SOUTHERN FISHERIES DISTRICT

Beaverdam Lake

1946 Investigation

By

Cecil Heacox

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Introduction

An investigation of Beaverdam Lake was made during the period, August 26-29, by A. C. Petty, D. J. Spittler and the writer.

Beaverdam Lake, also known as Ramsdell Lake, (P234-Lower Hudson Watershed), is located about six miles southwest of Newburgh. It is an artificial lake formed by a dam about one mile above Trib. 12 on Trib. 89 of Moodna Creek.

Although there are many privately-controlled areas on the Lake, public fishing is easily accessible, especially through a public beach and boat livery. Observations during the investigation indicate fishing pressure to be moderately heavy.

Purpose of the Investigation

The survey was made at the request of Mr. Howard Benedict, President of the Orange County Federation of Sportsmen's Clubs. The sportsmen, represented by Mr. Benedict, were interested especially in the largemouthed bass fishing. A study of this Lake during the Biological Survey of the Lower Hudson Watershed in 1936 indicated that natural spawning was providing as many young bass as the water would support, many more than the Conservation Department was in a position to furnish and, therefore the stocking of largemouthed bass was not recommended at the time.

A decrease in the quality of fishing during the past decade caused Mr. Benedict to request a new survey to evaluate present conditions.

Physical Characteristics

Beaverdam Lake is somewhat larger than indicated on the United States Geological Survey map. A brick-faced concrete dam, estimated to be 30-35 feet high impounds a former stream and forms a body of water of about 160 acres.

The shores slope rather sharply to a depth of 6 to 8 feet and then more gently to a 20-foot level in the middle of the Lake. The maximum depth is 28 feet in a small area in front of the dam. The bottom is composed almost entirely of a thin layer of decaying vegetation on a bed of mud and clay. A few small, isolated gravel shoals were found but in general, shoal areas, so important in the production of fish forage, are rather limited.

At the time of the study, a heavy bloom of algae was present. We were advised that several attempts, apparently unsuccessful, had been made to control the algae with copper sulphate. The vascular plants were confined to the marginal areas. Nowhere are they abundant.

The inlet is the only tributary and this showed no visible flow at the time of the investigation.

Methods of Investigation

A sketch map (See Figure 1) was made of the Lake showing soundings and bottom composition.

To secure samples of the fish population, a trap net and gill nets of assorted sizes were employed. Shore seining with various sized seines proved very successful in sampling the young fish population.

Lengths, weights, scales and other biological data were taken on a large part of the collections and representative samples of the various species were saved for later study in the laboratory.

A chemical analysis of the water was made at various depths.

Fish Life

Stocking History

Prior to the Biological Survey in 1936, Beaverdam Lake had been stocked with smallmouthed bass, yellow perch and pike-perch. Spawning and other conditions were found to be unsuitable for smallmouthed bass and pike-perch and since natural spawning was found to be sufficient for the maintenance of largemouthed bass, no stocking was recommended at the time.

We were advised that the Lake has been stocked by local sportsmen on several occasions. Adult pickerel, purchased from a commercial hatchery have been stocked and several species of fish, principally white perch, golden shiners and largemouthed bass, have been transferred from the Hudson River in salvage operations by Mr. Benedict and local sportsmen.

Netting

A total of 686 fish, representing 10 species, were taken during the netting operations. 390 were taken in the trap net and 296 in the various sized gill nets. It is interesting to note that rock bass and killifish, present in 1936, were not taken in the 1946 investigation. No pickerel of any size were taken either in 1936 or 1946.

A list of the number of each species taken by netting is given in Table I.

TABLE I

Species		No. Taken		
Common Name	Scientific Name	Trap Net	Gill Net	Total
Largemouthed bass	Huro salmoides	1		1
Bullhead catfish	Ameiurus nebulosus	98	52	150
Common sunfish	Lepomis gibbosus	127	10	137
Bluegill sunfish	Helioperia macrochira	37	7	44
Calico bass	Pomoxis nigro-maculatus	90	3	93
White perch	Morone americana	16	27	43
Yellow perch	Perca flavescens	20	80	100
Golden shiner	Notemigonus c. crysoleucas	1	117	118
	Total	390	296	686

Trap Net

An 8-foot trap with 3/4" mesh in the car and a 100-foot leader was set on the north shore of the island as shown on the map (Figure 1). It was set in the conventional manner with the car in 14 feet of water on a mud bottom. It began fishing at noon August 26 and fishing was terminated at noon on August 29. The catch by species is given in Table 2.

