Minnesota Department of Natural Resources
Special Publication 191, January 2025

DEPARTMENT OF NATURAL RESOURCES

Synopsis of Minnesota Catfish Fisheries and Catfish Management

Version 1.01

May 2023

Minnesota Department of Natural Resources
Division of Fish and Wildlife
Section of Fisheries
500 Lafayette Road
St. Paul, MN 55155-4020

Authors

This document was developed by MNDNR Catfish Technical Team members during 2020–2023.

Anthony Sindt, Minnesota River Fisheries Specialist, Hutchinson, MN

Devon Oliver, Fisheries Research Scientist, Lake City, MN

Greg Berg, Assistant Fisheries Supervisor, Aitkin, MN

Jack Lauer, Southern Region Fisheries Manager, New Ulm, MN

Joel Stiras, Metro River Specialist, Saint Paul, MN

Michael Wolf, Fisheries Specialist, Baudette, MN

Nicholas Kludt, Red River Fisheries Specialist, Detroit Lakes, MN

Nicholas Schlesser, Large Lake Specialist, Lake City, MN

Scott Mackenthun, Area Fisheries Supervisor, Hutchinson, MN

Sean Sisler, Commercial Aquatic Health and Fish Health Consultant, Saint Paul, MN

Steve Shroyer, Fisheries Research Scientist, Waterville, MN

Acknowledgements

We thank the 2023 Citizen Catfish Workgroup members for their review of this document. This is intended to be a living document and additional versions are expected.

TABLE OF CONTENTS

INTRODUCTION

The Minnesota Department of Natural Resources, Fish and Wildlife Division is dedicated to: Conserving and managing catfish populations in a way that balances and maximizes the ecological, economic, and recreational benefits for the people of Minnesota.

The status of catfishes and catfishing in Minnesota is nothing short of excellent. Our state has a nationally recognized trophy Channel Catfish fishery on the Red River of the North, bountiful trophy Flathead Catfishing opportunities on the Mississippi River and its major tributaries, and countless lakes and streams with healthy fishable populations of Channel Catfish. Admittedly, catfishes are not among the most popular sport fishes in Minnesota. Approximately 5 to 10 percent of anglers target catfish annually compared with nearly 3 out of every 4 anglers targeting Walleye and over half of all anglers targeting crappies and sunfish (Schroeder and Fulton 2004; Miller 2018). However, catfishes are an important component of Minnesota fisheries, and have significant value to many anglers. Six percent of Minnesota anglers fishing for catfishes an average of 7 days per year (Miller 2018) equates to more than 600,000 catfish angling days, which contributes significantly to our state's fishing economy. Anecdotal evidence and increased publicity on social media also indicate that catfishing is increasing in popularity with Minnesota anglers, and recent surveys show that younger generations are particularly interested in catfish angling (Schroeder and Fulton 2004; Miller 2018). In some parts of the state, catfishes are among the most popular species with anglers. Creel surveys conducted on the Minnesota River and Red River indicate that over half of all anglers specifically target catfishes and that Channel Catfish dominate the catch and harvest (Chapman 2001; Wendel 2016b; Sindt 2023). Catfish are easy and fun to catch, they are great for eating, and abundant Channel Catfish populations can be found near most urban centers—making them accessible and desirable for a diverse group of anglers. Details of Minnesota catfish angler demographics and preferences are poorly understood, but catfish anglers vary from those solely interested in catching Channel Catfish to eat and anglers interested in catching "anything that bites" to specialized anglers targeting trophy-size fish for catch-and-release. Catfish fishing and catfish management in Minnesota have evolved over time, and catfishes are currently an important component of recreational fishing in Minnesota. The Minnesota Department of Natural Resources (MNDNR) is dedicated to conserving and managing catfish populations for the benefit of all Minnesotans. The four primary objectives guiding management of Minnesota catfish fisheries include: supporting science-based management, protecting and enhancing important fisheries, fostering relationships with anglers, and promoting angling opportunities.

Minnesota's Catfish Management Philosophy

- **Protect and maintain trophy fisheries** – Minnesota waters offer several world-class catfish fisheries. The MNDNR is committed to maintaining the quality of these resources for all current and future Minnesotans.
- **Promote and maintain angler harvest opportunities** – Minnesota has diverse and publicly accessible catfishing opportunities statewide. The MNDNR is committed to providing and promoting catfishing opportunities for all Minnesotans.

SPECIES DISTRIBUTIONS AND FISHERIES

Channel Catfish

Channel Catfish inhabit lakes, rivers, and streams throughout much of Minnesota (Figure 1). Channel Catfish are native to all major drainages in the state, except the Rainy River drainage. Channel Catfish are also absent from much of the North Shore region and were historically absent in the Mississippi River drainage upstream of St. Anthony Falls. However, during the mid-1900's Channel Catfish were stocked into lakes and rivers upstream of St. Anthony Falls (Enblom 1977) and have since spread to additional lakes and rivers. Channel Catfish are found in the Red River basin all the way to the Canadian border and beyond. In the central and eastern portions of Minnesota the Channel Catfish range includes the Mississippi River upstream to the Blandin Dam in Grand Rapids, and the St. Louis River and major tributaries upstream to Colby Lake in St. Louis County. Even within their native range, Channel Catfish have been introduced to many lakes where they were historically absent. An increasing number of shallow lakes support Channel Catfish populations, which presumably is related to a decreasing frequency of winterkill events.

The most popular and productive Channel Catfish fisheries in Minnesota are major rivers—the Minnesota River, Mississippi River, Red River, St. Croix River, and St. Louis River. All of these large rivers, along with some of their major tributaries provide "trophy fisheries" where there is reasonable potential for anglers to catch fish over 28 inches or 10 pounds. The historical state record Channel Catfish was caught from the Mississippi River (Hennepin County) in 1975 and weighed 38 pounds. Additionally, "trophy fisheries" include around 20 lakes distributed throughout the southern half of the state (Figure 2, Appendix A). Numerous other rivers, streams, and lakes provide "quality fisheries" with moderately to highly abundant Channel Catfish populations. Lakes with quality Channel Catfish fisheries are most common in the southwestern corner of the state, within the Crow River and Sauk River watersheds in central Minnesota, and lakes within the Snake River watershed. Within their introduced range, fishing for Channel Catfish is becoming increasingly popular on the Mississippi River, and a notable summer and winter fishery has developed on the Sauk River chain of lakes in Stearns County.

Flathead Catfish

Flathead Catfish are native to larger rivers within the Mississippi River and Gulf Slope drainages of North America. Their distribution in Minnesota is primarily limited to the Mississippi River downstream of Coon Rapids Dam, the Minnesota River downstream of Granite Falls Dam, the St. Croix River downstream of St. Croix Falls Dam, and their larger tributaries (e.g., Blue Earth River, Cannon River). In the past, Flathead Catfish were introduced into several lakes around the state (Davis 1985), but remnant populations are small and there is little evidence that fishable populations of Flathead Catfish can persist in Minnesota lakes.

All three of the large rivers inhabited by Flathead Catfish are popular "trophy fisheries" where anglers have the opportunity to catch Flathead Catfish exceeding 38 inches or 25 pounds. The historical state record Flathead Catfish weighed 70 pounds and was caught from the St. Croix River in 1970. More recently, a 52.5-inch Flathead Catfish was caught from the St. Croix River in 2017, setting a new catch-and-release record based on length. The world record Flathead Catfish caught in Kansas weighed 123 pounds, and records for Flathead Catfish in other southern states often exceed 70 pounds. Although Minnesota anglers are unlikely to catch a 100+ pound Flathead Catfish, Minnesota's premier fisheries provide exceptional opportunities for anglers to catch fish in the 20- to 40-pound range. For example, in the lower Minnesota River

there were estimated to be about 50 Flathead Catfish over 34 inches per river mile (Shroyer 201

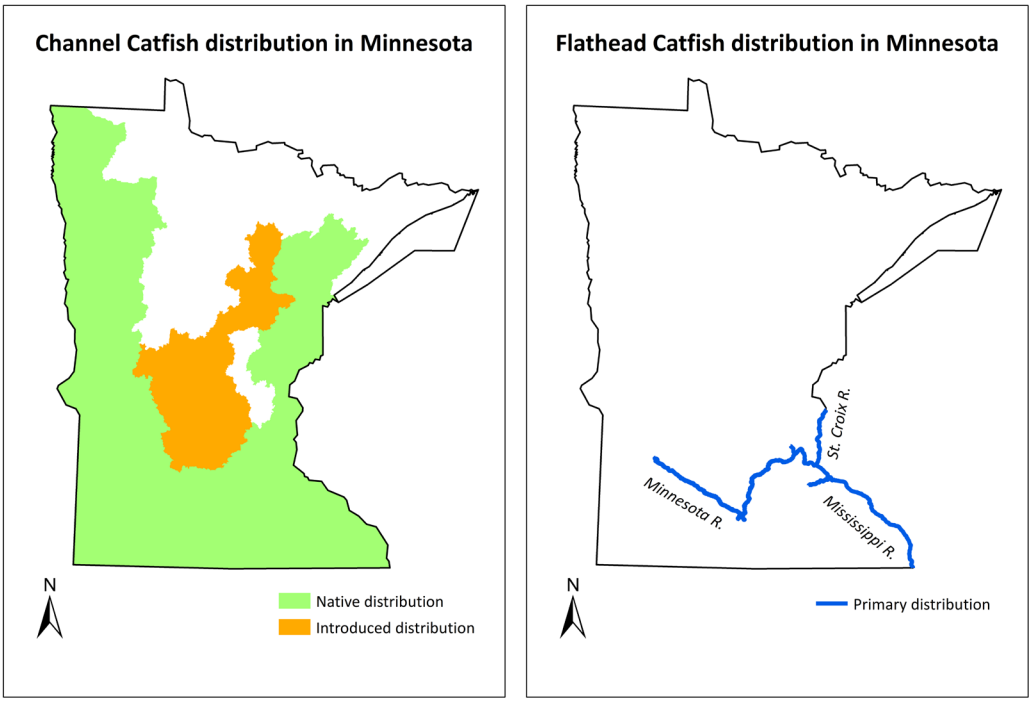

FIGURE 1. Native and introduced distribution of Channel Catfish in Minnesota (left) and the primary distribution of Flathead Catfish in Minnesota (right).

