MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

State of Montana

Project No.: F-12-R-9 Name Western Montana Fishery Study

Job No.: I Title Inventory of Waters of the Project Area

Period Covered: May 1, 1962 through June 30, 1963

ABSTRACT:

Twenty-five streams and 28 lakes were surveyed during the report period. Eight of these lakes were waters on which follow-up survey information, or specific information concerning management measures was desired. Initial surveys were conducted on the remaining 20 lakes and all 25 streams. Management problems are discussed for Salmon, Rainy, Coopers and Bowman Lakes, and recommendations are given for all lakes surveyed.

Original survey data are filed in the district headquarters, copies of lake and stream survey cards for waters surveyed in the 1962 field season have been sent to Helena.

Opening day pressure and harvest information are presented for Browns Lake.

RECOMMENDATIONS:

Mountain Lakes

1. Alpine - No reproduction, good growth rate, plant 1,400 two-inch rainbow annually.
2. Carruthers - Natural reproduction, slow growth, remove from planting program.
3. Dora Thorn - Natural reproduction, remove from planting program.

4. Fourmile Basin #1 - Too small to manage.
5. Fourmile Basin #2 - Too small to manage.
6. Fourmile Basin #3 - Heavy population of brook trout, no stocking necessary.
7. Fourmile Basin #4 - No planting at present, survey again in 1964 or 1965 to determine success of golden trout reproduction.
8. Fourmile Basin #5 - Too shallow to manage.
9. Goat - Too shallow for fish.
10. Ivanhoe - Fair reproduction, no stocking necessary.
11. Johnson - Fair cutthroat population, no stocking necessary.
12. Little Racetrack - Good reproduction, no stocking necessary.
13. Meadow #1 - Overstocked, suspend from planting program for 4 years.
14. Meadow #2 - Overstocked, suspend from planting program for 4 years.
15. Meadow #4 - Partially winterkill presumed, remove from planting program.
16. Meadow #5 - Overstocked, suspend from planting program for 4 years.
17. Mountain Ben - Fair reproduction, many, small-sized fish, remove from planting program.
18. Sidney - Fair reproduction, remove from planting program.
19. Tamarack - Too shallow to manage.
20. Un-named - Too shallow for fish.
21. Un-named - Too shallow for fish.

Other Lakes

1. Salmon Lake - Repeat bottom net sets again in 1963. Repeat plant again in 1963 and continue evaluation of 3-inch rainbow trout stocking.
2. Middle Bowman Lake - Repeat gill net sets in the fall of 1963 to continue evaluation of changes in fish population due to raising water levels of the lake.

3. Coopers Lake - Gill net catches in June of 1963 indicate a large rough fish population. Consideration should be given to building a barrier in the outlet of the lake and rehabilitating the lake.

4. Rainy Lake - Sample fish population again in the fall of 1964. Continue publicity efforts concerning the large size and number of cutthroat trout to increase the harvest of mature fish.

5. Millers Lake - No change in present management plans.

6. MudLake - No change in present management plans.

7. Krohn - Stock with 780, 7- to 9-inch rainbow soon after ice break-up in 1964. Net again in late fall of 1964 to determine seasonal growth of stocked fish. Net again in the spring of 1965 for evidence of winter survival.

OBJECTIVES:

The primary objective of this job is to obtain basic information through general, initial surveys on waters from which no fish-population, physical, or chemical data are available.

A secondary objective is to conduct follow up surveys on waters where additional information is needed to evaluate management practices on specific waters.

TECHNIQUES USED:

Twenty-five streams and 28 lakes were surveyed by standard methods during the report period. Survey data were recorded on standard Montana forms and are filed in the district office. Duplicate file copies of the Lake and Stream survey cards for waters covered in the 1962 field season have been sent to Helena. File copies of the lake survey cards for waters surveyed in the 1963 season will be prepared.

The following is a list of common names, abbreviations used, and scientific names used for all species mentioned in this report.

