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FISHES OF THE LOWER PRAIRIE CREEK AREA, VIGO COUNTY, INDIANA

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ABSTRACT. Sixty-five species of fish are known from the lower Prairie Creek drainage of Vigo County, Indiana; 51 of them had been reported prior to the present study. During the summer of 1999 we seined 15 sites in Prairie Creek, Oxendine Bayou, and Muskrat Pond. Nine of the sites had been previously sampled by Gerking (1945) and/or Whitaker and Wallace (1973). Ten of the 51 previously found species were not found in 1999 or in any collections after 1987. They are *Notropis atherinoides, Phenacobius mirabilis, Rhinichthys obtusus, Carpiodes cyprinus, C. carpio, Erimyzon oblongus, Etheostoma flabellare, E. gracile, Percina maculata,* and *Sander canadensis.* The number of species of fish known from Vigo County is now 111, or 52.6% of the 211 species known from Indiana.

Keywords: Fishes, Indiana, Vigo County, Prairie Creek

Vigo County, Indiana, was first sampled for fishes by Jenkins (1887), who reported 63 species of fishes there. However, he did not sample the Prairie Creek area. Prairie Creek is located in west central Indiana and is primarily a small stream (25 m), mostly sandy bottom, but with some gravel and rocky bottomed areas. Collections by Jordan (1877, 1890), Evermann & Jenkins (1888), Jordan & Evermann (1902), Hubbs & Trautman (1937), Blatchley (1938), and Gerking (1945) added 20 species to the known fish fauna of Vigo County, making a total of 83 species. Whitaker and Wallace (1973) during a study of the fishes of Vigo County reported an additional 25 species, yielding 108 species known from Vigo County. Based on historical collecting through 1973, 51 species of fish were known to occur in the lower Prairie Creek area. The Prairie Creek area is particularly interesting because it has been little studied, it includes a large tract of bottomland woods, and it appears to have high diversity at least for some organisms.

The purpose of this study was to assess the present distribution and abundance of fish in the lower Prairie Creek area of Vigo County, Indiana, and to determine changes in the fish community from previous studies (1945–1966) of this area, as compared to the period 1980 to 1999.

STUDY AREA

Prairie Creek drains much of the southwestern portion of Vigo County (Fig. 1), flowing west into the Wabash River bottoms, where it flows into Negro Ditch. As Prairie Creek turns south it drains approximately 650 ha (1600 acres) of forest. Oxendine Bayou runs west from Negro Ditch, then to the southwest. Muskrat Pond and Round Pond both lie west of the north-south portion of Prairie Creek and south of Oxendine Bayou. Most of Prairie Creek has a sandy bottom, but there are periodic riffles in the upper east/west portion. The stream width is about 9 m and depth is up to 1 meter. Oxendine Bayou is 6–10 m wide with a mud bottom. Except for periodic pools, much of Prairie Creek dries up in the summer, but the entire bottomland part of the study area (all sites except 4, 1, and 14) may be flooded when the Wabash River floods.

METHODS

Fifteen collections of fish in the lower Prairie Creek area were made during 19–30 July 1999, including ten in Prairie Creek, three along Oxendine Bayou, one in Round Pond, and one in Muskrat Pond (Fig. 1). Four of the ten sites along Prairie Creek, two in Oxendine Bayou, and the one in Muskrat Pond had been sampled in previous studies. Also included are unpublished data from the 1990 Indiana State University vertebrate zoology class from Ox-

