Hackert Lake
Mason County
Lincoln River Watershed, last surveyed 2019

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Environment

Hackert Lake is a 125-acre glacial lake in Amber Township in Mason County, Michigan. The lake is located approximately 6 miles northeast of Ludington. Hackert Lake lies within the Lincoln River watershed and has no outlets and only one small inlet that comes from an adjacent wetland. Hackert Lake has a maximum depth of 52 feet and a shoreline length of 2.35 miles. The primary substrates in Hackert Lake are marl, organic, and sand. The surrounding landscape consists of privately-owned land, with a mix of agricultural fields, woodlots, and wetlands. The land ownership around the lake is nearly all private, except for one small parcel (public access site) owned by the Michigan Department of Natural Resources (MDNR). Due to its mostly private land ownership, Hackert Lake is heavily developed with approximately 70 dwellings and one campground. Despite this, shoreline armoring and alteration is moderate, with some natural shoreline remaining intact.

Hackert Lake was once known as "Crystal Lake" back in the early 1900s. File correspondence (MDNR Cadillac office) indicates that the U. S. Board of Geographic Names published a decision that the lake would be known as "Hackert Lake" in 1948. Public access to Hackert Lake is gained at the MDNR boat launch on the western shore of the lake. The site has a hard surface boat launch with one skid pier, a pit toilet, and parking for 23 vehicles and trailers. Other than the MDNR access site, riparian land ownership on Hackert Lake is private. There is one privately-owned campground on the southern shore of the lake. Since 2001, Hackert Lake has been regulated by the MDNR as a "no minimum size limit" lake for Northern Pike. The daily catch limit for Northern Pike is five per day with no minimum size limit, but only one can exceed 24 inches in length.

Since 1967, Hackert Lake has had a local watercraft ordinance in place that states: "On the waters of Hackert Lake, sections 2 and 3, town 18 north, range 17 west, township of Amber, county of Mason, state of Michigan, it is unlawful between the hours of 6:30 p.m. to 10:00 a.m. of the following day to: Operate a vessel of high speed. Have in tow or shall otherwise assist in the propulsion of a person on water skis, water sled, kite, surfboard or other similar contrivance. The hours should be 7:30 p.m. to 11:00 a.m. of the following day when Eastern Daylight Savings Time is in effect. "High-speed boating" means a speed at or above which a motorboat reaches a planing condition."

The primary citizen group for Hackert Lake is the Hackert Lake Association (HLA), which was created in 1984. According to their website (http://www.hackertlake.org/), the purpose of the HLA is to "promote the education of riparian property owners and other lake users about water quality and water safety," to "support issues, which concern the welfare of the lake in general, including the conservation of the water supply in the lake, the quality of water safety for swimming and renewal of the fish resources," and to "strive to improve the lines of communication between property owners". The Hackert Lake Improvement Board (HLIB) was established in 2004. The primary objective of the HLIB is to control invasive aquatic plants in Hackert Lake. The HLIB collects tax revenue from riparian landowners, which is used for the treatment of invasive plants. Several different chemical

treatments targeting Eurasian Milfoil have taken place in recent years, most recently in 2013. In 2004 and 2005, weevils (insects that target Eurasian milfoil) were stocked into the lake with the goal of reducing the Eurasian milfoil population through biological control.

History

The first recorded fish stockings of Hackert Lake took place in 1905 and 1909, when Largemouth Bass fingerlings were stocked (Table 1); likely by the Michigan Fishery Commission. Walleye fry were also stocked in 1910. Stocking records from the early 20th century are somewhat incomplete, and some records may have been lost in a fire in Lansing. No further known stockings occurred in Hackert Lake until 1929, when Largemouth Bass were again stocked, this time by the Michigan Department of Conservation (MDOC; the precursor to the MDNR of today). Yellow Perch were stocked in 1939, and Bluegill and Largemouth Bass were stocked in 1940. Walleye were again stocked in 1953, 1957, and 1962. In several years between 1966 and 1976, adult Northern Pike were stocked into an adjacent marsh in early spring, in hopes that they would spawn in the marsh and their offspring would migrate into Hackert Lake. From 1979-1983, Tiger Muskellunge (a hybrid of Northern Pike and Muskellunge) were stocked. Walleye were again stocked in 1991, and they have been stocked on a fairly regular basis since then. The HLA has also stocked fathead minnows (2002-2005), in attempt to provide forage for popular game and panfish species.

