

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 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.

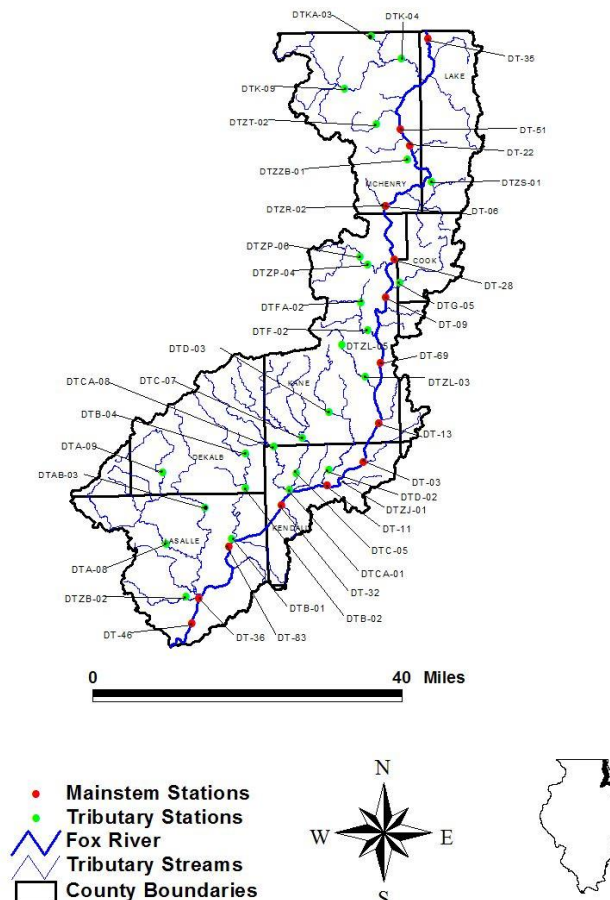


Figure 1. Location of fish sampling stations for the 2017 Fox River Basin Survey.

This report summarizes the fish community sampling portion of the most recent survey conducted in 2017 and compares results to 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.

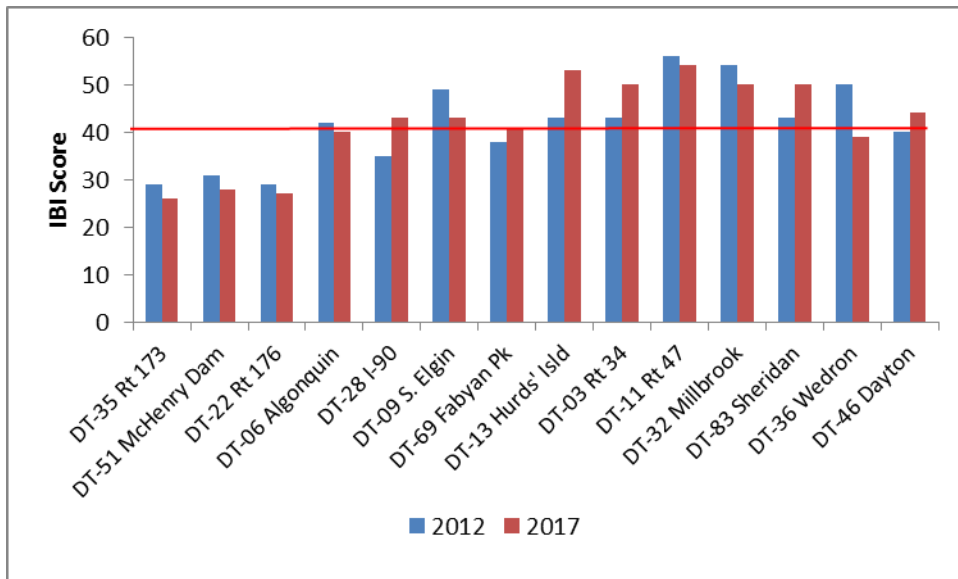


Figure 2. IBI scores for the Fox River mainstem sampling stations in 2012 and 2017. Stations are arranged from upstream (left) to downstream (right). The red line indicates the IBI threshold for “Full Support” of Aquatic Life (IBI≥41; Smogor 2004).

