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INSTITUTE FOR FISHERIES RESEARCH  
 UNIVERSITY MUSEUMS  
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REPORT NO. 366

STUDIES ON THE FISH FAUNA OF WINTERGREEN LAKE,

MAY 8 AND 9, 1936

On May 8 and 9, 1936, Messrs. Shetter and Cooper of the Institute staff conducted further studies on the fish fauna of Wintergreen Lake on the Kellogg Bird Sanctuary at Battle Creek. Dr. Pirnie and members of his staff were very generous in assisting the work. This study included (1) collecting of fishes from the lake by means of an 800-foot gillnet and a 100-foot seine, and (2) taking of scale samples and stomach samples for future study. Analyses of the collections of smaller fishes are included in this report. The records of our field activities are as follows:

Gillnet--800feet, 3 $\frac{1}{2}$  inch stretched mesh

Set through the center of the lake, from a point approximately 200 yards N.E. of Dr. Pirnie's residence in a northeastern direction to a point approximately 300 yards from the N. E. shore of the lake. Air 85 degrees, water 70 degrees at 2 P.M.; sky clear and brisk S.E. breeze. The net in this position set from 2 P.M. to 5 P.M. (May 8, 1936) took the following:

<u>Species</u>	<u>No.</u>	<u>Standard length in mm.</u>	<u>Weight in grams</u>	<u>No. of stomachs saved for examination</u>
Yellow Perch	1	265	366	None
Bluegill	1	191	285	None

Set in this same position, this net was fished from 5 P.M., May 8 to 9:30 A.M., May 9 and took the following:

<u>Species</u>	<u>No.</u>	<u>S.L. in mm.</u>	<u>Wt. in grs.</u>	<u>No. stomachs saved</u>
Yellow Perch	1	267	317	None
Dogfish	1	approx. 20"	...	"
Yellow Bullhead ( <u>A. natalis</u> )	4	300-338 (Total lengths)	...	4

At 10 A.M. this net was set in the shallows along the N.E. shore line of the lake in 6 to 10 feet of water, 20 to 100 feet from shore. At 11 A.M., May 9, the water was 74 degrees at the surface, the air 76 degrees. Fished in this position until 11:30 A.M. the net took the following:

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Wt. in grs.</u>	<u>No. stomachs saved</u>
Bluegill	23	146-188	127-257	23
P. sunfish	9	142-164	133-211	9
Large-mouthed Bass	6	233-256	317-393	6
Yellow Bullhead ( <u>A. natalis</u> )	5	290-323 (Total lengths)	...	5

At 11:30 A.M., May 9, this net was drawn in toward shore a few feet so that it set in approximately the same relative position to the shore line, but in water 4 to 6 feet deep and 15 to 50 feet from shore (along the N.E. shore). The net was fished in this position from 11:30 A.M. to 5 P.M., May 9, and took the following:

<u>Species</u>	<u>No.</u>	<u>S.L. in mm.</u>	<u>Wt. in grs.</u>	<u>No. stomachs saved</u>
Bluegill	15	149-193	137-283	15
P. sunfish	8	144-175	134-243	8
Large-mouthed Bass	4	251-258	341-438	4
Yellow Bullhead	3	340-355	...	3
( <u>A. natalis</u> )		(total lengths)		
Brown Bullhead	1	354	...	1
( <u>A. nebulosus</u> )		(total length)		
Dogfish	1	approximately	...	None
		2 ft.		

This net set in this same position was fished from 5 to 8:15 P.M., May 9. Air 76 degrees, water 74 degrees at 5:15 P.M. It took the following fish:

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Wt. in grs.</u>	<u>No. stomachs saved</u>
Bluegill	11	148-192	150-285	11
P. sunfish	4	140-168	143-241	4
Bluegill x sunfish	1	161	214	None
Yellow Bullhead	3	291-306	...	3
( <u>A. natalis</u> )		(total lengths)		

At 8:30 P.M., May 9, this net was set in the shallows along the east shore of the lake, from the N.E. corner of the lake southwestward, in 4 to 8 feet of water, 40 to 50 feet from shore, and parallel to the shore line. Water 72 degrees, air 67 degrees at 10:20 P.M. The net was fished in this position from 8:30 P.M. to 10:30 P.M. It took the following:

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Wt. in grs.</u>	<u>No. stomachs saved</u>
Bluegill	15	165-193	167-290	15
P. sunfish	5	154-166	137-238	5
Large-mouthed Bass	1	247	332	None
Yellow Bullhead	4	323-350	...	4
( <u>A. natalis</u> )		(total lengths)		
Brown Bullhead	1	295	...	1
( <u>A. nebulosus</u> )		(total length)		

