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MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
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PROJECT 29-E-2

A PRELIMINARY FISHERY SURVEY OF HUNGRY HORSE RESERVOIR

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Introduction

Hungry Horse Reservoir (figure 1) is located on the South Fork of the Flathead River about 5 miles upstream from the confluence with the Flathead River. This artificial impoundment was created by construction of Hungry Horse dam and power plant, a U. S. Bureau of Reclamation project, which was completed in 1952. The dam is 564 feet high and maximum depth in the reservoir is 500 feet. The reservoir can store 3,500,000 acre feet of water covering 25,500 surface acres. The impoundment, when full, is 34 miles long with a maximum width of $3\frac{1}{2}$ miles.

The South Fork of the Flathead River has provided very good fishing in the past. Cutthroat trout and Dolly Varden migrated up this stream on spawning runs from Flathead Lake. These runs were eliminated by Hungry Horse Dam. Fish passage facilities were unfeasible because of the height of the dam. Fishing has been generally good in the impoundment but angling has been largely confined to those portions of the reservoir near boat-launching sites and around stream mouths. The average catch ranged from .8 to 1.4 fish per hour during the 1955, 1956 and 1957 seasons. This data was obtained from the state-wide creel census computations. Very little additional data is available regarding this fishery. Therefore, a preliminary survey of this reservoir was initiated in 1958 to obtain information regarding the fish population and the characteristics of the reservoir that may influence the future of this fishery. The project is part of a long range study of fishery problems associated with large impoundments in Western Montana.

Past Management: Grayling fry were planted in the Hungry Horse impoundment during the years 1953 through 1956. The annual plants are shown in table 1.

Table 1. Grayling fry planted in Hungry Horse Reservoir, 1953-1956.

Year	No. of Fish
1953	1,200,000
1954	870,000
1955	2,208,000
1956	1,450,550
Total	5,728,000

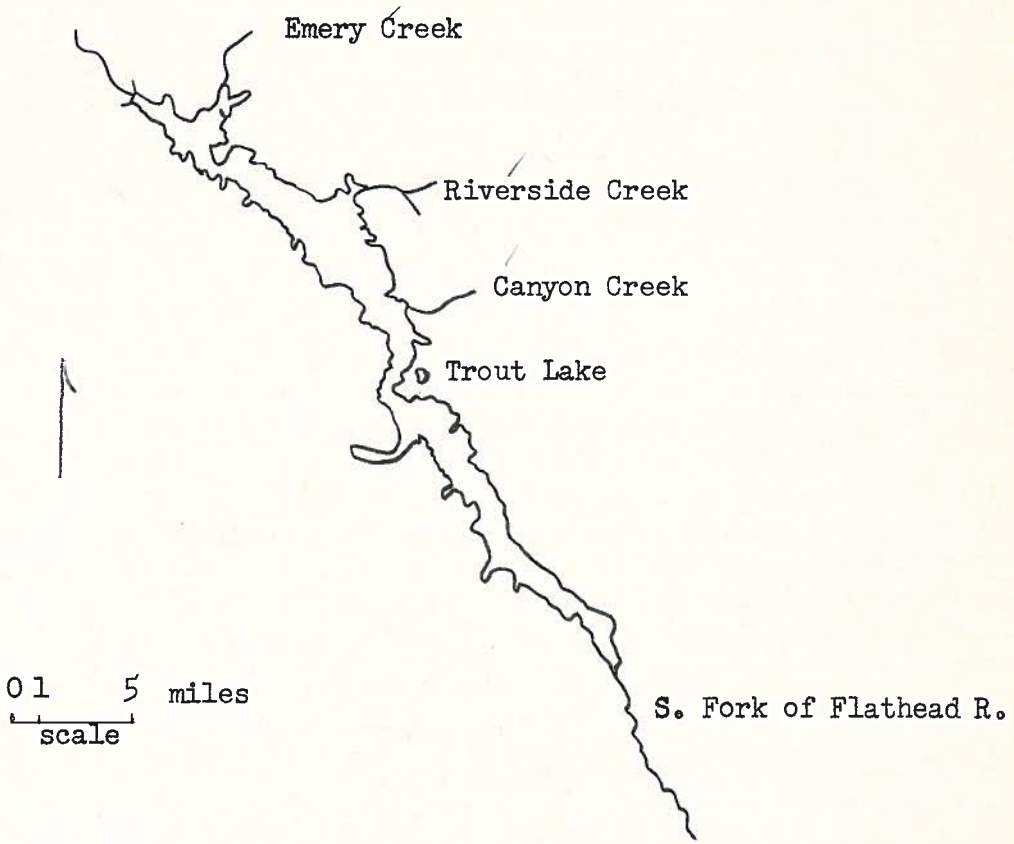

Figure 1. Map of Hungry Horse Reservoir

Cutthroat trout runs occured annually in several of the larger tributaries during early June. The upstream movement of these fish was stopped when they reached the intersections of the streams with a road built around the reservoir. Culverts installed in the road bed were either too high above the stream bed to allow fish to enter or the current in the culvert prevented fish from moving through. The spawners concentrated in pools at the downstream ends of these culverts and were especially vulnerable to angling. In 1955, a later opening date was adopted to protect these fish until spawning had occurred. This regulation is still in effect. Opening dates have varied but have usually been in mid-June or later.