HISTORY OF CATFISH FISHERIES AND MANAGEMENT

Catfish management has been less intensive than management of other game fishes in Minnesota, but since 1941 there has been a gradual shift to more restrictive catfish harvest regulations and an increasing emphasis on catfish fisheries (Figure 3). Prior to 1941 there were no harvest restrictions on catfishes in Minnesota and catfish "management" was likely an afterthought. Not until the 1990s were their targeted efforts by MNDNR to better understand catfish populations in some of the state's premier fisheries (see Appendix B). By 2003 the statewide harvest regulations included a more restrictive five fish daily and possession limit, with no more than two being Flathead Catfish, and no more than one over 24 inches. The first special harvest regulation for catfish on an inland waterbody was implemented in 2015, allowing a daily and possession limit of 10 Channel Catfish on the Sauk River chain due to an abundant and under-utilized population.

Stocking records for Channel Catfish date back to the mid-1950's (and possibly before) with the presumed goal of establishing new fisheries and supplementing existing populations. More recently, the MNDNR has stocked limited amounts of Channel Catfish with the primary goal of establishing and supplementing urban fisheries—such as Fishing in the Neighborhood Lakes and kids fishing ponds (Cross et al. 1991; Walsh and Levitt 2004).

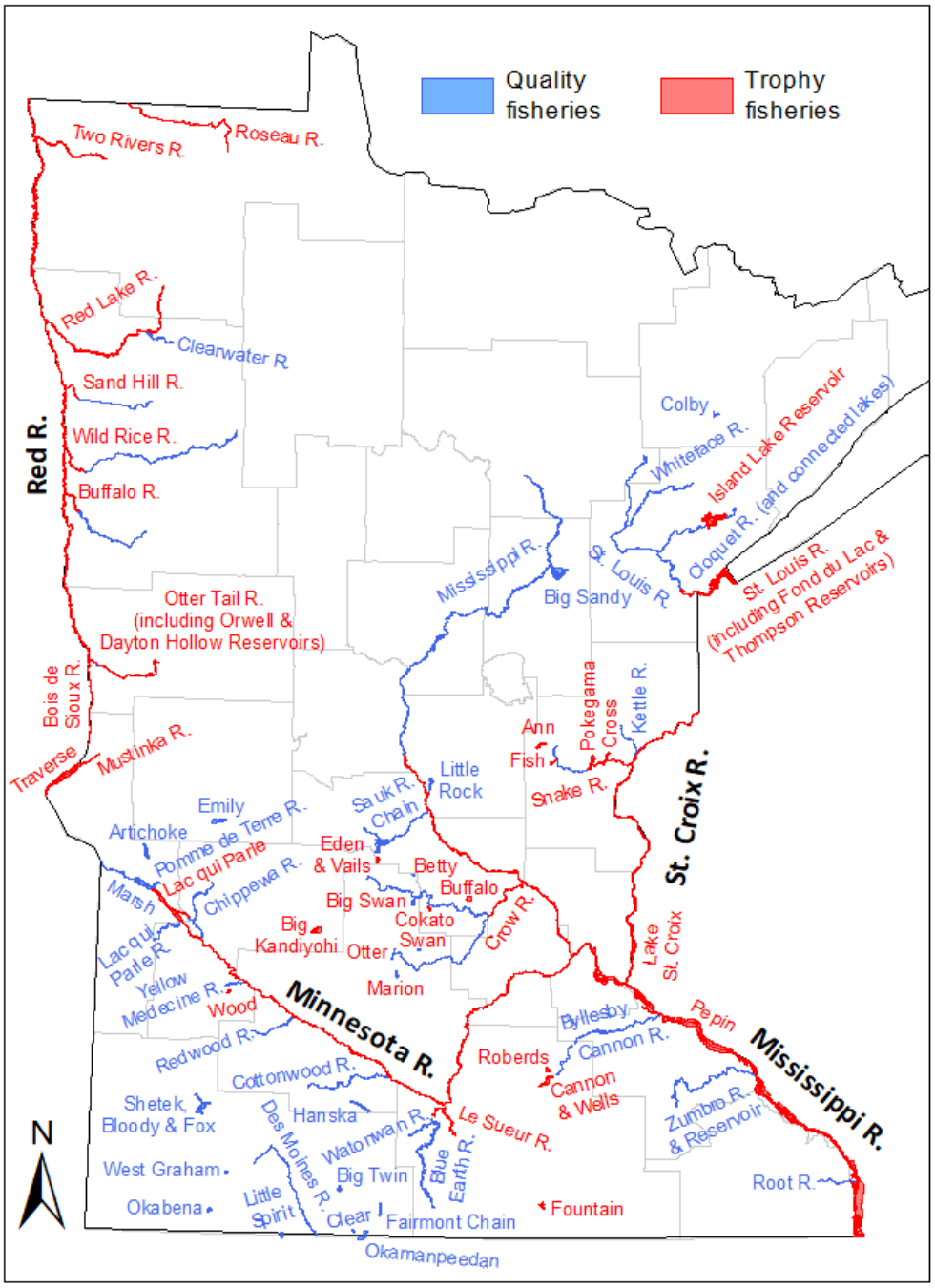

FIGURE 2. Map of quality and trophy Channel Catfish fisheries in Minnesota.

Popularity of catfish angling, particularly trophy catfish angling, has presumably increased over the last 30+ years and today the MNDNR is monitoring and studying catfish populations around the state. In 2011, the MNDNR formed the Citizen Catfish Workgroup and through a collaborative effort several regulation changes have been made. These include a closed season for Flathead Catfish during the overwintering period of Dec. 1st through March 31st, and the allowance of bullheads up to 10 inches for use as bait. Additionally, recent increased interest in trophy angling and catch-and-release angling prompted the MNDNR to develop a catch-and-

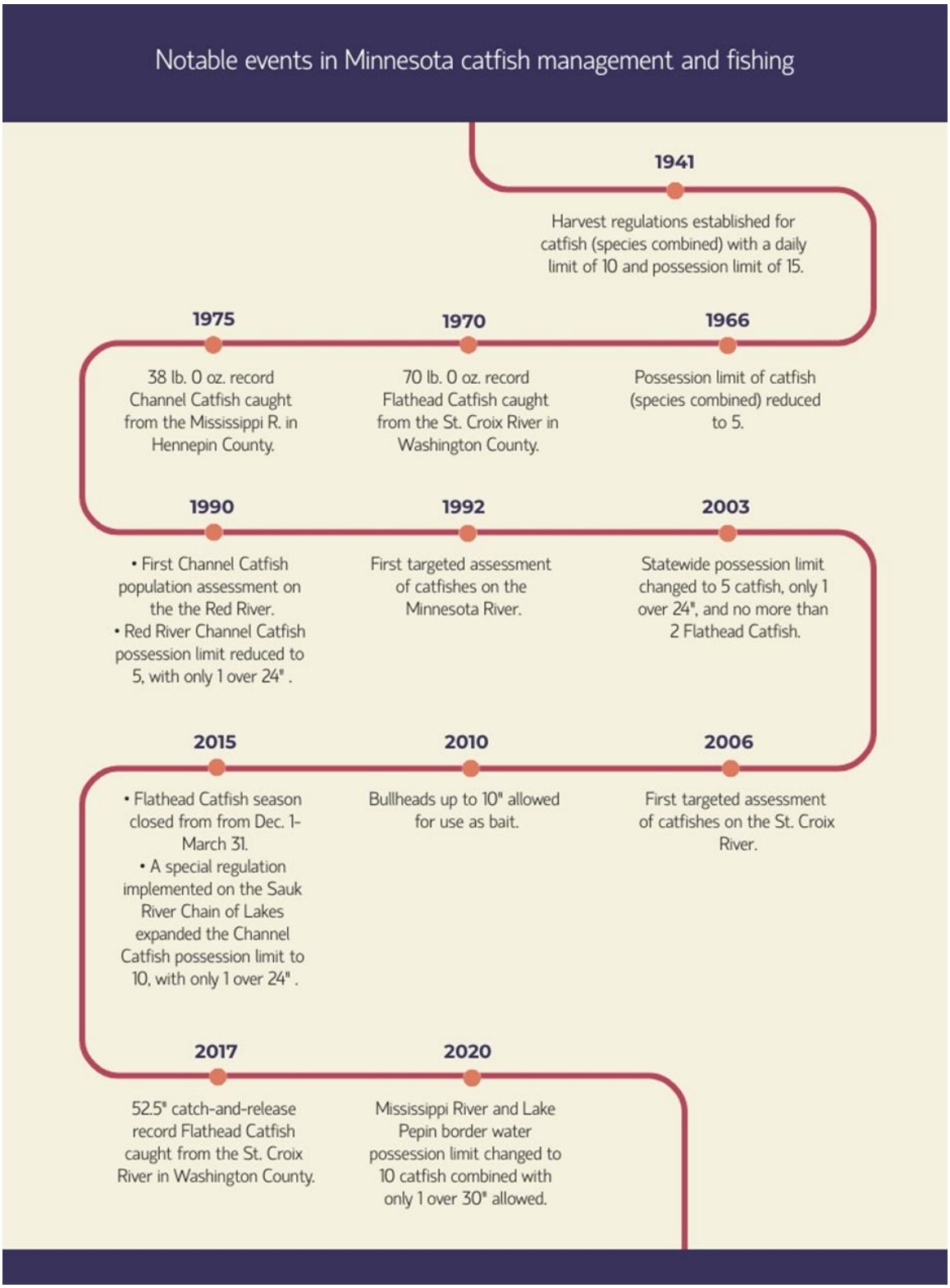

FIGURE 3. Timeline of notable events in Minnesota catfish management and fishing.

release record program for Flathead Catfish and other large fish species based on fish lengths and photographic submissions by anglers.

CONTEMPORARY CATFISH MANAGEMENT

Guiding Management Objectives

- **Support science-based management** – long-term monitoring and continued research of catfish population dynamics, ecology, and management are essential for informing management decisions.
- **Protect and enhance important fisheries** – several of our state's large rivers provide world-class catfish fisheries and ensuring the sustainability of these resources for all current and future Minnesotan's is a priority.
- **Foster relationships with anglers** – achieving catfish management goals requires understanding of catfish angler demographics and desires and understanding how they change over time.
- **Promote angling opportunities** – increasing awareness of and access to catfishing opportunities is critical for maximizing the recreational benefits of catfish fisheries for all Minnesotans.

