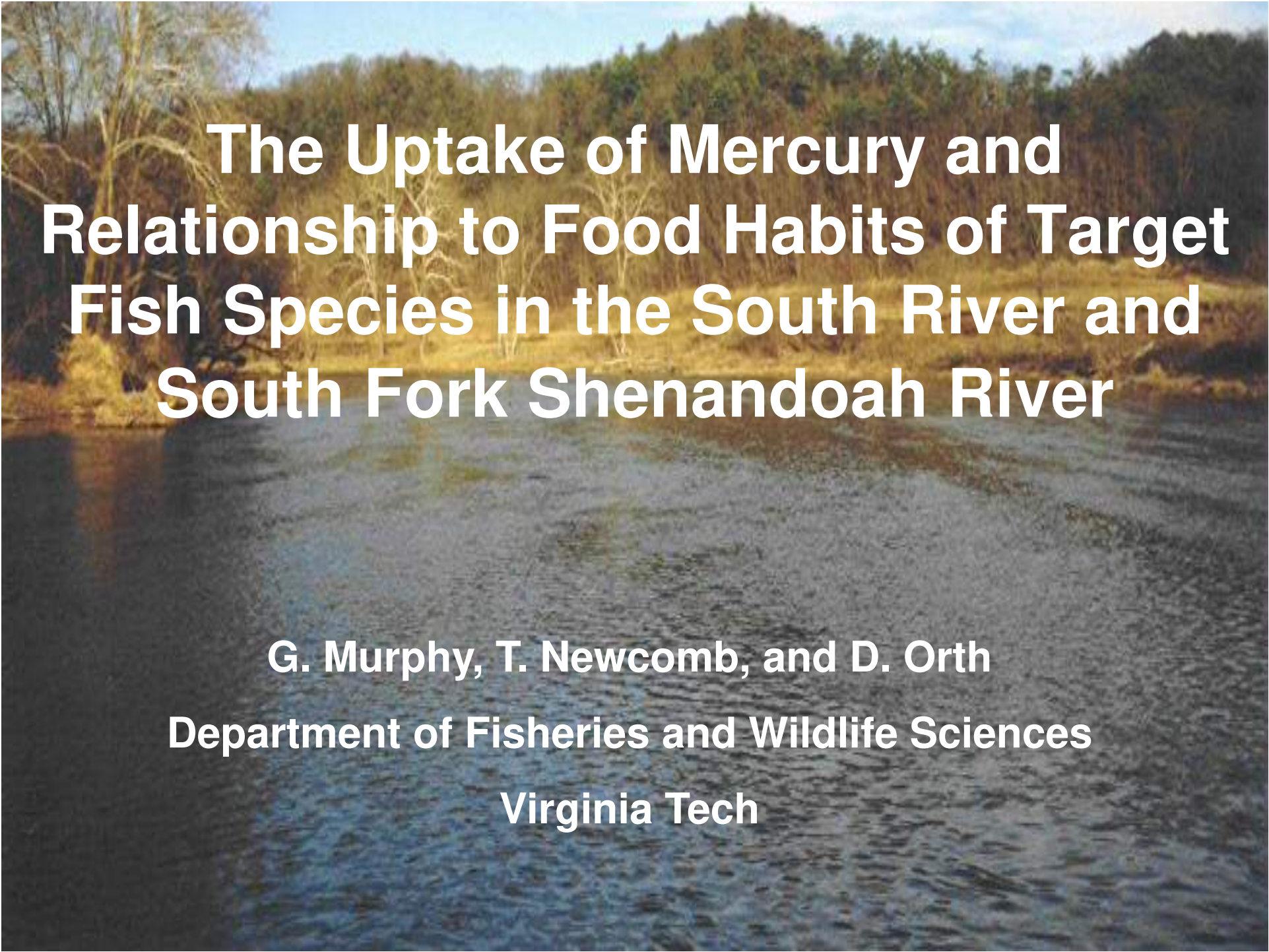




The Uptake of Mercury and Relationship to Food Habits of Target Fish Species in the South River and South Fork Shenandoah River

G. Murphy, T. Newcomb, and D. Orth

Department of Fisheries and Wildlife Sciences

Virginia Tech

Virginia Tech Study

OBJECTIVE 1:

- Determine diet composition of the target fish species in study and references reaches



