Lake Besser
Alpena County, T31N, R8E
Thunder Bay River watershed, last surveyed 2015

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Environment

Lake Besser, also known as Ninth Street Pond, is a 366-acre impoundment located within the lower reaches of the Thunder Bay River in Alpena County (Figure 1) and adjacent to the city of Alpena. The impounded reach from Highway 23 downstream to the dam is 59 acres in size. The water surface area upstream of Highway 23 to where the river enters Lake Besser proper is 307 acres. The impoundment was created in 1910 and has been used for hydroelectric power generation since it was built, with the most recent license settlement agreement established in 1998 between the Federal Energy Regulatory Commission (FERC) and Thunder Bay Power Company. Current ownership of the dam is North American Hydro, though it is still managed by Thunder Bay Power Company. The drainage area of the pond is over 1,200 square miles while storage of the pond is 6,000 acre-feet at normal maximum surface elevation of 598.25 feet. The head of the dam is 17 feet, and no operating fish passage structure exists at the site. A fish ladder was built into the structure but it never facilitated proper fish passage and was removed. Downstream of this dam is a 1.7-mile reach of the Thunder Bay River that flows into Lake Huron. Potadromous fish migrate from Lake Huron to the dam that creates Lake Besser.

Lake Besser has both a lentic and lotic environment. River channels cut through wetland complexes and forested islands, while the water is much more open directly upstream of the dam (Ninth Street Dam). Much of the shoreline of Lake Besser is highly irregular and interspersed with many wetland complexes. Parts of the water complex are bordered by residences and city development, since they lie entirely within the city of Alpena. Bottom substrate of the pond is primarily muck and sand. Pond depths near the dam reach 18 feet, while the old river channels in the pond are typically 6 to 20-feet deep. Aquatic vegetation (submersed and emergent), algae, and deadhead stumps are a common occurrence in Lake Besser. Multiple city boat launches exist along the south shore of the lake and river, particularly in the area of the fairgrounds. They offer launching for smaller boats and trailers, while limited parking is available. Due to its proximity to Alpena, fishing pressure is considered moderate on Lake Besser and some shore fishing opportunity is available. The 17-acre Alpena Wildlife Sanctuary is located on the north shore and offers hiking trails and viewing platforms along the waterbody.

History

The first biological inventory of Lake Besser occurred in August 1939 and was conducted by the Michigan Department of Conservation (MDOC). No stocking records exist for Lake Besser prior to this survey. This first examination was done to assess general habitat conditions and water temperatures. It was found to support a warm water fish community. During this period, managers were considering stocking Rainbow Trout in the river reaches directly upstream of the impoundment at the request of anglers. This stocking effort was not accomplished after examination of the warm water community.

The second biological assessment was made by MDOC in 1950. During this period, Lake Besser supported two resorts, two boat liveries, and fishing pressure was considered light, but the fishery was of good quality. The impoundment did not stratify thermally, alkalinity was good at 140ppm, and water was stained dark. Fish surveys were more intensive than in 1939 and utilized shoreline seining and experimental gill nets in July and August. Panfish species that were common included Pumpkinseed, Rock Bass, Black Crappie, and Yellow Perch. Bluegills were collected, but were rare. Predator game fish included Largemouth and Smallmouth bass and Northern Pike. Largemouth Bass were considered abundant but large fish were not common. Northern Pike were the second most abundant game fish and were collected up to 27 inches in length. Smallmouth Bass were less common and most were smaller fish. One 24 inch Muskellunge was collected, and Walleyes were absent in the catch. Lake Besser was considered to contain an abundant coarse fish population based on the survey catch. Bullheads and Redhorse Suckers were common, while White Suckers were present. Other forage fish included darters, killifish, Bluntnose Minnows, and Blackchin and Golden shiners. Skin parasites were considered excessive in the Yellow Perch and Northern Pike populations. Based on the survey results, natural fish communities appeared adequate to provide a satisfactory warm-water fishery.

Nearly two decades later state fisheries personnel examined the fish community again at Lake Besser. Boomshocking in the impoundment and Thunder Bay River upstream of the impoundment was used to assess the fish community on one night in July of 1967. Typical warm water fish communities as those observed in the 1950 survey were observed. No Walleyes were collected. Growth was considered to be average or slightly below average for most species.

