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Period: 01 April 2022
through
31 March 2023

ANNUAL PERFORMANCE REPORT

for

Statewide Fisheries Investigation Project

Part I of IV

Subsection I: Stream Fisheries Investigation



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Department of Fish and Wildlife Resources

Fisheries Division



STATE: Kentucky

GRANT NO.: F-40-45

GRANT TYPE: Research and Survey

GRANT TITLE: Statewide Fisheries Investigations

SUBSECTION I TITLE: Stream Fisheries Investigations

PERIOD COVERED: 1 April 2022 - 31 March 2023

Research and Survey Section

Subsection I

Project I: Ohio River Sport Fishery Survey

Project Objective: Develop and implement a monitoring program for selected sport fish populations and their fisheries.

A. ACTIVITY

Meldahl Pool

Embayments— A total of 6.75 hours of general sport fish electrofishing was conducted during October 2022 in embayment of the Meldahl Pool of the Ohio River. Six embayments were sampled: Big Snag Creek (0.75 hr), Big Locust Creek (1.5 hr), Big Turtle Creek (1.0 hr), Bracken Creek (1.5 hr), Lawrence Creek (0.75 hr), and Cabin Creek (1.25 hr). Bluegill, largemouth bass, white crappie, and spotted bass were the most abundant species, but catch rates varied among embayments.

Markland Pool

Embayments— A total of 7.5 hours of general sport fish electrofishing was conducted during October 2022 in embayments of the Markland Pool of the Ohio River. Five embayments were sampled: Craig's Creek (1.5 hr), Paint Lick Creek (1.5 hr), Big Bone Creek (1.5 hr), Gunpowder Creek (1.5 hr), and Woolper Creek (1.5 hr). Bluegill, largemouth bass, and white crappie were the most abundant species, but catch rates varied substantially among embayments.

Sander Surveys

Previous modeling of ORFMT data suggested that overfishing was occurring and that regulations should be implemented on the Ohio River sauger population. A 14.0-in minimum size limit with a 6-fish creel limit was passed by KDFWR and went into effect in January 2019. Illinois DNR, Indiana DNR, and Ohio DNR have all passed this same regulation on the Ohio River since then. Six 10-minute transects were completed in each of the Markland, Cannelton, and JT Myers tailwaters in December 22 for a total of 3.0 hr of effort. A total of 924 sauger and 4 walleye were collected with no saugeye present in the sample. This was the highest overall catch rate since sampling resumed in 2014.

Otoliths were taken from a subsample of sauger to assess age structure and growth. Based on back calculated lengths at age, sauger growth was excellent with age-1 sauger averaging 8.3 in and age-2 sauger averaging 12.5 in. As in years past, very few age-2 and older fish were observed. No fish older than age-2 were collected.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2023

Work accomplished - 31 March 2023

C. SIGNIFICANT DEVIATIONS

General Sport Fish Assessments

None

Sander Surveys

None

D. REMARKS

General Sport Fish Assessments

None

Sander Surveys

None

E. RECOMMENDATIONS

General Sport Fish Assessments

General sport fish sampling/monitoring will continue in various pools along the Ohio River. The McAlpine and Cannelton pools will be sampled in 2023.

Sander Surveys

Sampling in conjunction with the ORFMT will continue

Project II: Evaluation of new recreational and commercial regulations on catfish in the Ohio River

Project Objectives:

1. Determine abundance (CPUE), size structure, and condition of blue catfish, channel catfish, and flathead catfish in the Ohio River, and evaluate the effects of new regulations on blue, channel, and flathead catfish in the Ohio River, particularly trophy-size catfish.
2. Quantify age, growth, and mortality of the three species in each reach, and compare to previous data to determine if any changes have occurred over time.

A. ACTIVITY

The conflict between commercial fishermen and recreational catfish anglers on the Ohio River has been apparent for nearly a decade, with the main issue being a perceived switch from a harvest market predominantly for flesh to a market for sale of largely trophy fish to pay lakes. In 2013, KDFWR standardized its catfish data collection methods and began expanding the effort river-wide to more accurately estimate population dynamics of blue catfish, channel catfish, and flathead catfish. On December 1, 2014 the following regulation became law:

Recreational anglers on the main-stem Ohio River are allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day. Harvest of fish below their respective length limits is not regulated.

The majority of commercial fishers fishing in the legal waters of the Ohio River and its tributaries are allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day. However, up to 50 commercial fishers (this number was reduced to 15 commercial fishers in 2019) that harvested over 10,000 lbs of catfish in at least 2 of the last 3 years along with an additional six commercial fishers, who are chosen by a lottery drawing, are allowed a daily harvest of four (in aggregate) blue catfish and flathead catfish ≥ 40.0 in and channel catfish ≥ 30.0 inches in Kentucky's portion of the Ohio River and its tributaries open to commercial fishing below Cannelton Lock and Dam. Harvest of fish below their respective length limits is not regulated.

Accusations by recreational anglers that overharvest was still occurring on the Ohio River surfaced again in 2018. Multiple meetings were held with KDFWR staff, recreational anglers, commercial fishermen, and paylake owners to work towards another compromise. Several regulations were proposed and submitted for review. At the time of this report the following regulations have been made law:

The number of commercial fishers awarded trophy permits was reduced to 15 (previously 50).

There will be no more than two licensed commercial fisherman per boat. If more are present, they may only keep two limits of trophy catfish.

A possession limit (twice the daily limit) was placed on trophy catfish for commercial fishers. This applies when on the water and when trailering fish.

Trotlines—Record high CPUE of blue catfish was documented in 2022 (CPUE = 7.1 fish/line). Catch rate of blue catfish has been gradually increasing since 2013; however, catch rate of trophy size (≥ 35.0 in) blue catfish has remained consistent since 2018.

Hoop nets—Catch rate of channel catfish was 2.1 fish/net-night and has continually decreased since 2017. Flathead catfish CPUE was 1.5 fish/net night, a nearly two-fold increase from 0.8 fish/net-night in 2021.

Electrofishing—Blue catfish CPUE (29.7 fish/hr) was the second highest ever observed and was well above the historical average (CPUE = 18.1 fish/hr). CPUE of flathead catfish was 47.1 fish/hr which is also above the historical average (CPUE = 36.5 fish/hr).

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2023

Work accomplished - 31 March 2023

C. SIGNIFICANT DEVIATIONS

Trotlines—An emphasis on collecting fish for age and growth analysis from the Meldahl and Cannelton pools was made a priority. As such, no trotline sampling occurred in the Smithland Pool in 2022.

Hoop nets—An emphasis on collecting fish for age and growth analysis from the Meldahl and Cannelton pools was made a priority. As such, no hoop net sampling occurred in the Smithland Pool in 2022.

D. REMARKS

NONE

E. RECOMMENDATIONS

Continue sampling blue catfish, channel catfish, and flathead catfish using approved methods. Age and growth analysis will be conducted on blue catfish, channel catfish, and flathead catfish within the Smithland Pool in 2023. Priority will be put on completing all sampling in that pool.

Project III: Warm Water Stream Sport Fish Surveys

Project Objective: To conduct general sport fish surveys on streams and rivers to determine relative abundance, size structure, growth rates and condition of these fisheries. This information will be used to promote these fisheries while providing anglers with accurate population assessments.

A. ACTIVITY

Spring sport fish electrofishing surveys were conducted on Otter Creek, Russell Fork and Levisa Fork when water temperatures ranged from 45 - 58°F. In March of 2022, a total of seven species of sport fish were collected in Otter Creek. Rainbow trout, smallmouth bass and rock bass were the most abundant species collected in Otter Creek. Rainbow trout made up 45%, smallmouth bass made up 30% and rock bass made up 22% of the entire sample. In April of 2022, a total of six species of sport fish were collected in Russell Fork. Smallmouth bass and rock bass were the most abundant species accounting for 87% of the electrofishing sample with smallmouth bass being 66% and rock bass being 21% of fish collected. Spring population assessments for smallmouth and rock bass in Russell Fork both received a “good” assessment rating. In the Levisa Fork, smallmouth bass received a “good” population assessment while rock bass received a “poor” population assessment rating. There were nine species of fish collected in Levisa Fork with smallmouth bass making up 54% of all species of fish collected followed by channel catfish making up 21% of fish collected.

Fall sport fish surveys were conducted in Lower Barren River, Pool 5 of Green River, Old Pool 6 of the Green River, pools 8-11 of the Kentucky River and Pool 13 of the Kentucky River. Smallmouth bass ranging in size from 3 – 19 in classes, trophy muskellunge (≥ 40 in) and a variety of other sport fish were collected in lower Barren River. In the unimpounded section of Lower Barren River, catch rates of smallmouth bass were the second highest recorded since sampling began in 2007. Spotted bass catch rates were the third highest since sampling began in 2007, and rock bass were the highest sampled since 2017. Lock and Dam 1 at Greencastle was removed from Lower Barren River in August – September 2022. After the dam removal, this formerly impounded section's water level dropped approximately 7 – 10 ft causing drastic changes to both instream habitat and river conditions. The catch rates for smallmouth bass, spotted bass and rock bass were all the highest recorded since sample began in 2017. Additional sampling will continue in order to collect more trend data and determine the impacts of dam removal on riverine sport fish species. Due to low water conditions only three of six sites were accessible on Old Pool 6 of Green River. Smallmouth bass and rock bass comprised 84% of the entire sample on Old Pool 6 of Green River. Even though the water was low, we had the highest catch rate of smallmouth bass since sampling began in 2013. Smallmouth bass ranging in size from 2 – 18 in classes, quality size muskellunge (≥ 35 in) and 60% of rock bass sampled were of quality size (≥ 6 in) and a variety of other sport fish were collected on Green River just in lower densities. Overall, relative weights for smallmouth bass were fair and rock bass were excellent. Species density and catch rates on Kentucky River Pools 8, 9, 11 and 13 were relatively low with the exception of Pool 10. Spotted bass and smallmouth bass made up 67% of the entire sample on Pool 8 of Kentucky River with smallmouth bass ranging from 3 – 18 in class and spotted bass ranging from 2 – 13 in. Overall, 47% of smallmouth bass collected were above the statewide minimum of 12 in. Pool 9 of the Kentucky River again had relatively low numbers with spotted and largemouth bass comprising 50% of the total sample. Pool 10 of the Kentucky River had the best numbers of species collected out of all the pools that were sampled. Bluegill was the most abundant species sampled (CPUE=11.7 fish/hr) followed by spotted bass (CPUE=9.7 fish/hr) and largemouth bass (CPUE=9.3 fish/hr). Largemouth bass ranged in size of 4 – 19 in class, and smallmouth bass ranged from 10 – 17 in class. Pool 11 of the Kentucky River had eight species collected but in low densities with bluegill being the most sampled fish (CPUE=15.3 fish/hr) followed by spotted bass (CPUE=7.3 fish/hr) and flathead catfish (CPUE=7.3 fish/hr). Pool 13 had the lowest density of fish species that were collected out of all the pools sampled. Bluegill was the most abundant fish (CPUE=5.5 fish/hr) followed by spotted bass (CPUE=4.0 fish/hr).

Twenty streams are currently available on the KDFWR departmental website providing detailed information on public access sites, water levels, stream mileages, interactive maps, fisheries, and photo gallery. This information provides Kentucky anglers with an increased awareness to the fishing and boating opportunities that exist in many of Kentucky's rivers and streams. Additionally, the stream webpages have been updated and the newest data for these streams will be available on the webpage soon.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date- 31 March 2023
Work accomplished- 31 March 2023

C. SIGNIFICANT DEVIATIONS

None

D. REMARKS

New locations will be sampled annually. Sites are scheduled to be sampled on a 3-5 year rotation in an effort to develop trend data that will be beneficial for future management decisions.

E. RECOMMENDATIONS

Continue stream sampling due to the current lack of continuous sport fish data on most streams.

Project IV: Investigation of the Restoration of Native Walleye in the Upper Barren River

Project Objective: To determine if stocking native walleye fingerlings can result in the reestablishment of a self-sustaining native walleye population in the upper Barren River.

A. ACTIVITY

No field sampling was conducted, and work on a final report was continued.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2023

Work accomplished - 31 March 202

C. SIGNIFICANT DEVIATIONS

None

D. REMARKS

None

E. RECOMMENDATIONS

Field work has concluded for this project. A final report will be written with management recommendations.

Project V: Post-stocking Movement of Muskellunge in the Kentucky River

Project Objectives:

1. Determine dispersal of muskellunge, with an emphasis on age-1 and age-2 fish, stocked into pools 11 -13 of the Kentucky River.
2. Utilize results of this project to develop muskellunge stocking recommendations for the Kentucky River.

A. ACTIVITY

Only two muskellunge were captured at a rate of 0.3 fish/hr in fall 2022. No clipped fish were observed in the sample. An additional 21.75 hr of electrofishing was conducted to look for stocked fish and PIT tag other captured muskellunge. Ten fish were collected and implanted with PIT tags. One clipped fish was captured during this effort and no previously PIT tagged fish were observed. Thus far, only two clipped fish have been collected and have traveled an average of 51.6 miles downstream. No upstream movement of fish has been observed thus far.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2023

Work accomplished - 31 March 2023

C. SIGNIFICANT DEVIATIONS

Additional effort to collect muskie was limited due to staffing shortages and time constraints. Pool 12 was unable to be sample during the standard fall sample due to access issues.

D. REMARKS

Recapture rate has been less than expected, but it is likely due to a missed stocking in 2020 resulting from COVID-19 restrictions in the workplace, a historic flood two days post-stocking in 2022, as well as limited effort outside of standard sampling to collect fish due to staff shortages.

E. RECOMMENDATIONS

Continue fall standard sampling and maximize effort along the Kentucky River to assess dispersal of stocked muskellunge.

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Project I: Ohio River Sport Fishery Survey

FINDINGS

General Sport Fish Assessments

Meldahl Pool

A total of 6.75 hours of general sport fish electrofishing was conducted during October 2022 in embayment of the Meldahl Pool of the Ohio River. Six embayments were sampled: Big Snag Creek (0.75 hr), Big Locust Creek (1.5 hr), Big Turtle Creek (1.0 hr), Bracken Creek (1.5 hr), Lawrence Creek (0.75 hr), and Cabin Creek (1.25 hr). Bluegill, largemouth bass, white crappie, and spotted bass were the most abundant species, but catch rates varied among embayments.

Total CPUE of largemouth bass was 45.2 fish/hr, and ranged from 16.8 fish/hr in Cabin Creek to 107.0 fish/hr in Big Turtle Creek (Table 1). Lengths of largemouth bass ranged from 3.9 – 17.7 in with a mean length of 7.8 in. Spotted bass CPUE was 9.5 fish/hr and ranged from 5.3 fish/hr in Bracken Creek to 15.2 fish/hr in Cabin Creek. Only one smallmouth bass was captured during sampling for an overall CPUE of 0.1 fish/hr. Lengths of spotted bass ranged from 2.6 – 13.1 in with a mean length of 6.2 in. Size structure of largemouth bass and spotted bass varied between embayments, but 92.1% of black bass were <12.0 in. Catch rates for four different length groups of largemouth bass and spotted bass were examined and CPUE for largemouth bass and spotted bass increased in nearly all length groups since the 2019 fall sample (Table 2). Relative weights of all length groups for both largemouth bass and spotted bass have increased since the 2019 fall sample with fish being in excellent condition (Table 3).

Bluegill were the most abundant fish sampled in the Meldahl Pool (CPUE=103.6 fish/hr; Table 4). Catch rates ranged from 13.6 fish/hr in Cabin Creek to 232.0 fish/hr in Lawrence Creek. Lengths ranged from 1.0– 6.8 in with a mean length of 4.3 in and only 3.7% of those fish were quality size (≥ 6.0 in). Overall catch rate of redear sunfish was 1.5 fish/hr. Catch rates ranged from 0.0 fish/hr in Bracken Creek and Cabin Creek to 5.0 fish/hr in Big Turtle Creek. Lengths ranged from 5.0 – 10.5 in with a mean length of 7.7 in. White crappie were collected at 12.6 fish/hr and ranged from 0.0 fish/hr in Cabin Creek to 26.0 fish/hr in Big Turtle Creek. Lengths ranged from 3.4 – 13.5 in with a mean length of 8.7 in. Black Crappie were collected at 1.5 fish/hr and ranged from 0.0 fish/hr in Bracken Creek and Cabin Creek to 6.7 fish/hr in Big Snag Creek. Lengths ranged from 4.5 – 11.7 in with a mean length of 8.7 in. Catch rates for two different length groups of white crappie and black crappie were examined (Table 5). Overall, white crappie and black crappie CPUE was the lowest recorded value in the past three samples. Most of the fish observed during the sample were larger as CPUE of fish ≥ 8.0 and CPUE of fish ≥ 10.0 were at or near record highs. Relative weight of white crappie (100) and black crappie (104) indicated that both species were in excellent condition (Table 6).

Markland Pool

A total of 7.5 hours of general sport fish electrofishing was conducted during October 2022 in embayments of the Markland Pool of the Ohio River. Five embayments were sampled: Craig's Creek (1.5 hr), Paint Lick Creek (1.5 hr), Big Bone Creek (1.5 hr), Gunpowder Creek (1.5 hr), and Woolper Creek (1.5 hr). Bluegill, largemouth bass, and white crappie were the most abundant species, but catch rates varied substantially among embayments.

Total CPUE of largemouth bass was 50.9 fish/hr, and ranged from 14.0 fish/hr in Paint Lick Creek to 98.7 fish/hr in Gunpowder Creek (Table 7). Lengths of largemouth bass ranged from 3.2 – 20.5 in with a mean length of 8.9 in. Spotted bass CPUE was 2.4 fish/hr and ranged from 0.7 fish/hr in Craig's Creek and Paint Lick Creek to 4.7 fish/hr in Big Bone Creek and Woolper Creek. Lengths of spotted bass ranged from 2.5 – 13.5 in with a mean length of 6.8 in. Size structure of largemouth bass and spotted bass varied between embayment, but larger fish were more common in the Markland Pool than the Meldahl Pool. Catch rates for four different length groups of largemouth bass and spotted bass were examined. Increases in CPUE from 2019 for all length groups of largemouth bass were observed, while decreases

were small decreases were seen in most length groups for spotted bass (Table 8). Relative weights of all length groups for both largemouth bass were similar to the 2019 sample and spotted bass were in slightly better condition than the 2019 sample (Table 9).

Bluegill were the most abundant fish sampled in the Meldahl Pool (CPUE= 125.1 fish/hr; Table 10). Catch rates ranged from 46.0 fish/hr in Gunpowder Creek to 263.3 fish/hr in Craig's Creek. Lengths ranged from 2.0– 6.6 in with a mean length of 4.7 in and only 8.3% of those fish were quality size (≥ 6.0 in). Overall catch rate of redear sunfish was 1.7 fish/hr with the highest observed CPUE in Paint Lick Creek (6.7 fish/hr). Lengths ranged from 6.8 – 10.4 in with a mean length of 8.1 in, and 100% of those fish were quality size (≥ 6.0 in). White crappie were collected at 49.9 fish/hr and ranged from 12.7 fish/hr in Big Bone Creek to 164.0 fish/hr in Paint Lick Creek. Lengths ranged from 3.6 – 14.8 in with a mean length of 9.6 in. Black Crappie were collected at 1.7 fish/hr and ranged from 0.0 fish/hr in Paint Lick Creek to 4.7 fish/hr in Big Bone Creek. Lengths ranged from 5.8 – 13.5 in with a mean length of 8.8 in. Catch rates for two different length groups of white crappie and black crappie were examined (Table 11). Overall, white crappie CPUE was the highest in the previous three samples but has been extremely consistent over that time period. Black crappie CPUE was slightly lower than the 2019 sample. Most of the fish observed during the sample were larger as CPUE of fish ≥ 8.0 and CPUE of fish ≥ 10.0 were at record highs for both species. Relative weight of white crappie (96) and black crappie (92) indicated that both species were in good condition (Table 12).

Sander Surveys

The member agencies of the Ohio River Fish Management Team (ORFMT) had traditionally completed annual surveys of sauger and walleye in the Ohio River. Due to time and budget constraints, this cooperative effort stopped in 2007; however, recent concerns of a possibly declining fishery as well as threats from the expanding Asian carp population led biologists to reinstate these annual surveys in 2014. KDFWR, Ohio Department of Natural Resources, West Virginia Department of Natural Resources, Indiana Department of Natural Resources, and Illinois Department of Natural Resources all agreed to sample tailwaters of the Ohio River. KDFWR was tasked with sampling the Markland and Cannelton tailwaters. In 2017, JT Myers tailwater was added. After three years of sampling in late fall, all agencies reported lower catch rates than in the past and noted a lack of age 3+ sauger. Issues with timing of sampling were discussed in a meeting in January 2017. Although a late fall sample was likely underrepresenting larger fish and females (therefore inflating mortality estimates), the decision was made to keep sampling methods the same due to the unpredictably and unstable nature of water levels on the Ohio River during the preferred months of January – March.

Previous modeling of ORFMT data suggested that overfishing was occurring and that regulations should be implemented on the Ohio River sauger population. A 14.0-in minimum size limit with a 6-fish creel limit was passed by KDFWR and went into effect in January 2019. Illinois DNR, Indiana DNR, and Ohio DNR have all passed this same regulation on the Ohio River since then.