Seine--100-foot,  $\frac{1}{4}$  inch mesh

Between 2 and 3 P.M., May 8: One seine haul was made at the S.E. corner of the lake. Bottom chiefly mud and peat; seining over an area 40 ft. x 50 ft.; in water up to 3 ft. deep; near a small patch of water lillies. Two more seine hauls were made along the S. W. shore directly in front of Dr. Pirnie's residence; seining an area 50 ft. x 300 ft.; bottom sand and peat; near a large bed of water lillies; in water up to 6 ft. in depth. At 3 P.M., air 80 degrees, water 69 degrees. During these three seine hauls, the following fishes were preserved (these represent approximately 3/4 of all the smaller fishes in the catch):

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Age</u>
Bluegill	24	36-42	yearlings
"	4	84, 91, 103, 107	2 yr. olds
P. sunfish	39	34-47	yearlings
Bluegill x P. sunfish	1	34	yearling
P. sunfish	1	111	2 year old male
Large-mouthed Bass	5	65-76	yearlings
" " "	2	117-123	yearlings
Yellow Perch	7	69-85	yearlings
Blunt-nosed Minnow	10	56-60	Adult males (in breeding habit)
" " "	3	42-51	Adult females
Golden Shiner	2	38-41	yearlings
Black-chinned Shiner	1	36	juvenile
Black-nosed Shiner	2	45-46	adult

Between 4 and 5 P.M., May 8: 5 seine hauls were made in the shallows along the N.E. shore; bottom chiefly sand; seining over an area 75 ft. x 600 ft.; in water up to 3 ft. deep; in an area chiefly void of vegetation. Of the fishes taken by this seining, approximately 1/3 of all the smaller fishes were preserved, as follows (available for further study; in the museum collection):

<u>Species</u>	<u>No.</u>	<u>S.L. in mm.</u>	<u>Age</u>
Bluegill	5	35-45	yearlings
"	2	94-111	2 yr. old
P. sunfish	2	40-41	yearlings
"	6	91,94,96,98,99,106	2 yr. old
Bluegill x P. sunfish	1	126	2 yr. old
Large-mouthed Bass	10	62-76	yearlings
" "	1	108	yearling
"	2	163-164	2 yr. old
Perch	6	65-82	yearlings
Golden Shiner	81	39-62	yearlings
" "	1	78	2 yr. old
Black-nosed Shiner	72	36-50	adults
Blunt-nosed Minnow	8	53-67	Males in breeding habit
" " "	58	38-53	Adults - females and maturing males

The larger fishes collected during this seining (2 to 3 P.M. and 4 to 5 P.M., May 9) were grouped in one lot and were studied in the field; scale samples, weights and lengths were taken and stomachs were removed from the fresh fish. These adults were about equally abundant in the two localities. The large fishes taken by these seine hauls included the following:

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Wt. in grams</u>	<u>No. stomachs saved</u>
Bluegill	11	109-189	47-256	10 (S.L. 123-189)
P. Sunfish	53	126-177	88-275	50 (S.L. 126-177)
Large-mouthed Bass	13	205-265	185-407	12 (S.L. 205-265)
Bluegill x P. sunfish	2	184-192	274-345	None

Between 2 and 3 P.M., May 9, 2 hauls with this seine were made in the exhibit pond at the south end of the lake. This seining was done over a bottom of mud and peat, in water up to 4 feet deep; each haul included an area approximately 50 feet x 75 feet. No aquatic vegetation was present near the seined area. Of all the fishes taken by the seine, all of the bass and approximately half of the remaining fishes were preserved. The preserved collection included the following:

<u>Species</u>	<u>No.</u>	<u>S. L. in mm.</u>	<u>Age</u>	<u>Remarks</u>
Bluegill	50	32-52	yearlings	
"	2	78-80	2 yr. old	
P. Sunfish	70	30-57	yearlings	
"	24	73-108	2 yr. old	
"	2	125-133	3 yr. old	
Bluegill x P. Sunfish	11	33-57	yearlings	- Average size larger than yearlings of either parent species.
Large-mouth Bass	86	58-123	yearlings	Two distinct size groups.
Golden Shiner	2	63-64	yearlings	
" "	47	67-102	2 yr. old	
" "	3	126-131	3 yr. old	
Common Shiner	4	83-128	adults	Probably introduced as a bait min-
Lake Chub Sucker	41	55-87	yearlings	Most individuals adult, ready to spawn. <sup>now.</sup>

