

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
Rock River and Yahara River Hoop Net Surveys
Rock County, Wisconsin
2020, 2021 and 2022



Photo Credit: Wisconsin DNR



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Executive Summary

Channel catfish and flathead catfish are two of Wisconsin's popular gamefish targeted by anglers. The Wisconsin Department of Natural Resources (DNR) monitors channel and flathead catfish populations within Rock County using baited hoop net surveys at three different locations on a 4-year rotation basis. These three locations include the Rock River at the Hwy 14 bridge near Janesville, the Rock River near Afton at Happy Hallow Park and the Yahara River near the confluence with the Rock River. Surveys were completed in three consecutive years, starting in 2020 and ending in 2022. Overall, an increase in channel catfish numbers was observed on the Rock River, which may be due to the removal of the Monterey Dam, and the Yahara River had a high catch per unit effort compared to both Rock River surveys.

Introduction

The Rock River flows for 300 miles and begins near Horicon, Wisconsin where the south, east and west branches of the Rock River meet in Horicon Marsh to create the mainstem of the river. It continues to flow south for 138 miles through Fort Atkinson, Janesville and Beloit until it reaches the Illinois border, where it eventually dumps into the Mississippi River in Western Illinois. The Yahara River begins as a small, coldwater stream in northern Dane County near the town of Windsor. It flows south through the many large impoundments on the Madison Chain of lakes (Mendota, Monona, Waubesa and Kegonsa) as well as a few smaller millponds near Stoughton. Eventually, the Yahara River flows freely for 13.8 miles after Dunkirk Dam, and it empties into the Rock River below Indianford Dam and Lake Koshkonong near Fulton, Wisconsin. The Yahara River was originally known as the "Catfish River" by Ho-Chunk tribes and was later named the Yahara River in 1903 as "Yahara" is Ho-Chunk for the word catfish.

The Wisconsin Department of Natural Resources (DNR) conducted three post-spawn baited hoop net surveys in Rock County between 2020 and 2022: two on the Rock River and one on the lower Yahara River. The goal of each survey was to determine the relative abundance, size structure and growth of channel catfish and flathead catfish populations. Aging structures and genetic samples for multiple size classes were also collected to assess growth and help establish a genetic map of catfish on a statewide scale.

SURVEY LOCATIONS

Rock River

Public access points can be found all throughout the Rock River, especially in cities like Janesville and Beloit where boat launches are plentiful. The most popular shore fishing spots in Rock County are found near hydro-electric dams in Indianford, Janesville or Beloit. County and city parks also provide great shore access for fishing opportunities. Gamefish sampled during Rock River surveys include channel catfish,

flathead catfish, northern pike, walleye, smallmouth bass, black crappie, bluegill, pumpkinseed and white bass. Other non-gamefish species collected include common carp, bigmouth buffalo, shorthead redhorse and freshwater drum.

Rock River Survey – Afton

In 2022, a hoop net survey was conducted on a 4.5-mile stretch of the Rock River near Happy Hollow Boat landing located in Afton (Figure 1). The lowermost section of the Rock River within the survey area consists of shallow, wide braided channels filled with woody debris mid-channel. Bridge pilings on railroad and road crossings create deep scour holes over 12 feet in depth. Happy Hollow Park, a Rock County park, is in the middle of the survey area. The upper stretch of the river contains islands near where Bass Creek empties into the Rock River. The substrate within the survey area transitions from sand or silt in the lower section to rock and gravel in the upper section. Most of the riparian area along this stretch of the Rock River is used for industrial or agricultural purposes.

Rock River Survey – Janesville

In 2021, a hoop net survey was conducted on a 2.3-mile stretch of the Rock River between Riverside Park and the Highway 14 bridge located northwest of Janesville (Figure 2). The middle of the survey area follows a section of the Ice Age Trail that is locally known as Devil’s Staircase, which features large bluffs and rock formations on the river. Most of the riparian area along this stretch of the Rock River is highly developed, with a park, golf course, walking trails and dozens of households on both sides of the river. This area is also very popular for water sports such as water skiing and wake boarding.

Lower Yahara River

The lower Yahara River has no public boat launches in Rock County; however, it can be accessed via the Rock River during high water periods. The lower Yahara River has many kayak landings near Stoughton and Fulton, one of the most popular being Murwin Park. Public access is limited on the lower Yahara River, but shoreline fishing can be found in the city of Stoughton and below a few small dams. Gamefish sampled during this survey include channel catfish, northern pike, walleye, largemouth bass and bluegill. Other non-gamefish species collected include common carp, shorthead redhorse, white sucker and freshwater drum.

Lower Yahara River Survey – Fulton

In 2020, a hoop net survey was conducted on a 1-mile stretch of the Yahara River just above the confluence with the Rock River near the town of Fulton (Figure 3). The Yahara River in the survey area is shallow, with average depths of around 3 feet, and the substrate is mainly composed of sand and silt with some gravel. Backwater areas or large fallen trees near the main channel provide most of the channel catfish habitat. The riparian area along this stretch of the Yahara River is made up of wetland complexes, flooded woodlands or agricultural fields.

Methods

Catfish species were targeted within the Rock River watershed using baited hoop net surveys following standard procedures listed in the Wisconsin DNR fish management handbook (Simonson 2015). In all three surveys, hoop nets were set in the month of August and typically sampled every 24 hours with a few exceptions for each survey. Sample dates for each survey can be found in Table 1. Each survey used hoop nets with 42-inch fiberglass hoops and 1-inch mesh made of nylon.

Hoop nets were set parallel with the shoreline having the cod end pointing upstream and the mouth facing downstream. Nets were set near optimal catfish habitat in deep runs, above pools or near woody debris to maximize catfish catch rates. Refer to Tables 2, 3 and 4 for net locations. The cod end of each net was secured by embedding a large spade anchor into the substrate. The downstream end of each net was secured to the river bottom by a 10-pound mushroom anchor with an attached DNR buoy. Net retrieval was completed by pulling the buoy and mushroom anchor on the downstream end of each net and working towards the upstream end of each net hoop by hoop. Nets were baited by placing roughly 2 pounds of pressed soy cake into a 1/8-inch mesh bag. Bait was checked and replaced daily.

