

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

HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTSState of MontanaProject No. F-12-R-4Job No. IVPeriod Covered May 1, 1957 to Oct. 30, 1957Name Western Montana Fisheries StudyTitle Cost Estimate Survey for the
Rehabilitation of the Upper Clearwater
DrainageAbstract:

The Clearwater River sub-drainage, above Rainy Lake, was mapped and surveyed for a rehabilitation project. A barrier dam was designed for the outlet of Rainy Lake in order to prevent fish movement into this area. Stream flows and lengths, lake areas and volumes, and toxicant requirements are given. A procedure for the rehabilitation job is outlined. It is recommended that this sub-drainage be rehabilitated when the barrier dam is completed.

Objectives:

The objectives of this job were: to plan and make cost estimates for a fish barrier dam at the outlet of Rainy Lake; to prepare a development project for the construction of this dam; to obtain the data necessary for planning a rehabilitation project on the drainage above this barrier; and to make cost estimates of this rehabilitation project.

Techniques used:

The proposed damsite at the outlet of Rainy Lake was surveyed by the project leader, two engineers from the Soil Conservation Service and the ranger from the Seeley Lake District, Lolo National Forest, U.S.F.S. The Soil Conservation Service engineers designed the barrier, the U.S.F.S. reproduced the plans and issued a special use permit for the dam's construction. A Federal Aid in Fisheries Restoration, Development Project was prepared and submitted.

Large scale outline maps of the three lakes in this sub-drainage were pantographed from aerial photographs.

Soundings on Rainy and Summit Lakes were made with a Bendix Depth Recorder, which was installed on an outboard motor boat. Due to its inaccessibility, Clearwater Lake was sounded with a hand line, used from a raft. From the sounding data, thus collected, contour lines were drawn on the outline maps.

A polar planimeter was used to obtain the area enclosed by each contour line. The volume of water between each contour line was computed by the formula $V = (A_1 - A_2) \frac{1}{2} SD$; where V = volume, A_1 = area of one contour line, A_2 = area of next inner contour and SD = summation of the depths of the two contour intervals.

Aerial survey disclosed no other bodies of water in this sub-drainage. Lengths of stream sections, which must be rehabilitated, were measured with a map wheel, on $\frac{1}{8}$ inch to the mile U.S.F.S. maps. Volumes of these streams sections were estimated at various points along their lengths.

Rainy and Summit Lakes were divided into sections and water volumes were computed by section for better boat distribution of the toxicant. Because Clearwater Lake will have to be treated by air, it was not sectioned.

Pro-Noxfish was chosen as the toxicant for Rainy and Clearwater Lakes and for the stream sections. This is the most economical of the rotenone emulsives and will break down rapidly enough to allow re-stocking the year following rehabilitation. It is planned to use Pro-Noxfish, Formula 56, for the lake water below 20 feet, in order to obtain better distribution of the toxicant in deep water.

Summit Lake is quite turbid, contains a heavy growth of submerged aquatics and is considered to be too shallow (Maximum depth 11 feet) to maintain a good trout fishery. Therefore, Fish-tox was selected for this body of water, in order to better insure a complete kill of rough species.

Areas immediately surrounding the three lakes were carefully examined, by ground survey, in order to locate any backwaters or pools, which were not apparent from the lake or from the air.

Toxicant requirements were computed at one part per million, toxicant to water. This was done by volume for Pro-Noxfish and by weight for Fish-tox.

Estimates were made of the labor, equipment, materials and supplies, and rentals necessary to rehabilitate this sub-drainage. A development project for this rehabilitation job has been prepared.

Findings:

An outline map of this area is shown on Figure 1.

The development project for the construction of the barrier dam was approved and the contract for construction was awarded to Gray Lumber Company, Seeley Lake, Montana. Construction of this barrier was started in November 1957.

Rainy and Clearwater Lakes, and the Clearwater River, were found to have no backwater areas, which would require special toxicant treatment. Summit Lake and Sucker Creek were found to contain numerous slow-flowing pools, backwaters and boggy areas. Beaver activity had deepened many of these and spread their water over larger areas. Most of this area is under a dense growth of willow and alder and had to be examined by careful ground survey. Because of its dense cover, it will have to be treated by ground crews equipped with back pumps.

