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Period: 01 April 2023
through
31 March 2024

ANNUAL PERFORMANCE REPORT

for

Statewide Fisheries Investigation Project

Part I of III

Subsection I: Stream Fisheries Investigation



Project Leader: *Josh Pennington*, Assistant Director

Co-Project Leader: *Jason Herrala*, Statewide Fisheries Program Coordinator

Co-Project Leader: *Brandon Sawyers*, Fisheries Biologist II

Project Assistant: *Ryan Kausing*, Fisheries Technician

Project Assistant: *Robert Nipper*, Fisheries Technician



Department of Fish and Wildlife Resources

Fisheries Division



STATE: Kentucky

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GRANT TYPE: Research and Survey

GRANT TITLE: Statewide Fisheries Investigations

SUBSECTION I TITLE: Stream Fisheries Investigations

PERIOD COVERED: 1 April 2023 - 31 March 2024

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

General Sport Fish Assessments

McAlpine Pool

Embayments— A total of 4.0 hours of general sport fish electrofishing was conducted during October 2023 in embayments of the McAlpine Pool of the Ohio River. Four embayments were sampled: Little Kentucky River (1.0 hr), Corn Creek (0.75 hr), Harrods Creek (1.5 hr), and Beargrass Creek (0.75 hr). Largemouth bass, bluegill, and spotted bass were the most abundant species, but catch rates varied among embayments.

Cannelton Pool

Embayments— A total of 8.75 hours of general sport fish electrofishing was conducted during October 2023 in embayments of the Cannelton Pool of the Ohio River. Six embayments were sampled: Wolf Creek (1.25 hr), Yellowbank Creek (1.0 hr), Sinking Creek (1.5 hr), Town Creek (1.0 hr), Bull Creek (1.0 hr) and Clover Creek (3.0 hr). Bluegill, white crappie, largemouth bass, and redear sunfish 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 2023 for a total of 3.0 hr of effort. A total of 400 sauger and 16 walleye were collected with no saugeye present in the sample. This was the third lowest overall catch rate for sauger and the highest overall catch rate of walleye since sampling resumed in 2014.

Otoliths were taken from a subsample of sauger to assess age structure and growth. Length at age as calculated by the von Bertalanffy growth equation indicated good growth as age-1 sauger averaged 8.4 in, age-2 sauger average 12.5 in, and most fish reaching legal harvestable size

before age-3.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2024

Work accomplished - 31 March 2024

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 Smithland Pools will be sampled in 2024.

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 pay lake 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—CPUE of blue catfish in 2023 was 5.3 fish/50 hooks). Catch rate of blue catfish had been gradually increasing since 2013 until this year. Catch rate of trophy-size (≥ 35.0 in) blue catfish has remained consistent since 2018.

Hoop nets—Catch rate of channel catfish was 1.3 fish/net-night and has continually decreased since 2017. Flathead catfish CPUE was 0.6 fish/net-night and was the lowest recorded catch rate since this sampling began in 2019. It is believed that below average temperatures and low flow during the sampling period negatively influenced catch rates.

Electrofishing—Blue catfish CPUE (14.2 fish/hr) was one of the lowest catch rates observed since

sampling began in 2004. CPUE of flathead catfish was 48.4 fish/hr and was the third highest catch rate historically.

Age, growth, and mortality—Otoliths (up to 10 per inch class in each pool) were taken from blue catfish (n=489), channel catfish (n=290), and flathead catfish (n=491). Growth rates of all three species did not differ from growth rates in 2017; however, differences in blue catfish and channel catfish growth were noted between pools. Total annual mortality of all three species did not differ from estimates in 2017, but flathead catfish annual mortality (both total and estimated fishing) was found to be higher downriver where commercial fishing is more prominent.

Regulations talk resurfaced once again, and KDFWR suggested the following regulations which were passed unanimously by the Commission and are currently going through state filing processes:

All commercial fishers are allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day on commercially fishable waters statewide. Trophy permit harvest is now only allowed on the Ohio River from Cannelton Dam downriver to the Ohio River's confluence with the Mississippi River.

Commercial fishing on several waterbodies across the state was closed permanently due to low use, low harvest, and/or low abundance of fish (identified by KDFWR sampling).

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2024

Work accomplished - 31 March 2024

C. SIGNIFICANT DEVIATIONS

NONE

D. REMARKS

NONE

E. RECOMMENDATIONS

Continue sampling blue catfish, channel catfish, and flathead catfish using approved methods.

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 Goose Creek, upper Barren River, Gasper River, and upper Green River when water temperatures ranged from 51 - 62°F. A total of seven species of sport fish were collected on Goose Creek, with smallmouth bass making up 46% of the entire sample. Smallmouth bass received a “fair” population assessment score while rock bass received a “poor” score. A total of eleven species of sport fish were collected in upper Barren River, with channel catfish making up 62% of the entire sample. Smallmouth and rock bass were found but in lower densities which coincides with the population assessment scores, smallmouth bass received a “poor” population assessment score, and rock bass received a “fair” population assessment score for upper Barren River. A total of ten species of sport fish were collected in Gasper River. Smallmouth bass made up 48% of the entire sample and 28.0 fish/hr was the highest recorded on Gasper River since the 2013 sample. Smallmouth bass received a “good” population assessment rating. Spotted bass made up 29% of the entire sample with 17.5 fish/hr being the second highest recorded since the 2013 sample. Spotted bass received a “fair” population assessment rating. A total of eight species were collected on upper Green River, with white bass making up 52% and channel catfish making up 28% of the entire sample. Smallmouth and rock bass were collected on upper Green River but in lower densities.

Fall sport fish surveys were conducted in Red Bird River, Pool 5 of the Green River, lower Barren River, and upper Salt River. A total of five species were collected at Red Bird River with the most abundant species collected being rock bass at 19.8 fish/hr. Smallmouth bass were the second most abundant species collected 13.8 fish/hr. Red Bird River previously had the statewide 12-inch size minimum, and a new regulation passed increasing the minimum size limit to 15 inches. Ninety - three percent of smallmouth bass collected were under the new 15-inch minimum size limit. A total of nine different species were collected on Pool 5 of the Green River with spotted bass being the most abundant species collected (23.3 fish/hr). CPUE was tied for the highest catch rates recorded since sampling began in 2012 and significantly higher than historical average of 12.3 fish/hr. Smallmouth bass were the second most abundant species collected at a rate of 4.7 fish/hr. The 2023 sample was the highest CPUE recorded since sampling began in 2012 and above the historical average of 2.1 fish/hr. A total of fourteen species were collected on lower Barren River with smallmouth bass being the most abundant at (19.2 fish/hr). Lower Barren River previously had the statewide 12-inch size minimum, and a new regulation passed increasing the minimum size limit to 15 inches. Ninety – one percent of smallmouth bass collected were under the new 15-inch minimum size limit. The second most abundant species collected was spotted bass, CPUE was similar to the historical average (11.0 fish/hr). Overall, rock bass CPUE (8.8/fish hr) decreased from the 2022 sample (11.6/fish hr) and was the just below the historical average (11.2 fish/hr). Lock and Dam 1 at Greencastle was removed from lower Barren River in August – September 2022. After the dam removal, this formerly impounded sections water level has dropped approximately 7 – 10 ft with a change in a variety of habitat conditions. The four most abundant species observed were spotted bass (16.7 fish/hr), bluegill (9.3 fish/hr), smallmouth bass (6.0 fish/hr) and rock bass (3.7 fish/hr). The catch rates for smallmouth bass, spotted bass and rock bass were all the second highest recorded since sample began in 2017. This could be due in part to significant habitat changes with the low water conditions, but further sampling will continue in order to collect more historical data for post-dam removal to better compare the effects of impounded and free-flowing streams on lower Barren River.

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 will be getting 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 2024

Work accomplished- 31 March 2024

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 2024

Work accomplished - 31 March 2024

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 2023. No clipped fish were observed in the sample. An additional 24.5 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. No clipped fish were captured during this effort; however, one PIT tagged fish was observed. That particular muskellunge has been recaptured twice since its initial capture and tagging and appears to have established a small home range. Thus far, only two clipped fish have been collected and only downstream movement has been observed.

B. TARGET DATES FOR ACHIEVEMENT AND ACCOMPLISHMENTS

Planned achievement date - 31 March 2024

Work accomplished - 31 March 2024

C. SIGNIFICANT DEVIATIONS

Additional effort to collect muskie was limited due to staffing shortages and time constraints.

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

McAlpine Pool

A total of 4.0 hours of general sport fish electrofishing was conducted during October 2023 in embayments of the McAlpine Pool of the Ohio River. Four embayments were sampled: Little Kentucky River (1.0 hr), Corn Creek (0.75 hr), Harrods Creek (1.5 hr), and Beargrass Creek (0.75 hr). Largemouth bass, bluegill, and spotted bass were the most abundant species, but catch rates varied among embayments.

Total CPUE of largemouth bass was 16.5 fish/hr and ranged from 5.3 fish/hr in Corn Creek to 24.0 fish/hr in Beargrass Creek (Table 1). Lengths of largemouth bass ranged from 3.3 – 16.7 in with a mean length of 10.0 in. Spotted bass CPUE was 11.5 fish/hr and ranged from 2.7 fish/hr in Beargrass Creek to 18.0 fish/hr in Little Kentucky River. Lengths of spotted bass ranged from 3.2 – 13.3 in with a mean length of 7.1 in. Smallmouth bass were only captured in Harrods Creek for a total CPUE of 0.8 fish/hr. Size structure of largemouth bass and spotted bass varied between embayments, but 77.4% 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 decreased in nearly all length groups since the 2020 fall sample (Table 2). Relative weights of nearly all length groups for both largemouth bass and spotted bass decreased since the 2020 fall sample, but fish were still in excellent condition (Table 3).

Otoliths were taken from a subsample of largemouth bass to assess age structure and growth. In this case all largemouth bass sampled were kept due to low numbers. Length at age as calculated by the von Bertalanffy growth equation indicated good growth in the McAlpine Pool with fish reaching legal size (12.0 in) at just over two years and reaching 15.0 in at just over five years (Table 4). Very few fish over 15.0 were captured, and no fish older than five years were observed in the subsample taken for otoliths (Table 5). Age-0 to Age-2 largemouth bass comprised 80.3% of the sample. A weighted catch curve estimated total annual mortality to be 40.0%. Low overall catch rates and low frequency of larger, older fish has been the norm for the McAlpine Pool in recent years. Harrods Creek is the only embayment in the McAlpine Pool that receives largemouth bass stockings, and it routinely has higher catch rates than other embayments in the pool. Stockings in other embayments maybe warranted in the future if catch rates remain low.

Bluegill were the second most abundant fish sampled in the McAlpine Pool (CPUE=11.8 fish/hr; Table 6). Catch rates ranged from 4.0 fish/hr in Corn Creek and Beargrass Creek to 18.7 fish/hr in Harrods Creek. Lengths ranged from 1.2– 7.0 in with a mean length of 4.5 in and only 6.4% of those fish were quality size (≥ 6.0 in). Only one redear sunfish was captured for a total CPUE of 0.3 fish/hr. White crappie and black crappie were present but in extremely low numbers. Catch rates for two different length groups of white crappie and black crappie were also examined (Table 7). Overall, white crappie CPUE was the lowest recorded value in the past three samples. Most of the fish observed during the sample were ≥ 8.0 . Relative weight of white crappie (91) and black crappie (98) indicated that both species were in good condition (Table 8).

Cannelton Pool

A total of 8.75 hours of general sport fish electrofishing was conducted during October 2023 in embayments of the Cannelton Pool of the Ohio River. Six embayments were sampled: Wolf Creek (1.25 hr), Yellowbank Creek (1.0 hr), Sinking Creek (1.5 hr), Town Creek (1.0 hr), Bull Creek (1.0 hr) and Clover Creek (3.0 hr). Bluegill, white crappie, largemouth bass, and redear sunfish were the most abundant species, but catch rates varied substantially among embayments. Total CPUE of largemouth bass was 27.9 fish/hr and ranged from 10.7 fish/hr in Sinking Creek to 56.0 fish/hr in Yellowbank Creek (Table 9). Lengths of largemouth bass ranged from 3.1 – 21.0 in with a mean

length of 9.3 in. Spotted bass CPUE was 4.5 fish/hr and ranged from 0.0 fish/hr in Town Creek and Bull Creek to 8.7 fish/hr in Sinking Creek. Lengths of spotted bass ranged from 2.9 – 12.0 in with a mean length of 6.5 in. Size structure of largemouth bass and spotted bass varied between embayments, but large/older fish were not common. Catch rates for four different length groups of largemouth bass and spotted bass were examined. Increases in CPUE from 2020 for all length groups of largemouth bass except ≥ 15.0 in were observed. Overall CPUE of largemouth bass was a record high. Small increases in CPUE were observed in most length groups for spotted bass (Table 10). Relative weights of all length groups for both largemouth bass and spotted bass were all higher than the 2020 (Table 11).

Otoliths were taken from a subsample of largemouth bass to assess age structure and growth. Length at age as calculated by the von Bertalanffy growth equation indicated good growth in the Cannelton Pool with fish reaching legal size (12.0 in) at just over two years and reaching 15.0 in at less than five years (Table 4). A limited number of fish over 15.0 were captured, and only a small percentage of fish over five years of age were observed in the subsample taken for otoliths (Table 5). Age-0 to Age-2 largemouth bass comprised 86.1% of the sample. A weighted catch curve estimated total annual mortality to be 38.2%.

Bluegill were the most abundant fish sampled in the Cannelton Pool (CPUE= 261.8 fish/hr; Table 12). Catch rates ranged from 27.3 fish/hr in Sinking Creek to 372.0 fish/hr in Town Creek. Lengths ranged from 1.0– 7.8 in with a mean length of 4.3 in and only 5.2% of those fish were quality size (≥ 6.0 in). Overall catch rate of redear sunfish was 20.8 fish/hr with the highest observed CPUE in Bull Creek (39.0 fish/hr). Lengths ranged from 2.8 – 10.4 in with a mean length of 6.5 in, and 65.4% of those fish were quality size (≥ 6.0 in). White crappie were collected at 55.2 fish/hr and ranged from 0.7 fish/hr in Sinking Creek to 93.0 fish/hr in Bull Creek. Lengths ranged from 1.9 – 14.6 in with a mean length of 8.9 in. Black Crappie were collected at 4.8 fish/hr and ranged from 0.0 fish/hr in Sinking Creek to 14.4 fish/hr in Wolf Creek. Lengths ranged from 4.7 – 12.4 in with a mean length of 8.4 in. Catch rates for two different length groups of white crappie and black crappie were examined (Table 13). Overall, white crappie CPUE was the highest in the previous three samples and has been steadily increasing over that time period. Black crappie CPUE was slightly lower than the 2020 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 or near record highs for both species. Relative weight of white crappie (99) and black crappie (108) indicated that both species were in excellent condition (Table 14).

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 2023 for a total 18 transects and 3.0 hr of effort. A total of 400 sauger and 16 walleye were collected with

no saugeye present in the sample (Table 15). Overall CPUE of sauger was 133.3 fish/hr, the third lowest since sampling resumed in 2014 (Table 16). Lengths ranged from 4.9 – 17.7 in with a mean length of 9.1 in (Table 17). While still relatively low, walleye CPUE was a record high (CPUE = 5.2 fish/hr).

Catch rates were also calculated for four length groups of sauger (Table 18). Overall catch rates of sauger in the Markland Tailwater (CPUE=126.0 fish/hr) and Cannelton Tailwater (CPUE=119.0 fish/hr) were the third lowest since sampling resumed in 2014 and below their historical averages of 189.7 fish/hr and 245.1 fish/hr, respectively. CPUE in the JT Myers Tailwater (155.0 fish/hr) was the second highest since sampling resumed but still low compared to historical catch rates in the Markland and Cannelton tailwaters. Size structure and length specific CPUE varied between tailwaters, but older, larger fish were once again sparse as catch rates of sauger ≥ 15.0 in all tailwaters were below historical averages. Only 3.0% of sauger were legally harvestable (≥ 14.0 in).

Otoliths were taken from a subsample of sauger to assess age structure and growth. Length at age as calculated by the von Bertalanffy growth equation indicated good growth as age-1 sauger averaged 8.4 in, age-2 sauger average 12.5 in, and most fish reaching legal harvestable size before age-3 (Table 19). Age-0 and age-1 sauger dominated the catch as usual, comprising 98.8% of the total catch (Table 20). As in years past, very few age-2 and older fish were observed. Estimates for total annual mortality of sauger were once again high. Markland Tailwater annual mortality rate for 2023 was 85.4%, while Cannelton Tailwater annual mortality rates were 76.8% (Table 19). Mortality was unable to be calculated for JT Myers tailwater since only two year classes of fish were collected. 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 2019 - 2021 year classes.

Table 1. Length-frequency and CPUE (fish/hr) of black bass collected during 4.0 hrs of electrofishing in six embayments in the McAlpine Pool of the Ohio River during October 2023. Standard errors are in parentheses.

Embayment	Species	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total	CPUE
Little Kentucky River	Largemouth bass						1		1	1	2	4		1		10	10.0 (7.6)
	Spotted bass	1	6		3	3		1	4							18	18.0 (2.6)
	Smallmouth bass															0	0.0
Corn Creek	Largemouth bass	1	1					1		1						4	5.3 (1.3)
	Spotted bass		1			1	1				1					4	5.3 (1.3)
	Smallmouth bass															0	0.0
Harrods Creek	Largemouth bass	1	1	4		1	1	2	4	6	6	4	3		1	34	22.7 (4.0)
	Spotted bass	4	3	1	5	1		2	2	1	2	1				22	14.7 (3.8)
	Smallmouth bass				1					1	1					3	2.0 (0.9)
Beargrass Creek	Largemouth bass	1	3	3	1		2	5	1	2						18	24.0 (4.6)
	Spotted bass		2													2	2.7 (2.7)
	Smallmouth bass															0	0.0
Total	Largemouth bass	3	5	7	1	1	4	8	6	10	8	8	3	1	1	66	16.5 (3.1)
	Spotted bass	5	12	1	8	5	1	3	6	1	3	1				46	11.5 (2.2)
	Smallmouth bass				1					1	1					3	0.8 (0.4)

Table 2. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of black bass from the McAlpine Pool of the Ohio River in 2016-2023. 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					
2016	6.8 (2.3)	2.3 (0.7)	1.0 (0.5)	1.3 (0.6)	11.3 (3.1)
2020	17.8 (3.6)	15.0 (3.1)	6.5 (1.8)	1.3 (0.6)	40.5 (6.9)
2023	4.3 (1.4)	7.0 (1.8)	4.8 (1.7)	0.5 (0.3)	16.5 (3.1)
Mean	9.6 (1.7)	8.1 (1.4)	4.1 (0.9)	1.0 (0.3)	22.8 (3.3)

Year	Length Group				Total
	<7.0 in	7.0-10.9 in	11.0-13.9 in	≥14.0 in	
Spotted bass					
2016	6.5 (1.7)	2.8 (0.6)	0.8 (0.4)	0.0	10.0 (2.0)
2020	10.0 (2.2)	1.8 (0.9)	0.3 (0.3)	0.0	12.0 (2.1)
2023	6.5 (1.7)	3.8 (1.1)	1.3 (0.5)	0.0	11.5 (2.2)
Mean	7.7 (1.1)	2.8 (0.5)	0.8 (0.2)	0.0	11.2 (1.2)

Table 3. Relative weight (Wr) estimates by length group for each species of black bass collected from the McAlpine Pool of the Ohio River in 2016-2023.

