INVESTIGATING BIGHEADED CARP ADULT AND ICHTHYOPLANKTON PRESENCE IN TRIBUTARIES OF ILLINOIS RIVERS

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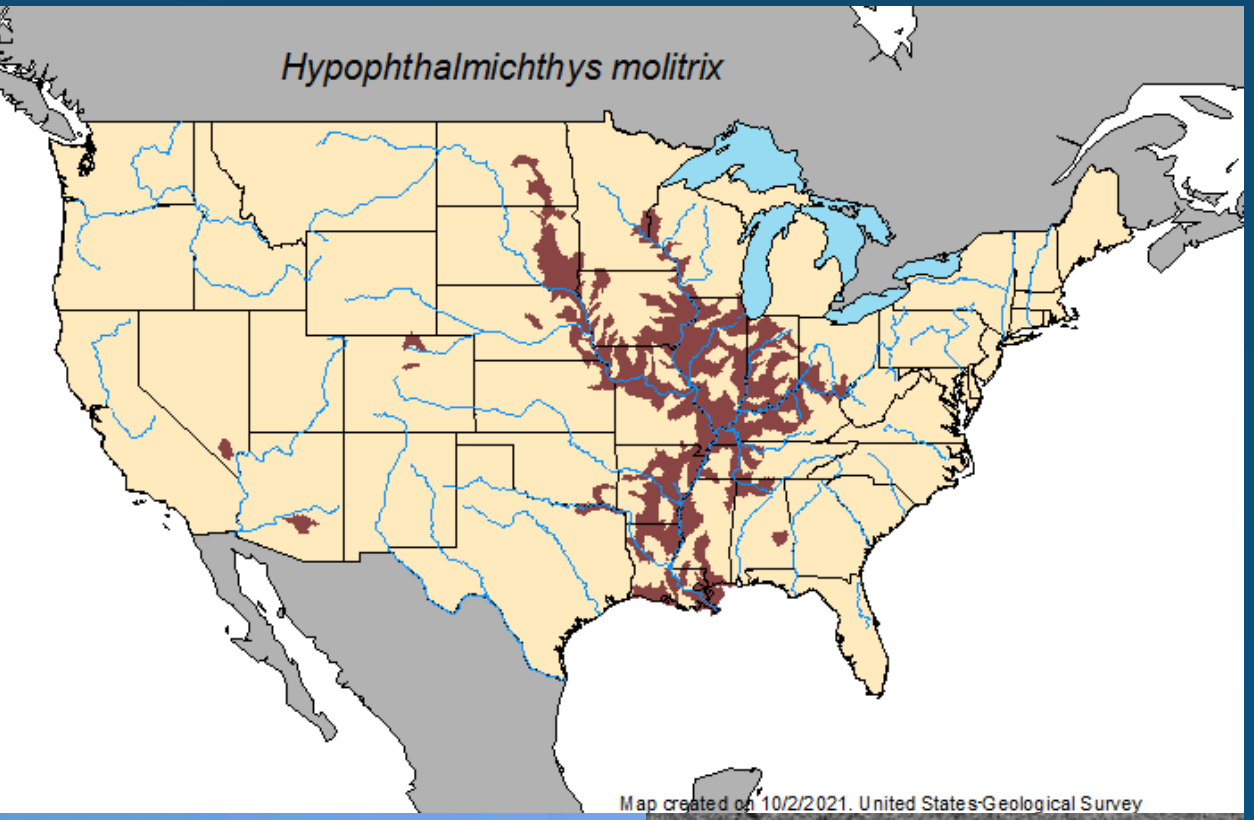
Black Carp (*Mylopharyngodon piceus*)

Grass Carp (*Ctenopharyngodon Idella)*

Bighead Carp (*Hypophthalmichthys nobilis*)

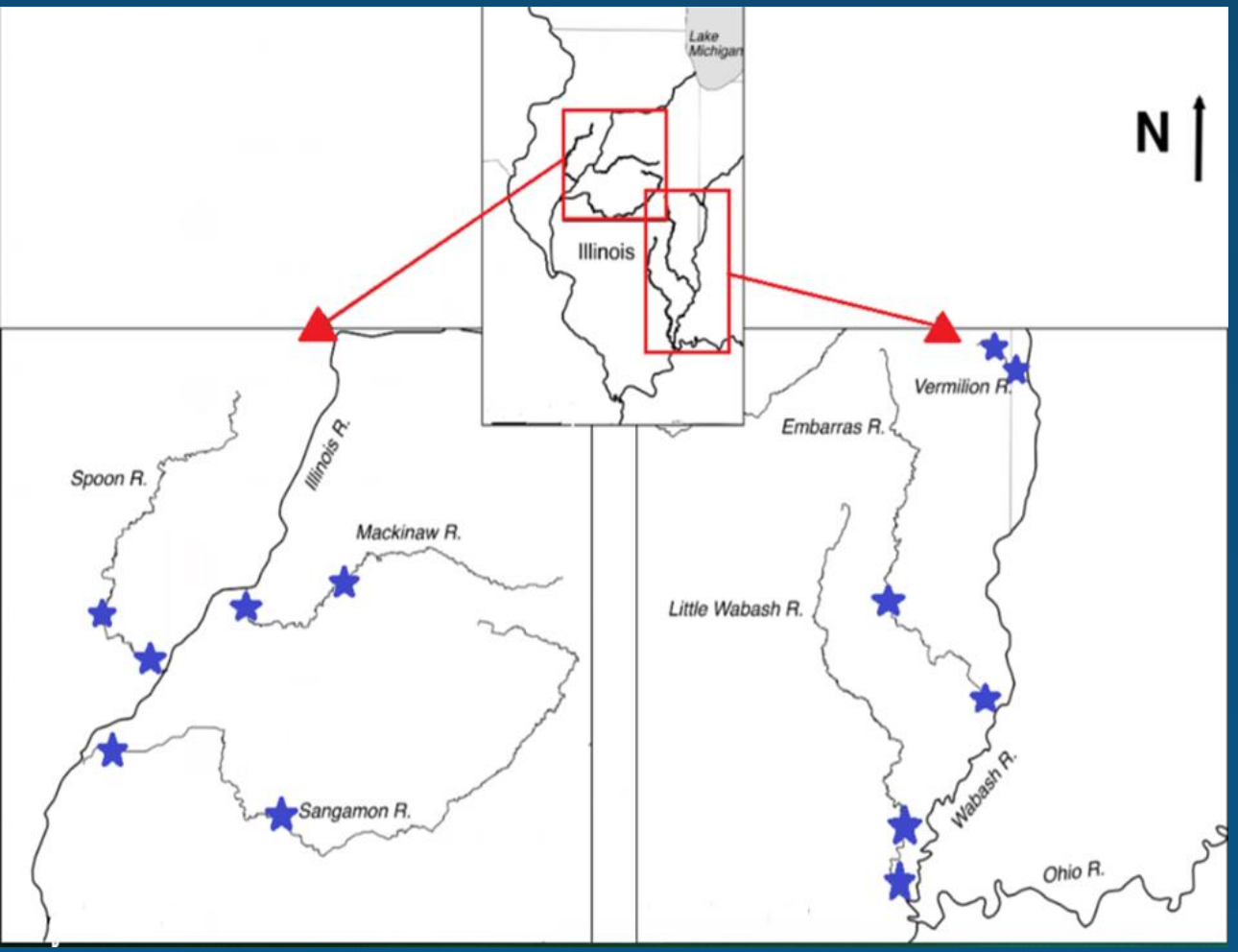
Silver Carp (*Hypophthalmichthys molitrix*)