Most catfish fisheries require less intensive management than other fisheries in the state because both Channel Catfish and Flathead Catfish successfully reproduce in most managed fisheries and harvest rates are generally considered low. This reduces the need for stocking, monitoring, and special harvest regulations. In general, conservative statewide harvest limits help lessen concerns of over-harvest, and documented instances of catfish over-harvest are uncommon. Many of our state's premier catfish fisheries are on border waters that are cooperatively managed with natural resource agencies of the neighboring state. Many of these border water fisheries have unique characteristics and are managed differently than inland fisheries that fall under statewide harvest regulations (Appendix C).

Channel Catfish is a hardy species, less threatened by climate change and eutrophication than some of the state's more intolerant species such as Lake Trout and Cisco. Channel Catfish are, however, particularly sensitive to low levels of dissolved oxygen and are uncommon in waterbodies that experience frequent winterkills. As climate patterns shift and winterkill events becomes less common, Channel Catfish may thrive in a greater number of lakes. This is already evident in southwestern Minnesota where Channel Catfish populations have drastically increased during the last 20+ years. Expansion of Channel Catfish populations into new systems has been perceived as undesirable and a nuisance by some anglers, but those concerns appear to be decreasing over time. The MNDNR will continue monitoring the status of catfish fisheries across the state and will use the four primary fisheries management tools— monitoring, stocking, regulations, and habitat— to maintain and enhance populations. Similar to management of other fishes, the MNDNR uses an adaptive approach to inform and improve management, which requires monitoring of populations and continually enhancing knowledge

about catfish population dynamics, management strategies, and anglers (Figure 4).

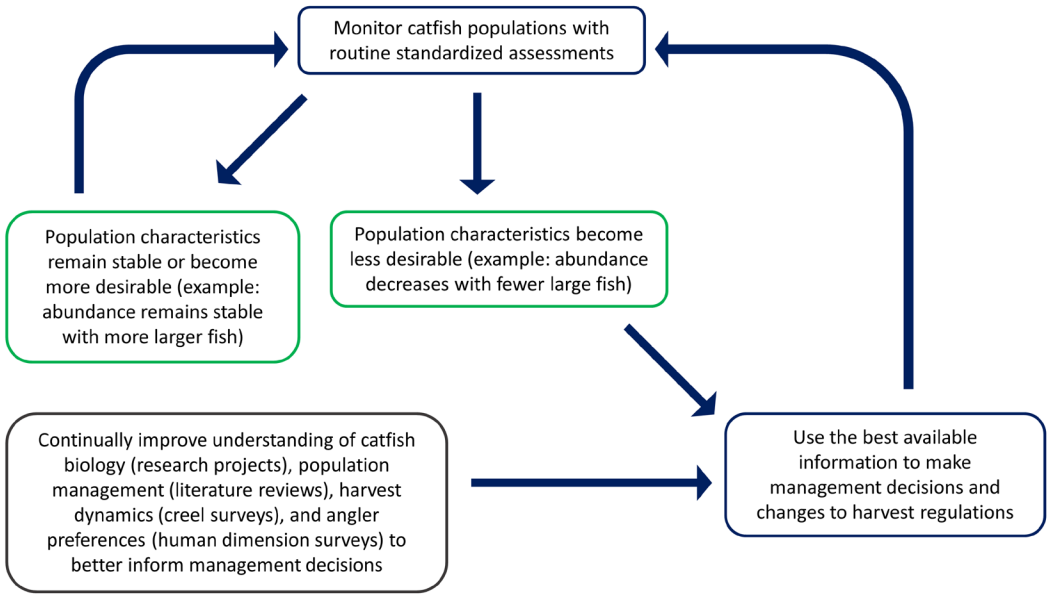

FIGURE 4. Flow-chart depicting the adaptive approach for managing catfish populations and using the best available information to inform management decisions.

Monitoring

- At the present time, approximately half of the MNDNR Fisheries Area offices actively manage at least one catfish fishery and monitor characteristics of the populations.

- Most evidence suggests that Minnesota catfish populations are not being over-harvested; however, some populations display delayed sexual maturity. For instance, up to 40% of angler harvest in the Red River is sexually immature fish. The abundance of larger trophy-sized fish in populations may also be sensitive to increases in mortality. Thus, even moderate increases in harvest may have negative impacts on the quality of fisheries. Therefore, it is important for the MNDNR to continue monitoring important catfish populations.

- Standardized and routine catfish population assessments have been developed and implemented for most of the state's large river fisheries including the Red River (MNDNR 2017), Minnesota River (MNDNR 2018), and Mississippi River (Stiras 2008).

  Monitoring relative abundance and size structure—
  For Channel Catfish populations in lakes, the MNDNR generally measures the relative abundance and characterizes the sizes of fish in the population with standardized summer gill net surveys or trot-line surveys. Gill nets are not the most efficient gear for capturing Channel Catfish and they can misrepresent size structure, but gill net catches may provide an accurate representation of population density (Bodine et al. 2013). In general, Minnesota lakes with gill net catches greater than 3.0 catfish per net have moderately abundant populations and lakes with gill net catches greater than 7.0 fish per net have high

abundance. For Channel Catfish and Flathead Catfish populations in rivers, fisheries managers use a variety of sampling techniques depending on the characteristics of the river. Sampling gears include electrofishing, hoop nets, trap nets, and trot-lines. For instance, annual hoop net surveys are used to monitor Minnesota River catfish populations, and management goals include maintaining average catch rates of 1.0 or more Flathead Catfish and 3.0 or more Channel Catfish per net (MNDNR 2018).

Measuring growth—
The number of years it takes fish to reach a particular size can be measured as a growth rate. The MNDNR standard method for estimating the age and growth rate of catfishes involves removing pectoral spines from a sub-sample of fish that are representative of all fish sizes in the population (Hoxmeier et al., 2018). Pectoral spines are cut into thin sections and viewed under microscopes. Each visible ring or "annulus" indicates one year of growth.

Creel surveys—
Fisheries managers conduct creel surveys to estimate angling effort, catch, and harvest. Relatively few creel surveys have been conducted on important catfish fisheries in Minnesota. Creel surveys are typically conducted during the day, failing to include catfish anglers fishing after dark. The limited creel data available indicates that rivers are generally more popular than lakes for catfishing. The Minnesota River and Red River are among the most popular fisheries with more than 50% of anglers targeting catfishes and annual harvest of Channel Catfish exceeding 15 fish per river mile (Chapman 2001; Wendel 2016b; Sindt 2023; Table 1). Other important river catfish fisheries include the Mississippi River (Gorton 1997; Altena 2008), St. Croix River (Gorton et al. 1998), and St. Louis River estuary (Varian and Hendrickson 2016). Most other catfish fisheries experience relatively low levels of harvest—less than one fish per acre annually. The exceptions include the Sauk River chain of lakes and small (less than 70 acre) urban lakes where annual harvest can exceed five fish per acre. The only other waterbodies with creel data indicating that more than 1% of anglers specifically target catfishes include Fox Lake in Martin County, Lac qui Parle Lake in Lac qui Parle County, Cross Lake in Pine County, Peltier Lake in Anoka County, and Zumbro Lake in Olmsted County.

Stocking

- Natural reproduction sustains Channel Catfish and Flathead Catfish populations in most Minnesota lakes and rivers with important fisheries. Therefore, the MNDNR does not generally stock either species to supplement or enhance populations.

- The MNDNR does stock Channel Catfish into a limited number of small urban lakes—such as Fishing in the Neighborhood lakes and kids' fishing ponds—where natural reproduction is insufficient to support high levels of harvest. Presently, most of the stocked Channel Catfish are purchased from hatcheries in other states.

- Presently, Waterville State Fish Hatchery maintains Channel Catfish broodstock and raises Channel Catfish to fingerling size. Channel catfish raised at the Waterville State Fish Hatchery have been used in an exchange program with the U.S. Fish and Wildlife Service Genoa National Fish Hatchery where the Channel Catfish fingerlings are used as glochidial hosts for endangered mussels. However, 2023 is anticipated to be the last year of Channel Catfish production at the Waterville State Fish Hatchery.

- During the early 2000s the abundant population of Channel Catfish in the Sauk River chain of lakes was used as a source for stocking many urban fisheries, but this was discontinued in 2017 after the Sauk River chain was infested with Zebra Mussels
- Channel Catfish may also be re-introduced into lakes or streams that experience severe winterkill or other die-offs events at the discretion of the area fisheries managers and according to established management plans.
- Flathead Catfish are not easily or economically produced by Minnesota hatcheries.

Regulations

- Special catfish harvest regulations are rarely implemented for Minnesota lakes and rivers and harvest from most waterbodies is regulated with uniform statewide or border water regulations.
- An increased possession limit of 10 Channel Catfish, with only one over 24 inches, was implemented for the Sauk River chain of lakes in response to an overly abundant and under-utilized population. This scenario provides a precedent, and area fisheries managers may consider utilizing the same regulation for other abundant and under-utilized Channel Catfish populations.
- Catfish harvest regulations on border waters are similar to statewide Minnesota harvest regulations for waterbodies bordering Manitoba, North Dakota, and South Dakota, but are less restrictive for waterbodies bordering Iowa and Wisconsin.
- Recently, several groups of researchers have modeled the effects of length-based harvest regulations on catfish populations and generally concluded that protecting larger fish with more restrictive harvest regulations has minimal effect on the number of larger-sized fish in a population, especially when harvest rates are low (Stewart et al., 2016; Muhlbauer and Krogman 2021; Schall and Lucchesi 2021).