Remarks on the Characteristics of the Fish Fauna of Wintergreen Lake

During the examination of Wintergreen Lake on May 3, 4 and 5, 1935 (see Report 289) by an Institute party and members of the Kellogg Bird Sanctuary staff, the same 800-foot gillnet (as was used during the present studies on May 8 and 9, 1936), set for  $26\frac{1}{2}$  hours through the center of the lake, took 26 adult fish (1 Dogfish and 25 game fish) or approximately 1 fish per hour; and, when set along the north and east shores in shallow water for  $19\frac{1}{2}$  hours, took 170 adult fish (all game species) or approximately  $8\frac{1}{2}$  fish per hour. During the examination of May 8 to 9, 1936, this 800-foot gillnet, set through the center of the lake for  $19\frac{1}{2}$  hours, took 8 adult fish (1 Dogfish and 7 game fish) or approximately  $\frac{1}{2}$  fish per hour, and, when set in shallow water along the north and east shores for  $12\frac{1}{4}$  hours, took 120 fish (1 Dogfish, the remainder game fishes) or approximately 10 fish per hour. Similar figures are obtained by comparing the catch of adult game fish from the lake proper by the 100-foot seine for the two examinations. In 1935, 6 hauls with this seine yielded 90 fish or 15 fish per seine haul; in 1936, 8 hauls yielded 79 fish or approximately 10 fish per haul. Since these two examinations were conducted at approximately the same season (at a time when the sunfishes and bass were congregating on the shallows just prior to spawning), and since the methods of collecting were practically identical for the two periods, it is believed that a general statement as to the relative abundance of adult game fish in the lake at the time of these two examinations is justified. On the basis of the above figures on the number of fish collected per unit of fishing effort, it appears that the adult game fish population of the lake was in general about the same, at the time of the two examinations, in terms of numbers of individuals; there was no evidence that the number present during the examination of May 1936 was either a great increase or decrease over that of 1935.

Of the more than 200 adult game fish collected during May 8 and 9, 1936, not a single tagged fish was included in the lot. This fact undoubtedly has considerable significance in relation to the total number of adult game fishes which were present in Wintergreen Lake. During 1935 there were several hundred tagged game fishes liberated

in the lake by members of the Sanctuary staff (Mr. Shetter will give an accurate report on this phase of the work<sup>(Report 365)</sup>), and these tagged fish should have been captured as readily by the netting as were the untagged fish. Assuming that the law of chance should operate in this instance, it can be <sup>stated</sup> safely that the total population of adult game fish in Wintergreen Lake must be at least many thousands.

In determining the ages of the smaller individuals of the Bluegills and Pumpkinseed Sunfish (already listed in this report), it was noted that the amount of growth made by these two species in their second and third years of life was very great. This fact was also noted in the appendix to report 289 on the results of studies made in 1935.

Hybrids between the Bluegill and Pumpkinseed Sunfish are quite common in Wintergreen Lake. During the examinations on May 8 and 9, 1936, the gillnet took a total of 65 Bluegills, 26 P. Sunfish and 1 hybrid; the seine took a total of 98 Bluegills, 197 P. Sunfish and 15 hybrids--a total of 163 Bluegills, 223 P. Sunfish and 16 hybrids. The greater growth of the hybrids over either of the parent species was particularly noticeable among the yearlings collected from the exhibit pond on May 9.

#### Material from Wintergreen Lake Available for Study

Scale samples were taken from all Perch, Bluegills, Sunfish and Large-mouthed Bass caught during these two days (May 8 and 9) by the 800-foot gillnet, and from all of the larger individuals taken by the seine. These samples are being kept at the Institute Laboratory for future study. Data on age determinations on all of the smaller specimens have been included in this report.

Stomachs from the larger game fishes were preserved shortly after the fishes were taken from the lake. This material is also being kept in the Institute Laboratory for future study.

A considerable amount of material was turned over to the Institute by Dr. Pirnie for future study. The time and efforts of Dr. Pirnie and members of his staff in collecting these samples warrant special recognition. This material includes the following:

1. Records of line fishing on Wintergreen Lake during 1935 and the first part of 1936. These records include data on the recovery of tagged fish. The records in will be analyzed by Mr. Shetter (Report 365).
2. A very large series of stomach samples (approximately 1500) taken from game fish from Wintergreen Lake during 1935 and 1936.
3. A series of 121 scale samples from game fish of Wintergreen Lake.

The above material offers a splendid opportunity to continue the intensive study of the fish fauna of Wintergreen Lake, and it will be analyzed by members of the Institute staff as soon as possible.

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