Year	Largemouth bass relative weight (Wr)			Overall
	length group			
	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2016	95	94	92	94
2020	111	112	100	111
2023	101	103	99	102
Mean	106	107	96	106

Year	Spotted bass relative weight (Wr)			Overall
	length group			
	7.0-10.9 in	11.0-13.9 in	≥14.0 in	
2016	95	93		94
2020	111	104		110
2023	109	108		109
Mean	105	102		104

Table 4. Mean length (in) at age calculated with the von Bertalanffy growth equation based on otoliths taken from largemouth bass from McAlpine and Cannelton pools the Ohio River in fall 2023.

Pool	Age											
	0	1	2	3	4	5	6	7	8	9	10	11
McAlpine	5.2	9.4	11.9	13.4	14.3	14.9						
Cannelton	7.3	9.5	11.3	12.9	14.2	15.3	16.2	17.0	17.7	18.3	18.7	19.1
Overall	5.5	8.6	11.0	12.9	14.4	15.6	16.5	17.2	17.8	18.2	18.5	18.8

Table 5. Age frequency and CPUE results for largemouth bass collected in embayments of the McAlpine and Cannelton pools of the Ohio River in October 2023. Standard errors are in parentheses.

Pool	Age	Inch class																			Total	%	CPUE
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
McAlpine	0	3	5	7	1																16	24.2%	3.8 (1.4)
	1					1	4	5	5	5											20	30.3%	4.7 (1.2)
	2							3	1	4	7	2									17	25.8%	4.0 (1.1)
	3									1	1	2	1								5	7.6%	1.2 (0.4)
	4											3	2								5	7.6%	1.2 (0.5)
	5											1		1	1						3	4.5%	0.7 (0.4)
Total		3	5	7	1	1	4	8	6	10	8	8	3	1	1						66	100%	16.5 (3.1)
Cannelton	0	20	28	27	1																76	31.1%	8.7 (1.6)
	1			1		6	12	20	21	7	1										68	27.9%	7.8 (1.4)
	2							3	19	16	12										66	27.0%	7.5 (1.2)
	3								1	5	2	1	2								11	4.5%	1.3 (0.3)
	4										4	3	1	4							12	4.9%	1.4 (0.3)
	5													1	2						3	1.2%	0.3 (0.1)
	6										1		1		1	1	1				5	2.0%	0.6 (0.2)
	7																				0	0.0%	0.0
	8																				0	0.0%	0.0
	9														1					1	2	0.8%	0.2 (0.1)
	10																				0	0.0%	0.0
	11																	1			1	0.4%	0.1 (0.1)
Total		20	28	28	1	6	12	23	41	28	24	16	4	5	4	1	1	1	0	1	244	100.00%	27.9 (3.5)
Total	0	23	33	34	2																92	29.7%	7.1 (1.2)
	1			1		7	16	24	27	12	1										88	28.4%	6.8 (1.0)
	2							7	19	20	23	14									83	26.8%	6.3 (0.9)
	3								1	6	3	3	3								16	5.2%	1.3 (0.2)
	4										4	6	3	4							17	5.5%	1.3 (0.3)
	5											1		2	3						6	1.9%	0.5 (0.1)
	6										1		1		1	1	1				5	1.6%	0.4 (0.1)
	7																				0	0.0%	0.0
	8																				0	0.0%	0.0
	9														1					1	2	0.6%	0.2 (0.1)
	10																				0	0.0%	0.0
	11																	1			1	0.3%	0.1 (0.1)
Total		23	33	35	2	7	16	31	47	38	32	24	7	6	5	1	1	1		1	310	100%	24.3 (2.7)

Table 6. Length-frequency and CPUE (fish/hr) of selected sunfish species collected during 4.0 hrs of electrofishing in four embayments in the McAlpine Pool of the Ohio River during October 2023. Standard errors are in parentheses.

Embayment	Species	Inch class											Total	CPUE
		1	2	3	4	5	6	7	8	9	10	11		
Little Kentucky River	Bluegill	2	2	1	3	3	1	1					13	13.0 (1.9)
	Redear sunfish												0	0.0
	White crappie												0	0.0
	Black crappie									1			1	1.0 (1.0)
Corn Creek	Bluegill	1		2									3	4.0 (2.3)
	Redear sunfish					1							1	1.3 (1.3)
	White crappie											1	1	1.3 (1.3)
	Black crappie							2					2	2.7 (1.3)
Harrods Creek	Bluegill			5	9	13	1						28	18.7 (4.2)
	Redear sunfish												0	0.0
	White crappie										1		1	0.7 (0.7)
	Black crappie												0	0.0
Beargrass Creek	Bluegill			2	1								3	4.0 (4.0)
	Redear sunfish												0	0.0
	White crappie												0	0.0
	Black crappie												0	0.0
Total	Bluegill	3	2	10	13	16	2	1					47	11.8 (2.4)
	Redear sunfish					1							1	0.3 (0.3)
	White crappie										1	1	2	0.5 (0.3)
	Black crappie							2		1			3	0.8 (0.4)

Table 7. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of crappie from the McAlpine Pool of the Ohio River from 2016-2023. Standard errors are in parentheses.

per cent

Year	Length group		Total
	≥8.0 in	≥10.0 in	
<u>White crappie</u>			
2016	0.5 (0.3)	0.3 (0.3)	0.8 (0.5)
2020	1.3 (0.6)	0.8 (0.4)	1.3 (0.6)
2023	0.5 (0.3)	0.5 (0.3)	0.5 (0.3)
Mean	0.8 (0.3)	0.5 (0.2)	0.8 (0.3)
<u>Black crappie</u>			
2016	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)
2020	3.0 (1.3)	1.3 (1.0)	3.8 (1.3)
2023	0.3 (0.3)	0.0	0.8 (0.4)
Mean	1.2 (0.5)	0.5 (0.4)	1.6 (0.5)

Table 8. Relative weight (Wr) by length group estimates for each species of crappie collected from the McAlpine Pool of the Ohio River from fall 2016-2023.

White crappie relative weight (Wr)				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2016		89	99	94
2020		90	100	96
2023			92	92
Mean		90	97	95

Black crappie relative weight (Wr)				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2016			93	93
2020	106	114	105	109
2023	95	105		98
Mean	102	113	103	107

Table 9. Length-frequency and CPUE (fish/hr) of black bass collected during 8.75 hrs of electrofishing in six embayments in the Cannelton Pool of the Ohio River during October 2023. Standard errors are in parentheses.

Embayment	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		
Wolf Creek	Largemouth bass		10	11	6		1			1	3	3										35	28.0 (11.8)
	Spotted bass		1	1																		2	1.6 (1.0)
	Smallmouth bass																					0	0.0
Yellowbank Creek	Largemouth bass		7	6	2		1	3	4	14	6	6	4	1	1	1						56	56.0 (17.0)
	Spotted bass			1																		1	1.0 (1.0)
	Smallmouth bass																					0	0.0
Sinking Creek	Largemouth bass		1	2	1	1	1		1	3	2	1		2					1			16	10.7 (4.9)
	Spotted bass		2	2		2	2		3	2												13	8.7 (3.2)
	Smallmouth bass																					0	0.0
Town Creek	Largemouth bass				3			1	3	4	5	2	2				1					21	21.0 (6.2)
	Spotted bass																					0	0.0
	Smallmouth bass																					0	0.0
Bull Creek	Largemouth bass		1	3	5		1	3	2	1	3	4	1		1						1	26	26.0 (3.8)
	Spotted bass																					0	0.0
	Smallmouth bass																					0	0.0
Clover Creek	Largemouth bass		1	6	11		2	5	13	18	9	8	9	1	3	3		1				90	30.0 (3.8)
	Spotted bass	1	5	6			4	1	1	4		1										23	7.7 (2.4)
	Smallmouth bass																					0	0.0
Total	Largemouth bass		20	28	28	1	6	12	23	41	28	24	16	4	5	4	1	1	1		1	244	27.9 (3.5)
	Spotted bass	1	8	10		2	6	1	4	6		1										39	4.5 (1.2)
	Smallmouth bass																					0	0.0

Table 10. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of black bass from the Cannelton Pool of the Ohio River in 2016-2023. 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					
2016	9.6 (1.1)	9.5 (1.6)	3.9 (1.0)	2.4 (0.5)	25.4 (2.7)
2020	6.7 (1.3)	9.6 (1.8)	3.1 (0.6)	1.8 (0.5)	21.2 (3.3)
2023	9.5 (1.7)	11.9 (2.0)	5.0 (1.0)	1.5 (0.4)	27.9 (3.5)
Mean	8.6 (0.8)	10.3 (1.0)	4.0 (0.5)	1.9 (0.3)	24.8 (1.8)
	<7.0 in	7.0-10.9 in	11.0-13.9 in	≥14.0 in	Total
Spotted bass					
2016	4.8 (1.6)	1.3 (0.4)	0.2 (0.2)	0.0	6.3 (1.8)
2020	1.7 (0.8)	1.6 (0.6)	0.2 (0.2)	0.0	3.4 (1.3)
2023	2.4 (0.7)	1.9 (0.6)	0.1 (0.1)	0.0	4.5 (1.2)
Mean	3.0 (0.7)	1.6 (0.3)	0.2 (0.1)	0.0	4.7 (0.8)

Table 11. Relative weight (Wr) estimates by length group for each species of black bass collected from the Cannelton Pool in the Ohio River in 2016-2023.

Largemouth bass relative weight (Wr)				
Year	length group			Overall
	8.0-11.9 in	12.0-14.9 in	≥15.0 in	
2016	92	91	90	91
2020	105	101	99	103
2023	107	108	102	107
Mean	102	101	97	101
Spotted bass relative weight (Wr)				
Year	length group			Overall
	7.0-10.9 in	11.0-13.9 in	≥14.0 in	
2016	93	90		93
2020	112	96		110
2023	107	112		107
Mean	106	97		105

Table 12. Length-frequency and CPUE (fish/hr) of selected sunfish species collected during 8.75 hrs of electrofishing in six embayments in the Cannelton Pool of the Ohio River during October 2023. 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		
Wolf Creek	Bluegill	5	56	76	66	37	19	4								263	210.4 (71.0)
	Redear sunfish				3	18	21	2	1							45	36.0 (8.1)
	White crappie			1		8	6	7	4	17	29	4	3			79	63.2 (15.7)
	Black crappie					3	4	2	5	1	2		1			18	14.4 (4.8)
Yellowbank Creek	Bluegill	10	9	65	90	111	45	4								334	334.0 (97.3)
	Redear sunfish					2	3	6		1						12	12.0 (4.9)
	White crappie						5	2	11	10	12	5	1	1	1	48	48.0 (20.6)
	Black crappie					1		2	3	6	1	1				14	14.0 (8.7)
Sinking Creek	Bluegill		1	11	13	7	9									41	27.3 (5.4)
	Redear sunfish					2	3				2					7	4.7 (1.9)
	White crappie										1					1	0.7 (0.7)
	Black crappie															0	0.0
Town Creek	Bluegill	12	26	100	142	87	5									372	372.0 (176.6)
	Redear sunfish				1	6	14	8			1					30	30.0 (9.6)
	White crappie	1	1	5	1	11	6	3	8	12	12	4	1	3		68	68.0 (9.4)
	Black crappie					1	2			1						4	4.0 (2.3)
Bull Creek	Bluegill	4	7	86	115	69	9									290	290.0 (123.7)
	Redear sunfish				1	3	10	12	8	1	4					39	39.0 (14.8)
	White crappie		1	1	4	23	8	7	11	20	10	3	4		1	93	93.0 (27.4)
	Black crappie												1			1	1.0 (1.0)
Clover Creek	Bluegill	20	55	287	401	203	22	3								991	330.3 (38.6)
	Redear sunfish		1		12	14	18	2	2							49	16.3 (5.8)
	White crappie			2	5	12	19	15	26	37	27	20	22	9		194	64.7 (4.5)
	Black crappie				1				1		1	2				5	1.7 (0.8)
Total	Bluegill	51	154	625	827	514	109	11								2291	261.8 (34.8)
	Redear sunfish		1		17	45	69	30	11	2	7					182	20.8 (3.5)
	White crappie	1	2	9	10	54	44	34	60	96	91	36	31	13	2	483	55.2 (6.4)
	Black crappie				1	5	6	4	9	8	4	3	2			42	4.8 (1.5)

Table 13. Fall electrofishing catch-per-unit-effort (fish/hr) estimates for four size groups of crappie from the Cannelton Pool of the Ohio River from 2016-2023. Standard errors are in parentheses.

	Length group		
Year	≥8.0 in	≥10.0 in	Total
<u>White crappie</u>			
2016	14.8 (2.5)	9.2 (1.8)	21.2 (3.3)
2020	35.1 (5.4)	20.7 (4.0)	46.0 (6.4)
2023	37.7 (4.5)	19.9 (2.2)	55.2 (6.4)
Mean	29.0 (2.6)	16.5 (1.7)	40.5 (3.5)
	≥8.0 in	≥10.0 in	Total
<u>Black crappie</u>			
2016	1.4 (0.5)	0.7 (0.3)	3.5 (1.2)
2020	4.3 (0.8)	1.6 (0.5)	7.0 (1.2)
2023	3.0 (1.1)	1.0 (0.3)	4.8 (1.5)
Mean	2.9 (0.5)	1.1 (0.2)	5.1 (0.8)

Table 14. Relative weight (Wr) by length group estimates for each species of crappie collected from the Cannelton Pool of the Ohio River from fall 2016-2023.

<u>White crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2016	91	90	85	88
2020	102	98	98	99
2023	98	98	100	99
Mean	98	97	97	97
<u>Black crappie relative weight (Wr)</u>				
Year	length group			Overall
	5.0-7.9 in	8.0-9.9 in	≥10.0 in	
2016	94	95	88	93
2020	103	102	107	103
2023	125	98	97	108
Mean	106	100	100	102

Table 15. Electrofishing effort and CPUE (fish/hr) of *Sander spp.* collected during 3.0 hr of electrofishing in the Ohio River in November and December 2023. Standard errors are in parentheses.

Tailwater	No. of transects	Effort (hr)	No. of sauger	CPUE	No. of walleye	CPUE
Markland	6	1.0	126	126.0 (37.8)	11	11.0 (5.6)
Cannelton	6	1.0	119	119.0 (8.3)	5	5.0 (1.8)
JT Myers	6	1.0	155	155.0 (34.3)	0	0.0
Total	18	3.0	400		16	
Mean				133.3 (16.7)		5.2 (2.1)

Table 16. CPUE (fish/hr) of sauger, walleye, and saugeye collected during electrofishing surveys on the Ohio River from 2014 - 2023. 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
2023	133.3 (16.7)	5.2 (2.1)	0.0
Mean	199.0 (13.8)	1.9 (0.4)	0.4 (0.2)

Table 17. 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 November and December 2023. Standard errors are in parentheses.

Tailwater	Species	Inch class														Total	Mean length (in)	Wr	CPUE
		4	5	6	7	8	9	10	11	12	13	14	15	16	17				
Markland	Sauger	1	10	40	19	12	4	12	11	8	6	1	1	1		126	8.6	87	126.0 (37.7)
	Walleye					1	3	2	1	1		1	1	1		11	11.5	85	11.0 (5.6)
Cannelton	Sauger		6	12	13	9	13	8	17	24	13	3			1	119	10.2	86	119.0 (8.2)
	Walleye					2	1	1				1				5	10.3	85	5.0 (1.8)
JT Myers	Sauger		2	8	36	61	29	9		4	1	4	1			155	8.7	87	155.0 (34.3)
	Walleye																		0.0
Total	Sauger	1	18	60	68	82	46	29	28	36	20	8	2	1	1	400	9.1	87	308.0 (56.1)
	Walleye					3	4	3	1	1		2	1	1		16	11.1	85	5.2 (2.1)

Table 18. Electrofishing catch-per-unit-effort (fish/hr) estimates for four length groups of sauger from the Ohio River from 2014 - 2023. 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)
2023	70.0 (30.4)	39.0 (20.5)	15.0 (9.6)	2.0 (1.0)	126.0 (37.7)
Mean	39.2 (7.9)	113.7 (11.4)	30.9 (3.6)	5.9 (1.3)	189.7 (15.9)

	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)
2023	31.0 (9.0)	47.0 (10.5)	40.0 (13.0)	1.0 (1.0)	119.0 (8.2)
Mean	31.8 (11.1)	152.8 (16.7)	51.7 (7.5)	8.9 (2.0)	245.1 (26.2)

	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)
2023	46.0 (14.3)	99.0 (19.1)	9.0 (3.4)	1.0 (1.0)	155.0 (34.3)
Mean	26.0 (8.8)	69.0 (20.4)	18.8 (3.4)	5.0 (1.5)	118.8 (29.3)

Table 19. Mean length (in) at age calculated with the von Bertalanffy growth equation and total annual mortality (A) of sauger collected from the various tailwaters of the Ohio River in November and December 2023.

Tailwater	Age			
	1	2	3	A
Markland	8.3	13.1	15.2	85.4
Cannelton	8.2	12.8	15.2	76.8
JT Myers	-	-	-	-
Total	8.4	12.5	15.1	85.6

Table 20. Age frequency and CPUE results for sauger collected in the Markland Tailwater of the Ohio River in November and December 2023. Standard errors are in parentheses.

Tailwater	Age	Inch class														Total	%	CPUE
		4	5	6	7	8	9	10	11	12	13	14	15	16	17			
Markland	0	1	10	40	19	12	4	7	1							94	74.6%	94.0 (26.6)
	1							5	10	8	6	1				30	23.8%	30.0 (19.6)
	2													1		1	0.8%	1.0 (1.0)
	3												1			1	0.8%	1.0 (1.0)
	Total	1	10	40	19	12	4	12	11	8	6	1	1	1		126	100%	126.0 (37.7)
Cannelton	0		6	12	13	9	13	5								58	48.7%	58.0 (13.4)
	1							3	17	24	13	1				58	48.7%	58.0 (13.1)
	2											2				2	1.7%	2.0 (1.2)
	3														1	1	0.8%	1.0 (1.0)
	Total		6	12	13	9	13	8	17	24	13	3			1	119	100%	119.0 (8.2)
JT Myers	0		2	8	36	61	29	9								145	93.5%	145.0 (34.0)
	1									4	1	4	1			10	6.5%	10.0 (2.9)
	Total		2	8	36	61	29	9		4	1	4	1			155	100%	155.0 (34.3)
Total	0	1	18	60	68	82	46	21	1							297	74.3%	99.0 (16.1)
	1							8	27	36	20	6	1			98	24.5%	32.7 (9.0)
	2											2		1		3	0.8%	1.0 (0.4)
	3												1		1	2	0.5%	0.7 (0.4)
	Total	1	18	60	68	82	46	29	28	36	20	8	2	1	1	400	100%	133.3 (16.7)

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 Cannelton 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 pay lake 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.

