Twin Lakes 2-5
Cheboygan County, T36/37N, R36/37N, many sections
Black River Watershed, last surveyed 2013

Tim A. Cwalinski, Senior Fisheries Biologist, Gaylord

Environment

Twin Lakes 2-5 is located in the northeast part of Cheboygan County approximately fifteen miles southeast of the town of Cheboygan (Figure 1). This chain of natural lakes is of glacial origin and is approximately 200 acres in size and has no inlets. The small outlet flows from a northwestern lake basin over a small water control structure that was built by the Twin Lakes Association in the 1950s and is operated by the same association today. There is a three foot head associated with this structure. The outlet flows to Owens Creek which eventually flows into the Black River. Boards are added or removed at the control structure which lowers or raises water levels of the many natural lake basins and connecting channels associated with Twin Lakes.

Five main lake basins, or potholes, are commonly recognized in this lake chain (Figure 2), although closer examination may suggest up to 10 individual lake basins exist of various sizes. Board manipulation at the outlet can increase water levels in channels between the basins, which allows for easier boating accessibility between lakes. The lake basins of Twin Lakes are relatively deep, with the northern-most basin reaching a depth of 75 feet deep, while the other basins reach from 25-45 feet deep. These basins stratify thermally and dissolved oxygen is variable from the top to bottom during summer months. Littoral zones are narrow at these lakes and lead into steep drop-offs to deep water. Bottom substrate is primarily muck, sand, and marl. Submergent and floating aquatic vegetation is fairly common among the lake basins, while some emergent vegetation does exist, especially between basins. Large woody debris is relatively common in the littoral zone, especially when compared to other northern Michigan lakes that are more heavily developed for various human uses. Water clarity is high, as evidenced by a secchi-disk reading of 12 1/2 feet on August 28, 2013.

The majority of the land around Twin Lakes is privately owned except for a small parcel of state owned land on the southern-most basin. The lake riparian zone is heavily forested, with a fair amount of cottages and homes sprinkled throughout the basin. No shoreline armoring was noticed during the survey. This is a-typical for a northern Michigan lake. Riparian docks tended to be classified as "small" as compared to "large." A small boat launch exists on the west end of the lake basin off Page Road. This is more of a county road ending that leads into the lake, as compared to a maintained boat launch (Susan Page, Twin Lakes Association, personal communication). This site is now overseen by Grant Township. A small campground exists between lakes basins 2 and 3 (Figure 2) and is maintained by the State of Michigan Department of Natural Resources. It has 12 campsites and a carry in boat launch. This campground has been closed in recent years due to state budget cuts, but may be re-opened in the future.

History

Records of fish management at Twin Lakes 2-5 date back to 1968. The initial survey of this lake chain (excluding Twin Lake 1 which is not connected) was completed in August of that year by the

Michigan Department of Conservation (MDOC). Experimental gill nets were used to capture a variety of fish including northern pike, cisco (lake herring), and other species. Notes from this survey indicated fast growth of cisco.

In the 1970s, the Michigan Department of Natural Resources (MDNR) began statewide experimental stocking efforts with tiger muskellunge, which is a hybrid cross between a muskellunge and northern pike. Spring fingerling tiger muskellunge were stocked in Twin Lakes in both 1976 and 1978 (Table 1). The purpose behind these stocking efforts is unknown. Following these efforts, a more complete fish community assessment was made again by MDNR in 1979 to evaluate the overall fish population and recent stocking efforts of tiger muskellunge. An unknown number of gill nets and trap nets were used to survey fish. Many of the species captured during this survey, are still captured in Twin Lake today with the exception of tiger muskellunge. Four young specimens of tiger muskellunge were collected. Northern pike and cisco were found in good numbers, as were bluegill, rock bass, and largemouth bass. Pike growth was deemed very slow, despite the high quality cisco forage base. Bluegill, pumpkinseed, and largemouth bass growth was considered good to average, while yellow perch growth was suppressed. Cisco were considering fast growing.

The next fish species evaluation was made by MDNR in 1981. The purpose was to determine if any tiger muskellunge had survived, while simultaneously examining the bluegill and largemouth bass population. Sampling effort consisted of fifteen hours of alternating current electrofishing in the shallow water. One juvenile tiger muskellunge was captured, while another was observed but not netted. Most bluegill and pumpkinseed collected were in the 2-6 inch size range, while small (1-2 inches) yellow perch were also considered numerous. Six year classes of largemouth bass were caught and growth of this species was considered average to slightly below the statewide average.

