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A Report on the Fishes of Bull Mountain Creek, with Comments on the Status of Rare Species



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A REPORT ON THE FISHES OF BULL MOUNTAIN CREEK, WITH COMMENTS ON THE STATUS OF RARE SPECIES

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With the ongoing construction of the Tennessee-Tombigbee Waterway, continuous stress is expected to be put on the ichthyofauna of the Upper Tombigbee River. Major tributaries of the Tombigbee, such as Bull Mountain and Luxapalila creeks and the Buttahatchie, Noxubee, and Sipsey rivers, have become increasingly important as refugia for upper Tombigbee species that require current and stable gravel substrate. In this survey of the fishes of Bull Mountain Creek, representatives of several species usually considered riverine in habitat requirements and listed as endangered, threatened, or rare were collected.

There have been few fish collections reported from the Bull Mountain Creek system. Caldwell (1969) and Boschung (1973), in their preimpoundment surveys of the upper Tombigbee River drainage, made five collections in the Bull Mountain Creek system, with two of these being from the main stem. Schultz (1971) conducted hoop-net sampling in this creek as part of a broad survey of the walleye population in the Tombigbee drainage. The present study consisted of 124 collections made at 15 stations in Bull Mountain Creek proper. Fishes were collected from May 1979 to December 1981 using seines, hoop nets, and rotenone.

Bull Mountain Creek is, at the present time, a free-flowing, virtually unaltered major tributary of the upper Tombigbee River. Its headwaters originate in the Fall Line Hills of Marion and Franklin counties in northwestern Alabama at an elevation of 149 meters. It enters Itawamba County, Mississippi, and flows through the upper Coastal Plain before entering the Tombigbee River at the edge of the Black Belt, at an elevation of 70 meters. The stream channel within the study area meanders through mature bottomland hardwoods, creating a floodplain ranging from 1.8 to 2.7 kilometers in width. The stream's main channel is not well defined at some points because of the braided nature of the creek. Long pools broken by occasional gravel riffles, undercut banks, long blockages, and backwater areas provide a diversity of habitats. Bull Mountain Creek is a fifth-order stream ranging from 10 to 20 meters in width from its mouth to the upper sampling station 50.9 km upstream. U.S. Geological Survey (1980) reports a 40 year average discharge of 16.14 cubic meters per second (570 cfs) at Smithville, Mississippi (5.2 km upstream from the confluence with the Tombigbee River).

At this time no alterations in the form of channelization or impoundment are planned for the upper section of Bull Mountain Creek; however, the completion

and filling of Lock B Pool of the Tennessee-Tombigbee Waterway scheduled for late 1983 will inundate approximately 6.4 km of the lower section. The lower 2.9 km will be cut off by the west-bank levee of the canal section of the Tennessee-Tombigbee Waterway, and will be dependent on a minimum-flow structure for continued flow from Lock B Pool. Because of the west-bank levee, direct movements of fishes from the Tombigbee River into Bull Mountain Creek will be blocked.

Prior to impoundment by Lock B Lake, a survey of the fishes of Bull Mountain Creek was conducted by the Mississippi Department of Wildlife Conservation to determine species composition, and to monitor seasonal movements of fishes vulnerable to hoop net capture (Schultz 1981, Schultz et al 1982).

Three hoop nets were fished at each of four locations (sites 6, 9, 13, and 15 in Fig. 1) for three consecutive days every other week from January to December 1981. An additional 51 net days of sampling occurred from May 1979 to April 1980. Hoop nets were fished unbaited at a variety of depths and flow conditions for a total of 915 net days. These nets were 4.5 m in length and 91 cm in diameter with 2.5 cm nylon mesh. Seines used in 18 collections at eight locations were 3.6 m long and 1.2 m deep with 3.2 mm nylon mesh. Rotenone in liquid form (Noxfish) was used in four samples at four locations, and was put out 60 to 90 m above a 15 x 1.8 m bag seine, which was used as a block net. KMnO_4 was used to oxidize the rotenone below the block net.

