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HALFMOON LAKE

Washtenaw County
(T1S, R3E, Sec. 1, 6) Surveyed May, 1991

Michael P. Herman

Environment

Halfmoon Lake is located within the boundaries of the Pinckney Recreation Area and is approximately 6 miles north of the Village of Chelsea (Figure 1). The main part of this lake lies in the northwest part of Washtenaw County and a small portion extends into southwestern Livingston County. Halfmoon Lake is approximately 236 acres in size and part of a chain&endash;of&endash;lakes that are included in the Middle Huron Watershed within the Huron River Basin. There are several lakes upstream from Halfmoon Lake, including Woodburn, Patterson, Watson, Bruin, and Blind. The only outlet of Halfmoon Lake is approximately 20 feet wide and 2-to-3 feet deep; it exits to Hi-Land Lake. Water then flows in a northeasterly direction to the Portage River, Little Portage Lake, Big Portage Lake, and finally to the Huron River just south of the Village of Pinckney.

The lake bottom consists primarily of marl in the shallow water areas and muck and pulpy peat in deep water. There are also scattered areas of fibrous peat, gravel, rubble, and sand which are found mainly in the shallows. Halfmoon Lake has steep drop-offs, several submerged islands, and water depths up to 87 feet. Approximately 75% of the lake's surface area has water greater than 10 feet deep. Vegetation is very limited in this lake and includes scattered areas of bulrush, white and yellow water lily, several varieties of pondweed, and Chara or muskgrass. The latest limnology survey was in August of 1991. Temperatures ranged from 77°F at the surface to 54°F at the 25foot depth. Very low dissolved oxygen levels in the thermocline were recorded, making this lake unsuitable for the introduction of rainbow trout.

The shoreline of Halfmoon Lake is moderately developed, and about 100 summer and permanent homes presently exist on this lake. The undeveloped portions of the shoreline are a combination of mainly forested and emergent wetlands, as well as some wooded upland. There is a state access site and public swimming beach located on the lake's northeast shore.

History

Bluegills, largemouth bass, yellow perch, and walleye fry were stocked in Halfmoon Lake in the late 1930's and early 1940's. These stocking programs were soon discontinued. Rainbow trout were stocked in Halfmoon Lake in the early 1940's but poor survey returns led to discontinuing these plants in 1945. Rainbow trout stocking resumed in 1955 and continued through 1969; once again, trout plants were discontinued because of poor angler returns. An experimental plant of chinook salmon was made in 1973. A subsequent gill net survey produced no chinooks. A private plant of approximately 12,000 walleye fingerlings was made in 1986 but none have been reported caught. In 1987, approximately 24,000 redear sunfish fingerlings were stocked in this lake.

In the summer of 1989, a floating fishing pier was constructed by the Fisheries Division of the

DNR and placed on the northeast end of Halfmoon Lake. The following summer, twenty fish cover structures were placed in two groups in approximately 15 feet of water and within casting distance of the fishing pier. The fish structure project was a cooperative effort between the Parks and Fisheries Divisions of the DNR and the Lower Michigan Bass Organization based in Southfield, Michigan. Each structure was built using old Christmas trees which were anchored into a standard size cinder block with cement. Because of heavy pleasure boat traffic and the potential for injury that might result from the location of the fishing pier, it was moved to Crooked Lake which is approximately 1 mile to the east.

Fishery Resource

Halfmoon Lake was last surveyed in late May, 1991 with six standard 8 x 5 x 3-foot trap nets (Table 1). No gill nets were used since evaluation of the redear sunfish stocking program was the primary objective of this survey. Species captured in descending order of abundance included bluegills, pumpkinseeds, carp, black crappie, longnose gar, rock bass, largemouth bass, bowfin, northern pike, yellow perch, warmouth, and white bass.

Bluegills predominated in the survey, comprising 69% by number but only 20% by weight of the total catch. The 384 bluegills in the sample averaged 7.5 inches each, which is an unusually large average size. Nearly all of the bluegills caught in trap nets ware 6.0 inches or longer, or what is considered to be an acceptable size to anglers (Table 1). Based on growth analysis using fish scales, bluegills caught during the 1991 survey exhibited growth rates that were nearly one&endash;inch above state average growth rates (Table 2).

