

### **Cochran Lake**

Cheboygan County, T35N, R2W, Section 21  
Cheboygan River watershed, last surveyed 2014

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#### **Environment**

Cochran Lake, also known locally as North Twin Lake, is a small natural waterbody located approximately three miles east of Indian River, Michigan (Figure 1). It is surrounded entirely by public land, which is administered by the Michigan Department of Natural Resources Forest Resources Division. There is no inlet, while the outlet of Cochran Lake is a small intermittent tributary which flows to Roberts Lake. The lake is about 27 acres in size and its deepest location is approximately 15 feet deep.

There are no private residences or cottages on the shores of Cochran Lake. A small public boat launch is located on the northeast shore and is administered by MDNR Parks and Recreation Division. The small gravel surfaced boat launch is appropriate for car top boats, small trailers, and canoes. There are no more than five trailer parking sites. Dispersed camping is popular around Cochran Lake. The lake riparian is conifer trees with a mixture of hardwood. Lake bottom substrate is primarily sand and detritus. Aquatic vegetation is common in the summer months. Fish winterkill may be prevalent at Cochran Lake in harsh winters due to its shallow depth.

#### **History**

Despite its small size, Cochran Lake has been the focus of various surveys or observation by the State of Michigan for nearly eight decades. Fish stocking records date back to a period when warmwater fish were stocked statewide in lakes and rivers, regardless of the necessity of stocking. The following fish were stocked by year in Cochran Lake: smallmouth bass yearlings and adults 1936, 1938, and 1947; largemouth bass fingerlings and yearlings 1947-1948, and 1959; bluegill fingerlings 1938, 1948, and 1959; redear sunfish fingerlings 1954 and 1956; and rainbow trout yearlings 1959, 1962, and 1965. Subsequent surveys and management practices would be linked to some of these stocking efforts.

The first recorded observations for Cochran Lake date back to the 1940s when fisheries management was in its budding stages locally. Michigan Department of Conservation (MDOC) investigations from 1945 reported that Cochran Lake lacked any shoreline or riparian development, had colorless water, and a maximum depth of 12 feet. Fish cover was considered lacking, with aquatic vegetation present only in the shallow water. Spawning grounds were "limited" for panfish and bass, "absent" for northern pike, and "adequate" for yellow perch. Fish species present included pumpkinseed, bluegill, yellow perch, largemouth bass, and bullheads. Water temperature and dissolved oxygen measurements indicated that Cochran Lake did not stratify thermally, had warm water from the surface to the bottom, and sufficient dissolved oxygen to support a warm water fish community.

Additional management emphasis was placed on Cochran Lake starting in 1946. A fish population analysis was first made from July 17 to August 8 by MDOC and summarized by Crowe (1947). The intent of the survey was to determine overall fish community size and diversity, and to determine if it

could be enhanced through supplemental stocking, supplemental lake fertilization, or both. Crowe (1947) used population estimation methods through mark and recapture fish netting to estimate an overall fish population of approximately 4,052 fish. This mostly included pumpkinseed, bluegill, and hybrids of both species. Also present in low numbers were smallmouth bass, yellow perch, yellow bullheads, largemouth bass, Iowa darters, blacknose shiners, and bluntnose minnows. Overall, the fish community was considered poor, and only bluegill were thought to be furnishing a small fishery. Bluegill growth was average, while pumpkinseed growth was slow. Fish competition was considered to be severe, and overall lake productivity was considered poor. Despite these perceptions, MDOC initiated a supplemental stocking program of warmwater fish including smallmouth and largemouth bass, as well as bluegill. In addition, the lake was fertilized at three week intervals in the summer of 1946, and plans were also made to do the same in 1947 and 1948. It is unknown if the later applications were made. A total of 11,400 pounds of 10-6-4 (nitrogen:phosphate:potassium ratio) fertilizer was added to Cochran Lake with the goal of increasing aquatic vegetation to provide additional fish cover, and increasing overall lake productivity.