Regulations talk resurfaced once again, and KDFWR suggested the following regulations which were passed unanimously by the Commission and are currently going through state filing processes:

All commercial fishers are allowed one blue catfish ≥ 35.0 in, one flathead catfish ≥ 35.0 in, and one channel catfish ≥ 28.0 in per day on commercially fishable waters statewide. Trophy permit harvest is now only allowed on the Ohio River from Cannelton Dam downriver to the Ohio River's confluence with the Mississippi River.

Commercial fishing on several waterbodies across the state was closed permanently due to low use, low harvest, and/or low abundance of fish (identified by KDFWR sampling).

A compilation of all 2023 catfish sampling activities is summarized in Table 1.

Trotline Surveys

During summer 2023 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, Cannelton, and Smithland pools of the Ohio River, and Indiana Department of Natural Resources sampled the JT Myers Pool. One hundred six total trotlines were fished throughout those pools: 20 in Meldahl Pool, 33 in Cannelton Pool, 29 in JT Myers Pool, and 24 in Smithland Pool (Table 2). CPUE of blue catfish (CPUE=5.3 fish/hr) decreased from 2022 record highs but was within the range of previous catch rates since new methods were adopted in 2018 (Table 3).

Blue catfish collected with trotlines ranged from 10.7 – 47.7 in with a mean length of 27.9 in (Table 4). Trophy blue catfish were captured in all pools sampled during trotline sampling and accounted for 9.6% of the total sample (up from 8.2% in 2022). Trotline catch rates for different size groups of each species of catfish were also examined (Table 5). Due to the change in trotline methods in 2018, comparisons with previously collected data should be made with caution. Most size groups examined were very similar to 2022 catch rates with the exception of the 20.0 – 29.9 in size group. That size group accounted for nearly all of the decrease from 2022 CPUE levels.

Trotline CPUE and size structure of blue catfish in the JT Myers and Smithland 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 carp biomass is continually increasing in this part of the river. Both of these factors could play a role in lower catch rates. Electrofishing CPUE and size structure don't follow this same trend. Differences in available habitat and behavioral tendencies (due to invasive carp) are potential causes for this difference in catchability. If results from different gear types start to align, potential changes in harvest regulations should be examined.

Hoop Net Surveys

Channel catfish hoop net surveys—Department hoop netting was conducted in the Meldahl, Cannelton, and Smithland pools to gather data from hoop net catch of channel catfish. 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 225 net-nights: 75 in Meldahl Pool, 60 in Cannelton Pool, and 90 in Smithland Pool (Table 6). Overall catch rate of channel catfish was 1.3 fish/net-night. CPUE of channel catfish has steadily declined since sampling began in 2017 (Table 7).

Lengths of channel catfish ranged from 4.0 – 27.3 in with a mean length of 14.8 in (Table 8). Hoop net catch rates were also examined for different size groups of channel catfish. Channel catfish catch rates for all size groups examined were record lows (Table 9).

Flathead catfish hoop net surveys—Netting was conducted simultaneously with baited channel catfish hoop nets in the Meldahl, Cannelton, and Smithland 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 216 net-nights: 72 in the Meldahl Pool, 57 in the Cannelton Pool, and 87 in the Smithland Pool (Table 10). Overall CPUE of flathead catfish was a record low 0.6 fish/net-night (Table 11).

Lengths of flathead catfish ranged from 13.7 – 45.0 in with a mean length of 27.3 in (Table 12). Hoop net catch rates of different size groups were also examined, and as with channel catfish, all size groups decreased from 2022 catch rates (Table 13). Trophy flathead catfish (≥ 35.0 in) were captured at 0.1 fish/net-night (14.5% of the total catch) and were observed in all pools sampled.

Catch rates of both channel catfish and flathead catfish in hoop nets have been steadily declining over the past 4 – 7 years. Hoop net CPUE can be highly influence by flow and temperature. Unseasonably low flow and below average water temperatures during the 2023 sampling season likely had negative impacts on catch rates. Electrofishing catch rates of flathead catfish have been increasing since 2004 and provide a more accurate representation in years when hoop net sampling conditions are not ideal.

Electrofishing Surveys

Low-pulse DC electrofishing was conducted in seven pools in June 2023: 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 496 blue catfish and 1,694 flathead catfish (Table 14). Overall CPUE of blue catfish was 14.2 fish/hr, the third lowest CPUE on record and slightly below the historical average of 17.8 fish/hr (Table 15). Overall flathead catfish CPUE was 48.4 fish/hr, a slight increase from 2022 (47.1 fish/hr) and above the historical average (37.4 fish/hr).

Blue catfish collected with electrofishing ranged from 5.1 – 48.5 in with a mean length of 18.9 in (Table 16). Electrofishing catch rates were also examined for different size groups of blue catfish (Table 17). CPUE of blue catfish <30.0 in decreased while CPUE of fish >30.0 in remained stable. Trophy blue catfish were observed in all pools except the Markland and McAlpine pools (Table 16).

Flathead catfish lengths ranged from 3.4 – 46.5 in with a mean length of 14.9 in (Table 16). Electrofishing CPUE for all size groups examined were above their historical averages and nearly identical to 2022 catch rates (Table 18). Trophy flathead catfish were observed in all pools sampled (Table 16).

Relative Weight

Relative weight (Wr) was also calculated for each species of catfish. Fish collected from all sampling methods used in 2023 were combined to provide a more representative estimate for the entire population of each catfish species. Overall Wr of blue catfish (N=1,061) in 2023 was 106 (Table 19). Flathead catfish (N=1,461) overall relative weight was 101, and channel catfish (N=308) overall relative weight was 84. Blue catfish and flathead catfish were at or near historical averages; however, channel catfish relative weight was a record low.

Age and Growth

In spring 2022 and 2023, otoliths (up to 5 per inch class in each pool sampled) 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 20). While there were some small differences, growth rate calculations for all three species of catfish examined in 2022/2023 were not significantly different than those calculated in 2017 (Figure 1).

Blue catfish—A subsample of 489 otoliths were taken from blue catfish, 158 from the Meldahl Pool, 182 from the Cannelton Pool, and 149 from the Smithland Pool. Ages of fish ranged from 1 – 29 years with all year classes except for 1997 - 1995 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 16.7 years to reach trophy size (≥ 35.0 in; Table 21), a year sooner than was calculated from the 2017 age and growth sample. Further analysis using ANCOVA was also done to test for differences in blue catfish growth. Despite getting to trophy size quicker in the 2023 sample, there was no difference in growth between 2017 and 2023 samples ($F = 1.46$, $p = 0.23$; Figure 1). Differences in growth between pools were apparent ($F = 3.82$, $p = 0.03$; Table 21; Figure 2). No significant difference in growth was found between the Meldahl and Cannelton pools ($F = 0.55$, $p = 0.46$); however, blue catfish in both the Meldahl Pool ($F = 7.27$, $p = 0.01$) and Cannelton Pool ($F = 4.26$, $p = 0.05$) grew faster but were not as long lived as blue catfish in the Smithland Pool. Lastly, there was also a difference in growth between sexes ($F = 7.14$, $p = 0.01$; Table 21; Figure 3). Overall, male blue catfish were found to grow faster, live longer, and attain larger sizes. This difference in growth between male and female blue catfish should be viewed with caution as a small sample size of larger, older fish likely heavily influenced growth curves.

Channel catfish—A total of 290 otoliths were taken from channel catfish, 96 from the Meldahl Pool, 104 from the Cannelton Pool, and 90 from the Smithland 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 21.4 years, indicating that most channel catfish will not reach trophy size during their lifespan (Table 22). No difference in growth was found between the 2017 sample and the 2023 sample ($F = 2.14$, $p = 0.15$; Figure 1). Similar to blue catfish, there was a difference in growth rates between pools ($F = 11.94$, $p < 0.01$; Table 22; Figure 2). No significant difference in growth was found between the Meldahl and Cannelton pools ($F = 2.94$, $p = 0.10$); however, channel catfish in both the Meldahl Pool ($F = 18.80$, $p < 0.01$) and Cannelton Pool ($F = 9.42$, $p = 0.01$) grew slower but were longer lived than channel catfish in the Smithland Pool. Growth between sexes was also examined, but no differences were found ($F = 2.75$, $p = 0.11$; Table 22; Figure 3).

Flathead catfish—A subsample of 491 otoliths were taken from flathead catfish, 165 from the Meldahl Pool, 185 from the Cannelton Pool, and 142 from the Smithland Pool. Ages of fish ranged from 1 – 34 years with all but the 1997 and 1990 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 20.3 years to reach trophy size (≥ 35.0 in; Table 23), and not significantly different to 20.1 years that was calculated in 2017 ($F = 1.02$, $p = 0.32$; Figure 1). Unlike blue catfish and channel catfish, flathead catfish growth did not differ between pools ($F = 1.44$, $p = 0.24$; Table 23; Figure 2). Overall, male flathead catfish grew faster than females in the first 15 years, but females tended to outgrow males later in life ($F = 15.63$, $p < 0.01$; Table 23; Figure 3). This difference in growth between male and female flathead catfish should be viewed with caution as a small sample size of larger, older fish likely heavily influenced growth curves.

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 2023. Length frequency data from 2023 was paired with the 2022/2023 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. FAMS was also used to estimate instantaneous natural mortality, which could then be used to estimate annual fishing mortality (exploitation). ANCOVA was then used to test for differences in mortality

between years and pools.

Blue catfish—In 2023, river-wide total annual mortality for blue catfish was 16.8% (Table 24) and did not differ from estimates in 2017 ($F = 0.01$, $p = 0.96$). Additionally, no differences in total annual mortality were found between pools ($F = 0.05$, $p = 0.95$). Exploitation of blue catfish was relatively low overall ($\mu = 4.7\%$) and did not differ much between pools.

Channel catfish—Channel catfish total annual mortality was 21.7% (Table 24) in 2023 and did not differ from estimates in estimates in 2017 ($F = 1.53$, $p = 0.23$). Additionally, no differences in total annual mortality were found between pools ($F = 3.04$, $p = 0.06$). Overall exploitation of channel catfish was estimated at 7.6% and was higher in the Smithland Pool ($\mu = 7.7\%$) than in the Meldahl ($\mu = 3.5\%$) and Cannelton ($\mu = 3.4\%$) pools.

Flathead catfish—Flathead catfish total annual mortality was 18.2% (Table 24) and did not differ from estimates in 2017 ($F = 0.07$, $p = 0.79$). Difference in annual mortality between pools was found ($F = 14.28$, $p < 0.01$). Total annual mortality was not different between the Meldahl and Cannelton pools ($F = 1.62$, $p = 0.21$); however, total annual mortality of flathead catfish in the Meldahl Pool ($F = 12.40$, $p < 0.01$) and Cannelton Pool ($F = 23.73$, $p < 0.01$) was significantly lower than the Smithland Pool. Exploitation of flathead catfish ($\mu = 8.7\%$) was higher than both blue catfish and channel catfish. Additionally, flathead catfish exploitation in the Smithland Pool ($\mu = 13.6\%$) was noticeably higher than the Meldahl ($\mu = 6.2\%$) and Cannelton ($\mu = 5.2\%$) pools.

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 has been fairly stable since record keeping began in 1999 (Figure 2). Low points in blue catfish harvest are likely related to extended high water that did not allow gear to be effectively fished. Record harvest of blue catfish (388,274 lbs) was observed in 2021. Channel catfish harvest has been lower than blue catfish but has followed a similar trend. Harvest of channel catfish increased from 2002 – 2011 then gradually declined from 2013 - 2023. Channel catfish harvest in 2023 was 60,371 lbs and was the lowest recorded since 2003. Flathead catfish harvest has mirrored channel catfish harvest since records began in 1999 and began decreasing in 2013. Flathead catfish harvest in 2023 was 53,853 lbs and was the second lowest on record. 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 has increased gradually from 1999 – 2023. One low point in harvest in 2004 was likely a result of high water/poor fishing conditions. Harvest rate in 2023 was a record high, and the last 5 years have been the highest five on record (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 1999 (Figure 3). Channel catfish and flathead catfish harvest in commercial nets have both typically remained between 5 – 15 pounds/net since 1999; 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. Summary of 2023 catfish sampling sites by pool, river mileage, sampling method, species (B=blue catfish, C=channel catfish, and F=flathead catfish), date, and river conditions.

Pool	Location	River mile	Sampling method	Species	Date	Water temp.	Water level (USGS gauge station)	Comments
Meldahl	Manchester Island	396.6 - 394.8	Hoop nets	C,F	5/1/2023	58.2	23.57' @ Greenup Dam	Setting nets
Meldahl	Manchester Island	396.6 - 394.9	Hoop nets	C,F	5/4/2023	56.8	27.89' @ Greenup Dam	Pulling nets
Cannelton	Brandenburg	638.3 - 649.3	Hoop nets	C,F	5/9/2023	59.2	27.00' @ Louisville, KY	Setting nets
Cannelton	Brandenburg	638.3 - 649.3	Hoop nets	C,F	5/12/2023	60.0	23.26' @ Louisville, KY	Pulling nets
Smithland	Old Shawneetown	855.0 - 863.0	Hoop nets	C,F	5/15/2023	66.0	21.31' @ Old Shawneetown, IL	Setting nets
Smithland	Elizabethtown Ferry	887.0 - 894.8	Electrofishing	B,C,F	5/16/2023	67.6	20.08' @ Old Shawneetown, IL	Age and growth collection
Smithland	Old Shawneetown	855.0 - 863.0	Hoop nets	C,F	5/18/2023	68.5	20.58' @ Old Shawneetown, IL	Pulling nets
Meldahl	Dover	412.8 - 423.0	Hoop nets	C,F	5/22/2023	67.9	17.82' @ Greenup Dam	Setting nets
JT Myers	Uniontown	841.5 - 845.2	Electrofishing	B,F	5/23/2023	70.1	18.09' @ Uniontown Dam	Annual sample
Smithland	JT Myers Tailwater	846.1 - 848.0	Electrofishing	B,F	5/23/2023	70.7	17.89' @ Old Shawneetown, IL	Annual sample
Smithland	Old Shawneetown	858.0 - 861.7	Electrofishing	B,F	5/23/2023	72.6	17.89' @ Old Shawneetown, IL	Annual sample
Meldahl	Dover	412.8 - 423.0	Hoop nets	C,F	5/25/2023	68.3	15.94' @ Greenup Dam	Pulling nets
Cannelton	Wolf Creek	667.4 - 677.1	Hoop nets	C,F	5/30/2023	69.3	11.76' @ Louisville, KY	Setting nets
Meldahl	Augusta	423.0 - 426.6	Electrofishing	B,F	5/30/2023	69.1	15.06' @ Greenup Dam	Annual sample
Markland	Foster	436.2 - 439.0	Electrofishing	B,F	5/30/2023	69.1	27.11' @ Cincinnati, OH	Annual sample
Markland	California	445.1 - 447.5	Electrofishing	B,F	5/30/2023	68.7	27.11' @ Cincinnati, OH	Annual sample
McAlpine	Ghent	533.0 - 535.8	Electrofishing	B,F	5/31/2023	67.1	15.63' @ McAlpine Dam	Annual sample
McAlpine	Carrolton	542.8 - 546.2	Electrofishing	B,F	5/31/2023	67.3	15.63' @ McAlpine Dam	Annual sample
JT Myers	Diamond Island	818.5 - 821.9	Electrofishing	B,F	5/31/2023	73.7	14.12' @ Newburgh Dam	Annual sample
Smithland	Old Lock and Dam 50	873.5 - 878.0	Electrofishing	B,F	5/31/2023	74.7	15.57' @ Old Shawneetown, IL	Annual sample
Smithland	Carrsville	890.9 - 894.8	Electrofishing	B,F	5/31/2023	75.8	15.57' @ Old Shawneetown, IL	Annual sample
Smithland	Birdsville	912.7 - 915.7	Electrofishing	B,F	5/31/2023	73.5	15.57' @ Old Shawneetown, IL	Annual sample
McAlpine	Milton	557.2 - 560.3	Electrofishing	B,F	6/1/2023	72.1	15.66' @ McAlpine Dam	Annual sample
McAlpine	Westport	578.3 - 580.0	Electrofishing	B,F	6/1/2023	71.3	15.66' @ McAlpine Dam	Annual sample
McAlpine	Cox's Park	595.2 - 598.4	Electrofishing	B,F	6/1/2023	70.1	15.66' @ McAlpine Dam	Annual sample
Newburgh	Little Pigeon Creek	773.0 - 775.4	Electrofishing	B,F	6/1/2023	76.7	12.31' @ Cannelton Dam	Annual sample
JT Myers	Newburgh Tailwater	777.2 - 780.0	Electrofishing	B,F	6/1/2023	73.7	14.82' @ Newburgh Dam	Annual sample
JT Myers	Henderson	797.7 - 803.0	Electrofishing	B,F	6/1/2023	73.2	14.82' @ Newburgh Dam	Annual sample
Cannelton	Wolf Creek	667.4 - 677.1	Hoop nets	C,F	6/2/2023	72.6	13.10' @ Louisville, KY	Pulling nets
Smithland	Old Lock and Dam 50	869.2 - 880.0	Hoop nets	C,F	6/5/2023	74.7	15.69' @ Old Shawneetown, IL	Setting nets
Newburgh	Hawesville	720.7 - 723.9	Electrofishing	B,F	6/5/2023	71.6	11.48' @ Cannelton Dam	Annual sample
Newburgh	Lewisport	733.3 - 739.3	Electrofishing	B,F	6/5/2023	71.6	11.48' @ Cannelton Dam	Annual sample
Newburgh	Owensboro	753.7 - 762.5	Electrofishing	B,F	6/5/2023	73.2	11.48' @ Cannelton Dam	Annual sample
Cannelton	Wolf Creek	671.5 - 683.2	Electrofishing	B,F	6/6/2023	73.9	11.94' @ Louisville, KY	Annual sample
Cannelton	Cloverport	708.2 - 710.0	Electrofishing	B,F	6/6/2023	73.5	11.94' @ Louisville, KY	Annual sample
Meldahl	Garrison	366.0 - 368.6	Electrofishing	B,F	6/7/2023	72.6	13.09' @ Greenup Dam	Annual sample
Meldahl	Manchester Island	395.3 - 398.3	Electrofishing	B,F	6/7/2023	74.8	13.09' @ Greenup Dam	Annual sample
Meldahl	Maysville	406.8 - 409.5	Electrofishing	B,F	6/7/2023	75.8	13.09' @ Greenup Dam	Annual sample
Cannelton	Greenwood	616.2 - 619.5	Electrofishing	B,F	6/8/2023	73.7	10.41' @ Louisville, KY	Annual sample
Cannelton	Brandenburg	636.8 - 644.0	Electrofishing	B,F	6/8/2023	73.5	10.41' @ Louisville, KY	Annual sample
Smithland	Old Lock and Dam 50	869.2 - 880.0	Hoop nets	C,F	6/8/2023	75.2	15.15' @ Old Shawneetown, IL	Pulling nets
Meldahl	Wheelersburg	344.2 - 353.0	Hoop nets	C,F	6/12/2023	71.2	15.42' @ Greenup Dam	Setting nets
Meldahl	Wheelersburg	341.0 - 343.5	Electrofishing	B,F	6/13/2023	72.2	13.61' @ Greenup Dam	Annual sample

