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A FISHERIES SURVEY OF DAWN
AND SUNSET LAKES, MENOMINEE COUNTY

by

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Dawn and Sunset Lakes are located in Holmes Township (T 36 N., R 28 W., Sec. 4). They form the headwaters of Goodman Creek, a small stream flowing into the Menominee River near the Chalk Hills dam. Dawn Lake lies farthest upstream, being connected with Sunset Lake by a small creek about 125 yards long. These lakes are reached via County Road 347, 2-1/4 miles west of Nathan, the nearest village, then 1.9 miles south on an old military road, then east approximately 2 miles on very poor tote roads. A portage of about 1/4 mile was necessary to reach the lakes.

Maps used in the survey of these lakes were prepared by the Institute for Fisheries Research during the winter of 1939-40. The mapping party was headed by Floyd Ames, who reported on these waters in Institute Report No. 584. The survey of Sunset Lake was made July 10-11, 1940. Dawn Lake was studied August 23, 1940.

✓ The survey party was manned by Fred E. Locke, Aquatic Biologist I, leader; Irving J. Cantrall, Burton P. Hunt, Fisheries Technicians A, and Pat Galvin, Fish Culturist C, assistants.

These lakes are very difficult to reach. Roads, other than County Road #347, are mere sand trails. Few fishermen ever visit the lakes. They are so far away from any population center and so inaccessible, that only those familiar with the country are able to locate them. The lakes have been appropriately called "The Lost Lakes". Other names in use are Maureen for Sunset, and Harriette for Dawn.

Fishing in Sunset Lake has been fairly good during the past ten years according to Mr. Dan Deacon. Northern pike, sunfish and bullheads are most often taken. No information could be obtained on Dawn Lake. If conditions, as found by the survey party, are normal for this lake, fishing is practically impossible. No cottages nor recreational facilities have been developed on these lakes.

Physical Characters

Dawn and Sunset Lakes lie in a rather long basin. Undoubtedly this basin was once a long, shallow lake which has become filled except for the two small lakes under consideration. Natural erosion of the outlet of Sunset Lake may have drained off much of the water volume in the basin, exposing a low gravel ridge above which Dawn Lake now lies. On either side of this basin there are slightly rolling, cut-over hills which are predominately sand, gravel, and boulders. Drainage into these lakes is quite limited. Less than one square mile of drainage contributes to their water supply.

The shape and contour of both lakes are shown in the accompanying maps. It should be noted that these lakes are tending to become rounded and that the shores of each are encroaching. Such rounding of the shoreline is indicative of senility. Dams occur in the outlets of both lakes. The dam in Sunset Lake was constructed by interested fishermen. It is of log construction, about 20 feet long, and 20 inches high, and does not obstruct upstream migration when water-flow over it is normal. Beaver constructed the dam at the outlet of Dawn Lake. The dam was made during the spring of 1940. It increased the level of the lake

about five feet. The shoreline extent and depths of Dawn Lake were so changed thereby that the map, prepared during the previous winter and reproduced here, does not express its present morphometry. Everything in this lake was in such a state of change because of the increase in water level that the survey party decided not to remap it during the course of the inventory. This beaver dam obstructs upstream migration of fish.

Dawn Lake has several inlets which drain from a swampy area to the north. None of them are consolidated and do not represent streams. They are classed as seepages. About two cubic feet of water per second were flowing over the beaver dam at the outlet of this lake at the time of the survey. This flow is considered somewhat above normal. Water from Dawn Lake courses through a rather circuitous, mucky-bottomed channel, and enters Sunset Lake on the north-east shore. Seepage also adds to the volume of Sunset Lake. The outlet of Sunset is the source of Goodman Creek.