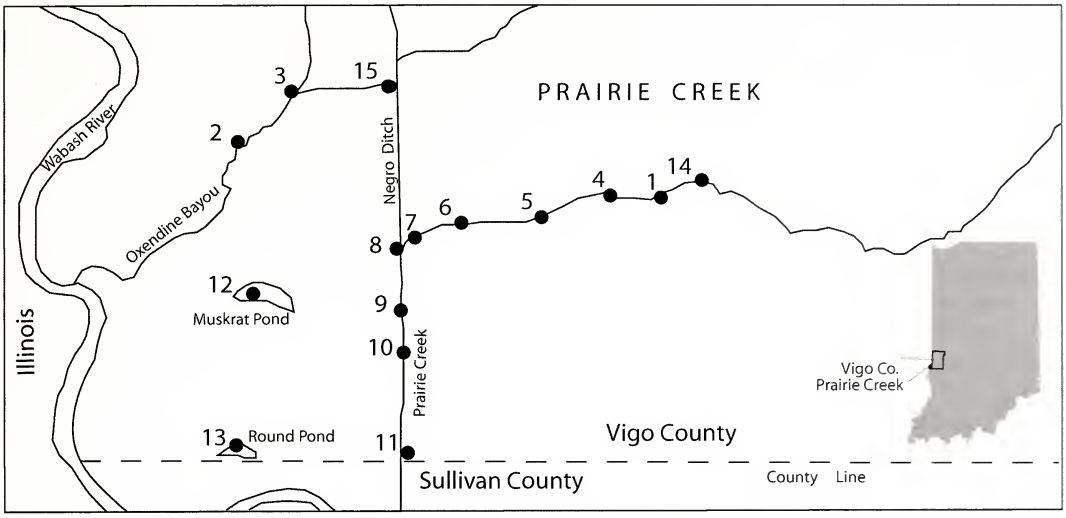

Figure 1.—Collection sites of the 1999 study in the lower Prairie Creek area.

endine Bayou, which documented the first *Gambusia* in Vigo County, and one collection in Prairie Creek by Leanna Smith (1988).

Collections were made with either a 15 or 30 foot, ¼ inch mesh seine. Collection sites along Prairie Creek and Oxendine Bayou averaged 100 m in length with the average width being approximately 7–8 m. Muskrat Pond was sampled with seine hauls throughout most of its length and width. Nomenclature follows the Revised Checklist of the Vertebrates of Indiana (Simon et al. 2002).

RESULTS

Sixty-five species of fish from 15 families and 40 genera have been taken in the lower Prairie Creek area, Vigo County, Indiana (Table 1). Fifty of these species were taken since 1988. The most abundant species in Prairie Creek by family in the recent collection were: Clupeidae—*Dorosoma cepedianum,* 44; Cyprinidae—*Hybognathus nuchalis,* 697, *Cyprinella spiloptera,* 174, *Notropis blennius,* 70, *Pimephales notatus,* 50; Catostomidae—*Catostomus commersoni,* 10; Centrarchidae—*Lepomis macrochirus,* 25, *Etheostoma caeruleum,* 24, and *E. nigrum,* 13. The most abundant species in Oxendine Bayou were *Gambusia affinis,* 104; *D. cepedianum,* 52; *Cyprinus carpio,* 44; *L. macrochirus,* 37; *Pomoxis annularis,* 24; *P. nigromaculatus,* 21; and *Hypophthalmichthys nobilis,* 21.

Fourteen species had not been found in the Prairie Creek area prior to 1988 and constitute new locality records. They are *Lepisosteus osseus, Ctenopharyngodon idella, Cyprinella whipplei, Hypophthalmichthys nobilis, Notropis stramineus, Hypentelium nigricans, Ictalurus punctatus, Gambusia affinis, Labidesthes sicculus, Morone chrysops, Ammocrypta pellucida, Etheostoma chlorosoma, Percina phoxocephala,* and *Aplodinotus grunniens.*

Ten species were taken before 1987, but they have not been taken in any of the collections since. Listed in order of decreasing numbers taken, they are: *Notropis atherinoides* (65), *Erimyzon oblongus* (9), *Sander canadensis* (9), *Phenacobius mirabilis* (6), *Carpiodes cyprinus* (4), *Carpiodes carpio* (4), *Etheostoma gracile* (3), *Etheostoma flabellare* (2), *Percina maculata* (2), and *Rhinichthyes obtusus* (1). All of these are listed as common by Simon et al. (2002), except for *Erimyzon oblongus* and *Etheostoma gracile,* which are listed as rare.

Nineteen species of cyprinids have been collected from Prairie Creek at nine collection sites sampled during the present study and four of 17 sites sampled by Whitaker & Wallace (1973). Gerking (1945) collected only ten species, but he sampled only one site in this area. The most common species of cyprinid fish in Prairie Creek during the present study were *Hybognathus nuchalis, Notropis blennius, Cyprinella spiloptera,* and *Pimephales notatus.*

Eleven species of cyprinids were collected

Table 1.—Species of fish collected in the lower Prairie Creek area. Gerking did not provide numbers of individuals collected; therefore, his collections are marked by an '×'. Species taken since 1989 are marked with an asterisk. PC = Prairie Creek, OB = Oxendine Bayou, MP = Muskrat Pond, RP = Round Pond.

