RIO GRANDE CUTTHROAT TROUT IN TEXAS

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ABSTRACT.—Historic records provide evidence that Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) were indigenous to some Texas streams. This information includes railroad survey reports and several accounts in a major sporting publication of the late 1800s, including a drawing with color description. Published accounts continued through the mid-1900s, after which man's activities made these streams unsuitable for trout survival. *Key words*: indigenous; cutthroat trout; *Oncorhynchus*; *Gila*.

There has been considerable debate over whether any salmonid species are native to Texas. Hubbs (1982) listed the rainbow trout (*Oncorhynchus mykiss*) as the only salmonid presently occurring in Texas. He was referring to the only known viable population in the state, which is in McKittrick Creek, Guadalupe Mountains National Park, where it was introduced. The native range of rainbow trout is west of the Rocky Mountains and no natural populations occur in eastern slope streams. Rainbow trout probably were stocked in McKittrick Creek in the early 1900s when the Game, Fish and Oyster Commission of Texas was actively pursuing a rainbow trout stocking program throughout the state.

Historic records indicate Texas may have had one indigenous salmonid, the Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*). An indigenous species is here defined as one with an occurrence in Texas that did not result from importation by man, and that it was born, reproduced, or lived in the state.

For more than 100 years there have been anecdotal accounts on the natural occurrence of trout in Texas. Because these accounts are largely unverified and no preserved specimens exist today, most authors have not included Texas in the native range of any salmonid. This study summarizes literary accounts that provide evidence to support classifying Rio Grande cutthroat trout as an indigenous species in the state.

MATERIALS AND METHODS

Current literature and historic documents were reviewed for accounts of trout occurrence in the southwestern United States. Repositories that were searched for pertinent documents included the libraries at The University of Texas at Austin and at San Antonio, military archives at Fort Bliss, El Paso, and Fort Hood, Killeen, and historical archives at Guadalupe Mountains National Park and Fort Davis National Historic Site. Museum collections at the University of Texas (Texas Memorial Museum), Texas A & M University (Texas Cooperative Wildlife Collection), and the University of Michigan (Museum of Zoology) were searched for trout specimens.

Results

Cutthroat trout (*O. clarki*) have the most widespread and primitive distributional pattern of any species of trout in North America (Behnke, 1979, 1988). However, in the last century, the increasing human population in the West has caused extirpation of cutthroat trout throughout most of its range (Behnke, 1988). As early as the turn of the 20th century, many of the habitat alterations that were taking place were noted to be harmful to trout (Jordan and Evermann, 1923). In addition, introduced salmonids reduced the numbers of cutthroat trout through hybridization (with rainbow trout, and other subspecies of cutthroat trout) and competition (with brown trout, brook trout, rainbow trout, and other subspecies of cutthroat trout) (Behnke, 1979; Minckley et al., 1986; Sublette et al., 1990).

The Rio Grande cutthroat trout has the southernmost distribution of any of the 14 subspecies of the species (Behnke, 1979). There are two forms of this subspecies, one in the Rio Grande and the other in the Pecos River. The Pecos River form is distinguished by larger spots and more scales in the lateral series. Rio Grande cutthroat trout first were described from Ute Creek, Colorado, a tributary of the Rio Grande, by Girard (1856) as *Salar virginalis*. Following the description, several authors assigned a variety of other names to Rio Grande cutthroat trout from other locations within its range, thereby creating a period of nomenclatorial confusion in the group.

Like cutthroat trout in general, the Rio Grande cutthroat trout is now rare throughout its native range (Behnke, 1979; Sublette et al., 1990). It was listed as "threatened" in Colorado until 1985 when successful recovery efforts enabled delisting (Trotter, 1987). New Mexico now has a management program for maintaining and enhancing existing cutthroat trout populations and establishing new populations (Stefferud, 1988).