Fisheries managers had gained considerable knowledge of Twin Lakes 2-5 by this time. Management revolved around maintaining the current fish community, and possibly improving it through tiger muskellunge stocking. It was believed this additional predator would reduce some of the slow growing panfish (e.g. perch) and reduce competition among such desirable species, possibly enhancing growth rates. The jury was still out though on whether enough tiger muskellunge had survived from recent stocking efforts. Managers at this time knew there was a cold water niche available in this lake chain, since cisco remained a part of the fish community. It was during this period that MDNR Fisheries Division was experimenting with rearing splake and stocking them in locations where juvenile yellow perch were abundant. Splake, another hybrid, are a cross between a brook trout and lake trout. Managers across the Upper Peninsula had had some success with controlling stunted yellow perch by adding splake as an additional predator. This program was initiated in Twin Lakes in 1982 (Table 1) and continued through 1993.

Splake were stocked nearly annually into Twin Lakes for over a decade (Table 1), yet these stocking efforts were not evaluated through a fish assessment until 1992. It was the fall of this year that MDNR used 14 experimental gill net lifts to assess splake survival throughout the lake chain. Only one splake was captured in the survey. Acceptable numbers of northern pike and cisco were captured in the nets, as well as other competing species that are more susceptible to gill netting. Although there was a cold water niche available at Twin Lakes, survival of splake was deemed poor likely due to predation and competition from other species, and not from lake morphology.

In July 1993, MDNR conducted water temperature and dissolved oxygen profiles at basins 3 and 5 in Twin Lakes. This was done to better assess conditions for splake survival in the lake chain. In basin 5 (furthest north), the profile was made in 70 feet of water. The thermocline was established at 14-16 feet below the surface, with a temperature from top to bottom ranging from 73F to 40F. Dissolved oxygen was absent at the bottom, and supersaturated at 20 feet below the surface (51 degrees F). In basin 3, the profile was taken in 34 feet of water. Water temperature ranged from 73F at the surface to 48F near the bottom. However, in this basin, dissolved oxygen remained high (above 9ppm) throughout the water column. Both basins were considered to have a high quality cold water niche capable of supporting species such as splake and cisco.

No known fish stocking events were made at Twin Lakes following the final stocking event of splake in 1993. MDNR conducted a more intensive fish community survey from May 8-17 of 2000. Sampling effort was more than had been used in the past, and included 33 large-mesh trap net lifts, 2 fyke net lifts, and 12 experimental gill net lifts.The panfish catch was represented by bluegill, pumpkinseed, rock bass, yellow perch, and black crappie. Thirty black crappie were collected, which marked the first survey capture of this species in the lake chain. All black crappie were age 3, and ranged between 7 and 10 inches. Ten year classes of bluegill were collected with a good distribution of sizes. The largest bluegill captured was more than 10 inches, while acceptable numbers of fish larger than 8 inches were caught. Growth of bluegill was considered average when compared to statewide bluegill statistics. Pumpkinseed were again caught in Twin Lakes, but they were considered less common. Yellow perch were not common in the survey catch, yet this is explained by gear selectivity. Juvenile perch were still considered abundant, but were too small to recruit to the large-mesh gear used in the 2000 survey. Rock bass were considered very common, and most were 5-7 inches in length.

Largemouth bass, northern pike, and bowfin comprised the main predators based on the 2000 survey. Most largemouth bass were in the 10-13 inch size range, although fish up to 20 inches were caught. Nine year classes of bass were represented indicating stable recruitment. Growth was considered average for largemouth bass.

Northern pike were considered common and were also represented by nine year classes. Most pike were in the 18-22 inch size range, although an acceptable number of pike larger than the 24 inches (statewide minimum size) were collected. Northern pike growth was only considered average, despite the ample forage base of panfish and cisco.

Bowfin, or dogfish, were common in Twin Lakes based on the 2000 survey. Bowfin are large predators than can grow up to 30 inches and consume prey much like a bass or pike does. They are native to alkaline natural lakes of northern Michigan, especially lakes that have aquatic vegetation. Bowfin ranged in size from 11-26 inches, with a relatively large number of fish longer than 22 inches. Other species captured during this survey were bullheads, creek chubs, a white sucker, common shiner, and one 9 inch cisco.