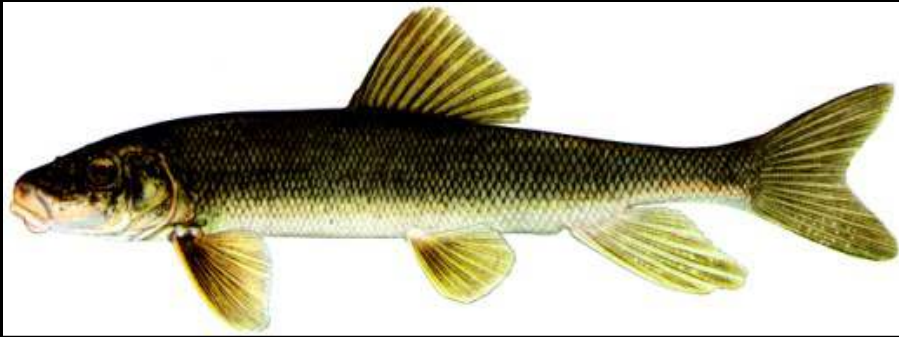
Asian clam



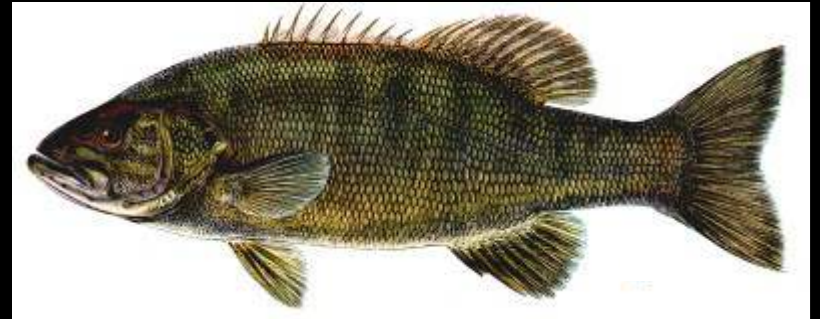
Darter

Target Fish Species

White sucker



Smallmouth bass



Channel catfish

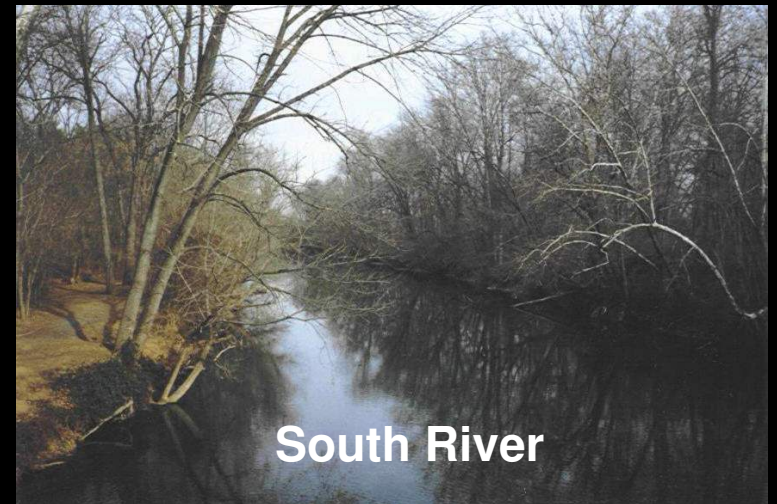


Redbreast sunfish

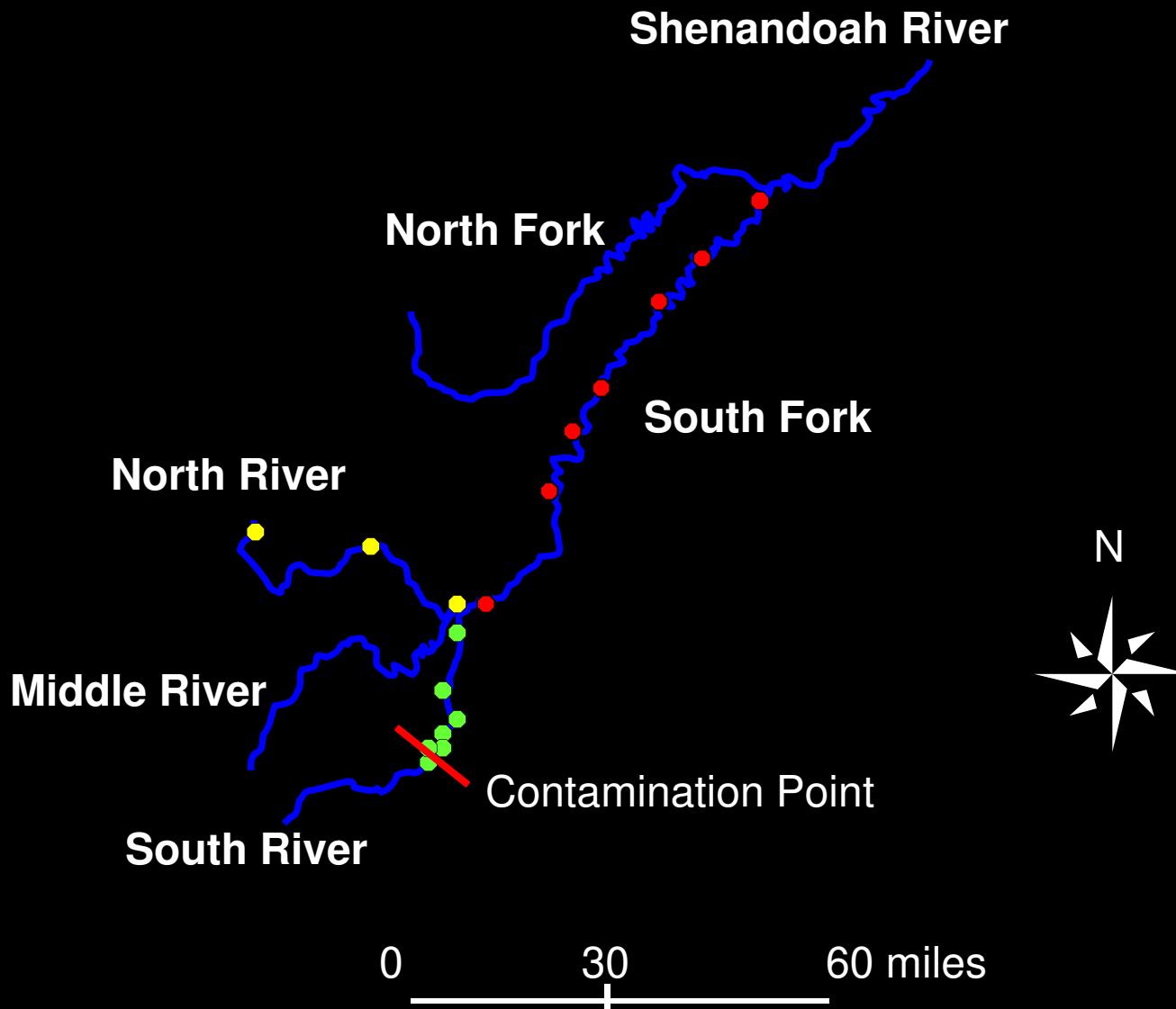


Study Reaches

- **South River:**
 - Waynesboro to Port Republic
- **South Fork Shenandoah River:**
 - Port Republic to Front Royal
- **North River (reference):**
 - Port Republic to Bridgewater



Fish Sampling Sites



Fish Collection Methods

- Boat & barge electrofishing
- Hoop netting
- Goal = 30/species/reach
- Maximize age/size range
- Seasonally



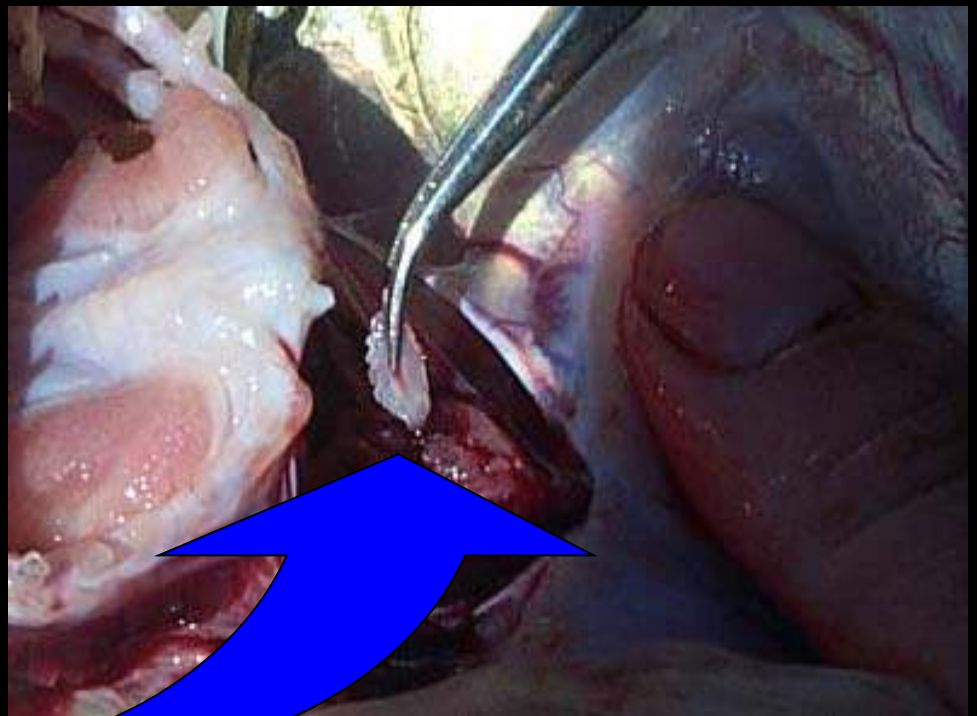
Fish Processing Methods

- Fish identification
- 40-80 ppm clove oil anesthetic
- Measured TL (mm)
- Weighed (g)
- Sexed



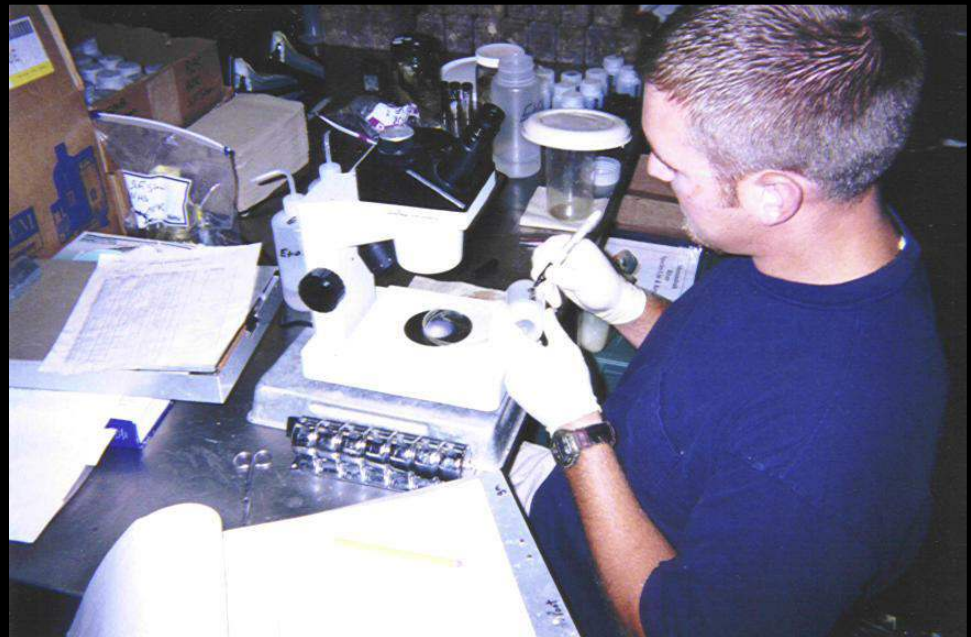
Fish Processing Methods

- **Stomach or intestine:**
 - 10% formalin
 - diet analysis
- **Otoliths (earstones):**
 - age analysis



Laboratory Methods

- Food item identification:
 - invertebrates (order)
 - fish (species)
- Blotted dry
- Weighed to 0.001g
- Stored in 70% ethanol