Extirpation of the Rio Grande cutthroat trout from a large portion of its range is attributed to several factors. Angling pressure (Trotter, 1987; Griffith, 1988), hybridization, competition with non-native trouts, and habitat degradation (Stefferud, 1988) all played a role. The majority of the streams where the Rio Grande cutthroat occurred suffer from habitat degradation, primarily because of cattle grazing (Behnke, 1979; Sublette et al., 1990).

Reports of trout in Texas first appeared in the late 1800s. In 1876, an editor for Forest and Stream magazine, the major sporting publication of that period, reported that "brook trout" could be found in northwestern Texas in headwaters of the Canadian River. Troublesome Indians were noted as one of the major concerns for anglers in that area. In an 1878 edition of the magazine, a buffalo hunter and Major D. W. Hinkle, with Emory's Boundary Commission, reported abundant trout in the

headwaters of the Canadian and Red rivers in the Panhandle region of Texas. They reportedly had bigger and bluer spots than "the trout in the North."

The early reports of trout in the Canadian and Red rivers in Texas are likely due to geographic confusion. Rio Grande cutthroat trout were in the headwaters of the Canadian River (Behnke, 1979; Cross et al., 1986; Trotter, 1987; Sublette et al., 1990), but that location is in New Mexico. They could have moved into Texas during late-Pleistocene glacial periods, but the subsequent warmer, drier period makes it unlikely they were there during historic times.

In 1878, N. A. Taylor wrote in Forest and Stream that a surgeon, Dr. H. I. Hunter, stationed at Fort Davis, Texas, during the Civil War took "*Salmo fontinalis*" from nearby Limpia Creek. Another surgeon, Dr. J. W. Daniel, who traveled in western Texas and New Mexico during the Civil War period wrote in Forest and Stream (also in 1878) about catching "*S. fontinalis*" in Texas in the Devils River at Fort Hudson and in Limpia Creek near Fort Davis. He also reported taking this species from the "Rio Benito" at Fort Stanton, New Mexico, and other mountain streams in New Mexico. The Rio Bonito is a tributary of the Pecos River and is known to have contained *O. c. virginalis* at that time (Behnke, 1979); therefore, Daniel's trout indentification skills were likely sufficient to recognize the species in question. An editor's note following Daniel's article stated that the presence of trout (as *Salmo spilurus*) in Texas had been firmly established by "ample testimony." A drawing of the fish was accompanied by the description: "yellowish brown above, spotted with black; a red band on each side of the chin." Although the drawing is rather generic, the description is correct for cutthroat trout (see for example, Behnke, 1979; Sublette et al., 1990) and of particular significance is the reference to a red band. This coloration is distinctive for cutthroat trout, occurring on the gular folds.

Hallock (1883) stated trout (as *Salmo irridea*) were found in northwestern Texas, but gave no specific locations. He designated the range of "Rio Grande trout" (as *S. spilurus*) as "head-waters of Rio Grande, New Mexico; Sangre de Christo Pass, Colorado; and Brazos and Chama Rivers, New Mexico." Evermann and Kendall (1894) listed "*Salmo mykiss spilurus*" as in Texas at "Limpia, Devil River, San Felipe Springs, and headwaters of the Canadian River, Texas."

During the mid- to late-1800s the U. S. government and the Pacific Railroad worked cooperatively to explore new railroad routes and to perform faunal and floral surveys. One such report in 1854 (reviewed by Evermann and Kendall, 1894) on the exploration of a route from the Red River to the Rio Grande by Lieutenant L. H. Marshall listed trout occurrence in 1) the Sacramento River (tributary of the Pecos in southeastern New Mexico), 2) the easternmost branch of the Colorado

River, Texas, 3) the Double Mountain Fork of the Brazos River, Texas, and 4) the Clear Fork of the Brazos River, Texas. Although it was common during this time period for members of the genus *Micropterus* to be referred to as trout (Henshall, 1892), Marshall discriminated between the presence of "bass" and "trout," at times listing both in the same general location. Evermann and Kendall (1894) stated that if Marshall's fish was a trout it was likely "*S. m. spilurus*."

