

# **HABITAT IMPROVEMENT PROJECT**

## **Fishery Division**



**OREGON STATE GAME COMMISSION**  
1634 S. W. Alder Portland 5, Oregon

**NUMBER 4**

STATE OF OREGON  
OREGON STATE GAME COMMISSION  
FISHERY DIVISION

C. J. Campbell, Chief of Operations

FEDERAL AID TO FISH RESTORATION  
COMPLETION REPORT

State-wide Fishery Rehabilitation  
Unity Reservoir and Tributaries Segment  
F-20-D-19

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## COMPLETION REPORT

### State-wide Fishery Rehabilitation Unity Reservoir and Tributaries Segment

Period Covered: September 25, 1962 to January 1, 1964

#### ABSTRACT

Unity Reservoir in Baker County, Oregon, was chemically treated with liquid rotenone on October 17, 1962. Approximately 136 miles of streams and diversion ditches and seven small ponds, tributary to the reservoir, were treated with liquid rotenone prior to work on the reservoir. The reservoir at time of treatment contained 1,700 acre-feet of water and covered 320 acres.

A total of 700 gallons of liquid synergized rotenone was used on the tributary system and 850 gallons in the impoundment. Liquid rotenone was applied to the reservoir by three boats using the boat-bailer venturi device. Shallow mud flats were covered with rotenone by airplane. The kill in the reservoir was slow because of low water temperatures. Rotenone appeared to dissipate in Burnt River at a distance of 15 to 25 miles below Unity Dam. No toxic water entered Brownlee Reservoir.

Chemical tests of water were made to determine rotenone content. Concentrations of 0.8 p.p.m. rotenone were detected in the water seven days after application to the reservoir. Chemical tests for rotenone made 41 days after treatment were negative.

The reservoir was restocked with rainbow trout. The tributary system was restocked with rainbow, cutthroat and brook trout. Some redbside shiners and bridgelip suckers survived the rotenone treatment in problem areas of the tributary system.

A successful sport fishery developed in the fall of 1963 for 6 to 10-inch rainbow trout.

#### Location and Past History

Unity Reservoir is located in Township 12 South, Range 37 East, Sections 20, 21, 28, and 29 in Baker County, Oregon. The community of Unity is five miles south of the reservoir. The dam was constructed by the U. S. Bureau of Reclamation and is now operated by an irrigation district.

At capacity the reservoir covers 2,500 surface acres. The dam is on Burnt River below the junction of the South, Middle, and North Forks. Burnt River is tributary to Brownlee Reservoir on the Snake River. So called rough fish were found in all tributaries of the Burnt River. Several ponds and gold dredge areas also contained rough fish and were treated during the project.

The reservoir and tributaries were chemically treated to kill rough fish in 1949, 1951 and 1954. The treatment in 1954 provided good to excellent sport fishing for rainbow trout until 1961. Roach first appeared in the reservoir after the last treatment in 1957. The number of roach progressively increased until sampling by gill nets in 1962 revealed that the fish population was made up of approximately 80 per cent rough fish.

With the increase in rough fish, angling success and annual use by anglers decreased. Records kept at the state park on the reservoir indicated that recreational use had decreased in use days from 18,132 in 1959 to 13,900 in 1962. The reduction in number of anglers was known to be even more severe. Angler success dropped from 4.6 fish per angler in 1956 to 2.4 fish per angler



in 1962. Rate of catch from 1956 to 1962 decreased from 1.1 to 0.64 fish per hour, respectively. Growth rate of rainbow trout had not changed substantially, but percentage of survival of stocked fingerling and fry was reduced because of rough fish competition.

The reservoir was drawn down to low storage by late September 1962. The irrigation demands during 1962 were high and it provided an excellent time for chemical treatment with the least amount of water in the remaining pool.

#### Chemical Treatment of the Tributary System

The work of eliminating undesirable species from the tributary system started in the middle of September 1962, and was completed at the end of October. Approximately 136 miles of streams and diversion ditches tributary to the reservoir, including seven small ponds with a total of nine surface acres, were treated with liquid rotenone. Rotenone was applied by means of constant flow devices placed as necessary on each tributary. The stream was rechecked by spraying backwater areas with back-pack spray cans. A 250-gallon portable spray pump mounted on a 3/4-ton four-wheel drive pickup was used to advantage on intermittent sections of the streams and in small ponds. The work on the tributary system is listed by stream.

#### North Fork Burnt River

The North Fork Burnt River was treated from the mouth of MacNamee Gulch in Section 23, Township 10 South, Range 34 East, Willamette Meridian to the reservoir, a distance of approximately 38 miles. Rainbow trout and speckled dace were found in the North Fork of the Burnt River and tributaries upstream from MacNamee Gulch. No suckers and only one reidside shiner were found upstream from the mouth of Cub Creek, which is one-fourth mile downstream from MacNamee Gulch.

Squawfish were found only in the Whitney Valley on the North Fork of the Burnt River between Geiser Creek to the west and Trout Creek to the east.

Squawfish were also present in the lowermost two miles of Camp Creek in the same area.

All gold dredge ponds on the North Fork and on Camp Creek were treated and contained an assortment of rough fish. The dredge ponds on the North Fork are now being used as silt settling basins by gold miners. The silt is filling the ponds and has precluded their use for trout production.

On September 11, 1962, the North Fork of the Burnt River was flowing 2.5 cfs at the mouth of MacNamee Gulch. Water temperature was 52° F. Above the mouth of Greenhorn Creek the North Fork Burnt River was flowing 0.2 cfs.

A barrier to upstream fish was placed on the North Fork near Geiser Creek prior to treatment.