Scientific and common names are those listed in the American Fisheries Society Special Publication No. 2, 1960.

| Common Name | Abbreviation | Scientific Name |
|---|---|---|
| Kokanee | KOK | Oncorhynchus nerka (Walbaum) |
| Mountain whitefish | Wf | Prosopium williamsoni (Girard) |
| Cutthroat trout | Ct | Salmo clarki Richardson |
| Rainbow trout | Rb | Salmo gairdneri Richardson |
| Brown trout | LL | Salmo trutta Linnaeus |
| Brook trout | Eb | Salvelinus fontinalis Mitchill |
| Golden trout | Gt | Salmo aquabonita |
| Dolly Varden | Dv | Salvelinus malma (Walbaum) |
| Longnose sucker | F Su | Catostomus catostomus (Forster) |
| Largescale sucker | C Su Col. | Catostomus macrocheilus Girard |
| Sculpin | Cott | Cottus sp. |
| Northern Squawfish | SQ | Ptychocheilus oregonensis (Richardson) |
| Peamouth | CRC | Mylocheilus caurinus (Richardson) |
| Yellow perch | YP | Perca flavescens (Mitchill) |
| Pumpkinseed | PS | Lepomis gibbosus (Linneaus) |

All lengths of fishes in this report are presented as total lengths in inches.

### Mountain Lakes

A helicopter was used for transportation to survey 21 mountain lakes in the project area. Survey costs were charged to a state project, but, since the work done is closely related to this job, the data are included in this report. Lakes were surveyed by standard mountain lake methods, except where a lake's maximum depth was 20 feet or less, only depth, name and location were recorded.

## FINDINGS:

### Mountain Lakes

Forty-four hours and 40 minutes of helicopter flying time made the lake-survey transportation cost $3,350. This is $74.44 per lake which is $5 less than the lowest cost-per-lake we have had for rented, horse-back transportation. Extremes of the 21 lakes surveyed were 35 airline miles apart. Survey by horse-back would have taken at least 30 days, with the helicopter it took 13.

A list of the mountain lakes surveyed, showing location, area, number of nets set, numbers and species of fish collected, and average length and weight of fish by species is presented in Table 1. Growth rates for cutthroat, rainbow and brook trout are shown in Table 2.

Table 1. SUMMARIZATION OF MOUNTAIN LAKE SURVEY DATA, UPPER CLARK FORK RIVER DRAINAGE, JULY AND AUGUST 1962.

| Lake | Location (County) | Area in acres (Est.) | Number of Net Sets | Species | Number caught | Average length (inches) | Average weight (pounds) |
|---|---|---|---|---|---|---|---|
| Alpine | Granite | 17.5 | 2 | Rb | 2 | 20.4 | 4.45 |
| Carruthers | Powell | 8 | 1 | Ct | 49 | 7.6 | 0.13 |
| Dora Thorn | Granite | 3 | 1 | Rb | 2 | 13.2 | 0.73 |
| | | | | Ct | 27 | 8.9 | 0.25 |
| Four Mile Basin #1 | Deer Lodge | 3 | 1 | Rb | 3 | 9.5 | 0.42 |
| Four Mile Basin #2 | Deer Lodge | 1 | No sets made - Too shallow for fish | | | | |
| Four Mile Basin #3 | Deer Lodge | 12 | 1 | Gt | 1 | 9.0 | 0.23 |
| | | | | Eb | 42 | 7.8 | 0.16 |
| Four Mile Basin #4 | Deer Lodge | 10 | 2 | Gt | 50 | 8.8 | 0.24 |
| Four Mile Basin #5 | Deer Lodge | 4 | 2 | None caught | | | |
| Goat | Powell | 3 | No sets made | | | | |
| Ivanhoe | Granite | 7 | 1 | Rb | 5 | 11.4 | 0.52 |
| Big Johnson | Granite | 75 | 2 | Ct | 15 | 8.8 | 0.20 |
| Little Racetrack | Granite | 3 | 1 | Rb | 6 | 15.6 | 1.39 |
| | | | | Ct | 11 | 9.3 | 0.27 |
| Meadow #1 | Granite | 6 | 1 | Rb | 14 | 9.0 | 0.29 |
| | | | | Ct | 6 | 9.9 | 0.22 |
| Meadow #2 | Granite | 5 | 1 | Rb | 32 | 7.3 | 0.13 |
| Meadow #4 | Granite | 6 | 1 | Rb | 3 | 7.3 | 0.18 |
| Meadow #5 | Granite | 5 | 1 | Rb | 24 | 8.1 | 0.23 |