Evermann and Kendall (1894) also listed "*S. m. spilurus*" in the streams of the Sierra Madre, Chihuahua, México. However, this was apparently an erroneous report based on specimens collected by Cope (1886) at an elevation of 7000 to 8000 feet, "in the southern part of the State of Chihuahua, near the boundaries of Durango and Sinaloa." The specimens were lost and identification cannot be verified, but Meek (1901) stated that Cope's trout of the Sierra Madre were from streams of the Pacific slope and were rainbow trout (as *S. irideus*). The trout of the Pacific slope of the Sierra Madres are actually Mexican golden trout (*O. chrysogaster*; Behnke, 1979). Chihuahua, México, also was cited by Jordan and Evermann (1896, 1923) as the southern limit for Rio Grande cutthroat trout, but this information was also derived from Cope's report.

By the middle of this century, trout still were being recorded as native or possibly native to Texas. Baughman (1950) listed *S. spilurus* as having a range that included Texas. Knapp (1953) noted the only possible locality for native trout in Texas was in the Davis Mountains (Limpia Creek). "Oldtimers" had stated that trout were present in that location, but the reports were never verified. Hubbs (1954, 1957) also felt that it was possible cutthroat trout (as *S. c. virginalis*) had occurred in the Pecos River drainage in Texas before intensive irrigation activities "raised temperature, lowered stream flow and increased salinity" (Hubbs, 1954). Again, there were no authenticated accounts of occurrence. Current experts continue to address the possibility of natural occurrence of Rio Grande cutthroat trout in Texas (Behnke, 1979, 1988; Trotter, 1987; Sublette et al., 1990).

The distribution of the Rio Grande chub (*Gila pandora*) (see Minckley, 1980) may be helpful in resolving the question of native Texas trout. Rio Grande chubs are often sympatric competitors with trout (Koster, 1957) and are found throughout the upper Rio Grande and Pecos river drainages with one relict population in Texas in the Davis Mountains. With the exception of the Davis Mountains location, their range is quite similar to that of Rio Grande cutthroat trout. Many northern species, in a variety of taxa, extended their ranges southward during the Wisconsin glacial period (Milstead, 1960; Bryant, 1977; Metcalf, 1977; Schmidly, 1977). For aquatic organisms in particular, the Chihuahuan Desert was a route for dispersal during this period (Miller, 1977). One can easily extrapolate a more widespread and continuous Rio Grande chub

distribution during this wetter and cooler period. As conditions became more xeric, the range diminished and relict populations were left behind in small areas of suitable habitat. In Texas, Rio Grande chubs now are restricted to Little Aguja Creek, a flood tributary of the Pecos River, in the Davis Mountains (Miller and Hubbs, 1962). This creek is in close proximity to Limpia Creek, one of the purported sites of trout in Texas. It is conceivable that during the Wisconsin pluvial period, the Rio Grande cutthroat trout expanded its range in the same way as the Rio Grande chub, and that at one time these two species had a more widespread, sympatric distribution.

Rio Grande chubs superficially resemble trout, (Koster, 1957) but seldom exceed 150 mm in standard length (Minckley, 1980). It is possible that laymen in the Davis Mountains, Texas, could have mistaken Rio Grande chubs for small trout; however, we feel that the accounts cited here were by individuals experienced enough with fish morphology to distinguish trouts from chubs.

Catalogued collections of Rio Grande cutthroat trout from locations in Texas would have provided conclusive evidence, but it appears they do not exist. However, the above accounts, taken together, present a likely scenario for natural occurrence of this species in the state. Although less than ideal, there is documentation that supports occurrence of trout in Texas with no indication of importation by man. Because of the locations of the purported populations, the trout would have had to have lived and reproduced in Texas. These locations (for example, Devils River, San Felipe Creek, and Limpia Creek) were spring-fed streams of relatively high flow prior to human settlement (Brune, 1981). The Texas trout was most likely the Rio Grande cutthroat trout, based on historical descriptions and the known distribution patterns of salmonids in North America.

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