BIGHEADED CARP

- Silver Carp, Bighead Carp
- Highly invasive
- Reproduction, lotic, high fecundity
- Restructure communities (Solomon et al. 2016).
- Competition with native planktivores (Sass et al. 2014).
- Hazard to boaters
- Threat to Great Lakes

TRIBUTARY RIVERS

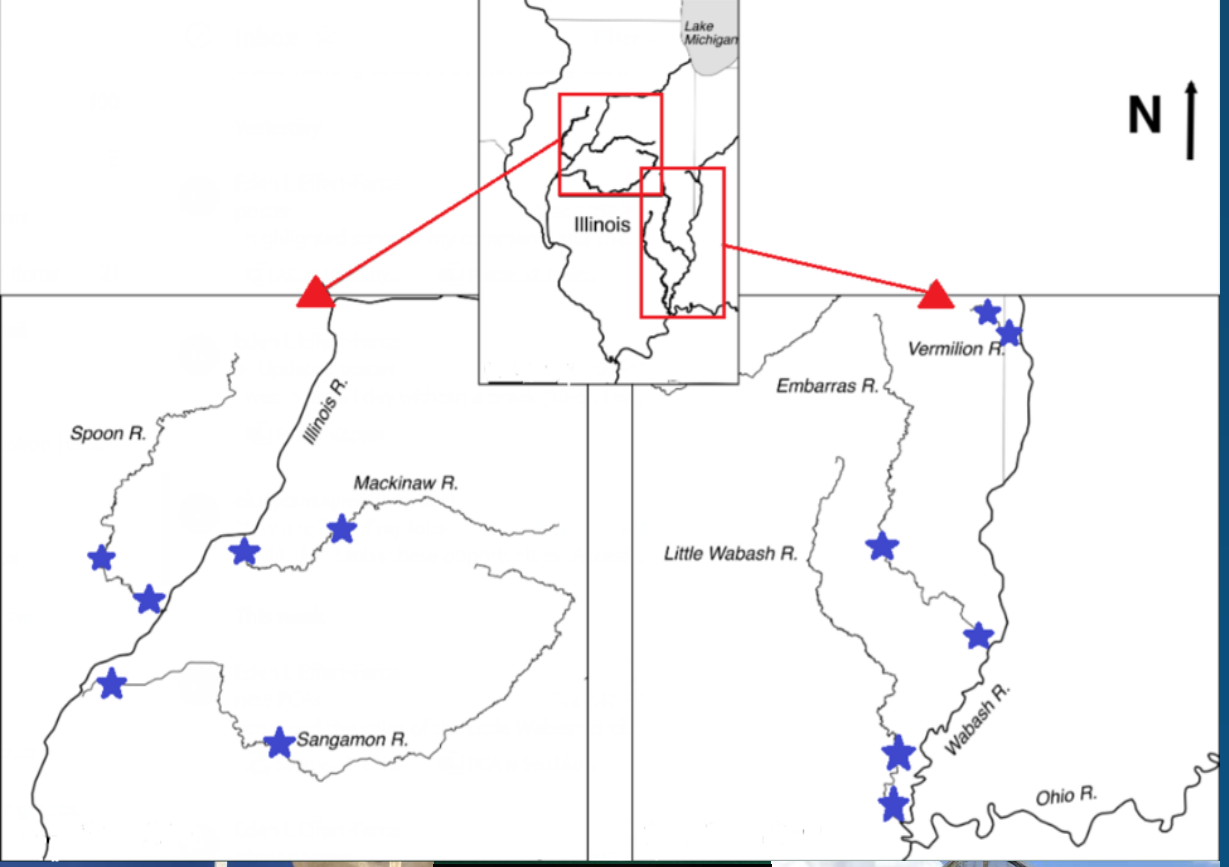


Illinois Watershed Wabash Watershed

- Less research in tributary rivers
  - Length < 500 river km
  - Mean discharge <110 m^3/s
- Illinois River tributaries
  - Mackinaw River
  - Spoon River
  - Sangamon River
- Wabash River tributaries
  - Vermilion River
  - Embarras River
  - Little Wabash River