Table 1. Continued

| Lake | Location (County) | Area in acres (Est.) | Number of Net Sets | Species | Number caught | Average length (inches) | Average weight (pounds) |
|---|---|---|---|---|---|---|---|
| Mountain Ben | Powell | 10 | 2 | Rb | 28 | 9.4 | 0.26 |
| | | | | Ct | 18 | 9.0 | 0.22 |
| Sidney | Granite | 9 | 1 | Rb | 11 | 9.8 | 0.36 |
| | | | | Ct | 19 | 10.7 | 0.41 |
| Tamarack | Granite | 6 | 1 | No fish captured | | | |
| Unnamed | Powell | - | - | No sets made, too shallow for fish | | | |
| Unnamed | Powell | - | - | No sets made, too shallow for fish | | | |

Table 2. AGE AND GROWTH OF TROUT, MOUNTAIN LAKES, 1962

| Lake | Species | Average Length in Inches at Annulus I | II | III | IV |
|---|---|---|---|---|---|
| Alpine | Rb | 4.0 (2) | 9.9 (2) | 15.5 (2) | 18.5 (2) |
| Carruthers | Ct | 3.7 (35) | 6.2 (34) | 6.7 (4) | |
| Dora Thorn | Rb | 2.9 (2) | 7.2 (2) | 10.7 (2) | 12.4 (2) |
| | Ct | 5.0 (23) | 7.7 (11) | 9.8 (4) | |
| Four Mile Basin #1 | Rb | 4.3 (3) | 7.4 (2) | 10.2 (1) | |
| Four Mile Basin #3 | Eb | 3.5 (28) | 6.8 (25) | | |
| Ivanhoe | Rb | 2.6 (4) | 5.7 (4) | 9.0 (4) | 11.4 (2) |
| Big Johnson | Ct | 3.2 (14) | 6.3 (13) | 8.5 (3) | |
| Little Racetrack | Rb | 2.9 (6) | 7.2 (6) | 11.3 (6) | 13.8 (5) |
| | Ct | 3.9 (9) | 6.6 (9) | 8.7 (1) | |
| Meadow #1 | Rb | 3.2 (11) | 6.2 (9) | 9.1 (8) | 10.0 (1) |
| | Ct | 4.9 (5) | 7.9 (5) | 8.5 (1) | |
| Meadow #2 | Rb | 3.0 (32) | 6.5 (23) | | |
| Meadow #4 | Rb | 4.0 (3) | 6.0 (2) | | |
| Meadow #5 | Rb | 3.8 (19) | 6.7 (19) | 7.7 (5) | |
| Mountain Ben | Rb | 2.4 (28) | 6.1 (28) | 8.6 (22) | |
| | Ct | 3.5 (18) | 7.1 (16) | 8.3 (4) | |
| Sidney | Rb | 2.6 (11) | 6.6 (11) | 9.6 (7) | 10.0 (1) |
| | Ct | 4.0 (19) | 7.6 (19) | 9.0 (11) | 10.4 (1) |

Numbers in parenthesis indicate sample size.

## Salmon Lake

Summaries of the 1961 and 1962 catch data are shown in Table 3. The 1962 netting was done from October 23-26 and the 1961 from September 26-29, thus the kokanee spawning run was more advanced during the 1962 sampling, which probably accounts for the increased catch of this species. Of the 120 kokanee taken in 1962, 26 were immature and 94 were adults which were mostly ripe. The average length and weight of the immature salmon was 9.6 inches and 0.32 pounds, and of the adults was 12.6 inches and 0.71 pounds. Primarily due to this increased catch of kokanee and a decreased catch of perch and peamouth, the percent of game fish in the catch (by numbers) increased from 19.7 in 1961 to 28.8 in 1962.

Rainbow and cutthroat were very low in the catch in both years. The 1961 plant of 3- to 4-inch rainbow did not show up in the 1962 netting. Possibly they were still too small to be vulnerable to our smallest-sized mesh (3/4-inch square). Therefore Salmon Lake should be netted again in 1963.