A broader assessment of the Lake Besser fish community and angler use was made by the Michigan Department of Natural Resources (MDNR) in 1982. Ryckman and Lockwood (1985) estimated boat angler hours for Lake Besser at 5,545 hours in the summer months. This was higher than for nearby Four Mile Impoundment, but four times lower than the estimate for Seven Mile Impoundment (Lake Winyah).

The fish community was assessed in 1982 via spring trap-netting and gill-netting, along with summer boomshocking. A total of 6 trap net lifts, 4 experimental gill net lifts, and 1.5 hours boomshocking were used. Panfish were considered to be represented by good sizes and numbers, particularly for Black Crappies and Yellow Perch. Also common were Pumpkinseeds and Rock Bass, while Bluegills were still rare. Panfish growth was considered above average. Northern Pike continued to be the dominant predatory game fish, although growth was considered below average. Largemouth Bass and Walleyes were caught in marginal numbers during the survey.

Following the 1982 survey, managers decided to start a Walleye stocking program at Lake Besser. A Walleye pond was developed during that period in the upper reaches of the Thunder Bay River watershed. After harvesting, the remaining fingerling Walleyes are drained into the river system, which of course fed into the lower impoundments of the Thunder Bay River (including Besser). Despite this, the stocking program initiated at Lake Besser in 1986 included direct stocking events. It was believed that Lake Besser could support an additional predator fish, and Walleyes were increasing in popularity. Spring fingerlings were directly stocked on five occasions between 1986 and 1997 (Table 1) at rates ranging from 53 to 136 fingerlings per acre.

A fishery survey was completed by MDNR Fisheries Division in May 1998 at Lake Besser with the primary goal of evaluating recent Walleye stocking efforts. The survey catch from 12 large mesh trap net lifts suggested a "stable fish community capable of supporting a good fishery," and "forage fish communities abundant enough to sustain predators." After five Walleye stocking events, it was evident from the catch that the Walleye population had increased. Four year classes of Walleyes were collected with fish ranging from 17 to 23 inches. Northern Pike continued to be common in Lake Besser but growth remained average when compared to the statewide average. Few large pike were collected. Largemouth Bass were still collected, but in relatively low numbers. The panfish community continued to be dominated by Pumpkinseeds, Rock Bass, Yellow Perch, and Black Crappies, and to a lesser extent Bluegills. Panfish sizes tended to be small. More evident during the 1998 survey was the coarse fish population. Common Carp were reported, and although present, this author believes that a vast majority of those fish specimens were actually Redhorse Suckers. Bullheads and Bowfins also made up a large percentage of the catch biomass, and one Longnose Gar was captured.

Current Status

In 2015 MDNR Fisheries Division conducted a fish community survey at Lake Besser. Effort consisted of 6 large-mesh trap-net lifts, 9 large-mesh fyke net lifts, 4 small-mesh fyke net lifts, 7 experimental gill net lifts and 30 minutes of direct current nighttime electrofishing. Lead lengths for the larger mesh trap and fyke nets were variable depending on the amount of littoral zone. Sampling effort followed the Status and Trends sampling protocol established by Fisheries Division. The survey was done from May 18 through June 2. Water temperature during the survey ranged from the upper 50s to lower 60s Fahrenheit. Zebra mussels and rusty crayfish were noted during the survey, and aquatic vegetation was considered abundant, particularly in the zones off the main river channel. Lake limnological parameters were recorded in late August of 2015 for Lake Besser. Secchi disk (measure of clarity) was 8 feet, total alkalinity was high at 172 mg/L, and pH was typically near 7.9 throughout the water column. Water temperature on that date was uniform (72F) throughout the water column in 20 feet of water. Dissolved oxygen levels throughout the water column were at or near 6ppm, which is ample for fish growth and survival.

