

JOB COMPLETION REPORT  
DEVELOPMENTAL PROJECT

STATE OF Montana  
PROJECT NO. F-24-D-13 NAME Statewide Lake and Stream Rehabilitation  
JOB NO. 1 TITLE Upper Clearwater Drainage  
PERIOD COVERED September 1, 1958 through December 1, 1958

## ABSTRACT:

The Upper Clearwater Drainage was treated with fish toxicants between September 10 and November 11, 1958. Fish-tox, Pro-noxfish, Chem Fish Synergized Special and Toxaphene were used in the various waters of this sub-drainage. Kinds and amounts of toxicants used and methods and schedules of application are described. The fish species present in the treated waters of the drainage are listed. Recommendations are made for re-stocking the area with game fish, for evaluating the success of this rehabilitation project, and for future rehabilitation work in the remainder of the Clearwater drainage.

TECHNIQUES USED: Treatment of the upper Clearwater drainage with toxicants began on September 10 and ended on November 11, 1958. The main portion of the job was accomplished between September 10 and 13. The locations of the waters in this drainage section are shown on Figure 1.

Clearwater Lake was treated with 7,720 pounds of Fish-tox on September 10, 1958. Because this lake is inaccessible by road, the toxicant was applied by aircraft. On September 9, two crew members packed into Clearwater Lake, where they observed the aerial application on the 10th and treated the North Fork of the Clearwater River at two points with two 12-pound applications of Fish-tox. (Stations 1 and 3, Figure 1.)

Through cooperation with the U. S. Forest Service, Fish-tox powder was mixed with water to the consistency of thin paste and pumped aboard the spray planes at their smokejumper's base, west of Missoula. The Forest Service loaned the use of their borate mixer, three centrifugal pumps and three men for this operation on September 10th.

Spray planes converted from Navy torpedo bombers (TBM's), which were normally used to apply borate to forest fires, were employed to transport and apply the toxicant. Each of these aircraft was equipped with a three-compartment, 600 gallon tank. Each of the three compartments had a separate dump chute and the pilot, by pulling a series of levers, could dump each tank separately, or all three tanks at once. Prior to this rehabilitation job, an experimental water dump was made at the airport, west of Missoula. When all three tanks were dumped at once, with the aircraft flying 190 m.p.h. about 300 feet above the ground, coverage of approximately 2000 feet by 200 feet was obtained. Thus, by dumping his tanks in sequence, rather than simultaneously, the pilot could extend his swath the maximum distance across the lake (approximately 3,500 feet).

Eight loads of toxicant were applied to Clearwater Lake between 0620 and 1235 hours on September 10th. The application pattern is shown on Figure 2.

The treatment of Summit Lake and its backwater areas began on September 11th. Four hundred and sixty pounds of Fish-tox were applied to the surface of the lake and 640 pounds were used for the treatment of the backwater areas, both above and below the lake. The lake was treated by towing sacks of toxicant behind an outboard powered boat. Toxicant was applied to the backwater areas by sacks and back pumps. Summit Lake and its shoreline were completely treated on September 11th. The backwater areas were completed to the inlet of Rainy Lake on September 12th.

On September 12th, 425 gallons of emulsifiable liquid rotenone were applied to Rainy Lake. One 55 gallon drum of Pro-noxfish regular, plus 40 gallons of Chem Fish Synergized Special were sprayed on the shoreline and weedbed areas through a high-pressure, Pacific Marine pump. Six 55 gallon drums of Chem Fish Synergized Special were applied to the lake's surface. This application was made by attaching a length of one-quarter inch pipe to the small bung of the toxicant barrel and trailing the terminal end of the pipe in the prop wash of the outboard motor. The barrel was mounted at sufficient elevation in the boat to permit gravity flow of the toxicant through the outlet pipe. A valve installed in this pipe permitted regulation of the amount of toxicant flow. Because no outboard foot valve and hose arrangement was used to pre-mix the toxicant and water by this method, the distribution boat could travel at full throttle, and cover its area in a series of "criss-cross" patterns. Although the "track" of toxicant immediately behind the boat was somewhat narrower by this method than it was behind a 30 foot boom spray, better apparent distribution was obtained by the gravity flow method. This was due to the fact that the higher speed allowed by the absence of an outboard intake pipe permitted more thorough coverage of an area in a given length of time. This higher speed also allowed the boat operator to locate his previous "track" more readily, when attempting to lay down a definite pattern.

