



**Region II Fisheries**  
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## 2017 Status Report of Fish Assemblages and the Sport Fishery in the Fox River Watershed

The Fox River is a valuable resource which provides drinking water, storm drainage, waste water treatment, and flood conveyance to 11% of Illinois' population who reside in the watershed. Located near the Chicago Metropolitan Area, the Fox River is also heavily used for motor boating, canoeing, angling, and various other recreational activities. Although some areas of the mainstem have diverse fish assemblages and sustainable sport fisheries, the effects of urban landuse, combined with 13 low head dams has resulted in wide-spread water quality impairments (Santucci et al. 2005; IEPA 2018). High quality tributary sites remain. However, many streams have been impacted by past and current agricultural activity, as well as expanding urban development (Pescitelli and Rung 2013). Efforts to address causes of impairment on the mainstem are currently underway by The Fox River Study Group (FRSG), a consortium of public and private entities.

The Illinois Department of Natural Resources (IDNR) Division of Fisheries conducts fish surveys in the Fox River basin every five years as part of a Statewide monitoring program. The surveys are done in collaboration with the Illinois Environmental Protection Agency (IEPA), which conducts macroinvertebrate and water quality sampling. Since 1996, four basin surveys have been completed in the Fox River watershed, providing an opportunity to examine stream conditions over a 21 year period. This report summarizes the fish community sampling portion of the most recent survey conducted in 2017 and compares results to

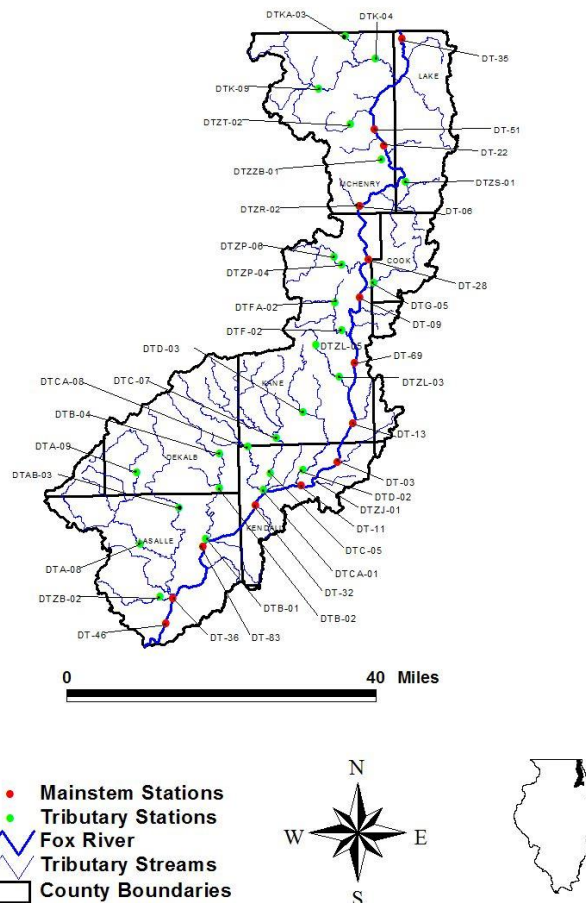


Figure 1. Location of fish sampling stations for the 2017 Fox River Basin Survey.

previous surveys, including species composition, distribution and stream quality ratings. We also examine selected sportfish populations and discuss potential factors influencing fish assemblages at mainstem and tributary locations.

### Study Area

The Fox River is the third largest tributary to the Illinois River, running from its origin in Waukesha, Wisconsin to the confluence in Ottawa, Illinois. Total watershed area includes approximately 2,660 square miles, 1,720 of which are in Illinois (IDNR 1998). The long, narrow watershed includes parts of 11 Illinois Counties: Lake, McHenry, Cook, Kane, DuPage, DeKalb, Lee, LaSalle, Kendall, Grundy and Will (Figure 1).

Landuse is primarily agricultural (66%) with 18% developed land (IDNR 1998).

Within Illinois, the mainstem of the Fox River flows for a length of 115 miles through the Fox Chain-O-Lakes and across varied landforms, which include tall sandstone bluffs in the southern reaches. The upper river channel is very low gradient from the state line at Wisconsin to Algonquin (mean slope=0.3 ft./mi.), increasing to 2.0 ft./mi. between Algonquin and St. Charles. The river segment from St. Charles to Yorkville has a mean slope of 4.7 ft./mi. Downstream of Yorkville the slope decreases to 2.7 ft./mi. As the Fox River drops from Wedron to Dayton there is a very steep gradient, falling over 19 ft./mi. (Santucci and Gephard 2003). The 29 ft. tall Dayton Dam, located five miles upstream of the Illinois River, impounds this steep section and presents an impassable fish barrier. The mainstem of the river has 12 other lowhead dams, nine of which are in the higher gradient area of Kane County (Figure A-1).

There are 15 larger tributaries to the Fox River with watersheds ranging from 15 to 264 square miles. Landuse and habitat conditions vary widely with generally lower gradient and higher urban landcover in the upper Fox River watershed, transitioning to higher gradient and more agricultural coverage in the lower watershed in Kendall, DeKalb and LaSalle Counties. Within many of the tributaries the headwater and lower order streams have been channelized, while downstream segments retain more natural features as they descend the river valley. Dams are found on Nippersink Creek and many of the smaller creeks in Lake and McHenry Counties, creating recreational impoundments or enhancing water levels in natural glacial lakes. Mill, Waubonsie, Big Rock and Somonauk Creeks also have one or more dams. Blackberry Creek had a 12 ft. tall dam near the confluence with the Fox River, which was removed in 2013.

### **Methods**

**Fish Collection.** Fish were collected at 41 stations throughout the Fox River basin, including 14 mainstem and 27 tributary locations, June-September 2017 (Figure 1; Table A-1; Table A-2). Mainstem and larger tributary stations were sampled using pulsed DC boat electrofishing. Seine hauls were conducted at boat stations where depth and structure allowed, using a 30-ft. long, 0.25-in. mesh minnow seine. Three hauls were made in an upstream direction along the shoreline. Each haul was approximately 50-ft. in length. Wadeable tributary sites were sampled using a 30-ft. long electric seine powered by a single-phase, 2,000 watt AC generator (Bayley et al. 1989). The mainstem was sampled in June and tributary collections were made in August and September. At each sampling location, fish large enough for field identification were measured (mm), weighed (g) and returned to the stream alive. Smaller specimens that were difficult to identify in the field were preserved in 10% formalin solution for laboratory analysis.

**Data Analysis.** In addition to information on species composition, distribution and abundance, catch per unit effort (CPUE; fish/hr.) was calculated for select sportfish species for both the mainstem and tributary stations. Stream quality ratings were calculated using the Index of Biotic Integrity (IBI). The IBI is composed of 10 metrics based on the fish assemblage's taxonomic and trophic composition as well as the abundance of fish (Barbour et al. 1999). IBI scores range from 0 to 60, with higher scores indicating better stream quality (Smogor 2004). Fish species assemblages were compared among mainstem and tributary stations using cluster analysis of Bray-Curtis similarity coefficients based on fish species presence-absence (Bray and Curtis, 1957). All statistical analyses were conducted in Microsoft Excel 2010 and PRIMER (v.5; Primer-E Ltd. 2001).

### **Results and Discussion**

We collected 25,864 fish representing 77 species and 17 families from 41 sampling stations in 2017 (Table A-3). One State of Illinois Threatened fish species was collected: American Brook Lamprey from Silver Creek in McHenry County. No other Illinois Threatened or Endangered fish species were captured. Four non-native species were collected, including Silver Carp and Bighead Carp (downstream of the Dayton Dam only), as well as Grass Carp and Common Carp. Species composition was similar to previous surveys, with minnows (family Cyprinidae), suckers (family Catostomidae) and sunfish (family Centrarchidae) accounting for 84% of the total abundance. Fox River flows were above average during the 2017 basin survey, with the exception of the time period from approximately June 10-June 14 (Figure A-2). High flows had no apparent effect on fish collections. However, the aforementioned low flow period impacted collections at the Wedron site on the Fox River (DT-36), as discussed *in* Stream Quality section below.

#### **Fox River Mainstem**

**Species distribution and abundance.** Seven thousand fourteen fish representing 58 species were collected at 14 stations on the mainstem of the Fox River in 2017 (Table 1; Table A-4). The average number of fish species for all mainstem stations was 24, ranging from 16 at Chain O'Lakes to 33 at Dayton Dam. The collections were dominated by minnows, suckers and sunfishes, which together accounted for

Table 1. Results of fish collections at the Fox River mainstem stations in 2017 including station codes, station locations, fish abundance, number of species collected and catch per unit effort (CPUE; fish/hr.) for select sportfish species.

Station code	Location	Abundance	Species	IBI	Smallmouth	Channel			Largemouth	Flathead
			(N)	Score	Bass	Bluegill	Catfish	Bass	Walleye	Catfish
DT-35	C.O.L. State Prk, Rt. 173	78	16	26	4	12	3	0	0	2
DT-51	McHenry Dam	1035	23	28	4	144	26	30	16	0
DT-22	Burton's Bridge, Rt. 176	134	18	27	0	22	20	10	1	0
DT-06	Algonquin Dam	1152	31	40	80	11	30	2	1	2
DT-28	Elgin, I-90	183	24	43	32	27	20	6	2	3
DT-09	South Elgin, State St	277	23	43	80	32	54	2	22	4
DT-69	Batavia, Fabyan Park	308	22	41	48	47	16	16	0	2
DT-13	Aurora, Hurds Island	440	26	53	90	39	8	5	0	1
DT-03	Oswego, Rt. 34	338	23	50	38	12	26	6	12	5
DT-11	Yorkville, Rt. 47	324	28	54	15	29	8	3	3	7
DT-32	Millbrook	608	24	50	18	16	17	0	4	6
DT-83	Sheridan	816	25	50	23	12	17	3	2	4
DT-36	Wedron	654	22	39	1	4	18	0	0	8
DT-46	Dayton Dam	667	33	44	7	16	21	1	6	3
	Mean	501	24	42	31	30	20	6	5	3
	Total	7014	58	-	-	-	-	-	-	-

88% of all fish sampled from the mainstem. The five most abundant species were Spottfin Shiner, Sand Shiner, White Sucker, Smallmouth Bass and Bluegill (Table A-4). Both species richness and the distribution of fish species within the mainstem appeared to be related to longitudinal position, stream gradient and the influence of dams.

As shown in the cluster analysis of Bray-Curtis similarity coefficients, the 11 stations downstream of the Algonquin Dam formed two clusters at a 62% similarity level to samples within each group: the four stations located from below the Algonquin Dam to Batavia formed one cluster while the remaining seven stations from Aurora to downstream the Dayton Dam formed the other cluster (Figure A-3). The three stations above the Algonquin Dam formed a third cluster at a 55% similarity level to the samples within the aforementioned groups (Figure A-3).

The stations above the Algonquin Dam are in a very low gradient segment of the river (mean slope=0.3 ft./mi.) with slow moving, deeper, lake-like conditions not suitable for obligate stream fish species which prefer riffles, runs and areas with greater diversity of depths and flows. Stream fish species absent from this river segment include several species of Catostomids (suckers): Shorthead Redhorse, Silver Redhorse, Golden Redhorse, Northern Hogsucker, White Sucker and Highfin Carpsucker, as well as Johnny Darter (family Percidae (perch)) and Rosyface Shiner (family Cyprinidae (minnow)) (Table A-4). Flathead Catfish, which were collected at all the stations below Algonquin, were only collected at the Chain O'Lakes station.

The four stations located below the Algonquin Dam are in a segment of increased gradient (mean slope=2.0 – 4.7 ft./mi.) which provides more suitable habitat for stream fish. Though Shorthead Redhorse and Highfin Carpsucker were absent, diversity of Catostomids increased in this mid river segment compared to the upper river stations. Additionally, Johnny Darter was present at two of the four stations while Flathead Catfish were collected at all four stations (Table A-4).