Eighteen different species and a total of 744 fish were collected during the 2015 survey (Table 2). Large predator fish including Largemouth Bass, Walleyes, Northern Pike, and Muskellunge made up 7% of the catch by number, while non-game species such as Bowfin, bullheads, suckers, and Common Carp made up 77% of the catch by number. These percentages were similar to those found in upstream impoundment Lake Winyah (Cwalinski 2009). Weight was not collected for all fish overall fish biomass in the lake would have been dominated by non-game species. The panfish community of Lake Besser is diverse and dominated by Pumpkinseeds, Rock Bass, Yellow Perch, and to a lesser degree Bluegills and Black Crappies. Because the survey was done early in the spring (cold period), we believe the relative proportions of panfish in the catch were skewed low overall and that many panfish were not near-shore and vulnerable to our sampling gear. Panfish represented 16% of the total catch for this survey and would probably have been higher if the survey was completed later in the spring. The catch at length for certain game fishes is provided in Table 2.

Panfish catches were low during the 2015 survey, and likely lower than during previous surveys. It is understandable that panfish are not prolific in Lake Besser since it has both lake and river characteristics. However, the low catches may also be explained by the low temperatures during the survey and the challenge of setting trap and fyke nets in the impoundment. The panfish found in the

waterbody today have been found historically with Pumpkinseeds and Rock Bass being the most common species. Yellow Perch were not captured in large numbers, and appeared to be less abundant today than in the 1982 survey, but more abundant than in the 1998 survey (Table 4). Bluegills, consistent with previous surveys, were captured in low numbers. Black Crappies were less abundant in the recent survey catch compared to the 1982 survey. This may be explained by the cyclic nature of Black Crappie populations. Some large panfish are available to anglers. Yellow perch up to 10 inches were collected (Table 3), with larger Black Crappies and Pumpkinseeds available to anglers. Recent conservation officer reports indicate that panfish still provide a fishery at Lake Besser, primarily during the ice fishing season.

The three primary predator game fish in Lake Besser are Largemouth Bass, Northern Pike, and Walleye. Large specimens of each species can be caught, especially for Largemouth Bass and Walleye (Table 3). Largemouth Bass numbers are relatively low, but fish up to 18 inches were collected. Bass abundance has not changed when compared to past survey data (Table 4). Northern Pike are more abundant, with some legal size (24 inches or greater) fish present. No pike greater than 26 inches were collected during the survey. Pike growth at Lake Besser is average to slightly below average (Table 5). Larger and smaller pike were collected in the 1982 survey (Table 4) compared to the recent survey. It takes 4-5 years for a Northern Pike to reach legal size at Lake Besser. One large legal sized (42 inches or greater) Muskellunge was captured during the survey and was age 8. The fish's color pattern was typical of the northern strain variation. Northern strain Muskellunge were stocked upstream in Lake Winyah in 2005, 2006, and 2008, and this fish may be a product of those stocking efforts.

Walleyes were the only game fish collected during the 2015 survey that appeared to be more abundant than during past surveys (Table 4). Most of the fish were of legal size (15 inches or greater) and nearly half of the specimens were greater than 20 inches. The largest fish captured was 28 inches. Ten age classes of Walleyes were collected with the oldest fish 17 years old. This species is not currently being stocked in Lake Besser, and the fish are likely downstream migrants from upstream pulse stocking efforts in Lake Winyah or the Thunder Bay River. However, some natural reproduction might be occurring since high quality river spawning habitat is available for fish in the river directly upstream of Lake Besser.

Non-game fish such as Bowfins, bullheads, Common Carp, and suckers were prevalent in the Lake Besser environment. Black and Yellow bullheads were prolific. This is common for impoundments that have a silty bottom and dense aquatic vegetation. Bullheads in the 10-14 inch size range were particularly abundant. Bowfins were also very common and reached lengths up to 27 inches. These are large predators which undoubtedly impact the other species in Lake Besser. White Suckers were also common and reached lengths up to 21 inches. Four Common Carp were collected. Two species of Redhorse suckers (silver and greater) were found to be common and attained large sizes (Table 2). Though likely more abundant, shiners and minnows were not caught in Lake Besser in high numbers.