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.

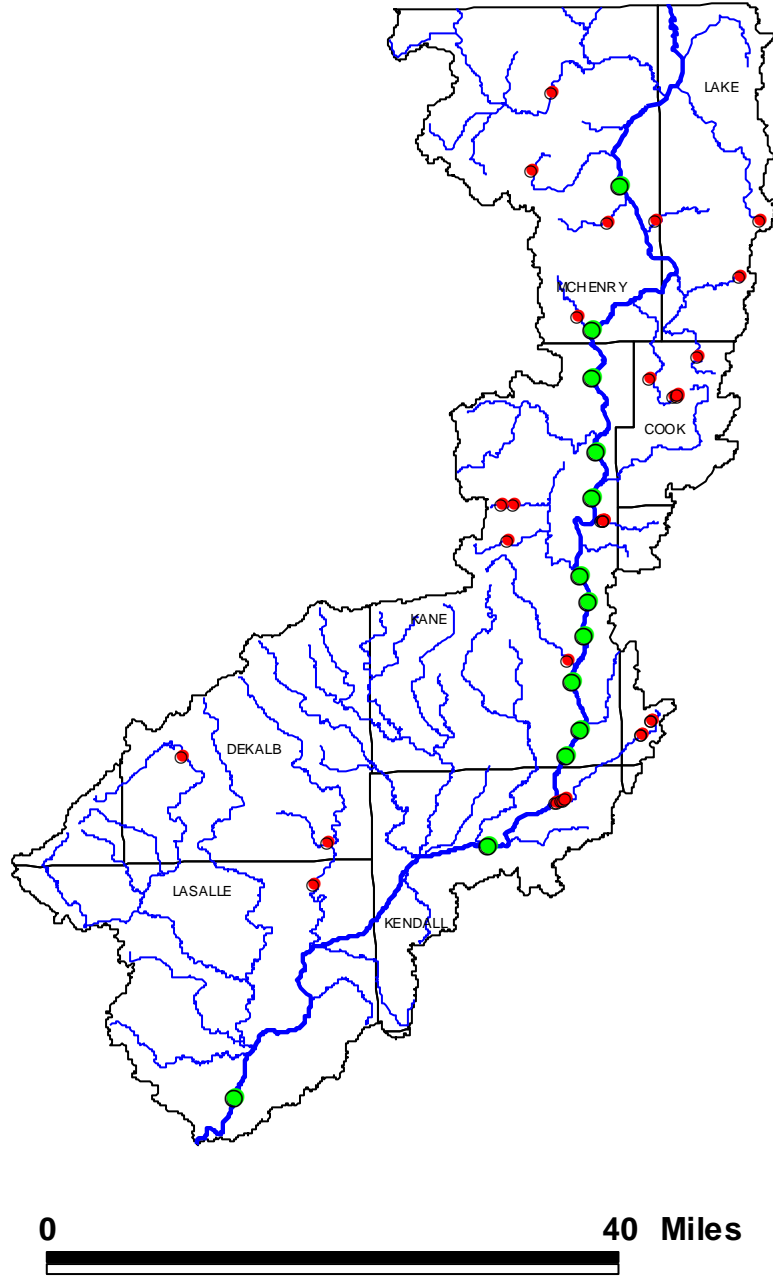
Members of IDNR Fisheries staff are involved with the FRSG's efforts to address current use impairments on the Fox River (www.foxriverstudygroup.org). Results of extensive sampling and modeling by FRSG have confirmed that the major sources of impairment on the mainstem are primarily the combination of 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.

For additional information contact: Tristan Widloe; tristan.widloe@illinois.gov or Steve Pescitelli; steve.pescitelli@illinois.com. This study was funded in part by the USFWS Sportfish Restoration Program.

