

**Stream Name:** Minnesota River

**Survey Type:** Targeted Survey

**Kittle ID Number:** M-55

**Survey ID Dates:** 7/10/2023–7/27/2023

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**Reason for survey**

Monitor Channel Catfish and Flathead Catfish populations in the Minnesota River.

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**Stream Location**

Counties: Big Stone, Blue Earth, Brown, Carver, Chippewa, Dakota, Hennepin, Lac Qui Parle, Le Sueur, Nicollet, Redwood, Renville, Scott, Sibley, Yellow Medicine

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**Area Fisheries Office**

Area Name: Hutchinson

ORG Code: F401

Region Name: Southern Region

Region Number: 4

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**Watershed Characteristics**

Drainage Basin: Minnesota River

Size (mi<sup>2</sup>): 17,008 mi<sup>2</sup>

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**Stream Characteristics**

Stream Length (miles): 320

Stream Type: Warmwater

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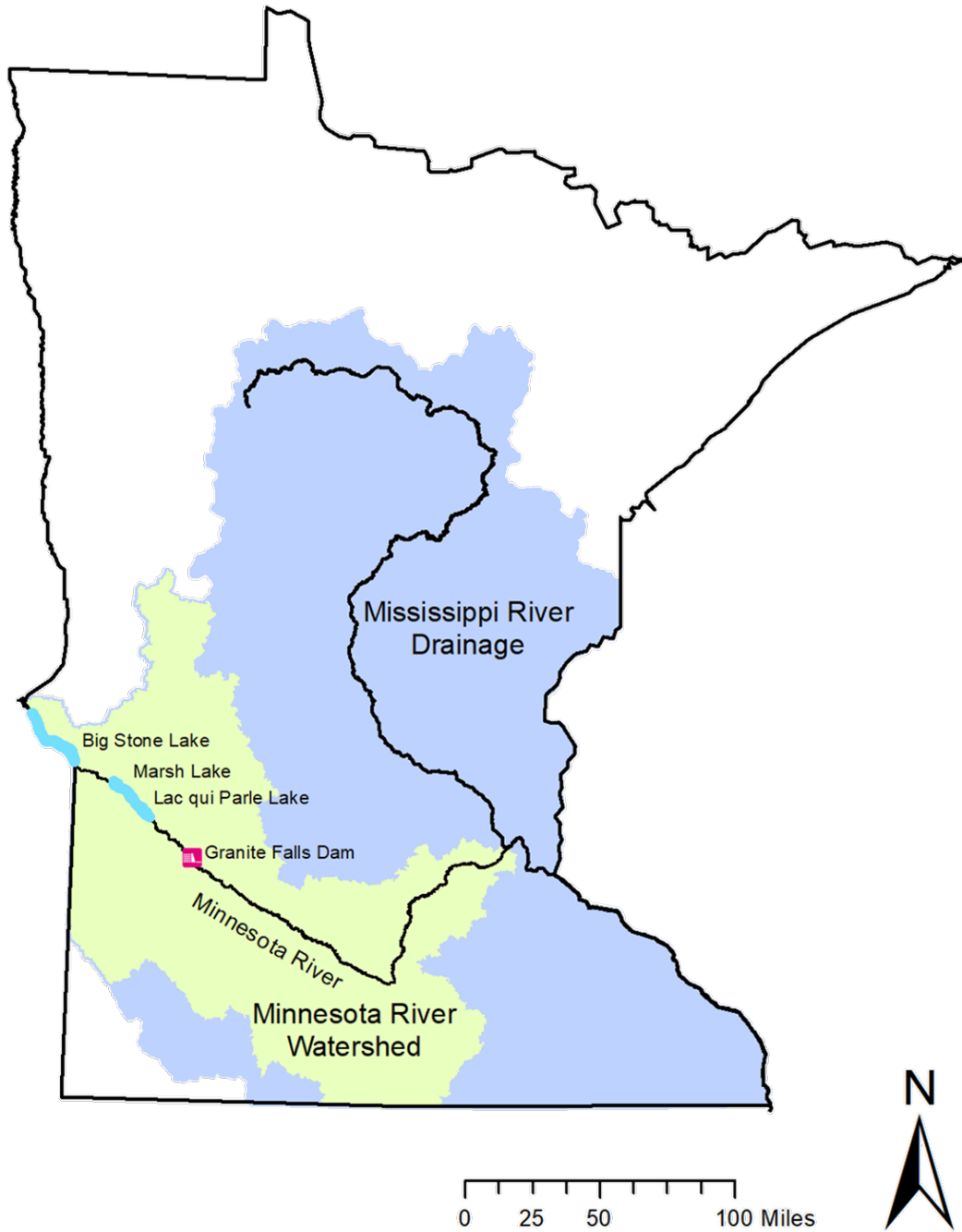


