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**INSTITUTE FOR FISHERIES RESEARCH**

DIVISION OF FISHERIES  
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A FISHERIES SURVEY OF SWANZY LAKE,  
MARQUETTE COUNTY

by

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and  
F. E. Locke

Introduction

Swanzy Lake, also known as Lindman Lake, is located in Forsyth Township (T. 45 N., R. 25 W., Sec. 13) in the southeast part of Marquette County. It lies approximately two miles north of Little Lake and one half mile west of Provost Lake. A former lumbering center, Old Swanzy, lies one half mile to the west; a branch of the Chicago Northwestern Railway skirts the southwestern shore of the lake.

The lake was mapped and inventoried during August 13-15, 1940 by the Institute for Fisheries Research.\*

There is no evidence that the lake has been used industrially in the past. Formerly considered a good bass and bluegill lake, its production is said to have fallen off markedly. Since there is no resort development, the future popularity of the lake depends largely upon the maintenance of good fishing.

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\*The party consisted of: F. E. Locke, leader; I. J. Cantrall, B. F. Hunt, and P. Calvin, assistants.

### Physical Characters

Swanzy Lake is a pit lake situated in a rolling topography. Its basin is relatively deep, containing a single central depression, the sides of which have a rather gentle gradient. Sand shoal areas, extending 30 - 150 feet from the shoreline, are found around the entire margin.

The lake has neither inlet nor outlet, and the water level is nearly stable. While the lake is not directly tributary to any drainage system, waters from the vicinity drain south via Half Way Creek of the Escanaba River system, or north through the channel of the West Branch of the Choccolay.

A summary of the physical characters of Swanzy Lake is given below.

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Lake area - 20.4 acres  
Maximum depth - 45 feet  
Per cent shoal (10 ft. and under) - 38.2  
Bottom types  
    Shoal - Sand and pulpy peat  
    Depths - Pulpy peat  
Color of water - Colorless  
Secchi disc - 15 feet  
Shoreline development - 1.12

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The lake is rather deep for its size but the gentle slope of the bottom gives it some characteristics of a shallow lake. Large shoals, the most productive areas of the lake, produce spawning areas for centrarchids (bluegill, bass and sunfish) and habitat for forage fish.

The clear water allows deep light penetration, an advantage to animal and plant populations. Shoreline development, in large lakes, is an indication of bays, coves, and shoal areas, since it is obtained by dividing the circumference of the lake by the circumference of a circular lake of the same size. (Swanzy Lake has a shoreline 12 per cent longer than it would have if it were perfectly round.)

### Temperature and Chemical Character

The growth of fish is influenced directly and indirectly by the temperature and chemical nature of the water. Decreases in temperature retard the growth rate of all fish, although some fish grow better than others in cold waters of the same temperature. Chemical conditions may not affect the fish directly, but influence food or environmental conditions.

A summary of the temperature and chemical conditions in Swanzy Lake are given below.

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Date of examination - August 15, 1940	
Temperatures	
Surface -	75
Bottom -	46
Thermocline -	15-27 feet
Top -	73
Bottom -	53
Oxygen	
Surface	- 8.2 p.p.m.
Bottom	- 0.0 p.p.m.
Top of thermocline	- 8.95 p.p.m.
Bottom of thermocline	- 10.0 p.p.m. (27 foot depth)
(30 foot depth	- 3.5 p.p.m.)
CO <sub>2</sub> range -	1.0 - 19.0 p.p.m.
M. C. Alkalinity range -	15.0 - 24.0 p.p.m.
pH range -	7.4 - 6.8

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From the standpoint of temperature and chemical conditions, the lake is suitable for both warm- and cold-water fish. The water of the thermocline (zone of rapid temperature change--between 15 and 27 feet in this lake) is cold enough and has plenty of oxygen for trout, while the upper water favors growth of warm-water species.

Soft waters (under 30 p.p.m. M. C. Alkalinity), indicating a small amount of dissolved minerals, are often associated with low productivity.

The pH varies only slightly from neutral (pH 7 is neutral) and is suitable for nearly all aquatic life.

#### Biological Characters

In addition to chemical and physical qualities of the lake, biological characters (vegetation, fish food, and other fish present) are important in determining the kind and abundance of game fish.

#### Vegetation

Following is a list of aquatic plants found in Swanzy Lake.

<u>Plant</u>	<u>Relative abundance</u>
Waterweed ( <u>Anacharis canadensis</u> )	Few
Spike rush ( <u>Eleocharis Smallii</u> )	Common
Pipewort ( <u>Eriocaulon septangulare</u> )	Few
St. John's wort ( <u>Hypericum ellipticum</u> )	Rare
Quillwort ( <u>Isoetes sp.</u> )	Few
White water lily ( <u>Nymphaea odorata</u> )	Few
Yellow water lily ( <u>Nuphar sp.</u> )	Few
Smartweed ( <u>Polygonum natans v. genuinum</u> )	Few
Pondweed ( <u>Potamogeton gramineus</u> )	Few
Big bulrush ( <u>Scirpus acutus</u> )	Common
Bladderwort ( <u>Utricularia intermedia</u> )	Rare

♣ Plants identified by Miss B. M. Robertson.

Owing to the moderate wave action on the shoals, plant beds are not extensive or abundant.

#### Fish Foods

Plankton (semi-microscopic plants and animals) was relatively abundant at the time of the survey. Plankton is used as food by smaller fish. Due to the fluctuation in plankton populations, samples taken at only one time during the year are not particularly significant. Plant forms predominated in the samples taken from Swanzy Lake.

The shoal areas were quite productive of bottom foods. Damselfly, dragonfly, and mayfly nymphs, and caddisfly and midge larvae made up the bulk of the bottom food supply.

The deeper portions of the lake yielded very few bottom organisms.

Since vegetation is not abundant, the supply of food organisms from this source is small.

Fish

Only two species of fish were reported by the survey party. Perch were abundant; a few largemouth bass were taken. Although 4,800 bluegills were planted in 1937, none were taken by the survey party; however, some were taken later by the poisoning party.

Growth studies on the three game species follow:

Fish	Number of specimens	Age group	Average length (inches)
Perch	1	0	2.2
	2	I	3.9
	7	IV	6.2
	7	V	6.2
	1	VI	8.2
	6	VII	8.0
	3	VIII	8.4
	Largemouth bass	3	0
1		II	14.6
1		III	13.8
1		IV	14.8
2		VI	17.1
5		VII	17.6
3		VIII	17.9
5		IX	17.7
Bluegill	1	II	5.4
	1	IV	8.5
	1	V	8.9
	1	VI	8.4
	11	VII	8.9
	17	VIII	9.0
	23	IX	9.2
	10	X	9.3
	1	XI	10.0

These studies indicate a stunted perch population. The bluegills are doing well; largemouth bass make good growth to a certain point and fail to grow further. This growth of largemouth seems characteristic of many Upper Peninsula lakes.

Spawning facilities are adequate for the warm-water fish, but it is doubtful that trout could spawn successfully in this lake.

#### Management

A management program has been in effect since August, 1940, when the lake was poisoned to remove the entire fish population. The lake was then stocked as follows:

May 14, 1941	1,200	year-old	Brook trout
September 25, 1941	4,000	8-month	Brook trout
October 8, 1941	1,000	2-year	Brook trout

Further management should consist of determining the growth of brook trout and, since no spawning is likely to occur, trout should be planted as and when it becomes necessary.

Predators and parasites require no control in Swanzy Lake.

While cover is not plentiful, there is no present necessity for improvement. Since the lake has no inlets or springs, spawning facilities for brook trout cannot be supplied.

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