Six 10-minutes transects were completed in each of the Markland, Cannelton, and JT Myers tailwaters in 2022 for a total 18 transects and 3.0 hr of effort. A total of 924 sauger and 4 walleye were collected with no saugeye present in the sample (Table 13). Overall CPUE of sauger was 308.0 fish/hr, the highest since sampling resumed in 2014 (Table 14). Lengths ranged from 6.0 – 16.5 in with a mean length of 8.8 in (Table 15).

Catch rates were also calculated for four length groups of sauger (Table 16). Overall catch rates of sauger in the Markland Tailwater (CPUE=319.0 fish/hr) and Cannelton Tailwater (CPUE=488.0 fish/hr) were the highest since sampling resumed in 2014 and well above their historical averages of 196.8 fish/hr and 260.9 fish/hr, respectively. CPUE in the JT Myers Tailwater (117.0 fish/hr) was lower than the previous sample in 2020 but still above the historical average (106.7 fish/hr). Catch rates of sauger < 8.0 in were record highs in all three tailwaters in 2022 indicating successful spawns. Catch rates of sauger in the 8.0 – 11.9 in length group were above historical averages in all tailwaters. Older, larger fish were once again sparse as catch rates were below average for all except the 12.0 – 14.9 in length group in the

Cannelton Tailwater. Only 1.3% of sauger were legally harvestable (≥ 14.0 in).

Otoliths were taken from a subsample of sauger to assess age structure and growth. Based on back calculated lengths at age, sauger growth in both tailwaters was good with age-1 sauger averaging 8.3 in and age-2 sauger averaging 12.5 in (Table 17). Age-0 and age-1 sauger dominated the catch as usual, comprising 98.8% of the total catch (Table 18). As in years past, very few age-2 and older fish were observed and no fish older than age-2 were observed in 2022. Estimates for total annual mortality of sauger were once again high. Markland Tailwater annual mortality rate for 2022 was 91.8, while Cannelton and JT Myers tailwaters annual mortality rates were 88.3 and 75.6, respectively (Table 17). Lack of older fish in the sample could be a result of sampling bias. Sampling occurred in December and many older mature fish may not have migrated up to the tailwaters yet. It could also indicate poor year class survival from the 2018 - 2020 year classes.

Table 1. Length-frequency and CPUE (fish/hr) of black bass collected during 6.75 hrs of electrofishing in six embayments in the Meldahl Pool of the Ohio River during October 2022. Standard errors are in parentheses.

Embayment	Species	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Total	CPUE
Big Snag Creek	Largemouth bass				3	5	4	1		2					1	1		17	22.7 (2.7)
	Spotted bass			5				1	2				1					9	12.0 (4.6)
	Smallmouth bass																	0	0.0
Big Locust Creek	Largemouth bass					5	5	2	4	6	3	2		1	1			29	19.3 (3.2)
	Spotted bass		5	6		1		1	1	2	1							17	11.3 (4.4)
	Smallmouth bass																	0	0.0
Big Turtle Creek	Largemouth bass			13	18	32	9	5	11	8	5	5		1				107	107.0 (13.2)
	Spotted bass		2				2	1			1							6	6.0 (3.5)
	Smallmouth bass																	0	0.0
Bracken Creek	Largemouth bass		1	2	12	29	18	4	1	10	1	6	1	2		1		88	58.7 (12.2)
	Spotted bass		1	1	1	1	1		2	1								8	5.3 (3.2)
	Smallmouth bass																	0	0.0
Lawrence Creek	Largemouth bass			2	8	13	7	1	2	4	5		1					43	57.3 919.4)
	Spotted bass		2	1				1		1								5	6.7 (1.3)
	Smallmouth bass																	0	0.0
Cabin Creek	Largemouth bass			7	3	4	1			1	1			2		1	1	21	16.8 (6.0)
	Spotted bass			5	9			2		3								19	15.2 (3.2)
	Smallmouth bass															1		1	0.8 (0.8)
Total	Largemouth bass		1	24	44	88	44	13	18	31	15	13	2	6	3	2	1	305	45.2 (7.2)
	Spotted bass		2	14	21	1	2	3	6	5	7	2	1					64	9.5 (1.6)
	Smallmouth bass															1		1	0.1 (0.1)

Table 2. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of black bass from the Meldahl Pool of the Ohio River from 2007-2022. Standard errors are in parentheses.

Year	Length group				Total
	<8.0 in	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
Largemouth bass					
2007	23.8 (8.2)	14.2 (4.9)	17.6 (4.2)	2.9 (1.8)	58.4 (13.5)
2008	3.0 (2.3)	24.2 (8.0)	2.5 (3.8)	1.5 (0.8)	31.2 (7.4)
2009	3.7 (1.7)	5.9 (2.5)	4.5 (2.4)	1.3 (0.9)	15.5 (3.8)
2010	9.4 (3.4)	5.3 (2.8)	6.4 (2.2)	2.4 (1.4)	23.5 (4.2)
2011	37.3 (5.6)	20.1 (2.4)	10.3 (2.1)	2.9 (0.7)	70.6 (7.7)
2012	23.9 (3.9)	30.2 (3.9)	10.5 (1.7)	1.8 (0.6)	66.4 (6.3)
2013	7.0 (1.3)	16.0 (2.1)	3.9 (0.9)	1.4 (0.5)	28.9 (3.3)
2014	26.4 (4.6)	19.1 (3.2)	14.2 (2.4)	1.0 (0.6)	60.7 (6.8)
2015	24.4 (5.6)	13.4 (2.5)	4.2 (0.9)	0.9 (0.4)	42.8 (8.0)
2019	23.5 (5.3)	7.9 (1.5)	3.3 (0.8)	0.8 (0.3)	35.5 (5.9)
2022	29.8 (5.3)	11.4 (2.0)	3.1 (0.7)	0.9 (0.3)	45.2 (7.2)
Mean	20.2 (1.5)	15.4 (1.0)	7.0 (0.6)	1.4 (0.2)	44.1 (2.3)
	<7.0 in	7.0-10.9 in	11.0-13.9 in	≥14.0 in	Total
Spotted bass					
2007	12.0 (5.2)	3.1 (1.7)	4.0 (2.1)	0.4 (0.4)	19.6 (6.4)
2008	0.5 (0.4)	6.8 (3.0)	0.3 (0.3)	0.0 (0.0)	9.1 (2.2)
2009	0.8 (0.8)	1.3 (1.0)	0.3 (0.3)	0.3 (0.3)	2.7 (1.0)
2010	4.0 (2.3)	1.6 (1.2)	1.9 (1.2)	0.0 (0.0)	7.5 (1.7)
2011	17.5 (5.3)	17.7 (3.1)	6.1 (1.1)	0.4 (0.3)	41.5 (7.7)
2012	11.8 (2.0)	3.1 (1.7)	0.6 (0.4)	0.2 (0.2)	15.6 (3.0)
2013	3.2 (0.9)	1.8 (0.6)	0.9 (0.5)	0.2 (0.2)	6.2 (1.3)
2014	11.6 (3.7)	6.7 (1.8)	2.6 (1.1)	0.4 (0.3)	21.3 (5.5)
2015	11.0 (3.2)	2.8 (0.7)	0.5 (0.3)	0.2 (0.2)	14.4 (3.8)
2019	3.5 (1.6)	0.9 (0.4)	0.4 (0.2)	0.0 (0.0)	4.8 (1.2)
2022	5.9 (1.1)	3.1 (0.9)	0.4 (0.3)	0.0 (0.0)	9.5 (1.6)
Mean	7.5 (1.0)	4.7 (0.6)	1.5 (0.2)	0.2 (0.1)	13.8 (1.5)

Table 3. Relative weight (Wr) by length group estimates for each species of black bass collected from the Meldahl Pool in the Ohio River from fall 2007-2019.

Largemouth bass relative weight (Wr)				
Year	length group			Overall
	8.0-11.9 in	12.0-14.9 in	<u>≥</u> 15.0 in	
2007	106	105	103	105
2008	107	101	88	105
2009	96	92	93	94
2010	110	105	99	106
2011	106	109	107	107
2012	112	108	103	111
2013	92	95	91	92
2014	119	104	83	112
2015	94	89	91	93
2019	97	90	92	95
2022	109	103	100	107
Mean	105	102	97	104

Spotted bass relative weight (Wr)				
Year	length group			Overall
	7.0-10.9 in	11.0-13.9 in	<u>≥</u> 14.0 in	
2007	106	115	107	111
2008	116	95		115
2009	102	94	75	97
2010	116	99		107
2011	108	109	111	108
2012	108	103	101	107
2013	97	92	97	96
2014	103	100	92	102
2015	106	85	95	102
2019	103	101		102
2022	106	105		106
Mean	107	103	96	105

Table 4. Length-frequency and CPUE (fish/hr) of selected sunfish species collected during 6.75 hrs of electrofishing in embayments in the Meldahl Pool of the Ohio River during October 2022. Standard errors are in parentheses.

Embayment	Species	Inch class														Total	CPUE
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Big Snag Creek	Bluegill	1	1	6	37	38	10									93	124.0 (32.7)
	Redear sunfish							1	1							2	2.7 (2.7)
	White crappie				1			1	3	2	3	3	3			16	21.3 (4.8)
	Black crappie				2		1			1		1				5	6.7 (1.3)
Big Locust Creek	Bluegill	3	7	36	86	41	7									180	120.0 (30.1)
	Redear sunfish						1				1					2	1.3 (0.8)
	White crappie				2				4	8	7	2	2	1		26	17.3 (4.8)
	Black crappie							1								1	0.7 (0.7)
Big Turtle Creek	Bluegill	6	15	44	45	37	2									149	149.0 (23.7)
	Redear sunfish						1	3			1					5	5.0 (5.0)
	White crappie			4	9	2	2	1	3		3	2				26	26.0 (5.3)
	Black crappie										1					1	1.0 (1.0)
Bracken Creek	Bluegill	2	4	26	34	16	4									86	57.3 (21.8)
	Redear sunfish															0	0.0 (0.0)
	White crappie						1		1	1	5					8	5.3 (2.2)
	Black crappie															0	0.0 (0.0)
Lawrence Creek	Bluegill	9	14	67	57	24	3									174	232.0 (148.5)
	Redear sunfish					1										1	1.3 (1.3)
	White crappie				1				3	1	2	1	1			9	12.0 (10.1)
	Black crappie										1	2				3	4.0 (2.3)
Cabin Creek	Bluegill	3	2	1	10	1										17	13.6 (5.3)
	Redear sunfish															0	0.0 (0.0)
	White crappie															0	0.0 (0.0)
	Black crappie															0	0.0 (0.0)
Total	Bluegill	24	43	180	269	157	26									699	103.6 (20.7)
	Redear sunfish					1	2	4	1		2					10	1.5 (0.8)
	White crappie			4	13	2	3	2	14	12	20	8	6	1		85	12.6 (2.4)
	Black crappie				2		1	1		1	2	3				10	1.5 (0.5)

Table 5. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of crappie from the Meldahl Pool of the Ohio River from 2015-2022. Standard errors are in parentheses.

Year	Length group		Total
	<u>>8.0 in</u>	<u>>10.0 in</u>	
<u>White crappie</u>			
2015	9.6 (2.1)	4.7 (1.1)	17.4 (4.3)
2019	7.3 (1.8)	3.3 (0.9)	13.2 (3.5)
2022	9.0 (1.9)	5.2 (1.0)	12.6 (2.4)
Mean	8.6 (1.1)	4.4 (0.6)	14.2 (2.0)
<u>Black crappie</u>			
	<u>>8.0 in</u>	<u>>10.0 in</u>	Total
2015	0.7 (0.3)	0.5 (0.3)	1.7 (0.7)
2019	0.7 (0.4)	0.3 (0.2)	2.9 (1.3)
2022	0.9 (0.4)	0.7 (0.4)	1.5 (0.5)
Mean	0.8 (0.2)	0.5 (0.2)	2.1 (0.5)

Table 6. Relative weight (Wr) by length group estimates for each species of crappie collected from the Meldahl Pool in the Ohio River from fall 2015-2022.

<u>White crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2015	97	94	94	96
2019	107	98	90	99
2022	113	108	103	106
Mean	103	100	97	100
<u>Black crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2015	100	88	100	99
2019	108	100	97	106
2022	115	102	103	106
Mean	106	98	101	104

Table 7. Length-frequency and CPUE (fish/hr) of black bass collected during 7.5 hrs of electrofishing in embayments in the Markland Pool of the Ohio River during October 2022. Standard errors are in parentheses.

Embayment	Species	Inch class																		Total	CPUE
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Craig's Creek	Largemouth bass		1	5	3	1		2		1	3	1	3		3	2	1			26	17.3 (5.7)
	Spotted bass										1									1	0.7 (0.7)
Paint Lick Creek	Largemouth bass		1	1	2			2	5	2	2	2					1	2	1	21	14.0 (2.7)
	Spotted bass									1										1	0.7 (0.7)
Big Bone Creek	Largemouth bass		5	14	29	14	3	12	13	5	6	2	3	2	5	2	1	1	1	118	78.7 (17.9)
	Spotted bass		1				2		2		1	1								7	4.7 (2.4)
Gunpowder Creek	Largemouth bass	4	7	19	30	16	4	13	20	8	7	9	8	2	1					148	98.7 (13.7)
	Spotted bass		2																	2	1.3 (1.3)
Woolper Creek	Largemouth bass	1	8	20	12	5		7	7	1	3	4	1							69	46.0 (8.1)
	Spotted bass	7																		7	4.7 (1.6)
Total	Largemouth bass	5	22	59	76	36	7	36	45	17	21	18	15	4	9	4	3	3	2	382	50.9 (7.7)
	Spotted bass	7	3				2		2	1	2	1								18	2.4 (0.7)

Table 8. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of black bass from the Markland Pool of the Ohio River from 2007-2022. Standard errors are in parentheses.

Year	Length group				Total
	<8.0 in	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
Largemouth bass					
2007	18.6 (4.4)	25.6 (4.8)	10.7 (3.2)	2.8 (1.3)	57.7 (6.1)
2008	18.9 (6.7)	27.4 (5.3)	8.1 (2.1)	2.0 (1.1)	45.7 (7.7)
2009	8.0 (2.6)	15.2 (4.4)	8.7 (2.6)	5.2 (1.9)	37.0 (5.5)
2010	24.7 (5.7)	18.1 (4.8)	7.0 (2.2)	2.8 (1.4)	52.6 (8.2)
2011	18.1 (3.3)	27.8 (4.9)	10.4 (1.8)	3.2 (1.1)	59.6 (8.8)
2012	38.4 (5.3)	54.3 (7.4)	20.1 (2.9)	3.6 (0.8)	116.4 (12.7)
2013	4.7 (1.6)	16.4 (2.4)	4.8 (1.2)	1.2 (0.4)	27.9 (4.0)
2014	21.4 (3.1)	28.3 (3.9)	22.0 (3.5)	2.6 (0.8)	74.3 (8.0)
2015	21.6 (7.7)	23.9 (3.7)	8.0 (1.3)	1.9 (0.5)	55.4 (10.5)
2019	24.8 (4.5)	10.5 (2.2)	4.7 (0.9)	2.5 (0.6)	42.5 (6.7)
2022	26.4 (4.5)	14.0 (3.0)	7.2 (1.4)	3.3 (0.8)	50.9 (7.7)
Mean	19.8 (1.3)	24.1 (1.4)	10.1 (0.7)	2.8 (0.2)	56.8 (2.7)

Year	Length Group				Total
	<7.0 in	7.0-10.9 in	11.0-13.9 in	≥14.0 in	
Spotted bass					
2007	3.8 (1.8)	4.8 (1.9)	4.2 (1.7)	0.5 (0.3)	13.3 (2.7)
2008	2.0 (1.3)	5.8 (2.5)	2.1 (1.1)	0.4 (0.2)	8.3 (2.2)
2009	0.5 (0.4)	0.9 (0.6)	0.7 (0.5)	0.2 (0.2)	2.3 (0.6)
2010	3.3 (1.3)	0.5 (0.5)	0.8 (0.7)	0.2 (0.2)	4.7 (1.3)
2011	2.4 (0.6)	2.2 (1.2)	1.5 (0.7)	0.2 (0.2)	6.2 (2.3)
2012	3.3 (1.0)	3.5 (1.0)	0.9 (0.4)	0.2 (0.2)	7.8 (1.7)
2013	0.9 (0.4)	1.7 (0.6)	0.0 (0.0)	0.2 (0.2)	2.8 (0.9)
2014	2.1 (1.1)	4.0 (1.2)	1.9 (0.8)	0.0 (0.0)	7.9 (2.4)
2015	3.7 (0.7)	0.3 (0.2)	0.6 (0.4)	0.0 (0.0)	4.6 (0.9)
2019	3.4 (0.7)	0.7 (0.3)	0.3 (0.2)	0.0 (0.0)	4.4 (1.0)
2022	1.3 (0.5)	0.5 (0.4)	0.5 (0.3)	0.0 (0.0)	2.4 (0.7)
Mean	2.3 (0.3)	2.2 (0.3)	1.2 (0.2)	0.2 (0.1)	5.8 (0.5)

Table 9. Relative weight (Wr) by length group estimates for each species of black bass collected from the Markland Pool in the Ohio River from fall 2007-2022.

Largemouth bass relative weight (Wr)				
Year	length group			Overall
	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2007	106	106	109	106
2008	101	98	100	101
2009	97	94	101	97
2010	101	103	100	102
2011	100	97	105	100
2012	107	106	103	107
2013	91	95	98	92
2014	107	103	106	105
2015	97	108	98	100
2019	95	96	95	95
2022	95	92	94	94
Mean	101	101	100	101

Spotted bass relative weight (Wr)				
Year	length group			Overall
	7.0-10.9 in	11.0-13.9 in	≥14.0 in	
2007	101	106	109	104
2008	100	100	90	99
2009	100	99	98	99
2010	103	102	94	102
2011	102	104	113	104
2012	124	84	103	115
2013	99	111	81	97
2014	106	97		103
2015	96	91		93
2019	93	100		95
2022	102	97		100
Mean	105	100	99	103

Table 10. Length-frequency and CPUE (fish/hr) of selected sunfish species collected during 7.5 hrs of electrofishing in embayments in the Markland Pool of the Ohio River during October 2022. Standard errors are in parentheses.

Embayment	Species	2	3	4	5	6	7	8	9	10	11	12	13	14	Total	CPUE
Craig's Creek	Bluegill	6	39	180	146	24									395	263.3 (70.3)
	Redear sunfish														0	0.0
	White crappie		2	1	1		3	9		4	4	4	1		29	19.3 (3.0)
	Black crappie						1			1					2	1.3 (0.8)
Paint Lick Creek	Bluegill	1	23	78	31	16									149	99.3 (20.2)
	Redear sunfish					1	4	2	1	2					10	6.7 (3.5)
	White crappie		1	2	4	27	27	43	37	37	42	21	4	1	246	164.0 (42.8)
	Black crappie														0	0.0
Big Bone Creek	Bluegill		7	50	65	18									140	93.3 (21.1)
	Redear sunfish														0	0.0
	White crappie				1					3	9	6			19	12.7 (6.2)
	Black crappie						1	2	2	1			1		7	4.7 (1.9)
Gunpowder Creek	Bluegill		8	30	25	6									69	46.0 (17.3)
	Redear sunfish														0	0.0
	White crappie						3	1	4	15	3	2	1	1	30	20.0 (7.3)
	Black crappie						2	1							3	2.0 (1.4)
Woolper Creek	Bluegill	7	61	63	40	14									185	123.3 (33.7)
	Redear sunfish					1	1	1							3	2.0 (1.4)
	White crappie		2	2	1	2	2	7	14	9	6	3	2		50	33.3 (5.2)
	Black crappie				1										1	0.7 (0.7)
Total	Bluegill	14	138	401	307	78									938	125.1 (20.9)
	Redear sunfish					2	5	3	1	2					13	1.7 (1.0)
	White crappie		5	5	7	29	35	60	55	68	64	36	8	2	374	49.9 (13.5)
	Black crappie				1		4	3	2	2			1		13	1.7 (0.6)

Table 11. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of crappie from the Markland Pool of the Ohio River from 2015-2022. Standard errors are in parentheses.

Year	Length group		Total
	<u>>8.0 in</u>	<u>>10.0 in</u>	
<u>White crappie</u>			
2015	28.7 (5.4)	19.3 (4.1)	44.3 (8.9)
2019	28.4 (4.5)	16.8 (3.0)	44.8 (7.3)
2022	39.1 (10.3)	23.7 (6.2)	49.9 (13.5)
Mean	32.2 (4.2)	20.0 (2.7)	46.4 (5.9)
<u>Black crappie</u>			
	<u>>8.0 in</u>	<u>>10.0 in</u>	Total
2015	0.2 (0.2)	0.0	0.6 (0.3)
2019	0.6 (0.3)	0.0	2.2 (0.9)
2022	1.1 (0.5)	0.4 (0.2)	1.7 (0.6)
Mean	0.6 (0.2)	0.1 (0.1)	1.5 (0.4)

Table 12. Relative weight (Wr) by length group estimates for each species of crappie collected from the Markland Pool in the Ohio River from fall 2015-2022.

<u>White crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2015	94	94	93	94
2019	93	90	85	89
2022	96	96	95	96
Mean	94	94	93	94
<u>Black crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2015	101	92	83	96
2019	99	98		99
2022	106	84	83	92
Mean	101	92	83	96

Table 13. Electrofishing effort and CPUE (fish/hr) of *Sander spp.* collected during 3.0 hr of electrofishing in the Ohio River in December 2022. Standard errors are in parentheses.

