# HISTORICAL ACCOUNTS OF CEDAR RIVER IN IOWA SUGGEST HARELIP SUCKERS MAY HAVE ONCE OCCURRED IN THE STREAM

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I want to respond to Konrad Schmidt's Winter (January) 2018 *American Currents* article (Schmidt 2018) on the Harelip Sucker (*Moxostoma lacerum*) (Figure 1) and his contention that this species might have once occurred in the Cedar River of southern Minnesota. This contention is based on the 2008 discovery at the California Academy of Sciences of a Harelip Sucker in a 100+ year-old jar of fish collected from the Cedar River at Austin, Minnesota (Figure 2). As Konrad noted, ichthyologist Seth Meek (1859–1914) is the "prime suspect" for the collector of the Harelip Sucker at Austin. Surveying fishes for the United States Fish Commission in the late 1800s, he sampled the Cedar River and two of its tributaries at Austin, MN, in July 1890 (Meek 1892:230).

I also want to respond to the notion expressed by some that evidence is lacking for this occurrence. Based on what I know about the Harelip Sucker's distribution, decline, and extinction—and based on my years of experience with Iowa's fishes and streams including the Cedar River—I tend to accept the possibility that the Harelip Sucker did occur in the upper Cedar River. The following are my reasons for doing so.

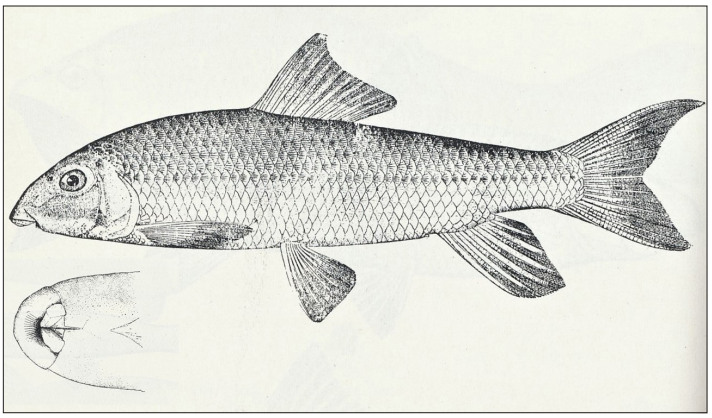

**Figure 1. Harelip Sucker (*Moxostoma lacerum*). Modified from Plate XXXVIII (*Lagochila lacera*) in Jordan and Evermann (1896a).**

**The Cedar River was a high-quality stream in the 19th century that was likely capable of supporting Harelip Sucker.** Jordan and Evermann (1896b:199) state that Harelip Sucker occurred in *clear streams of the Mississippi Valley*. This statement is based at least in part on an 1884 collection from the White River in the Ozark Mountains of northwestern Arkansas (Jordan and Gilbert 1886:2). I feel that the upper Cedar River, in a very general and relative sense, is a *clear stream of the Mississippi Valley* today and would have been of even higher quality in the 19th century. My historical view of the Cedar River's quality is supported by descriptions of the Cedar River in field notes of J. Clark Salyer who, when conducting fish surveys in northern Iowa in 1932 for the University of Michigan, wrote the following on July 14:

> *July 14. Cedar River at Otranto, Mitchell Co.* [Iowa], *close to Minn. Line here (3 miles to it). River is 125′ wide & runs from 1 ft up to holes waist deep. Looks like Shellrock here but is better shaded and has nice sand & gravel bottom. Large boulders strewn all over bottom. An abundance of Potamogeton in stream here—P. richardsoni, P. interior & pectinatus. Some elodea & coontail. A dam here of concrete & poles—110 ft. long & 6′ high. ⅛ mile below dam, 3 large springs in river bed. One forced water up in air above river some 6″ or 7″. This spring's temp at 47 degrees F. This was coldest water or spring we encountered in Iowa. River water in vicinity of spring lowered to 69 degrees F. Seined below dam: S. gyrinus, cyanellus, rock bass, deliciosus, cornutus-many, biguttatus, B. nigrum, N. umbratilis, pullum, H. notatus, smallmouth, bluegills, long-eared sunfish, fat-head minnows. The upper Cedar River above juncture with Shellrock would be a river of unique and pristine beauty were it not for the periodic downpouring of pollution out of Minn. Packing plants, creameries, etc. at Austin, Minn & above, contribute to this. State should co-operate and interest Minn. authorities in this.* [Unrecognized name] *says the two health boards have already gotten together.*

John Olson is retired from the Iowa DNR where he worked for 30 years in the Water Quality Section. He has been involved with stream fish survey work in Iowa since attending Iowa State University where he participated in a statewide survey of Iowa fishes from 1981–1984. He assisted with fish surveys while at the DNR, and continues to pursue his interest in Iowa fishes in retirement. John has co-authored papers on invasive fishes in Iowa and on the occurrence of Chestnut Lamprey (*Ichthyomyzon castaneus*) in a southern Iowa river. He has a degree in Animal Ecology from Iowa State, with an emphasis in fisheries biology. His ongoing research into his ancestry has honed skills useful in finding the accounts of Iowa's early ichthyologists.