Smaller fish specimens were fixed in 15 percent formalin and later identified, measured in total length, counted, and stored in 50 percent isopropanol. Larger fish were identified, measured, and released. Voucher specimens were deposited at the Mississippi Museum of Natural Science, Auburn University fish collection, and Mississippi State University fish collection.

Hoop-net sampling accounted for 32 species, 11 of which were not collected by other methods (Table 1). These nets were generally selective for the larger, mobile game and commercial fishes, and proved effective in taking ictalurids, centrarchids, and catostomids. Channel catfish (*Ictalurus punctatus*) made up 54 percent of the catch, whereas blacktail redbreast (*Moxostoma poecilurum*), shadow bass (*Ambloplites ariommus*), bluegill (*Lepomis macrochirus*), and white crappie (*Pomoxis annularis*) represented 6.8, 6.6, 6.5, and 4.5 percent of the catch respectively. A complete list of species and catch per unit effort is presented in Table 1. A listing of the 1981 hoop net catch by month is presented in Table 2. In most cases, the peak catch of each species occurred during its spawning period. An atypical hoop-net catch of 436 channel catfish during a single sampling period in February occurred after heavy rains and a rapid increase in stream volume and flow. This sample was at the mouth of Bull Mountain Creek, and the high catch probably resulted from the movements of Tombigbee River fish

into the creek. This higher than normal catch inflates the percent relative abundance given for channel catfish in Table 1.

Seines were used for collecting 53 species, seven of which were not collected by other methods (Table 1). Areas suitable for seining occur infrequently in the main stem of Bull Mountain Creek and are widely separated by deep pools. For this reason, stream habitats where collections were made usually consisted of swift gravel riffles and transitional habitat adjacent to riffles. This sampling bias is reflected in the high percent relative abundance of several riffle species. The rock darter (*Etheostoma rupestre*) was the most abundant species in the seine samples, making up 21 percent of the sample, followed by the speckled darter (*Etheostoma stigmaeum*) at 12.1 percent, the striped shiner (*Notropis chrysocephalus isolepis*) at 9.5 percent, the speckled madtom (*Noturus leptacanthus*) at 7.5 percent, and the blacktail shiner (*Notropis venustus*) at 5.9 percent (Table 1). The collection of a single smallmouth bass (*Micropterus dolomieu*) (a non-native species) results from an earlier stocking by the Mississippi Department of Wildlife Conservation.

Rotenone collections accounted for 58 species, five of which were not collected by other methods (Table 1). Sample areas were chosen to represent a wide variety of stream habitats. The black madtom (*Noturus funebris*) was the most abundant species taken in these collections, and comprised 10.8 percent of the total sample. This was followed by the gulf darter (*Etheostoma swaini*), 8.3 percent; the blacktail shiner, 6.5 percent; the rock darter, 5.7 percent; and the striped shiner, 5.2 percent (Table 1). A total of 79 species was collected during the study.