Tailwater	No. of transects	Effort (hr)	No. of sauger	CPUE	No. of walleye	CPUE
Markland	6	1.0	319	319.0 (60.5)	0	0.0
Cannelton	6	1.0	488	488.0 (106.6)	4	4.0 (2.0)
JT Myers	6	1.0	117	117.0 (61.3)	0	0.0
Total	18	3.0	924		4	
Mean				308.0 (56.1)		1.3 (0.8)

Table 14. CPUE (fish/hr) of sauger, walleye, and saugeye collected during electrofishing surveys on the Ohio River from 2014 - 2022. Standard errors are in parentheses.

Year	Species		
	Sauger	Walleye	Saugeye
2014	273.5 (48.0)	1.5 (1.1)	1.5 (0.8)
2015	213.0 (22.9)	1.0 (1.0)	0.0
2016	289.5 (61.8)	1.0 (1.0)	1.5 (1.1)
2017	75.3 (12.3)	3.3 (1.6)	1.0 (1.0)
2018	140.5 (28.9)	0.5 (0.5)	0.0
2019	199.5 (43.0)	2.5 (1.1)	0.0
2020	230.7 (37.0)	0.0	0.0
2021	104.0 (30.3)	0.0	0.0
2022	308.0 (56.1)	1.3 (0.8)	0.0
Mean	208.9 (15.5)	1.4 (0.3)	0.5 (0.2)

Table 15. Length frequency, mean length, relative weight (Wr), and CPUE (fish/hr) of *Sander spp.* collected during 3.0 hr of electrofishing in the Ohio River in December 2022. Standard errors are in parentheses.

Tailwater	Species	Inch class												Mean length (in)	Wr	CPUE
		6	7	8	9	10	11	12	13	14	15	16	Total			
Markland	Sauger Walleye	10	143	105	21	7	25	7			1		319	8.4	83	319.0 (60.5) 0.0
Cannelton	Sauger Walleye	36	164	132	30	9	47	55	12	2		1	488	8.9	81	488.0 (106.6)
				1	3								4	9.0	82	4.0 (2.0)
JT Myers	Sauger Walleye	5	29	45	18	1		4	7	5	2	1	117	9.1	83	117.0 (61.3) 0.0
Total	Sauger Walleye	51	336	282	69	17	72	66	19	7	3	2	924	8.8	82	308.0 (56.1)
													4	9.0	82	1.3 (0.8)

Table 16. Electrofishing catch-per-unit-effort (fish/hr) estimates for four length groups of sauger from the Ohio River from 2014 - 2021. Standard errors are in parentheses.

Year	Markland tailwater length group				Total
	<8.0 in	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2014	25.0 (5.6)	235.0 (61.5)	44.0 (15.1)	4.0 (1.2)	308.0 (78.1)
2015	47.0 (10.0)	101.0 (36.0)	39.0 (7.6)	5.0 (2.8)	192.0 (40.9)
2016	2.0 (1.2)	121.0 (25.6)	32.0 (10.2)	1.0 (1.0)	156.0 (33.1)
2017	2.0 (1.2)	63.0 (16.1)	52.0 (8.0)	7.0 (4.7)	124.0 (19.7)
2018	50.0 (23.8)	106.0 (23.0)	39.0 (13.4)	10.0 (4.5)	205.0 (39.1)
2019	4.0 (2.5)	129.0 (34.6)	41.0 (17.4)	8.0 (4.5)	182.0 (53.1)
2020	1.0 (1.0)	137.0 (23.2)	25.0 (4.1)	18.0 (7.9)	181.0 (29.7)
2021	38.0 (9.8)	48.0 (15.6)	15.0 (7.6)	3.0 (1.3)	104.0 (30.3)
2022	153.0 (43.0)	158.0 (27.0)	7.0 (4.7)	1.0 (1.0)	319.0 (60.5)
Mean	35.8 (8.1)	122.0 (12.1)	32.7 (3.8)	6.3 (1.4)	196.8 (17.0)

	Cannelton tailwater length group				Total
	<8.0 in	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2014	3.0 (2.0)	150.0 (32.3)	60.0 (21.4)	26.0 (11.5)	239.0 (59.9)
2015	17.0 (7.0)	178.0 (24.8)	34.0 (7.4)	5.0 (2.4)	234.0 (21.5)
2016	1.0 (1.0)	279.0 (60.6)	141.0 (37.8)	2.0 (2.0)	423.0 (93.1)
2017	4.0 (2.5)	36.0 (11.0)	22.0 (7.2)	6.0 (4.8)	68.0 (15.3)
2018	29.0 (12.7)	24.0 (5.0)	12.0 (7.3)	11.0 (3.9)	76.0 (23.3)
2019	1.0 (1.0)	166.0 (48.6)	38.0 (25.0)	12.0 (6.4)	217.0 (72.7)
2020	0.0 (0.0)	277.0 (35.8)	49.0 (7.4)	16.0 (5.6)	342.0 (31.2)
2022	200.0 (71.3)	218.0 (48.6)	69.0 (15.7)	1.0 (1.0)	488.0 (106.6)
Mean	31.9 (12.5)	166.0 (17.9)	53.1 (8.3)	9.9 (2.2)	260.9 (28.7)

	JT Myers tailwater length group				Total
	<8.0 in	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2017	0.0	9.0 (6.0)	13.0 (4.4)	12.0 (3.4)	34.0 (11.1)
2020	24.0 (19.0)	104.0 (70.9)	37.0 (8.0)	4.0 (3.0)	169.0 (92.4)
2022	34.0 (25.4)	64.0 (32.5)	16.0 (5.2)	3.0 (2.0)	117.0 (61.3)
Mean	19.3 (10.5)	59.0 (26.2)	22.0 (4.2)	6.3 (1.8)	106.7 (37.3)

Table 17. Mean back calculated length at age and total annual mortality (A) of sauger collected from the various tailwaters of the Ohio River in December 2022.

Tailwater	Age		A
	1	2	
Markland	8.5	13.3	91.8
Cannelton	8.1	13.0	88.3
JT Myers	8.5	12.2	75.6
Total	8.3	12.5	86.7

Table 18. Age frequency and CPUE results for sauger collected in the Markland Tailwater of the Ohio River in December 2022. Standard errors are in parentheses.

Tailwater	Age	6	7	8	9	10	11	12	13	14	15	16	Total	%	CPUE
Markland	0	10	143	105	17	1							276	86.5%	276.0 (64.0)
	1				4	6	25	7					42	13.2%	42.0 (14.8)
	2										1		1	0.3%	1.0 (1.0)
	Total	10	143	105	21	7	25	7			1		319	100%	319.0 (60.5)
Cannelton	0	36	164	132	30	2							364	74.6%	364.0 (110.6)
	1					7	47	55	12				121	24.8%	121.0 (27.0)
	2									2		1	3	0.6%	3.0 (3.0)
	Total	36	164	132	30	9	47	55	12	2		1	488	100%	488 (106.6)
JT Myers	0	5	29	45	18	1							98	83.8%	98.0 (50.6)
	1							4	7	1			12	10.3%	12.0 (5.2)
	2									4	2	1	7	6.0%	7.0 (2.6)
	Total	5	29	45	18	1		4	7	5	2	1	117	100%	117.0 (61.3)
Total	0	51	336	282	65	5							739	80.0%	246.3 (50.8)
	1				4	12	72	66	19	1			174	18.8%	58.0 (14.1)
	2									6	3	2	11	1.2%	3.7 (1.4)
	Total	51	336	282	69	17	72	66	19	7	3	2	924	100%	308.0 (56.1)

Project II: Evaluation of new recreational and commercial regulations on catfish in the Ohio River

FINDINGS

Commercial fishing for catfish has long existed on the Ohio River; however, harvesting trophy-sized fish to sell to pay lake owners has become more prevalent while a market for flesh also remains popular. At the same time, catch and release trophy catfishing has become extremely popular for recreational anglers on the Ohio River. Different viewpoints on how the fishery should be managed has led to conflict between recreational anglers and commercial anglers. Recreational catfish anglers came to KDFWR asking for more stringent regulation for both recreational and commercial anglers, because of a perceived decline in trophy catfish numbers. KDFWR began looking at some basic population parameters of the three major catfish species (blue catfish, channel catfish, flathead catfish) in the Ohio River beginning in 2004. The study was initiated to obtain baseline information on length frequency, weight, and age profiles of these three species and determine methods to more effectively sample each of these species. The conflict was again brought up at a commission meeting in 2012 and it was decided that one additional year of intense sampling would be conducted before a decision on potential regulations was made. Data prior to 2013 was collected from different pools each year and lacked the consistency and standardization to effectively monitor trends of catfish populations in the Ohio River. In 2013 methods for all gear types were standardized and additional effort was put towards sampling to more accurately estimate population dynamics of blue catfish, channel catfish, and flathead catfish in the Ohio River.

A public meeting was held in October 2013 to present catfish data that had been gathered during this project and discuss potential regulations that may be put in place. Both recreational and commercial anglers were in attendance and given the opportunity to share their thoughts and suggestions. In November 2013, the following regulations designed to give some protection to trophy catfish were proposed to the Fisheries Committee:

Recreational anglers on the main-stem Ohio River will be allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day. Harvest of fish below their respective length limits will not be regulated.

The majority of commercial fishers fishing in the legal waters of the Ohio River and its tributaries will be allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day. However, 44 commercial fishers that harvested over 10,000 lbs of catfish in at least 2 of the last 3 years along with an additional six commercial fishers, who will be chosen by a lottery drawing, will be allowed a daily harvest of four (in aggregate) blue catfish and flathead catfish ≥ 40.0 in and channel catfish ≥ 30.0 inches in Kentucky's portion of the Ohio River and its tributaries open to commercial fishing below Cannellton Lock and Dam. Harvest of fish below their respective length limits will not be regulated.

After hearing comments from stakeholders in attendance and discussion with the Fisheries Division Director, the Fisheries Committee voted unanimously to pass the proposed regulations on to the full Commission. The regulations were passed by the full Commission at their meeting in December 2013. In June 2014, the regulation was made law; however, an injunction on the regulation was filed by commercial fishers shortly after its enactment and regulations on commercial fishers were not enforceable until December 1, 2014.

Accusations by recreational anglers that overharvest was still occurring on the Ohio River surfaced again in 2018. A working group comprised of the KDFWR Fisheries Committee, KDFWR Director of Fisheries and staff biologist, recreational anglers, commercial fishermen, and paylake owners was formed so that all parties were represented in discussions. Multiple workgroup meetings were held to work towards another compromise. Several regulations were proposed and submitted for review. At the time of this report the following regulations have been made law:

The number of commercial fishers awarded trophy permits is 15 (previously 50).

No more than two licensed commercial fisherman per boat. If more are present, they may only keep two limits of trophy catfish.

A possession limit (twice the daily limit) was placed on trophy catfish for commercial fishers. This applies when on the water and when trailering fish.

Trotline Surveys

During summer 2022 trotlines (50 hooks/line) baited with fresh cut rough fish (primarily smallmouth buffalo and silver carp) were used to sample blue catfish. KDFWR crews completed sampling in the Meldahl and Cannelton pools of the Ohio River, and Indiana Department of Natural Resources sampled the JT Myers Pool. KDFWR typically also samples the Smithland Pool; however, an emphasis was placed on collecting samples in the Meldahl and Cannelton pools for age and growth analysis. The Smithland Pool will be priority for sampling in 2023. Seventy-one total trotlines were fished throughout those pools: 28 in Meldahl Pool, 20 in Cannelton Pool, and 23 in JT Myers Pool (Table 1). CPUE of blue catfish increased from the most recent sample in 2020 to a new record high (Table 2).

Blue catfish collected with trotlines ranged from 11.1 – 48.8 in with a mean length of 28.1 in (Table 3). Trophy blue catfish were captured in all pools sampled during trotline sampling and accounted for 8.2% of the total sample. Trotline catch rates for different size groups of each species of catfish were also examined (Table 4). Due to the change in trotline methods in 2018, comparisons with previously collected data should be made with caution. Overall, blue catfish CPUE in 2022 was the highest on record. All size groups saw increases in CPUE from 2020, and all except the 12.0 – 19.9 in size group were above their historical averages.

Trotline CPUE and size structure of blue catfish in the JT Myers Pool was once again lower than expected based on findings in the Meldahl and Cannelton pools. The Meldahl and Cannelton pools have displayed consistently higher CPUE (total and trophy fish) than the JT Myers and Smithland pools since 2017. The majority of commercial harvest occurs on the trophy permit section, and invasive Asian carp biomass is rapidly increasing in this part of the river. Both of these factors could play a role in lower catch rates. If this continues, potential changes in harvest regulations should be examined in the near future.

Hoop Net Surveys

Channel catfish hoop net surveys—Department hoop netting was conducted in the Meldahl and Cannelton pools to gather data from hoop net catch of channel catfish and flathead catfish. KDFWR typically also samples the Smithland Pool; however, an emphasis was placed on collecting samples in the Meldahl and Cannelton pools for age and growth analysis. The Smithland Pool will be priority for sampling in 2023. Single nets baited with ZOTE® soap were set overnight for three consecutive net nights in the main stem of the Ohio River. Hoop nets were fished for a total of 171 net-nights: 87 in Meldahl Pool and 84 in Cannelton Pool (Table 5). Overall catch rate of channel catfish was 2.1 fish/net-night. This is similar to CPUE in 2021 (2.4 fish/net-night) and below the historical average of 4.2 fish/net-night (Table 6).

Lengths of channel catfish ranged from 7.1 – 28.1 in with a mean length of 16.1 in (Table 7). Hoop net catch rates were also examined for different size groups of channel catfish. Channel catfish catch rates for all size groups examined were nearly identical to 2021 and were all below historical averages (Table 8).

Flathead catfish hoop net surveys—Netting was conducted simultaneously with baited channel catfish hoop nets in the Meldahl and Cannelton pools. Singles nets were set overnight for three consecutive nights in the main stem of the Ohio River. Hoop nets were fished for a total of 156 net-nights: 75 in the Meldahl Pool and 81 in the Cannelton Pool (Table 9). Overall CPUE of flathead catfish was 1.5 fish/net-night which is nearly double the CPUE from 2021 (0.8 fish/net-night; Table 10).

Lengths of flathead catfish ranged from 15.4 – 45.9 in with a mean length of 28.1 in (Table 11). Hoop net catch rates of different size groups were also examined, and all size groups were at or above 2021 catch rates (Table 7). Trophy flathead catfish (≥ 35.0 in) were captured at 0.2 fish/net-night, and were observed in all pools sampled.

Electrofishing Surveys

Low-pulse DC electrofishing was conducted in seven pools in June 2022: Meldahl, Markland, McAlpine, Cannelton, Newburgh, JT Myers, and Smithland. A total of 35.0 hr of electrofishing effort was conducted resulting in a total catch of 1,039 blue catfish and 1,650 flathead catfish (Table 13). Overall CPUE of blue catfish was 29.7 fish/hr, the second highest CPUE on record and above the historical average of 18.1 fish/hr (Table 14). Overall flathead catfish CPUE was 47.1 fish/hr, a slight increase from 2021 (41.7 fish/hr) and above the historical average (36.5 fish/hr).

Blue catfish collected with electrofishing ranged from 4.1 – 46.8 in with a mean length of 16.0 in (Table 15). Electrofishing catch rates were also examined for different size groups of blue catfish (Table 16). CPUE of <12.0 in fish increased and was a record high. All other size groups examined also increased from 2021 levels, and CPUE of trophy-size catfish was tied for a record high (0.6 fish/hr). Trophy blue catfish were observed in all pools except the Meldahl and Markland pools (Table 15).

Flathead catfish lengths ranged from 2.3 – 45.8 in with a mean length of 14.7 in (Table 15). Electrofishing CPUE for all size groups examined were above their historical averages (Table 17). Trophy flathead catfish were observed in all pools sampled except the Markland Pool (Table 15).

Relative Weight

Relative weight (W_r) was also calculated for each species of catfish. Fish collected from all sampling methods used in 2022 were combined to provide a more representative estimate for the entire population of each catfish species. Overall W_r of blue catfish ($N=915$) in 2022 was 103 (Table 18). Flathead catfish ($N=1,453$) overall relative weight was 95, and channel catfish ($N=236$) overall relative weight was 89. Although all species had relative weights less than their historical averages, results indicate that fish are generally in good to excellent condition.

Age and Growth

In spring 2022, otoliths (up to 5 per inch class) were taken from blue catfish, channel catfish, and flathead catfish to assess growth rates for each species. Von Bertalanffy growth equations were calculated for each species (Table 19). While there were some small differences, growth rate calculations for all three species of catfish examined in 2022 were very similar to those calculated in 2017 (Figure 1). A deeper and more statistical driven investigation into differences in von Bertalanffy growth equations between years, pools, and sex will be conducted in 2023 when Smithland has been sampled and the age and growth sample is complete.

Blue catfish—A subsample of 340 otoliths were taken from blue catfish, 158 from the Meldahl Pool and 182 from the Cannelton Pool. Ages of fish ranged from 1 – 25 years with all year classes except for 2013 present in the sample. No fish older than 20 years were observed in the 2017 age and growth sample. On average, it took blue catfish 16.2 years to reach trophy size (≥ 35.0 in; Table 20). This is slightly faster than the 17.7 years that was calculated from the 2017 age and growth sample. Blue catfish also exhibited slightly faster growth in the Meldahl Pool when compared to the Cannelton Pool. Overall, female blue catfish grew faster than males in the first eight years, but males tended to outgrow females through age-25.

Channel catfish—A total of 200 otoliths were taken from channel catfish, 96 from the Meldahl Pool and 104 from the Cannelton Pool. Ages of fish ranged from 1 - 18 with all age classes present. Max age of sampled channel catfish was lower than 2017 (20 years). The von Bertalanffy growth equation estimated that channel catfish would reach trophy size (28.0 in) at 22.3 years, indicating that most channel catfish will not reach trophy size during their lifespan (Table 21). Growth of male and female channel catfish was extremely similar throughout all ages.

Flathead catfish—A subsample of 349 otoliths were taken from flathead catfish, 165 from the Meldahl Pool and 185 from the Cannelton Pool. Ages of fish ranged from 1 – 34 years with 30 year classes present. Max age (34 years) was one year older than the max observed in the 2017 age and growth sample. On average, it took flathead catfish 20.4 years to reach trophy size (≥ 35.0 in; Table 22), and is very similar to 20.1 years that was calculated in 2017. Flathead catfish grew slightly quicker in the Meldahl Pool, but predicted length at age was nearly identical after age-15. Overall, male flathead catfish grew faster than females in the first nine years, but females tended to outgrow males later in life.

Mortality

Total annual mortality estimates were made on all three species of catfish based off length-at-age of capture data from otoliths and paired with unaged catfish collected with multiple sampling techniques in 2022. Length frequency data from 2022 was paired with the 2022 age-length key to provide mortality estimates. Using Fishery Analysis and Modeling Simulator (FAMS), a separate weighted catch-curve regression was run on each species of catfish for each sampling method to calculate a range of total annual mortality estimates. As a precautionary step, the highest mortality estimate calculated for each species is reported to avoid underestimates and potentially masking problems in the populations. In 2022, river-wide total annual mortality for blue catfish was 26.4%. Channel catfish total annual mortality was 15.8%, and flathead catfish total annual mortality was 17.6% (Table 23).

Commercial Fishing Industry

Commercial fishing for catfish has long been present in the Ohio River, but concerns of potential overharvest have warranted further investigations. Harvest of blue catfish began increasing from 2004 to 2005 and has remained near 200,000 – 250,000 lbs through 2018 with the exception of large harvests in 2012, 2021, and 2022 (Figure 2). Record harvest of blue catfish (388,274 lbs) was observed in 2021. Channel catfish harvest has fluctuated, but generally increased from 2007 – 2012 then gradually declined from 2013 - 2022. Channel catfish harvest for 2021 was 111,169 lbs. Flathead catfish harvest began decreasing in 2012, but has remained stable from 2015 – 2022 between 80,000 and 120,000 lbs. Unfortunately, commercial fish harvest reports do not include detailed information about gear (number of net nights, baited vs. unbaited, length of gillnet, etc.); however, the number of hooks fished for trotlines as well as number of hoop nets fished is required to be reported. Although trotline and hoop net harvest should not be considered indicative of the entire commercial catfish harvest, it is the best available method to analyze trends in commercial catfish harvest rates. Effort (number of hooks for trotlines and number of nets for hoop nets) and pounds harvested by method were examined to determine if harvest rates varied over the years. Trotlines are more effective at capturing blue catfish, while hoop nets are more effective when targeting flathead catfish according to commercial harvest data. Channel catfish appear to be captured efficiently by both trotlines and hoop nets. Each species was examined according to the most effective gear. The harvest rate of blue catfish increased sharply from 2004 to 2005, then increased gradually from 2005 – 2022. Harvest rate reached an all-time high in 2021 and 2022 was the second highest recorded harvest rate (Figure 3). Recent years with decreases in total pounds of catfish harvested are likely not a result of decreased harvest rates, but rather a decrease in effort. The harvest rate remaining high in years where harvest is lower indicates that the amount of fish harvested is not solely a result of increased effort. Channel catfish trotline harvest rates has been extremely consistent since 2004, but reached a historical high in 2020 and remained near those levels the previous two years (Figure 3). Channel catfish and flathead catfish harvest in commercial nets have both remained between 5 – 15 pounds/net since 2014; however, a drastic spike in harvest occurred in 2012 and 2013 (Figure 4).

