

MONTANA FISH AND GAME DEPARTMENT

FISH DIVISION

JOB COMPLETION REPORT
DEVELOPMENT PROJECT

Location: Bearmouth, Montana

Type of Job: Poison goldfish in warm water pond

Date or inclusive dates: April 23, 1958

Personnel on Job: Ford, Averett and later Whitney, Lewis, Bailey, Ramsey

Related Data: None--complete report attached

Written by: Averett

Objectives and Techniques Used:

Locate and remove goldfish from warm water pond near Bearmouth, Montana. Used Fish Tox and Pro-Noxfish. Lowered water level by removal of headgate boards.

Findings and Remarks:

At about 0900 hours, April 23, 1958, a telephone call from a Missoula resident was taken by Fish and Game Warden Jim Ford. The person calling told Mr. Ford that he heard that the Fish and Game Department was going to remove the goldfish from the pond near Bearmouth, and would like for us (Fish and Game Department) to save some for him. The Missoula resident further stated that someone had told him of the goldfish in the pond and that this person had previously seined some of them out.

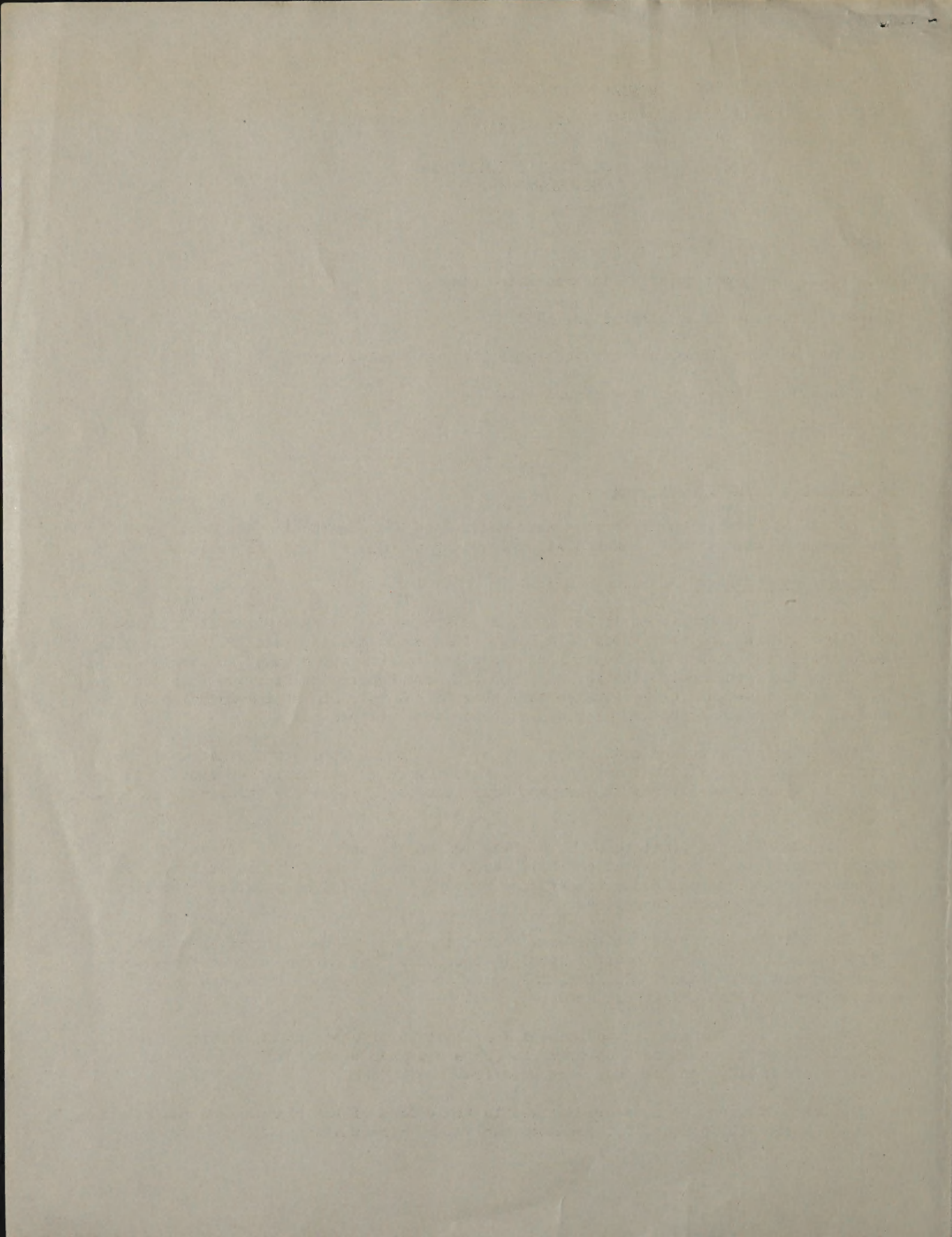
Mr. Ford and I loaded a 40 pound sack of Fish Tox, pump can and other equipment into a vehicle. A trip in relation to Mr. Ford's work was accomplished first. At about 1430 hours, we arrived at the pond near Bearmouth, where the goldfish were reported to be present.