Catfish species were measured to the nearest tenth of an inch and weight measurements were taken in kilograms, which was later converted to pounds. All other gamefish had lengths and weights recorded while all non-gamefish were only counted. Pectoral spines were taken from channel and flathead catfish for aging structures. Spines were clipped using a pair of side cutters, and cross sections of each spine were cut using a slow-speed precision saw. Cross sections were sanded down and aged by two different readers under a dissecting microscope (Figure 4). Genetic samples were collected in each survey and were sent to the Wisconsin Cooperative Fisheries Research Unit at UW-Stevens Point for further analysis.

Results

ROCK RIVER – AFTON

A total of 419 channel catfish were sampled during 100 net nights, which resulted in a catch per unit effort of 4.19 channel catfish per net night. The average length of channel catfish collected was 21.3 inches, with sizes varying from 9.2 inches to 27.2 inches (Figure 5). The average weight of channel catfish collected was 2.98 pounds, with a maximum weight of 6.99 pounds. Channel catfish that were 16 inches or greater made up 96 % of the total number of channel catfish sampled, which resulted in a Proportional Size Distribution (PSD) value of 96. Refer to Table 7 for more PSD values as well as historical values. Pectoral spines were collected from 106 channel catfish with ages ranging from 2 to 17 (Table 8). The average age of channel catfish was 9 years old, and the mean length at a given age is shown in Figure 9.

A total of 19 flathead catfish were sampled during 100 net nights, which resulted in a catch per unit effort of 0.19 flathead catfish per net night. The average length of flathead catfish collected was 24.9 inches, with sizes varying from 14.9 inches to 42.7 inches (Figure 6). The average weight of flathead catfish collected was 9.79 pounds, with a maximum weight of 39.4 pounds.

ROCK RIVER – JANESVILLE

A total of 949 channel catfish were sampled during 87 net nights, which resulted in a catch per unit effort of 10.9 channel catfish per net night. The average length of channel catfish collected was 18.4 inches, with sizes varying from 9.7 inches to 28.7 inches (Figure 7). The average weight of channel catfish collected was 2.31 pounds, with a maximum weight of 8.3 pounds. Channel catfish that were 16 inches or greater made up 92 % of the total number of channel catfish sampled, which resulted in a Proportional Size Distribution (PSD) value of 92. Refer to Table 7 for more PSD values as well as historical values. Pectoral spines were collected from 145 channel catfish with ages ranging from 3 to 16 (Table 9). The channel catfish average age was 8.6 years old, and the mean length at a given age is shown in Figure 10.

A total of 12 flathead catfish were sampled during 87 net nights, which resulted in a catch per unit effort of 0.14 flathead catfish per net night. The average length of flathead catfish collected was 26.2 inches, with sizes varying from 15.3 inches to 39.3 inches (Figure 6). The average weight of flathead catfish collected was 8.6 pounds, with a maximum weight of 33 pounds.

LOWER YAHARA RIVER

A total of 1,069 channel catfish were sampled during 77 net nights, which resulted in a catch per unit effort of 13.9 channel catfish per net night. The average length of channel catfish collected was 17.0 inches, with sizes varying from 9.5 inches to 29.4 inches (Figure 8). The average weight of channel catfish collected was 1.8 pounds, with a maximum weight of 17.6 pounds. Channel catfish that were 16 inches or greater made up 80% of the total number of channel catfish sampled, which resulted in a Proportional Size Distribution (PSD) value of 80. Other PSD values include $PSD_{24} = 0.46$, $PSD_{28} = 0.19$ and $PSD_{36} = 0$. No flathead catfish were observed during this survey. Pectoral spines were collected from 97 channel catfish, with ages ranging from 2 to 10 (Table 10). The channel catfish average age was 6.3 years old, and the mean length for channel catfish at a given age is shown in Figure 11.

Discussion

ROCK RIVER – AFTON

In 2016, the DNR performed a similar hoop netting survey on the same area of the Rock River near Afton, where a total of 92 channel catfish were collected. Fisheries Management staff set 10 hoop nets for 10 nights which totals to 100 net nights, meaning the channel catfish catch per unit effort was 0.92 per net night. The 2016

survey found that channel catfish had an average length of 19.3 inches, with sizes ranging from 11.8 to 25 inches.

In 2022, the number of channel catfish sampled increased by 355% when compared to the previous survey in 2016. Catch rates of channel catfish increased by 3.27 fish per net night. Channel catfish average size also increased by 2 inches over the last six years, with size ranges remaining similar in both surveys (Table 5).

ROCK RIVER – JANESVILLE

In 2013, the DNR performed a similar hoop netting survey on the same area of the Rock River near Janesville, where a total of 376 channel catfish were collected. Fisheries Management staff set 10 hoop nets for four nights, totaling to 40 net nights, meaning the channel catfish catch per unit effort was 9.4 per net night. The 2013 survey found that channel catfish had an average length of 11.4 inches, with sizes ranging from 8.6 to 27.1 inches.

In 2021, the number of channel catfish catch per unit effort increased by 16% when compared to the previous survey in 2013. Catch rates of channel catfish increased by 1.5 fish per net night. Channel catfish average size also increased by 7 inches over eight years, with size ranges remaining similar in both surveys (Table 6).

MONTEREY DAM REMOVAL

Monterey Dam, formerly located on the Rock River on Janesville's south side, was constructed in 1848. In 2012, a DNR safety inspection determined that the dam was deteriorating and had reached its life expectancy with significant cracks being found on the spillway. Due to the poor condition of the dam, it was removed July 2018.