Reasons for this extreme peak in harvest are not known, but could be a result of prolonged favorable fishing conditions or demand for fish.

Table 1. CPUE (fish/line) of blue catfish collected during trotline surveys on the Ohio River in summer 2022. Standard errors are in parentheses.

Pool	No. of trotlines	No. of Blue Catfish	CPUE
Meldahl	28	248	8.9 (0.8)
Cannelton	20	186	9.3 (1.0)
JT Myers	23	69	3.0 (0.5)
Total	71	503	7.1 (0.6)

Table 2. CPUE (fish/line) of blue catfish collected during trotline surveys on the Ohio River during summer from 2004 - 2022. Standard errors are in parentheses.

Year	CPUE
2004	1.5 (0.3)
2005	1.5 (0.4)
2006	6.6 (1.2)
2007	2.4 (0.5)
2008	5.9 (0.7)
2010	4.0 (0.4)
2011	3.9 (0.6)
2012	3.0 (0.8)
2013	1.2 (0.2)
2014	1.3 (0.1)
2015	1.6 (0.2)
2016	2.8 (0.2)
2017	2.0 (0.2)
2018*	5.2 (0.4)
2019*	5.9 (0.4)
2020*	5.4 (0.3)
2022*	7.1 (0.6)
Mean**	2.9 (0.5)

*New methods were adopted for trotlining including changes in bait and style of dropper lines.

**Mean calculated from 2004 - 2017 data prior to changing methods.

Table 3. Length frequency and CPUE (fish/line) of blue catfish collected during trotline surveys on Ohio River in summer 2022. Standard errors are in parentheses.

Pool	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Total	CPUE
Meldahl								1	3	1	1	6	9	9	17	24	44	39	36	12	13	5	8	5	3	1	3		1		1	1	2	1		1		1	248	8.9 (0.8)
Cannelton	2		2	1	3			2	1	1		4	14	15	22	22	22	19	14	5	4	2	6	5	2	2	5	2	2		1	1	1				2	2	186	9.3 (1.0)
JT Myers					4	1	1	2	2		2	3	1	3	5	7	4	10	7	4	2	4	1		3	1			1				1						69	3.0 (0.5)
Total	2		2	1	7	1	1	5	6	2	3	13	24	27	44	53	70	68	57	21	19	11	15	10	8	4	8	2	4		2	2	4	1		1	2	3	503	7.1 (0.6)

Table 4. CPUE (fish/line) by size group of blue catfish collected during trotline surveys on the Ohio River during summer from 2004 - 2022. Standard errors are in parentheses.

Year	Size group (in)					Total
	<12.0	12.0 - 19.9	20.0 - 29.9	30.0 - 34.9	≥35.0	
2004	0.0	0.3 (0.2)	0.9 (0.2)	0.3 (0.2)	0.1 (0.1)	1.5 (0.3)
2005	0.0	<0.1 (<0.1)	1.0 (0.6)	0.2 (0.1)	0.2 (0.1)	1.5 (0.4)
2006	<0.1 (<0.1)	0.8 (0.2)	5.0 (1.0)	0.6 (0.2)	0.2 (0.1)	6.6 (1.2)
2007	0.0	0.3 (0.1)	1.5 (0.4)	0.5 (0.2)	0.1 (<0.1)	2.4 (0.5)
2008	0.0	0.6 (0.2)	4.1 (0.8)	1.0 (0.1)	0.1 (0.1)	5.9 (0.7)
2010	0.0	0.2 (<0.1)	1.9 (0.3)	1.1 (0.3)	0.7 (0.2)	4.0 (0.4)
2011	0.0	0.2 (0.1)	2.7 (0.5)	0.9 (0.3)	0.3 (0.1)	3.9 (0.6)
2012	0.1 (<0.1)	0.7 (0.3)	1.7 (0.3)	0.3 (0.2)	0.2 (0.1)	3.0 (0.8)
2013	0.1 (<0.1)	0.3 (0.1)	0.6 (0.1)	0.1 (<0.1)	<0.1 (<0.1)	1.2 (0.2)
2014	<0.1 (<0.1)	0.5 (0.1)	0.5 (0.1)	0.2 (<0.1)	0.1 (0.1)	1.3 (0.1)
2015	<0.1 (<0.1)	0.5 (0.2)	0.7 (0.2)	0.3 (0.1)	0.1 (<0.1)	1.6 (0.2)
2016	<0.1 (<0.1)	0.7 (0.2)	1.5 (0.4)	0.5 (0.2)	0.1 (<0.1)	2.8 (0.2)
2017	0.0	0.3 (0.1)	1.4 (0.1)	0.2 (<0.1)	0.1 (<0.1)	2.0 (0.2)
2018*	<0.1 (<0.1)	0.3 (0.1)	3.2 (0.3)	0.9 (0.1)	0.8 (0.1)	5.2 (0.4)
2019*	<0.1 (<0.1)	0.2 (<0.1)	4.2 (0.3)	0.9 (0.1)	0.6 (0.1)	5.9 (0.4)
2020*	0.0	0.1 (<0.1)	3.9 (0.2)	0.7 (0.1)	0.7 (0.1)	5.4 (0.3)
2022*	.03 (.02)	0.3 (0.1)	5.1 (0.5)	1.1 (0.2)	0.6 (0.1)	7.1 (0.6)
Mean**	<0.1 (<0.1)	0.4 (0.1)	1.8 (0.4)	0.5 (0.1)	0.2 (<0.1)	2.9 (0.5)

*New methods were adopted for trotlining including changes in bait and style of dropper lines.

**Mean calculated from 2004 - 2017 data prior to changing methods.

Table 5. CPUE (fish/net-night) of channel catfish collected during baited hoop net surveys in Meldahl and Cannelton pools of the Ohio River in spring 2022. Standard errors are in parentheses.

Pool	Effort (net nights)	No. of channel catfish	CPUE
Meldahl	87	207	2.4 (0.7)
Cannelton	84	152	1.8 (0.5)
Total	171	359	2.1 (0.4)

Table 6. CPUE (fish/net-night) of channel catfish collected during baited hoop net surveys on the Ohio River in spring 2017 - 2022. Standard errors are in parentheses.

Year	CPUE
2017	7.0 (1.0)
2018	3.8 (0.5)
2019	4.5 (0.8)
2021	2.4 (0.5)
2022	2.1 (0.4)
Mean	4.2 (0.3)

Table 7. Length frequency and CPUE (fish/net-night) of channel catfish collected during baited hoop net sampling in the Meldahl and Cannelton pools during spring 2022 on the Ohio River. Standard errors are in parentheses.

Pool	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Total	CPUE
Meldahl	3	4	36	33	11	9	4	12	12	17	13	12	12	9	7	5	4	3	1				207	2.4 (0.7)
Cannelton		1	9	4	5	1	4	7	13	8	16	13	15	11	10	11	11	4	5	2	1	1	152	1.8 (0.5)
Total	3	5	45	37	16	10	8	19	25	25	29	25	27	20	17	16	15	7	6	2	1	1	359	2.1 (0.4)

Table 8. CPUE (fish/net-night) by size group of channel catfish collected during baited hoop net surveys on the Ohio River in spring 2017 - 2021. Standard errors are in parentheses.

Year	Size group (in)				Total
	<12.0	12.0 - 19.9	20.0 - 27.9	≥28.0	
2017	1.5 (0.3)	4.5 (0.7)	1.0 (0.2)	<0.1 (<0.1)	7.0 (1.0)
2018	0.7 (0.1)	2.5 (0.4)	0.6 (0.1)	<0.1 (<0.1)	3.8 (0.5)
2019	0.8 (0.2)	2.6 (0.5)	1.0 (0.3)	<0.1 (<0.1)	4.5 (0.8)
2021	0.6 (0.1)	1.3 (0.4)	0.5 (0.1)	0.0	2.4 (0.5)
2022	0.6 (0.2)	1.0 (0.2)	0.5 (0.2)	<0.1 (<0.1)	2.1 (0.4)
Mean	0.9 (0.1)	2.6 (0.2)	0.7 (0.1)	<0.1 (<0.1)	4.2 (0.3)

Table 9. CPUE (fish/net-night) of flathead catfish collected during unbaited hoop net surveys in Meldahl and Cannelton pools of the Ohio River in spring 2022. Standard errors are in parentheses.

Pool	Effort (net nights)	No. of Flathead Catfish	CPUE
Meldahl	75	96	1.3 (0.3)
Cannelton	81	135	1.7 (0.3)
Total	156	231	1.5 (0.2)

Table 10. CPUE (fish/net-night) of flathead catfish collected unbaited hoop net surveys on the Ohio River in spring 2017 - 2022. Standard errors are in parentheses.

Year	CPUE
2019	1.8 (0.2)
2021	0.8 (0.2)
2022	1.5 (0.2)
Mean	1.4 (0.1)

Table 11. Length frequency and CPUE (fish/net/night) of flathead catfish collected during unbaited hoop net sampling in the Meldahl and Cannelton pools during spring 2022 on the Ohio River. Standard errors are in parentheses.

Pool	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	Total	CPUE
Meldahl		3			2		7	5	9	7	14	9	5	5	8		7	4	1	5		1					3	1				96	1.3 (0.3)
Cannelton	3		1	1	4	1	3	13	4	11	14	9	8	3	6	6		11	7	3	4	5	6	1	3	3	2	1		1	1	135	1.7 (0.3)
Total	3	3	1	1	6	1	1	18	13	18	28	18	13	8	14	6	7	15	8	8	4	6	6	1	3	3	5	2		1	1	231	1.5 (0.2)

Table 12. CPUE (fish/net-night) by size group of flathead catfish collected during unbaited hoopnet surveys on the Ohio River in spring 2019 - 2021. Standard errors are in parentheses.

Year	Size group (in)					Total
	<12.0	12.0 - 19.9	20.0 - 29.9	30.0 - 34.9	≥35.0	
2019	0.0	0.1 (<0.1)	1.1 (0.1)	0.3 (0.1)	0.2 (0.1)	1.8 (0.2)
2021	0.0	0.1 (<0.1)	0.5 (0.2)	0.1 (0.1)	0.1 (<0.1)	0.8 (0.2)
2022	0.0	0.1 (<0.1)	0.9 (<0.1)	0.3 (0.1)	0.2 (0.1)	1.5 (0.2)
Mean	0.0	0.1 (<0.1)	0.9 (0.1)	0.3 (<0.1)	0.2 (<0.1)	1.4 (0.2)

Table 13. Effort and CPUE (fish/hr) of blue catfish and flathead catfish collected during electrofishing surveys on the Ohio River in June 2022. Standard errors are in parentheses.

Pool	No. of transects	Effort (hr)	No. of Blue Catfish	CPUE	No. of Flathead	CPUE
Meldahl	20	5.0	150	30.0 (6.4)	249	49.8 (5.7)
Markland	20	5.0	288	57.6 (18.3)	207	41.4 (4.9)
McAlpine	20	5.0	107	21.4 (7.3)	224	44.8 (4.7)
Cannelton	20	5.0	112	22.4 (4.4)	222	44.4 (3.3)
Newburgh	20	5.0	112	22.4 (5.5)	203	40.6 (6.6)
JT Myers	20	5.0	119	23.8 (6.5)	289	57.8 (5.1)
Smithland	20	5.0	151	30.2 (4.8)	256	51.2 (10.2)
Total	140	35.0	1039	29.7 (3.4)	1650	47.1 (2.3)

Table 14. CPUE (fish/hr) of blue catfish and flathead catfish collected during electrofishing surveys on the Ohio River from 2004 - 2022. Standard errors are in parentheses.

Year	Species	
	Blue catfish	Flathead catfish
2004	0.0	14.5 (4.1)
2009	1.6 (0.8)	15.5 (4.1)
2010	11.9 (4.0)	17.1 (3.3)
2013	11.4 (4.8)	38.9 (5.1)
2014	19.3 (3.2)	32.8 (2.6)
2015	19.0 (3.8)	37.6 (3.6)
2016	17.5 (2.7)	35.5 (2.2)
2017	25.2 (2.7)	40.6 (2.1)
2018	39.8 (5.7)	54.0 (4.7)
2019*	22.2 (2.6)	40.2 (2.4)
2020	20.1 (2.4)	59.6 (3.0)
2021	17.9 (2.0)	41.7 (2.2)
2022	29.7 (3.4)	47.1 (2.3)
Mean	18.1 (3.0)	36.5 (3.9)

*Incomplete sample due to high water

Table 16. CPUE (fish/hr) by size group of blue catfish collected during electrofishing surveys on the Ohio River from 2004 - 2022. Standard errors are in parentheses.

Year	Size group (in)					Total
	<12.0	12.0 - 19.9	20.0 - 29.9	30.0 - 34.9	≥35.0	
2004	0.0	0.0	0.0	0.0	0.0	0.0
2009	0.1 (<0.1)	1.0 (0.1)	0.4 (<0.1)	0.1 (<0.1)	0.0	1.6 (0.8)
2010	8.8 (2.3)	1.0 (0.1)	1.4 (0.1)	0.7 (<0.1)	0.0	11.9 (4.0)
2013	9.2 (2.5)	1.8 (0.9)	0.3 (0.1)	0.0	0.0	11.4 (4.8)
2014	6.8 (0.6)	10.1 (1.2)	2.1 (0.2)	0.2 (0.1)	0.1 (0.1)	19.3 (3.2)
2015	0.8 (0.4)	14.3 (3.0)	3.5 (0.5)	0.2 (<0.1)	0.2 (0.1)	19.0 (3.8)
2016	0.7 (0.4)	11.1 (2.8)	4.9 (0.9)	0.3 (0.1)	0.5 (0.2)	17.5 (2.7)
2017	3.5 (0.7)	12.8 (1.7)	7.8 (1.0)	0.5 (0.2)	0.5 (0.1)	25.2 (2.7)
2018	6.2 (1.8)	15.1 (3.4)	17.3 (6.8)	0.6 (0.2)	0.6 (0.2)	39.8 (5.7)
2019*	4.9 (1.0)	7.4 (1.0)	8.6 (1.3)	0.9 (0.2)	0.5 (0.1)	22.2 (2.6)
2020	2.9 (0.5)	4.6 (0.7)	11.4 (1.7)	0.7 (0.2)	0.5 (0.1)	20.1 (2.4)
2021	7.0 (1.2)	4.2 (0.5)	5.9 (0.8)	0.3 (0.1)	0.5 (0.1)	17.9 (2.0)
2022	13.3 (2.4)	7.8 (1.0)	7.4 (0.9)	0.7 (0.1)	0.6 (0.1)	26.7 (3.4)
Mean	4.9 (1.1)	7.0 (1.5)	5.5 (1.4)	0.4 (0.1)	0.3 (0.1)	17.9 (2.9)

*Incomplete sample due to high water

Table 17. CPUE (fish/hr) by size group of flathead catfish collected during electrofishing surveys on the Ohio River from 2004 - 2022. Standard errors are in parentheses.

Year	Size group (in)					Total
	<12.0	12.0 - 19.9	20.0 - 29.9	30.0 - 34.9	≥35.0	
2004	9.3 (4.2)	5.0 (1.1)	0.3 (0.3)	0.0	0.0	14.5 (4.1)
2009	8.4 (1.7)	4.3 (0.2)	2.6 (0.2)	0.0	0.3 (<0.1)	15.5 (4.1)
2010	8.8 (1.9)	6.0 (2.1)	2.1 (0.5)	0.2 (<0.1)	0.0	17.1 (3.3)
2013	14.9 (4.5)	17.2 (1.1)	6.3 (1.8)	0.3 (0.1)	0.2 (0.2)	38.9 (5.1)
2014	12.3 (2.6)	15.9 (3.7)	4.3 (0.2)	0.3 (0.1)	0.1 (<0.1)	32.8 (2.6)
2015	15.8 (2.1)	14.6 (4.2)	5.6 (0.9)	0.9 (0.4)	0.7 (0.3)	37.6 (3.6)
2016	10.9 (1.6)	16.0 (4.2)	7.2 (1.3)	0.8 (0.3)	0.6 (0.3)	35.5 (2.2)
2017	12.5 (1.1)	15.5 (1.0)	10.7 (0.9)	1.1 (0.2)	0.8 (0.2)	40.6 (2.1)
2018	22.0 (2.8)	15.3 (1.0)	13.5 (1.2)	1.9 (0.3)	1.2 (0.2)	54.0 (4.7)
2019*	15.0 (1.8)	12.9 (0.9)	10.1 (0.8)	1.4 (0.3)	0.8 (0.2)	40.2 (2.4)
2020	33.1 (2.4)	13.3 (0.9)	10.8 (0.8)	1.1 (0.2)	1.3 (0.2)	59.6 (3.0)
2021	18.4 (1.5)	15.0 (1.1)	6.8 (0.6)	0.9 (0.2)	0.6 (0.1)	41.7 (2.2)
2022	21.0 (1.9)	14.8 (0.8)	9.7 (0.2)	0.8 (0.2)	0.8 (0.2)	47.1 (2.3)
Mean	15.6 (1.9)	12.8 (1.3)	6.9 (1.1)	0.7 (0.2)	0.6 (0.1)	36.5 (3.9)

*Incomplete sample due to high water

Table 18. Relative weight (Wr) of blue catfish, channel catfish, and flathead catfish collected from the Ohio River using trotlines, hoop nets, electrofishing and catfish tournaments from 2013 - 2022.

Year	Species		
	Blue catfish	Channel catfish	Flathead catfish
2013	112	100	99
2014	105	97	92
2015	109	100	98
2016	107	97	106
2017	106	89	107
2018	104	90	101
2019	99	86	99
2020	107		107
2021	112	87	114
2022	103	89	95
Mean	106	93	102

Table 19. von Bertalanffy growth parameters used to estimate length-at age for blue catfish, channel catfish, and flathead catfish collected from the Ohio River in 2022 where L_{∞} = theoretical maximum length, K=body growth coefficient, and t_0 =time coefficient.

Parameter	Blue catfish	Channel catfish	Flathead catfish
L_{∞} (in)	55.0	35.0	55.0
K	0.058	0.065	0.043
t_0	-1.224	-2.442	-3.119

Table 20. Mean length (in) at age calculated with the von Bertalanffy growth equation based on otoliths taken from blue catfish from the Ohio River in spring and summer of 2022.

Pool	Sex	Age																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Meldahl	Male	7.5	10.3	12.8	15.3	17.5	19.7	21.7	23.6	25.4	27.1	28.7	30.3	31.7	33.0	34.3	35.5	36.6	37.7	38.7	39.6	40.5	41.3	42.1	42.9	43.6
	Female*																									
	Total	6.8	9.7	12.5	15.1	17.6	19.9	22.0	24.0	25.9	27.7	29.4	31.0	32.4	33.8	35.1	36.3	37.5	38.6	39.6	40.5	41.4	42.2	43.0	43.8	44.5
Cannelton	Male	5.9	8.7	11.3	13.8	16.1	18.3	20.4	22.3	24.2	25.9	27.6	29.1	30.6	32.0	33.3	34.5	35.7	36.8	37.8	38.8	39.7	40.6	41.4	42.2	42.9
	Female	9.4	11.6	13.7	15.7	17.6	19.5	21.2	22.9	24.4	25.9	27.4	28.7	30.0	31.2	32.4	33.5	34.6	35.6	36.5	37.4	38.3	39.1	39.9	40.6	41.3
	Total	6.4	9.1	11.6	14.0	16.3	18.5	20.5	22.4	24.2	25.9	27.5	29.1	30.5	31.9	33.2	34.4	35.5	36.6	37.6	38.6	39.5	40.4	41.2	42.0	42.7
Overall	Male	6.5	9.4	12.0	14.5	16.9	19.1	21.2	23.2	25.1	26.8	28.5	30.0	31.5	32.8	34.1	35.4	36.5	37.6	38.6	39.6	40.5	41.3	42.1	42.9	43.6
	Female	9.4	11.8	14.0	16.0	18.0	19.9	21.7	23.4	25.0	26.5	28.0	29.3	30.6	31.9	33.1	34.2	35.2	36.2	37.2	38.1	39.0	39.8	40.6	41.3	42.0
	Total	6.7	9.4	12.0	14.4	16.7	18.9	20.9	22.8	24.7	26.4	28.0	29.5	31.0	32.3	33.6	34.8	36.0	37.0	38.1	39.0	39.9	40.8	41.6	42.4	43.1

*Growth was unable to be calculated due to insufficient number of females in the subsample.

Table 21. Mean length (in) at age calculated with the von Bertalanffy growth equation based on otoliths taken from channel catfish from the Ohio River in spring and summer of 2022.