Habitat

- Woody habitat—such as downed trees and log jams—is important for both Channel Catfish and Flathead Catfish. Woody habitat can serve as spawning structure and can influence the suitability of over-wintering habitats in rivers (Weller and Winter 2001; Kelsch and Wendel 2004; Daugherty and Sutton 2005). Therefore, it is important to maintain natural processes that contribute trees and woody debris into lakes and rivers and limit the removal of important woody habitat.
- Habitat fragmentation caused by dams and other fish passage barriers limits recolonization of Channel Catfishes into many aquatic systems and can prevent access to important spawning, feeding, and overwintering habitats (Aadland et al. 2005; Sindt 2021). Similarly, dams restrict the current distribution of Flathead Catfish in Minnesota waters—though several of these dams occur at natural barriers. Therefore, limiting the construction of new dams and removing existing fish passage barriers is important for maintaining healthy catfish populations in existing fisheries and restoring extirpated populations. However, barriers preventing colonization of Channel Catfish and Flathead Catfish outside of their native ranges may be desirable but could have negative impacts on other native fishes.
- Stream and river habitat degradation has also been a major force influencing the distribution of catfish. The most common issues are channelization, disconnection from the floodplain,

and altered hydrology. These are often linked to landscape drainage or floodwater retention activities. These alterations can be remedied with river restoration projects of varying scales, which often include local, state, and federal partnerships. Projects restoring natural riverine form and function can be an important tool for improving Channel Catfish habitat, populations, and fishing.

MINNESOTA CATFISH POPULATION CHARACTERISTICS

Spawning

In Minnesota, both Channel Catfish and Flathead Catfish generally spawn sometime between late-spring and mid-summer, primarily during June and July. Channel Catfish are reported to spawn when water temperatures are between 70 and 84°F (Hubert 1999) and Flathead Catfish are reported to spawn when water temperatures are between 66 and 75°F (Jackson 1999). Both Channel Catfish and Flathead Catfish are cavity nesters, and males generally select secluded spawning sites—in undercut banks, hollow logs, or under rocks—where they prepare a nest by fanning out fine sediments and other debris. Females select a suitable nest and mate, and once eggs are deposited and fertilized, males defend the nest until the young hatch and leave.

Age, growth, and size structure

In general, Flathead Catfish grow to larger sizes and live longer than Channel Catfish. Similar to other Channel Catfish populations in northern states and Canada (e.g., Gerhardt and Hubert 1991; Haxton and Punt 2004; Siddons et al. 2016), Minnesota Channel Catfish populations are generally slower growing, later maturing, and longer lived than populations further south (Figure 5, e.g., Barada and Pegg 2011; Eder et al., 2016). Flathead Catfish growth rates and population characteristics are variable throughout their native range and seem less influenced by differences in climate from north to south (Kwak et al. 2006). Yet, in general, catfishes in Minnesota exhibit relatively slow to moderate growth and can be long-lived with some Flathead Catfish living more than 30 years (Shroyer 2018) and some Channel Catfish living more than 20 years. When harvest rates are relatively low, these population characteristics often result in fisheries with high proportions of large fish—which is generally desired by anglers. For instance, over 30% of Flathead Catfish sampled with hoop nets from the Minnesota River exceed 35 inches and over 20% of Channel Catfish sampled from the Red River with trot-lines exceed 28 inches (Wendel 2016a). Flathead Catfish and Channel Catfish grow fastest at young ages and may reach 16 inches within about 4 to 7 years, respectively (Tables 2 and 3). Growth slows with age, especially once fish reach sexual maturity, and trophy-sized Flathead Catfish greater than 38 inches are typically more than 20 years old and may grow less than half an inch per year. Similarly, trophy-sized Channel Catfish greater than 28 inches are typically older fish that are more than 15 years old. Channel Catfish in Minnesota generally reach sexual maturity when they are between 5 and 10 years old, but in some populations—such as the Red River—they usually do not reach sexual maturity until after age 10. Less is known about age at sexual maturity for Flathead Catfish in Minnesota waters, but presumably they reach sexual maturity at lengths of 15 to 20 inches (Minckley and Deacon 1959), corresponding to around ages 4 to 6 in the Minnesota River (Shroyer 2018).

Similar to most Minnesota fish species, catfishes dedicate most of their energy to producing sperm or eggs prior to the spawning season. After they finish spawning, they begin dedicating energy to growth in body size. Therefore, sexually mature catfishes in Minnesota only dedicate energy to growing larger during a relatively short period of time each year—primarily during July

and August—before water temperature becomes too cold for growth. Similarly, newly hatched catfishes also have a relatively short period of time to grow prior to their first winter, potentially only reaching 2 to 4 inches in length.

As stated above, catfishes generally have a slower growth potential in Minnesota than in warmer climates further south. However, catfishes exhibit latitudinal counter-gradients in growth which means that relative to the length of the growing season they actually grow faster in colder climates than in warmer southern climates (Rypel 2011). For example, in Minnesota, catfishes might only grow during a short two- or three-month period from late-June through early-September, whereas catfishes in southern states may grow during a four month or longer period. Therefore, catfishes in Minnesota can exhibit faster growth per month of the growing season than catfishes in more southern populations.

Growth rates of Channel Catfish are particularly variable among waterbodies in Minnesota. Growth is influenced by many factors including latitude, habitat type, population density, and food availability. As a result, catfish fisheries in Minnesota are variable, with some fisheries having higher density populations with generally smaller fish while other fisheries have lower density populations that primarily provide trophy fishing opportunities. In general, Channel Catfish grow faster in lakes than in rivers, but they tend to live longer and reach larger sizes in large rivers such as the Red River and St. Croix River.

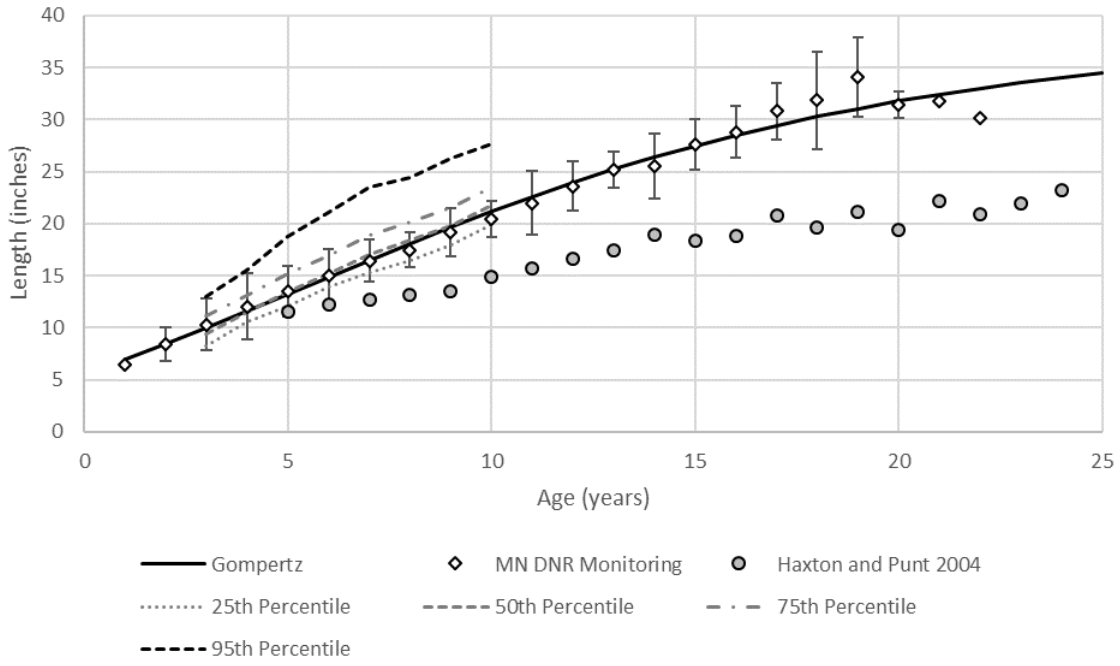

FIGURE 5. Channel Catfish Gompertz growth curve from the Red River of the North 1995 – 2015. North American range-wide percentiles from Hubert (1999) and another northern population, the Ottawa River (Haxton and Punt 2004), shown for comparison.

Migratory patterns and seasonal habitat use

Numerous studies have demonstrated that both adult Channel Catfish and adult Flathead Catfish exhibit annual migration patterns in rivers that can include long-distance upstream migrations associated with spawning and long-distance downstream migrations to overwintering habitats (e.g., Pellett et al. 1998; Fago 1999; Wendel 1999; Daugherty and Sutton 2005;

Gelwicks and Simmons 2011; Piette and Niebur 2011). A conceptual model presented in Figure 6 shows the generalized annual migration pattern of Flathead Catfish, and to some extent Channel Catfish, in the Minnesota River. In general, Channel Catfish and Flathead Catfish inhabiting rivers tend to congregate in specific overwinter habitats (Hawkinson and Grunwold 1979) beginning in November and remain in these overwintering habitats until the spring when water temperatures begin increasing past 50°F. During this over-wintering period, Flathead Catfish enter a state of hibernation—called torpor—and have been shown to exhibit almost zero movement. During spring—generally April or May—catfishes begin migrating away from overwintering habitats towards spawning sites or summer habitats. Spawning typically occurs during June or July, and most catfishes tend to migrate upstream or into smaller tributaries in search of suitable spawning habitat. During the spawning period some catfishes may exhibit little movement, especially while the males are preparing and defending nest sites. However, shortly after the spawning process is complete, adult catfishes may make significant migrations to specific summer habitats where they will likely remain for most of late-July through August and into September. Both Channel Catfish and Flathead Catfish have been shown to return to the same reach of river year after year, including Flathead Catfish in the Minnesota River (Shroyer 2011). As water temperatures begin cooling during late-September through October, Channel Catfish and Flathead Catfish begin migrating back to their overwintering habitats—which are typically downstream. In Minnesota, telemetry studies by MNDNR have shown that

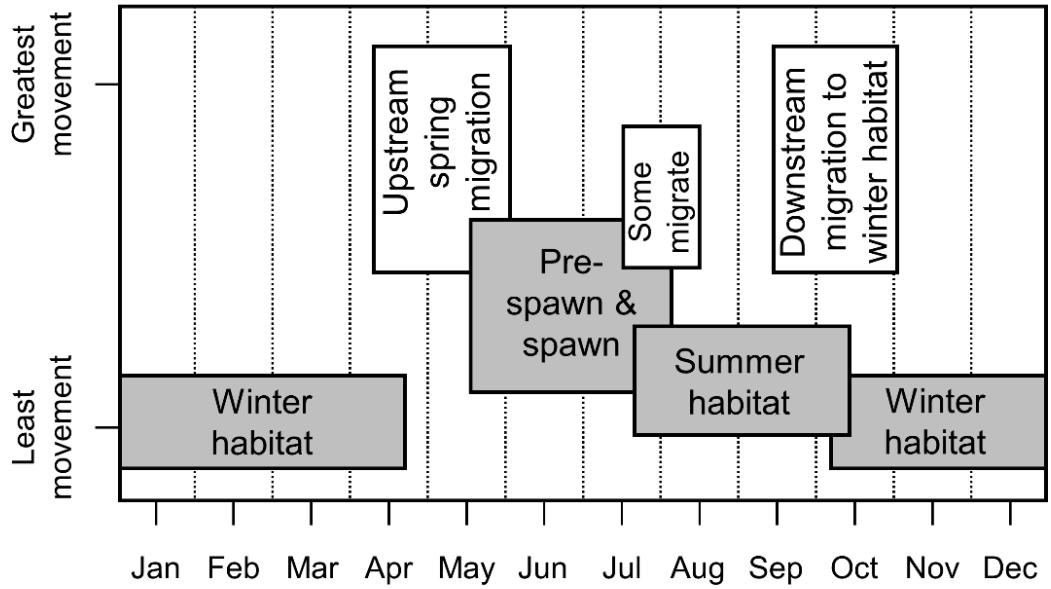

FIGURE 6. Conceptual diagram of Flathead Catfish movement patterns and behavior in the Minnesota River.

