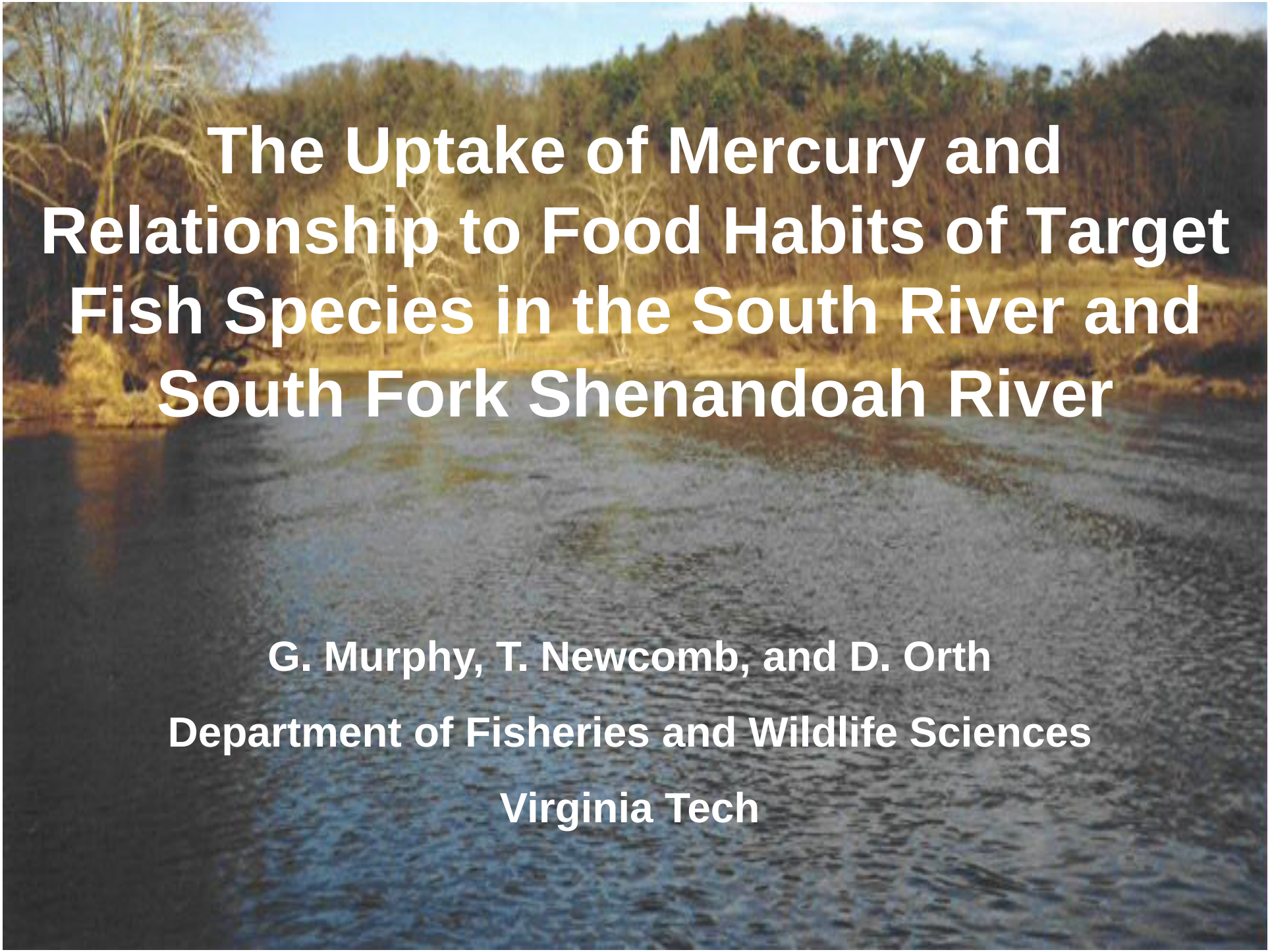


The Uptake of Mercury and Relationship to Food Habits of Target Fish Species in the South River and South Fork Shenandoah River

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

Department of Fisheries and Wildlife Sciences

Virginia Tech

Virginia Tech Study

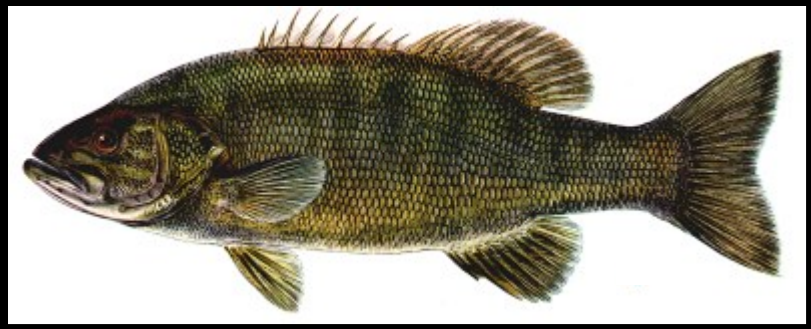
OBJECTIVE 1:

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

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

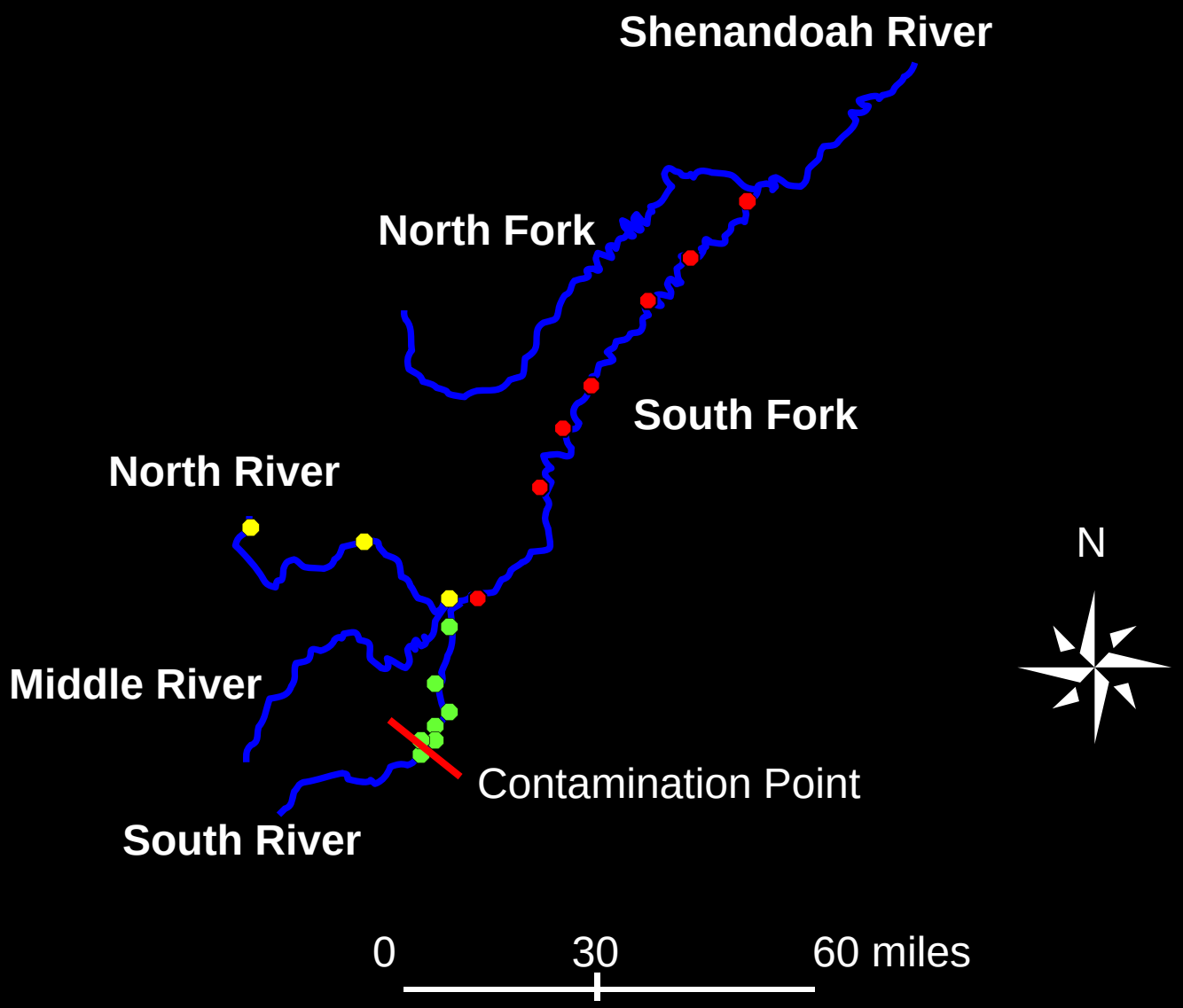
- **North River (reference):**

  - Port Republic to Bridgewater


South River


South Fork

Fish Sampling Sites



Fish Collection Methods

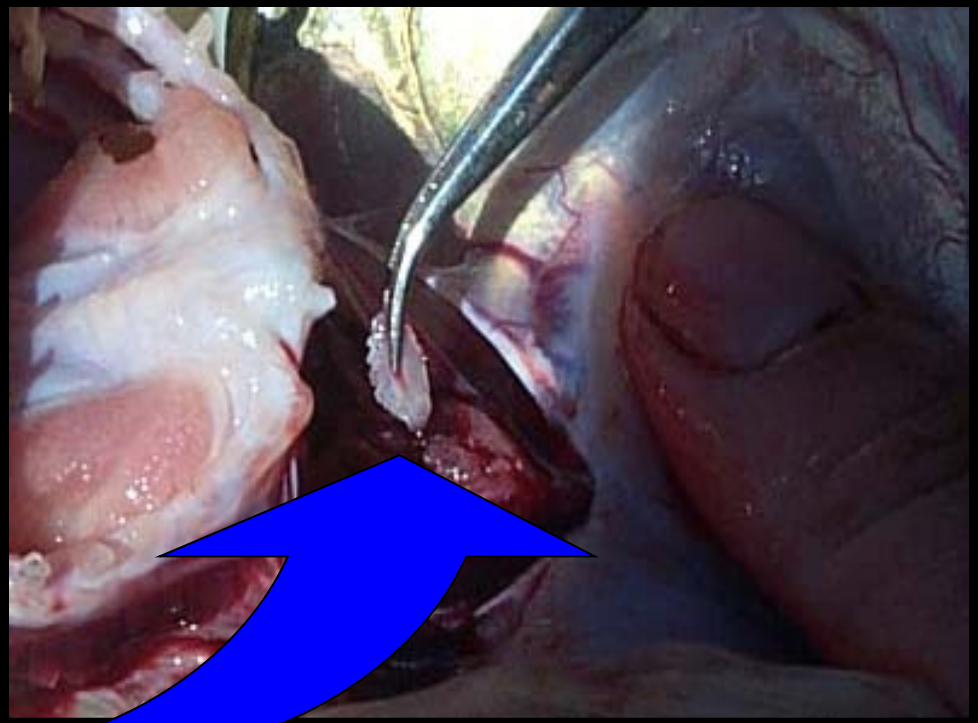
- Boat & barge electrofishing
- Hoop netting
- Goal = 30/species/reach
- Maximize age/size range
- Seasonally

