MONTANA DEPARTMENT OF FISH AND GAME

FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana Title: Inventory of the Waters of the

Project No.: F-9-R-21 Project Area.

Job No.: I-C

Period Covered: July 1, 1972 to June 30, 1973

ABSTRACT

A summary of Armstrong Creek population data is presented. Brown trout (Salmo trutta) and rainbow trout (Salmo gairdner) made up 80% and 20% of the total trout population, respectively. In 1972 a standing crop of 716 trout per acre weighed 338 pounds per acre.

Brief progress reports are included for projects on Hyalite Reservoir, Shields River, Sixteen Mile Creek and the Yellowstone River.

OBJECTIVES

The purpose of this job is to add to the knowledge of the physical, chemical and biological characteristics of the fishing waters in the project area.

PROCEDURES

Fish populations were sampled using 0-500 variable voltage direct current electrofishing equipment. Electrofishing was conducted from a fiberglas boat with the negative electrode permanently attached to the bottom. The sampling procedures and data analysis were those described by Vincent (1971).

Captured fish were anesthetized, measured, weighed and marked with a partial fin clip or Floy T tag; scale samples were collected, and the fish were released near the capture site.

Armstrong Spring Creek Fish Population Study

Armstrong Creek is a small spring-fed tributary to the Yellowstone River. It is nationally known for its clear, smooth water and its challenge to fly fishermen. A population study was begun when Trout Unlimited obtained a lease of the fishing rights on the stream. Population estimates were made in

the summer of 1970, spring and fall, 1971, and spring, 1972, to determine standing crop and mortality rates of adult fish. A voluntary creel census was conducted during the summer of 1971. A total of 317 fishermen filled out cards indicating that 2,049 trout had been caught in 1,232.2 man-hours of fishing. Sixty-two brown trout and 55 rainbow trout were reportedly creeled, the others were released (Workman, 1972).

Trout estimates were computed for one section of stream 2,100 feet long with an average width of 63 feet (Elser and Marcoux, 1971). Rainbow trout made up approximately 20% and brown trout 80% of the total trout population. Table 1 is a summary of the trout population data.

Mortality rates indicate a consistently higher turnover rate among adult brown trout than rainbow. The rainbow trout seem to undergo higher mortality during the winter than during the summer. The high trout density probably plays an important role in causing high mortality rates, especially among brown trout. High population density may also have contributed to low condition factors of brown trout as compared to the rainbow's condition factor (Figure 1). A downward trend in fish condition is also indicated by the average condition factors in Figure 1. The section of Armstrong which was sampled has a total of 3.04 surface acres. In 1972 trout numbers totaled 716 per acre and weighed 338 pounds per acre. All population estimates made during the Armstrong study were included in Table 1 to provide a more complete understanding of the population data.

Hyalite Reservoir Fisheries Study

Hyalite Reservoir is located approximately 15 miles south of Bozeman, Montana, in the Hyalite Creek drainage. In the spring of 1972, a study of the Hyalite fishery was initiated. The objectives were to determine what species are present, the amount of fisherman use it receives and to develop a management plan. The present management plan calls for annual plants of fingerling Yellowstone cutthroat trout.

During a three-day netting period in June, 94 fish were handled. The percent species composition of the sample was 70.2% (66) cutthroat trout, 18.1% (17) Arctic grayling, 10.6% (10) brook trout, and 1.1% (1) rainbow trout. Plastic numbered T tags were placed in 60 cutthroat trout and 17 Arctic grayling and they were released back into the reservoir.

This will be a continuing study which will include creel census hatchery fish fin-clipping, and netting. More comprehensive analyses of the data will be submitted in subsequent years.

Shields River Fisheries Study

Fish population estimates on the Shields River are being conducted every other year on three sections. Estimates include trout and mountain whitefish. The purpose is to monitor game fish populations. In a previous report, Elser, 1971, found that land use practices along the river could be adversely effecting the fish populations. A more complete report will be written at a later date.

FIGURE 1. Average condition factors for brown and rainbow trout from Armstrong Creek during the 1970, 1971 and 1972 sampling periods.