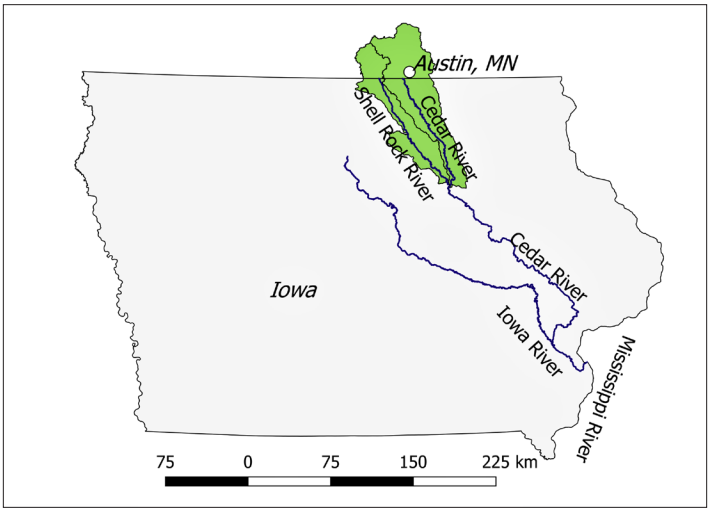


**Figure 2. The upper Cedar River basin of northern Iowa and southern Minnesota.**

Based on my 1981 and 2014 fish samplings in the Cedar River at Otranto, the springs described in 1932 by Salyer have been reduced and/or destroyed. During my 1981 sampling, I noticed a small area of exceptionally clear water of from 2 to 3 feet deep with abundant aquatic macrophytes in the approximate location described by Salyer. In 2014, however, all that remained of the spring in this area was a small, sandy seep.

Here are more notes from Salyer's 1932 surveys in Iowa, this time for the Shell Rock River (a tributary of the upper Cedar River) on July 13:

> *A surprising Iowan river which is reminiscent of Ozark streams except that it has no shade for miles but flows thru gently sloping well-grassed banks and open prairie & pasture country. Flat rubble rock bottom. No hint of silt or mud. 12" -15" deep. Av width 40'. Lots of vallisneria, coontail, potamogeton-several species. Low limestone ledges exposed at some interval. Best food I've seen for days & weed growth & appearance of weeds in water here the most beautiful I've seen in any river!*

It is interesting that Salyer's descriptions of the upper Cedar and Shell Rock rivers are somewhat similar to Jordan and Gilbert's (1886:1) brief description of the Ozark streams in northwestern Arkansas in the area where they collected Harelip Sucker in 1884:

> *The streams of this region are fed by numerous springs. The waters are very clear, and the bottoms are gravelly.*

As inferred from reports of commercial harvest, the robust population of freshwater mussels in the upper Cedar River basin of the early 20th century also suggests its historically exceptional water quality and aquatic habitat. In 1920, the Cedar and the Shell Rock rivers were the leading mussel shell producers of Iowa's interior rivers, with the Cedar producing 690,000 pounds and the Shell Rock producing nearly 445,000 pounds (Albert 1922:29-30).

**The fish community of the Cedar River has strong affinities with the fish fauna the Ozark region which once supported the Harelip Sucker.** The upper Cedar basin (really, the entire Cedar River basin as well as river basins in Iowa to the north and east of the Cedar) has strong affinities with the Ozark fish fauna as defined by Pflieger (1997:5). Ozark-type fishes in the Cedar basin include American Brook Lamprey (*Lethenteron appendix*), Largescale Stoneroller (*Campostoma oligolepis*), Ozark Minnow (*Notropis nubilus*), Carmine Shiner (*N. percobromus*), Black Redhorse (*Moxostoma duquesnei*), Golden Redhorse (*M. erythrurum*), Rainbow Darter (*Etheostoma caeruleum*), Banded Darter (*E. zonale*), and Logperch (*Percina caprodes*). An additional Ozark representative in the upper Cedar and Shell Rock rivers is the River Redhorse (*M. carinatum*) which was believed extirpated from Iowa but which has been collected occasionally from the Cedar and Shell Rock since 2000 (see NANFA News in *American Currents*, Winter 2018). If the Harelip Sucker was known to occur in Ozark streams in the late 19th century as suggested by Jordan and Evermann, it's just not that much of a stretch for me to see the Harelip Sucker occupying the upper Cedar River basin during the same time period along with its Ozarkian associates.