After impoundment of the canal section by Lock B, many Tombigbee River fishes dependent on riverine conditions will probably be eliminated, as predicted by Boschung (1973) and demonstrated in post-impoundment surveys on Gainesville and Aliceville lakes by Timmons (1982). The number of species in Aliceville Lake declined from 82 in pre-impoundment surveys by Caldwell (1969) and Boschung (1973) to 56 in post-impoundment studies 2 years after filling of Aliceville Lake (Timmons, 1982). Similar results can be expected after the closing of locks in the canal section of the waterway. Species present in pre-impoundment surveys by Caldwell (1969) or Boschung (1973) in the upper Tombigbee River, but absent from post-impoundment surveys in Gainesville and Aliceville lakes by Timmons (1982) are: Alabama shad (*Alosa alabamae*), mooneye (*Hiodon tergisus*), stoneroller (*Camptostoma anomalum*), speckled chub (*Hybopsis aestivalis*), rough shiner (*Notropis baileyi*), pretty shiner (*Notropis bellus*), mimic shiner (*Notropis volucellus*), Alabama hog sucker (*Hypentelium etowanum*), frecklebelly madtom (*Noturus munitus*), crystal darter (*Ammocrypta asprella*), harlequin darter (*Etheostoma histrio*), johnny darter (*Etheostoma nigrum*), rock darter (*Etheostoma rupestre*), blackbanded darter (*Percina nigrofasciata*), river darter (*Percina shumardi*), and saddleback darter (*Percina ouachitae*). All of these species except the Alabama shad and speckled chub were collected in the present study in Bull Mountain Creek from 1979 to 1981. Other fishes collected by Schultz (1981) from both the Tombigbee River and Bull Mountain Creek that will be adversely affected by loss of critical habitat due to impoundment are: Alabama shiner (*Notropis callistius*), blue sucker (*Cycleptus elongatus*), river redhorse (*Moxostoma carinatum*), and freckled darter (*Percina lenticula*). The frecklebelly madtom and the freckled darter are currently under status review by the U.S. Fish and Wildlife Service. Alabama lists the frecklebelly madtom as endangered and the blue sucker, crystal darter, and freckled darter as threatened (Ramsey, 1976). Mississippi lists the frecklebelly madtom and crystal darter as endangered and the freckled darter as rare (Clemmer et al 1975). Forty-five specimens of the frecklebelly madtom were taken in eight collections at four locations over gravel and sand-gravel riffles in moderate to strong

current (sites 4, 10, 12, and 15 in Figure 1). The frecklebelly madtom was taken up to 40 km above the confluence of Bull Mountain Creek with the Tombigbee River. A single adult specimen of the blue sucker was collected by hoop net at one location (site 6). Seventeen specimens of the crystal darter were collected at two locations in strong current over stable gravel beds in water to 1 m deep (sites 12 and 14). Two adult specimens of the freckled darter were collected at one location in a swift chute over gravel (site 10).

Beds of stable current-swept gravel occur less frequently in Bull Mountain Creek when compared to the Tombigbee River prior to Tenn-Tom construction. Riverine species occurring in Bull Mountain Creek that have critical habitat requirements exist in reduced numbers over these smaller areas of suitable habitat when compared to populations of the Tombigbee River prior to impoundment.

Many of the Tombigbee tributaries have undergone modifications to the detriment of their fish populations. Stream channelization, clearing of riparian vegetation, and gravel mining and washing activities have altered stream habitat in much of the Tombigbee drainage.

To prevent further habitat alteration, strict enforcement of gravel mining and washing operations is needed. Timber companies and private land owners should be encouraged to leave a buffer zone of vegetation along stream borders during timber cutting or clearing practices. The public should be continually informed about erosion, loss of sport fisheries, and downstream flooding problems associated with stream channelization. A portion of the diverse ichthyofauna of the Tombigbee River may be preserved on a reduced scale if major tributaries such as Bull Mountain Creek are protected as refugia for these sensitive species.

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COLLECTING STATIONS ON BULL MOUNTAIN CREEK WITH A LIST OF FISHES COLLECTED AT EACH STATION*