Before its alteration by a rise in water level, Dawn Lake had an area of 2.04 acres and a maximum depth of 12 feet. Approximately 76% of its area was shallower than ten feet. At present, the lake is probably eight acres in extent, and has a maximum depth of 17 feet. Water in Dawn Lake was very brown. A secchi disc disappeared from view five feet below the surface. The lake had a shoreline development of 1.7, but, undoubtedly, this figure would be different at present. Great masses of the bog mat which once constituted the shoreline were floating free in the lake and inundated trees and swamp grasses formed most of the present shoreline. Bottom materials were practically all fibrous peat on the shoals and pulpy peat in the depths. Some sand and gravel occurred at the south end near the outlet.

Sunset Lake has an area of 4.1 acres, a maximum depth of 14 feet, and a shoreline development of 1.16. This shoreline development means that the shoreline is 1.16 times as long as the circumference of a circle would be, were

the area of Sunset Lake enclosed by that circle. It is an expression of shore irregularity which, in turn, is one indicator of productive capacity. Fibrous peat is the bottom type on the shoals. Pulpy peat and fibrous peat occur in the depths. A small area of gravel, rubble and sand is exposed near the outlet of the lake. Water in Sunset Lake is also brown. It is slightly clearer than water in Dawn Lake. A secchi disc disappeared from view beneath 6 feet of water.

Considering the physical attributes of these lakes as discussed above and shown in the accompanying maps, the most striking feature of both is their senility. They are old, as lake life-history goes. Both may have been given a new lease on life by the dams placed in their outlets. However, these are but transitory remedies and can only forestall the early disappearance of the lakes. Protected from the wind, and wave action resulting from it, by virtue of their size and position, the lakes offer suitable space for tremendous growths of aquatic plants on all sides. Decaying generations of aquatic plants tend to fill the lake basins, while semi-aquatic species encroach from the shore ultimately closing the open water or leaving only room for a small creek to pass which keeps its channel clean by virtue of its current. Such growths are usually evidences of productivity. However, in small lakes, they do not always indicate a heavy population of fish or even fish food. Some waters, suitable to certain plant associations, are not good producers of fish or fish foods. Usually, these conditions are found in small, bog lakes. Dawn Lake, because of the instability occasioned by the rise in water level, was not well populated with fish. Sunset, on the other hand, contained many fish, none of which were large.

Thermal and Chemical Features

Thermal and chemical analyses of the waters in Dawn and Sunset Lakes are given in the following table:

Thermal and Chemical Attributes

Sunset - July 11, 1940 - 3:15PM Air temp. 64°F

Dawn - Aug. 23, 1940 - 4:00PM - Air temp. - 66°F.

Depth in ft.	Temp. °F	O ₂ in p.p.m.✓	CO ₂ in p.p.m.	M.O.		Temp. °F	O ₂ in p.p.m.	CO ₂ in p.p.m.	M.O.	
				alk. p.p.m.	pH				alk. p.p.m.	pH
0	72.3	4.55	4.0	165	8.0	64.0	3.5	8.0	181	7.7
3	71.2	...	...	...	...	59.9	...	...	...	...
6	66.9	...	...	...	...	58.6	...	...	...	...
9	61.5	...	...	...	...	56.4	...	...	...	...
12	55.9	5.25	1.1	162	8.1	52.5	...	...	...	...
15						50.5	0.0	38.0	192	6.8

✓ P.P.M. = Parts per million.

The water temperatures shown above are quite typical of small, sheltered lakes. A thermocline (zone of rapid temperature change) begins at the 3-foot depth and continues to the bottom. This layer is near the surface in most small lakes because of the small amount of wave action occurring there. Water temperatures in these lakes appear suitable for cold-water fishes, but it is felt that the risk involved in stocking them with trout would be too great. These temperatures are not considered normal. The likelihood of the lower waters losing their oxygen is great. Dawn Lake, due to its instability, contained only 3.5 p.p.m. of oxygen at the surface, and none at the bottom. This concentration at the surface is hardly enough to maintain fish life. Decay of newly acquired organic matter in the lake and seepage of bog waters are believed primarily responsible for this low oxygen content. The oxygen content in Sunset Lake was great enough to maintain fish life even in the bottom waters. In fact, the bottom waters contained more of this vital gas in solution than those at the surface. Heavy rains prior to the survey and inflow of water from Dawn Lake would account for this peculiarity. Carbon dioxide was quite abundant in Dawn Lake, but was insignificant in Sunset. Such concentrations as occurred in Dawn, combined with the low oxygen content, almost preclude the existence of many fish. The water in both lakes was hard. Methyl Orange alkalinity readings ranged between 162 and 192 p.p.m. of bicarbonate salts as expressed in