The pond lies adjacent to U. S. highway 10, on the north side. It has an estimated surface area of about one-half acre, and an estimated volume of less than six acre feet. The pond had a temperature of 72°F and is fed by a series of springs near its east and north shorelines.

The outflow is located at the west end of the pond. A headgate of about two feet in height maintains the water level in the pond. The outflow stream flows west along highway 10 for about 200 feet, then goes under the highway through a culvert and empties into the Clark Fork River.

Mr. Ford and I looked the pond over for about 15 minutes, in an effort to locate goldfish. Several small dark colored fish were observed by Mr. Ford. It was impossible to ascertain whether or not they were goldfish.

After observing the pond, we decided to apply some of the Fish Tox to the water. We applied about 20 pounds, both by pump can and by direct mixing, in the pond.



A block net was placed in the outflow stream, to prevent downstream escapement of the fish. After applying the toxicant, we waited for a considerable length of time to check the results. No fish action was detected, and we decided to apply the remaining 20 pounds of Fish Tox. After doing this, and again waiting for fish action, the first fish in distress was noted. This fish was retrieved. It was a small (about 4 inches) goldfish of a brassy-brown color, indicating that it was most likely one or two generations removed from the original plant. Soon afterwards, we were successful in retrieving about one dozen similar fish.

A bright red goldfish was later observed in the pond, along with many other "wild type" fish. It was apparent from their actions that the toxicant was not having a lethal effect upon them. It was then decided that it would be necessary to obtain more toxicant, if a complete kill was to be realized.

Mr. Ford contacted the Missoula office by radio and requested additional toxicant in the form of Pro-Noxfish. At approximately 1800 hours, Messrs. Bailey, Whitney, Lewis and Ramsey arrived at the pond with additional toxicant.

A total of six gallons of Pro-Noxfish was applied to the pond. Due to the springs, at the east end and the rapid flow of water through the pond, heavy concentrations of the toxicant were applied at the east end. Soon after the application of Pro-Noxfish, the goldfish appeared to be in distress.

At about 2000 hours, it was decided that a complete kill had been attained. Enough toxicant had been applied to bring the total toxicity of the pond up to 6 parts per million. It should be mentioned, however, that the rapid outflow of water through the pond prevented this heavy a concentration of toxicant in the pond at any one time.

At this time (2000), we removed two of the headgate boards at the pond outlet and dropped the water level approximately 24 inches. One of the boards was then replaced (the other had floated away) and toxicant was again applied to the pond. This was done in an effort to keep the pond toxic while it filled up again.

The temperature difference between the pond and the Clark Fork River was 30°F. Freshly captured goldfish were placed in a bucket containing water from the Clark Fork River. These fish immediately stiffened and showed signs of distress. Whether or not the temperature difference was enough to cause lethal effects could not be determined, as the goldfish used in the experiment were already under the effect of the toxicant.

A collection of the goldfish was made. Color patterns ranged from bright red through intermediate red and brown to brassy brown. Size groups were from minute fry ($\frac{1}{2}$ "") to adults (8"). Several other aquarium fishes were also found, which appeared to be guppies, however, their exact species is unknown.

Plans have been formulated to re-toxify the pond several times, in the event unhatched eggs were present during the first toxification.