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**

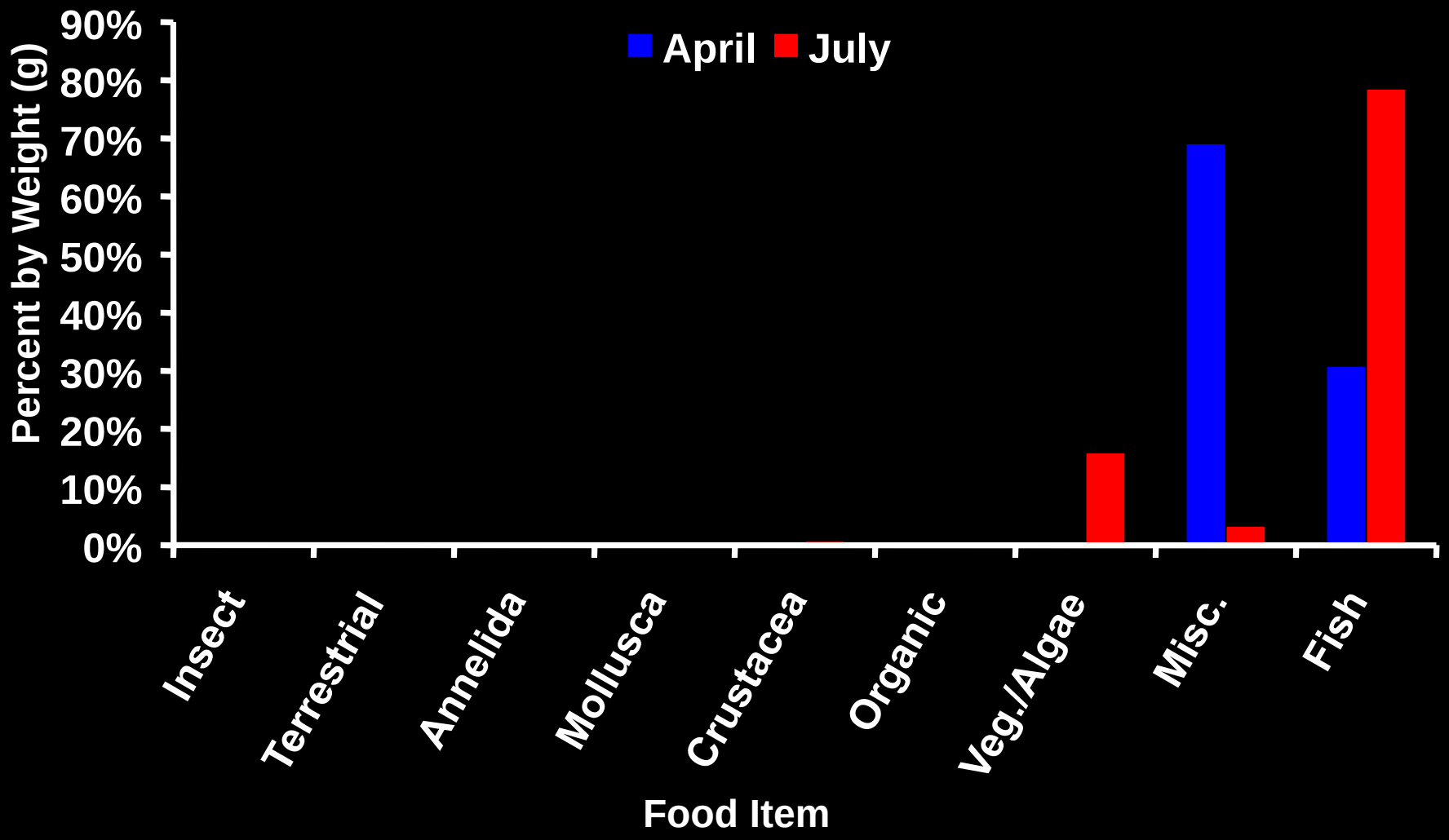
Fish Collection Results

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

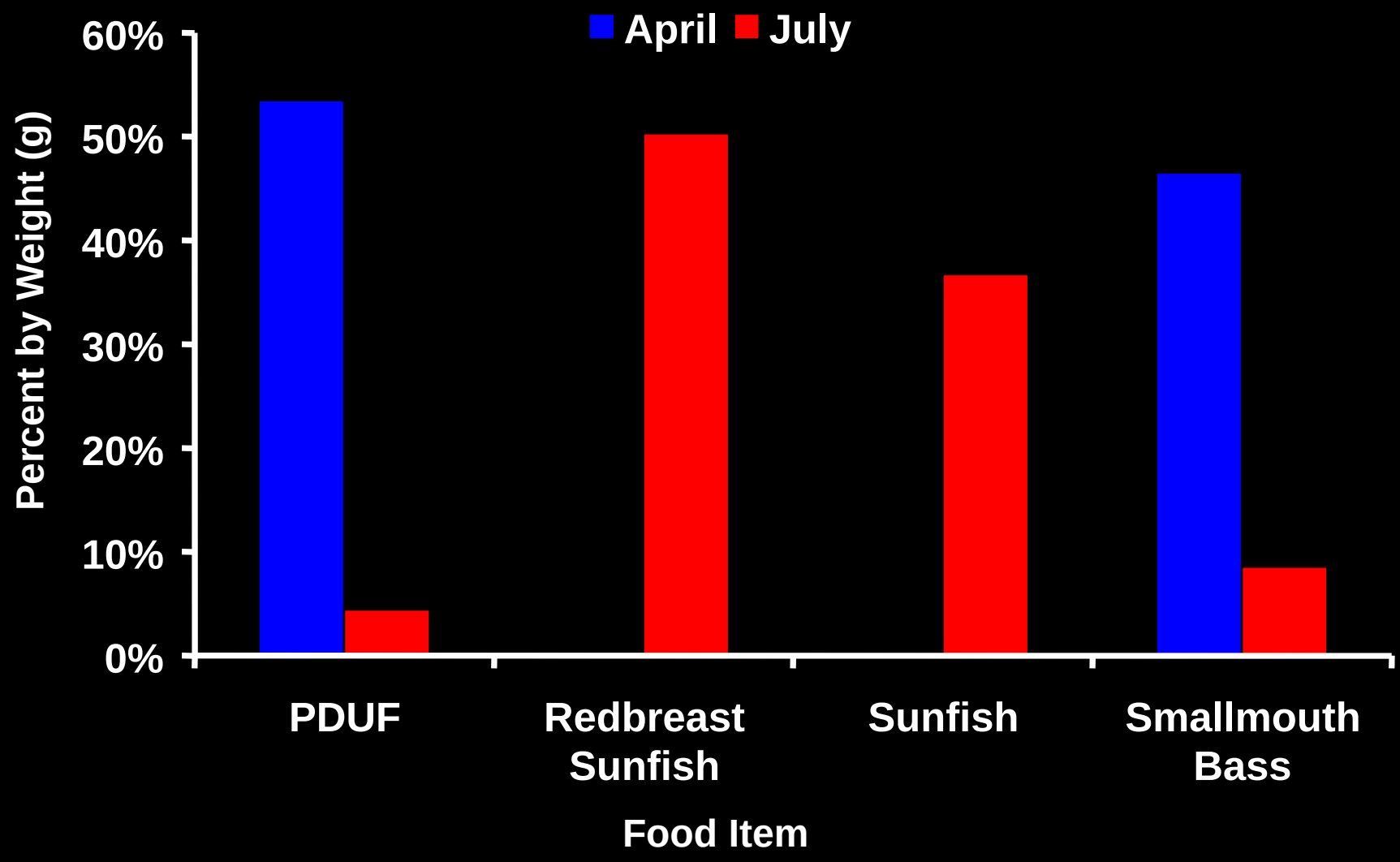

South Fork
Channel Catfish
Preliminary Findings

South Fork Channel Catfish



South Fork Channel Catfish

Fish Analysis



South Fork Channel Catfish

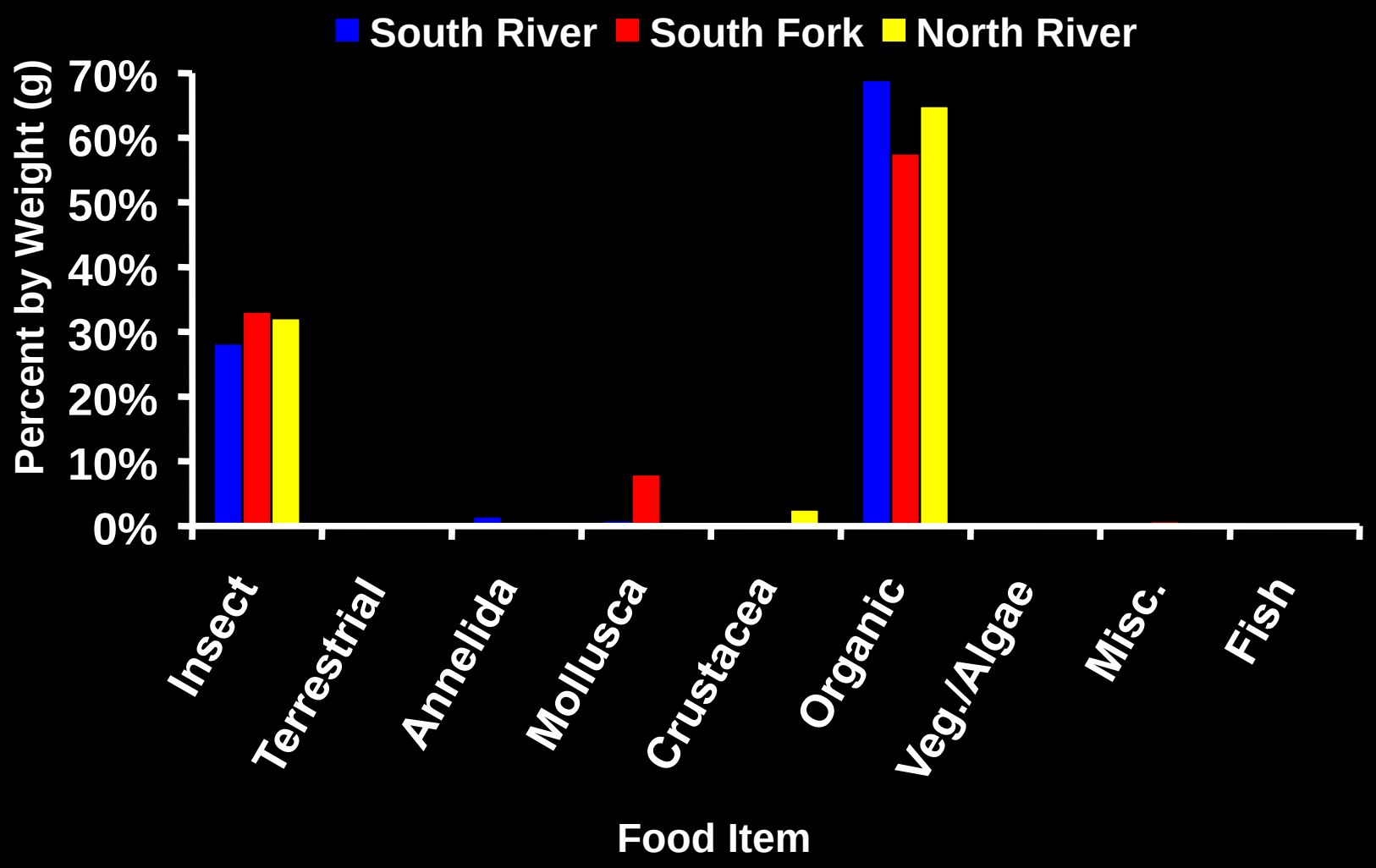
Summary

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


