Region II Fisheries
5931 Fox River Drive
Plano, IL 60545

2022 Status Report of Fish Assemblages and the Sport Fishery in the Fox River Watershed

The Fox River is a valuable resource providing drinking water, storm drainage, wastewater treatment, and flood conveyance to 11% of Illinois' population residing in the watershed. Located near the Chicago Metropolitan Area, the Fox River is also heavily used for motor boating, canoeing, angling, and other recreational activities. Although some areas of the mainstem have diverse fish assemblages and sustainable sport fisheries, the effects of urban land use, combined with the presence 13 dams has resulted in wide-spread water quality impairments (Santucci et al. 2005; IEPA 2018).

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, six basin surveys have been completed in the Fox River watershed, providing an opportunity to examine stream conditions over a 26-year period. This report summarizes the fish community sampling portion of the most recent survey conducted on the Fox River in 2022. Results include species composition, distribution, and stream quality ratings, which are compared to previous surveys. We also examine sportfish populations and discuss potential factors influencing fish assemblages.

Study Area

The Fox River is the third largest tributary to the Illinois River, flowing 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). Land use is primarily agricultural (66%) with 18% developed land (IDNR 1998).

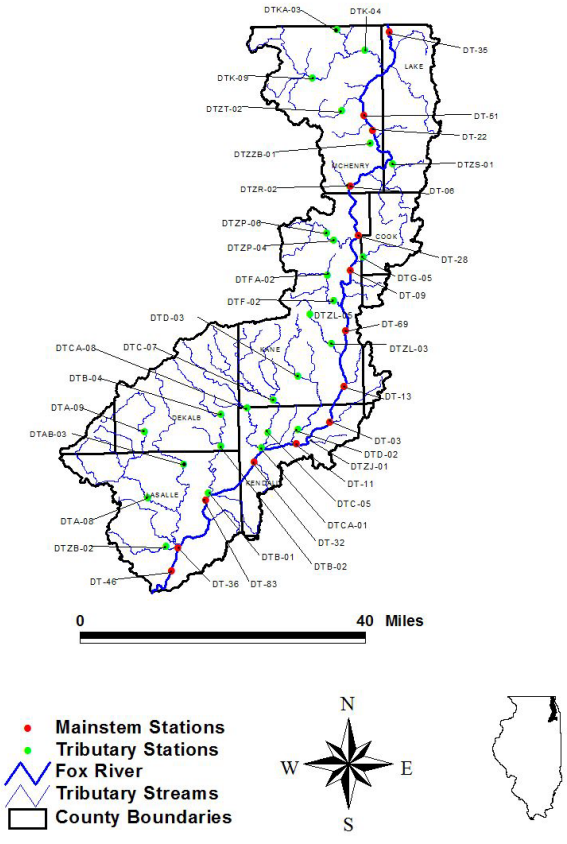

Figure 1. Sampling stations for the 2022 Fox River basin survey.

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 flows 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 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. Land use 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 were collected at 41 stations throughout the Fox River basin, including 15 mainstem and 26 tributary locations (Figure 1). The mainstem was sampled in June and tributary stations were sampled in August and early September (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 habitat 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). 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 a 10% formalin solution for laboratory analysis.

Species composition, distribution, and abundance along the mainstem of the Fox River was evaluated in relation to the longitudinal segments of the river as described in the *Study Area* section above. Four segments were designated based on gradient, fragmentation by dams and urban land use (Table 1). Non-Metric Multidimensional Scaling (NMDS) was used to compare fish species composition among sampling stations and river segments using Bray Curtis (1957) similarity of log transformed species abundance (Kwak and Peterson 2007). Stream quality ratings were calculated for both the Fox River and tributary stations 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. IBI scores range from 0 to 60, with higher scores indicating better stream quality (Smogor 2004). Lastly, catch per unit effort (CPUE; no. fish/hr.) was used to assess Fox River sportfish populations.

Table 1. Description of segment designations on the mainstem of the Fox River in Illinois.

Segment	Location	Length (mi.)	Channel Gradient (ft./mi.)	Urban Landcover	No. Dams	No. Sampling Stations
UPPER	State Line to Algonquin Dam	39.8	0.3	Moderate	2	4
MID UPPER	Algonquin Dam to Yorkville Dam	46.1	4.7	High	10	6
MID LOWER	Yorkville Dam to Dayton Dam	30.8	2.7	Low	1	4
LOWER	Dayton Dam to Illinois River	5.7	2.5	Low	0	1

Results and Discussion

Forty-one thousand three hundred thirty-three (41,333) fish representing 78 species and 18 families were collected from 41 sampling stations in 2022 (Table A-3). Species composition was similar to previous surveys, with minnows (family Leuciscidae), accounting for 62% of the total abundance. Suckers (family Catostomidae) and sunfish (family Centrarchidae) comprised 14% and 7% of the catch, respectively. These three families together made 83% of the total abundance. Four State Threatened fish species were collected: American Brook Lamprey from Boone Creek, Mottled Sculpin from Boone, Tyler, Blackberry, Big Rock, and Little Rock Creeks, Ozark Minnow from Somonauk Creek, and Blackchin Shiner from North Branch Nippersink Creek and DT-51 on the Fox River (downstream of the McHenry Dam) (Table A-4; Table A-5). Two non-native species were collected: Common Carp, a ubiquitous species first introduced in the United States the 1800's, and Silver Carp, a more recent invader among a group of invasive carps which arrived in Illinois in the 1990's. Silver Carp were collected at only one station on the Fox River, downstream of the Dayton Dam (DT-46) (Table A-4). That site has a direct connection to the Illinois River where Silver Carp are abundant. The 29-ft. high dam blocks their upstream movement.

Fox River flows were near or slightly below normal levels during the 2022 mainstem survey (Figure A-2) allowing adequate boat access to most sampling areas. Flows were variable during the tributary surveys but were within acceptable levels for fish sampling.

Table 2. Catch per unit effort (CPUE; no. fish/hr.) for each fish species collected within designated river segments during the 2022 Fox River survey. Shading indicates species presence within a segment.

Common name	UPPER	MID UPPER	MID LOWER	LOWER
Shortnose Gar	0.0	0.0	0.0	5.1
Longnose Gar	0.0	0.0	0.3	10.2
Bowfin	0.3	0.0	0.0	0.0
Gizzard Shad	192.5	0.6	1.0	7.1
Grass Pickerel	1.0	0.0	0.0	0.0
Northern Pike	0.5	0.2	0.0	0.0
Muskellunge	0.0	0.2	0.3	0.0
Silver Carp	0.0	0.0	0.0	50.8
Common Carp	13.5	7.0	9.6	9.2
Golden Shiner	2.8	2.5	0.0	0.0
Southern Redbelly Dace	0.0	0.0	0.3	0.0
Creek Chub	0.0	0.9	0.3	0.0
Hornyhead Chub	0.0	0.0	1.0	0.0
Central Stoneroller	0.0	0.2	0.0	0.0
Suckermouth Minnow	0.0	0.4	1.3	2.0
Blacknose Dace	0.0	0.0	0.3	0.0
Common Shiner	0.0	0.0	1.0	0.0
Spotfin Shiner	285.3	183.6	375.4	54.9
Pugnose Minnow	0.5	0.0	0.0	0.0
Fathead Minnow	2.3	0.0	0.0	0.0
Bluntnose Minnow	12.0	27.9	111.2	21.4
Bullhead Minnow	0.0	0.6	33.5	1.0
Emerald Shiner	35.3	2.6	0.0	0.0
Rosyface Shiner	0.0	0.0	11.3	16.3
Bigmouth Shiner	0.5	0.0	0.0	0.0
Blackchin Shiner	0.3	0.0	0.0	0.0
Sand Shiner	2.0	482.6	503.9	6.1
Mimic Shiner	0.5	0.4	0.5	0.0
Spottail Shiner	34.0	80.4	1.8	1.0
Smallmouth Buffalo	0.5	0.0	0.0	35.6
Quillback	107.3	70.6	17.4	3.1
River Carpsucker	0.0	0.0	1.8	13.2
Highfin Carpsucker	0.0	0.0	1.0	4.1
White Sucker	0.5	473.4	6.6	0.0
Northern Hog Sucker	0.0	16.2	16.1	3.1
Shorthead Redhorse	0.3	35.5	44.8	15.3
Black Redhorse	0.0	0.0	4.0	2.0
Golden Redhorse	2.0	9.4	26.0	11.2
Silver Redhorse	0.0	2.6	3.3	1.0
Channel Catfish	7.8	24.5	33.3	15.3
Yellow Bullhead	0.0	0.2	0.0	0.0
Flathead Catfish	1.8	4.7	5.3	4.1
Blackstripe Topminnow	0.3	1.3	14.4	0.0
Brook Silverside	1.8	0.4	0.0	0.0
White Bass	3.3	1.9	0.0	1.0
Yellow Bass	2.3	0.2	0.0	0.0
Black Crappie	1.3	0.4	0.8	0.0
White Crappie	0.3	0.0	0.0	0.0
Rock Bass	2.5	0.0	0.0	0.0
Largemouth Bass	26.0	4.2	0.5	0.0
Smallmouth Bass	6.8	89.1	32.5	34.6
Green Sunfish	1.3	1.1	1.3	2.0
Bluegill	41.3	23.0	4.8	12.2
Pumpkinseed	1.0	0.0	0.0	0.0
Orangespotted Sunfish	0.3	0.4	0.0	0.0
Walleye	1.5	3.8	6.8	0.0
Sauger	0.0	0.0	0.0	1.0
Yellow Perch	2.8	3.0	0.0	0.0
Slenderhead Darter	0.0	0.9	1.5	1.0
Logperch	0.8	4.0	0.3	2.0
Johnny Darter	0.3	2.1	4.5	0.0
Banded Darter	0.3	2.3	9.1	0.0
Rainbow Darter	0.0	0.0	0.3	0.0
Freshwater Drum	20.0	7.0	0.5	40.7
No. species	42	41	41	31

Fox River Mainstem

Species distribution and abundance. Fox River stations yielded 17,094 fish, representing 64 species (Table A-3; Table A-4). Minnows were the most diverse family with 20 native species, accounting for 58% of the total abundance. Suckers had the second highest species richness (*N*=10), comprising 25% of the total abundance. Mean abundance was 1,140, with a range from 381 downstream of the Dayton Dam (DT-46) to 2,910 downstream of the Algonquin Dam (DT-06). Mean species richness for all stations was 25, ranging from 18 at DT-09 in South Elgin to 32 at DT-11 in Yorkville (Table A-4). Sand Shiner, Spotfin Shiner, White Sucker, Quillback and Gizzard Shad were the five most abundant species. Species composition was similar to the previous survey in 2017, though abundance was higher in 2022 (*N*=7,014 in 2017). The increased abundance of White Sucker and Quillback was due to the presence of young-of-the-year (YOY) in seine hauls at DT-06 and DT-51. YOY Gizzard Shad were very abundant at two UPPER segment stations in 2022 (DT-23, DT-22). Sand Shiner were numerous at most locations downstream of Algonquin. Spotfin Shiner were also numerous, collected at all stations except DT-23. Increased abundance in 2022 was due in part to increased number of YOY fish and may have also been related to good sampling conditions.