Fish Collection Results

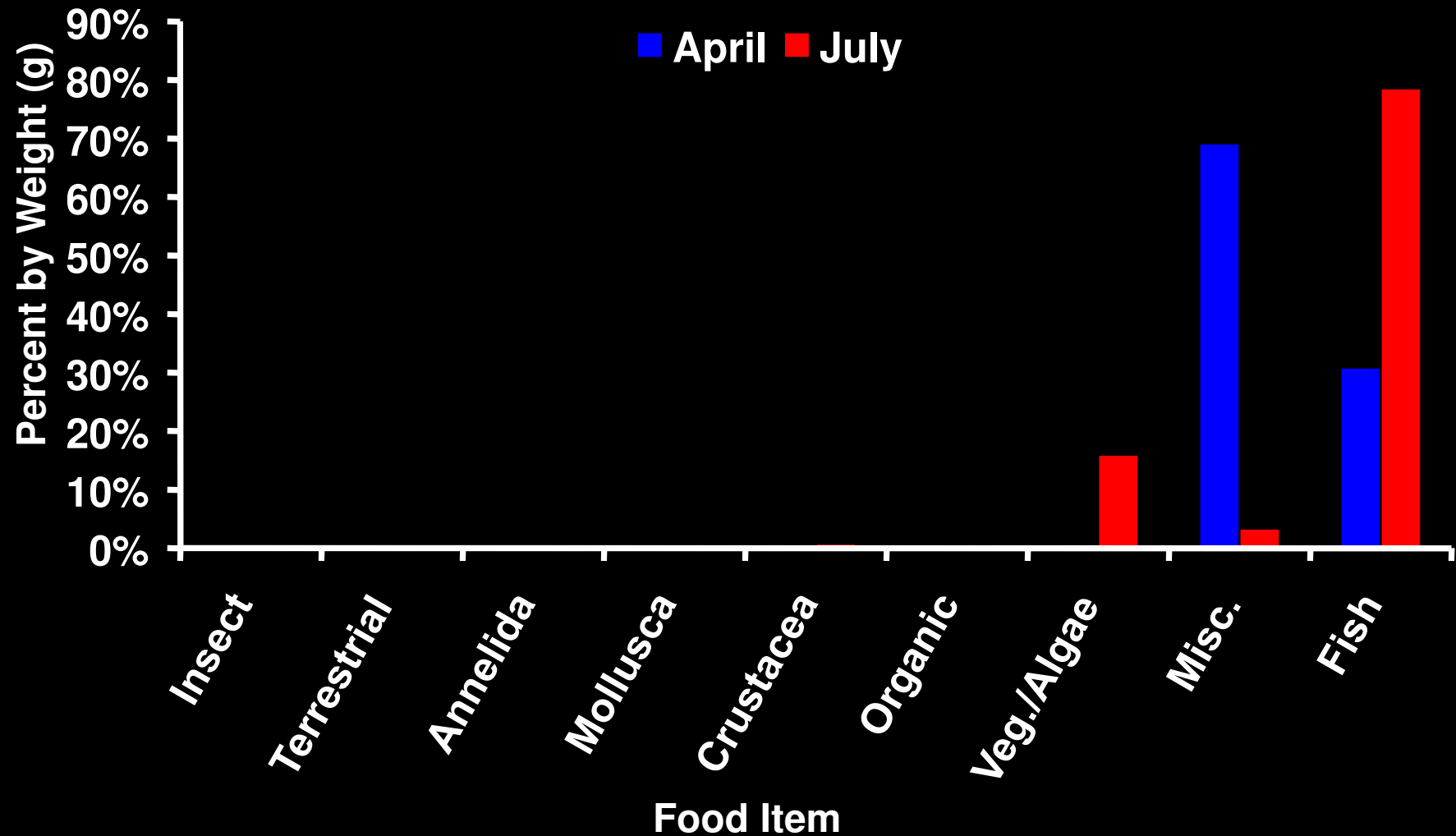
April + July

	CCF	RDB	SMB	WHS	
South River	-	66	77	70	
South Fork	39	74	80	60	
North River	-	54	61	60	
Totals	39	194	218	190	641



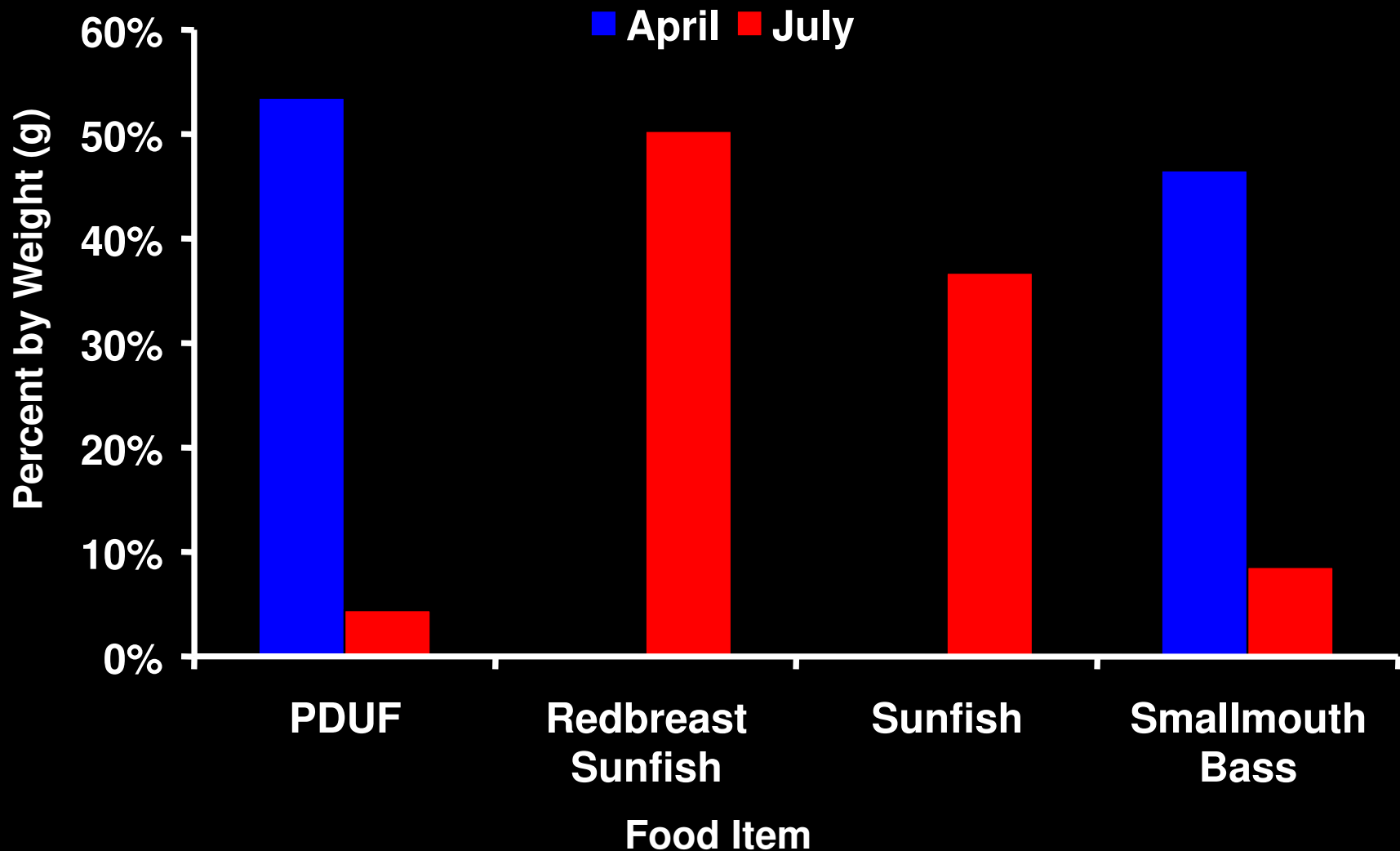
South Fork Channel Catfish *Preliminary Findings*

South Fork Channel Catfish



South Fork Channel Catfish

Fish Analysis



South Fork Channel Catfish

Summary

- Mainly consume sunfishes (centrarchids) in April & July
- Green algae important in July
- Opportunistic feeders:
 - meadow vole
 - crayfish
 - fish
 - green algae
 - aquatic insects

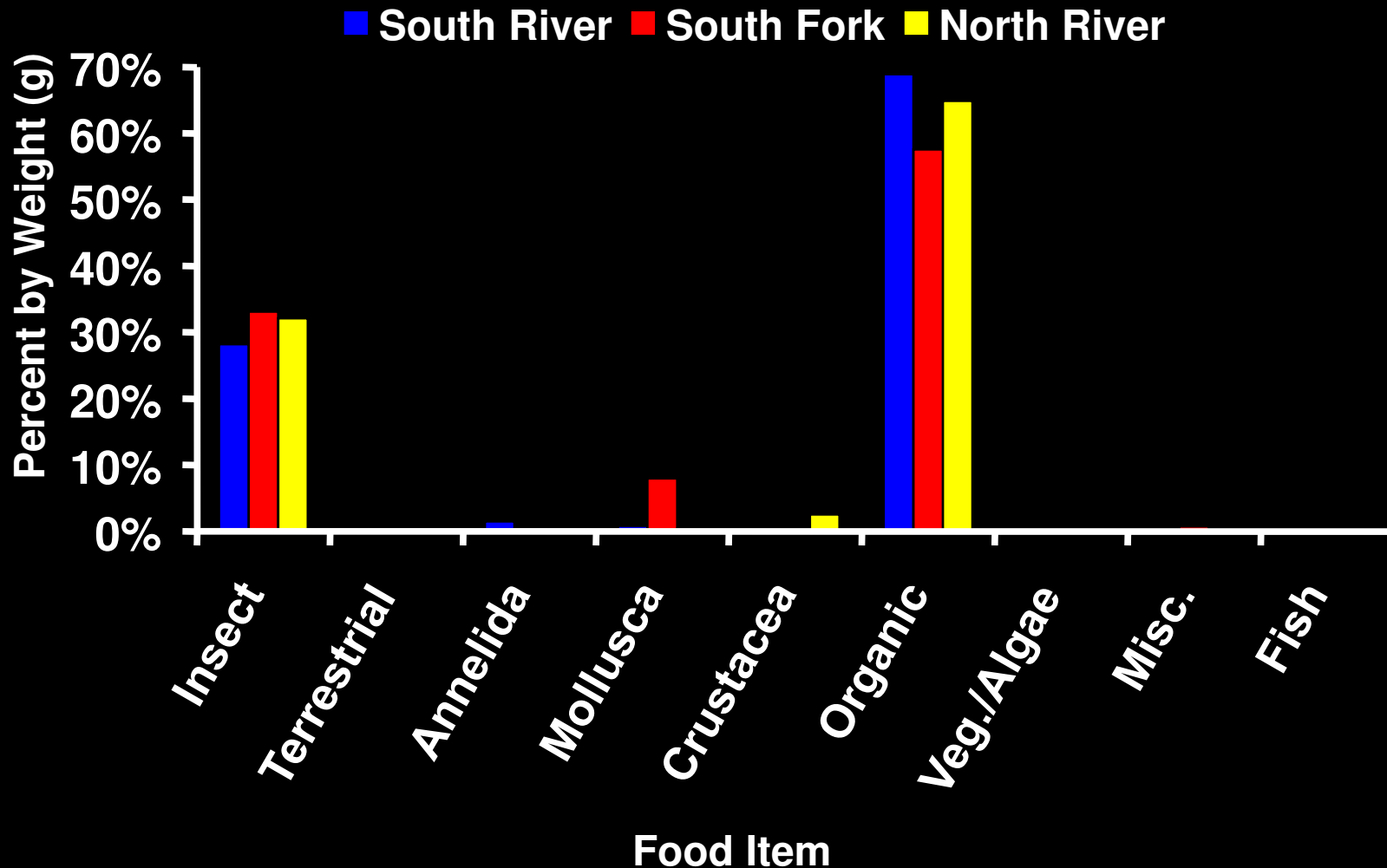


A photograph of four White Sucker fish (Catostomus commersoni) lying on a gravelly riverbed. The fish are arranged horizontally, with their heads pointing to the left. They have a silvery, elongated body with a prominent white stripe running along the side. The scales are fine and silvery. The background consists of a mix of small and large, smooth and angular stones in various shades of brown, tan, and grey. The text "White Sucker" is written in a bold, yellow, sans-serif font, and "Preliminary Findings" is written below it in a yellow, italicized, sans-serif font. Both lines of text are centered over the middle fish.