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

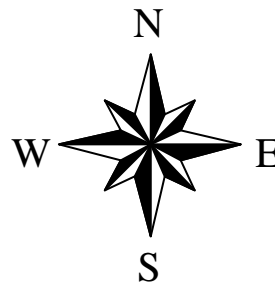


Figure A-1. Location of dams in the Fox River Basin.

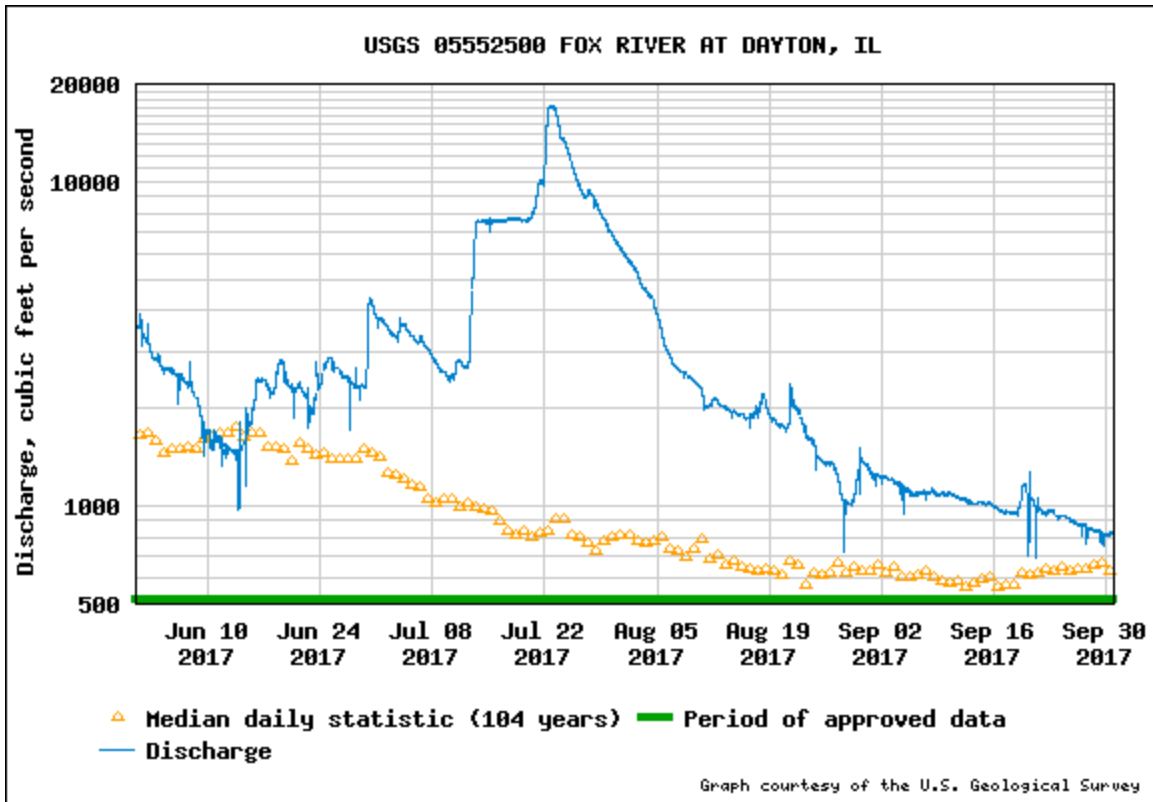


Figure A-2. Discharge (in cubic feet per second) at the Dayton gage, located downstream of the Dayton Dam, during the sampling period of the 2017 Fox River basin survey.