During the treatment of Rainy Lake, 20 pounds of Fish-tox were applied to the North and South Forks of the Clearwater River at stations 8 and 9, Figure 1. This toxified the stream from the junction of its forks to Rainy Lake.

On September 13th, 80 pounds of Fish-tox and two gallons of Chem Fish Synergized Special were applied to the North Fork of the Clearwater River at stations 1 through 8.

Rainy and Summit Lakes were sampled with gill nets on October 23, 1958. Two dolly varden trout were taken in Rainy Lake and one coarse-scaled sucker was taken in Summit Lake.

On November 11th, seven gallons of 60% toxaphene were applied to the surface of Summit Lake. The toxicant was mixed 1:30 with water before it was applied. Distribution was made with the use of one boat equipped with the gravity flow toxicant dispenser, described above.

A list of the waters treated, lake areas and volumes, stream lengths and estimated flows, and amounts of toxicant applied are shown in Table 1.

#### FINDINGS:

Fish species known to be present in the various waters of this drainage section are shown in Table 2.

Shortly after the first load of toxicant had been distributed on Clearwater Lake the ground crew observed fish in distress. After the last load

had been applied, distressed and moribund fish could be seen over the entire surface of the lake. These were primarily mountain whitefish and longnose suckers.

On September 21, 1958 partially decomposed fish were observed along the shores of Clearwater Lake, and no fish activity was noted. This lake has not been test netted since its treatment.

Yellow perch were noted in distress within one-half hour after the first sacks of toxicant were applied to Summit Lake. This species, long-nose suckers and reidside shiners could be seen distressed and moribund throughout the entire treatment of the lake. These same species were also killed, along with a surprisingly large number of small cutthroat trout, in some of the very shallow, weedy backwater areas.

The one longnose sucker taken from Summit Lake in a gill net on October 23rd indicated lack of toxicity in the lake itself. Even if this fish had been missed in some backwater area, it should have died upon entering the lake, due to the normally long-lasting toxicity of Fish-tox. (The manufacturers specifications indicated that the original 1 p.p.m. Fish-tox application should have resulted in a concentration of 0.07 p.p.m. of toxaphene in the lake). On the assumption that the dense beds of Myriophyllum, which cover the bottom of Summit Lake, might have removed some of the toxaphene from the first application, the lake was re-treated; this time with 0.1 p.p.m. toxaphene by weight. No fish were observed during this second treatment on November 11th.

All of the species of fish listed for Rainy Lake, on Table 2, were observed during and after the treatment of this body of water on September 12th. On September 14th, some fish were still appearing in distress; on September 16th, no further fish activity could be noted.

On September 16th, several schools of small perch, not obviously in any distress, were observed in the shallow, upper end of Alva Lake, which is on the Clearwater River about one mile downstream from Rainy Lake. No dead fish could be found in this area, except in the immediate vicinity of the river's mouth, where two longnose suckers had lodged on a sandbar. Thus, it is believed that toxic water from the rehabilitated area had no noticeable effect on the fish populations in the lakes downstream.

When the main Clearwater River, from its forks to Rainy Lake, was toxified on September 12th, it was noted that live fish were present in the North Fork at station No. 8. On September 13th, the North Fork was checked for its entire length and found to have sunk underground at several places in the vicinity of station No. 2. The stream was re-treated with toxicant at stations 1 through 8 on the same day. Only cutthroat trout were observed to have been killed by this treatment.

The two dolly varden trout taken by gill nets in Rainy Lake on October 23rd were to have been expected. This species, cutthroat trout and mountain whitefish were left in the untreated portion of the South Fork of the Clearwater River. Their presence in the lake at that time was a good indication that toxicity from the straight rotenone toxicants used in Rainy Lake had already dissipated.

