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MONTANA DEPARTMENT OF FISH AND GAME

FISHERIES DIVISION

JOB PERFORMANCE REPORT

STATE: Montana

TITLE: Flathead Lake Fisheries Investigation

PROJECT NO: F-33-R-10

JOB NO: I-a

TITLE: The seasonal, area and depth distribution of cutthroat trout and Dolly Varden in Flathead Lake

PERIOD COVERED: July 1, 1975 through June 30, 1976

OBJECTIVES

The primary objective of this job is to identify the diel and seasonal movements of the cutthroat trout and Dolly Varden as they are associated with species habitat preferences or by spawning migration activities. The present segment of this job was to define the summer-fall shoreline distribution patterns and prespawning concentrations of these fish in the lake. Associated with the fish sampling, measurements of the basic chemical, physical and biological characteristics of the sample areas were to be made.

ACCOMPLISHMENTS

The procedures to accomplish the objectives of the present segment of this job were modified when hydroacoustical gear was available. Major efforts changed from the scheduled seasonal gill netting to the development of the hydroacoustical gear and its application to these specific fish. Efforts were also expended on the development of a mid-water trawl system that could be used to verify fish species and sizes indicated by the acoustical gear. The net, with an eight by eight foot opening, and capable of fishing to depths over 100 feet, was readied for the coming work season.

The experimental mid-water trawl hauls made between August 8th and October 1st caught primarily kokanee, 66.5 percent of the total catch. The net was usually fished nights at depths ranging from surface to 70 feet, towed at 1.4 m/sec or 3.6 mph. Other fish species taken were: pygmy whitefish, 25.0 percent; peamouth, 5.1 percent with lake whitefish, yellow perch, sculpins, largescale suckers and longnose suckers making up a total of 3.4 percent.

The largest fish, 345 mm (13.6 inches) total length, was a longnose sucker and the smallest was a peamouth measuring 13 mm (0.5 inches).