Table 1. Continued

Waterbody	Location	River mile		Species	Date	Water temp.	Water level (USGS gauge station)	Comments
Markland	Fredericks Landing	465.0 - 470.0	Electrofishing	B,F	6/13/2023	72.6	27.15' @ Cincinnati, OH	Annual sample
Markland	Petersburg	495.5 - 497.8	Electrofishing	B,F	6/14/2023	73.1	26.54' @ Cincinnati, OH	Annual sample
Markland	Big Sugar Creek	519.2 - 523.1	Electrofishing	B,F	6/14/2023	74.7	26.54' @ Cincinnati, OH	Annual sample
Meldahl	Wheelersburg	344.2 - 353.0	Hoop nets	C,F	6/15/2023	71.6	14.52' @ Greenup Dam	Pulling nets
Smithland	Birdsville	905.0 - 917.2	Hoop nets	C,F	6/19/2023	75.9	16.23' @ Old Shawneetown, IL	Setting nets
Smithland	Birdsville	905.0 - 917.2	Hoop nets	C,F	6/22/2023	75.7	14.46' @ Old Shawneetown, IL	Pulling nets
Cannelton	Cloverport	704.5 - 713.7	Trotlines	B	7/10/2023	77.6	13.78' @ Louisville, KY	Setting lines
JT Myers	Newburgh	776.1 - 787.0	Trotlines	B	7/10/2023	81.5	15.58' @ Newburgh Dam	Setting lines (INDNR)
JT Myers	Newburgh	776.1 - 787.0	Trotlines	B	7/11/2023	81.5	16.14' @ Newburgh Dam	Pulling/resetting lines (INDNR)
Cannelton	Cloverport	704.5 - 713.7	Trotlines	B	7/11/2023	78.2	13.56' @ Louisville, KY	Pulling/resetting lines
Cannelton	Cloverport	704.5 - 713.7	Trotlines	B	7/12/2023	78.1	12.64' @ Louisville, KY	Pulling lines
JT Myers	Newburgh	776.1 - 787.0	Trotlines	B	7/12/2023	81.5	14.62' @ Newburgh Dam	Pulling lines (INDNR)
Meldahl	Dover	415.5 - 423.0	Trotlines	B	7/17/2023	79.0	14.73' @ Greenup Dam	Setting lines
Meldahl	Dover	415.5 - 423.0	Trotlines	B	7/18/2023	79.2	15.97' @ Greenup Dam	Pulling/resetting lines
Meldahl	Dover	415.5 - 423.0	Trotlines	B	7/19/2023	78.7	20.77' @ Greenup Dam	Pulling lines
Cannelton	Wolf Creek	668.5 - 678.0	Trotlines	B	7/24/2023	80.2	12.94' @ Louisville, KY	Setting lines
Cannelton	Wolf Creek	668.5 - 678.0	Trotlines	B	7/25/2023	79.9	12.29 @ Louisville, KY	Pulling lines
Cannelton	Brandenburg	638.3 - 649.3	Trotlines	B	7/26/2023	80.2	12.56' @ Louisville, KY	Setting lines
Cannelton	Brandenburg	638.3 - 649.3	Trotlines	B	7/27/2023	80.8	12.19' @ Louisville, KY	Pulling/resetting lines
Cannelton	Brandenburg	638.3 - 649.3	Trotlines	B	7/28/2023	81.6	12.85' @ Louisville, KY	Pulling lines
Smithland	Birdsville	905.0 - 917.2	Trotlines	B	7/31/2023	82.0	16.31' @ Old Shawneetown, IL	Setting lines
Smithland	Birdsville	905.0 - 917.2	Trotlines	B	8/1/2023	82.5	14.96' @ Old Shawneetown, IL	Pulling/resetting lines
Smithland	Birdsville	905.0 - 917.2	Trotlines	B	8/2/2023	82.5	15.38' @ Old Shawneetown, IL	Pulling lines
Meldahl	Manchester Island	390.1 - 401.2	Trotlines	B	8/8/2023	81.1	15.87' @ Greenup Dam	Setting lines
Meldahl	Manchester Island	390.1 - 401.2	Trotlines	B	8/9/2023	80.9	15.07' @ Greenup Dam	Pulling lines
JT Myers	Mount Vernon	829.0 - 835.0	Trotlines	B	8/15/2023	82.9	16.90' @ Newburgh Dam	Setting lines (INDNR)
JT Myers	Mount Vernon	829.0 - 835.0	Trotlines	B	8/16/2023	83.0	15.65' @ Newburgh Dam	Pulling/resetting lines (INDNR)
JT Myers	Mount Vernon	829.0 - 835.0	Trotlines	B	8/17/2023	83.0	15.71' @ Newburgh Dam	Pulling lines (INDNR)
Smithland	Old Shawneetown	855.0 - 863.0	Trotlines	B	8/22/2023	81.5	14.98' @ Old Shawneetown, IL	Setting lines
Smithland	Old Shawneetown	855.0 - 863.0	Trotlines	B	8/23/2023	82.7	15.25' @ Old Shawneetown, IL	Pulling lines

Table 2. CPUE (fish/line) of blue catfish collected during trotline surveys on the Ohio River in summer 2023. Standard errors are in parentheses.

Pool	No. of trotlines	No. of Blue Catfish	CPUE
Meldahl	20	149	7.5 (0.6)
Cannelton	33	250	7.6 (0.5)
JT Myers	29	76	2.6 (0.5)
Smithland	24	90	3.8 (0.7)
Total	106	565	5.3 (0.4)

Table 3. CPUE (fish/line) of blue catfish collected during trotline surveys on the Ohio River during summer from 2004 - 2023. 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)
2023*	5.3 (0.4)
Mean**	5.7 (0.2)

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

**Mean calculated from 2018 - 2023 data after changing methods.

Table 4. Length frequency and CPUE (fish/line) of blue catfish collected during trotline surveys on Ohio River in summer 2023. Standard errors are in parentheses.

Pool	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	35	36	37	38	39	40	41	42	43	44	45	46	47	Total	CPUE
Meldahl			1		2	1			1	1	3	3	2	3	3	10	18	22	18	15	17	8	4	5	1	4	2	1	1		1	1				1			149	7.5 (0.6)
Cannelton	2	1	3	1	3	1	1			4	5	2	5	11	18	24	35	27	15	22	12	13	8	5	4	7	4	2	2	1	2	2	2	3	2		1		250	7.6 (0.5)
JT Myers							2	1	1	1	1	3	4	4	5	7	4	5	8	6	1	3	3	4	2	4	1	2	1	1							1	1	76	2.6 (0.5)
Smithland			1		1		2	3	2	5	1	3	2	5	2	8	6	4	4	7	9	7	8	3	3	1	1	1									1		90	3.8 (0.7)
Total	2	1	5	1	6	2	5	4	4	11	10	11	13	23	28	49	63	58	45	50	39	31	23	17	10	16	8	6	4	2	3	3	2	3	2	1	3	1	565	5.3 (0.4)

Table 5. CPUE (fish/line) by size group of blue catfish collected during trotline surveys on the Ohio River during summer from 2004 - 2023. 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)
2023*	<0.1 (<0.1)	0.4 (0.1)	3.3 (0.3)	1.1 (0.1)	0.5 (0.1)	5.3 (0.4)
Mean**	<0.1 (<0.1)	0.2 (<0.1)	3.9 (0.1)	0.9 (0.1)	0.7 (0.1)	5.7 (0.2)

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

**Mean calculated from 2018 - 2023 data after changing methods.

Table 6. CPUE (fish/net-night) of channel catfish collected during baited hoop net surveys in Meldahl and Cannelton pools of the Ohio River in spring 2023. Standard errors are in parentheses.

Pool	Effort (net nights)	No. of channel catfish	CPUE
Meldahl	75	118	1.6 (0.5)
Cannelton	60	119	2.0 (0.7)
Smithland	90	51	0.6 (0.2)
Total	225	288	1.3 (0.3)

Table 7. CPUE (fish/net-night) of channel catfish collected during baited hoop net surveys on the Ohio River in spring 2017 - 2023. 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)
2023	1.3 (0.3)
Mean	3.8 (0.3)

Table 8. Length frequency and CPUE (fish/net-night) of channel catfish collected during baited hoop net sampling in the Meldahl and Cannelton pools during spring 2023 on the Ohio River. Standard errors are in parentheses.

Pool	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	CPUE
Meldahl					3	8	8	17	13	6	9	6	12	7	12	6	5	2	2			2			118	1.6 (0.5)
Cannelton	2				1	2	10	16	21	17	8	10	10	9	7	1	1	2	2						119	2.0 (0.7)
Smithland						1	4	1	3	5	5	5	2	1	5	8	2	2	2	3			1	1	51	0.6 (0.2)
Total	2				4	11	22	34	37	28	22	21	24	17	24	15	8	6	6	3		2	1	1	288	1.3 (0.3)

Table 9. CPUE (fish/net-night) by size group of channel catfish collected during baited hoop net surveys on the Ohio River in spring 2017 - 2023. 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)
2023	0.3 (0.1)	0.8 (0.2)	0.1 (<0.1)	0.0	1.3 (0.3)
Mean	0.8 (0.1)	2.4 (0.2)	0.6 (0.1)	<0.1 (<0.1)	3.8 (0.3)

Table 10. CPUE (fish/net-night) of flathead catfish collected during unbaited hoop net surveys in Meldahl and Cannelton pools of the Ohio River in spring 2023. Standard errors are in parentheses.

Pool	Effort (net nights)	No. of Flathead Catfish	CPUE
Meldahl	72	54	0.8 (0.2)
Cannelton	57	38	0.7 (0.2)
Smithland	87	39	0.5 (0.1)
Total	216	131	0.6 (0.1)

Table 11. CPUE (fish/net-night) of flathead catfish collected during unbaited hoop net surveys on the Ohio River in spring 2017 - 2023. Standard errors are in parentheses.

Year	CPUE
2019	1.8 (0.2)
2021	0.8 (0.2)
2022	1.5 (0.2)
2023	0.6 (0.1)
Mean	1.1 (0.1)

Table 12. Length frequency and CPUE (fish/net/night) of flathead catfish collected during unbaited hoop net sampling in the Meldahl, Cannelton, and Smithland pools during spring 2023 on the Ohio River. Standard errors are in parentheses.

Pool	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	Total	CPUE
Meldahl			1						1	2	6	7	1	6		1	4	5	3	1	2	1	1	2	3	2	3	1					1	54	0.8 (0.2)
Cannelton		1		2				1	3	3	1	6	5	4	3	1	3	1				1	1					1	1					38	0.7 (0.2)
Smithland	1	1		3	1		2	1	2	1	2	7	4	2	2	2	2					3	1		1							1	39	0.5 (0.1)	
Total	1	2	1	5	1		2	2	6	6	9	20	10	12	5	4	9	6	3	1	2	5	3	2	4	2	3	2	1			1	1	131	0.6 (0.1)

Table 13. CPUE (fish/net-night) by size group of flathead catfish collected during unbaited hoopnet surveys on the Ohio River in spring 2019 - 2023. 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)
2023	0.0	0.1 (<0.1)	0.4 (0.1)	0.1 (<0.1)	0.1 (<0.1)	0.6 (0.1)
Mean	0.0	0.1 (<0.1)	0.7 (0.1)	0.2 (<0.1)	0.1 (<0.1)	1.1 (0.1)

Table 14. Effort and CPUE (fish/hr) of blue catfish and flathead catfish collected during electrofishing surveys on the Ohio River in May and June 2023. Standard errors are in parentheses.

Pool	No. of transects	Effort (hr)	No. of Blue Catfish		No. of Flathead Catfish	
				CPUE		CPUE
Meldahl	20	5.0	37	7.4 (1.13)	229	45.8 (4.6)
Markland	20	5.0	76	15.2 (5.8)	147	29.4 (3.2)
McAlpine	20	5.0	36	7.2 (2.3)	237	47.4 (6.8)
Cannelton	20	5.0	77	15.4 (4.2)	282	56.4 (4.5)
Newburgh	20	5.0	107	21.4 (4.9)	182	36.4 (4.4)
JT Myers	20	5.0	65	13.0 (3.0)	385	77.0 (7.33)
Smithland	20	5.0	98	19.6 (4.0)	232	46.4 (9.3)
Total	140	35.0	496	14.2 (1.5)	1694	48.4 (2.5)

Table 15. CPUE (fish/hr) of blue catfish and flathead catfish collected during electrofishing surveys on the Ohio River from 2004 - 2023. 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)
2023	14.2 (1.5)	48.4 (2.5)
Mean	17.8 (2.8)	37.4 (3.7)

*Incomplete sample due to high water

Table 17. CPUE (fish/hr) by size group of blue catfish collected during electrofishing surveys on the Ohio River from 2004 - 2023. 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)
2023	2.1 (0.5)	6.9 (1.0)	4.0 (0.5)	0.7 (0.2)	0.5 (0.1)	14.2 (1.5)
Mean	4.7 (1.1)	7.0 (1.4)	5.4 (1.3)	0.4 (0.1)	0.3 (0.1)	17.6 (2.7)

*Incomplete sample due to high water

Table 18. CPUE (fish/hr) by size group of flathead catfish collected during electrofishing surveys on the Ohio River from 2004 - 2023. 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)
2023	21.0 (1.9)	16.3 (1.0)	9.6 (0.6)	0.7 (0.2)	0.9 (0.2)	48.4 (2.5)
Mean	16.0 (1.8)	13.0 (1.2)	7.1 (1.0)	0.7 (0.1)	0.6 (0.1)	37.4 (3.7)

*Incomplete sample due to high water

Table 19. 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 - 2023.

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
2023	106	84	101
Mean	106	87	102

Table 20. 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 and 2023 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	0.055	0.067	0.043
t_0	-1.622	-2.620	-3.113

Table 21. 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 and 2023.

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	
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									
	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									
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					
Smithland	Male	10.3	12.4	14.5	16.4	18.3	20.0	21.7	23.3	24.8	26.3	27.7	29.0	30.2	31.4	32.5	33.6	34.7	35.6	36.6	37.5	38.3	39.1	39.9	40.6	41.3	42.0	42.6	43.2	43.8	
	Female	9.8	12.1	14.2	16.3	18.2	20.0	21.8	23.4	25.0	26.5	27.9	29.3	30.6	31.8	32.9	34.0	35.1	36.1	37.0	37.9	38.8	39.6	40.4	41.1	41.8	42.5	43.1	43.7	44.3	
	Total	8.3	10.6	12.8	14.9	16.9	18.8	20.6	22.3	24.0	25.5	27.0	28.4	29.7	31.0	32.2	33.3	34.4	35.4	36.4	37.3	38.2	39.1	39.9	40.6	41.3	42.0	42.7	43.3	43.9	
Overall	Male	7.5	10.2	12.7	15.1	17.4	19.5	21.5	23.4	25.2	26.9	28.5	30.0	31.4	32.7	34.0	35.2	36.3	37.4	38.4	39.3	40.2	41.0	41.8	42.6	43.3	44.0	44.6	45.2	45.7	
	Female	10.4	12.5	14.5	16.5	18.3	20.1	21.8	23.4	24.9	26.3	27.7	29.0	30.3	31.4	32.6	33.7	34.7	35.7	36.6	37.5	38.3	39.1	39.9	40.6	41.3					
	Total	7.4	10.0	12.4	14.7	16.8	18.9	20.8	22.6	24.4	26.0	27.6	29.1	30.5	31.8	33.0	34.2	35.3	36.4	37.4	38.3	39.2	40.1	40.9	41.7	42.4	43.1	43.7	44.3	44.9	

Table 22. 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 and 2023.

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
Smithland	Male	7.8	10.2	12.4	14.3	16.1	17.8	19.3	20.6	21.9	23.0	24.1	25.0						
	Female	6.2	8.7	11.0	13.1	15.0	16.7	18.3	19.8	21.1	22.3	23.4	24.4	25.3	26.2	26.9			
	Total	6.0	8.6	11.0	13.2	15.2	17.0	18.7	20.2	21.5	22.8	23.9	24.9	25.8	26.7	27.4			
Overall	Male	10.4	11.8	13.1	14.3	15.5	16.6	17.6	18.6	19.5	20.4	21.2	22.0	22.7	23.4	24.1	24.7	25.3	
	Female	10.9	12.1	13.3	14.4	15.5	16.5	17.5	18.4	19.2	20.0	20.8	21.5	22.2	22.9	23.5	24.1	24.7	25.2
	Total	7.5	9.3	11.0	12.5	14.0	15.4	16.6	17.8	18.9	20.0	20.9	21.9	22.7	23.5	24.3	24.9	25.6	26.2

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

Table 23. 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 and 2023.

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			
	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				
	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		
	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		
Smithland	Male	10.1	12.1	14.0	15.9	17.6	19.3	20.9	22.5	23.9	25.3	26.7	28.0	29.2	30.4	31.5	32.5	33.5	34.5	35.4	36.3	37.2													
	Female*																																		
	Total	8.4	10.4	12.3	14.1	15.8	17.5	19.1	20.6	22.0	23.4	24.8	26.0	27.3	28.4	29.6	30.6	31.7	32.6	33.6	34.5	35.4	36.2	37.0	37.8	38.5									
Overall	Male	13.5	15.0	16.4	17.8	19.2	20.5	21.8	23.0	24.1	25.3	26.3	27.4	28.4	29.4	30.3	31.2	32.1	32.9	33.7	34.5	35.2	36.0	36.7	37.3	38.0	38.6	39.2	39.8	40.3	40.9	41.4	41.9	42.4	42.8
	Female	9.3	11.3	13.2	15.0	16.7	18.4	20.0	21.5	22.9	24.3	25.6	26.9	28.1	29.3	30.4	31.5	32.5	33.4	34.4	35.3	36.1	36.9	37.7	38.5	39.2	39.9	40.5	41.2	41.8	42.3	42.9	43.4		
	Total	8.9	10.9	12.7	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	41.8	42.4	42.9	43.5	43.9

*Growth was unable to be calculated due to large variance.