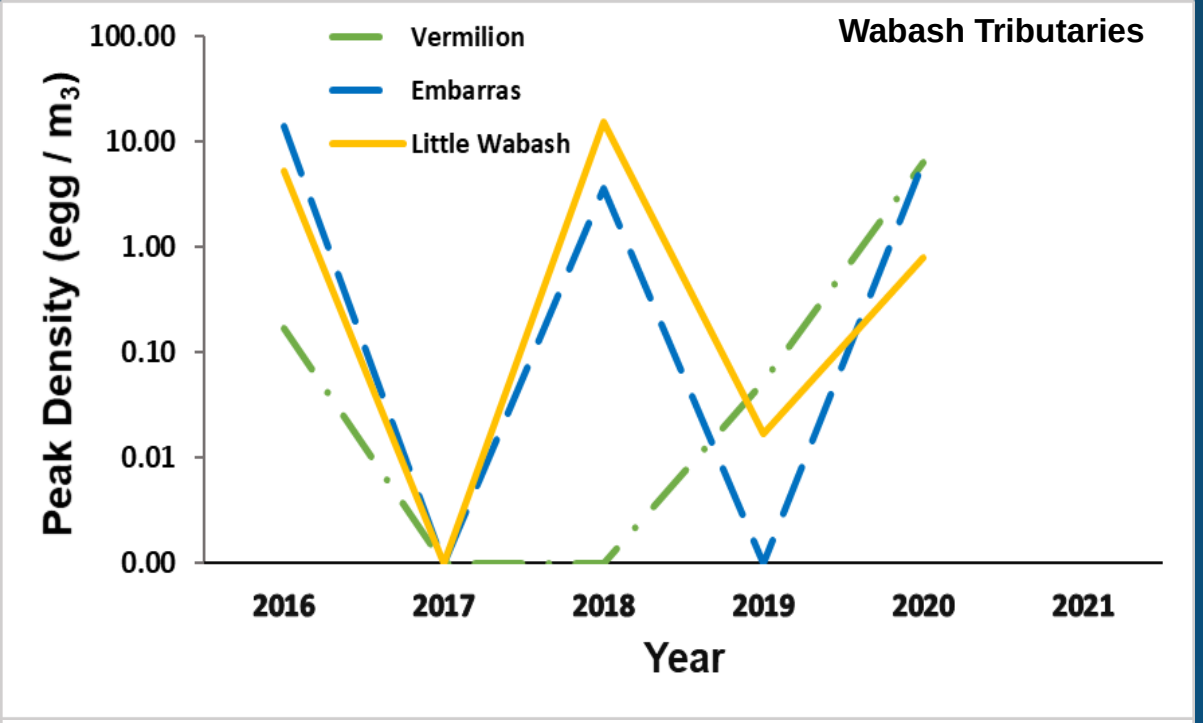
GREAT LAKES AND TRIBUTARY RIVERS

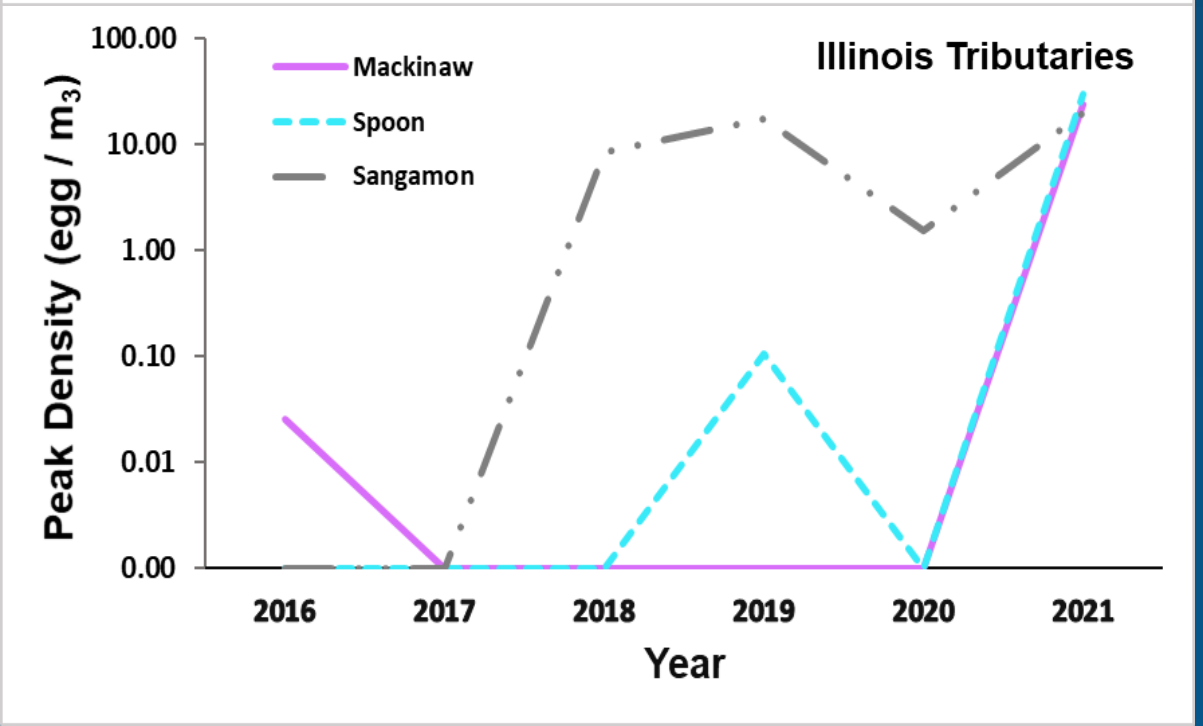
- Great Lakes Basin
  - Characterized by small rivers
- Tributary rivers
  - Provide spawning habitat for carp populations



PREVIOUS RESEARCH AT EIU

- Evaluation of ichthyoplankton sampling gears (Roth et al. 2021)
- Carp eggs, larval fish density (Schaick et al. 2021)
  - Differences among rivers
  - Corresponding differences in river characteristics



