

BASELINE LAKE
*Allegan County (T1N, R13W, Sections 32 and 33)
Surveyed April 17-18, 1990*

James L. Dexter, Jr.

Environment

Baseline Lake is a natural lake located in southern Allegan County. The lake is easily accessed off M-40 about 6 miles south of the City of Allegan.

The watershed is dominated by cultivated farmland. Residential areas and large tracts of woods are sparse. The land surrounding the lake is made up mostly of poorly drained silty loams and aquent soils. The topography is slightly undulating, with moderate sized glacial hills to the north.

Baseline Lake is 187 acres in size with a maximum depth of about 45 feet. The lake has never been mapped. Three very small inlets that are rated as second quality warmwater exist (southwest, west, and north central shores) along with one outlet (top quality warmwater) in the northeast corner. Because of riparian flooding problems in 1978 and 1980, a legal lake level of 729.00 feet was established in 1980, and a control structure was built.

Water quality conditions of the lake were studied in August of 1990. The water was brown and very turbid. This condition appears to be present just about year-round, most likely due to high nutrient enrichment from surrounding farms. Secchi disc readings were only 3.5 feet, slightly less than in the early 1980's. Within the water column, alkalinities ranged from 111 ppm to 126 ppm, and pH was about 8.5. These values indicate the water is hard and well buffered. Water temperatures varied from 81.5°F at the surface to 50°F at the bottom. A thermocline occurred from about 12 to 20 feet of water. However, not enough oxygen was present in this area to support most fish species. Dissolved oxygen levels were as high as 10.3 ppm at the 3-foot depth, but diminished to 0.5 ppm at the 12-foot depth.

Although the lake bottom has sharp dropoffs around most of the perimeter, most shoal areas are heavily vegetated. Coontail and milfoil appear to dominate the submerged plant community. Floating and emerged species are rated as common to abundant throughout the lake's shoal areas.

Development around Baseline Lake is sparse compared with many southern Michigan lakes. This is explained by the marshy shore areas and poorly drained soils. Most development has taken place on the southwestern, western, and northwestern shores. Most other areas are still in their natural state (lowland hardwoods). A public access site on the west side of the lake is available with 15 trailer parking sites and a paved ramp.

Fishery Resource

Baseline Lake historically produced good northern pike, largemouth bass, and bluegill fishing. Between 1934 and 1945, various combinations of bluegill, largemouth bass, yellow perch, walleye, and black crappie were stocked. Of those species, only walleye are not present today. Of 1,710,000 walleye fry stocked between 1937 and 1942, no reference can be found of either anglers or fisheries personnel finding a stocked walleye in Baseline Lake.

By the mid-1950's the fishery started to decline. This coincided with increased development around the lake. Bluegills became stunted, and other game species suffered a decline. In May of 1959, water quality was reported to be poor due to turbidity caused by high algal density. This same water quality condition exists today, practically year-round.

Partial fishery surveys were conducted with an AC-boomshocking boat in 1975 and 1979. These surveys documented again that bluegills were small and slow growing, while largemouth bass size and recruitment rates were very good. Few crappies or perch were collected because of the gear used and time of collection (June). The species composition of the lake was typical of a warmwater fish community.

The community of fish present today is a little different from that of 40 years ago (Table 1). The most recent survey (April 17-18, 1990) was conducted specifically to evaluate the northern pike population. Water temperatures at the time of the survey were cool (46°-47°F), and catches in the trap, fyke, and gill nets were very low. However, a spring 1988 trap-netting survey provided a very large sample and revealed much information about the bluegill population.

Baseline Lake today is very popular among bluegill, pike, bass, and crappie anglers. The bluegill fishery appears to have recovered substantially from that of 10–30 years ago. Growth has increased from below state average rates in 1975 and 1979, to slightly above the state average rate (Table 2). This better rate of growth was seen in the 1988 sample also. Most recently sampled bluegills were of acceptable size (1988-89.2%; 1990-96.1%). We were surprised to find that the bluegill population had reversed itself.