Rotenone devices were used on the North Fork Burnt River at one-mile intervals from the mouth of Geiser Creek to the mouth of the river. Because of low stream flow, rotenone traveled at a speed of one mile in a 12 to 16-hour period. Five to six rotenone devices were in operation each day on the stream. Several potholes and streamside eddys supported live fish after fish in the stream were killed. Back-pack cans were used on all thirty-eight miles of the treated stream.

The Rouse's Pond, located in Section 34, Township 10 South, Range 36 East, at the old Whitney saw mill, was treated with rotenone. The pond contained rainbow and redbreast shiners. Water supply is from springs and irrigation ditches.

A large spring seep area on the north side of the river in Section 24, Township 11 South, Range 36 East, between Sheep and Lick Creeks, was treated three times to eliminate shiners and suckers.

MacNamee Gulch, Sec. 23, T. 10S, R. 34 E. W.M.

The stream bed was dry one hundred yards above the mouth. A small seep was present at the mouth. Speckled dace fry was the only fish species found in the lower portion of the stream.

Cub Creek, Sec. 24, T. 10S, R. 34 E., W.M.

Cub Creek was dry at the mouth but flowing 0.5 gallon per hour 500 yards above the mouth. Water temperature was 58° F. No fish were found in the creek.

Nameless Tributaries, Sec. 21, 22, 28, T. 10S., R. 35 E., W.M.

The lower portions were observed on the ground, and their entire lengths were observed from the air. The drainages were all dry.

Geiser Creek, Sec. 26, T. 10S., R. 35 E., W.M.

Geiser Creek was flowing 0.5 cfs on September 6. Water temperature was 56° F. Trout only were found one mile from the mouth of the stream. One and one-tenth miles were treated. A few redbreast shiners were present in the lower one-half mile and dace disappeared from the kill at the three-quarter-mile station.

An upstream fish barrier was erected at the mouth of the stream.

Nameless Tributaries, Sec. 24, 25, 26, T. 10S., R. 35 E., W.M.

The stream was dry after being observed from the ground and air.

Patrick Creek, Sec. 29, T. 10S., R. 36E., W.M.

Patrick Creek was flowing 0.25 cfs on September 17. Water temperature was 56° F.

Treatment of the lower two miles of creek indicated that no fish were present. The first mile and one-half of stream courses through a meadow that cattle have completely grazed and trampled.

Sloughs, Sec. 28 and 29, T. 10S., R. 36 E., W.M.

A slough system south of some hay meadows on the south side of the river was treated. The sloughs are supplied from an irrigation ditch leaving the Burnt River North Fork near the center of the SW $\frac{1}{4}$  of the NE $\frac{1}{4}$  of Section 30.

No fish were found in the nearly dry sloughs or in the small irrigation ditch. The irrigation ditch crosses the mouth of Patrick Creek where the creek then flows down the ditch into the sloughs. There is no surface outlet from the sloughs.

Camp Creek, Sec. 34, T. 10S., R. 36E., W.M.

Camp Creek was treated from the mouth upstream to approximately six miles. The six-mile point was the second bridge crossing the creek upstream from the Hale Ranch, or the first bridge in Sec. 11, T. 10S., R. 36E., W.M. Trout only were observed beyond the bridge. Trout, finescale suckers, dace, redbreast shiners and a few small squawfish were present from the bridge downstream.

Stream flow was approximately 1.5 cfs and temperature was 54° F. on September 13. A barrier was erected at the mouth of the creek even though the lower two miles were intermittent. Rough fish were killed in the pot-holes.

Pinus Creek, Sec. 16, T. 10S., R. 36 E., W.M.

Upper limits of rough fish are one mile from the mouth. Three miles of the stream were treated and only trout were present above the one-mile point. Stream flow was 0.5 cfs and water temperature was 50° F. on September 13, 1962.

Gimlet Creek, Sec. 27, T. 10S., R. 36E., W.M.

Stream was treated to two-mile point and suckers, shiners, and dace

present up to 1.25 miles from mouth. A weir at the Ranes & Borger Mine blocks upstream rough fish movement. Only trout were present above the weir. The stream was carrying a heavy silt load below the mine and fish habitat was poor.

Dry Creek, Sec. 34, T. 10S., R. 36 E., W.M.

The first four miles of the stream were dry. Standing water was found in a spring-fed stock water pond four miles upstream from the mouth. There was a seepage flow of less than 0.5 gallon per minute on the west tributary above the forks. Creek and pond temperature was 58° F. No fish were present in the stream system or in a shallow dredge pond on the main creek one-fourth mile below the upper forks in Section 16.

Trout Creek, Sec. 3, T. 11S., R. 36 E., W.M.

Trout Creek was treated to the Huckleberry Mountain road crossing in Sec. 33, T. 10S., R. 37 E., a distance of seven miles.

A pond, belonging to a Mr. Walker, is situated in the main channel of the stream in Sec. 35, T. 10S., R. 36 E. Redside shiners, suckers, and dace were abundant. A few trout and cottids were present in the stream above and below the pond. Redside shiners were found upstream from the east boundary line of Range 36 East. No suckers were found upstream from the center of Sec. 32, T. 10S., R. 37 E.

Stream flow was 0.5 cfs and water temperature was 54° F. at the Huckleberry Mountain crossroad on September 14. On the same date at the mouth, stream flow was 1.0 cfs and water temperature was 58° F. Trout Creek is the only tributary stream in the North Fork system that supported a cottid population. The stream is the only major tributary that has not been mined. A weir was erected at the mouth of the creek.

Three Cent Gulch, Sec. 35, T. 10S., R. 36 E., W.M.

The lower one mile was dry. A seep, less than 1.0 gallon per hour, flows at the road crossing in Section 25. Road culvert at crossing has the outfall three feet above the stream bed. No fish were found in this poor habitat.

Alder Creek, Sec. 31, T. 10S., R. 37E., W.M.

