MONTANA FISH AND GAME DEPARTMENT

Preliminary Report on Fish Sampling in the Kootenai River below Libby Dam

September 14, 1972

By

Joe E. Huston

Fish population sampling has been conducted in the Jennings section of the Kootenai River downstream from Libby Dam in 1969, 1970, 1971, and 1972. Work done in 1969, 1970 and 1971 was financed by Dingell-Johnson funds. The sampling done in 1969 and 1970 has been reported in Montana Fish and Game Department Federal Aid Job Progress Reports F-34-R-4, Job IV-a and F-34-R-5, Job IV-a. This report is prompted by the recent gas supersaturation problem in the Kootenai and the report's purpose is to make the 1971 fish population estimates available ahead of their regular schedule. Also included are preliminary, rough estimates from the recently completed 1972 shocking and some catch-per-unit-of-effort data. The latter are included to allow at least a rough comparison of three rather than two years data.

The Jennings section of the Kootenai River is that section of the river from one-quarter mile below Alexander Creek downstream to about 200 yards above the first Jennings rapids. It is approximately 10,000 feet long and Dunn Creek and Fisher River enter the Kootenai within the section.

Sampling done in 1969 was primarily for development of gear and techniques for future work and was conducted on only a small portion of the Jennings section. The 1970 sampling was abbreviated by a boating accident and only that part of the river downstream from Dunn Creek to immediately below Fisher River was sampled. The entire sample section was worked in both 1971 and 1972.

Improvements in electrofishing equipment were made following the 1970 sampling and have resulted in better catch efficiencies. Electrode design was changed so that narcotized fish would remain in the electrical field longer and thus allow netters a better chance to capture them. Netting efficiency was estimated to be about 5 percent in 1970 and was increased to about 15 percent in 1971. A further increase in netting efficiency to 20 percent in 1972 was not related to gear improvement but to the fact that there were less fish narcotized and held in the electrical field. Thus individual fish had a better chance of being caught.

A comparison of catch-per-unit-effort for the years of 1970, 1971, and 1972 is presented in Table 1. The number of fish caught per hour of effort must be related to that year's netting efficiency to derive valid statistics. Data presented in Table 1 and all other tables pertain only to the major species found in the Jennings section. Species included are mountain whitefish (Prosopium williamsoni), largescale suckers (Catostomus macrocheilus), finescale suckers (Catostomus catostomus), Dolly Varden (Salvelinus malma), rainbow trout (Salmo gairdneri), cutthroat trout (Salmo clarki), and brook trout (Salvelinus fontinalis). Brook trout were found in the Jennings section only during the 1972 sampling. Several other species of fish are found in the Jennings section and are listed in the two Federal Aid reports. Catch data in this report are for fish five inches total length or longer. Fish smaller than five inches are difficult to capture

and any effort spent attempting to capture them would have greatly reduced our efficiency in netting the larger fish.

An hour of catch effort is defined as one hour of boat operation. All sampling was conducted from a boat with a crew of three to five people. Each year's sampling was conducted within a two-week period during the full-moon portion of late August or early September.

Table 1. Capture efficiency and catch-per-unit-effort, Kootenai River, Jennings section, 1970, 1971, and 1972

Year	Hours of Effort	Netting Efficiency	Catch Per Hour of Effort			
			Suckers	Mountain Whitefish	Trout	Total
1970	25.0	5%	50.8	45.8	1.6	98.2
1971	34.0	15%	130.0	100.5	1.4	231.9
1972	50.5	20%	74.0	9.4	0.3	83.7

Data collected in 1970 and 1971 may be termed pre-impoundment, pre-nitrogen supersaturation data. The 1972 data were collected after several months of flow regulation and nitrogen supersaturation. In general the 1970 and 1971 data indicate that the population composition was about 50 percent suckers and 50 percent whitefish. The 1972 data indicate the population had shifted to 90 percent suckers and 10 percent whitefish.

A comparison of whitefish catch rates, realizing changes in netting efficiencies, would indicate a very dramatic reduction of this species in 1972. The catch rate for suckers in 1972 also indicate a reduction from 1971 and 1970 but not of the magnitude for whitefish. Although trout cannot be considered major species number-wise, they are a major species of human importance. The catch data seem to indicate a marked reduction in 1972.

Fishery data collected in 1971 were tabulated and analyzed by computer to obtain a statistically sound population estimate. This estimate is given in Table 2 for whitefish and suckers. Data collected on the trout population were too few to warrant computer analysis so the estimate given was calculated "by hand" using the Peterson Index Method and data were not segregated by size groups. No confidence limits were computed.

Table 2. Estimated number of suckers, mountain whitefish and trout in Jennings section of Kootenai River, 1971.

Species	Point Estimate	Confidence Limits (95% level)
Suckers	95,475	50.5%
Mountain Whitefish	38,187	17.9%
Trout	284	

These data indicate that suckers are the predominate fish found in the Jennings section. The whitefish estimate is more precise than the sucker estimate because we had a much higher percentage of whitefish recaptures.

Data collected from the 1972 sampling will be computer analyzed. For comparison purposes with 1971 results, 1972 estimates using field data, not broken into size groups, are presented in Table 3. It is cautioned that these are preliminary and will certainly change somewhat, maybe even greatly, when done by size groups on the computer. Also the estimate of whitefish may be too large due to heavy mortality of marked fish following their release back into the section. Mortality of whitefish from time of capture to time of release (usually about one hour) averaged 20 percent. Mortality of whitefish held overnight in live cages averaged about 90 percent even though any whitefish kept overnight were held at the mouth of Fisher River in non-supersaturated water.

Table 3. Peterson Index estimate of suckers, mountain whitefish and trout, Jennings section of Kootenai River, 1972.

Species	Point Estimate
Mountain Whitefish	3,000
Suckers	65,000
Trout	50

A comparison of the data in Tables 2 and 3 shows general agreement with data presented in Table 1. A marked reduction in numbers of trout and mountain whitefish and a lesser reduction in numbers of suckers is indicated following the increase in gas saturation levels coincident with the closing of Libby Dam.

The data presented above also indicate that whitefish and trout are quite sensitive to high nitrogen levels and that suckers are more resistant. About 1,000 suckers, trout and whitefish were examined for signs of gas bubble disease. Symptoms were bubbles appearing under the skin or in fins or the typical "popeye" appearance. Severe symptoms were classed as eroded fins, hemorrhaging tissues, ulcers, and secondary infections. Almost all of the fish examined had symptoms and many had severe symptoms. Many had missing eyes, missing fins, and numerous deep ulcerated sores, usually in the anterior region. Also the body below the dorsal line was frequently a continuous gas blister. We would expect sucker mortalities to increase greatly with continued exposure to gas supersaturation.

Fourteen trout were caught during the 1972 sampling. Two of these fish were brook trout and are the first recorded from the Kootenai River since sampling started in 1969. These fish had no symptoms of bubble disease,indicating they had not spent much time in the Jennings section. It is likely they had moved into the Kootenai River from the Fisher River drainage. Seven of the fourteen trout were mature Dolly Varden and these fish showed none to very mild symptoms of bubble disease; also indicating they had not been in the Jennings section long. Since these fish were mature and of spawning size they probably had moved into the Jennings section from the Kootenai River downstream.