Fish management was less extensive at Cochran Lake during the 1950s and but picked up again in the 1960s. Managers started realizing the impacts of winterkill on the fish community. It seemed as though the fish communities faced a paradox of low productivity, marginal habitat conditions, and low winter oxygen levels. The first documented winter fish kill was observed in 1956 and was considered "heavy", especially for largemouth bass and bluegill. Low oxygen levels were also measured in the lake on March 5, 1959. Following this, Fisheries Division decided to essentially start over with the Cochran Lake fish community through chemical reclamation. This fisheries management tool was gaining popularity in the science world. Managers thought they could eliminate an unsatisfactory fish community and subsequently replace it with an improved fish community built to their specifications, at least for a few years.

On August 6, 1959 Fisheries Division applied 25 gallons of rotenone in Cochran Lake at a concentration of 0.5 parts per million. Rotenone is a widely used chemical used to eliminate undesirable fish populations. It works by reducing the ability of fish to properly absorb dissolved oxygen through the gills. The treatment was considered successful, and the fish kill was thought to be complete. Dead fish observed included yellow perch, bluegill, pumpkinseed, largemouth bass, bullheads, darters, minnows, shiners, and even species that were not previously reported, such as northern pike and black crappie (though in low numbers). Fish stocking ensued at Cochran Lake following the fish reclamation project. Rainbow trout (despite having only seasonally suitable trout water) were stocked later in 1959, as well as 1962 and 1965. Bluegill and largemouth bass were also re-stocked in the lake following the project.

The management effort in the 1960s at Cochran Lake centered on evaluating the fish community rebuilding project. Shoreline seining efforts were made in June 1962 which documented species such as bluegill, pumpkinseed, largemouth bass, and northern pike. Most were young fish except for some larger northern pike. Catches of pumpkinseed and northern pike demonstrated that the fish kill of 1959 was not a "complete" kill as it was believed earlier. In 1964, Fisheries Division assessed the adult fish population with six experimental gill net lifts. Good numbers of northern pike, bullheads, and some bluegill were collected. This effort was duplicated in late June of 1969. Managers collected good numbers of bluegill, but none were larger than 8 inches. Fair numbers of 7-10 inch yellow perch were caught, along with a few small largemouth bass. It was becoming apparent that the fish community

was not changing for the better when compared to previous decades, and that lake productivity was the driving force.

Fish management tapered off at Cochran Lake after the 1969 survey. It became apparent that managers had accepted the warmwater fish community in its natural state. The only other report since that time was a record from an angler in 1985 that documented (from one day) high fishing pressure, and high catches of small largemouth bass, and many bluegill in the 6-7 inch size range.

### **Current Status**

The recent fish community survey of Cochran Lake was made from May 12-14, 2014. Effort consisted of: 6 large mesh fyke-net lifts, 2 large mesh trap net lifts, and 2 small mesh fyke-net lifts. The survey was done for the following reasons: 1) to capture updated fisheries information at this small natural lake, and 2) to evaluate fish communities at a shallow, regionally representative lake following a harsh northern Michigan winter (this survey was also done in conjunction with neighboring Roberts Lake). The previous winter was characterized as above average snowfall and prolonged cold temperatures. The 2014 survey was prior to any spawning activity for panfish species due to a cold spring. Fisheries personnel observed many dead and decaying largemouth bass in the shallows during the onset of the netting process, a testimonial to the harsh winter and low oxygen levels likely present in Cochran Lake in previous months. Water temperature ranged from 56-57 degrees Fahrenheit during the three day survey event, while air temperature was cool and conditions wet.

Bluegills are currently the most abundant panfish in Cochran Lake (Table 1), with good numbers in the 6 through 8 inch length range (Table 2). Very few bluegills larger than 9 inches can be found in the lake. Growth of this species was considered average to slightly above statewide average and eight year classes were found, indicating consistent recruitment. It appears that winterkill of bluegill is less frequent since many year classes live in the lake. This is not true for nearby Roberts Lake where most bluegill year classes were missing in 2014. It takes approximately five years for a Cochran Lake bluegill to reach 7 inches in length (Table 3), which is considered satisfactory for harvest.