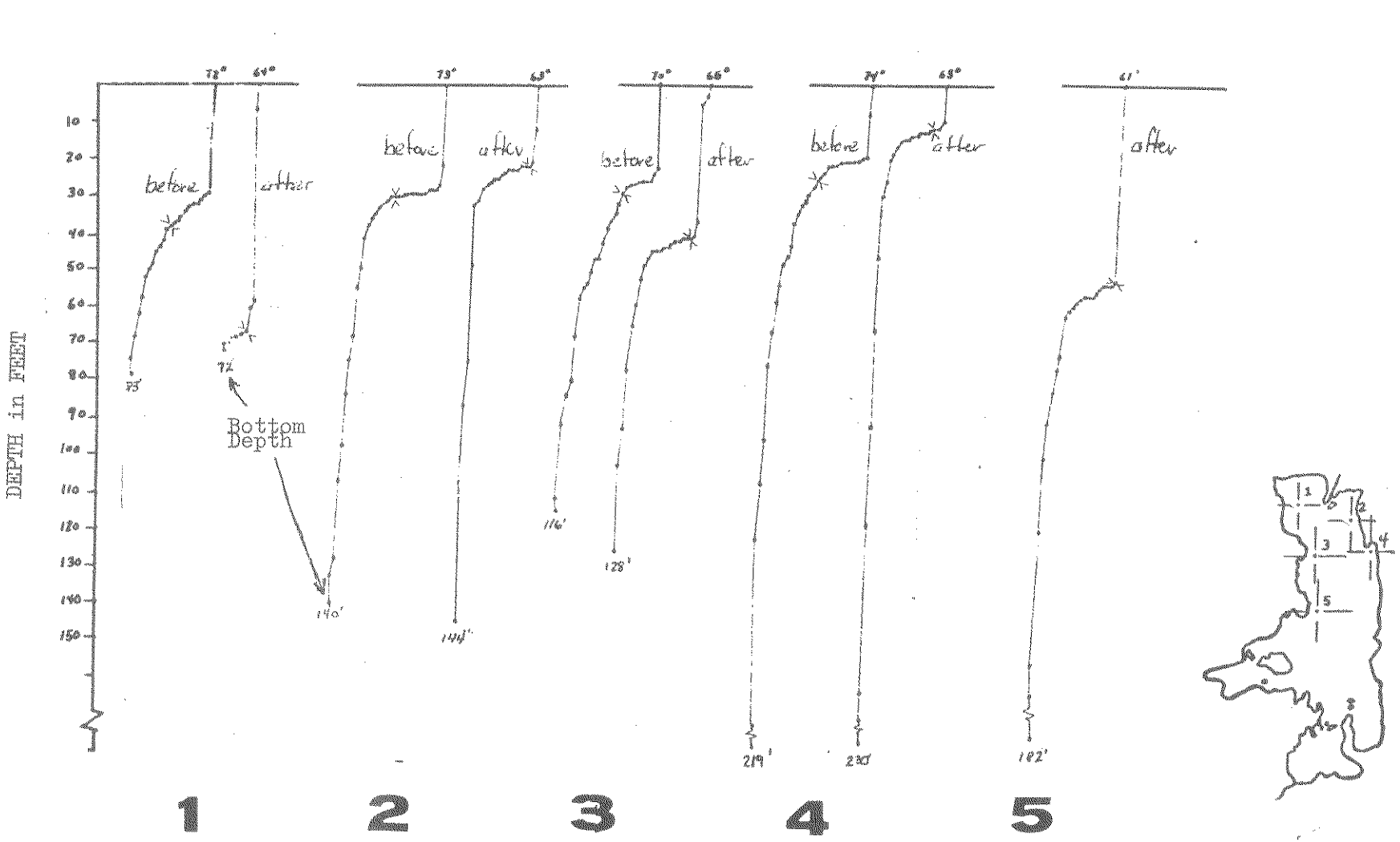

Figure 1. Water temperature profiles at five stations in Flathead Lake taken before and after a prolonged period of wind during August, 1975. A one degree Fahrenheit change is noted by each dot in the profiles. the "V" reference pointers indicate the depth position of 60° F.

A series of shoreline gill net sets made in the late fall during the kokanee spawning season further supplemented previous seasonal distribution patterns on both the cutthroat trout and Dolly Varden. In this series, Dolly Varden ranging in size from 8.0 to 28.5 inches (total length) and cutthroat trout 9.8 to 12.7 inches were found to frequent the lakeshore spawning areas of salmon during November and December.

Thermal conditions of the lake were recorded periodically during the summer. These measurements were made either concurrent with the acoustical and trawl sampling work or during fish reconnaissance cruises. Three temperature series, taken in late July, August and September, represented stations over the entire lake and at routine sampling sites.

A radical change in the thermo-stratification occurred in the lake following prolonged periods of wind on August 13-15. Wind velocities measured at the lake's north end weather station, were clocked at 27 knots (31 mph) out of the southeast. Higher wind velocities do occur on the lake, but usually do not persist more than one day. Prior to the winds, the upper limits of the thermocline ranged from 25 feet along the east shore to 40 feet along the west shore. Surface temperatures at this time ranged from 70°F to 74°F, with these surface temperatures extending down to the upper limits of the thermocline. A week after the winds had subsided, temperature profiles showed surface temperatures had cooled considerably; ranging from 61°F to 65°F or some 10 degrees less in one week. The position of the upper limits of the thermocline also was altered. Along the eastern shore upper limits rose to within 15 feet of the surface while west shore limits dropped to depths of 65 feet, (Figure 1).

Area differences were classically illustrated by the 50 foot difference in positioning of the upper limits of the thermocline as they occurred on the same day on opposite sides of the lake. Abnormal weather conditions can display their effect on the thermal patterns even upon this large sized lake.

Fish distribution patterns, primarily salmon, were disrupted by the abnormal weather. After the winds, the large concentration normally found along the northeast shore apparently was displaced and appeared on the lee or west side of the lake, where a large concentration was located. The disappearange and appearance of fish before and after the wind were verified by echograms. The salmon did return to the east shore area some two weeks after the wind, but it was not known whether these fish were the same as those that were displaced.

Prepared by: Delano A. Hanzel

Date: September 23, 1976

Water Referred To:

Flathead Lake 07-6400