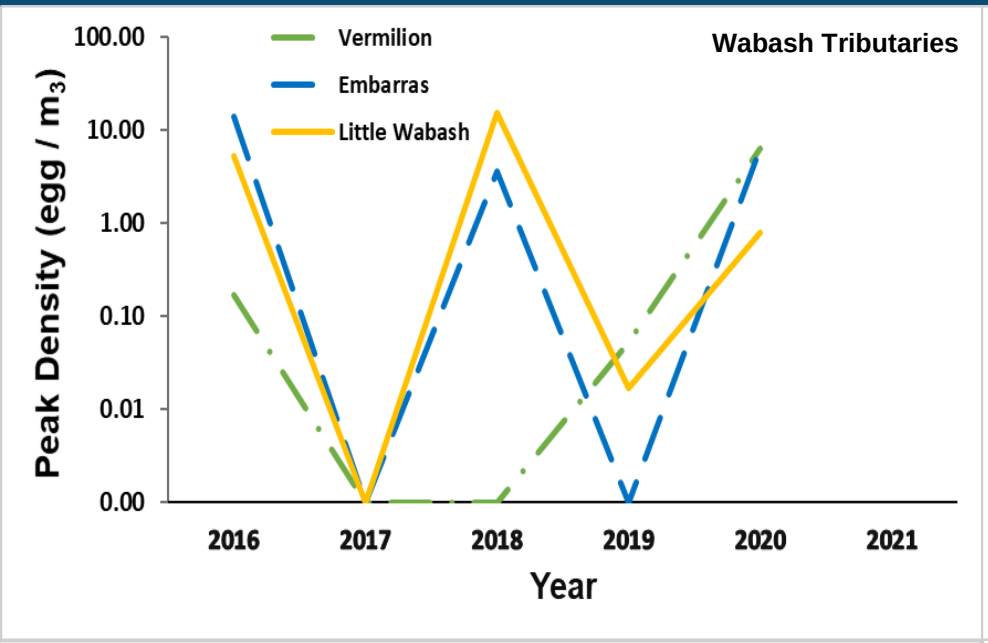


BIGHEADED CARP EGG DENSITIES

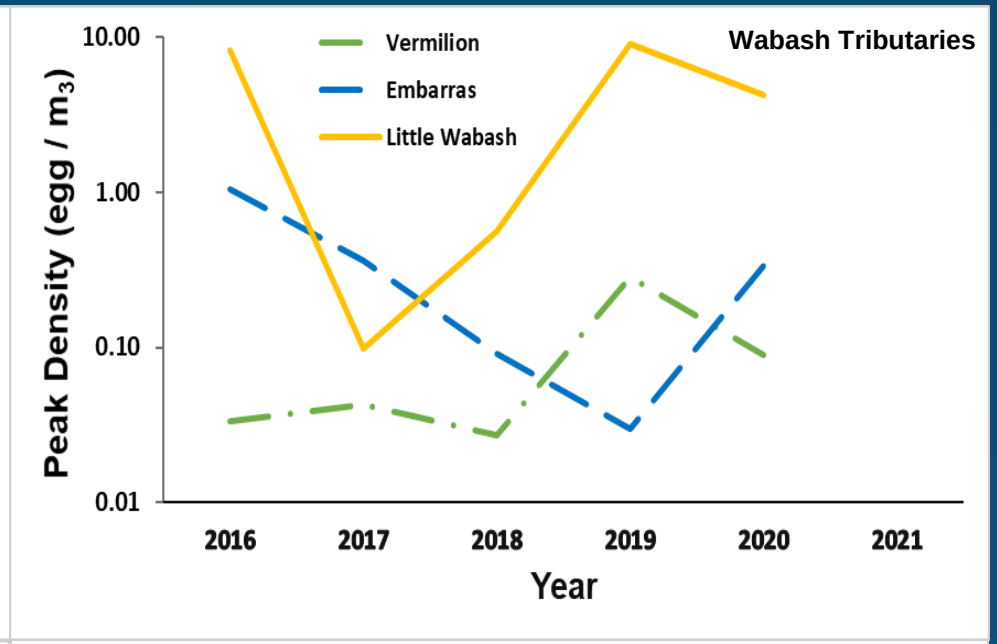
- Annual variability
- Synchrony in Wabash tributaries
- Increase in Vermilion River post dam removal
- Differences among tributaries
- All Illinois tributaries high density 2021