The stream supported a few small trout, dace, and finescale suckers. No suckers were found a distance of one-half mile from the mouth. The first one-fourth of a mile was dry but an Alder surrounded spring area on the East Fork was maintaining a flow near 0.25 cfs to within one-quarter mile of the creek mouth on September 12.

A dry stream channel entered Trout Creek from the south near the mouth of Alder Creek. One stock water pond on the dry channel was treated and found to be free of fish.

Spring Gulch, Sec. 34, T. 10S., R. 37E., W.M.

The stream was dry at the mouth. No fish were in the boxed spring. The stream was dry above the spring.

Mosquito Creek, Sec. 3, T. 11S., R. 36E., W.M.

Spot checks to one mile above the mouth revealed rough fish, suckers and dace were present only in the first 400 yards of stream. Stream flow during treatment was less than 0.25 cfs and temperature was 58° F. on September 14, 1962.

Petticoat Creek, Sec. 23, T. 11S., R. 36E., W.M.

Rough fish were found only in lower one-fourth mile although one mile was treated. The road culvert at the mouth is a barrier to fish movement at low water. Only rainbow fingerling were found above the first one-fourth mile of stream.

Stream flow was 0.5 cfs and temperature was 56° F. on September 14, 1962.

Sheep Creek, Sec. 24, T. 11S., R. 36E., W.M.

Culvert crossing stream at mouth is a barrier to rough fish movement. Only rainbow fry and fingerling were found upstream from the culvert. One-fourth mile was treated.

Stream flow was less than 0.5 cfs and temperature was 56° F. on September 14, 1962.

Lick Creek, Sec. 24, T. 11S., R. 36E., W.M.

Dry. No potholes present up the channel.

Third Creek, Sec. 24, T. 11S., R. 36E., W.M.

Dry.

Second Creek, Sec. 25, T. 11S., R. 36 E., W.M.

Dry.

First Creek, Sec. 30, T. 11S., R. 37E., W.M.

Dry.

China Creek, Sec. 31, T. 11S., R. 37E., W.M.

Stream was dry at mouth. Rough fish, suckers, dace, and shiners were present from 0.15 to 0.25 miles. Stream was treated to the three-mile point. No fish were found in the ditch leaving China Creek near the three-mile point.

Stream flow at 0.25 miles was less than 0.25 cfs and temperature was 58° F. on September 15, 1962.

A barrier was erected at the mouth of the stream.

Nameless Tributary, Sec. 25, T. 12S., R. 37E., W.M.

The stream is north of the North Fork Burnt River but an irrigation diversion ditch from the North Fork carries water to the stream.

The diversion leaves the North Fork just upstream from the mouth of Second Creek. The ditch was intermittent when treated. A few small rough fish were present. A siphon carries the water under the North Fork in Sec. 5,

R. 37E. The ditch enters the Nameless Tributary in Sec. 4, R. 37 E. The siphon, ditches, and Nameless Tributary were treated. Small shiners, dace, suckers, and a few trout were killed.

An impassible falls at the outlet of a road culvert in Sec. 23, T. 12S. R. 37E. forms a barrier to upstream movement from the Burnt River. Springs in Sec. 10, T. 12S., R. 37E. were maintaining a flow at the impassible road culvert of 0.5 cfs. Water temperature was 48° F. on October 14, 1962. Flood water from the stream enters the Burnt River in a small channel. Most water is lost in irrigation diversions before reaching the mouth of the stream. Trout were present only downstream from the springs.

A one-quarter acre pond was treated in the drainage and was found to be free of fish.

#### West Fork Burnt River

The mouth is located in Sec. 17, T. 12S., R. 37E., W.M. The lower three miles of the stream were treated. Redside shiners were present only in the first 1.25 miles. A few suckers were present to 2.0 miles. Rainbows, cottids, and a few dace were present upstream from the two-mile point.

A diversion leaves the stream to the south near the three-mile point and empties into Thompson Gulch pond, property of Rice. Only cottids and rainbows were found in the ditch.

Stream flow was 1.0 cfs and temperature was 58° F. on September 24, 1962. The diversion ditch was carrying insufficient volume to reach the mouth of the ditch and stream flow was sinking in mud flats.

#### Spring

A spring is situated in Sec. 17, T. 12S., R. 37E., W.M. below the high-water line of Unity Reservoir and is situated on the point between the West Fork and Thompson Gulch. Stream flow from the spring was 0.5 cfs and water temperature was 57° F. on September 24, 1962.



### Thompson Gulch

The tributary enters the reservoir in Sec. 20, T. 12S., R. 37E., W.M. No fish were found in a small pond of Rice's at forks of Thompson Gulch in Section 13. A ditch is supplied by diversion from West Fork Burnt River. No stream water was found upstream from the pond and no outflow from pond was present.

Seepage in the fields between the pond and county road was treated but no fish were found. The mouth of the creek was dry.

### Middle Fork Burnt River

The lower 2.5 miles were treated. Shiners, suckers, and dace were found only in the first 1.25 miles. A few rainbow and dace were found beyond the 2.5-mile point.

An irrigation reservoir of Morgan's situated adjacent to the stream near the two-mile point, or in Section 24, was almost dry. No fish were present in a one-half acre sump.

Stream flow at the mouth was 1.0 gallon per minute on September 25. Water temperature was 56° F.

### Nameless Tributary, Sec. 20, T. 12S., R. 37E., W.M.

The swale has no watershed but collects waste irrigation water from a diversion of the South Fork Burnt River.

Three miles of channel were treated. Redside shiners, dace, suckers, and roach were found upstream to the Highway 26 crossing. The flow at the mouth was 0.25 cfs and water temperature was 60° F. on September 26.