The first fisheries report on Hackert Lake (at that time known as "Crystal Lake") was published in 1932 (Hubbs and Eschmeyer 1932). While the report alludes to some sampling being conducted, no gear types or catch reports are provided. Fish species discussed include Smallmouth Bass, Walleye, Yellow Perch, Bluegill, White Sucker, Northern Pike, and Bluntnose Minnow. Management recommendations included the construction of brush shelters for fish cover and the stocking of Walleye, Smallmouth Bass, and Yellow Perch. It is likely that the authors were confusing Smallmouth Bass with Largemouth Bass, as no Smallmouth Bass have ever been caught in any fisheries survey of Hackert Lake, while Largemouth Bass have been caught in every survey conducted since 1961 (Table 2). The authors discuss Hackert Lake as having an "anoxic zone" in which the deeper, colder water in the lake is essentially devoid of oxygen seasonally, therefore uninhabitable for fish. This condition is still present today.

Since the initial investigation in 1932, a number fisheries surveys of Hackert Lake have been conducted, utilizing various gears and techniques. A total of 21 fish species have been caught in those surveys (Table 2). After a fisheries survey in 1961, MDOC Fisheries Biologist Bruce Vollmar mentioned that Hackert Lake had a good population of large Bluegill, and that no stunting was evident at that time. Apparently, the Walleye population was strong as well, along with the Yellow Perch and Largemouth Bass populations. Northern Pike were reportedly scarce, but a few large individuals were present.

The next fisheries surveys, conducted in 1974 and 1975, did not find any Walleye (they had not been stocked since 1962; Table 1). Notes from the surveys also indicate that fishing was poor at that time, due to too many small Bluegill. As a result, MDNR fisheries personnel conducted a Fintrol (fish toxicant) treatment in 1977, with the goal of thinning out the Bluegill population, potentially spurring better growth and size structure among the remaining Bluegill. Unfortunately, there is nothing in the file (Cadillac MDNR office) that discusses the success or failure of the treatment. A 1979 fisheries (electrofishing) survey was inconclusive, as only a few Bluegill were caught. A more comprehensive

fisheries survey conducted in 1984 did find a better Bluegill population. MDNR Fisheries Biologist Ralph Hay commented that "fishing (was) reported to be good for all species except (Tiger) Musky". As a result of the survey (and the poor fishing reports), the Tiger Muskellunge stocking program was discontinued.

From 1998 to 2001, Helal (2002) conducted extensive water quality sampling on Hackert Lake. Parameters such as nitrogen, dissolved oxygen, pH, nitrate, were typically found to be at healthy levels, while occasional spikes in phosphorous did occur. Secchi depth was also measured and was shown to decrease from 1998 to 2001. Eighteen different aquatic plant species were also identified in Hackert Lake.

Further MDNR fisheries surveys were conducted in 2004 and 2005 (Heintzelman 2007). The 2004 survey was a fall electrofishing survey aimed at juvenile Walleye. Unfortunately, no Walleye were observed or captured in the survey. The 2005 survey was more comprehensive, using trap nets, fyke nets, and inland gill nets. Most fish species were found to be growing slowly, and the Bluegill in particular were small in size. No Walleye were caught. Despite this, management recommendations included the continuation of the Walleye stocking program, with the combined goals of creating a fishery for Walleye and improving Bluegill growth through predation.