Other panfish were scarce in Cochran Lake based on survey results, and included only pumpkinseed and yellow perch. Only one yellow perch was captured, a catch rate much lower when compared to historical surveys. Pumpkinseed are relatively scarce as well, but are present in numbers and sizes that allow opportunity for harvest (Table 2).

The only predator found in Cochran Lake in the 2014 survey was largemouth bass which appear to be present in numbers and sizes which would support a fishery, as well as serving the purpose of keeping the fish community in balance. Most bass were in the 10 inch size range, although a fair number were of legal size (14 inches and larger). Five year classes of largemouth bass were collected, which was less than the age distribution in 1959, and more than in 1969 (Table 3). A bass die-off was observed in the lake at the onset of the survey (due to a long winter), and this likely reduced bass catches in the survey, as well as some ages that might have been represented. It appears that bass are more susceptible to low winter oxygen levels at Cochran Lake.

No northern pike were collected at Cochran Lake in 2014, although they had been captured in past surveys in low numbers (Table 3). The only other species of fish caught in the survey was brown bullheads.

### **Analysis and Discussion**

The current fish community of Cochran Lake can be generally characterized as having the following: 1) a lake that is low in both productivity and diversity of its fish community, 2) a panfish population dominated by acceptable growing bluegill which are present in good numbers, and 3) a predator population comprised of only largemouth bass which are vulnerable to periodic winter kills and variable numbers each year. It is certainly plausible that past rotenone applications at Cochran Lake may have contributed to the low fish diversity that is present today.

### **Management Direction**

No change in fisheries management is recommended for Cochran Lake at this time. Based on the survey results, the lake is fairly healthy for its inherent fish productivity. Current State of Michigan fishing regulations are appropriate at this waterbody. Heavy snow and ice cover in certain years may periodically reduce the fish population at Cochran Lake. These fish kills will likely only be partial, and enough broodstock of most species (particularly bass and bluegill) will be present to replenish the lake in following years. Current bluegill and bass communities are acceptable at Cochran Lake, given the natural limitations of this small waterbody.

### **References**

Crowe, W.R. 1947. Fish population analysis of North Twin Lake, Cheboygan County. Institute for Fisheries Research, Division of Fisheries, Michigan Department of Conservation. Ann Arbor, MI.

Figure 1. General location of Cochran Lake in Cheboygan County.