White Sucker
Preliminary Findings

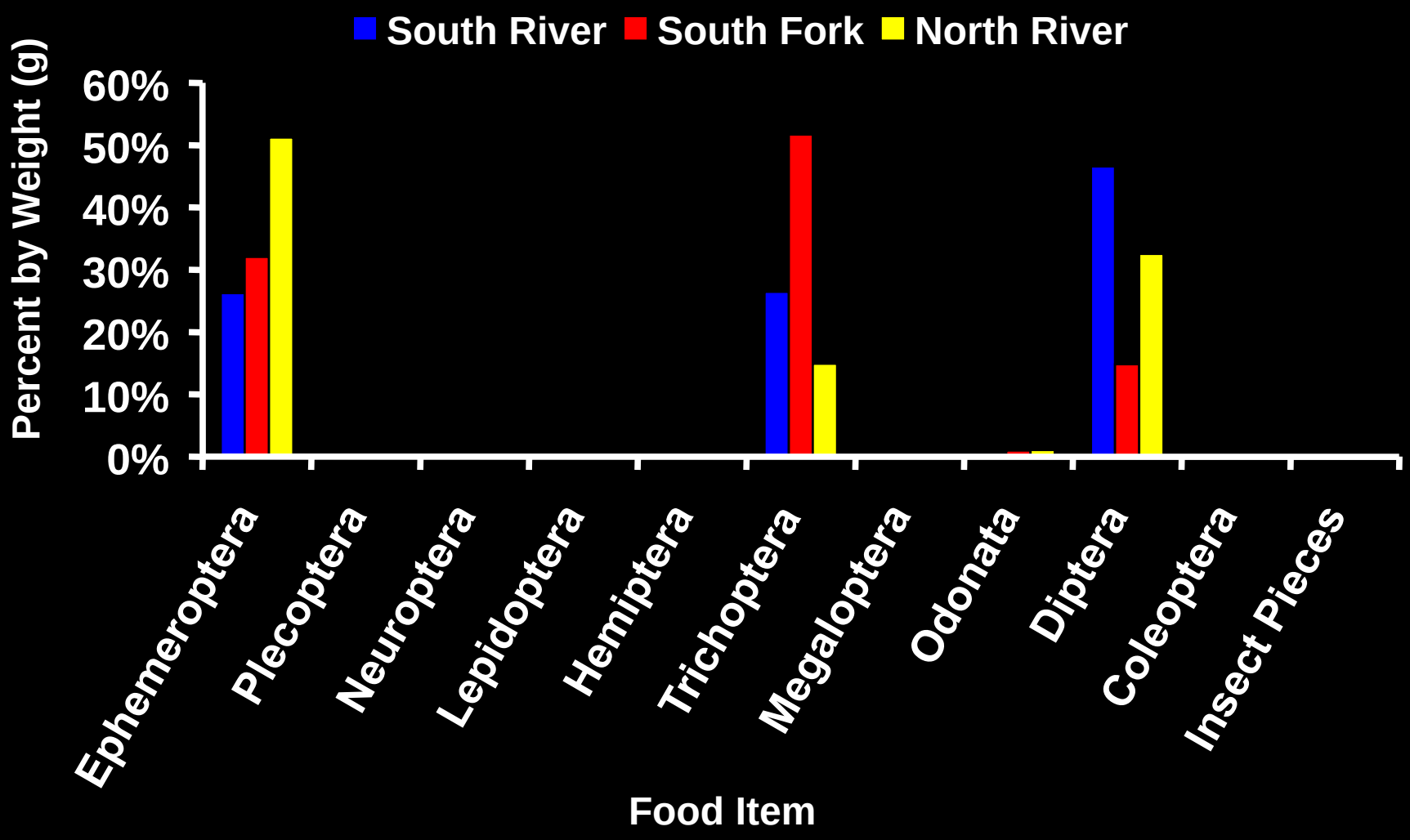
White Sucker

April



White Sucker

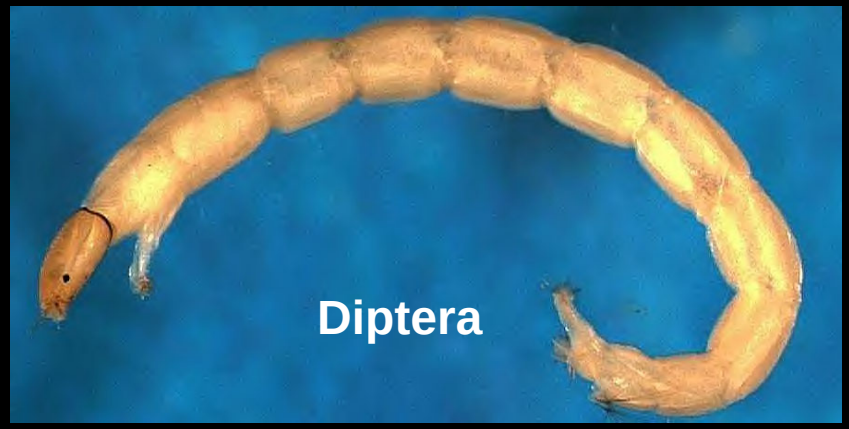
Insect Analysis



White Sucker

Summary

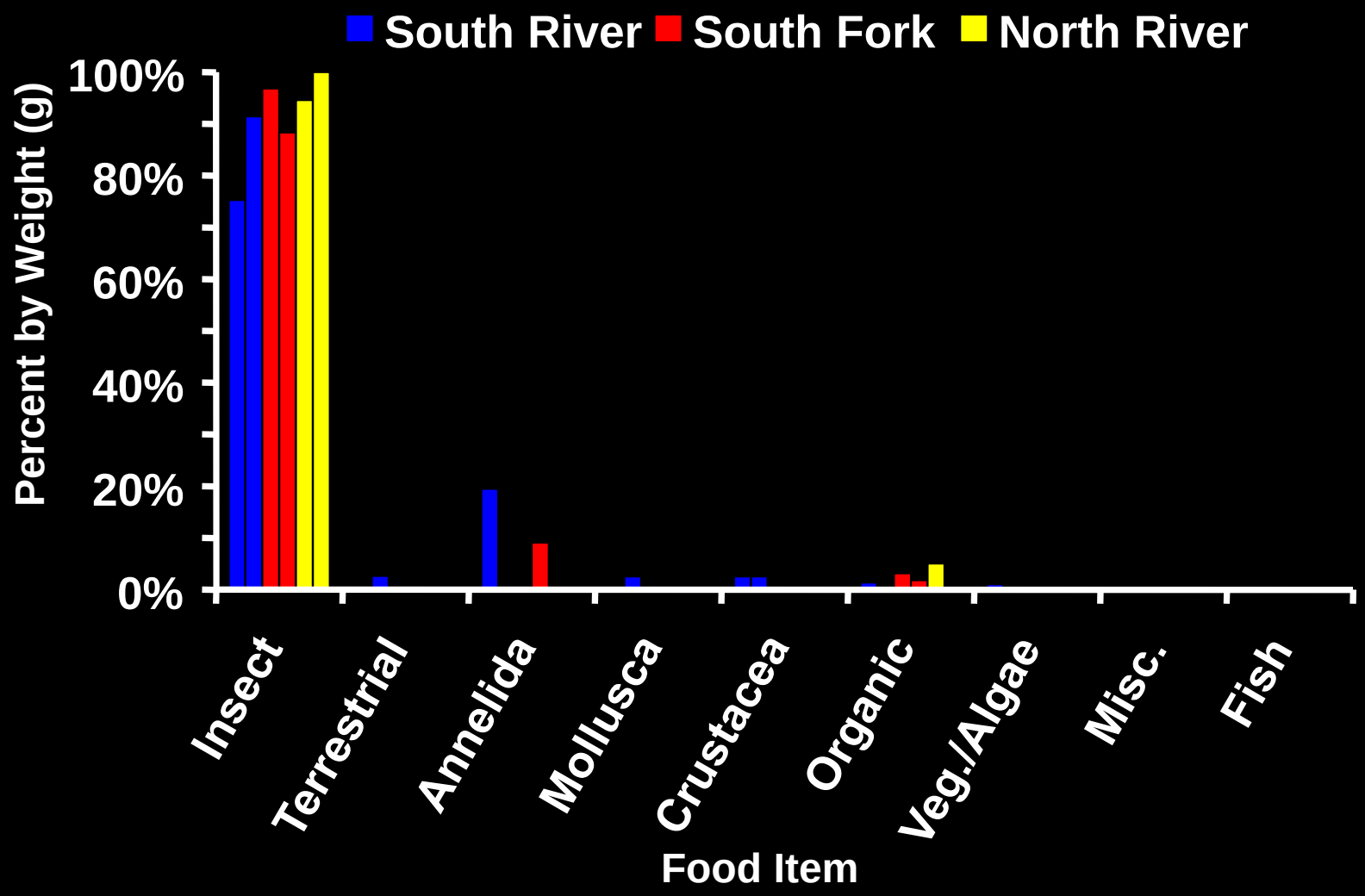
- **Mainly consume aquatic insects:**
  - **Ephemeroptera (North River)**
  - **Trichoptera (South Fork)**
  - **Diptera (South River)**
- **Large amount of unidentifiable organic matter**
- **Mollusca important in South Fork**