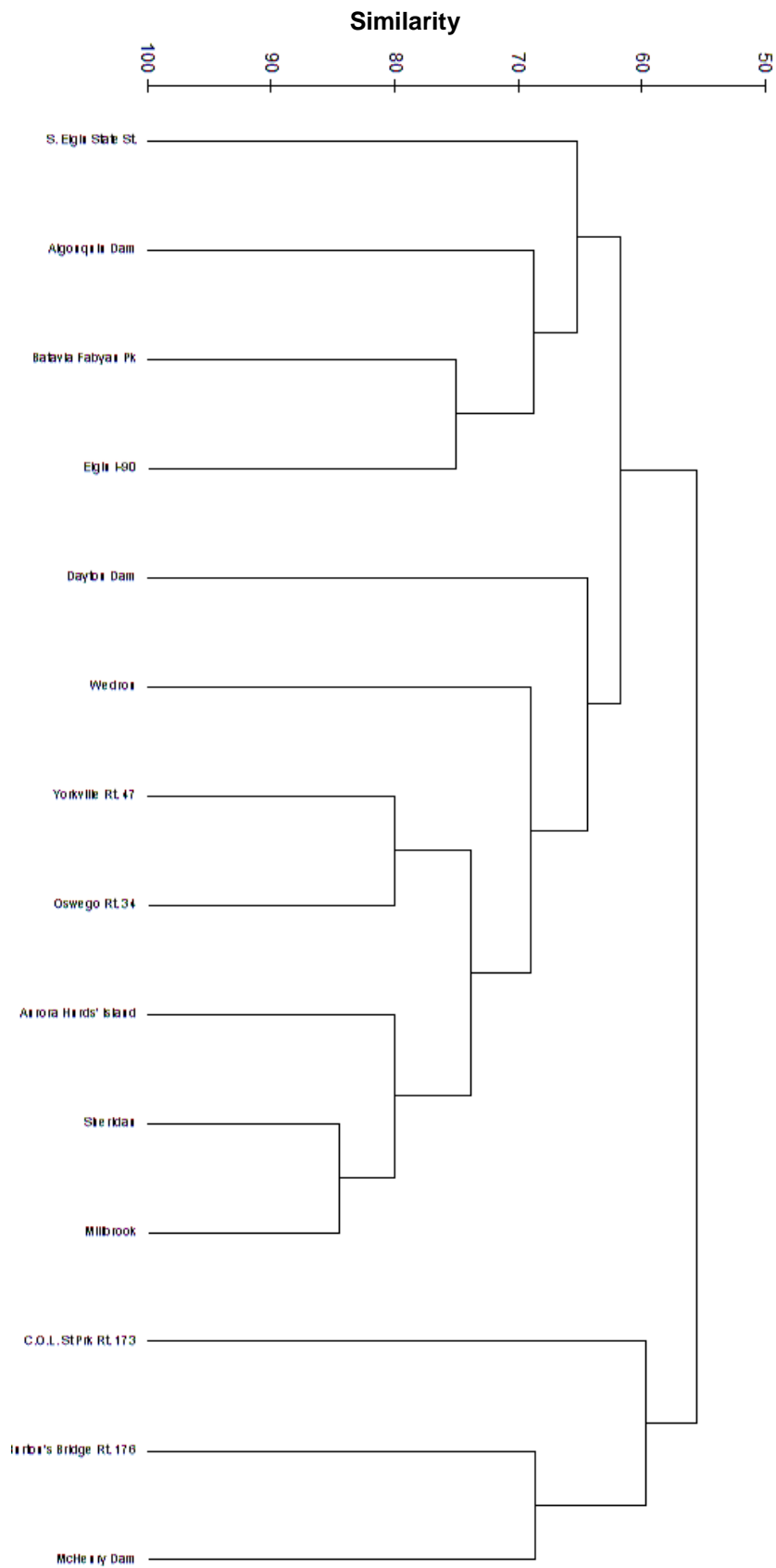


Figure A-3. Cluster analysis based on Bray-Curtis similarity index for species presence-absence, 2017 Fox River mainstem stations.