Channel Catfish Migration

A major benefit of the Monterey Dam removal is fish migration. With the impassable dam being removed, multiple fish species, including channel catfish, can freely migrate up and down the Rock River between Janesville and Beloit. In 1998, a tagging study conducted by DNR on the Lower Wisconsin River and Mississippi River suggests that channel catfish do large seasonal migrations (Pellett et al. 1998). In the spring, many channel catfish were found to migrate upstream to small home ranges to spawn during the summer and, by late summer or fall, would return downstream to find overwintering habitat.

With the Rock River being similar to the Wisconsin River, it's plausible that channel catfish on the Rock River have similar migration patterns as Wisconsin River channel catfish populations. The increase in channel catfish sampled at Afton, from 92 fish in 2016 to 419 fish in 2022, could be attributed to the Monterey Dam removal. The removal occurred in 2018, which would have given catfish a few years leading up to the 2022 hoop net survey to migrate downstream from areas upstream of the former

dam. Dam removal also leads to increased natural habitat and could create more suitable spawning areas.

YAHARA RIVER

Historically, the Yahara River was known as the “Catfish River” by Ho-Chunk tribes. This name was very fitting because the Lower Yahara River had the highest CPUE out of all three surveys performed in Rock County since 2020. When compared to the 10-year statewide average CPUE from 2010 to 2019 of 8.7 channel catfish per net night, the Yahara River also ranks higher at 13.9 channel catfish per net night. This is the first hoop net survey performed on the Yahara River due to limited water depth and accessibility using DNR boats.

Management Recommendations

ROCK RIVER

Channel catfish numbers are increasing in the Rock River near Afton and Janesville, and these stretches of the Rock River continue to provide great angling opportunities to capture fish with good size structure. Flathead catfish densities within Rock County are low, which provides great potential for trophy fish in the lower Rock River system. DNR will continue to monitor the Rock River’s channel catfish and flathead catfish populations on a 4-year rotation basis.

Since the Rock River has multiple successful year classes in self-sustaining catfish populations, there is no need for stocking of fish or regulation changes for this fishery. DNR will continue to manage the Rock River using the statewide regulation for general inland waters, which has a daily aggregate bag limit of 10 channel catfish/flathead catfish per day with no minimum size limit.

LOWER YAHARA RIVER

Much like the Rock River, the lower Yahara River has many successful year classes of channel catfish, which suggest that no management changes are necessary. The statewide regulation of 10 channel catfish per day with no minimum length limit will remain in effect on the lower Yahara River. The DNR will return to perform another hoop net survey on the lower Yahara River in 2024.

Acknowledgements

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References

Pellett, T.D., Van Dyck, G.J. and Adams, J.V. 1998. Seasonal Migration and Homing of Channel Catfish in the Lower Wisconsin River, Wisconsin. *North American Journal of Fisheries Management*, 18: 85-95.

Simonson, T. 2015. Surveys and Investigations – Inland Fisheries Surveys. *Fish Management Handbook Chapter 510*, Wisconsin Department of Natural Resources internal publication. Madison, Wisconsin



Figure 3. 2020 channel catfish survey area and hoop netting locations on the Yahara River near Fulton. Yellow dots represent nets 1-7 (Table 4).