	Earlier collections (1945–1966)				
	Gerking (1945)	Whitaker & Wallace (1973), 1962–66			
	PC	PC	OB	MP	RP
Lepisosteidae					
*Lepisosteus osseus**					
Longnose gar		0	0	0	0
*Lepisosteus platostomus**					
Shortnose gar		0	93	1	0
Amiidae					
Amia calva					
Bowfin		0	94	0	0
Clupeidae					
*Dorosoma cepedianum**					
Gizzard shad		2	300	60	7
Cyprinidae					
*Campostoma anomalum**					
Stoneroller	×	15	0	0	0
*Ctenopharyngodon idella**					
Grass carp		0	0	0	0
*Cyprinella spiloptera**					
Spotfin shiner	×	24	21	0	0
*Cyprinella whipplei**					
Steelcolor shiner		0	0	0	0
*Cyprinus carpio**					
Carp	×	12	213	24	180
*Ericymba buccata**					
Silverjaw		2	0	0	0
*Hybognathus nuchalis**					
Mississippi silvery minnow	×	132	39	0	0
*Hypophthalmichthys nobilis**					
Bighead carp		0	0	0	0
*Luxilus chrysocephalus**					
Striped shiner	×	24	0	0	0
*Lythrurus umbratilis**					
Redfin shiner	×	47	0	2	0
*Notemigonus crysoleucas**					
Golden shiner		1	2	0	0
*Notropis atherinoides**					
Emerald shiner		63	2	0	0
*Notropis blennius**					
River shiner		144	9	0	0
*Notropis stramineus**					
Sand shiner		0	0	0	0
Phenacobius mirabilis					
Suckermouth minnow	×	6	0	0	0
*Pimephales notatus**					
Bluntnose minnow	×	59	4	0	0
*Pimephales vigilax**					
Bullhead minnow		0	2	0	0

Table 1.—Extended.

Oxendine Bayou 1988–1998			Present (1999)				
Smith (1989)	Class (1990)	Class (1998)	PC	OB	MP	RP	Overall totals
0	0	50	3	0	0	0	53
8	0	10	6	20	1	0	139
500	0	0	0	0	0	0	594
0	400	200	44	52	100	7	1165
0	0	0	2	0	0	0	17
0	0	100	5	31	8	0	144
0	12	5	174	0	1	0	237
0	0	0	9	0	0	0	9
1	15	5	22	44	19	180	535
0	0	0	3	0	0	0	5
0	0	0	697	17	20	0	905
0	0	200	6	21	10	0	237
0	0	0	6	0	0	0	30
0	0	0	2	0	0	0	51
13	12	0	0	0	1	0	29
0	0	0	0	0	0	0	65
0	150	0	70	0	0	0	373
0	0	0	3	0	0	0	3
0	0	0	0	0	0	0	6
0	0	0	50	5	0	0	118
0	2	0	1	0	0	0	5

Table 1.—Continued.

	Earlier collections (1945–1966)				
	Gerking (1945)	Whitaker & Wallace (1973), 1962–66			
	PC	PC	OB	MP	RP
Rhinichthyes obtusus					
Blacknose dace	×	1	0	0	0
*Semotilus atromaculatus**					
Creek chub	×	46	2	0	0
Catostomidae					
Carpioides carpio					
River carpsucker		3	1	0	0
Carpiodes cyprinus					
Quillback		4	0	0	0
*Catostomus commersoni**					
White sucker		22	1	0	0
Erimyzon oblongus					
Creek chubsucker	×	9	0	0	0
*Hypentelium nigricans**					
Northern hogsucker		0	0	0	0
*Ictiobus bubalus**					
Smallmouth buffalo	×	0	0	0	0
*Ictiobus cyprinellus**					
Bigmouth buffalo		0	61	0	2
Ictiobus niger					
Black buffalo		0	80	0	15
*Minytrema melanops**					
Spotted sucker	×	1	1	0	0
*Moxostoma erythrurum**					
Golden redhorse	×	0	0	0	0
Ictaluridae					
*Ameiurus melas**					
Black bullhead	×	10	21	0	0
*Ameiurus natalis**					
Yellow bullhead	×	3	1	0	0
*Ictalurus punctatus**					
Channel catfish		0	0	0	0
Esocidae					
*Esox americanus**					
Grass pickerel		29	2	0	0
Aphredoderidae					
Aphredoderus sayanus					
Pirate perch		148	38	0	0
Fundulidae					
*Fundulus notatus**					
Blackstripe topminnow	×	3	0	0	0
Poeciliidae					
*Gambusia affinis**					
Mosquitofish		0	0	0	0
Atherinidae					
Labidesthes sicculus					
Brook silverside		0	0	0	0

Table 1.—Extended (Continued).