The stations located from Aurora to below the Dayton Dam had the highest diversity of Catostomids. Shorthead Redhorse and Highfin Carpsucker, which occurred only in this segment, were collected at seven and six stations, respectively (Table A-4). Northern Hogsucker, which were absent from all stations above Algonquin and present at only one of four stations below Algonquin, were collected at all seven stations within this segment. Flathead Catfish were also collected at all seven stations while darter species (Banded Darter and Johnny Darter) were more prevalent as well (Table A-4). This is the only river segment where Rosyface Shiner were present, occurring at five stations. Similar to the mid river, this lower segment is higher gradient, providing favorable habitat conditions for a variety of stream species. However, the high density of dams in the mid river reach cause fragmentation as well as habitat and water quality degradation. These conditions are less favorable for sensitive sucker species as demonstrated by the absence of Shorthead Redhorse and Highfin Carpsucker from the four stations downstream of the Algonquin Dam. Santucci et al. (2005) noted that dams impacted the distribution of 30% of Fox River fish species. Silver Carp and Bighead Carp, which were only collected at the station below the Dayton Dam, are unable to move upstream as the 29-ft. tall dam serves as a permanent barrier to upstream fish movement.

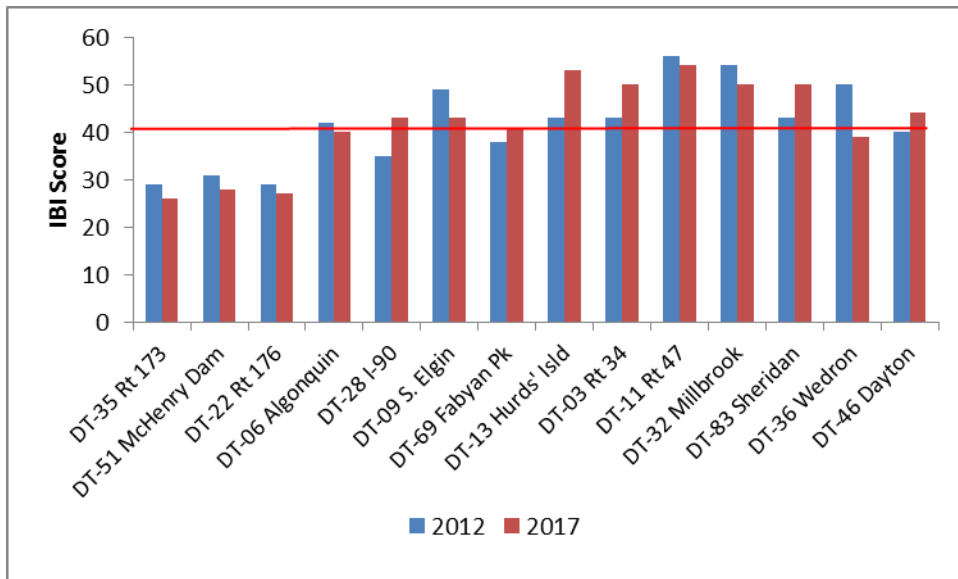


Figure 2. IBI scores for the Fox River mainstem sampling stations in 2012 and 2017. Stations are arranged from upstream (left) to downstream (right). The red line indicates the IBI threshold for “Full Support” of Aquatic Life (IBI $\geq$ 41; Smogor 2004).

**Stream Quality - Index of Biotic Integrity.** Fox River mainstem IBI scores ranged from 26 to 54 in 2017 (Figure 2; Table 2). Individual metric values and scores are shown in Table A-5. Stations in the low gradient area above the Algonquin Dam had the lowest IBI scores (mean=27). Scores improved substantially in the higher gradient section from Algonquin to Rt. 34 in Oswego, with IBIs ranging from 40 to 53 (mean=45). The highest score (54) was at the station in the free-flowing, less urbanized segment downstream of the Yorkville Dam. The two stations below Yorkville, Millbrook and Sheridan, both had scores of 50. The Wedron station had an uncharacteristically low score of 39. This can likely be attributed to the low flow conditions experienced while sampling that station on June 13, 2017 (Figure A-2) which precluded us from effectively accessing all available habitat.

Among the stations sampled in all five basin surveys, IBI scores remained relatively stable with only three changes in IBI exceeding 10 points, the threshold defined as “biologically meaningful difference” (Smogor 2004): Burton’s Bridge 1996-2002, Batavia 2002-2007 and Wedron 2012-2017 (Table 2). IBI scores from the most recent surveys in 2012 and 2017 were also consistent, with only one station with scores differing >10 points between years; Wedron decreased by 11 points presumably due to low water conditions as previously mentioned. The range of mean IBI scores across all stations and years (38-42) supports the stable nature of mainstem water quality conditions since 1996 (Table 2).

**Sportfish.** Smallmouth Bass was the most abundant sportfish species in the mainstem during the 2017 survey, with 431 individuals collected by electrofishing and seining combined (Table A-4). Mean CPUE with boat electrofishing for all stations was 31 Smallmouth Bass per hour (394 individuals; Table 1). Smallmouth Bass prefer high gradient-high water velocity conditions and as a result were more numerous at the 11 stations downstream of the Algonquin Dam, where CPUE averaged 39 fish per hour compared to 3 fish per hour at the three stations upstream of Algonquin. Algonquin, South Elgin and Aurora had the greatest abundances of Smallmouth Bass with CPUE of 80, 80 and 90 fish per hour, respectively (Table 1). Thirty-three young-of-the-year (YOY) were collected from the mainstem of the Fox River (Figure A-4). Fish in the 4-10 inch range (ages 1-3) were very abundant and made up a large portion of the population (N=209), indicating good recruitment in recent years. One hundred fifty-two Smallmouth Bass 11 inches or larger were collected from the mainstem as well, with 50 fish from 14 to 19 inches in length and one individual over 20 inches (Figure A-4).

Bluegill was the second most numerous sportfish species with 385 individuals collected at all mainstem stations (Table A-4). Three hundred thirty-four Bluegill were collected via boat electrofishing, with a mean CPUE of 30 fish per hour (Table 1). Abundance was greater at the impounded, lake-like locations upstream of the Algonquin Dam, particularly at the McHenry Dam station where CPUE for Bluegill was 144 fish per hour. Fifty-three Bluegill six inches or larger were collected throughout the mainstem (Figure A-4).

Two hundred forty-one Channel Catfish were collected at all mainstem locations with a mean CPUE of 20 fish per hour (Table A-4; Table 1). Algonquin and South Elgin had the highest CPUE of Channel Catfish with 30 and 54 per hour, respectively. There were no apparent longitudinal distribution patterns

Table 2. Station codes, station locations and IBI scores for the Fox River mainstem stations sampled 1996-2017. Stations without an IBI score were not sampled during that given year.

Station code	Station code	1996	2002	2007	2012	2017	Mean
DT-35	C.O.L. State Prk, Rt. 173		30	30	29	26	29
DT-51	McHenry Dam			35	31	28	31
DT-22	Burton's Bridge, Rt. 176	22	33	30	29	27	28
DT-06	Algonquin Dam		36	41	42	40	40
DT-28	Elgin, I-90	31	38	39	35	43	37
DT-09	South Elgin, State St			37	49	43	43
DT-69	Batavia, Fabyan Park	44	44	33	38	41	40
DT-13	Aurora, Hurds Island			43	43	53	46
DT-03	Oswego, Rt. 34	45	52	43	43	50	47
DT-11	Yorkville, Rt. 47				56	54	55
DT-32	Millbrook			52	54	50	52
DT-83	Sheridan			49	43	50	47
DT-36	Wedron	49	52	58	50	39	50
DT-46	Dayton Dam			47	40	44	44
	Mean	38	41	41	42	42	41

(Table 1). Large Channel Catfish were common, with 174 fish ranging from 16 to 28 inches in length collected (Figure A-5).

Largemouth Bass preferred the lake-like conditions in the upper river, where CPUE averaged 13 fish per hour, compared to four fish per hour downstream of Algonquin. Typical of riverine environments, the size distribution for Largemouth Bass was skewed toward smaller individuals. Only 14 fish larger than 12 inches were collected at mainstem stations. Catch rate for Walleye were low, with a mean CPUE of 5 fish per hour (Table 1). South Elgin had the greatest number of Walleye (22 fish per hour). Sixty-nine percent of the Walleye collected throughout the mainstem were 15 inches in length or greater. Flathead Catfish were present at all stations downstream of Algonquin. Although abundance was low (mean CPUE of three fish per hour; Table 1) higher catch rates (10-20 fish per hour) have been recorded from targeted studies using low frequency, low amperage pulsed-DC electrofishing (Pescitelli and Rung 2013). Flathead Catfish from a wide range of sizes (5-36 inches) were collected.

### Tributaries

**Species distribution and abundance.** Fox River tributary stations yielded 18,850 fish, representing 63 species in 2017 (Table 3; Table A-6; Table A-7). One State Threatened fish species was collected: American Brook Lamprey from Silver Creek (DTZZB-01). This species was captured at that station in 2012 as well. The only other occurrence from IDNR Fox River basin surveys is from Boone Creek in 1996. Other records for American Brook Lamprey in northern Illinois are from the Kankakee River and the Rock River basin. No other State Threatened or Endangered species were collected from tributary sites. Ozark Minnow, a rare species for the Fox River basin, was collected in Somonauk Creek, where an isolated population was first documented in 2007. This species was previously found only in the Driftless Region of northeastern Illinois (Smith 1987). Minnows were the most diverse family with 20 native species, accounting for over 66% of the total abundance. Darters, sunfishes and suckers were the next most abundant families, accounting for 29% of the fish collected. The five most abundant species were Sand Shiner, Bluntnose Minnow, Central Stoneroller, Spottfin Shiner and Hornyhead Chub (Table A-6; Table A-7). Common Carp was the only non-native fish species collected at the tributary stations. Abundance and species richness were both variable among sampling locations in 2017. The average number of species for all stations was 19, ranging from 10 at Silver and Tyler (DTZP-06) Creeks to 29 at Little Rock Creek (DTCA-08; Table 3). Average abundance was 698, with a range from 42 at North Branch of Nippersink Creek to 2,741 at Somonauk Creek (DTB-04). Wider streams with larger watersheds in the southern part of the Fox River basin (e.g. Big Rock, Little Rock, Somonauk, Indian Creeks) generally had greater abundance and species richness. Mean species richness and mean abundance in the southern portion of the watershed was 24 and 1,161, respectively, compared to 15 and 269 in the northern part of the watershed. However, factors other than longitudinal position may have affected abundance and species richness including, but not limited to, urbanization, channelization, available habitat or the presence of dams. In 2013, the dam located ~0.2 miles

Table 3. Results of fish collections at the Fox River tributary stations in 2017 including station codes, station locations, abundance, number of species collected and catch per unit effort (CPUE; fish/hr.) for select sportfish species.

Station code	Location	Abundance	Species (N)	IBI Score	Smallmouth Bass	Largemouth Bass	Channel Catfish
DTKA-03	N Br Nippersink Creek	42	11	30	0	2	4
DTK-09	Nippersink Creek	385	15	26	0	3	0
DTK-04	Nippersink Creek	300	25	47	37	12	7
DTZT-02	Boone Creek	93	11	33	12	0	6
DTZZB-01	Silver Creek	84	10	31	50	0	2
DTZS-01	Flint Creek	100	16	23	8	0	23
DTZR-02	Crystal Creek	181	14	38	70	55	17
DTZP-06	Tyler Creek	178	10	32	0	0	0
DTZP-04	Tyler Creek	690	18	48	25	28	28
DTG-05	Poplar Creek	338	18	48	60	78	18
DTFA-02	Otter Creek	230	20	35	49	0	14
DTF-02	Ferson Creek	815	23	50	52	50	49
DTZL-05	Mill Creek	183	12	36	4	0	6
DTZL-03	Mill Creek	142	11	20	42	0	8
DTD-03	Blackberry Creek	174	18	39	34	0	36
DTD-02	Blackberry Creek	373	20	37	94	5	15
DTC-07	Big Rock Creek	536	26	56	1	12	7
DTC-05	Big Rock Creek	550	20	49	0	13	0
DTCA-08	Little Rock Creek	2017	29	51	5	18	2
DTCA-01	Little Rock Creek	722	24	53	1	10	1
DTB-04	Somonauk Creek	2741	21	45	47	19	13
DTB-02	Somonauk Creek	1224	22	41	95	19	9
DTB-01	Somonauk Creek	2010	28	50	20	17	11
DTAB-03	Little Indian Creek	1435	26	55	0	87	0
DTA-09	Indian Creek	1008	23	52	5	5	0
DTA-08	Indian Creek	637	27	58	19	55	2
DTZB-02	Buck Creek	1662	24	56	0	60	1
	Mean	698	19	42	27	20	10
	Total	18850	63	-	-	-	-

upstream of the confluence with the Fox River on Blackberry Creek was removed. Prior to dam removal, the two Blackberry Creek stations had a mean species richness of 14 and 16 in 2007 and 2012, respectively. Approximately four years following dam removal, mean species richness for the two stations was 19 in 2017. Flathead Catfish, Smallmouth Bass, Rosyface Shiner and Banded Darter, species not present during the aforementioned survey years, were collected in 2017 at the two stations located upstream of the former dam.