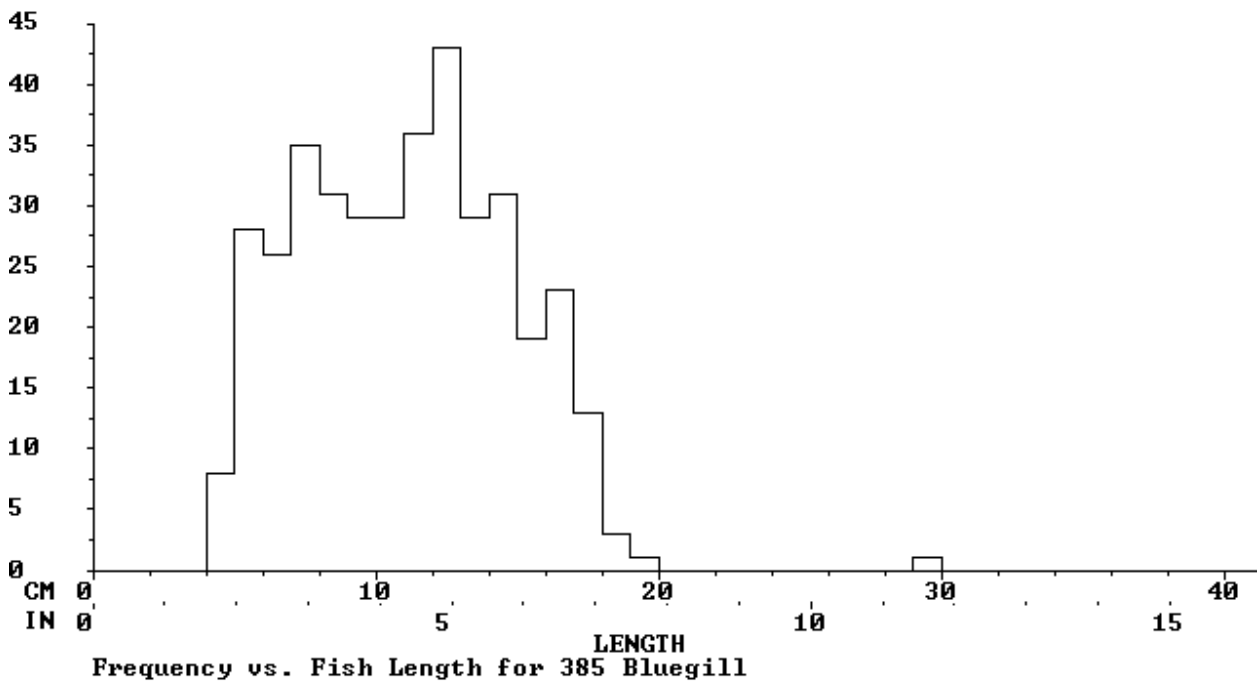
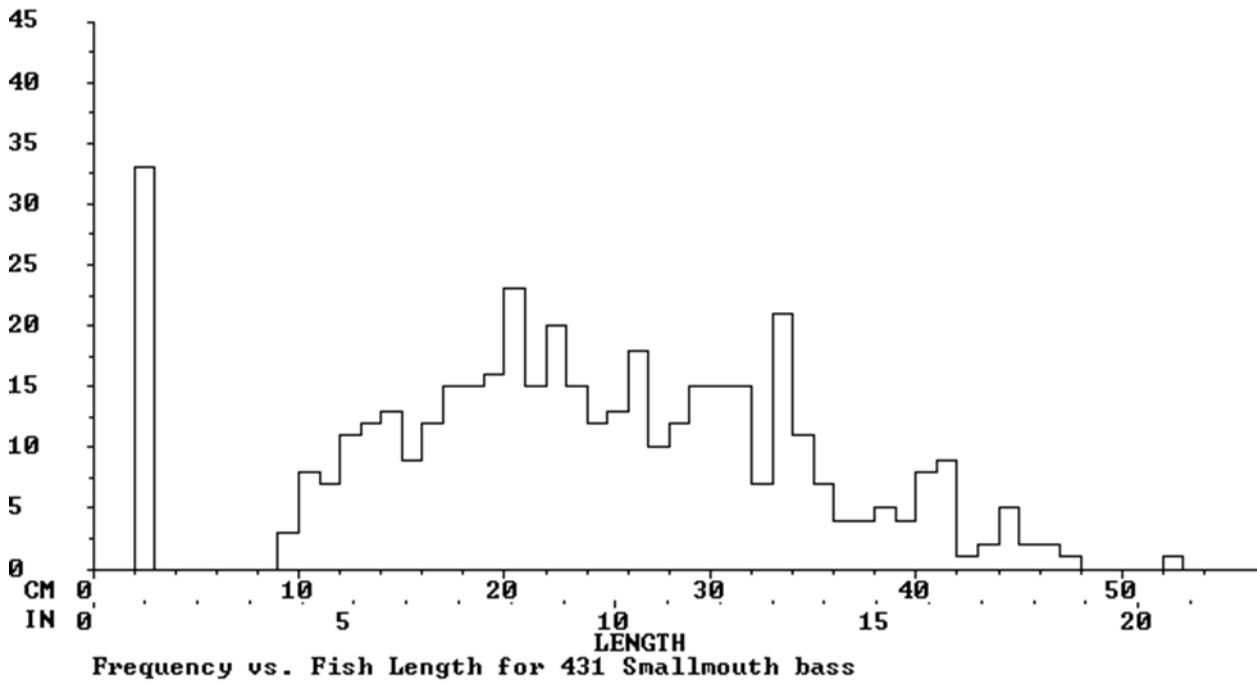