Oxendine Bayou 1988–1998			Present (1999)				Overall totals
Smith (1989)	Class (1990)	Class (1998)	PC	OB	MP	RP	
0	0	0	0	0	0	0	1
0	0	0	14	0	1	0	63
0	0	0	0	0	0	0	4
0	0	0	0	0	0	0	4
0	0	0	10	0	0	0	33
0	0	0	0	0	0	0	9
0	0	0	2	0	0	0	2
0	1	0	9	7	3	0	20
0	1	5	0	8	21	2	98
0	0	0	0	0	0	15	95
0	0	0	6	0	0	0	8
0	0	0	2	0	0	0	2
6	0	0	1	3	60	0	101
5	0	0	1	0	0	0	10
2	6	0	15	0	1	0	24
1	3	0	1	0	0	0	36
3	0	0	0	0	0	0	189
0	75	0	1	0	0	0	79
0	6	10	80	104	1000	0	1200
0	1	0	0	0	0	0	1

Table 1.—Continued.

	Earlier collections (1945–1966)				
	Gerking (1945)	Whitaker & Wallace (1973), 1962–66			
	PC	PC	OB	MP	RP
Moronidae					
Morone chrysops					
White bass		0	0	0	0
Centrarchidae					
*Lepomis cyanellus**					
Green sunfish	×	27	83	0	0
*Lepomis gulosus**					
Warmouth		0	1	0	0
*Lepomis humilis**					
Orangespotted sunfish	×	0	3	0	0
*Lepomis macrochirus**					
Bluegill	×	20	285	0	0
*Lepomis megalotis**					
Longear sunfish	×	3	0	0	0
*Lepomis microlophus**					
Redear sunfish		0	1	0	0
*Micropterus punctulatus**					
Spotted bass		0	1	0	0
*Micropterus salmoides**					
Largemouth bass		2	12	0	0
*Pomoxis annularis**					
White crappie		0	43	0	0
*Pomoxis nigromaculatus**					
Black crappie		0	55	0	0
Percidae					
*Ammocrypta pellucida**					
Eastern sand darter		0	0	0	0
*Etheostoma blennioides**					
Greenside darter	×	11	0	0	0
*Etheostoma caeruleum**					
Rainbow darter	×	1	0	0	0
Etheostoma chlorosoma					
Bluntnose darter		0	0	0	0
Etheostoma flabellare					
Fantail darter	×	2	0	0	0
Etheostoma gracile					
Slough darter		3	0	0	0
*Etheostoma nigrum**					
Johnny darter	×	53	0	0	0
*Etheostoma spectabile**					
Orangethroat darter	×	2	0	0	0
*Percina caprodes**					
Logperch	×	4	2	0	0
Percina maculata					
Blackside darter		2	0	0	0
*Percina phoxocephala**					
Slenderhead darter		0	0	0	0
Sander canadense					
Sauger		0	8	1	0
Sciaenidae					
*Aplodinotus grunniens**					
Freshwater drum		0	0	0	0

Table 1.—Extended (Continued).

Oxendine Bayou 1988–1998			Present (1999)				Overall totals
Smith (1989)	Class (1990)	Class (1998)	PC	OB	MP	RP	
0	0	5	0	0	0	0	5
0	0	5	3	1	2	0	121
0	0	0	0	8	4	0	13
0	0	0	2	1	0	0	6
10	25	2	25	37	52	0	456
0	0	0	16	0	0	0	19
0	0	0	0	4	0	0	5
0	0	0	12	2	0	0	15
0	15	2	5	11	0	0	47
0	25	50	5	24	5	0	152
8	50	50	2	21	59	0	245
0	0	0	2	0	0	0	2
0	0	0	1	0	0	0	12
0	0	0	24	1	0	0	26
0	15	0	0	0	0	0	15
0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	3
0	0	0	13	0	0	0	66
0	0	0	3	0	0	0	5
0	0	0	10	0	0	0	16
0	0	0	0	0	0	0	2
0	0	0	5	0	0	0	5
0	0	0	0	0	0	0	9
0	0	20	3	3	0	0	26