Redbreast Sunfish
Preliminary Findings

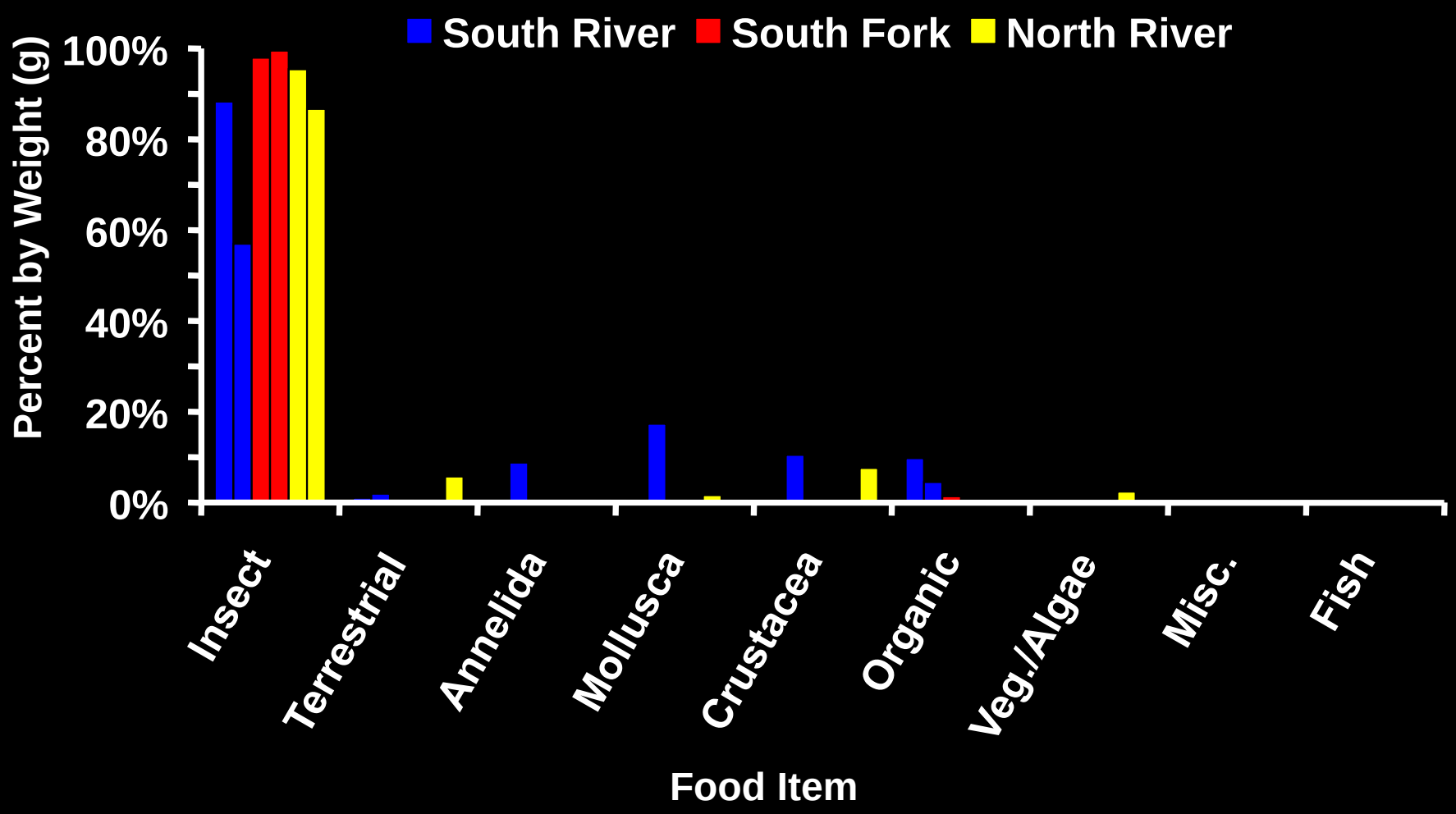
Redbreast Sunfish

< 126 mm



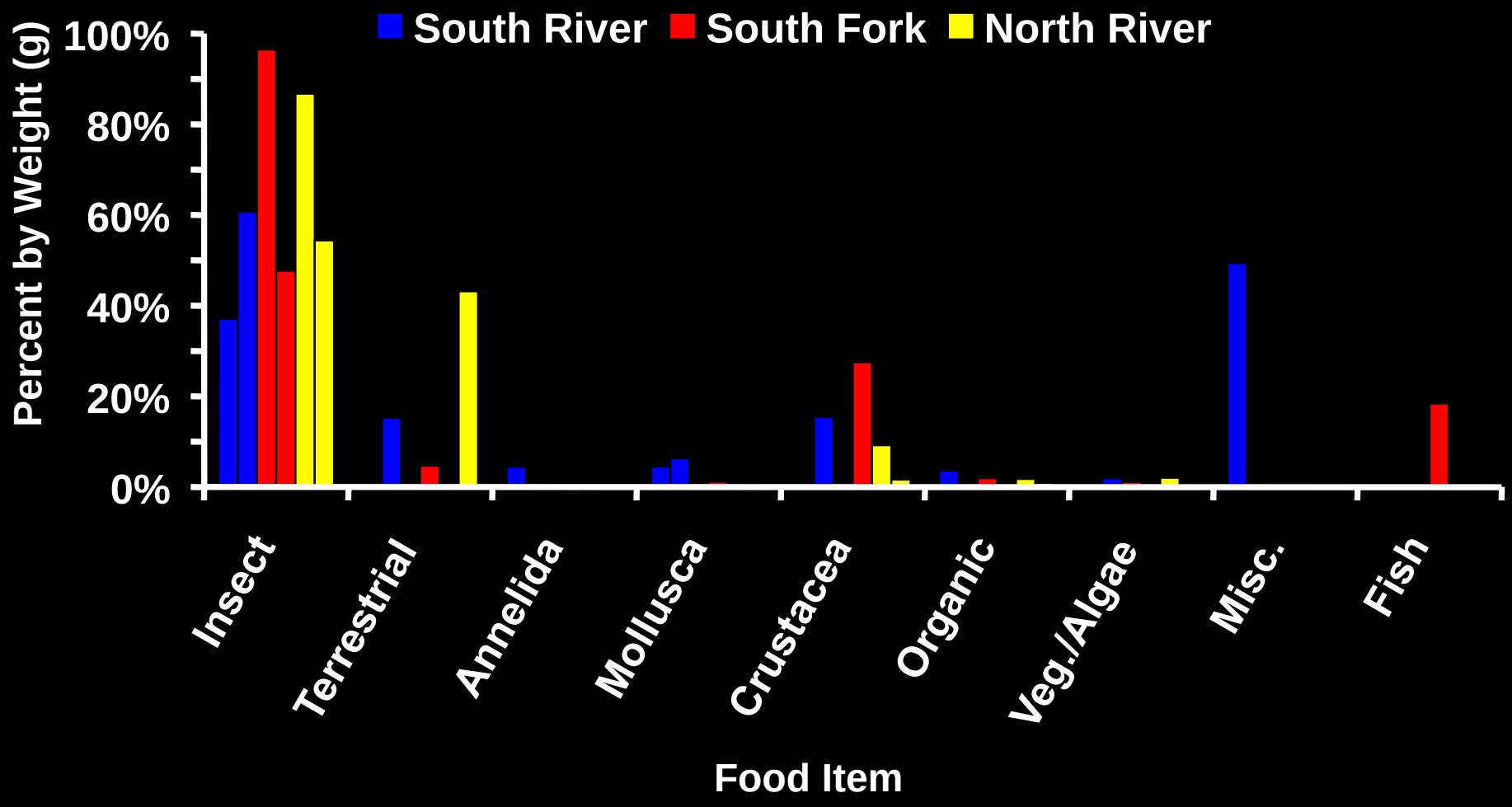
Redbreast Sunfish

126 - 150 mm



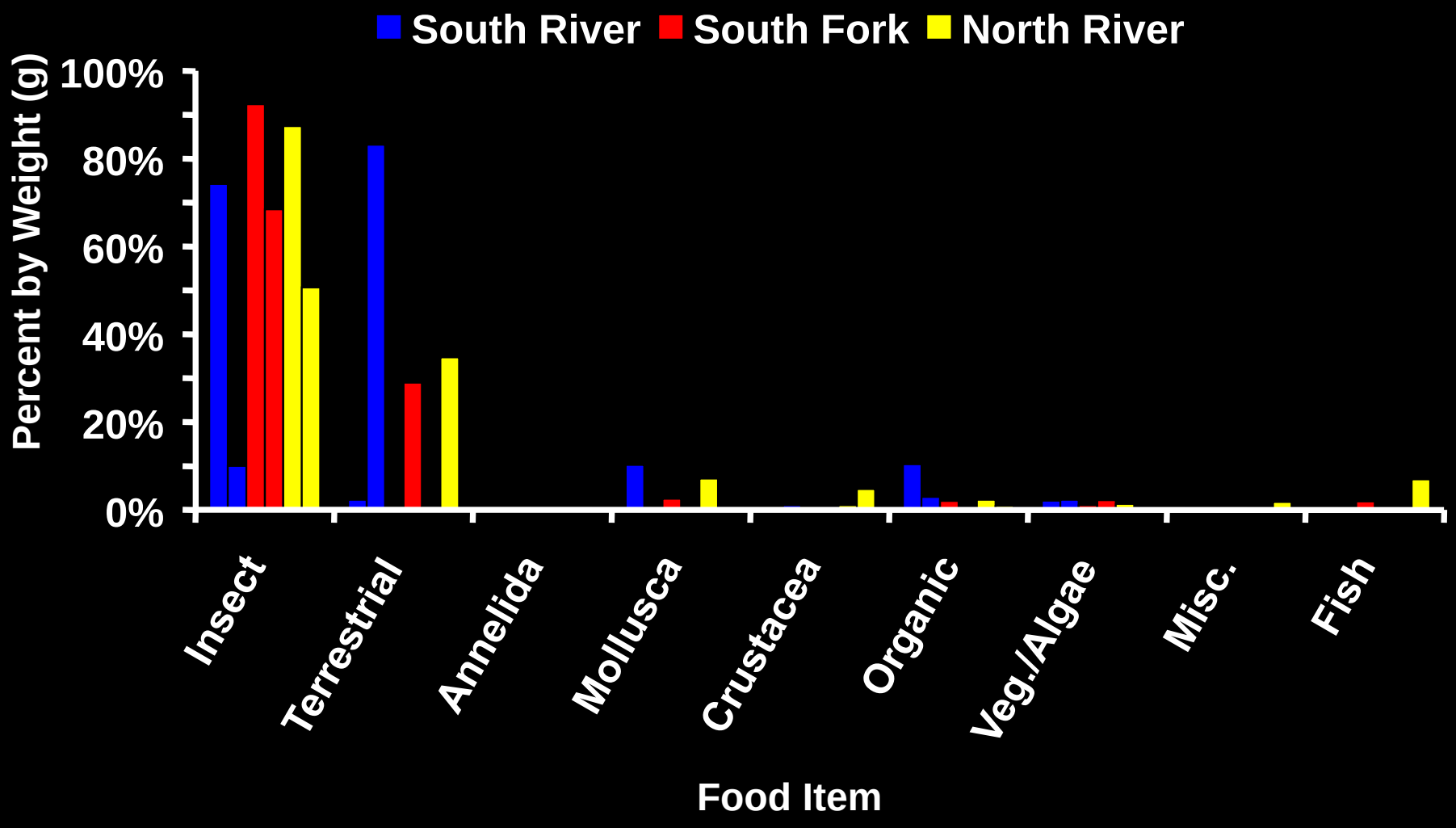
Redbreast Sunfish

