

IMPLICATIONS OF COMMERCIAL HARVEST OF RIVER TURTLES IN MISSOURI

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ABSTRACT

In Missouri, three turtle species are open to commercial harvest: common snapping turtles (*Chelydra serpentina*), smooth softshells (*Apalone mutica*), and spiny softshells (*A. spinifera*). To assess implications of harvest on these species in Missouri, we carried out mark-recapture studies in 2011 and 2012 on the Missouri River where harvest of turtles is permissible and two of its unharvested tributaries, the Osage and Gasconade rivers. We estimated abundance at harvested vs. unharvested sites, and conducted mock harvests to estimate plausible commercial harvest rates. Snapping turtle abundance was significantly lower in the Missouri River than in unharvested tributaries. Based on raw capture data, there was no significant difference in harvested vs. unharvested population size for either softshell species. Mock harvest rates averaged removal of 23% of the population (SE = 5%; 6-79%) based on abundance estimates. To assess implications of our harvest rates we used demographic data from the literature to develop stage-based matrix models, one for snapping turtles and one for softshells combined. Using mean demographic rates, snapping turtle populations exhibited growth ($\lambda = 1.030$) and declined at all levels of harvest, except under a juveniles-only strategy at minimum rates. Softshell populations declined ($\lambda = 0.952$) in the absence of harvest. To provide managers with a method to assess the river of capture of harvested turtles in central Missouri, we evaluated the use of microchemistry analysis of turtle nails. Classification and regression tree models indicated that the Sr:Ca ratio in nails could be used to classify turtles with 83.5% accuracy to either the Missouri River or to the two tributaries. Finally, we have provided management recommendations to assist managers in decision-making for commercial turtle harvest.