Current Status

A variety of methods were used to evaluate the fish community in Twin Lakes 2-5 during mid to late June of 2013. Fish were captured with large mesh trap nets (6 lifts), large mesh fyke nets (9 lifts), small mesh fyke nets (4 lifts), experimental gill nets (4 lifts), and 30 minutes of nighttime direct

current electrofishing gear as part of MDNR's Status and Trends fish sampling program. This program involves standardized sampling in randomly selected lakes to provide information regarding spatial and temporal trends in Michigan's fish communities. Total lengths were recorded for all fish. For game fish species, dorsal spine or scale samples were collected from 10 fish per inch group for age determination.

In addition, limnological parameters were measured at Twin Lakes northern-most basin (basin 5) on August 28, 2013 (Table 2) in over 70 feet of water. The thermocline was established from approximately 18-24 feet below the surface. Dissolved oxygen suitable to fish growth (6ppm or higher) was found as deep as 33 feet, while some level of dissolved oxygen could be found throughout the entire water column. A supersaturation of dissolved oxygen was found at the thermocline layer, indicating a possible bloom of phytoplankton. This would most likely be the layer most suitable to a cold water species such as cisco.

A total of 1,349 fish were caught during the 2013 survey (Table 3) and represented by 14 fish species. The relatively high catch numbers and diversity are representative of other natural lakes in upper Michigan with a diversity of habitat types. Panfish caught were bluegill, yellow perch, rock bass, and pumpkinseed and made up 71% of the total catch by number, and 30% by weight. Predators such as largemouth bass, northern pike, and bowfin made up 8% of the total by number, and 64% by weight (Table 3).

Bluegill were the most abundant panfish in Twin Lakes and made up 56% of the catch by number, and 19% by weight (Table 2). Size of bluegill collected ranged from 1-8 inches. Most of the bluegill were in the 4 and 5 inch size ranges, and very few were larger than 8 inches. The Schneider Index (Schneider 1990) is used to qualify bluegill size composition and is used frequently by Michigan fisheries biologists. Variables such as bluegill average length, and percentage of bluegill larger than 6, 7, and 8 inches are used in the index. Based on this index, bluegill size structure is considered only "acceptable" in Twin Lakes (Table 5). Growth was also considered average to slightly below average when compared to bluegill growth statewide. Bluegill were represented by ages 1-8 in the catch, however, only two bluegill older than age 6 were aged based on our catch sample.

Yellow perch were the next most abundant panfish in Twin Lakes followed by rock bass and pumpkinseed. The actual yellow perch catch (Table 3) was skewed low in the survey. Yellow perch in the 2 and 3 inch size range were extremely abundant in the near-shore sand and marl flats. We only netted a sample of these while electrofishing. No perch greater than 5 inches were collected, a population trait noticed in previous surveys as well. Only age 1 and 2 perch were collected (Table 6). Rock bass were relatively common Twin Lakes and ranged in length from 3-10 inches. Most of this species were in the 5-7 inch size range. We did not age rock bass as part of this survey. Pumpkinseed, another sought after game fish, were present in Twin Lakes but to a much lesser degree than bluegill. Pumpkinseed are much more reliant on dense areas of aquatic vegetation, which is habitat generally lacking in Twin Lakes (dense vegetation). Seven year classes of pumpkinseed were collected (Table 6) and growth of this species was considered slow when compared to a state index for yellow perch.

The predator community of Twin Lakes was comprised of largemouth bass, northern pike, and bowfin. Largemouth bass are the keystone species of Twin Lakes and most certainly do their fair share of controlling further stunting of panfish populations. Largemouth bass up through 19 inches were

captured, and were represented by eight year classes (1-8) (Table 6). Bass age 7 and older were uncommon while age 1-6 bass were common. The growth index of largemouth bass aged from Twin Lakes from this sample was -0.8 inches. This means that largemouth bass in Twin Lakes grow nearly an inch slower for combined ages than bass throughout Michigan. This is not uncommon for bass in natural lakes in northern Michigan. Many larger bass that were collected had obvious hook marks on their jaws, indicating their vulnerability to angling.

Northern pike from 15-32 inches were collected in the survey gear. Most certainly there are pike larger than 32 inches in Twin Lakes, but they simply were not caught during the survey, and are likely not abundant. Pike in the 20-25 inch size range were most common (Table 4) and their growth was also characterized as very slow (-2.0 inches) when compared to the statewide index for pike. Only six year classes of this species were collected (Table 6) with no pike age 8 or older sampled.