Flathead Catfishes regularly migrate between rivers and are able to pass both upstream and downstream through Mississippi River locks and dams. For instance, one Flathead Catfish initially captured in the Minnesota River annually traveled more than 175 miles between spawning habitats in the Minnesota River upstream of Mankato and overwintering habitat in Pool 3 of the Mississippi River.

CATFISH MANAGEMENT CHALLENGES, OBJECTIVES, AND STRATEGIES

Challenge 1
Sustainable “trophy” catfish fisheries are sensitive to over-harvest.

- Objective: Manage premier catfish fisheries for “trophy” angling opportunities while maintaining harvest opportunities.
- Strategy: Continue monitoring premier catfish fisheries with routine population assessments.
- Strategy: Conduct periodic creel surveys to quantify catfish angling effort, catch, and harvest.
- Strategy: Take an adaptive approach and use the best available information to inform management decisions.
- Strategy: Promote catch-and-release angling of large catfishes through harvest regulations, outreach efforts, and a catch-and-release record program for Flathead Catfish, and eventually Channel Catfish.

Challenge 2
Understanding of catfish biology is incomplete and catfish management is an evolving field of study.

- Objective: Use the best available information and a science-based approach to inform catfish management in Minnesota.
- Strategy: Support professional development and catfish management related training for fisheries staff.
- Strategy: Conduct applied research to inform catfish management decisions and catfish sampling methodologies.

Challenge 3
Achieving the agency’s primary catfish management goal requires frequent public input and a current understanding of catfish angler demographics and desires.

- Objective: Foster relationships with catfish anglers and monitor trends in catfish angler demographics and preferences.
- Strategy: Conduct periodic angler surveys and human dimension surveys that gather information about Minnesota’s catfish anglers.
- Strategy: Pursue opportunities to engage with catfish anglers.
- Strategy: Continue collaboration with the Citizen Catfish Workgroup.

Challenge 4
In river systems, Channel Catfish and Flathead Catfish exhibit migratory behavior and annual migrations up to hundreds of miles that can span multiple rivers and even multiple states and countries with varying management approaches.

- Objective: Improve understanding of migratory patterns and seasonal habitat requirements of catfishes in large river systems.
- Strategy: Continue utilizing the large network of acoustic telemetry receivers throughout the Mississippi River basin and Red River basin to monitor large-scale movements of acoustic-tagged catfishes.

- Strategy: Continue mark-recapture efforts that inform movement patterns and population characteristics of catfishes in large river systems.

Challenge 5
Several of Minnesota's premier catfish fisheries are border waters that are managed cooperatively with neighboring states.

- Objective: Cooperate with fisheries management agencies is neighboring states to effectively manage shared catfish populations and achieve management goals.
- Strategy: Maintain open communication with neighboring fisheries management agencies and seek opportunities for collaboration.

Challenge 6
Although catfishes can provide high catch rates and excellent harvest opportunities for shore anglers, many waterbodies have poor shoreline access or are unknown by anglers.

- Objective: Maintain, increase, and promote shore fishing opportunities with emphasis on urban catfishing opportunities.
- Strategy: Create or sustain urban Channel Catfish fisheries through stocking.
- Strategy: Identify and promote shore fishing opportunities.
- Strategy: Seek funding for developing or improving shore fishing access.

TABLES

TABLE 1. The most recent creel survey results from select river and lake catfish fisheries.

Fishery	Creel period	Percent of anglers targeting catfish	Channel Catfish catch rate by anglers targeting catfish	Estimated Channel Catfish harvest	Estimated Flathead Catfish harvest
Cross Lake (Pine County)	May 10–Sept. 30, 2014	2%	–	0.2/acre	–
Lake Pepin and Mississippi River Pool 4	Nov. 1, 2011–Oct. 31, 2013	<1%	–	<0.1/acre	<0.1/acre
Lake St. Croix (Washington County)	May 1–Oct. 31, 2013	3%	>0.2/hr	0.1/acre	<0.1/acre
Minnesota River	May 1–Oct. 21, 1998	72%	–	24.8/mile	6.0/mile
Minnesota River	April 27–October 31, 2022	50%	0.26/hr	16.1/mile	1.5/mile
Mississippi River (Dayton to St. Cloud)	May 10–Sept. 30, 1997	10%	0.1/hr	26.3/mile	–
Mississippi River Pool 2	April 1–Oct. 31, 1996 & 1997	11%	0.2/hr	0.1/acre	<0.1/acre
Pokegama Lake (Pine County)	May 10–Sept. 30, 2014	<1%	–	0.1/acre	–
Red River	May 1–Sept. 30, 2015	67%	>0.4/hr	17.2/mile	–
Sauk River chain of lakes (Stearns County)	April 4–Oct. 31, 2015	17%	1.0/hr	4.0/acre	–
Sauk River chain of lakes (Stearns County)	Dec. 3, 2014–March 22, 2015	12%	0.8/hr	1.6/acre	–
St. Louis River estuary	May 9–Oct. 31, 2015	3%	0.3/hr	<0.1/acre	–

TABLE 2. Typical length range of Minnesota Channel Catfish by age.

Age	Typical length range (inches)
2	6–10
3	8–12
4	10–14
5	12–16
6	13–17
7	15–19
8	16–21
9	17–22
10	19–24
11	20–26
12	20–27
13	21–28
14	21–29
15	22–30+

TABLE 3. Approximate average length-at-age of Minnesota River Flathead Catfish (modified from data collected by S. Shroyer).

Age	Average length (inches)
3	13
4	17
5	20
6	23
7	25
8	27
9	29
10	31
12	33
14	35
16	36
18	37
20	37
22	38
24	38
26	39
28	39
30	40

REFERENCES

Aadland, L.P., T.M. Koel, W.G. Franzin, K.W Stewart, and P. Nelson. 2005. Changes in fish assemblage structure of the Red River of the North. American Fisheries Society Symposium 45:293–321.

Altena, E. 2007. Mississippi River creel survey from St. Cloud to Coon Rapids, May 12–Sept. 30, 2007. Minnesota Department of Natural Resources study 4 completion report, job 794.

Barada, T. J., and M. A. Pegg. 2011. Population characteristics of Channel Catfish in the Platte River, Nebraska. Pages 81–94 *in* P. H. Michaletz and V. H. Travnichek, editors. Conservation, ecology, and management of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda, Maryland.

Bodine, K. A., D. E. Shoup, J. Olive, Z. L. Ford, R. Krogman, and T. J. Stubbs. 2013. Catfish sampling techniques: where we are now and where we should go. Fisheries 38:529–546.

Chapman, B. 2001. Angler creel survey of a 110 mile segment of the Minnesota River. Minnesota Department of Natura Resources study 4 completion report, job 466.

Cross, T., T. Polomis, and R. Davis. 1991. Use of Channel Catfish to Create an Urban Fishery in Lions' Lake, Mankato, Minnesota. Minnesota Department of Natural Resources Investigational Report No. 407.

Daugherty, D. J., and T. M. Sutton. Seasonal movement patterns, habitat use, and home range of Flathead Catfish in the lower St. Joseph River, Michigan. North American Journal of Fisheries Management 25:256–269.

Davis, R. 1985. Evaluation of Flathead Catfish as a Predator in a Minnesota Lake. Minnesota Department of Natural Resources Investigational Report No. 384.

Eder, B. L., G. E. Mestl, and M. A. Pegg. 2016. Temporal trends of Channel Catfish population characteristics in the Missouri River, Nebraska. The American Midland Naturalist 176:106–118.

Enblom, J. W. 1977. A biological reconnaissance of the Upper Mississippi River. Minnesota Department of Natural Resources Division of Fish and Wildlife, Section of Ecological Services. Special Publication 121, St. Paul.

Fago, D. 1999. Movement of Channel Catfish in the lower Wisconsin River using radio telemetry. Pages 177–185 *in* E. R. Irwin, W. A. Hubert, C. F. Rabeni, H. L. Schramm, Jr., and T. Coon, editors. Catfish 2000: proceedings of the International Ictalurid Symposium. American Fisheries Society, Symposium 24, Bethesda, Maryland.

Gelwicks, G. T., and G. A. Simmons. 2011. Range and seasonal movements of Flathead Catfish in the Iowa River, Iowa. Pages 443–453 *in* P. H. Michaletz and V. H. Travnichek, editors. Conservation, ecology and management of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda, Maryland.

Gerhardt, D. R., and W. A. Hubert. 1991. Population dynamics of a lightly exploited Channel Catfish stock in the Powder River system, Wyoming–Montana. North American Journal of Fisheries Management 11:200–205.

Gorton, J. M. 1998. Angler creel survey of Pool 2, Mississippi River. Minnesota Department of Natural Resources study 4 completion report, job 446.

Gorton, J. M., D. C. Sewell, and S. D. Morse. 1998. A creel survey of the St. Croix River. Minnesota Department of Natural Resources study 4 completion report, job 439.

Goundry, P. 2002. The heritage beneath our feet. The Forks North Portage Partnership, Winnipeg, Manitoba.