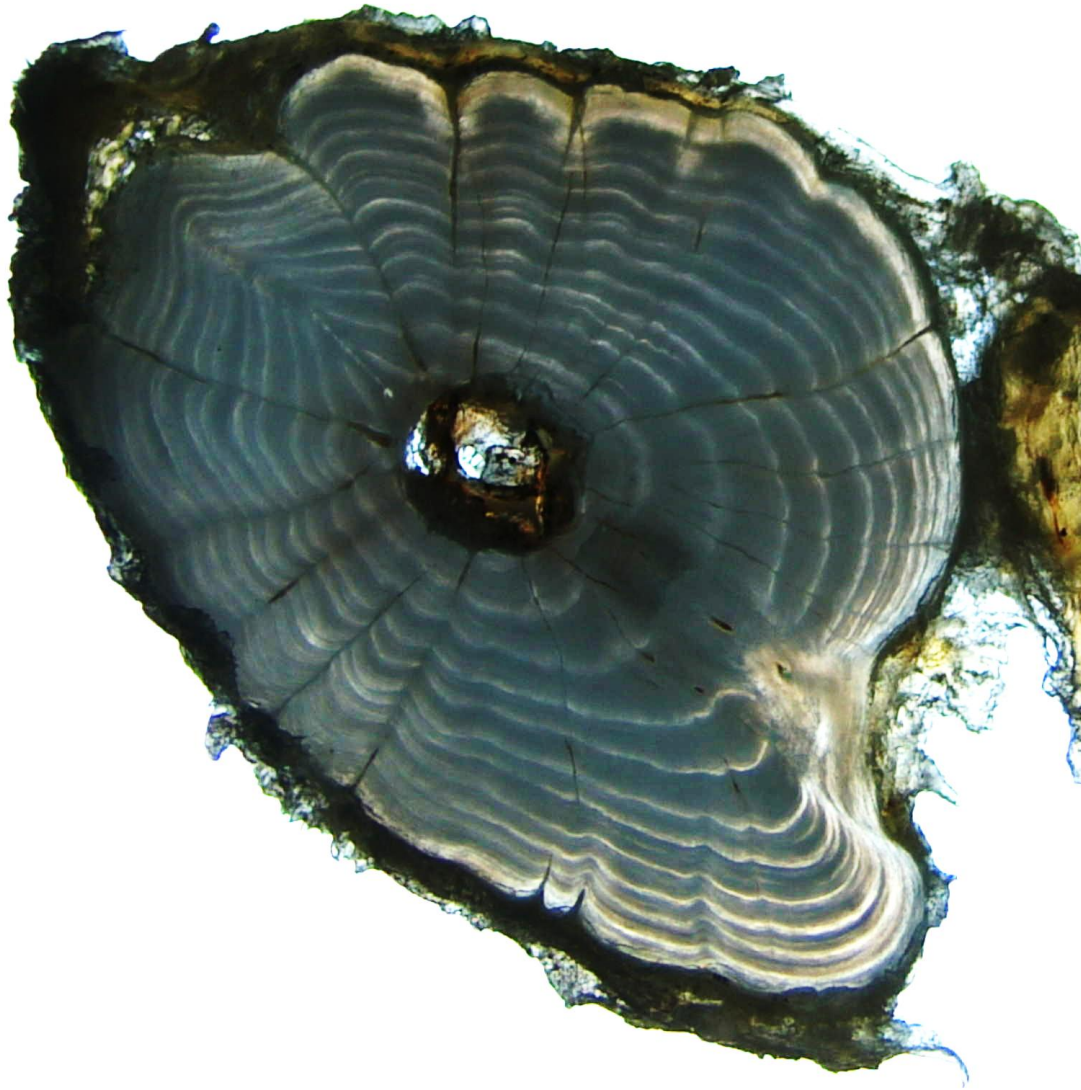


Figure 4. A cross sectioned pectoral spine of a channel catfish aging structure from the Rock River under a microscope.

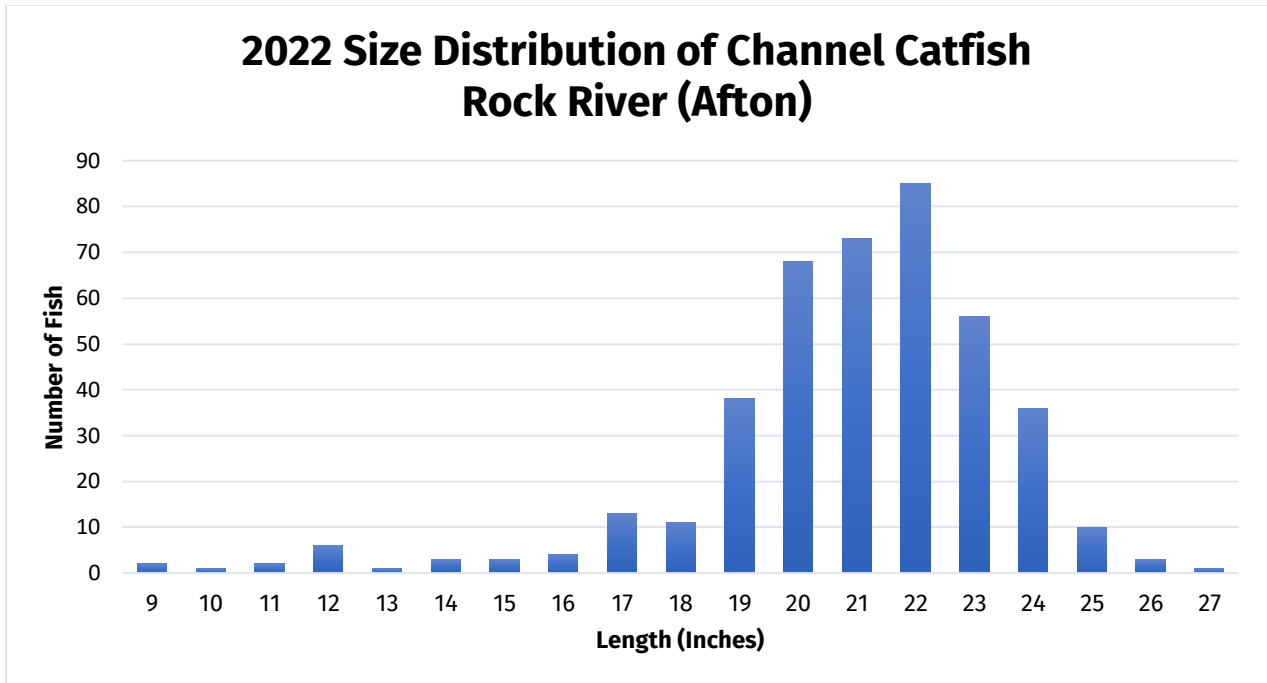


Figure 5. Length frequency of channel catfish surveyed during the 2022 baited hoop net survey on the Rock River near Afton.