As noted in previous surveys, species richness and distribution throughout the Fox River appeared to be related to longitudinal position, stream gradient and the influence of dams; factors used to designate river segments in Table 1. Although there were similar number of species present in the three segments upstream of Dayton Dam (Table 2), species composition was quite different among segments. Reduced species richness in the LOWER segment was due to the presence of only one sampling station in that segment.

Stations in the UPPER segment, above the Algonquin Dam, are very low gradient with slow moving, deeper, lake-like habitats. These conditions are not suitable for obligate stream species preferring riffles, runs and areas with greater diversity of depths and flows. Sixteen of the 22 species absent from this river segment were stream species, including several species of minnows, suckers, and darters (Table 2). Although some stream species were present in this segment, such as Sand Shiner, Bluntnose Minnow, Golden Redhorse, Shorthead Redhorse, and Smallmouth Bass, their abundances were much lower compared to downstream segments. Some species preferring lower gradient, more lake-like conditions were only present in the UPPER segment (Bowfin, Grass Pickerel, Fathead Minnow, Pugnose Minnow, Pumpkinseed) or were more abundant in the UPPER segment when compared to other segments (Gizzard Shad, Emerald Shiner, Yellow Bass, Bluegill, Largemouth Bass).

The MID UPPER segment, which includes the six stations located downstream of the Algonquin Dam, has much higher channel gradients (mean slope=2.0–4.7 ft./mi.) with more suitable habitats for obligate stream fishes. For example, suckers such as Northern Hog Sucker and Silver Redhorse were present in the MID UPPER and absent from the UPPER segment (Table 2). Slenderhead Darter was also collected in the MID UPPER and absent from the UPPER segment. Darters, which generally require higher flows, were more abundant in the MID UPPER than the UPPER segment.

Increased gradient in the MID UPPER is also favorable for sportfish species like Smallmouth Bass and Channel Catfish. Although the MID UPPER segment has higher gradient habitat, much of the habitat is lost due to impoundment by the high number of dams present (Table 1). Throughout the Fox River, 47% of its length is impounded by dams (Santucci et al. 2005). Impounded areas have less habitat and decreased water quality conditions which contribute to impaired status designation (IEPA 2018). The dams also fragment the river, limiting fishes access to foraging and spawning areas while inhibiting seasonal movement for migratory species. The MID UPPER segment also has both higher urban development and point and non-point pollution sources. Past water quality problems (prior to the Clean Water Act 1972) may have led to the local extirpation of several sensitive species. Despite improved water quality conditions, the presence of multiple dams in this segment inhibits recolonization.

Species absent from the MID UPPER segment but present in the free-flowing MID LOWER segment include more sensitive species: Rosyface Shiner, Southern Redbelly Dace, Hornyhead Chub, Rainbow Darter, Highfin Carpsucker, and Black Redhorse, as well as River Carpsucker and Blacknose Dace (Table 2). In a study of the impact of mainstem dams on Fox River fish assemblages, Santucci et al. (2005) described this condition as “discontinuous distribution”. The study noted that dams influenced the distribution of 30% of Fox River fish species and impacted water quality conditions. Additionally, with no dams present for over 30 miles of the MID LOWER segment, more free flowing, higher quality habitat is available.

Only one station was sampled in the LOWER segment downstream of the Dayton Dam. Therefore, species richness was lower, but many of the stream species collected in the upstream segments were present. Only three species were unique to the LOWER segment in 2022: Shortnose Gar, Sauger and Silver Carp (Table 2). Bighead Carp, another of the invasive carps, was collected in this segment in 2017. Santucci et al. (2005) reported other large river species in the LOWER segment including American Eel, Mooneye, Skipjack Herring, and Speckled Chub.

Differences in fish species composition among the designated river segments were apparent in the NMDS plot (Figure 2). Stations in the UPPER segment grouped together separate from the other segments. The MID UPPER stations also grouped together with the stations in the furthest downstream portion of the segment (DT-13, DT-03) grouping closely with the MID LOWER stations. The single station in the LOWER segment, downstream of the Dayton Dam, plotted separate from all other stations.

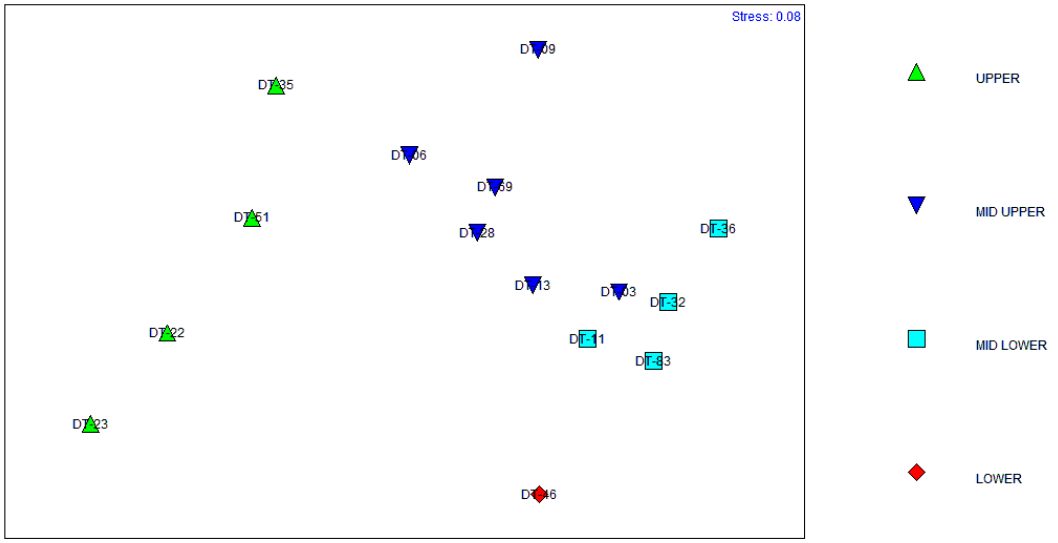

Figure 2. Non-metric multidimensional scaling plot of log transformed species abundance for the 15 Fox River stations. River segments were used as factors and are designated in the legend. Stations grouping closer together have more similar fish assemblages.

Differences in stream gradient, habitat, and fragmentation due to dams appeared to have a strong influence on the distribution of species within the Fox River mainstem. Only 16 of the 64 species were present in all river segments. Among many of those species, differences in abundance between the segments were evident (Table 2). Furthermore, 19 of 64 species were collected in only one segment, further highlighting the discontinuous distribution of fish species in the Fox River.

Stream Quality - Index of Biotic Integrity. Fox River mainstem IBI scores ranged from 28 at DT-23 in McHenry to 58 at DT-11 in Yorkville (Figure 3; Table 3). Metrics used in calculating IBI scores are based on species presence, abundance, and composition of the fish assemblage at each station. Therefore,

longitudinal trends for IBI scores are similar to trends discussed in the *Species distribution and abundance* section above. As observed in previous surveys, IBI scores and stream quality improved along the longitudinal gradient from UPPER to LOWER (Figure 3). Stations in the UPPER segment above the Algonquin Dam had the lowest IBI scores (mean=31). IBI scores were higher in the MID UPPER segment, with a mean IBI of 42. Mean IBI score for the free-flowing MID LOWER segment was 47, with the highest score of 58 at DT-11 in Yorkville. The one station sampled in the LOWER segment below Dayton Dam (DT-46) had an IBI score of 52. Mean annual IBI scores for the Fox River have been consistent during the six basin surveys since 1996, ranging from 38 to 42 over that period with four of the six basin surveys having a mean IBI score of 41 (Table 3). Conversely, mean annual IBI scores for the nearby Kankakee River, which is also a tributary of the Illinois River, range from 46 to 53 over the course of six basin surveys (Pescitelli and Widloe 2021). The multitude of dams and highly urban watershed, particularly in the upper and mid Fox River watershed, are key factors preventing the Fox River from obtaining IBI scores comparable to that of the Kankakee River.

Lower quality, impaired conditions in the UPPER segment can be attributed in part to hydrologic modification due to the presence of the Algonquin dam, which raises water levels throughout this low gradient segment. Stream banks have been modified for boat docks and river access, thereby eliminating wetland areas and natural shoreline. In addition, this segment is heavily utilized by motorboats which likely impacts habitat and water quality as well. Despite higher channel gradients in the MID UPPER segment much of the area remains impaired. Three of the six IBI scores in this segment were less than 41 (the IEPA threshold for “Full Support of Aquatic Life”), likely due to modification of riverbanks and the multitude of dams. The dams eliminate natural stream habitat, and cause water quality degradation from increased algal growth in the impounded areas. High nutrient loading from wastewater effluents combined with slow moving water in the dam pools promotes excessive algal growth and oxygen depletion, especially in the summer months (Santucci et al. 2005). IBI scores were higher in the MID LOWER and LOWER segments, which are mostly free flowing with the exception of the dam at Dayton. In addition, urbanization and stream bank modification is less prevalent in these segments.

A change in IBI exceeding 10 points, the threshold defined as a “biologically meaningful difference” (Smogor 2004), occurred at DT-09 in South Elgin in 2022 (Table 3). This particular site is difficult to maneuver by boat even at normal flows. When this station was sampled in 2022, flow was below that of the median, thereby impacting sampling efficiency. IBI scores have been lower in recent surveys at both Sheridan (DT-83) and Wedron (DT-36) (Figure 3, Table 3). However, no changes in habitat were observed at these locations.