### South Fork Burnt River

The South Fork Burnt River was treated from the mouth, fourteen miles upstream to the mouth of Barney Creek in Sec. 28, T. 13S., R. 36E., W.M. A rotenone device was placed in the South Fork at Barney Creek. Stream flow was 27.0 cfs and temperature was 56° F. In sixteen hours the rotenone

had killed fish to Whited Reservoir, a distance of approximately six miles. A rotenone device below the reservoir killed fish in the stream and irrigation ditches to the Powell Ranch in Section 1. Two large diversions to the east and two to the west were taking water from the stream. Stream flow immediately below Whited Reservoir was 18.0 cfs; below diversions at Pole Gulch crossroad, 10.0 cfs; and below diversions at Powell Ranch only a seep remained. The stream was treated with back-pack cans from Powell Ranch diversions to Rouse's Ranch on lower South Fork crossroad. Return irrigation water had increased stream flow to 5.0 cfs at the lowest crossroad. A rotenone device placed in operation at this point effectively killed the fish in the stream to the mouth.

A barrier was erected one-fourth mile upstream from the mouth.

No rough fish were found upstream from Whited Reservoir. The irrigation outlet of the dam is apparently impassible to rough fish movement. Rainbows and cottids were present above the reservoir. An impassible falls also is present in Section 28, Range 36 East, which is two miles upstream from Whited Reservoir.

#### South Fork Tributaries

No rough fish were found in any tributaries of the South Fork.

#### Diversion Ditches

All diversion ditches were treated by walking with back-pack pumps.

Rough fish were found only in those ditches leaving the river downstream from Whited Reservoir.

Roach were found in the first 2.0 miles of the South Fork and reidside shiners and suckers were found as far as Whited Reservoir.

A pond with no surface inlet or outlet in the northwest corner of Section 18, Range 37 East, Township 13 South, was free of fish.

#### Job Creek

Job Creek contained roach in the first 2.0 miles of stream. Redside

shiners were found to the three-mile point. Suckers were present up to the Unity sawmill pond, or the 5.5-mile point.

Rotenone devices at two-mile intervals were used in Job Creek below the Unity sawmill.

The Unity sawmill pond forms a barrier to fish upstream movement. No rough fish were found above the mill. Gambusia affinis are present in the mill pond. They were stocked by the U. S. Department of Health to control mosquitoes.

Water diverted from the South Fork Burnt River in Section 27, Township 13 South, Range 36 East, enters Job Creek in Sections 15, 19, 20 and 21, Township 13 South, Range 37 East, Willamette Meridian.

The pond in Section 20 was treated but was free of fish. Elm Reservoir in Section 15 was dry.

The tributaries entering lower Job Creek in Sections 28 and 33, Township 12 South, were dry. The tributaries entering the stream in Section 4, Township 13 South, were treated but no fish were found.

The Rouse Reservoir adjacent to Job Creek in Section 28, Township 12 South, contained a large population of roach. The pond was heavily infested with weeds. A high-pressure pump was used to force liquid rotenone down into the weeds. The reservoir contained 20-acre feet of water.

A natural low-water barrier was present north of Highway 7.

#### Summary of Reservoir Rehabilitation

Contour maps of the Unity impoundment were obtained from the U. S. Bureau of Reclamation Boise office. Levels were run from the bench mark on the crest of the dam to the water's surface. The acre-capacity curve developed for the impoundment was found to be accurate at low-volume storage.

The reservoir was sounded with a Bendix depth recorder in order to

verify the volume of water present.

Water samples were taken on September 5, 1962. Chemical analysis was made by the Charlton Laboratories, Portland, Oregon. Table 1 is a listing of the information.

Table 1: Water analysis, Unity Reservoir, September 5, 1962

<u>Depth</u> <u>Water Temperature</u>	<u>Surface 69°</u>	<u>8 feet 58.8° F.</u>
pH	7.63	7.75
Total Solids, p.p.m.	234	233
Volatile Solids, p.p.m.	25	38
Alkalinity (as CaCO <sub>3</sub> )		
Carbonate, p.p.m.	0	0
Bicarbonate, p.p.m.	98	101
Specific conductance micromhos/cm	260	260

Unity Reservoir was treated with liquid synergized rotenone on October 17, 1962. Water storage was just over 1,700 acre-feet. A total of 850 gallons of liquid rotenone was used to rehabilitate the impoundment.

The reservoir was divided into two sections for treatment. Two barges with 25-horsepower engines and one 16-foot boat with a 28-horsepower engine were used to distribute the rotenone. Liquid rotenone was drawn from barrels in the boats by boat-bailers. Chemical application required six hours.

Suckers and shiners, live-boxed at various places on the reservoir, were dying the day before impoundment treatment. The kill resulted from inflow of toxic tributary water. Suckers remained alive for 42 hours after treatment in the live box near the dam on the north side of the reservoir.

Vandals destroyed several suckers that were live-boxed for toxicity analysis.

Distressed fish were noticed in the reservoir one hour after the start of rotenone application. Die-off was slow and suckers were observed dying the evening of the 18th, forty-two hours after the initial application.

The mud flats of the South, Middle, and North Forks were sprayed by airplane. Coverage was excellent and fish were killed in a few seep areas that had previously been treated by personnel with back-pack cans.

Rotenone distribution devices were operated near the mouths of all inflowing streams for two days prior and two days after chemical treatment. All spring seeps were again treated near the mouths of streams in an attempt to prevent non-toxic water from entering the reservoir.

Live suckers were placed in a screen-box suspended in the Burnt River approximately 25 river-miles downstream from the Unity Dam. The live-boxed suckers were not effected by rotenone after one month when the live box was removed because of ice; all of the test suckers were alive.

No live fish could be found in the Burnt River from the dam downstream for 15 miles after a period of one week. A 110-volt, 14.5-amp DC generator was used for fish inventory.

The testing indicated the ground-water return flow diluted the rotenone to a non-toxic level somewhere between the 15 and 25-mile stations downstream from the dam. No effect from rotenone was realized in Brownlee Reservoir.

