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

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Project No. F-11-R-1 Job No. I-A

Title of Job: Cataloging the Waters of the Project Area

Abstract:

The Milk River, in the 27 miles from the Fresno Reservoir to the Canadian Border, meanders through a rather silted flood plain in a valley which will average about one-half mile in width. This section of the river usually experiences two periods of high water and flooding, one in the latter part of March, and again in late May and early June. There are two main tributaries to the river in this section, both flowing only during run-off periods, as do the many smaller drainage coulees in the area. Water levels are low in late fall and a poor habitat for fish is offered. Much of the section is inaccessible and the area is sparsely settled. Fishing pressure is negligible. No recommendations for improving fishing in this section of the river are offered.

Some of the streams that head in the Bear Paw Mountains were surveyed during the summer and fall of 1952. Gross chemical analyses were made on some of these streams during the fall of 1953. The lowest oxygen content found was 8.1 ppm and pH values ranged between 8.0 and 8.7. The information series will be continued as opportunity arises.

Brush Lake in Sheridan County, Montana, has a surface area of 200 acres and a depth of 57 feet. Fish have been planted at various times, but no catches have been reported. Water analysis showed the lake to be highly saline. After finding only 0.5 ppm dissolved oxygen on March 1, 1954, under 18 inches of ice, no further stocking was recommended.

Numerous ponds in the area were investigated. Rough fish, introduced purposely or accidentally, were a problem in many ponds. Poisoning the ponds would be of questionable value because of the danger of reintroduction of undesirable fish through minnow fishing. In tests to date, some of the cool water ponds of eastern Montana seem well adapted to the walleye and northern pike. Further stocking of these species should be made and their culture promoted so that stock for introductions will be available.

In areas lacking manageable fishing waters, and where the need is justified, impoundments designed solely for fishing should be constructed.

Objectives:

To determine the physical, chemical, and biological characteristics of the various waters in the project area and to catalog these waters.

Techniques Used:

The Milk River was surveyed from the air in October, 1953. Aerial photos were taken at this time.

The length of the drainage was measured on a Hill County map with a map measure.

Gross chemical analyses were made on the waters of some of the streams that were surveyed during the summer of 1952 in Hill and Chouteau counties.

Several ponds and lakes in the project area were investigated.

Findings:

I. The Milk River from Fresno Lake to the Canadian Border.

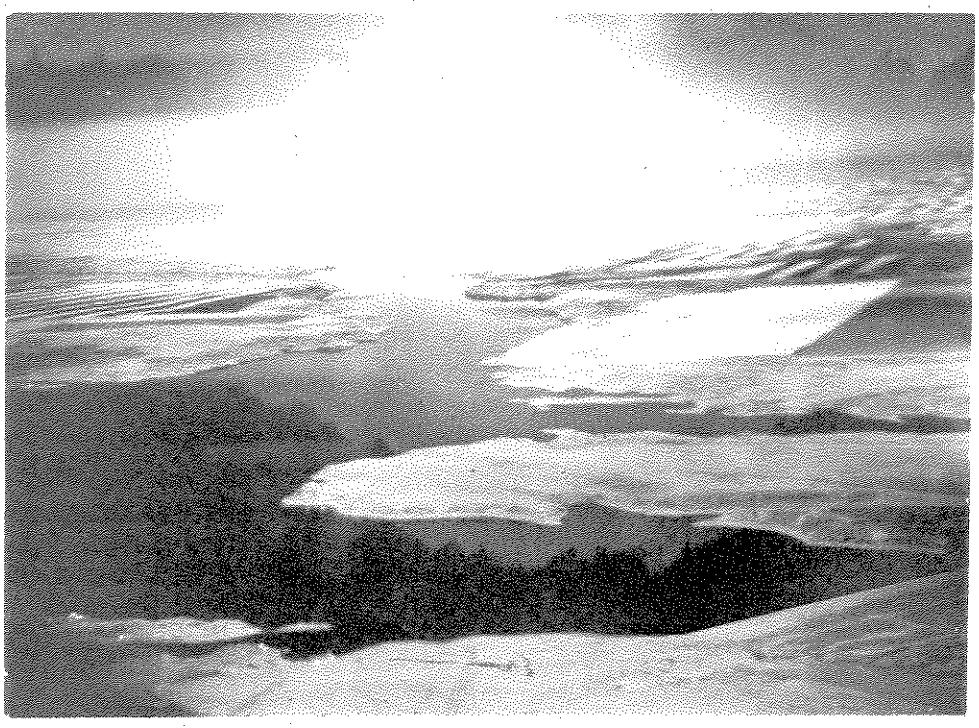
This section of the Milk River meanders in a generally southeasterly direction through a valley which, in places, is rather sharply eroded. The average width of the valley is about one-half mile, and the length is approximately 27 miles. The stream has cut its channel through rolling prairie uplands, most of which is covered with native grasses, though some crops are interspersed. The flood plain of the stream is fringed with small cottonwoods and willows. The Milk River enters Hill County at an elevation of about 2700 feet, then drops almost 200 feet in the 60 miles to Havre. Further eastward the drop is less; slightly under 2 feet per mile.