As shown in the cluster analysis of Bray- Curtis similarity coefficients, fish species assemblages were similar amongst stations within the same geographic or longitudinal position in the watershed (Figure A-6). Tributary stations in the more urbanized northern portion of the watershed were more similar to one another than they were to the stations in the less urbanized/agricultural southern portion of the watershed and vice versa. Similar to variations in species richness, factors such as available habitat, stream gradient, presence of dams and quality of downstream recruitment source impacted fish assemblages. The fish assemblage in Silver Creek was different than all other tributary stations (Figure A-6). Silver Creek is a small silt laden cool water stream. It was the only station where American Brook Lamprey were collected. It also had the lowest number of fish species (N=10) and, similar to Flint Creek, was the only other tributary station where sucker species were not collected. Furthermore, only one minnow species (Bluntnose Minnow) was collected at this station (Table A-6).

**Stream Quality - Index of Biotic Integrity.** The IBI scores at Fox River tributary stations ranged from 20 on Mill Creek to 58 on Indian Creek (DTA-08; Table 3). Individual metric values and scores are shown in Table A-8 and A-9. Stream quality at tributary sites appeared to be influenced by longitudinal position in the watershed, instream habitat, flow and landuse in the watershed. The IBI scores were generally lower for tributaries in McHenry and Lake County, where six of seven stations scored lower than 41 (range 23-47; mean=33; Table 3; Table 4), which is the IBI threshold for “Full Support” of Aquatic Life (Smogor 2004). Lake and McHenry County tributaries, with the exception of Crystal Creek, flow into a very low gradient, degraded section of the Fox River, which offers a poor recruitment source for many stream species. Nippersink Creek flows into the Fox Chain-O-Lakes. The station on North Branch Nippersink Creek (DTKA-03) had substrate that was largely sand and gravel with abundant aquatic macrophytes. However, this station flows through a restored agricultural field that was previously channelized. The distance to the downstream recruitment source, which albeit is fairly poor, was also a limiting factor. The instream habitat at DTK-09 on Nippersink Creek was similar to that of DTKA-03, though with more cobble substrate than sand. This station also has a poor downstream recruitment source as it flows into a large instream impoundment (Wonder Lake). The other station on Nippersink Creek (DTK-04) was the only station in McHenry County with an IBI score above 41 (IBI=47; Table 3). This station was the widest of all the tributary stations and has variable depths, flows and abundant instream habitat. Fish likely congregate to this section of the creek due to the increased depths and abundant habitat. Unlike DTKA-03 and DTK-09, this station had a forested riparian corridor that may provide thermal refuge during summer months. Boone Creek also has poor recruitment of riverine species due the presence of instream impoundment ~ 2 miles downstream. Silver Creek is a silt laden low gradient stream in a former lake bed with impacts from agricultural drainage. Flint Creek appears to have suitable habitat, substrate and flow, with no impacts from dams or instream impoundments. However, it had the second lowest IBI score of all the tributary stations (IBI=23; Table 3). It is possible that Flint Creek experienced a localized fish kill at some point but was unable to recover because the Fox River in this part of the watershed is a poor recruitment source.

Streams in Kane County were better quality when compared to stations in McHenry and Lake Counties, with IBI scores ranging from 32 to 56 (mean=39; Table 3; Table 4). Although urban landuse is relatively high for some Kane County locations, the stream sites were higher gradient and retained more natural habitat features as a result. Kane County tributaries also flow into a high gradient portion of the Fox River. A few stations, however, still had IBI scores well below 41 (Table 3; Table 4). Tyler Creek was sampled as part of an intensive watershed survey in 1995. DTZP-06 on Tyler Creek had an IBI score of 53 at the time of that survey. Since then large subdivisions have been constructed immediately upstream of that station on both sides of the creek. That station is also immediately downstream of Big Timber Road. DTZP-06 was devoid of any loose or fine substrate when it was sampled in 2017. The creek bottom was extensively scoured with no aquatic macrophytes present. It is likely that added runoff from the impervious surfaces from the subdivisions coupled with the constricting of flow under Big Timber Road caused the scour and loss of any loose substrate, exposing hard clay pan. The absence of suitable habitat resulted in an IBI score of 32, down 21 points from 1995. Surprisingly, Mottled Sculpin, which is typically associated with cool water streams with abundant riffles, made up 73% of the fish collected at DTZP-06. Conversely, DTZP-04, located ~2 miles downstream, did not experience the same impacts from upstream development. This station is situated within a forest preserve and retained more natural features as a result, which likely contributed to the IBI score of 48 (Table 3). Otter Creek, similar to DTZP-06 on Tyler Creek, is immediately downstream from expansive urban development. The upper end of this station was particularly degraded, likely due to direct impact from Silver Glen Road. This area was silted over and lacked any riffle-run complexes. Both stations on Mill Creek are impacted by a large instream impoundment (Mooseheart Lake) that prevents any recruitment from the Fox River. The two stations on Blackberry Creek both had IBI scores below 41 as well (Table 3). However, they have improved since the removal of the dam near the confluence with the Fox River in 2013, with mean IBI scores of 31 in 2012 and 38 in 2017 (Table 4).

Tributary IBI scores were considerably higher in the less urbanized areas of DeKalb, Kendall and LaSalle Counties. IBI scores ranged from 37 to 58 (mean=49; Table 3; Table 4). Big Rock Creek has uninhibited connection to a high quality downstream recruitment sources as well as diverse instream habitat and higher ground water inputs. There are two dams present on Big Rock Creek; however both have fish passage structures present. Little Rock Creek also has a dam ~1 mile from its confluence with Big Rock Creek. That dam is a makeshift sheet pile dam that does not form a complete barrier and appears to be passable at most stream flow levels. The two upper Somonauk Creek stations (DTB-04 and DTB-02) are above a very large instream impoundment (Lake Holiday). Though they both have lower IBI scores than the station below Lake Holiday (DTB-01), they are still within the range of fully supporting aquatic life (IBI≥41; Table 3). Both Indian Creek and Buck Creek have diverse habitat with no downstream barriers, providing direct connection to a portion of the Fox River with a high quality recruitment source.

Table 4. Station codes, station locations and IBI scores for the Fox River tributary stations sampled 1996-2017. Stations without an IBI score were not sampled during that given year.

Station code	Location	1996	2002	2007	2012	2017	Mean
DTK-09	Nippersink Creek			31	27	26	28
DTK-04	Nippersink Creek	50	43	38	41	47	44
DTZT-02	Boone Creek	30	23	36	36	33	32
DTZZB-01	Silver Creek				29	31	30
DTZS-01	Flint Creek	27	28	21	13	23	22
DTZR-02	Crystal Creek				41	38	40
DTZP-06	Tyler Creek			39		32	36
DTZP-04	Tyler Creek	39	47	50	46	48	46
DTG-05	Poplar Creek		41		49	48	46
DTFA-02	Otter Creek			29	38	35	34
DTF-02	Ferson Creek	48	44	48	45	50	47
DTD-03	Blackberry Creek			34	34	39	36
DTD-02	Blackberry Creek	37	31	27	28	37	32
DTC-07	Big Rock Creek	48	58	53	57	56	54
DTC-05	Big Rock Creek		56	55	57	49	54
DTCA-08	Little Rock Creek			44	48	51	48
DTCA-01	Little Rock Creek	44	54	50	52	53	51
DTB-04	Somonauk Creek			44	38	45	42
DTB-02	Somonauk Creek			40	38	41	40
DTB-01	Somonauk Creek			56	50	50	52
DTA-09	Indian Creek			53	51	51	52
DTA-08	Indian Creek	55	51	58	38	58	52
DTZB-02	Buck Creek	46	51	54	42	56	50
	Mean	42	44	43	41	43	43

Similar to the mainstem stations, IBI scores remained relatively stable among the tributary stations sampled in all five basin surveys with only five changes in IBI exceeding 10 points - the threshold defined as “biologically meaningful difference” (Smogor 2004): Boone Creek 2002-2007, Indian Creek (DTA-08) 2007-2012, 2012-2017 and Buck Creek 2007-2012, 2012-2017 (Table 4). The changes in IBI scores at the last two stations can be attributed to low flow conditions in 2012. These stations were also impacted by active cattle grazing that year which, combined with the low flows, caused excessive algal growth and possibly low dissolved oxygen in the isolated pools. These were also the only two stations with changes in IBI scores >10 points from 2012-2017. The range of mean IBI scores across all stations and years (41-44) indicates stable stream quality conditions since 1996 (Table 4).

**Sportfish.** Bluegill was the most abundant sportfish species at Fox River tributary stations. They were widespread, occurring at 21 of the 27 stations (Table 3). YOY and adults less than five inches in length comprised 85% ( $N=400$ ) of the Bluegill collected. Somonauk (DTB-02), Blackberry (DTD-02) and Crystal Creeks had the highest CPUE of Bluegill (Table 3). Smallmouth Bass were collected at 19 of the 27 tributary stations (Table 3). Tributaries served as spawning and nursery areas with YOY representing 65% ( $N=241$ ) of the total catch (Figure A-7). Twenty percent ( $N=75$ ) of the Smallmouth Bass collected were seven inches in length or greater, with 29 of those fish 11 to 17 inches in length. Stations on smaller, low gradient tributaries and/or those stations fragmented from the Fox River by dams typically had few if any Smallmouth Bass. Little Indian, Poplar, and Buck Creeks had the highest CPUE of Smallmouth Bass (Table 3). One hundred eighty-eight Largemouth Bass were collected at 22 tributary stations. Thirteen percent ( $N=25$ ) of which were larger than 7 inches, with 3 individuals over 12 inches. One 16 inch Largemouth Bass was collected from Little Rock Creek (DTCA-08). Fifty-one channel catfish were collected at all tributary stations, ranging from two to 27 inches in length. Thirty-five Channel Catfish 16 inches in length or greater were collected with three individuals over 24 inches. The largest Channel Catfish were collected from Nippersink and Somonauk Creeks.



## **Summary**

The Fox River watershed has a mosaic of stream habitats ranging from low gradient channels in poorly drained soils to higher gradient, rocky streams within defined valleys. The wide diversity of habitats supports diverse assemblages of fishes. Among the 77 native fish species collected in 2017, American Brook Lamprey, a State Threatened fish species, was the only Illinois Threatened or Endangered species captured. River Redhorse, a State Threatened sucker species, was last captured during the 2002 basin survey when only one individual was found (Pescitelli and Rung 2004). Although there have been several River Redhorse observed in other IDNR surveys, they remain in very low abundance. Invasive Silver Carp and Bighead Carp were documented below the large, impassable dam at Dayton. Longitudinal position in the watershed, stream gradient, presence of dams and level of urban landuse influenced species richness and distribution on both the mainstem and tributaries.

A range of stream quality ratings were found at mainstem and tributary locations. Similar to species richness and distribution, stream quality appeared to be influenced primarily by the extent of channel modification, level of urbanization, longitudinal position and degree of fragmentation/impoundment by dams. Stream quality conditions have been relatively stable over the sampling period from 1996 to 2017 at most mainstem and tributary locations. Indian and Buck Creeks experienced very low flows in 2012, which combined with cattle grazing, caused declines in IBI exceeding 10 points. Since there are no downstream dams on these streams, recovery of the local fish communities was apparent in 2017 with IBI score increases of 20 and 14, respectively.

Sportfish were common in most areas on the Fox River. Smallmouth Bass are abundant and provide ample angling opportunities, especially at the higher gradient locations. The presence of many YOY Smallmouth Bass indicated successful reproduction and recruitment, with tributaries providing important spawning and nursery habitat. Channel Catfish and Bluegill are wide spread throughout the mainstem. Walleye, Flathead Catfish and Largemouth Bass are present throughout the river, but in lower numbers. A more intensive study is underway for Flathead Catfish (Pescitelli and Rung 2013). This study indicates that large individuals up to 40 inches are present but in relatively low abundance. Currently, IDNR stocks, on average, 50,000 Walleye fingerlings each year in the lower river to supplement natural reproduction.