Figure 1. Location of the Minnesota River and Minnesota River Watershed within the Mississippi River Drainage of Minnesota.

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**INTRODUCTION**

The Minnesota River flows approximately 320 miles from Big Stone Lake on the Minnesota–South Dakota Border to its confluence with the Mississippi River in St. Paul, MN and provides an important recreational fishery in southern Minnesota (Figure 1). Channel Catfish and Flathead Catfish are the most targeted species by Minnesota River anglers (Sindt 2023). The unique Flathead Catfish fishery is especially popular among “trophy” anglers and the abundance of large Flathead Catfish in the Minnesota River is a result of low mortality rates (Shroyer 2018). Therefore, monitoring the catfish populations is among the highest Minnesota River fisheries management priorities (MNDNR 2024). The Minnesota Department of Natural Resources monitors and evaluates the Channel Catfish and Flathead Catfish populations with annual hoop net surveys. This annual report summarizes the first complete survey cycle of five Minnesota River catfish assessment reaches (Figure 2), including the annual assessment conducted during 2023. Refer to the previous (2018–2023) or current (2024–2028) Minnesota River Fisheries Management Plan (MNDNR 2018; MNDNR 2024) for additional explanations of objectives and methods (Figure 3).

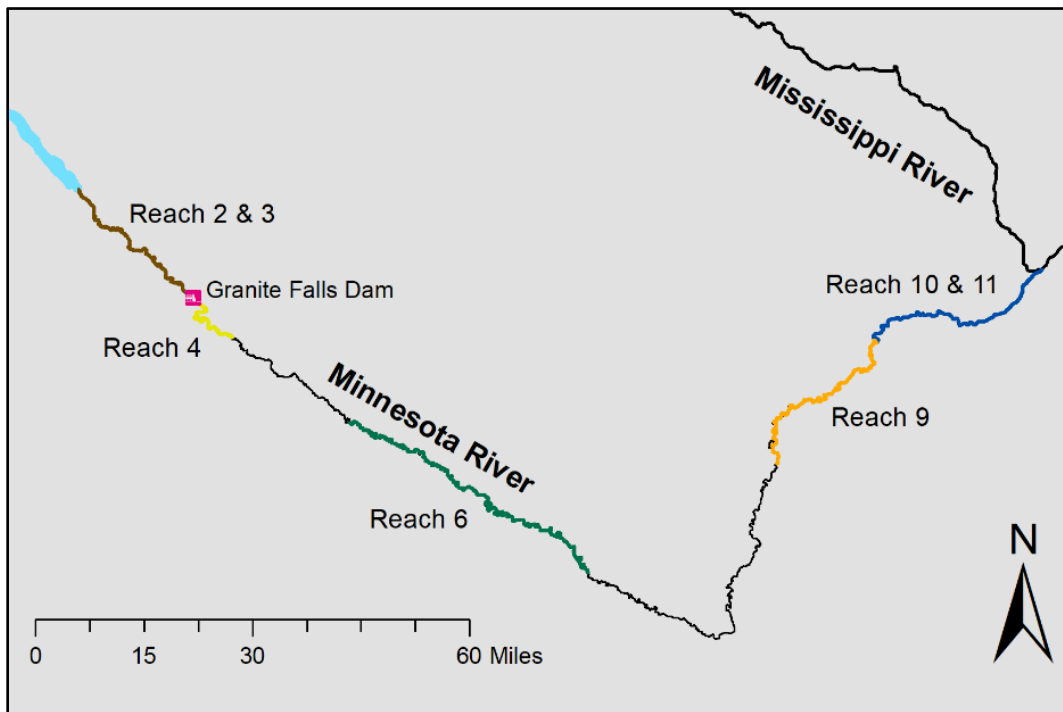


Figure 2. Locations of Minnesota River survey reaches that are included in a five-year rotation for catfish assessments.

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**Fisheries Management Goals and Benchmarks**

- Populations of Channel Catfish, Flathead Catfish, Freshwater Drum, Sauger, and Walleye continue to provide quality recreational fishing in the Minnesota River.
  - Abundances of Channel Catfish and Flathead Catfish provide July hoop net catch rates of  $\geq 3$  Channel Catfish and  $\geq 1$  Flathead Catfish per net.
  - Abundance of large Channel Catfish downstream of Granite Falls Dam provide July hoop net catches of at least one 24" or larger Channel Catfish in every three hoop nets ( $\geq 0.33$  per net) and at least one 28" or larger Channel Catfish in every seven hoop nets ( $\geq 0.15$  per net).
  - Abundance of large Flathead Catfish downstream of Granite Falls Dam provide July hoop net catches of at least one 34" or larger Flathead Catfish in every five hoop nets ( $\geq 0.2$  per net) and at least one 40" or larger Flathead Catfish in every ten hoop nets ( $\geq 0.1$  per net).

