MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-34-R-1 Name Reservoir Investigations

Job No. 2 Title Hungry Horse Reservoir Studies

Period Covered March 1, 1967 - June 30, 1967

ABSTRACT:

The experimental fish trap located on the main stem of Hungry Horse Creek was damaged beyond use by the 1967 spring flood. Damage occurred before the westslope cutthroat trout (Salmo clarki subsp.) spawning run started. Box traps were fished in two Hungry Horse Creek tributary streams trapped in previous years. The spawning run was later in its start and finish in 1967 than any year since 1961. Time of run was from June 12th through July 2nd for 1967 versus June 1st through June 20th for 1961-66. Average total length for cutthroat trout was 14.2 inches in 1967, 14.7 inches in 1966 and 15.9 inches in 1963. Estimated size of the run was 900 fish for 1967, 1,200 each for 1966 and 1965, and 1,500 for 1963. Increased reservoir drawdown beginning in 1964-1965 winter season is thought to be the principle cause of declining size and numbers.

The later spawning period of 1967 caused by the opening of angling season to coincide with the late spawning run. Creel census information was collected to measure harvest of spawned and unspawned cutthroat trout from reservoir tributary streams. Harvest from four streams with estimated combined run of 3,000 fish was 375 of which 157 were ripe females.

All constructed fish passage facilities at barrier culverts enabled spawning cutthroat trout to move through the culverts. Above normal stream flows did cause some delay in passage and accelerated streambed erosion. Design of needed fish passage repair work was made.

Aerial and ground surveys were used to determine that Bunker Creek is an important Hungry Horse Reservoir spawning stream.

RECOMMENDATIONS:

The fish trap on the main stem of Hungry Horse Creek should be repaired. The repairs should incorporate design changes to facilitate greater stream flows. Spillway, abutment, and overflow channel capacities should be enlarged to pass 1,000 cfs of water, a 25 percent increase over the recent capacities. Streambed erosion below fish passage facilities should be controlled by

armouring stream bottoms and addition of gabion dams, where needed. Comprehensive survey of cutthroat trout and Dolly Varden spawning habitats should be started in Bunker Creek drainage. This information is needed to provide guidelines for road construction and logging proposed for this drainage.

OBJECTIVES:

This job is a continuation of State Project 2262 started in 1958. Objectives were: first, collection of fish population trend information from the reservoir and from one cutthroat trout spawning stream; second, determination of effectivenss of fish passage facilities at road culverts and need for improvements; and third, preliminary survey of Bunker Creek to determine if it is used for spawning by Hungry Horse Reservoir fish.

FINDINGS:

Reservoir Population Trends: Sampling of fish populations in Hungry Horse Reservoir was cancelled for spring 1967. Reservoir drawdown during sampling periods was much greater this year than in past years and comparisons of data for year of such great variation in drawdown might not be justified. Excessive drawdown also effectively limited boat access for anglers as well as for population sampling.

Bunker Creek Survey: Bunker Creek forms a part of the boundary of the Bob Marshall Wilderness Area and, at the present time, is without road access. U. S. Forest Service plans to build roads, primarily for logging, into this drainage within a few years. A survey of the creek is needed to give guidelines to prevent damage to the fisheries resource.

Fixed wing aircraft flights were made over the drainage to determine if it would be possible to locate barriers to upstream movement of fish and to see whether spawning redds could be enumerated from the air. Gorge Creek (Figure 1) is probably inaccessible to spawning fish from the reservoir. Several potential barriers were noted in Bunker Creek above Gorge Creek. A ground survey will be required to determine if fish can pass. It is doubtful that redds were accurately counted from the plane. Speed of the airplane (60 mph minimum) and cleanliness of gravel bars were the two characteristics thought to be the most limiting to successful aerial observation of redds. Locating redds by helicopter may be possible.

Ground survey of the lower three miles of Bunker Creek in July indicated that reservoir cutthroat trout spawn in the drainage. Several mature and immature cutthroat trout were collected and were judged to be migrants from the reservoir and not stream resident fish. Preliminary inspection of proposed road routes into Bunker Creek indicates that little damage to the fishery should occur from construction.

