

## Interactions between an introduced piscivore and a native piscivore in a California stream

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### Synopsis

I quantified microhabitat use and abundance of fishes in the South Yuba River (Nevada County, California) to test the hypothesis that predation by introduced smallmouth bass, *Micropterus dolomieu*, limits the abundance of native Sacramento pikeminnow, *Ptychocheilus grandis*. Predation by smallmouth bass appears to be the most likely cause of decreases in native species. Based on microhabitat experiments, competition with juvenile smallmouth bass did not contribute to predation by adult smallmouth bass on native species. The main factors that appear to favor smallmouth bass, with regard to intraguild predation with pikeminnow, are: (1) the smaller size of smallmouth bass at the onset of piscivory; (2) the greater use of cover by juvenile smallmouth bass; and (3) lower microhabitat overlaps of juvenile smallmouth bass with piscivores.

### Introduction

Introduced piscivores are reducing the abundance of native fishes in California (Moyle & Williams 1990, Moyle 2002). Introduced smallmouth bass, *Micropterus dolomieu*, have replaced native fishes in California and South African streams (Gore et al. 1991, Brown & Moyle 1993, Moyle 2002), and caused the decline of native walleye, *Stizostedion vitreum vitreum*, in Minnesota lakes (Johnson & Hale 1977). Gard (2002) found that in the presence of smallmouth bass there was a disproportionate decrease in smaller sizes of native fishes in the South Yuba River. Smallmouth bass are ecologically similar to Sacramento pikeminnow, *Ptychocheilus grandis*; both species tend to be found in pool and run habitats in larger rivers, feed primarily on aquatic macroinvertebrates as juveniles, and switch to piscivory as adults (Moyle 2002).

I tested the following hypotheses: (1) smallmouth bass have lowered the number of pikeminnow and hardhead, *Mylopharodon conocephalus*, and have limited the distribution of California roach, *Lavinia symmetricus*; (2) predation by smallmouth bass has caused the above patterns by limiting recruitment of native cypriids; and (3) competition between juvenile smallmouth bass and juvenile pikeminnow does not play a major role in enhancing the predation.

### Methods

#### *Study area*

I collected data on the South Yuba River and its tributaries during summers 1991–1993. The study area was the lowermost 15 km of the South Yuba