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The Occurrence of Chestnut Lamprey (*Ichthyomyzon castaneus*; Pisces: Petromyzontidae) in the Chariton River in South-Central Iowa

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In the mid-1990s, Iowa Department of Natural Resources (IDNR) Fisheries Bureau biologists began receiving reports from anglers of a parasitic lamprey attached to fish taken immediately downstream from Rathbun Lake on the Chariton River in south-central Iowa; these reports have continued to present. In 2002, the IDNR received and identified a chestnut lamprey (*Ichthyomyzon castaneus* Girard) from an angler who removed the lamprey from a common carp (*Cyprinus carpio* Linnaeus) he captured. This record was the first for a lamprey from the Chariton River drainage in Iowa. Five additional specimens of chestnut lamprey have been collected and identified since this specimen was found, all from the same location. The Rathbun Lake tailrace is one of only a few locations on Iowa's interior rivers and streams with verified records for chestnut lamprey.

INDEX DESCRIPTORS: chestnut lamprey, *Ichthyomyzon castaneus*, threatened species, parasitic lamprey, Chariton River.

The chestnut lamprey (*Ichthyomyzon castaneus* Girard) is one of four lamprey species (Family Petromyzontidae) known to occur in Iowa waters and is one of only two parasitic lampreys in the state (Table 1). The chestnut lamprey reaches a length of 254 to 305 mm at maturity; the back and sides of the adults are yellowish-tan grading to a light olive-yellow on the belly and fins. The life cycle of this lamprey includes a larval stage of approximately five years followed by transformation to the adult (parasitic) stage which lasts only about 18 months. Spawning adults often leave the large river systems and enter medium-sized creeks to moderately large rivers in the spring. The most frequent host for the chestnut lamprey is the common carp (*Cyprinus carpio* Linnaeus), but they are also found on other scaled fish (Pflieger 1997).

The chestnut lamprey has been included in Iowa's fish fauna only since the early 1950s when this species appeared in Bailey's (1951) Checklist of the Fishes of Iowa. Previous checklists of Iowa fishes referred to only one species of parasitic lamprey, e.g., in their review of Iowa's early fish records, Potter and Jones (1928) listed only the "silver lamprey *Ichthyomyzon concolor* (Kirtland)." Similarly, Aitken's (1941) check-list of Iowa fishes referred to the "western silver lamprey" (*I. castaneus* Girard) as the only parasitic lamprey species. In their revision of the lamprey genus *Ichthyomyzon*, Hubbs and Trautman (1937) described the silver lamprey and chestnut lamprey as separate species. Their recommendations regarding the taxonomy of the silver lamprey and chestnut lamprey were adopted by the American Fisheries Society in their initial list of common and scientific names of fishes (American Fisheries Society 1948). Since then, the taxonomy of these two lamprey species has remained stable (Nelson et al. 2004).

The newly-discovered population of chestnut lamprey in a south-central Iowa river is important for the following reasons. Despite several statewide inventories of Iowa fishes during the 20th Century (as summarized in Harlan and Speaker 1951, 1956, and Harlan et al. 1987), this state-threatened species (IAC 2002)

had not been reported from Iowa's interior waters for over 100 years. The most recent published account of the distribution of Iowa fishes, Harlan et al. (1987), shows no records for chestnut lamprey from Iowa's interior waters and only isolated records for chestnut lamprey for the Iowa portion of the Upper Mississippi River. The Iowa Rivers Information System (2008) online fish database contains only one chestnut lamprey record from Iowa's interior waters: Meek's (1892) record from the Des Moines River at Des Moines.

DISTRIBUTION

The chestnut lamprey is found throughout the Mississippi River system and historically ranged into the Red River of Canada, the Great Lakes, and Mobile Bay Basin (Lee et al. 1980). The chestnut lamprey is the most abundant and widely distributed lamprey in Missouri but is confined to the Missouri and Mississippi rivers in the northern half of the state. Chestnut lampreys are rarely encountered in the Missouri River above St. Joseph and are uncommon in the upper portions of the Upper Mississippi River in Missouri (Pflieger 1997).