Current Status

The most recent comprehensive fisheries survey of Hackert Lake was conducted during the summer of 2019. The netting portion of the survey was conducted from May 13-16, 2019. Gear used included trap nets (3 net-nights), large-mesh fyke nets (9 net-nights), small-mesh fyke nets (3 net-nights), inland gill nets (6 net-nights), and straight run gillnets (1 net-night). On June 19, 2019, the seining (2 seine hauls) and electrofishing (two ten-minute transects with an 18' electrofishing boat) portion of the survey was conducted. Appropriate age structures (scales and spines) were taken from game and panfish species for age and growth analysis.

In the netting portion of the 2019 survey, a total of 1,148 fish, representing 15 different species were caught (Table 3). Black Crappie, Bluegill, and Rock Bass were the most frequently collected species in this part of the survey. A total of 520 Black Crappie were caught, ranging from 6 to 12 inches in length. The Bluegill ranged from 1 to 9 inches in length, with 224 caught. The Rock Bass catch numbered 135, and they ranged from 2 to 12 inches. Gamefish species caught in the 2019 netting survey included 28 Largemouth Bass up to 19 inches, 26 Northern Pike up to 34 inches, and two Walleye (26 and 27 inches). Growth rates for panfish, including Black Crappie, Bluegill, Pumpkinseed, and Yellow Perch all exceeded the state average (Table 4). Predator species such as Largemouth Bass and Northern Pike had slower growth rates.

In the seining/electrofishing portion of the 2019 survey, a total of 539 fish, representing 11 different species were caught (Table 5). Bluegill, Sand Shiner, and Bluntnose Minnow were the most frequently caught species in this part of the survey. While growth rates for the Bluegill were near the state average, Largemouth Bass were growing more slowly (Table 6).

Analysis and Discussion

Hackert Lake continues to be an excellent destination for anglers in pursuit of panfish such as Black Crappie and Bluegill. Black Crappie were particularly numerous in the 2019 survey, with trap net catch rates of 91/net-night and large mesh fyke net catch rates of nearly 40/net-night. These are some of the highest catch rates ever recorded in the Central Lake Michigan Management Unit (CLMMU; essentially the northwestern Lower Peninsula). The Bluegill population in Hackert Lake is also very robust. This is a departure from the past, where stunted, slow-growing Bluegill populations have been a problem. The Bluegill population is much improved over the 2005 and 1984 surveys. According to the Schneider Index (Schneider 1990; Table 7) the 2019 Hackert Lake Bluegill population scored 6.2 out of 7, ranking it as "Excellent". In contrast, in 1984 and 2005 the Bluegill population had scores of 4.0 ("Acceptable"), and 2.8 ("Poor"). The Pumpkinseed Sunfish and Rock Bass populations were also robust, with large average sizes.

The predator species caught in the 2019 Hackert Lake survey, including Largemouth Bass and Northern Pike, tended to grow more slowly, particularly at younger ages. Despite this, large individuals from both species were present, and angler reports for these species remain positive. Only two Walleye were caught in the 2019 survey, but both were large adults (26 and 27 inches). While Walleye are not overly numerous in Hackert Lake, they are caught occasionally by anglers. Also, the adult Walleye in the lake are likely playing a role in shaping the panfish populations. Adult Walleye are known to be excellent predators on small panfish and can help keep their populations from stunting (O'Neal 2017). It is highly likely that all adult Walleye present in Hackert Lake come from MDNR stocking efforts, since Hackert Lake does not have the appropriate habitat for consistent Walleye natural reproduction.

While there is some artificial shoreline hardening and overdevelopment on Hackert Lake, much of the shoreline is relatively intact and in a natural state. Also, the submerged aquatic plants in Hackert Lake provide excellent cover and habitat for both the panfish and gamefish species in the lake. Although no formal plant surveys were conducted in the 2019 fisheries survey, anecdotally the submerged aquatic plants appear to be in good balance and well below nuisance levels.