Table 24. 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
2023	16.8	21.7	18.2
Mean	20.9	23.4	18.0

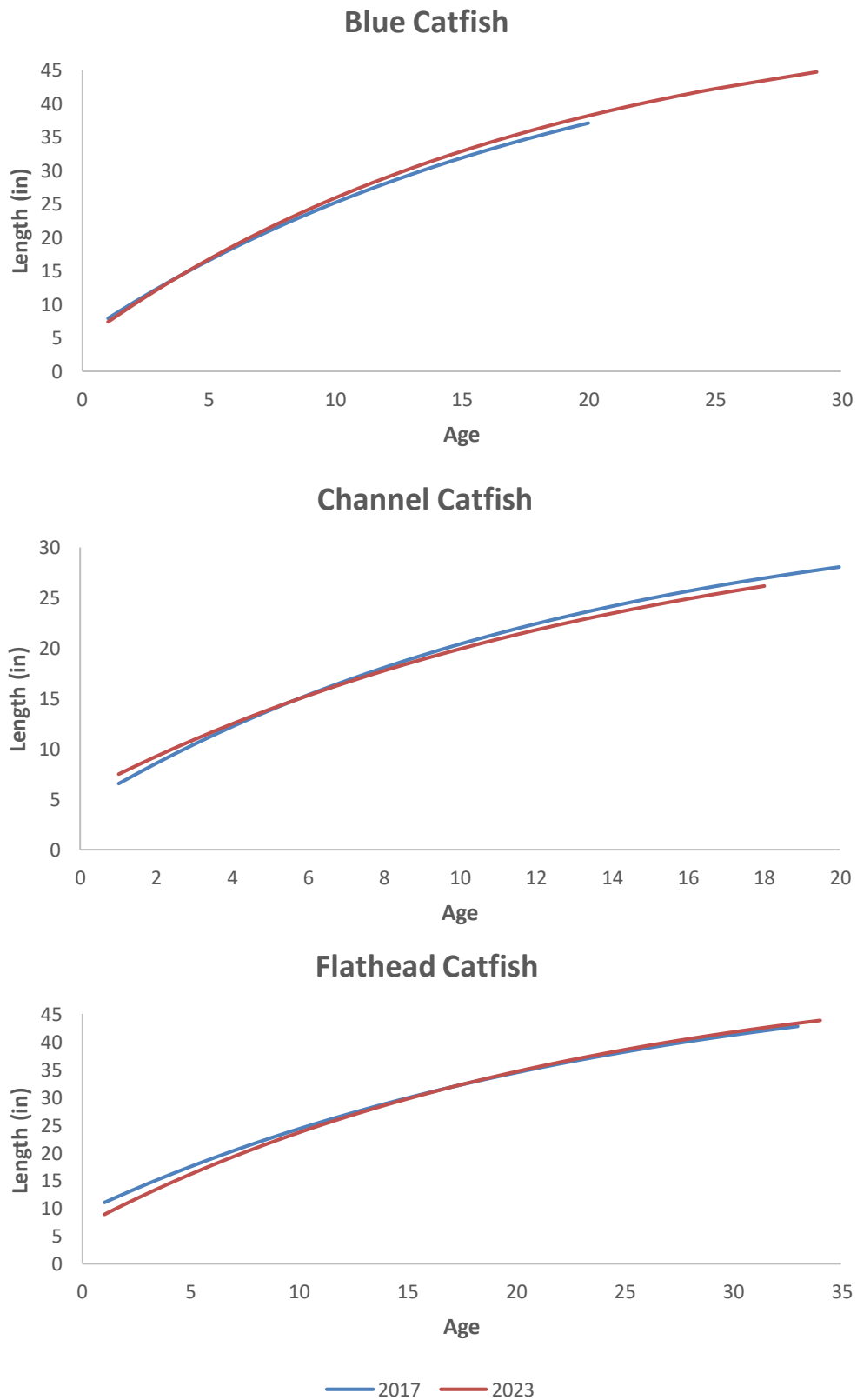


Figure 1. Comparison of von Bertalanffy growth curves for blue catfish, channel catfish, and flathead catfish from age and growth samples conducted in 2017 and 2022/2023.

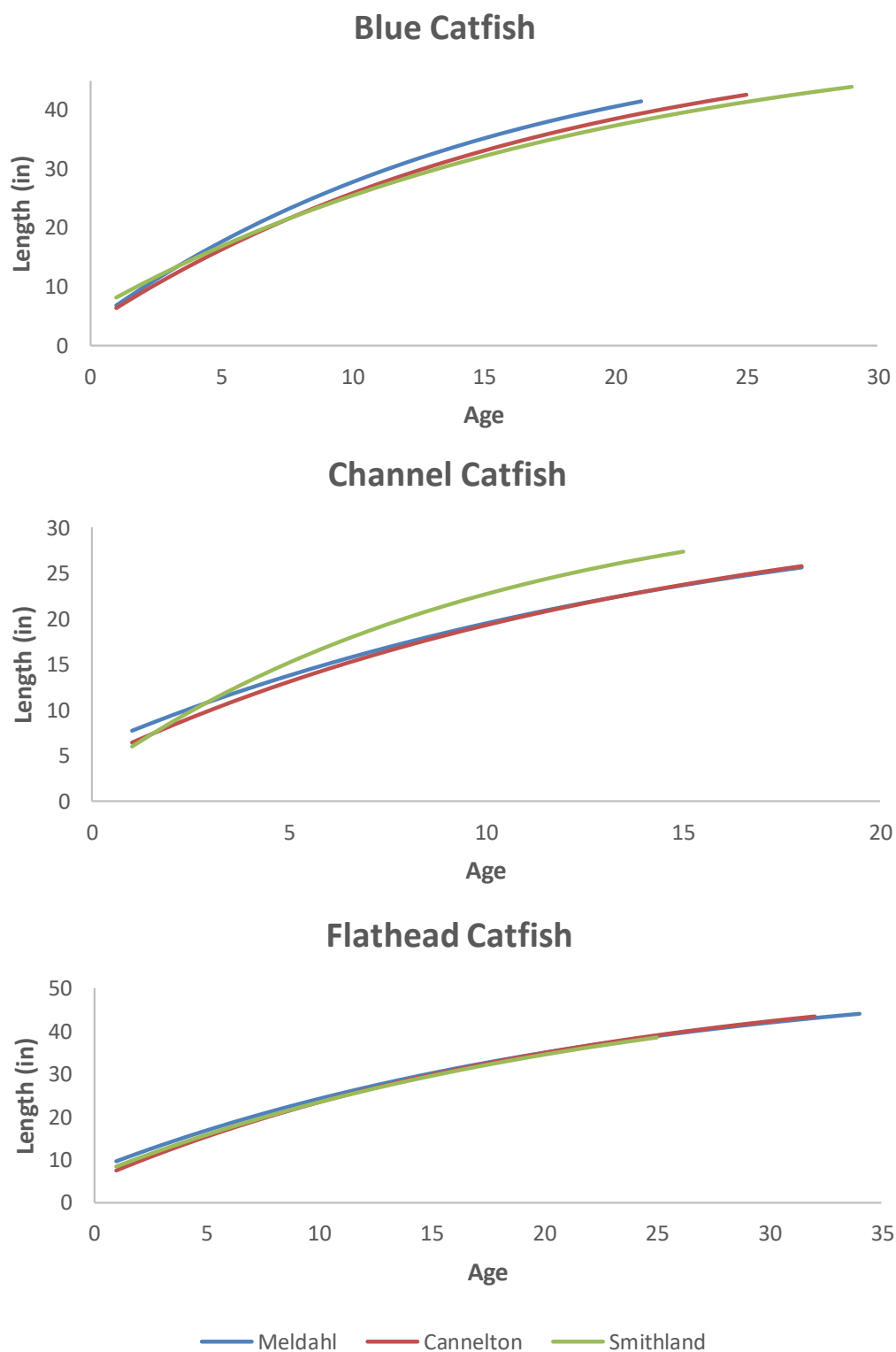


Figure 2. Comparison of von Bertalanffy growth curves for blue catfish, channel catfish, and flathead catfish by pool from age and growth samples collected in the spring and summer of 2022 and 2023.

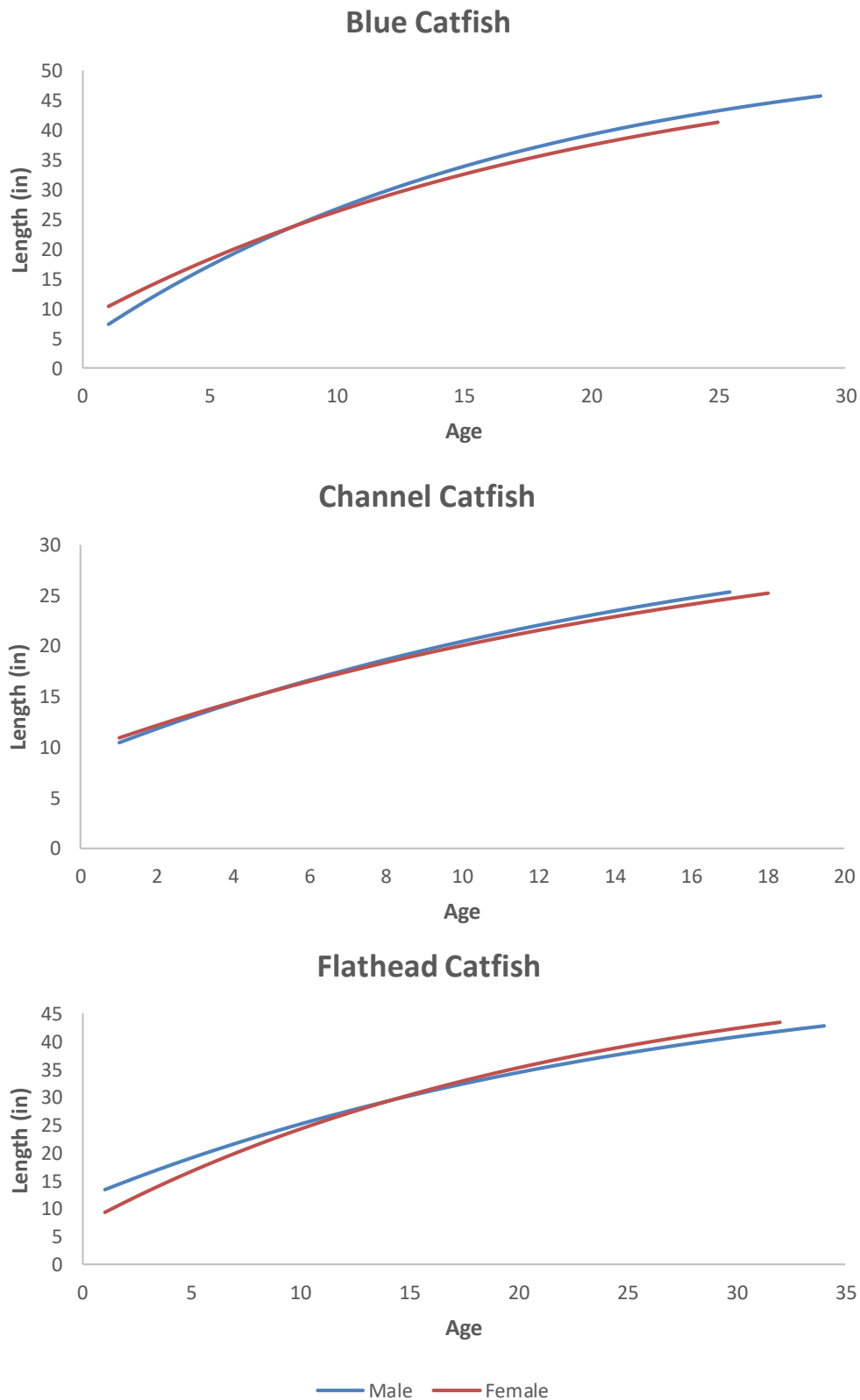


Figure 3. Comparison of von Bertalanffy growth curves for blue catfish, channel catfish, and flathead catfish by sex from age and growth samples conducted in 2022 and 2023.

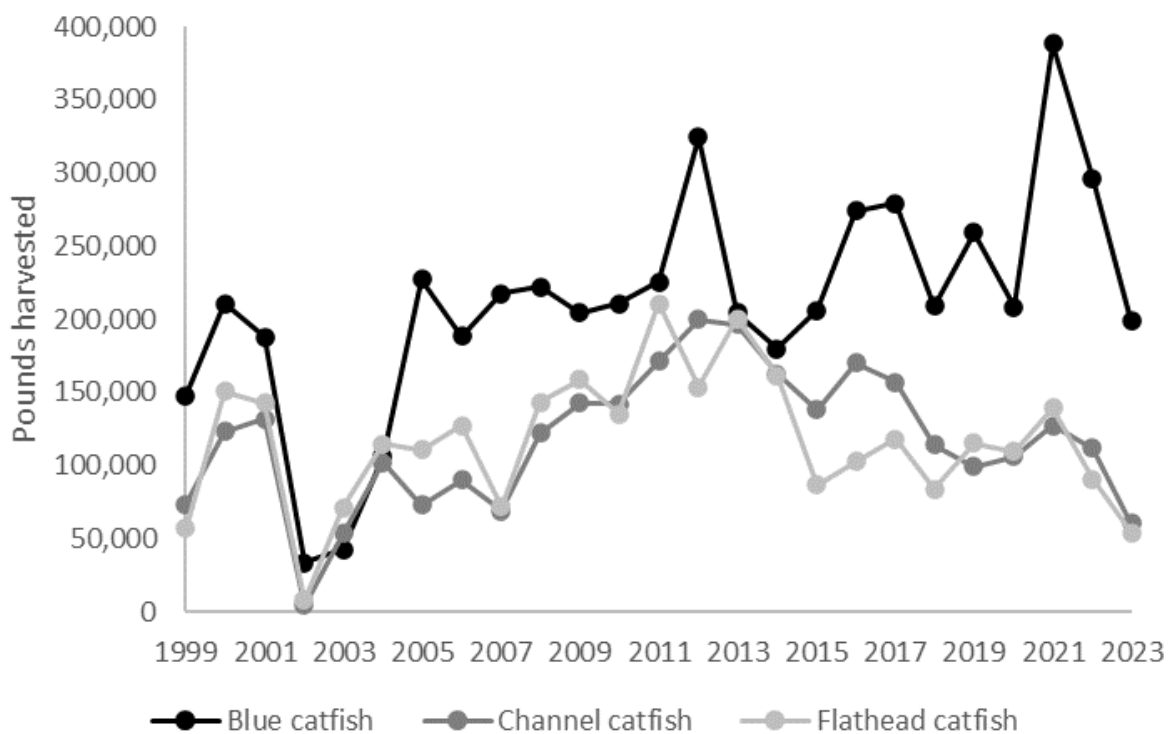


Figure 2. Total pounds of blue catfish, channel catfish, and flathead catfish harvested by commercial fishermen from the Ohio River from 2004 – 2023.

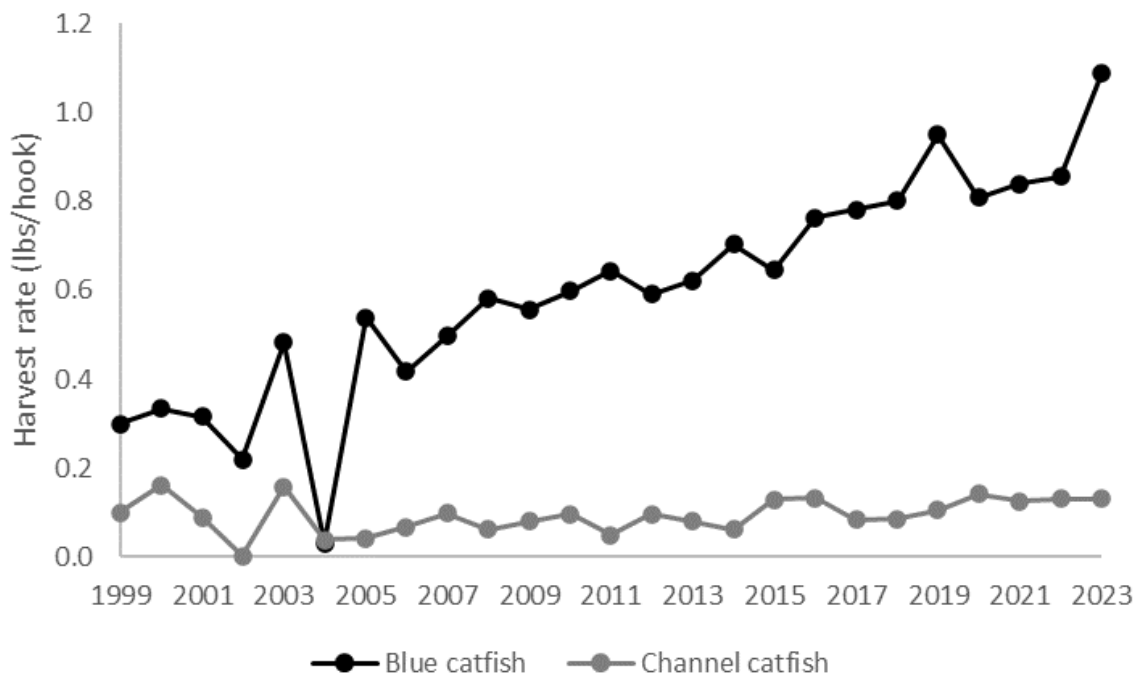


Figure 3. Harvest rate (lbs/hook) of blue catfish and channel catfish harvested with trotlines by commercial fishermen from the Ohio River from 2004 – 2023.

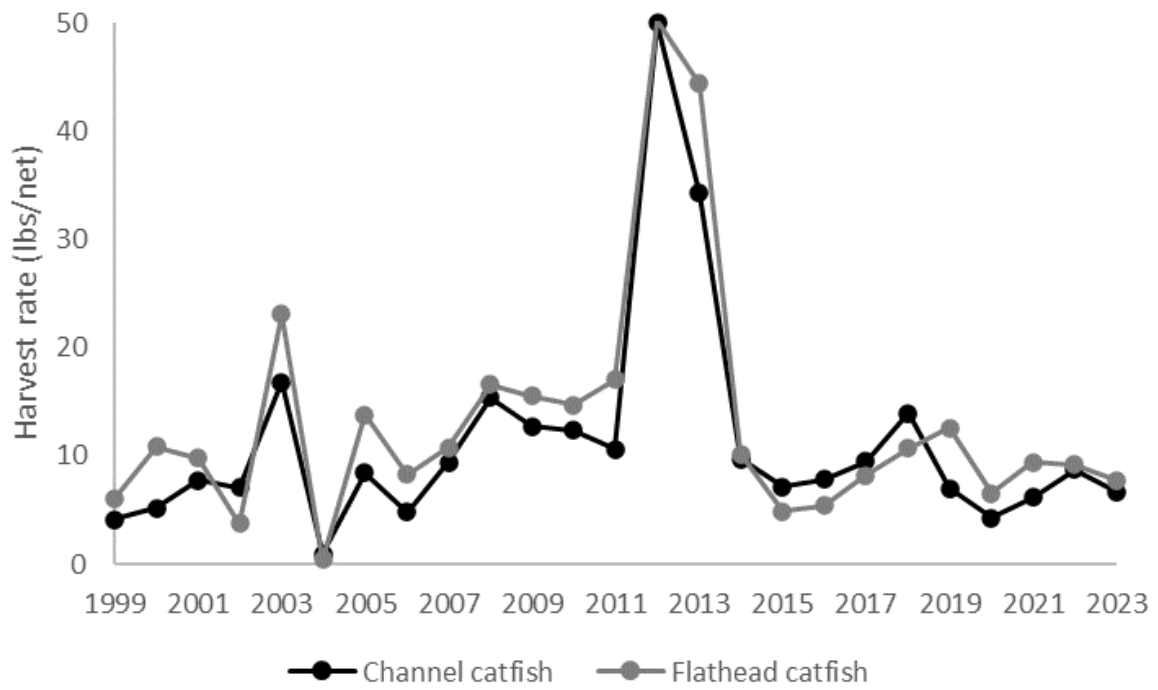


Figure 4. Harvest rate (lbs/net) of channel catfish and flathead catfish harvested with hoop nets by commercial fishermen from the Ohio River from 2004 – 2023.