Baffles were installed in the culverts on Riverside, Felix, N. Fk. Logan, and Harris Creeks in 1957 to facilitate fish passage. These baffles were patterned after those developed by the Washington Department of Fisheries to alleviate the problem of fish passage through culverts.

FISH POPULATION

The fish population was sampled with nylon graduated mesh gill nets (3/4- to 2-inch square mesh), 6 feet deep and 125 feet long. Twenty-four overnight sets were made from June 9th to 26th and 15 sets were made between October 8th and 10th. The June netting represents stations near Emery Creek, Riverside Creek, Trout Lake and the inlet of the South Fork. The Trout Lake station was not netted in October because of bad roads. Sampling stations were selected to represent different sections of the reservoir. Nets were set in water ranging from 6 to 80 feet deep with depths of 20-30 feet being most common. Gently sloping shorelines are uncommon in this reservoir, especially in the middle and downstream portions.

The June netting took 1136 fish and 484 fish were taken in October. The average catch per overnight set is shown in table 2.

Table 2. Average catch per net in Hungry Horse Reservoir, 1958.

	DV	Ct.	Wh.	Kok	LNS[1]	CLSS[2]	Sq.	Total
June	7.7	.9	7.0	t	23.0	6.5	2.2	47.4
October	7.1	2.5	14.6	-	3.0	1.9	3.2	32.3

[1] Catostomus catostomus
[2] Catostomus macrocheilus

The greater abundance of whitefish in the October nets is a result of pre-spawning activity. Many of these whitefish were ripe or near-ripe. The large number of suckers in the spring catch may also be related to spawning behavior although the maturity of these fish was not determined.

Squawfish were more common in the Emery Creek sets than in the catch at other stations during both netting periods. Table 3 shows the average

catch per net at the four stations. The average catch of other species did not indicate any such relationship.

Table 3. Distribution of Squawfish as indicated by average number caught in each gill net.

	Emery	Riverside	Trout L.	Inlet
June	5.38	.33	1.00	.40
October	8.20	1.20	.00	1.00

Dolly Varden made up nearly half of the total weight of all fish taken during each netting period, although by number they made up only 16 per cent of the fish taken in June and 22 per cent of those taken in October (table 4). The average weight of individual Dolly Varden was 1.36 pounds in the June sets and 1.47 in the October catch. These trout ranged up to 8 3/4 pounds. Cutthroat averaged .51 and .60 pounds respectively in the spring and fall samples. The largest cutthroat weighed 1.14 pounds. Suckers represented about one-half of the June catch numerically but many of these were small and consequently they made up less than one-quarter of the total weight for that period.

Table 4. Total number and weight of each species taken in gill nets.

	DV		ct		wh		FSS		CSS		Sq	
	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
June	185 (16%)	252.44 (47%)	22 (2%)	11.24 (2%)	168 (15%)	57.66 (11%)	553 (49%)	120.95 (22%)	155 (14%)	82.93 (15%)	52 (5%)	15.39 (3%)
October	103 (21%)	151.20 (45%)	37 (8%)	22.07 (7%)	219 (45%)	111.11 (33%)	45 (9%)	11.04 (3%)	28 (6%)	18.47 (6%)	52 (11%)	23.38 (7%)

( ) = percent of total

An 18-inch minimum size law has been in effect on Dolly Varden in the Flathead River Drainage since 1951. Fishing has been prohibited on several small streams to further protect the spawning Dolly Varden and cutthroat trout. The fishery in Hungry Horse Reservoir has been subject to the minimum size law since impoundment but none of the streams above the dam have been permanently closed to fishing.

The Dolly Varden taken during the 1958 netting periods ranged from 7 to 29 inches in length. Scales were collected but they have not been read. Data on file in District 1 headquarters indicates that 3 year old Dolly Varden in the South Fork of the Flathead are about 7 - 8 inches long. Therefore, it is assumed the Dolly Varden taken in this study are 3 years or older. A length frequency distribution did not reveal distinct size classes but it did give an indication of the ratio of legal to sub-legal fish in this population. Twenty-

eight percent of those taken in June and 24 percent of the fall catch exceeded the minimum size length of 18 inches. Therefore, about three-fourths of the Dolly Varden trout over three years of age in Hungry Horse Reservoir are not available to anglers under present regulations. Subsequent study of this population will provide additional data for evaluating this regulation.

