

## Gull Lake Fish and Mudpuppy Mortality - spring 2018

DNR Fisheries received multiple reports of small numbers of dead fish or mudpuppy *Necturus maculosus* along the shore of Gull Lake during May and June 2018. In addition, reports of dead mudpuppies were received by David Mifsud (Herpetological Resources and Management) and Greg Schneider (University of Michigan Museum). This memo is intended to document observations and reports related to the kill.

On June 3, DNR Fisheries received a report of an observed mudpuppy kill starting May 24 through the weekend resulting in 30 total observed mortalities. This kill was reported by Bill Lawrence on the north side of the lake. This report was forwarded to Matt Diana (Fisheries Biologist) by Mike Gallagher and Bryan Beck of the Gull Lake Quality Organization. On June 8, a request was made to Bryan Beck to inquire about kills that reported up to 20 mudpuppies washed up on a property on the north end. The request originated from Kathy Gallagher and most likely is based on the same report received on June 3. Bryan reported this information to Matt Diana and Brian Gunderman (SLMMU Manager) on June 8, 2018. Brian Gunderman also received a report of a fish kill from Susan Behnke on June 8. Ms. Behnke stated that her and a friend had seen about 30 dead fish of various species and a dead muskrat on the north end of the lake. Ms. Behnke saw the fish from shore and her friend saw them while kayaking.

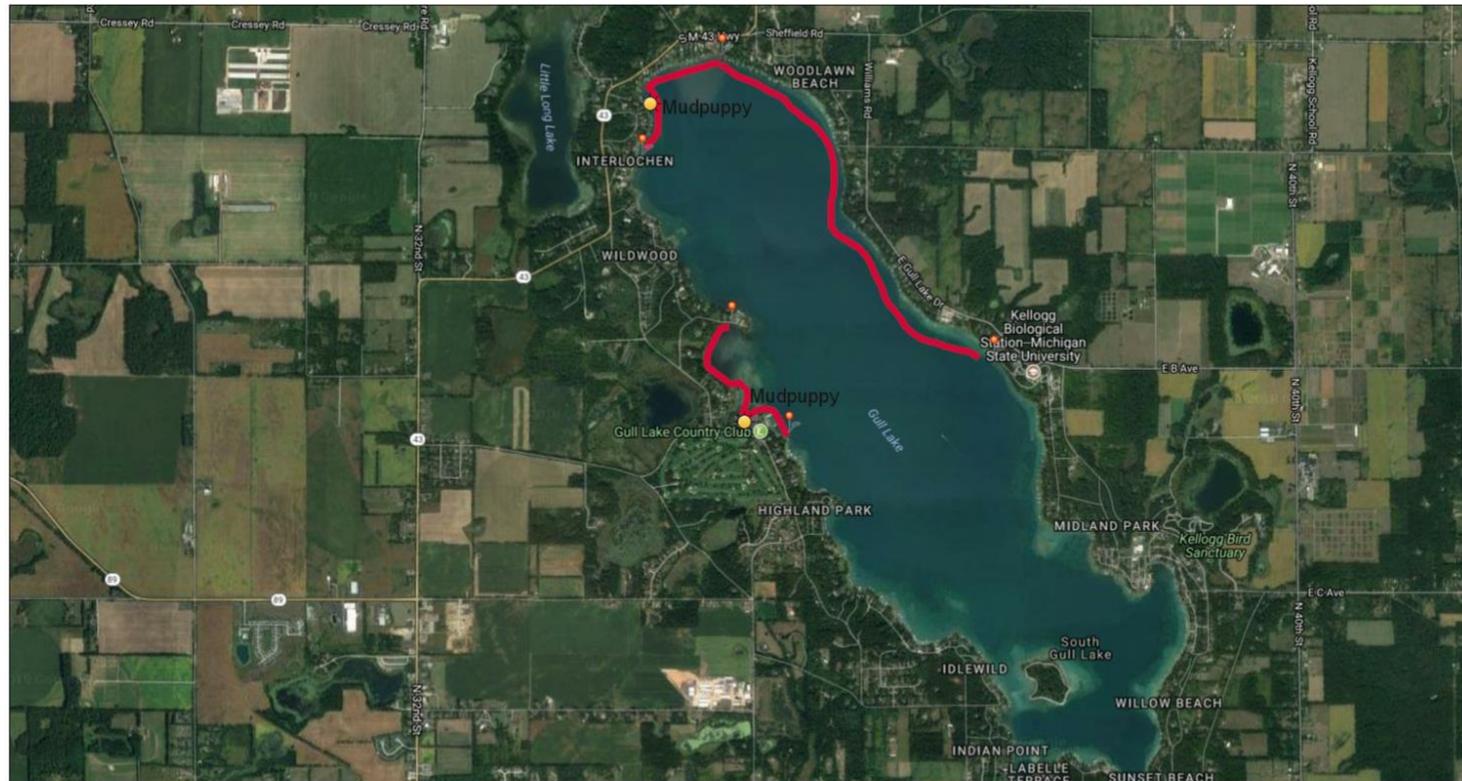
Matt Diana contacted David Mifsud on June 11, 2018 to discuss concerns over the mudpuppy reports. During this phone conversation, we were informed that he had received additional reports. Brendan Reid from the Kellogg Biological Station (KBS) reported to David Mifsud additional mudpuppy mortality on Gull Lake. Mr. Reid found two adults in a small lagoon off Gull Lake (near Kellogg Biological Station) on May 15, 2018. One mudpuppy was alive but lethargic and had some white patches on its skin and gills. It was released and it swam out into the main lake. The second mudpuppy was dead and had more extensive white patches, and what looked like very serious inflammation on the ventral side (especially around the cloaca). Brendan also included pictures of the specimens and can be found in the file (Figure 3). Brendan continued to observe mortality throughout May including 1 mudpuppy on May 16, 1 mudpuppy on May 23, and 5 mudpuppies on May 25. Mr. Reid collected and froze individuals he encountered and transferred the specimens to DNR on the date of the site visit.