Distribution in Iowa:

Harlan et al. (1987) describe the chestnut lamprey in Iowa as uncommon and noted that it is rarely collected and then only in the Upper Mississippi River. The historical presence of chestnut lamprey in Iowa interior streams is based on Meek's (1892) record from the Des Moines River at Des Moines in Polk County. He also noted the existence of museum specimens of this species from the Cedar River ("represented in the Coe College Museum [Cedar Rapids] by a single specimen, collected in the Cedar River several years ago") and from the Iowa River ("a few specimens in the museum of the Iowa State University [Iowa City]"). Hubbs and Trautman (1937) examined Meek's specimen from the Des Moines River at Des Moines catalogued in the Field Museum of

Table 1. Species of lamprey (family Petromyzontidae) known to occur in Iowa (Harlan and Speaker 1956, Harlan et al. 1987, Gelwicks et al. 2002).

Common Name	Scientific Name	Adult life history
Chestnut lamprey	<i>Ichthyomyzon castaneus</i> Girard	Parasitic
Northern brook lamprey	<i>I. fossor</i> Reighard and Cummins	Nonparasitic
Silver lamprey	<i>I. unicuspis</i> Hubbs and Trautman	Parasitic
American brook lamprey	<i>Lampetra appendix</i> (DeKay)	Nonparasitic

Natural History (FMNH 963) and confirmed that it was a chestnut lamprey. They further stated that, based on locality and circumstantial evidence, the museum specimens from the Iowa River and Cedar River noted by Meek were probably chestnut lamprey as well. The specimens from the Iowa River reported by Meek were subsequently verified as chestnut lamprey and are in the collection of fishes at the Smithsonian National Museum of Natural History (listed as Iowa River at Iowa City (NMNH 174809; collected in May 1888) and Iowa City, Iowa (NMNH 174811)). The status of the Coe College specimen is unknown. In his study of fishes of the Des Moines River basin, Call (1892) noted that single specimens of a parasitic lamprey (assigned by Call to *Petromyzon concolor* Kirtland) were taken in 1887 and 1889 from large catfish caught in the Des Moines River within the city limits of Des Moines. Call further noted that local fishermen reported that these lampreys were "fairly common" on large catfish in the spring. Call's lamprey specimens were not examined by Hubbs and Trautman (1937) but were presumed by them to be correctly identified based on Meek's specimens from the Des Moines River. These pre-20th Century records suggest a formerly wider distribution for the chestnut lamprey in Iowa.

Although published records for Iowa's interior streams are lacking, information from Iowa Department of Natural Resources biologists suggests that the chestnut lamprey has long been part of the fish fauna of the Upper Iowa River basin in extreme northeastern Iowa (Scott Gritters, Iowa DNR Fisheries Bureau, personal communication). As confirmation, a specimen of chestnut lamprey was taken from a tributary of the Upper Iowa River (Canoe Creek) in 2009 in eastern Winneshiek County as part of a graduate research project at Iowa State University, Ames (Mike Quist, Iowa State University, personal communication).

PHYSICAL SETTING OF THE CHARITON RIVER WATERSHED AND RATHBUN LAKE

The Chariton River watershed is entirely within the Central Irregular Plains Ecoregion of southern Iowa and northern Missouri as described by Griffith et al. (1994). This ecoregion is characterized by irregular plains with low hills having moderate loess covering over loamy till. Stream corridors tend to have wider forested riparian zones than in other regions of southern Iowa where prairie grasslands predominate. The potential natural vegetation of the Central Irregular Plains is a mix of bluestem prairie and oak-hickory forest; current land use/land cover is relatively diverse for Iowa and includes cropland, pasture, and deciduous forest.

Rathbun Lake is a 4,452 ha Federal flood control impoundment constructed in 1969 on the Chariton River in Appanoose County in south-central Iowa. The drainage area of the Chariton River basin above Rathbun Dam is approximately 142,710 ha; the drainage area of this basin at the Iowa/Missouri state line is approximately 211,600 ha. Rathbun Dam is located approximately 47 river kilometers from the Iowa/Missouri state line. The

confluence of the Chariton River with the Missouri River near Marshall, Missouri, is approximately 148 kilometers from the Rathbun Lake dam (Fig. 1). The Rathbun Lake tailrace appears to be the focal point of this chestnut lamprey population in the Iowa portion of the Chariton River, likely due to the barrier to upstream movement of host fishes represented by the Rathbun Lake dam.