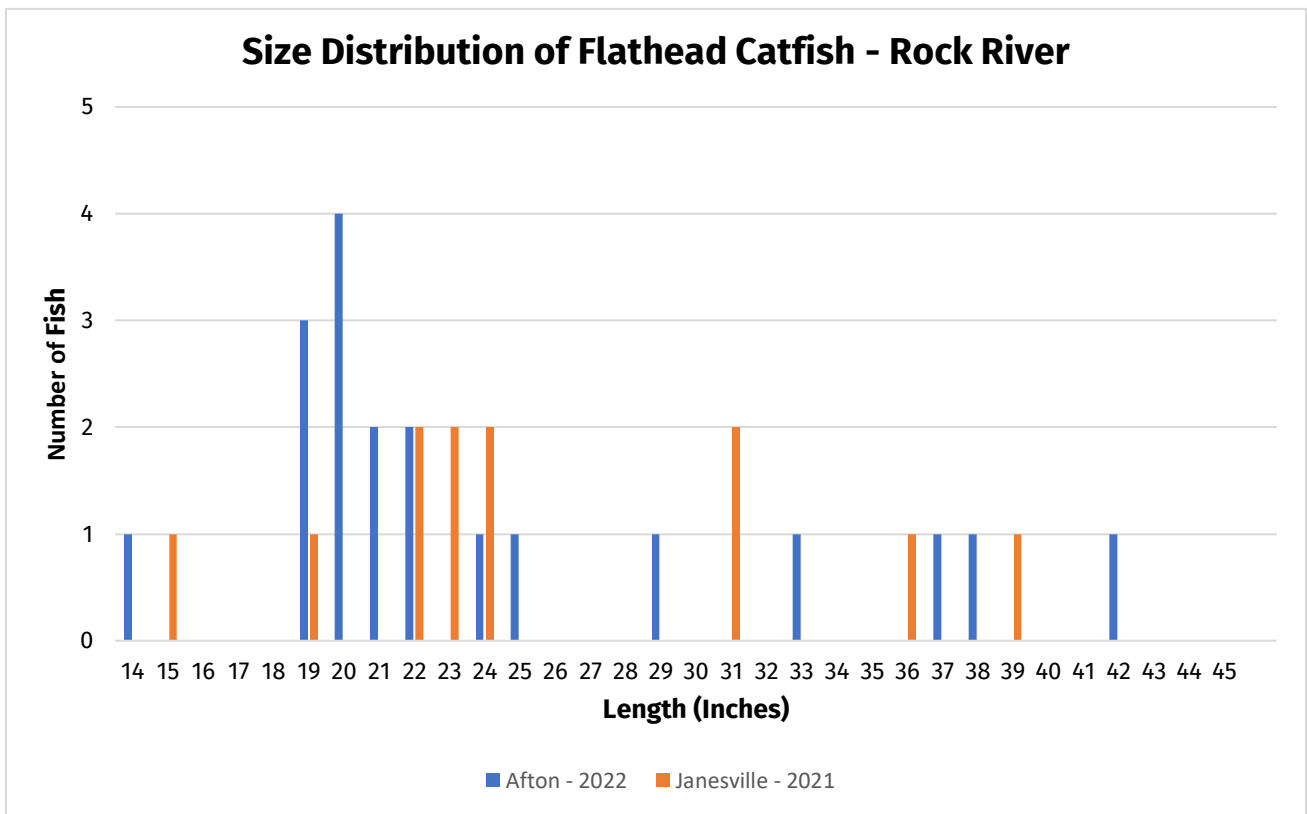


Figure 6. Length frequency of flathead catfish surveyed using baited hoop net surveys on the Rock River in Janesville during 2021 and Afton during 2022.

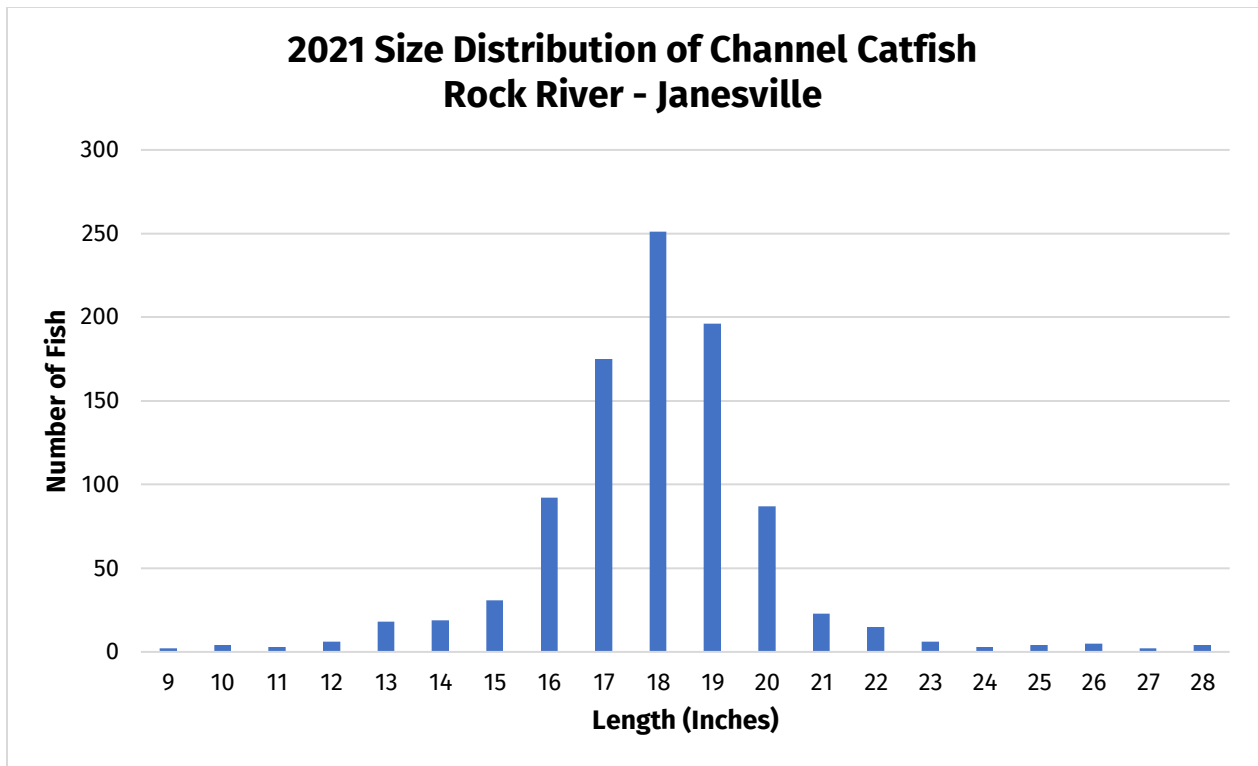


Figure 7. Length frequency of channel catfish surveyed during the 2021 baited hoop net survey on the Rock River near Janesville.