151 - 175 mm



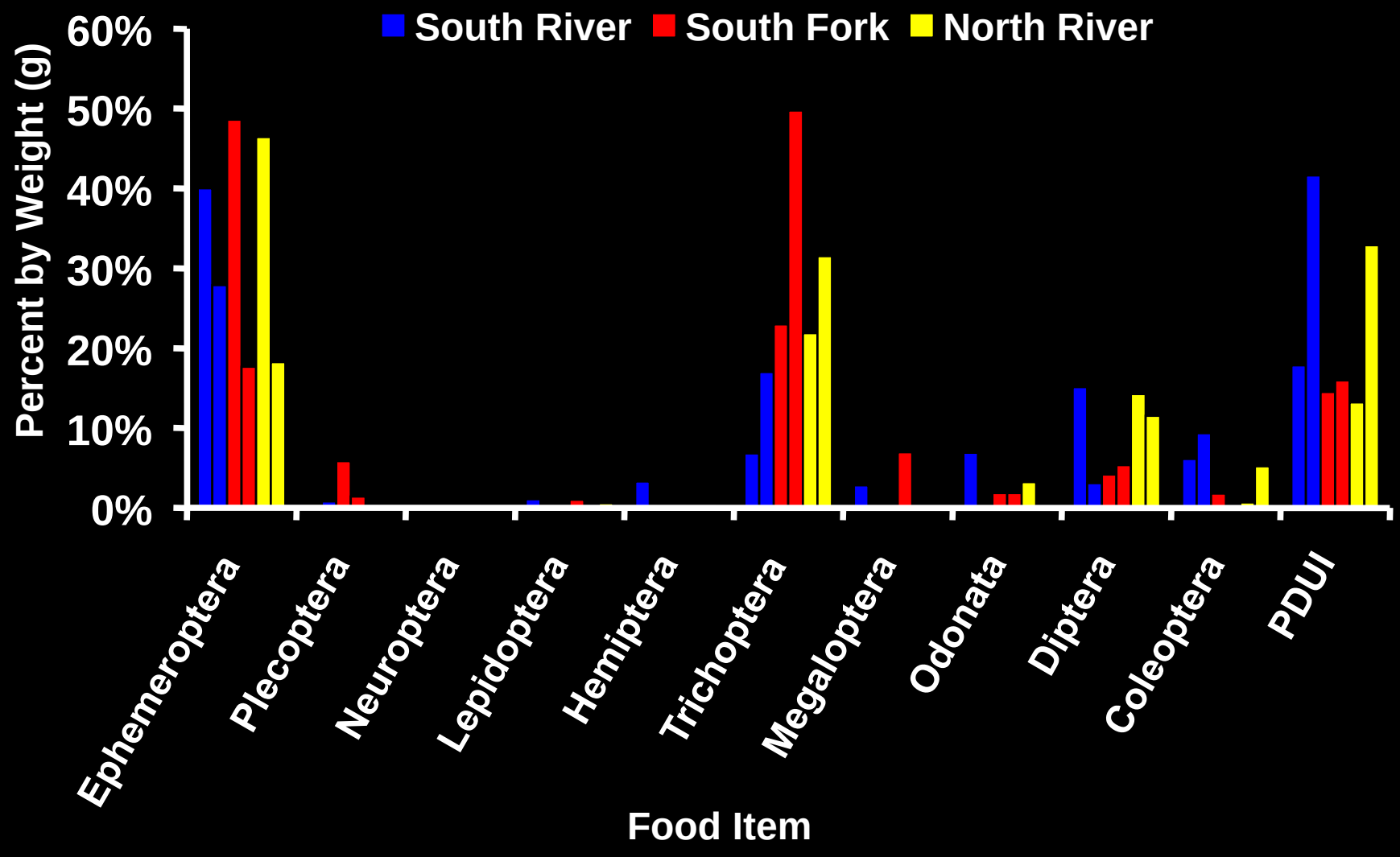
Redbreast Sunfish

> 175 mm



Redbreast Sunfish

Insects Analysis



Redbreast Sunfish

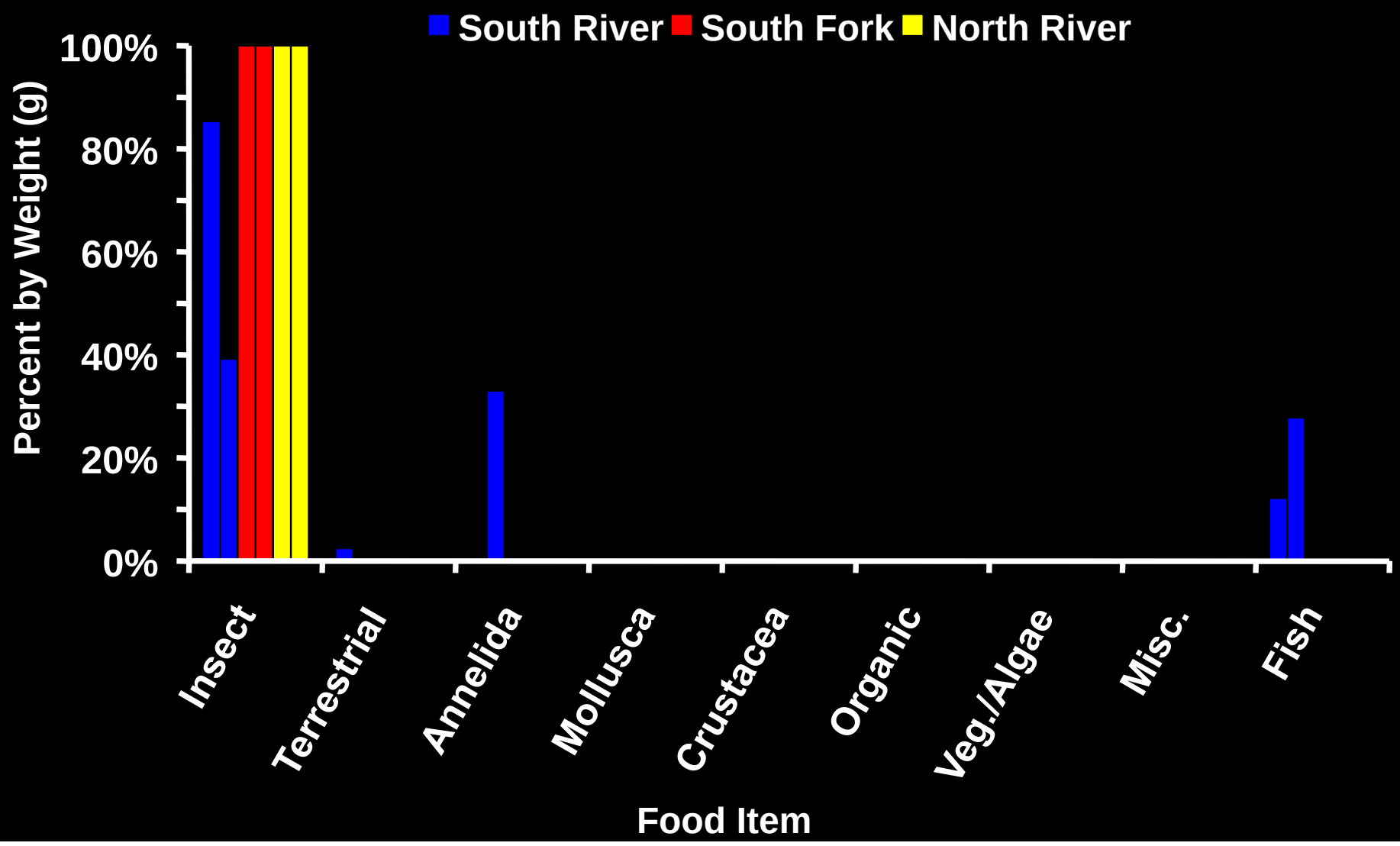
Summary

- **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**