Pool	Sex	Age																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Meldahl	Male	9.8	11.3	12.7	14.0	15.3	16.4	17.5	18.6	19.5	20.5	21.3	22.1	22.9	23.6	24.3	24.9	25.5	26.1
	Female*																		
	Total	7.7	9.4	11.0	12.4	13.8	15.1	16.3	17.5	18.5	19.5	20.5	21.4	22.2	23.0	23.7	24.4	25.0	25.7
Cannelton	Male	5.6	7.6	9.4	11.1	12.7	14.2	15.6	16.9	18.1	19.2	20.3	21.2	22.2	23.0	23.8	24.6	25.3	25.9
	Female	8.4	10.0	11.6	13.0	14.4	15.7	16.9	18.0	19.0	20.0	21.0	21.8	22.6	23.4	24.1	24.8	25.4	26.0
	Total	6.4	8.3	10.0	11.6	13.1	14.5	15.9	17.1	18.3	19.4	20.4	21.3	22.2	23.0	23.8	24.5	25.2	25.8
Overall	Male	9.8	11.2	12.5	13.7	14.9	16.0	17.0	18.0	18.9	19.8	20.6	21.4	22.2	22.9	23.5	24.1	24.7	25.3
	Female	10.2	11.5	12.7	13.9	15.0	16.0	17.0	17.9	18.8	19.6	20.4	21.2	21.9	22.6	23.2	23.8	24.4	24.9
	Total	7.0	8.8	10.4	12.0	13.4	14.8	16.1	17.2	18.4	19.4	20.4	21.3	22.2	23.0	23.7	24.4	25.1	25.7

*Growth was unable to be calculated due to insufficient number of females in the subsample.

Table 22. Mean length (in) at age calculated with von Bertalanffy growth equation based on otoliths taken from flathead catfish from the Ohio River in spring and summer of 2022.

Pool	Sex	Age																																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Meldahl	Male	14.0	15.5	16.9	18.3	19.7	20.9	22.2	23.4	24.5	25.6	26.7	27.7	28.7	29.7	30.6	31.5	32.4	33.2	34.0	34.8	35.5	36.2	36.9	37.6	38.2	38.8	39.4	40.0	40.5	41.1	41.6	42.1	42.5	43.0
	Female	11.6	13.3	15.0	16.6	18.2	19.6	21.1	22.4	23.7	25.0	26.2	27.4	28.5	29.6	30.6	31.6	32.5	33.4	34.3	35.1	35.9	36.7	37.4	38.2	38.8	39.5	40.1	40.7	41.3	41.9	42.4	42.9	43.4	43.9
	Total	9.6	11.6	13.4	15.1	16.8	18.4	20.0	21.5	22.9	24.2	25.5	26.8	28.0	29.1	30.2	31.3	32.3	33.2	34.1	35.0	35.9	36.7	37.5	38.2	38.9	39.6	40.2	40.9	41.5	42.0	42.6	43.1	43.6	44.1
Cannelton	Male	11.4	13.1	14.6	16.1	17.6	19.0	20.3	21.6	22.9	24.1	25.2	26.4	27.4	28.5	29.5	30.4	31.3	32.2	33.1	33.9	34.7	35.4	36.2	36.9	37.6	38.2	38.8	39.5	40.0	40.6	41.1	41.7	42.2	42.6
	Female	7.9	10.1	12.2	14.1	16.0	17.8	19.5	21.2	22.7	24.2	25.6	27.0	28.3	29.5	30.7	31.8	32.9	33.9	34.9	35.8	36.7	37.5	38.3	39.1	39.8	40.5	41.2	41.9	42.5	43.0	43.6	44.1	44.6	45.1
	Total	7.5	9.6	11.6	13.6	15.4	17.1	18.8	20.4	21.9	23.4	24.8	26.1	27.4	28.6	29.8	30.9	32.0	33.0	34.0	34.9	35.8	36.6	37.4	38.2	39.0	39.7	40.4	41.0	41.6	42.2	42.8	43.3	43.8	44.3
Overall	Male	13.3	14.8	16.2	17.7	19.0	20.3	21.6	22.8	24.0	25.1	26.2	27.3	28.3	29.2	30.2	31.1	32.0	32.8	33.6	34.4	35.1	35.9	36.6	37.2	37.9	38.5	39.1	39.7	40.3	40.8	41.3	41.8	42.3	42.8
	Female	8.0	10.2	12.3	14.3	16.3	18.1	19.8	21.5	23.0	24.5	26.0	27.3	28.6	29.9	31.1	32.2	33.3	34.3	35.3	36.2	37.1	37.9	38.7	39.5	40.2	40.9	41.6	42.2	42.8	43.4	44.0	44.5	45.0	45.5
	Total	8.9	10.9	12.8	14.5	16.2	17.9	19.4	20.9	22.4	23.8	25.1	26.3	27.6	28.7	29.8	30.9	31.9	32.9	33.8	34.7	35.6	36.4	37.2	37.9	38.7	39.4	40.0	40.7	41.3	41.9	42.4	42.9	43.5	43.9

Table 23. Maximum total annual mortality rates of blue catfish, channel catfish, and flathead catfish collected from the Ohio River using trotlines, hoopnets, and electrofishing from 2013 - 2022.

Year	Species		
	Blue catfish	Channel catfish	Flathead catfish
2013	18.7	32.2	18.8
2014	24.7	26.8	18.7
2015	20.0	20.6	15.9
2016	17.4	16.8	16.0
2017	18.9	27.9	18.2
2018	19.8	28.0	18.0
2019	17.3	23.3	17.1
2020	26.6		19.5
2021	23.7	20.7	19.8
2022	26.4	15.8	17.6
Mean	21.4	23.6	18.0

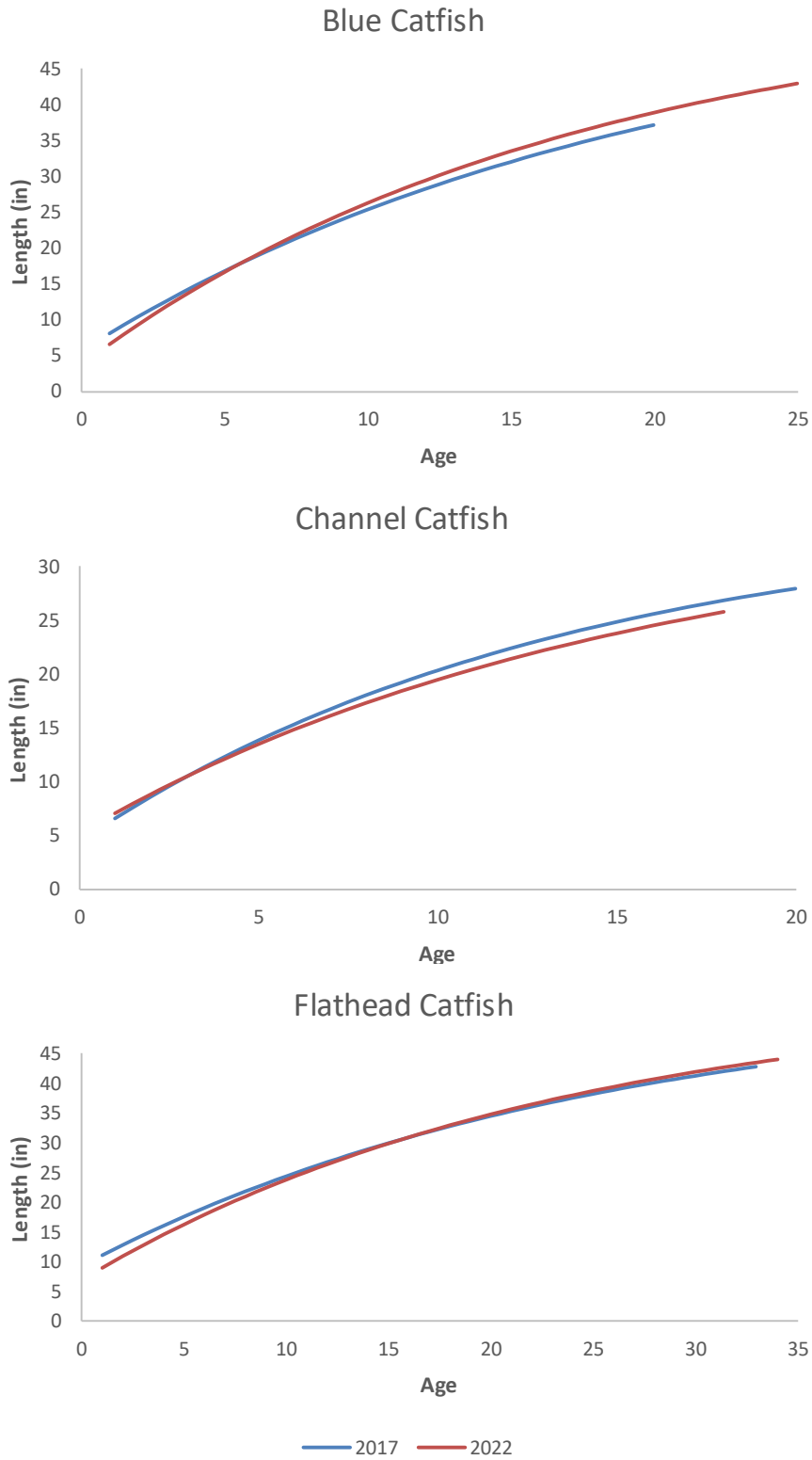


Figure 1. Comparison of von Bertalanffy growth curves for blue catfish, channel catfish, and flathead catfish from age and growth samples conducted in 2017 and 2022.

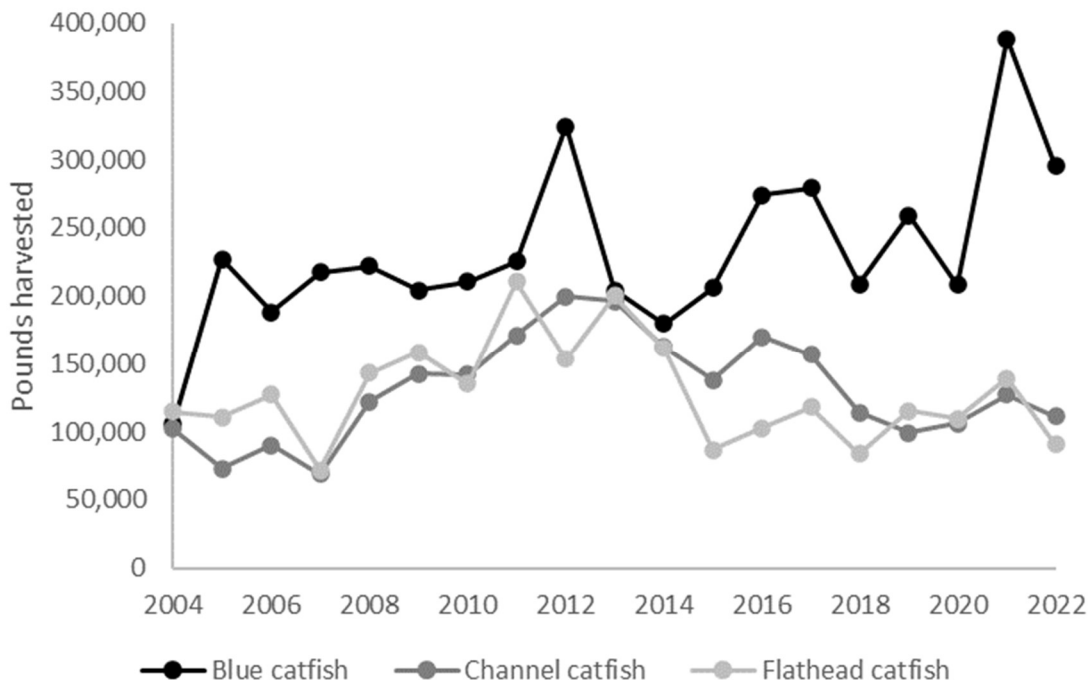


Figure 2. Total pounds of blue catfish, channel catfish, and flathead catfish harvested by commercial fishermen from the Ohio River from 2004 – 2022.

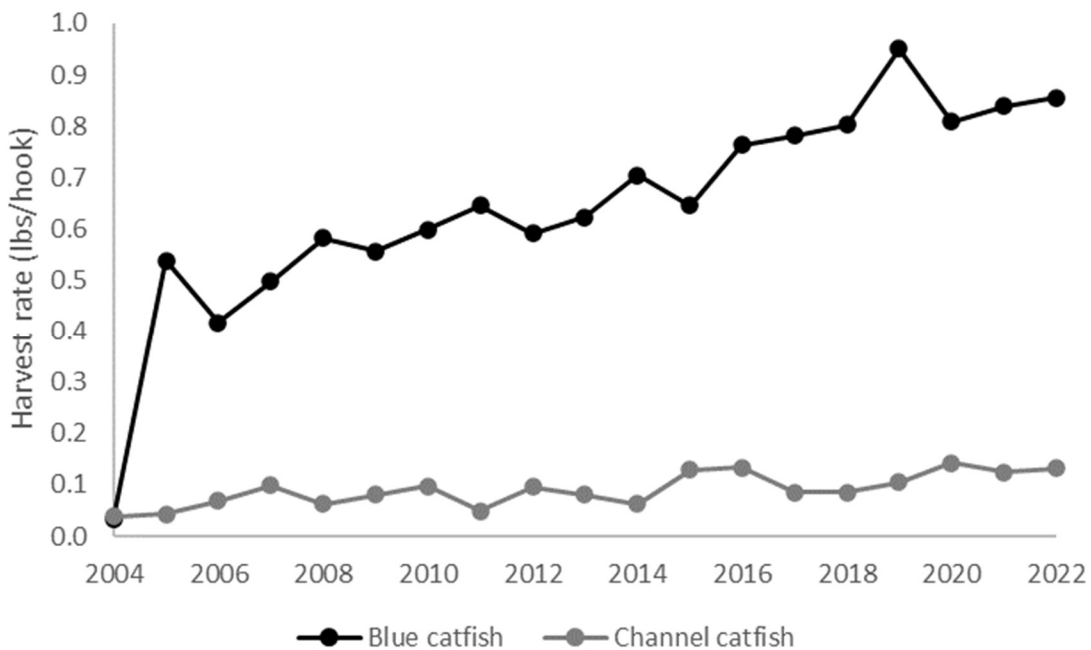


Figure 3. Harvest rate (lbs/hook) of blue catfish and channel catfish harvested with trotlines by commercial fishermen from the Ohio River from 2004 – 2022.

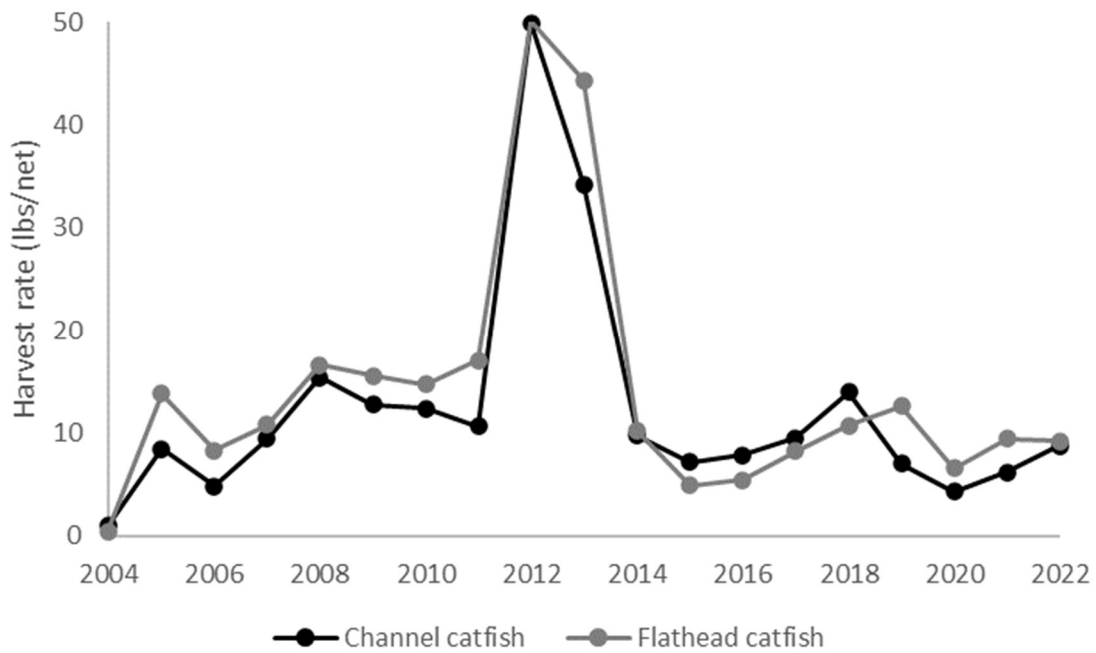


Figure 4. Harvest rate (lbs/net) of channel catfish and flathead catfish harvested with hoop nets by commercial fishermen from the Ohio River from 2004 – 2022.

Project III: Warm Water Stream Sport Fish Surveys

FINDINGS

Warm water stream sport fish surveys and black bass/rock bass samples were completed on various streams during 2022. Species collected during general sport fish surveys include largemouth bass, smallmouth bass, spotted bass, rock bass, bluegill, redear sunfish, white crappie, black crappie, muskellunge, walleye, sauger, white bass, hybrid striped bass, channel catfish, rainbow trout and flathead catfish. Sampling seasons and sites for each stream are kept consistent in an effort to standardize the data for comparative purposes. River and stream sampling sites and conditions are summarized in Table 1 and Figure 1.

Otter Creek

In March 2022, a general sport fish survey was conducted on Otter Creek at six sites using an electrofishing tote barge for a total effort of 2.25 hrs. A total of seven species were collected in Otter Creek. Rainbow trout were the most abundant species collected at 44.4 fish/hr (Table 2). Rainbow trout were collected at all sampling sites except the section around Camp Carlson (Table 3). CPUE for the 8.0 – 11.9 in length group was (33.8 fish/hr) and ≥ 12.0 in length was (10.7 fish/hr; Table 4). They ranged in size from 8.0 – 14.0 in class and 75% of rainbow trout collected were ≥ 10 in (Table 2). Rainbow trout are stocked into various portions of Otter Creek (both in the recreation area and Fort Knox) in all months except January. Based on sampling results, survival appears to be sufficient to provide a recreational fishery.

Smallmouth bass were the second most abundant species collected. Overall CPUE was 29.3 fish/hr and fish ranged in size from 2 – 13 in class (Table 2). Eighty-nine percent of smallmouth collected were under the 12 – 16 protective slot limit on Otter Creek, and 53% of smallmouth collected were in the 4.0 – 8.9 in length group (Table 5).

Rock bass were the third most abundant species collected at 21.8 fish/hr and ranged in size from 3 - 9 in class (Table 2). Out of the total rock bass sampled on Otter Creek, fifty-three percent of the sample consisted of fish ≥ 6.0 in (Table 6).

Bluegill (1.3 fish/hr), largemouth bass (0.9 fish/hr), brown trout (0.9 fish/hr), and spotted bass (0.4 fish/hr) were also collected (Table 2) but at lower densities.

Russell Fork

A general sport fish survey was conducted on Russell Fork during April 2022 at three sites using boat-mounted electrofishing for a total effort of 1.75 hrs. Smallmouth bass (49.7 fish/hr) were the most abundant sport fish collected followed by rock bass (14.9 fish/hr) and walleye (3.4 fish/hr; Table 7). Smallmouth bass were collected from the 4 -20 in classes, with 52% of the sample consisting of quality size (≥ 12.0) fish and 30.0% of the sample above the preferred size (≥ 14.0 ; Table 8). Based on the data collected during 2022 the size structure of smallmouth bass has significantly improved with good numbers of intermediate, quality and preferred size fish along with the catch rates nearly doubling from the 2017 sample with three fewer sites sampled (Table 8). The smallmouth bass fishery in Russell Fork received an assessment score of 15, representing a “good” rating (Table 9).

Rock bass were the second most abundant species collected in Russell Fork (14.9 fish/hr), with fish ranging from 3 - 9 in classes (Table 7). Overall, 77% of rock bass sampled were above quality size (≥ 6.0 in) and 15% were above preferred size (≥ 8.0 in; Table 10). The rock bass numbers were down from the 2017 sample which is to be expected with three fewer sites sampled and the sites that weren’t accessible had an adequate amount of chunk rock which is the preferred habitat of rock bass (Table 10). The rock bass fishery receiving an assessment score of 9, representing a “good” rating (Table 11).

Additional sport fish species were also present in Russell Fork but found in lower densities. Bluegill (0.6 fish/hr), largemouth bass (0.6 fish/hr), spotted bass (0.6 fish/hr) and walleye (3.4 fish/hr) were collected (Table 7).

Levisa Fork

During April 2022, four sites on Levisa Fork were sampled with boat-mounted electrofishing for a total effort of 5.0 hrs. Nine species were collected with smallmouth bass (17.6 fish/hr) being the most abundant, followed by channel catfish (6.8 fish/hr) and rock bass (2.2 fish/hr; table 12). Smallmouth bass ranged from 4 - 21 in classes with 33% of the sample consisting of quality size (≥ 12.0) fish and 28% of the sample ≥ 14.0 in (preferred size; Table 13). The smallmouth bass population received an overall assessment rating of "good" with a score of 13 (Table 14).

Channel catfish were the second most abundant species observed in Levisa Fork and had a CPUE of 6.8 fish/hr. Fish ranged in size from 14 -26 in class, with quality size fish (≥ 14.0 in) making up 100% of the sample (Table 12).

Rock bass (2.2 fish/hr) ranged from the 4 - 9 in classes with 66% of the sample being ≥ 6.0 in size class (quality size) and 36% of the sample ≥ 8.0 in size class (preferred size; Table 15). Rock bass received a population assessment score of 4, indicating a "poor" rating (Table 16).

Other species observed in Levisa Fork included spotted bass (2.4 fish/hr), bluegill (1.4 fish/hr), flathead catfish (0.2 fish/hr), hybrid striped bass (0.4 fish/hr) and walleye (0.8 fish/hr). Trophy opportunities for walleye are available as they were observed up to 30 inches (Table 12).