Usually, high water and flooding occur each spring in the latter part of March when melting snows are being carried off, and again in late May and early June, when seasonal rains and melting mountain snows cause a rise. Fresno Dam offers relatively little control of the rapid run-off. During the period of high water in the spring of 1951, for example, a four-foot head of water was flowing over the spillway structure.

There are two main tributaries to the Milk River in this area, Lost River near the Canadian Border and Spring Coulee near the head of Fresno Lake. Both tributaries are intermittent, flowing only during the run-off periods. There are numerous small drainage coulees which empty into the Milk River in this section; these also flow only during run-off periods.

An aerial survey of this section of the Milk River was made in October 1953. Aerial photos were taken, showing the type of drainage found (Fig. 1, 2, 3, 4). It was apparent that the section offered a poor habitat for fish during periods of low water.

There is extremely little, if any, fishing pressure exerted in this portion of the Milk River, and for much of its length, it is inaccessible. It has been reported by fishermen that trout fishing has improved in the upper reaches of the Milk River in Glacier County since the planting of rainbow trout in Fresno Lake. This report has not been verified by tagging or shocking experiments, but it is possible that the trout could move through the section of the Milk River surveyed, during the high water periods in the spring of the year.



/Fig. 1 - Fresno Reservoir on Milk River, the dam in the lower right.

Fig. 2 - Milk River at the upper end of Fresno Reservoir.

Fig. 3 - Milk River a short distance above Fresno Reservoir.

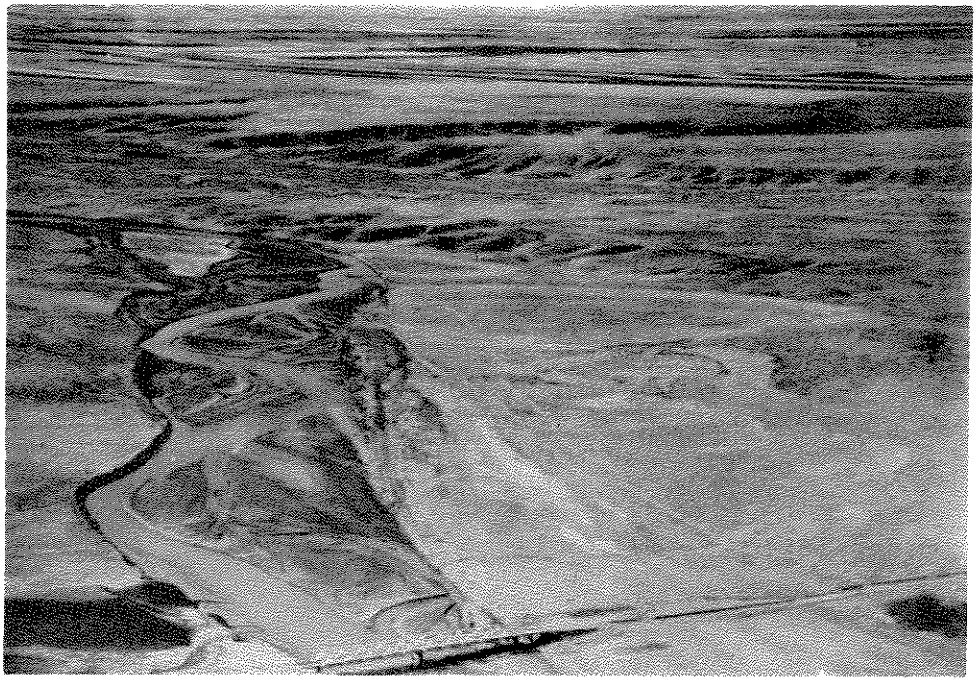


Fig. 4 - Milk River just below Spring Coulee.

