September 20, 1944

REPORT NO. 957

A BRIEF EXAMINATION OF SOME OF THE WATERS OF THE COLEMAN LAKE CLUB, WISCONSIN

by

Albert S. Hazzard and Stanley Shust

Introduction

At the request of Mr. Raymond E. Herman of the Coleman Lake Club, Mr. F. A. Westerman, Chief of the Fisheries Division of the Michigan Department of Conservation, arranged for an examination of North Pond on the Coleman Lake Club. The Club paid all the costs of the investigation.

Our examination was made August 11 to 13, 1944. Mr. Herman's original request was for a study of North Pond but upon arrival at the club, we were presented with a page of questions dealing with North Pond, Scott Pond, Railroad Pond and Moon Lake, also some general questions on fish culture and fish management. When it was explained that we could not investigate all of these waters thoroughly in the time available the members agreed that North Pond was the most important problem and that we should concentrate our efforts upon it.

We wish to thank Mr. F. A. Preston, President of the Coleman Lake Club, and Mr. Herman for their courteous consideration of our comfort and needs while at the club. Also the manager, Mr. David Washburn, for making the necessary arrangements for the work and for information concerning

the fisheries at the club. Mr. Victor Lundberg, fish culturist, was assigned to help us in our investigation and proved to have a good practical knowledge of the waters. The excellent stock of trout at the rearing ponds is evidence of his ability as a fish culturist and also speaks well for the water supply of the ponds.

Results of Investigation

North Pond

a) History of pond and fishing-- According to Mr. Preston and others this pond was made by a dam built about sixty years ago in connection with lumbering operations. Two spring-fed streams, the McIntyre and Jeffers, supply the pond. It furnished exceptional brook trout fishing until about eleven years ago (as stated in Mr. Herman's letter of December 7, 1943) at which time the pond was drained to eliminate "a scum which appeared around August." According to the members, aquatic vegetation (especially coontail), fresh-water shrimp and minnows were very abundant in the pond prior to draining but these disappeared thereafter and attempts to re-establish plants and shrimp by stocking have been largely failures. Plantings of dace were said to have been successful. A super-abundance of crayfish and suckers appeared after the water was put back.

Examination of the partially complete fishing records at the North Pond Clubhouse and statements of the members indicate that the pond has provided some rather good trout fishing in recent years. It was roughly estimated that some six thousand trout running on the average of five or six to the pound were removed each year. If our estimate of forty acres of water is fairly close this would mean a production of about twenty-five pounds per acre. Not many figures are available for comparison but from what is known this would be considered as considerably better than average.

b) Depth and bottom-- North Pond was sounded in several places and a maximum depth of seven feet was found about 100 feet out from the spillway. Several feet of pulpy peat and silt were present over most of the lower part of the pond bottom. In the upper end there seemed to be a thinner deposit over firm sand.

c) Shelter-- Some shelter for fish in the pond is afforded by stumps, logs and a few sparse stands of waterlilies, but parts of the pond-- especially the upper end-- might be benefited by the addition of some platform shelters as suggested by Lundberg. A few small beds of waterweed (Elodea) were seen near the upper end of the pond. It will be fortunate if this plant does not become established in North Pond as it can become a nuisance and apparently is of little value in a trout lake.

d) Temperature-- Water temperatures limit the use of the pond by trout during mid-summer. On August 11 at 5:00 p.m. the surface water at the spillway was 79° F. with an air temperature of 86°. About midway up the pond the surface temperature was 77°. At the head of the rearing ponds on the McIntyre the water temperature was 69° at 5:30 p.m.--probably near the maximum water temperature encountered here. Temperatures taken on August 13 with a Negretti-Zambra reversing thermometer at the surface and at the bottom indicate that during hot weather and with a strong wind down the pond (said to be the prevailing direction) there would be little temperature stratification in the lower end of the pond. About 100 feet out from the spillway the surface temperature was 73°, at six feet (one foot from the bottom) 72.5°. About midway up the pond the temperature was 69.3° at one foot below the surface and 67.6 at four feet (one foot from bottom). The surface temperature near the mouth of the McIntyre was 66° and near the lower end of the Jeffers 66°. These temperatures were taken between 11:00 a.m. and 12:30 p.m. on August 13 with an air temperature of 83°.

