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Recent Observations of the Distribution and Status of Freckled Madtom and First Record of Spotted Gar in Iowa

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The distribution and status of Iowa's fishes were last extensively described in *Iowa Fish and Fishing* (Harlan et al. 1987). Since then, numerous fish collections have been made in Iowa's interior and bordering rivers and streams. In this paper, I describe recent collections of freckled madtom (*Noturus nocturnus*) and spotted gar (*Lepisosteus oculatus*) from the Upper Mississippi River (UMR). Six specimens of *N. nocturnus* were collected from Pool 13 of the UMR in 2001. Although the first documented specimens of *N. nocturnus* in Iowa were collected in the English River in 1984, few collections have been made throughout the state since. Two specimens of *L. oculatus* were collected in Pool 13 of the UMR in 2000. Although the spotted gar had not been documented in Iowa waters previously, its presence in the UMR has been hypothesized.

INDEX DESCRIPTORS: endangered species, fish distribution, freckled madtom, *Lepisosteus oculatus,* Long Term Resource Monitoring Program, *Noturus nocturnus,* Pool 13, spotted gar, Upper Mississippi River.

Within the last 100 years, major alterations have occurred across Iowa's diverse landscapes. The native flora and fauna have responded to these rather abrupt changes, and occasionally as an oversight, we realize that some species that were once abundant are not so now. Compared to terrestrial plant, insect, bird and mammal populations, organisms in aquatic communities have historically been more difficult to study over the course of time. The importance of recording the distributions of Iowa's rare and endangered fishes has been well documented (Menzel 1981, Paragamian 1990, Howell and Leoschke 1992). Changes in the abundances and distributions of the fish fauna reflect changes in the quality of aquatic habitats, and documentation of these changes is vital to understanding the general health of the aquatic environment. To understand these ttends, we must have an accurate record of species' distributions and abundances, especially for poorly studied, non-game fishes.

This paper describes the distribution and status of an extremely rare ictalurid in Iowa, the freckled madtom (*Noturus nocturnus,* Jordan and Gilbert) and documents one previously undescribed species in Iowa, the spotted gar (*Lepisosteus oculatus,* Linnaeus). In 1984, five specimens of the freckled madtom were collected from a single site in the English River, Washington County (Paragamian 1986). Since then, only three specimens of *N. nocturnus* have been documented from three collection sites in Iowa waters (Iowa Natural Areas Inventory Database, Iowa Department of Natural Resources, unpublished data 2002). Distribution of the freckled madtom in Iowa is probably limited to the Mississippi River and its tributaries covering the eastern third of the state.

No known collections of *L. oculatus* have been reported in Iowa waters from the historic records in *Iowa Fish and Fishing* (Harlan et al. 1987) or from the Iowa Natural Areas Inventory database (Iowa Department of Natural Resources, unpubl. data), although Bailey (1951) speculated the presence of *L. oculatus* in Iowa's waters in the early 1950s. The previous northern-most documented collection of spotted gar for the Upper Mississippi River drainage basin was a record from sometime prior to 1908, taken from Henry County, Illinois on the Green River, a tributary to the Rock River several miles above the confluence with the Mississippi River (Bob Hrabik, Missouri Department of Conservation, Fisheries Programs Coordinator, pers. comm.).

The Upper Mississippi River (UMR) borders Iowa from New Albin to Keokuk (Fig. 1). The UMR is a complex of impounded pools consisting of backwater lakes, braided side channels, main channel borders, impounded areas, and tailwater zones below dams. The fish communities within these aquatic habitats are rich. Of the 148 fish species described by Harlan et al. (1987), 92 (62%) can be found in the UMR bordering Iowa (Pitlo et al. 1995). Since 1989, fisheries biologists from the Long Term Resource Monitoring Program (LTRMP) have documented 85 species from Pool 13 alone. Currently, 19 fish species (Table 1) have special status listings in Iowa (Iowa Administrative Code 2002). Eleven of these species have been documented in the UMR in Iowa (Pitlo et al. 1995, Bowler et al. 2003).