Hawkinson, B., and G. Grunwold. 1979. Observation of a Wintertime Concentration of Catfish in the Mississippi River. Minnesota Department of Natural Resources Investigational Report No. 365.

Haxton T., and K. Punt. 2004. Abundance and demography of Channel Catfish in a large northern river. North American Journal of Fisheries Management 24:1440–1446.

Hoxmeier, J., M. McInerny, M. Habrat, N. Hodgins, E. Katzenmeyer, C. Shavlik, and J. Stewig. 2018. Division of Fish and Wildlife guidelines for age and growth estimation of Minnesota Fishes, Ver. 1.01. Minnesota Department of Natural Resources completion report, Study 671.

Hubert, W. A. 1999. Biology and Management of Channel Catfish. Pages 3–22 *in* E. R. Irwin, W. A. Hubert, C. F. Rabeni, H. L. Schramm Jr., and T. Coon, editors. Catfish 2000: proceedings of the International Ictalurid Symposium. American Fisheries Society, Symposium 24, Bethesda, Maryland.

Jackson, D. C. 1999. Flathead Catfish: Biology, Fisheries, and Management. Pages 23–36 *in* E. R. Irwin, W. A. Hubert, C. F. Rabeni, H. L. Schramm Jr., and T. Coon, editors. Catfish 2000: proceedings of the International Ictalurid Symposium. American Fisheries Society, Symposium 24, Bethesda, Maryland.

Kelsch, S. W., and J. L. Wendel. 2004. Lotic habitat availability and use by Channel Catfish in the Red River of the North. Journal of Freshwater Ecology 19:473–484.

Kwak, T. J., W. E. Pine III, and D. S. Waters. 2006. Age, growth, and mortality of introduced Flathead Catfish in Atlantic Rivers and a review of other populations. North American Journal of Fisheries Management 26:73–87.

Lysack, W. 1986. The angling fishery of the lower Red River. Manitoba Natural Resources, Fisheries, Manuscript report No. 86-16.

Macdonald, D. 1990. The channel catfish sport fishery of the lower Red River. Master's thesis. University of Manitoba, Winnipeg, MB.

Miller, H.M. 2018. Fishing in Minnesota: A Study of Angler Participation and Activities−2018 Final Report. University of Minnesota, Minnesota Cooperative Fish and Wildlife Research Unit, Department of Fisheries, Wildlife, and Conservation Biology.

Minckley, W. L., and J. E. Deacon. 1959. Biology of the flathead catfish in Kansas. Transactions of the American Fisheries Society 88:344-355.

MNDNR. 2017. Red River of the North management plan, 2017-2027. Minnesota Department of Natural Resources, Bemidji, MN.

MNDNR. 2018. Minnesota River fisheries management plan 2018-202. Minnesota Department of Natural Resources.

Muhlbauer, S. R., and R. M. Krogman. 2021. Evaluation of potential regulations for improving Flathead Catfish size structure in Iowa's large reservoirs. North American Journal of Fisheries Management.

Pellett, T. D., G. J. Van Dyck, and J. V. Adams. 1998. Seasonal migration and homing of Channel Catfish in the lower Wisconsin River, Wisconsin. North American Journal of Fisheries Management 18:85–95.

Piette, R. R., and A. D. Niebur. 2011. Movement of adult male Flathead Catfish in the upper Fox River and Wolf River systems determined by radiotelemetry. 455–471 *in* P. H. Michaletz and V. H. Travnichek, editors. Conservation, ecology and management of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda, Maryland.

Rypel, A. L. 2011. Meta-analysis of growth for five North American catfishes: effects of climate, hydrologic habitat, and latitudinal countergradients. Pages 661–677 *in* P. H. Michaletz and V. H. Travnichek, editors. Conservation, ecology and management of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda, Maryland.

Schall, B. J., and D. O. Lucchesi. 2021. Population dynamics and simulated effects of length-based trophy regulations for Flathead Catfish and Channel Catfish in the Lower James River, South Dakota. North American Journal of Fisheries Management.

Schroeder, S., and D. C. Fulton. 2004. Fishing in Minnesota: A Study of Angler Participation and Activities. University of Minnesota, USGS Minnesota Cooperative Fish and Wildlife Research Unit.

Shroyer, S. M. 2018. Population dynamics of Flathead Catfish in the lower Minnesota River. Minnesota Department of Natural Resources, Section of Fisheries, Investigational Report 564, St. Paul.

Siddons, S. F., M. A. Pegg, N. P. Hogberg, and G. M. Klein. 2016. Age, growth, and mortality of a trophy Cannel Catfish population in Manitoba, Canada. North American Journal of Fisheries Management 36:1368–1374.

Sindt, A. R. 2021. Comparing Channel Catfish populations in the fragmented Minnesota River. North American Journal of Fisheries Management.

Sindt, A. R. 2023. Minnesota River Creel Survey April 27–October 31, 2022. Minnesota Department of Natural Resources study 4 completion report, job 1156.

Stange, D. 2020. Catfish chronicles; Lockport on the Red. In-Fisherman Catfish In-Sider. Baxter, MN.

Stewart, D. R., J. M. Long, and D. E. Shoup. 2016. Simulation modeling to explore the effects of length-based harvest regulations for *Ictalurus* fisheries. North American Journal of Fisheries Management 36:1190–1204.

Stiras, J. 2008. Special Assessment River Survey, Upper Mississippi River, Pool 2, 2008.

Varian, A., and D. Hendrickson. 2017. Access based creel survey of the open water and winter fishery 2015–2016 and Walleye population estimate on the St. Louis River Estuary, St. Louis County, MN and Douglas County, WI. Minnesota Department of Natural Resources study 4 completion report, job 998.

Walsh, R. J., and J. T. Levitt. 2004. A creel survey of select channel catfish lakes and kids' fishing ponds in the Twin Cities metropolitan area. Minnesota Department of Natural Resources study 4 completion report, job 661.

Weller, R. R., and J. D. Winter. 2001. Seasonal variation in home range size and habitat use of Flathead Catfish in Buffalo Springs Lake, Texas. North American Journal of Fisheries Management 21:792–800.

Wendel, J.L. 1999. Habitat use and movements of Channel Catfish in the Red River of the North. Master's thesis, University of North Dakota, Grand Forks, ND.

Wendel, J. 2016a. Red River of the North Channel Catfish Population Assessment, Summer 2015. Minnesota Department of Natural Resources, Division of Fish and Wildlife, Detroit Lakes, MN

Wendel, J. 2016b. Red River of the North creel survey May 1 to September 30, 2015. Minnesota Department of Natural Resources study 4 completion report, job 961.

APPENDIX A. QUALITY AND TROPHY CHANNEL CATFISH FISHERIES IN MINNESOTA

Name	DOW or Kittle	Type	County
Alden Lake	69013100	Quality	St. Louis
Ann Lake	33004000	Trophy	Kanabec
Artichoke Lake	06000200	Quality	Big Stone
Betty Lake	47004200	Trophy	Meeker
Big Kandiyohi Lake	34008600	Trophy	Kandiyohi
Big Sandy Lake	01006200	Quality	Aitkin
Big Swan Lake	34008600	Trophy	Meeker
Big Twin Lake	46013300	Quality	Martin
Bloody Lake	51004000	Quality	Murray
Blue Earth River	M-055-076	Trophy and quality reaches	Blue Earth, Faribault
Bois de Sioux River	H-026	Trophy	Traverse, Wilkin
Buffalo Lake	86009000	Trophy	Wright
Buffalo River	M-026-056	Trophy and quality reaches	Clay
Cannon Lake	66000800	Trophy	Rice
Cannon River	M-048	Quality	Multiple
Chippewa River	M-055-158	Quality	Chippewa
Clear Lake	46009600	Quality	Martin
Clearwater River	H-026-030-019	Quality	Red Lake
Cloquet River	S-002-016	Quality	St. Louis
Cokato Lake	86026300	Trophy	Wright
Colby Lake	69024900	Quality	St. Louis
Cottonwood River	M-055-095	Quality	Brown
Cross Lake	58011900	Trophy	Pine
Crow River	M-064	Trophy	Hennepin, Wright
Dayton Hollow Reservoir	56082400	Trophy	Otter Tail
Des Moines River	I-037	Quality	Cottonwood, Jackson
Eden Lake	73015000	Trophy	Stearns
Emily Lake	61018000	Quality	Pope
Fairmont Chain of Lakes	Multiple	Quality	Martin
Fish Lake	33003600	Trophy	Kanabec
Fond du Lac Reservoir	09016700	Trophy	Carlton
Fountain Lake	24001800	Trophy	Freeborn
Fox Lake	51004300	Quality	Murray
Hunter Lake	69039600	Quality	St. Louis
Island lake Reservoir	69037200	Trophy	St. Louis
Kettle River	M-050-046	Quality	Pine
Lac qui Parle Lake	37004600	Trophy	Lac qui Parle
Lac qui Parle River	M-055-166	Quality	Lac qui Parle
Lake Byllesby	19000600	Quality	Dakota
Lake Hanska	08002600	Quality	Brown
Lake Marion	43008400	Trophy	McLeod
Lake Okabena	53002800	Quality	Nobles
Lake Pepin	25000100	Trophy	Goodhue
Lake St. Croix	82000100	Trophy	Washington
Lake Traverse	78002500	Trophy	Traverse
Le Sueur River	M-055-076-001	Trophy	Blue Earth
Little Alden Lake	69013000	Quality	St. Louis
Little Rock Lake	05001300	Quality	Benton
Little Spirit Lake	32002400	Quality	Jackson
Marsh Lake	06000100	Quality	Big Stone
Minnesota River	M-055	Trophy and quality reaches	Multiple
Mississippi River	M	Trophy and quality reaches	Multiple

