

STREAM SURVEY RESULTS FOR THE  
  
GRAVEL CHUB (ERIMYSTAX X-PUNCTATUS)  
  
AND BLACK REDHORSE (MOXOSTOMA DUQUESNEI),  
  
IN SOUTHEASTERN MINNESOTA

Konrad P. Schmidt  
Minnesota Department of Natural Resources  
Ecological Services Section  
22 March 1993

## **Introduction**

In 1984, the Minnesota Department of Natural Resources (MDNR) officially listed the gravel chub and black redhorse as special concern species. Both these species are on the periphery of their ranges in southeastern Minnesota (Coffin and Pfannmuller 1988). MDNR Fisheries and James Ford Bell Museum of Natural History (Bell) surveys have sampled the gravel chub from the Root River in Fillmore and Houston Counties and the Upper Iowa River in Fillmore County. The black redhorse has been reported from the Zumbro River watershed in Dodge, Goodhue, and Olmsted Counties; and the Root River watershed in Fillmore and Olmsted Counties.

Regionally, the gravel chub was formerly Threatened in Iowa (Harlan and Speaker 1987 and Schmidt 1984) and is Endangered in Wisconsin (Schmidt 1990). The Black Redhorse is Threatened in Iowa and was considered extirpated in Wisconsin (Schmidt 1990), but was recently proposed for Endangered status.

In October 1992, surveys were conducted for both species to establish new records; provide additional information on distribution, relative abundance, habitat use and associate species; and evaluate the selectivity of sampling gears and methods.

## **Methods and Materials**

Stations were selected in the general locality of existing records which are primarily in the Root, Upper Iowa, and Zumbro River watersheds. Surveys were conducted at 28 stations over six days from 5 through 19 October 1992. Sampling was scheduled for the fall when streams are usually at or near base flows and most young of the year species are of sufficient size to identify. The study area covered six major watersheds in Fillmore, Houston, Olmsted, and Winona Counties.

Sampling gear consisted of a Smith Root DC backpack shocker and kicknets. Shocking surveys were conducted in an upstream direction with the anode ring swept slowly toward shore or some type of submerged structure (e.g., logs). In riffles, the kick net was positioned firmly in the streambed while the ring was swept downstream and a final kicking pass dislodged stunned specimens from the substrates. Effort was recorded in seconds at electroshocking stations. Polarizing sunglasses were used to find submerged structure and stunned specimens. Kick net surveys were conducted in a downstream direction and usually in sand substrates. The net was held stationary while the bottom was worked with both feet on the upstream side to flush fish from cover.

All fish sampled were sorted to species and tallied. At least one specimen of each species and all unidentified specimens were deposited in the fish collection at the Bell Museum. Survey information was compiled on computer using

Dbase 3 Plus which generated the field data print-outs and summaries provided in Appendices I - IV.

### Results and Discussion

The surveys collected 1811 fish representing 54 species in 12 families (Appendices I - IV). One gravel chub and three black redhorse were sampled in the North Branch of the Root River at the Chatfield Canoe Access in Fillmore County (Township 104 North-Range 11 West-Section 6) on 12 October 1992 (Figure 1). Both species were sampled with the backpack electroshocker at the head of a pool over gravel and cobble substrates. Water was clear to the bottom and approximately 0.5 meters in depth. Fourteen species representing five families were collected at the sample site (Table 1).

Table 1. Total catch, percent composition, and catch per unit of effort (CPUE) for the gravel chub, black redhorse and associate species sampled from North Branch of the Root River at the Chatfield Canoe Access in 1992. CPUE is expressed in the number of fish sampled per hour.

Species	FAMILY	Catch	Percent	CPUE
-----				
CYPRINIDAE - MINNOWS				
central stoneroller	( <i>Campostoma anomalum</i> )	32	30.8	184
gravel chub	( <i>Erimystax x-punctatus</i> )	1	1.0	6
common shiner	( <i>Luxilus cornutus</i> )	4	3.8	23
suckermouth minnow	( <i>Phenacobius mirabilis</i> )	1	1.0	6
longnose dace	( <i>Rhinichthys cataractae</i> )	5	4.8	29
CATOSTOMIDAE - SUCKERS				
white sucker	( <i>Catostomus commersoni</i> )	7	6.7	40
northern hog sucker	( <i>Hypentelium nigricans</i> )	8	7.7	46
black redhorse	( <i>Moxostoma duquesnei</i> )	3	2.9	17
redhorse YOY	( <i>Moxostoma</i> species)	5	4.8	29
SALMONIDAE - TROUTS				
brown trout	( <i>Salmo trutta</i> )	5	4.8	29
CENTRARCHIDAE - SUNFISHES				
smallmouth bass	( <i>Micropterus dolomieu</i> )	4	3.8	23
PERCIDAE - PERCHES				
fantail darter	( <i>Etheostoma flabellare</i> )	6	5.8	35
johnny darter	( <i>Etheostoma nigrum</i> )	21	20.2	121
blackside darter	( <i>Percina maculata</i> )	2	1.9	12
-----				
Totals:		104	100.0	599

The gravel chub and black redhorse comprised 1.0 and 2.9 percent of the catch, respectively. Catch per unit of effort (CPUE) is the number of fish sampled over time. The CPUE for the gravel chub and black redhorse were 6 and 17 fish per hour, respectively. The central stoneroller was the most abundant species at 30.8 percent of the catch and sampled at a rate of 184 fish per hour. The gravel chub and

suckermouth minnow were the least common species which were each represented by a single specimen.

Sixty-six young of the year redhorse from 8 sample stations were deposited in the fish collection at the Bell Museum. A few silver redhorse (*Moxostoma anisurum*) were present in some of these collections, but most of the specimens were too small to be identified.

