



Michigan DNR Fisheries– Southern Lake Huron Management Unit

**Budd Lake – 2021 Fall Muskellunge, Northern Pike,
and Walleye Survey**

2021 Discretionary Survey Report



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On the cover: Northern strain of Muskellunge. Credit: Wisconsin DNR

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Introduction

Budd Lake has a long history of Muskellunge and Walleye stocking by the Michigan DNR along with a variety of other species stocked by private entities under permit (Table 1). Budd Lake has not had a comprehensive Status and Trends lake survey since May 2007. The lake has had a history of viral hemorrhagic septicemia (VHS) outbreaks which have caused fish kills, including Muskellunge but no surveys for VHS have been conducted since 2008. Budd Lake is one of the few closed basin lakes in the state where stocking of Northern Strain of Muskellunge is allowed following the recommendations of the Michigan DNR Esocid Team. This provides a unique opportunity to understand and compare survival and growth to the Great Lakes strain which is more widely stocked across the state. The Muskellunge fishery is also popular with angling groups including the Michigan Muskies Alliance.

Prior to this survey, the last survey on Budd Lake was an electrofishing discretionary survey completed in 2020. The primary focus of the survey was to tag Muskellunge, and the secondary purpose was to evaluate the Walleye and Northern Pike population. Muskellunge were implanted with passive integrated transponder (PIT) tags to generate additional information on muskellunge population dynamics including movement, habitat use, growth, and angler harvest in Budd Lake. Two Muskellunge, nine Northern Pike and two Walleye were captured in that survey (Table 2). Too few individuals were collected for each species to calculate the mean growth index. The low catch rate for Muskellunge and Northern Pike was not surprising because electrofishing catchability of Esocid species is low. The low catch rate of Walleye was surprising given that electrofishing is the typical method used to target Walleye in the spring. Due to the small catch amount, the discretionary survey needed to be repeated using different gear types.

We surveyed Budd Lake on 12 - 16 April 2021 for Muskellunge, Northern Pike, and Walleye. Our objectives were to 1) document relative abundance, 2) document size structure, 3) determine age and growth, and 4) insert passive integrated transponder (PIT) tags into Muskellunge.

Table 1. Fish stocked by the MI DNR in Budd Lake, Clare County, 1979-2020. Muskellunge genetic strain given in parenthesis.

Year	Species	Age	Average Length (inches)	Number
1979	Tiger Muskellunge (Hybrid)	Yearling	5.28	800
1980	Tiger Muskellunge (Hybrid)	Yearling	7.62	1,800
1981	Tiger Muskellunge (Hybrid)	Yearling	6.57	2,000
1982	Tiger Muskellunge (Hybrid)	Yearling	5.83	2,000
1983	Tiger Muskellunge (Hybrid)	Yearling	7.40	1,500
1984	Tiger Muskellunge (Hybrid)	Yearling	7.17	1,200
1985	Muskellunge (Northern)	Yearling	13.70	809
1987	Muskellunge (Northern)	Yearling	6.18	1,643
1989	Walleye	Spring fingerling	1.81	19,512
1989	Muskellunge (Northern)	Yearling	8.19	772
1991	Walleye	Spring fingerling	1.77	9,655
1992	Walleye	Spring fingerling	1.97	10,501
1995	Walleye	Spring fingerling	1.81	22,720
1995	Walleye	Fall fingerling	3.50	8,859
1995	Muskellunge (Northern)	Yearling	4.02	2,036
1996	Walleye	Spring fingerling	1.69	21,000
1997	Muskellunge (Northern)	Yearling	11.46	285
2000	Muskellunge (Northern)	Yearling	10.59	500
2003	Muskellunge (Northern)	Yearling	10.67	500



2005	Muskellunge (Iowa)	Yearling	11.61	1,000
2006	Walleye	Spring fingerling	1.85	20,347
2009	Walleye	Spring fingerling	1.58	13,089
2009	Muskellunge (Iowa)	Yearling	10.71	350
2012	Muskellunge (Great Lakes)	Yearling	9.48	300
2013	Walleye	Spring fingerling	1.39	8,832
2014	Walleye	Spring fingerling	1.81	11,200
2014	Muskellunge (Great Lakes)	Yearling	8.94	263
2016	Walleye	Spring fingerling	2.08	12,821
2017	Muskellunge (Northern)	Yearling	9.57	508
2018	Walleye	Spring fingerling	1.64	17,736
2019	Muskellunge (Northern)	Yearling	11.10	350
2020	Walleye	Spring fingerling	1.58	13,398

Table 2. Age and length range (in.) of species collected October 13, 2020 during a discretionary survey.

