

Michigan Lake Survey—A Cooperative Enterprise

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MICHIGAN LAKE SURVEY—A COOPERATIVE ENTERPRISE

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The major modifications in the methods used in lake inventory in Michigan during the past year are related to the assistance and cooperation given the Institute for Fisheries Research by a number of other agencies in the state. It is the primary purpose of this paper to point out these changes during the past year.

The M.E.C.W. has made the geographical survey of a number of lakes. The Parks E.C.W., the Resettlement Administration and the U. S. Forest Service have assisted, to some extent, in mapping certain other lakes. This part of the survey involves the making of a shore line map either by direct survey or by enlargement, on cross section paper, of an aerial map. By means of proper symbols various shore features such as positions of cottages, inlets, outlets, high ground, encroaching shore, etc. are added. After this has been completed the lakes are sounded at intervals of 100-400 feet along lines designated at the time of the marginal survey. At strategic points such as in the region of the drop-off the distance between soundings is reduced to intervals as small as 25 feet. A bench mark or less complicated position must be established at the time the soundings are made so that the difference in lake level at any future time can be determined. Since drifted snow may hide many shore line features, it is best to make the marginal survey when there is no snow. Soundings are easily and accurately made through holes chopped or bored in the ice along lines designated at the time of the shore line survey.

Some difficulties have arisen in instances where enlargements were made from aerial maps. Usually it is necessary to use aerial maps which have been made several years before. During the intervening period the lake level may have changed considerably, making large bays into dry land or swamp, exposing much gravel, etc. Also, shore features such as cottages are not shown well on such a map.

The map showing shore line features and soundings is prepared in the field office of the group handling the survey. This it sent to the E.C.W. drafting office where it is transferred to tracing paper, contours being added instead of soundings. Blue-line prints are then made for the Institute.

The geographical survey is only a preliminary step in the lake inventory. However, since it is time consuming, especially on larger

lakes, the amount of work which can be done by the biologists is greatly increased. On large lakes the geographical survey takes more time than all other operations put together.

The blue-line maps with bottom contours are taken into the field when the chemical physical and biological surveys are made. Data in regard to the location, kind and abundance of vegetation, location of spawning beds, gravel areas and kind of bottom are added to the maps by means of appropriate symbols. These data are later transferred to the original tracing cloth map by the M.E.C.W. draftsmen. Blue-line prints are again made and the kind of bottom added in colors.

Men from the various groups have helped, under the direct supervision of the biologists, with the manual labor connected with the biological survey, such as rowing boats, assisting with seining and gill netting of fish, collecting and screening of bottom samples, etc. Since only three to ten days are spent in securing the biological and chemical-physical data of any one lake, new men have to be introduced to this work frequently, but whenever possible the experienced men can be used to greater advantage.

The Institute survey crews consist of three men each. Two of these are trained biologists and the other is supplied by the hatchery which distributes fish to the district. The hatchery man knows the locality, the present status and history of fishing in particular lakes, the desires of fishermen in the district, and is able to contribute other information. In addition, he assists in most of the operations of the party and becomes acquainted with survey methods.

Methods for the securing of most biological and physical-chemical data in the Michigan Lake Inventory have been described by McMurry, Eschmeyer, and Davis (1933). However, certain additional data were secured during the past summer, and a brief description of the methods used are included here.

Measured, vertical or horizontal plankton hauls were made by means of a closing plankton net. In the field, the volume of plankton which precipitated after twenty-four hours of preservation was measured. The volume of plankton per cubic meter was then calculated. Hauls were made at several stations on each lake if it seemed important to do so. All samples were preserved for future study.

Bottom samples were secured from various depths by means of an Ekman dredge, two samples being taken at each depth. The bottom material was passed through a number twenty brass screen. The organisms left on the screen were preserved and their approximate volume was determined, when possible, in the field. All samples were preserved for further study.

A plant collection accompanied by a label giving the place where taken, the type of bottom and the depth of water in which it was growing, was made from each lake surveyed.

Up to 1936 about 150 lakes were surveyed. During the past summer about twenty-five more, including some of the largest lakes in Michigan, were added to the list. It is hoped that with the continued co-operation of the various agencies considerable progress may be made in the future.

LITERATURE CITED

- McMurry, K. C., Eschmeyer, R. W., and Davis, C. M.
1933. Objectives and Methods in the Lake Inventory in Michigan. *Pap. Mich. Acad. Sci., Arts and Letters*, 18:259-276.