Figure A-4. Length-frequency distribution of Smallmouth Bass (top) and Bluegill (bottom) collected from the mainstem of the Fox River in 2017.

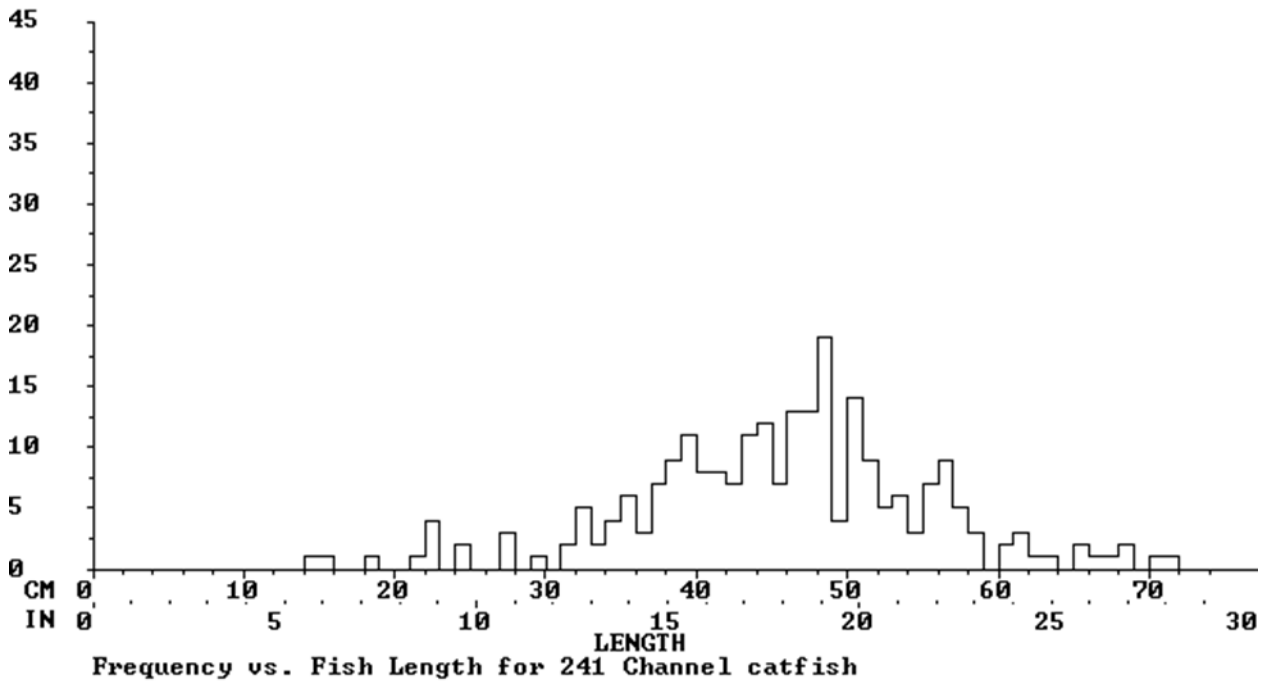


Figure A-5. Length-frequency distribution of Channel Catfish collected from the mainstem of the Fox River in 2017.