in Oxendine Bayou. Listed by decreasing abundance, the most common species were the common carp (*Cyprinus carpio*), the bighead carp (*Hypophalmichthys nobilis*), the river shiner (*Notropis blennius*), the grass carp (*Ctenopharyngodon idella),* and the silvery shiner (*Hybognathus muchalis*). Other species taken in relatively low numbers were *Cyprinella spiloptera, Notemigonus chrysoleucas, Pimephales notatus, P. vigilax, Notropis atherinoides,* and *Semotilus atromaculatus. Notropis atherinoides, Luxilus chrysocephalus, S. atromaculatus,* and *Cyprinella spiloptera* were not netted at all during the 1999 work.

Of the ten species of suckers that have been found in Prairie Creek, the most abundant was the white sucker (*Catostomus commersonii*). The other nine species collected were *Erimyzon oblongus, Ictiobus bubalus, I. cyprinellus, I. niger, Minytrema melanops, Carpiodes cyprinus, Carpiodes carpio, Hypentelium nigricans,* and *Moxostoma erythrurum. Erimyzon oblongus* was taken earlier, but not in the recent studies.

Ten species of percids have been collected from Prairie Creek. Gerking (1945) collected six species, Whitaker & Wallace (1973) eight, and seven species were collected during the present study. The most common percid observed in Prairie Creek was *Etheostoma nigrum.* Whitaker & Wallace (1973) captured 53 of the 66 individuals, whereas only 13 were taken in the present study (Table 1). Twenty-five individuals of *Etheostoma caeruleum* were netted, with 24 taken in the present study (Table 1). *Etheostoma nigrum* and *E. spectabile* are the most common darters in the sand streams of Vigo County (Whitaker & Wallace 1973). Other percids observed were *Percina caprodes, Etheostoma blenniodes, Etheostoma spectabile, Percina phoxocephala, Etheostoma gracile, Percina maculata, Etheostoma flabellare,* and *Ammocrypta pellucida.* Whitaker & Wallace (1973) sampled only one site on the north-south portion of the creek but caught no fish at all there. Four sites were sampled during the present study (1999), and only three percids were taken.

Few percids were collected in Oxendine Bayou. Not surprisingly, *Etheostoma chlorosoma* was the most abundant species (15 individuals collected in 1990), as it is typically found in bottomland pools and bayous. Other percids collected in decreasing abundance were *Sander canadensis, Percina caprodes,* and *Etheostoma caeruleum.*

DISCUSSION

Species that comprised the largest number of individuals collected from all studies of the lower Prairie Creek area were: western mosquitofish, gizzard shad, silvery shiner, bowfin, common carp, and bluegill. Three species, the mosquitofish (*Gambusia affinis*), grass carp (*Ctenopharyngodon idella*), and bighead carp (*Hypophthalmichthys nobilis*), have apparently recently become established in Vigo County.

The bighead carp was first introduced in the 1970s in Arkansas to be used as an aquaculture species (Henderson 1976; Jennings 1988). The grass carp was introduced to control plant growth in ponds and lakes (Laird & Page 1996). The first bighead carp and grass carp from Indiana were taken in northern Vigo County in 1988 (unpubl. data). The grass carp has also been collected in northwest Indiana, at Moss Lake (Simon et al. 2004), and in the Little Calumet River, Lake Michigan, and several other lakes in Porter and LaPorte counties (Simon et al. 2005). The bighead carp has also been collected in the Wabash River, the West Fork of the White River, and the lower Ohio River (Simon 2006).