Table 3. SUMMARIZATION OF SALMON LAKE CATCH DATA FOR 1961 and 1962

1961

| Species | CSuCol | SQ | CRC | F Su | YP | PS | Wf | KOK | Dv | LL | Rb | Ct |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No.caught | 83 | 178 | 177 | 62 | 242 | 10 | 117 | 44 | 15 | 6 | 2 | 1 |
| Ave.length | 12.61 | 11.36 | 11.16 | 13.00 | 6.50 | 5.33 | 11.12 | 9.60 | 14.47 | 14.20 | 13.8 | 8.2 |
| Ave.weight | .86 | .52 | .41 | .73 | .12 | .14 | .41 | .33 | .92 | 1.09 | .87 | .20 |
| % of Total | 8.86 | 19.00 | 18.89 | 6.62 | 25.83 | 1.07 | 12.49 | 4.70 | 1.60 | .64 | .21 | .11 |

1962

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No.caught | 100 | 103 | 96 | 84 | 113 | 9 | 101 | 120 | 16 | 6 | 1 | 1 |
| Ave.length | 13.1 | 10.7 | 11.1 | 13.0 | 6.5 | 6.2 | 10.9 | 12.0 | 14.3 | 15.5 | 13.2 | 10.9 |
| Ave.weight | 0.86 | 0.47 | 0.49 | 0.80 | 0.12 | 0.19 | 0.40 | 0.62 | 1.32 | 1.13 | 0.80 | 0.44 |
| % of Total | 14.3 | 17.2 | 10.1 | 8.9 | 19.8 | 1.0 | 13.5 | 12.6 | 1.7 | 0.6 | 0.1 | 0.1 |

## Rainy Lake

Rainy Lake, rehabilitated in 1958, was checked with 2 overnight gill net sets on October 18 and 19, 1963. The catch included 39 trout and 32 suckers. A comparison of the average catch per net of 1955-57 season with the 1962 season is shown in Table 4. Also included in the table is the number and average length of fish caught in 1962.

Table 4. RAINY LAKE CATCH DATA, 1955-62

| Species | Average catch per net 1955-1957 | Average catch per net 1962 | Number caught (1962) | Average length (1962) |
|---|---|---|---|---|
| Cutthroat | 0.6 | 16.0 | 32 | 11.5 |
| Dolly Varden | 1.2 | 3.0 | 6 | 14.8 |
| Rainbow | 0.0 | 0.5 | 1 | 17.4 |
| Suckers (F Su & C Su) | 6.5 | 16.0 | 31 | 9.3 |

Results of the average catch per net data show a considerable population increase of cutthroat trout in 1962 as compared to 1955-57 data.

The lake, supposed to have been replanted only with cutthroat in 1958, also revealed the presence of rainbow trout. Dolly Varden probably entered the lake from an untreated section of the Clearwater River above Rainy Lake.

Large numbers of suckers both longnose and largescale showed up in the catch. Apparently, the lake rehabilitation was successful in eliminating only northern squawfish, peamouth and yellow perch.

Few reports of angler success have been received to date. Although Rainy Lake possesses a good population of large cutthroat trout, fishing pressure is believed to be very light. Publicity has been given to the size and condition of fish captured and perhaps more pressure can be expected on this lake in the future. The lake should be resurveyed again in 1964.

## Coopers Lake

Coopers Lake in Powell County was surveyed on June 12 and 13, 1963. Three overnight gill nets resulted in a catch of 112 longnose suckers, 101 northern squawfish, 1 cutthroat and 1 rainbow.

Because of the large population of rough fish, the possibility of rehabilitating this lake was discussed with local home-owners. Several barrier sites on the outlet stream were investigated and discussed with a local rancher. Plans to rehabilitate the lake should be considered.

## Middle Bowman Lake

Middle Bowman Lake has been gill netted annually since 1960 to determine the effects of increased water levels and subsequent water fluctuations on the fish population. A special use permit was issued by the U. S. Forest Service to a landowner lower in the drainage to raise the water level of the lake 12 to 16 feet. The permit provides that the level of the lake will not be lowered below its natural level. The impounded water will be used for irrigation.