Analysis and Discussion

The 2015 fish community of Lake Besser (Ninth Street Pond) may be characterized as having the following: 1) a diverse panfish community demonstrating average growth and dominated by Pumpkinseed Sunfish and Rock Bass, 2) a diverse game fish predator population dominated by Northern Pike, Largemouth Bass, and Walleyes, none of which are considered abundant, 3) an acceptable Walleye population that is likely built from upstream stocking efforts and with fish able to

reach older ages, 4) a low level Muskellunge population that is currently being rebuilt through stocking efforts, 5) a prolific non-game fish community composed of bullheads, Bowfins, Common Carp, and suckers which dominated the 2015 fish community survey by both weight and number, 6) an impoundment environment with large amounts of silt and aquatic vegetation.

The Lake Besser panfish community is high in diversity but poor in abundance according to recent survey results. Species available to anglers include Black Crappie, Pumpkinseed Sunfish, Rock Bass, Yellow Perch, and to a lesser degree Bluegill. Overall panfish growth rates appear to be acceptable.

The game fish predator base of Lake Besser is dominated by Northern Pike, Largemouth Bass, and Walleyes. Largemouth Bass are not abundant in this waterbody, which may be explained by the riverine environments associated with Lake Besser. Northern Pike are the key game fish in the pond and growth rates are acceptable. They are also not prolific, but abundant enough to support a fishery. Walleyes are more abundant in Lake Besser today than in previous surveys. Consistent upstream stocking efforts are likely the reason for this increased abundance. This species can live a long time in this environment and attain larger sizes.

The non-game warm water fish community within Lake Besser is non typical for northern Michigan lakes. A variety of suckers, carp, Bowfin and bullheads dominate the silty and vegetated backwaters and river channels and likely reduce other species through predation and competition. Non-native organisms such as zebra mussels, Eurasian water milfoil, and rusty crayfish all exist in Lake Besser.

Management Direction

1) The aquatic community of Lake Besser (Ninth Street Pond) is complex and should be monitored on a fairly consistent basis. A complete fish community survey documenting changes should be accomplished every 20-30 years. Effort used during the past fish surveys has not been consistent. Future effort should duplicate the 2015 survey for more comparable results. Lake Besser has a half river and half lake/marsh environment with many coves, river channels, and wetlands. These systems are likely more vulnerable to change (e.g. high water events, aquatic vegetation densities) year to year. This in turn will impact the Lake Besser fish population much more than fish populations in northern Michigan's natural lakes. Despite this, the fish community will likely remain similar and surveys may be less frequent than other nearby lakes.

2) Continue to rely on natural reproduction or downstream migration of Walleyes into Lake Besser. This species does offer a fishery opportunity in the impoundment, but little is known if a fishery actually exists for this species. Trophy sized Walleye are available to anglers. Consistent upstream stocking efforts into Lake Winyah (Seven Mile Impoundment) and the Thunder Bay River have likely created the Walleye population in Lake Besser today. There is no reason to stock Lake Besser directly with Walleyes since a population already exists from other means.

3) Northern Pike and Largemouth Bass are native to Lake Besser and important parts of the fish community. The panfish community will continue to support the fishery of Lake Besser despite their lower abundances.

4) Anglers suggest that some large native Muskellunge have been caught or seen in Lake Besser, even prior to upstream stocking efforts. According to a recent watershed assessment, this entire lower river

system with its connection to Thunder Bay of Lake Huron would have supported Great Lakes strain Muskellunge prior to dam construction. Thus, Muskellunge stocking plans were proposed for the impoundments of the lower Thunder Bay River. Today's plan is to continue stocking Great Lakes train muskellunge into Lake Besser (as well as upstream in Lake Winyah) to provide a trophy fishery someday. Initial stocking efforts at 1.5 fall fingerlings per acre were accomplished in 2013, 2014, and 2015. Future stocking efforts will continue on an alternate year basis. Periodic assessments can be made with electrofishing gear and through angler accounts.

5) The non-game large fish community of Lake Besser is prolific and diverse and includes White Suckers, Redhorse suckers, bullheads, carp, and Bowfin. Bow and spear fishing opportunities are available at this waterbody and this type of activity should be promoted.

6) The standard suite of State of Michigan fishing regulations is appropriate for Lake Besser and I recommend no changes.

References

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Figure 1. Lake Besser (Ninth Street Pond) in Alpena County.