terms of calcium carbonate. Only the water of Dawn Lake tended toward acid conditions (pH 7.7 to 6.8). This acidity was due primarily to the high content of carbon dioxide in solution. The present chemical condition of waters in Dawn Lake is certainly detrimental to the productivity of both fish and fish foods. Conditions in Sunset Lake are somewhat better.

Biological Features

Owing to the sudden change of water level, vegetation is not well established in Dawn Lake. Emergent, floating, and submerged types were intermingled. Scirpus (bulrush), lilies and submerged forms (chiefly Chara and Myriophyllum) occupied the shoal areas. Many lily rhizomes, bulrush roots, grass and Chara mats were floating indiscriminately about the lake. It is believed that, once the lake reaches a stable condition, it will contain rather extensive vegetation beds. A glance at the map of Sunset Lake will show how extensive the vegetation was in that lake. It occurred throughout the lake. However, it followed typical ecological zonation. Emergents grew around the shores. Floating forms occupied the shoal waters. Submerged types grew over the rest of the lake bottom. The species of plants, as found by the survey party, are listed in the following table. A rough estimate of abundance is expressed by the letters under each lake heading: A = abundant; C = common; F = few; and R = rare.

Name of Plant*		Lake	
Common	Scientific	Dawn	Sunset
Yellow Water Lily	<i>Nuphar variegatum</i>	C	A
White Water Lily	<i>Nymphaea tuberosum</i>	C	A
Water Milfoil	<i>Myriophyllum</i> sp.	F	A
Floating Pondweed	<i>Potamogeton natans</i>	C	F
/Sago Pondweed	<i>Potamogeton pectinatus</i>	C	A
Flat-stemmed Pondweed	<i>Potamogeton zosteriformis</i>	C	C
Pondweed	<i>Potamogeton pusillus</i>	F	-
Softstem Bulrush	<i>Scirpus validus</i>	F	F
Cattail	<i>Typha latifolia</i>	R	C
Bladderwort	<i>Utricularia vulgaris</i> var. amer.	C	-
Muskgrass	<i>Chara</i>	A	A

*Plants identified by Miss Betty Robertson, Department of Botany, University of Michigan.

Plankton and bottom foods were relatively scarce in Dawn Lake. The bottom fauna seemed to be undergoing some flux due to the change in water level. Predominant among these bottom dwellers were snails and finger-nail clams. Phantom midge larvae and true midge larvae occurred sparingly. All of these forms were limited to water depths of 0 - 5 feet. No organisms were found in the deeper portions of this lake. Most of the emergent plants had extensive colonies of Bryozoa on the stems. Midge larvae and Planaria were common among these colonies.

Bottom fauna and plankton in Sunset Lake were found to be poor, both in quality and quantity. Small finger-nail clams were abundant. They were the main organism on the shoals. Mayfly nymphs and fresh-water shrimps were common. No fish food organisms were found in samples taken from the depths. The fauna on plants was not very abundant. It probably constitutes the main source of available fish food in this lake. The bottoms of these lakes are chiefly flocculent pulpy or fibrous peat. Such a substratum affords practically no suitable abodes to many of the important fish food organisms. Only those forms capable of survival beneath this mass, or able to live buoyed above it, can live on such bottoms. Despite this lack of bottom food production, it is believed the food supply is made adequate by the plant-inhabiting forms.

Only one species of game fish was taken from Dawn Lake by the survey party. A single yellow perch was caught in 12 hours of gill net sets. Pumpkinseed sunfish, northern pike and largemouth bass are probably present. Forage fish taken in seine hauls were common and golden shiners. The common shiners were more abundant than golden shiners. Neither species was too common in this lake.