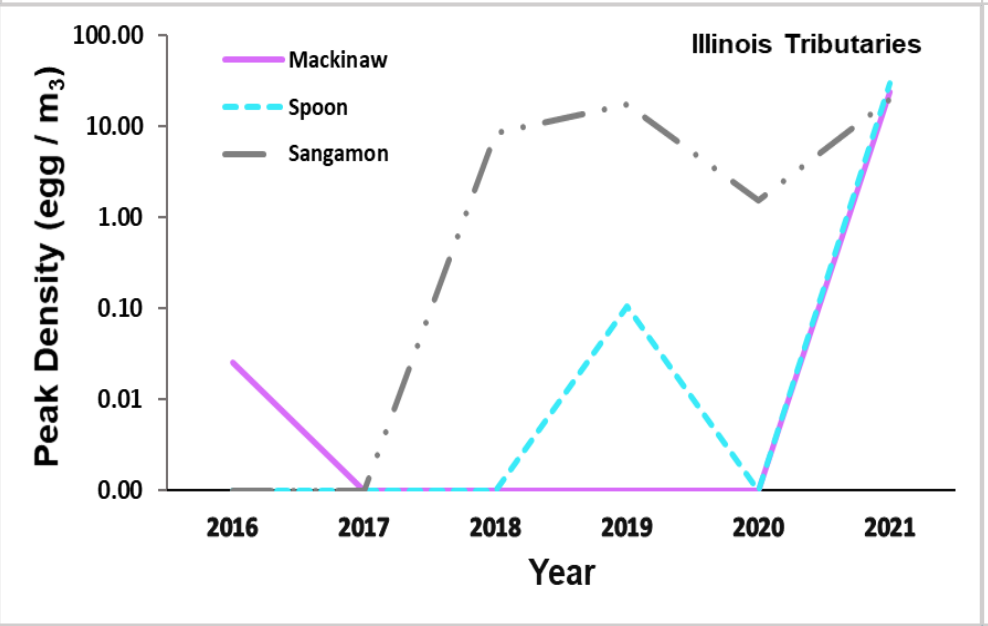
ICHTHYOPLANKTON TRENDS

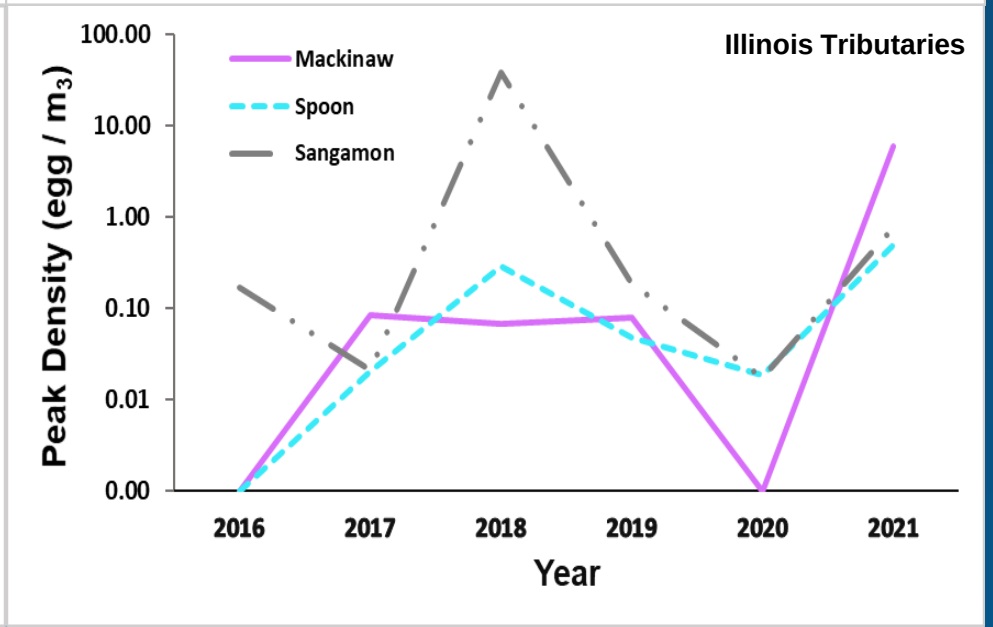
Bigheaded Carp Egg Density



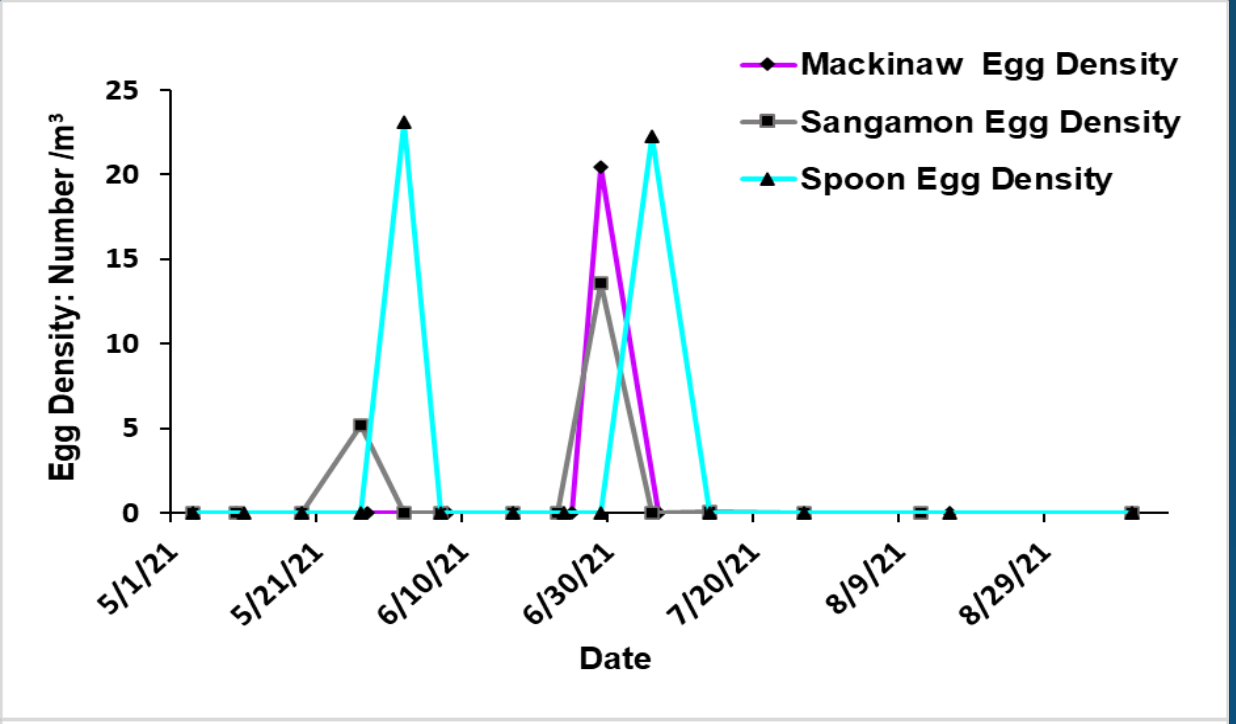
Bigheaded Carp Larval Fish Density