White Sucker
Preliminary Findings

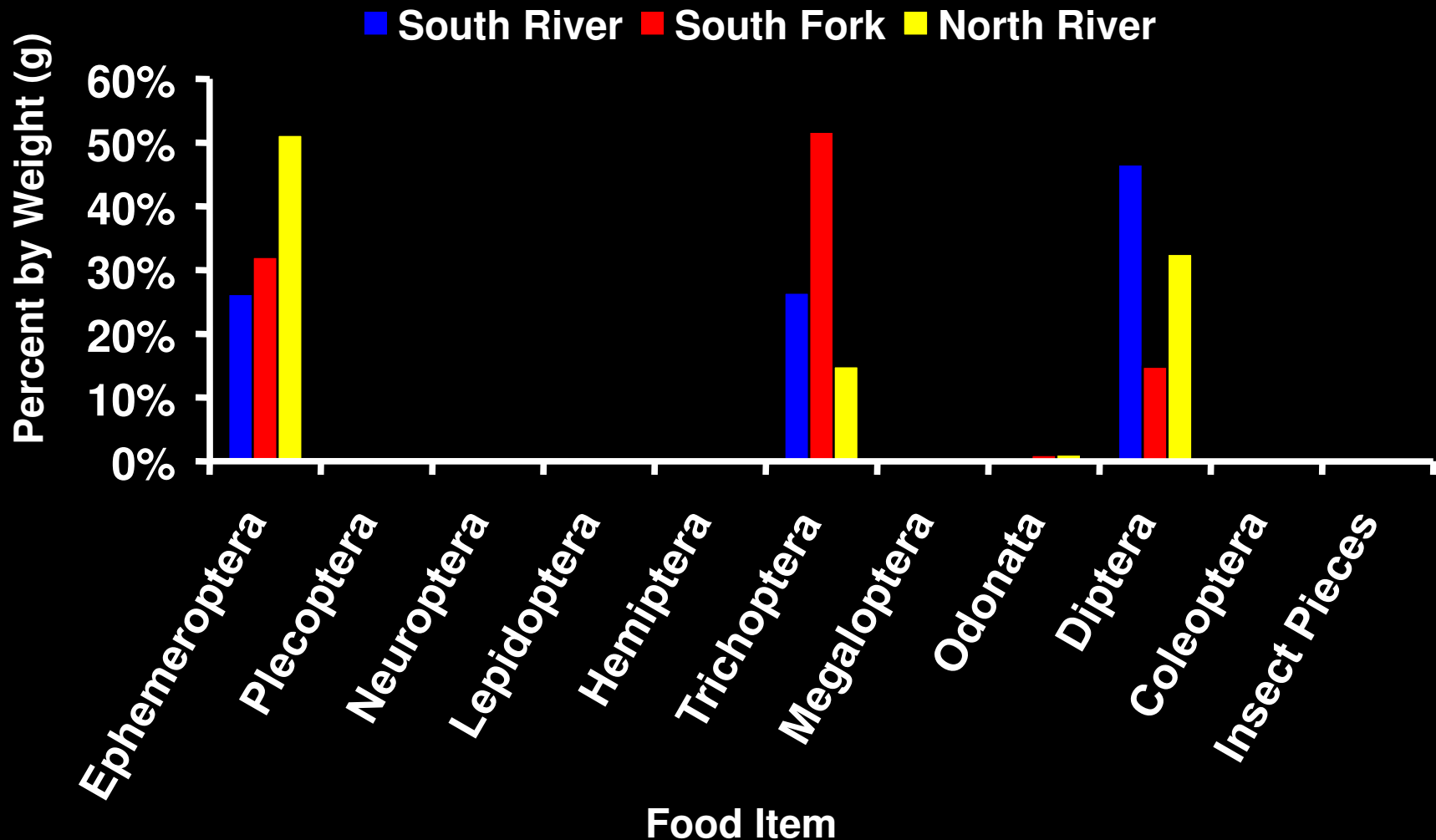
White Sucker

April



White Sucker

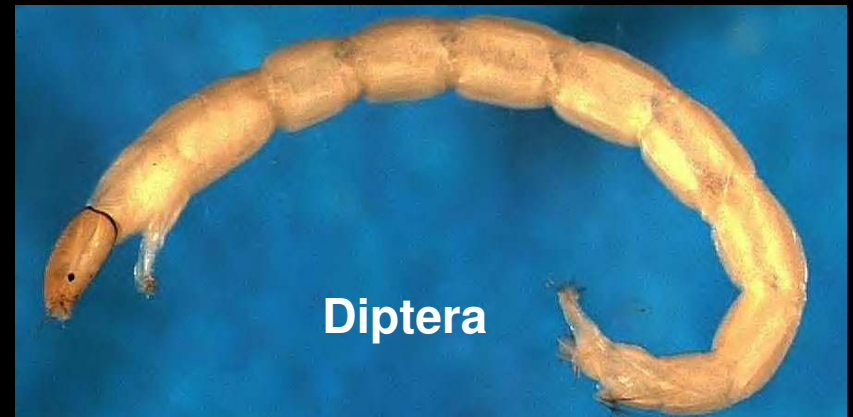
Insect Analysis



White Sucker

Summary

- Mainly consume aquatic insects:
 - Ephemeroptera (North River)
 - Trichoptera (South Fork)
 - Diptera (South River)
- Large amount of unidentifiable organic matter
- Mollusca important in South Fork



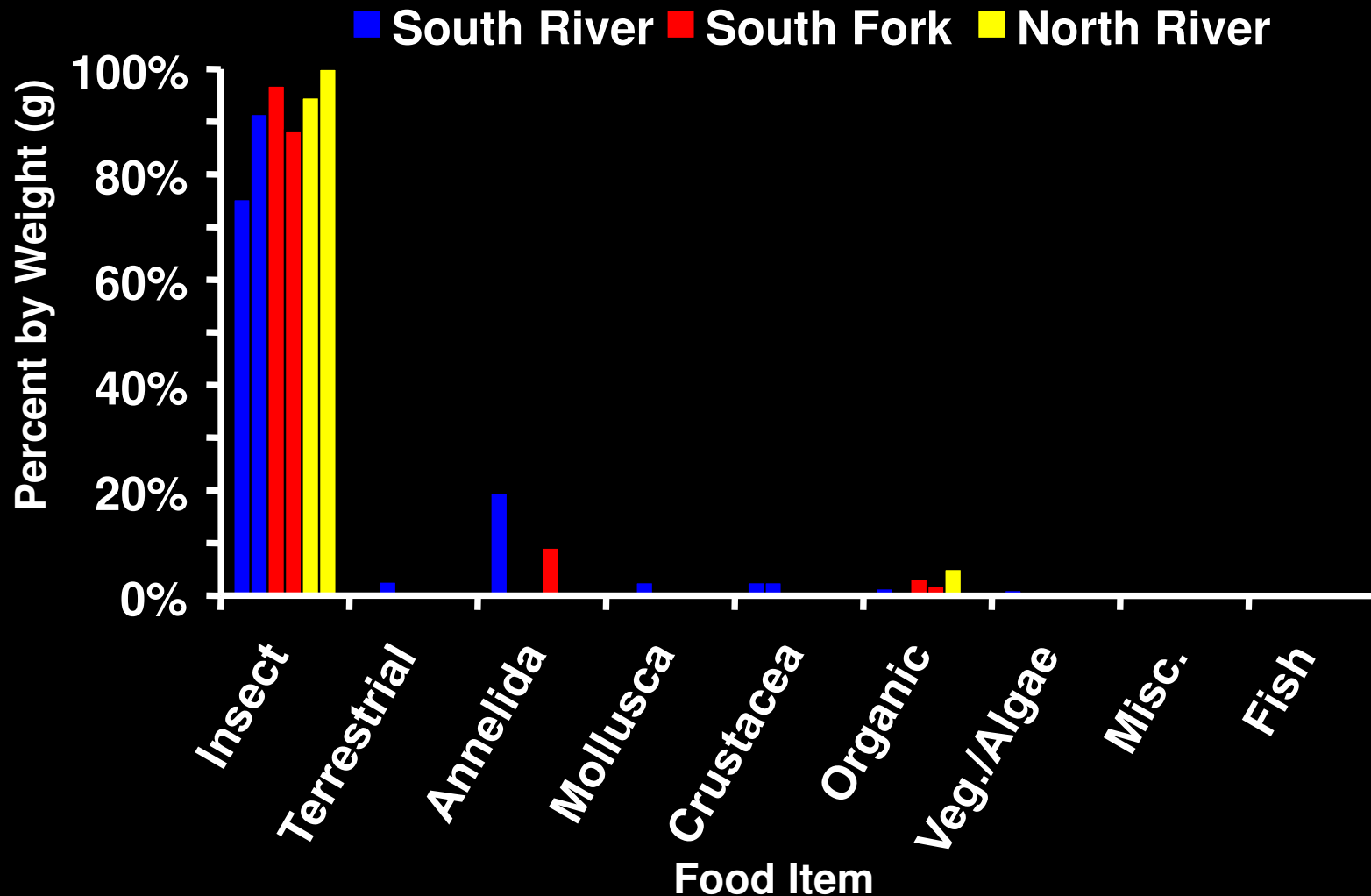
A photograph of a Redbreast Sunfish being held in a white nitrile glove. The fish is dark green with a lighter, yellowish-green patch on its side. It has a prominent eye and a slightly open mouth. The background shows a gravelly surface and some white containers.