TEMPERATURE DATA

Vertical temperature series were obtained at three stations on July 2 and 3 with a portable resistance thermometer. This data is shown in figure 2. The more rapid decrease in the 20-40 foot zone at 2 stations indicates that thermal stratification occurs, at least temporarily, in this impoundment. The inlet station also showed a sharp temperature gradient in the 15-20 foot zone but this may be a result of currents induced by the inlet stream. No dissolved oxygen determinations were made but the June net sets took fish as deep as 80 feet.

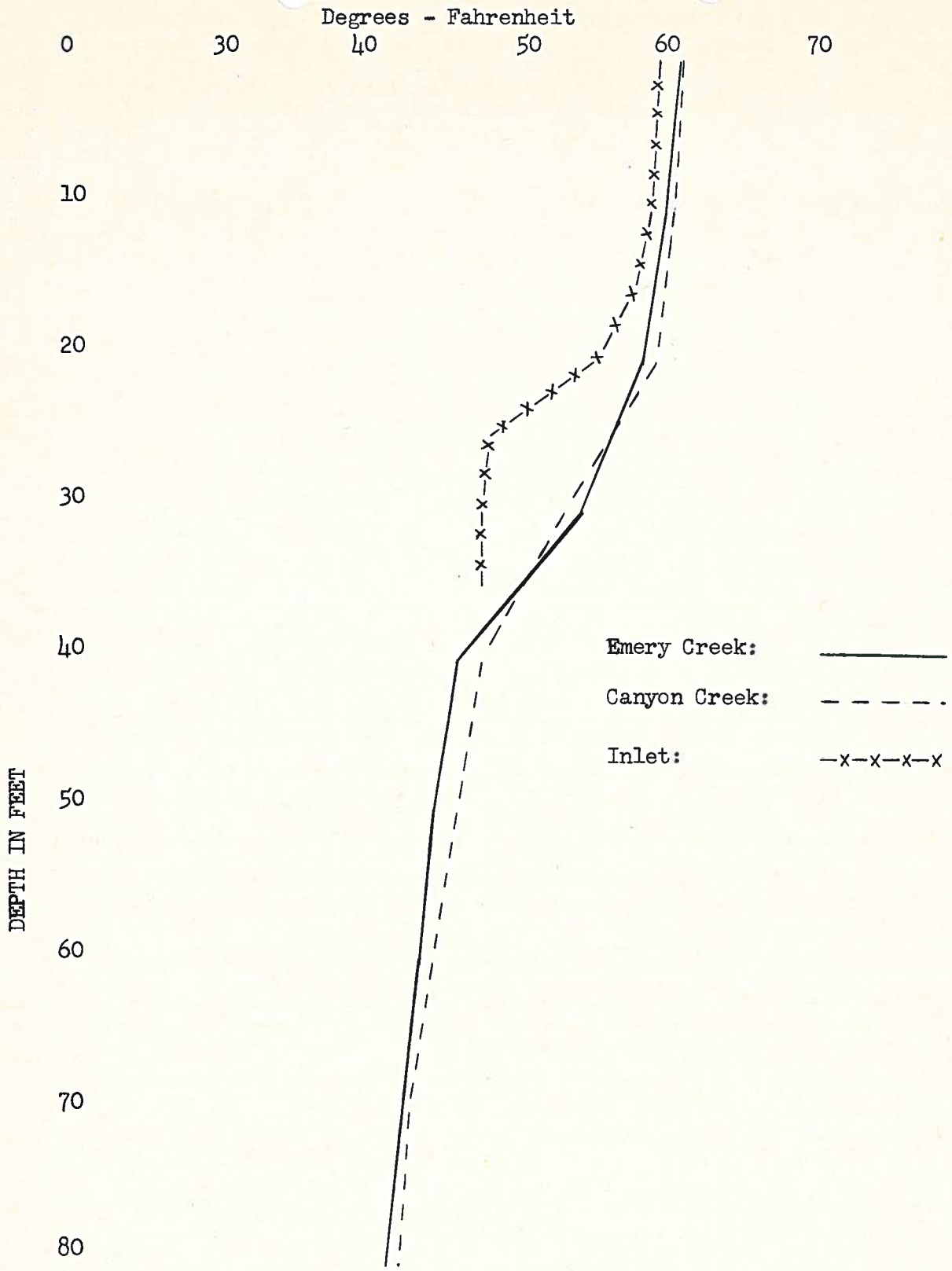

Figure 2. Temperature data from Hungry Horse Reservoir, 1958.