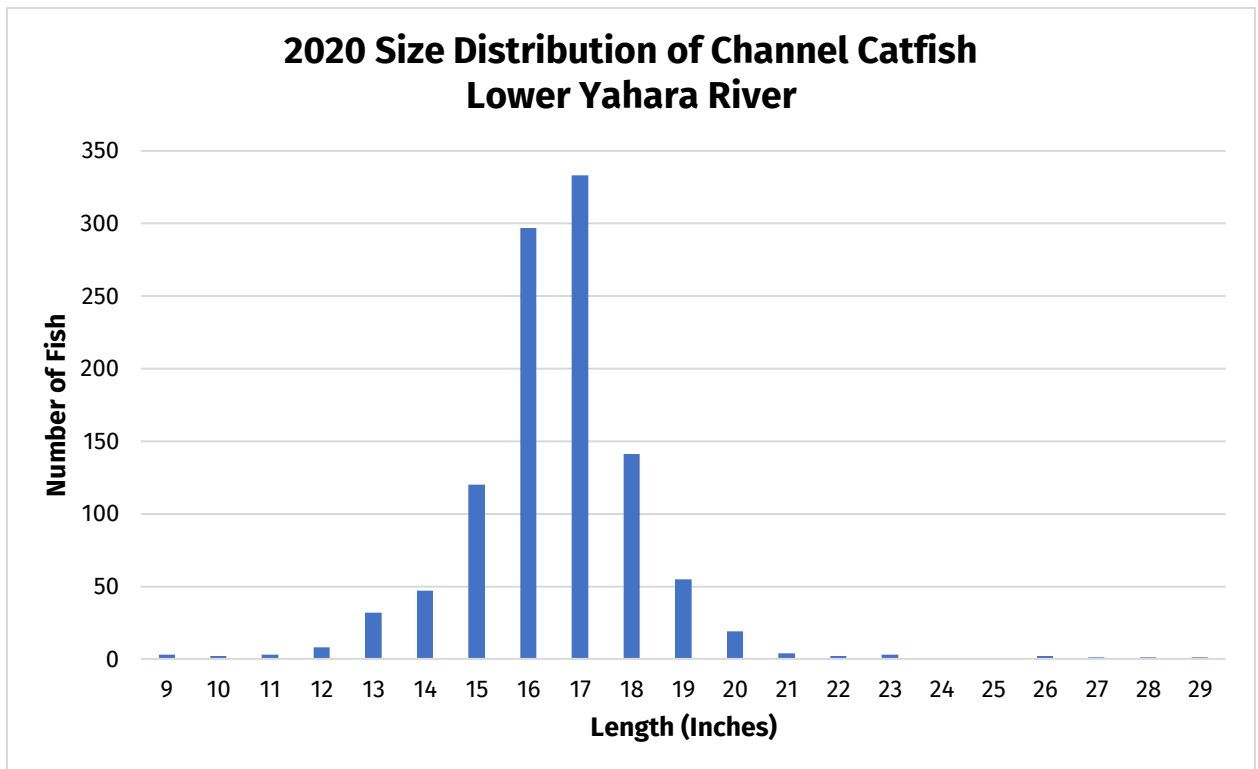


Figure 8. Length frequency of channel catfish surveyed during the 2020 baited hoop net survey on the Yahara River.

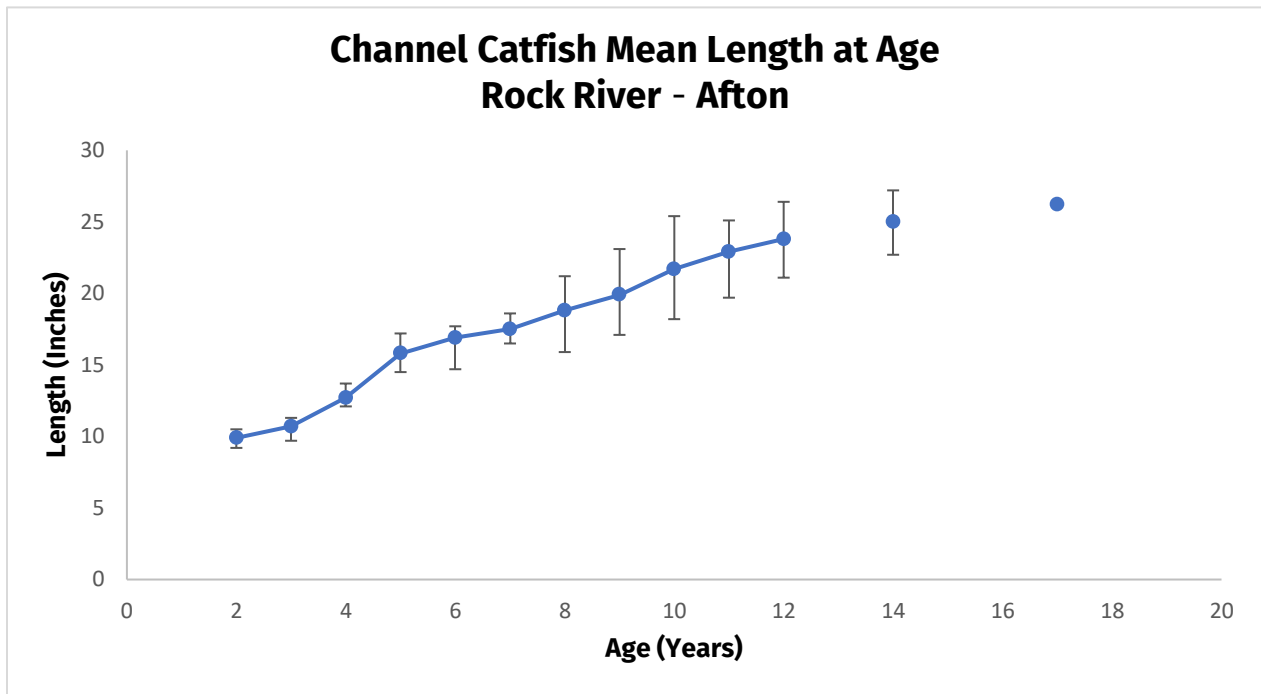


Figure 9. Mean length at age for channel catfish collected during the 2022 hoop net survey on the Rock River in Afton. Channel catfish ages were estimated using sectioned pectoral spines. Error bars represent the size distribution at a given age.