Figure 3. Excerpt of the catfish management goals from the Minnesota River Fisheries Management Plan 2024–2028.

## **METHODS**

### *Sampling gear*

Many different types of sampling gears have been used to assess relative abundance and size structure of catfish populations (Stauffer and Koenen 1999; Bodine et al. 2013), but Sindt (2018) found that unbaited hoop nets are an efficient and effective gear for simultaneously assessing both Channel Catfish and Flathead Catfish populations in the Minnesota River. Although catches of catfish may be greater during other months, hoop net assessments conducted during July and August provide relatively unbiased catches of catfishes and occur during a time of year when river levels are typically stable (Sindt 2018). Since Minnesota River IBI assessments are conducted during August, July is designated as the primary month for conducting standardized Minnesota River catfish population assessments with hoop nets.

Hoop nets used for assessing catfishes on the Minnesota River vary slightly, but always have seven fiberglass hoops with a 4-foot diameter first hoop, finger-style throats attached to the second and fourth hoops and constructed with 1-inch square mesh. Deployed hoop nets are anchored with a heavy-duty sand anchor attached to the cod end with an approximately 20-ft rope. Nets are held taught by attaching an approximately 30-ft rope to the bridle on the open (downstream) end, attaching a 15lb claw anchor roughly halfway along the rope, and then attaching a buoy to the end of the rope.

### *Field methods*

Standardized catfish assessments are conducted annually during July, rotating among one of five hoop net study reaches each year (Figure 2). Each study reach contains four to six target

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stations (reaches) that vary from 1.5- to 4.5-km long. Within each target station, pairs of hoop nets are set at approximately 200 m intervals, with one net along each side of the river channel. Hoop nets are generally set in 3–12 feet of water, parallel to the current, with the cod-end facing upstream. Side-scanning and down-scanning sonars are generally used to scout potential net locations and ensure they are clear from hazards such as submerged trees. An attempt is made to evenly space hoop net pairs throughout each target station but spacing may vary depending on habitat characteristics. Each hoop net is fished overnight and retrieved the next day. Retrieved nets that clearly did not fish effectively (e.g., collapsed, twisted, snagged, torn) are noted and excluded from catch rate analyses.