II. Gross Chemical Analyses on Some of the Streams in Hill and Chouteau Counties.

Some of the streams that head in the Bear Paw Mountains in Hill and Chouteau counties were surveyed during the summer and fall of 1952. While the work of that summer was financed entirely by State funds, the report of the survey was included in the publication, Federal Aid in Fisheries Restoration, by the Montana Fish and Game Commission, 1953. At the time of the survey, a chemical kit was not available and that information could not be included. Some analyses were made during the fall of 1953 with the following results:

| Stream and Location | Water Temp. F. | Parts per million $O_2$ | $CO_2$ | ph-th | MO | pH |
|---|---|---|---|---|---|---|
| Beaver Creek<br>Hill County | 43 | 9.9 | 0 | 20 | 162 | 8.7 |
| Big Sandy Creek<br>Hill and Chouteau Counties | 40 | 9.6 | 0 | 0 | 149 | 8.1 |
| Eagle Creek<br>Chouteau County | 42 | 8.9 | 0 | 0 | 226 | 8.0 |
| Clear Creek<br>Blaine County | 43 | 8.1 | 26 | 0 | 195 | 8.2 |

While Clear Creek lies outside Hill and Chouteau counties, it is located in the same general vicinity of the other streams and heads in the Bear Paw Mountains.

III. Pond and Lake Investigations.

No attempt was made to check all ponds within the district. As opportunity arose, those ponds or lakes which apparently had possibilities of supporting a fishery were investigated.

In August of 1953, the Soil Conservation Service conducted pond management schools in eastern Montana. In conjunction with these schools, eight reservoirs in Blaine County were investigated, with the following results:

| Name of Reservoir | Size, Acres | Maximum depth, ft. | Surface Temp. |
|---|---|---|---|
| Miller No. 6 | 12 | 20 | 64 |
| Miller No. 7 | 3-4 | 18 | 65 |
| Lux | 3-4 | 14 | 68 |
| Grasshopper | 20 | 16 | 62 |
| Upper Hicks | 2 | 12 | 60 |
| Lyons | 10-15 | 16 | 62 |
| Rock | 4 | 16 | 62 |
| Reibe | 5 | 14 | 61 |

Temperatures alone in these ponds put them definitely out of the usual bass-bluegill classification.

Brush Lake in Sheridan County, Montana, is a saline, pothole type lake with no inlet or outlet. The lake has a surface area of 200 acres, and depths have been checked to 57 feet. In June 1953 the surface temperature was 70 degrees F. and the temperature at 57 feet was 57 degrees F. Two overnight gill net sets produced no fish, and the owner of the land on which the lake is situated reported that he had never seen fish caught. Various plantings of fish have been made in the lake; the first recorded plant in 1918. Later records show 8000 lake trout introduced in June 1944, and 30,000 rainbow trout planted in June 1945. No success has been reported from any of the plants. Water samples were taken in September of 1953 and were sent to the Montana State Board of Health for analysis. They obtained the following results: total solids 6153 ppm; 444 ppm carbonates; 1043 ppm bicarbonates; 188 ppm chlorides; 124 ppm hardness as calcium carbonate (6 grains per gallon); pH 9.4. Dr. D. S. Rawson of the University of Saskatchewan stated in a personal communication that some success had been obtained in the saline lakes of Saskatchewan with various species of fish. He sent also, a copy of the publication by Rawson and Moore, The Saline Lakes of Saskatchewan, which, in view of the chemical content of the water, would be very applicable to conditions found in Brush Lake. On March 1st, 1954, a trip was made to Brush Lake to test the dissolved oxygen content of the water under the ice cover. Weather conditions at that time were extremely adverse - the air temperature was 10 degrees below zero F., and winds were of such force that it was difficult to walk or stand on the ice. At approximately 200 yards from shore the ice cover measured 18 inches in thickness. It was possible to save only one water sample taken with the Kemmerer bottle, this sample was taken from the bottom at 17 feet. Dissolved oxygen measured only 0.5 ppm.

Raymond Reservoir in Sheridan County at one time supported a considerable sport fishery for people of the surrounding area. In checks made in August of 1950 by C. K. Phenicie and Nels Thoreson, very good fishing was found to be available. Local fishermen have reported that following the severe winter of 1951, no fish have been caught - the reservoir apparently suffered a winter-kill at this time. In June of 1953 an overnight gill net set caught no fish, though 5 larval salamanders were taken. With a surface area of 3-5 acres, the impoundment is not large, but depths were good (up to 14 feet checked), and temperatures were 70 degrees F. at the surface and 54.5 degrees F. at the 14 foot depth in June. Flowing springs entering the bottom of the impoundment kept temperatures cool and water levels relatively stable. Fish were reported introduced to the impoundment again in the fall of 1953, but no catches have shown up as yet.

All information on the streams and lakes (ponds) of the project area is entered on the file cards developed for that purpose. The cards are made out in duplicate. One card is sent to the main office in Helena, and the other is retained in the District office. During the summer and fall of 1953 checks were made and information taken on Whitetail Lake, an impoundment of some 20 acres in Daniels County; on Killenbeck Reservoir, also in Daniels County; on Factory Lake, an impoundment near Sidney in Richland County; on Kubish Reservoir, Johnson Reservoir, and Lindsay Reservoir in Dawson County; on Lame Steer Reservoir in Wibaux County; and on Patrolia and Yellow Water Reservoirs in Petroleum County.