NEW RECORDS FROM THE CHARITON RIVER

Prior to 2002, the chestnut lamprey had not been documented from the Chariton River in either Iowa or Missouri. From 1996 to 2002, several anglers in the Chariton River immediately below Rathbun Lake described catching fish with lamprey attached. Host species included common carp, bigmouth buffalo (*Ictiobus cyprinellus* (Valenciennes)), bighead carp (*Hypophthalmichthys nobilis* (Richardson)), and largemouth bass (*Micropterus salmoides* (Lacepède)). None of these lampreys were collected for identification. On 17 April 2002, an angler fishing in the Chariton River in the Rathbun Lake tailrace caught a common carp to which a lamprey was attached. The angler brought the lamprey to IDNR fisheries biologists who identified the specimen as chestnut lamprey. The specimen was 273 mm in total length and was preserved. The specimen was submitted to Southern Illinois University for taxonomic verification and was entered in the university's fluid vertebrate collection, catalog number SIUC 53798. Another specimen of chestnut lamprey was identified by IDNR fisheries biologists on 3 February 2003 from the same

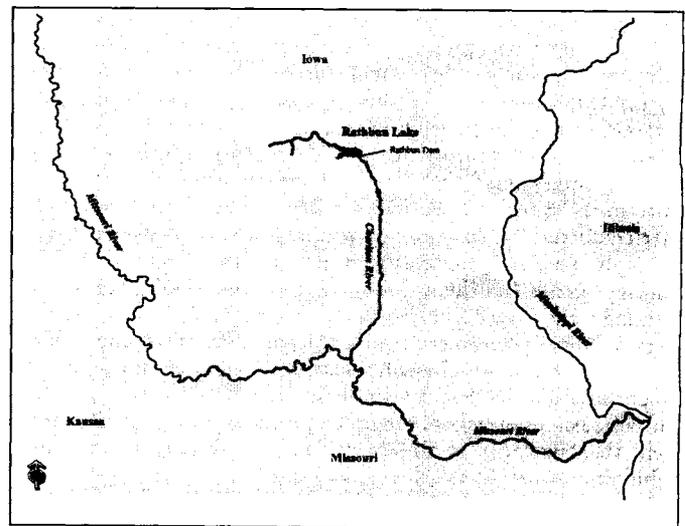


Fig. 1. Location of the Chariton River and collection site for the chestnut lamprey (*Ichthyomyzon castaneus* Girard) in reference to the Missouri River and Upper Mississippi River drainages.

location; no measurements were taken, and this fish was released alive. On 2 April 2008, biologists collected a free swimming adult from the same location as previous specimens. This adult was 340 mm in total length and weighed 112 grams. This specimen was deposited at the University of Iowa Hygienic Laboratory. Yet another specimen was captured in the Rathbun Lake tailrace by a sport angler who snagged a 225 mm specimen on 4 June 2008; it was released alive. The two most recent specimens were also snagged by anglers from the same location on 7 February 2009 and 15 February 2010. These specimens were 330 mm and 350 mm in total length, respectively. Both were allowed to die as the anglers were unaware of their rarity.

Also in 2002, the Missouri Department of Conservation (MDOC) reported the first collection of chestnut lamprey in the Missouri reach of the Chariton River within the boundaries of the Rebels Cove Conservation Area, approximately 24 river kilometers downstream of the Iowa boarder (Matt Combes, MDOC, personal communication).

DISCUSSION

Establishment of the Chariton River population

The origin of the population of chestnut lamprey in the Chariton River downstream from Rathbun Lake is unclear. None of the previous fish surveys of the Chariton River (for example, Jordan and Meek 1885, Harrison and Speaker 1954, and Harlan and Speaker 1956)—including a fish survey conducted on the Chariton River just prior to the 1969 impoundment of Rathbun Lake (Mayhew 1965)—produced records for this species. Also, no occurrence of lampreys from the Rathbun Lake tailrace was reported during the first 25 years after the reservoir was constructed (i.e., 1969–1995), this despite periodic sampling of the tailrace by Iowa DNR fisheries management personnel whom maintain consistent contact with tailrace anglers. Regardless, the chestnut lamprey has maintained a presence in the Chariton River below Rathbun Dam since the mid-1990s.

CONCLUSIONS

The mid-1990s appearance of chestnut lampreys on host fish in the Chariton River in the Rathbun Reservoir tailrace represents the first verified occurrence of this species from the Chariton River basin in Iowa and represents one of the few records for Iowa's interior rivers and streams over the last 100 years. The origin of the Chariton River population is subject to speculation, but the lack of records for parasitic lampreys from the Chariton River basin and the Rathbun Lake tailrace until the mid-1990s suggest the relatively recent (late 20th Century) establishment of this population of chestnut lamprey.

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Department of Conservation), and Anthony Sindt (Iowa State University).

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