Project III: Warm Water Stream Sport Fish Surveys

FINDINGS

Warm water stream sport fish surveys were completed on various streams during 2023. 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 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.

Goose Creek

A general sport fish survey was conducted on Goose Creek during April 2023 at four sites using boat-mounted electrofishing for a total effort of 4.5 hrs. Smallmouth bass (8.0 fish/hr) were the most abundant sport fish collected followed by walleye (4.0 fish/hr) and rock bass (2.9 fish/hr; Table 2). Smallmouth bass were collected from 6.0 – 19.0 in size classes, with 58% of the sample consisting of quality size (≥ 12.0) fish and 31% of the sample consisting of preferred size (≥ 14.0) fish. CPUE was below the historical average which is 9.1 fish/hr (Table 3). The smallmouth bass in Goose Creek received an assessment score of 9, representing a “fair” rating (Table 4).

Walleye were the second most abundant species collected, although no trophy size (≥ 25.0 in) fish were present. Walleye were caught in relatively low numbers at a rate of 4.0 fish/hr with fish ranging in size from 12.0 - 22.0 in size classes (Table 2).

Although at lower densities, rock bass that were sampled in Goose Creek ranged from 3.0-9.0 in size classes (Table 2). CPUE was drastically lower (2.9 fish/hr) compared to the 2018 sample and the historical average which is 7.0 fish/hr (Table 5). Overall, 46% of rock bass sampled were above quality size (≥ 6.0 in) with 23.0% being above preferred size (≥ 8.0 in) (Table 2), with the fishery receiving an assessment score of 4, representing a “poor” rating (Table 6).

Additional sport fish species were also present in Goose Creek but found in lower densities. Channel catfish (1.3 fish/hr) spotted bass (0.4 fish/hr), muskellunge (0.4 fish/hr) and bluegill (0.2 fish/hr) were collected (Table 2). Overall, the CPUE (fish/hr) for smallmouth and rock bass were down from the 2018 sample which could be contributed to higher water flow and fluctuating water temperatures compared to the 2018 sample.

Upper Barren River

A general sport fish survey was conducted on upper Barren River during April 2023 at four sites using boat-mounted electrofishing gear for a total effort of 2.75 hrs. A total of eleven species of sport fish were collected with the most abundant species being channel catfish (60.7 fish/hr) followed by white bass (9.1 fish/hr) and rock bass (6.2 fish/hr) (Table 7). Although no trophy size (≥ 28.0 in) channel catfish were present in the upper Barren River sample, there were exceptionally good numbers of channel catfish ranging from 8.0 – 26.0 in size class with 43% being ≥ 14.0 in (Table 7).

White bass were the second most abundant species collected at a rate of (9.1 fish/hr) (Table 7). White bass collected ranged from 7.0 – 15.0 in class and overall numbers of white bass collected were lower than the 2018 sample which could be contributed to time of year and unstable water temperatures when white bass typically make their way upstream from Barren River Lake to favorable spawning habitats.

Rock bass were the third most abundant species collected at a rate of (6.2 fish/hr) (Table 7). CPUE of rock bass was higher than the 2018 sample and the historical average of 6.0 fish/hr (Table 8). Rock bass size ranged from 4.0 – 8.0 in class with 29% being ≥ 8.0 in size class (Table 7). Rock bass received a population assessment score of 5, representing a “fair” rating (Table 9).

Additional sport fish species were collected in upper Barren River but found in consistently lower densities than the species mentioned above. Bluegill (4.4 fish/hr), white crappie (4.0 fish/hr), hybrid striped bass (3.6 fish/hr), smallmouth bass (3.3 fish/hr), spotted bass (2.9 fish/hr), flathead catfish (2.2 fish/hr), largemouth bass (1.5 fish/hr) followed by walleye at (1.1 fish/hr) (Table 7). Smallmouth bass catch rates per length group were higher than the 2018 sample (Table 10) and population assessment for smallmouth bass received a score of 4, representing a “poor” rating (Table 11). Walleye were present up to the 22.0 in size class, white crappie was found in ≥ 8.0 in size class, and largemouth bass up to 18.0 in size class (Table 7).

Gasper River

A general sport fish survey was conducted at two sites on Gasper River using boat-mounted electrofishing during April/May 2023 for a total of 2.0 hrs. Only one site was sampled in 2020 due to water levels and site conditions. A total of ten species were collected with the most abundant species being smallmouth bass (28.0 fish/hr) followed by spotted bass (17.5 fish/hr) and rock bass (6.0 fish/hr) (Table 12). Smallmouth bass were collected from 3.0 – 20.0 in class with 21% of the sample consisting of quality size (≥ 12.0 in) fish (Table 12). The 2023 sample was the highest catch rates recorded in comparison to the 2013 and 2020 samples and the historical average of 21.5 fish/hr (Table 13). The smallmouth bass received a population assessment score of 14, representing a “good” rating (Table 14). A fish kill occurred on Clear Fork Creek and a portion of Gasper River in May 2019 causing a decline in overall sportfish densities in these sections of river. Catch rates and size structure of smallmouth bass have drastically improved since the 2020 sample indicating the area has been repopulated and stocking efforts were likely successful.

Spotted bass was the second most abundant species collected at a rate of (17.5 fish/hr) (Table 12). Spotted bass size ranged from 3.0 – 15.0 in class and received an assessment score of 9, representing a “fair” rating (Table 15). Catch rates were the second highest recorded for Gasper River and tripled the catch rates from the previous sample in 2020 (4.7 fish/hr) (Table 16).

Rock bass was the third most abundant species collected at a rate of (6.0 fish/hr) (Table 12). Rock bass size ranged from 4.0 – 10.0 in class with 67% of rock bass being above quality size (≥ 6.0 in). CPUE in 2023 dramatically increased from the 2020 sample (Table 17).

Additional fish populations were present in Gasper River in lower densities. Largemouth bass (3.0 fish/hr) were found up to the 16.0 in size class, as well as walleye (1.0 fish/hr) redear sunfish (1.0 fish/hr), hybrid striped bass (0.5 fish/hr), black crappie (0.5 fish/hr), channel catfish (0.5 fish/hr) and muskellunge (0.5 fish/hr) which were found up to 37.0 in class (Table 12). Catch rates and size structure from all black bass and rock bass collected have dramatically improved since the 2020 sample along with additional species being collected indicating the fish population for Gasper River is slowing rebounding after the fish kill in 2019. Sampling will continue on a rotational basis for Gasper River which will allow for further monitoring of the fish population post fish kill.

Upper Green River

A general sport survey was conducted at two sites on upper Green River using boat-mounted electrofishing gear during April 2023. A total of eight species were collected with the most abundant species being white bass (98.2 fish/hr) followed by channel catfish (52.9 fish/hr) and white crappie (25.3 fish/hr); (Table 18). White bass size ranged from 7.0 – 17 in. class (Table 18) and the high catch rates could be contributed to time of year and water temperature when white bass typically make their upstream spawning migration from Green River Lake to their preferred spawning habitat in this upper riverine section.

Although there were no trophy size (≥ 28 inch) channel catfish, there were exceptionally good numbers of

fish collected on upper Green River. Channel catfish catch rate was 52.9 fish/hr with fish ranging from 9.0 – 27.0 in class (Table 18).

White crappie (25.3 fish/hr) were the third most abundant species sampled on upper Green River (Table 18). White crappie size ranged from 6.0 – 11.0 in class (Table 18) with 91% of fish collected being below the 9 – inch size class.

Additional sport fish species were collected in upper Green River which included spotted bass (4.0 fish/hr), bluegill (3.6 fish/hr), largemouth bass (3.1 fish/hr) with fish collected up to the 20 in size class, rock bass (0.9 fish/hr) and smallmouth bass (0.9 fish/hr); (Table 18). Catch rates for smallmouth bass was higher than the 2014 sample which was 0.7 fish/hr (Table 19) and rock bass catch rates were lower than the 2014 sample which was 4.7 fish/hr (Table 20). Spring population assessments for smallmouth bass and rock bass were not completed due to small sample size.

Red Bird River

In September 2023, a general sport fish survey was conducted on Red Bird River at five sites using an electrofishing tote barge for a total effort of 3.125 hrs (7.5 min transects). Convenient access and water depth are the two main factors taken into consideration when looking for sampling sites usable for the tote barge. The tote barge is relatively heavy for movement purposes which is the reason for convenient access sites and depth can dictate what's wadable in a stream which in turn limits the amount of transects that are obtainable in any give section of stream.

A total of five species were collected on Red Bird River with rock bass being the most abundant species collected at 19.8 fish/hr (Table 21). Rock bass ranged in size from 2.0 – 8.0 in class with thirty one percent being ≥ 6.0 in class. Wood and rocky habitat was scattered throughout Red Bird River which is the preferred habitat for rock bass. Relative weight values for rock bass were good (109) for the 4.0-5.9 in and good (101) for the 6.0 – 7.9 in length group (Table 22). The overall condition (101) for this population was good (Table 22).

Smallmouth bass were the second most abundant species collected 13.8 fish/hr and ranged in size from 2.0 – 16 in class (Table 21). Red Bird River previously had the statewide 12-inch size minimum, and a new regulation passed increasing the minimum size limit to 15 inches. Ninety - three percent of smallmouth bass collected were under the new 15-inch minimum size limit. Relative weight values for smallmouth bass were good (92) for the 7.0 – 10.9 in class, good (83) for 11.0 – 13.9 and good (84) for the ≥ 14 in size class (Table 22). The overall condition (86) for this population was good (Table 22).

Although available at lower densities, bluegill (1.0 fish/hr), walleye (1.0 fish/hr) and largemouth bass (0.3 fish/hr) were also collected (Table 21).

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. Annual fall sampling to collect general sport fish will continue in Pool 5 for up to five years post removal.

In September 2023, a general sport fish survey using boat-mounted electrofishing was conducted on Pool 5 of the Green River. Nine different species were collected during 3.0 hrs (15-minute transects) of electrofishing. Spotted bass were the most abundant species collected (23.3 fish/hr) and ranged from the

2.0 - 12.0 in size classes (Table 23). CPUE was tied for the highest catch rates recorded since sampling began in 2012 and significantly higher than historical average of 12.3 fish/hr (Table 24). When the lock and dam removal is completed, habitat will revert to its natural state which would be more favorable to black bass and rock bass. Relative weight values were good for the 7.0-10.9 in (95) and 11.0-13.9 in (80) size groups. Overall condition of these fish was good (Wr= 87; Table 25).

Smallmouth bass were collected at a rate of 4.7 fish/hr ranging from 2.0 – 17.0 in size classes (Table 23). Sampling for smallmouth bass in Pool 5 of the Green River has never been highly productive but the 2023 sample was the highest CPUE recorded since sampling began in 2012 and above the historical average of 2.1 fish/hr (Table 26). Even though there was a small sample size, relative weights for smallmouth bass were good with an overall condition (Wr=83; Table 25)

Largemouth bass were collected at a rate of 1.0 fish/hr ranging from the 5.0-17.0 in size classes (Table 23). CPUE of largemouth bass continues to be low and was the second lowest recorded since 2012 (Table 27). Even though there was a small sample size relative weights for largemouth bass were good for the ≥ 15.0 in (92) size group (Table 25).

Additional sport fish species were collected in Pool 5 of the Green River but found in consistently lower densities. Flathead catfish (2.7 fish/hr), bluegill (2.0 fish/hr), channel catfish (1.0 fish/hr) with fish collected up to the 24 in size class, rock bass (1.0 fish/hr), black crappie (0.3 fish/hr) and sauger (0.3 fish/hr Table 23). Rock bass catch rates were very similar to the historical average of 1.2/fish hr (Table 28).

Lower Barren River

Unimpounded

A general sport fish survey was conducted on the lower Barren River during September 2023 at five sites using boat-mounted electrofishing for a total effort of 7.5 hrs (15-minute transects). Typically, there are six standardized sites sampled but due to a bridge being repaired the sixth site wasn't accessible for sampling this year. Smallmouth bass (19.2 fish/hr) were the most abundant sport fish collected followed by spotted bass (12.0 fish/hr), and rock bass (8.8 fish/hr; Table 29). It should be noted that smallmouth bass had the fourth highest catch rate since sampling started back in 2007. This could be contributed to the survival of the 2021 smallmouth bass stocking done at Martinsville Ford and Osborne ramp along with natural recruitment. Smallmouth bass were collected from the 2.0-19.0 in size classes (Table 29). Lower Barren River previously had the statewide 12-inch size minimum, and a new regulation passed increasing the minimum size limit to 15 inches. Ninety – one percent of smallmouth bass collected were under the new 15-inch minimum size limit. Catch rates by length group were similar or above the historic average and CPUE was again the fourth highest recorded (19.2) well above the historical average (16.1 fish/hr; Table 30). Relative weight values observed for smallmouth bass were good but decreased as fish grew larger. Condition was good (92) for the 7.0-10.9 in size group, good (82) for the 11.0-13.9 in size group, and good (83) for the ≥ 14.0 in size group (Table 31).

Spotted bass were collected from the 2.0-14.0 in size classes at a rate of 12.0 fish/hr (Table 29). Catch rates by length groups were similar or above the historical average (11.0 fish/hr; Table 32). Overall, 92.2% of the sample was below the 12-in statewide minimum size limit and 7.8% was above the 12.0-in statewide minimum. Relative weight values for spotted bass were good (95) for the 7.0-10.9 in, good (91) for the 11.0-13.9 in length group and good (92) for the ≥ 14.0 in length group. The overall condition (92) for this population was good (Table 31).

Rock Bass sampled in the lower Barren River ranged from the 1.0-10.0 in size classes (Table 29), with quality size (≥ 6.0 in) fish representing 48.4 % of the sample. Overall CPUE (8.8/fish hr.) decreased from the 2022 sample (11.6/fish hr.) and was the just below the historical average 11.2/fish hr. (Table 33). Relative weight values for rock bass were good (101) for the 4.0 – 5.9, good (95) for the 6.0 – 9.0 fish, good (86) for the ≥ 8.0 in and had an overall Wr of 90 (Table 31).

Additional sport fish populations were sampled in lower Barren River but found in lower densities. Channel catfish (7.3 fish/hr) were present up to the 28.0 in size class, bluegill (2.3 fish/hr), flathead catfish (1.3 fish/hr), redear sunfish (1.2 fish/hr), walleye (1.1 fish/hr), largemouth bass (0.5 fish/hr) and muskellunge, white bass, white and black crappie, and hybrid striped bass (0.1 fish/hr Table 29).

Formerly Impounded

Lock and Dam 1 at Greencastle was removed between August-September of 2022. Sampling in 2023 began the second year of post-dam removal sampling in lower Barren River. The sample consists of two transects normally sampled in the formerly impounded portion of Pool 1 of lower Barren River. A general sport fish survey was conducted at two sites for a total effort of 3.0 hrs (15-minute transects) during September 2023. Lower Barren River has drastically changed with water levels dropping approximately 7-10 ft exposing more gravel shoals, chunk rock banks, woody laydowns and creating more hard bottoms for fish to be able to relate to as well as riffles. With more exposed habitat the numbers of spotted bass and smallmouth bass have drastically improved. The number of species collected in the impounded section was 10 (Table 34) and can be comparable to the numbers of species collected in the unimpounded section which was fourteen. The four most abundant species observed were spotted bass (16.7 fish/hr), bluegill (9.3 fish/hr), smallmouth bass (6.0 fish/hr) and rock bass (3.7 fish/hr) (Table 34). CPUE was down for the four species listed above compared to the 2022 sample, but water temperatures were slightly higher which could have kept fish from being pulled up into shoreline habitat. Even though CPUE was down for spotted bass, smallmouth bass, and rock bass it was still the second highest catch rate since sampling started in 2017 (Tables 30, 32, 33). With smallmouth bass and rock bass traditionally needing a more typical riffle-pool environment it is encouraging to see the numbers beginning to improve for the second consecutive year compared to previous sampling years and new environmental conditions.

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 formerly 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 formerly impounded section of lower Barren River is beginning to show signs of habitat conditions somewhat comparable to that of the unimpounded sections. Further sampling will continue for the foreseeable future to compare habitat conditions and species composition post-dam removal.

Upper Salt River

A general sport fish survey was conducted at two sites on the upper Salt River using boat-mounted electrofishing during October 2023 for a total of 1.75 hrs. Bluegill (30.9 fish/hr) were the most abundant sport fish collected followed by largemouth bass (21.7 fish/hr) and rock bass (2.3 fish/hr; Table 35). Bluegill were collected at a rate of 30.9 fish/hr with fish ranging in size from the 1.0-7.0 in size classes (Table 39). Seventy-nine percent of the total bluegill sampled were in the 5.0-7.0 in size classes.

Largemouth bass ranged from the 3.0-17.0 in size classes, with thirty nine percent of the sample consisting of quality size (≥ 12.0 in) fish (Table 35). The overall condition of largemouth bass in the upper Salt River was good ($Wr=91$), which is consistent across all length groups (Table 36). Overall, the largemouth bass population sampled in upper Salt River was above the historical average and had the third highest catch rate recorded (Table 37).

Additional fish populations present in low densities were rock bass (2.3 fish/hr) and black crappie (0.6 fish/hr). Rock bass CPUE for the last three sample years has been drastically below the historical average (Table 38) and it's to be noted that there was zero smallmouth captured during the 2023 sample

and the historical smallmouth CPUE is (7.7 fish/hr Table 39).