- 8.0 km NE of Tremont and 0.8 km W of the Alabama State line. Itawamba Co. Ms. T10S, R10E, Sec. 30. Species: 4,8,13,15,16,18,20,21,22,24,26,27,31,33,36,38,39,40,42,44,47,48,64,66,67,68,69,70,74,75.
- 5.4 km NE of Tremont at Co. Road 23. Itawamba Co. Ms. T10S, R10E, Sec. 26. Species: 8,13,15,18,20,27,31,40,44,45,52,64,66,67,68,70.
- 1.6 km NW of Tremont above U.S. Hwy 78. Itawamba Co. Ms. T10S, R10E, Sec. 5. Species: 8,13,16,17,18,19,21,31,40,41,44,52,55,63,64,65,66,67,68,70,74,75,76.
- 1.9 km NW of Tremont above U.S. Hwy 78. Itawamba Co. Ms. T10S, R10E, Sec. 5. Species: 8,13,16,17,18,19,20,21,22,26,27,30,31,36,38,39,40,42,43,46,47,48,49,51,52,56,66,67,68,70,74,75.
- 1.1 km WNW of Tremont below U.S. Hwy 78. Itawamba Co. Ms. T10S, R10E, Sec. 5. Species: 8,13,14,15,16,17,18,19,20,21,22,24,26,31,40,44,45,46,47,52,56,57,62,64,65,66,67,68,70,74,75,76.
- 4.6 km W of Cadamy and 7.5 km SW of Tremont. Itawamba Co. Ms. T10S, R9E, Sec. 25. Species: 2,3,4,5,18,29,30,33,34,35,36,37,38,42,47,49,51,52,58,59,78,79.
- 5.1 km WSW of Cadamy and 8 km SW of Tremont. Itawamba Co. Ms. T10S, R9E, Sec. 25. Species: 15,22,24,31,38,44,45,52,57,62,64,66,67,68,70,74,76.
- 4.8 km WSW of Cadamy and 8.3 km SW of Tremont. Itawamba Co. Ms. T10S, R9E, Sec. 36. Species:

- 8,16,21,22,64,66,67,68,70,74,76.
9. 2.1 km NE of Smithville and 2.1 km upstream from State Hwy 25. Itawamba Co. Ms. T11S, R9E, Sec. 29. Species: 4,5,9,18,33,34,35,36,38,42,47,51,52,53,54,57,58,59,78,79.
10. 1.6 km NE of Smithville and 1.6 km upstream from State Hwy 25. Itawamba Co. Ms. T11S, R9E, Sec. 29. Species: 1,7,8,11,12,13,15,16,17,18,20,21,22,23,24,25,26,27,28,31,32,36,37,39,40,41,43,44,45,46,47,48,49,50,51,52,56,57,60,62,63,66,67,68,71,72,73,74,75,76,79.
11. 1.3 km NE of Smithville and 1.3 km upstream from State Hwy 25. Itawamba Co. Ms. T11S, R9E, Sec. 29. Species: 13,16,17,18,21,22,40,66,67,68,75,76.
12. 1.3 km NNW of Smithville and 1.0 km downstream from State Hwy 25. Itawamba Co. Ms. T11S, R9E, Sec. 30. Species: 5,8,11,12,13,15,16,17,18,20,21,22,23,24,25,26,31,32,35,36,38,39,40,41,42,44,47,49,51,

- 52,56,57,60,61,64,66,67,68,70,71,74,75,76,77,78.
13. 1.8 km NNW of Smithville and 1.3 km downstream from State Hwy 25. Itawamba Co. Ms. T11S, R9E, Sec. 30. Species: 2,4,6,9,17,18,28,32,33,34,35,36,37,38,42,47,51,52,56,58,59,78,79.
14. 3.5 km NW of Smithville and 0.5 km upstream from confluence with Tombigbee River. Itawamba Co. Ms. T11S, R8E, Sec. 25. Species: 5,10,11,13,16,18,20,21,22,24,25,26,35,40,41,45,57,60,62,63,66,67,68,71,75,76.
15. 3.8 km NW of Smithville just upstream from confluence with Tombigbee River. Itawamba Co. Ms. T11S, R8E, Sec. 26. Species: 2,4,5,9,28,30,32,34,35,36,38,42,47,50,51,52,53,56,58,59,78,79.