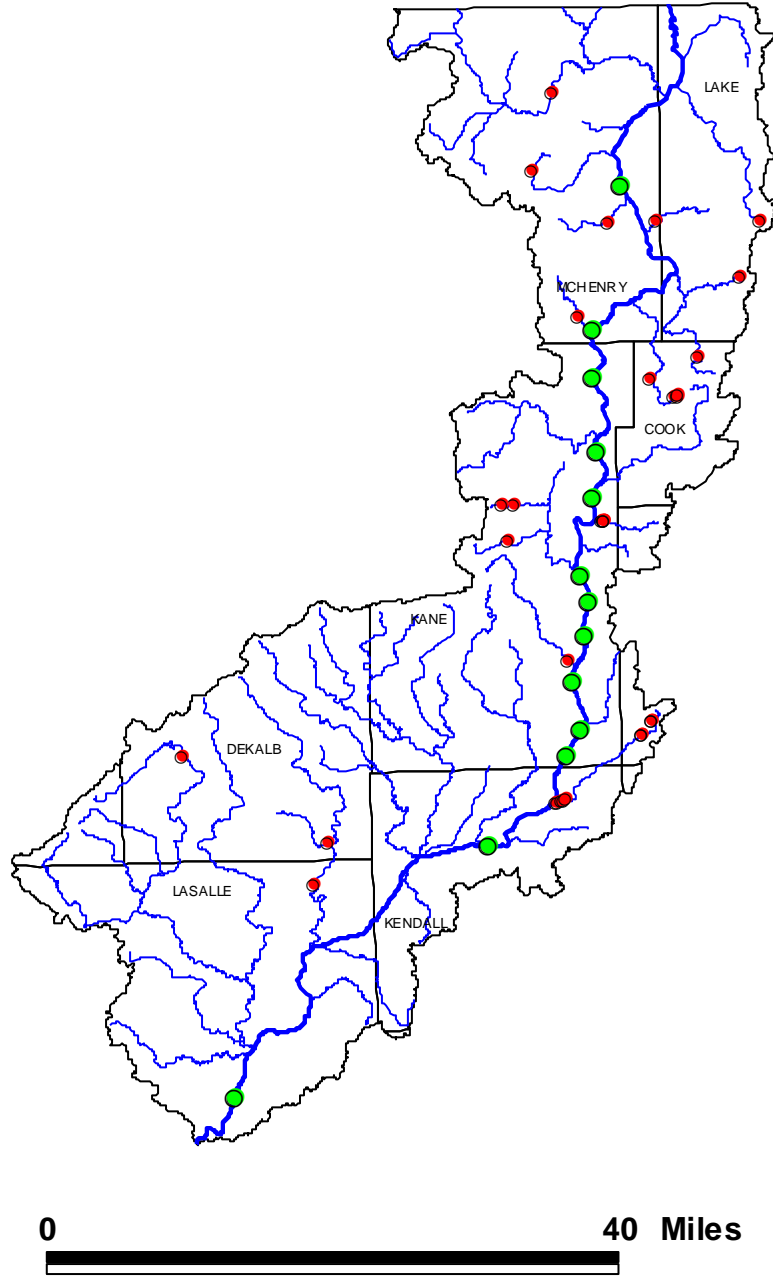
Members of IDNR Fisheries staff are involved with the FRSG's efforts to address current use impairments on the Fox River ([www.foxriverstudygroup.org](http://www.foxriverstudygroup.org)). Results of extensive sampling and modeling by FRSG have confirmed that the major sources of impairment on the mainstem are primarily the combination of high nutrients and impoundments resulting from 13 remaining dams. The FRSG is developing an implementation plan to address these major watershed issues. They are also collaborating with IDNR and the U.S. Army Corps of Engineers to address the problems associated with lowhead dams.

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- Mainstem Dams
- Tributary Dams
- Fox River
- Tributary Streams
- County Boundries

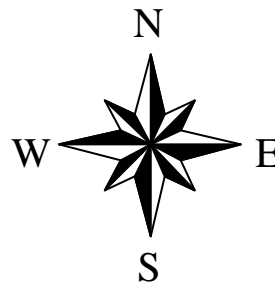


Figure A-1. Location of dams in the Fox River Basin.

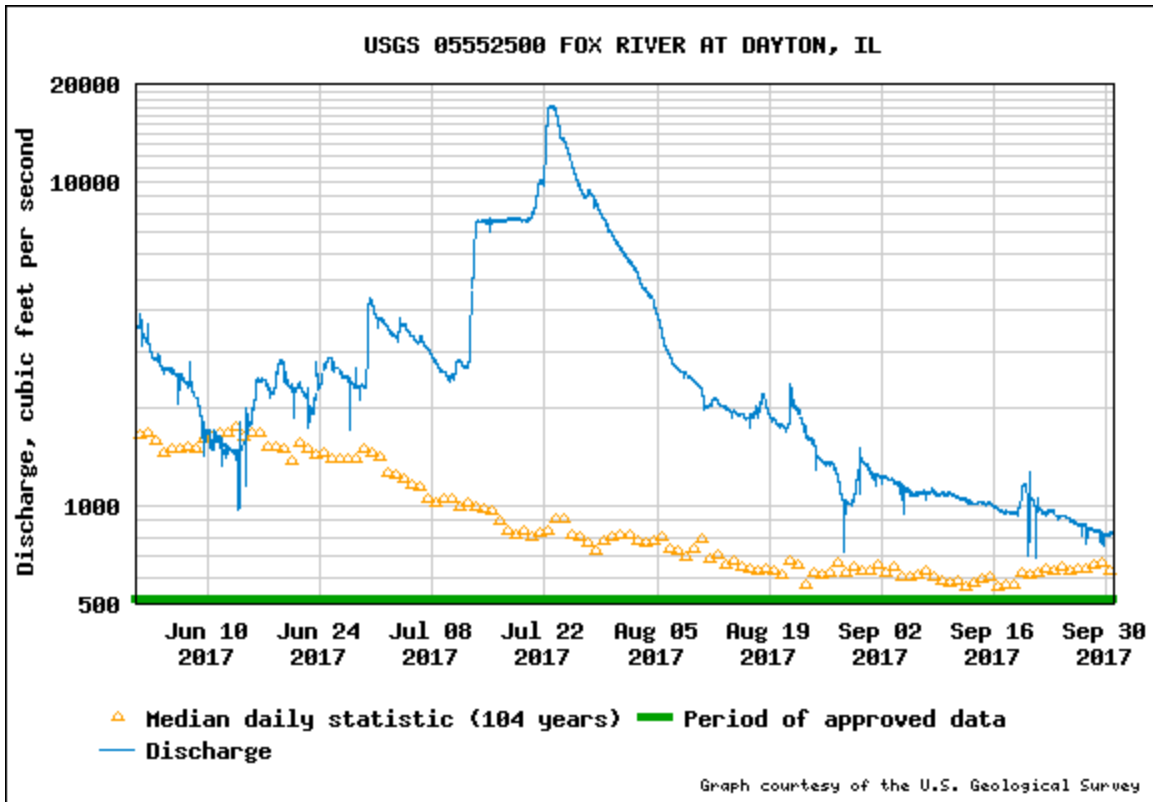


Figure A-2. Discharge (in cubic feet per second) at the Dayton gage, located downstream of the Dayton Dam, during the sampling period of the 2017 Fox River basin survey.

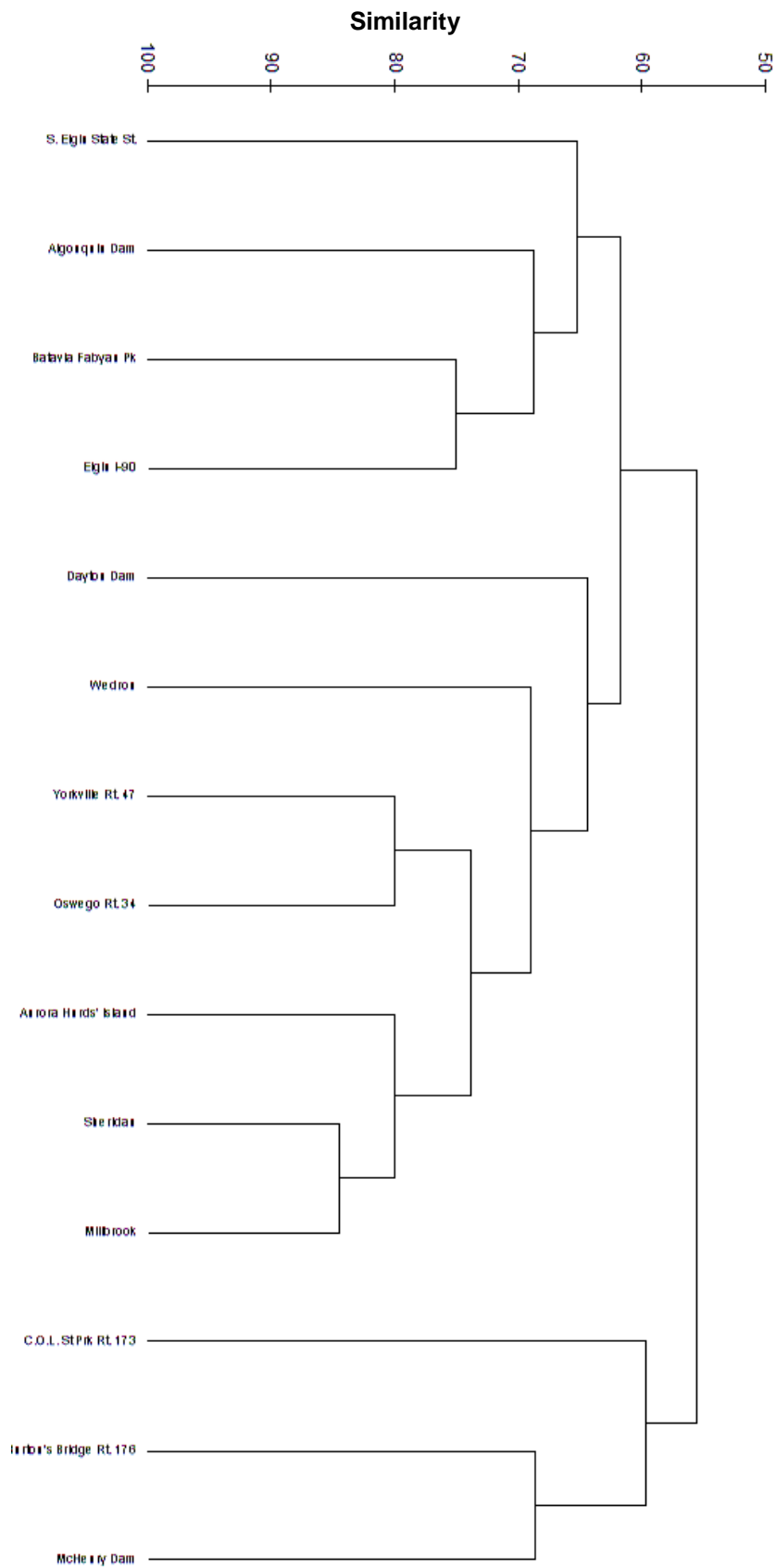


Figure A-3. Cluster analysis based on Bray-Curtis similarity index for species presence-absence, 2017 Fox River mainstem stations.