Other species collected in varying numbers in the 2013 survey were bowfin, cisco, bullhead species, and various minnows, shiners, and darters. These species are common to most northern Michigan natural lakes with the exception of cisco. Twelve cisco were collected in gill nets and ranged from 9-13 inches and represented by three year classes (Table 6). More ciscos could have been captured during the survey, but we decided to reduce sampling effort (gill nets) so as to reduce the mortality of ciscos captured in the gear. Another interesting note was that where ciscos were captured in gill nets, so were northern pike that were obviously targeting cisco as prey in the nets.

Analysis and Discussion

The current fish community and environment of Twin Lakes 2, 3, 4,5 can be generally characterized as having: 1) a moderately productive set of lake basins with good water clarity, a strong summer thermocline, and good dissolved oxygen levels throughout much of the water column (for the major lake basins), 2) a panfish community with moderate diversity and dominated by bluegill, 3) an average, to slow growing panfish community, 4) a limited predator population not dependent on stocking and dominated by largemouth bass, 5) a northern pike population that is common and slow growing, 6) a cold water niche for some lake basins that historically and currently contains cisco, and 6) a non-game fish community dominated by bullheads and a relatively diverse shiner, minnow, and darter community.

The Twin Lakes panfish community is moderate in diversity and relatively low in quality. Species available to anglers include bluegill, pumpkinseed, and rock bass, all of which grow slowly. Yellow perch are abundant but not at sizes considered tablefare. We can do some comparisons with the bluegill population of Twin Lakes from 2000 through 2013. Sampling effort was much greater in 2000 compared to the recent survey, so the reader should not examine catch numbers, but can examine size structure. For example, bluegill 9 inches and larger were caught in the 2000 survey (Table 7), but were not collected in 2013. Since current growth rates of bluegill are only slightly below average, it appears that bluegill have the ability to reach larger sizes by living longer. Despite this, few bluegill past age 6 were collected (Table 6). This could be explained by overharvest of bluegill when they get to this desirable size. It could also be explained by older bluegill simply evading our sampling gear in 2013. Slow growth of all panfish could be explained by low nutrients in the system and competition with other panfish and prey species.

Largemouth bass size structure was similar between the 2000 and 2013 surveys (Table 7). Bass can grow to large sizes in Twin Lakes, yet individuals 16 inches and larger are uncommon and growth is relatively slow. A healthy bass population will be needed to control competing panfish, especially rock bass and yellow perch.

Northern pike densities (despite the effort differences) may be different today than in 2000 at Twin Lakes. Wild pike populations fluctuate and are most affected by spring water levels. Fewer pike were collected in the recent survey (Table 7), although no noticeable shift in size structure could be ascertained from the data. It is somewhat unusual to find slow growing northern pike in a lake system with cisco. Pike most certainly seek out the cooler water refuge in the summer and find themselves in a zone too warm for cisco to inhabit, and too cold for prey-sized panfish to seek out. This may hinder their feeding in the summer and keep their growth rates lower. There may also be a general lack of natural vegetative ambush habitat for pike in this lake chain. Despite this, pike and cisco have evolved together in this lake system.

Cisco are a Michigan state-threatened species. They are not present in most northern Michigan natural lakes. This species requires lakes that not only stratify thermally in the summer, but must contain high amounts of dissolved oxygen in the colder water below the thermocline. As lakes become developed and influenced by humans, oxygen levels often decrease below the thermocline. Because of this, the range of ciscos in our natural lakes in Michigan has likely declined. Thus, cisco become an indicator of high water quality and limited human influence on our lakes. Cisco were relatively common in Twin Lakes during the 1979, 1992, and 2013 surveys, but not common in the 2000 survey. Older year classes were also found in the 1979 and 1992 cisco catch.

Management Direction

1) The Twin Lakes aquatic community should be monitored on a fairly consistent basis. Many of the game fish play a vital role not only in the fishery, but also for overall ecosystem balance. A complete fish community survey documenting changes should be accomplished no later than 2030 at Twin Lakes. Periodic evaluations of the cisco population could be made more frequently to determine relative densities and year class structure. Effort could be minimal and could mimic what was done by managers to catch cisco in these lake basins in previous surveys.

2) Standard State of Michigan fishing regulations are appropriate for Twin Lakes.