Bluegills are targeted for sampling in inland lakes because of their role in determining fish community structure and overall sportfishing quality (Schneider 1981). Even though the goal of lake surveys is to sample all fish species and all sizes present, many times only the bluegill population is adequately sampled because bluegills are usually the most abundant fish. Recently, a ranking system has been developed that allows fish managers to get an idea of the relative quality of a lake's fish population (Schneider 1990). On a scale of 1 to 7, the quality of the bluegill population in Halfmoon Lake was calculated as 6.3 or "excellent".

Although black crappie are not a large component of the fishery in Halfmoon Lake, they appeared very healthy and averaged 7.4 inches long. Based on fish scale analysis, crappies exhibited growth that was nearly one-inch above state average rates (Table 2).

Not enough northern pike and largemouth bass were captured during the 1991 survey to be statistically significant. However, growth trends indicate that both species are growing well above state average rates (Table 2).

Longnose gar and carp comprised a total of over 75% of the survey catch by weight. Although these fish often compete for food and space with all other fish species, growth of bluegill, crappie, bass and pike seem to be unaffected.

Pumpkinseeds comprised nearly 10% of the total catch by number. These fish appeared very healthy and robust and over 80% were 6 inches or larger, or what anglers consider to be "keeper" size.

Analysis and Discussion

Survey records show that species composition has remained relatively unchanged throughout the past 50 years with the exception of carp. Growth trends for bluegill, crappie and largemouth bass in 1991 are comparable to those from surveys of Halfmoon Lake in 1965, 1973, and 1983.

Table 3 outlines the estimates of age frequency for bluegills and crappies caught during the May

1991 survey of Halfmoon Lake. Bluegills up to 10 years old were found, which indicates unusually high longevity. Black crappie, on the other hand, seem to be short&endash;lived. In general, bluegill age groups III through VII were well represented. However, the estimated age frequency for age V bluegills was only 16%, which suggests that a weak year class may exist. Conversely, the estimated age frequency for age II crappies was nearly 75%, which suggests a very strong year class. Water temperature, spawning success, weather, food availability, and many other variables contribute to the success or failure of a particular year class of fish.

Only one northern pike was caught in trap nets during the present survey. However, pike are better sampled with gill nets, which were not used in 1991. Past surveys of this lake with gill nets have resulted in the capture of relatively good numbers of northern pike. Northern pike caught in 1983 and in 1991 exhibited growth trends that were well above the state average rate.

Very few carp have been captured in past surveys of Halfmoon Lake. The 1991 survey resulted in the capture of 47 carp, averaging over 27 inches and over 9 pounds each. Carp dominated the survey by weight, comprising nearly 70% of the entire catch. Although the apparent large population of carp have not yet had a measurable negative impact on the other fish populations sampled, it is possible that changes in the general fish population of Halfmoon Lake may occur in the future if carp numbers continue to increase.

No ciscoes were taken in the 1991 survey and they may have become extinct. They were reported in surveys dating back to 1942. Several reports of mid&endash;summer ciscoe mortalities have been received by the Jackson District Fisheries office throughout the years. Surveys subsequent to 1942 resulted in the capture of fewer and fewer ciscoes. Reasons for the decline of ciscoes in Halfmoon Lake may include, but are not limited to, increased predation by northern pike and deteriorating water quality. In general, there is a movement in spring and early summer from shallow to deeper water, when ciscoes move into the colder layers. This seasonal migration may lead to mass mortalities if the layer of water below the thermocline (hypolimnion) becomes depleted of oxygen (McCrimmon 1952). An August, 1991 limnology survey of Halfmoon Lake showed that very little oxygen existed in or below the thermocline.

Halfmoon Lake is used mainly by pleasure craft other than fishing boats throughout much of the summer, and there is seasonally intense competition for use of the lake. Even though some anglers report good bluegill and bass fishing success in recent years, the steep drop-offs and the general lack of fish concentrating cover in this lake may make it difficult for anglers to locate fish. As a result, bluegills and other gamefish are probably underutilized.