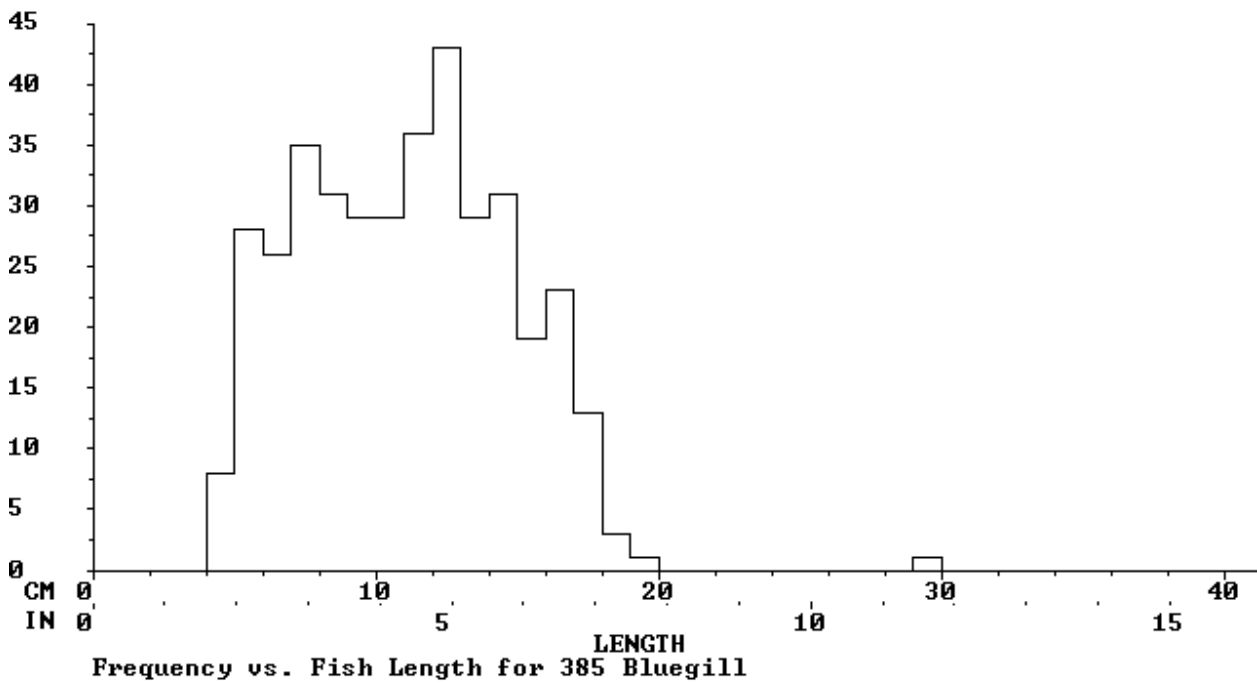
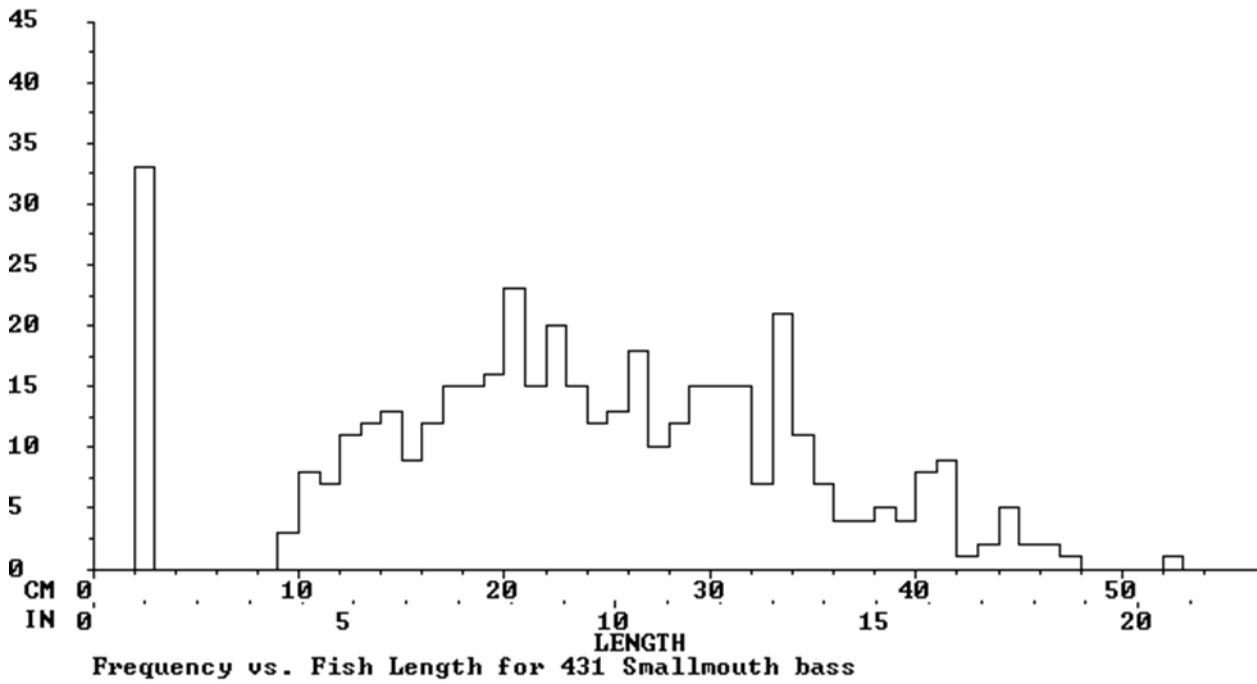


Figure A-4. Length-frequency distribution of Smallmouth Bass (top) and Bluegill (bottom) collected from the mainstem of the Fox River in 2017.

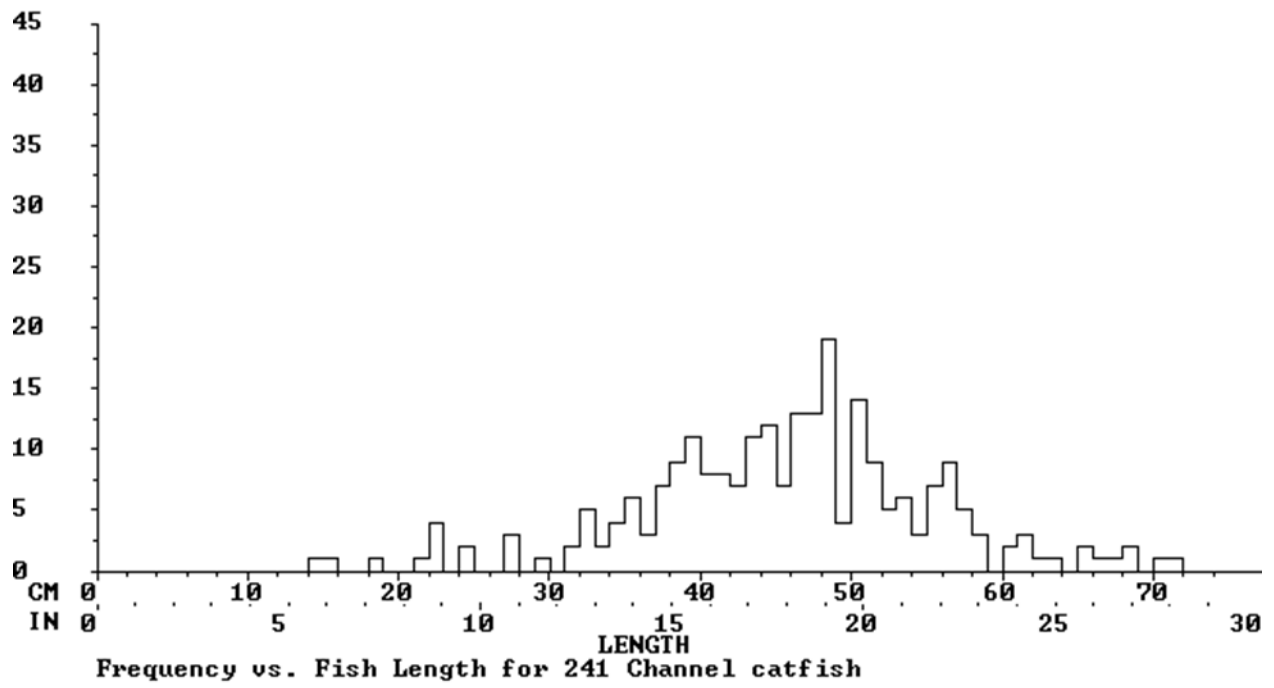


Figure A-5. Length-frequency distribution of Channel Catfish collected from the mainstem of the Fox River in 2017.

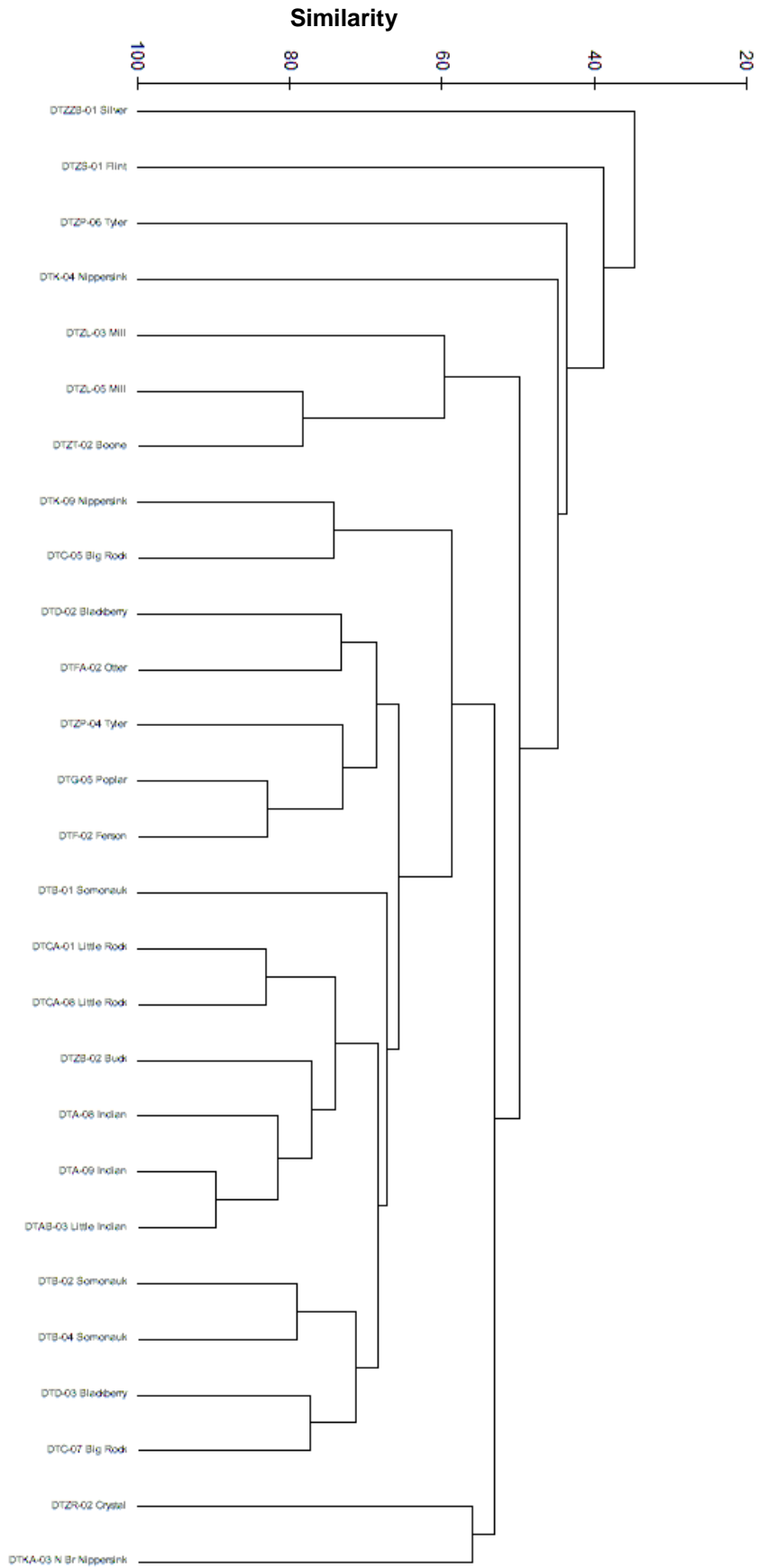


Figure A-6. Cluster analysis based on Bray-Curtis similarity index for species presence-absence, 2017 Fox River tributary stations.