Species / Age	No. aged	Length Range (in)	State Average Length (in)
Muskellunge			
Age XI	2	36.10-40.20	-
Northern Pike			
Age II	4	20.80-24.40	20.8
Age III	1	22.80-22.80	23.4
Age IV	3	21.60-31.30	25.5
Age VI	1	22.70-22.70	29.3
Walleye			
Age II	1	18.30-18.30	13.9
Age IV	1	19.80-19.80	17.6

Study Area

Budd Lake is a 175-acre natural lake in Clare County within the City of Harrison in north-central Michigan (Figure 1). The lake is a closed basin with no major inlets or outlets connecting it to other watersheds. The lake is heavily developed with houses surrounding the shoreline, except for Wilson State Park on the northwest end of the lake. Budd Lake is relatively shallow with a maximum depth of 34 feet and many large shoal areas extending 50-300 feet into the lake.

Budd Lake has abundant public access for shore fishing and boat anglers alike. Wilson State Park provides shore fishing and carry-in launch access. A wooden public fishing platform is on the western shoreline of the lake and provides additional shore fishing. Finally, a public boat launch site with 14 parking slots that is operated and maintained by the city of Harrison located off Grant Road.

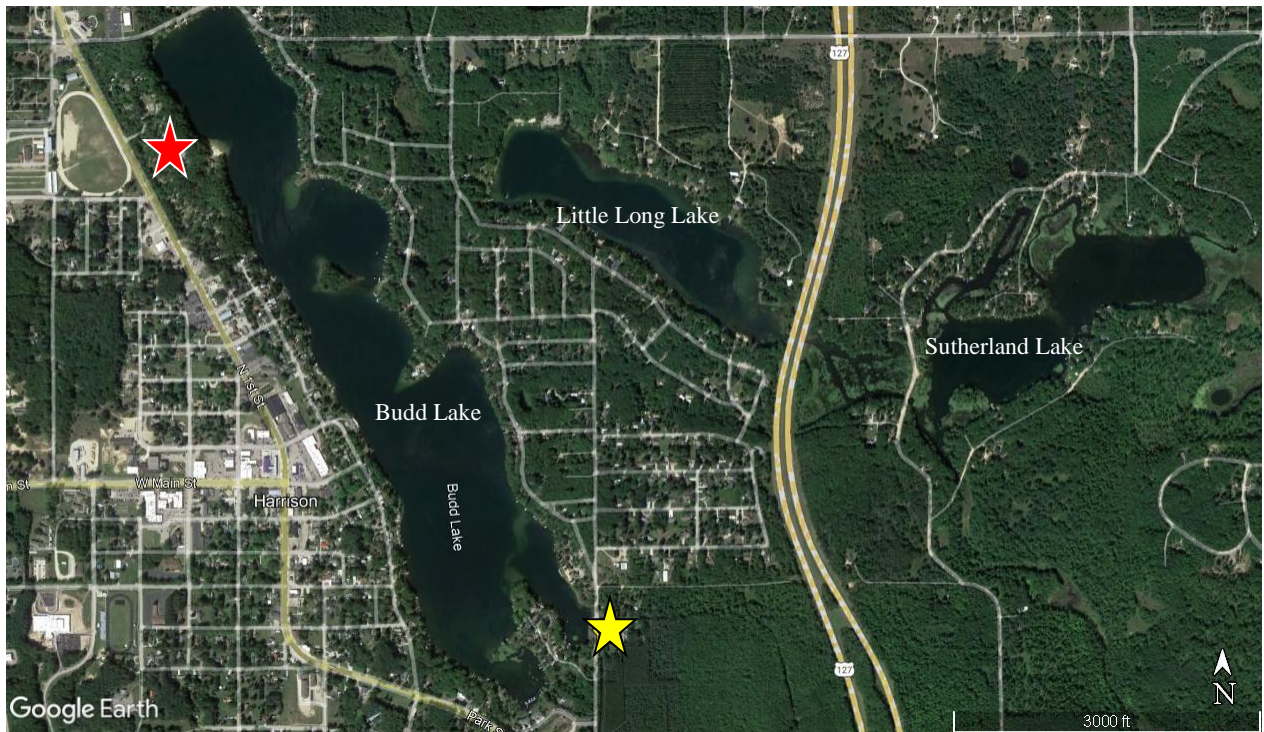


Figure 1. Budd Lake in Clare County, Michigan. The red star indicates the location of the Wilson State Park, and the yellow star is the location of the public boat launch.

Methods

Three trap nets and four large mesh fyke nets (1.5") were set for four net nights with daily checks from April 12th to 16th in different locations throughout Budd Lake (Figure 2). All Muskellunge, Northern Pike, and Walleye caught were measured to total length (TL in inches) and a dorsal fin ray was removed for later age estimation using standard techniques. All