MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION

JOB PROGRESS REPORT

State of Montana Name Northwest Montana Fisheries Study

Project No. F-7-R-18 Title Inventory of Waters of the Project

Job No. I Area

Period Covered April 1, 1968 to March 31, 1969

ABSTRACT

Fish population surveys were conducted on 24 lakes and 3 streams in District One to provide additional information for management of these waters. Water chemistry data (total alkalinity, specific conductance and pH) were collected in conjunction with fish population surveys.

Dissolved oxygen concentrations were measured beneath the ice during the late winter of 1969 for 42 lakes in the district. Critical oxygen levels of less than 1.5 ppm (surface readings) were recorded for 5 lakes. Contour maps of 10 lakes have been reproduced and printed from sonar depth recordings.

Opening day creel census data for Lake Mary Ronan is discussed briefly.

BACKGROUND

This is a continuing project designed to accumulate and update physical, chemical and biological data on waters in the district.

OBJECTIVES

The objective of this project is to obtain biological, chemical and physical data on lakes, streams and reservoirs and to prescribe management practices where needed.

PROCEDURES

Experimental gill nets of graduated mesh size from 3/4 to 2 inch (square measure) were used to sample fish populations in lakes. A mite-lite 110 volt generator in conjunction with a variable voltage pulsator was the power source used for electro-fishing to sample stream fish populations. Individual total lengths and weights of fish were recorded and scale samples collected. Lake depths were determined with either a Bendix Echo Sounder or a Lowrance Fish Lo-K-Tor. Alkalinity, pH and standard conductance determinations were made for most waters surveyed and are presented in table 1. Dissolved oxygen tests were made for a selected group of lakes. All data contained in this report are kept on file at the District One headquarters.

Table 1. Water chemistry data collected for lakes and streams surveyed in District One between April 1, 1968 and March 31, 1969

Lake or Stream	Date	Phenolphthalein Alkalinity (ppm)	Methyl Orange Alkalinity (ppm)	pH	Standard Conductance (Micro-Mho's/cm.)
Boyle	8/ 8/68	15	167	8.2	331
Blue	4/25/68	11	110	8.7	198
Cliff	8/26/68	0	200	7.9	379
Cree	4/17/68	10	115	8.2	234
Gilbertson	4/17/68	13	130	8.5	174
Grayling #1	4/25/68	10	143	8.5	276
Harbin	4/18/68	6	118	8.4	209
Mary Ronan	5/ 9/68	0	66	7.6	133
Loon	5/13/68	3	142	8.3	261
Metcalf	8/23/68	8	100	7.9	179
Northwestern	8/27/68	46	368	8.4	695
Rogers	2/26/68	0	132	7.1	210/70
Spill	4/25/68	9	108	8.4	155
Swimming	4/17/68	10	127	8.4	208
Horseshoe	7/15/68	8	122	8.4	117
Leon	7/15/68	0	61	8.0	224
Yaak River	8/20/68	0	92	7.7	163

FINDINGS

The following fish species were collected from lake and stream surveys conducted between April 1, 1968 and March 31, 1969. Game fish species collected were: rainbow trout (Salmo gairdneri), cutthroat trout (Salmo clarki), brook trout (Salvelinus fontinalis), lake trout (Salvelinus namaycush), kokanee (Oncorhynchus nerka), arctic grayling (Thymallus arcticus), mountain whitefish (Prosopium williamsoni), largemouth bass (Micropterus salmoides), and smallmouth bass (Micropterus dolomieui). Non-game species found were: yellow perch (Perca flavescens), pumpkinseed (Lepomis gibbosus), northern squawfish (Ptychocheilus oregonensis), largescale sucker (Catostomus macrocheilus), and longnose sucker (Catostomus catostomus).

Lake and Stream Surveys

Fish population surveys were conducted on 24 lakes and 3 streams in the District where additional data were needed for management. A summary of gill netting and fish shocking data is presented in table 2.

Contour maps of 10 lakes and reservoirs have been drawn up and printed from sonar depth recordings. These waters include Spencer, Carpenter, Frank, Island, Long, McDonald, Murphy and Rock Lakes; Kicking Horse and Mission Reservoirs.