#### Summary of Toxicity Tests

Chemical analysis of impounded water for rotenone concentration was conducted shortly after the initial application of rotenone was begun. Table 2 shows the results of the chemical analysis. No rotenone could be detected 0.5 hour after the start of chemical application. Concentrations of 0.8 p.p.m. rotenone were found twenty-four hours after completion of

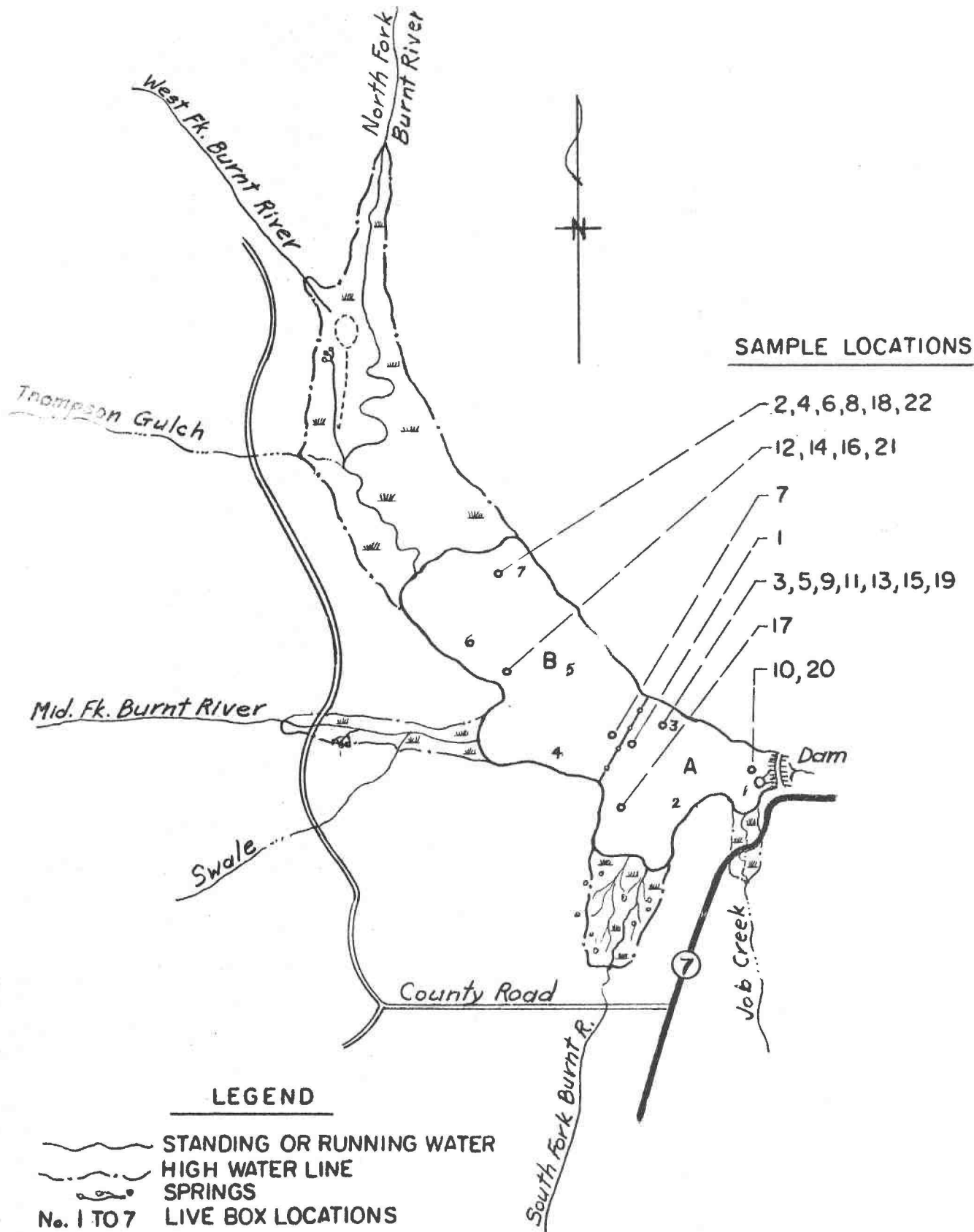
treatment; 1.0 p.p.m. after 43 hours; and 0.8 p.p.m. after seven days. Chemical tests on November 27, forty-one days after treatment, failed to reveal any rotenone. Water storage in the impoundment had doubled.

Live rainbow trout, live-boxed at various points and depths on the reservoir, perished in a two-hour period eight days after treatment.

Table 2: Unity Reservoir rotenone analysis, 1962

Date	Sample number	Location	Depth in feet	Time	Rotenone p.p.m.
October 17	1	Section A	10	1/2 hour after start 10:30 A.M.	0.0
	2	Section A	2	1/2 hour after start	0.0
	3	Section A	15	3:30 P.M.	0.0
	4	Section A	2	3:30 P.M.	0.5
October 18	5	Section A	15	8:30 A.M.	0.8
	6	Section B	0.5	8:45 A.M.	0.8
	7	Section B	10	11:30 A.M.	0.8
	8	Section B	2	11:30 A.M.	0.8
	9	Section A	15	3:00 P.M.	0.5
	10	Section A	15	3:00 P.M.	1.0
October 19	11	Section A	15	4:00 P.M.	0.5
	12	Section B	6	4:15 P.M.	1.0
October 20	13	Section A	15	9:00 A.M.	0.8
	14	Section B	6	9:15 A.M.	1.0
October 25	15	Section A	18	10:00 A.M.	0.8
	16	Section B	7	10:15 A.M.	0.8
	17	Section A	4	10:30 A.M.	0.8
	18	Section B	3	11:00 A.M.	0.8
November 27	19	Section A	21	8:00 A.M.	0.0
	20	Section A	7	8:15 A.M.	0.0
	21	Section B	10	8:20 A.M.	0.0
	22	Section B	6	8:30 A.M.	0.0

Samples are located on the following map.