Kentucky River

Pool 8

In October 2022, a general sport fish survey using boat-mounted electrofishing was conducted in the upper and lower sections of Pool 8 of the Kentucky River for a total of 3.0 hrs (15-minute transects). Eight species were collected with smallmouth bass and spotted bass being the most abundant. Smallmouth bass CPUE was 6.3 fish/hr and sizes ranged from 3 -18 in classes (Table 17). Catch rates and size structure for smallmouth bass had improved since the 2018 sample (Table 18). Fifty-six percent of the fish sampled were above the 12 in statewide minimum size limit (Table 17). Relative weight values were good for both the 7.0-10.9 in (92) and 11.0-13.9 in (84) length groups groups and poor for the ≥ 14.0 in (76) size group. Overall, the condition of these fish was fair, with an overall relative weight value of 84 (Table 19).

Spotted bass CPUE was 6.3 fish/hr with fish ranging from the 3 - 13 in classes (Table 17). Catch rates in all length groups of spotted bass increased from the 2018 sample (Table 20) Relative weight values were excellent for the 7.0-10.9 in length group (100) and the 11.0-13.9 in length group (105; Table 19).

Although collected at lower densities, largemouth bass (2.0 fish/hr), bluegill (2.0 fish/hr), sauger (1.0 fish/hr), white crappie (0.7 fish/hr), walleye (0.3 fish/hr) and white bass (0.3 fish/hr) were also present (Table 19). Additionally, largemouth bass CPUE was lower in all length groups for largemouth bass compared to the 2018 sample done on Pool 8 of Kentucky River (Table 21).

Pool 9

Sport fish sampling in the upper and lower sections of Pool 9 of the Kentucky River was conducted in September 2022 using boat-mounted electrofishing for a total effort of 3.0 hrs (15-minute transects). Overall, seven species were collected with spotted bass being the most abundant species sampled,

followed by largemouth bass and smallmouth bass. Spotted bass CPUE was 4.0 fish/hr and ranged in size from 2 -12 in classes (Table 22). Catch rates of all length groups of spotted bass were higher compared to the 2019 sample of Pool 9 on Kentucky River (Table 23). Spotted bass relative weights were good across all size class ranges (Table 24).

Largemouth bass were collected at 3.7 fish/hr and ranged in size from 3 - 16 in classes (Table 22). Catch rates for largemouth bass were higher in 2022 compared to the 2019 sample on Pool 9 of the Kentucky River (Table 25). Additionally, relative weights for largemouth bass were excellent for the 8.0 -11.9 in length group and good for 12.0 – 14.9 in and ≥ 15.0 in length groups (Table 24).

Smallmouth bass were sampled at a rate of 2.7 fish/hr (Table 22). Length-frequency distribution shows fish ranged in size from 10 – 17 in classes. Overall, 75% of smallmouth bass sampled were ≥ 12 in (Table 22). Additionally, the catch rates for 2022 were higher than the 2019 sample on Pool 9 of Kentucky River (Table 26).

Additional sport fish species were observed in Pool 9 of the Kentucky River but found in lower densities. Bluegill (2.3 fish/hr), sauger (1.3 fish/hr), channel catfish (0.7 fish/hr), and white bass (0.7 fish/hr) were all present in the sample (Table 22).

Pool 10

Sport fish sampling with boat-mounted electrofishing was conducted in the upper and lower sections of Pool 10 of the Kentucky River in October 2022 for a total effort of 3.0 hrs (15-minute transects). Ten species were collected with bluegill being the most abundant sampled, followed by spotted bass and largemouth bass. Bluegill were collected at a rate of 11.7 fish/hr with fish ranging from the 3 – 7 in size classes (Table 27).

Spotted bass were collected at 9.7 fish/hr and ranged in size from 3 – 12 in size classes (Table 27). Catch rates of spotted bass for each length group examined were higher in the 2022 sample compared to the 2019 sample (Table 28). Largemouth bass CPUE was 9.3 fish/hr (Table 27). CPUE was higher than 2019 which could be because of a recent stocking of largemouth bass relatively close to our sampling sites. Length frequency distribution shows fish ranged in size from 4 – 19 in classes with increased catch rates in all length groups examined of largemouth bass compared to the 2019 sample on Pool 10 of Kentucky River (Table 29). Twenty-one percent of largemouth bass sampled were ≥ 12 in (Table 27). Additionally, relative weights for all black bass species collected were good for all length groups (Table 30). Smallmouth bass were collected in the sample (4.0 fish/hr) with 75% being ≥ 12 in (Table 31).

Additional sport fish species were observed in Pool 10 of the Kentucky River but found in lower densities. White bass (5.0 fish/hr), channel catfish (1.0 fish/hr), sauger (1.0 fish/hr), flathead catfish (0.3 fish/hr), muskellunge (0.3 fish/hr) and redear sunfish (0.3 fish/hr) were also present in the sample.

In the 2022 sample on Pool 10 of Kentucky River, water levels and flow were lower than normal, and unlike the 2019 sample water temperatures were in the low 60's which is ideal for sampling. Which could be one of the reasons the catch rates for multiple species were significantly higher than the 2019 sample.

Pool 11

During September 2022, the upper and lower sections of Pool 11 of the Kentucky River were sampled with boat-mounted electrofishing for a total effort of 3.0 hrs (15-minute transects). Eight species were collected with bluegill (7.7 fish/hr) being the most abundant, followed by spotted bass (7.3 fish/hr) and flathead catfish (7.3 fish/hr; Table 32).

Spotted bass comprised 78% of the black bass sample. Spotted bass CPUE was 3.7 fish/hr and fish ranged in size from 3 – 10 in classes (Table 32). Catch rates for spotted bass were equivalent to that of the 2019 sample on Pool 11 of the Kentucky River (Table 33). Relative weights were good for spotted bass collected in Pool 11 (Table 34).

Bluegill were collected from the 3 – 6 in classes at a rate of 7.7 fish/hr (Table 32). Flathead catfish (3.7 fish/hr), largemouth bass (3.0 fish/hr), channel catfish (1.7 fish/hr), white bass (1.0 fish/hr), sauger (0.7 fish/hr) and muskellunge (0.7 fish/hr) were collected at lower densities (Table 32). Additionally, largemouth bass catch rates were the same as the 2019 sample (Table 35).

Pool 13

Sport fish sampling on Pool 13 of the Kentucky River was conducted in October 2022 using boat-mounted electrofishing for a total effort of 2.0 hrs (15-minute transects). Overall, four species were collected with bluegill being the most abundant species sampled, followed by spotted bass. Bluegill (CPUE=5.5 fish/hr) ranged in size from 4 – 7 in classes (Table 36).

Spotted bass CPUE was 4.0 fish/hr with fish ranging from the 5 – 11 in classes (Table 36). Catch rates for spotted bass increased from the 2019 sample (Table 37). Additionally, even though the number of fish collected for relative weights were low, all species of black bass were in acceptable condition for all length groups examined.

Although collected at lower densities, smallmouth bass CPUE (1.5 fish/hr) increased from 2019 levels (Table 38). Conversely largemouth bass CPUE (0.5 fish/hr) decreased from to the 2019 sample (Table 39).

Green River

The removal of Lock and Dam 6 on the Green River was initiated in late March/ early April 2017 due to a breach that formed in the dam in late November 2016 causing the structure to become a major safety hazard. As a result, Lock and Dam 6 was completely removed in the several months following initiation of the project. Removal of Lock and Dam 5 was initiated in summer 2021 and removal will continue into 2023. Sampling was conducted on Pool 5 and old Pool 6 in fall 2022. Annual fall sampling to collect general sport fish will continue in Pool 5 for several years post dam removal. Sampling efforts on old Pool 6 have transitioned to a 3-to-5-year sampling rotation to maintain trend data.

Pool 5

In September 2022, a general sport fish survey using boat-mounted electrofishing was conducted on the upper and lower sections of Pool 5 of the Green River. Ten different species were collected during 3.0 hrs (15-minute transects) of electrofishing. Spotted bass were the most abundant species collected (8.3 fish/hr) and ranged from the 2 – 11 in classes (Table 40). CPUE was lower than in 2021 (12.3 fish/hr) and below the historical average of 11.6 fish/hr (Table 41). Relative weight values were acceptable for the 7.0-10.9 in (100) and 11.0-13.9 in (87) size groups. Overall condition of these fish was good (Wr= 93; Table 42).

Largemouth bass CPUE was 1.0 fish/hr and fish ranged from the 5 – 13 in classes (Table 40). CPUE of largemouth bass continues to be low and was the second lowest recorded since 2012 (Table 43). Sample size was small; however, relative weights of largemouth bass were good for the 12.0-14.9 (93) size groups (Table 42).

Smallmouth bass and rock bass were sampled at rates of 1.7 and 0.3 fish/hr, respectively. Smallmouth bass ranged in size from the 3 – 12 in classes, while only one rock bass was observed at the 5.0 in class (Table 40). Smallmouth bass and rock bass catch rates in Pool 5 have historically been very low. Catch per unit effort for smallmouth bass was similar to samples from 2012 – 2021, but slightly below the historical CPUE (1.9 fish/hr; Table 44). Rock bass CPUE was also similar (0.3 fish/hr) to samples from 2012 – 2021 (Table 45).

Old Pool 6

Fall sport fish electrofishing (3.25 hrs) was conducted during September 2022 at three standardized sites in Old Pool 6 of the Green River. Rock bass were observed in the 2 – 9 in classes at a rate of 46.5 fish/hr (Table 46). The last two samples for Rock bass have substantially increased in CPUE compared to the prior sampling events in 2016 and 2017, and the 2022 sample is the fourth highest total CPUE since sampling began in 2013 (Table 47). Out of the total rock bass sampled, 60% of the sample consisted of fish ≥ 6 in (quality size). Relative weight values for rock bass were good across all size groupings giving an overall population relative weight of 98 (Table 48).

Smallmouth bass were collected at a rate of 44.0 fish/hr, with fish ranging from the 2 – 18 in classes (Table 46). Twenty-nine percent of smallmouth bass in the sample consisted of quality size fish (≥ 12 in). Overall CPUE in 2022 was the highest recorded (44.0 fish/hr) since annual fall sampling began in 2013 (Table 49). The catch rates of 9.0–11.9 fish collected was also the highest recorded and is a good sign for quality size fish for the foreseeable future. Relative weight values were poor to fair across all size groups with the fishery receiving an overall value of 79 (Table 48).

Although available at lower densities, spotted bass (4.3 fish/hr), bluegill (3.7 fish/hr), channel catfish (3.1 fish/hr), flathead catfish (0.6 fish/hr), largemouth bass (1.5 fish/hr), and muskellunge (0.3 fish/hr), were collected (Table 46).

Lower Barren River

Unimpounded

A general sport fish survey was conducted on the lower Barren River during September 2022 at three sites using boat-mounted electrofishing for a total effort of 4.5 hrs (15-minute transects). Typically, there are six standardized sites sampled but due to historically low water conditions only three sites were accessible for sampling this year. Smallmouth bass (CPUE=41.3 fish/hr) were the most abundant sport fish collected followed by spotted bass (CPUE=21.1 fish/hr), and rock bass (CPUE=11.6 fish/hr; Table 50). Smallmouth bass were collected from the 3 – 19 in classes. Overall, 83.3% of fish were below the 12 in statewide minimum size limit. Catch rates by length group were almost all above their historic averages (Table 51). Relative weight values observed for smallmouth bass were good, but decreased as fish grew larger. Condition was good (89) for the 7.0-10.9 in size group, good (82) for the 11.0-13.9 in size group, and poor (77) for the ≥ 14.0 in size group (Table 52). Smallmouth bass had the second highest catch rate since annual sampling began in 2007. Fingerling were stocked into lower Barren River in 2021, so it is unclear if increased catch rates of smaller fish are a result of stocking, a successful spawn, or both.

Rock Bass sampled in the lower Barren River ranged from the 3 - 9 in size classes (Table 50), with quality size (≥ 6 in) fish representing 92% of the sample. Overall (CPUE=11.6 fish/hr) increased from 2021 and was the highest it has been since 2017 (Table 53). This increase was observed especially in the quality size length groups (≥ 6 in) of fish which were above the historical average. Relative weight values for rock bass were poor (78) for the 4.0 – 5.9 and good for the 6.0 – 9.0 fish and had an overall Wr of 90 (Table 52).

Spotted bass were collected from the 4 – 12 in classes at a rate of 21.1 fish/hr (Table 50). CPUE was the third highest observed dating back to 2007 and well above the historical average (10.9 fish/hr; Table 54). Relative weight values for spotted bass were good (101) for the 7.0-10.9 in and good (99) for the 11.0-13.9 in length group. The overall condition (100) for this population was good (Table 52).

Additional sport fish species were observed in lower Barren River but found in lower densities. Channel catfish (2.2 fish/hr) were present up to the 27.0 in size class. Walleye (likely native strain) were captured at 3.3 fish/hr. Bluegill were also captured at 3.6 fish/hr. All other species captured were observed at rates < 1.3 fish/hr (Table 50).

Previously Impounded

Sampling in 2022 began the first year of post-dam removal sampling in lower Barren River. Lock and Dam 1 at Greencastle was removed between August-September of 2022. There are traditionally two sites in this sample; however, only one site was sampled as Barren River Lake began its seasonal drawdown during the sample and made sampling unsafe. The primary focus of sampling these sites is to collect community sportfish data pre and post dam removal. A general sport fish survey was conducted at one site for a total effort of 1.5 hrs (15-minute transects) during September 2022. The four most abundant species observed were spotted bass (CPUE=80.7 fish/hr), smallmouth bass (CPUE=14.0 fish/hr), bluegill (CPUE=14.7 fish/hr) and rock bass (CPUE=8.7 fish/hr; Table 55). The CPUE and numbers of smallmouth bass, spotted bass and rock bass by length groups are the highest it has been since we started sampling in 2017 reference (Tables 51,53,54).

In general, species composition and overall number of fish sampled between the unimpounded and impounded sections of lower Barren River have traditionally been very different. But with the changing water levels and habitat conditions further sampling will need to take place to determine the impact the dam removal will have for the previously impounded section of lower Barren River. Typically, the unimpounded section of lower Barren River consists of riffle, run and pool habitats and access to the flood plain, which provides more natural and complex stream type ecosystems that allows for a greater diversity of fish species to flourish in these areas. The previously impounded section of lower Barren River is beginning to show signs of habitat conditions somewhat comparable to that of the unimpounded sections. Habitat in the section has drastically changed from previous years as the water level has dropped approximately 7-10 ft exposing more natural habitat including gravel shoals and chunk rock banks that were once covered in silt, more woody laydowns. Additionally, riffles are now present as far upriver as Sibert Island. Improved catch rates of smallmouth bass and spotted bass may be the result of several factors. Improved habitat and the loss of a major barrier may have already led to fish immigrating into this portion of the river. Secondly, shallower water may have increased catchability of fish that were previously in the area but not susceptible to electrofishing gear. Lastly, smallmouth bass were stocked at Lonnie White Boat Ramp in 2021 and increased CPUE of age-0 fish could be a result of that stocking. Nevertheless, it is encouraging to see the catch rates of these species increasing so shortly after Lock and Dam 1's removal. Further sampling will continue for the foreseeable future to compare habitat conditions and species composition post-dam removal.

Table 1. Summary of 2022 boat (B) and tote-barge (TB) electrofishing sampling sites by waterbody, river mile, date, and conditions.

Waterbody	Sampling method	River mile	Species	Date	Water temp.	Water level (USGS gauge station)	Secchi (inches)	Comments
Otter Creek - Blue Hole	TB	3.3 - 3.6	Sport fish	3/28/2022	45.5	No gauge	---	
Otter Creek - Archery Range Access	TB	4.2 - 4.3	Sport fish	3/28/2022	51.7	No gauge	---	
Otter Creek - Garnettsville	TB	5.7 - 6.0	Sport fish	3/28/2022	49.6	No gauge	---	
Otter Creek - Twin Bridges Road	TB	6.3 - 6.6	Sport fish	3/29/2022	49.6	No gauge	---	
Otter Creek - Camp Carlson	TB	7.7 - 7.9	Sport fish	3/29/2022	51.2	No gauge	---	
Otter Creek - Fort Avenue Slab Crossing	TB	10.3 - 10.5	Sport fish	3/29/2022	51.4	No gauge	---	
Russell Fork- Ratliff Hole	B	15.4 - 15.7	Sport fish	4/18/2022	58.5	2.62 ft, 157 cfs @ Haysi, VA	102	good level
Russell Fork- Carson Island Park	B	14.1 - 14.5	Sport fish	4/18/2022	58.1	2.62 ft, 157 cfs @ Haysi, VA	102	good level
Russell Fork- Blair Adkins Road	B	4.5 - 5.7	Sport fish	4/19/2022	54.0	2.91 ft, 267 cfs @ Haysi, VA	102	good level
Levisa Fork- Hatfield and McCoy Access Ramp	B	92.2 - 96.7	Sport fish	4/18/2022	58.1	6.78 ft, 500 cfs @ Pikeville, KY	96	good level
Levisa Fork- Pikeville Cut-through Ramp	B	85.9 - 87.8	Sport fish	4/19/2022	54.3	7.2 ft, 730 cfs @ Pikeville, KY	96	good level
Levisa Fork- Texas Roadhouse Ramp	B	82.3 - 84.6	Sport fish	4/19/2022	55.1	7.2 ft, 730 cfs @ Pikeville, KY	96	good level
Levisa Fork- Harman Station Ramp	B	46.8 - 50.4	Sport fish	4/20/2022	53.7	3.9 ft @ Prestonsburg, KY	36	good level
Kentucky River Pool 11 - Drowning Creek	B	204.3 - 207.9	Sport fish	9/13/2022	76.5	9.87 ft, @ Ky River L & D 12	29	good level
Kentucky River Pool 11 - Irvine Ramp	B	220.8 - 223.6	Sport fish	9/13/2022	76.3	9.87 ft, @ Ky River L & D 12	21	good level
Green River Old Pool 6 - Roachville Ramp	B	294 - 292.8	Sport fish	9/16/2022	69.9	.93 ft @ Greensburg, KY	36	low level
Green River Old Pool 6 - Greensburg Ramp	B	284.2 - 283.2	Sport fish	9/15/2022	69.9	.94 ft @ Greensburg, KY	56	low level
Green River Old Pool 6 - Munfordville Ramp	B	233.4 - 227	Sport fish	9/14/2022	70.3	2.81 ft, 343 cfs @ Munfordville, KY	56	low level
Green River Pool 5 - Brownsville	B	180.7 - 183.8	Sport fish	9/20/2022	73.2	20.32 @ Brownsville Water Plant	24	low level
Green River Pool 5 - Alexander Creek	B	170.1 - 177.6	Sport fish	9/20/2022	75.0	20.32 ft @ Brownsville Water Plant	24	low level
Barren River - Hwy 101 Bridge	B	62.8 - 66.4	Sport fish	9/29/2022	65.0	265 cfs @ Barren River Lake Dam	72	low level
Barren River- Martinsville Ford	B	57.5 - 62.5	Sport fish	9/29/2022	65.0	265 cfs @ Barren River Lake Dam	72	low level
Barren River - Above Boat Landing Ramp	B	30.5 - 35.2	Sport fish	9/28/2022	65.0	4.08 ft, 265 cfs @ Bowling Green, KY	46	low level
Barren River - Below Boat Landing Ramp	B	27.7 - 30.3	Sport fish	9/28/2022	65.0	4.08 ft, 265 cfs @ Bowling Green, KY	46	low level
Kentucky River Pool 8 (Upper)	B	150.2 - 159.6	Sport fish	10/24/2022	61.0	10.83 ft, 452 cfs @ KY River L&D 9	51	low level
Kentucky River Pool 8 (Lower)	B	141.9 - 148.6	Sport fish	10/20/2022	60.3	10.53 ft, 235 cfs @ KY River L&D 9	51	good level
Kentucky River Pool 9 (Upper)	B	172.4 - 178.8	Sport fish	10/19/2022	61.4	9.53 ft, 208 cfs @ KY River L&D 10	122	good level
Kentucky River Pool 9 (Lower)	B	159.9 - 172.1	Sport fish	10/19/2022	61.4	9.53 ft, 208 cfs @ KY River L&D 10	122	good level
Kentucky River Pool 10 (Upper)	B	192.6 - 205.6	Sport fish	10/17/2022	63.0	10.64, 210 cfs @ KY River L&D 11	48	good level
Kentucky River Pool 10 (Lower)	B	179.8 - 191.3	Sport fish	10/17/2022	63.0	10.64, 210 cfs @ KY River L&D 11	48	good level
Kentucky River Pool 13	B	244.9 - 253.7	Sport fish	10/25/2022	57.3	9.32 ft, 451 @ KY River L&D 14	52	good level

Table 2. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 2.25 hrs of electrofishing (15-minute transects) at six sites on Otter Creek during March 2022; standard error is in parentheses.

Species	Inch class													Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	14		
Rainbow trout							8	17	29	22	14	7	3	100	44.4 (14.4)
Brown trout											2			2	0.9 (0.6)
Smallmouth bass	3	2	1	6	8	12	8	8	4	7	4	3		66	29.3 (10.7)
Spotted bass		1												1	0.4 (0.4)
Largemouth bass		1						1						2	0.9 (0.6)
Rock bass		1	7	15	17	7	1	1						49	21.8 (12.5)
Bluegill	1	1		1										3	1.3 (0.9)

Table 3. Length-frequency and CPUE (fish/hr) of rainbow trout and brown trout collected during 2.25 hrs of electrofishing (15-minute transects) at six sites on Otter Creek during March 2022; standard error is in parentheses.