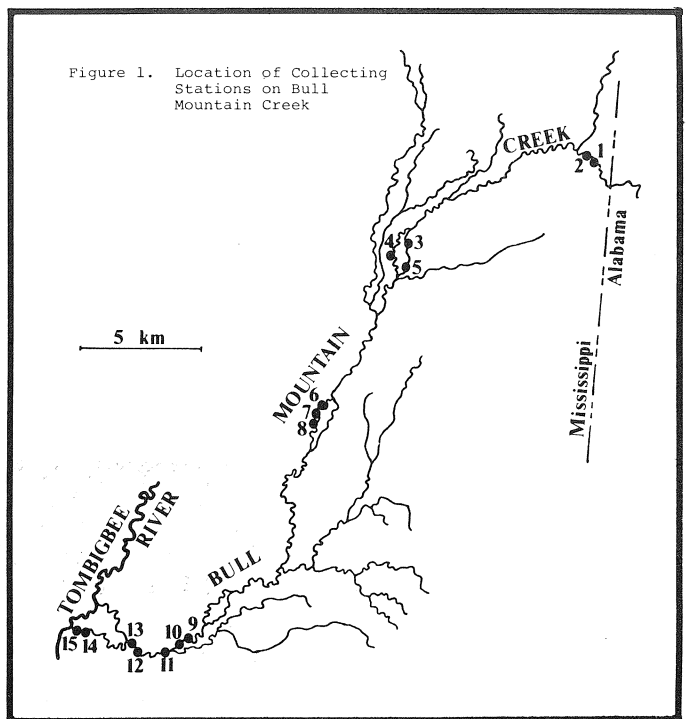
* Fishes are listed in phylogenetic sequence by number as they appear in Table 1.

Table 1. Number (N), Percentage Relative Abundance (PRA) and Percent Occurrence (PO) of Fishes Collected by Seine and Rotenone and Number, Percentage Relative Abundance and Catch Per Unit of Effort (CPE) by Hoop Net Collecting in Bull Mountain Creek (CPE equals number of fishes per 9 net hours).