Sucker Creek and the North Fork of the Clearwater River are included in the area to be treated, because they are below lakes where rough fish are known to exist. The South Fork of the Clearwater River was checked with Fish-tox about 500 yards upstream from its junction with the North Fork. About 15 pounds of Fish-tox removed the entire population of the stream, from its point of application to the river's mouth at Rainy Lake. All fish observed in this section were retrieved. These were: 274 mountain whitefish, 146 cutthroat trout, 65 dolly varden trout and three suckers. The suckers were taken within 100 yards of Rainy Lake; the other three species were taken throughout the entire stream section.

Bertha and Allen Creeks were found to go dry in late summer.

All the drainages flowing into Clearwater Lake were found to be dry, except for the spring. This had water for a distance of about 100 feet from the lake. It will have to be treated from the ground while the lake is being sprayed from the air.

The stream sections which must be included in the rehabilitation project are given in Table 1.

Table No. 1

<u>STREAM SECTION</u>	<u>LENGTH</u>	<u>MAXIMUM AUTUMN FLOW</u>
Sucker Creek	3 miles	Less than 1 cfs
N. Fork Clearwater River	3 miles	Less than 5 cfs
Clearwater River (from its forks to Rainy Lake)	1 mile	Less than 20 cfs
Spring above Clearwater Lake	100 feet	Less than 1 cfs

The following amounts of toxicant have been allowed for these areas: two hundred pounds of Fish-tox for the swamp area around Summit Lake, for Sucker Creek, and for the Clearwater Lake spring area; eighty pounds of Fish-tox for the North Fork of the Clearwater River; one 25 gallon drum of Pro-Noxfish for the one mile section of the Clearwater River.

Table 2 shows the areas and volumes of the lakes, the amounts and costs of the toxicants required for the various sections of the drainages. It is estimated that the proper application of this toxicant will require 70 man-days, plus airplane hire for Clearwater Lake.

Recommendations:

The Clearwater sub-drainage, above the outlet to Rainy Lake, should be rehabilitated in the fall of 1958.

The following recommendations are made for the time sequence of the various phases of this rehabilitation project.

1. Apply Fish-tox to Summit Lake.
2. Treat Summit Lake bog areas, Sucker Creek and Sucker Creek backwaters with back pumps.
3. Buoy off 20 foot contour line in Clearwater Lake and mark off Rainy Lake Sections.
4. Apply Pro-Noxfish to Clearwater Lake by airplane and treat spring flow by ground crew.
5. Apply Fish-tox to the North Fork of the Clearwater River.
6. Install dripper barrel in the Clearwater River just above junction of the forks. Keep in operation until Rainy Lake is treated.
7. Apply Pro-Noxfish to Rainy Lake by boat.

Table No. 2. Amount and cost of toxicants for the various portions of the Upper Clearwater Drainage.

LAKE (or section)	AREA	ACRE FEET	GALLONS (or pounds)	COST
Clearwater	127 acres	1774 (above 20' contour) 1017 (below 20' contour)	660 gal. Pro-Noxfish 385 gal. Pro-Noxfish "56"	\$2692.80 1651.50
Rainy Lake	69 acres	1054 (above 20' contour) 134 (below 20' contour)	385 gal. Pro-Noxfish 55 gal. Pro-Noxfish "56"	1570.80 235.95
Summit Lake	26 acres	136	400 lbs. Fish-tox	148.00
Clearwater River			25 gal. Pro-Noxfish	102.00
North Fork Clearwater River			80 lbs. Fish-tox	29.60
Sucker Creek & Summit Lake backwaters			200 lbs. Fish-tox	74.00

Rainy and Clearwater Lakes should be planted in the spring of 1959 with one pound of rainbow trout (2 or 3 inch size) per surface acre. The Clearwater River should be replanted with the same amount of similar sized fish per mile of stream. These plants should continue for three years. Summit Lake should be checked for toxicity each year following treatment, and should be planted when it is no longer toxic. .

