

Detection Estimates and Habitat Occupancy of Two Pelagic Broadcast Spawning Cyprinids

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Non-native species introductions are a primary threat to the biodiversity of southwestern rivers. Historically, the federally-threatened Arkansas River Shiner *Notropis girardi* occurred throughout the Arkansas River basin. Major anthropogenic changes throughout the basin have altered the natural flow regime and reduced the Arkansas River Shiner's range to only the South Canadian river. It has been speculated that the establishment of the non-native Red River Shiner *Notropis bairdi* reduces the chance of Arkansas River Shiner recovery but little evidence exists of ecological relationships between the species that may promote interspecific competition. However, detection error is rarely accounted for when sampling riverine fish assemblages which may lead to false conclusions. This study examined the habitat occupancy of both Arkansas River Shiner and Red River Shiner in the Arkansas River basin, Oklahoma to determine if there was an ecological-niche overlap and if population estimates may be biased due to detection error. We sampled reaches throughout the Cimarron and South Canadian rivers to collect abundance estimates and microhabitat information. Single-species occupancy modeling was used to assess the probability of detection, presence, and abundance of each species at the microhabitat scale. We also used multi-season occupancy models to estimate seasonal colonization and extinction rates (i.e., patch turnover). Our results indicated that Arkansas River Shiner typically occupied main channel habitats, whereas Red River Shiner tended to occupy backwater habitats. Habitat use infers that if these species were to co-occur, habitat overlap would unlikely be the cause for competitive exclusion. Results also indicated that when detection is not accounted for populations may be underestimated. Understanding habitat use, particularly in relation to potential competitors, is crucial for both future management of Arkansas River Shiner and non-native species control in southwestern rivers. Furthermore, failure to assess sampling error may be detrimental to detecting the spread of non-native species.

KEY WORDS Detection, Arkansas River Shiner, Threatened, Occupancy, Non-native.