### *Analyses*

Hoop net catches during summer catfish assessments are used to calculate mean catch rates (i.e., catch per net; CPN) as indices of Channel Catfish and Flathead Catfish relative abundance. Additionally, size-specific catch rates are calculated for preferred ( $\geq 24$  inches; 610 mm) and memorable length ( $\geq 28$  inches; 710 mm) Channel Catfish (Gabelhouse 1984) and memorable ( $\geq 34$  inches; 860 mm) and trophy ( $\geq 40$  inches; 1020 mm) length Flathead Catfish (Bister et al. 2000). Incremental proportional size distributions are calculated as indices of Channel Catfish and Flathead Catfish size structure (Table 1). Catch rates from summer catfish assessments are tested against management goals (see Figure 3) using one-sided *t*-tests and allowing a 10% risk of type I error. Flathead Catfish under quality length (20 inches; 510mm) are infrequently captured in hoop nets, and therefore, PSD S-Q is not reported for Flathead Catfish. Additionally, Flathead Catfish in the Minnesota River commonly exceed “trophy” length, thus an additional “exceptional” length category ( $\geq 44$  inches; 1120 mm) is used for describing size structure.

## **RESULTS**

During July 2023, the annual summer catfish assessment was completed on Reach 9 of the Minnesota River and represents the completion of the first survey cycle of the five catfish assessment reaches along the Minnesota River. This five-reach cycle began in 2017 and took two additional years to complete because of flood conditions during July of 2018 and the COVID-19 Pandemic during 2020. Low water conditions during 2023 required adjustments to some net locations, including the re-setting of 14 nets in the same location as the previous day, and may have impacted net catches.

Mean catch per net of Channel Catfish and Flathead Catfish during the 2023 assessment did not meet goals established in the Minnesota River Fisheries Management Plan (Table 2 & Table 3).

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However, all size-specific catch rates and size structure goals were exceeded with 39% of Channel Catfish exceeding preferred length (24 in.) and 49% of captured Flathead Catfish exceeding memorable length (34 in.; Table 4 & Table 5).

Table 1. Proportional size distribution length categories for Channel Catfish and Flathead Catfish, including the addition of an “Exceptional” length category for Flathead Catfish.

Length categories	Flathead Catfish		Channel Catfish	
	mm	inches	mm	inches
Stock (S)			280	11
Quality (Q)	510	20	410	16
Preferred (P)	710	28	610	24
Memorable (M)	860	34	710	28
Trophy (T)	1020	40	910	36
Exceptional (E)	1120	44		

Table 2. Mean Channel Catfish catch rates (catch per net) in hoop nets during summer catfish assessments. Asterisks denote catches statistically below management goals.

Reach (survey year)	Nets	Channel Catfish		≥ 24-inch		≥ 28-inch	
		Mean		Mean		Mean	
		CPE	SD	CPE	SD	CPE	SD
Reach 2 & 3 (2017)	63	42.23	37.93	1.46	1.97	0.06	0.25
Reach 4 (2022)	102	26.10	48.28	1.28	2.23	0.51	1.14
Reach 6 (2019)	107	4.79	10.70	1.74	4.07	0.64	1.64
Reach 9 (2023)	124	1.80*	2.75	0.62	1.46	0.15	0.52
Reach 10 & 11 (2021)	127	4.24	5.07	1.31	2.41	0.35	0.87

Table 3. Mean Flathead Catfish catch rates (catch per net) in hoop nets during summer catfish assessments. Asterisks denote catches statistically below management goals.

Reach (survey year)	Nets	Flathead Catfish		≥ 34-inch		≥ 40-inch	
		Mean		Mean		Mean	
		CPE	SD	CPE	SD	CPE	SD
Reach 4 (2022)	102	1.74	3.18	0.75	1.66	0.25	0.70
Reach 6 (2019)	107	1.35	2.33	0.53	1.05	0.19	0.50
Reach 9 (2023)	124	0.83*	1.44	0.40	0.90	0.12	0.39
Reach 10 & 11 (2021)	127	1.40	2.44	0.60	1.39	0.20	0.61

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Table 4. Incremental proportional size distribution indices for Channel Catfish captured during Minnesota River catfish population assessments.