Site	Species	Inch class							Total	CPUE
		8	9	10	11	12	13	14		
Blue Hole	Rainbow trout		2	3	2	4	2		13	26.0 (10.0)
	Brown trout								0	0.0 (0.0)
Archery range access	Rainbow trout	1	1	4	3	4	1		14	56.0 (0.0)
	Brown trout					1			1	4.0 (4.0)
Garnettsville	Rainbow trout	6	8	10	11	4	3	2	44	88.0 (56.0)
	Brown trout					1			1	2.0 (2.0)
Twin Bridges	Rainbow trout	1	6	10	6	2	1	1	27	54.0 (14.0)
	Brown trout								0	0.0 (0.0)
Camp Carlson	Rainbow trout								0	0.0 (0.0)
	Brown trout								0	0.0 (0.0)
Fort Avenue slab crossing	Rainbow trout			2					2	8.0 (0.0)
	Brown trout								0	0.0 (0.0)
Total	Rainbow trout	8	17	29	22	14	7	3	100	44.4 (14.4)
	Brown trout					2			2	0.9 (0.6)

Table 4. Rainbow trout and brown trout electrofishing CPUE (fish/hr) from each length group collected during sampling on Otter Creek in March 2022; standard errors are in parentheses.

Species	Length group (in)				Total
	<8.0	8.0-11.9	≥12.0	≥15.0	
Rainbow trout	0.0	33.8	10.7	0.0	44.4 (14.4)
Brown trout	0	0	0.9	0	0.9 (0.6)

Table 5. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Otter Creek in March 2022; standard errors are in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2022	2.2	15.6	8.4	3.1	0.0	29.3 (10.7)

Table 6. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Otter Creek in March 2022; standard errors are in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2022	0.4	9.8	10.7	0.9	21.8 (12.5)

Table 7. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 1.75 hrs of electrofishing (15-minute transects) at three sites on Russell Fork during April 2022; standard error is in parentheses.

Species	Inch class																		Total	CPUE
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Smallmouth bass		3	2	7	2	4	9	5	10	9	10	7	9	3	3	2	1	1	87	49.7 (11.9)
Largemouth bass											1								1	0.6 (0.6)
Spotted bass									1										1	0.6 (0.6)
Rock bass	2	2	2	11	5		4												26	14.9 (6.2)
Bluegill						1													1	0.6 (0.6)
Walleye														1	2	2	1		6	3.4 (3.4)

Table 8. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Russell Fork from 2017 and 2022; standard error is in parentheses.

Year	Length group (in)					Total	Assessment rating
	<4.0	4.0-8.9	≥9.0	≥12.0	≥14.0		
2017	1.6	8.8	2.7	3.5	9.1	25.6 (5.3)	Excellent
2022	0.0	10.3	13.7	10.9	14.9	49.7 (11.9)	Good
Mean	1.1	9.3	6.2	5.8	10.9	33.3 (5.5)	

Table 9. Population assessment of smallmouth bass collected from Russell Fork in April 2022.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-8.9 in)	10.3	3
Adult density (CPUE ≥9.0 in)	39.4	4
Quality density (CPUE ≥12.0 in)	25.7	4
Preferred density (CPUE ≥14.0 in)	14.9	4
Total score		15
Assessment rating		Good

Table 10. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Russell Fork from 2017 and 2022; standard error is in parentheses.

Year	Length group (in)				Total	Assessment rating
	<4.0	4.0-5.9	≥6.0	≥8.0		
2017	1.1	3.5	3.7	9.9	18.1 (3.8)	Good
2022	1.1	2.3	9.1	2.3	14.9 (6.2)	Good
Mean	1.1	3.1	5.5	7.5	17.1 (3.2)	

Table 11. Population assessment of rock bass collected from Russell Fork in April 2022.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	1.1	3
Intermediate density (CPUE 4.0-5.9 in)	2.3	2
Quality density (CPUE ≥6.0 in)	11.4	2
Preferred density (CPUE ≥8.0 in)	2.3	2
Total score		9
Assessment rating		Good

Table 12. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 5.0 hrs of electrofishing (15-minute transects) at four sites on Levisa Fork during April 2022; standard error is in parentheses.

Species	Inch class																																								Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		41											
Smallmouth bass			1	3	13	14	6	3	9	10	3	1	11	1	5	4	3			1														88	17.6 (3.6)							
Spotted bass	1	1		1	1		2		2	4																								12	2.4 (1.1)							
Rock bass			3	1	1	2	3	1																										11	2.2 (0.7)							
Hybrid striped bass																1	1																	2	0.4 (0.3)							
Bluegill			1		2	4																												7	1.4 (0.7)							
Rainbow trout									2		1																								3	0.6 (0.6)						
Channel catfish													2	1	4	7	6	2	5	4			1	1		1								34	6.8 (1.9)							
Flathead catfish																																1		1	0.2 (0.2)							
Walleye										1						1												1		1				4	0.8 (0.6)							

Table 13. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Levisa Fork from 2017 and 2022; standard error is in parentheses.

Year	Length group (in)					Total	Assessment rating
	<4.0	4.0-8.9	≥9.0	≥12.0	≥14.0		
2017	0.5	10.6	4.4	1.2	3.7	20.4 (3.6)	Good
2022		7.4	4.4	0.8	5.0	17.6 (3.6)	Good
Mean	0.3	9.1	4.4	1.0	4.3	19.1 (2.5)	

Table 14. Population assessment of smallmouth bass collected from Levisa Fork in April 2022.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-8.9 in)	7.4	3
Adult density (CPUE ≥9.0 in)	10.2	3
Quality density (CPUE ≥12.0 in)	5.8	3
Preferred density (CPUE ≥14.0 in)	5.0	4
Total score		13
Assessment rating		Good

Table 15. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Levisa Fork from 2017 and 2022; standard error is in parentheses.

Year	Length group (in)				Total	Assessment rating
	<4.0	4.0-5.9	≥6.0	≥8.0		
2017	0.0	0.9	1.2	1.4	3.5 (1.3)	Poor
2022	0.0	0.8	0.6	0.8	2.2 (0.7)	Poor
Mean	0	0.8	0.9	1.1	2.9 (0.8)	

Table 16. Population assessment of rock bass collected from Levisa Fork in April 2022.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-5.9 in)	0.8	1
Quality density (CPUE ≥6.0 in)	1.4	1
Preferred density (CPUE ≥8.0 in)	0.8	1
Total score		3
Assessment rating		Poor

Table 17. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.0 hrs of electrofishing (15-minute transects) at two sites in Pool 8 of the Kentucky River during October 2022; standard error is in parentheses.

Species	Inch class																				Total	CPUE
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
White bass				1																	1	0.3 (0.3)
Bluegill			2	3	1																6	2.0 (1.0)
Smallmouth bass	1	2			2	1	2	2		3	1	1	1	1							17	6.3 (2.5)
Spotted bass	2	3	1	1	4	1	3	1	1	1	1										19	6.3 (1.2)
Largemouth bass		1	1					2	1	1											6	2.0 (1.0)
White crappie	1	1																			2	0.7 (0.7)
Sauger													1	1	1						3	1.0 (0.7)
Walleye																				1	1	0.3 (0.3)

Table 18. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 8 of Kentucky River from 2018 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2018	0.0	1.3 (0.8)	0.3 (0.3)	1.7 (0.9)	2.3 (1.2)	5.7 (2.4)
2022	0.3 (0.3)	1.7 (0.9)	1.3 (0.8)	1.3 (0.8)	1.7 (1.0)	6.3 (2.5)
Mean	0.2 (0.2)	1.5 (0.6)	0.8 (0.4)	1.5 (0.6)	2.0 (0.8)	6.0 (1.7)

Table 19. Number of fish and the relative weight (Wr) for each length group of black bass collected in Pool 8 of the Kentucky River during October 2022.

Species	Length group (in)						Total	
	7.0-10.9		11.0-13.9		≥14.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Smallmouth bass	7	92	4	84	5	76	16	84
Spotted bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	9	100	3	105			12	102

Table 20. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 8 of Kentucky River from 2018 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2018	0.0	1.3 (0.8)	0.7 (0.5)	0.3 (0.3)	0.0	2.3 (1.3)
2022	0.7 (0.5)	3.0 (0.7)	1.7 (0.8)	0.7 (0.5)	0.3 (0.3)	6.3 (1.2)
Mean	0.3 (0.2)	2.2 (0.5)	1.2 (0.5)	0.5 (0.3)	0.2 (0.2)	4.3 (0.9)

Table 21. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 8 of Kentucky River from 2018 and 2022; standard error is in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2018	1.7 (0.9)	3.7 (2.2)	1.0 (0.7)	0.7 (0.7)	7.0 (3.7)
2022	0.7 (0.5)	1.0 (0.7)	0.3 (0.3)	0.0	2.0 (1.0)
Mean	1.2 (0.5)	2.3 (1.2)	0.7 (0.4)	0.3 (0.3)	4.5 (1.9)

Table 22. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.0 hrs of electrofishing (15-minute transects) at two sites in Pool 9 of the Kentucky River during October 2022; standard error is in parentheses.

Species	Inch class																						Total	CPUE
	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22			
Channel catfish																			1		1	2	0.7 (0.5)	
White bass														2								2	0.7 (0.7)	
Bluegill	1	3			1	2																7	2.3 (1.4)	
Smallmouth bass										1	1		2	3		1						8	2.7 (1.1)	
Spotted bass			2	1	1	1	1		1	4		1										12	4.0 (1.0)	
Largemouth bass			1	1		1	2		1		3	1			1							11	3.7 (1.6)	
Sauger								1				1		1	1							4	1.3 (1.0)	

Table 23. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 9 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2019	0.0	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	0.0	1.0 (0.5)
2022	0.7 (0.5)	1.3 (0.6)	1.7 (0.8)	0.3 (0.3)	0.0	4.0 (1.0)
Mean	0.3 (0.2)	0.8 (0.3)	1.0 (0.4)	0.3 (0.2)	0.0	2.5 (0.6)

Table 24. Number of fish and the relative weight (Wr) for each length group of black bass collected in Pool 9 of the Kentucky River during October 2022.

Species	Length group (in)						Total	
	8.0-11.9		12.0-14.9		≥15.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Largemouth bass	4	102	1	93	1	87	6	94

Spotted bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	6	99	1	94			7	96

Table 25. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 9 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2019	1.0 (0.5)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)	2.0 (0.8)
2022	1.7 (1.0)	1.3 (0.8)	0.3 (0.3)	0.3 (0.3)	3.7 (1.6)
Mean	1.3 (0.6)	0.8 (0.4)	0.3 (0.2)	0.3 (0.2)	2.8 (0.9)

Table 26. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 9 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2019	0.0	0.0	0.0	0.0	0.0	0
2022	0.0	0.0	0.7 (0.5)	0.0	2.0 (0.9)	2.7 (1.1)
Mean	0	0	0.3 (0.2)	0	1.0 (0.5)	1.3 (0.6)

Table 27. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.00 hrs of electrofishing (15-minute transects) at two sites in Pool 10 of the Kentucky River during October 2022; standard error is in parentheses.

Species	Inch class																			Total	CPUE
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		46		
Channel catfish													1	1			1			3	1.0 (0.7)
Flathead catfish						1														1	0.3 (0.3)
Muskellunge																		1		1	0.3 (0.3)
White bass			2	7	1					3	1	1								15	5.0 (3.0)
Bluegill	5	5	9	14	2															35	11.7 (4.7)
Redear sunfish				1																1	0.3 (0.3)
Smallmouth bass								2	1	1	3	2	2		1					12	4.0 (1.6)
Spotted bass	6	4	1	5	1		3	7	1	1										29	9.7 (2.8)
Largemouth bass		4	6	2	3	4	2		1	2	2		1					1		28	9.3 (3.2)
Sauger					1												2			3	1.0 (0.5)

Table 28. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 10 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2019	0.3 (0.3)	0.0	0.0	0.0	0.0	0.3 (0.3)
2022	2.0 (1.0)	3.7 (0.8)	3.3 (1.3)	0.7 (0.5)	0.0	9.7 (2.8)
Mean	1.2 (0.6)	1.8 (0.5)	1.7 (0.7)	0.3 (0.2)	0.0	5.0 (1.7)

Table 29. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 10 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2019	0.3 (0.3)	0.7 (0.5)	0.0	0.0	1.0 (0.5)
2022	5.0 (2.6)	2.3 (0.9)	1.3 (0.8)	0.7 (0.5)	9.3 (3.2)
Mean	2.7 (1.4)	1.5 (0.5)	0.7 (0.4)	0.3 (0.2)	5.2 (1.8)

Table 30. Number of fish and the relative weight (Wr) for each length group of black bass collected in Pool 10 of the Kentucky River in October 2022.

Species	Length group (in)						Total	
	7.0-10.9		11.0-13.9		≥14.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Smallmouth bass	2	86	5	84	5	83	12	84
Spotted bass	11	97	2	97			13	97
Largemouth bass	8.0 - 11.9		12.0 - 14.9		≥15.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	7	94	4	94	2	100	13	96

Table 31. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 10 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2019	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	1.0 (0.5)	1.3 (1.0)	1.7 (0.9)	4.0 (1.6)
Mean	0	0	0.5 (0.3)	0.7 (0.5)	0.8 (0.5)	2.0 (0.9)

Table 32. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.0 hrs of electrofishing (15-minute transects) at two sites on Pool 11 of the Kentucky River during September 2022; standard error is in parentheses.

Species	Inch class																				Total	CPUE
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	31		40	
Channel catfish													1		2	1		1			5	1.7 (0.7)
Flathead catfish								1	5	2	1	1	1								11	3.7 (1.8)
Muskellunge																			1	1	2	0.7 (0.5)
White bass			1							1		1									3	1.0 (1.0)
Bluegill	4	4	10	5																	23	7.7 (2.3)
Spotted bass	3		1	2	1	2	1	1													11	3.7 (1.5)
Largemouth bass	1				1			1													3	3.0 (0.5)
Sauger						1	1														2	0.7 (0.5)

Table 33. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool11 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2019	0.0	1.7 (1.0)	1.3 (0.6)	0.3 (0.3)	0.0	3.3 (1.4)
2022	1.0 (0.7)	1.3 (1.0)	1.3 (0.6)	0.0	0.0	3.7 (1.5)
Mean	0.5 (0.4)	1.5 (0.7)	1.3 (0.4)	0.2 (0.2)	0.0	3.5 (1.0)

Table 34. Number of fish and the relative weight (Wr) for each length group of black bass collected in Pool 11 of the Kentucky River during September 2022.

Species	Length group (in)						Total	
	8.0-11.9		12.0-14.9		≥15.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Largemouth bass	1	102	0		0		1	102
Spotted bass	7.0-11.9		12.0-14.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	5	98	0		0		5	98

Table 35. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool11 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2019	0.3 (0.3)	0.0	0.7 (0.5)	0.0	1.0 (0.7)
2022	0.7 (0.5)	0.3 (0.3)	0.0	0.0	1.0 (0.5)
Mean	0.5 (0.3)	0.2 (0.2)	0.3 (0.2)	0.0	1.0 (0.4)

Table 36. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 2.00 hrs of electrofishing (15-minute transects) in Pool 13 of the Kentucky River during October 2022; standard error is in parentheses.

Species	Inch class									Total	CPUE
	4	5	6	7	8	9	10	11	15		
Bluegill	1	5	4	1						11	5.5 (2.0)
Smallmouth bass						1		1	1	3	1.5 (0.7)
Spotted bass		2		1	1	1	2	1		8	4.0 (1.9)
Largemouth bass								1		1	0.5 (0.5)

Table 37. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 13 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2019	0.0	1.3 (0.8)	0.0	0.0	0.0	0.3 (0.3)
2022	0.0	1.5 (0.7)	2.0 (1.1)	0.5 (0.5)	0.0	4.0 (1.9)
Mean	0	1.4 (0.5)	1.1 (0.7)	0.3 (0.3)	0.0	2.9 (1.1)

Table 38. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 13 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2019	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	1.0 (0.7)	0.0	0.5 (0.5)	1.5 (0.7)
Mean	0	0	0.6 (0.4)	0.0	0.3 (0.3)	0.9 (0.5)

Table 39. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during fall sampling on Pool 13 of Kentucky River from 2019 and 2022; standard error is in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2019	1.3 (0.8)	1.3 (0.8)	0.0	0.0	2.7 (1.3)
2022	0.0	0.5 (0.5)	0.0	0.0	0.5 (0.5)
Mean	0.6 (0.4)	0.9 (0.5)	0.0	0.0	1.4 (0.7)

Table 40. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.0 hrs of electrofishing (15-minute transects) at two sites in Pool 5 of the Green River during September 2022; standard errors are in parentheses.

Species	Inch class																				Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	19	20	28	...	37		
Channel catfish														1		1					2	0.7 (0.7)
Flathead catfish							1	1	3	2	2	1		1			1	1			13	4.3 (1.4)
Muskellunge																				1	1	0.3 (0.3)
Rock bass				1																	1	0.3 (0.3)
Bluegill		1		1	1																3	1.0 (0.5)
Smallmouth bass		1						1	1	1	1										5	1.7 (1.0)
Spotted bass	2		1	3	2	8	3	3	2	1											25	8.3 (2.7)
Largemouth bass				1								1	1								3	1.0 (0.7)
Black crappie										1											1	0.3 (0.3)
Sauger																1	1				2	0.7 (0.5)

Table 41. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
2012	2.3	7.3	11.7	2.0	0.0	23.3 (3.3)
2013	0.3	3.3	9.0	0.7	0.3	13.7 (3.1)
2014	2.7	2.7	7.7	1.0	0.3	14.3 (3.6)
2015	0.3	1.0	6.0	3.0	0.0	10.3 (3.1)
2016	0.2	0.8	0.9	0.4	0.0	2.3 (0.5)
2017	1.3	4.3	2.7	0.3	0.0	8.7 (2.4)
2018	0.3	1.3	2.0	1.0	0.0	4.7 (1.8)
2019	0.0	7.7	5.0	0.7	0.3	13.7 (3.7)
2020	0.3	1.7	2.7	0.3	0.7	5.7 (1.7)
2021	0.3	5.3	4.0	2.3	0.3	12.3 (3.3)
2022	0.7	4.5	2.7	0.3		8.3 (2.7)
Mean	0.9	3.8	5.2	1.2	0.2	11.3 (0.9)

Table 42. Number of fish and the relative weight (Wr) for each length group of largemouth bass and spotted bass collected in Pool 5 of the Green River during September 2022.

Species	Length group (in)						Total	
	8.0-11.9		12.0-14.9		≥15.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Largemouth bass	0		2	93	0		2	93
Smallmouth bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	2	78	2	79	0		4	78
Spotted bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	16	100	1	87	0	0	16	93

Table 43. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)				Total
	<8.0	8.0-11.9	12.0-14.9	≥15.0	
2012	1.7	4.3	2	0.3	8.3 (2.1)
2013	2	4.7	3.3	0.7	10.7 (3.9)
2014	0.3	3.3	0.0	0.7	4.3 (1.3)
2015	0.7	3.7	4.0	1.3	9.7 (4.5)
2016	0.2	0.6	0.4	0.1	1.6 (0.5)
2017	1.7	0.7	1.0	0.7	4.0 (1.2)
2018	0.0	0.0	0.0	0.0	0.0
2019	3.7	0.3	0.0	0.7	4.7 (1.1)
2020	1.7	1.0	1.0	0.3	4.0 (2.0)
2021	0.3	0.0	0.3	0.7	1.3 (0.6)
2022	0.3	0.0	0.7	0.0	1.0 (0.7)
Mean	1.2	1.9	1.3	0.5	4.8 (0.7)

Table 44. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2012	1	1.3	0.3	0.0	0.0	2.7 (0.9)
2013	0.3	1.3	0.3	0.0	0.0	2.0 (0.9)
2014	0.0	0.7	0.3	0.0	0.0	1.0 (0.7)
2015	1.0	0.7	0.3	0.0	0.0	2.0 (1.4)
2016	0.0	0.5	0.1	0.2	0.0	0.8 (0.4)
2017	0.0	0.7	0.3	0.0	0.0	1.0 (0.7)
2018	0.3	0.7	0.3	0.0	0.0	1.3 (1.0)
2019	4.0	0.0	0.0	0.0	0.0	4.0 (1.2)
2020	0.0	1.0	0.0	0.3	0.0	1.3 (0.9)
2021	0.0	0.7	0.0	0.0	0.3	1.0 (0.7)
2022	0.3	0.0	1.0	0.3	0.0	1.7 (1.0)
Mean	0.6	0.8	0.3	0.2	0.0	1.9 (0.3)

Table 45. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2012	0.0	0.0	1.3	0.7	2.0 (1.1)
2013	0.0	0.7	0.3	0.3	1.3 (0.9)
2014	0.7	0.0	1.3	0.3	2.3 (1.3)
2015	0.0	0.0	0.3	0.0	0.3 (0.3)
2016	0.0	0.0	0.3	0.0	0.3 (0.2)
2017	0.0	0.0	0.3	0.3	0.7 (0.7)
2018	0.0	0.0	0.0	0.0	0.0 (0.0)
2019	0.7	0.3	1.7	0.7	3.3 (3.3)
2020	0.0	0.0	0.7	0.0	0.7 (0.5)
2021	0.3	0.0	0.7	0.3	1.3 (0.9)
2022	0.0	0.3	0.0	0.0	0.3 (0.3)
Mean	0.2	0.1	0.7	0.2	1.2 (0.4)

Table 46. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.25 hrs of electrofishing (15-minute transects) at three sites in old Pool 6 of the Green River during September 2022; standard errors are in parentheses.