TABLE 2

Species	Catch		
	Aug. 28	Aug. 29	Total
Bullhead catfish	85	13	98
Common sunfish	52	75	127
Bluegill sunfish	25	12	37
Calico bass	73	17	90
Yellow perch	13	7	20
White perch	6	10	16
Largemouthed bass		1	1
Golden shiner		1	1
Totals	254	136	390

Gill Nets

Three gangs of gill nets of assorted mesh sizes were set in varied habitats. An attempt was made to set the gillnets in situations of a different type than the trap net to obtain, if possible, a sample of the fish life not obtained by the trap net. Locations of the gill net sets are given in the sketch map (Figure 1).

Set No. 1

Set 5:00 PM - Aug. 26
Bottom: mud

Pulled 9:00 AM - Aug. 27
Depth: 8 ft. throughout

Species	Mesh Size 5"	2"	1¼"	Total
Bluegill sunfish	1			1
Golden shiner		46		46
Yellow perch		52	5	57
White perch		1	7	8
Totals	1	99	12	112

Set No. 2

Set 5:00 PM - Aug. 26
Bottom: mud

Pulled 1:00 PM - Aug. 27
Depth: 5 ft. throughout

Species	Mesh Size 2½"	3"	Total
Bullhead catfish	15		15
Golden shiner	65		65
Bluegill sunfish	3		3
Calico bass		2	2
White perch		7	7
Common sunfish		5	5
Yellow perch		1	1
Totals	83	15	98

Set No. 3

Set 5:00 P.M. - Aug. 26
Bottom: mud

Pulled 2:00 P.M. - Aug. 27
Depth: 8 ft. throughout

Species	Mesh Size 5"	1¼"	3"	Totals
Bullhead catfish	1	1	35	37
Yellow perch		22		22
Calico bass			1	1
Common sunfish			5	5
Bluegill sunfish			3	3
White perch			12	12
Golden shiner			6	6
Totals	1	23	62	86

Seining

Shore seining with various sized seines indicated an abundance of fry and fingerlings of largemouthed bass, white perch, calico bass and perch.

The decline in the largemouthed bass fishing is not due to a bottle-neck in the young fish group as there is every indication that natural spawning is producing all the young fish a body of water of this size can support.

An important consideration in the forage situation is the apparent lack of small golden shiners. Only large golden shiners, unsuitable as fish food, were found. The golden shiners taken in the nets may have been fish transferred from the Hudson River. The absence of killifish (present in 1936) leaves only the young of the game and pan fish as forage fish.

Age and Growth

The scales of a representative number of fish of various species were examined with a binocular microscope to determine ages and estimate growth rates.

Since there has been so much transfer of fish to this Lake from other waters, principally the Hudson River, it is difficult to evaluate the true growth rate of the Beaverdam Lake fish.

The one specimen of largemouthed bass (18 7/8" total length) was ten years of age. Its growth, as well as the growth of the other species, appears to be close to average.

For completeness, growth data for yellow perch, calico bass and golden shiner are presented in Tables 3, 4 and 5.

TABLE 3

Age Group	No. Specimens in each age group	% of each age group in total samples	Length Range inches	Average Length inches
		Yellow Perch		
3 +	1	8.3	6 3/8	6 3/8
4 +	9	75.0	6-8¼	7.47
5 +	1	8.3	8 1/8	8 1/8
6 +	1	8.3	7 3/8	7 3/8

TABLE 4

Golden Shiners

Age Group	No. Specimens in each age group	% of each age group in total samples	Length Range inches	Average Length inches
2 ≠	1	11.1	7 7/8	7 7/8
3 ≠	1	11.1	8 1/2	8 1/2
4 ≠	1	11.1	9 3/8	9 3/8
5 ≠	2	22.2	9 1/8- 9 5/8	9 3/8
7 ≠	4	44.4	8 3/4- 9 5/8	9.3

TABLE 5

Black Crappie

2 ≠	2	16.6	7 7/8-8 1/4	8.1
3 ≠	9	75.0	8-9 7/8	9 1/8
4 ≠	1	8.3	9 5/8	9 5/8

Largemouth Bass

10 ≠	1	100	18 7/8	18 7/8

Chemical Analysis

The chemical content of water, especially in ponds of the Beaverdam Lake type, is of primary importance to fish life. It is interesting to note that the oxygen content of the water and other chemical conditions were found to be about the same in 1946 as at the time of the Biological Survey in 1936.

Below the 8-foot level, oxygen conditions are unfavorable for fish life and below 15 feet, there is not enough oxygen to support any species with the possible exception of bullheads. In addition, the deeper water areas contain an excess of carbon dioxide.

A check of the outlet stream showed a dark water (blue black) condition at lower levels. This condition may be due to the excessive algae but the exact cause could not be determined. It is evident that poor chemical conditions are the greatest limiting factors in building up a larger fish population in this water. As far as actual fish-producing water is concerned, Beaverdam Lake is much smaller than its general appearance indicates since nearly 50% of the water is unfavorable for fish life.