Mr. Ford did some aqua lung diving in this pond last fall. He saw no fish life of any kind, at that time. Because the pond is small and the water very clear, this is a good indication that these goldfish were planted sometime between the fall of 1957 and spring of 1958.

News releases were given to the local paper and radio and coverage was obtained on each. A display of the collected fish has been made in the window of a local sporting goods store.

The first part of the report is devoted to a general description of the work done during the year. It is divided into three main sections: the first dealing with the general work, the second with the work done in the various departments, and the third with the work done in the various sections of the departments.

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Bailey, J.

B.

MONTANA FISH AND GAME DEPARTMENT

FISH DIVISION

JOB COMPLETION REPORT

29-L-0: Hatchery Biologist Activities

Period: May 1, 1957 - April 30, 1958

Diagnosis of Hatchery and Wild Trout Diseases

Vitamin assay of the New Age brand pellet by George Post of Wyoming revealed a thiamin deficiency in at least one batch of the New Age pellet. A thiamin deficiency was therefore suspected among one lot of rainbow trout on the New Age brand pellet at Great Falls when the fish became nervous and a slight increase in mortality rate developed. Fresh visceral meat supplement was recommended and hatcherymen were instructed to watch for further symptoms.

A rainbow trout from Meadow Lake near Ennis was sent in by a fisherman in August, 1957 for examination. A diplo-bacillus morphologically resembling furunculosis was found in the furunculosis-like lesions.

A smoked rocky mountain whitefish was submitted April, 1958 for examination of yellowish pinhead size pustules in the musculature of the caudal peduncle. The fish was caught from Rock Creek in Granite County by a fisherman. The pustule contained thousands of the myxosporidian, Henneguya.

A die-off of carp in Canyon Ferry Reservoir was investigated in mid-January. The dead carp were mostly 1- to 3-year-olds. Mucous and inflammation particularly around the nose and gills suggest "cold-injury" as the probable cause of death. According to Schaperclaus' Textbook of Pond Culture this disease kills young carp wherever water temperatures drop below 4°C. Such a condition could easily occur in Canyon Ferry Reservoir during winter cold snaps.

The brood stock pond at Arlee was treated with sodium arsenite in an attempt to rid it of aquatic weeds, mainly Anacharis occidentalis. Manufacturers recommendations were followed for treatment dilution and application. All trout in the pond died presumably due to oxygen depletion. The weed kill was not complete in all parts of the pond and the treatment was judged unsuccessful as a practical means of controlling weeds in that particular pond.

Big Timber hatchery personnel were given technical assistance in calculations for chlorine sterilization of some outside ponds.

Development of a Pellet Fish Feed

Feeding trials over extended periods with pellets containing only four ingredients; cottonseed meal, wheat middlings, fish meal, and distiller's solubles were successful as far as growth rate and conversion was concerned. Vitamin deficiencies, however, resulted in a low vitality of the fish. After an extensive review of the literature on animal feeding and trout nutrition a new pellet formula was recommended utilizing the same four ingredients as the major sources of protein. The new pellet was

milled to contract specifications by Teslow Mills in Bozeman and contains the following ingredients:

| | |
|---|-----|
| Cottonseed meal (43% protein)..... | 20% |
| Wheat middlings..... | 20 |
| Fish meal (Canadian herring)..... | 21 |
| Distiller's solubles (dried corn sol.)..... | 15 |
| Dried skimmilk..... | 10 |
| Brewer's yeast..... | 8 |
| A & D feeding oil..... | 2 |
| Molasses..... | 2 |
| Alfalfa meal..... | 2 |

A vitamin premix is added at the rate of 10 pounds per ton to give the following analysis per 100 pounds of the finished feed:

| | |
|-----------------------------|----------|
| Riboflavin..... | 500 mgs |
| Pyridoxine..... | 160 mgs |
| Niacin..... | 2000 mgs |
| Pantothenic acid..... | 5000 mgs |
| Vitamin E (20,000 u/g)..... | 4000 mgs |

Vitamin assays on the four-ingredient pellet and on the new pellet formula showed thiamine deficiency in both, riboflavine adequate only in the new pellet, pyridoxine adequate in both, niacin adequate in both, pantothenic acid adequate only in the new pellet, biotin and folic acid inadequate in both.