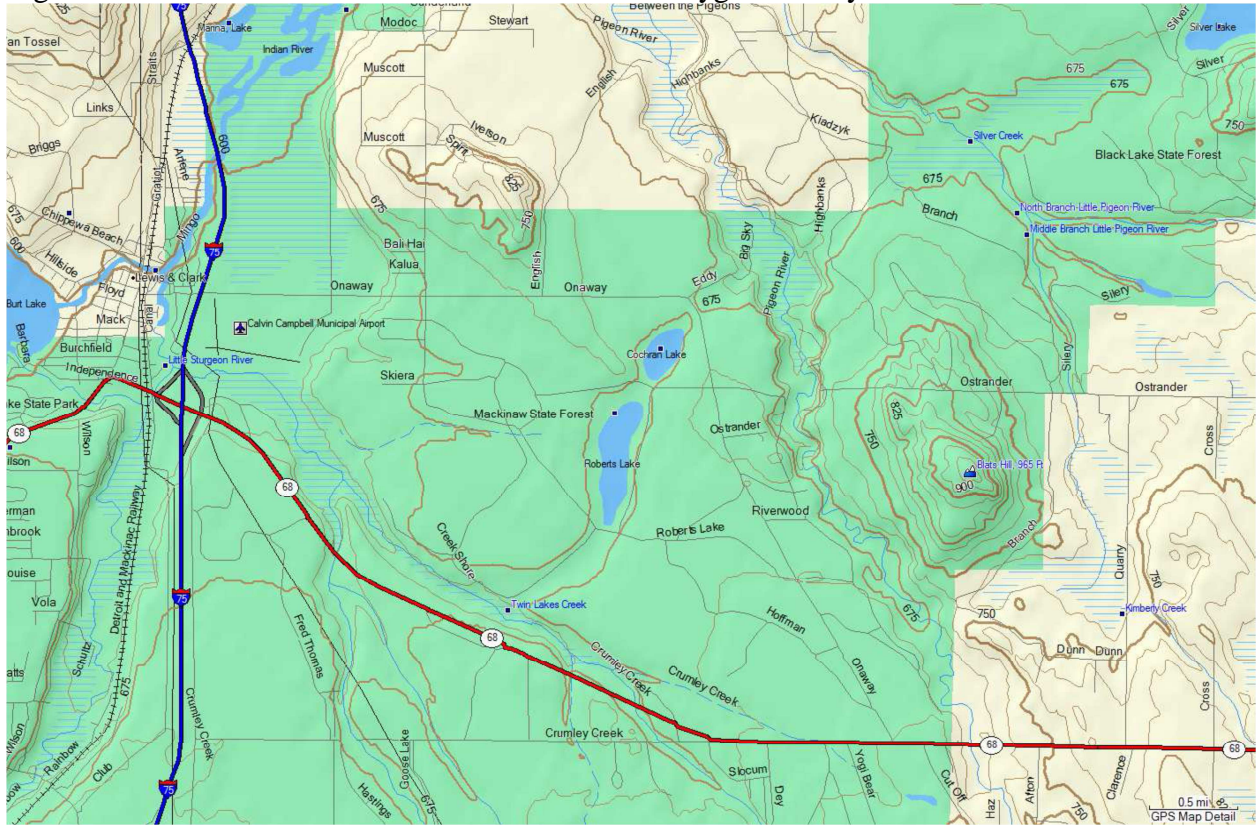


Figure 2. Depth map of Roberts Lake from 1945.

