The Status of Brook Trout (*Salvenlinus fontinalis*) in Iowa.

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Brook trout reach the southwestern limit of their native North American distribution in northeastern Iowa (Lee et al. 1980). In Iowa, the native distribution of brook trout is believed to be the coldwater tributaries of the Upper Iowa River drainage "and some other streams" in northeast Iowa (Evans et al. 1876:18). This statement from the 1870s represents the extent of our knowledge on the distribution of this species in the state prior to European settlement. Harlan and Speaker (1956:58) stated that this original distribution was probable but had been confused by stockings in the 1800s. An indication of these stockings is given in the first report of the Iowa State Fish Commission (Evans et al. 1876:18) where references are made to private trout farms raising and stocking "brook trout" (identified as *Salmo Fontanalis* [sic]). This activity began at least 15 years prior to the initial fish surveys in Iowa conducted by Meek (1892), who, unfortunately, collected fish from only two locations in the Upper Iowa River drainage (Chester and Decorah); no trout were taken at either location. He neither mentioned nor sampled any smaller coldwater streams in the Upper Iowa basin, nor does he indicate the presence of brook trout or other coldwater fish species (e.g., sculpins) in that basin.

More recently, Harlan et al. (1987) state that brook trout were native not only to the Upper Iowa River basin but were originally found in abundance in most spring-fed streams of northeastern Iowa. As opposed to the issue of early stocking, the confusion over the pre-settlement distribution of brook trout is attributed to the inconsistent naming conventions used for salmonid species in the late 1800s. Harlan et al. (1987), however, provide no supporting information for their suggestion of a wider pre-settlement distribution of brook trout in Iowa.

The significance of fish stocking in the 1870s and 1880s to the distribution of brook trout in Iowa is suggested by the occurrence of several pre-1900 records from locations well outside the Upper Iowa River drainage. These records include McLoud Run at Cedar Rapids (Shaw 1880:27; Meek 1892:235), Mad Creek at Muscatine (Meek 1892:221), and a "small stream near Anamosa" (Evans et al. 1876:18). That these records represent stocked populations is suggested by fish stocking summaries from the early reports of the Iowa Fish Commission (Evans 1876, Shaw 1878 and Shaw 1880). Summaries of fish stocking in these early biennial reports show that brook trout were acquired from the fish farm of H. Dousman in Wisconsin and were held at Iowa's newly-constructed state fish hatchery at Anamosa. These brook trout were then distributed and stocked across the state as far west as Plymouth, Woodbury, Pottawattamie, and Mills counties in western Iowa. These stocking records include McLoud Run (listed as "McCloud's creek") at Cedar Rapids. Shaw (1880) describes the placement of brook trout into a spring brook near Anamosa in 1875. The practice of acquiring fish species (especially salmonids) from other states for stocking into Iowa waters was a routine aspect of early fisheries management in Iowa.

In the report of his statewide fish investigations from 1889-1891, Meek (1892:240) does mention the occurrence of brook trout in Spring Branch, a spring-fed tributary of the Maquoketa River near Manchester in northeastern Iowa that supports trout populations today, thus suggesting a potentially broader pre-settlement distribution. Meek does not, however, include brook trout in his list of fishes in the Maquoketa River basin even though he does report six fish species taken from either Spring Branch or a small bayou of this stream. Although Meek's reference to "brook

trout" in Spring Branch does likely refer to *S. fontinalis*, he gives no indication of whether these fish are native or "planted." Early stocking records from the reports of the Iowa Fish Commission suggest, however, that the brook trout were stocked: 5,000 brook trout (presumably as fry) were sent from the state fish hatchery in June 1877 for stocking in "Spring Branch"(no county specified); this was one of 25 locations across Iowa that received brook trout from the state fish hatchery in Anamosa that year (Evans et al. 1876). Also, the stocking records for 1879 show that 5,000 brook trout from the Dousman fish farm in Wisconsin were distributed from the Anamosa hatchery to "Manchester"; 20 additional Iowa locations received from 300 to 15,000 brook trout fry in that year (Shaw 1880). As shown in the biennial reports of the Iowa Fish Commission, the annual distribution of brook trout, along with several other native and non-native species, to various locations in Iowa continued throughout the remainder of the 1800s and into the 1900s. Thus, Meek's reference to brook trout in Spring Branch near Manchester may reflect stocked rather than native populations.