Recommendations:

I. The Milk River from Fresno Lake to the Canadian Border.

At the present time there is no method foreseen of improving the sport fishing in this section of the Milk River, nor, since this section receives almost no fishing pressure, is there any need for an improved fishery. Tagging and shocking experiments to determine movements of fish through this section will be considered in future plans.

II. Gross Chemical Analyses on Some of the Streams in Hill and Chouteau Counties.

It is recommended that the series begun be continued and that additions be made as opportunity to do so arises.

III. Pond and Lake Investigations.

Since a good many of the fishermen in Eastern Montana must necessarily depend upon ponds for their sport fishing, it is recommended that considerable emphasis be placed upon pond investigations. It is realized that it would be almost impossible to set up controlled experiments in ponds; the work of Arthur Whitney in Southeastern Montana demonstrated this. However, it would be desirable to determine what species or species combination would thrive best in our cool water ponds. It is recommended that we continue to introduce pike in ponds that are suitable, as walleye and the northern pike have done well in a few test ponds, and check the success of these plants under the various conditions that will be found. It has been difficult to obtain pike for stocking and it is recommended that methods of pike culture be improved at existing facilities in eastern Montana so that stock will be available.

It is recommended that no surveys be made on ponds which are quite remote from communities and which receive extremely little fishing pressure. Much could be accomplished in the district by the construction of impoundments designed solely for fishing in the areas where there is a need for fishing waters.

Some of the ponds in the district are overstocked with rough fish or are over-populated with bluegill or crappie. These ponds could be rehabilitated through poisoning and fishing could be improved; however, it is recommended that no ponds be poisoned as long as minnow fishing is allowed.

It is recommended that no further introductions of fish be made in Brush Lake in view of the low dissolved oxygen content found under the ice cover. A series of tests should be made to complete the year round conditions found in the lake.

Raymond Reservoir was previously a good fishing pond and furnished a considerable amount of fishing in the area. It is recommended that the reservoir receive systematic stocking.

IV. General Recommendations:

Some of the cool-water ponds in the district should be managed as trout ponds. The success of the pike is not definitely known as we do not at present produce enough pike to stock all of the ponds. The facilities for raising trout are already established.

Some of the small, marginal trout-water streams in eastern Montana have been stocked with eastern brook trout each year. Survival in these streams would be low because of the low water in late summer and fall and because of the severe winter conditions. Keeper size rainbow trout planted in the accessible areas several times during the fishing season would provide better fishing for more fishermen.

Summary:

The Milk River from Fresno Lake to the Canadian Border in Hill County flows for about 27 miles through rolling upland prairie in a valley which will average about one-half mile in width. High water occurs usually in the latter part of March due to run-off of melting snow, then again in late May and early June due to seasonal rains. By the fall of the year water levels are low and the stream offers a poor habitat for fish. Access to this section of the Milk River is very poor over most of its length. Measured extreme flows range from 12,000 second-feet to no flow at the border and 2,540 second-feet down to 15.6 second-feet about 6 miles west of Havre. No recommendations for improvement of this section are offered, though movement of fish through the area will be considered in future plans.

Gross chemical analyses were made on Beaver Creek, Big Sandy Creek, Eagle Creek, and Clear Creek. At temperatures in the low forties, the lowest oxygen content found was 8.1 ppm in Clear Creek. The pH in the streams varied from 8.0 to 8.7. The series of tests will be continued.

Brush Lake in Sheridan County, Montana has a surface area of 200 acres and depth measured up to 57 feet. Fish have been planted in this lake since 1918, however no fish have been caught. Water samples analyzed by the Montana Board of Health showed the water to be highly saline, though very likely within the range for some species of fish. No further stocking is recommended, since the dissolved oxygen content under an 18 inch ice cover on March 1, 1954 was only 0.5 ppm.

Numerous other ponds in the district were investigated and the information entered on the survey file cards. Some of the ponds supported a fishery and some, with proper management, could be made to do so. In many cases a carnivorous species is needed to help control the rough fish populations, in other, rehabilitation and restocking would be necessary. However, until minnow fishing is discontinued, the danger of recontamination with rough fish is felt to be too great to justify poisoning.

Walleye and northern pike should be raised for the cool-water ponds of the district, however, some of the ponds should be managed as trout ponds. The success of the pike is not definitely known and a large supply of pike for stocking is not available. Trout rearing facilities are established.

In areas lacking a manageable fishing water, and where the use of the water for fishing would justify it, impoundments designed solely for fishing should be constructed.

Prepared by William Alvord Approved by _____

Date May 1, 1954