Only a few largemouth bass, yellow perch, and black crappie were collected in this survey, too few to draw any firm conclusions about their growth rates or populations. Five northern pike were collected that ranged from 21.6 to 31.0 inches. Their growth was very good, much above observed state average rates (Table 2). These fish were ages IV and V, and may or may not have been of hatchery origin. When the control structure was built in 1980, pike spawning runs up Baseline Creek to Baseline Lake were cut off. A decline in the pike fishery quickly developed. Annual stocking of northern pike spring fingerlings at the rate of 10/acre was initiated in 1984.

Although the largemouth bass sample was not large, we do know that the fishery for them is very good. Baseline Lake is a popular stop for bass tournaments because of the number and size of bass available, and the good access.

The age composition and survival characteristics of bluegills appear to be normal with one exception (Table 3). Age-VI bluegills are much less numerous than age-VII bluegills. This may indicate a weak year class or high mortality of that particular year class. Age-II bluegill may also represent a very strong year class. Older bluegill are well represented in the sample. No conclusions on age composition and survival can be drawn for the other species in Table 3 because of inadequate samples.

The overall fishery of Baseline Lake is good. The physical/chemical environment appears to have changed little in the past 30 years. Fishing today is better for bluegills than it has been for many decades. While it is hard to say just how good the fishery of 20–50 years ago really was for other species, I believe most anglers would agree that it is quite good today. As a lake that provides good fishing for at least 4 to 5 game species, Baseline Lake compares well to other good lakes in the region.

Why has the previous "poor" bluegill fishery reversed itself today to a "good" fishery? A combination of many factors may be at work. These may include increased weed treatments since the mid-1980's, decreased recruitment of bluegills caused by largemouth bass predation, increased harvest of bluegills by anglers, or perhaps increased nutrient loading. Schneider (1990) developed five criteria for ranking bluegill populations from survey catches. From the 1988 trap net sample of 1,214 bluegills, the population then ranked a 4.8 (good) on a scale of 1–7. In the most current survey bluegills ranked a 6.3 (excellent), one of the highest ratings a lake in this region has received.

Management Direction

The only direct management currently required for Baseline Lake is the continued stocking of northern pike fingerlings at the rate of 10/acre each year. We really have no idea the extent of any actual reproduction, so stocking should continue. A year "break" in the stocking will be scheduled soon to allow us to evaluate natural reproduction during the next survey. A full survey, including all netting options and electroshocking, will be conducted by the year 2000.

Baseline Lake should provide good fishing for a variety of game fish for years to come. Our main goal will be to maintain the present status of the fishery. This may prove to be difficult. If the lakes' pike population is totally relying on recruitment from the hatchery, we may not be able to provide good pike stock for the lake each year. Dietary problems within the hatchery are reducing the quality of this supply. If bass tournaments continue to increase in frequency at Baseline Lake, the bass population may be reduced, and that in turn may harm the bluegill population.

Water quality problems also need to be addressed, as excessive turbidity and algae blooms are common. Fish populations at present are limited to the top 11 feet of water during the summer months. These chemical "problems" may be related to the farming practices in the watershed, and should be addressed as the opportunities arise.

Report completed: June 1991.

References

Schneider, J.C. 1990. Classifying bluegill populations from lake survey data, Michigan Department of Natural Resources, Fisheries Technical Report 90-10, Ann Arbor.

Table 1.-Number, weight, and length (inches) of fish collected from Baseline Lake with trap, fyke, and gill nets, April 17-18, 1990.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (in.) ¹	Average length	Percent legal size ²
Bullhead	76	45.5	58.0	51.9	7-14	10.9	100.0 (7)
Bluegill	51	30.5	11.4	10.2	4-8	7.1	96.0 (6)
Golden shiner	11	6.6	2.6	2.3	7-9	8.6	-
Yellow perch	7	4.2	0.5	0.4	5-7	6.2	14.0 (7)
Northern pike	6	3.6	23.7	21.2	21-31	26.5	100.0 (20)
Black crappie	5	3.0	2.0	1.8	4-11	8.3	80.0 (7)
Bowfin	4	2.4	8.8	7.9	16-21	18.8	-
Largemouth bass	2	1.2	2.7	2.4	13-14	14.0	100.0 (12)
Warmouth	2	1.2	0.2	0.2	5-6	6.0	-
Pumpkinseed	1	0.6	0.1	0.1	6	6.5	100.0 (6)
Lake chubsucker	1	0.6	0.2	0.2	8	8.5	-
Spotted gar	1	0.6	1.6	1.4	22	22.5	-
Total	167	100.0	111.8	100.0			