The dam construction began in 1960 and the lake was filled to its maximum level in 1962. Ten overnight gill net sets were made in 1960 followed by a series of 5 net sets in 1961 and 1962. All fish captured were weighed, measured and scale samples were taken.

The catch data from Middle Bowman Lake for 1960, 1961 and 1962 is shown in Table 5.

Table 5. CATCH DATA FROM MIDDLE BOWMAN LAKE 1960, 1961 and 1962

| Species | Ave. Catch per set '60 | '61 | '62 | No. of fish captured '60 | '61 | '62 | Ave. length (inches) '60 | '61 | '62 |
|---|---|---|---|---|---|---|---|---|---|
| Ct | 9.3 | 5.2 | 12.4 | 93 | 26 | 61 | 9.2 | 9.9 | 10.6 |
| Rb | 1.7 | 2.2 | 0.3 | 17 | 11 | 1 | 10.0 | 10.2 | 10.6 |

The average catch per net of cutthroat trout in 1962 was more than twice the average number caught in 1961 and slightly better than the average catch of 1960. The average catch per net of rainbow trout in 1963 showed a decrease from 1960 and 1961. The average length of both rainbow and cutthroat increased gradually from 1960 to 1963.

The growth rates of cutthroat trout for 1960, 1961 and 1962 are shown in Table 6.

Table 6. GROWTH RATES OF CUTTHROAT TROUT, BOWMAN LAKE 1960, 1961 and 1962.

| | Average length in inches at Annulus | | | |
|---|---|---|---|---|
| | I | II | III | IV |
| 1960 | 2.7 | 6.2 | 8.3 | 10.8 |
| 1961 | 2.8 | 6.1 | 8.9 | |
| 1962* | 3.0 | 6.6 | 10.0 | 11.6 |

*All age group I over 4.9" were moved to age group II

The average length of cutthroat trout showed gradual increases in all size groups from 1960 to 1962.

The average catch per set, the average lengths and annual growth of cutthroat trout have increased since the survey was initiated in 1960. No detrimental effects to the cutthroat population are evident as a result of increasing the water level of Bowman Lake. The survey should continue again in 1963 to determine the affects of seasonal drawdowns on the present fishery.

## Mud Lake

Mud Lake, a small pothole lake, was surveyed and found to have a good population of large rainbow along with a few cutthroat. One overnight gill net, set on June 12, 1963, caught 28 rainbow and 3 cutthroat trout, Table 7.

Table 7. AVERAGE LENGTH AND WEIGHTS OF RAINBOW AND CUTTHROAT TROUT CAPTURED IN MUD LAKE, JUNE 1963.

| Species | No. in sample | Ave. length in inches | Range (inches) | Ave. weight in pounds | Range (Pounds) |
|---|---|---|---|---|---|
| Rb | 28 | 10.1 | (6.0-17.4) | 0.57 | (0.11 - 1.82) |
| Ct | 3 | 8.9 | (8.3- 9.6) | 0.27 | (0.20 - 0.40) |

Access to this lake poses a problem as part of the shoreline entrance to the lake is on private land. The only public access to the lake is from the Bob Marshall Wilderness area side. No management changes are recommended.

Krohn Lake

Krohn Lake near Lincoln was surveyed and found to contain no fish. The lake is very productive and has a large population of food organism, mainly fresh water shrimp and caddis fly larvae.

An experimental plant of 780, 7- to 9-inch rainbow has been recommended for the spring of 1964 to obtain data on growth rates.

Krohn Lake is very shallow, with a maximum depth of 15 feet. Winter kills would probably be an annual occurrence. However, this productive lake may provide good seasonal fishing if good summer growth and harvest rates can be attained. The lake is on private land but the owner has agreed to permit public fishing if the lake is stocked.

Millers Lake

Millers Lake (Powell County), also known as Miller Creek Lake, has an area of 11 acres and was sampled with one 2-hour gill net set. During this short period, 45 longnose suckers, 2 rainbow and one cutthroat trout were captured.

The lake is used primarily for irrigation and watering stock and is subject to severe water fluctuations. At present, the lake is posted to fishing and fishing privileges are limited to a few local anglers. For this reason no future management plans have been proposed.