No mosquitofish had been taken in Vigo County until recently, although a great amount of collecting has been done there. Since 1990, they have occurred by the thousands. The first record of the western mosquitofish was in 1990, when six individuals were taken in Oxendine Bayou in Vigo County, but hundreds were present in 1992 and since (Clem & Whitaker 1996). The original range of this species in the state was in extreme southwest Indiana. We suspect that they became established in Vigo County about 1989 or 1990. With no current (except during flooding), warm water, and aquatic vegetation, Oxendine Bayou provides an excellent habitat for this species. Eighty mosquitofish were collected in Prairie Creek during the present study. By far the most abundant species collected in Muskrat Pond during the present study was the western mosquitofish. We collected over 1000 individuals, but probably hundreds of thousands more were present. It had not been taken in the previous collections from Muskrat Pond. Many young and pregnant female mosquito-

fish were observed. Since Muskrat Pond receives most of its water from the Wabash River, it is presumed that the mosquitofish entered the lower Prairie Creek area via the Wabash River.

Some of the species not taken prior to 1987 deserve special comment. Whitaker & Wallace (1973) and Smith (1988) did not observe the bighead carp (*H. nobilis*) or the grass carp (*C. idella*). These two species had not been taken in Vigo County or in Indiana until recently. Both species were taken at several sites during the present study. These are both exotic species introduced from Asia, and each was first taken in the state in 1988 in Otter Creek below Markle's Dam in the northern part of Vigo County (unpubl. data, JOW). The fish presumably came up Otter Creek from the Wabash River. Our collections include young individuals which, along with the large numbers taken, indicates that these species are successfully reproducing in Vigo County.

The eastern sand darter, *Ammocrypta pellucida,* is listed as special concern in the state, and is a federally-endangered candidate species (Simon et al. 2002). In addition, it has declined noticeably in Vigo County over recent decades, as indicated in annual samples collected by the Indiana State University vertebrate zoology classes. Therefore, it was of special interest that *Ammocrypta* had not been found earlier in Prairie Creek, but it was found during the present work.

The bluntnose darter, *Etheostoma chlorosoma,* is listed as rare (Simon et al. 2002) but likewise was not found earlier; however, 15 individuals were found during the present work. This species is fairly common in the sloughs and ponds of the Wabash River bottoms.

The other nine species not taken before 1989 are listed in order of decreasing numbers taken: *Lepisosteus osseus* (53), *Aplodinotus grunniens* (26), *Ictalurus punctatus* (24), *Cyprinella whipplei* (9), *Morone chrysops* (5), *Percina phoxocephala* (5), *Notropis stramineus* (3), *Hypentelium nigricans* (2), and *Labidesthes sicculus* (1).

The creek chub (*Semotilus atromaculatus*), silverjaw minnow (*Ericymba buccata*), and the central stoneroller (*Campostoma pullum*) were three of the most abundant species in Vigo County as a whole; but they were taken only in low numbers at Prairie Creek in previous studies and in the present study. This result is surprising since they were some of the most common species in Vigo County (Whitaker & Wallace 1973). Other species collected in low numbers (30 individuals or less) were the common shiner (*Luxilus chrysocephalus*), steelcolor shiner (*Cyprinella whipplei*), *Notropis stramineus, Phenacobius mirabilis,* golden shiner (*Notemigonus crysoleucas*), bullhead minnow (*Pimephales vigilax*), and western blacknose dace (*Rhinichthys obtusus*).

Whitaker and Wallace (1973) captured the pirate perch (*Aphredoderus sayanus*), in Vigo County only in the Prairie Creek area. It was fairly common, 148 being taken by Whitaker & Wallace (1973) in Prairie Creek, and 38 in Oxendine Bayou. Three individuals were taken by Smith (1988) and none since, even though we seined at this site nearly every year from 1980 to 2000. From the results of the present study, it appears that the pirate perch no longer exists in the lower Prairie Creek area, although it is possible it has just been greatly reduced. Numerous factors could have contributed to decline of the pirate perch population in the lower Prairie Creek area—such as the disturbance to the habitat, the fluctuating nature of a bottomland, seasonal variation, or introduced and native species competing for resources. The pirate perch requires abundant cover, such as aquatic plants or aquatic debris. It is a solitary fish that hides under the vegetative growth during the daytime, and comes out to feed at night (Pflieger 1997). Since trees were removed along the creek at this site in 1997, it would not be surprising if the disappearance of this fish coincides with the removal of trees and the dredging within the creek. Jake Burskey, an Indiana State University graduate student (pers. commun.), made the only recent collection of this species in Vigo County. It was from northern Honey Creek about 5km NE of Riley, Indiana on 10 November 2006, while electrofishing for crayfish. This locality is about 30 km north of Prairie Creek.