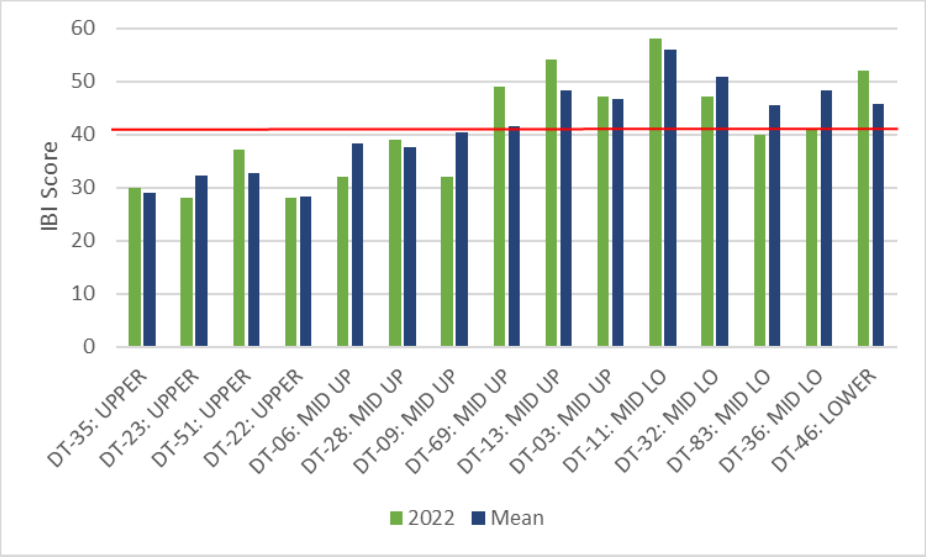

Figure 3. IBI scores for the Fox River sampling stations in 2022, including the mean IBI score for each station. Stations are arranged from upstream (left) to downstream (right). The red line indicates the IEPA threshold for “Full Support of Aquatic Life” (IBI ≥ 41).

Table 3. IBI scores for the Fox River mainstem stations sampled 1996-2022. Stations are arranged from upstream (top) to downstream (bottom). Stations without an IBI score were not sampled during that given year.

Station Code	Location	1996	2002	2007	2012	2017	2022	Mean
DT-35	Antioch, Rt. 173		30	30	29	26	30	29
DT-23	McHenry, Rt 120			42	27		28	32
DT-51	McHenry Dam			35	31	28	37	33
DT-22	Crystal Lake, Rt 176	22	33	30	29	27	28	28
DT-06	Algonquin		36	41	42	40	32	38
DT-28	Elgin, I-90	31	38	39	35	43	39	38
DT-09	South Elgin, Route 20			37	49	43	32	40
DT-69	Batavia, Fabyan Park	44	44	33	38	41	49	42
DT-13	Aurora, Hurds Island			43	43	53	54	48
DT-03	Oswego, Rt. 34	45	52	43	43	50	47	47
DT-11	Yorkville, Route 47				56	54	58	56
DT-32	Millbrook			52	54	50	47	51
DT-83	Sheridan			49	43	50	40	46
DT-36	Wedron	49	52	58	50	39	41	48
DT-46	Dayton			47	40	44	52	46
	Mean	38	41	41	41	42	41	41

Sportfish. Largemouth Bass preferred the lake-like conditions in the UPPER segment upstream of the Algonquin Dam. Catch rate in this segment was 26 fish/hr., compared to an average of two fish/hr. in the downstream segments (Table 2). Typical of riverine environments, the size distribution for Largemouth Bass was skewed toward smaller individuals with 74% of fish less than 12 inches in length. Bluegill were also more abundant in the UPPER segment with a catch rate of 41 fish/hr., compared to an average of 13 per hour in the downstream segments (Table 2). Catch rate for Walleye was low throughout the Fox River, with a mean CPUE of four fish/hr. Catch rate was highest at Oswego (DT-03) and Yorkville (DT-11) (Table 4). Thirty-seven percent (37%) of the Walleye collected were greater than 15 inches in length. Flathead Catfish were present at 12 of 15 stations, though abundance was low, with a mean CPUE of four fish/hr. (Table 4). Fifty-eight percent (58%) of Flathead Catfish were greater than 20 inches in length; the largest individual collected was 39 inches at DT-06. Higher catch rates (10-20 fish/hr.) have been recorded from targeted studies using low frequency, low amperage pulsed-DC electrofishing (Pescitelli and Rung 2013). As in previous surveys, Smallmouth Bass was the most abundant sportfish in the Fox River. Preferring higher gradient habitats, Smallmouth Bass were more abundant in the MID UPPER segment, with a catch rate of 89 fish/hr. DT-09 and DT-06 had the highest catch rates for Smallmouth Bass (Table 4). Catch rate was lower in the downstream segments (mean CPUE=34 fish/hr.), which have slightly lower stream gradients. Twenty-six percent (26%) of the Smallmouth Bass collected were greater than 11 inches in length. Channel Catfish also preferred the higher gradient segments downstream of Algonquin. There they averaged 24 fish/hr., compared to eight per hour in the UPPER segment. Sixty-two percent (62%) of Channel Catfish were greater than 16 inches in length; 23% of those individuals were greater than 24 inches.

Table 4. Catch per unit effort (CPUE; no. fish/hr.) for select sportfish from the Fox River in 2022, including total number of sportfish collected at each sampling station.

Station code	Location	Total No.	Smallmouth Bass	Channel Catfish	Bluegill	Largemouth Bass	Walleye	Flathead Catfish
DT-35	Antioch, Rt. 173	57	20	9	24	2	0	2
DT-23	McHenry, Rt. 120	74	2	4	53	14	1	0
DT-51	McHenry Dam	106	5	9	33	54	3	2
DT-22	Burton's Bridge, Rt. 176	103	0	9	55	34	2	3
DT-06	Algonquin Dam	164	103	28	20	4	2	7
DT-28	Elgin, I-90	155	93	17	35	2	2	6
DT-09	South Elgin, State St	128	164	111	14	2	0	5
DT-69	Batavia, Fabyan Park	151	93	20	32	5	1	0
DT-13	Aurora, Hurds Island	101	57	6	28	9	1	0
DT-03	Oswego, Rt. 34	92	63	13	1	1	16	12
DT-11	Yorkville, Rt. 47	92	52	11	14	1	12	2
DT-32	Millbrook	100	42	38	5	0	9	6
DT-83	Sheridan	74	25	31	0	0	6	12
DT-36	Wedron	64	10	52	0	1	0	1
DT-46	Dayton Dam	65	34	15	12	0	0	4
	Mean	102	51	25	22	9	4	4
	Total	1526						

Tributaries

Species distribution and abundance. Fox River tributary stations yielded 24,239 fish, representing 62 species in 2022 (Table 5; Table A-3; Table A-5). Four State Threatened fish species were collected: American Brook Lamprey, Mottled Sculpin, Ozark Minnow and Blackchin Shiner. American Brook Lamprey was collected in Boone Creek. This was the first time they were collected at this location since 1996. Mottled Sculpin were present at seven sites. Although rare throughout most of the state, 711 individuals were collected throughout the Fox River basin. Ozark Minnow, a rare species for the Fox River basin, was collected at two stations on Somonauk Creek (DTB-04, DTB-02), where an isolated population was first documented in 2007. This species was previously found only in the Driftless Region of northeastern Illinois (Smith 2002). One Blackchin Shiner was collected from North Branch Nippersink Creek. This species is restricted to glacial lakes and tributaries of the Fox and Des Plaines Rivers (Metzke et al 2022).

Similar to the Fox River mainstem, minnows were the most diverse family with 21 native species, accounting for 66% of the total abundance (Table A-3; Table A-5). Darters (family Percidae), sunfishes, and suckers were the next most abundant families, accounting for 29% of the fish collected. The five most abundant species were Bluntnose Minnow, Spotfin Shiner, Sand Shiner, Banded Darter, and Hornyhead Chub. Abundance and species richness were variable among sampling locations in 2022. Mean species richness for all stations was 21, ranging from 10 at Boone Creek to 30 at Indian Creek (Table 5; Table A-5). Mean abundance was 932, ranging from 244 at Otter Creek to 3,355 at Somonauk Creek (DTB-01) (Table 5; Table A-5). Tributaries in the northern part of the watershed, with the exception of Nippersink Creek, are smaller than the southern portion which generally had greater abundance and species richness. Mean species richness and abundance in the southern portion of the watershed was 24 and 1,250, respectively, compared to 19 and 561 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, and the presence of dams.

An example of the impacts of dams on tributary streams is evident in Blackberry Creek. A dam formerly located approximately 0.2 miles upstream from the confluence with the Fox River was removed in 2013. Several species have returned to the creek including suckers (Shorthead Redhorse, Quillback, Silver Redhorse), darters (Banded Darter, Orangethroat Darter, Rainbow Darter), minnows (Rosyface Shiner, Largescale Stoneroller), as well as Smallmouth Bass. The former dam prevented fish movement from the Fox River. Prior to dam removal, species richness was lower in Blackberry Creek compared to nearby Fox River tributaries without dams (Pescitelli 2016).

Stream Quality - Index of Biotic Integrity. Fox River tributary stations had a mean IBI score of 45, ranging from 23 on Boone Creek to 56 on Big Rock Creek (DTC-07) (Table 5). Stream quality at tributary sites was influenced by longitudinal position in the watershed, instream habitat, flow, and land use. The IBI scores were lower for tributaries in the northern portion of the watershed (mean=39). Six of 12 stations scored below the threshold for "Full Support of Aquatic Life" (IBI ≥ 41; Smogor 2004) (Table 5; Figure 4). In contrast, the mean IBI for southern stations was 50, with only one of the 14 stations (DTB-02, Somonauk Creek) scoring below 41 (Table 5; Figure 4).