During 23 hours of gill net sets in Sunset Lake, the survey party took 4 northern pike, 1 rock bass, 1 bluegill, 5 pumpkinseed sunfish, 1 brown bullhead, and 13 yellow bullheads. No seining was possible because of the boggy nature of the shores. It is believed that common and golden shiners inhabit this lake as well as Dawn. Growth rate studies on the fish from Sunset Lake showed the 4 northern pike to be in 3 age groups. Two specimens were in their 5th year. They

averaged 16.6 inches in length and 15.1 ounces in weight. One fish in its 6th year was 17.8 inches long and weighed 16 ounces. The last specimen was in its 8th year, weighed 3 pounds, 14 ounces, and was 27 inches long. Five pumpkinseed sunfish were aged. Three of them were in their 6th summer of life and averaged 4.7 inches in length and 1.2 ounces in weight. One, in its 7th year, was 5 inches long and weighed 1.5 ounces. Another, in its 8th year was 5.5 inches long and weighed 2.3 ounces. These results show definitely that growth of all game species in Sunset Lake is very slow. Northern pike, although legal size, were extremely small when compared with the same age groups from other waters. Pumpkinseeds hadn't reached legal size by the middle of their 8th summer. They probably never reach the 6 inch limit. Both species are probably too numerous in this lake for the available food supply. All age determinations were made by W. C. Beckman of the Institute Staff.

No fish of any kind have been stocked in either Dawn or Sunset Lakes during the past six years, according to Conservation Department records. Spawning facilities for game species in these lakes are believed adequate.

Management Suggestions

Considering the small size, inaccessibility, advanced senility, and lack of interest in these lakes, it is suggested that they be regarded as no longer suitable for the maintenance of good fishing. Any long range management program would be practically useless, since it is quite obvious that the lakes will only be in existence a few years. Encroachment will cover them rapidly despite the damming and water level increase which have taken place. It would be necessary to clean them out if they were to be maintained as worthwhile fishing waters. Such a project would be entirely too expensive.

Mr. Dan Deacon, who led the survey party to these lakes, was amazed at the changes that had occurred in them during the five years since he had seen them last. According to his statements, both lakes had lost about one-half of their original area, not by a loss in level, but by encroachment. Using his observations as a basis, a prediction that, barring catastrophic changes, these lakes will be non-existent within ten years seems very moderate.