Redbreast Sunfish

Preliminary Findings

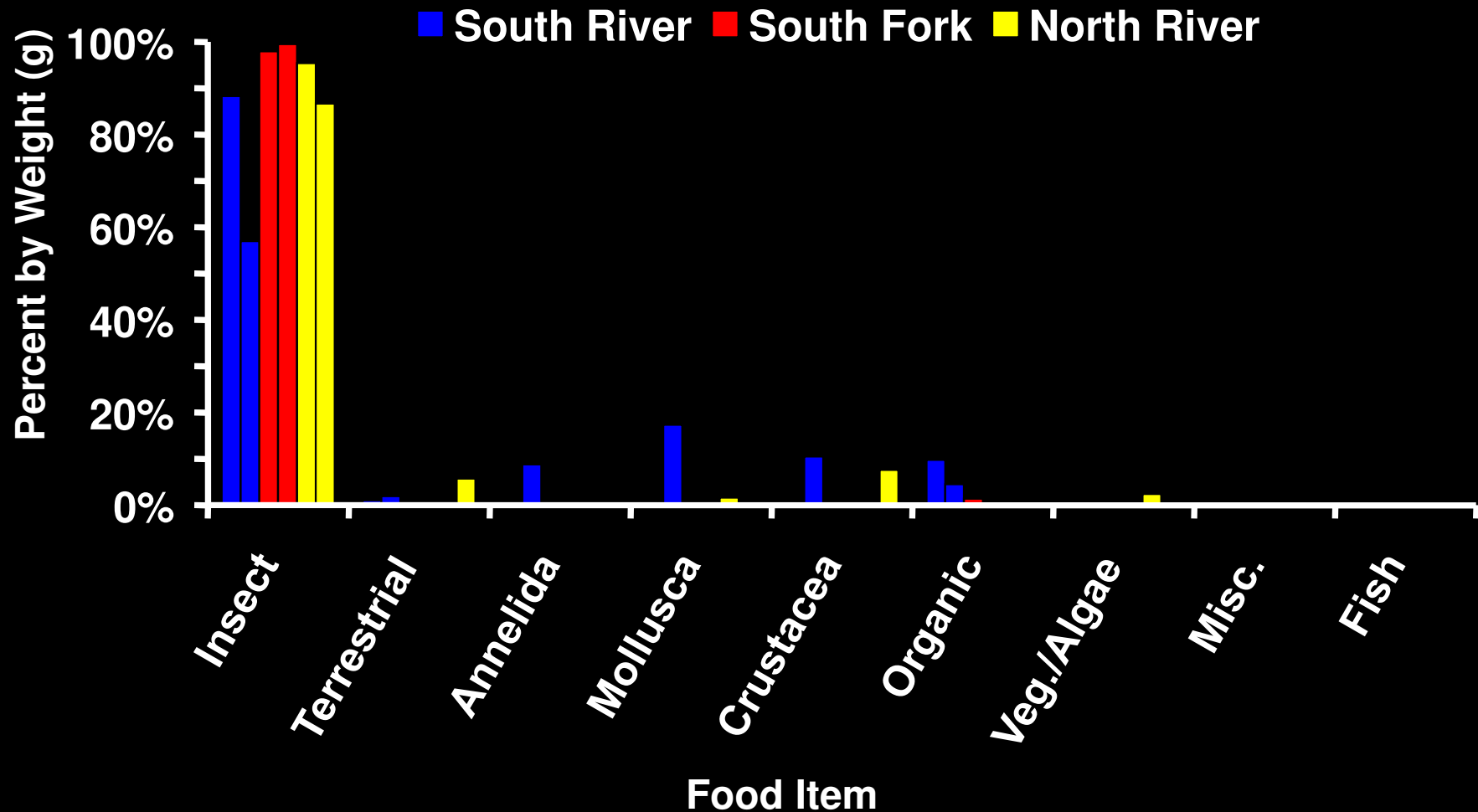
Redbreast Sunfish

< 126 mm



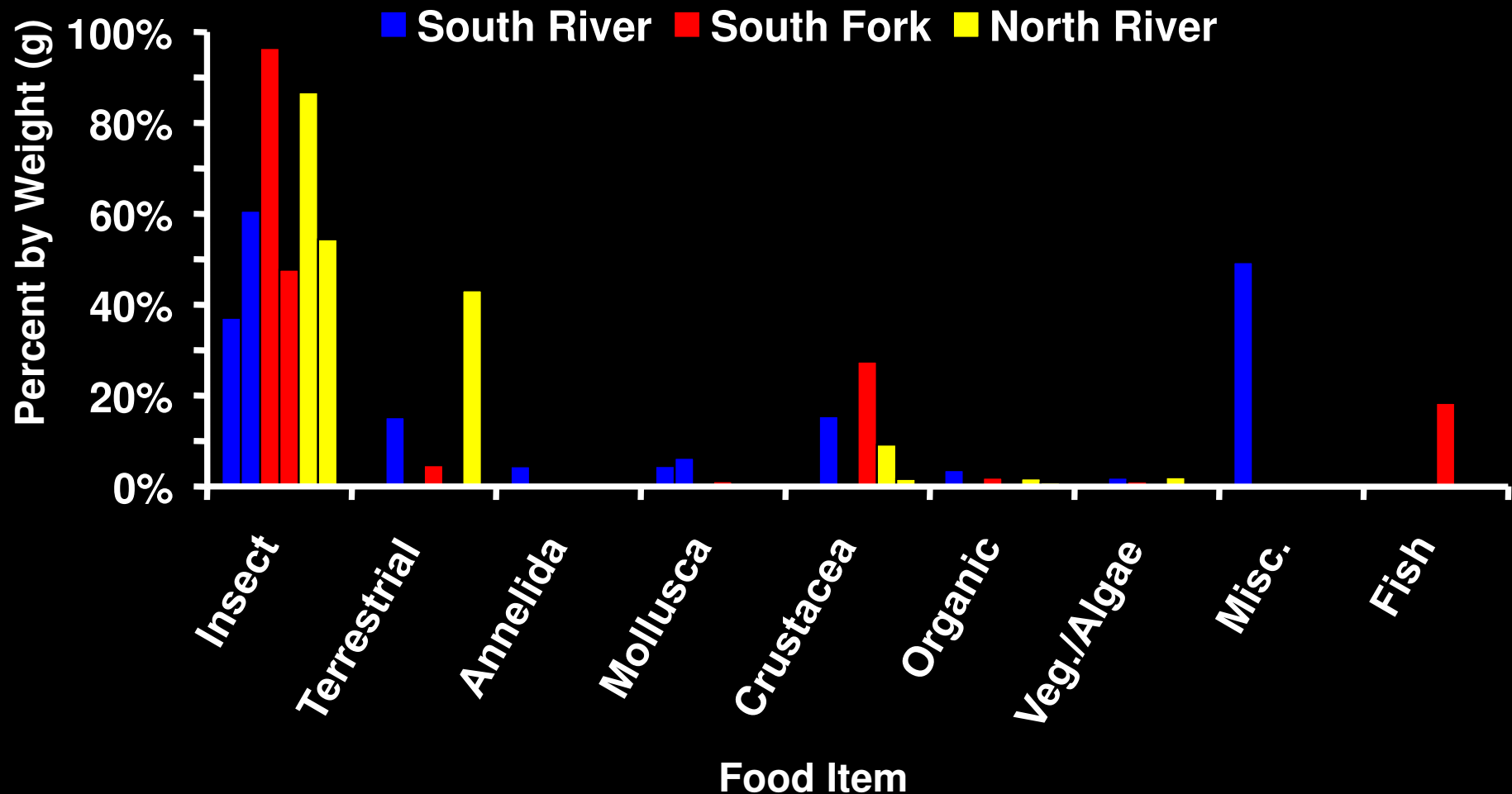
Redbreast Sunfish

126 - 150 mm



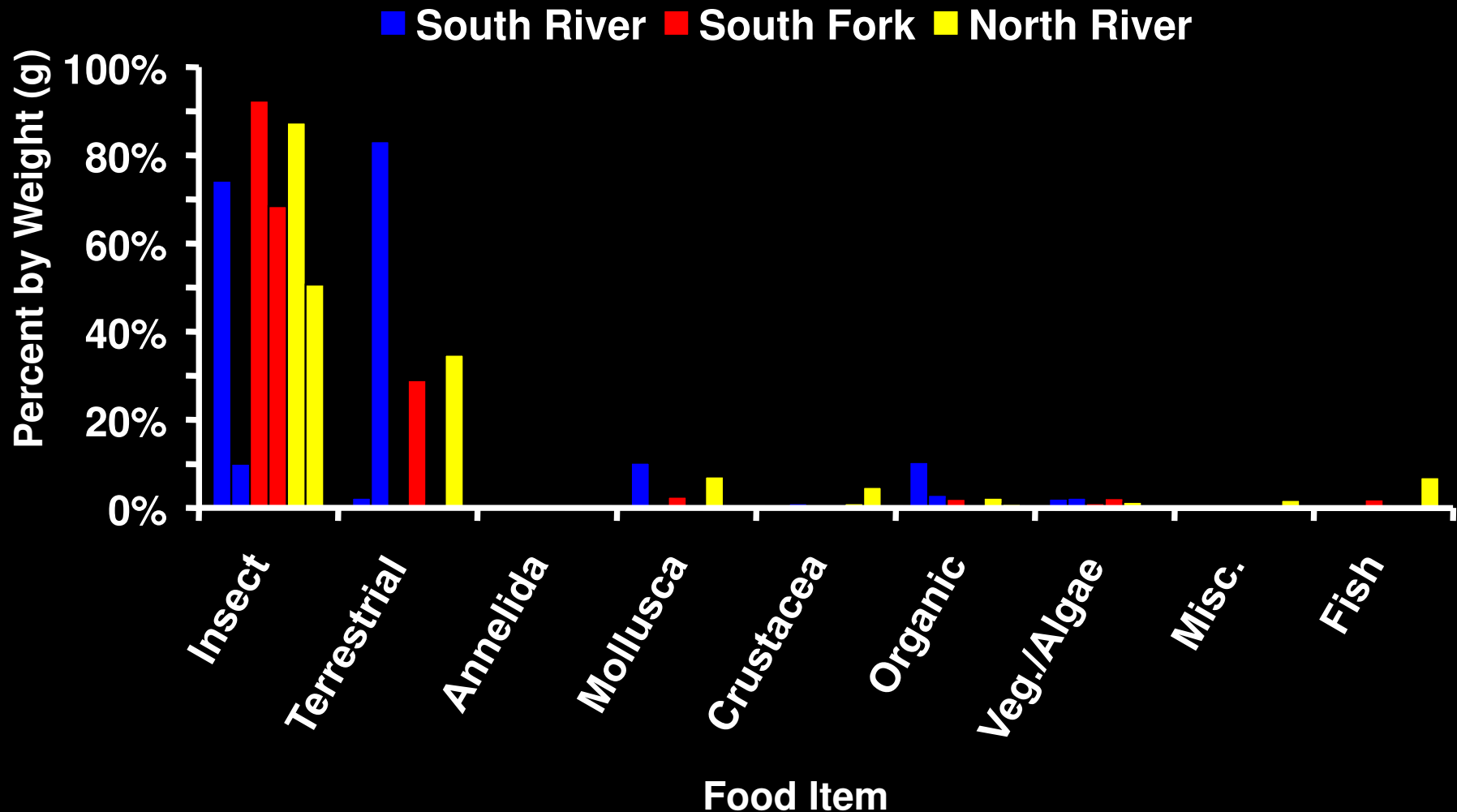
Redbreast Sunfish

151 - 175 mm



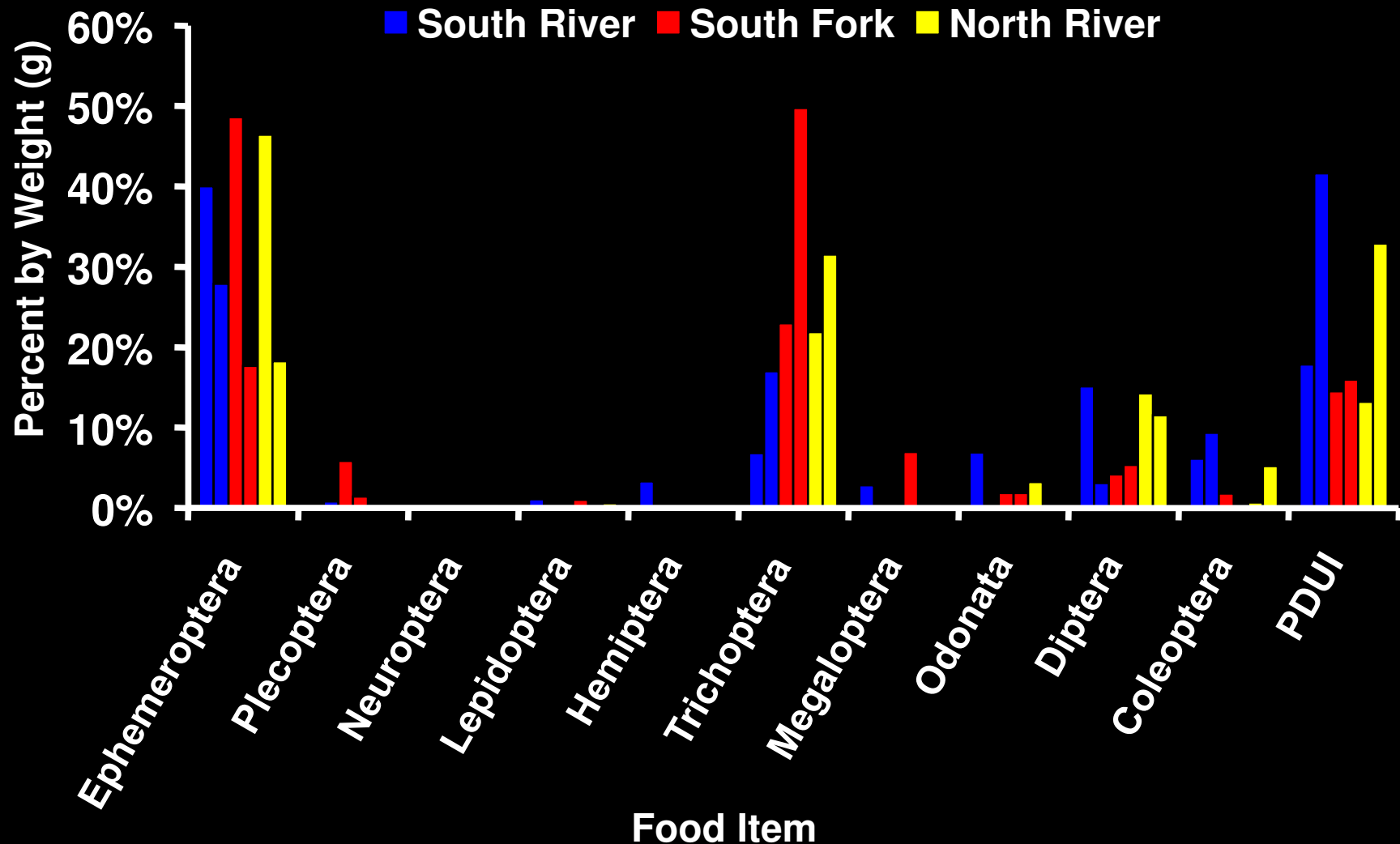
Redbreast Sunfish

> 175 mm



Redbreast Sunfish

Insects Analysis



Redbreast Sunfish

Summary

- Mainly consume aquatic insects
- Larger cohorts have a more variable diet
- Larger cohorts shift to terrestrial insects from April to July
- Ephemeroptera, trichoptera, and diptera most common
- Decrease in ephemeroptera and increase in trichoptera from April to July in all reaches