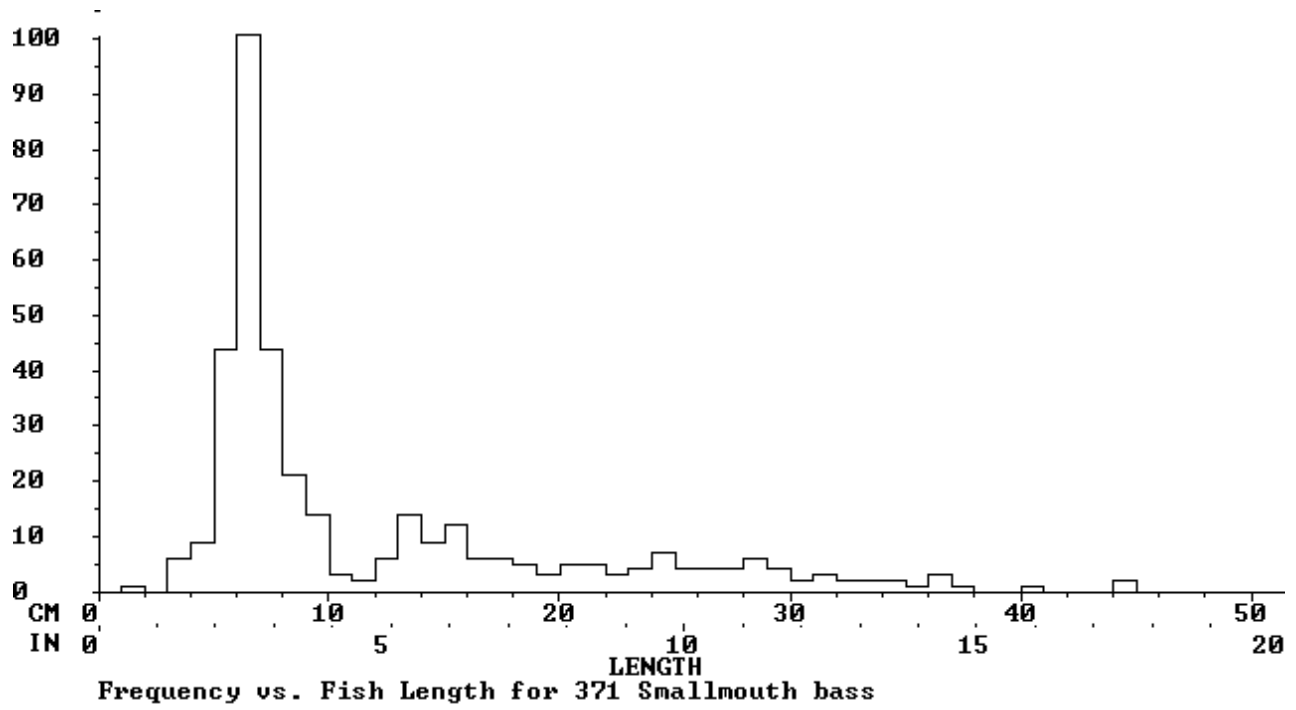


Figure A-7. Length-frequency distribution of Smallmouth Bass collected from tributaries of the Fox River in 2017.

Table A-1. Sampling station information for the 2017 Fox River basin survey.

IEPA CODE	STREAM NAME	COUNTY	LOCATION	LATD	LONGD
DT-35	FOX RIVER	LAKE	RT 173 BR 4 MI E ANTIOCH	42.478990	-88.178500
DT-51	FOX RIVER	MCHENRY	MCHENRY DAM SE MCHENRY SHORES	42.310380	-88.251040
DT-22	FOX RIVER	MCHENRY	RT 176 BR 5 MI ENE CRYSTAL LK	42.279540	-88.226920
DT-06	FOX RIVER	MCHENRY	RT 62 BR ALGONQUIN RD	42.165900	-88.289830
DT-28	FOX RIVER	KANE	I-90 BR N OF ELGIN	42.066450	-88.271480
DT-09	FOX RIVER	KANE	STATE ST S ELGIN	41.994270	-88.294270
DT-69	FOX RIVER	KANE	2 MI S GENEVA FABYAN PK	41.871510	-88.308330
DT-13	FOX RIVER	KANE	NORTH AVE BR AURORA	41.759190	-88.314400
DT-03	FOX RIVER	KENDALL	RT 34 BR OSWEGO	41.685250	-88.356370
DT-11	FOX RIVER	KENDALL	RT 47 YORKVILLE	41.643610	-88.446500
DT-32	FOX RIVER	KENDALL	0.6 MI NW OF MILLBROOK	41.606660	-88.561990
DT-83	FOX RIVER	LASALLE	IN SHERIDAN, N OF N 41ST ST	41.529722	-88.695278
DT-36	FOX RIVER	LASALLE	1 MI N RT 21 BR WEDRON	41.433500	-88.771160
DT-46	FOX RIVER	LASALLE	RT 18 BR DAYTON	41.386350	-88.789590
DTKA-03	N. BRANCH NIPPERSINK CK.	MCHENRY	0.7 MI N RT 173 RICHMOND	42.486517	-88.321532
DTK-09	NIPPERSINK CREEK	MCHENRY	UPS GREENWOOD RD SE OF GREENWOOD	42.387670	-88.390839
DTK-04	NIPPERSINK CREEK	MCHENRY	BLIVIN ST BR SPRING GROVE	42.440710	-88.236880
DTZT-02	BOONE CREEK	MCHENRY	BULLY VALLEY RD BR 3 MI SW OF MCHENRY	42.320660	-88.312580
DTZZB-01	SILVER CREEK	MCHENRY	CHALET HILLS GOLF CLUB IN OAKWOOD HILLS	42.252479	-88.236687
DTZS-01	FLINT CREEK	LAKE	KELSEY RD LK BARRINGTON	42.211100	-88.173450
DTZR-02	CRYSTAL CREEK	MCHENRY	RT 31 ALGONQUIN	42.167051	-88.294687
DTZP-06	TYLER CREEK	KANE	DOWNSTREAM BIG TIMBER RD IN GILBERTS	42.071296	-88.357391
DTZP-04	TYLER CREEK	KANE	RANDALL RD 1 MI W ELGIN	42.056880	-88.338010
DTG-05	POPLAR CREEK	COOK	JAY ST EXTENDED, 0.2 MI N OF RT 20 IN ELGIN	42.022580	-88.257950
DTFA-02	OTTER CREEK	KANE	3.5 MI SW SOUTH ELGIN, 400 FT S SILVER GLEN RD	41.969220	-88.355770
DTF-02	FERSON CREEK	KANE	RANDALL RD BR, 2 MI NW ST CHARLES	41.932463	-88.343415
DTZL-05	MILL CREEK	KANE	0.4 MI SW OF GARFIELD FARM IN LA FOX	41.906715	-88.405145
DTZL-03	MILL CREEK	KANE	DEERPATH RD BR IN BATAVIA	41.845680	-88.348812
DTD-03	BLACKBERRY CREEK	KANE	0.75 UPS BLISS RD SUGAR GROVE	41.784975	-88.447628
DTD-02	BLACKBERRY CREEK	KENDALL	0.5 MI E RT 47 ON KENNEDY RD IN YORKVILLE	41.673044	-88.431805
DTC-07	BIG ROCK CREEK	KANE	JERICO RD 5 MI NNE PLANO	41.737776	-88.510492
DTC-05	BIG ROCK CREEK	KENDALL	MAIN ST E EDGE OF PLANO	41.666440	-88.524010
DTCA-08	LITTLE ROCK CREEK	KENDALL	GALENA RD 0.5 MI W LITTLE ROCK	41.716700	-88.580700
DTCA-01	LITTLE ROCK CREEK	KENDALL	BURR OAK RD S PLANO	41.640693	-88.556818
DTB-04	SOMONAUK CREEK	DEKALB	SOMONAUK RD 4.0 MI NNW OF SANDWICH	41.704700	-88.652200
DTB-02	SOMONAUK CREEK	DEKALB	RT 34 BR 1 MI E SOMONAUK	41.639520	-88.652580
DTB-01	SOMONAUK CREEK	LASALLE	N 42ND RD BR 1 MI N SHERIDAN	41.543600	-88.686750
DTAB-03	LITTLE INDIAN CREEK	LASALLE	N 4609TH RD BR 2.5 MI SE LELAND	41.603298	-88.753676
DTA-09	INDIAN CREEK	DEKALB	SUYDAM RD 1.4 MI E OF ROLLO	41.670700	-88.859900
DTA-08	INDIAN CREEK	LASALLE	1 MI N HARDING AT CO RD 4150 BR	41.535590	-88.852060
DTZB-02	BUCK CREEK	LASALLE	E 19TH RD 1.5 MI W OF WEDRON	41.436610	-88.803760

Table A-2. Sampling information for the 2017 Fox River basin survey stations. Sampling methods include BE = boat electrofishing, ES = electric seine, SH = seine haul, PE = backpack electrofishing.

IEPA CODE	STREAM NAME	SAMPLING DATE	SAMPLING METHOD	STATION	STATION	SAMPLE
				WIDTH (FT.)	LENGTH (FT.)	TIME (MIN.)
DT-35	FOX RIVER	6/22/2017	BE/SH	190	3700	60
DT-51	FOX RIVER	6/22/2017	BE/SH	235	2300	30
DT-22	FOX RIVER	6/21/2017	BE/SH	460	4500	60
DT-06	FOX RIVER	6/21/2017	BE/SH	170	4500	60
DT-28	FOX RIVER	6/20/2017	BE/SH	209	4000	49
DT-09	FOX RIVER	6/20/2017	BE/SH	300	2460	30
DT-69	FOX RIVER	6/16/2017	BE/SH	400	3500	60
DT-13	FOX RIVER	6/16/2017	BE/SH	250	2500	60
DT-03	FOX RIVER	6/15/2017	BE/SH	280	2500	53
DT-11	FOX RIVER	6/15/2017	BE/SH	380	3500	60
DT-32	FOX RIVER	6/14/2017	BE/SH	280	4000	60
DT-83	FOX RIVER	6/14/2017	BE/SH	260	3000	60
DT-36	FOX RIVER	6/13/2017	BE/SH	260	2500	60
DT-46	FOX RIVER	6/13/2017	BE/SH	270	3000	60
DTKA-03	N. BRANCH NIPPERSINK CK.	8/15/2017	ES	42	600	30
DTK-09	NIPPERSINK CREEK	8/16/2017	ES	37	550	40
DTK-04	NIPPERSINK CREEK	8/15/2017	BE/PE	60	1500	45
DTZT-02	BOONE CREEK	8/16/2017	ES	21	621	39
DTZZB-01	SILVER CREEK	9/13/2017	PE	15	250	30
DTZS-01	FLINT CREEK	8/17/2017	ES	34	725	36
DTZR-02	CRYSTAL CREEK	8/17/2017	ES	27	717	25
DTZP-06	TYLER CREEK	9/27/2017	PE	35	750	45
DTZP-04	TYLER CREEK	8/23/2017	ES	23	822	50
DTG-05	POPLAR CREEK	8/23/2017	ES	20	450	35
DTFA-02	OTTER CREEK	8/24/2017	ES	25	648	47
DTF-02	FERSON CREEK	8/24/2017	ES	33	732	53
DTZL-05	MILL CREEK	9/26/2017	ES	14	312	30
DTZL-03	MILL CREEK	8/21/2017	ES	28	552	30
DTD-03	BLACKBERRY CREEK	8/21/2017	ES	26	456	30
DTD-02	BLACKBERRY CREEK	8/30/2017	ES	34	654	47
DTC-07	BIG ROCK CREEK	8/22/2017	ES	42	642	45
DTC-05	BIG ROCK CREEK	8/22/2017	ES	47	729	55
DTCA-08	LITTLE ROCK CREEK	8/25/2017	ES	35	737	52
DTCA-01	LITTLE ROCK CREEK	8/25/2017	ES	44	762	63
DTB-04	SOMONAUK CREEK	8/28/2017	ES	38	903	45
DTB-02	SOMONAUK CREEK	8/28/2017	ES	47	744	41
DTB-01	SOMONAUK CREEK	8/29/2017	ES	45	718	50
DTAB-03	LITTLE INDIAN CREEK	8/29/2017	ES	33	650	45
DTA-09	INDIAN CREEK	8/30/2017	ES	36	480	40
DTA-08	INDIAN CREEK	8/31/2017	ES	47	475	35
DTZB-02	BUCK CREEK	8/31/2017	ES	20	365	50

Table A-3. List of each fish species, with corresponding family name, collected during the 2017 Fox River basin survey; all methods and stations combined. \* denotes non-native species.