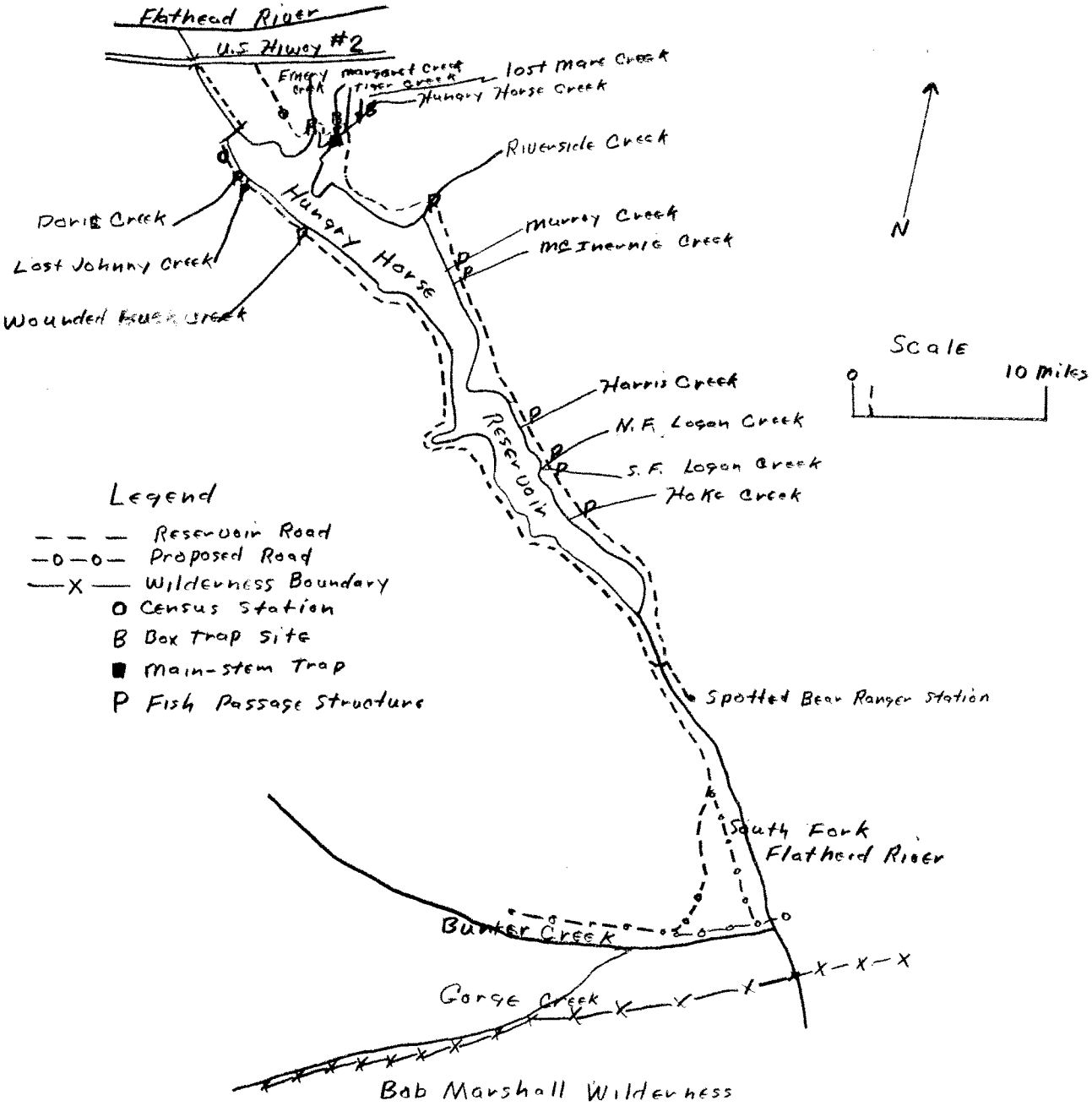

Figure 1. Hungry Horse Reservoir and some tributary streams.