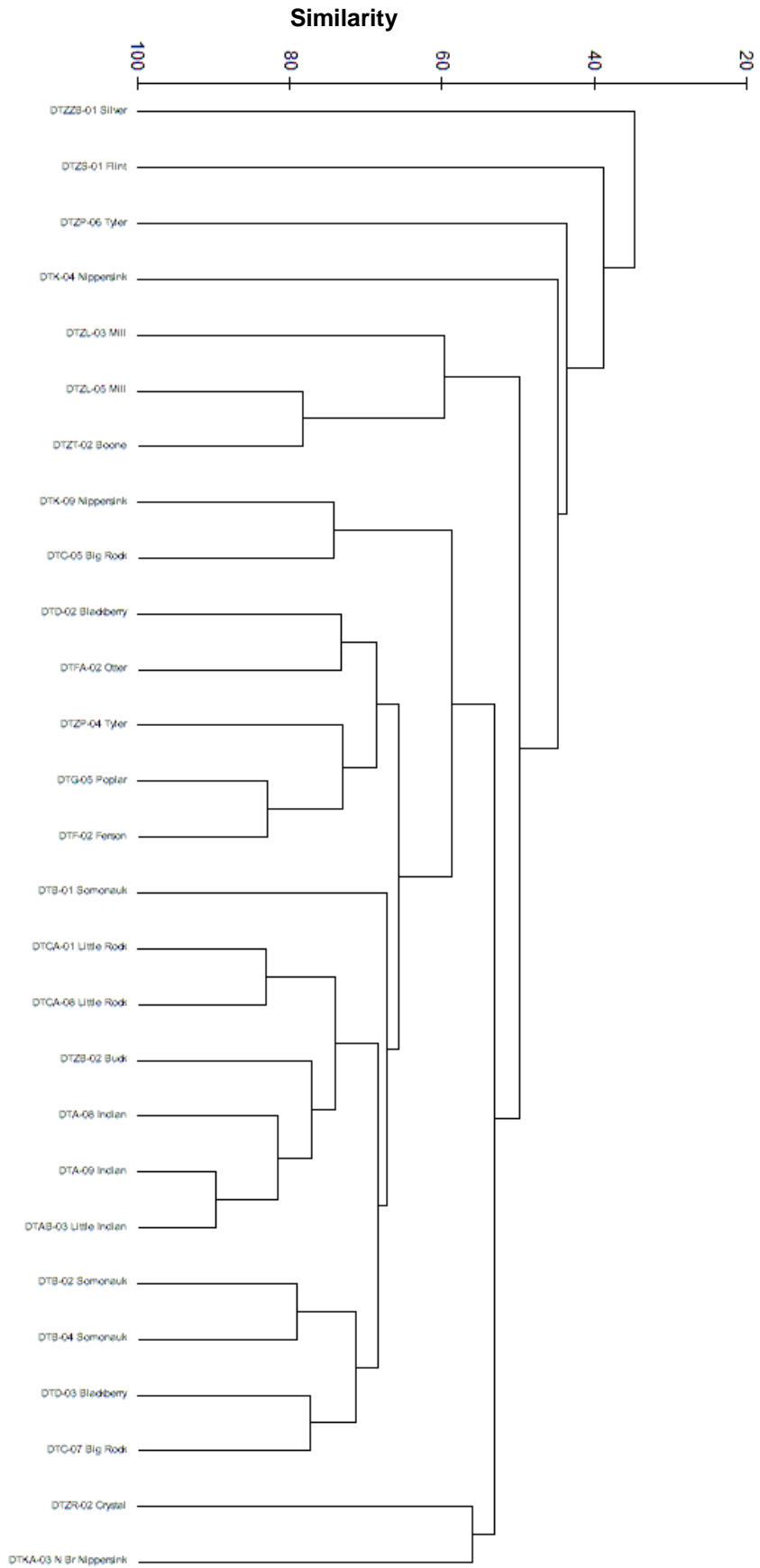


Figure A-6. Cluster analysis based on Bray-Curtis similarity index for species presence-absence, 2017 Fox River tributary stations.

