

INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

RECEIVED
JUN 23 1931
UNIVERSITY OF MICHIGAN

June 19, 1931

Report No. 73

ON THE MORTALITY OF FISH IN LAKE MITCHELL, WEXFORD COUNTY,
MICHIGAN

This investigation was undertaken in response to a request from Mr. F. A. Westerman, Fish Division, Michigan Department of Conservation.

We arrived at the lake on June 15, 1931. In company with Mr. Mart Moon, Special Warden, Mr. R. Fowser, and Mr. A. W. Wilson, both County Wardens, almost all of the eroded shore of Lake Mitchell was examined.

According to available information it is apparent that a rather unusual loss has taken place in this lake, possibly from the time that the ice went out. The loss at the present time is negligible, when the size of the lake and the number of fish it contains (as attested by the number of fish taken each season), is considered. The loss is steady and probably not periodic as one would think in visiting the lake. The evidence of periodicity is the result of heavy winds carrying the dead and dying fish to one shore.

The part of the wind swept shore receiving fish from across the entire lake was examined after a rather heavy wind had been blowing for about six hours. The large fish on shore made it appear as if there were thousands and, no doubt, the condition would be reported as such by a casual observer. We stepped off the most heavily littered shore and counted all the fish, including even those represented only by a skeleton, dried skin or head. One hundred four fish were

found in 188 paces.

The loss in this lake has, it is true, been abnormal, but present conditions indicate that the loss is declining at a rapid rate. Evidence for this is found in the fact that only three or four fish that were found were fresh enough for examination purposes and no weak or dying fish were being carried in by the ^{waves} waters.

The only unnatural losses have occurred in perch and wall-eyed pike. These fish are all large breeding fish. It was unfortunate that specimens were not fresh enough to determine the sex. The few perch which could be examined were all male fish. Many of the fish showed injuries in the form of areas with the scales removed. Practically all of them were fungused, otherwise these fish were perfectly healthy specimens and had an abundance of fat in the visceral cavity. This and other factors indicate that this lake is very productive.

No disease epidemic could be identified among these fish. The more recent abnormal loss in the adults of the two species is explainable on the basis of a complex of conditions, the effect of which is only partially known. An explanation follows.

Lake Mitchell is connected with Lake Cadillac by a canal. There is one small stream flowing into the former and Clam River from Lake Cadillac is the outlet for the two basins. According to Mr. Johnson, City Manager of Cadillac, the lake level was maintained as normal last year by damming up the outlet. This spring, in late March and early April, the water level, according to Mr. Johnson, was 13 inches below normal but late spring rains have caused this level to rise until, at the time of our visit, the level was only about five inches below normal. Lake Mitchell has tremendous areas of shallow water, more than does Lake Cadillac, and the greatest depth found by Metzelaar was only 21 feet. Since the water level was low at the spawning time of these fish and since they are particularly sensitive to water conditions, their spawning activities, no doubt, were interfered with, even to the

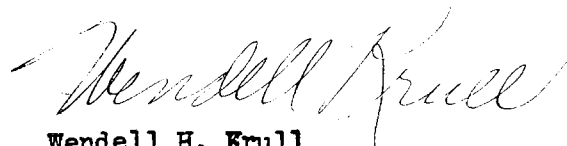
extent of making some of the normal spawning beds unavailable for the fish. This in turn would increase strife among individuals and result in increased injuries, and might well alter the water condition so as to make the fish less resistant. These factors make the fish liable to the attack of fungus. Although fungus is generally held to be a secondary infection, ~~but~~ we have very good evidence from laboratory experiments to indicate that it attacks sound fish with low vitality in which resistance has been lowered by spawning, by temporary starvation, by sudden changes in water temperature, by sudden changes in oxygen content of the water, etc. Mycologists tell us that the fungus spores of a given strain are not known to vary in virulence, but environmental conditions have a tremendous influence on the growth of the spore, and that there may be physiological races which vary in virulence.

The loss of fish due to fungus, in various ways correlated with the exceedingly low water level of lakes and streams, has been very conspicuous this season.

A concrete case showing the difference in the reaction of mature fish was cited by Mr. R. Fowser, County Warden, who has observed that the black bass have not occupied their spawning beds in Lake Mitchell this spring.

We wish to thank Mr. Johnson, City Manager, Cadillac and Wardens Moon, Wilson and Fowser for their assistance in making this investigation possible.

INSTITUTE FOR FISHERIES RESEARCH



Wendell H. Krull
Fish Pathologist

Copies to:

- Ross Fowser, Manton, Mich.
- A. W. Wilson, Lake City, Mich.
- M. Moon, Cadillac, Michigan.