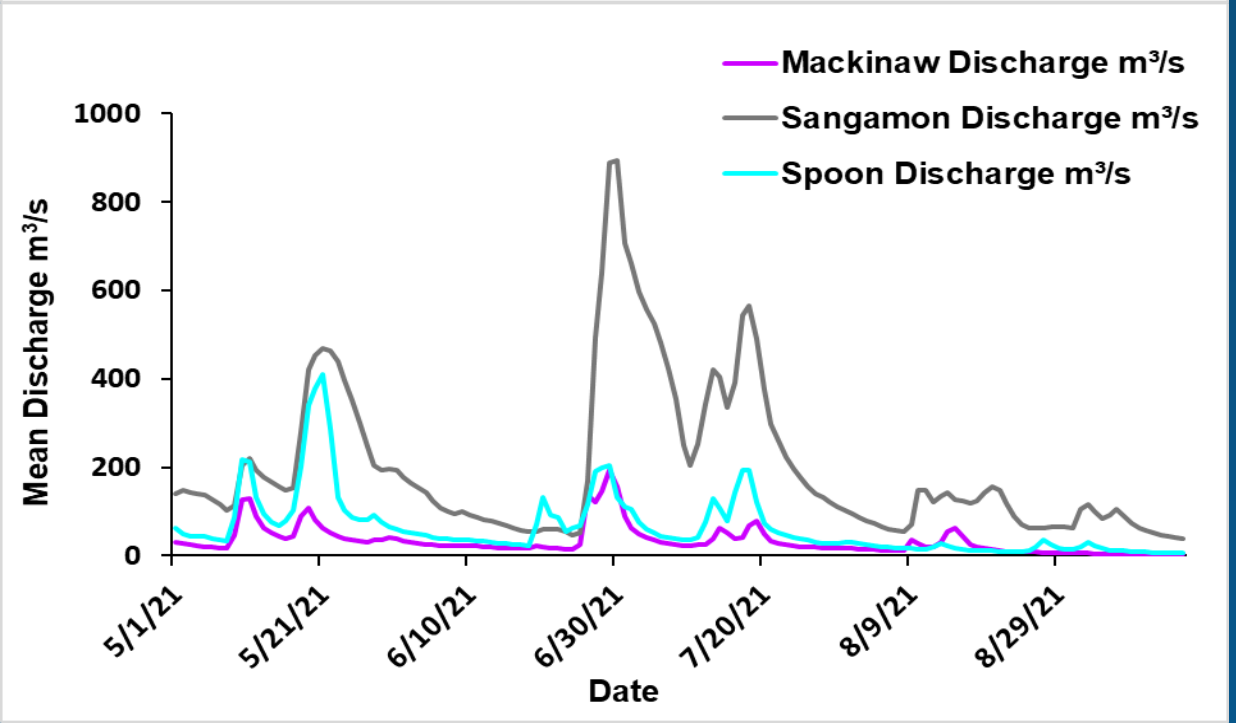






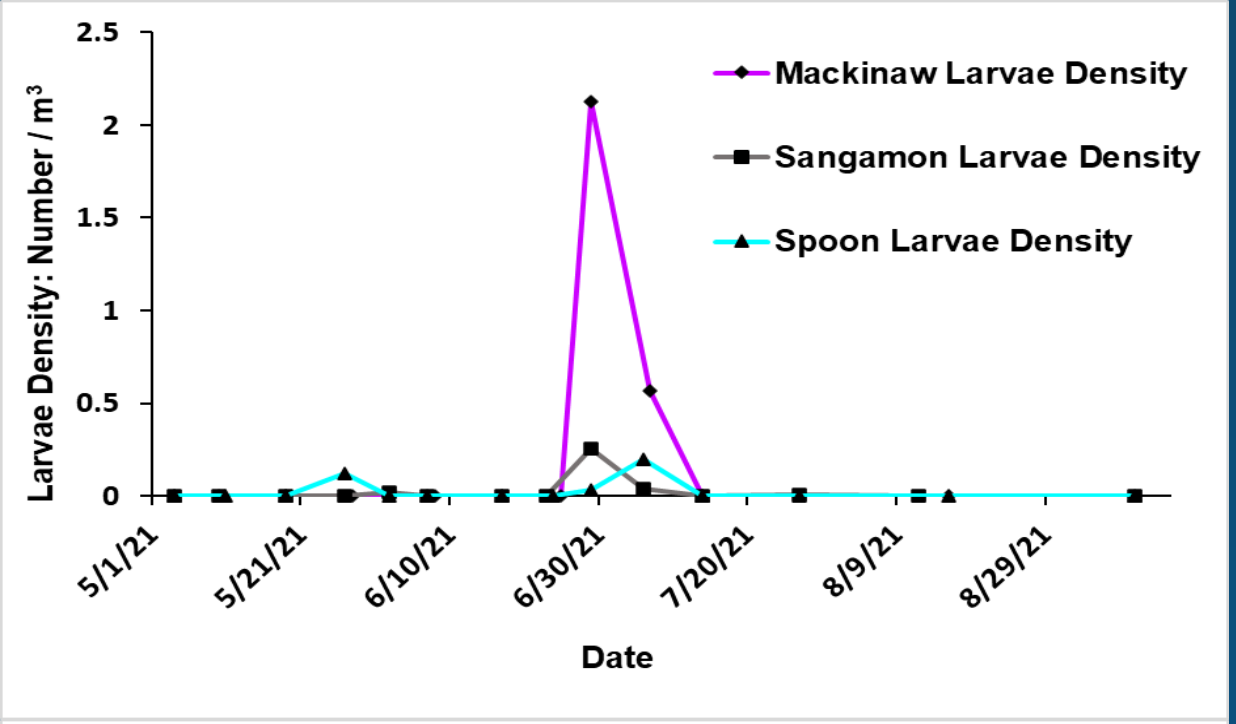
- Larval fish densities differed among years
- Differences among tributaries
- 2021 Production

