CHAIN-O' LAKES REPORT

by; Richard Dunbar
The Chain O'Lakes region in northwestern lower Michigan has long been a favorite home and vacation spot for many people. Very early, many centuries before the white man came, the area was inhabited by Indians.

The Indians used the Chain O'Lakes for furs, food, and recreation. The area was used chiefly in the wintertime for trapping and fishing through the ice.

In 1847, Mr. Wadsworth was one of the first white men to settle in the area. He started a saw-mill on the Elk River and manufactured pickets and lathe. Soon many settlers followed and the area was beginning to boom.

By 1885 wealthy people of Chicago were spending summers in the region. Tour boats on the Chain of Lakes reached their peak and then died out by the 1920's.

So we have seen a transition of use over the years. Early it was a method of traveling and a food supply. Later the lakes and streams worked for the white man. And after that until today they are used chiefly for the tourist, the fisherman, and the sorter.

If we expect to have the privilege of enjoying this area in years to come, something should be done now.
What is there that draws people into the area? To be sure they provide an income for those who are year round residents and depend on the summer months to provide an annual income. But what is the attraction? It is the lakes and streams and what is contained in the waters.

That is the purpose of this study. To try and discover what there is and why is it found in one place but not another. It is a part of a continued 10 year study started initially in the Spring of 1964.

The information and samples used in this report were collected on two weekends. They were Oct. 23-24, 1965 and Oct. 30-31, 1965. A representative collection was attempted to be taken both by boat and by car.

The locations of the sample stations are as follows: (Also see map, page 22.)

1. East Arm Grand Traverse Bay near mouth of Elk River.
2. Elk River West of U.S. 31 bridge.
4. Round Lake North of narrows.
5. Torch River.
6. Indian Point, Torch Lake.
8. Clam Lake.
9. Lake Bellaire.
10. Intermediate River at Bellaire.
11. Intermediate River at power house dam.
12. Intermediate Lake at Deepwater Point.
15. Birch Lake.

The samples were taken both from a boat and by car. Samples taken in the boat were collected with a Peterson dredge and a plankton tow net. Then the bottom samples were screened, sorted, and labeled. The Kemmer water sample bottle was also used for collecting water chemistry samples. The samples taken by car were taken with a large seine, various sizes of wash screens, the plankton tow net and any thing else that sufficed.

The samples were placed in small jars and viles. The fixative in the bottles is formalin. This is a satisfactory solution of formaldehyde and will preserve the specimens for later identification. Water samples taken were tested in the field and at Torch Cliff. Following are the results, by station, of the two weekends of collecting.
PHYTOPLANKTON-
Asterionella
Cymbella
Diatoma
Fragilaria
Spirogyra

ZOOPLANKTON and OTHERS

GASTREPODA
Physa sp.

ISOPODA
Asellus militarius

ROTIFER
Kellicotta

TRICHOPTERA
Hydropsyche sp.

TบทEIMBELLARIA
Curtisia feremani
STATION NO. 2.

Elk River West of bridge.

PHYTOPLANKTON

Asterionella formosa
Ceratium hirundinella
Cymbella sp.
Cymbella sertularia
Fragilaria crotonensis
Rhizoclonium sp.
Synura sp.

ZOOPLANKTON and OTHERS

ANNEIIDA

Bithynia tentaculata

CLADOCERA

Daphnia sp.

COPEPODA

Cyclops sp.
Diaptomons sp.

EPHEMEROPTERA

Hexagenia bilineata

DIPTERA

Chrysochironimus digitatus
Pseudochironimus sp.
Tendipedidae
STATION NO. 3.

Elk River East of bridge.

PHYTOPLANKTON
Cymbella sp.
Gyrostigma sp.

ZOOPLANKTON and OTHERS

AMPHIPODA
Gammarus sp.
Hyaalella azteca

ANNELIDA
Lumbriculus sp.
small leach

DIPTERA
Tendipedidae

EPHEMEROPTERA
Ephemera sp.
Hexagenia bilineata
Pentagenia sp.
Ethrogena sp.

GASTROPODA
Helisome antrosa
Physa sp.
Pomatiopsis sp.
Viviparus sp.

MEGALOPTERA
Sialis sp.

ODONATA
Zygoptera

PELECEPYPODA
Lampsilis sp.
Sphaerum sp.
Strophitus sp.

TRICHOPTERA
Molanna sp.
STATION NO. 4.

Round Lake North of narrows.

PHYTOPLANKTON

Ceratium hirundinella
Chrysosphaerella sp.
Dinobryon sertularia
Fragilaria crotonsia
Synura sp.

ZOOPLANKTON and OTHERS

DECAPODA

Orconectes immunis

ROTIFER

Kellicottia sp.
Keratella sp.
STATION NO. 5.

Torch River below Rapid River inlet.

**PHYTOPLANKTON**

Dinobryon sertularia
Fragilaria crotensis
Navicula sp.
Pinnularia sp.
Synedra sp.

**ZOOPLANKTON and OTHERS**

Believe following were taken in Torch River also.

**annelida**

Oligochaeta sp.