Nippersink Creek is one of the larger stream systems in the Fox River basin and has maintained good stream quality in the lower reach at DTK-04 with IBI scores routinely above 41 (Table 6). Results at the North Branch station (DTKA-03) indicated moderate impairment in 2017 (IBI=30) but improved dramatically in 2022 (IBI=48) due to better sampling conditions. DTK-09 has consistently been lower quality, despite diverse habitat conditions (mean IBI=29). This station is upstream of Wonder Lake and suffers from lack of connection to downstream fish recruitment sources. Boone, Silver (not sampled in 2022), and Flint Creeks are smaller, low gradient streams impacted by channel modifications resulting in lower IBI scores (Table 5; Table 6). These streams also drain into a low gradient, impounded section of the Fox River which has lower fish species richness than the free-flowing segments downstream. Crystal Creek enters the Fox River just below the Algonquin Dam but has a heavily developed watershed, which includes impoundments upstream. Stream restoration efforts near the mouth have improved habitat. Large numbers of Smallmouth Bass were collected at this site (*N*=120).

Despite extensive urban development throughout much of the Tyler Creek watershed, station DTZP-04 (upstream of Randell Road) has maintained good conditions (mean IBI=46). This station is in a segment buffered by wooded forest preserve land. Station DTZP-06, located approximately 2 miles upstream, is downstream of a heavily urbanized area. Increased runoff from impervious surfaces, along with a bridge replacement project upstream in the early 2000s caused excessive scouring and channel degradation, reflected by the IBI score of 32 in 2017 (Table 6). Although there was improvement in 2022 (IBI=42), recent scores at this site are much lower than that of pre urban development. In 1995, many darters and other sensitive species were present resulting in an IBI score of 53 (Pescitelli and Rung 2011).

Table 5. Results of fish collections at Fox River tributary sampling stations including station codes, stream name, total fish abundance, number of species, and index of biotic integrity scores (IBI).

Station Code	Stream	Total No.	No. Species	IBI
DTKA-03	N. BRANCH NIPPERSINK CK.	308	23	48
DTK-09	NIPPERSINK CREEK	606	18	33
DTK-04	NIPPERSINK CREEK	347	28	46
DTZT-02	BOONE CREEK	426	10	23
DTZS-01	FLINT CREEK	730	23	30
DTZR-02	CRYSTAL CREEK	435	20	40
DTZP-06	TYLER CREEK	407	16	42
DTZP-04	TYLER CREEK	816	17	48
DTG-05	POPLAR CREEK	286	18	44
DTFA-01	OTTER CREEK	244	21	38
DTF-02	FERSON CREEK	1742	20	44
DTZL-05	MILL CREEK	388	12	34
DTD-03	BLACKBERRY CREEK	797	22	46
DTD-02	BLACKBERRY CREEK	400	22	46
DTD-01	BLACKBERRY CREEK	606	27	48
DTC-07	BIG ROCK CREEK	512	25	56
DTC-05	BIG ROCK CREEK	656	20	50
DTCA-08	LITTLE ROCK CREEK	1552	26	55
DTCA-01	LITTLE ROCK CREEK	1354	21	52
DTB-04	SOMONAUK CREEK	2575	18	41
DTB-02	SOMONAUK CREEK	1565	23	40
DTB-01	SOMONAUK CREEK	3355	29	51
DTAB-03	LITTLE INDIAN CREEK	337	18	49
DTA-09	INDIAN CREEK	1066	30	54
DTA-08	INDIAN CREEK	646	26	55
DTZB-02	BUCK CREEK	2083	24	52
	Total	24239	62	-
	Mean	932	21	45

Despite being located in the highly urbanized Elgin area, the station on Poplar Creek also appears to benefit from nearby wooded corridors and forest preserves both up- and downstream with a mean IBI score of 46. The station on Ferson Creek is in a higher gradient segment within LeRoy Oakes Forest Preserve (mean IBI=47) (Table 6). In contrast, the station upstream on Otter Creek, which is a previously channelized, lower gradient tributary to Ferson Creek, has a series of large housing developments upstream. The incised channel has little habitat available with extensive siltation and lower quality IBI ratings as a result (mean IBI=35) (Table 6). The station on upper Mill Creek is a small, previously channelized stream that is impacted by a large instream impoundment downstream (Mooseheart Lake) that prevents recruitment from the Fox River. Mean IBI at this station is low as a result (35). Stations on Blackberry Creek have good habitat but historically had IBI scores below 41 (Table 6). Since removal of the dam located near the confluence with the Fox River in 2013, IBIs at both stations improved to 46 in 2022. The importance of downstream connectivity and the impact of tributary dams was also observed on Somonauk Creek. Stations upstream Lake Holiday (DTB-04, DTB-02) had IBI scores of 41 and 40, respectively. The station downstream of Lake Holiday (DTB-01), with direct connection to the Fox River, had an IBI score of 52.

Tributary IBI scores were higher in the less urbanized areas of DeKalb, Kendall, and LaSalle Counties, which includes previously discussed Blackberry and Somonauk Creeks. IBI scores in this part of the watershed ranged from 40 to 56 (mean=50) (Table 5; Figure 6). Big Rock Creek has a connection to a high-quality downstream recruitment source as well as diverse instream habitat and cool 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 approximately 1 mile upstream from its confluence with Big Rock Creek. That dam is a damaged sheet pile dam that does not form a complete barrier and appears to be passable at most stream levels. Little Indian, Indian and Buck Creeks are high quality streams, free of dams. Mean IBI score for the four stations located along those creeks is 53.

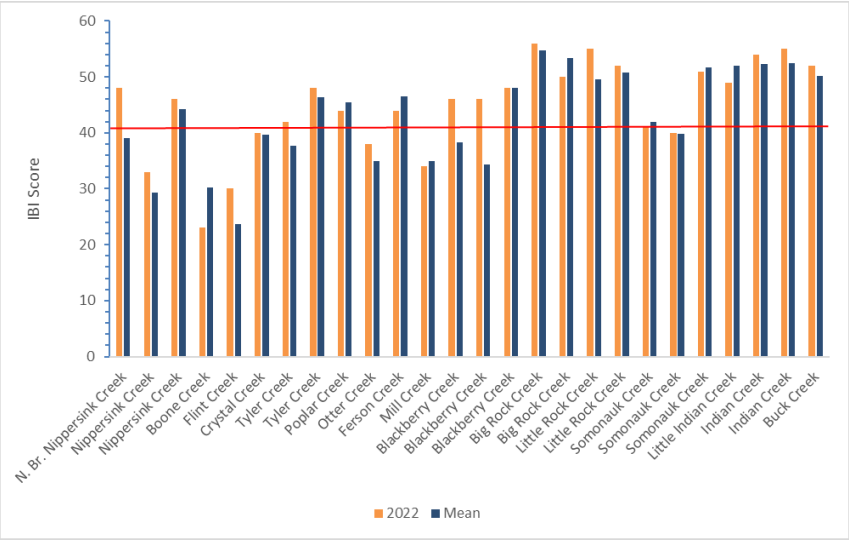

Figure 4. IBI scores for the Fox River tributary sampling stations in 2022, including the mean IBI score for each station. Stations are arranged from upstream (left) to downstream (right) within the watershed. The red line indicates the IEPA threshold for “Full Support of Aquatic Life” (IBI≥41).

Table 6. IBI scores for the Fox River tributary stations sampled 1996-2022. Stations are arranged from upstream (top) to downstream (bottom) within the Fox River watershed. Stations without an IBI score were not sampled during that given year.

Station code	Location	1996	2002	2007	2012	2017	2022	Mean
DTKA-03	N. Br. Nippersink Creek					30	48	39
DTK-09	Nippersink Creek			31	27	26	33	29
DTK-04	Nippersink Creek	50	43	38	41	47	46	44
DTZT-02	Boone Creek	30	23	36	36	33	23	30
DTZZB-01	Silver Creek				29	31		30
DTZS-01	Flint Creek	27	28	21	13	23	30	24
DTZR-02	Crystal Creek				41	38	40	40
DTZP-06	Tyler Creek			39		32	42	38
DTZP-04	Tyler Creek	39	47	50	46	48	48	46
DTG-05	Poplar Creek		41		49	48	44	46
DTFA-02	Otter Creek			29	38	35	38	35
DTF-02	Ferson Creek	48	44	48	45	50	44	47
DTZL-05	Mill Creek					36	34	35
DTD-03	Blackberry Creek			34	34	39	46	38
DTD-02	Blackberry Creek	37	31	27	28	37	46	34
DTD-01	Blackberry Creek						48	48
DTC-07	Big Rock Creek	48	58	53	57	56	56	55
DTC-05	Big Rock Creek		56	55	57	49	50	53
DTCA-O8	Little Rock Creek			44	48	51	55	50
DTCA-01	Little Rock Creek	44	54	50	52	53	52	51
DTB-04	Somonauk Creek			44	38	45	41	42
DTB-02	Somonauk Creek			40	38	41	40	40
DTB-01	Somonauk Creek			56	50	50	51	52
DTAB-03	Little Indian Creek					55	49	52
DTA-09	Indian Creek			53	51	51	54	52
DTA-08	Indian Creek	55	51	58	38	58	55	53
DTZB-02	Buck Creek	46	51	54	42	56	52	50
	Mean	42	44	43	41	43	45	43

Similar to the mainstem, tributary IBI scores have remained relatively stable during the six basin surveys since 1996. Mean annual IBI scores range from 41 to 45 over that period (Table 6). Seven changes in IBI exceeding 10 points, the threshold defined as a “biologically meaningful difference” (Smogor 2004), occurred over that period. Boone and Flint Creek are both degraded creeks where variable IBIs are not uncommon, likely due to water levels and other localized stressors. Decreased IBI scores in 2012 on lower Indian Creek (DTA-08) and Buck Creek were due to exceptionally low flow conditions. While we have observed intact fish assemblages in other streams with very low flows, both stations were heavily grazed by cattle. As a result, refuge pools were highly nutrified by cattle waste, creating algal blooms and low dissolved oxygen levels. Conversely, high flows during the 2017 survey on the North Branch Nippersink Creek resulted in a poor fish collection and a low IBI. Normal flows during the 2022 survey yielded a more representative sample.