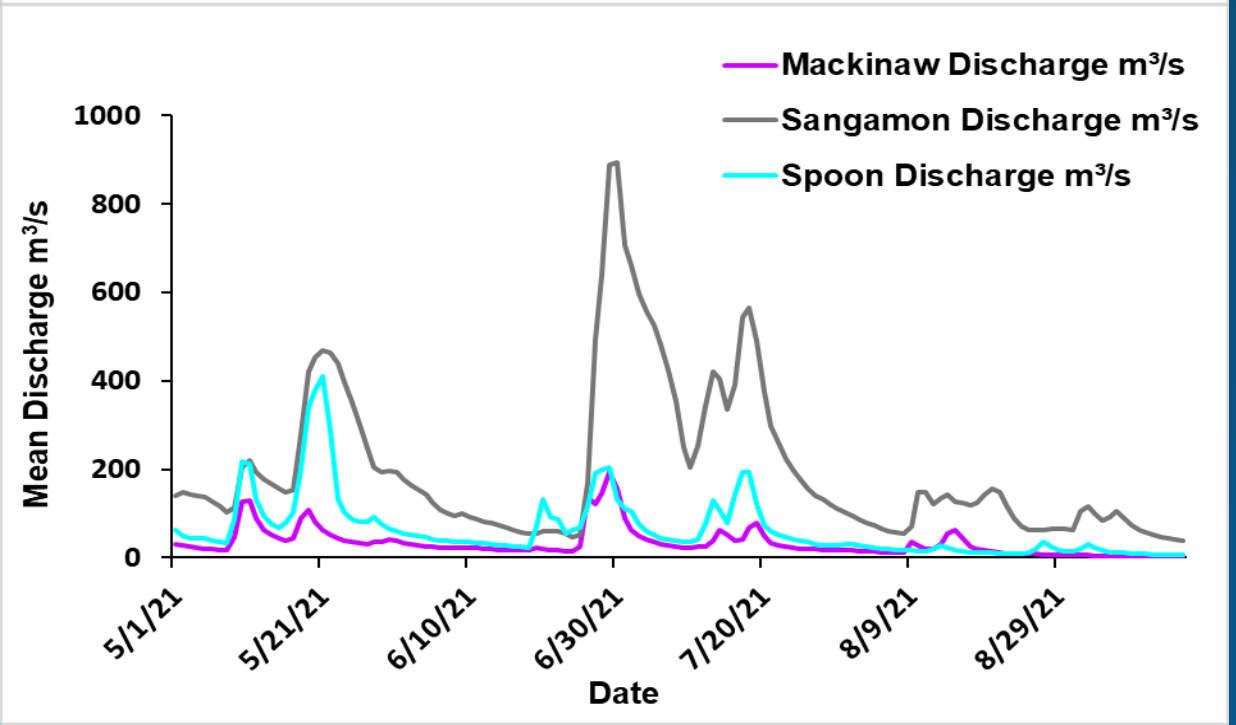




2021 EGG DENSITIES

- Synchrony among tributaries
- Egg production associated with high discharge





2021 LARVAE DENSITIES

- Most larvae collected in Mackinaw

HYPOTHESES AND OBJECTIVES

- Adult carp populations will show similar relative abundance trends to ichthyoplankton in tributaries
- Objectives:
  - Assess relative abundance
  - Examine Gonadosomatic Index

METHODS

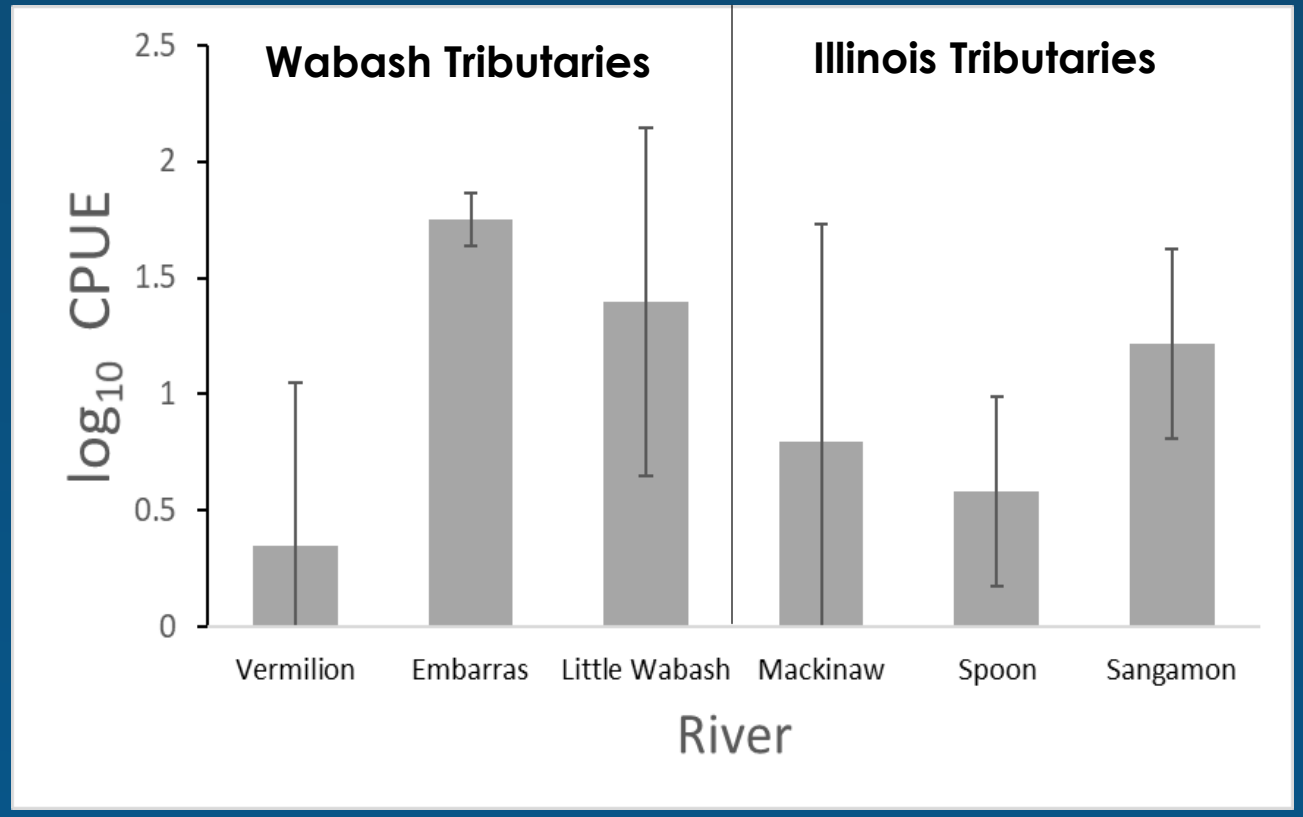
- DC electrofishing
  - Modified electrofishing method (Bouska et al. 2017).
  - Each site sampled April and May
  - Two 15 minute transects

