

2021 Lake Sturgeon Research and Stocking Summary

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The 2021 Black Lake research season began on April 12th when Michigan State University (MSU) and Michigan Department of Natural Resources (MDNR) researchers captured 2 adult Lake Sturgeon ascending the Upper Black River. Radio Frequency Identification (RFID) data indicated the first sturgeon entered the river on April 7th, 2021 with the first fish reaching the spawning grounds on April 11th.

A total of 351 adult Lake Sturgeon were captured during the spawning season, of which 64 were captured for the first time (18.23%). Of the first time captures, three fish were confirmed to be of hatchery origin. The largest single day capture was on May 4th, where the crew sampled 56 fish. The largest fish captured this year was a 6.1-oot female that weighed 131.62 pounds. Gametes were collected from spawning Lake Sturgeon and transported to the Streamside Rearing Facility for fertilization and rearing. In total 1,189 unique individual Lake Sturgeon have been captured in the Upper Black River since 2001.

In addition to raising eggs in the hatchery, wild larval Lake Sturgeon were captured as they drifted downstream. Previous research conducted by MSU and MDNR found that wild larvae represent the highest quality genetic source stock, so MSU and MDNR make an effort to fulfill all stocking quotas with fish captured in the wild, where possible. This year, larval drift sampling began on May 21st and continued sparsely until June 14th. At the historical drift site, MSU personnel captured 31,303 larvae across 23 drift nights.

In 2021, 494 Lake Sturgeon were released into the Black River. All fish that were stocked into the Black River were implanted with a passive integrated transponder tag, which will aid future management efforts. In addition, 489 Lake Sturgeon were released into Mullet Lake, all of which were implanted with a PIT tag.

At the direction of the Lake Sturgeon committee and in collaboration with the United States Fish and Wildlife Service, Black Lake Sturgeon for Tomorrow, and Michigan Sea Grant, fall fingerling Lake Sturgeon were released into the Titabawassee (n = 117), Flint (n = 122), Shiawassee (n = 115), and Cass Rivers (n = 114), respectively as part of an ongoing rehabilitation and research effort. This project will continue at an approximate density of 125 Lake Sturgeon from the Black River Streamside Rearing Facility for the foreseeable future.

Researchers conducted a mark-recapture assessment across four transects from the mouth of the river to Red Bridge

nightly from dusk until completion during the week of August 1st, 2021. 26 fish were recaptured across three recapture nights. Efforts to derive a population estimate for 2021 are ongoing.

Research efforts in 2021 focused on factors contributing to reproductive success; particularly those that can be quantified by data collected from Radio Frequency Identification (RFID) antennas placed throughout the Upper Black River including migratory strategy, inter-annual migratory trade-offs and sperm quality. This work resulted in a publication in the



University of Manitoba Graduate Student, Alaina Taylor, holds an adult lake sturgeon in 2021

Canadian Journal of Fisheries and Aquatic Sciences.

Additionally, 2021 marked the final year of a project evaluating the factors contributing to olfactory imprinting by age-0 Lake Sturgeon. Graduate Student Jake Kimmel raised a small number of Lake Sturgeon under differing water combinations (ground water, Black River Water) to differentiate when Age-

0 Lake Sturgeon imprint on their natal water. Additionally, Jake

monitored the changes in amino acid consistency in the Upper Black River as this has shown to differentiate imprinting in salmonid smolts. Analysis of that data is ongoing.

Finally, Michigan State University collaborated with Dr. Gary Anderson and graduate student Alaina Taylor to collect fin ray samples from adult lake sturgeon for elemental signature analysis. Elemental signatures in fin rays have been used to predict past life history events in fish, such as migration, habitat use, and exposure to pollutants. This study aimed to compare fin rays to known life history events (i.e. point of first known spawn) to determine if onset of sexual maturity can be identified based on elemental composition and/or morphology of the fin ray. Pectoral fin clips were collected from the Black Lake sturgeon population because it has been closely monitored since 2001. Individuals inter-spawning intervals were available from fish tagged with Passive Integrated Transponder (PIT) tags and monitoring with Radio Frequency Identification (RFID) antennas (established 2016).

Continuing research through MSU includes: the selective properties of female lake sturgeon ovarian fluid; downstream outmigration of drifting Lake Sturgeon and the consequences for recruitment; behavioral plasticity as a function of intra-species reproductive competition and its consequences for current and future reproduction; the interaction of predatory and herbaceous macroinvertebrates, fungi, antibiotics and lake sturgeon eggs; and feeding efficiency of Lake Sturgeon in the hatchery. In total, Michigan State University published 11 papers related to lake sturgeon in Black Lake in 2021. Additionally, six manuscripts are in revision or review.