**Nineteenth-century agricultural and urban development of the upper Mississippi River basin was already well underway by 1890 and would have adversely impacted the Harelip Sucker, thus leading to its demise.** Significant agricultural and urban alterations of the landscape had occurred in Iowa and Minnesota by the time that fish surveys began in the upper Mississippi River valley (~1890). Seth Meek, who conducted Iowa's first statewide fish survey around 1890, mentions adverse impact to Iowa streams in an often-quoted passage in his 1892 paper (Meek 1892:218):

> *The prairie was originally covered with a dense growth of prairie grass and herbaceous plants, which tended to produce a stiff sod. During heavy rains this sod absorbed the water, preventing its direct flow into the rivers, and it reached the latter chiefly by slowly filtering through the soil. The streams were thus relieved from overflow, and were kept from drying up during the summers. I have been informed that many streams, formerly deep and narrow, and abounding in pickerel, bass, and catfishes, have since grown wide and shallow, while the volume of water in them varies greatly in the different seasons, and they are now inhabited only by bullheads, suckers, and a few minnows. The breaking of the native sod for agricultural purposes has especially affected the smaller streams in this respect, while the construction of ditches and the practice of underdraining have had their effects upon the larger ones. Moreover the constant loosening of the soil, in farming, tends to reduce it to that condition in which it is readily transported by the heavy rains to produce muddy currents. To this cause, no doubt, is due the present absence of trout from many of the streams of northeastern Iowa and their marked decrease in other parts of the State.*

Based on Meek's comments there apparently was considerable human-caused alteration to the Midwest landscape relative to pre-settlement conditions by the time of his collections in Iowa and southern Minnesota around 1890. If the Harelip Sucker was as water quality-sensitive (especially turbidity-sensitive) as we think, I could see this species being eliminated from the agricultural Upper Mississippi valley by the late 1800s. Maybe even in 1890, the upper Cedar was functioning as a kind of refugium for fish species such as Harelip Sucker that were not going to be able to tolerate adverse changes in water quality and habitat resulting from agricultural and urban development. At some point, even

the upper Cedar River was likely too adversely impacted to support Harelip Sucker.

**Due to the timing of the earliest fish investigations west of the Mississippi River (late 19th century), the Harelip Sucker may have had a wider distribution than is believed.** As shown on the distribution map in Konrad's article (Figure 3), the known records for this species are scattered widely around the drainages of the middle Mississippi River, Ohio River, and Great Lakes (Lake Erie). It seems possible that the occurrence of the majority of known records for Harelip Sucker east of the Mississippi River may reflect the timing of fish surveys relative to the demise of this species in the late 19th century. For example, Trautman (1981) notes that surveys of Ohio fishes go back to Rafinesque around 1820 and continue with Kirtland from 1838-1854 and Klippart in the 1870s. (Note: Klippart sent a specimen of Harelip Sucker collected near Columbus, OH, in 1878 to D.S. Jordan (Trautman 1981:452)). In Midwestern states west of the Mississippi River (e.g., MN, IA, & MO), however, the earliest fish investigations/surveys were usually those of Meek in the mid to late 1880s and early 1890s. These surveys were conducted at the same time that the Harelip Sucker was nearing extinction. Thus, this species was gone before subsequent surveys could more accurately document its pre-settlement distribution.

Given the above circumstantial evidence, and with the existence of a preserved Harelip Sucker in an apparently long unopened jar of fish from the Cedar River at Austin, MN, I agree with Konrad that the historical occurrence of the Harelip Sucker in the upper Cedar River basin is plausible. At this point, and without additional information surfacing from somewhere, it seems easier to argue for this record than to argue against it.

**Addendum:** In Konrad's article (Schmidt 2018), the presumption was made that the ground glass jar with the specimen of Harelip Sucker discovered by Dave Neely in 2008 at the California Academy of Sciences had miraculously survived the San Francisco earthquake of 1906. The history of this jar may be incorrect. In a 1984 letter I received from Reeve Bailey regarding Iowa fishes, he stated that "Meek spread his collections about…many [went] to Indiana U. [These] were transferred to the California Academy of Sciences in 1930." Thus, the possibility exists that, during the 1906 earthquake, this interesting jar of fish was safe and sound in Bloomington, Indiana.

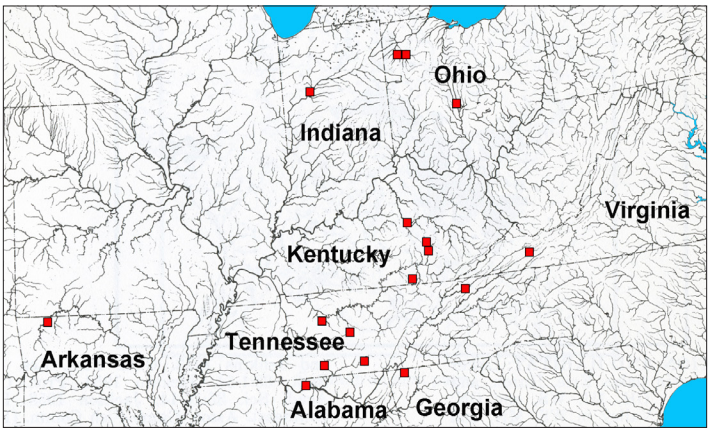


**Figure 3. Known distribution of the Harelip Sucker. Map from Lee et al. (1980) as modified by Schmidt (2018).**

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