Management Direction

The Walleye stocking program on Hackert Lake should continue and the stocking rate should be increased to 12,500 (100/acre) spring fingerlings on an every-other year rotation. If larger fall fingerling Walleye become available for stocking on a regular basis in the CLMMU, Hackert Lake would be a good candidate to receive those. The primary goals of the Hackert Lake Walleye stocking program are to provide predatory pressure on the Bluegill population to keep them from stunting, and also to create a fishery. While Hackert Lake will likely never be a "destination" Walleye fishery, having adult Walleye in the lake for anglers to catch occasionally adds diversity to the Hackert Lake angling experience.

Most of the Walleye that have been stocked into Hackert Lake (and many other lakes in the CLMMU) over the years have come from the Mason County Walleye Association (MCWA) rearing pond. MCWA raises Walleye fingerlings in its privately-owned pond in cooperation with MDNR. MCWA has long been a valuable partner to MDNR and the mutually beneficial relationship should continue indefinitely.

The "no minimum size limit" regulation on Northern Pike should remain in place. Even with the regulation in place, Hackert Lake Northern Pike continue to grow slowly. Despite this, several large Northern Pike were caught in the 2019 survey. Also, anglers are content with the existing regulation and enjoy the opportunity to harvest smaller Norther Pike if they desire. Seven different year classes of Northern Pike were present in the 2019 survey catch (Table 4), and the existing regulation does not seem to be inducing any negative impacts on the Hackert Lake Northern Pike population.

The submerged aquatic plants currently found in Hackert Lake should be allowed to continue to thrive, as they provide valuable habitat for a number of desirable fish species. The HLIB should continue to be very judicious about when and how aquatic nuisance plant treatments are conducted. Submerged and emergent aquatic vegetation is critical to maintaining healthy fish populations in inland lakes such as Hackert Lake. Aquatic nuisance plant treatments should only be conducted when invasive species like Eurasian milfoil are taking over large areas of the lake and interfering with recreational activities such as fishing, swimming, tubing, etc. If that occurs, the Eurasian milfoil beds should be carefully spot treated, with effort made to avoid treating native aquatic plants. Emergent vegetation along the shoreline of the lake should also be carefully protected.

The shoreline of Hackert Lake should be protected and considered critical to the continued health of the lake's aquatic community. Human development in the form of seawalls, artificial beaches, and riprap do not provide a healthy environment for aquatic life. Appropriate watershed management is necessary to sustain healthy biological communities, including fish, invertebrates, amphibians, reptiles, birds and aquatic mammals. Generally, for inland lakes this includes maintenance of good water quality, especially for nutrients; preservation of natural shorelines, especially shore contours and vegetation; and preservation of bottom contours, vegetation, and wood structure within a lake. Guidelines for protecting fisheries habitat in inland lakes can be found in Fisheries Division Special Report 38 (O'Neal and Soulliere 2006). Also, the Michigan Natural Shoreline Partnership, an organization dedicated to promoting natural shoreline landscaping to protect Michigan's inland lakes (http://www.mishorelinepartnership.org/), can provide guidance and training on how best to manage the land/water interface for the benefit of Hackert Lake.

References

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Table 1. Fish stocked in Hackert Lake, Mason County, 1905-2019.