INSTITUTE FOR FISHERIES RESEARCH

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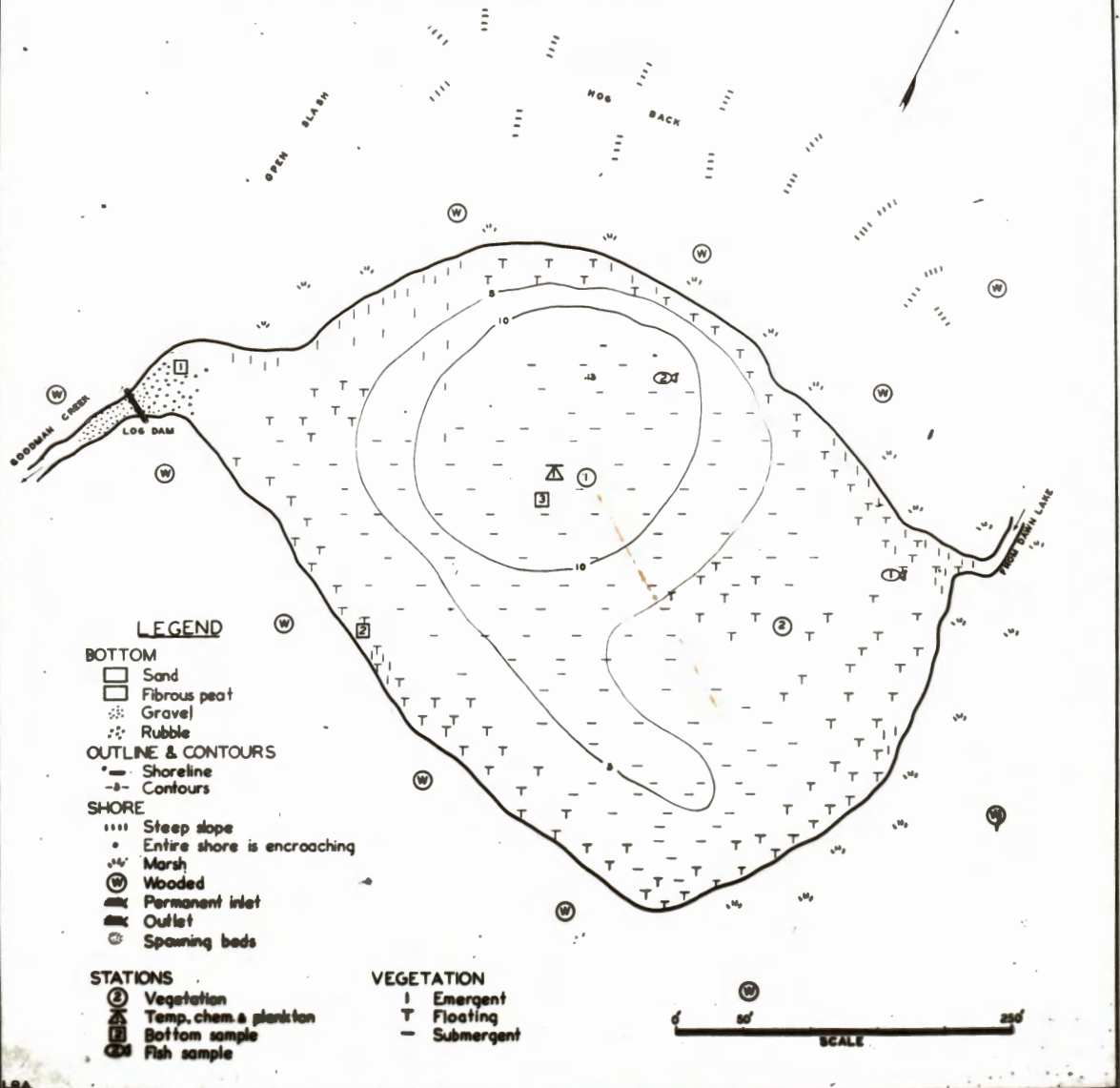
INSTITUTE FOR FISHERIES RESEARCH
 DIVISION OF FISHERIES MICHIGAN CONSERVATION DEPT.
 LAKE INVENTORY MAP
DAWN LAKE
 AREA 2.04 ACRES
 MARGINAL SURVEY & SOUNDINGS 1-25-40
 MENOMINEE COUNTY 8-23-1940 T 36 N, R 28 W, SEC. 4



- LEGEND**
- BOTTOM**
 □ Fibrous peat
 □ Pulpy peat
 ⊕ Deadheads or snags
 X Trash
- OUTLINE & CONTOURS**
 — Shoreline
 - - - Contours
- SHORE**
 ⊕ Marsh
 ⊙ Wooded
 ● Spring
 ≡ Permanent inlet
 ≡ Outlet
- STATIONS**
 ⊙ Vegetation
 △ Temperature and chemicals
 ✕ Plankton
 □ Bottom sample
 ⊕ Fish sample
- VEGETATION**
 I Emergent
 T Floating
 - Submergent
 ● Beaver dam has raised the lake level about five feet (spring 1940).

DAWN LAKE Menominee Co. T 36 N, R 28 W, SEC. 4.

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 DIVISION OF FISHERIES MICHIGAN CONSERVATION DEPT.
 LAKE INVENTORY MAP
SUNSET LAKE
 AREA 4.1 ACRES
 MARGINAL SURVEY & SOUNDINGS 1-29-40.
 MENOMINEE COUNTY 7-(10-11)-1940 T.26 N, R.26 W, SEC. 4.



SUNSET LAKE Menominee Co. T.26 N, R.26 W, SEC. 4