# UNITY RESERVOIR REHABILITATION PROJECT 1962

Table 3: Fish species found in Unity Reservoir and tributaries during the 1962 chemical treatment project.

<u>Scientific Name</u>	<u>Common Name</u>
<u>Salmo gairdneri</u> Richardson	Rainbow trout
<u>Siphateles bicolor</u> (Girard)	Tui chub
<u>Richardsonius balteatus</u> (Richardson)	Redside shiner
<u>Catostomus macrocheilus</u> Girard	Largescale sucker
<u>Pantosteus platyrhynchus</u> (Cope)	Mountain sucker
<u>Catostomus columbianus</u> (Eigenmann and Eigenmann)	Bridgelip sucker
<u>Rhinichthys osculus</u> (Girard)	Speckled dace
<u>Ptychocheilus oregonensis</u> (Richardson)	Northern squawfish
<u>Cottus sp.</u>	Sculpins

#### Restocking Reservoir and tributaries

The reservoir was stocked from March through July in 1963 with a total of 406,698 rainbow trout fingerling. Cutthroat and rainbow trout fingerling were stocked in the North Fork of Burnt River in June and July, 1963. Rainbow and brook trout were used to restock the main South Fork Burnt River and tributaries. Table 4 lists the trout stocked in Unity Reservoir and tributaries in 1963 after chemical treatment.



Table 4: Restocking of trout in Unity Reservoir and tributaries - 1963

<u>Name</u>	<u>Month Stocked</u>	<u>Species</u>	<u>Number</u>	<u>Pounds</u>	<u>Average Size, inches</u>
Unity Reservoir	March	Rainbow Trout	99,985	624	2
	April	Rainbow Trout	100,404	604	2
	May	Rainbow Trout	36,941	1,414	4-5
	July	Rainbow Trout	169,368	2,775	3-4
			406,698	4,877	2-5
North Fork Burnt River	June	Cutthroat	26,274	121	2
	July	Rainbow Trout	22,048	361	3
			48,322	482	2-3
South Fork Burnt River	May	Rainbow Trout	4,026	1,547	10
	June	Rainbow Trout	2,577	859	9
	July	Rainbow Trout	10,592	174	3
	August	Brook Trout	19,900	107	2
			37,095	2,687	2-10

Summary of Fish Population Sampling

Reservoir

Four gill nets were fished for 24 hours at Unity Reservoir in April, 1963. The nets caught no fish. The trout stocked in March and April were of small size and could not be collected in nets.

Four gill nets were fished on September 17 for 12 hours, a total of 48 fishing hours, and produced 614 rainbow and 2 small bridgelip suckers. Netted rainbow ranged in size from 5.5 to 10.5 inches, fork length, and averaged 7.7 inches. Average weight of the rainbow was 3.8 ounces. The two suckers were 5.5 and 6.0 inches in length. The suckers probably entered the reservoir from the tributary system during the spring runoff.

## Streams

Rough fish fry were observed at the mouth of Camp Creek in August. Camp Creek is a tributary of the North Fork of the Burnt River and enters the North Fork in the Whitney Valley.

Spot treating with liquid rotenone in Camp Creek revealed numerous redside shiner fry. Liquid rotenone was used from the mouth of Camp Creek upstream approximately five miles. The upper limits of the re-treatment were in the lower limits of gold dredge tailings. Camp Creek was intermittent with much of the stream flow underground in the dredge tailing area.

It is believed that fresh ground water is available to small rough fish in the spaces between gravels in the dredged areas. Redside shiners and fine-scale suckers found in Camp Creek in the fall of 1963 were probably missed in the area of dredging in 1962.

The North Fork of the Burnt River was treated in the Whitney Valley area. Approximately five miles of stream received applications of rotenone. Redside shiners, suckers and dace, as well as planted rainbow and cutthroat, were killed. The stream is almost a continuous series of beaver ponds. It is believed the rough fish missed here in the fall of 1962 were in the burrows of the ponds and swampy areas that could not be reached with rotenone.

Several spot checks were made in the fall of 1962 after chemical treatment in both Camp Creek and the North Fork of the Burnt River. One redside shiner was found in the North Fork near the mouth of Trout Creek. The lower one-eighth of a mile of Trout Creek was treated with rotenone in 1963 and only rainbow and cutthroat trout were killed.

Two small return irrigation seeps were checked that enter near the mouth of the Middle Fork of the Burnt River. No fish were found.

Creel Census in 1963

A small fishery developed at Unity Reservoir in late 1963, but the significant angling will not start until the 1964 season. A partial creel census resulted in a check of 79 anglers that caught 417 rainbow trout that ranged in size from 6 to 10 inches. The fish were caught at a rate of 1.26 fish per hour and a success of 5.3 fish per angler.