Trichoptera

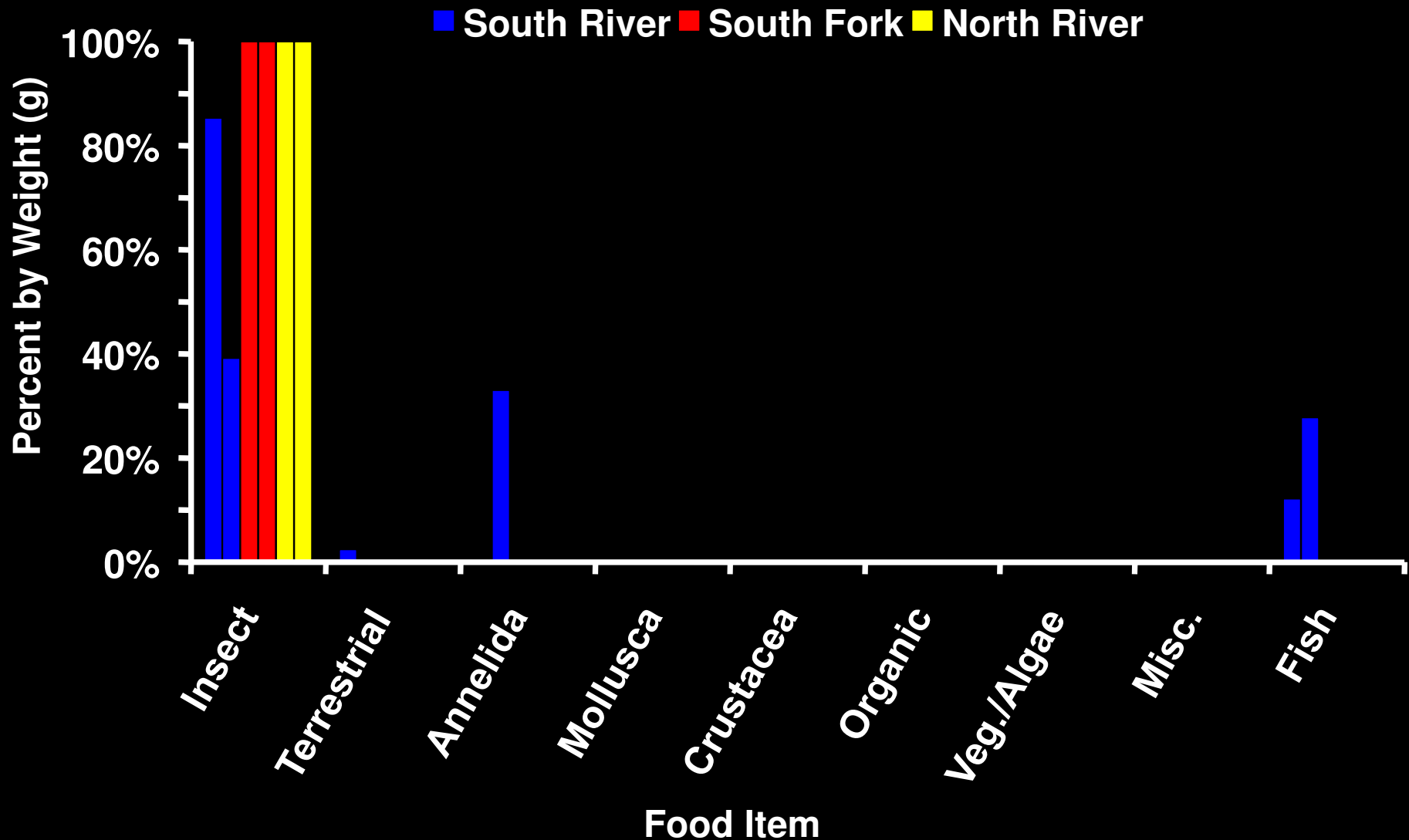
A close-up photograph of a person's hands holding a smallmouth bass. The fish is dark green with a lighter yellowish-brown belly and a prominent blue stripe along its side. It has a pointed snout and a slightly open mouth. The person holding the fish is wearing a dark shirt, and the background shows a body of water with some reeds or grass. The text "Smallmouth Bass" is written in a large, bold, yellow font, and "Preliminary Findings" is written below it in a smaller, italicized, yellow font.