Mustinka River	H-026-092	Trophy	Traverse
North Fork Crow River	M-064	Quality	Wright, Meeker
Okamanpeedan Lake	46005100	Quality	Martin
Orwell Reservoir	56094500	Trophy	Otter Tail
Otter Lake	43008500	Trophy	McLeod
Otter Tail River	H-026-081	Trophy	Wilkin, Otter Tail
Pokegamma Lake	58014200	Trophy	Pine
Pomme de Terre River	M-055-179	Quality	Swift
Red Lake River	H-026-030	Trophy	Multiple
Red River	H-026	Trophy	Multiple
Redwood River	M-055-126	Quality	Redwood
Roberds Lake	66001800	Trophy	Rice
Root River	M-009	Quality	Houston
Roseau River	H-024	Trophy	Roseau
Sand Hill River	H-026-038	Trophy and quality reaches	Polk
Sauk River	M-074	Quality	Stearns
Sauk River Chain of Lakes	Multiple	Quality	Stearns
Shetek Lake	51004600	Quality	Murray
Side Lake	69051900	Quality	St. Louis
Snake River	M-050-044	Trophy and quality reaches	Pine, Kanabec
South Fork Crow River	M-064-005	Quality	Multiple
St. Croix River	M-050	Trophy	Multiple
St. Louis River	S-002	Trophy and quality reaches	St. Louis, Carlton
St. Louis River Estuary	69129100	Trophy	St. Louis
Swan Lake	43004000	Trophy	McLeod
Thompson Reservoir	09000100	Trophy	Carlton
Two Rivers River	H-026-009	Trophy	Kittson
Vails Lake	73015100	Trophy	Stearns
Watonwan River	M-055-076-003	Quality	Blue Earth
Wells Lake	6001000	Trophy	Rice
West Graham Lake	53002100	Quality	Nobles
Whiteface Reservoir	69037500	Quality	St. Louis
Wild Rice River	H-026-047	Trophy and quality reaches	Norman, Mahnomen
Wood Lake	87003000	Trophy	Yellow Medicine
Yellow Medicine River	M-055-146	Quality	Yellow Medicine
Zumbro Reservoir	55000400	Quality	Olmsted
Zumbro River	M-034	Quality	Wabasha

APPENDIX B. MINNESOTA DEPARTMENT OF NATURAL RESOURCES PUBLISHED STUDIES ON CATFISHES AND CATFISH FISHERIES (IN CHRONOLOGICAL ORDER)

Skrypek, J.L. 1965. Three years of winter catfish angling on Lake Pepin, 1962-1965. Minnesota Department of Natural Resources Investigational Report No. 286.

Hawkinson, B., and G. Grunwold. 1979. Observation of a Wintertime Concentration of Catfish in the Mississippi River. Minnesota Department of Natural Resources Investigational Report No. 365.

Davis, R. 1985. Evaluation of Flathead Catfish as a Predator in a Minnesota Lake. Minnesota Department of Natural Resources Investigational Report No. 384.

Cross, T., T. Polomis, and R. Davis. 1991. Use of Channel Catfish to Create an Urban Fishery in Lions' Lake, Mankato, Minnesota. Minnesota Department of Natural Resources Investigational Report No. 407.

Topp, D., H. Drewes, M. Henry, G. Huberty, and P. Jacobsen. 1994. An assessment of the Red River Fishery, with special emphasis on Channel Catfish. Minnesota Department of Natural Resources study 4 completion report, job 242.

Stauffer, K. R. Binder, B. Chapman, and B. Koenen. 1996. Population characteristics and sampling methods of flathead catfish (Pylodictis olivaris) in the Minnesota River. Minnesota Department of Natural Resources study 4 completion report, job 389.

Stauffer, K. W., and B. D. Koenen. 1999. Comparison of methods for sampling Flathead Catfish in the Minnesota River. Pages 329-333 *in* E. R. Irwin, W. A. Hubert, C. F. Rabeni, H. L. Schramm Jr., and T. Coon, editors. Catfish 2000: proceedings of the International Ictalurid Symposium. American Fisheries Society, Symposium 24, Bethesda, Maryland.

Altena, E. R. 2000. Horseshoe/Becker and Cedar Island lakes creel survey with reference to an expanding channel catfish population, May 8 to Oct. 31, 1999. Minnesota Department of Natural Resources study 4 completion report, job 496.

Walsh, R. J., and J. T. Levitt. 2004. A creel survey of select channel catfish lakes and kids' fishing ponds in the Twin Cities metropolitan area. Minnesota Department of Natural Resources study 4 completion report, job 661.

Chapman, B. 2001. Angler creel survey of a 110 mile segment of the Minnesota River. Minnesota Department of Natura Resources study 4 completion report, job 466.

Chapman, B. 2002. Special sampling of Flathead Catfish in the Minnesota River. Minnesota Department of Natural Resources study 4 completion report, job 542.

Schultz, B. E. 2008. A history of Channel Catfish stocking and effects of Channel Catfish stocking on Black Bullhead populations in southern Minnesota lakes. Minnesota Department of Natural Resources study 4 completion report, job 800.

Stiras, J. K., and L. M. 2011. East Metro Area catfish special assessment, 2009-2010. Minnesota Department of Natural Resources study 4 completion report, job 866.

Shroyer, S. M. 2011. Movement and site fidelity of Flathead Catfish in the Minnesota River. Pages 473-483 *in* P. H. Michaletz and V. H. Travnichek, editors. Conservation, ecology, and management of catfish: the second international symposium. American Fisheries Society, Symposium 77, Bethesda, Maryland.

Wendel, J. 2016. Red River of the North creel survey May 1 to September 30, 2015. Minnesota Department of Natural Resources study 4 completion report, job 961.

Shroyer, S. M. 2018. Population dynamics of Flathead Catfish in the lower Minnesota River. Minnesota Department of Natural Resources, Section of Fisheries, Investigational Report 564, St. Paul.

Sindt, A. R. 2018. Evaluation of unbaited hoop nets for simultaneously assessing Channel Catfish and Flathead Catfish populations in the Minnesota River. North American Journal of Fisheries Management 38:538-548.

Sindt, A. R. 2021. Comparing Channel Catfish populations in the fragmented Minnesota River. North American Journal of Fisheries Management, Special Issue 1 41:S146-S155.

Sindt, A. R. 2023. Minnesota River Creel Survey April 27–October 31, 2022. Minnesota Department of Natural Resources study 4 completion report, job 1156.

APPENDIX C. CATFISH MANAGEMENT ON BORDER WATER FISHERIES

Mississippi River

History and regulations—

Catfish have a long commercial and recreational harvest history on the Mississippi River. Records collated by the Upper Mississippi River Conservation Committee (UMRCC) for commercial catch go back to 1953. Prior to 1992 Flathead, Channel, and Blue Catfish harvests were lumped together for reporting purposes and commercial catch from both states bordering a particular river pool were grouped. The Minnesota border waters portion of the Mississippi River is made up of all or parts of Pools 3 through 9. There is an extensive commercial fishery for catfish (primarily Channel Catfish) in Pool 9, however the majority of that pool is outside of Minnesota and in the Iowa/Wisconsin border reach. The catfish catch from Pool 9 consistently equaled the catch from Pools 3 through 8 combined during the 1950s and 1960s. By the early 1990s the Pool 9 catch was just under half of the combined catch from the other pools. The commercial catch data from 1992 to present is recorded by species. Catch of both Channel and Flathead Catfish has decreased, most likely due to reductions in the number of active licensed commercial operators on the river. Pool specific catch data is available in the annual commercial report (MN Commercial Fish Harvest Report MN/WI Border Waters – Mississippi River) in the Lake City Area Fisheries files. Additional information can be found in the species-specific chapters of the UMRCC Fisheries Compendium 4th Edition.

A change in Minnesota Administrative Rule on March 5, 2020 consolidated the states definition of “Rough Fish” resulting in the removal of catfish from the “Rough Fish” designation for the Minnesota/Wisconsin border waters. As a result of this change the only legal way Minnesota licensed commercial anglers can harvest catfish from the Minnesota/Wisconsin border waters is by seine from October 1st through April 3rd, and only up to 100 pounds of catfish over 15 inches in length may be retained as catch incidental to commercial operations. This change functionally ended commercial harvest of catfish by Minnesota licensed commercial operators on the border waters.

Recreational fisheries for catfish have also existed on all border water pools of the Mississippi River. In the early 1900s through the 1920s regulations changed often, though generally catfish bag limits were permissive (except when constrained by overall fish limits) and sale of recreationally caught fish was generally allowed. A variety of minimum lengths were applied to catfish regulations in the 1930s through 1950s but generally the bag limit for catfish was unlimited on the Mississippi River border waters. Starting around 1960 efforts were made to standardize regulations between Minnesota and Wisconsin. This resulted in removal of minimum size limits for catfish in both states and agreement on a daily bag limit of 25 catfish (species combined). In 1967 Wisconsin adopted a year-round open season on the Mississippi River border waters with Minnesota adopting a matching season in 1969. Wisconsin’s catfish regulations and seasons on the Mississippi River did not change from 1967 through 2019, while Minnesota’s only changes were a reduction in the daily bag limit to 10 in 1978 and the addition of a closed season for Flathead Catfish from November 30th through April 1st beginning in 2015.

Beginning in 2018 a concerted effort by both Minnesota and Wisconsin Department of Natural Resources (WIDNR) staff began to review all recreational bag and size limits on the Mississippi River portion of their shared border. After two rounds of public input, new regulations were

enacted in the spring of 2020. In most cases regulations were made more conservative with the implementation of lower bag limits or the addition of size limits. Both of these aspects were applied to the catfish regulation. Prior to 2020 the regulations for catfish (Flathead and Channel combined) included a daily bag of 25 in Wisconsin and 10 in Minnesota with no size limits in either state. While nothing indicated imminent stress in the populations of either species, there was strong concern among stakeholders and management agencies that potential exploitation of Flathead Catfish in particular could be unsustainable if exercised to the extent of the regulation. Therefore, a combined 10 fish bag limit (species combined) with no more than 1 fish (of either species) over 30” was instituted as the new regulation. The unified bag limit across state lines provided protection from potential overharvest of trophy individuals of both species and maintained harvest opportunities for anglers. The protection of the larger individuals provided by the new regulations gained importance when the Wisconsin legislature passed Wisconsin Act 297 during 2017 which added catfish to the species targetable while bowfishing and prohibited the WIDNR from enforcing rules prohibiting the taking of catfish by hand (“noodling”). Current monitoring of the popularity and potential impacts of these methods, particularly bowfishing, on catfish populations is underway in Wisconsin.