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MICHIGAN LAKE SURVEY--A COOPERATIVE ENTERPRISE

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During the past year certain changes have been made in the methods used in lake inventory in Michigan. The major modifications are related to the assistance given the Institute for Fisheries Research by a number of other agencies in the state. In many ways this cooperation is rather unique in fish work. It is the primary purpose of this paper to show how the various groups contribute to the work of the Institute.

The M.E.C.W. has made the geographical survey of a number of lakes. The Parks E.C.W., the Resettlement Administration and the U. S. Forest Service have assisted, to some extent, in mapping certain other lakes. This part of the survey involves the making of a shore line map either by direct survey or by enlargement, on cross section paper, of an aerial map. By means of proper symbols various shore features such as position of cottages, inlets, outlets, high ground, encroaching shore, etc. are added. After this has been completed the lakes are sounded at intervals of 100-400 feet along lines designated at the time of the marginal survey. At strategic points such as in the region of the drop-off the distance between soundings is cut down to intervals as small as 25 feet. A bench mark or less complicated position must be established at the time the soundings are made so that the difference in lake level at any future time can be determined. Since drifted snow may hide many shore line features, it is best to make the marginal survey when there is no snow. Soundings are most easily and accurately made through holes chopped or bored in the ice along lines designated at the time of

the shore line survey.

Some difficulties have arisen in instances where enlargements were made from aerial maps. Usually it is necessary to use aerial maps which have been made several years before. During the intervening period the lake level may have changed considerably, making large bays into dry land or swamp, exposing much gravel, etc. Also, shore features such as cottages are not shown well on such a map.

The map showing shore line features and soundings is prepared in the field office of the group handling the survey. This is sent to the E.C.W. drafting office where it is transferred to tracing paper, contours being added instead of soundings. Blue-line prints are then made for the Institute.

The geographical survey is only a preliminary step in the lake inventory. However, since it is quite time consuming, especially on larger lakes, the amount of work which can be done by the biologists is greatly increased. On large lakes the geographical survey takes more time than all other operations put together.

The blue-line maps with bottom contours are taken into the field when the chemical-physical and biological survey is made. Data with regard to the location, kind and abundance of vegetation; location of spawning beds; gravel areas; and kind of bottom are added to the maps by means of appropriate symbols. This data is later transferred to the original tracing cloth map by the M.E.C.W. draftsmen. Blue-line prints are again made and the kind of bottom added in colors.

Men from the various groups have further helped with the manual labor connected with the biological survey. This work consists of rowing boats, assisting with seining and gill netting of fish, collecting and screening of bottom samples, etc. All of these operations are done under the direct supervision of the biologists. Since only 3-10 days were spent in securing the biological and chemical-physical data from any one lake, new men have to be introduced to this work quite frequently. In areas where it is possible to use the same men for three or four weeks they can be used to greater advantage.

The Institute survey crews consist of three men each. Two of these are trained biologists and the other is supplied by the hatchery which distributes fish to the

district. The hatchery man knows the locality, the present status and history of fishing in particular lakes, the desires of fishermen in the district, and is able to contribute other information. In addition, he assists in most of the operations of the party and becomes acquainted with survey methods.

Methods for the securing of most biological and physical-chemical data in the Michigan Lake Inventory have been described by McMurry and others (1933). The reader is referred to this paper for such material. However, certain additional data were secured during the past summer. A brief description of the methods used in the securing of these data will be included here.

Measured, vertical or horizontal plankton hauls were made by means of a closing plankton net. In the field, the volume of plankton which precipitated after 24 hours of preservation was measured. The volume of plankton per cubic meter was then calculated. Hauls were made at several stations on each lake if it seemed important to do so. All samples were preserved for future study.

Bottom samples were secured from various depths by means of an Ekman dredge, two samples being taken at each depth. The bottom material was passed through a number 20 brass screen. The organisms left on the screen were preserved and ~~then~~ approximate volume was determined, when possible, in the field. All samples were preserved for further study.

A plant collection was made from each lake surveyed. Each plant was accompanied by a label giving certain data with regard to the place collected and the type of bottom, and depth of water in which it was growing.

Up to 1936 about 150 lakes had been surveyed. During the past summer about 25 more, including some of the largest lakes in Michigan, were added to the list. It is hoped that with the continued cooperation of the various agencies involved considerable progress may be made in the future.

Literature Cited

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