MONTANA STATE DEPARTMENT OF FISH AND GAME
FEDERAL AID IN FISH RESTORATION SECTION
HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. F-7-R-3 Work Plan No. IV Job No. IV-B

Title of Job: Developing Measures to Determine Kokanee Abundance in Flathead Lake

Abstract:

Three methods were used to determine the relative abundance of kokanee in Flathead Lake, creel census, gill netting and seining during the spawning season. Gill netting was of no value. Creel census along with the records of seining operations appear to be the best source of information. The percentage of kokanee caught by anglers was higher in 1951 than in 1952 and 1953. However, for one area seined in all three years, the catch per seine haul was higher in 1952 than in 1951 or 1953. The creel census for 1952 and 1953 was more of a random sample of the lake than was the census in 1951. No extreme annual fluctuation of the relative abundance of kokanee was noted during the period of this study.

Objectives:

To determine the relative abundance of kokanee in Flathead Lake that yearly fluctuations in abundance may be noted.

Techniques Used:

Creel census was taken by wardens, guides and outfitters, and by fishermen who kept logs. Creel census forms were distributed to boat house operators on the lake and creel census cards were given to individuals owning large boats that took out fishing parties. Boat counting forms were given to reliable residents on the lake to obtain fishing pressure on part of the lake. The number of kokanee caught by seining during the spawn taking operations was counted for each net haul. Gill nets were set in several areas of the lake.

Findings:

Flathead Lake is the largest natural lake in Montana having an area of 120,320 acres and a shore line of 127 miles. The chief tributaries are the Flathead and Swan Rivers. The deepest part of the lake is 339 feet in the vicinity of Yellow Bay.

The entire lake seldom freezes over but many of the bays are frozen over for about three months each year. During the term of this study the lake has had ice only in the sheltered bays.

The following fish are caught in Flathead Lake: Cutthroat trout, rainbow trout, dolly varden trout, mackinaw trout, kokanee, mountain whitefish, lake whitefish, bullheads, squawfish, yellow perch, suckers, and large mouth bass. Several brown trout were reported caught in 1953 but this may be misidentification.

Three methods were used to determine kokanee abundance in the lake, creel census, seining and by gill netting.

Gill nets were not successful in capturing kokanee. Records were made of kokanee captured during seining and spawn-taking operations on Flathead Lake in 1953 (Table 1). The seines used were eight feet high and were either 240 feet or 400 feet long of one inch bar measure. The number of kokanee per seine haul was 355 at Rollins Bay and 936 at Dr. Richards Bay.

A trap was installed in MacDonald Creek approximately 52 miles from Flathead Lake. Records were kept of fish spawned in this trap. This trap was operated from November 9 to November 30th. A total of 4,429 kokanee were caught in 20 days of trap operation, or an average of 211 fish caught per day.

Creel census was taken by wardens, boat house operators and individual anglers. The catch per hour of all game fish in 1953 was 1.9 with kokanee making up 70 percent of the catch.

Analysis and Recommendations:

Three methods were attempted to determine the abundance of kokanee in Flathead Lake. In the three years of this study, gill nets have been of no value. Many fish were caught in these nets but no kokanee were ever caught.

Information obtained in 1951 and 1952 have been reported in Job Completion Report IV-B for both years.

The catch of kokanee per seine haul over the three year period varied in the areas where they were taken (Table 2). These data may be useful when records are kept over a much longer period of time, since many variables enter the picture when the data is subjected to statistical tests. For example, a rough lake while seining, holes in the seine, distance net is set from shore, technique in pulling in net, snags catching net and several others affect the number of kokanee taken in each seine haul. Also the number of kokanee eggs required each year for the hatcheries vary and thus affects the amount of seining to be done. Yearly fluctuations may be noted from seining spawning kokanee but should not be used as the sole criteria.

Creel census appears to be the better method to determine relative kokanee abundance in the lake. The catch per hour of all fish for the years 1951, 1952 and 1953 was 2.3, 0.9 and 1.9 respectively. The percentage of kokanee caught was 94.8 in 1951, 70.3 in 1952 and 69.8 in 1953. The high percentage of 1951 is attributed to records kept at a boat house and perhaps does not represent a random sample of the lake. The census for 1952 comes in approximately equal amounts from wardens and angler logs or boathouse records. In 1953, most of the data collected was from angler logs and boat house records. For instance, there is a record of only 170 fish caught in 1952. However, the percentage of kokanee caught for each of the three years is high and this along with the catch per hour will give some indications of their relative abundance.

Table 1. The number of kokanee captured during seining operations on Flathead Lake during November, 1953

Date	Location	Number of Fish	Number of Seine Hauls	Length of Seine in Feet
November 12	Dr. Richards Bay	4,125	4	400
November 14	Dr. Richards Bay	3,533	5	400
November 16	Rollins Bay	1,421	4	400
November 17	Dr. Richards Bay	3,573	3	400

Table 2. The number of kokanee captured during seining operations on Flathead Lake for 1951, 1952 and 1953.

Year	Location	Total Number of Fish	Number of Seine Hauls	Number of Fish Per Haul
1951	Rollins Bay	7,771	20	388.5
	Somers Hatchery Bay	10,382	9	1154.0
1952	Rollins Bay	1,797	3	599.0
	Somers Hatchery Bay	3,383	2	1691.5
	Dr. Richards Bay	7,609	6	1268.1
1953	Rollins Bay	1,421	4	355.2
	Dr. Richards Bay	11,231	12	935.9

Table 3. Number of fish caught and species composition by creel census of Flathead Lake for the years 1951, 1952 and 1953.

	1951		1952		1953	
Species	Number	Percentage Composition	Number	Percentage Composition	Number	Percentage Composition
Cutthroat trout	124	2.32	8	4.65	133	19.96
Rainbow trout	15	0.28	4	2.33	2	0.30
Dolly varden trout	104	1.95	22	12.79	19	2.85
Mackinaw trout	1	0.02				
Mountain whitefish	1	0.02	12	6.98	31	4.66
Kokanee	5071	94.80	121	70.34	465	69.83
Yellow perch	28	0.52			3	0.45
Bullhead	5	0.09			1	0.15
Sucker			1	0.58		
Squawfish			4	2.33		
Brown trout*					2	0.30
Lake whitefish					10	1.50
Total fish	5349		172		666	
Catch per hour	2.3		0.9		1.9	

*This may be a case of misidentification.

Fishing pressure is not high on the open waters of the lake, most of the fishing being done in bays and near shore. The lake can get rough and most boats available for fishing are small.

No success was obtained in getting fishing pressure on the lake. An attempt was made to have interested residents living on strategic points count boats on the lake at various times of the day. Their interest soon waned and very little information was obtained.

It is recommended that this study as such should be discontinued under Federal Aid. However, creel census by wardens, anglers and boat house operators should be continued along with records of seining operations during the season. The information thus obtained will give a general idea of the relative abundance of kokanee. During the course of the study no fluctuation of the relative abundance of the kokanee was noted.

Summary:

Three methods, creel census, seining, and gill netting were attempted to obtain the relative abundance of kokanee in Flathead Lake. Gill netting was of no value due to failure of the nets to catch kokanee. Creel census in combination with seining operations during the spawning season appear to be the best source of information. The percentage of kokanee caught by anglers was higher in 1951 than in 1952 and 1953. No annual fluctuation of the relative abundance of the kokanee was noted during the period of this study.

Data and Reports:

The original data and related reports are with the project leader in Kalispell and with the Fish and Game Department in Helena, Montana.

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