Table 1. Amount and kind of toxicants applied to the various waters in the upper Clearwater drainage.

Body of Water	Acres or miles	Acre feet or c.f.s.	Toxicant applied
Clearwater Lake	127 acres	2,792 a.f.	7,720 lbs. Fish-tox
Summit Lake	27 acres	136 a.f.	440 lbs. Fish-tox and 7 gal. toxaphene
Rainy Lake	70 acres	1,188 a.f.	425 gal. emuls. rotenone
Bertha Cr., Sucker Cr. & backwater areas	4 miles	3 a.f.(est.)	640 lbs. Fish-tox
Main Clearwater River,	1 mile	20 c.f.s.	100 lbs. Fish-tox and
N.F. Clearwater River	4 miles	5 c.f.s.	2 gal. emuls. rotenone

Table 2. Fish species known to be present in waters rehabilitated in the Upper Clearwater project. Relative abundance of species in descending order, for each body of water.

Body of Water	Fish Species
Clearwater Lake	Longnose sucker Mountain whitefish Cutthroat trout
Summit Lake	Yellow perch Longnose sucker Redside shiner
Bertha Cr., Sucker Cr. and backwater areas	Yellow perch Longnose sucker Redside shiner Cutthroat trout
Rainy Lake	Mountain whitefish Longnose sucker Largescale sucker Yellow perch Peamouth chub Redside shiner Northern squawfish Cutthroat trout Dolly varden trout
Clearwater River and N. F. Clearwater River	Cutthroat trout Mountain whitefish Dolly varden trout Longnose sucker