- Data collection
  - Total length and weight
  - Gonads (GSI)
  - Postcleithrum (for aging)
  - Abiotic data collection

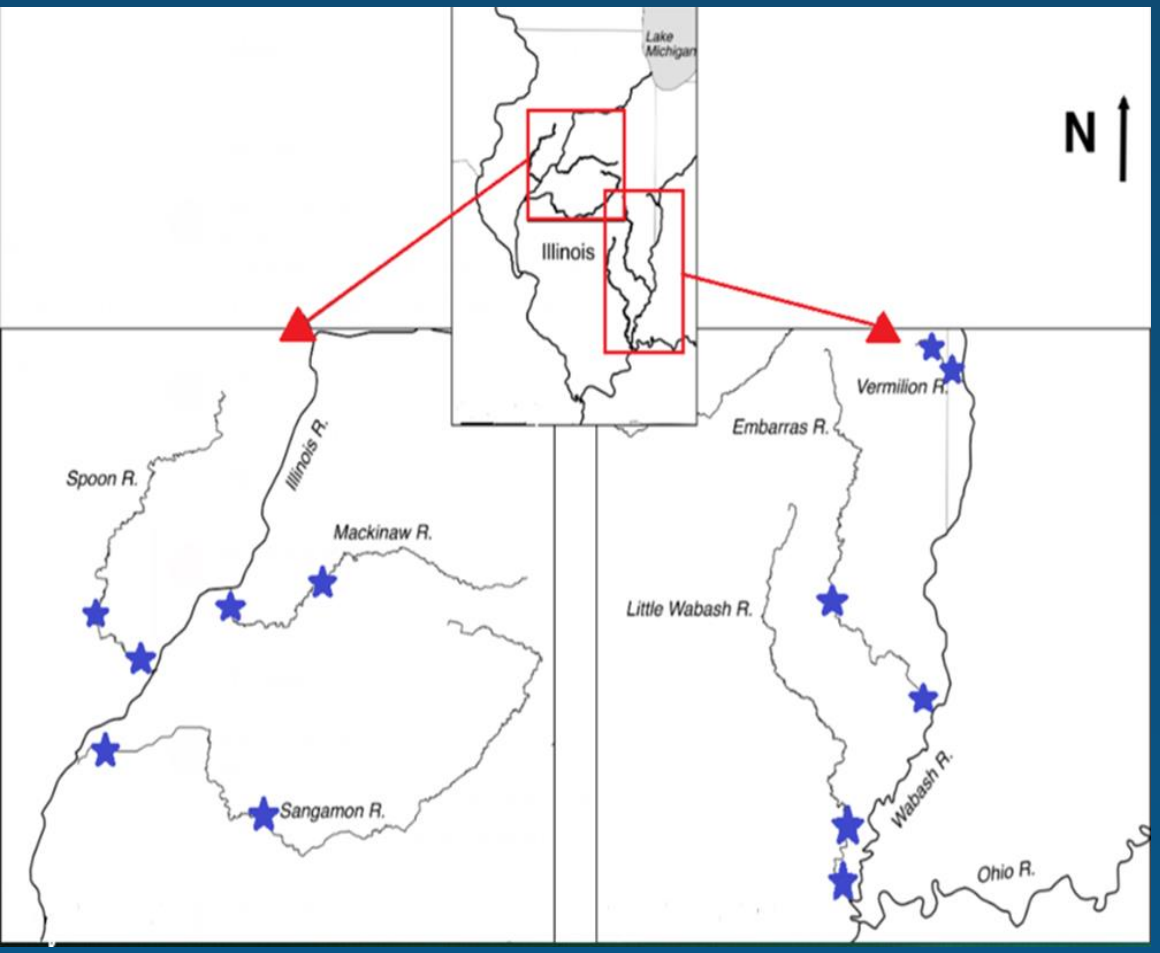
DATA ANALYSIS

- Tested for differences in mean CPUE (fish/hr) by tributary
- Log_{10} transformed CPUE values
- ANOVA test for differences in mean CPUE
- Tested for differences in mean GSI

RESULTS CPUE



- ANOVA on $\log_{10}$ CPUE
  - df = 5, 17; F = 3.12
  - p = 0.035
- Mean CPUE
  - Highest in Embarras, Little Wabash, and Sangamon
  - Lowest in Mackinaw, Spoon, Vermilion



Average Gonadosomatic Index (GSI)			
	Embarras April GSI	Embarras May GSI	Little Wabash April GSI
Female	7.475*	15.322*	12.423*
Male	0.983	1.136	0.895
Temperature	12℃	22℃	18℃
% Female	25.00%	29.17%	55.17%
% Male	75.00%	70.83%	44.83%

- Female GSI differed between April-May
  - Wilcoxon Rank Sum: p = 0.003
- Female April GSI differed between Little Wabash and Embarras
  - T-Test: df = 17.0, p = 4.462e-06 (<0.05)
- April EM Female-Male ratio differed from 1-1
  - Analysis of Proportions: p = 0.008

DISCUSSION

- Limitations
- Adult relative abundance
- Future directions
  - Combine with 2021 ichthyoplankton data
- Usage of Tributaries

QUESTIONS?

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