Reach (survey year)	Channel Catfish				
	S-Q	Q-P	P-M	M-T	T
Reach 2 & 3 (2017)	49	46	5	0	0
Reach 4 (2022)	59	27	8	5	0
Reach 6 (2019)	17	44	25	15	0
Reach 9 (2023)	18	43	30	9	0
Reach 10 & 11 (2021)	24	44	24	9	0

Table 5. Incremental proportional size distribution indices for Flathead Catfish captured during Minnesota River catfish population assessments.

Reach (survey year)	Flathead Catfish				
	Q-P	P-M	M-T	T-E	E
Reach 2 & 3 (2017)	NA	NA	NA	NA	NA
Reach 4 (2022)	21	35	29	11	3
Reach 6 (2019)	29	29	26	12	2
Reach 9 (2023)	26	16	34	15	0
Reach 10 & 11 (2021)	25	28	28	13	2

**DISCUSSION**

The catfish assessment conducted on Reach 9 during 2023 completes the first five-reach hoop-net survey cycle of the Minnesota River. In general, relative abundance and size structure is more variable among Minnesota River reaches for Channel Catfish than Flathead Catfish. Not surprisingly, the most notable differences in Channel Catfish population characteristics are between reaches upstream and downstream of Granite Falls Dam. Channel Catfish are much more abundant and have a smaller size structure upstream of Granite Falls Dam than downstream (see Sindt 2021 for additional details). However, Channel Catfish are also more abundant and smaller in the reach immediately downstream of Granite Falls Dam (i.e., Reach 4) than in the three downstream most assessment reaches. In contrast, Flathead Catfish are absent upstream of Granite Falls Dam and the relative abundance and size structure is generally similar among the four study reaches downstream of Granite Falls Dam.

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Channel Catfish and Flathead Catfish catch rates and size structure indices met or exceeded management goals during the first survey cycle, except for mean catch rates of both species during the 2023 assessment of Reach 9. Although catch rates below management goals in Reach 9 are concerning, the exceedance of catch rate goals in all other study reaches diminishes the concerns. Additionally, extremely low water conditions during 2023 created many challenges for conducting hoop net surveys, and these challenges may have also negatively impacted hoop net catches. Despite relatively low overall catch rates of Channel Catfish and Flathead Catfish from Reach 9, catch rates of larger fish exceeded management goals and are indicative of quality fishing opportunities. In general, high catch rates of Channel Catfish  $\geq$  24-inches and Flathead Catfish  $\geq$  34-inches in all study reaches reflects an abundance of large fish in the populations and should be encouraging for “trophy-oriented” anglers.

Overall, the size structure and relative abundance of Channel Catfish and Flathead Catfish in the Minnesota River is favorable for anglers. Although densities of “trophy-sized” Flathead Catfish likely vary among microhabitats within the Minnesota River, catfish assessments indicate that they are similarly abundant in all reaches of the river from Granite Falls Dam to the confluence with the Mississippi River. Population characteristics are indicative of high annual survival for both Channel Catfish and Flathead Catfish, which suggests that past and current harvest levels are likely sustainable, and that angling opportunities for “trophy-sized” fish are continuing.

Standardized annual monitoring of the Minnesota River catfish populations are still in their infancy with only one five-reach survey cycle completed. The hoop net survey in Reaches 2 & 3 during 2024 will begin the second survey cycle, which should be completed during summer of 2028.

## REFERENCES

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**APPROVAL**

Fisheries Specialist: \_\_\_\_\_ Date: \_\_\_\_\_

Manager/Supervisor: \_\_\_\_\_ Date: \_\_\_\_\_

Regional Manager: \_\_\_\_\_ Date: \_\_\_\_\_