## Stream Surveys

### Blackfoot Streams

Initial surveys of six tributary streams to the Blackfoot River in the vicinity of Lincoln were made in July 1962. Surveys were made of Alice, Klondike, Stonewall, Beaver, Poorman and Keep Cool Creeks. Physical characteristics were recorded on stream survey forms. Survey data were obtained in conjunction with the observance of spruce budworm spraying in the area.

These streams are small, fast flowing spring-fed mountain streams that range from 5 to 18 feet in width and have a maximum depth of one foot. Stream flows ranged from 10 to 43 cfs. Small cutthroat trout in the 5- to 7-inch category are fairly abundant in most of these streams. Fishing pressure on these streams is generally regarded as light with the exception of Alice and Poorman Creek which receive the heaviest fishing pressure and have the best reputation of the local small streams.

### Ninemile Streams

Initial surveys were made of 19 tributary streams to Ninemile Creek in August 1962. Physical characteristics are recorded on stream survey cards. Five of the creeks surveyed were found to be dry. These creeks were Marion, Little Blue, Kennedy, Stony and Spring Creeks. The remaining 14 streams surveyed were:

| | | |
|---|---|---|
| Beecher | Devils | Pine |
| *Big Blue | *Josephine | Rennic |
| *Burnt Fork | *Martina | *Soldier |
| Butler | Mattie V. | *St. Louis |
| *Camp | McCormick | |

*May go dry during dry year

Most of the above streams surveyed are very small, contain small-sized fish and contribute little to the sport fishery. With the exception of Butler Creek, recorded stream flows ranged from 0.38 to 6.5 cfs. Butler Creek had a flow of 37.5 cfs. Stream widths ranged from 2 to 14 feet and

depth from .2 to .6 feet. Most of the streams contained cutthroat trout and in some cases brook trout were also present. Although accessibility to these streams is good via Ninemile Creek road, they are not popular because the fish do not attain a catchable size. A small dredge mill pool on Mattie V Creek was found to have a good population of 4- to 9-inch cutthroat.

Browns Lake Opening Day Creel Census

An opening day creel check was conducted at Browns Lake to determine an estimate of harvest and fishing pressure. Fishing pressure was extremely heavy in 1963 and many excellent catches of rainbow trout were made. Boats and shore fishermen were counted at three-hour intervals and 35 boats and 9 shore fishing parties were contacted during the day. The data obtained from anglers were: the number of fishermen in the party, the number of hours fished and the number of fish caught (rainbow trout). These data are presented in table 8.

Table 8. OPENING DAY CONTACT DATA, BROWNS LAKE, 1963.

| | Parties contacted | Anglers per party | No. of Anglers | Ave. length of trip | Man-hours fished | Fish caught | CPMH* | Catch per trip |
|---|---|---|---|---|---|---|---|---|
| Boat fishermen | 35 | 2.9 | 102 | 4.0 | 407 | 578 | 1.4 | 5.8 |
| Shore fishermen | 9 | 1.4 | 15 | 5.0 | 76 | 76 | 1.0 | 5.1 |

*Catch per man-hour

Boat fishermen averaged 1.4 fish per hour and 5.8 fish per trip as compared to 1.0 fish per hour and 5.1 fish per trip for shore anglers.

Estimates of total pressure and harvest are shown on Table 9. These are ratio estimates made from the contact data and the periodic boat and shore fishermen counts. An estimated 906 fishermen fished a total of 3834 hours and took 5020 fish. Boat anglers caught nearly four times the

number of fish as did the shore anglers.

Table 9. RATIO ESTIMATES OF OPENING DAY HARVEST AND FISHING PRESSURE, BROWNS LAKE, 1963

| | No. Fishermen | No. hours fished | No. fish caught |
|---|---|---|---|
| Boat fishermen | 696 | 2784 | 3960 |
| Shore fishermen | 216 | 1050 | 1060 |
| Total | 906 | 3834 | 5020 |

An opening day creel census should be repeated in 1964 to compare harvest and pressure estimates with the 1963 data.

Prepared by: Arthur N. Whitney and Robert J. Domrose

Date: May 1, 1964

Approved by George D. Holton
George D. Holton