A summary of the chemical investigation is presented in Table 6.

TABLE 6

Chemical Analysis

Location	Date	Time	Depth in Feet Sample	Temp. °C Sample	CO_2 ppm	Alk PPM $CaCO_3$ M.O.	Dissolved Oxygen p.p.m	Dissolved Oxygen %sat.	pH
Outlet Dam	8/23/46	1000	S	24°C	3.5	40	7.0	82.0	9.1
" "	"	-					9.85	115.5	
" "	"	-	B26	18°C	36	134.5	0.0		6.9
" "	"	1220	14	29°C	12	52	1.7	21.9	6.9
" "	"	1345	20	18°C	21	39	0.1	1.0	6.9
Opposite Island #2	"	1400	8	23°C			4.6	53.0	
" "	"	1400	5	23°C	3.5	39.5			8.3
Off Island	"	-	B12	22°C			2.45	27.7	
Between Island & E. Shore			B11	23°C			3.25	37.4	
Trap Net off Island		1403	5	23			7.55	87.	
" " " "		1458	5	23			8.00	92	
" " " "		1413	10	22			4.2	48	
" " " "		1413	B16	19.5			0.1	1.1	
" " " "		1500	S	24			9.5	111	
" " " "		1507	5	23			9.05	104.	
" " " "		1512	10	22			5.25	60.	
" " " "		1521	B16	19.5			6.05	66.	

Algae in water abundant
Dark water at lower levels (Noted in outlet stream)

Discussion of Results

The 1946 Investigation of Beaverdam Lake showed the following conditions to be present.

1. This body of water is producing a very large poundage of fish at the present time.

2. Most of this poundage, however, is in calico bass, perch, sunfish and bullheads, species apparently not favored by local fishermen.

Studies over a period of years have shown that every body of water has a definite fish carrying capacity. This capacity is best measured in pounds rather than numbers. Furthermore, it has been found that the best fishing results are usually obtained when all of the fish producing capacity of a water is concentrated on the one or two species for which the water is most suited.

It happens that conditions in Beaverdam Lake favor calico bass, perch, sunfish and bullheads - species not favored by local fishermen. Largemouthed bass is the favored species. While natural spawning provides a large number of young fish, there is a definite bottleneck in the number of fish produced of catchable size.

3. Some of the factors which limit the production of largemouthed bass in Beaverdam Lake are:

a. The competition of too many other species of similar feeding habits and other requirements.

b. A limited amount of shoal water or fish forage producing water.

c. A lack of oxygen in the deeper water. As far

as actual fish producing water is concerned, Beaverdam Lake is much smaller than its general appearance would indicate since approximately 50% of the water is unfavorable, if not definitely unsuitable, for fish life.

Studies of waters similar in character to Beaverdam Lake show that there is a noticeable correlation in waters deficient in oxygen and a scarcity of fish in the larger sizes. Why this situation prevails, is not definitely known. There is a good possibility that when the young fish migrate from the shallow to the deeper water, they are unable to make the adjustment to a deficiency in oxygen and considerable mortality results. But it is believed that many young fish succumb as they grow larger and migrate to the deeper water. This situation may be especially true in Beaverdam Lake where the deeper water contains a lethal amount of carbon dioxide.

It is quite possible that the chemical conditions in this Lake may be the most important factor limiting better fish production, especially largemouthed bass. Unfortunately, there is no solution to this problem at present.

Recommendations

1. The ideal way to improve fishing in Beaverdam Lake would be to drain it or poison the fish present and start over with a balanced fish population of the most suitable species. The size of the Lake and the riparian rights of the individual property owners make such a procedure impractical.

2. The stocking of hatchery fish is not recommended since there

are plenty of fish - largemouthed bass, perch, etc. in the smaller sizes - the sizes the Conservation Department's hatcheries are in a position to furnish at the present time.

3. The most satisfactory solution to the problem from the fishermen's point of view is the transfer of fish of catchable size salvaged from other waters.

It is recommended that stocking of this nature be limited to pickerel for the next few years. Since pickerel inhabit the shallower water, it is felt that the chances for survival of this species may be somewhat greater than with largemouthed bass. Stocking with the larger sizes of the latter species might improve fishing for a short subsequent period but there will probably be considerable mortality and therefore an excessive waste of valuable fish.

4. At the same time, it is suggested that a program be set up to encourage fishing for calico bass, perch, sunfish and bullheads. These species constitute most of the total poundage of fish annually produced and unless large numbers are cropped each season, these species will increase even more, thus aggravating an already unsatisfactory situation.

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All data and management policies in this report are subject to revision as new or additional information is obtained.