Pool 13 of the UMR is approximately 51 km long extending from Lock and Dam 12 at Bellevue, Iowa to Lock and Dam 13 at Fulton, Illinois. Pool 13 contains nearly 11,500 ha of aquatic area and is a mosaic of aquatic habitats that include the main channel, channel border areas, side channels, backwater lakes, sloughs, the impounded area above Lock and Dam 13 and the tailwater zone.

METHODS

Fish samples were collected during 1993–2002 at random and fixed sites in Pool 13 as part of LTRMP monitoring. Random site selections were made using a stratified random sampling regime—stratified by habitat (strata) into three periods: June 15 to July 31, August 1 to September 15 and September 16 to October 31. Sampling was conducted in eight strata in Pool 13. Strata included: contiguous backwater offshore, contiguous backwater shoreline, impounded offshore, impounded shoreline, main channel border unstructured, main channel border wing dam, side channel border and tailwater zone. Fish were collected using ten standardized gears de-

Table 1. Iowa listing of fish species considered endangered, threatened or of special concern (Iowa Administrative Code 2002).

Scientific Name	Common Name	Iowa Listing
Acipenser fulvescens	Lake sturgeon	Endangered**
Scaphirhynchus albus	Pallid sturgeon	Endangered*
Notropis anogenus	Pugnose shiner	Endangered
Notropis texanus	Weed shiner	Endangered**
Margariscus margarita	Pearl dace	Endangered
Noturus nocturnus	Freckled madtom	Endangered**
Etheostoma chlorosomum	Bluntnose darter	Endangered**
Etheostoma microperca	Least darter	Endangered
Ichthyomyzon castaneus	Chestnut lamprey	Threatened**
Lamptera appendix	American brook lamprey	Threatened
Esox americanus vermiculatus	Grass pickerel	Threatened**
Notropis heterolepis	Blacknose shiner	Threatened
Notropis topeka	Topeka shiner	Threatened*
Moxostoma duquesnei	Black redhorse	Threatened**
Lota lota	Burbot	Threatened**
Ammocrypta clara	Western sand darter	Threatened**
Etheostoma spectabile	Orangethroat darter	Threatened
Opsopoeodus emiliae	Pugnose minnow	Special Concern**
Aphredoderus sayanus	Pirate perch	Special Concern**

*Federally endangered
**Documented in the Mississippi River between New Albin, Ia and Keokuk, Ia

scribed in Gutreuter et al. (1995). Gear types included: day electrofishing, night electrofishing, fyke netting, tandem fyke netting, mini-fyke netting, tandem mini-fyke netting, seining, hoop netting—small, hoop netting—large, and trawling. A target of 486 samples (162 per period) was allocated for each year. Of these, 438 were stratified random samples, and 48 were fixed site samples confined to the tailwater zone stratum. Long Term Resource Monitoring Program fisheries' component procedures can be found in Gutreuter et al. (1995). In 2001, an experimental trawl (Herzog et al., in review) similar in design specifications to the standard LTRMP trawl was built and implemented to assess escapement and size variability between the two trawls.