Financial Statement

Project approval	\$ 13,000.00
Actual expenditures	\$ 19,700.00

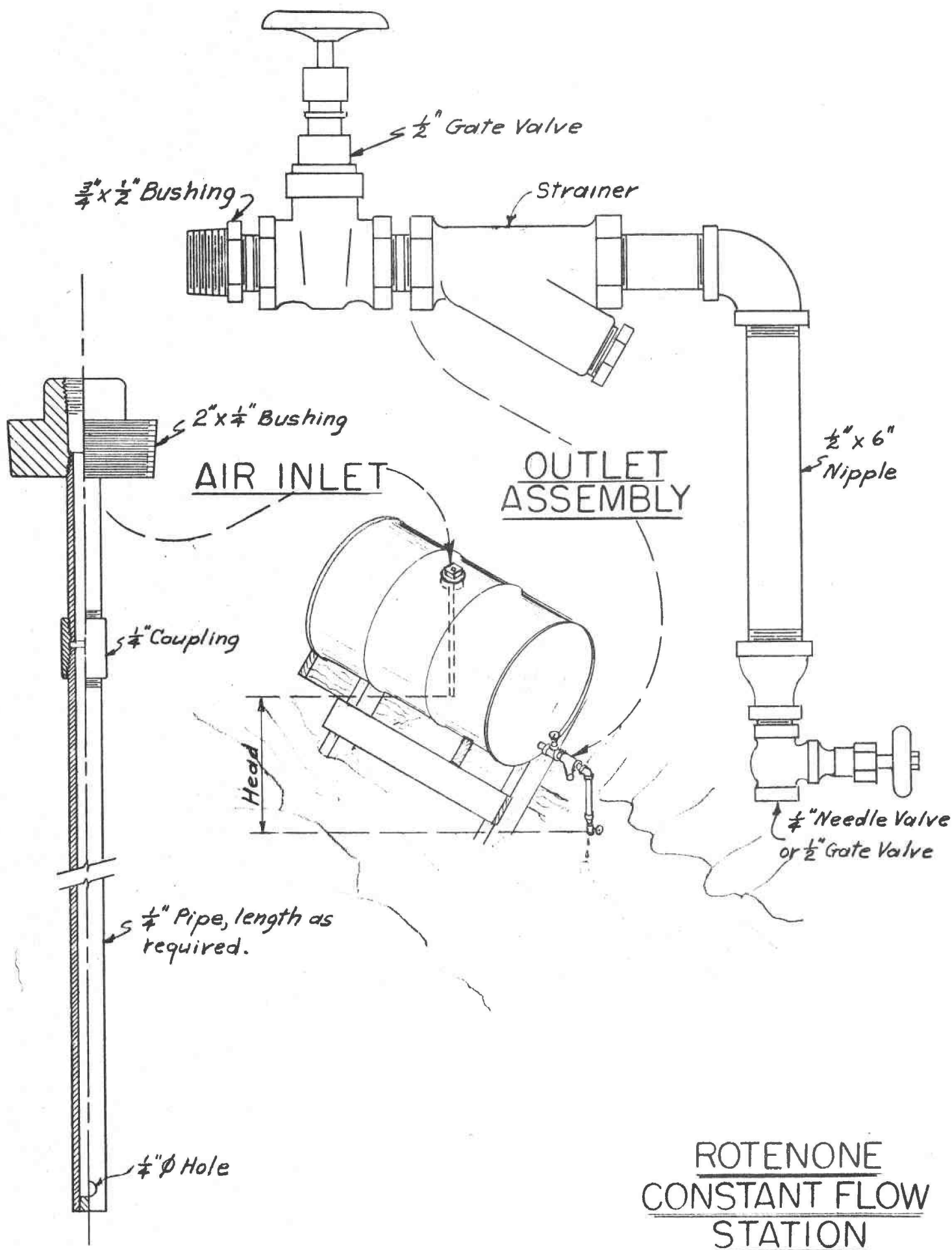
Approved by:

Submitted by:

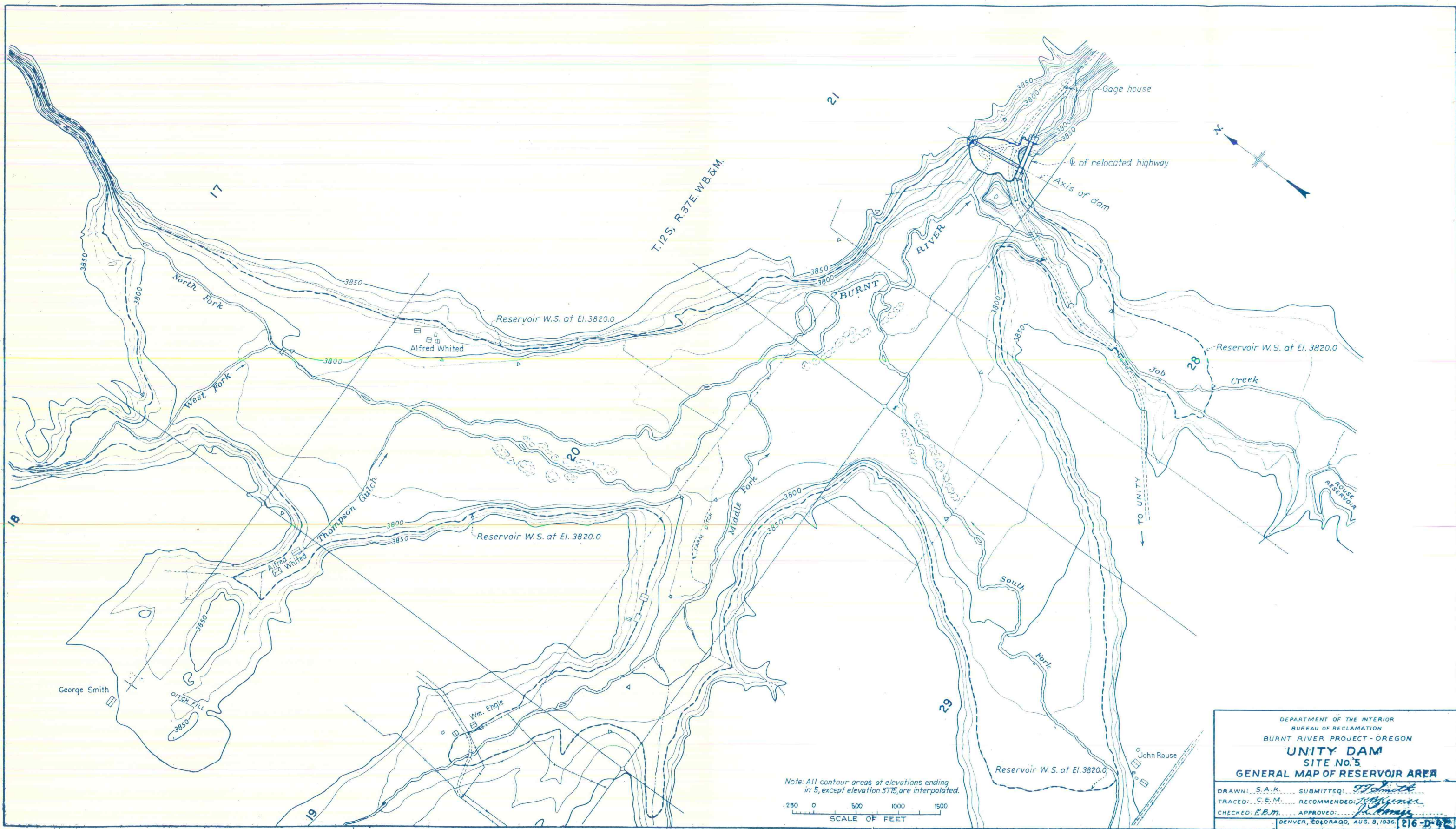
James W. Goin, Jr.  
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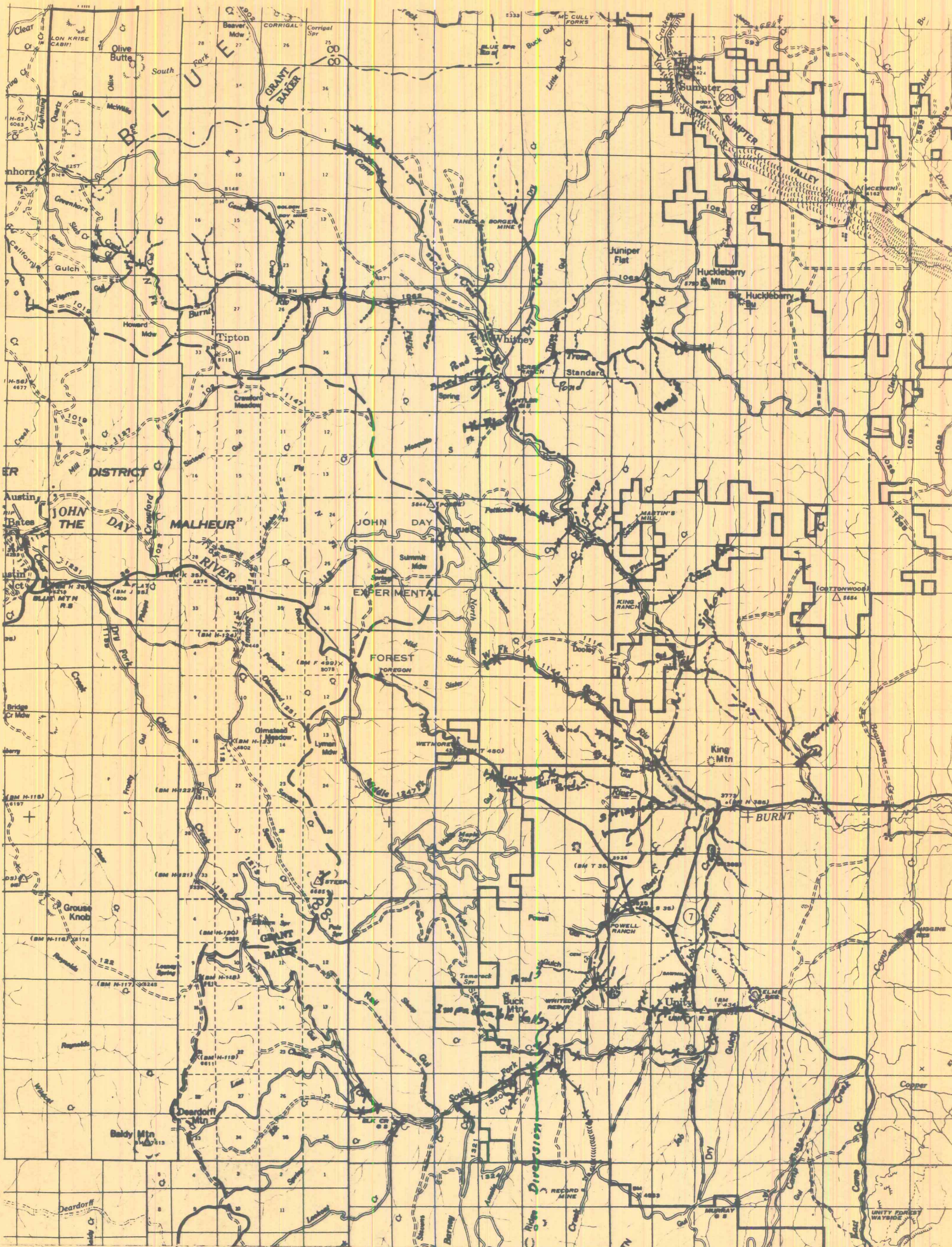






DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION BURNT RIVER PROJECT - OREGON	
<b>UNITY DAM</b> SITE NO. 5 GENERAL MAP OF RESERVOIR AREA	
DRAWN: S.A.K.	SUBMITTED: <i>H. Smith</i>
TRACED: C.E.M.	RECOMMENDED: <i>H. Smith</i>
CHECKED: E.B.M.	APPROVED: <i>H. Smith</i>
DENVER, COLORADO, AUG. 3, 1936. 216-D-42	









**OREGON STATE GAME COMMISSION**  
**PORTLAND, OREGON**

**UNITY RESERVOIR DRAINAGE**

**LEGEND -**

-  **TROUT AND DACE**
-  **ROUGH FISH RANGE**
-  **WATER, BUT NO FISH**
-  **DRY STREAMBED**