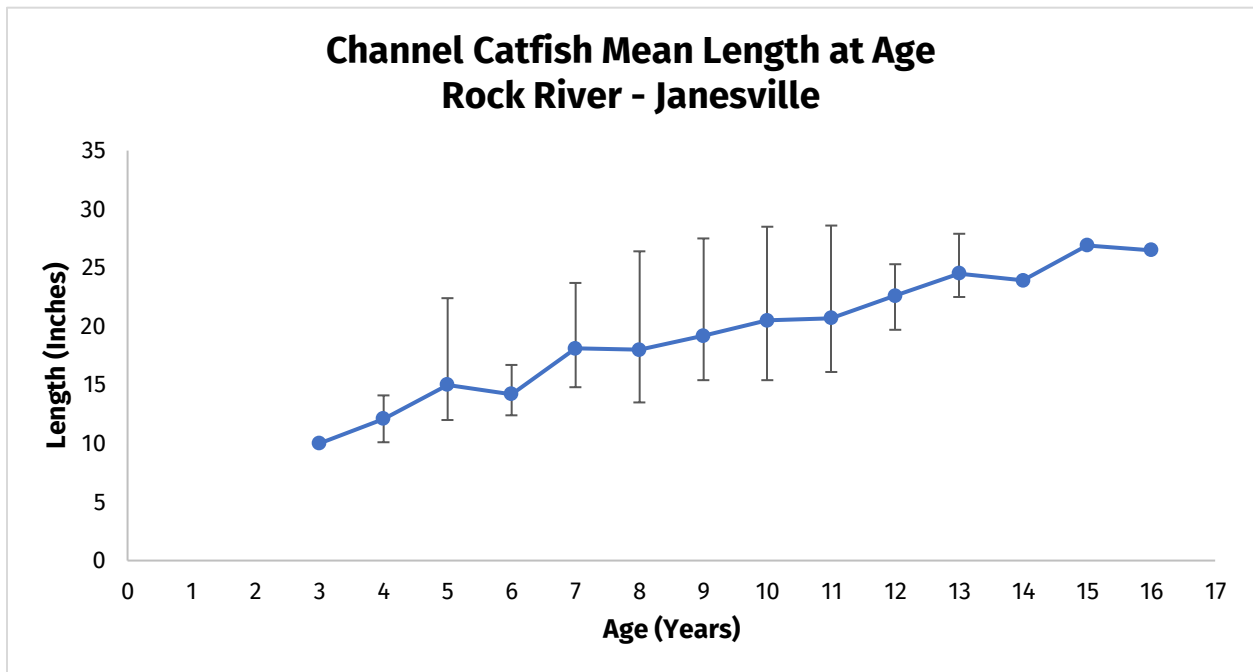


Figure 10. Mean length at age for channel catfish collected during the 2021 hoop net survey on the Rock River in Janesville. Channel catfish ages were estimated using sectioned pectoral spines. Error bars represent the size distribution at a given age.

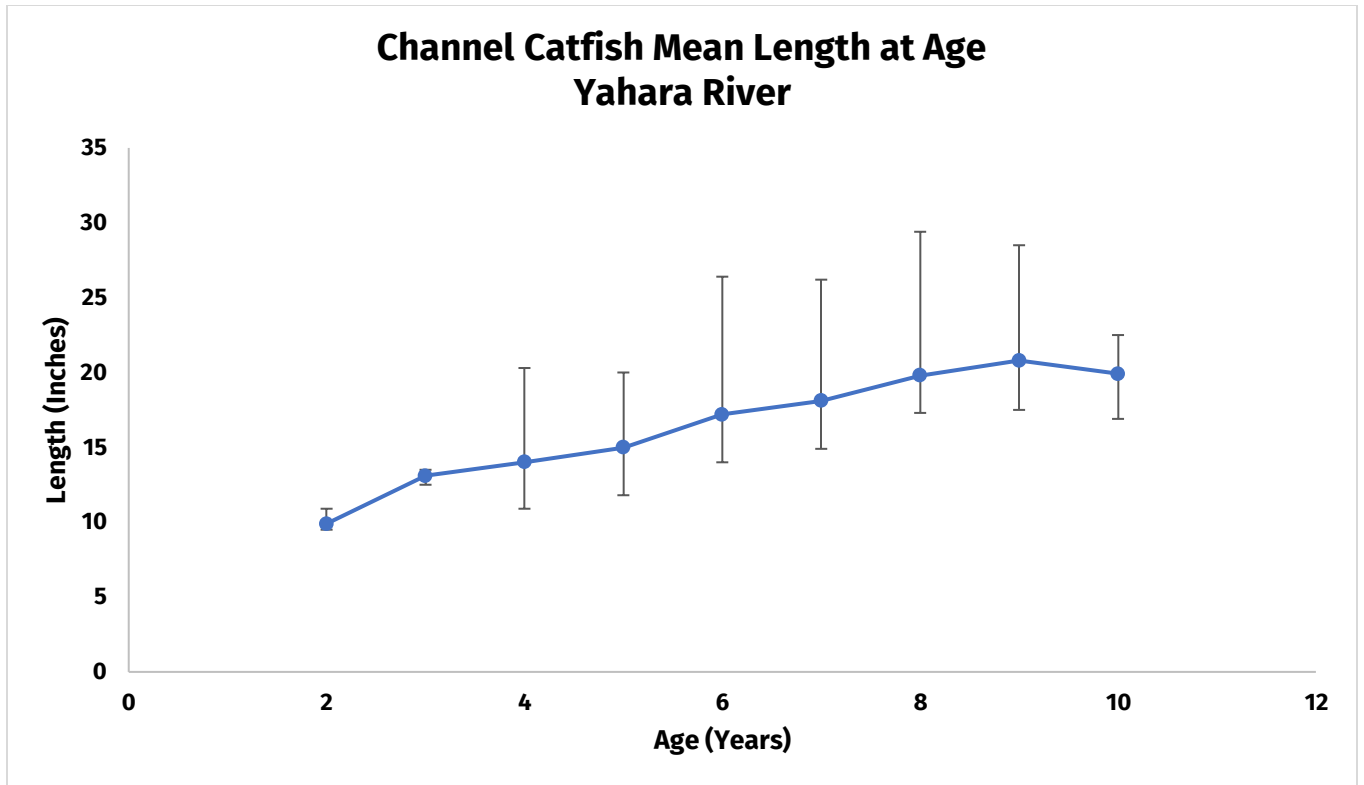


Figure 11. Mean length at age for channel catfish collected during the 2020 hoop net survey on the Yahara River near Fulton. Channel catfish ages were estimated using sectioned pectoral spines. Error bars represent the size distribution at a given age.