	Method of Collection								
	Seine			Rotenone			Hoop Net		
	N	PRA	PO	N	PRA	PO	N	PRA	CPE
1. <i>Lampetra aepyptera</i>	2	0.13	5.6				34	2.13	0.33
2. <i>Lepisosteus osseus</i>							1	0.06	0.01
3. <i>Amia calva</i>				1	0.11	25.0	20	1.26	0.20
4. <i>Anguilla rostrata</i>	1	0.07	5.6	1	0.11	25.0	5	0.31	0.05
5. <i>Dorosoma cepedianum</i>							31	1.95	0.30
6. <i>Hiodon tergisus</i>	1	0.07	5.6						
7. <i>Esox niger</i>	66	4.37	55.5	51	5.73	100.0			
8. <i>Camptostoma oligotepis</i>							6	0.38	0.06
9. <i>Cyprinus carpio</i>	5	0.33	5.6						
10. <i>Hybognathus hayi</i>	14	0.93	5.6	8	0.90	50.0			
11. <i>Hybognathus nuchalis</i>	2	0.13	5.6	3	0.34	25.0			
12. <i>Hybopsis winchelli</i>	18	1.19	50.0	45	5.06	100.0			
13. <i>Moxostoma leptocephalus</i>	1	0.07	5.6						
14. <i>Notemigonus crysoleucas</i>	54	3.58	33.3	34	3.82	25.0			
15. <i>Notropis baileyi</i>	30	3.31	50.0	43	4.83	100.0			
16. <i>Notropis bellus</i>	33	2.19	44.4	37	4.16	75.0	1	0.06	0.01
17. <i>Notropis callistius</i>	143	9.47	44.4	46	5.17	100.0	5	0.31	0.05
18. <i>Notropis chrysoccephalus</i>	5	0.33	16.7	1	0.11	25.0			
19. <i>Notropis emiliae</i>	21	2.72	44.4	32	3.60	100.0			
20. <i>Notropis stilbicus</i>	24	1.59	50.0	17	1.91	100.0			
21. <i>Notropis texanus</i>	89	5.89	72.2	58	6.52	100.0			
22. <i>Notropis venustus</i>	3	0.20	5.6	1	0.11	25.0			
23. <i>Notropis volucellus</i>	23	1.52	27.8	4	0.45	50.0			
24. <i>Notropis sp.</i> (cf. <i>N. longirostris</i>)	5	0.33	5.6	3	0.34	25.0			
25. <i>Pimephales notatus</i>	9	0.60	27.8	9	1.01	100.0			
26. <i>Pimephales vigilax</i>	1	0.07	5.6	2	0.22	50.0			
27. <i>Semotilus atromaculatus</i>				1	0.11	25.0			
28. <i>Carpodacus velifer</i>							3	0.19	0.03
29. <i>Cycleptus elongatus</i>							4	0.25	0.04
30. <i>Erimyzon oblongus</i>				1	0.11	25.0			
31. <i>Hypentelium etowanum</i>	6	0.40	16.7	17	1.91	100.0			
32. <i>Ictiobus bubalus</i>				3	0.34	50.0	23	1.44	0.23
33. <i>Minytrema melanops</i>				2	0.22	25.0	12	0.75	0.12
34. <i>Moxostoma carinatum</i>	2	0.13	5.6	4	0.45	25.0	11	0.69	0.11
35. <i>Moxostoma erythrum</i>				9	1.01	100.0	29	1.82	0.28
36. <i>Moxostoma poecilurum</i>							108	6.78	1.06
37. <i>Ictalurus natalis</i>	1	0.07	5.6	39	4.38	100.0	7	0.44	0.07
38. <i>Ictalurus punctatus</i>				96	10.79	100.0	866	54.36	8.49
39. <i>Noturus funebris</i>	113	7.48	66.7	10	1.12	100.0			
40. <i>Noturus leptacanthus</i>	31	2.05	33.3	14	1.57	50.0			
41. <i>Noturus munitus</i>				4	0.45	75.0	30	1.88	0.29
42. <i>Pygidictis olivaris</i>	1	0.07	5.6	1	0.11	25.0			
43. <i>Aphredoderus sayanus</i>	49	3.25	44.4	4	0.45	75.0			
44. <i>Fundulus olivaceus</i>	7	0.46	22.2				2	0.13	0.02
45. <i>Gambusia affinis</i>	2	0.13	5.6	1	0.11	25.0	1	0.06	0.01
46. <i>Labidesthes sicculus</i>	2	0.13	5.6	18	2.02	100.0	104	6.53	1.02
47. <i>Ambloplites arionum</i>	1	0.07	5.6	2	0.22	50.0	47	2.95	0.46
48. <i>Elassoma zonatum</i>	2	0.13	5.6	7	0.79	75.0	5	0.31	0.05
49. <i>Lepomis cyanellus</i>	2	0.13	5.6	3	0.34	50.0	1	0.06	0.01
50. <i>Lepomis gulosus</i>	16	1.06	33.3	9	1.01	75.0	104	6.53	1.02
51. <i>Lepomis macrochirus</i>							47	2.95	0.46
52. <i>Lepomis megalotis</i>							5	0.31	0.05
53. <i>Lepomis microlophus</i>							1	0.06	0.01
54. <i>Lepomis punctatus</i>									
55. <i>Micropterus dolomieu</i>	1	0.07	5.6	5	0.56	75.0	5	0.31	0.05
56. <i>Micropterus punctulatus</i>	3	0.20	11.1	4	0.45	50.0	1	0.06	0.01
57. <i>Micropterus salmoides</i>	4	0.26	16.7				71	4.46	0.70
58. <i>Pomoxis annularis</i>							14	0.88	0.14
59. <i>Pomoxis nigromaculatus</i>									
60. <i>Ammocrypta asprella</i>	15	0.99	5.6	2	0.22	25.0			
61. <i>Ammocrypta beani</i>				1	0.11	25.0			
62. <i>Ammocrypta meridiana</i>	20	1.32	27.8						
63. <i>Etheostoma histrio</i>	2	0.13	11.1	8	0.90	25.0			
64. <i>Etheostoma nigrum</i>	7	0.46	27.8	2	0.22	50.0			
65. <i>Etheostoma procellare</i>	3	0.20	11.1						
66. <i>Etheostoma rupestre</i>	318	21.06	77.8	51	5.73	100.0			
67. <i>Etheostoma stigmaeum</i>	183	12.12	77.8	18	2.02	100.0			
68. <i>Etheostoma swaini</i>	48	3.18	66.7	74	8.31	100.0			
69. <i>Etheostoma whipplei</i>	1	0.07	5.6						
70. <i>Etheostoma (Nanostoma) sp.</i>	22	1.46	44.4	6	0.67	50.0			
71. <i>Percina caprodes</i>	1	0.07	5.6	3	0.34	50.0			
72. <i>Percina lenticula</i>				2	0.22	25.0			
73. <i>Percina maculata</i>				1	0.11	25.0			
74. <i>Percina nigrofasciata</i>	16	1.06	50.0	7	0.79	75.0			
75. <i>Percina ouachitae</i>	14	0.93	50.0	29	3.26	100.0			
76. <i>Percina sciara</i>	27	1.79	50.0	31	3.48	50.0			
77. <i>Percina shumardi</i>				1	0.11	25.0			
78. <i>Stizostedion vitreum</i>				1	0.11	25.0	6	0.38	0.06
79. <i>Aplodinotus grunniens</i>				3	0.34	25.0	34	2.13	0.33

