

OCCURRENCE OF THE RIVER SHINER, *NOTROPIS BLENNIUS*, IN LAKE MEREDITH, TEXAS

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ABSTRACT—The river shiner, *Notropis blennioides*, was collected from Lake Meredith, Texas and outside of its reported native range. This specimen likely represents a bait-bucket release. Within its native range, the river shiner readily acclimates to lentic conditions, increases in abundance, and displaces other riverine fishes following flow regime alterations. Its occurrence and possible establishment might have similar negative impacts on the Canadian River fish assemblage upstream from Lake Meredith, which includes the threatened Arkansas River shiner, *Notropis girardi*.

RESUMEN—*Notropis blennioides* fue colectado en el Lago Meredith, Texas, y fuera de su distribución nativa registrada. Esta especie probablemente representa un tipo de cebo liberado. Dentro de su distribución nativa, esta especie es conocida por su habilidad de climatizarse a condiciones de corrientes mínimas, de incrementar su abundancia rápidamente, y de desplazar a otras especies de peces río viales después de cambios de manejo de corriente. Su apariencia y posiblemente establecimiento pueden causar impactos negativos parecidos a la comunidad de peces que se encuentre río arriba del Lago Meredith en el Río Canadá. Una de estas especies ya amenazada es *Notropis girardi*.

River shiner, *Notropis blennioides*, inhabits large rivers in the Hudson Bay, Lake Michigan, Mississippi River, Missouri River, and Arkansas River drainages of central North America (Miller and Robison, 1973; Etnier and Starnes, 1993). Its current distribution includes the Red River drainage of Texas and Oklahoma, although this population might be introduced (Hubbs and Bonham, 1951; Cross et al., 1986). In the Arkansas River drainage, native range of the river shiner includes the Arkansas River main stem from the Mississippi River confluence to Oxford, Kansas, and tributaries in Kansas and Oklahoma (Hubbs and Bonham, 1951; Cross, 1967; Gilbert, 1978), including the Cimarron River (Miller and Robison, 1973) and lower reaches of the North Canadian and Canadian rivers of Oklahoma (Pigg et al., 1992).

On 5 June 2003, one river shiner (male; 95 mm total length) was collected from Big Blue Creek Bay, Lake Meredith, Moore County, Texas (N35°41'28.06", W101°37'57.37") during an ichthyofaunal survey of the Canadian River drainage within Lake Meredith National Recreation Area. Defining morphometric and meristic characteristics of the captured specimen included short intestine, lack of maxillary bar-

bel, lack of crowded predorsal scales, terminal and oblique mouth, pharyngeal teeth in 2 rows (2, 4–4, 2), 7 anal rays, origin of dorsal fin over insertion of pelvic fin, and a prominent mid-dorsal stripe that surrounds the dorsal fin base and is about 10 chromatophores wide (Cross, 1967; Hubbs et al., 1991; Etnier and Starnes, 1993). Identification was verified independently by D. Hendrickson (University of Texas–Austin) and G. Linam (Texas Parks and Wildlife Department). The specimen was captured with a seine (mesh size: 6.4 mm) from shallow water (50 cm deep). Bullhead minnow (*Pimephales vigilax*), red shiner (*Cyprinella lutrensis*), and juvenile channel catfish (*Ictalurus punctatus*) were collected at the same location. The specimen was deposited in the West Texas A&M University Museum (WTAMU 28307).

Lake Meredith is a main-stem reservoir on the Canadian River and outside of the previously reported range of the river shiner in Oklahoma and Texas (Miller and Robison, 1973; Hubbs et al., 1991). It is unlikely that this region of the Canadian River represents its natural range. River shiner was not reported in this area from 1954 through 1996 (Bonner and Wilde, 2000) and does not occur upstream

from Lake Eufala (Pittsburg, McIntosh, and Haskell counties, Oklahoma) in the Canadian River (W. Matthews, University of Oklahoma, pers. comm.). Instead, river shiner occurrence in Lake Meredith likely represents a bait-bucket release. At least one bait dealer interviewed in Lake Meredith vicinity purchases live bait from a distributor in Oklahoma who captures minnows from the Cimarron River, where river shiner is native.