Prepared by Arthur N. Whitney

Date December 9, 1957

Approved by George D. Halton

Date December 18, 1957

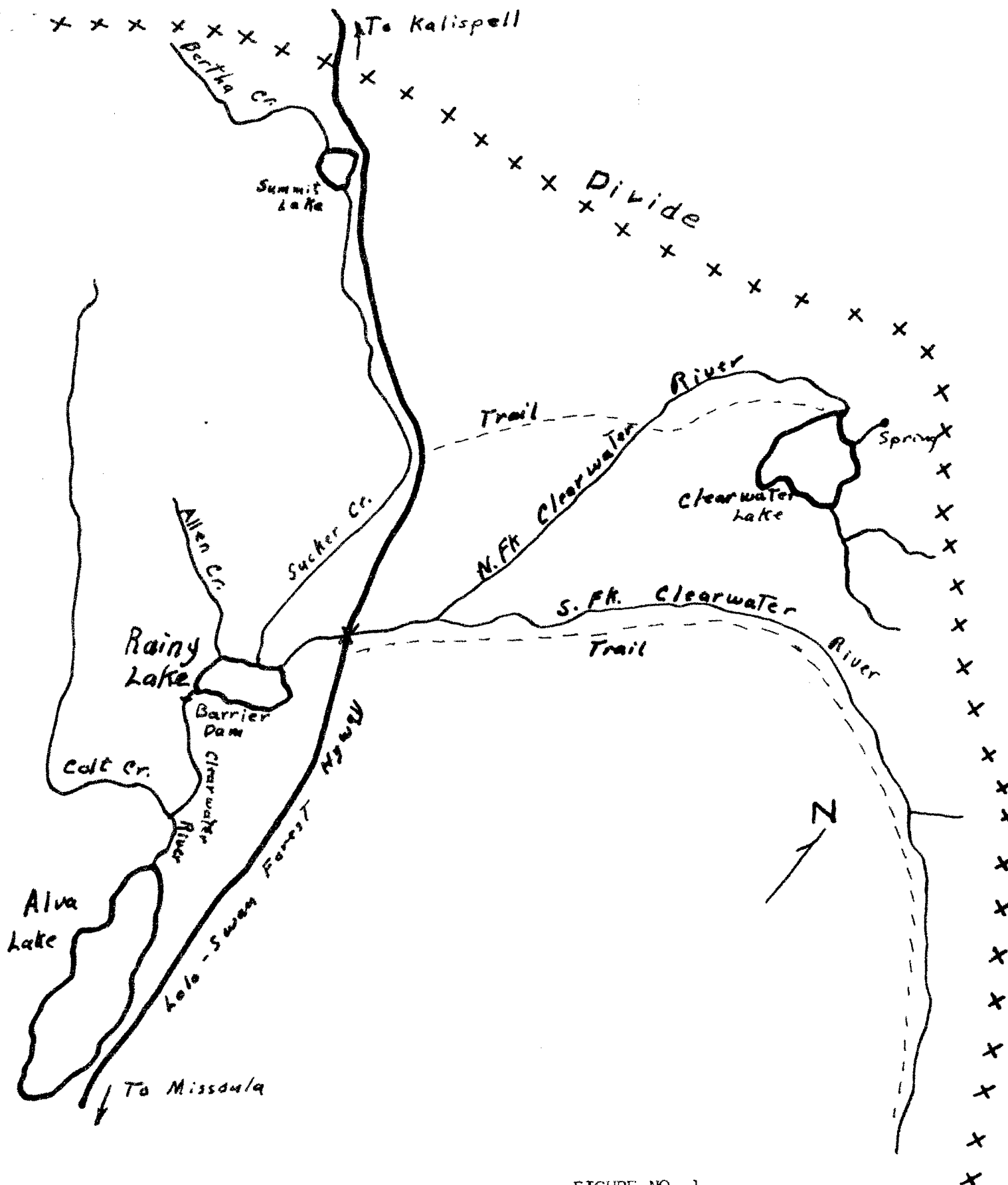


FIGURE NO. 1
UPPER CLEARWATER DRAINAGE