other species collected were measured but not aged. In the laboratory, a cross section of the fin ray was removed using a Dremel tool. Then the cross section is observed under a microscope to count the number of annuli—representing the age of the fish. Captured Muskellunge were also tagged with a passive integrated transponder (PIT) tag. All fish were immediately returned to the water after processing. Lake surface water temperature was measured with a handheld temperature probe.

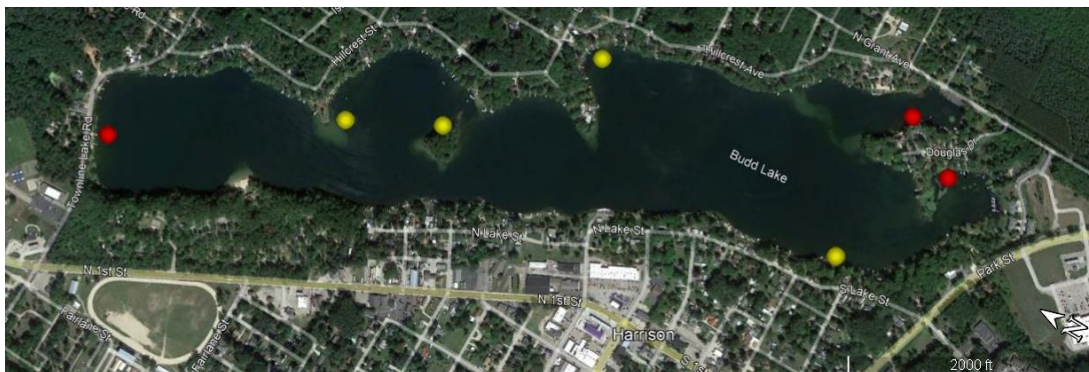


Figure 2. Location of trap and large mesh fyke nets set April 12-16, 2021 on Budd Lake. Red indicates the location of trap nets and yellow is the location of large mesh fyke nets.



Results

Temperature ranged from 53-55°F. The fish community was dominated by Bluegill (45.1%) followed by Black Crappie (18.3%) and Pumpkinseed (17.9%; Table 3). Twenty-three Muskellunge, four Northern Pike, and four Walleye were captured (Table 4). Muskellunge TL ranged from 19.2 to 45.5 inches with an age range of 2 to 12 years with no individuals age 4 to 9. The length-at-age data indicates that the Muskellunge population in Budd Lake has a mean growth index -11.8 inches below state average. Northern Pike TL ranged from 20.3 to 25.0 inches and fish were between age 3 and age 5. Walleye TL ranged 28.3 to 28.7 inches and age estimates were age 10 to 12 years. Age 2 and age 12 Muskellunge and age 10 Walleye corresponded to previous stocking events and were likely stocked fish although without a definitive mark at the time of stocking this cannot be confirmed.

Table 3. Fish species captured in April 2021 on Budd Lake, Michigan. Columns represent number of fish, percent by number, and mean total length (TL) of each species captured.