Table 1. Survey dates for each individual survey in the Rock River watershed.

Location/Year	Set Date	End Date	Total Nets	Total Net Nights
Rock River – Afton / 2022	8/15/2022	8/25/2022	10	100
Rock River – Janesville / 2021	8/11/2021	8/19/2021	11	87
Yahara River – Fulton / 2020	8/10/2020	8/21/2020	7	77

Table 2. Latitude and longitude coordinates with set dates for 2022 hoop net locations on the Rock River near Afton.

Net Number	Date Set	Latitude	Longitude
1	8/15/2022	42.59489	-89.03724
2	8/15/2022	42.59319	-89.03052
3	8/15/2022	42.59031	-89.0261
4	8/15/2022	42.58296	-89.0232
5	8/15/2022	42.57882	-89.02964
6	8/15/2022	42.57533	-89.03024
7	8/15/2022	42.5739	-89.03811
8	8/15/2022	42.60302	-89.04987
9	8/15/2022	42.60356	-89.06001
10	8/15/2022	42.60809	-89.06282
8A	8/20/2022	42.60254	-89.05574

Table 3. Latitude and longitude coordinates with set dates for 2021 hoop net locations on the Rock River near Janesville.

Net Number	Date Set	Latitude	Longitude
1	8/11/2021	42.73199	-89.06076
2	8/11/2021	42.72977	-89.0582
3	8/11/2021	42.72715	-89.05832
4	8/11/2021	42.71711	-89.05184
5	8/11/2021	42.71653	-89.04893
6	8/11/2021	42.71729	-89.04506
7	8/11/2021	42.71847	-89.04245
8	8/11/2021	42.71869	-89.03891
9	8/11/2021	42.71672	-89.03628
10	8/11/2021	42.71554	-89.0369
11	8/12/2021	42.71975	-89.05186

Table 4. Latitude and longitude coordinates with set dates for 2020 hoop net locations on the Lower Yahara River.

Net Number	Date Set	Latitude	Longitude
1	8/10/2020	42.79321	-89.12469
2	8/10/2020	42.79358	-89.12646
3	8/10/2020	42.79479	-89.12653
4	8/10/2020	42.79557	-89.12607
5	8/10/2020	42.79786	-89.12528
6	8/10/2020	42.79994	-89.1233
7	8/10/2020	42.80025	-89.1225

Table 5. Catch summary of channel catfish surveyed during the 2022 and 2016 baited hoop net surveys on the Rock River near Afton.

Species	Year	Total Fish Collected	CPUE	Average Length	Minimum Length	Maximum Length
Channel Catfish	2022	419	4.19	21.3	9.2	27.2
Channel Catfish	2016	92	0.92	19.3	11.8	25

Table 6. Catch summary of channel catfish surveyed during the 2021 and 2013 baited hoop net surveys on the Rock River near Janesville.

Species	Year	Total Fish Collected	CPUE	Average Length	Minimum Length	Maximum Length
Channel Catfish	2021	949	10.9	18.4	9.7	28.7
Channel Catfish	2013	376	9.4	11.4	8.6	27.1

Table 7. Proportional Size Distribution (PSD) values for channel catfish during four separate baited hoop net surveys on the Rock River.

Species/Year	Location	PSD	PSD ₂₄ Preferred	PSD ₂₈ Memorable	PSD ₃₆ Trophy
Channel Catfish 2022	Afton	96	12	0	0
Channel Catfish 2016	Afton	84	3	0	0
Channel Catfish 2021	Janesville	92	2	0.004	0
Channel Catfish 2013	Janesville	22	2	0	0

Table 8. Age summary of channel catfish found during the 2022 baited hoop net survey on the Rock River near Afton.

Age (Observed)	Number in Group	Average Length	Minimum Length	Maximum Length
2	2	9.9	9.2	10.5
3	3	10.7	9.7	11.3
4	7	12.7	12.1	13.7
5	5	15.8	14.5	17.2
6	9	16.9	14.7	17.7
7	2	17.5	16.5	18.6
8	5	18.8	15.9	21.2
9	11	19.9	17.1	23.1
10	22	21.7	18.2	25.2
11	27	22.9	19.7	25.5
12	10	23.8	21.1	26.4
13	0	-	-	-
14	2	25	22.7	27.2
15	0	-	-	-
16	0	-	-	-
17	1	26.2	-	-

Table 9. Age summary of channel catfish found during the 2021 baited hoop net survey on the Rock River near Janesville.

Age (Observed)	Number in Group	Average Length	Minimum Length	Maximum Length
3	4	10	9.9	10.3
4	10	12.1	10.1	14.1
5	5	15	12	22.4
6	12	14.2	12.4	16.7
7	13	18.1	14.8	23.7
8	13	18	13.5	26.4
9	13	19.2	15.4	27.5
10	27	20.5	15.4	28.5
11	23	20.7	16.1	28.6
12	5	22.6	19.7	25.3
13	4	24.5	22.5	27.9
14	1	23.9	-	-
15	1	26.9	-	-
16	1	26.5	-	-

Table 10. Age summary of channel catfish found during the 2020 baited hoop net survey on the Lower Yahara River near Fulton

Age (Observed)	Number in Group	Average Length	Minimum Length	Maximum Length
2	4	9.9	9.5	10.9
3	3	13.1	12.5	13.5
4	13	14	10.9	20.3
5	13	15	11.8	20
6	20	17.2	14	26.4
7	19	18.1	14.9	26.2
8	10	19.8	17.3	29.4
9	10	20.8	17.5	28.5
10	5	19.9	16.9	22.5