Fish Passage Facilities: Fish passage structures at barrier culverts (Figure 1) built between 1960 and 1966 were inspected periodically throughout the spawning run of cutthroat trout. Ability of fish to move through the structures and culverts was determined by sampling above and below the culvert and by watching fish as they passed through. Cutthroat trout were able to pass through all the structures and culverts although above normal stream flows did cause some delay. High volume flows caused streambed erosion below fishways that would not have occurred during years of normal flow. Inspections of culvert sites were made with Forest Service personnel and design of repairs planned. Repair will consist of additional gabion step-down dams and streambed armouring at four culverts. Work will be done by Forest Service personnel and funds will be from Forest Service-Montana Fish and Game cooperative funds held over from fiscal year 1966.

Hungry Horse Creek Experimental Trap: The fish trap on the main stem of Hungry Horse Creek was damaged by flood in May 1967. The trash boom upstream from the structure failed allowing passage of numerous trees and stumps through to the velocity barrier. This caused one abutment to wash out. Box traps with poultry wire leads were installed in upper Hungry Horse Creek and its tributary Margaret Creek, to continue collection of population trend information (Figure 1). Fish entering the traps were measured, sexed, had scale samples taken, and generally released upstream. Some female fish were killed for egg counts and some were held for artificial spawning. Specific data for this year's operation and from operations in 1963-1966 will be reported in F-34-R-2 job report. A brief resume of some of this data will be given here.

Estimated number of cutthroat trout entering Hungry Horse Creek was 900 trout in 1967, 1,200 trout each year in 1965 and 1966, and 1,500 trout in 1963. Average total length of spawning fish was 14.3 inches in 1967, 14.7 inches in 1966, and 15.9 inches in 1963. Primary reason for decline in numbers and size is thought to be the increased annual drawdown of Hungry Horse Reservoir following 1964. Maximum drawdown prior to 1964 was generally less than 60 feet but since has averaged about 100 feet each year.

Cutthroat trout are apparently triggered to enter Hungry Horse Creek during normal years by stream temperatures warming to a daily minimum of 40° F. Average run started June 1st and ended June 20th for 1963-1966. False starts have been recorded during these years when water temperatures reached 40° F. for only a day or two, then became colder. Due to below average air temperatures and above normal snow-pack stream warming to 40° F. minimum daily temperature was delayed until June 22, 1967 although the minimum daily temperature was reached for one day, June 5th. A false start was recorded June 5th, but fish stopped entering Hungry Horse Creek the next day. Actual start of the run was recorded June 12th, but minimum daily stream temperatures were only 39° F. Minimum daily temperatures between June 12th and 22nd varied from 38°F. to 39° F. Fish stopped entering the drainage July 2nd.

Fishing regulations provide later season opening on Hungry Horse Reservoir tributaries than most other area streams which normally permit the cutthroat trout to have 10-20 days spawning time before angling is allowed. In 1967 the opening of angling season occurred only 1-5 days after the start of the spawning run. Project personnel operated creel census stations (Figure 1) on two roads encircling the reservoir to measure angler success and determine the number of unspawned fish taken from tributary streams. Census stations were operated the opening three weekends and 4th of July.

This census showed that anglers did not endanger the spawning stock's potential. Harvest figures for the four streams considered to be most subject to excessive harvest are given in Table 1. Estimates of size of runs were derived from Hungry Horse Creek studies and from previous years' work on the other streams. Sex ratios from Hungry Horse Creek were applied to all streams.

Table 1. Estimates of size of runs and harvest of spawning cutthroat trout, Emery Creek, Hungry Horse Creek, Doris Creek, and Wounded Buck Creek, 1967

Creek	Run size	Females in run	Total harvest	Ripe female harvest
Emery	900	495	218	80
Hungry Horse	900	495	91	44
Doris	700	385	34	15
Wounded Buck	500	275	32	18

The project leader estimates that angler success was worse this year than in past years. Streams were still in flood stage and very hard to fish, road construction blocked access to many streams forcing more anglers into smaller areas. Catch per unit of effort for all streams was 0.43 fish per hour.

Only about one-half of the wild cutthroat trout eggs requested by Federal and State hatcheries were obtained. Creston Hatchery, U. S. Fish and Wildlife Service, received about 8,000 eggs and the State unit at Arlee, 4,500 eggs. Only 19 of some 60 fish held for spawn-taking could be stripped before the job was closed July 3rd.

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