Due to the multiple reports of dead fish and mudpuppies, a response was initiated by Brian Gunderman on June 11, 2018. DNR Fisheries Technician Matt Smith conducted a site investigation on June 11, 2018. The survey was conducted by boat to examine any mortalities that were occurring or recently occurred. Water temperature was 72 degrees. The survey began along the north shoreline from Prairieville Township boat launch to KBS and no mudpuppies were observed along that stretch of shoreline. They observed 3 dead largemouth bass, 1 bluegill and 1 rock bass. All had been dead for a period of time. They then surveyed the entire shoreline of the shallow bay near Miller Lake from the Yacht Club/Country Club to the outer point of the bay to the west where dead fish had been reported. They collected 2 dead mudpuppies along this stretch of shoreline that had been dead for a while. They also observed 21 bluegill, 11 rock bass, 3 northern pike and 1 largemouth bass, all of which had been dead for a while. They then proceeded down to the far west end of the lake just south and west of Prairieville Township boat launch. There had been a strong prevailing east/southeast wind. They collected 1 more dead mudpuppy there along with observing 53 bluegill, 17 rock bass, 2 bullhead and 2 largemouth bass. All locations were recorded with GPS (Figure 1). Pictures were taken of the fish and mudpuppies observed to document the kill and the state of decay of the fish. All indications were that mortalities

occurred at least a day prior to the survey and did not appear to be ongoing. All the mudpuppies observed were collected and frozen.

Matt Diana contacted Eric Bacon (DEQ ANS) on June 11, 2018 to determine if any weed treatment or chemical application had coincided with observed mortalities. Eric requested interim reports from the applicators for two active chemical applicator permits on Gull Lake (ANC9804165 and ANC9802432). Eric reported that treatment did occur in the canal off Wildwood Drive on May 16, 2018. This treatment targeted 2.14 acres of mixed submerged aquatic plants as well as algal treatment. Chemicals applied were Tribune (Diquat dibromide; 3 gal), Renovate (2,4-D; 3 gal), Chem One (copper sulfate; 25.68 lbs), Clipper (Flumioxazin; 21.4 oz), and Stingray (32 oz). Because the mortalities were spread out over a few weeks and the first report was prior to treatment on May 15, 2018, we do not suspect that the small treatment area is responsible for the mortality observed across Gull Lake. The treatment could have contributed to mortalities observed near the country club bay, but it is more likely that mudpuppies are experiencing a disease outbreak. Mudpuppies are good indicators of changes in water quality because they are sensitive to impacts. No changes to water quality of Gull Lake have been observed. Water clarity has been extremely high this year in initial lake surveys conducted by the Gull Lake Quality Organization (Mike Gallagher, personal communication). Manure application on farm fields is common in this watershed, but there were no indications of manure runoff or spills to Gull Lake during this time. Overall, the number of dead fish observed was small. Small numbers of dead fish are frequently observed at this time of year due to spawning stress and hooking mortality (lots of fishing activity in early summer). The mudpuppy die-off is more perplexing. We plan to send the mudpuppies that were collected by Brendan Reid and DNR staff to a lab for analysis. Based on the age of the samples, it will be difficult to determine if any viral activity was present. This report will be updated once lab results are available.

# ArcGIS Web Map



June 12, 2018  
Points  
● Override 1  
● Override 2  
— Override 1

1:36,112  
0 0.33 0.65 1.3 mi  
0 0.5 1 2 km  
© OpenStreetMap (and) contributors, CC-BY-SA

Web App Builder for ArcGIS  
Data prepared by Institute for Fisheries Research, Michigan Department of Natural Resources and School of Natural Resources, University of Michigan | Google, 2017 |

Figure 1. Location of shoreline survey conducted by DNR and observed mudpuppy mortalities on June 11, 2018.



Figure 2. Dead fish observed during DNR shoreline surveys on June 11, 2018.



Figure 3. Dead mudpuppy collected by Brendan Reid from the Kellogg Biological Station (photo credit Brendan Reid).