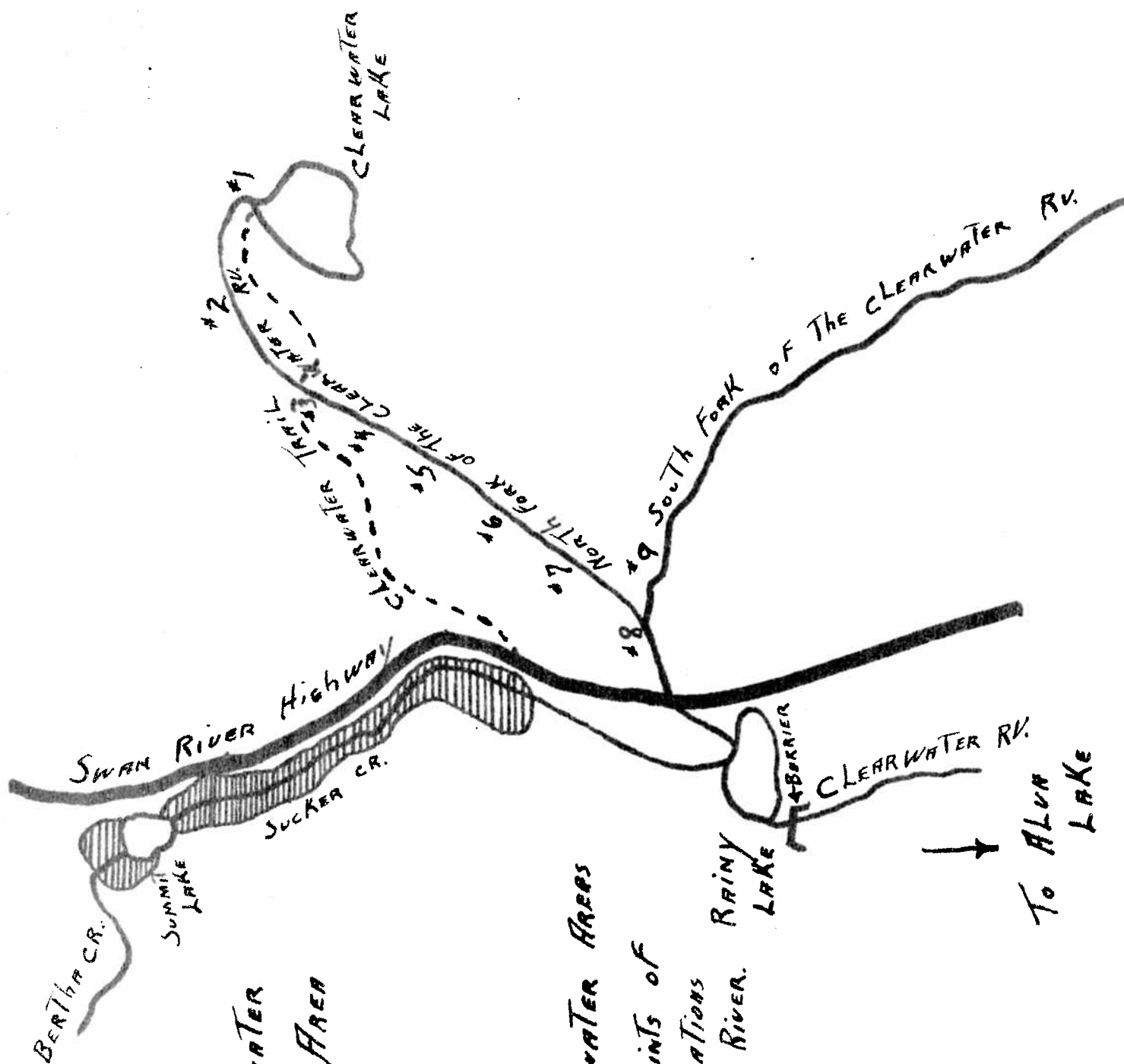


FIGURE No. 1  
UPPER CLEARWATER  
REHABILITATION AREA

Key



BACKWATER AREAS

#1, #2, etc. POINTS OF  
TOXICANT APPLICATIONS  
ON CLEARWATER RIVER.

1 MILE



Following is a list of common and scientific names of fishes mentioned in this report:

Cutthroat trout, (Salmo clarki)  
Dolly varden trout, (Salvelinus alpinus malma)  
Mountain whitefish, (Prosopium williamsoni)  
Longnose sucker, (Catostomus catostomus subsp.)  
Largescale sucker, (Catostomus macrocheilus)  
Peamouth chub, (Mylocheilus caurinum)  
Redside shiner, (Gila balteatus)  
Northern squawfish, (Ptychocheilus oregonense)  
Yellow perch, (Perca flavescens)

#### RECOMMENDATIONS:

1. From our previous experience with lakes treated with Fish-tox and/or toxaphene, Clearwater and Summit Lakes are expected to remain toxic for at least two seasons. It is recommended that they be checked for toxicity in the spring or summer of 1960.
2. Although only a small portion of the flow through Rainy Lake comes from Clearwater and Summit Lakes, Rainy should be checked for toxicity, using live cages of trout, following the major portion of the spring runoff in 1959.
3. If Rainy Lake is not toxic, it should be planted, in 1959, with the west-slope variety of cutthroat trout. Size and number should be determined from Montana's stocking tables.
4. When the waters of Summit and Clearwater Lakes have lost their toxicity, these lakes should also be planted as in No. 3 above.
5. Continued stocking of the drainage with trout should be based upon the recommendations of the fishery personnel responsible for the management of the drainage.
6. Creel census coverage of sufficient intensity to give a good estimate of catch per hour of game fish, should be given to Rainy, Alva and Inez Lakes in 1960, 1961 and 1962.
7. Rehabilitation of any large, major portion of the Clearwater drainage should depend upon a careful evaluation of the cost of whatever improvement in fishing is produced in Rainy Lake.
8. An engineering survey should be made of the entire Clearwater drainage to determine other suitable locations for barrier dams.
9. If a suitable barrier site can be located to separate another small, easily workable portion of this drainage, then that portion should be blocked off and rehabilitated. This should not depend upon the evaluation recommended in Nos. 6 and 7 above, but should be used, along with Rainy Lake, for that evaluation.

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DATE March 31, 1959