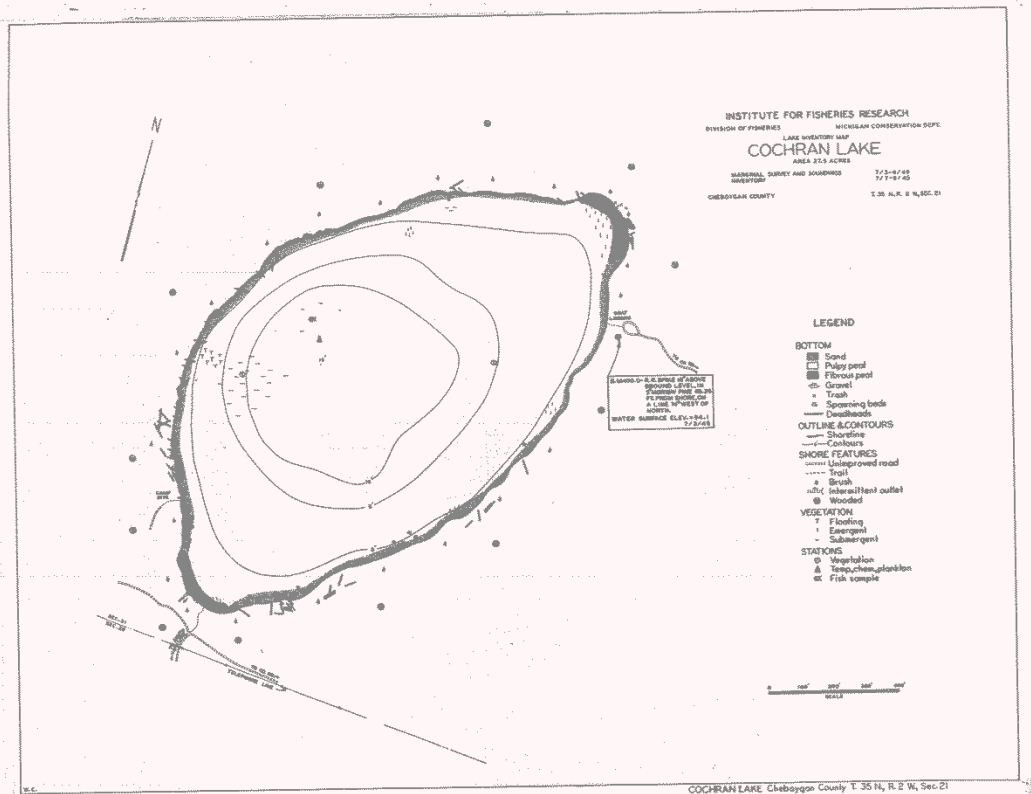


Table 1. Species and relative abundance of fishes collected with survey gear at Cochran Lake, May 12-14, 2014.

<b>Common Name</b>	<b>Number</b>	<b>Percent</b>	<b>Length Range (inches)</b>	<b>Weight (lbs)*</b>	<b>Percent</b>	<b>Growth** (inches)</b>
Bluegill	381	73.4	3-9	102.9	44.3	+0.4
Brown bullhead	94	18.1	8-15	92.9	39.9	
Largemouth bass	32	6.2	8-17	33.4	14.4	0.0
Pumpkinseed	11	2.1	5-8	3.3	1.4	+0.7
Yellow perch	1	0.2	4	0.0	0.0	
<b>Total</b>	519		232.4			

\* calculated based on length-weight relationships

\*\*based on a comparison to statewide growth for that species (inches)

Table 2. Length-frequency distribution of certain game fishes collected during the mid-May 2014 survey at Cochran Lake.

<b>Length (in)</b>	<b>Bluegill</b>	<b>Pumpkinseed</b>	<b>Largemouth bass</b>
1			
2			
3	1		
4	6		
5	32	2	
6	133	4	
7	131	3	
8	76	2	2
9	2		1
10			12
11			1
12			5
13			2
14			5
15			2
16			1
17			1
18			
19			
20			

Table 3. Mean length (inches) at age for various game fishes of Cochran Lake.  
 Number in parentheses represents number aged.

Species	Age group	Aug 1959	June 1969	May 2014
Bluegill	0	--	--	--
	I	--	--	--
	II	4.3 (13)	4.2 (4)	3.5 (2)
	III	5.6 (11)	5.5 (24)	4.8 (9)
	IV	7.8 (2)	6.6 (10)	6.3 (20)
	V	7.5 (1)	7.1 (10)	7.3 (3)
	VI	7.2 (1)	7.4 (2)	8.0 (7)
	VII	8.0 (2)	7.7 (5)	8.4 (8)
	VIII	--	--	8.5 (3)
IX	--	--	9.1 (1)	
Largemouth bass	0	3.5 (6)	--	--
	I	6.2 (4)	--	--
	II	10.6 (3)	--	--
	III	11.1 (2)	10.0 (3)	10.6 (12)
	IV	12.5 (1)	11.9 (4)	13.6 (4)
	V	14.0 (2)	--	15.2 (4)
	VI	14.3 (1)	--	13.5 (6)
VII	15.6 (2)	--	17.2 (2)	
Northern pike	0	9.9 (5)	--	--
	I	9.0 (1)	--	--
	II	21.3 (2)	--	--
	III	--	--	--
	IV	--	22.0 (1)	--
	V	--	25.5 (2)	--
	VI	--	--	--
VII	--	31.1 (1)	--	
Yellow perch	0	2.6 (1)	--	--
	I	4.4 (6)	--	--
	II	4.7 (7)	--	4.9 (1)
	III	--	9.1 (18)	--
IV	--	10.2 (1)	--	