Sportfish. Smallmouth Bass was the most abundant sportfish at Fox River tributary stations (*N*=732) Smallmouth Bass were collected at 23 of the 26 tributary stations (Table A-5). Tributaries served as spawning and nursery areas with YOY and age 1 fish representing 57% (*N*=419) of the total catch. Thirty-one percent (31%; *N*=228) of Smallmouth Bass collected were seven inches in length or greater, with 75 of those fish 11 inches in length or greater. Stations on smaller, low gradient tributaries and/or those stations fragmented from the Fox River by dams typically had few if any Smallmouth Bass present. Crystal Creek was the best tributary site for Smallmouth Bass with 20 individuals 11 inches in length or greater. One 18-inch Smallmouth Bass was collected from Little Rock Creek (DTCA-08). Bluegill was the second most abundant sportfish (*N*=613), occurring at 19 of the 26 stations (Table A-5). YOY and adults less than three inches in length comprised 65% (*N*=398) of the Bluegill collected. Eight percent (8%; *N*=50) of Bluegill collected were 5 inches in length or greater. One hundred eighty-one (181) Largemouth Bass were collected at 22 tributary stations. Seven percent (7%; *N*=12) of which were larger than 7 inches, with 3 fish over 11 inches. Seventy-eight (78) channel catfish were collected at 11 tributary stations, ranging from two

to 27 inches in length. Thirty-nine (39) Channel Catfish 16 inches in length or greater were collected with four individuals over 24 inches. The largest Channel Catfish was collected from Blackberry Creek.

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. Of the 76 native fish species collected during the 2022 Fox River basin survey, four State threatened species were present: American Brook Lamprey, Mottled Sculpin, Ozark Minnow and Blackchin Shiner. River Redhorse, a State threatened sucker species, was last captured during the 2002 basin survey when only one individual was identified (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 have been documented below the large, impassable dam at Dayton. Longitudinal position in the watershed, stream gradient, presence of dams and level of urban land use influenced species distribution and richness in both the mainstem and tributaries.

A range of stream quality ratings were calculated for 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 2022 at most mainstem and tributary locations. Mean IBI scores over that period ranged from 38 to 42 and 41 to 45 at mainstem and tributary stations, respectively.

Sportfish were common in most areas of the Fox River. Smallmouth Bass were abundant, providing ample angling opportunities, especially at the higher gradient locations. The presence of many YOY Smallmouth Bass indicates successful reproduction and recruitment, with tributaries providing important spawning and nursery habitat. Channel Catfish and Bluegill were widespread throughout the mainstem with many large fish present. Walleye, Flathead Catfish and Largemouth Bass are present throughout the river, but in lower numbers. A more intensive study was conducted 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 Fox River Study Group (FRSG) 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 low head dams along the Fox River.

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.

References

Bayley, R. R., R. W. Larimore, and D. C. Dowling. 1989. Electric seine as a fish sampling gear in streams. Transactions of the American Fisheries Society 118:447-453.

Bray, J. R. and J. T. Curtis. 1957. An ordination of the upland forest communities of Wisconsin. Ecological Monographs 27:325-349

Illinois Department of Natural Resources. 1998. Fox River Area Assessment. Volume 2.: Water Resources. Office of Scientific Research and Analysis, Illinois State Water Survey, Champaign, Illinois.

Illinois Environmental Protection Agency. 2018. Integrated Water Quality Report and 303d List. Springfield, Illinois https://www2.illinois.gov/epa/Documents/iepa/water-quality/watershed-management/tmdls/2018/303d-list/appendix-a-2.pdf

Kwak, T. J., and Peterson, J. T. 2007. Community indices, parameters, and comparisons. In C. S. Guy & M. L. Brown (Eds.) Analysis and interpretation of freshwater fisheries data. (pp. 677-763). Bethesda, MD: American Fisheries Society.

Metzke, Brian A., Brooks M. Burr, Leon C. Hinz Jr, Lawrence M. Page, and Christopher A. Taylor. 2022. An atlas of Illinois fishes: 150 years of change. University of Illinois Press.

Pescitelli, Stephen. 2016. Evaluation of the Blackberry Creek Dam Removal on Stream Fish Assemblages. Illinois American Fisheries Society Annual Meeting, Springfield, Illinois.

Pescitelli, Stephen and Robert Rung. 2004. 2002 Fox River Basin Survey: Fish Community Sampling. Illinois Department of Natural Resources, Northeastern Illinois Streams Program, Plano, Illinois.

Pescitelli, Stephen and Robert Rung. 2011. Status of Fish Assemblages in Tyler Creek: Effects of Natural and Human Factors 1995-2007. Illinois American Fisheries Society Annual Meeting, Peoria, Illinois.

Pescitelli, Stephen and Robert Rung. 2013. Evaluation of Fox River Flathead Catfish Populations. Illinois Department of Natural Resources, Northeastern Illinois Streams Program, Plano, Illinois.

Pescitelli, Stephen and Tristan Widloe. 2021. Evaluation of Stream Quality and Sport Fisheries in the Kankakee River Basin. Illinois Department of Natural Resources, Northeastern Illinois Streams Program, Plano, Illinois.

Santucci, V. J., Jr. and S. R. Gephard. 2003. Fox River Fish Passage Feasibility Study. Max McGraw Wildlife Foundation, Dundee, Illinois.

Santucci, V. J., Jr., S. R. Gephard, and S. M. Pescitelli. 2005. Effects of multiple low-head dams on fish, macroinvertebrates, habitat, and water quality in the Fox River, Illinois. North American Journal of Fisheries Management 23: 975-992.

Smith, Philip Wayne. 2002. The Fishes of Illinois. University of Illinois Press.

Smogor, R. 2004. Manual for Calculating Index of Biotic Integrity Scores for Streams in Illinois. Illinois Environmental Protection Agency, Bureau of Water, Springfield, Illinois.

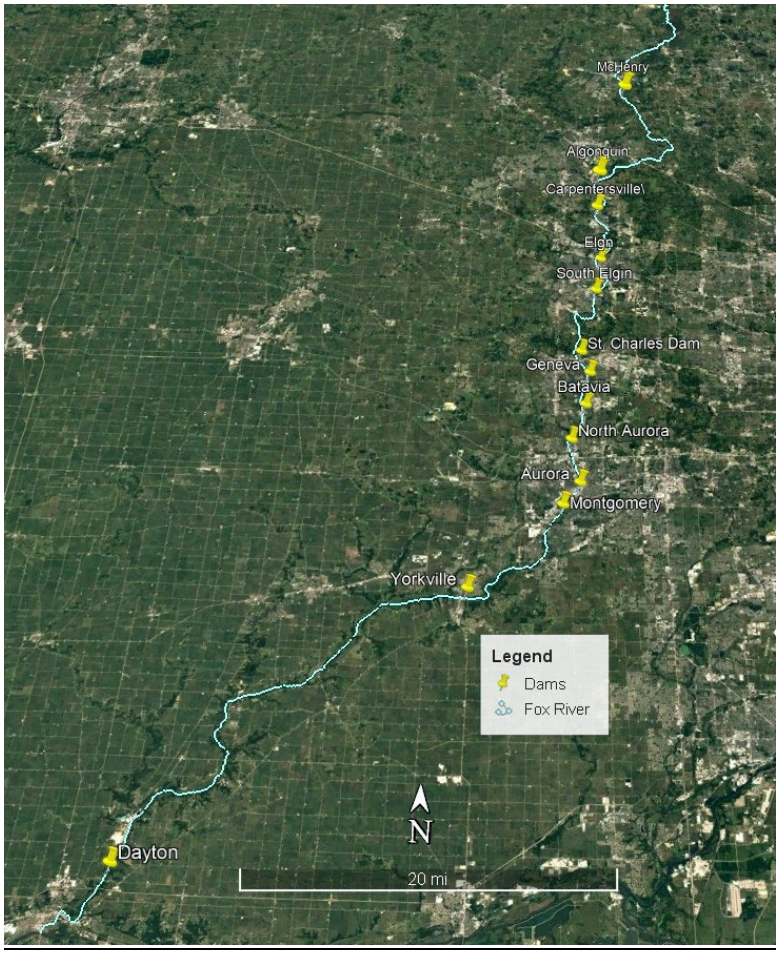

Figure A-1. Fox River dams.

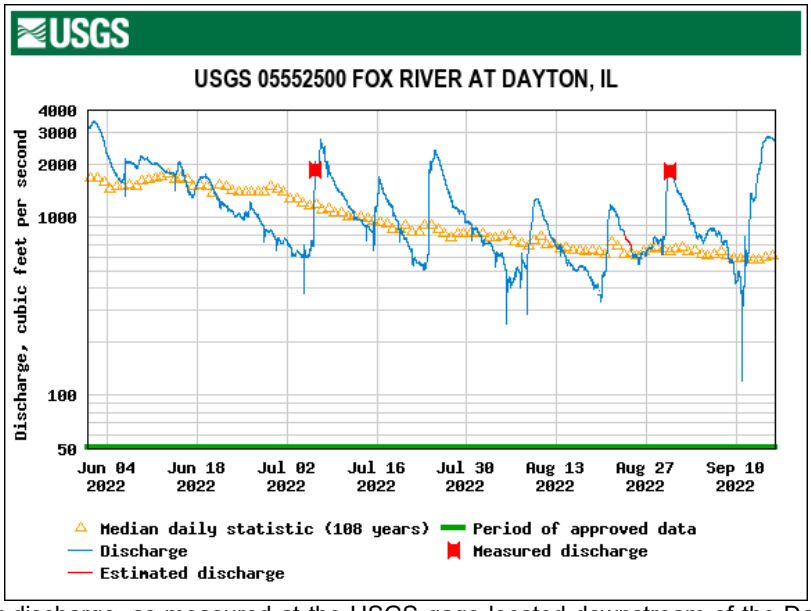

Figure A-2. Fox River discharge, as measured at the USGS gage located downstream of the Dayton Dam, during the sampling period of the 2022 Fox River survey.

Table A-1. Location information for the 2022 Fox River basin survey sampling stations.