Year	Species	Number	Size	Strain
1905	Largemouth Bass	1,000	fingerlings	
1909	Largemouth Bass	3,000	fingerlings	
1910	Walleye	200,000	fry	
1929	Largemouth Bass	240	4 mo.	
1939	Yellow Perch	7,000	7 mo.	
1940	Bluegill	3,000	3 mo.	
	Largemouth Bass	300	3 mo.	
1953	Walleye	5,000	spring fingerlings	
1957	Walleye	5,000	spring fingerlings	
1962	Walleye	5,000	spring fingerlings	
1966	Northern Pike	21	adults	
1967	Northern Pike	6	adults	
1968	Northern Pike	22	adults	
1969	Northern Pike	80,000	fry	
1973	Northern Pike	26	adults	
	Northern Pike	600	spring fingerlings	
1976	Northern Pike	1,300	spring fingerlings	
1979	Tiger Muskellunge	500	yearlings	
1980	Tiger Muskellunge	500	yearlings	
1981	Tiger Muskellunge	500	yearlings	
1982	Tiger Muskellunge	490	yearlings	
1983	Tiger Muskellunge	400	yearlings	
1991	Walleye	7,515	spring fingerlings	Muskegon
1993	Walleye	8,550	spring fingerlings	Muskegon
1995	Walleye	8,202	spring fingerlings	Muskegon
1999	Walleye	7,557	spring fingerlings	Muskegon
2001	Walleye	10,116	spring fingerlings	Muskegon
2004	Walleye	7,719	spring fingerlings	Muskegon
2005	Walleye	417	fall fingerlings	Muskegon
2006	Walleye	15,886	spring fingerlings	Muskegon
2008	Walleye	7,644	spring fingerlings	Muskegon
2009	Walleye	662	spring fingerlings	Muskegon
2010	Walleye	2,712	spring fingerlings	Muskegon
2011	Walleye	8,122	spring fingerlings	Muskegon
2013	Walleye	7,519	spring fingerlings	Muskegon
2014	Walleye	16,042	spring fingerlings	Muskegon
2017	Walleye	9,579	spring fingerlings	Muskegon
2019	Walleye	8,658	spring fingerlings	Muskegon

Table 2. Presence/absence of fish species in historical fisheries surveys of Hackert Lake, Mason County.

Species	1932	1961	1974	1975	1978	1984	2005	2019
Banded Killifish								x
Black Bullhead						x		
Black Crappie			x		x	x	x	x
Bluegill	x	x	x	x	x	x	x	x
Bluntnose Minnow	x						x	x
Brown Bullhead			x				x	x
Bullhead spp.		x						
Golden Shiner							x	x
Green Sunfish		x					x	x
Hybrid Sunfish								x
Iowa Darter								x
Largemouth Bass		x	x	x	x	x	x	x
Northern Pike	x		x	x	x	x	x	x
Pumpkinseed		x	x	x		x	x	x
Rock Bass		x	x	x		x	x	x
Sand Shiner							x	x
Smallmouth Bass*	x							
Tiger Muskellunge						x		
Walleye	x	x					x	x
White Sucker	x			x				x
Yellow Bullhead				x		x	x	x
Yellow Perch	x	x	x	x	x	x	x	x

*Likely misidentified Largemouth Bass

Table 3. Number, weight, and length of fish collected from Hackert Lake, Mason County, with trap nets, inland gill nets, large-mesh fyke nets, and small-mesh fyke nets from May 13-16, 2019.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Black Crappie	520	45.3	226.2	40.8	6-12	9.1	99 (7")
Bluegill	224	19.5	73.3	13.2	1-9	7.4	88 (6")
Bluntnose Minnow	85	7.4	0.3	0.1	1-3	1.9	
Brown Bullhead	65	5.7	52.1	9.4	5-15	11.7	98 (7")
Golden Shiner	1	0.1	0.0	0.0	3-3	3.5	
Green Sunfish	4	0.3	0.7	0.1	2-7	5.8	
Hybrid Sunfish	1	0.1	0.1	0.0	7-7	7.5	100 (6")
Iowa Darter	16	1.4	0.0	0.0	1-2	1.7	
Largemouth Bass	28	2.4	30.6	5.5	7-19	12.5	11 (14")
Northern Pike	26	2.3	55.9	10.1	11-34	18.9	100
Pumpkinseed	24	2.1	7.7	1.4	4-8	6.9	92 (6")
Rock Bass	135	11.8	83.4	15.0	2-12	9.0	75 (6")
Walleye	2	0.2	13	2.3	26-27	27.0	100 (15")
White Sucker	2	0.2	6.0	1.1	17-21	19.5	
Yellow Perch	15	1.3	5.5	1.0	6-13	9.1	87 (7")
Total	1,148	100	554.8	100			

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 4. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Hackert Lake, Mason County, with trap nets, large-mesh fyke nets, small-mesh fyke nets, and gill nets, May 13-16, 2019. Number of fish aged is given in in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