Because pumpkinseeds and redear sunfish have similar food and habitat requirements, redears were expected to flourish in Halfmoon Lake. In addition, the lake has a marl bottom and similar features to other area lakes where redears have done well. It was hoped that the introduction of redear sunfish would give anglers an opportunity to catch a trophy panfish. Based on the growth of redears in other area lakes, redear sunfish stocked in Halfmoon Lake in 1987 should have been at least 8 to 9 inches long in 1991; however, none were caught in the trap nets. The presence of large numbers of carp in this lake may have had a negative effect on redear growth and survival, since redears feed mainly on the bottom and could be in competition with carp for food.

Management Direction

No redear sunfish were caught during the present survey. It should be noted that the redears stocked into Halfmoon Lake were some of the last fingerlings harvested from the rearing pond in 1987. In general, the last fish harvested from a pond experience increased stress because of reduced water volumes which causes crowding, lowered oxygen levels, turbidity, and increased water temperatures. Additionally, the fingerlings stocked in 1987 were only 1-inch long. The average size of redear fingerlings stocked in other District 13 lakes has been approximately 2

inches. The quality of redear fingerlings stocked into this lake remains suspect. When available, Halfmoon Lake should be stocked with redear sunfish fingerlings for 3 years in succession and the fishery evaluated 3 years later.

Halfmoon Lake has a reputation among anglers for catches of large bluegill, as well as crappie and largemouth bass of acceptable size. In general, anglers are satisfied with the existing fishery.

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References

McCrimmon, H. R. 1952. Mortality of coregonid fish in Lake Simcoe during spring temperature warm-up. Canadian Field&endash;Naturalist 66(4): 112.

Schneider, J. C. 1981. Fish communities in warmwater lakes. Michigan Department of Natural Resources. fisheries Research Report 1890, Ann Arbor.

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Table 1.-Number, weight and length indices of fish collected from Halfmoon Lake with trap nets, May 29, 1991.

Species	Number	Percent by number	Weight (pounds)	Percent by weight	Length range (inches)[1]	Average length	Percent legal size[2]
Bluegill	384	68.7	128.8	20.1	5-9.5	7.5	96
Pumpkinseed	53	9.5	12.2	1.9	5-8.5	6.6	85
Black crappie	39	7.0	7.2	1.1	5-9.5	7.4	67
Northern pike	1	0.2	0.7	0.1	15.5	15.5	0
Yellow perch	1	0.2	0.2	0.0	7.5	7.5	100
Largemouth bass	2	0.4	2.2	0.3	12-14.5	13.5	100
Rock bass	4	0.7	1.4	0.2	6-9.5	8.3	100
Warmouth	1	0.2	0.1	0.0	4.5	4.5	0
White bass	1	0.2	1.0	0.2	11.5	11.5	100
Carp	47	8.4	443.0	69.3	21-32.5	27.4	-
Longnose gar	24	4.3	37.1	5.8	22-40.5	27.3	-
Bowfin	2	0.4	5.5	0.9	20-21.5	21.0	-
Total	559	100.0	639.4	100.0			

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

[2]Percent legal size or acceptable size for angling.

Table 2.-Average total length (inches) at age, and growth relative to the state average, for two species of fish sampled from Halfmoon Lake with trap nets, May 29, 1991. Number of fish aged is given in parenthesis.

Species	Age I	II	III	IV	V	VI	VII	VIII	IX	X	Mean growth index[1]
Bluegill	-	-	5.8 (14)	7.1 (12)	7.5 (4)	8.2 (7)	8.6 (3)	9.1 (2)	9.3 (7)	9.7 (1)	+0.9
Black crappie	5.8 (1)	7.0 (20)	8.3 (8)	9.9 (1)	-	-	-	-	-	-	+0.9

[1]Mean growth index is the average deviation from the state average length.

Table 3.-Estimated age frequency (percent) of two species of fish caught from Halfmoon Lake with trap nets, May 29, 1991.

Species	Age I	II	III	IV	V	VI	VII	VIII	IX	X	Number caught
Bluegill	-	-	14.8	40.5	15.7	17.9	8.0	1.0	2.0	0.1	384
Black crappie	2.6	74.4	20.5	2.6	-	-	-	-	-	-	39

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Web Author: *Tina M. Tincher, Librarian*

Questions, comments and suggestions are always welcome! Send them to
tinchert@michigan.gov