

## Distribution of the Red River Shiner, *Notropis bairdi*, in the Arkansas River Drainage

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The Red River shiner, *Notropis bairdi* Hubbs and Ortenburger, is a small (up to 64 mm standard length [SL]) member of the family Cyprinidae (1). A broad flattened head, large sub-terminal mouth, scales embedded or absent on the anterior nape, distinct predorsal stripe, and seven anal rays distinguish this species from its congeners (2,3). This shiner inhabits sandy, turbid channels of small to large rivers with bottoms of silt and shifting sand (1,2).

Historically, the Red River shiner was endemic to the Red River drainage of northern Texas, southern Oklahoma, and extreme southwestern Arkansas (1). The species was first collected from the Cimarron River (Arkansas River drainage) of Oklahoma in 1976 (4). Cross et al. (5) deduced that the introduction occurred between 1964 and 1972. By 1979 the Red River shiner was firmly established in the Cimarron River Drainage (6).

Introduction of the Red River shiner into the Cimarron River occurred proximal to the decline of the Arkansas River shiner, *Notropis girardi* Hubbs and Ortenburger, in that system (6-9). The Arkansas River shiner (10) spawns during flood conditions and presumably, the Red River shiner (9) requires similar conditions. Felley and Cothran (6) implied that ecological displacement of the Arkansas River shiner by the Red River shiner occurred in the Cimarron River. However, the Arkansas River shiner declined during a similar time frame in other streams devoid of the Red River shiner (9). Larson (7) and Cross et al. (9) provided convincing evidence that reduced stream flows were the primary reason for decline of the Arkansas River shiner. However, neither Larson (7) nor Cross (pers. comm.) discounted the possibility that displacement by the Red River shiner played a secondary role in the decline of the Arkansas River shiner.

In 1994 the United States Fish and Wildlife Service proposed to list the Arkansas River Basin population of the Arkansas River shiner as endangered (11). This proposal contained the following statement: "The unintentional release of Red River shiners, or other potential competitors, into the Canadian River by anglers or the commercial bait industry is a potentially serious threat and could lead to decimation or extirpation of the remaining natural Arkansas River shiner populations." In an attempt to aid recovery efforts (i.e., reintroduction) for the Arkansas River shiner, the current known distribution of the Red River shiner in the Arkansas River drainage was summarized. This summary is based on a review of museum records (Oklahoma State University Collection of Vertebrates: OSUS, and Oklahoma Museum of Natural History: OKMNH), a review of the literature, and seine collections made by the authors from 1976 through 1994.

Occurrence of the Red River shiner in the Cimarron River of Kansas and Oklahoma has been widely recognized in the literature (e.g., 4-9). Pigg (12) recently reported the species from the North Canadian River of Oklahoma. However, limited occurrence of the Red River shiner in his extensive collections from this stream suggests that this was a transient introduction (J. Pigg, unpubl. data). In the summer of 1994 Luttrell and Underwood made seine collections of the Red River shiner from the Arkansas River (OSUS 27458: Osage Co., 4 specimens), Salt Fork of the Arkansas River (OSUS 26844: Grant Co., 1 specimen), and South Canadian River (OSUS 26807:

McClain/Cleveland Co., 1 specimen) in Oklahoma. This represents the first report of the Red River shiner from these streams. Subsequently, voucher specimens were found in OSUS that indicated the Red River shiner had inhabited these three rivers for over 10 years. Jimmie Pigg collected the species from the Arkansas River in 1982 (OSUS 19564: Tulsa Co., 4 specimens, and OSUS 19567: Tulsa Co., 1 specimen); from the Salt Fork of the Arkansas River in 1982 (OSUS 19583: Alfalfa Co., 1 specimen); and from the South Canadian River in 1978 (OSUS 19597: Blaine Co., 1 specimen). The specimen, OSUS 26807, taken 28 July 1994 from the South Canadian River near Lexington (McClain/Cleveland Co.), was a gravid female (37 mm SL). Additionally, OSUS 19564, taken from the Arkansas River near Sand Springs (Tulsa Co.) contained four specimens, three of which were young-of-the-year (< 15 mm SL).

Given the success of the Red River shiner in the Cimarron River, its failure to rapidly colonize the Arkansas, Salt Fork of the Arkansas, and South Canadian rivers is puzzling. Perhaps introductions were limited to small numbers of individuals at a few sites (e.g., bait buckets). Alternatively, environmental conditions in these streams (e.g., stream flows) may limit spawning by the Red River shiner. Whether these sporadic collections represent established populations or transient introductions is unclear. Further spread of the Red River shiner in the drainage should be closely monitored. Establishment of the species in the South Canadian River may pose a serious threat to the last native population of the Arkansas River shiner (11).

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