Current activities and goals—
The MNDNR currently has several catfish monitoring efforts planned for the Mississippi River border waters. Starting in 2021, catfish collected as part of the annual Large Lake Program gillnet survey on Lake Pepin are being aged using pectoral spines. The 2022 survey will also determine catfish sex and maturity in addition to age. This data collection will quickly develop one of the largest catfish age and growth datasets in the state of Minnesota if continued long term.

Neil Rude (Mississippi River Habitat Specialist, MNDNR) is nearing completion of a multiyear effort to evaluate the status of the Flathead Catfish populations in Pools 3 through 9 of the Mississippi River. Annual low frequency electrofishing is conducted during the month of June on a subset of the Pools such that a three-year cycle is achieved.

The MNDNR Large Lake Program on Lake Pepin/Pool 4 is also implementing a 24-month creel survey to evaluate the impacts of the 2020 regulation changes and the use of trail cameras for estimating angling effort. The use of trail cameras may provide better insight into the actual amount of angling pressure targeting catfish (particularly Flathead Catfish) that often occurs outside of normal daylight creel hours.

Red River

History and regulations—
A Channel Catfish fishery has existed on the Red River of the North for over 6,000 years (Goundry 2002). At a Red River archeological site near Lockport, Manitoba, 90% of fish bones discovered were from catfish harvested roughly 3,000 years ago. From the size of the bones, it was apparent that a wide size range of fish were exploited, with some estimated to be near 35 pounds (Macdonald 1990).

Over the past 50 years, management of the Red River became a priority as the fishery’s notoriety increased due to exposure in outdoor media (Macdonald 1990). The fishery was featured on a 1985 episode of Babe Winkleman’s “Good Fishing,” and shortly thereafter Selkirk, Manitoba, began marketing itself as the Catfish Capital of North America (Macdonald 1990). In print, In-Fisherman magazine (and later television) became a promotor of the unique

opportunities available in the Red River in 1986 (Stange 2020). Fishing pressure and interest in the river's Channel Catfish increased rapidly.

Overharvest and preservation of the large size structure were early management concerns. American anglers, predominantly from Iowa (Macdonald 1990), began appearing in increasing numbers on Canadian reaches of the Red River during the 1970s and 1980s, and provincial authorities were concerned by the large numbers of large catfish harvested by these parties (Macdonald 1990). These specific angler observations prompted Manitoba to introduce an 8 fish creel limit in 1981. Shortly thereafter, Lysack (1986) conducted a creel survey on a ten-mile segment of Red River near Lake Winnipeg and found that an estimated 7,920 lbs. of Channel Catfish were harvested in the study area. Of these, 90% were larger than 30 inches. Manitoba reduced the creel limit to 4, only one of which could be over 30 inches. A follow-up study (Macdonald 1990) confirmed this regulation was successfully reducing harvest of large fish.

In 1988, Minnesota, North Dakota, South Dakota and Manitoba convened a catfish coordination meeting, and in 1990 created the International Red River Fisheries Management Steering Committee as a standing work group. The group's focuses were providing protection for the Red River's Channel Catfish population from over harvest, coordinating assessments in the basin, and developing a joint fisheries management plan. Concurrently, North Dakota and Minnesota enacted regulations in 1990 that restricted angler harvest of Channel Catfish to five fish in possession, only one of which could be over 24 inches. In 1992, Manitoba went a step further and adopted a maximum size limit for Channel Catfish ≥ 24 inches (no harvest of Channel Catfish ≥ 24 inches) for the Red River.

During 1988–2000, North Dakota regulations included a continuously open fishing season on Red River, while Minnesota retained a closed season for sport fish from March 1 through the first Friday in May. In 2000, Minnesota adopted the year-round open season for Channel Catfish. Currently, the fishing season is continuous on the Minnesota/North Dakota border waters of the Red River. Regulations for Channel Catfish remain a creel limit of five fish with only one over 24 inches in US waters. Two lines per angler are allowed.

Current activities and goals—
The Red River Channel Catfish fishery is managed to maintain the uniquely old, trophy size structure. A standard population survey is conducted once every 5 years, and a creel survey runs concurrently with the population survey. Responsibility for the creel survey alternates between NDG&F and MNDNR. The concurrent surveys are meant to provide a snapshot of the fishery's angler use dynamics and population structure.

Additionally, MNDNR and other US agencies collaborate with Manitoba Sustainable Resource Management, Department of Fisheries and Oceans Canada, and university partners to conduct research on various fisheries topics in the Red River Basin. These activities are coordinated under the Aquatic Ecosystem Committee of the International Joint Commission, established by the 1909 Border Waters Treaty.

Habitat improvement and barrier removal are major management activities in the Red River Basin. The Red River Basin benefits from the "1998 Mediation Agreement Project Team Process," which was established in the wake of the devastating 1997 flood and subsequent legal controversy around water control proposals. This formalizes the process for how the MNDNR, Red River Water Management Board, individual watershed districts, and other partners interact on water management projects. It also formalizes how natural resource

enhancements (NREs) are incorporated into project plans and provides funding formulae. Dam removal/modification projects are aggressively pursued; of the 77 dams or major fish barriers in the basin, 40 have been removed to date, with another 8 expected completions in the next 1-5 years. Additionally, experience has shown river restorations can reduce drainage system maintenance costs and agricultural damages; thus, DNR partners with watershed districts to restore natural or nature-like function to rivers and streams. Projects range in scale from 1-mile drainage ditch reconstructions to 20-mile re-meanderings of channelized river segments.

St. Croix River

While the St. Croix River fish populations have been surveyed for decades using gill nets, trap nets, and electrofishing, the first attempt at targeted catfish surveys did not occur until 2006. The 2006 catfish survey used trot-lines, but catches were poor. The poor success of the 2006 survey led to a catfish tagging project that was conducted from 2009 through 2015 and conducted on the lower St. Croix River and Pool 2 of the Mississippi River. However, capturing sufficient numbers of catfishes in the St. Croix River was difficult, especially Flathead Catfish. Low-frequency electrofishing was effective for capturing Flathead Catfish in Pool 2, but lower water conductivity in the St. Croix did not elicit the same response to electricity and was generally ineffective.

The St. Croix River has a reputation for producing trophy-sized Channel Catfish and Flathead Catfish. Catfish regulations have rarely changed on the St. Croix River. A continuous season and 10 catfish harvest limit was in effect from 1974 through 2014. In 2015, a harvest season was implemented on Flathead Catfish from April 1 to November 30. However, the regulation only applies to Minnesota territorial waters since Wisconsin has not adopted the same regulation.

St. Louis River

History and regulations—

The St. Louis River Estuary (SLRE) has a surface area of 10,255 acres and extends from the Fond du Lac Dam to the Wisconsin Entry from Lake Superior on Minnesota Point. The SRLE is an open system directly connected to Lake Superior. The fish community is very diverse with approximately 70 species being sampled over survey history, including Channel Catfish. Prior to 1978 no fisheries management was conducted by the MNDNR due to water pollution and very low fishing pressure. Water quality has since improved dramatically after the Western Lake Superior Sanitary District began treating industrial and municipal effluent from Cloquet and Duluth in 1979. The area from the Minnesota/Wisconsin boundary cable to the Fond du Lac Dam is entirely within Minnesota and is managed as a permanent fish sanctuary. While the sanctuary's main purpose is to protect critical spawning habitat for Walleye and Lake Sturgeon it offers protection for Channel Catfish at various times of the year as well.

Channel Catfish have not been stocked in the SLRE. The re-establishment of Channel Catfish after water quality improved was likely a result of downstream migration from the St. Louis River population above Cloquet. Channel Catfish are currently co-managed with Wisconsin DNR with a bag limit of 10 and no minimum length for harvest.

The Minnesota DNR closely coordinates management efforts and exchanges information with other government, tribal, public, and private entities that are active within the estuary (WIDNR, USFWS, Fond du Lac Resource Management, 1854 Treaty Authority, MPCA, USACE, US

Coast Guard, NRRI, Minnesota Sea Grant, University of Minnesota-Duluth, University of Wisconsin-Superior, SLRA, US-EPA, NERR, and the Seaway Port Authority).

Current activities and goals—
Channel Catfish were first sampled from the estuary in 1983. Since then, standard gillnet catches have ranged from 0.1 per net to 6.8 per net. Net catches have shown an increase over time. In a standard survey in 2020, 111 Channel Catfish were captured at an abundance of 5.3 per gillnet which was double the average of the previous 20 investigations. Average size was 15.3 inches. Similar results were observed in 2021. Concurrently, an increasing percentage of the angling population have been targeting Channel Catfish during the summer based on data collected from creel surveys. The St. Louis River Estuary is sampled annually with standard MNDNR gill nets. While the survey is intended for all species it provides abundance indices for Channel Catfish as well. Currently there are no goals or management activities directed specifically towards Channel Catfish.

APPENDIX D. EXAMPLES OF COMMENTS AND QUESTIONS FROM CITIZEN CATFISH WORKGROUP MEMBERS

During spring of 2023, Citizen Catfish Workgroup members were given the opportunity to review the Synopsis of Minnesota Catfish Fisheries and Management and provide comments and questions. The list below generalizes several of the substantive questions and comments.

- Do we know if more people are fishing the Minnesota River for catfish than in pools of the Mississippi River when creel surveys aren't conducted at night when most people are out catfishing?
- Why does the closed season for Flathead Catfish start in December? Should it start in November instead? Will Wisconsin adopt a similar closed season for border waters?
- I disagree with studies saying restrictive harvest and protecting trophy fish have minimal effect on populations. Is there more information and interpretation available for the papers cited regarding the effectiveness of various regulations for increasing the number of larger catfish in a population?
- Explain the rational for potentially re-stocking Channel Catfish into a lake after a winterkill.
- Can voluntary angler diaries be used to help understand catfish angling effort, catch, and harvest?
- Since telemetry data show that some catfish and sturgeon can pass through dams on the Mississippi River, why is it that removing dams and fish passage barriers will help catfish?
- Catfish regulations in Minnesota have been proactive and ahead of their time for maintaining trophy regulations.
- River degradation is an ongoing problem due to drainage.
- Do Channel Catfish or Flathead Catfish spawn first?
- Water temperature and flow conditions will impact how much and how far Channel Catfish migrate for spawning.
- Red River creel survey and my observations indicate that shore fishing participation is declining. Why might this be and what can we do about it?