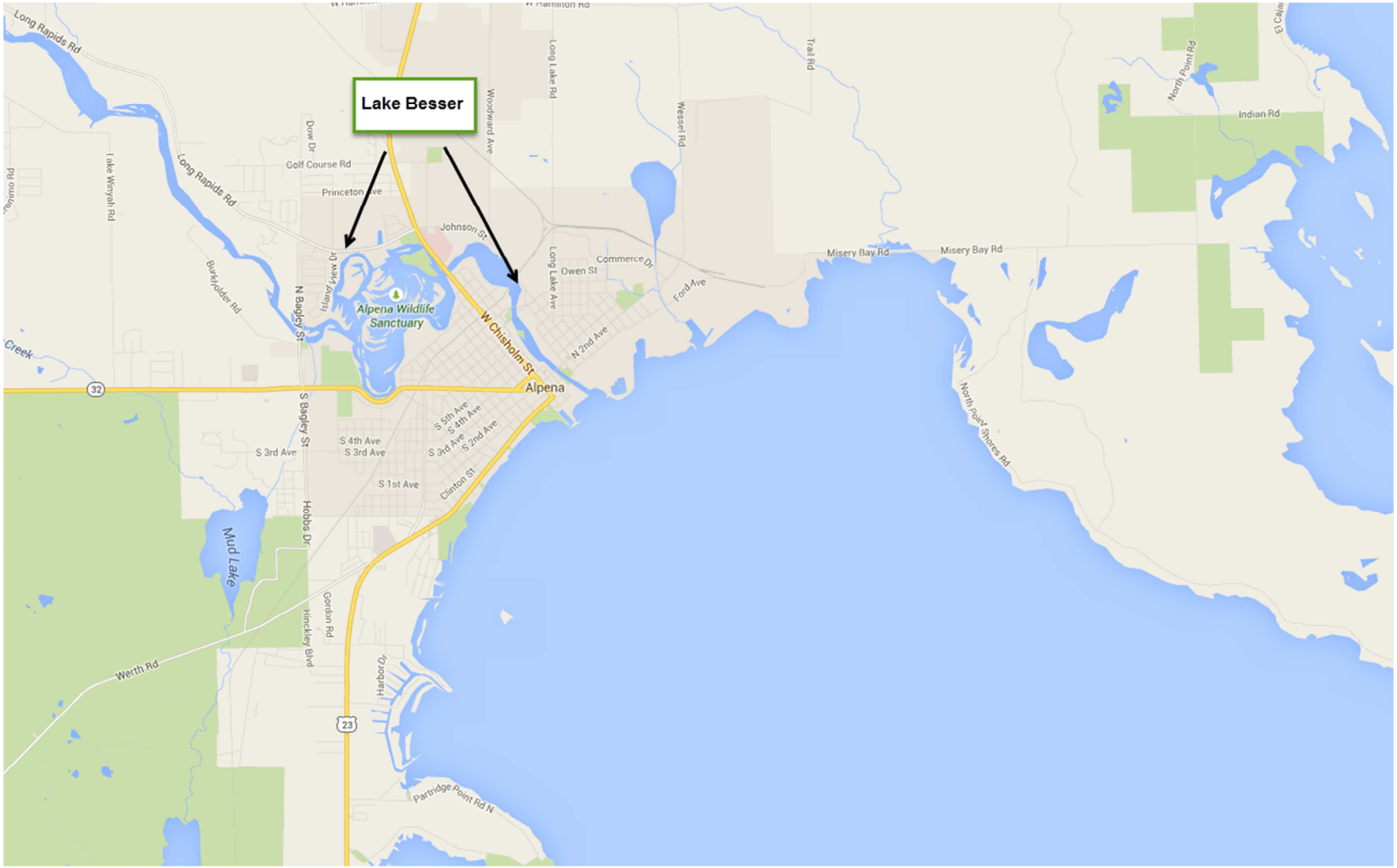

Table 1.-Stocking history for Lake Besser (Ninth Street Impoundment) by Michigan DNR.