Smallmouth Bass
Preliminary Findings

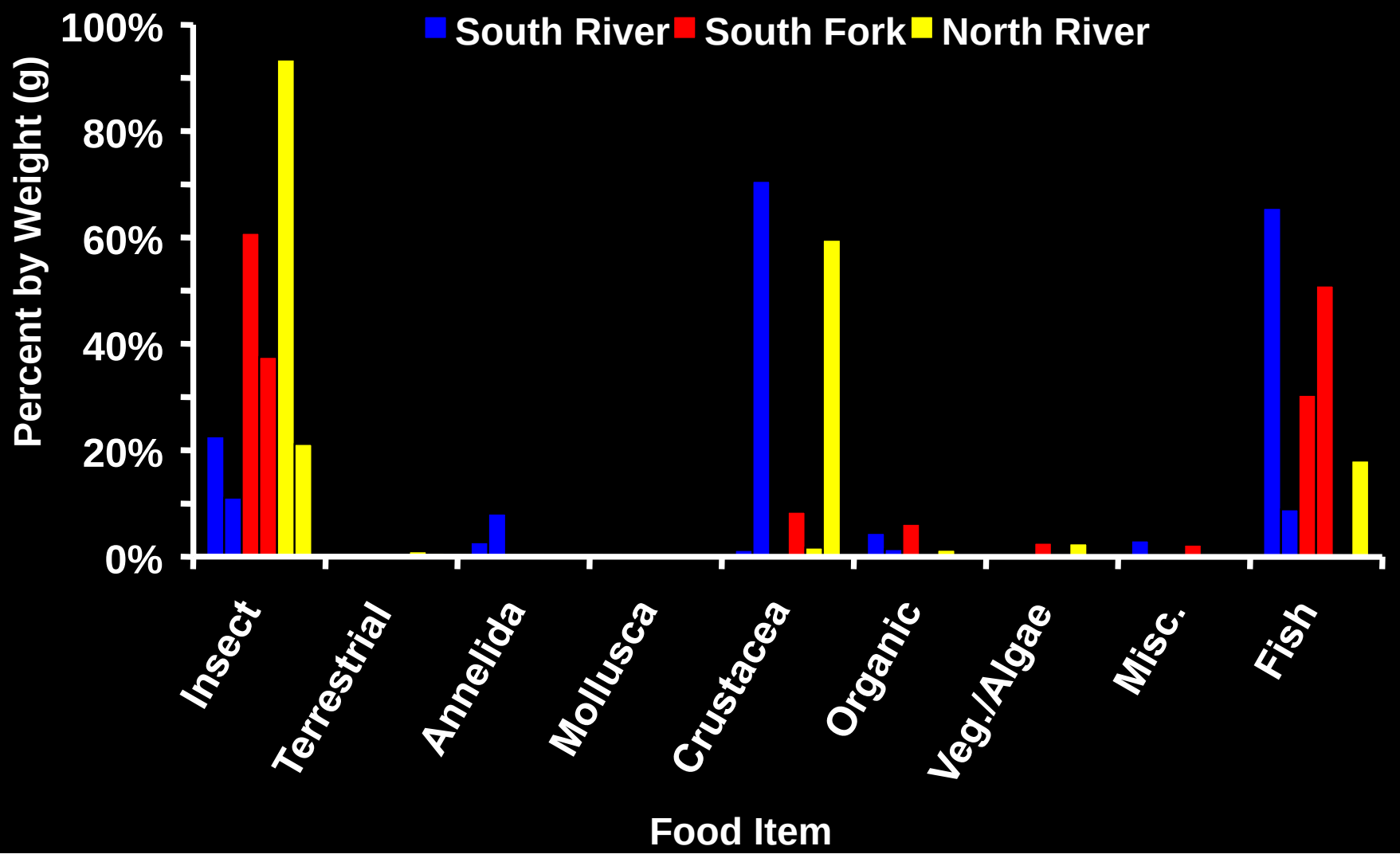
Smallmouth Bass

< 100 mm



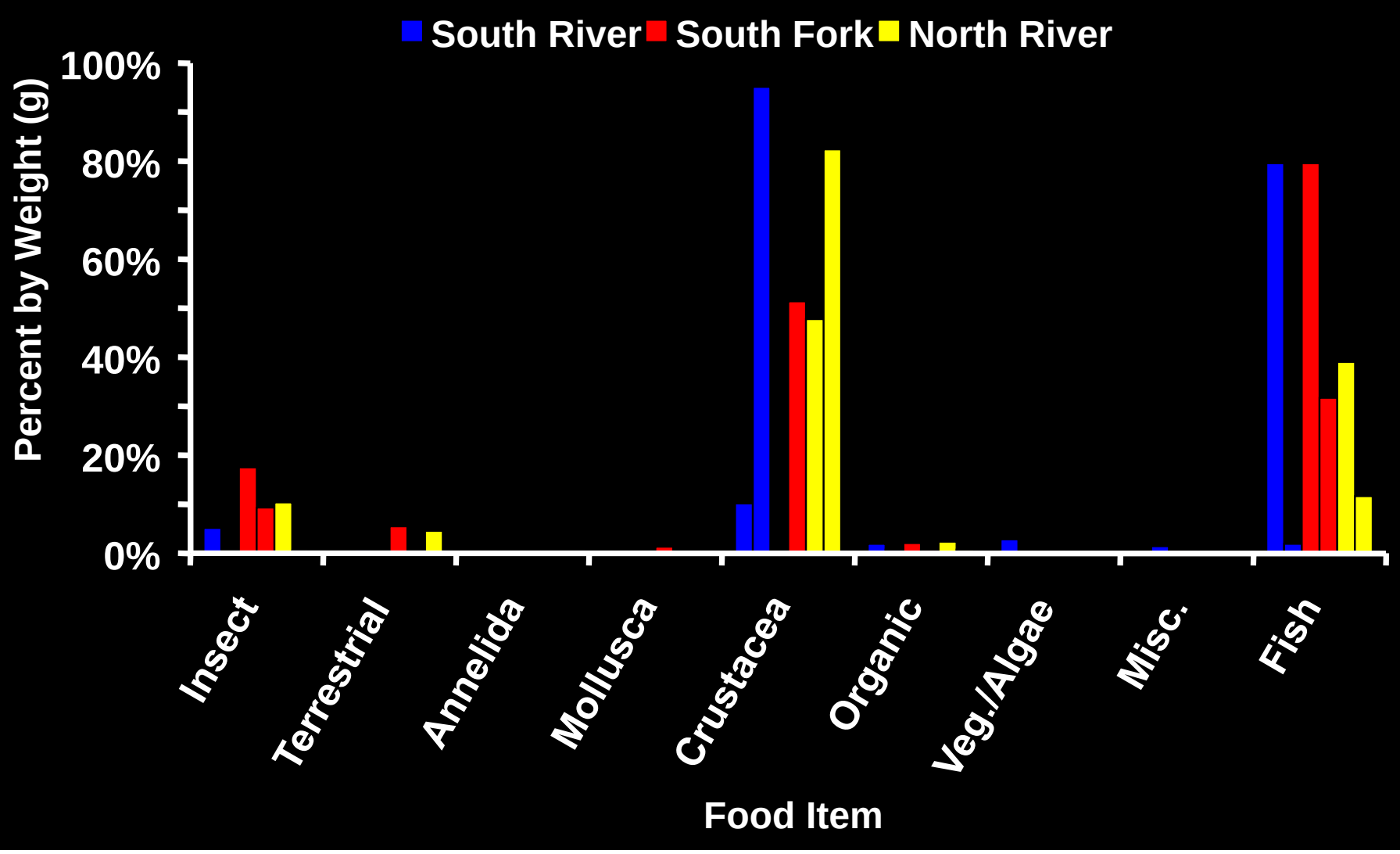
Smallmouth Bass

100 - 199 mm



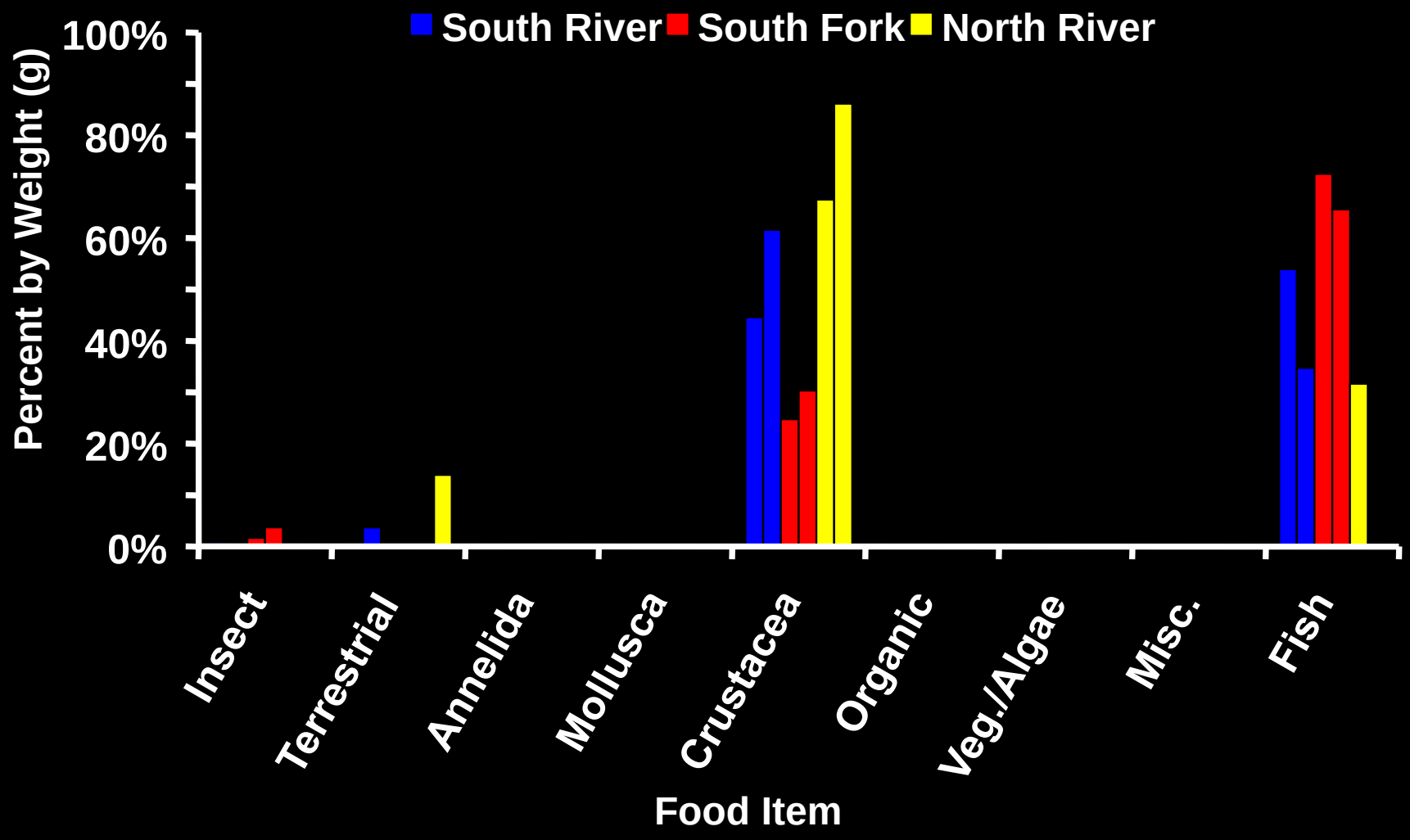
Smallmouth Bass

200 - 299 mm