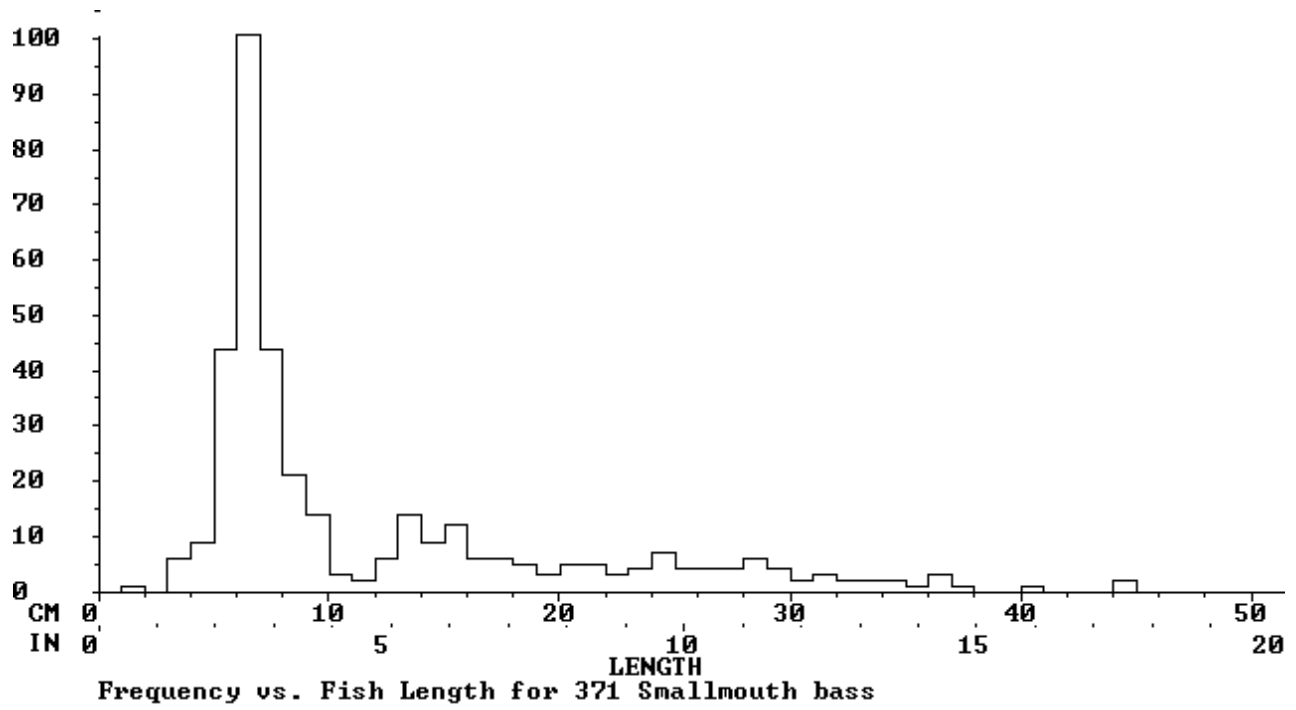


Figure A-7. Length-frequency distribution of Smallmouth Bass collected from tributaries of the Fox River in 2017.

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> |
| 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> |
| | 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 | | | | |
| Stoneyhead | 38 | 7 | 1 | | 5 | 2 | | | | | 1 | 15 | 7 | 7 | |
| Slender madtom | 3 | 2 | | | | | 1 | | | | | | | | 2 |
| Blackstripe topminnow | 5 | 3 | 1 | | 3 | | | | | | | | | | |
| 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 | |