Table 1. Summary of 2023 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
Goose Creek - William White Ramp	B	19.0 - 22.8	Sport fish	4/5/2023	59.5	8.01 ft, 351 cfs @ Manchester, KY	30	no higher
Goose Creek - Tobacco Road	B	8.3 - 10.5	Sport fish	4/10/2023	54.4	7.63 ft, 225 cfs @ Manchester, KY	30	good level
Goose Creek - Dump Hollow Ramp	B	4.9 - 8.3	Sport fish	4/10/2023	51.7	7.63 ft, 225 cfs @ Manchester, KY	30	good level
Upper Barren River - Deep Ford	B	128.7 - 129.5	Sport fish	4/12/2023	60.1	1272 cfs @ Barren River Lake Inflow	32	good level
Upper Barren River - Coruth Ford	B	114.5 - 116.1	Sport fish	4/13/2023	62.8	1058 cfs @ Barren River Lake Inflow		good level
Upper Barren River - Holland Bridge	B	107.7 - 110.7	Sport fish	4/12/2023	62.5	1272 cfs @ Barren River Lake Inflow	32	good level
Gaspar River - Greencastle Ramp	B	0.1 - 1.3	Sport fish	4/17/2023	61.2	5.05 ft, 644 cfs @ Bowling Green, KY	24	
Upper Green River - Green River Valley Ford	B	344.1 - 346.2	Sport fish	4/24/2023	55.0	1012 cfs @ Green River Lake Inflow	28	good level
Upper Green River - Snake Creek Ramp	B	327.4 - 328.7	Sport fish	4/26/2023	55.3	466 cfs @ Green River Lake Inflow		good level
Red Bird River - Bowen Creek Road	TB	27.1 - 27.5	Sport fish	9/6/2023	76.0	5.78 ft, 10 cfs Goose Creek @ Manchester, KY		good level/no lower
Red Bird River - Gilberts Creek Road	TB	24.2 - 24.8	Sport fish	9/6/2023	77.0	5.78 ft, 10 cfs Goose Creek @ Manchester, KY		good level
Red Bird River - Frank Bowling Road	TB	17.9 - 18.8	Sport fish	9/6/2023	76.0	5.78 ft, 10 cfs Goose Creek @ Manchester, KY		good level/no higher
Red Bird River - Laurel Branch Road	TB	5.5 - 6.1	Sport fish	9/7/2023	76.0	5.80 ft, 11.7 cfs @ Manchester, KY		good level/no higher
Red Bird River - Martin Cemetery Road	TB	4.1 - 4.3	Sport fish	9/7/2023	75.0	5.80 ft, 11.7 cfs @ Manchester, KY		good level
Green River Pool 5 - Brownsville	B	180.7 - 183.8	Sport fish	9/18/2023	70.0	19.97 ft @ Brownsville Water Plant	35	low level
Green River Pool 5 - Alexander Creek	B	170.1 - 177.6	Sport fish	9/19/2023	71.6	19.93 ft @ Brownsville Water Plant	35	low level
Barren River - Hwy 101 Bridge	B	62.8 - 66.4	Sport fish	9/25/2023	73.8	508 cfs @ Barren River Lake Dam	72	good level
Barren River - Martinsville Ford	B	57.5 - 62.5	Sport fish	9/25/2023	72.1	508 cfs @ Barren River Lake Dam	72	good level
Barren River - Weldon Peete Ramp	B	45.1 - 47.8	Sport fish	9/28/2023	76	5.00ft, 613 cfs @ Bowling Green, KY	42	good level
Barren River - Above Boat Landing Ramp	B	30.5 - 35.2	Sport fish	9/21/2023	70.3	4.70 ft, 485 cfs @ Bowling Green, KY	42	good level
Barren River - Below Boat Landing Ramp	B	26.2 - 30.3	Sport fish	9/21/2023	70.3	4.70 ft, 485 cfs @ Bowling Green, KY	42	good level
Barren River - Lonnie White Ramp	B	20.9 - 24.1	Sport fish	9/13/2023	77	3.93 ft, 234 cfs @ Bowling Green, KY	48	low level
Barren River - Greencastle Ramp	B	12.5 - 15.0	Sport fish	9/29/2023	72.6	4.59ft, 437 cfs @ Bowling Green, KY	36	good level
Upper Salt River - Dry Branch Road	B	134.3 - 135.4	Sport fish	10/4/2023	66	2.60 ft, 8.9 cfs @ Glensboro, KY	39	good level
Upper Salt River - Harrodsburg Ramp	B	131.7 - 133.7	Sport fish	10/4/2023	65.9	2.60 ft, 8.9 cfs @ Glensboro, KY	39	good level

Table 2. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 4.5 hrs of electrofishing (15-minute transects) at four sites on Goose Creek during April 2023; standard error is in parentheses.

	Inch class																												
Species	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24		36	Total	CPUE				
Channel catfish															1	1	1	2			1				6	1.3 (0.7)			
Muskellunge																			1				1		2	0.4 (0.3)			
Rock bass	1	1	5	2	1	2	1																		13	2.9 (1.0)			
Bluegill					1																				1	0.2 (0.2)			
Smallmouth bass				2		2	6	3	2	6	4	3	3	3	1			1							36	8.0 (2.2)			
Spotted bass								1	1																2	0.4 (0.3)			
Walleye										1	2			1	2	6	3	1	1	1					18	4.0 (1.7)			

Table 3. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling on Goose Creek in 2018 and 2023. Number of sites and effort have varied across years; 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	3.3 (1.3)	4.8 (1.2)	0.5 (0.3)	1.2 (0.5)	9.8 (2.5)
2023	0.0	0.9 (0.4)	2.4 (0.7)	2.2 (0.8)	2.4 (1.0)	8.0 (2.2)
Mean	0	2.3 (0.8)	3.8 (0.8)	1.2 (0.4)	1.7 (0.5)	9.1 (1.7)

Table 4. Population assessment of smallmouth bass collected from Goose Creek in April 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-8.9 in)	0.9	1
Adult density (CPUE ≥9.0 in)	7.0	2
Quality density (CPUE ≥12.0 in)	4.6	3
Preferred density (CPUE ≥14.0 in)	2.4	3
Total score		9
Assessment rating		Fair

Table 5. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Goose Creek in 2018 and 2023. Number of sites and effort have varied across years; standard error is in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2018	1.3 (0.6)	6.5 (1.7)	1.5 (0.5)	0.7 (0.3)	10.0 (2.1)
2023	0.2 (0.2)	1.3 (0.8)	0.7 (0.4)	0.7 (0.4)	2.9 (1.0)
Mean	0.9 (0.4)	4.3 (1.1)	1.1 (0.3)	0.7 (0.2)	7.0 (1.4)

Table 6. Population assessment of rock bass collected from Goose Creek in April 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.2	1
Intermediate density (CPUE 4.0-5.9 in)	1.3	1
Quality density (CPUE ≥6.0 in)	1.4	1
Preferred density (CPUE ≥8.0 in)	0.7	1
Total score		4
Assessment rating		Poor

Table 7. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 2.75 hrs of electrofishing (15-minute transects) at four sites on upper Barren River during April 2023; 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		26					
Channel catfish						6	19	20	20	18	13	14	11	12	7	7	4	9	4	2		1	167	60.7 (9.8)			
Flathead catfish									1		1	1											3	2.2 (1.9)			
White bass					1	1	3	4	6	4	3	2	1										25	9.1 (3.8)			
Rock bass		2	2	4	4	5																	17	6.2 (2.6)			
Bluegill	1	2	5	4																			12	4.4 (2.2)			
Smallmouth bass			1	1			2	1	2			1			1								9	3.3 (1.9)			
Spotted bass			1	1	1		1	1	1	2													8	2.9 (1.2)			
Largemouth bass						1			1			1				1							4	1.5 (0.8)			
White crappie							6	5															11	4.0 (1.9)			
Walleye												1							1	1			3	1.1 (0.8)			
Hybrid striped bass					1				1		3	4	1										10	3.6 (2.6)			

Table 8. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from upper Barren River in 2018 and 2023. Number of sites and effort have varied across years; standard error is in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2018	0.0	1.5 (1.2)	4.0 (2.1)	0.3 (0.3)	5.9 (3.3)
2023	0.0	1.5 (0.8)	2.9 (1.8)	1.8 (1.0)	6.2 (2.6)
Mean	0	1.5 (0.8)	3.5 (1.4)	1.0 (0.5)	6.0 (2.1)

Table 9. Population assessment of rock bass collected from upper Barren River during April 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-5.9 in)	1.5	1
Quality density (CPUE ≥6.0 in)	4.7	2
Preferred density (CPUE ≥8.0 in)	1.8	2
Total score		5
Assessment rating		Fair

Table 10. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from upper Barren River in 2018 and 2023. Number of sites and effort have varied across years; 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	0.3 (0.3)	0.6 (0.6)	0.0	0.0	0.9 (0.7)
2023	0.0	0.7 (0.5)	1.8 (1.0)	0.0	0.7 (0.7)	3.3 (1.9)
Mean	0	0.5 (0.3)	1.2 (0.6)	0	0.3 (0.3)	2.0 (1.0)

Table 11. Population assessment of smallmouth bass collected from upper Barren River in April 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.0	0
Intermediate density (CPUE 4.0-8.9 in)	0.7	1
Adult density (CPUE ≥9.0 in)	7.0	1
Quality density (CPUE ≥12.0 in)	0.7	1
Preferred density (CPUE ≥14.0 in)	0.7	1
Total score		4
Assessment rating		Poor

Table 12. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 2.0 hrs of electrofishing (15-minute transects) at two sites on Gasper River during April/May 2023; standard errors are in parentheses.

Species	Inch class																				Total	CPUE
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	19	20	23		37		
Channel catfish																1					1	0.5 (0.5)
Muskellunge																				1	1	0.5 (0.5)
Rock bass		2	2	4	2	1		1													12	6.0 (2.8)
Redear sunfish					2																2	1.0 (0.7)
Smallmouth bass	1	3	1	14	11	6	3	2	3	2	3	3	3				1				56	28.0 (10.7)
Spotted bass	1	1	2	12	6	5	2	1		3		1	1								35	17.5 (3.4)
Largemouth bass				1			1		2					1	1						6	3.0 (2.1)
Black crappie							1														1	0.5 (0.5)
Walleye															2						2	1.0 (1.0)
Hybrid striped bass																		1			1	0.5 (0.5)

Table 13. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling on Gasper River from 2013, 2020 and 2023. 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	2.7 (0.9)	10.9 (2.3)	2.9 (1.1)	4.5 (1.8)	4.5 (1.3)	25.6 (5.4)
2020	0.0	1.3 (0.8)	0.0	0.0	1.3 (0.8)	2.7 (1.3)
2023	0.5 (0.5)	17.5 (7.0)	4.0 (1.7)	2.5 (1.1)	3.5 (1.6)	28.0 (10.7)
Mean	1.5 (0.5)	10.8 (2.4)	2.6 (0.8)	3.0 (1.0)	3.6 (0.8)	21.5 (4.3)

Table 14. Population assessment of smallmouth bass collected from Gasper River in April/May 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.5	1
Intermediate density (CPUE 4.0-8.9 in)	17.5	4
Adult density (CPUE ≥9.0 in)	10.0	3
Quality density (CPUE ≥12.0 in)	6.0	3
Preferred density (CPUE ≥14.0 in)	3.5	3
Total score		14
Assessment rating		Good

Table 15. Population assessment of spotted bass collected from Gasper River in April/May 2023.

Parameter	Actual value	Assessment score
Recruitment (CPUE <4.0 in)	0.5	1
Intermediate density (CPUE 4.0-7.9 in)	10.5	3
Adult density (CPUE ≥8.0 in)	6.5	2
Quality density (CPUE ≥11.0 in)	2.5	2
Preferred density (CPUE ≥13.0 in)	1.0	1
Total score		9
Assessment rating		Fair

Table 16. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling on Gasper River in 2013, 2020 and 2023. 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	
2013	0.3 (0.3)	24.5 (3.8)	20.3 (4.0)	9.1 (2.4)	2.4 (0.9)	56.5 (7.0)
2020	0.0	0.7 (0.7)	2.0 (1.4)	0.7 (0.7)	1.3 (1.3)	4.7 (3.3)
2023	0.5 (0.5)	10.5 (2.4)	4.0 (0.7)	1.5 (0.7)	1.0 (0.7)	17.5 (3.4)
Mean	0.3 (0.2)	15.7 (2.7)	12.0 (2.6)	5.2 (1.4)	1.8 (0.6)	35.0 (5.7)

Table 17. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from Gasper River in 2013, 2020 and 2023. Number of sites and effort have varied across years; standard error is in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2013	0.3 (0.3)	1.3 (0.6)	4.0 (1.4)	6.1 (2.4)	11.7 (4.1)
2018	0.0	0.0	0.0	0.0	0.0
2023	0.0	2.0 (1.1)	3.0 (1.7)	1.0 (0.7)	6.0 (2.8)
Mean	0.1 (0.1)	1.2 (0.5)	2.9 (0.9)	3.5 (1.3)	7.7 (2.4)

Table 18. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 2.25 hrs of electrofishing (15-minute transects) at two sites on upper Green River during April 2023; standard error is in parentheses.

Species	Inch class																									Total	CPUE
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26	27				
Channel catfish						4	10	10	10	15	7	13	8	11	7	9	4	2	5	1	1	1	1		119	52.9 (17.5)	
White bass				1		3	3	14	39	34	91	28	7	1											221	98.2 (41.8)	
Rock bass				1	1																				2	0.9 (0.9)	
Bluegill		1	5	2																					8	3.6 (2.7)	
Smallmouth bass							1							1											2	0.9 (0.6)	
Spotted bass	1	1	1	1	2	1						2													9	4.0 (1.2)	
Largemouth bass				1			2	1			1		1					1							7	3.1 (1.5)	
White crappie			1	18	33	3	1	1																	57	25.3 (12.6)	

Table 19. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from upper Green River in 2014 and 2023. Number of sites and effort have varied across years; 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	
2014	0.0	0.2 (0.2)	0.2 (0.2)	0.2 (0.2)	0.0	0.7 (0.4)
2023	0.0	0.0	0.4 (0.4)	0.0	0.4 (0.4)	0.9 (0.6)
Mean	0.0	0.1 (0.1)	0.3 (0.2)	0.1 (0.1)	0.2 (0.2)	0.7 (0.3)

Table 20. Rock bass electrofishing CPUE (fish/hr) from each length group collected during spring sampling from upper Green River in 2014 and 2023. Number of sites and effort have varied across years; standard error is in parentheses.

Year	Length group (in)				Total
	<4.0	4.0-5.9	6.0-7.9	≥8.0	
2014	0.2 (0.2)	0.7 (0.5)	2.9 (1.3)	0.9 (0.5)	4.7 (1.7)
2023	0.0	0.0	0.4 (0.4)	0.4 (0.4)	0.9 (0.9)
Mean	0.2 (0.2)	0.4 (0.3)	2.1 (0.9)	0.7 (0.4)	3.4 (1.2)

Table 21. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.125 hrs of electrofishing (7.5 min transects) at five sites on Red Bird River during September 2023; standard errors are in parentheses.

	Inch class																Total	CPUE
Species	2	3	4	5	6	7	8	9	10	12	14	15	16	19	20			
Rock bass	4	10	6	23	15	3	1									62	19.8 (4.0)	
Bluegill	1	2														3	1.0 (0.7)	
Smallmouth bass	1	3	2	10	1	3	3	7	6	3	1	1	2			43	13.8 (3.5)	
Largemouth bass												1				1	0.3 (0.3)	
Walleye														2	1	3	1.0 (1.0)	

Table 22. Number of fish and the relative weight (Wr) for each length group of smallmouth bass and rock bass collected in Red Bird River during September 2023.

Red Bird River during September 2020.

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	19	92	3	83	4	84	26	86

Rock bass	4.0-5.9		6.0-7.9		≥8.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	28	109	18	101	1	93	47	101

Table 23. 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 2023; 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	20	22	23	24		
Channel catfish																		1	1	1	3	1.0 (0.7)
Flathead catfish							1	1	3	1		1		1							8	2.7 (1.7)
Rock bass			1		1	1															3	1.0 (0.7)
Bluegill		1	2	1	2																6	2.0 (0.9)
Smallmouth bass	2		1	3			1	2		1	1		1			2					14	4.7 (2.3)
Spotted bass	3		7	10	4	19	15	8	1	2	1										70	23.3 (4.2)
Largemouth bass				1											1	1					3	1.0 (0.5)
Black crappie									1												1	0.3 (0.3)
Sauger																	1				1	0.3 (0.3)

Table 24. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2023. 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	0.0	8.3 (2.7)
2023	1.0	13.3	8.0	1.0	0.0	23.3 (4.2)
Mean	0.9	4.6	5.4	1.2	0.2	12.3 (1.0)

Table 25. Number of fish and the relative weight (Wr) for each length group of black bass collected in Pool 5 of the Green River during September 2023.

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		0	0	2	92	2	92
Smallmouth bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	3	92	2	76	3	82	8	83
Spotted bass	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	43	95	3	80	0	0	46	87

Table 26. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2023. 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)
2023	0.7	1.7	1.0	0.3	1.0	4.7 (2.3)
Mean	0.6	0.8	0.4	0.2	0.1	2.1 (0.3)

Table 27. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2023. 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)
2023	0.3	0.0	0.0	0.7	1.0 (0.5)
Mean	1.1	1.7	1.2	0.5	4.5 (0.7)

Table 28. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling on Pool 5 of the Green River from 2012-2023. 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)
2023	0.0	0.3	0.7	0.0	1.0 (0.7)
Mean	0.1	0.1	0.7	0.2	1.2 (0.4)

Table 29. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 7.5 hrs of electrofishing (15-minute transects) at five unimpounded sites in lower Barren River during September 2023; standard errors are in parentheses.

Species	Inch class																																									Total	CPUE
	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		41													
Channel catfish										1	1	1	4	5	4	3	6	3	3	3	2	8	1	1	3	3	2	1						55	7.3 (2.0)								
Flathead catfish							1	1			1	2	1	2	1				1														10	1.3 (0.4)									
Muskellunge																																	1	1	0.1 (0.1)								
White bass										1																								1	0.1 (0.1)								
Rock bass	1		3	7	23	8	13	8	2	1																								66	8.8 (1.9)								
Bluegill			1	1	4	5	6																											17	2.3 (0.8)								
Redear sunfish						1	6	1	1																									9	1.2 (0.5)								
Smallmouth bass		2	3	5	13	13	20	26	18	8	2	4	9	8	4	1	4	3	1															144	19.2 (3.1)								
Spotted bass		1	1	8	8	9	18	13	7	10	8	4	1	2																				90	12.0 (1.5)								
Largemouth bass						1	1						2																					4	0.5 (0.3)								
White crappie										1																								1	0.1 (0.1)								
Black crappie				1																														1	0.1 (0.1)								
Walleye												1		1			2	2	1		1												8	1.1 (0.3)									
Hybrid striped bass										1																								1	0.1 (0.1)								

Table 30. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling at five unimpounded sites of lower Barren River during 2007, 2010, and 2012-2023 and for comparison two sites on the formerly impounded section of lower Barren River in 2017-2023. 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)
	2023	0.7	10.3	3.7	1.7	2.8	19.2 (3.1)
	Mean	0.8	6.8	4.1	1.9	2.5	16.1 (1.0)

* 2012 CPUE data was collected during the spring

Formerly Impounded	2017	0.0	0.3	0.0	0.0	0.0	0.3 (0.3)
	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)
	2023**	0.7	4.0	0.7	0.3	0.3	6.0 (1.2)
	Mean	0.5	1.7	0.4	0.1	0.3	3.0 (0.6)

** Indicates the years sampled post dam removal

Table 31. Number of fish and the relative weight (Wr) for each length group of black bass and rock bass collected at five unimpounded sites in the lower Barren River during September 2023.