3) Anglers are urged to report catches of all species to the local MDNR biologist. Sampling gear is not always efficient at capturing some fish (e,g large bluegill or yellow perch), sometimes leaving information gaps for individual species. Such reports are useful for management of the fishery not only currently, but for future managers as well.

References

Schneider, J.C. 1990. Classifying bluegill populations from lake survey data. Fisheries Division Technicalk Report, Michigan Department of Natural Resources, Lansing, MI.

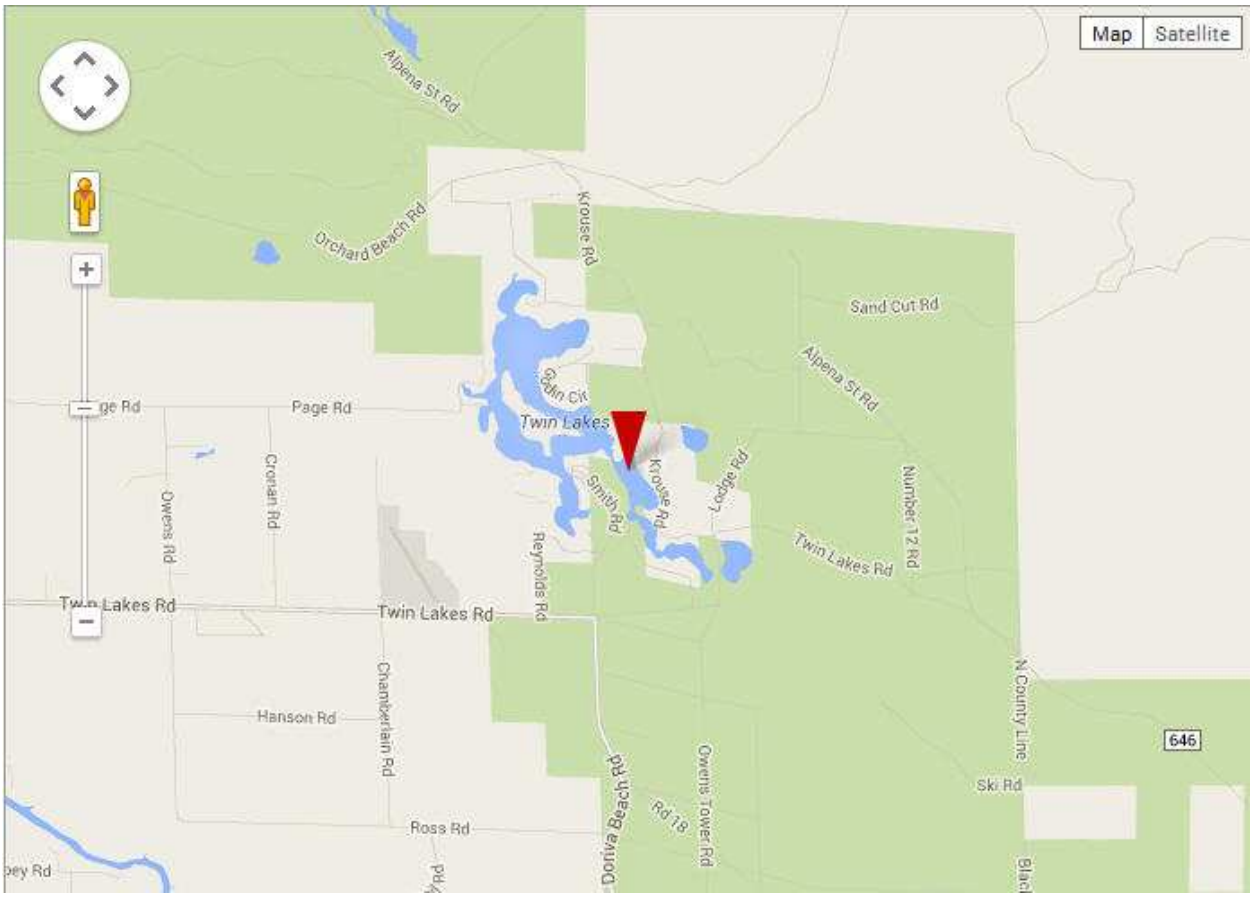

Figure 1. – Twin Lakes, Cheboygan County

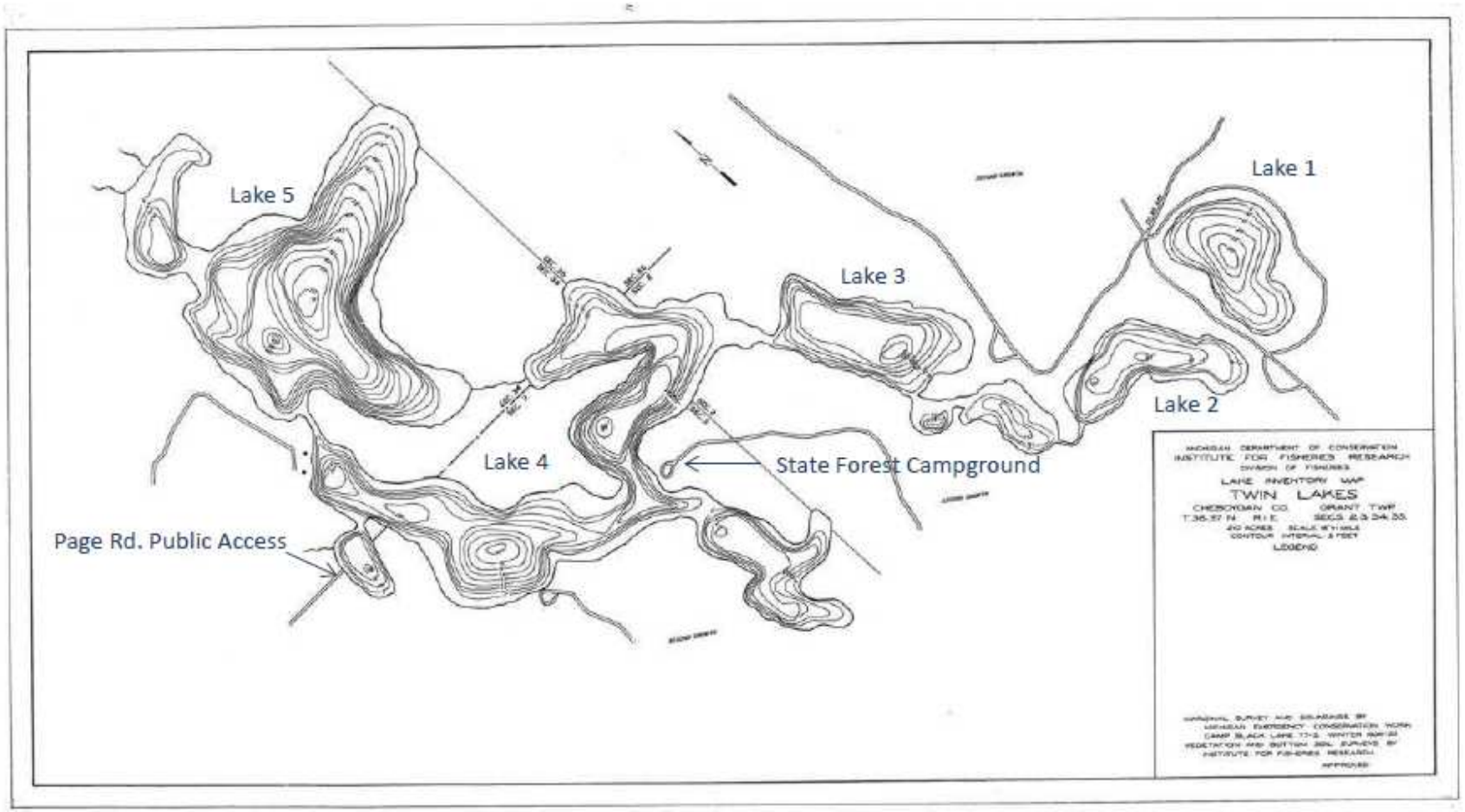

Figure 2. – Twin Lakes, Cheboygan County

Table 1.-Stocking history for Twin Lakes 2-5, Cheboygan County.

