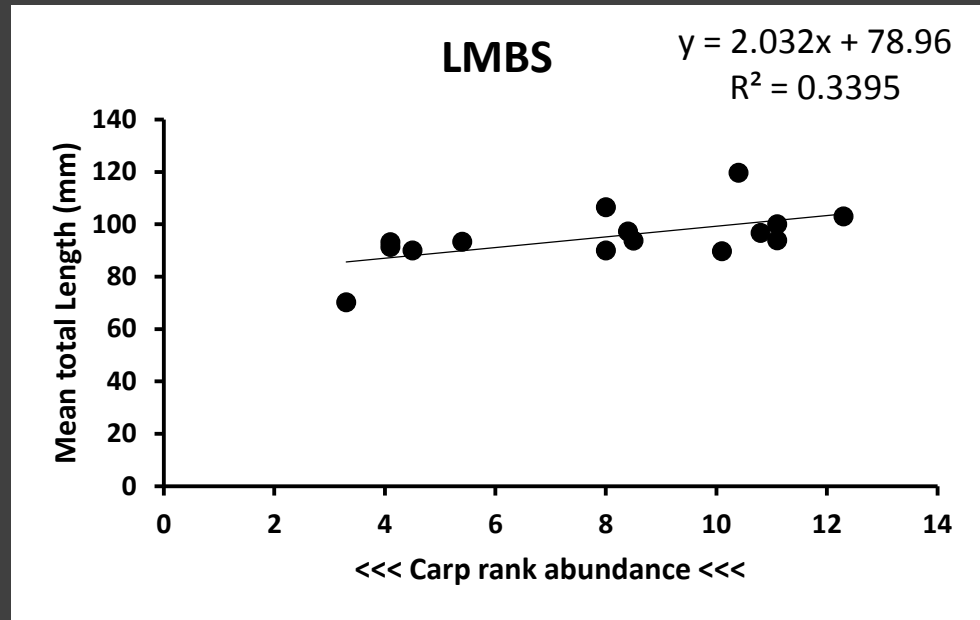
# Summer

- **LMBS:** Mean length inversely related to carp abundance ( $P=0.023$ )

*Possible competition?*

- **WTCP:** CPUE directly related to carp abundance ( $P=0.046$ )

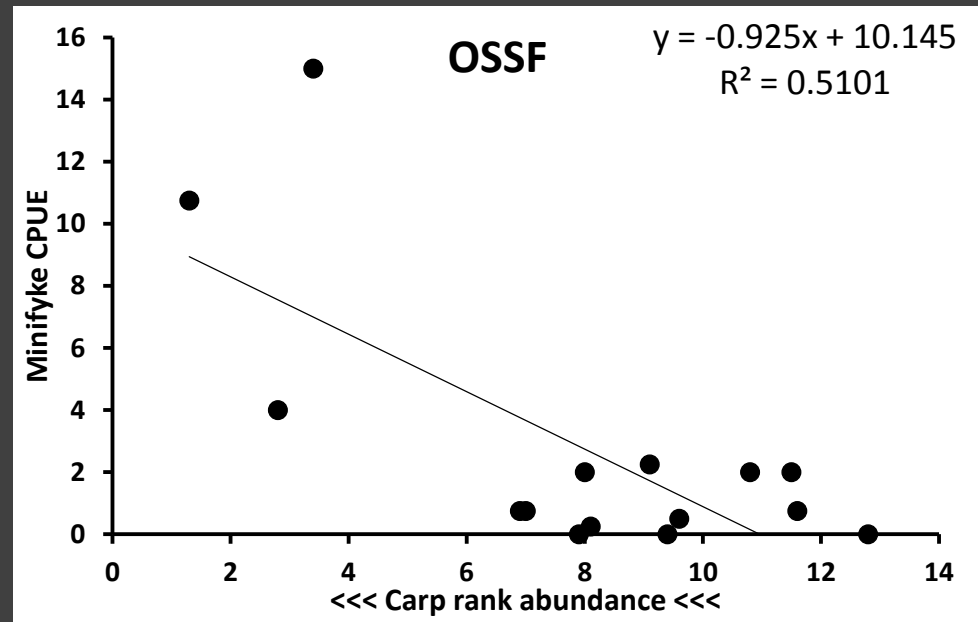
*Possible habitat or lake productivity influence?*



# Fall

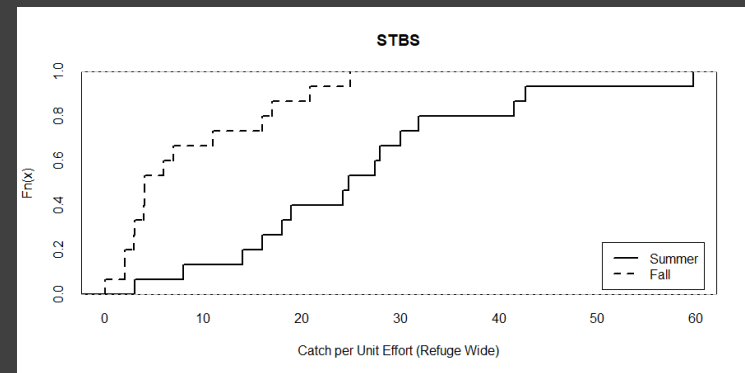
- **OSSF**: CPUE directly related to carp abundance (P=0.003)

*Environmental influence?*



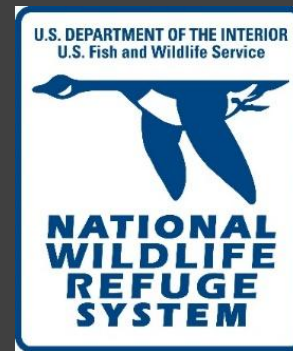
# Summary

- CPUE differences prevalent between summer and fall seasons
- Both inverse and direct relationships to increasing carp densities for some species
- Future analyses – multivariate approaches including env. data
- PCA
- Multiple regression
- Analysis of mean length/weight distributions for each target species and lake using K-S tests



# Acknowledgements

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# Questions