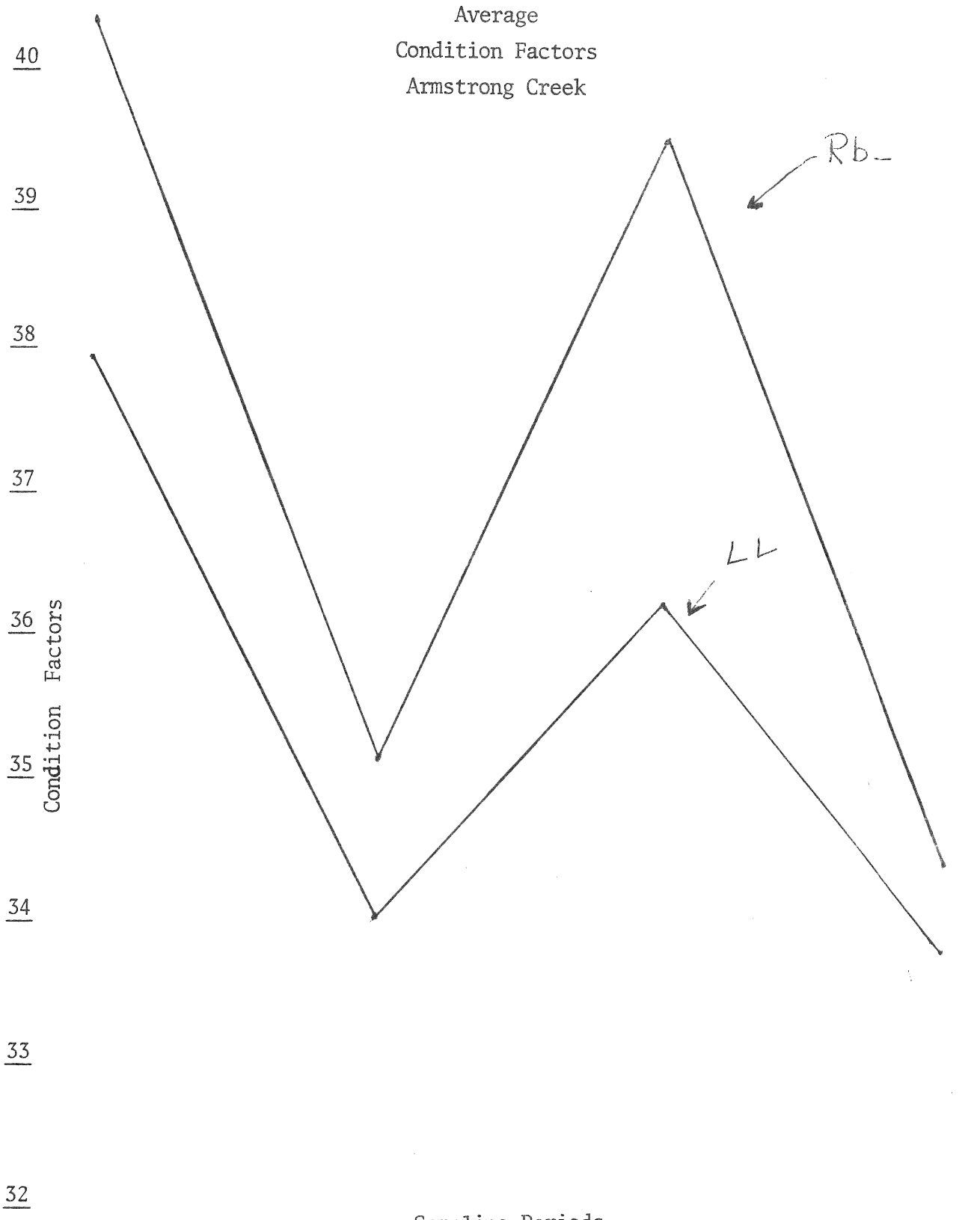

TABLE 1. Armstrong Creek rainbow and brown trout population estimates and mortality rates. Weight in parentheses.

RAINBOW TROUT

Age	Summer 1970	Percent Mortality	Spring 1971	Percent Mortality	Fall 1971	Percent Mortality	Spring 1972
2	160 (76)		409 (235)	37.9%	254 (222)		247 (136)
3 +	105 (139)	62.0%	101 (121)	32.6%	68 (107)	50.9%	125 (110)
4 +						85.6%	10 (14)
TOTALS	265 (215)		510 (356)	36.9%	322 (329)		382 (260)

BROWN TROUT

Age	Summer 1970	Percent Mortality	Spring 1971	Percent Mortality	Fall 1971	Percent Mortality	Spring 1972
2	849 (419)		1857 (670)	55.6%	824 (560)		1430 (519)
3	240 (242)	71.1%	245 (211)	42.9%	140 (247)	59.6%	333 (197)
4 +	48 (82)	89.6%	30 (56)	66.7%	10 (28)	79.3%	31 (51)
TOTALS	1137 (743)		2132 (937)	54.3%	974 (835)		1794 (767)

Sixteen Mile Creek Fishery Study

Four fish population study sections were established when an extensive fish kill was reported in 1969. The purpose of the population studies was to determine what mechanisms operate in the wild to reestablish fish populations where they have been nearly eliminated. The studies, thus far, have indicated that the initial boost to recovery of the rainbow trout populations has come from immigration of yearlings during winter from areas which produce a surplus of young fish over the carrying capacity of the area. Brown trout recovery has depended upon reproduction of the remaining residents and the small number of adults which immigrate. Trout populations in the poisoned reach of stream appear to be building in numbers from the head of the section to the mouth. A comprehensive report will be written at the conclusion of the study.

YELLOWSTONE RIVER

Point of Rocks Section

This is a section which has received large plants of hatchery rainbow trout over the past several years. In 1971, a study was begun to learn the status of the wild fishery, the amount of fishing pressure it was receiving and the contribution of hatchery rainbow and wild trout to the harvest. In 1973, the hatchery planting was stopped for that section of the Yellowstone River. The study will continue until it is learned what effects the hatchery planting was having on the fishery at which time a comprehensive report will be written. In addition, these data become part of a large bank of general biological information about the Yellowstone River.

Sheep Mountain Section

This section is located about 5 miles east of Livingston; data collection was begun here for survey purposes. The threat of coal-related development on the Yellowstone River has made it necessary to learn as much as possible about the entire river. These data will be presented in a later report.

LITERATURE CITED

Elser, A. and R. G. Marcoux. 1971. Inventory of the Waters of the Project Area. Job Completion Report, Federal Aid in Fish and Wildlife Restoration Acts. Montana Proj. No. F-9-R-19, Job 1-a; 39 pp.

Vincent, R. 1971. River Electrofishing and Fish Population Estimates. Prog. Fish Cult., Vol. 33(3); 163-169.

Workman, D. L. 1972. Inventory of the Waters of the Project Area. Job Completion Report, Federal Aid in Fish and Wildlife Restoration Acts. Montana Proj. No. F-9-R-20, Job 1-c; 10 pp.

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Waters Referred To:

Armstrong Spring Creek	22-0140
Hyalite Reservoir	09-8512
Shields River	22-5334
Sixteen Mile Creek	17-6736
Yellowstone River	22-7070