Year	Species	Number	Average Size	Source
1976	Tiger muskellunge	1,000	Fall fingerlings	DNR
1978	Tiger muskellunge	800	Fall fingerlings	DNR
1982	Splake	6,000	Yearlings	DNR
1983	Splake	6,000	Yearlings	DNR
1984	Splake	6,000	Yearlings	DNR
1985	Splake	6,000	Yearlings	DNR
1986	Splake	6,000	Yearlings	DNR
1987	Splake	6,000	Yearlings	DNR
1988	Splake	6,000	Yearlings	DNR
1990	Splake	7,000	Yearlings	DNR
1991	Splake	7,000	Yearlings	DNR
1992	Splake	7,000	Yearlings	DNR
1993	Splake	6,490	Yearlings	DNR

Table 2.-Water temperature and dissolved oxygen profile for Twin Lakes 2-5 northernmost basin, August 28, 2013.

Depth (ft)	Temperature (F)	Dissolved Oxygen (ppm)
Surface	75	7.9
3	75	7.7
6	75	7.9
9	75	7.5
12	74	7.3
15	71	8.5
18	67	9.2
21	60	11.4
24	51	11.4
27	47	10.9
30	45	8.5
33	43	6.2
36	42	4.5
39	41	3.2
42	41	2.9
45	40	2.9
48	40	3.0
51	40	3.0
54	40	3.0
57	40	3.0
60	40	3.0
63	40	3.0
66	40	3.0
69	40	2.9
72	40	2.9

Table 3.-Species catch and relative abundance of fishes collected during the Twin Lakes 2-5 fish community survey, June 2013. Weight is estimated.

Species	Number	Percent by number	Weight (lb.)	Percent by weight	Length range (in.)
Bluegill	669	56.6	50.4	18.8	1-8
Yellow perch	147	12.4	1.5	0.5	2-4
Bluntnose minnow	142	10.5	0.8	0.3	2
Rock bass	102	8.6	22.3	8.3	3-10
Emerald shiner	92	6.8	0.3	0.1	2
Largemouth bass	70	5.9	60.7	22.6	1-19
Bluntnose minnow	65	5.5	0.6	0.2	2
Pumpkinseed	41	3.5	6.0	2.2	2-8
Northern pike	26	2.2	73.6	27.4	15-32
Black bullhead	14	1.2	10.2	3.8	9-13
Cisco	12	1.0	5.0	1.8	9-13
Bowfin	11	0.9	38.1	14.2	16-24
Iowa darter	10	0.8	0.0	0.0	1-2
Mimic shiner	8	0.7	0.0	0.0	2
Blacknose shiner	5	0.4	0.0	0.0	2
TOTAL	**1,349**		**268.8**		

Table 4.-Length-frequency distribution of important game fishes collected during the 2013 netting survey at Twin Lakes 2-5.

Length (in)	Bluegill	Pumpk. sunfish	Rock bass	Cisco	Largemouth bass	Yellow perch	Northern pike
1	157				1		
2	82	3			6	89	
3	84	7	7		3	53	
4	108	12	13		2	5	
5	117	5	20		1		
6	84	10	27		3		
7	31	1	24		5		
8	6	3	8		2		
9			2	1	5		
10			1	3	10		
11				3	7		
12				2	2		
13				3	4		
14					9		
15					6		1
16					1		1
17					2		2
18							1
19					1		1
20							1
21							3
22							6
23							2
24							
25							4
26							1
27							
28							1
29							1
30							
31							
32							1

Table 5.- Twin Lakes 2-5 bluegill size structure rating of 427 fish captured in trap and fyke net lifts completed during June 2013. Size structure is rated using scores from the Schneider Index (Schneider 1990). Index scores are as follows: 1=very poor, 2=poor, 3=acceptable, 4=satisfactory, 5=good, 6=excellent, and 7=superior.

Measurement	Index Score	Value
Average Length	1	4.0”
% 6 inches or larger	3	25%
% 7 inches or larger	3	8%
% 8 inches or larger	5	1%
Average Score	3	Acceptable

Table 6.-Mean length (inches) at age for various game fishes of Twin Lakes 2-5 during different survey periods. Number in parentheses represents number aged.