Table 2. 1981 Monthly Hoop Net Catch in Bull Mountain Creek at 4 Sampling Stations (864 Net Days).

	J	F	M	A	M	J	J	A	S	O	N	D	Total
<i>Lepisosteus osseus</i>	1			1	1	27	1						30
<i>Amia calva</i>													1
<i>Anguilla rostrata</i>				2	5	3	4	1	1	1			17
<i>Dorosoma cepedianum</i>		1					1	2	1				5
<i>Hiodon tergisus</i>			4										4
<i>Cyprinus carpio</i>			1				3		1		1		6
<i>Notropis chrysoccephalus</i>			3										3
<i>Carpodacus velifer</i>							1						1
<i>Cycleptus elongatus</i>												1	1
<i>Erimyzon oblongus</i>												4	4
<i>Ictiobus bubalus</i>				2		1							3
<i>Minytrema melanops</i>			1										1
<i>Moxostoma carinatum</i>	1	5	1			1				1	1	1	6
<i>Moxostoma erythrum</i>	7	9	4	2					1		1	2	27
<i>Moxostoma poecilurum</i>	6	6	20	12	2	2	5	2	3	4	3	9	74
<i>Ictalurus natalis</i>	1	2				1							3
<i>Ictalurus punctatus</i>	20	436	29	18	16	41	58	3	10	7	10	175	823
<i>Pygidictis olivaris</i>					2	5	6	8	2	1	1	2	27
<i>Ambloplites arionum</i>	2	6	7	21	20	25	3	5	2	1	6	3	101
<i>Lepomis cyanellus</i>				1	1								2
<i>Lepomis gulosus</i>													1
<i>Lepomis macrochirus</i>	9	5	16	16	16	10	3	3	7	9	1		95
<i>Lepomis megalotis</i>			1	6	8	11	10	2	2	2	3	2	47
<i>Lepomis microlophus</i>				1	2		1	1					5
<i>Lepomis punctatus</i>											1		1
<i>Micropterus punctulatus</i>			2										2
<i>Micropterus salmoides</i>							1						1
<i>Pomoxis annularis</i>	1	2	8	13	18	6	4	7	1	1	3		64
<i>Pomoxis nigromaculatus</i>	1	2		3	3	1	1			2			13
<i>Stizostedion vitreum</i>			1							1			3
<i>Aplodinotus grunniens</i>						11	7	2		1	2	6	29



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