**Ephemeroptera**

Ephemera varia
Hexagenia bilineata
Torch Lake-Indian Point.

**PHYTOPLANKTON**
- Anabaena sp.
- Asterionella formosa
- Ceratium hirundinella
- Coelosphaerium sp.
- Diatoma sp.
- Dinobryon sertularia
- Fragilaria crotensis

**ZOOPLANKTON and OTHERS**

**CRUSTACEA**
- Cyclops varicans

**DIPTERA**
- Pseudochironomus sp.
- Tanytarsus (Stictochironomus)

**PROTOZOOAN**
- Synura sp.

**ROTIFER**
- Keratella cochlearis
STATION NO. 7.

Torch Lake-Christiaan Point.

**PHYTOPLANKTON**

- Anabaena sp.
- Asterionella formosa
- Ceratium hirundinella
- Dinobryon bavarium
- Dinobryon sertularia
- Fragilaria croitensis

**ZOOPLANKTON and OTHERS**

**CRUStACEA**

- Cyclops varicans
Clam Lake.

**PHYTOPLANKTON**
Asterionella
Certiphium
Cladophora
Fragilaria
Surirella
Tribonema

**ZOOPLANKTON and OTHERS**

**AMPHIPODA**
Hyalella azteca

**COLEOPTERA**
Phanocerus

**EPHEMEROPTERA**
Ephemera sp.

**GASTROPODA**
Goniobasis livescens
Helisoma campanulatia

**ISOPODA**
Asellus militarius

**ROTIFER**
Kellicottia
Keratella

**TRICHOPTERA**
Trichoptera cases, no larvae

**OTHERS ?**
Etheostoma nigrum
Opsopoedus emilae
Lake Bellaire

**PHYTOPLANKTON**

Anabaena
Asterionella
Ceritium
Cladophora
Fragilaria

**ZOOPLANKTON and OTHERS**

**EUBRANCHIPODA**

Eubranchipus

**GASTROPODA**

Goniobasis livescens
Lymnea stagnalis

**PELECYPODA**

Sphaerium

**PROTOZOA**

Volvox

**ROTIFER**

Kellicotta

**OTHERS ?**

Opsopoedus emiliae
Stagnicola
Station No. 10.
Intermediate River at Bellaire

PHYTOPLANKTON
Asterionella formosa
Coelosphaerium sp.
Fragilaria crotensis
Gomphosphaerium sp.
Melosira sp.
Navicula sp.
Tabellaria fenestra

ZOOPLANKTON and OTHERS

CRUSTACEA
Daphnia magna

EPHEMEROPTERA
Ephemera sp.
Hexagenia sp.

GASTROPODA
Physa sp.
Pleurocera sp.

OSTEICHTHYES
Etheostoma nigrum nigrum
Labidesthes sicculus sicculus

ROTIFER
Kelllicottia longispina
Keratella coehlearis
Intermediate River at power house.

**PHYTOPLANKTON**

- Asterionella formosa
- Ceratium hirundinella
- Coebsphaerium sp.
- Fragilaria crotensis
- Gomphosphaerium sp.
- Tabellaria fenestra

**ZOOPLANKTON and OTHERS**

**CRUSTACEA**

- Bosmina coregoni
- Cyclops varicans

**ROTIFER**

- Keratella coehlearis
STATION NO. 12.

Intermediate Lake at Deepwater Point.

PHYTOPLANKTON

Anabaena sp.
Asterionella formosa
Ceratium hirundinella
Coelosphaerium sp.
Fragilaria crotensis
Gomphosphaerium sp.
Tabellaria fenestra

ZOOPLANKTON and OTHERS

DECAPODA

Orconectes virilus

CRUSTACEA

Bosmina corregoni

ISOPODUS

Ascellus militaris

OSTEICHTHYES

Castostimus commersonnii

Chrosomus eos

ROTIFER

Keratella coehlearis

(15)
North end of Intermediate Lake at Central Lake.

PHYTOPLANKTON

Anabaena sp.
Asterionella formosa
Coelsphaerium sp.
Dinobryon bavaricum
Dinobryon sertularia
Gomphosphaerium
Lynbya latissma
Rhizoclonium sp.
Tabellaria fenestra

ZOOPLANKTON and OTHERS

CRUSTACEA

Bosmina coregoni
Cyclops varicans

DECAPODA

Orconectes rusticus

ODONATA

Anisoptera

OSTEICHTHYES

Etheostoma nigrum nigrum
Micropterus salmoides salmoides
Pimephales notatus
Ellsworth

**PHYTOPLANKTON**

Cymbella
Fragilaria

**ZOOPLANKTON and OTHERS**

**DIPTERA**

Pseudochironomus sp.
Tanytarsus (Stictochironomus)

**OSTEICHTHYES**

Chrosomus eos
STATION NO. 15.

Birch Lake

PHYTOPLANKTON

Asterionella formosa
Cymbella sp.
Dinobryon sertularia
Melosira sp.
Mougeotia sp.
Navicula sp.
Rhizosolenia sp.
Spirogyra sp.