Smallmouth Bass

Preliminary Findings

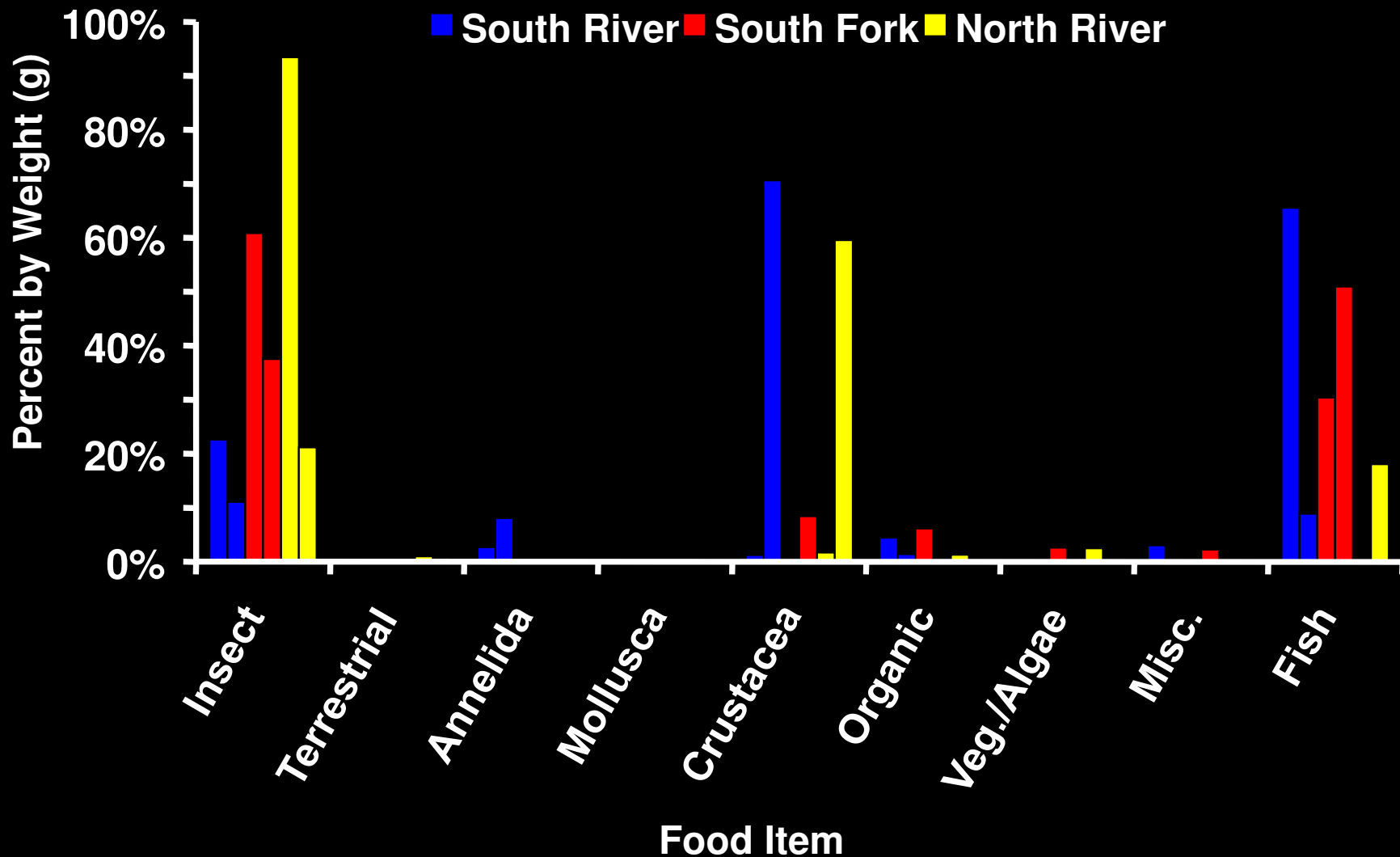
Smallmouth Bass

< 100 mm



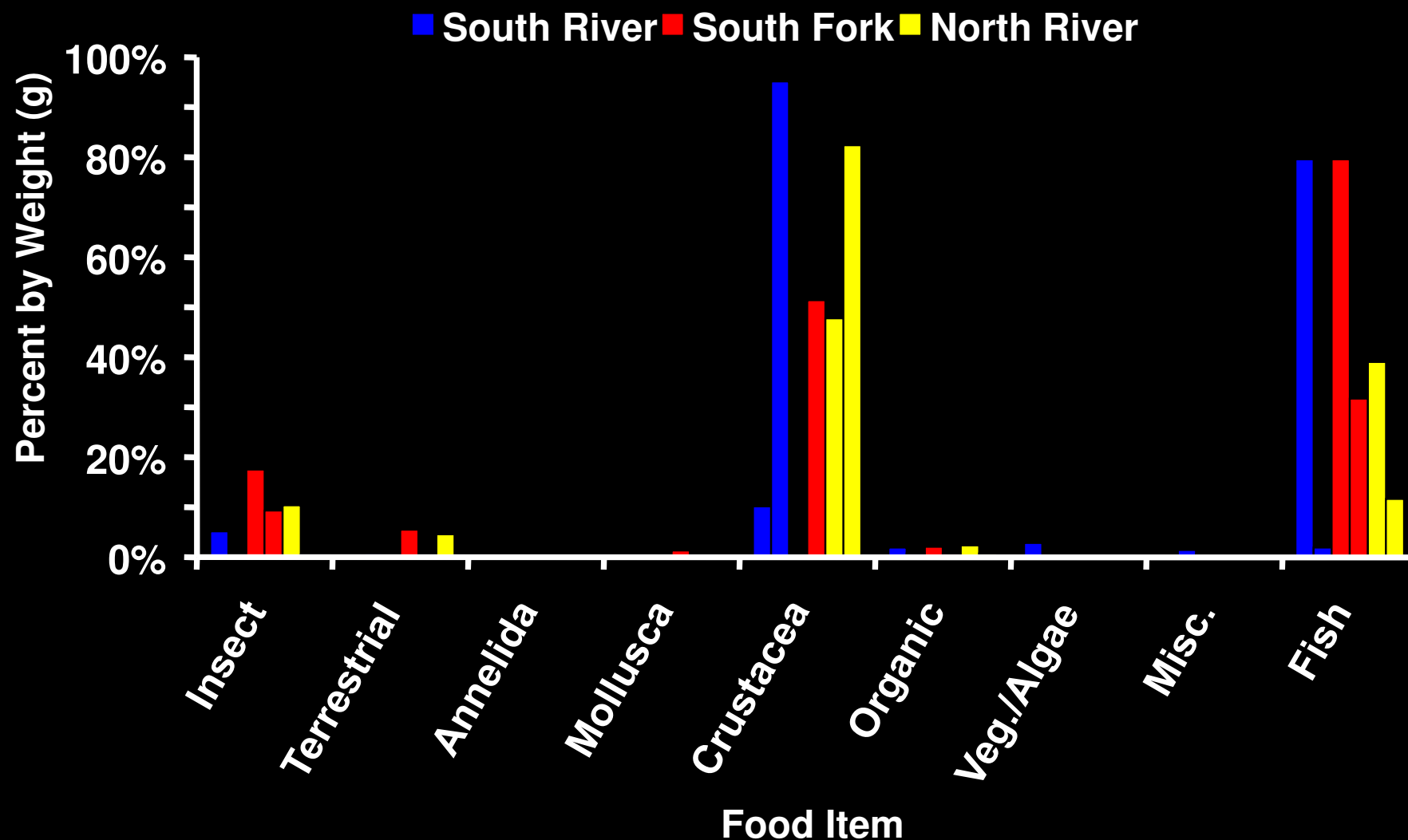
Smallmouth Bass

100 - 199 mm



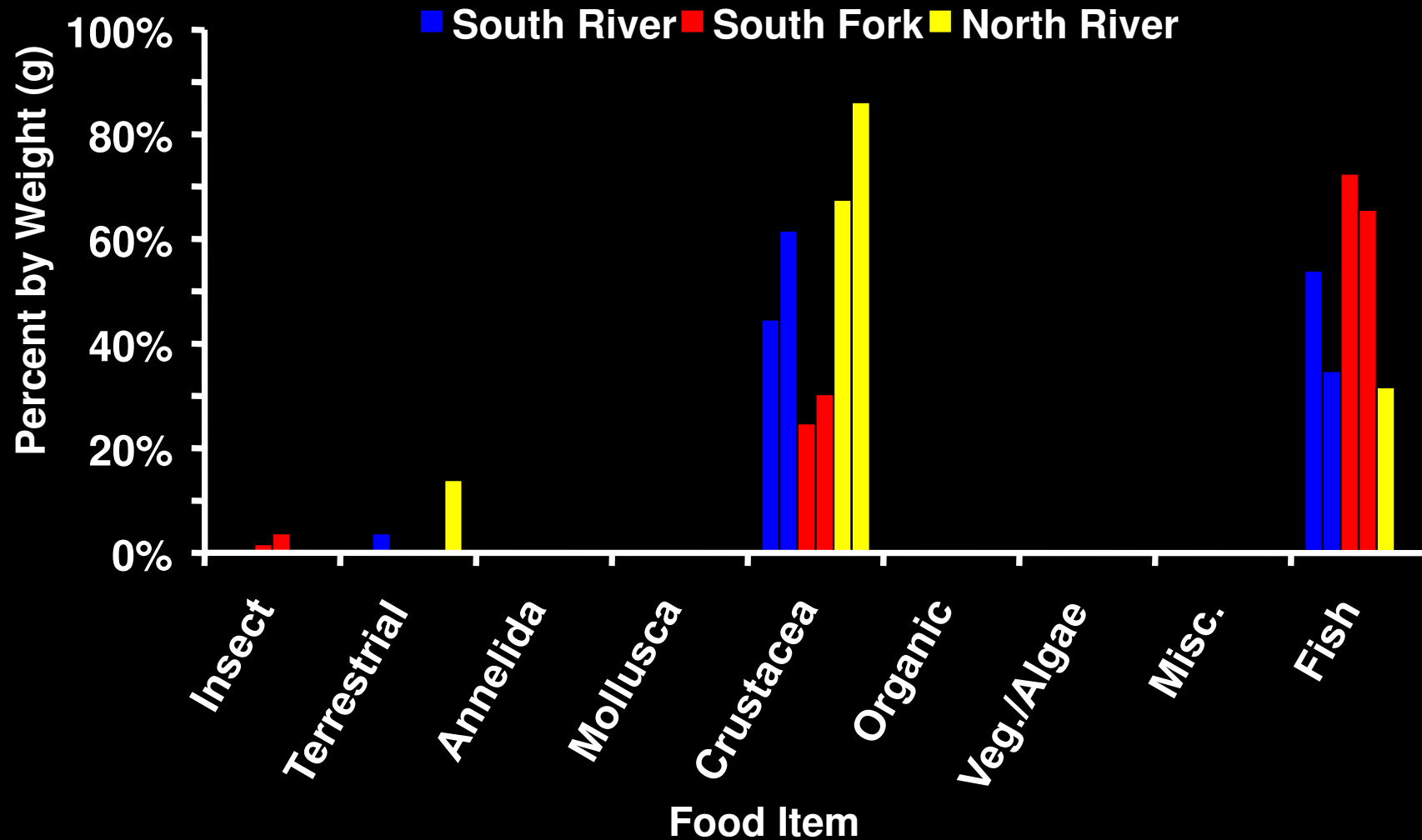
Smallmouth Bass

200 - 299 mm



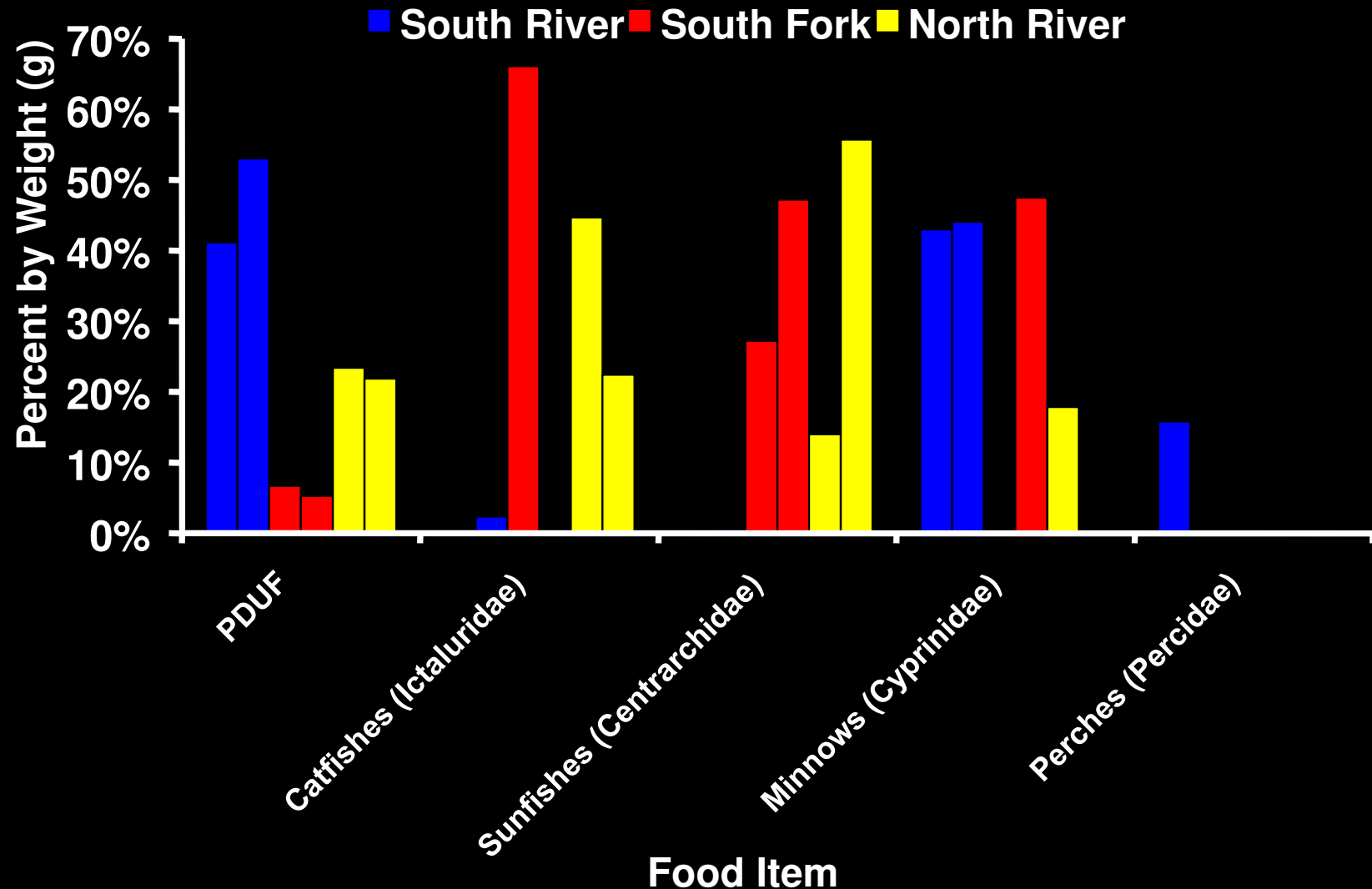
Smallmouth Bass

> 299 mm



Smallmouth Bass

Fish Analysis



Smallmouth Bass

Summary

- < 100 mm cohort mainly consuming aquatic insects
- Smaller cohorts in South River consuming more fish
- Larger cohorts consume mostly crayfish and fish
- Larger cohorts consume more crayfish and less fish from April to July
- Fish species consumed differ



Crayfish

Final Summary

- Diet results agree with literature review
- Good representation from each trophic group
- Fish, aquatic insects, and crayfish are most commonly consumed



Shiner



Plecoptera



Crayfish

Upcoming Events

- October fish sampling event (14 of 16 completed)
 - sample final 2 sites on North River tomorrow
- December fish sampling event
- Continue diet and age analysis



South Fork

Acknowledgements

Committee Members:



Steve Reeser
Tammy Newcomb
Don Cherry
Don Orth
John Ney



South River Science Team

A landscape photograph of a river at sunset or sunrise. The sky is a mix of blue and orange, with the sun low on the horizon. Silhouetted trees and hills are visible along the banks. The river reflects the sky and the surrounding landscape. A dark grey rectangular box is overlaid in the center of the image, containing the word "Questions?" in a bold, yellow, sans-serif font.

Questions?