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JOB COMPLETION REPORT

DEVELOPMENTS AND OPERATIONS

State of Montana

Name Southeastern Montana Fishery Study

Project No. F-24-D-1

Title Statewide Lake and Stream Rehabilitation - Tongue River Reservoir

Job No. I

Period Covered: Sept. 1, 1957 - April 30, 1958

Abstract: The Tongue River Reservoir and 20 miles of the Tongue River were chemically treated in 1957 to remove as many undesirable fish as possible. This will be followed by stocking rainbow trout in the spring of 1958 in an attempt to duplicate the fishing following initial impoundment of reservoirs.

The reservoir was lowered to dead storage (217 surface acres, with 1,400 acre-feet of water) by the State Water Conservation Board. Pro-Noxfish and Fish-Tox were used as fish toxicants. The bulk of the Pro-Noxfish was aerially applied. Many problems not encountered in treating natural lakes were encountered in treatment of reservoirs lowered to dead storage.

Objectives: The Tongue River Reservoir is an irrigation storage reservoir built by the State Water Conservation Board. Much of the storage water is unsold for irrigation purposes, which results in a relatively stable water level.

Because of its location and size, it has a sport fishing potential. This project was undertaken to rehabilitate the reservoir and some of the river above the reservoir. This is expected to give a temporary advantage for stocking game fish and perhaps duplicate conditions similar to those following initial impoundment of the reservoir.

Techniques Used: The reservoir has a maximum size of approximately 3,500 surface acres and a storage capacity of 69,439 acre-feet of water. To facilitate and make economically feasible the rehabilitation of the reservoir, the State Water Conservation Board cooperated and lowered the reservoir to dead storage, 217 surface acres with about 1,400 acre-feet of water.

Approximately 770 gallons of Pro-Noxfish was used to treat the reservoir and 20 miles of the Tongue River above the reservoir. Practically all of the Pro-Noxfish was applied with an airplane equipped with a Sorenson Spray Unit. Small amounts were applied with a hand spray pump in small inlets and some accessible sloughs. Approximately 1,370 pounds of commercial fish-tox were applied by

towing it in sacks behind a motor boat.

The Pro-Noxfish was applied undiluted from the airplane for reasons of economy in the number of airplane trips. The pilot was furnished a contour map of the reservoir and the amount of toxicant needed in various sections of the reservoir. The sections were distinguishable by surrounding landmarks and buoys. No flag men or markers were needed to guide the pilot. The toxicant left a prominent oil slick on the surface of the water. For treating the river portion the nozzles on one side of the spray booms were removed so the chemical would not be broken into a spray.

Application of the fish toxicant by airplane was necessary because the remaining water in the reservoir was surrounded by almost impassable mud flats and shallow slough areas. Numerous old trees (standing and fallen) were exposed in the draw-down that would have further complicated the application of fish toxicant from a boat. The dike was the only area where access could be readily gained to the water.

In the case of the Tongue River Dam, an old railroad grade appeared in the bottom making it possible to drive a truck down off the dike and near the remaining water. Had it not been for this railroad grade, it would not have been possible to get a motor vehicle within 200 yards of the remaining water.

During the time of toxicant application it was necessary to release 120 cfs down stream. Because of the position of the outlet structure, and water temperatures during toxicant application, it appeared that this water was flowing off the surface of the reservoir. This, coupled with the tendency of Pro-Noxfish to remain on the surface for a period following application, resulted in an area around the outlet that was relatively non-toxic because of loss down stream. A fish kill was observed below the dam following the first application of toxicant near the outlet structure.

Due to possible loss of toxicant in the outlet area, and large numbers of carp and goldfish still alive in the outlet area two days following application of Pro-Noxfish, approximately 1,370 pounds of fish-tox were applied. At the time of this application many of the fish showed visual signs of distress; however, about six hours following fish-tox application, all fish that could be observed were showing definite distress actions. No live fish could be visually observed 10 days later.

Pro-Noxfish was judged inadequate for aerial application in undiluted form. The manufacturer recommends emulsifications of Pro-Noxfish prior to application, probably because of its tendency to float on the surface of the water. The cost of application by air would be increased proportional to the amount of pre-emulsification, since cost of application is increased proportional to

the amount applied per surface acre. In only one isolated instance a small amount of wind-rowing of the chemical was noted. Wind was not blowing at the beginning of the toxicant application, and only a slight wind (probably less than 3 mph) was blowing when application was complete. The slight water agitation by the wind following toxicant application appeared to aid the downward dispersal of floating Pro-Noxfish.