Family	Common Name	Scientific Name	Total
Petromyzontidae	American brook lamprey	<i>Lampetra appendix</i>	3
Lepistosteidae	Shortnose gar	<i>Lepisosteus platostomus</i>	5
	Longnose gar	<i>Lepisosteus osseus</i>	7
Amidae	Bowfin	<i>Amia calva</i>	3
Clupidae	Gizzard shad	<i>Dorosoma cepedianum</i>	388
Umbridae	Central mudminnow	<i>Umbra limi</i>	25
Escoidae	Grass pickerel	<i>Esox americanus</i>	3
	Northern pike	<i>Esox lucius</i>	2
	Muskellunge	<i>Esox masquinongy</i>	1
Cyprinidae	Grass carp*	<i>Ctenopharyngodon idella</i>	4
	Bighead carp*	<i>Aristichthys nobilis</i>	1
	Silver carp*	<i>Hypophthalmichthys molitrix</i>	56
	Common carp*	<i>Cyprinus carpio</i>	224
	Golden shiner	<i>Notemigonus crysoleucas</i>	22
	Southern redbelly dace	<i>Phoxinus erythrogaster</i>	1
	Creek chub	<i>Semotilus atromaculatus</i>	493
	Hornyhead chub	<i>Nocomis biguttatus</i>	1247
	Central stoneroller	<i>Campostoma anomalum</i>	1456
	Largescale stoneroller	<i>Campostoma oligolepis</i>	7
	Suckermouth minnow	<i>Phenacobius mirabilis</i>	25
	Blacknose dace	<i>Rhinichthys atratulus</i>	127
	Striped shiner	<i>Luxilus chrysocephalus</i>	1249
	Common shiner	<i>Luxilius cornutus</i>	520
	Redfin shiner	<i>Lythrurus umbratilus</i>	13
	Spotfin shiner	<i>Cyprinella spiloptera</i>	3326
	Fathead minnow	<i>Pimephales promelas</i>	37
	Bluntnose minnow	<i>Pimephales notatus</i>	2798
	Bullhead minnow	<i>Pimephales vigilax</i>	88
	Emerald shiner	<i>Notropis atherinoides</i>	36
Rosyface shiner	<i>Notropis rubellus</i>	853	
Ozark minnow	<i>Notropis nubilus</i>	11	
Bigmouth shiner	<i>Notropis dorsalis</i>	325	
Sand shiner	<i>Notropis ludibundus</i>	3186	
Spottail shiner	<i>Notropis hudsonius</i>	59	
Catostomidae	Smallmouth buffalo	<i>Ictiobus bubalus</i>	67
	Quillback	<i>Carpiodes cyprinus</i>	243
	River carsucker	<i>Carpiodes carpio</i>	23
	Highfin carsucker	<i>Carpiodes velifer</i>	35
	White sucker	<i>Catostomus commersoni</i>	1371

Table A-3. Continued.

Family	Common Name	Scientific Name	Total	
Catostomidae	Northern hog sucker	<i>Hypentelium nigricans</i>	708	
	Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	391	
	Black redhorse	<i>Moxostoma duquesnei</i>	78	
	Golden redhorse	<i>Moxostoma erythrurum</i>	177	
	Silver redhorse	<i>Moxostoma anisurum</i>	36	
Ictaluridae	Channel catfish	<i>Ictalurus punctatus</i>	292	
	Yellow bullhead	<i>Ameiurus natalis</i>	103	
	Black bullhead	<i>Ameiurus melas</i>	6	
	Flathead catfish	<i>Pylodictis olivaris</i>	47	
	Stonecat	<i>Noturus flavus</i>	49	
	Tadpole madtom	<i>Noturus gyrinus</i>	2	
	Slender madtom	<i>Noturus exilis</i>	3	
Cyprinodontidae	Blackstripe topminnow	<i>Fundulus notatus</i>	123	
Antherinidae	Brook silverside	<i>Labidesthes sicculus</i>	5	
Gasterosteidae	Brook stickleback	<i>Culaea inconstans</i>	11	
Cottidae	Mottled sculpin	<i>Cottus bairdi</i>	454	
Moronidae	White bass	<i>Morone chrysops</i>	17	
	Yellow bass	<i>Morone mississippiensis</i>	47	
Centrarchidae	Black crappie	<i>Pomoxis nigromaculatus</i>	15	
	White crappie	<i>Pomoxis annularis</i>	2	
	Rock bass	<i>Ambloplites rupestris</i>	60	
	Largemouth bass	<i>Micropterus salmoides</i>	275	
	Smallmouth bass	<i>Micropterus dolomieu</i>	802	
	Green sunfish	<i>Lepomis cyanellus</i>	323	
	Bluegill x Green sunfish hybrid	<i>Lepomis macrochirus</i> x <i>L. cyanellus</i>	9	
	Bluegill	<i>Lepomis macrochirus</i>	856	
	Pumpkinseed	<i>Lepomis gibbosus</i>	8	
	Orangespotted sunfish	<i>Lepomis humilis</i>	45	
	Percidae	Walleye	<i>Stizostedion vitreum</i>	56
		Yellow perch	<i>Perca flavescens</i>	8
Blackside darter		<i>Percina maculata</i>	7	
Slenderhead darter		<i>Percina phoxocephala</i>	6	
Logperch		<i>Percina caprodes</i>	30	
Johnny darter		<i>Etheostoma nigrum</i>	443	
Banded darter		<i>Etheostoma zonale</i>	892	
Rainbow darter		<i>Etheostoma caeruleum</i>	250	
Orangethroat darter		<i>Etheostoma spectabile</i>	175	
Fantail darter		<i>Etheostoma flabellare</i>	557	
Scaenidae		Freshwater drum	<i>Aplodinotus grunniens</i>	156
	Total fish		25864	
	No. Species		77	
	No. Native Species		73	

Table A-4. Number of each species collected at mainstem stations during the 2017 Fox River basin survey. Species are listed in order of total abundance. Stations are arranged in order from upstream (left) to downstream (right).

			C.O.L. State Pk Rt. 173	Dnstrm McHenry Dam	Burton's Bridge Rt. 176	Dnstrm Algonquin Dam	Elgin I-90	S. Elgin State St	Fabyan Pk Batavia	Aurora Hurds' Island	Oswego Rt. 34	Yorkville Rt. 47	Millbrook	Sheridan	Wedron	Dnstrm Dayton Dam
	Total No.	No. Stations	DT-35	DT-51	DT-22	DT-06	DT-28	DT-09	DT-69	DT-13	DT-03	DT-11	DT-32	DT-83	DT-36	DT-46
Spotfin shiner	2099	14	18	743	3	207	1	15	25	15	40	54	239	430	134	175
Sand shiner	811	12		1	3		2	9	17	11	64	17	93	118	356	120
White sucker	649	8				595	11	25		4	3			7	3	1
Smallmouth bass	431	13	4	2		106	32	47	48	90	34	17	18	23	2	8
Bluegill	385	14	12	92	22	11	28	16	55	49	14	31	21	12	5	17
Shorthead redhorse	373	7								110	51	59	55	69	7	22
Channel catfish	241	14	3	13	20	30	20	27	16	8	23	8	17	17	18	21
Quillback	233	14	1	22	14	53	16	46	22	13	17	6	7	3	5	8
Bluntnose minnow	227	12	2			31	4	12	32	36	5	19	31	18	19	18
Carp	162	14	5	6	8	15	12	20	15	7	14	21	16	5	5	13
Freshwater drum	113	11	4	13	13	7	5			24	6	6	1	1		33
Blackstripe topminnow	104	8				17	10	12		18	14	12	20			1
Gizzard shad	100	12	3	4	17	22			2	2	12	8	2	2	3	23
Northern hog sucker	97	8						3		5	6	8	28	23	11	13
Bullhead minnow	88	6			4					8			21	46	7	2
Largemouth bass	87	12		17	13	2	6	6	20	6	8	4	1	3		1
Smallmouth buffalo	67	1														67
Rosyface shiner	63	5									2	3		3	51	4
Spottail shiner	57	5		48	6	1			1			1				
Silver carp	56	1														56
Walleye	51	10		8	1	1	2	11			11	3	6	2		6
Golden redhorse	45	7					1		8	4		5	10	15	2	
Flathead catfish	44	12	2			2	3	2	2	1	4	7	6	4	8	3
Yellow bass	44	6			1	5	1		30	5						2
Orangespotted sunfish	44	5		31		3		5	1	4						
Green sunfish	36	13	1	4	2	2	1	2	4	1	5	9	2	2		1
Highfin carpsucker	35	6								1		15	9	1	3	6
Silver redhorse	35	10				5	1	1	2	11	2	3	1	6		3
Johnny darter	29	4					21	4				1		3		
Fathead minnow	24	3		8		8		8								

Table A-4. Continued.

			C.O.L. State Pk Rt. 173	Dnstrm McHenry Dam	Burton's Bridge Rt. 176	Dnstrm Algonquin Dam	Elgin I-90	S. Elgin State St	Fabyan Pk Batavia	Aurora Hurds' Island	Oswego Rt. 34	Yorkville Rt. 47	Millbrook	Sheridan	Wedron	Dnstrm Dayton Dam
	Total No.	No. Stations	DT-35	DT-51	DT-22	DT-06	DT-28	DT-09	DT-69	DT-13	DT-03	DT-11	DT-32	DT-83	DT-36	DT-46
Emerald shiner	24	5	13	7			2		1	1						
River carpsucker	23	2													1	22
Banded darter	18	4				9				5		2	2			
White bass	15	7		2	2	2	1		2						1	5
Striped shiner	13	3				1		2							10	
Logperch	13	6		1	1	6	1		3	1						
Golden shiner	8	3		5		2			1							
Yellow perch	8	3	4		3	1										
Longnose gar	7	4				1						2	1			3
Black crappie	7	6		1	1		1				1	2				1
Slenderhead darter	6	4				2		1				1				2
Shortnose gar	5	1														5
Grass carp	4	1														4
Brook silverside	4	2				3		1								
Rock bass	4	1	4													
Pumpkinseed	4	1		4												
Bowfin	3	2	1	2												
Suckermouth minnow	3	2									1				2	
Blackside darter	3	2				1		2								
Grass pickerel	2	2	1									1				
Northern pike	2	2		1			1									
Hornyhead chub	2	2				1							1			
Muskellunge	1	1										1				
Bighead carp	1	1														1
Bigmouth shiner	1	1									1					
Black redhorse	1	1												1		
White crappie	1	1							1							
Orangethroat darter	1	1													1	
Total No.	7014	-	78	1035	134	1152	183	277	308	440	338	324	608	816	654	667
No. Species	58	-	16	23	18	31	24	23	22	26	23	28	24	25	22	33

Table A-5. IBI scores for Fox River mainstem stations in 2017, including value (V) and score (S) for each metric. Stations are arranged in order from upstream (left) to downstream (right).

	DT-35		DT-51		DT-22		DT-06		DT-28		DT-09		DT-69		DT-13		DT-03		DT-11		DT-32		DT-83		DT-36		DT-46	
	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S
No. fish species	15	3	22	5	17	4	30	6	23	5	22	5	21	5	25	6	22	5	27	6	23	5	24	5	21	5	29	6
No. native minnow species	5	2	6	4	4	3	7	4	4	3	5	3	6	4	5	3	6	4	5	3	5	3	5	3	7	4	5	3
No. sucker species	1	1	1	1	1	1	3	3	4	4	4	4	3	3	7	6	5	5	6	6	6	6	8	6	7	6	8	6
No. sunfish species	4	4	7	6	4	4	5	5	5	5	5	5	6	6	5	5	5	5	5	5	4	4	4	4	2	2	5	5
No. benthic invertevore species	0	0	1	1	1	1	5	4	4	3	5	4	3	3	6	5	5	4	6	5	5	4	7	5	5	4	5	4
No. intolerant species	1	1	1	1	0	0	4	4	1	1	3	3	1	1	4	4	3	3	5	5	5	5	6	6	4	4	5	5
Prop. specialist benthic invertivores	0	0	0	1	0.01	1	0.02	1	0.13	5	0.04	2	0.04	2	0.31	6	0.18	6	0.24	6	0.16	6	0.15	6	0.03	2	0.06	3
Prop. generalist feeders	0.58	6	0.91	2	0.74	6	0.85	4	0.52	6	0.66	6	0.62	6	0.35	6	0.59	6	0.58	6	0.75	6	0.81	5	0.87	3	0.83	4
Prop. Lithophilic spawners	0.1	3	0.01	1	0.02	1	0.11	3	0.2	5	0.24	6	0.2	5	0.5	6	0.32	6	0.31	6	0.2	5	0.17	4	0.13	3	0.09	2
Prop. Tolerant species	0.2	6	0.18	6	0.12	6	0.2	6	0.17	6	0.23	5	0.19	6	0.16	6	0.18	6	0.11	6	0.13	6	0.17	6	0.14	6	0.14	6
Total IBI Score	26		28		27		40		43		43		41		53		50		54		50		50		39		44	



Table A-6. Number of each species collected at tributary stations in the northern portion of the watershed during the 2017 Fox River basin survey. Species are arranged by family. Stations are in order from upstream (left) to downstream (right) in the watershed.