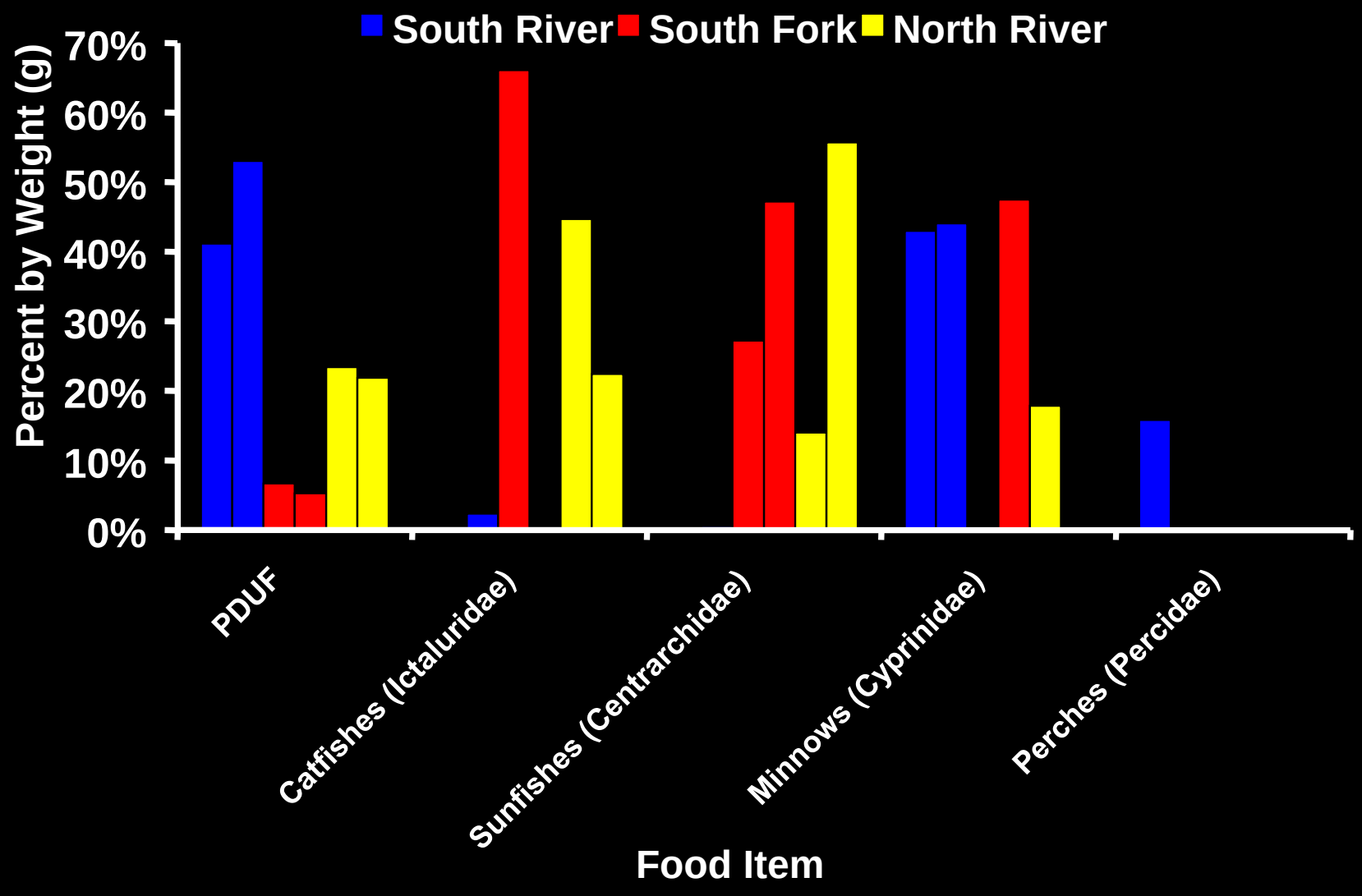
Smallmouth Bass

> 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

Acknowledgements

Committee Members:

Steve Reeser

Tammy Newcomb

Don Cherry

Don Orth

John Ney

South River Science Team


Questions?