On 8 August 1987, this investigator also sampled two gravel chubs from the Middle Branch of the Root River at the Power Plant Campsite in Fillmore County (Township 103 North-Range 10 West-Section 2). Gear consisted of a fifteen foot one-eighth inch mesh minnow seine and was conducted at night shortly after sunset over a sand-gravel substrate. This sample contained sixteen species representing five families (Table 2).

Table 2. Total catch and percent composition for the gravel chub and associate species sampled from the Middle Branch of the Root River at the Power Plant Campsite in 1987.

Species	Catch	Percent
=====		
FAMILY		
-----		
CYPRINIDAE - MINNOWS		
central stoneroller ( <i>Campostoma anomalum</i> )	2	2.4
spotfin shiner ( <i>Cyprinella spiloptera</i> )	21	25.7
common carp ( <i>Cyprinus carpio</i> )	1	1.2
gravel chub ( <i>Erimystax x-punctatus</i> )	2	2.4
common shiner ( <i>Luxilus cornutus</i> )	7	8.5
emerald shiner ( <i>Notropis atherinoides</i> )	1	1.2
creek chub ( <i>Semotilus atromaculatus</i> )	3	3.7
CATOSTOMIDAE - SUCKERS		
quillback ( <i>Carpiodes cyprinus</i> )	1	1.2
white sucker ( <i>Catostomus commersoni</i> )	4	4.9
northern hog sucker ( <i>Hypentelium nigricans</i> )	5	6.1
redhorse YOY ( <i>Moxostoma</i> species)	9	11.0
ICTALURIDAE - BULLHEAD CATFISHES		
stonecat ( <i>Noturus flavus</i> )	2	2.4
CENTRARCHIDAE - SUNFISHES		
smallmouth bass ( <i>Micropterus dolomieu</i> )	1	1.2
PERCIDAE - PERCHES		
fantail darter ( <i>Etheostoma flabellare</i> )	2	2.4
johnny darter ( <i>Etheostoma nigrum</i> )	12	14.7
blackside darter ( <i>Percina maculata</i> )	9	11.0
-----		
Totals:	82	100.0

The gravel chub comprised 2.4 percent of the catch and the spotfin shiner was the most abundant species at 25.7 percent. The common carp, emerald shiner, quillback, and smallmouth bass were the least common species which were each represented by a single specimen.

Three species of limited distribution were sampled in the 1992 surveys. The largescale stoneroller (*Campostoma oligolepis*) was found at four stations on the Root River in Fillmore and Olmsted Counties, the Ozark minnow (*Notropis nubilus*) at one station on the Zumbro River in Olmsted County, and the mud darter (*Etheostoma asprigene*) at two stations on the Mississippi River in Houston County (Appendix 3).

Weather patterns in 1992 created conditions which were less than optimum for collecting rare fishes in Minnesota. The spring and summer were unusually wet and cool. Streams remained above normal through October which hindered sampling efforts. Generally fish become more vulnerable to sampling in late summer and early fall as reduced flows gradually concentrate them into confined habitats. Atypically cool water temperatures also likely delayed spawning and reduced the expected growth rates of many young of the year species (e.g., redhorse) which made identification impossible.

#### **Recommendations**

MDNR Area Fisheries Offices in Lanesboro and Lake City should be informed of these results and encouraged to deposit additional specimens sampled during future stream surveys in the Bell Museum fish collection. Whenever possible, late summer and fall electrofishing surveys should be conducted for both species to sample adults and young of year. Dr. James Underhill, Curator of Fishes at the Bell Museum, noted some of the largest and greatest frequency of gravel chub collections from the Lanesboro Area Fisheries office were made in October and November (pers. comm.). Mel Haugstad, a former Area Fisheries Supervisor at Lanesboro who sampled the specimens, believed the gravel chub became more vulnerable to electroshocking surveys as the water temperatures cooled in the fall. Spring surveys should also be considered for the black redhorse during spawning runs to determine habitat requirements and biological information for this species in Minnesota. Prospective sites should be in streams where large numbers of redhorse (*Moxostoma* species) are historically known to congregate each year. Underhill reported sampling ripe males and females from the Zumbro River on 16 May 1967 (Eddy and Underhill 1973). MDNR Area Fisheries Offices and Conservation Officers may also be able to provide assistance in selecting locations and scheduling dates for the spring surveys.

#### **Acknowledgments**

These surveys were funded through a grant from the Minnesota Department of Natural Resources Nongame Wildlife Program. I would like to thank Ray Katula of the North American Native Fishes Association for assisting in the

surveys, and Dr. James Underhill at the James Ford Bell Museum of Natural History for verifying species identification whenever possible and offering insight from his decades of collecting experience which I have always found extremely valuable while searching for Minnesota's rare fishes.

#### **Literature Cited**

- Becker, G.C. 1983. Fishes of Wisconsin. University of Wisconsin Press, Madison. 1060 pp.
- Coffin, B., and L. Pfannmuller. 1988. Minnesota's Endangered Flora and Fauna. University of Minnesota Press, Minneapolis. 476 pp.
- Eddy, S., and J.C. Underhill. 1973. Northern Fishes. University of Minnesota Press, Minneapolis. 414 pp.
- Harlan, J.R. and E.B. Speaker. 1987. Iowa Fish and Fishing. Iowa Department of Natural Resources, Des Moines. 323 pp.
- Schmidt, K.P. 1984. Specially Protected Fishes: State and Provincial Lists of Endangered, Threatened, and Special Status Fishes. American Currents: May. North American Native Fishes Association, Philadelphia. 27 pp.
- Schmidt, K.P. 1990. Endangered, Threatened, and Special Status Fishes of North America. American Currents: March-May. North American Native Fishes Association, Philadelphia. 52 pp.