IEPA Code	Stream	Location	County	Latitude	Longitude
DT-35	Fox River	Antioch, Rt. 173	Lake	42.47899	-88.1785
DT-23	Fox River	McHenry, Rt 120	McHenry	42.34408	-88.2607
DT-51	Fox River	McHenry Dam	McHenry	42.30526	-88.2482
DT-22	Fox River	Crystal Lake, Rt 176	McHenry	42.27954	-88.22692
DT-06	Fox River	Algonquin	McHenry	42.16148	-88.29378
DT-28	Fox River	Elgin, I-90	Kane	42.08422	-88.28039
DT-09	Fox River	South Elgin, Route 20	Kane	41.99427	-88.29427
DT-69	Fox River	Batavia, Fabyan Park	Kane	41.87151	-88.30833
DT-13	Fox River	Aurora, Hurds Island	Kane	41.74776	-88.32666
DT-03	Fox River	Oswego, Rt. 34	Kendall	41.68525	-88.35637
DT-11	Fox River	Yorkville, Route 47	Kane	41.64361	-88.4465
DT-32	Fox River	Millbrook	Kendall	41.61745	-88.5576
DT-83	Fox River	Sheridan	LaSalle	41.53816	-88.68706
DT-36	Fox River	Wedron	LaSalle	41.4445	-88.75953
DT-46	Fox River	Dayton	LaSalle	41.38635	-88.78959
DTKA-03	N Br Nippersink Creek	RT 173 Forest Preserve	McHenry	42.48667	-88.32234
DTK-09	Nippersink Creek	Greenwood Road	McHenry	42.38767	-88.39083
DTK-04	Nippersink Creek	Spring Grove	McHenry	42.44245	-88.23786
DTZT-02	Boone Creek	Bull Valley Rd	McHenry	42.32066	-88.31258
DTZS-01	Flint Creek	Kelsey Rd	Lake	42.2111	-88.17345
DTZR-02	Crystal Creek	Algonquin	McHenry	42.16669	-88.29252
DTZP-06	Tyler Creek	Big Timber Road	Kane	42.07107	-88.35734
DTZP-04	Tyler Creek	Upstream Randall Road	Kane	42.05688	-88.33801
DTG-05	Poplar Creek	Jay St, 0.2 mi N of Rt 20 Elgin	Cook	42.02258	-88.25795
DTFA-01	Otter Creek	Wetland Slvr Gl Rd	Kane	41.97018	-88.3563
DTF-02	Ferson Creek	LeRoy Oakes FP	Kane	41.93328	-88.3411
DTZL-05	Mill Creek	Garfield Farm	Kane	41.9061	-88.4052
DTD-03	Blackberry Creek	Bliss Woods FP	Kane	41.78642	-88.44955
DTD-02	Blackberry Creek	Off Kennedy Rd in Yorkville	Kendall	41.67996	-88.42124
DTD-01	Blackberry Creek	US former dam site	Kendall	41.64662	-88.45401
DTC-07	Big Rock Creek	Jericho Rd 5 mi NNE Plano	Kane	41.73777	-88.51049
DTC-05	Big Rock Creek	Main St Plano	Kendall	41.66644	-88.52401
DTCA-08	Little Rock Creek	Galena Rd in Little Rock	Kendall	41.7167	-88.5807
DTCA-01	Little Rock Creek	Burr Oak Rd Plano	Kendall	41.6406	-88.55684
DTB-04	Somonauk Creek	Creek Rd W Somonauk Rd	DeKalb	41.7047	-88.6522
DTB-02	Somonauk Creek	Rt 34 bridge 1 mi E Somonauk	DeKalb	41.63952	-88.65258
DTB-01	Somonauk Creek	N 42nd Rd bridge 1 mi N Sheridan	LaSalle	41.5436	-88.68675
DTAB-03	Little Indian Creek	#9 E 21st Rd	LaSalle	41.59026	-88.75547
DTA-09	Indian Creek	Suydam Rd 300 N	DeKalb	41.6707	-88.8599
DTA-08	Indian Creek	County Rd 4150 N	LaSalle	41.53559	-88.85206
DTZB-02	Buck Creek	E 19th Rd 1.5 mi W Wedron	LaSalle	41.43661	-88.80376

Table A-2. Sampling information for the 2022 Fox River basin survey stations. Sampling methods include BEDC-WI = DC boat electrofishing, ES = electric seine, SH = seine haul, BP = backpack electrofishing.

IEPA Code	Stream	Sampling Date	Sampling Gear	Sampling Time (min)	Seine Hauls (n)	Station Length (ft)	Station Width (ft)
DT-35	Fox River	6/27/2022	BEDC-WI	60	0	4000	190
DT-23	Fox River	6/28/2022	BEDC-WI	60	0	3800	425
DT-51	Fox River	6/23/2022	BEDC-WI, SH	60	3	3000	235
DT-22	Fox River	6/28/2022	BEDC-WI	60	0	4000	460
DT-06	Fox River	6/23/2022	BEDC-WI, SH	60	3	4000	170
DT-28	Fox River	6/22/2022	BEDC-WI, SH	60	3	3800	210
DT-09	Fox River	6/22/2022	BEDC-WI, SH	26	3	2500	300
DT-69	Fox River	6/21/2022	BEDC-WI, SH	60	3	2700	400
DT-13	Fox River	6/21/2022	BEDC-WI, SH	60	3	2500	250
DT-03	Fox River	6/16/2022	BEDC-WI, SH	52	3	1500	280
DT-11	Fox River	6/16/2022	BEDC-WI, SH	58	3	2500	380
DT-32	Fox River	6/15/2022	BEDC-WI, SH	60	3	2800	280
DT-83	Fox River	6/15/2022	BEDC-WI, SH	60	3	2150	260
DT-36	Fox River	6/14/2022	BEDC-WI, SH	60	3	2300	260
DT-46	Fox River	6/14/2022	BEDC-WI, SH	59	3	2600	270
DTKA-03	N Br Nippersink Creek	8/15/2022	ES	30	0	600	40
DTK-09	Nippersink Creek	8/16/2022	ES	29	0	650	30
DTK-04	Nippersink Creek	8/15/2022	BP, BEDC-WI	50	0	1500	60
DTZT-02	Boone Creek	8/16/2022	ES	30	0	650	20
DTZS-01	Flint Creek	8/16/2022	ES	33	0	730	35
DTZR-02	Crystal Creek	8/17/2022	ES	33	0	600	27
DTZP-06	Tyler Creek	8/17/2022	ES	37	0	500	35
DTZP-04	Tyler Creek	8/18/2022	ES	35	0	600	23
DTG-05	Poplar Creek	8/18/2022	ES	43	0	500	25
DTFA-01	Otter Creek	8/23/2022	ES	30	0	600	25
DTF-02	Ferson Creek	8/23/2022	ES	37	0	600	33
DTZL-05	Mill Creek	8/24/2022	ES	32	0	375	14
DTD-03	Blackberry Creek	8/24/2022	ES	34	0	550	26
DTD-02	Blackberry Creek	8/25/2022	ES	37	0	780	32
DTD-01	Blackberry Creek	8/25/2022	ES	50	0	750	33
DTC-07	Big Rock Creek	8/26/2022	ES	43	0	615	42
DTC-05	Big Rock Creek	8/26/2022	ES	57	0	750	47
DTCA-08	Little Rock Creek	8/29/2022	ES	60	0	1038	35
DTCA-01	Little Rock Creek	8/29/2022	ES	55	0	775	44
DTB-04	Somonauk Creek	8/30/2022	ES	50	0	700	38
DTB-02	Somonauk Creek	8/30/2022	ES	60	0	900	47
DTB-01	Somonauk Creek	8/31/2022	ES	60	0	750	45
DTAB-03	Little Indian Creek	8/31/2022	ES	42	0	725	30
DTA-09	Indian Creek	9/2/2022	ES	45	0	660	36
DTA-08	Indian Creek	9/1/2022	ES	37	0	600	47
DTZB-02	Buck Creek	9/1/2022	ES	50	0	300	20

Table A-3. List and abundance of each fish species, with corresponding family name, scientific name, and conservation status, collected during the 2022 Fox River basin survey.

Family	Common name	Scientific name	Conservation status	Tributaries	Mainstem	Total fish
Petromyzontidae	American Brook Lamprey	*Lethenteron appendix*	ST,GN	4		4
Lepisosteidae	Shortnose Gar	*Lepisosteus platostomus*			5	5
	Longnose Gar	*Lepisosteus osseus*			11	11
Amiidae	Bowfin	*Amia calva*			1	1
Clupeidae	Gizzard Shad	*Dorosoma cepedianum*		201	784	985
Umbridae	Central Mudminnow	*Umbra limi*		1		1
Esocidae	Grass Pickerel	*Esox americanus*		1	4	5
	Northern Pike	*Esox lucius*			3	3
	Muskellunge	*Esox masquinongy*			2	2
Xenocyprinididae	Silver Carp	*Hypophthalmichthys molitrix*	NN		50	50
Cyprinidae	Common Carp	*Cyprinus carpio*	NN	62	138	200
Leuciscidae	Golden Shiner	*Notemigonus crysoleucas*		25	24	49
	Southern Redbelly Dace	*Phoxinus erythrogaster*			1	1
	Creek Chub	*Semotilus atromaculatus*		526	6	532
	Hornyhead Chub	*Nocomis biguttatus*		1163	4	1167
	Central Stoneroller	*Campostoma anomalum*		1733	1	1734
	Largescale Stoneroller	*Campostoma oligolepis*	GN	62		62
	Suckermouth Minnow	*Phenacobius mirabilis*		248	9	257
	Blacknose Dace	*Rhinichthys atratulus*		258	1	259
	Striped Shiner	*Luxilus chrysocephalus*		782		782
	Common Shiner	*Luxilius cornutus*		699	4	703
	Redfin Shiner	*Lythrurus umbratilus*		1		1
	Spotfin Shiner	*Cyprinella spiloptera*		2792	3657	6449
	Pugnose Minnow	*Opsopoeodus emiliae*	GN		2	2
	Fathead Minnow	*Pimephales promelas*		17	9	26
	Bluntnose Minnow	*Pimephales notatus*		3614	658	4272
	Bullhead Minnow	*Pimephales vigilax*		11	137	148
	Emerald Shiner	*Notropis atherinoides*		43	155	198
	Rosyface Shiner	*Notropis rubellus*		814	61	875
	Ozark Minnow	*Notropis nubilus*	ST	97		97
	Bigmouth Shiner	*Notropis dorsalis*		751	2	753
	Blackchin Shiner	*Notropis heterodon*	ST	1	1	2
	Sand Shiner	*Notropis stramineus*		2248	4571	6819
	Mimic Shiner	*Notropis volucellus*			6	6
	Spottail Shiner	*Notropis hudsonius*		15	570	585
Catostomidae	Smallmouth Buffalo	*Ictiobus bubalus*			37	37
	Quillback	*Carpiodes cyprinus*		22	875	897
	River Carpsucker	*Carpiodes carpio*			20	20
	Highfin Carpsucker	*Carpiodes velifer*			8	8
	White Sucker	*Catostomus commersoni*		754	2537	3291
	Northern Hog Sucker	*Hypentelium nigricans*		404	153	557
	Shorthead Redhorse	*Moxostoma macrolepidotum*		28	382	410
	Black Redhorse	*Moxostoma duquesnei*		144	18	162
	Golden Redhorse	*Moxostoma erythrurum*		275	172	447
	Silver Redhorse	*Moxostoma anisurum*		5	28	33

Table A-3. Continued.