Correspondence is now being carried on with suppliers of the vitamin premix to attempt to overcome the thiamine deficiency which is probably severe enough to cause deficiency symptoms after prolonged feeding with the straight pellet. A revised premix will probably be specified as follows:-- to be added at the rate of 10 pounds per ton to give the following analysis per 100 pounds of the finished feed:

| | |
|------------------------------|----------|
| Thiamine..... | 500 mgs |
| Riboflavine..... | 500 mgs |
| Pantothenic acid..... | 4000 mgs |
| Biotin..... | 100 mgs |
| Folic acid..... | 500 mgs |
| Vitamin E (200,000 u/g)..... | 4000 mgs |

Cost of the fortified pellet was 9.7 cents per pound. Cost of the changed vitamin premix is not yet known and final recommendations for the premix will be made after cost data is obtained.

Feeding trials with the new pellet have been successful after approximately three months continuous use but fish-culturists are cautioned to watch for thiamine deficiency symptoms which can be corrected with fresh visceral meat supplements.

Annual Reports

Hatchery foremen were assisted in the preparation of annual hatchery reports. All reports were reviewed and forwarded to Helena. An analysis of production data was tabulated for future use in making decisions involving changes in the trout rearing program.

Production Coordination

Requests for technical assistance from the hatchery biologist in making fish transfers are mainly concerned with the so-called fostering plan.

Growth rate predictions based on feeding tables and expected conversions are used to time the transfer of rainbow trout from warm water stations to cold water stations for the catchable fish planting commitments.

The requests are reviewed with the following requirements in mind:

1. Predicted growth rates are used to insure proper planting size (7 to 9 inches for catchable-size fish) at the proper time.
2. Portland office approval in Fish and Wildlife Service transfers.
3. Approval of species and size at planting by Holton, Keller, or the District Fishery Manager to insure that the fish are to be used in accordance with the planting policy in the hatchery area to which they are being transferred.
4. Final approval for the transfer is made on a form which must be signed by the Chief Fisheries Management Biologist and the Superintendent of Fisheries.

The following transfers of fish to be used in the 1958 planting season were recorded in the Hatchery Biologist's office:

| | | | |
|-------------|-------------------------|-------------------------|--------------------|
| Rb-40-57 | 51,205 at 245/lb | Bluewater to Anaconda | September 12, 1957 |
| Rb-40-57 | 19,146 at 137 to 113/lb | Bluewater to Lewistown | September 28, 1957 |
| Rb | 200,000 at 300-400/lb | Bozeman to Anaconda | April, 1957 |
| Rb-57 | 35,000 at 4.2/lb | Ennis to Hamilton | February, 1958 |
| Rb-Oreg.-57 | 50,000 at 420/lb | Ennis to Arlee | April, 1957 |
| Rb-40-57 | 23,400 at 9.5-10/lb | Bluewater to Big Timber | Feb. 11-18, 1958 |
| Rb-40-57 | 30,000 at 8.9-9.4/lb | Bluewater to Emigrant | Feb. 13-24, 1958 |
| Ct | 7,399 at 12/lb | Ennis to Emigrant | Feb., 1958 |
| Ct | Brood stock | Creston to Anaconda | April, 1957 |

Monthly Production and Distribution Records

Each month the second and third copies of hatchery production and distribution records are sent to the hatchery biologist. They are reviewed for possible errors or omissions and notations are made on the forms concerning recommended feed levels, expected growth rates, and expected conversions. The third copy is returned to the hatchery foreman who forwards it to the Superintendent of Hatcheries after transferring notes or corrections to the original copy. It is intended that hatchery foremen be kept aware

of the need to improve conversions and growth rates by proper feeding techniques with good diets. The end result is a lower food cost per pound for the fish produced.

Hatchery Manual

Each year a significant addition is to be made to the hatchery manual. In 1957, a revision to the section on blue-sac disease of trout fry was added when significant contributions to the knowledge of the disease were published by Dr. Ken Wolf of the Fish and Wildlife Service.

Tables containing measurements of rearing space, water temperatures, water quality, and volume of flow were added to the station copies. The tables are mainly of value in chemical treatments of fish in the rearing units.

Submitted by: Jack E. Bailey /s/
Hatchery Biologist

Date April 29, 1958