Bait bucket releases of the river shiner in Lake Meredith might have negative ecological impacts on native fishes of the Canadian River. The river shiner readily acclimates to lentic conditions and subsequently colonizes upstream and downstream reaches from reservoirs (Underhill, 1986; Pflieger and Grace, 1987). In the Arkansas and lower Missouri rivers, river shiner and other pelagic planktivorous and sight-feeding carnivorous fishes increased in abundance during a period of 30 to 40 years following reservoir construction that altered flow regimes and reduced sediment transport (Cross and Moss, 1987; Pflieger and Grace, 1987). Correspondingly, several large river fishes tolerant of turbidity (e.g., flathead chub, *Platygobio gracilis*; plains minnow, *Hybognathus placitus*) decreased in abundance, attributed in part to competition with the river shiner and other fishes. Upstream from Lake Meredith in the Canadian River, the fish assemblage is dominated by cyprinids tolerant of turbidity, including the flathead chub, plains minnow, and Arkansas River shiner (*Notropis girardi*) (Bonner and Wilde, 2000), a species listed as threatened by United States Fish and Wildlife Service (1998). Mean annual discharge in this section of the Canadian River is 28% lower than historical mean discharge because of reservoirs located upstream from Lake Meredith (Bonner and Wilde, 2000). In this altered system, a population of river shiners established through bait-bucket release might compete with native minnows, producing assemblage shifts similar to those observed in the Arkansas and Missouri river drainages. With the collection of only one individual, it is unknown if river shiners are established in Lake Meredith at this time. Additional surveys are warranted to monitor the occurrence, abundance, and dispersal of this potentially invasive fish.

Fieldwork in Lake Meredith National Recreation

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ABNORMAL DIGITS IN STRECKER'S CHORUS FROGS (*PSEUDACRIS STRECKERI*, HYLIDAE) FROM CENTRAL TEXAS

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ABSTRACT—We report the first case of unusually frequent abnormal anatomy in *Pseudacris streckeri* and the first such account for anurans in the state of Texas. We found abnormal digits in 55% of 40 adult males and 26% of 23 adult females in Austin, Texas. In contrast to other studies that reported frequent abnormal limbs and cutaneous fusion, abnormalities were restricted to digits. None of 325 newly metamorphosed juveniles showed abnormal digits, indicating that the abnormalities are formed after metamorphosis, or that the cause of the abnormalities was not active during the sampling period. Abnormalities continued to be found in the adults of this population during the following 3 years.

RESUMEN—Registramos el primer caso de anomalías anatómicas inusualmente frecuentes en la ranita *Pseudacris streckeri* y el primer caso para anuros en el estado de Texas. Encontramos dígitos anómalos en 55% de 40 machos adultos y 26% de 23 hembras adultas en Austin, Texas. En contraste con otros estudios que registran miembros anómalos y fusión cutánea, las anomalías estuvieron restringidas a los dígitos. Ninguno de los 325 juveniles recién metamorfoseados tenía dígitos anómalos, indicando que las anomalías se formaron antes de la metamorfosis y que la causa de las anomalías no estaba activa durante el periodo de muestreo. Se encontraron anomalías en los adultos de esta población durante los 3 años siguientes.

Several recent studies have reported high frequencies of abnormal limbs in amphibian populations (Helgen et al., 2000; Johnson et al., 2002; Gardiner et al., 2003; Johnson and Sutherland, 2003; Vandenslangenberg et al., 2003). The abnormalities observed at frequencies above normal typically involve missing, reduced, or extra digits or whole limbs, and skin webbing (Johnson et al., 2001, 2003; McCallum and Trauth, 2003; Schoff et al., 2003; Vandenslangenberg et al., 2003). These studies

have raised concern regarding the potential influence of environmental degradation and pointed out the importance of ascertaining abnormalities in nature.

In January 1998, we conducted a mark-recapture study on Strecker's chorus frogs (*Pseudacris streckeri*) and found a high percentage of abnormal digits. No record of abnormalities could be found for this species (<http://frogweb.nbio.gov/narcam>). The abnormalities seemed to be unusually restricted to digits and