Species	Number	Percent by Number	Mean TL (in.)
Black Crappie	436	18.3	8.8
Bluegill	1,077	45.1	5.9
Bowfin	10	0.4	22.0
Golden Shiner	1	0.0	5.5
Green Sunfish	2	0.1	6.5
Largemouth Bass	84	3.5	13.0
Muskellunge	23	1.0	36.0
Northern Pike	4	0.2	22.3
Pumpkinseed	427	17.9	7.3
Rock Bass	305	12.8	7.9
Walleye	4	0.2	27.5
White Sucker	1	0.0	18.5
Yellow Bullhead	4	0.2	10.8
Yellow Perch	9	0.4	7.7

Table 4. Age, number, and total length (TL) range of species collected in April 2021 on Budd Lake, Michigan.

Species / Age	Number	TL range (in)	State mean TL (in)
Muskellunge			
Age II	1	19.20-19.20	19.90
Age III	1	34.30-34.30	25.40
Age X	12	33.60-40.40	48.70
Age XII	8	36.60-45.50	-
Northern Pike			
Age III	1	20.30-20.30	20.8
Age IV	1	21.20-21.20	23.4
Age V	3	22.80-25.00	25.5
Walleye			
Age X	1	28.30-28.30	23.1
Age XI	1	26.20-26.20	-
Age XII	2	26.50-28.70	-



Conclusions

This survey provided a snapshot of the Muskellunge, Northern Pike, and Walleye populations of Budd Lake. A Status and Trends Lake Survey was conducted June 2021 to provide comprehensive information about the entire lake fish community and an additional Muskellunge survey in 2022 will add to our knowledge of this important sportfish and complete the population estimate. Some level of natural reproduction and stock survival is evident for Muskellunge and Walleye. The mean growth rate of Muskellunge in Budd Lake is significantly lower than the state average which, on the surface, indicates a potential overabundance of Muskellunge likely resulting in increased interspecific resource competition and reduced growth rates (i.e., stunting). However, the significantly low mean growth index could also be the result of intraspecific resource competition. Muskellunge are not known to prey heavily on Walleye as they prefer a forage base made up of primarily soft-rayed fishes. However, all three species will still predate on one another opportunistically to some extent. Additionally, all three species have similarities in prey preference. Muskellunge and Northern Pike both utilize marshy habitat for spawning, but at slightly different times with Northern Pike spawning just before Muskellunge. These overlaps in life history traits causes resource competition, which (if significant enough) could reduce Muskellunge growth rates and cause them to mature at a smaller size.

Muskellunge are known as the fish of 10,000 casts because of the challenges associated with catching this species. For this reason, the Muskellunge angling community is relatively small with a slow growth in members. Muskellunge anglers typically practice catch-and-release but still prefer to target trophy sizes across the state. Despite the poor size structure in Budd Lake, Muskellunge angling here is still popular with the public likely because the overabundance of small individuals allows for more angling success compared to other Muskellunge waters. Inland Muskellunge fishing opportunities are unique in the state, therefore the Budd Lake Muskellunge population remains popular despite the slightly smaller size structure. Stocking may still occur in Budd Lake to increase muskellunge angling opportunities and interest in this trophy species. The Great Lakes Muskellunge strain is the “native” genetic strain to Michigan and is the only strain allowed in interconnected waters. However, Budd Lake is a closed basin with no inlets/outlets, therefore, the Northern strain can be stocked here without ecological disturbance. To better allocate Great Lakes strain Muskellunge, only Northern strain Muskellunge should be considered for stocking.

Additional Muskellunge surveys and angler reports including information gained from recaptured PIT-tagged fish will help increase our knowledge of growth, angler success, and population abundance and provide support for this unique recreational angling opportunity. MDNR should work with the Musky Alliance to increase the number of PIT-tag readers located near Budd Lake. Additionally, there is some evidence of Walleye natural reproduction in the past. Spring ice-out surveys are more conducive for targeting adult Walleye which may explain our low catches; our results might not be fully representative of the Walleye population. Walleye stocking success should be evaluated in the future with a fall discretionary survey via electrofishing.



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