Family	Common name	Scientific name	Conservation status	Tributaries	Mainstem	Total fish
Ictaluridae	Channel Catfish	*Ictalurus punctatus*		78	308	386
	Yellow Bullhead	*Ameiurus natalis*		60	1	61
	Black Bullhead	*Ameiurus melas*		1		1
	Flathead Catfish	*Pylodictis olivaris*		3	57	60
	Stonecat	*Noturus flavus*		45		45
	Tadpole Madtom	*Noturus gyrinus*		6		6
	Slender Madtom	*Noturus exilis*		17		17
Fundulidae	Blackstripe Topminnow	*Fundulus notatus*		130	65	195
Atherinidae	Brook Silverside	*Labidesthes sicculus*		16	9	25
Moronidae	White Bass	*Morone chrysops*			24	24
	Yellow Bass	*Morone mississippiensis*			10	10
Cottidae	Mottled Sculpin	*Cottus bairdi*	ST	711		711
Centrarchidae	Black Crappie	*Pomoxis nigromaculatus*		12	10	22
	White Crappie	*Pomoxis annularis*		2	1	3
	Rock Bass	*Ambloplites rupestris*		71	10	81
	Largemouth Bass	*Micropterus salmoides*		181	128	309
	Smallmouth Bass	*Micropterus dolomieu*		732	662	1394
	Green Sunfish	*Lepomis cyanellus*		231	18	249
	Bluegill	*Lepomis macrochirus*		613	318	931
	Pumpkinseed	*Lepomis gibbosus*		6	4	10
	Orangespotted Sunfish	*Lepomis humilis*			3	3
	Sunfish hybrid	*Lepomis*		2		2
Percidae	Walleye	*Sander vitreum*		6	53	59
	Sauger	*Sander canadense*			1	1
	Yellow Perch	*Perca flavescens*	GN	3	27	30
	Blackside Darter	*Percina maculata*		12		12
	Slenderhead Darter	*Percina phoxocephala*		3	12	15
	Logperch	*Percina caprodes*		17	27	44
	Johnny Darter	*Etheostoma nigrum*		811	30	841
	Banded Darter	*Etheostoma zonale*		1337	49	1386
	Rainbow Darter	*Etheostoma caeruleum*		539	1	540
	Orangethroat Darter	*Etheostoma spectabile*		222		222
	Fantail Darter	*Etheostoma flabellare*		562		562
Sciaenidae	Freshwater Drum	*Aplodinotus grunniens*		9	159	168
			Total number	24239	17094	41333
			No. native species	61	62	76
			No. non-native species	1	2	2

ST = State threatened, GN = IL Species in Greatest Need of Conservation, NN = Non-native

Table A-4. Number of each species collected at mainstem sampling stations during the 2022 Fox River basin survey. Species are listed in order of total abundance. Stations are arranged in order from upstream (left) to downstream (right).

Common name	Total	No. of stations	C.O.L. State Pk Rt. 173 DT-35	Rt. 120 McHenry DT-23	Dnstrm McHenry Dam DT-51	Burton's Bridge Rt. 176 DT-22	Dnstrm Algonquin Dam DT-06	Elgin I-90 DT-28	S. Elgin State St DT-09	Fabyan Pk Batavia DT-69	Aurora Hurds' Island DT-13	Oswego Rt. 34 DT-03	Yorkville Rt. 47 DT-11	Millbrook DT-32	Sheridan DT-83	Wedron DT-36	Dnstrm Dayton Dam DT-46
Sand Shiner	4571	12	0	0	5	3	0	2073	47	128	183	127	265	931	210	593	6
Spotfin Shiner	3657	14	217	0	893	31	139	347	8	78	213	188	195	606	450	238	54
White Sucker	2537	9	0	1	1	0	2473	19	11	2	1	3	0	0	0	26	0
Quillback	875	12	1	0	428	0	56	70	154	77	12	5	13	15	0	41	3
Gizzard Shad	784	9	1	561	1	207	2	0	0	0	1	0	1	0	3	0	7
Smallmouth Bass	662	14	20	2	5	0	103	93	71	93	57	55	52	42	25	10	34
Bluntnose Minnow	658	13	43	0	0	5	12	83	7	17	26	3	44	180	115	102	21
Spottail Shiner	570	13	101	3	30	2	12	1	372	36	5	0	5	1	1	0	1
Shorthead Redhorse	382	9	0	0	1	0	0	0	0	2	106	80	70	65	33	11	15
Bluegill	318	13	24	53	33	55	20	35	6	32	28	1	14	5	0	0	12
Channel Catfish	308	15	9	4	9	9	28	17	48	20	6	11	11	38	31	52	15
Golden Redhorse	172	10	0	8	0	0	0	6	0	32	9	3	26	27	7	43	11
Freshwater Drum	159	11	11	24	15	30	8	21	0	2	4	2	0	0	2	0	40
Emerald Shiner	155	8	56	44	32	9	0	7	1	3	3	0	0	0	0	0	0
Northern Hog Sucker	153	10	0	0	0	0	0	13	9	3	57	4	25	14	8	17	3
Common Carp	138	15	25	3	8	18	6	10	6	8	1	6	20	9	7	2	9
Bullhead Minnow	137	8	0	0	0	0	0	1	0	0	1	1	27	74	26	6	1
Largemouth Bass	128	12	2	14	54	34	4	2	1	5	9	1	1	0	0	1	0
Blackstripe Topminnow	65	5	1	0	0	0	0	0	2	5	0	0	0	45	0	12	0
Rosyface Shiner	61	5	0	0	0	0	0	0	0	0	0	0	1	2	3	39	16
Flathead Catfish	57	12	2	0	2	3	7	6	2	0	0	10	2	6	12	1	4
Walleye	53	11	0	1	3	2	2	2	0	1	1	14	12	9	6	0	0
Silver Carp	50	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
Banded Darter	49	8	0	0	1	0	8	2	0	1	1	0	16	10	10	0	0
Smallmouth Buffalo	37	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	35
Johnny Darter	30	7	1	0	0	0	9	0	0	0	2	0	3	3	5	7	0
Silver Redhorse	28	9	0	0	0	0	5	3	0	1	3	2	7	2	4	0	1
Yellow Perch	27	5	0	3	0	8	1	14	0	1	0	0	0	0	0	0	0
Logperch	27	8	0	0	0	3	3	8	2	5	3	0	1	0	0	0	2
Golden Shiner	24	5	0	3	8	0	3	7	0	3	0	0	0	0	0	0	0

Table A-4. Continued.

Common name	Total	No. of stations	C.O.L. State Pk Rt. 173 DT-35	Rt. 120 McHenry DT-23	Dnstrm McHenry Dam DT-51	Burton's Bridge Rt. 176 DT-22	Dnstrm Algonquin Dam DT-06	Elgin I-90 DT-28	S. Elgin State St DT-09	Fabyan Pk Batavia DT-69	Aurora Hurds' Island DT-13	Oswego Rt. 34 DT-03	Yorkville Rt. 47 DT-11	Millbrook DT-32	Sheridan DT-83	Wedron DT-36	Dnstrm Dayton Dam DT-46
White Bass	24	6	0	12	1	0	0	2	0	7	0	1	0	0	0	0	1
River Carpsucker	20	3	0	0	0	0	0	0	0	0	0	0	6	0	1	0	13
Black Redhorse	18	4	0	0	0	0	0	0	0	0	0	0	2	4	0	10	2
Green Sunfish	18	8	0	1	3	1	0	0	0	0	6	0	3	1	1	0	2
Slenderhead Darter	12	6	0	0	0	0	1	2	2	0	0	0	5	0	0	1	1
Longnose Gar	11	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10
Yellow Bass	10	3	0	6	3	0	1	0	0	0	0	0	0	0	0	0	0
Black Crappie	10	6	0	3	1	1	1	1	0	0	0	0	3	0	0	0	0
Rock Bass	10	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Suckermouth Minnow	9	6	0	0	0	0	0	0	0	0	1	1	1	1	0	3	2
Fathead Minnow	9	1	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0
Brook Silverside	9	4	0	2	1	4	2	0	0	0	0	0	0	0	0	0	0
Highfin Carpsucker	8	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4
Creek Chub	6	3	0	0	0	0	4	0	1	0	0	0	0	1	0	0	0
Mimic Shiner	6	5	0	0	1	1	0	0	0	0	1	1	2	0	0	0	0
Shortnose Gar	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Grass Pickerel	4	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Hornyhead Chub	4	1	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
Common Shiner	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
Pumpkinseed	4	3	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0
Northern Pike	3	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Orangespotted Sunfish	3	3	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Muskellunge	2	2	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Pugnose Minnow	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Bigmouth Shiner	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Bowfin	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Southern Redbelly Dace	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Central Stoneroller	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Blacknose Dace	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Blackchin Shiner	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Bullhead	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
White Crappie	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sauger	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Rainbow Darter	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Total no. individuals	17094		531	749	1556	430	2910	2848	750	564	741	519	839	2096	961	1219	381
No. species	64		21	20	31	21	25	29	18	26	27	21	32	26	23	21	31

Table A-5. Number of each species collected at tributary stations during the 2022 Fox River basin survey. Species are grouped by family. Stations are arranged in order from upstream (left) to downstream (right) within the watershed.