Common Name	Total No.	No. Stations	N Branch														
			Nippersink Creek	Nippersink Creek	Nippersink Creek	Boone Creek	Silver Creek	Flint Creek	Crystal Creek	Tyler Creek	Tyler Creek	Poplar Creek	Otter Creek	Ferson Creek	Mill Creek	Mill Creek	
			DTKA-03	DTK-09	DTK-04	DTZT-02	DTZZB-01	DTZS-01	DTZR-02	DTZP-06	DTZP-04	DTG-05	DTFA-02	DTF-02	DTZL-05	DTZL-03	
American brook lamprey	3	1					3										
Gizzard shad	81	2		12	69												
Central mudminnow	25	3					22				2	1					
Common Carp	36	6		12	12				7		1		3			1	
Golden shiner	1	1								1							
Creek chub	230	12	6	13		15		5	12	6	118	2	9	8	34	2	
Hornyhead chub	311	10	2			1			9	20	35	13	4	184	13	30	
Central stoneroller	430	8		14					19	9	213	22	10	115	28		
Blacknose dace	9	2											1		8		
Striped shiner	1	1						1									
Common shiner	82	4									6	49		12		15	
Spotfin shiner	132	6		76	22			14	5				2	13			
Fathead minnow	11	4						1				1	7	2			
Bluntnose minnow	413	13	2	92	4	1	1	13	1		5	65	4	157	33	35	
Emerald shiner	12	1			12												
Bigmouth shiner	110	4		85		18				1	6						
Sand shiner	87	5	7	16	2								50	12			
Spottail shiner	2	1						2									
Quillback	1	1			1												
White sucker	338	12	7	40	26	26			46	6	43	9	57	58	12	8	
Northern hog sucker	116	7	7		1					1	51	7	1	48			
Shorthead redhorse	15	1			15												
Golden redhorse	15	4		3	5								1	6			
Channel catfish	21	3		1	13			7									
Yellow bullhead	26	9					3	5	5	1	4	2	1	3		2	
Black bullhead	6	2					5								1		
Stoneyhead	11	4			2				1				1	7			
Tadpole madtom	2	1						2									
Blackstripe topminnow	14	3	1					10				3					
Brook silverside	1	1			1												
Mottled sculpin	230	5					18			130	77	1		4			
White bass	2	1			2												
Black crappie	5	2			2											3	
Largemouth bass	123	12	2		5	4	1	14	7		23	6	11	43	3	4	
Smallmouth bass	128	7	1	2	9				23		23	26		44			
Green sunfish	112	12		1	3	1	3	9		2	21	14	24	10	4	20	
Bluegill x Green sunfish hybrid	1	1														1	
Bluegill	243	11			28	8	25	5	29		21	20	38	46	2	21	
Pumpkinseed	4	1			4												
Orangespotted sunfish	1	1												1			
Walleye	5	1			5												
Blackside darter	4	4	1					1					1	1			
Logperch	17	2			14				3								
Johnny darter	32	6		4		6	3					10		3	6		
Banded darter	139	8	6	14	4				20		23	31	4	37			
Rainbow darter	19	1									19						
Orangethroat darter	10	2				9							1				
Fantail darter	101	4				4						57		1	39		
Freshwater drum	43	2			39			4									
Total No.	3761	-	42	385	300	93	84	100	181	178	690	338	230	815	183	142	
No. Species	48	-	11	15	25	11	10	16	14	10	18	18	20	23	12	11	

Table A-7. Number of each species collected at tributary stations in the southern portion of the watershed during the 2017 Fox River basin survey. Species are arranged by family. Stations are in order from upstream (left) to downstream (right) in the watershed.

Common Name	Total No.	No. Stations	Blackberry Creek	Blackberry Creek	Big Rock Creek	Big Rock Creek	Little Rock Creek	Little Rock Creek	Somonauk Creek	Somonauk Creek	Somonauk Creek	Little Indian Creek	Indian Creek	Indian Creek	Buck Creek
			DTD-03	DTD-02	DTC-07	DTC-05	DTCA-08	DTCA-01	DTB-04	DTB-02	DTB-01	DTAB-03	DTA-09	DTA-08	DTZB-02
Gizzard shad	207	3	3		103	101									
Grass pickerel	1	1										1			
Common Carp	26	4		1		3	6	16							
Golden shiner	13	1								13					
Southern redbelly dace	1	1										1			
Creek chub	263	11	13	1	10		15	26	37	3	25	43	67		23
Hornhead chub	934	11	18	1	26		160	94	304	30		148	47	2	104
Central stoneroller	1026	13	12	2	50	108	89	92	48	60	180	82	69	19	215
Largescale stoneroller	7	1									7				
Suckerminnow	22	2									21				1
Blacknose dace	118	8	5			2	27	51	14	1		7	11		
Striped shiner	1235	7					154		369		2	141	184	7	378
Common shiner	438	9	3		39		65	36	242	13		17		12	11
Redfin shiner	13	1					13								
Spotfin shiner	1095	11	1	66	27	4	30	2		533	284	91	10	47	
Fathead minnow	2	1													2
Bluntnose minnow	2158	13	3	6	31	3	872	39	489	169	212	101	76	28	129
Rosyface shiner	790	12		2	26	11	75	20	152	151	34	214	25	70	10
Ozark minnow	11	1							11						
Bigmouth shiner	214	11	14		4	3	1	61	99	9	1	1	8		13
Sand shiner	2288	11		95	72	3	138		448	101	889	177	288	17	60
Quillback	9	1						9							
White sucker	384	12	24	2	11	10	56	64	116		8	31	4	42	16
Northern hoq sucker	495	13	4	20	58	31	22	33	3	15	63	25	37	89	95
Shorthead redbhorse	3	2				2									1
Black redbhorse	77	6			9		4				5	1	39	19	
Golden redbhorse	117	9		8	7	17	40	25				3	2	8	7
Silver redbhorse	1	1													1
Channel catfish	30	7		4	1	3		1		1	9			11	
Yellow bullhead	77	8		5			1		34		3	16	2	4	12
Flathead catfish	3	2		2							1				
Stonecat	38	7	1		5	2					1	15	7	7	
Slender madtom	3	2					1								2
Blackstripe topminnow	5	3	1		3							1			
Brook stickleback	11	1					11								
Mottled sculpin	224	3				67	78	79							
Yellow bass	3	2								2	1				
Black crappie	3	2			1					2					
White crappie	1	1			1										
Rock bass	56	6					11	1				21	2	9	12
Largemouth bass	65	10	18	12	5		2	1	10	6	9			1	1
Smallmouth bass	243	12		4	9	12	16	11	14	13	14	65	3	32	50
Green sunfish	175	10	27	40	2		9	1	31	3	3	53		6	
Bluegill x Green sunfish hybrid	8	1		8											
Bluegill	228	10	17	74	1		4	1	35	65	17		3	11	
Johnny darter	382	13	9	11	2	4	23	19	212	10	28	40	15	4	5
Banded darter	735	13	1	9	32	113	57	32	25	2	178	18	36	107	125
Rainbow darter	231	6			1	51					12	12		77	78
Orangethroat darter	164	7					37	8			1	9	3	2	104
Fantail darter	456	6							48	22		103	70	4	209
Total No.	15089	-	174	373	536	550	2017	722	2741	1224	2010	1435	1008	637	1662
No. Species	49	-	18	20	26	20	29	24	21	22	28	26	23	27	24

Table A-8. IBI scores for tributary stations in the northern portion of the watershed for the 2017 Fox River basin survey, including value (V) and score (S) for each metric. Stations are arranged in order from upstream (left) to downstream (right) in the watershed.

IBI Metric	North Branch Nippersink Creek		Nippersink Creek		Nippersink Creek		Boone Creek		Silver Creek		Flint Creek		Crystal Creek		Tyler Creek		Tyler Creek		Poplar Creek		Otter Creek		Ferson Creek		Mill Creek		Mill Creek	
	DTKA-03	DTK-09	DTK-04	DTZT-02	DTZZB-01	DTZS-01	DTZR-02	DTZP-06	DTZP-04	DTG-05	DTFA-02	DTF-02	DTZL-05	DTZL-03														
No. fish species	11	2	14	3	24	5	11	3	10	3	15	3	14	3	10	2	17	4	18	5	19	4	23	5	12	3	10	2
No. native minnow species	4	3	6	4	4	3	4	3	1	1	6	4	6	4	4	3	6	4	6	4	8	5	8	5	5	4	4	3
No. sucker species	2	2	2	2	5	5	1	2	0	0	0	0	1	2	2	2	2	3	2	3	3	4	3	3	1	2	1	1
No. sunfish species	2	2	2	2	6	6	3	4	3	4	3	3	3	4	1	1	4	5	4	5	3	4	5	5	3	4	4	4
No. benthic invertevore species	3	3	4	3	6	5	4	4	2	2	2	2	3	3	3	3	5	4	5	4	6	5	8	6	2	2	0	0
No. intolerant species	4	4	2	2	3	3	1	2	2	3	0	0	3	4	3	3	6	6	5	6	3	4	5	5	1	2	1	1
Prop. specialist benthic invertivores	0.333	6	0.055	2	0.13	5	0.204	6	0.25	6	0.03	2	0.127	5	0.736	6	0.246	6	0.314	6	0.035	2	0.123	5	0.246	6	0	0
Prop. generalist feeders	0.524	6	0.904	2	0.6	6	0.742	3	0.44	6	0.69	4	0.547	5	0.09	6	0.326	6	0.479	6	0.852	2	0.394	6	0.514	5	0.732	3
Prop. Lithophilic spawners	0.262	3	0.049	1	0.163	3	0.108	1	0.036	1	0.02	1	0.298	3	0.169	2	0.503	5	0.346	4	0.083	1	0.503	5	0.268	3	0.317	3
Prop. Tolerant species	0.273	5	0.357	5	0.167	6	0.364	5	0.3	5	0.4	4	0.357	5	0.4	4	0.353	5	0.333	5	0.368	4	0.261	5	0.333	5	0.6	3
Total IBI Score	30		26		47		33		31		23		38		32		48		48		35		50		36		20	

Table A-9. IBI scores for tributary stations in the southern portion of the watershed for the 2017 Fox River basin survey, including value (V) and score (S) for each metric. Stations are arranged in order from upstream (left) to downstream (right) in the watershed.

IBI Metric	Blackberry Creek		Blackberry Creek		Big Rock Creek		Big Rock Creek		Little Rock Creek		Little Rock Creek		Somonauk Creek		Somonauk Creek		Somonauk Creek		Little Indian Creek		Indian Creek		Indian Creek		Buck Creek	
	DTD-03	DTD-02	DTC-07	DTC-05	DTCA-08	DTCA-01	DTB-04	DTB-02	DTB-01	DTAB-03	DTA-09	DTA-08	DTZB-02													
No. fish species	18	4	19	4	26	6	19	4	28	6	23	5	21	5	22	5	28	6	26	6	23	5	27	6	24	6
No. native minnow species	8	5	7	4	9	5	7	4	12	6	5	5	11	6	11	6	10	6	12	6	10	6	8	5	11	6
No. sucker species	2	3	3	3	4	4	4	4	4	4	4	4	2	2	1	1	3	3	4	4	4	4	6	6	3	4
No. sunfish species	3	4	4	4	6	6	1	1	5	5	5	5	4	4	5	5	4	4	3	3	3	3	5	5	3	4
No. benthic invertevore species	5	4	4	3	8	6	9	6	9	6	7	5	5	4	5	4	9	6	10	6	9	6	11	6	10	6
No. intolerant species	3	4	5	5	7	6	6	6	8	6	6	6	6	6	5	5	6	6	8	6	6	6	7	6	7	6
Prop. specialist benthic invertivores	0.08	3	0.129	5	0.203	6	0.518	6	0.148	6	0.271	6	0.105	4	0.04	2	0.143	6	0.147	6	0.2	6	0.49	6	0.376	6
Prop. generalist feeders	0.632	4	0.788	3	0.562	6	0.24	6	0.653	4	0.425	6	0.698	4	0.744	4	0.723	4	0.473	6	0.648	4	0.29	6	0.387	6
Prop. Lithophilic spawners	0.241	3	0.099	1	0.42	5	0.425	6	0.364	4	0.514	6	0.418	5	0.231	3	0.169	3	0.52	6	0.419	5	0.546	6	0.641	6
Prop. Tolerant species	0.222	5	0.316	5	0.154	6	0.158	6	0.214	5	0.217	5	0.238	5	0.182	6	0.179	6	0.192	6	0.174	6	0.148	6	0.208	6
Total IBI Score	39		37		56		49		52		53		45		41		50		55		51		58		56	