Had these readings been taken in late afternoon of the 11th it is likely that they would have been from six to three degrees higher in the order in which they were listed. In other words, the lower half of the pond from top to bottom would be temporarily uninhabitable by brook trout and a concentration of fish toward the upper end would necessarily result under such conditions. The gill net catches referred to later support this idea.

Unfortunately there is nothing that can be done to lower these temperatures short of increasing the depth of the pond greatly (to 20 feet or more) which is probably impracticable. However temperatures can be prevented from going higher by keeping beaver ponds out of the two feeder streams and by encouraging stream side vegetation.

These bottom and top temperatures near the dam indicate that little benefit to the stream below would result from a bottom draw-off at least during periods of heavy winds.

e) Chemical conditions-- No tests for dissolved oxygen were made since the temperatures showed little stratification. It can be safely assumed that there is an ample supply of oxygen in all parts of the pond during the open water period at least when there is considerable wind. It is probable that some depletion of oxygen occurs in the lower end of the pond late in the winter following prolonged ice and heavy snow cover due to decomposition of organic matter in the water and the lack of photosynthesis. Mr. Lundberg's report of strong odors in the water in March support this assumption. Probably hydrogen sulphide (a product of decay) is also present which would account for the foul odor. This gas is known to be highly toxic to fish and may account for the loss reported in the hatchery operations.

Tests for total alkalinity (M.O.) and pH (hydrogen ion concentration) were made of the surface water off the dock of the North Pond Clubhouse. The methyl orange alkalinity (due entirely to bicarbonates) was 132 parts

per million. The pH was 8.2. These tests show that the water is quite hard and alkaline in reaction--both favorable to good growth and production of fish and fish food. A test for pH made in the lower end of the Jeffers branch was 8.4, even more alkaline than in the pond. This test was run since it was thought that the partly submerged logs and stumps and the deposits of organic matter might make the water acid in this part of the pond. Evidently, any carbonic or tannic acid from this material has long since disappeared or is neutralized by the alkaline water of the stream.

f) Fish samples-- Experimental gill nets each 125 feet long and 5 feet deep and each made of five sections of mesh from 1 1/2 to 4 inches (stretch measure) were set from 5 p.m. to 9 a.m., August 11 to 12. One net was placed in water from 4 to 5 feet in depth just above the clubhouse (about the center of the pond proper). It took 49 suckers (7 to 10 inches) and five brook trout (from 7 to 9 inches). The other net set near the upper end of the pond in about the same depth of water caught 30 suckers (8 to 13 inches) 1 brown trout (13 inches) and 13 brook trout (6 to 12 inches). The trout appeared to be in good condition but the suckers seemed a little thin. About a dozen crayfish were taken in each net. Many small minnows were seen everywhere along the shore, apparently the fine-scaled dace.

g) Recommendations-- The lack of an accurate hydrographic map of the lake and more detailed knowledge of the food supply, fish population, fish growth rate, etc. of North Pond and necessary data on the tributary streams prevent making any positive recommendations. The following represent our best judgement based on available information as to what should be done to manage the fishing in this lake. These answer in part the questions listed by the club for North Pond.

1) Control of competing fish-- Suckers and minnows although

providing some food for trout when small, compete with them for a number of food items and we believe may become so abundant as to interfere with trout production. The number of suckers taken in the gill nets and the number of minnows seen along the shore suggest that some control of these competing fish at least of the suckers may be desirable. Draining the pond every four years should be another way to control both suckers and minnows. If done in the fall (between September 15 and October 15) little permanent harm should result to the fish below or to the trout and fish food in North Pond if the water is lowered gradually. However this might not prove to be a wise procedure and we do not recommend it at present since the fishing appears to be reasonably good and since the trout taken are in good condition. Netting to control the sucker population is recommended as it proved successful before. An accurate record of the number and weight removed should be kept. If fishing becomes worse or if poor conditioned (thin) trout become common, draining as suggested might be carried out since there would then be little to lose.

2) Shelter-- While there is quite a bit of shelter afforded trout by submerged stumps and logs in the lower part of the pond, the installation of a number of the "table" shelters (described by Mr. Lundberg) in the upper part of the pond might be helpful. These should be scattered widely and should be as inconspicuous as possible to avoid concentrating fishermen.