Species	Length group (in)						Total	
	7.0-10.9		11.0-13.9		≥14.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
Smallmouth bass	71	92	15	82	20	83	106	85
Spotted bass	48	95	13	91	2	92	63	92
Rock bass	4.0-5.9		6.0-7.9		≥8.0		Total	
	No.	Wr	No.	Wr	No.	Wr	No.	Wr
	28	101	21	95	11	86	60	94

Table 32. Spotted bass electrofishing CPUE (fish/hr) from each length group collected during sampling at five unimpounded sites of lower Barren River from 2007, 2010, and 2012-2023 and for comparison two sites on the previously impounded section of lower Barren River from 2017-2023. 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)
	2023	0.3	5.7	4.0	1.6	0.4	12.0 (1.5)
	Mean	0.9	4.3	4.1	1.4	0.4	11.0 (0.7)
*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)
	2023**	1.0	9.7	3.0	2.0	0.7	16.3 (3.2)
	Mean	0.8	8.1	4.1	0.8	0.3	14.0 (2.7)

** Indicates the years sampled post dam removal

Table 33. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling at five unimpounded sites of lower Barren River during 2007, 2010, and 2012-2023 and for comparison two sites on the previously impounded section of lower Barren River in 2017-2023. 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)
	2023	0.5	4.0	2.8	1.5	8.8 (1.9)
	Mean	0.5	2.6	6.0	2.1	11.2 (1.0)

*2012 CPUE data was collected during the spring

Formerly Impounded	2017	0.0	0.3	2.0	0.3	2.7 (1.6)
	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)
	2023**	0.3	0.3	2.3	0.9	3.7 (1.0)
	Mean	0.1	0.4	1.7	0.5	2.7 (0.5)

** Indicates the years sampled post dam removal

Table 34. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 3.0 hrs of electrofishing (15-minute transects) at two sites on the previously impounded section of lower Barren River during September 2023; standard errors are in parentheses.

Species	Inch class																		Total	CPUE
	2	3	4	5	6	7	8	9	10	11	12	13	16	17	19	21	22	25		
Blue catfish													1						1	0.3 (0.3)
Channel catfish															1	1	1	3	6	2.0 (0.8)
Flathead catfish										1									1	0.3 (0.3)
Rock bass		1		1	3	4	2												11	3.7 (1.0)
Bluegill			3	3	9	11	2												28	9.3 (3.6)
Redear sunfish					2			1											3	1.0 (0.7)
Smallmouth bass	1	1	2	6	3		1	2			1		1						18	6.0 (1.2)
Spotted bass	2	1	2	7	5	15	5	2	2	1	5	2							49	16.3 (3.2)
Largemouth bass												3	1						4	1.3 (0.6)
Walleye														1					1	0.3 (0.3)

Table 35. Length-frequency and CPUE (fish/hr) of selected sport fish collected during 1.75 hrs of electrofishing (15-minute transects) at two sites on upper Salt River during October 2023; standard errors are in parentheses.

Species	Inch class																	Total	CPUE
	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17			
Rock bass							1	2	1								4	2.3 (0.8)	
Bluegill	1	2	4	4	15	20	8										54	30.9 (9.0)	
Largemouth bass				2	4	2	5	1		4	5	7	1	3	2	1	1	38	21.7 (5.9)
Black crappie								1									1	0.6 (0.6)	

Table 36. Number of fish and the relative weight (Wr) for each length group of largemouth bass collected in upper Salt River during October 2023.

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	9	90	11	94	4	89	24	91

Table 37. Largemouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling from upper Salt River in 2012, 2015, 2018, 2020 and 2023. Number of sites, effort, and sampling period 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	4.7	4.4	2.9	0.0	12.0 (2.5)
2015	5.4	7.5	6.6	2.8	22.2 (2.9)
2018	4.0	7.1	8.5	5.2	24.7 (4.0)
2020	1.9	3.2	4.3	2.4	11.7 (2.8)
2023	8.0	5.1	6.3	2.3	21.7 (5.9)
Mean	4.6	5.8	5.7	2.6	18.7 (1.6)

Table 38. Rock bass electrofishing CPUE (fish/hr) from each length group collected during sampling from upper Salt River in 2012, 2015, 2018, 2020 and 2023. Number of sites, effort, and sampling period 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	1.1	10.9	14.2	3.1	29.3 (10.6)
2015	0.3	2.9	23.3	6.8	33.2 (8.6)
2018	0.0	0.0	0.2	1.7	1.9 (1.0)
2020	0.0	0.0	0.5	0.5	1.1 (0.6)
2023	0.0	0.0	0.6	1.7	2.3 (0.8)
Mean	0.3	3.3	11	3.5	18.1 (4.0)

Table 39. Smallmouth bass electrofishing CPUE (fish/hr) from each length group collected during sampling from upper Salt River in 2012, 2015, 2018, 2020 and 2023. Number of sites, effort, and sampling period 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	0.0	1.4	2.1	0.2	0.5	9.6 (4.1)
2015	0.3	5.2	5.2	2.6	0.8	14.2 (3.2)
2018	0.0	1.4	2.1	0.2	0.5	4.2 (2.1)
2020	0.0	0.0	0.0	0.5	0.0	0.5 (0.4)
2023	0.0	0.0	0.0	0.0	0.0	0.0
Mean	0.1	3.2	2.7	1.3	0.4	7.7 (1.5)

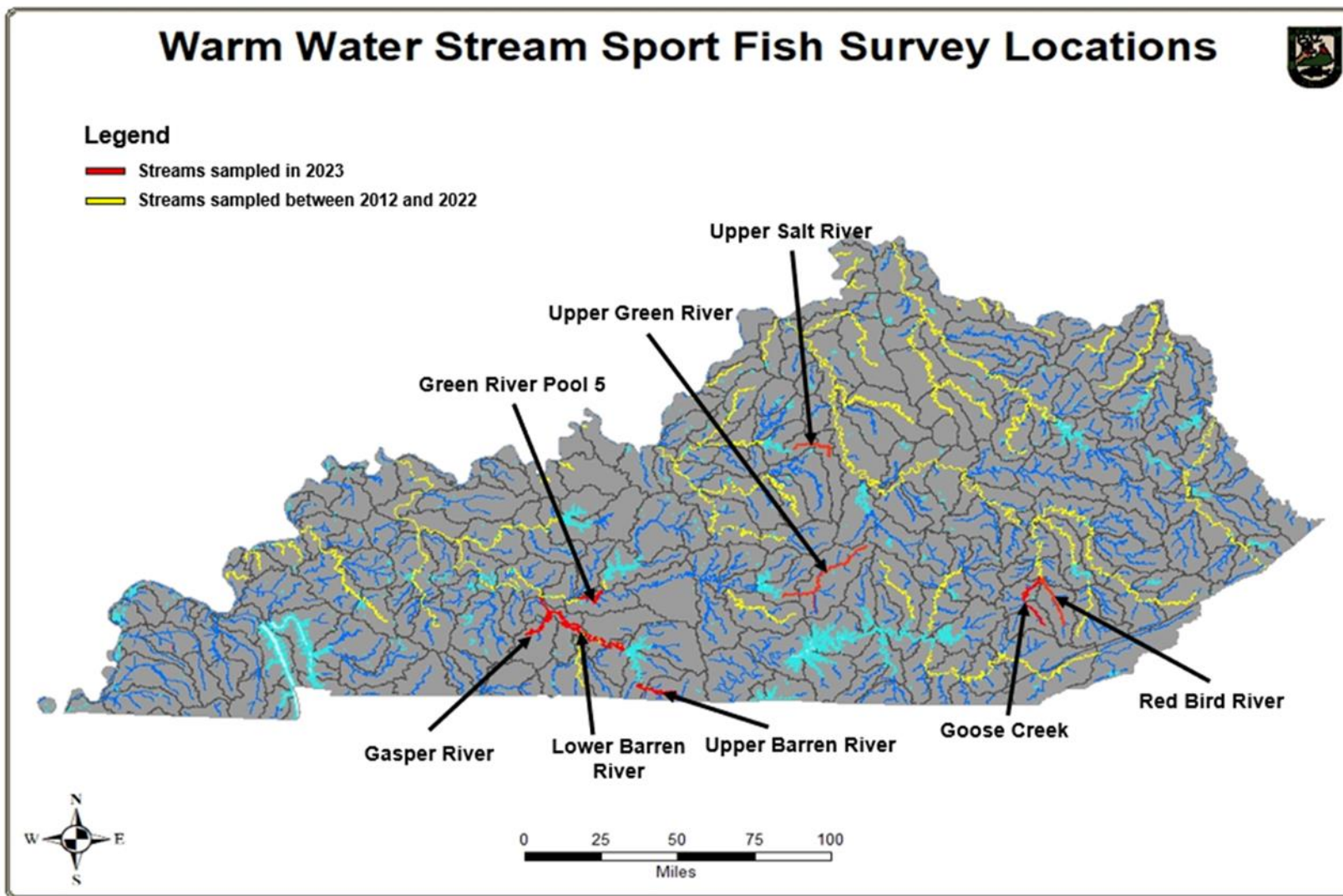


Figure 1. Map depicting warm water stream sport fish survey locations conducted by the Streams Investigation Branch and assisting crews for the current year (red outline/labeled) and previously sampled years from 2012 through 2022 (yellow outline).

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. Historic flooding occurred in the upper Kentucky River drainage two days following stocking and likely decreased survival in 2022. In 2023, 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 August 2023 (Table 1). A total of 960 fingerlings (mean length = 9.0 in) were stocked in the three pools at a rate of 20 fish/mile. Since the project began in 2019, 3,840 total fish have been stocked into the study area.

Standardized spring sampling was abandoned for the project in 2021 since many of the ramps become unusable due to high water depositing mud and silt on most ramps. Standardized fall sampling was conducted in October and November 2023 with additional effort being made throughout the year (Table 1). Twenty-eight 15-minute electrofishing transects were completed for a total of 7.0 hours of effort in pools 8 – 13 (Table 2). Only two muskellunge (both >30.0 in) 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 2020 and 2021, was less than desired due to continued staff shortages (Table 4). A total of 24.5 hr of effort was expended (8.0 hr within the study pools and 16.5 hr below the study pools). Ten fish were collected and implanted with PIT tags. No clipped fish were captured during this effort; however, one PIT tagged fish was observed. That particular muskellunge has been recaptured twice since its initial capture and tagging. All capture locations have been in the same tailwater within 200 yards of each other. Additionally, those capture events have happened throughout the year, indicating that this fish may have a small home range. 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. Summary of 2023 muskellunge electrofishing sampling sites by pool, river mileage, date, and river conditions.

Pool	Location	River mile	Date	Water temp.	Water level (USGS gauge station)	Comments
11	Irvine	218.2 - 220.9	3/21/2023	45.9	10.02' @ Lock and Dam 12	Additional pedal time
13	Sturgeon Creek	248.1 - 249.0	3/21/2023	43.5	10.57' @ Lock and Dam 14	Additional pedal time
11	Irvine	218.2 - 220.9	3/27/2023	55.8	14.25' @ Lock and Dam 12	Additional pedal time
13	Sturgeon Creek	248.1 - 249.0	3/27/2023	55.4	12.87' @ Lock and Dam 14	Additional pedal time
1	Big Twin Creek	17.4 - 21.0	3/28/2023	55.6	13.38' @ Lock and Dam 2	Additional pedal time
4	Benson Creek	65.8	3/28/2023	56.3	12.47' @ Lock and Dam 5	Additional pedal time
8	John Nickell Boat Ramp	142.7 - 157.5	4/11/2023	57.6	14.19' @ Lock and Dam 9	Additional pedal time
1	Gratz	30.0 - 31.0	5/2/2023	60.5	9.85' @ Lock and Dam 2	Additional pedal time
2	Monterey	41.2 - 42.0	5/2/2023	60.5	8.87' @ Lock and Dam 3	Additional pedal time
9	Fort Boonesboro State Park	175.5 - 176.4	5/3/2023	61.2	11.21' @ Lock and Dam 10	Additional pedal time
11	Irvine	218.2 - 220.9	5/3/2023	59.1	9.81' @ Lock and Dam 12	Additional pedal time
1	Gratz	30.0 - 31.0	5/5/2023	61.2	9.59' @ Lock and Dam 2	Additional pedal time
4	Clifton	80.0 - 82.2	5/5/2023	66.0	9.99' @ Lock and Dam 5	Additional pedal time
2	Monterey	41.2 - 42.0	5/11/2023	67.3	8.62' @ Lock and Dam 3	Additional pedal time
3	Frankfort Wastewater Plant	59.9 - 65.0	5/11/2023	66.2	7.7' @ Lock and Dam 4	Additional pedal time
1	Gratz	30.0 - 31.0	6/27/2023	76.7	10.4' @ Lock and Dam 2	Additional pedal time
2	Monterey	41.2 - 42.0	6/27/2023	76.9	9.57' @ Lock and Dam 3	Additional pedal time
3	Frankfort Wastewater Plant	63.9 - 65.0	6/27/2023	77.3	8.32' @ Lock and Dam 4	Additional pedal time
4	Benson Creek	65.8	6/28/2023	75.7	10.17' @ Lock and Dam 5	Additional pedal time
4	Clifton	80.0 - 82.2	6/28/2023	75.7	10.17' @ Lock and Dam 5	Additional pedal time
1	Gratz	30.0 - 31.0	7/7/2023	74.7	11.24' @ Lock and Dam 2	Additional pedal time
4	Benson Creek	65.8	7/7/2023	74.7	11.15' @ Lock and Dam 5	Additional pedal time
3	Frankfort Wastewater Plant	63.9 - 65.0	7/13/2023	76.2	7.98' @ Lock and Dam 4	Additional pedal time
4	Clifton	80.0 - 82.2	7/20/2023	79.2	10.34' @ Lock and Dam 5	Additional pedal time
5	Tyrone	95.5 - 96.2	7/25/2023	81.5	10.28' @ Lock and Dam 6	Additional pedal time
5	Tyrone	95.5 - 96.2	7/28/2023	83.1	10.00' @ Lock and Dam 6	Additional pedal time
3	Frankfort Wastewater Plant	63.9 - 65.0	8/4/2023	83.1	7.29' @ Lock and Dam 4	Additional pedal time
4	Benson Creek	65.8	8/4/2023	82.4	9.57' @ Lock and Dam 5	Additional pedal time
5	Tyrone	84.5 - 82.0	8/4/2023	82.3	10.36' @ Lock and Dam 6	Additional pedal time
11	Irvine	218.2 - 220.9	8/11/2023	81.3	9.94' @ Lock and Dam 12	Additional pedal time
3	Frankfort Wastewater Plant	63.9 - 65.0	8/21/2023	84.7	6.95' @ Lock and Dam 4	Additional pedal time
10	College Hill	184.9 - 201.0	9/14/2023	77.6	10.64' @ Lock and Dam 11	Additional pedal time
8	John Nickell Boat Ramp	142.7 - 157.5	10/23/2023	63.1	10.89' @ Lock and Dam 9	Fall Sample
10	College Hill	184.9 - 201.0	10/25/2023	64.3	11.23' @ Lock and Dam 11	Fall Sample
11	Irvine	218.2 - 220.9	10/31/2023	61.7	9.79' @ Lock and Dam 12	Fall Sample
11	Drowning Creek	205.2	10/31/2023	61.7	9.79' @ Lock and Dam 12	Fall Sample
12	Lock and Dam 13 Dam Tailwater	239.0 - 239.9	11/1/2023	58.4	10.85' @ Lock and Dam 13	Fall Sample
12	Ravenna	226.0 - 225.6	11/1/2023	58.7	10.85' @ Lock and Dam 13	Fall Sample
13	Sturgeon Creek	248.1 - 249.0	11/1/2023	58.7	9.59' @ Lock and Dam 14	Fall Sample
9	Fort Boonesboro State Park	175.8 - 176.4	11/2/2023	58.4	10.04' @ Lock and Dam 10	Fall Sample
10	Otter Creek	177.8 - 180.5	11/2/2023	58.4	11.76' @ Lock and Dam 11	Fall Sample

Table 2. Stocking locations, number, rate, and average length of advance fingerling muskellunge stocked in pools 11 - 13 of the Kentucky River in August 2023.

Pool	Site	No. of fingerlings	Stocking rate (fish/mile)	Average length (in)	Fin clip location
11	Irvine Ramp	398	20	9.0	Left pectoral
12	Lock and Dam 13 TW Ramp	380	20	9.0	Right pectoral
13	Sturgeon Creek Ramp	182	20	9.0	Left pelvic
Total		960			
Mean			20	9.0	

Table 3. Effort and CPUE (fish/hr) of muskellunge captured during electrofishing surveys in the Kentucky River in October/November 2023. Standard errors are in parentheses.

Pool	No. of transects	Effort (hr)	No. of muskellunge	CPUE
8	5	1.25	0	0.0
9	2	0.50	0	0.0
10	10	2.50	1	0.4 (0.4)
11	5	1.25	0	0.0
12	3	0.75	1	1.3 (1.3)
13	3	0.75	0	0.0
Total	28	7.00	2	0.3 (0.2)

Table 4. Length frequency, CPUE (fish/hr), and mean length of muskellunge collected from pools 8 - 13 of the Kentucky River in October/November 2023. Standard errors are in parentheses.

Pool	Inch class			Mean		CPUE
	28	...	34	Total	length (in)	
8				0		0.0
9				0		0.0
10			1	1	34.7	0.4 (0.4)
11				0		0.0
12	1			1	28.6	1.3 (1.3)
13				0		0.0
Total	1		1	2	31.7	0.3 (0.2)

Table 5. Additional effort, fish observed/recaptured during supplemental sampling efforts on the Kentucky River in March - October 2023.

Pool	Effort (hr)	No. of muskellunge	Recaptures	
			Clipped	PIT tagged
1	3.50	2	0	0
2	1.50	1	0	0
3	3.75	2	0	0
4	4.75	0	0	0
5	3.00	0	0	0
8	1.25	2	0	0
9	0.50	0	0	0
10	1.75	0	0	0
11	3.25	3	0	1
13	1.25	0	0	0
Total	24.50	10	0	1

Table 6. 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 (mi)*
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.