



# MDC Resource Science

## Trophic Interactions Between Missouri Ozarks Stream Crayfish Communities and Sport Fish Predators

Science Notes



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# Trophic Interactions Between Missouri Ozarks Stream Crayfish Communities and Sport Fish Predators



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## Abstract

Fisheries management is enhanced by knowledge of prey assemblages and effects of management activities on those assemblages. Few warmwater stream management efforts designed to increase abundance and/or size structure of sport fish have included measurements of potential effects on sport fish diets or prey communities, especially across multiple sites and long temporal periods. Crayfish are a major component of warmwater stream communities in many regions of North America, and are acknowledged as important prey for several centrarchid sport fishes. I examined potential effects of fisheries harvest regulation changes designed to increase sport fish abundance and size structure on stream crayfish communities and on sport fish diet patterns in two

Missouri Ozarks streams. Results indicated few if any

detectable effects to diurnal crayfish community densities or sport fish diet patterns. Crayfish consistently dominated smallmouth bass *Micropterus dolomieu* (61-63% of diet by weight), shadow bass *Ambloplites ariommus* (78%), and rock bass *Ambloplites rupestris* (78%) stomach samples at all four study stream reaches, during three seasons, over 11 years. I observed seasonal shifts in quantity of food consumed and use of various prey types by sport fish. Sport fish diet patterns indicated ontogenetic shifts manifested by increased use of crayfish as predators reached ages desired by anglers. Increasing population sizes of centrarchid sport fishes in Jacks Fork and Big Piney rivers appeared to be taking advantage of abundant and available crayfish forage, with no detectable adverse effects to those crayfish communities to date. However, managers are advised that

**Goal: Determine Effects of Sport Fishing Regulations on Crayfish Community and Importance of Crayfish as Prey**

these important prey assemblages, and hence the fisheries they support, are susceptible to stream habitat degradation, and possibly to overexploitation, and should be monitored.

Species (bass)/ Stream	Prey Type				
	Sample Size	Crayfish	Fish	Other Inverts	Other Vertebrates
Smallmouth-JF	1,905	0.61	0.22	0.1	0.01
Smallmouth-BP	1,630	0.63	0.24	0.09	0.01
Shadow- JF	984	0.78	0.03	0.12	0.01
Rock-BP	3,831	0.78	0.02	0.14	0.00

Table 1 Relative mean proportions of wet weights of five prey types extracted from stomachs of smallmouth bass (*Micropterus dolomieu*), shadow bass<sup>A</sup> (*Ambloplites ariommus*) and rock bass<sup>A</sup> (*Ambloplites rupestris*) during electrofishing collections in the reference stream reaches of Jacks Fork (JF; spring and autumn; 1991-2001) and Big Piney (BP; spring, summer, autumn; 1992-2000) rivers, Missouri. Cumulative totals for each species add to about 100 %.

## Project Details:

- Crayfish densities sampled in two Ozark streams
- Evaluated impact of a regulation change on prey base
- All bass species had fewer empty stomachs in spring
- Crayfish were the primary prey items for all bass
- Cyprinidae were the most common fish prey found in stomach samples

**Management Findings:** Study results demonstrated that smallmouth bass, shadow bass and rock bass fisheries in Jacks Fork and Big Piney rivers are largely dependent for most if not the entire year upon the abundant crayfish communities. The increased abundance and size structure of predators caused little change in crayfish community densities.

<sup>1</sup>Full report available from

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