3) Fertilization-- The water supply of North Pond is rich in calcium but may be low in phosphates, nitrates and other fertilizing elements. However, fertilization of a pond of this size would be of doubtful value especially since there is a sizable volume of water

flowing through it. Artificial feeding is not recommended because of the expense and the danger of concentrating fish.

4) Trout stocking-- In waters containing the proper species of fish and with adequate food, shelter and reproductive requirements the need for any stocking is questionable. Research is demonstrating that if these conditions are met, natural reproduction will supply all of the young fish which a stream or lake can grow to maturity. If anglers demand more fish (regardless of size or quality) than can be produced naturally, in waters in which the environment is ideal or which has been improved to the limit, stocking with legal-sized fish is the only answer. This program is costly and produces artificial conditions. The elements of skill and chance are reduced by such planting and "meat fishing" is encouraged. Stocking legal-sized trout will increase the catch per hour and will permit a larger removal of fish than a pond can produce naturally. The only alternative is to restrict the kill of trout to the level of the natural crop. Since few public officials or club fish committees would have the courage to manage the fishing on a natural basis, legal-sized trout planting has increased rapidly in recent years. It is presumed that the Coleman Lake Club does not wish to abandon artificial propagation, therefore the following suggestions are made concerning the rate and time of planting.

a) Sub-legal trout planting-- No study of the spawning grounds could be made at North Pond but considerable gravel is reported in the bottom of the McIntyre and it is fed by springs. It is likely that most of the mature trout in North Pond ascend the streams to spawn but successful reproduction can also occur in a pond if spring water wells up through gravel areas. If

spawning conditions are good in the tributaries or in the pond itself it is likely that enough fingerling trout are produced naturally (and find their way to the pond) to fully stock North Pond. In that case stocking with sub-legal trout would not be of any value, in fact it would be a waste of the pond's food supply. A careful study of the extent and use of the spawning facilities and possibly the operation of two-way fish traps on the streams would be necessary to answer this important question satisfactorily. Our present knowledge does not permit us to advise either for or against fall stocking of fingerling trout in North Pond.

b) Legal-size planting-- The results of a number of experimental plantings of legal sized brook trout in lakes lacking spawning facilities have shown that fall planting is almost as successful as spring and open season stocking (this was not true in stream planting experiments). It is therefore likely that a number of the two year old trout from the rearing ponds could be planted in the fall in North Pond. No one yet knows how many trout per acre should be stocked in any lake or stream to give the best results. In Michigan we have used a scale of from 30 to 70 per acre (in lakes lacking spawning grounds) depending upon the estimated richness of the food supply. This rate of stocking has resulted in fat healthy trout without any visible impairment of the food supply. How much heavier such lakes could be stocked is to be determined by experiments when sufficient help is again available. Probably an average figure of 50 trout per acre would not be excessive for fall planting in North Pond. Since the proportion of wild fish in the catch is not

known it is impossible to make an accurate allowance for this factor but we believe that probably natural reproduction and growth in the pond accounts for at least 50 per cent of the catch. On this assumption a stocking rate of 25 legal-sized trout per acre should be adequate. If our rough estimate of the area is correct this would mean a total of 1,000 legal-sized fish to be planted in the fall in North Pond

Spring planting (before the open season) should be unnecessary if fall stocking is done. If not possible to plant this number in the fall the balance might be made up by stocking after the ice has left the pond.

Open season planting should be based upon the number removed, assuming as above that one-half the fish taken were stocked. Approximately one-half the number caught out in May should be planted in June and so on through the season until the water warms up, (reported to be about mid-July) after which no further planting should be made until fall. There is danger of overstocking North Pond when the area habitable by trout is markedly reduced due to high temperatures. If the present reported catch continues this would mean an annual planting of approximately 4,000 legal sized trout per year.

5) Daily limits-- It is recommended that the daily limit per angler on North Pond be reduced to 10 trout. This should be ample for one individual and as suggested by Mr. Preston, should encourage the members to try other waters if they wish to fill out their limit of fifteen allowed by state law. It should also tend to make the fish stock last longer and maintain a better catch per hour. The psychological effect of a lower limit should also be helpful since more

anglers will approach or attain it if set at ten.