Table 2. Summary of lake and stream population data collected by gill netting and electro-fishing between April 1, 1968 and March 31, 1969

Lake or stream (I.B.M. code no.)	Surface acres	Number sets	Species (number)[1]	Size range (inches) (game species)	Percent of game species	Average length (inches) (game species)
Flathead River drainage						
Boyle Lake (07-5500-03)	41	2	PS(38)	-	0	-
Blue Lake (07-5420-03)	8	1	PS(16)	-	0	-
Cabin Lake (07-5600-03)	17	1	YP(129)	-	0	-
Cliff Lake (No Code)	9	1	None	-	-	-
Cree Lake (07-5860-03)	3	1	Eb(16) Rb(1)	Eb(7.3-14.5) Rb(17.7)	100	Eb(8.6) Rb(17.7)
Gilbertson Lake (07-6480-03)	5	1	Eb(26) Rb(1)	Eb(7.1-17.9) Rb(7.7)	100	Eb(8.8) Rb(7.7
Grayling Lake #1 (07-6520-03)	3	1	Eb(23) YP(1)	Eb(6.2-11.3)	96	Eb(9.1)
Harbin Lake (07-6640-03)	2	1	Rb(3)	Rb(16.8-25.0)	100	Rb(19.9)
Lake Mary Ronan [2] (07-7700-03)	1506	5	Rb(5) PS(120) LMB(2)	Rb(11.6-19.9) LMB(5.1-10.6)	6	Rb(15.4) LMB(7.8)
Lake Mary Ronan [3] (07-7700-03)		5	Rb(4) KOK(3) LMB(1) PS(68)	Rb(10.7-16.9) KOK(13.7-19.6) LMB(7.2)	11	Rb(12.9) KOK(16.7) LMB(7.2)

Table 2. (Continued)

Lake or stream (I.B.M. code no.)	Surface acres	Number sets	Species (number)	Size range (inches) (game species)	Percent of game species	Average length (inches) (game species)
Lake of the Woods (07-7180-03)	64	2	Eb(10) YP(113) Rb(1) PS(44)	Eb(6.7-12.2) Rb(19.6)	7	Eb(8.3) Rb(19.6)
Lion Lake (08-9140-03)	35	3	Rb(32) Eb(2)	Rb(8.4-17.0) Eb(7.7-14.4)	100	Rb(11.2) Eb(11.5)
Loon Lake (07-7820-03)	15	3	Ct(2) LNSu(13) PS(84)	Ct(11.9-13.7)	2	Ct(12.8)
Northwestern Lake (No Code)	24	1	PS(20)	-	0	0
Rogers Lake (07-8400-03)	237	3	Gr(58)	Gr(10.5-11.8)	100	Gr(11.3)
Snill Lake (07-8820-03)	24	1	Rb(2) PS(2)	Rb(11.0-12.3)	50	Rb(11.7)
Swan River Backwater (07-4560-01)	23	2	YP(11) Sq(17) LNSu(7) PM(18)	-	0	-
Swimming Lake (07-9020-03)	8	1	Eb(1) PS(1)	Eb(10.1)	50	Eb(10.1)
Clark Fork River drainage						
Lowell Lake (No Code)	-	1	0	-	-	-
McGregor Lake (05-9216-03)	1328	5	LT(26) Rb(41) KOK(9) Wf(1) FSU(16)Eb(1)	LT(10.1-25.3) Rb(9.0-17.7) KOK(16.5-21.0) Eb(12.5) Wf(12.8)	83	LT(16.2) Rb(11.3) KOK(19.4) Eb(12.5) Wf(12.8)

Table 2. (Continued)

Lake or stream (I.B.M. code no.)	Surface acres	Number sets	Species (number)	Size range (inches) (game species)	Percent of game species	Average length (inches) (game species)
Kootenai River drainage						
Horseshoe Lake (11-8520-03)	159	3	CSu(30) LMB(1) Sq (96) PS(2)	LMB(17.6)	1	LMB(15.3)
Leon Lake (11-8760-03)	22	1	LMB(3) PS(8)	LMB(5.9-6.3)	10	LMB(6.1)
Little Leon Lake (11-8880-03)	12	1	SMB(1) Sq(13) Rb (1) CSU(1)	SMB(9.0) Rb(7.5)	13	SMB(9.0) Rb(7.5)
Long Lake (11-8930-03)	54	3	Eb (2) CSU(1)	Eb(17.0-18.0)	67	Eb(17.5)
Yaak River (3 sections) (11-7760-01)	-	-	Rb (52) Eb(11) Wf (5) FSu(14)	Rb(2.3-9.4) Eb(3.1-7.5) Wf(2.8-6.3)	87	Rb(5.2) Eb(3.7) Wf(4.0)
West Fork Yaak River (11-7480-01)	-	-	Rb (5) Ct(4)	Rb(3.8-6.1) Ct(3.5-5.5)	100	Rb(4.9) Ct(3.5)
East Fork Yaak River	-	-	Rb (27) Eb(44)	Rb(1.7-6.5) Eb(2.3-9.4)	100	Rb(4.7) Eb(4.9)