RESULTS AND DISCUSSION

Freckled Madtom

Six specimens of freckled madtom were collected from Pool 13 of the UMR in 2001 (Fig. 1). Five of these specimens were collected from main channel border habitats with the LTRMP experimental trawl. Two of the five specimens were collected on 29 August, along a 230 m downstream vector, over a gravel bottom in approximately 4 m of depth, with a surface velocity of 0.54 m/sec. The remaining three specimens were collected on 31 August, along a 250 m downstream vector, over a gravel bottom in approximately 5 m of depth, with a surface velocity of 0.58 m/sec. A single specimen of freckled madtom was collected on 24 September, along a 350 m downstream vector, with the standard LTRMP trawl in the tailwater zone below Lock and Dam 12 at Bellevue. This collection occurred over a sand bottom in approximately 6 m of depth, with a surface velocity of 0.51 m/sec. The six specimens ranged from 34 to 65 mm in total length (mean = 48 mm). Page and Burr (1991) state 150 mm is the maximum length for *N. nocturnus,* although much of the literature suggests the lengths of adults are between 50–100 mm (Harlan et al. 1987, Pflieger 1997, Burr and Stoeckel 1999). Burr and Mayden (1982) suggest their maximum lifespan is at least 54 months. These six specimens have been preserved and archived at the LTRMP station at Bellevue, Iowa. Collectively, they are possibly the first substantially documented collections of the freckled madtom from the UMR bordering Iowa, although a single specimen has been reported from Pool 14, near LeClaire, Iowa between 1987 and 1989 (Normandeau Associates Inc. 1989). Historic freckled madtom collections are given in Figure 1 and Table 2.

The freckled madtom is currently listed in Iowa as endangered (Iowa Administrative Code 2002). The freckled madtom may be present in other southeastern Iowa locations because of its distribution in northeastern Missouri according to Harlan et al. (1987). Of note, electrofishing surveys in the English River as recent as 2002 have not yielded collections of *N. nocturnus* (Greg Gelwicks, Iowa Department of Natural Resources, pers. comm.). The LTRMP database (1990–2003) show no records of the freckled madtom from the Mississippi River in Minnesota or Wisconsin, and the occurrence of this species in Iowa is most likely at the northern-most extent of their North American range (Page and Burr 1991). The distribution and occurrence of *N. nocturnus* is, to some extent, widespread and common in the south-central and southeastern regions of the United States [i.e., Kentucky, eastern Oklahoma, eastern Texas, western Tennessee, western Alabama, and the lower Mississippi River Basin states (Lee et al. 1980, Robison and Buchanan 1988)]. Pflieger (1997) described the Missouri distribution of this madtom as widely distributed, but not abundant in occurrence, in the UMR basin. The states of Illinois, Minnesota, Missouri, and Wisconsin and the U.S. Fish and Wildlife Service do not list the freckled madtom as endangered, threatened or of special concern.

The freckled madtom is similar in appearance to the stonecat (*N. flavus*) and the tadpole madtom (*N. gyrinus*). Misidentification of *N. nocturnus* could easily occur in field surveys and this may partially explain the lack of its documentation in Iowa. The general lack of information for this small ictalurid may necessitate the status of the freckled madtom in Iowa to be "undetermined" until more is known about its specific habitat requirements, life history, and abundance and distribution in Iowa.