Species	Age group	1979 July	1992 Oct	2000 May	2013 June
Bluegill	I	-	4.2 (3)	1.7 (11)	1.9 (25)
	II	4.6 (8)	4.8 (7)	2.5 (13)	3.4 (10)
	III	5.4 (19)	5.8 (7)	4.2 (20)	4.4 (12)
	IV	6.5 (18)	6.1 (7)	5.6 (21)	5.6 (17)
	V	7.5 (12)	7.8 (1)	7.2 (25)	6.4 (9)
	VI	8.1 (6)	8.1 (1)	7.7 (11)	7.6 (12)
	VII	8.8 (9)	-	8.5 (7)	7.7 (1)
	VIII	9.0 (9)	-	-	8.7 (1)
	IX	9.6 (6)	-	9.5 (5)	-
	X	-	-	9.2 (1)	-
	XI	-	-	10.6 (1)	-
Pumpkinseed sunfish	I	-	-	-	-
	II	-	-	-	3.1 (6)
	III	5.6 (1)	-	4.9 (4)	4.3 (9)
	IV	5.9 (5)	-	6.7 (4)	5.1 (7)
	V	6.8 (4)	-	7.3 (3)	6.3 (7)
	VI	7.2 (2)	-	7.9 (2)	8.2 (1)
	VII	7.6 (1)	-	8.2 (2)	8.5 (1)
	VIII	-	-	-	8.4 (1)
Yellow perch	I	-	-	3.4 (16)	2.9 (11)
	II	5.8 (1)	6.4 (2)	5.3 (3)	3.9 (7)
	III	5.8 (5)	6.5 (5)	6.0 (1)	-
	IV	6.3 (5)	-	7.3 (1)	-

Table 6.-continued.

Species	Age group	1979 July	1992 Oct	2000 May	2013 June
Cisco	I	-	8.1 (7)	-	-
	II	10.2 (2)	-	-	10.5 (5)
	III	11.1 (16)	11.1 (7)	9.4 (1)	11.8 (3)
	IV	12.4 (15)	11.7 (22)	-	13.3 (4)
	V	13.5 (23)	14.6 (7)	-	-
	VI	14.7 (12)	-	-	-
	VII	15.1 (4)	16.0 (1)	-	-
Largemouth	I	-	5.4 (2)	2.7 (4)	3.3 (10)
bass	II	8.1 (10)	10.0 (1)	7.0 (3)	7.1 (11)
	III	10.8 (25)	11.5 (1)	10.0 (14)	10.1 (15)
	IV	12.2 (28)	12.4 (7)	12.4 (8)	12.0 (10)
	V	14.8 (10)	12.2 (2)	13.6 (10)	13.9 (11)
	VI	16.2 (5)	-	14.3 (1)	15.2 (9)
	VII	18.0 (1)	-	15.3 (5)	17.0 (1)
	VIII	18.6 (3)	-	17.4 (2)	18.4 (2)
	IX	-	-	-	-
	X	-	-	19.3 (1)	-
Northern pike	0	-	12.4 (2)	-	-
	I	16.1 (1)	16.7 (5)	13.6 (5)	-
	II	18.4 (9)	20.2 (17)	17.5 (24)	17.0 (4)
	III	20.2 (10)	22.9 (10)	19.2 (18)	19.1 (3)
	IV	22.5 (8)	26.9 (1)	20.8 (37)	22.5 (5)
	V	26.7 (2)	27.5 (1)	23.5 (22)	23.8 (9)
	VI	-	34.5 (1)	26.0 (5)	25.5 (3)
	VII	-	-	-	30.8 (2)
	VIII	32.4 (2)	-	32.1 (3)	-
	IX	38.2 (1)	-	37.4 (1)	-

Table 7.-Length-frequency distribution of certain game fishes at Twin Lakes 2-5 from the 2000 and 2013 surveys. Sampling effort was variable between years.

Length (in)	Bluegill 2000	Bluegill 2013	N. pike 2000	N. pike 2013	L. bass 2000	L. bass 2013
1	124	157				1
2	117	82			2	6
3	28	84			2	3
4	162	108				2
5	109	117				1
6	103	84			2	3
7	82	31			1	5
8	36	6				2
9	13				6	5
10	1				9	10
11					2	7
12			2		4	2
13			2		10	4
14					4	9
15			3	1	4	6
16			5	1		1
17			6	2	2	2
18			15	1		
19			19	1	1	1
20			17	1		
21			10	3		
22			14	6		
23			7	2		
24			2			
25			3	4		
26			5	1		
27			1			
28				1		
29				1		
30						
31			1			
32			2	1		
33						
34						
35						
36						
37			1			

Photo 1. – Chosen net spot Twin Lakes, and a view of the heavily forested shoreline.

Photo 2. – Twin Lakes natural shoreline and floating in-lake aquatic vegetation.

Photo 3. – Northern pike collected during the 2013 fish survey.

Photo 4. – Cisco, or lake herring, captured in nets during the 2013 fish survey.