Various experiments hint at possible effect of silt on fish toxicant. Some question as to the effect of the toxicant was experienced where the tributaries were cutting through banks of silt deposited below the normal level of reservoir operations. Fish kills were observed in the reservoir where the silt laden water was entering the reservoir; however, application was made in excess of 1 ppm in the turbid portions of the reservoir. The portions of the tributaries in the silt deposition beds were not observed since they were not accessible.

During the project 15 species of fish were observed; carp, bullheads, goldfish, crappies, yellow perch, rock bass, golden shiner, redhorse sucker, common white sucker, longnose dace, large mouth bass, rainbow trout, brown trout, sauger (or walleye) and stone cat. Carp and goldfish were estimated to be 99 per cent of the fish population by weight. Goldfish could be found in colors varying from bright gold to a dark brown similar in color to the carp. Carp were of uniform size, between 14-16 inches long. Only a few young of the year carp were observed. The only brown trout observed were found immediately below the dam. They were abundant for approximately 1/4 mile below the dam. All sizes of brown trout were seen. This is particularly interesting since this area had been poisoned with fish-tox in 1955 and stocked with walleye. Since 1955 no records of brown trout stocking can be found. Possibly brown trout survived this poisoning in the egg stages. No walleye were observed that could be attributed to a stocking in 1955. Also no catfish were observed from the reported plant in the Tongue River in Wyoming in 1956. No chemical was applied into the river below the dam; however, a fish kill occurred in 14 airline miles of river below the dam. One rainbow trout and one sauger (or walleye) were observed in the reservoir.

Application of fish toxicant by airplane has many advantages, especially when poisoning large reservoirs that have been partially drained. The main advantage is it provides a way to apply toxicant in the shallow sloughs and bays isolated by extensive mud flats and shallow water. In the Tongue River Reservoir old cottonwood trees were exposed in the drawdown. Applying toxicant in the cottonwoods may have been a problem without an airplane. In addition to this the method is rapid, and only a small crew is needed. Unfortunately air application also has some district disadvantages. Fish toxicant, applied in a manner similar to insecticides, is subject to drift. To date fish toxicants have not been designed specifically for aerial application. Pro-Noxfish is not satisfactory for aerial application in undiluted form. Perhaps it would be in pre-emulsified conditions; however, this would

increase cost of application. Spray pilots also have a tendency to want to atomize the toxicant as they do when spraying insecticides. To be successful, a small amount of insecticide has to drift onto practically each blade of grass or leaf. Such is not the case with a fish toxicant that will disperse in water.

In a later application of a different toxicant on another body of water, the nozzle orifices were removed leaving one-eighth inch holes in the nozzles. In this case the toxicant was applied with relatively little drift, since it was put out in drops rather than fine spray. The pilot still had control of the amount of toxicant applied per acre through the pressure in the spray unit and speed of the airplane.

Recommendations: Conditions encountered in rehabilitating drawn-down irrigation reservoirs are probably similar in other reservoirs and should be considered when planning such a project. Extensive mud flats and shallow sloughs are exposed by draw-down of water levels, leaving application by air about the only feasible method of applying toxicant. Time is also of importance in these projects. In this case the State Water Conservation Board wished to begin reimpoundment of water as soon as possible. Turbid water becomes a problem, especially around inlets and in creeks flowing through areas of silt deposition below the normal operation levels of the reservoir.

The position of the outlet structure in relation to remaining water levels and temperatures should also be considered. About 120 cfs were needed down stream during this project. Since the reservoir was at dead storage, the outlet was taking surface water, and it appeared that much of the toxicant applied in the vicinity of the outlet was almost immediately lost down stream.

From observations on this project, it is believed a toxicant designed for aerial application would be desirable. Characteristics of the toxicant should include reasonable costs, quick dispersal qualities, less bulk, and a higher specific gravity than the Pro-Noxfish used on this project.

Considering the tremendous amount of dilution from refilling a reservoir, toxaphene might be better and more economical fish poison. In an experiment on another reservoir, the concentrate toxaphene was pre-emulsified so the pilot could get the desirable distribution; however, the total amount of water and toxaphene was still about one-half the amount of undiluted Pro-Noxfish needed to treat this reservoir.

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