Month/Year	Species	Number	Average Size	Strain
November 2015	Muskellunge	588	8.5”	Great Lakes
November 2014	Muskellunge	588	8.1”	Great Lakes
November 2013	Muskellunge	588	8.1”	Great Lakes
June 1997	Walleye	21,120	1.4”	Tittabawassee
June 1995	Walleye	19,500	1.8”	Bay De Noc
June 1993	Walleye	20,426	1.6”	Muskegon
June 1990	Walleye	25,000	1.4”	Muskegon
June 1986	Walleye	50,000	1.7”	--

Table 2.-Species catch and relative abundance of fishes collected during the Lake Besser fish community survey, May 18-20, and June 2, 2015. Weight is estimated.

Species	Number	Percent by number	Weight (lb.)*	Percent by weight	Length range (in.)
Black Bullhead	405	54.4	103.3	14.8	2-14
Yellow Bullhead	80	10.8	15.9	2.3	7-12
Bowfin	53	7.1	220.1	31.5	7-27
Pumpkinseed	50	6.7	8.9	1.3	1-10
Rock Bass	33	4.4	7.7	1.1	4-8
Northern Pike	23	3.1	60.5	8.7	2-27
Walleye	19	2.6	65.0	9.3	6-28
Yellow Perch	18	2.4	3.6	0.5	2-10
White Sucker	15	2.0	35.5	5.1	6-21
Largemouth Bass	11	1.5	25.9	3.7	8-18
Bluegill	8	1.1	3.2	0.5	3-10
Greater Redhorse	8	1.1	49.7	7.1	25-27
Black Crappie	7	0.9	5.2	0.7	3-13
Silver Redhorse	7	0.9	35.5	5.1	24-26
Common Carp	4	0.5	36.3	5.2	20-33
Bluntnose Minnow	1	0.1	0.0	0.0	2
Mimic Shiner	1	0.1	0.0	0.0	2
Muskellunge	1	0.1	22.5	3.2	42
TOTAL	**744**		**698.8**		

*Weight was estimated for certain game fishes from Michigan length-weight equations for those species

Table 3.-Length-frequency distribution of important game fishes collected during the 2015 netting survey at Lake Besser.

Length (in)	Bluegill	Pumpk. Sunfish	Black Crappie	Yellow Perch	Largemouth Bass	Walleye	Northern Pike
1		2	1				
2		2		2			1
3	1	12		1			
4		6		1			
5		7		3			
6	2	12		3		1	
7		6		1			1
8	3	1	1	2	1		
9	1	1	1	2			
10	1	1	1	3		1	
11			1				
12						1	
13			2				
14					1	1	
15					2		
16					2		
17					3		2
18					2	1	2
19						4	1
20						1	1
21						1	
22						1	3
23						1	2
24						1	4
25						1	
26						2	4
27						1	2
28						1	
29							
30							
31							
32							

Table 4.-Length-frequency distribution of certain game fishes at Lake Besser from the 1982 and 2015 surveys. Sampling effort was variable between years.

Length (in)	P-seed 1982	P-seed 1998	P-seed 2015	B. Crappie 1982	B. Crappie 1998	B. Crappie 2015
1			2			1
2	1		2	1		
3	2		12			
4		3	6	6		
5	23	113	7	2	1	
6	55	13	12	4	1	
7	77	1	6	12	1	
8	4	1	1	20	3	1
9	1	1	1	14	1	1
10			1	18	5	1
11				6		1
12				2		
13				1		2
14						
15						
16						
17						
18						
19						
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21						
22						
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25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						

Table 4.-continued.

Length (in)	N. Pike 1982	N. Pike 1998	N. Pike 2015	Walleye 1982	Walleye 1998	Walleye 2015
1						
2			1			
3						
4						
5				1		
6						1
7			1			
8						
9						
10	2					1
11	4					
12	2	2		1		1
13	1	1				
14	2					1
15	2	2				
16	7					
17	2		2		2	
18	7		2			1
19	5	1	1		1	4
20	2		1		2	1
21		1		1	1	1
22	1		3		2	1
23	1	2	2		1	1
24	1	2	4			1
25		2				1
26		2	4			2
27	1		2			1
28	1					1
29	2					
30				1		
31	1					
32						
33						
34						
35						
36						
37						

Table 4.-continued.