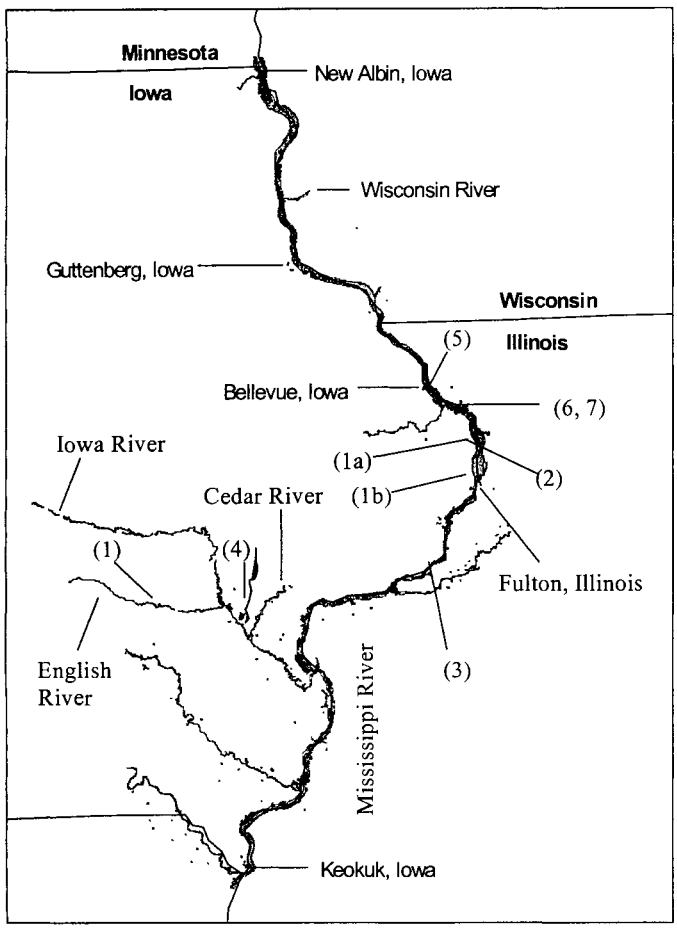

Fig. 1. Mississippi River and major tributaries in Iowa, with locations of freckled madtoms (1–7) and spotted gar (1a, 1b) in parentheses. Locations and site descriptions can be cross-referenced in Table 2.

Table 2. Locations of freckled madtom (1–7) and spotted gar (1a, 1b) in Iowa.

Year	County	Figure 2 Location ( ) and Site Description
1984	Washington	(1) English River, T77N, R8W, Sec. 13 near Kalorna, Ia.
1987	Clinton	(2) Elk River, T83N, R7E, Sec. 7 near Hauntown, Ia
1987–89	Scott	(3) UMR* Pool 14, near LeClaire, Ia
1988	Louisa	(4) Honey Creek, 3 miles south/.25 mile west of Conesville, Ia.
2001	Jackson	(5) UMR Pool 13, UTM** coordinates 4677862 N, 715148 E
2001	Jackson	(6) UMR Pool 13, UTM coordinates 4677943 N, 715085 E
2001	Jackson	(7) UMR pool 13, UTM coordinates 4681489 N, 712898 E
2000	Clinton	(1a) UMR Pool 13, UTM coordinates 4655735 N, 735525 E
2000	Clinton	(1b) UMR Pool 13, UTM coordinates 4647785 N, 733525 E

Spotted Gar

Two specimens of spotted gar were collected in Pool 13 of the UMR in 2000 (Fig. 1). A single specimen was collected in a side channel on 22 June, using a mini-fyke net, over a silty/clay substrate in 0.5 m of water depth, with a water velocity of 0.33 m/sec. This specimen was 635 mm in total length. Another single specimen of spotted gar was collected in an impounded shoreline on 14 August, using a fyke net, over a sand substrate in 0.5 m of water depth, with a water velocity of 0.00 m/sec. This specimen was 498 mm in total length. Both specimens have been preserved and archived at the LTRMP station at Bellevue, Iowa. These were the first two documented collections of spotted gar in Iowa waters (Iowa's Natural Areas Inventory Database 2002).

Spotted gar, like other gar, are well adapted to riverine environments. Gar species have shown strong swimming capabilities in the UMR, as shortnose gar (*L. platostomus*) were found to travel long distances during their spawning season (Coker 1930). Many collections of *L. oculatus* have been recently recorded by LTRMP personnel in Pool 26 of the UMR in Illinois and Missouri (Burkhardt et al. 2001). Also, LTRMP personnel have annually documented spotted gar in the Illinois River (Burkhardt et al. 2001). It is likely that spotted gar from the lower portions of the UMR (Page and Burr 1991) have migrated north, during years with very high spring water levels (i.e., when the lock and dams pose less of an obstruction to stronger swimming fishes). No collections of *L. oculatus* were made in the 2001 or 2002 LTRMP field season in Pool 13. Spotted gar are less likely to have an established population above Lock and Dam 19 at Keokuk, as this lock and dam appears to be a major barrier to most fish passage in the UMR. However, spotted gar are very similar to shortnose gar and the two species may easily be confused. Also, collectively gar species are widely considered less than desirable, and their role in fish communities is not well understood. Although misidentification and indifference may partially explain the lack of documentation of spotted gar in Iowa, caution should be used when making inferences from these collections (e.g., the spotted gar may be expanding its range northward in the UMR).

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