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

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

Table 2.-Average total length (inches) at age, and growth relative to the state average, for fish sampled from Baseline Lake with trap, fyke, and gill nets, April 17-18, 1990. Number of fish aged is given in parentheses. Top average is weighted by length frequency distribution bottom average is not weighted.

Species	Age								Mean Growth index ¹
	I	II	III	IV	V	VI	VII	VIII	
Bluegill	-	-	-	6.4	7.0	8.1	7.8	8.2	+0.3
	-	-	-	(12)	(7)	(2)	(7)	(2)	-
	-	-	-	6.4	7.0	8.1	7.9	8.3	-
Largemouth bass	-	-	-	13.3	-	14.8	-	-	-
	-	-	-	(1)	-	(1)	-	-	-
	-	-	-	13.3	-	14.8	-	-	-
Yellow perch	-	5.7	6.4	-	-	-	-	-	-0.0
	-	(1)	(5)	-	-	-	-	-	-
	-	5.7	6.3	-	-	-	-	-	-
Northern pike	-	-	-	26.0	28.3	-	-	-	+2.6
	-	-	-	(5)	(1)	-	-	-	-
	-	-	-	26.0	28.3	-	-	-	-
Black crappie	4.8	8.1	8.6	-	11.5	-	-	-	-
	(1)	(1)	(2)	-	(1)	-	-	-	-
	4.8	8.1	8.6	-	11.5	-	-	-	-

¹Mean growth index is the average deviation from the state average length at age.

Table 3.-Estimated age frequency (percent) of fish caught from Baseline Lake with trap, fyke, and gill nets, April 17-18, 1990.

Species	Age								Number caught
	I	II	III	IV	V	VI	VII	VIII	
Bluegill	-	-	-	46	25	4	20	4	51
Largemouth bass	-	-	-	50	-	50	-	-	2
Yellow perch	-	14	86	-	-	-	-	-	7
Northern pike	-	-	-	83	17	-	-	-	6
Black crappie	20	20	40	-	20	-	-	-	5

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MANAGEMENT PLAN
based on
Status of the Fishery Resource Report 91-13

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Two major management goals exist for Baseline Lake based on the 1988 and 1990 samples. Goal number one is to maintain the present fishery without impacting negatively on growth rates. Progress toward this goal will be monitored by contact with anglers who fish this lake, and by a more comprehensive survey within the next 10 years. This survey should include the same gear used in 1990 with the addition of 1-2 hours of nighttime electroshocking. This data can then be compared to past surveys and will enable us to detect important trends in game fish populations.

Goal number two is to evaluate the extent of natural reproduction by northern pike. This will be accomplished by not stocking pike at least 1 year, that year being 3 to 4 years before the next planned survey. More effort in that survey with gill nets should yield enough pike for us to determine the amount of reproduction. Substantial reproduction would allow us to drop Baseline Lake from the stocking list.

The worst obstacles to reaching the stated goals include increasing weeds, water quality conditions that may decline to a point where fish populations are severely impacted, and an increase in the use of the lake by bass clubs for tournaments. Substantial changes in bass population structure will most likely have a profound impact on the bluegill population. The expected yield of stocked northern pike to the fishing at Baseline Lake is uncertain because the amount of natural reproduction is unknown. Assuming that the entire pike population is from our stockings, we can optimistically expect a yield of 10% of the pike stocked, considering the poor quality of the hatchery-reared pike. Most will be harvested in the 20 to 25-inch range, but some should also reach a larger size and provide a quality fishing experience.

Plan completed: June, 1991.

Approved: David C. Johnson, District Biologist, August, 1991.

Donald Reynolds, Regional Biologist, September, 1991.

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Questions, comments and suggestions are always welcome!
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