MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State Montana Title Flathead Lake Fisheries Studies

Project No. F-33-R-7 Title The seasonal and depth distribution of the

Job No. I-a fish population in Flathead Lake

Period Covered July 1, 1972 through June 30, 1973

ABSTRACT

Floating gill nets were used to identify species composition of a fish concentration located and recorded on sonar in the pelagic area of the lake. The work preceeded the implementation of sampling by a recently developed experimental purse seine. The gill nets failed to provide data on small-sized kokanee and pygmy whitefish (100 to 200 mm T.L.) which were subsequently caught in the area by the purse seine. The nets, however, did provide data on the larger piscivorous fish, i.e. Dolly Varden and lake trout, which were not collected in the seine and were found to be associated with the kokanee.

Species composition and area association were derived from a series of late fall shoreline gill net sets made specifically to collect information on mature kokanee on their individual spawning grounds. Relatively large numbers of cutthroat trout were found to be concentrated along with the spawning salmon in the shallow waters along the eastern shoreline during early December.

BACKGROUND

Flathead Lake, in northwestern Montana, is part of the large intradependent lake-river system that contains populations of migrating salmonids. This system offers the public a national renowned lake and stream fishery and many other types of water-based recreation amidst a setting of mountains. The lake has 126,000 surface acres with a maximum depth of 400 feet. It is fed by a watershed containing over 180 river miles which includes portions of Glacier National Park and the Bob Marshall Wilderness.

Fishery investigations for the Flathead drainage were first initiated in 1953 and directed toward the assessment of the fishery in the river system above the lake. This work defined the interdependent relationship between the lake and river system. The recent work has been directed toward the gathering of knowledge of the fisheries resource, the spatial habitats various species occupy, and the factors that tend to degrade or destroy them.

OBJECTIVES

The objectives of this study are to develop techniques for using specialized equipment in determining the relative abundance of the various fishes in the lake, to determine their seasonal geographic and depth distribution and to establish criteria for measuring year to year trends in species populations.

PROCEDURES

A year-around fish sampling program was initiated in 1966 and was continued through December, 1970. Fish have been collected on a systematic schedule as the basis for defining the seasonal and depth distribution of populations in the lake (Hanzel, 1970, 1971 and 1972).

With the completion of the systematic sampling, emphasis on the job shifted toward sampling of small specific areas to determine the areas, range and extent of the seasonal movements of kokanee, Dolly Varden and cutthroat trout (Hanzel, 1973).

Floating monofiliment gill nets, 250 feet long and 25 feet deep, were fished on the surface in the limnetic areas of the lake while standard experimental nets, 125 feet long and 6 feet deep, were used for sampling shoreline areas during the fall. Both nets contained the same mesh sizes. The floating nets were never fished unattended or left overnight. The standard nets were all bottom sets and were allowed to fish overnight for approximately 16 to 20 hours.

All measurements of the fish were to the nearest millimeter in total length (T.L.), weights to the nearest gram and scale samples extracted and stored in individual envelopes. A cursory examination was also made into the abdominal cavity for sex determination and gonadal development.

FINDINGS

Surface Netting

A series of floating monofiliment gill nets were used to identify the species composition of a large concentration of fish located by sonar off Yellow Bay. The fish were located near the surface in late June on a routine fish reconnaissance cruise. The spatial distribution recorded on sonar tape was from the surface to 32 feet.

The floating nets were suspended from the surface to 25 feet in an area where bottom depths were greater than 230 feet. The catch in the nets was primarily Dolly Varden and kokanee; however, one lake trout (477 mm T.L.) was taken. The Dolly Varden ranged in size from 350 to 604 mm (13.8 to 23.8 inches) while the kokanee ranged in size from 216 to 311 mm (8.5 to 12.3 inches). A check of stomach contents indicated over half of the Dolly Varden had been feeding on small kokanee (122 to 175 mm) and pygmy whitefish (76 to 124 mm). The state of decomposition of the contents indicated the fish has been recently ingested. The close association and similar area and depth distribution of schooling kokanee and Dolly Varden, during the early summer months was previously noted by Hanzel, 1973.

Once the species composition within these concentrations were identified, the floating net series was terminated and sampling was resumed using the new experimental purse seine (Hanzel, 1972, 1973). Sampling with the seine (Hanzel, 1974) did substantiate the presence of kokanee, but also revealed the school contained a number of small kokanee (100 to 200 mm), pygmy whitefish and mountain whitefish. Dolly Varden were not taken in the seine hauls.

Fall Shoreline Series

A series of shoreline gill net sets were made in the late fall months to collect samples of spawning kokanee. Nine spawning sites were netted. They represented areas on both sides of the lake; however, most were located in the southern half of the lake. The series was conducted from November 29 through December 19; a period considered to have been after the peak number of spawning salmon reach their individual shoreline sites.

Although the series were specifically made to collect information on kokanee, seasonal distribution information was collected on 12 other fish species. During this series, the nets average 39.8 fish per 125-foot of net. Kokanee represented 31.0 percent of the total catch, 438 fish. Other major fish taken and their catch percentage were: lake whitefish - 16.1 percent, cutthroat trout - 14.6 percent, and mountain whitefish - 12.1 percent.

The number of cutthroat trout (a total of 68 trout) taken during this series nearly equalled the number that have been taken in all previous netting, 1966-71. This indicates that sampling gear and timing are critical when attempting to collect this trout in large lakes. A maximum number of 20 cutthroat trout were taken in one net on December 12 in Yellow Bay. Similar concentrations of cutthroat trout have previously been reported by Brunson, Pennington and Bjorklund, 1952.

Squawfish, Dolly Varden and peamouth made up nearly equal percentages of the catch with 7.8, 7.3 and 6.8 percent, respectively. Other fish collected, which represented 2.0 percent or less of the catch, were the largescale sucker, yellow perch, pygmy whitefish, rainbow trout, lake trout and redside shiner.

Kokanee, lake whitefish, Dolly Varden and mountain whitefish were taken at all sampling sites with only the cutthroat trout showing a strong tendency to occupy the eastern shoreline areas during this early winter period. The sex ratio of the cutthroat trout during this season was 1 male to 3.83 females. Sex ratios noted for the other species were: Dolly Varden, 1.0 to 0.38; Lake whitefish, 1.0 to 0.54; kokanee, 1.0 to 1.25; mountain whitefish, 1.0 to 1.68.

August Kokanee Creek Check

A creel census was conducted over the entire lake during the latter part of August to collect information on the salmon population represented in the fisherman creel. The information collected during this census was included in the five-year summary, 1968 - 1972 by Hanzel, 1973.

RECOMMENDATIONS

It is recommended that the specific fish sampling accomplished under this job be discontinued as a separate job and that the emphasis of the study be shifted toward a program of sampling of kokanee in the limnetic areas of the lake with the new purse seine. The August creel census for kokanee should be continued but be included as part of the sampling under Job I-b; age and growth analysis of kokanee.

LITERATURE CITED

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Waters Referred to:

Flathead Lake 07-6400-03