Length (in)	Y. Perch 1982	Y. Perch 1998	Y. Perch 2015	L. Bass 1982	L. Bass 1998	L. Bass 2015
1						
2			2			
3			1			
4			1			
5			3			
6	3	1	3			
7	4		1			
8	3	2	2	1		1
9	11	1	2			
10	17		3			
11	29	1				
12	12			1		
13	3			1		
14				2		1
15				1	2	2
16					2	2
17					4	3
18					2	2
19					2	
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						

Table 5.-Mean length (inches) at age for various game fishes of Lake Besser during various survey years. Number in parentheses represents number aged.

Species	Age group	June 1982	May 1998	May 2015	Recent growth index (in)
Black Crappie	I	--	--	3.0 (1)	
	II	6.7 (1)	5.8 (1)	--	
	III	7.8 (18)	7.2 (2)	--	
	IV	9.0 (9)	8.4 (3)	8.1 (1)	
	V	10.0 (6)	9.6 (1)	9.2 (1)	
	VI	10.0 (4)	--	10.9 (2)	
	VII	10.9 (6)	10.2 (5)		
	VIII	11.5 (3)	--	13.1 (1)	
	IX	12.4 (4)	--	13.8 (1)	
Pumpkinseed	I	--	--	1.9 (3)	+0.5
	II	--	--	3.5 (16)	
	III	5.7 (13)	4.2 (4)	5.1 (8)	
	IV	6.8 (15)	5.6 (8)	7.0 (9)	
	V	7.5 (5)	6.0 (11)	7.0 (9)	
	VI	8.1 (1)	6.4 (2)	7.3 (1)	
	VII	--	7.3 (1)	10.0 (2)	
	VIII	8.5 (1)	8.1 (1)	----	
	IX	--	9.3 (1)	--	
Yellow Perch	I	--	--	3.3 (4)	+0.8
	II	6.0 (6)	--	6.0 (6)	
	III	7.2 (6)	8.0 (4)	--	
	IV	8.7 (9)	--	8.3 (3)	
	V	9.9 (12)	10.4 (2)	9.2 (2)	
	VI	11.6 (10)	--	10.5 (2)	
	VII	--	--	10.9 (1)	
	VIII	12.8 (12)	--	--	
Walleye	I	--	--	--	
	II	12.8 (1)	--	8.4 (2)	
	III	--	--	12.1 (1)	
	IV	--	17.2 (1)	--	
	V	21.3 (1)	--	18.2 (4)	
	VI	--	19.1 (3)	--	
	VII	--	20.4 (1)	23.3 (2)	
	VIII	30.0 (1)	22.4 (4)	21.5 (2)	
	IX	--	--	25.3 (1)	
	X	--	--	21.1 (1)	
	XI	--	--	--	

Table 5.-continued.

Species	Age group	June 1982	May 1998	May 2015	Recent growth index (in)
Walleye cont.	XII	--	--	25.7 (3)	
	XIII	--	--	--	
	XIV	--	--	26.1 (2)	
	XV	--	--	--	
	XVI	--	--	--	
	XVII	--	--	26.1 (1)	
Muskellunge	VIII	--	--	42.0 (1)	
Largemouth	I	--	--	--	
Bass	II	--	--	--	
	III	13.5 (3)	--	8.4 (1)	
	IV	14.7 (1)	--	--	
	V	15.5 (1)	--	14.9 (1)	
	VI	--	--	15.6 (2)	
	VII	19.9 (1)	15.4 (1)	16.8 (1)	
	VIII	--	16.7 (4)	17.4 (4)	
	IX	--	17.4 (4)	17.8 (2)	
	X	--	19.0 (2)	--	
	XI	--	19.2 (1)	--	
Northern Pike	0	--	--	--	-0.5
	I	11.6 (11)	12.7 (3)	7.4 (1)	
	II	16.3 (15)	16.7 (3)	17.1 (1)	
	III	19.6 (9)	21.0 (1)	18.9 (4)	
	IV	24.0 (2)	23.7 (2)	23.6 (6)	
	V	30.0 (2)	24.9 (5)	24.3 (5)	
	VI	29.5 (1)	26.6 (1)	26.9 (3)	
	VII			27.8 (1)	

Photo 1. Typical Lake Besser environment.

Photo 2. Lake Besser largemouth bass.

Photo 3. Lake Besser walleye.

Photo 4. Lake Besser muskellunge.

Photo 5. Lake Besser redhorse sucker.