ZOOPLANKTON and OTHERS

CRUSTACEA

Bosmina coregoni
Cyclops sp.
Daphnia sp.
Limnocalanus sp.
Nauplius larvae
Plus an OSTRACODA

ROTIFER

Keratella cochlearis
Trichocerca sp.
One station was not understood by the writer and that is, "Round Lake, North of bridge." To the best of my knowledge there is no bridge on Round Lake near which samples could be collected. The following specimens were "collected there."

**PHYTOPLANKTON**

Asterionella formosa  
Fragilaria crotonensis  
Melosira sp.  
Navicula sp.

**ZOOPLANKTON and OTHERS**

**AMPHIPODA**

Gammarus sp.

**ANNELIDA**

small leach

**EPHEMEROPTERA**

Rhithrogena sp.

**GASTROPODA**

Physa sp.

**TRICHOPTERA**

Hydropsyche sp.

**TURBELLARIA**

Dugesia tigrina
### Alkalinity

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<tr>
<th>Date</th>
<th>Station</th>
<th>pH</th>
<th>pHth</th>
<th>mO</th>
<th>HCO₃⁻</th>
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<tbody>
<tr>
<td>Oct 30, 65</td>
<td>Stn. 1 Curry</td>
<td>7.2</td>
<td>0.0</td>
<td>23.4 ppm</td>
<td>65 ppm HCO₃⁻</td>
</tr>
<tr>
<td></td>
<td>Stn. 2 Jim, Surface</td>
<td>7.2</td>
<td>0.0</td>
<td>258 ppm</td>
<td>65 ppm HCO₃⁻</td>
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<tr>
<td></td>
<td>Stn. 4 Jim, Bottom</td>
<td>7.0</td>
<td>0.0</td>
<td>360 ppm</td>
<td>65 ppm HCO₃⁻</td>
</tr>
<tr>
<td>Oct 31, 65</td>
<td>Stn. 1 Jim, Top</td>
<td>7.1994</td>
<td>0.0</td>
<td>7.1994 ppm</td>
<td>7.1994 ppm HCO₃⁻</td>
</tr>
<tr>
<td></td>
<td>Stn. 3 Jim, Bottom</td>
<td>7.1994</td>
<td>0.0</td>
<td>7.1994 ppm</td>
<td>7.1994 ppm HCO₃⁻</td>
</tr>
<tr>
<td></td>
<td>Stn. 6 Jim</td>
<td>7.4686</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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### O₂

<table>
<thead>
<tr>
<th>Date</th>
<th>Station</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Oct 30, 65</td>
<td>Stn. 1 Curry</td>
<td>8.3062 L</td>
</tr>
<tr>
<td>Stn. 2 Curry</td>
<td>8.4458 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 3 Jim</td>
<td>7.678 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 4 Jim, Top</td>
<td>7.1994 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 3 Jim, Bottom</td>
<td>7.0498 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 4 Jim, Bottom</td>
<td>7.1994 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 6 Jim</td>
<td>7.4686 L</td>
<td></td>
</tr>
<tr>
<td>Oct 31, 65</td>
<td>Stn. 1</td>
<td>7.1196 L</td>
</tr>
<tr>
<td>Stn. 2</td>
<td>7.8176 L</td>
<td></td>
</tr>
<tr>
<td>Stn. 3</td>
<td>7.678 L</td>
<td></td>
</tr>
</tbody>
</table>

(21)
These sampling stations apply only to those outlined in red on page 21. Information regarding the others is not available at this time.
Differences in the animals found can be noted in the plankton fields. Collections made in the other areas were not entirely representative but some differences may be noted here also.

Differences noted may be due to many things. Some of these are current, or lack of it, water temperature, type of bottom, amount and direction of wind, and others. Also I don't think the collection methods were standardized which would also cause differences in the results.

For example we see the large number of small CRUSTACEA at station number 15 which is Birch Lake. There is little or no current in the lake during most of the year. Most of the lake is quite shallow, less than 30 ft., and the water temperature is therefore quite warm. Productivity in Birch Lake is probably quite high to the point of overpopulation.

In Torch Lake and Torch River there is more current, the lake is deeper, and the lakes are colder. In the river the current is so great that the plankton are really just riding the current through. In the Elk River the current is not so swift and it is more productive.

In the Intermediate chain and Clam Lake we also notice a larger variety of animal life. I think that with the same techniques used in Birch Lake it would reveal much the same in aquatic life. These lakes with the addition of Round Lake would be the most
productive.

Certain types of life would not survive in these lakes, however, for great lengths of time. Some of these are found in Torch and Elk Lakes. They would be such things as whitefish and laketrout that are found in colder, deeper lakes.

I feel that these lakes have been just about the same in productivity for many years. With the increasing number of year round residents and summer residents, desirable productivity could be reduced.

So through the years the Chain-O-Lakes has provided for the recreation and necessities of man and will continue to do so if man does not abuse them.


The following title was also used but exact information is not available at this time.

Wysong, Richard, *The Bay, The Land, And It's People*? 1949? Helping Dr. Wysong was one of his summer extension classes at Traverse City, Michigan.