In all three studies, Gerking (1945), Whitaker & Wallace (1973), and the present study, the majority of percids taken were from the east-west portion of Prairie Creek, apparently because of its habitat diversity: a combination of rock, gravel, bedrock, and sand, with many areas of riffles, whereas the north-south por-

tion tends to be sand and mud. The rock and gravel, rather than sand bottom is the preferred habitat of *Etheostoma caeruleum,* which was more abundant than *E. spectabile.* Low numbers of percids in the north-south portion may be due to low sampling effort in this area.

Most of the suckers prefer either a constant current or permanent and stable pools (Pflieger 1997). It is not surprising that so few suckers were present since Prairie Creek is continually subject to flooding and drought.

As indicated above, there have been some changes in the fish fauna of the Prairie Creek area. Of the 65 species known from Prairie Creek, 14 were not taken prior to 1987, and 10 were not taken after that year, whereas the other 41 were taken in both the earlier and later periods. Some of these differences appear to be real, whereas some are probably due to chance—i.e., populations vary greatly from year to year and these variations can affect our results (Whitaker 1976; Grossman et al. 1982), i.e., part of the variation was probably due to stochasticity.

Real changes seem to be the addition of the bighead carp, the grass carp, and the mosquitofish, but those species were introduced. It is likely that the remainder of the species not collected prior to 1987 were present in small numbers, but were missed during the later collection. It is also likely that all ten species taken prior to 1987, but not since, probably occurred in small numbers and would have been taken if more seining were carried out. Total biodiversity as indicated by this study was about the same, with 51 species taken earlier, and 55 (including 3 recent introductions) later. Our data seem to indicate few major differences in the fish fauna over this period other than the three introductions, and the major decrease in pirate perch.

In contrast, Retzer (2005) found a loss of an average of 8.4 species per basin among seven river basins in Illinois in the past 100 years. All seven drainages he studied lost four or more species of fishes. The greatest losses were in the highly disturbed Des Plaines River in the Chicago area where the greatest number of species was lost. On the other extreme was the Vermillion River in a highly agricultural area, with a loss of four species. The Vermillion River basin is about 85 km NW of the Prairie Creek area. On the other hand, species richness has been again increasing in some of the Illinois basins over the past 25 years.

Patton et al. (1997) assessed changes in the fish fauna in ten drainages in Wyoming between the 1960s and 1990s. They found that 12 of 31 native species were collected in fewer locations during the 1990s survey even with more efficient gear.

Koel & Peterka (1948) examined water quality and fishes in the Red River Basin of Minnesota, North Dakota, and South Dakota. That area also has become a major agricultural area. Although it is much larger than the Prairie Creek area, it contains only 85 species of fish, which is interesting since it is so large as compared to the Prairie Creek area with its 75. The Red River area has lost only one species over time.

The Prairie Creek area resembled more the Red River area than the Illinois or Wyoming areas in probably losing fewer fish over time. We think the relatively small loss in Prairie Creek is because there have not been major habitat changes in this bottomland area through the period of study. Surely, pollutants enter the area from farming operations in the area; but otherwise this is a remote area that is not much affected by nearby industrial or domestic pollution, nor does much development occur there. The habitat is affected mostly by flooding from the Wabash River. The flooding allows fish to move overland, but due to rains that caused the flooding, pollutants in the Wabash itself would be at their lowest levels.

The Lower Prairie Creek area is a biologically diverse aquatic and terrestrial landscape. Of the 211 species of fish known from Indiana (Simon et al. 2002; Simon pers. commun.), 108 were known from Vigo County (Whitaker & Wallace 1973). Three species taken during the present study (the mosquitofish, grass carp, and bighead carp) were not reported by Whitaker & Wallace (1973), but they now bring the species reported from Vigo County to 111, or 52.6% of the 211 known fish species of Indiana. The number is this large because of the diverse habitats provided by the Wabash River flowing through the county. In addition, part of the Southeastern Lowlands Natural Region extends northward into southern Vigo County. An additional reason for the high biodiversity is the lack of development in the bottomlands due to flooding. Until re-

cently, the area has remained in an unfragmented state. Major threats to the lower Prairie Creek area are those common to bottomland areas: agricultural runoff, water drainage for agricultural fields, and erosion/siltation runoff from logging.

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