6) Catch records-- Complete and accurate records of all the trout taken should be required by the club. These records are essential in order to stock or otherwise intelligently manage fishing. They are also a great source of interest of members and guests in future years. One person, preferably someone stationed at North Pond, should be given the necessary authority and responsibility for checking and recording all catches made. The essential information is little and can be quickly taken. If tact is used no angler should object to the slight delay entailed by the examination of his catch and answering the necessary questions particularly if he understands the value of such records. If the number and average size of the trout caught each year is known one can readily determine whether fishing is improving, declining or holding its own. As mentioned previously, these records provide the best guide to planting of legal-sized trout during the open season.

The following information should be recorded in the permanent record book: date, name of angler, number of hours fished (to the nearest quarter hour) the total length of each fish killed.

A simple measuring board with a ruler inset and a block at the zero end makes it easy to measure fish rapidly and accurately. If a ruler with inches and tenths of an inch is used, this will greatly facilitate securing average lengths.

A brief examination was made of Scott Pond, Railroad Pond and Moon Lake. Time did not permit complete surveys and our suggestions must therefore be qualified.

Scott Pond

Scott Pond is an impoundment on the stream coming from North Pond. This pond was drawn down completely a few years ago and improvements were installed to restore the stream between these two dams (approximately one-half mile of stream). Fishing is said to have been good in this stream early in the season. The temperature recorded at the spillway of North Pond (79°) indicates why the fishing here is seasonal. That afternoon a considerable number of trout (probably most of the trout left in this section of the stream) were seen concentrated below North Pond dam at the point where cold well water enters from a side channel.

Several feet of water had been added to this pond recently making a small shallow pool at the dam. A number of fingerling rainbow (said to be from 4 to 7 inches in length) had been stocked here after this pool was made. No evidence of these fish was seen. Presumably they were able to find cool places somewhere in the pond or stream above during the hot weather. If they survive they should furnish some fishing in the stream next season. The value of this practice will be proven by the results next year.

Some additional food will be produced by shallow flooding of the old basin of Scott Pond--the greater the area flooded the greater will be the food production--but this practice should not be employed until after the hot weather of summer is past since this impoundment will increase the temperature in Railroad Pond and consequently in the stream below.

Railroad Pond

This third impoundment, located about one-half mile below Scott Pond, has been maintained at a rather constant level for a number of years. It

is relatively shallow and has considerable shelter in the form of partly submerged stumps, logs and fine beds of aquatic plants (mostly pondweeds and smartweed). Surface and bottom temperatures near the dam were the same (73° at 9 feet and at the surface). This same temperature was found at the bottom on the south side of the middle of the pond at a depth of 6 feet. A bottom outlet for this pond would therefore not improve the temperature in the stream below.

An experimental gill net was set overnight in the pond near the upper end close to the entrance of the stream. It took: 16 yellow perch (10.8 to 13.7 inches--mostly 12 to 13 inches), 1 brown trout (12 inches), 4 suckers (7 to 14 inches), 11 common shiners about 6 inches in length and about 10 crayfish.

About 300 yards up the stream from the pond we were shown a fine spring having a flow of about 100 gallons per minute and a temperature of 46°. A number of large and small trout were seen concentrated in the pools immediately below the entrance of this spring.

Conditions in Railroad Pond are not suitable for many trout during the summer. Temperatures are better adapted to warm-water fish. Dr. Edward Schneberger (formerly Chief Aquatic Biologist and now Supervisor of Fisheries for the Wisconsin Conservation Department) was an overnight guest of the club during our study and examined Railroad Pond with us. He suggested that this pond might be developed for largemouth bass. We agree with him that conditions here are well adapted to this species. Spawning conditions and habitat are somewhat better adapted to largemouth than to smallmouth but the latter would probably also do well since there is some hard bottom. The introduction of either in a pond of this size would probably eliminate the small stock of trout and the limited trout fishing in the pond during cool weather, and might increase the number of bass in the stream below. These

may not be serious objections however.