During his statewide fish surveys, Meek (1892) also sampled the Turkey River and Yellow River basins in the Driftless Area of northeastern Iowa; portions of both these basins are adjacent to the Upper Iowa River basin. Meek mentions the occurrence of springs and "spring brooks" in both river basins. Although he reports sculpins (as *Cottus bairdi*) as "common" in coldwater streams in both basins (Bear Creek in the Turkey River basin and Hickory Creek in the Yellow River basin), he does not mention that brook trout occur in either stream or in either basin.

The practice of systematic and widespread stocking of native and non-native species soon after settlement of the state by Europeans—and well before the first organized fish distribution surveys—has forever limited our ability to conclusively identify the pre-settlement ranges of most of Iowa's native fish species. This dilemma certainly applies to any attempt to identify the native range of brook trout in the state. Indeed, the existing evidence that this species actually is native to the state is limited to one sentence in the first biennial report of the Iowa Fish Commission (Evans et al. 1876). Also clouding the pre-settlement picture of our native fish distributions—although probably not of brook trout—is the practice of "fish rescue". Fish rescue began in Iowa in 1876 and continued into the mid-1900s. This practice, which was originally seen as a cheaper alternative to artificial propagation in fish hatcheries, involved the seining of fish stranded in backwaters of the Upper Mississippi River following spring flooding. The seined fish were transported, in the early years by rail, and stocked into Iowa's interior streams, rivers, and natural lakes (Carlander 1954).

Despite the somewhat weak evidence for the native occurrence of brook trout in Iowa, the accounts of Eddy and Underhill (1974:162) for Minnesota and Becker (1983:316) for Wisconsin suggest that brook trout are, in fact, native to at least some of the coldwater streams in the Iowa portion of the Driftless Area. In addition, a recent genetic analysis of the naturally reproducing population of brook trout in South Pine Creek (a tributary of the Upper Iowa River in Winneshiek County) provides evidence that this population may be a remnant—the only one known—of the historic native distribution of this species in Iowa (Jansen 1998). That brook trout are at the limit of their distribution in Iowa is emphasized by the fact that this species is not native to Illinois (Smith 1979) nor to the states south and west of Iowa (Lee et al. 1980).

Whether native or stocked, the decline of brook trout in Iowa was noticed early in the state's history. Evans et al. (1876:18) state that the brook trout once occurred in large numbers, "but the perseverance of fishermen and improved appliances of civilization used for destroying them, even during their spawning season, have so diminished their numbers that stories about large strings of trout are quite mythical." Also, Meek (1892:244) states that the "Upper Iowa River was formerly a trout stream, but of late years, so far as I can learn, no trout have been taken from it." In

addition to the impacts of over-harvesting, the decline of brook trout in Iowa has been attributed to stream pollution, heavy siltation, and other water quality degradation (Harlan et al. 1987). Failure to compete with Iowa's two non-native stream dwelling salmonid species (rainbow trout and especially brown trout) may also explain the drastic decline of the brook trout in northeast Iowa. Waters (1983) and Fausch and White (1981) have both documented the ability of brown trout (*Salmo trutta*) to out-compete and replace native brook trout in stream environments; Clark and Rose (1997) describe a similar outcome between rainbow trout (*Oncoryhnchus mykiss*) and brook trout.

The number of Iowa streams with consistent natural reproduction of brook trout has increased in recent years. In addition to South Pine Creek, consistent, self-sustaining natural reproduction is also currently known in the upper reach of French Creek in Winneshiek County. Natural reproduction of brook trout is also known from Bankston Creek in Dubuque County and Spring Branch in Delaware County, although reproductive success in these streams is inconsistent from year to year, and stocking is needed to supplement the populations (Moeller 1999). A more recent summary of trout reproduction in Iowa (IDNR 2006) shows French and South Pine creeks continue to have fairly consistent reproduction and viable populations of brook trout without a need for stocking. Bankston and Spring Branch creeks continue to exhibit inconsistent reproductive success of brook trout. In addition, the 2006 update identifies Dutton Cave in Fayette County and Little Paint Creek in Allamakee County as also exhibiting natural but inconsistent reproduction of brook trout.

we have more recent info.

Iowa's brook trout can continue to exist in the state only through careful protection of the watershed and stream harboring the only remaining known population believed to be "native." In addition, efforts to establish brook trout in other suitable streams and wise fisheries management of Iowa's non-native salmonids will be important for the continued occurrence of brook trout in Iowa. Iowa distributional status and abundance of native populations: stable; extremely rare.

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