Common name	Total No.	No. Stations	N Branch Nippersink Creek DTKA-03	Nippersink Creek DTK-09	Nippersink Creek DTK-04	Boone Creek DTZT-02	Flint Creek DTZS-01	Crystal Creek DTZR-02	Tyler Creek DTZP-06	Tyler Creek DTZP-04	Poplar Creek DTG-05	Otter Creek DTFA-01	Ferson Creek DTF-02	Mill Creek DTZL-05
American Brook Lamprey	4	1	0	0	0	4	0	0	0	0	0	0	0	0
Gizzard Shad	66	2	0	0	45	0	0	21	0	0	0	0	0	0
Central Mudminnow	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Grass Pickerel	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Common Carp	32	5	0	8	3	0	10	3	0	0	0	8	0	0
Golden Shiner	24	5	1	0	2	0	14	6	1	0	0	0	0	0
Creek Chub	300	11	32	17	7	17	22	11	32	58	0	2	43	59
Hornyhead Chub	560	8	45	0	0	0	0	2	99	28	25	7	351	3
Central Stoneroller	769	7	0	0	0	0	0	6	27	253	24	3	439	17
Suckermouth Minnow	1	1	0	0	0	0	0	1	0	0	0	0	0	0
Blacknose Dace	21	2	0	1	0	0	0	0	0	0	0	0	0	20
Striped Shiner	42	3	0	0	0	0	0	0	11	18	0	0	13	0
Common Shiner	35	4	1	0	0	0	0	0	8	7	19	0	0	0
Spotfin Shiner	345	7	3	35	92	0	156	17	0	0	0	6	36	0
Fathead Minnow	17	3	7	0	0	9	0	0	0	0	1	0	0	0
Bluntnose Minnow	924	11	5	194	7	8	138	1	2	0	26	6	368	169
Bullhead Minnow	9	1	0	0	9	0	0	0	0	0	0	0	0	0
Emerald Shiner	43	1	0	0	43	0	0	0	0	0	0	0	0	0
Bigmouth Shiner	653	5	0	113	0	349	0	0	0	171	0	0	7	13
Blackchin Shiner	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Sand Shiner	388	4	21	10	0	0	0	0	0	0	0	43	314	0
Spottail Shiner	15	3	0	0	9	0	3	3	0	0	0	0	0	0
White Sucker	449	12	86	99	8	11	5	81	25	47	2	38	27	20
Northern Hog Sucker	57	7	7	0	3	0	0	0	2	14	6	2	23	0
Shorthead Redhorse	16	2	7	0	9	0	0	0	0	0	0	0	0	0
Golden Redhorse	14	3	0	3	5	0	0	0	0	0	0	6	0	0
Channel Catfish	34	4	0	14	11	0	8	0	0	0	0	1	0	0
Yellow Bullhead	31	8	0	0	1	0	2	18	1	1	4	2	2	0
Black Bullhead	1	1	0	0	0	0	0	0	0	0	0	1	0	0
Flathead Catfish	2	1	0	0	0	0	2	0	0	0	0	0	0	0
Stonecat	19	5	4	0	7	0	1	1	0	0	0	0	6	0
Tadpole Madtom	4	2	0	2	0	0	2	0	0	0	0	0	0	0
Blackstripe Topminnow	105	3	1	0	0	0	100	0	0	0	4	0	0	0
Brook Silverside	9	3	0	1	6	0	0	0	0	0	2	0	0	0
Mottled Sculpin	180	3	0	0	0	2	0	0	141	37	0	0	0	0
Black Crappie	3	2	0	0	2	0	0	0	0	0	0	1	0	0
White Crappie	1	1	0	0	0	0	0	0	0	0	0	1	0	0
Rock Bass	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Largemouth Bass	131	11	10	11	1	0	49	9	9	11	4	6	5	16
Smallmouth Bass	273	9	5	15	15	0	0	120	28	27	41	1	21	0
Green Sunfish	155	9	0	2	1	0	43	4	10	48	5	41	0	1
Bluegill	399	11	10	5	18	0	133	107	9	19	19	65	11	3
Pumpkinseed	6	2	5	0	0	0	1	0	0	0	0	0	0	0
Sunfish hybrid	2	1	0	0	0	0	2	0	0	0	0	0	0	0
Walleye	5	1	0	0	5	0	0	0	0	0	0	0	0	0
Yellow Perch	3	2	0	2	1	0	0	0	0	0	0	0	0	0
Blackside Darter	9	5	2	0	1	0	3	2	0	0	0	0	1	0
Logperch	17	4	3	0	9	0	2	3	0	0	0	0	0	0
Johnny Darter	198	9	31	61	2	11	9	2	0	0	0	1	38	43
Banded Darter	183	10	20	13	18	0	22	17	2	30	30	2	29	0
Rainbow Darter	7	1	0	0	0	0	0	0	0	7	0	0	0	0
Orangethroat Darter	56	4	0	0	0	14	0	0	0	40	1	0	1	0
Fantail Darter	105	5	0	0	0	1	0	0	0	0	72	1	7	24
Freshwater Drum	9	3	0	0	7	0	1	0	0	0	1	0	0	0
Total No.	6735		308	606	347	426	730	435	407	816	286	244	1742	388
No. native species	52		23	18	28	10	23	20	16	17	18	21	20	12
No. non-native species	1		0	1	1	0	1	1	0	0	0	1	0	0

Table A-5. Continued.

Common name	Total No.	No. Stations	Blackberry Creek DTD-03	Blackberry Creek DTD-02	Blackberry Creek DTD-01	Big Rock Creek DTC-07	Big Rock Creek DTC-05	Little Rock Creek DTCA-08	Little Rock Creek DTCA-01	Somonauk Creek DTB-04	Somonauk Creek DTB-02	Somonauk Creek DTB-01	Little Indian Creek DTAB-03	Indian Creek DTA-09	Indian Creek DTA-08	Buck Creek DTZB-02
Gizzard Shad	135	3	0	0	2	0	0	0	0	0	132	1	0	0	0	0
Common Carp	30	8	4	8	2	0	0	6	4	2	3	0	0	0	1	0
Golden Shiner	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Creek Chub	226	10	25	0	4	1	0	42	47	19	3	6	0	32	0	47
Hornyhead Chub	603	12	94	0	32	12	0	78	35	206	9	2	1	40	10	84
Central Stoneroller	964	12	0	7	15	21	114	199	61	48	68	61	0	43	7	320
Largescale Stoneroller	62	6	0	0	7	1	33	0	0	0	0	4	0	0	15	2
Suckermouth Minnow	247	7	25	26	23	0	6	0	0	0	0	165	0	1	0	1
Blacknose Dace	237	5	7	0	0	0	0	45	182	0	0	0	0	2	0	1
Striped Shiner	740	11	5	5	0	33	1	97	59	342	1	0	0	87	2	108
Common Shiner	664	11	3	3	0	14	1	113	12	460	4	0	0	47	6	1
Redfin Shiner	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Spotfin Shiner	2447	13	44	79	115	28	0	93	9	122	694	945	49	142	87	40
Bluntnose Minnow	2690	13	103	68	80	52	0	320	15	290	61	838	4	150	66	643
Bullhead Minnow	2	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Rosyface Shiner	814	13	0	1	28	27	26	28	164	283	1	104	8	25	51	68
Ozark Minnow	97	2	0	0	0	0	0	0	0	88	9	0	0	0	0	0
Bigmouth Shiner	98	7	4	1	0	0	0	3	0	56	26	7	0	0	0	1
Sand Shiner	1860	12	165	117	195	73	1	61	25	296	197	495	0	147	0	88
Quillback	22	2	0	2	0	0	0	0	20	0	0	0	0	0	0	0
White Sucker	305	13	36	2	0	8	14	37	47	64	3	43	8	28	3	12
Northern Hog Sucker	347	13	5	15	3	52	40	27	22	22	3	68	17	22	51	0
Shorthead Redhorse	12	4	0	0	5	0	0	0	0	0	0	3	0	1	3	0
Black Redhorse	144	6	0	0	0	41	7	0	0	0	0	7	14	39	36	0
Golden Redhorse	261	10	0	7	3	10	2	76	14	0	0	12	57	24	56	0
Silver Redhorse	5	2	0	3	0	0	0	0	0	0	0	2	0	0	0	0
Channel Catfish	44	7	0	3	8	0	2	0	1	0	5	20	0	0	5	0
Yellow Bullhead	29	7	5	0	0	1	0	3	0	1	0	0	3	0	9	7
Flathead Catfish	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Stonecat	26	9	2	1	8	1	3	0	0	0	0	3	2	4	2	0
Tadpole Madtom	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Slender Madtom	17	4	0	0	0	1	0	13	0	0	0	0	0	0	1	2
Blackstripe Topminnow	25	5	4	0	0	0	0	0	0	0	8	6	5	2	0	0
Brook Silverside	7	2	0	0	0	0	0	0	0	0	0	0	0	6	1	0
Mottled Sculpin	531	4	0	0	2	0	37	103	389	0	0	0	0	0	0	0
Black Crappie	9	2	0	0	0	0	0	1	0	0	8	0	0	0	0	0
White Crappie	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Rock Bass	70	6	0	0	0	3	0	14	0	0	0	0	29	5	11	8
Largemouth Bass	50	11	9	5	2	2	1	3	0	5	6	11	0	5	1	0
Smallmouth Bass	459	14	1	2	6	21	42	55	42	99	11	33	84	13	41	9
Green Sunfish	76	5	64	5	3	0	0	2	0	0	0	0	0	0	0	2
Bluegill	214	8	23	6	15	1	0	11	1	0	155	2	0	0	0	0
Walleye	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Blackside Darter	3	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Slenderhead Darter	3	3	0	0	0	0	0	0	0	0	0	0	1	1	1	0
Johnny Darter	613	14	120	13	7	11	4	21	68	130	61	99	1	26	3	49
Banded Darter	1154	12	48	21	26	69	92	76	119	0	0	334	35	129	96	109
Rainbow Darter	532	7	0	0	10	25	224	0	0	0	0	73	0	3	69	128
Orangethroat Darter	166	9	0	0	1	4	6	25	18	0	0	5	2	2	0	103
Fantail Darter	457	7	0	0	0	0	0	0	0	42	95	3	17	38	12	250
Total No.	17504		797	400	606	512	656	1552	1354	2575	1565	3355	337	1066	646	2083
No. native species	49		22	22	27	25	20	26	21	18	23	29	18	30	26	24
No. non-native species	1		1	1	1	0	0	1	1	1	1	0	0	0	1	0