On the other hand this pond now has an excellent stock of splendid perch and Railroad Pond might be kept for this fish and as a place for bait fishing by those who want to catch a mess of tasty fish by methods other than the use of artificial lures. If this plan is followed, bluegills might be introduced to add to the variety. This species ought to find conditions quite suitable in Railroad Pond and provide good sport for either the bait or fly fisherman. A pure stock of bluegills should be secured if this planting is made. Unfortunately other species are often mixed with bluegills (green sunfish, long-ear, rock bass, warmouth, etc.) secured from most sources and these fish are inferior to bluegills and often dominate following introduction of such a mixed stock.

Moon Lake

Moon Lake was examined only at the boat landing. It was reported to be rather poor in plant life and other shelter for fish. A test for alkalinity showed a methyl orange reading of 82 p.p.m. and a ph-th reading of 4 p.p.m. and a pH of 8.4. These tests indicate water of moderate hardness and strong alkaline reaction favorable to the production of fish and fish food if other conditions are suitable. Fertilization might increase the fish crop and the growth rate of the fish. The Wisconsin Natural History Survey located at the University of Wisconsin can suggest what may be done along this line since this organization has conducted pioneer experiments in lake fertilization in the lakes of Vilas County.

Brush shelters, as described in Bulletin No. 2 of the Institute for Fisheries Research, "The Improvement of Lakes for Fishing," might be helpful in improving the fishing in this lake if shelter is deficient as reported.

Fish Cultural Suggestions

(Contributed by Mr. Shust)

Following are answers to some of the questions listed by the club not otherwise discussed in the report:

1. What causes fin rot in our rearing ponds?

   Crowding - treat fish with copper sulphate before stocking.

2. How dangerous in damaging is Blue Heron, Otter, Mink, and meganzers to fish life?

   All these birds and animals are predators of fish life when fish are available and plentiful.

3. Any new ideas about fish food?

   No. Always try and feed some liver if possible.

Would suggest the club discontinue the hatching of brook trout due to poor water conditions, or use well water only and hatch out a limited quantity. It would be more economical to purchase trout fingerlings for stocking the rearing ponds than to try and hatch them. If trout are purchased would suggest they be treated in a solution of copper sulphate before placing into the ponds to control disease.

The rearing ponds should be improved with concrete bulk-heads throughout and provision made to clean each pond separately into the creek. By no means should the water be divided into three separate ponds as proposed by the fish culturist. In warm weather all the water is needed as now used.

Would suggest chicken wire be used to also cover the top of the raceways as well as the sides, to control predatory birds.

Fish food should consist of pork melts and fresh livers for best growth. Would not recommend any fish in the diet.

The Need for More Scientific Information

If it is desired to manage the fishing at the Coleman Lake Club on a modern, scientific basis, more basic information is essential. Complete surveys of the streams and lakes should be made including accurate maps showing depths, bottom types and weed beds, location of springs, etc. These surveys would supply a factual basis for further practical experiments and improvements and would permit intelligent management instead of the present "guess and try" methods which until recently have been universally employed by most states and private clubs. Considering the number and variety of waters of the Coleman Lake Club and that fishing is the major interest of the club it would seem that the employment of a year-round fisheries biologist would be justified. The other alternative would be to make an arrangement with the University of Wisconsin to support a graduate fellowship for the study of fish management problems at the club. (The Huron Mountain Club made such an arrangement with the University of Michigan with satisfactory results.) We believe the University would welcome this suggestion and would provide a suitable man and the necessary direction. (This might be impossible until after the war.)

From our brief and enjoyable visit at the club we were impressed with the number and variety of fish problems in the area and the need for more basic information for managing the waters. Many of the questions asked us by club members could not be answered except by detailed studies extending over several seasons. We believe that surveys of the waters and studies of certain special problems (such as the role of natural reproduction in maintaining the fishing in North Pond, the value of lake fertilization, the need for bass stocking, etc.) would provide the club

with a great many facts which would be of continual interest to the members as well as furnishing the basis for intelligent fish management.

INSTITUTE FOR FISHERIES RESEARCH

By Albert S. Hazzard, Director
Institute for Fisheries Research,
Michigan Department of Conservation,
University Museums Annex,
Ann Arbor, Michigan

and

Stanley Shust, Regional Supervisor
Division of Fisheries,
Michigan Department of Conservation,
Thompson, Michigan

Report approved by: A. S. Hazzard

Report typed by: M. Klaphaak