Species	Age I	II	III	IV	V	VI	VII	VIII	IX	X	XII	XIII	Mean Growth Index
Black Crappie			7.7 (19)	9.2 (17)	10.6 (8)	11.6 (6)	10.8 (1)	11.8 (3)	12.7 (1)		11.4 (1)		+0.9
Bluegill			5.8 (15)	6.0 (18)	8.7 (16)	9.0 (8)							+1.2
Hybrid Sunfish				7.5 (1)									--
Largemouth Bass		7.0 (1)	9.0 (2)	11.3 (9)	12.1 (3)	12.9 (4)	14.1 (5)	14.3 (3)		19.5 (1)			-1.3
Northern Pike		12.7 (5)	16.3 (7)	17.7 (5)	20.6 (4)		31.3 (2)	34.4 (1)	27.5 (2)				-5.1
Pumpkinseed Sunfish			6.1 (8)	6.7 (7)	8.0 (8)	8.5 (1)							+1.4
Walleye									26.9 (1)			27.3 (1)	--
Yellow Perch			6.3 (1)	7.8 (5)	9.7 (7)	12.3 (2)							+0.8

Table 5. Number, weight, and length of fish collected from Hackert Lake, Mason County, by seining and electrofishing on June 19, 2019.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Banded Killifish	14	2.6	0.1	0.3	1-3	2.5	
Bluegill	177	32.8	9.1	26.7	1-8	3.6	8 (6")
Bluntnose Minnow	124	23.0	0.6	1.8	1-2	2.5	
Brown Bullhead	2	0.4	2.4	7.0	11-15	13.5	100 (7")
Largemouth Bass	35	6.5	16.4	48.1	3-15	8.7	9 (14")
Northern Pike	1	0.2	0.8	2.3	15-15	15.5	100
Pumpkinseed	5	0.9	0.7	2.1	3-6	5.3	20 (6")
Rock Bass	7	1.3	2.4	7.0	5-8	7.6	86 (6")
Sand Shiner	172	31.9	0.7	2.1	1-2	2.3	
Yellow Perch	1	0.2	0.2	0.6	7-7	7.5	100 (7")
Yellow Bullhead	1	0.2	0.7	2.1	11-11	11.5	100 (7")
Total	539	100	34.1	100			

[1]Note some fish were measured to 0.1 inch, others to inch group: e.g., "5"=5.0 to 5.9 inch, 12=12.0 to 12.9 inches; etc.

[2]Percent legal size or acceptable size for angling. Legal size or acceptable size for angling is given in parentheses.

Table 6. Average total weighted length (inches) at age, and growth relative to the state average, for fish sampled from Hackert Lake, Mason County, with electrofishing and seining, June 19, 2019. Number of fish aged is given in parenthesis. A minimum of five fish per age group is statistically necessary for calculating a Mean Growth Index, which is a comparison to the State of Michigan average.

	Age												
Species	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Mean Growth Index
Bluegill		3.4 (2)	4.5 (26)	6.5 (13)	8.4 (3)								-0.3
Largemouth Bass		7.0 (8)	9.3 (11)	11.2 (6)	14.0 (1)			14.8 (1)				15.9 (1)	-1.3
Northern Pike		15.0 (1)											--
Pumpkinseed			4.6 (4)	6.6 (1)									--
Yellow Perch		7.1 (1)											--

Table 7. Hackert Lake Bluegill size structure rating using the Schneider Index (Schneider 1990). Schneider Index rankings are as follows: 1 = very poor, 2 = poor, 3 = acceptable, 4 = satisfactory, 5 = good, 6 = excellent, 7 = superior.

Year Surveyed	Trap/fyke-net catch average length (in.)	%>6 in.	%>7 in.	%>8 in.	Growth Index	Schneider Index
1987	6.3	57.2	20.1	1.4	-0.1	4.0
2005	5.6	31.5	13.0	0.0	-1.1	2.8
2019	7.4	88.0	69.6	44.6	+1.2	6.2