Species	Inch class																												Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	23	26		35							
Channel catfish															1	1	1	1	2	1	3							10	3.1 (2.0)	
Flathead catfish						2		4	1		2	3																12	0.6 (0.3)	
Muskellunge																								1			1	0.3 (0.3)		
Rock bass	1	8	28	24	39	26	21	4																			151	46.5 (11.8)		
Bluegill			4	1	4	3																					12	3.7 (1.5)		
Smallmouth bass	2		12	13	6	17	10	20	12	10	13	10	8	3	1	2	4										143	44.0 (5.7)		
Spotted bass	1			2	2	3		1	3			1	1														14	4.3 (1.2)		
Largemouth bass							2				1	1	1														5	1.5 (0.7)		

Table 47. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling on old Pool 6 of the Green River from 2012-2020 and 2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2013	2.8	10.0	30.0	6.4	49.2 (5.3)
2014	1.3	4.0	16.5	3.3	25.0 (3.8)
2015	4.8	15.5	46.5	7.8	74.5 (15.0)
2016	0.0	2.5	9.8	4.8	17.0 (3.3)
2017	1.5	5.3	16.3	4.3	27.3 (6.4)
2020	4.8	16.0	32.6	9.5	62.9 (13.9)
2022	2.8	16.0	20.0	7.7	46.5 (11.8)
Mean	2.4	9.1	22.3	5.7	39.4 (4.1)

Table 48. Number of fish and the relative weight (Wr) for each length group of smallmouth bass and rock bass collected in old Pool 6 of the Green River during September 2022.

Species	Length group (in)						Total	
	7.0-10.9		11.0-13.9		≥14.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Smallmouth bass	59	85	33	76	18	76	110	79

Rock bass	4.0-5.9		6.0-7.9		≥8.0		Total	
	No.	Wr	No.	Wr	No.	Wr		
	24	106	65	94	25	94	114	98

Table 49. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on old Pool 6 of the Green River from 2013-2020 and 2022. Number of sites and effort have varied across years; standard errors are in parentheses.

Year	Length group (in)					Total
	<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
2013	2.0	20.0	6.4	1.2	2.4	32.0 (8.6)
2014	1.0	7.8	8.0	2.7	2.8	22.3 (2.5)
2015	5.5	7.8	4.2	3.0	2.3	22.8 (3.0)
2016	0.3	7.3	2.8	5.8	5.3	21.3 (3.6)
2017	0.0	5.0	5.3	3.3	6.3	19.8 (3.4)
2020	1.0	11.6	5.7	3.4	4.2	25.9 (3.2)
2022	0.6	17.9	12.9	7.1	5.5	44.0 (5.7)
Mean	1.3	9.5	5.7	3.4	3.7	23.6 (1.7)

Table 50. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 4.5 hrs of electrofishing (15-minute transects) at three unimpounded sites in lower Barren River during September 2022; standard errors are in parentheses.

	Inch class																							Total	CPUE
Species	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	27	43			
Channel catfish										1		1					2	1	2	2	1			10	2.2 (1.3)
Flathead catfish					1			1			1	1	1	1										6	1.3 (0.7)
Muskellunge																						1		1	0.2 (0.2)
Rock bass	2	1	1	5	25	15	3																	52	11.6 (2.2)
Bluegill	1	2	6	4	3																			16	3.6 (1.4)
Redear sunfish					1																			1	0.2 (0.2)
Smallmouth bass	2	21	37	54	13	5	9	2	12	10	11	5	3	1			1							186	41.3 (8.5)
Spotted bass		14	23	8	5	16	17	6	5	1														95	21.1 (4.1)
Largemouth bass					1		1			1	1		1											5	1.1 (0.4)
White crappie					3	1																		4	0.9 (0.5)
Black crappie		1		1	2				1															5	1.1 (0.6)
Walleye													5	3	3	1	1	2						15	3.3 (0.9)

Table 51. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling at six unimpounded sites of lower Barren River during 2007, 2010, and 2012-2022 and for comparison two sites on the impounded section of Pool 1 of lower Barren River in 2017-2022. Only three unimpounded sites and one impounded sites were sampled in 2022. Standard errors are in parentheses.

Section	Year	Length group (in)					Total
		<4.0	4.0-8.9	9.0-11.9	12.0-13.9	≥14.0	
Unimpounded	2007	3.1	28.7	19.2	4.6	4.3	59.9 (14.6)
	2010	1.6	9.6	10.9	3.8	2.7	28.4 (4.8)
	2012*	4.3	8.0	2.4	0.7	2.0	17.4 (3.2)
	2013	0.3	10.0	2.1	1.5	2.3	16.1 (3.3)
	2014	0.5	5.7	6.3	1.3	2.1	15.9 (2.8)
	2015	0.5	4.7	5.8	1.8	1.5	14.2 (2.2)
	2016	0.1	2.1	2.4	2.9	4.0	11.5 (2.3)
	2017	0.0	2.7	2.4	2.0	1.6	8.7 (2.5)
	2018	0.1	2.9	3.1	1.3	4.1	11.5 (2.1)
	2019	0.0	3.0	2.1	0.9	2.0	8.0 (1.4)
	2020	0.1	3.1	2.4	1.5	2.1	9.3 (1.8)
	2021	0.2	1.1	2.1	1.7	2.6	7.7 (1.5)
	2022	0.4	28.9	5.1	4.7	2.2	41.3 (8.5)
	Mean	0.8	6.6	4.1	1.9	2.5	15.9 (1.1)
* 2012 CPUE data was collected during the spring							
Formerly	2017	0.0	0.3	0.0	0.0	0.0	0.3 (0.3)
Impounded	2018	0.0	1.0	0.0	0.0	0.0	1.0 (0.7)
	2019	0.3	0.7	0.3	0.0	0.7	2.0 (1.4)
	2020	0.0	1.7	0.0	0.0	0.0	1.7 (0.8)
	2021	0.0	0.7	0.3	0.0	0.3	1.3 (0.6)
	2022**	4.7	5.3	2.7	0.7	0.7	14.0 (2.9)
	Mean	0.5	1.3	0.4	0.1	0.2	2.4 (0.6)

** Indicates the years sampled post dam removal

Table 52. Number of fish and the relative weight (Wr) for each length group of black bass and rock bass collected at three unimpounded sites in the lower Barren River during September 2022.

Species	Length group (in)						Total	
	7.0-10.9		11.0-13.9		≥14.0			
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Smallmouth bass	29	89	33	82	10	77	72	82
Spotted bass	44	101	6	99			50	100

Rock bass	4.0-5.9		6.0-7.9		≥8.0		Total	
	No.	Wr	No.	Wr	No.	Wr		
	1	78	30	97	18	95	25	90

Table 53. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling at six unimpounded sites of lower Barren River during 2007, 2010, and 2012-2022 and for comparison two sites on the impounded section of Pool 1 of lower Barren River in 2017-2022. Only three unimpounded sites and one impounded sites were sampled during 2022. Standard errors are in parentheses.

Section	Year	Length group (in)				Total
		<4.0	4.0-5.9	6.0-7.9	≥8.0	
Unimpounded	2007	1.3	15.2	19.4	7.4	43.3 (18.6)
	2010	0.0	2.9	7.3	0.7	10.9 (1.8)
	2012*	1.0	1.7	8.3	2.9	13.9 (3.1)
	2013	1.7	3.5	5.6	3.3	14.1 (4.1)
	2014	0.2	5.0	4.6	2.9	12.8 (3.5)
	2015	1.7	4.5	13.4	2.2	21.8 (4.9)
	2016	0.0	0.7	3.1	0.1	3.9 (1.3)
	2017	0.0	2.6	7.0	2.6	12.1 (4.0)
	2018	0.5	1.1	5.9	0.8	8.2 (2.1)
	2019	0.0	0.5	3.5	1.8	5.8 (1.7)
	2020	0.0	0.8	3.9	1.8	6.4 (1.7)
	2021	0.0	0.2	1.7	1.2	3.1 (0.9)
	2022	0.4	0.4	6.7	4.0	11.6 (2.2)
	Mean	0.5	2.4	6.3	2.2	11.4 (1.1)
*2012 CPUE data was collected during the spring						
Formerly	2017	0.0	0.3	2.0	0.3	2.7 (1.6)
Impounded	2018	0.0	0.0	0.0	0.0	0.0
	2019	0.0	0.0	2.0	0.0	2.0 (1.4)
	2020	0.0	0.7	2.0	1.0	3.7 (1.5)
	2021	0.0	0.0	0.7	0.3	1.0 (0.5)
	2022**	0.7	2.0	4.7	1.3	8.7 (2.4)
	Mean	0.0	0.2	1.3	0.3	1.9 (0.5)

** Indicates the years sampled post dam removal

Table 54. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during sampling at six unimpounded sites of lower Barren River from 2007, 2010, and 2012-2022 and for comparison two sites on the impounded section of Pool 1 of lower Barren River from 2017-2022. Only three unimpounded sites and one impounded sites were sampled in 2022. Standard errors are in parentheses.

Section	Year	Length group (in)					Total
		<4.0	4.0-7.9	8.0-10.9	11.0-12.9	≥13.0	
Unimpounded	2007	3.0	11.6	11.1	1.5	0.2	27.4 (5.6)
	2010	2.4	4.0	2.7	1.1	0.0	10.2 (2.5)
	2012*	4.0	7.4	6.0	1.4	0.9	19.8 (2.0)
	2013	0.8	6.7	8.3	2.3	0.0	18.0 (2.8)
	2014	2.1	2.6	3.4	0.9	0.1	9.1 (1.8)
	2015	0.1	11.4	8.6	3.9	1.2	25.2 (5.0)
	2016	0.0	0.7	1.3	1.3	0.4	3.7 (1.0)
	2017	0.0	1.3	2.4	1.0	0.3	5.0 (1.2)
	2018	0.2	0.7	0.8	0.5	0.4	2.6 (0.6)
	2019	0.0	1.3	2.8	0.9	0.6	5.5 (1.1)
	2020	0.0	1.6	1.3	1.0	0.3	4.1 (0.9)
	2021	0.6	1.1	1.7	0.2	0.1	3.7 (0.7)
	2022	0.0	11.1	8.7	1.3	0.0	21.1 (4.1)
	Mean	0.9	4.2	4.1	1.3	0.4	10.9 (0.8)
*2012 CPUE data was collected during the spring							
Formely	2017	0.0	1.3	3.7	0.0	0.0	5.0 (1.5)
Impounded	2018	0.0	1.0	2.3	0.3	0.0	3.7 (2.0)
	2019	0.0	3.3	5.7	0.0	0.0	9.0 (3.0)
	2020	0.0	8.7	4.0	1.0	0.3	14.0 (3.4)
	2021	0.3	0.0	2.0	0.3	0.0	2.7 (0.9)
	2022**	8.0	56.7	12.0	2.7	1.3	80.7 (15.0)
	Mean	0.8	7.7	4.3	0.6	0.2	13.6 (3.1)

** Indicates the years sampled post dam removal

Table 55. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 1.5 hrs of electrofishing (15-minute transects) at one site on the previously impounded section of lower Barren River during September 2022; standard errors are in parentheses.

Species	Inch class																		Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	21	22		
Channel catfish																	1	2	3	2.0 (1.4)
Flathead catfish					2														2	1.3 (0.8)
Rock bass		1	1	2	6	1	2												13	8.7 (2.4)
Bluegill		1	6	7	8														22	14.7 (4.7)
Redear sunfish						1													1	0.7 (0.7)
Smallmouth bass	5	2	1	3	3		1	1	1	2	1								21	14.0 (2.9)
Spotted bass	10	2	30	34	20	1	6	3	9	3	1	1	1						121	80.7 (15.0)
Largemouth bass	2	1	1	2	1	1				1									9	6.0 (3.8)
Black crappie						1													1	0.7 (0.7)
Sauger																	1		1	0.7 (0.7)
Walleye														1					1	0.7 (0.7)

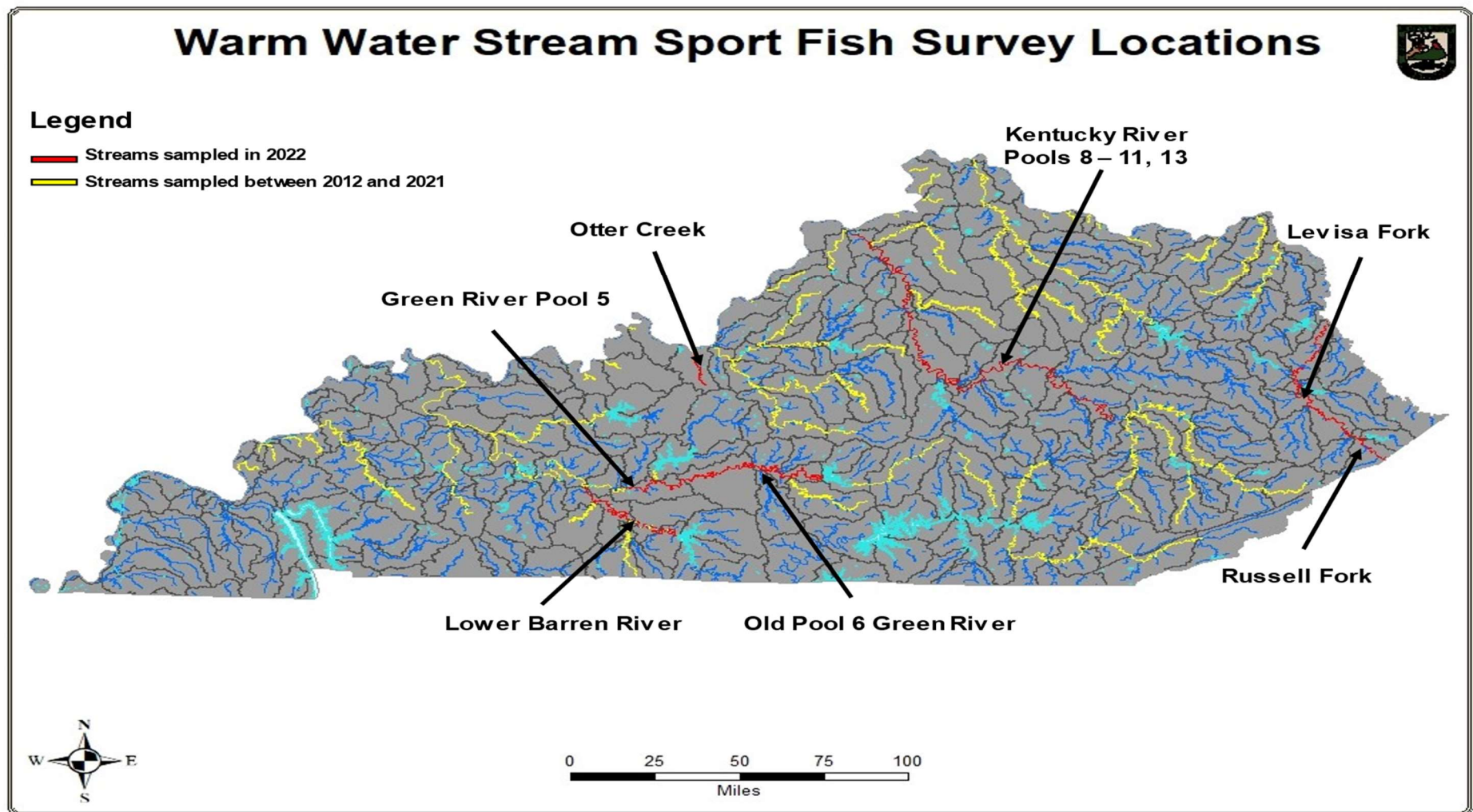


Figure 1. Map depicting warm water stream sport fish survey locations conducted by the Streams Investigations Branch and assisting crews for the current year (red outline/labeled) and previously sampled years from 2012 through 2021 (yellow outline).

Project V: Post-stocking Movement of Muskellunge in the Kentucky River

FINDINGS

Previous stockings of muskellunge throughout Kentucky have resulted in some of the state's premier fisheries such as Cave Run Lake and Green River Lake. On the Kentucky River, muskellunge stockings have historically been infrequent and at low numbers (typically ≤ 15 fish/mile)—only occurring when hatcheries have excess production.

From 2014 - 2017, increased stockings of 9.0 in and 13.0 in muskellunge were assessed in Pools 2 and 3 of the Kentucky River. CPUE of muskellunge were consistently low, and very few fished stocked during that study were present in spring and fall samples. Throughout that study, multiple cases of downriver movement were documented where fish traveled over 100 miles from their stocking site. Movement of stocked fish can play a critical role in stocking success making this evaluation of post-stocking dispersal critical in determining future stocking strategies for lotic waters in Kentucky. This project aims to determine dispersal of stocked muskellunge with an emphasis on age-1 and age-2 fish. Results can then be used to help develop muskellunge stocking recommendations for the Kentucky River and similar waterbodies in Kentucky.

No muskellunge fingerlings were stocked into the study site in 2020 due to COVID-19 workplace restrictions that prevented hatchery culture. In 2022, muskellunge were produced at Minor E. Clark State Fish Hatchery in Morehead, KY. Fish received stocking site (pool) specific fin clips and were stocked into pools 11 – 13 of the Kentucky River in July 2022 (Table 1). A total of 960 fingerlings (mean length = 8.0 in) were stocked in the three pools at a rate of 20 fish/mile. Of note, historic flooding occurred in the upper Kentucky River drainage two days following stocking and likely decreased survival and caused increased dispersion downriver.

Standardized spring sampling was abandoned for the project in 2021 since many of the ramps become useable due to high water depositing mud and silt on most ramps. Standardized fall sampling was conducted in October and November 2022. Twenty-five 15-minute electrofishing transects were completed for a total of 6.25 hours of effort in pools 8 – 13 (Table 2). Pool 12 was unable to be sampled due to low water rendering one boat ramp unusable and road construction that did not allow access the only other boat ramp. Only two muskellunge were captured at a rate of 0.3 fish/hr (Table 3). No clipped fish were observed in the sample.

Additional effort (April – October) was made to collect stocked and PIT tagged fish; however, that effort, while greater than 2021, was less than desired due to staff shortages (Table 4). A total of 21.75 hr of effort was expended (14.75 hr within the study pools and 7.0 hr below the study pools). Ten fish were collected and implanted with PIT tags. One clipped fish was captured during this effort and no previously PIT tagged fish were observed. Thus far, only two clipped fish have been collected and have traveled an average of 51.6 miles downstream (Table 5). No upstream movement of fish has been observed thus far.

Table 1. Stocking locations, number, rate, and average length of advance fingerling muskellunge stocked in pools 11 - 13 of the Kentucky River in July 2022.

Pool	Site	No. of fingerlings	Stocking rate (fish/mile)	Average length (in)	Fin clip location
11	Irvine Ramp	398	20	8.0	Left pectoral
12	Lock and Dam 13 TW Ramp	380	20	8.0	Right pectoral
13	Sturgeon Creek Ramp	182	20	8.0	Left pelvic
Total		960			
Mean			20	8.0	

Table 2. Effort and CPUE (fish/hr) of muskellunge captured during electrofishing surveys in the Kentucky River in October/November 2022. Standard errors are in parentheses.

Pool	No. of transects	Effort (hr)	No. of muskellunge	CPUE
8	5	1.25	0	0.0
9	4	1.00	0	0.0
10	9	2.25	1	0.4 (0.4)
11	4	1.00	1	1.0 (1.0)
12	0	0.00	-	-
13	3	0.75	0	0.0
Total	25	6.25	2	0.3 (0.2)

Table 3. Length frequency, CPUE (fish/hr), and mean length of muskellunge collected from pools 8 - 13 of the Kentucky River in October/November 2022. Standard errors are in parentheses.

Pool	Inch class			Mean		CPUE
	32	...	46	Total	length (in)	
8				0		0.0
9				0		0.0
10			1	1	46.6	0.4 (0.4)
11	1			1	32.9	1.0 (1.0)
12				0		-
13				0		0.0
Total	1		1	2	39.8	0.3 (0.2)

Table 4. Additional effort, fish observed/recaptured during supplemental sampling efforts on the Kentucky River in April - October 2022.

Pool	Effort (hr)	No. of muskellunge	Recaptures	
			Clipped	PIT tagged
1	1.00	0	0	0
2	1.50	0	0	0
3	1.25	0	0	0
4	2.00	0	0	0
5	1.25	0	0	0
8	1.75	0	0	0
9	3.25	2	1	0
10	1.75	0	0	0
11	4.25	3	0	0
12	1.00	3	0	0
13	2.75	2	0	0
Total	21.75	10	1	0

Table 5. Number of clipped muskellunge sampled from each stocking site and average distance from stocking site captured in Pools 11 - 13 of the Kentucky River.

Stocking site	No. of Individuals sampled from stocking site	Average distance from stocking site*
Pool 11	0	N/A
Pool 12	2	-51.6
Pool 13	0	N/A

*Positive values indicate upriver movements, and negative values indicate downriver movement.