1/ Species abbreviations: Eb = brook trout, Rb = rainbow trout, Lt = lake trout, Ct = cutthroat trout, KOK = kokanee, Gr = arctic grayling, Wf = mountain whitefish, LMB = largemouth bass, SMB = smallmouth bass, PS = pumpkinseed, Yp = yellow perch.

2/ Spring netting data - 1968.

3/ Fall netting data - 1968.

Flathead River Drainage: Lake population surveys conducted in the Flathead River drainage include: Boyle, Blue, Cabin, Gilbertson, Grayling #1, Cree, Harbin, Lion, Loon, Metcalf, Northwestern, Rogers, Spill, and Swimming Lakes; Lake Mary Ronan, Lake of the Woods, and Swan River Backwater.

Boyle Lake, located 4 miles northwest of Whitefish, is a warm, shallow lake with submerged aquatic vegetation covering the entire lake basin. Pumpkinseed was the only species collected from two gill net sets. Road access to the lake is poor and no further management measures are anticipated in the near future.

Cree, Gilbertson and Grayling #1 Lakes, small pothole lakes located a few miles north of Creston, were found to support fair populations of brook trout. The brook trout population is self-sustaining apparently utilizing spring areas for spawning. No changes in management were recommended for these lakes.

Remnant populations of rainbow were found to be present in Harbin, Spill and Swimming Lakes. These lakes have been managed for rainbow trout and were recommended for restocking with sub-catchable rainbow trout.

Non-game fish, mainly pumpkinseed and yellow perch, dominated the catch from Lake of the Woods, Blue and Cabin Lakes. Cabin Lake is scheduled for rehabilitation in 1970 and will be restocked with a trout species. Blue Lake and Lake of the Woods will be considered for rehabilitation in the future.

Two gill nets set in Cliff (Blast) Lake near Whitefish were unsuccessful in catching fish. The lake has an area of about 2 acres with a maximum depth of 20 feet, and may be marginal trout habitat. Recommendations were made to stock the lake with cutthroat fry in an attempt to establish a trout fishery.

Northwestern Lake, a shallow lake located about 10 miles northwest of Kalispell, was found to be heavily populated with pumpkinseed. This lake has a maximum depth of 12 feet, is heavily choked with weeds and has no potential as trout habitat. Consideration for future management plans will be to introduce largemouth bass in an attempt to create a warm water fishery.

The annual spring and fall population data collected from Lake Mary Ronan in 1968 indicate low population levels of rainbow trout and immature kokanee. No kokanee were collected from the spring netting series while only three kokanee were collected from the fall netting series. The data collected in 1968 suggest that kokanee populations have declined considerably within the past year. In 1967, 58 immature kokanee were netted during the spring netting series as compared to only one immature kokanee collected from the fall netting series in 1967.

The decline in the Lake Mary Ronan kokanee population is also reflected by the low hourly catch rate of 0.22 game fish per hour reported during the summer creel census of 1968. It is recommended that spring and fall gill netting be continued to determine population trends in the relative abundance of game fish species. It is further recommended that annual rainbow trout plants be reduced from 70,000 to 40,000 in an attempt to reduce predation on kokanee fry plants.

Lion Lake was netted to determine the success of annual rainbow trout plants. Three overnight net sets yielded an average of 10.7 trout averaging 11.3 inches

per net. Lion Lake is located adjacent to the Hungry Horse Dam access road and receives heavy fishing pressure in both summer and winter. It is recommended that sub-catchable plants of cutthroat be substituted for rainbow trout if available.

Non-game fish, mainly pumpkinseed and longnose suckers were predominant in the net catch from Loon Lake near Ferndale. Loon Lake was rehabilitated in 1959 and restocked with cutthroat trout. Because of the re-establishment of non-game species, cutthroat trout plants will be discontinued. Smallmouth bass will be introduced from nearby Horseshoe Lake in an attempt to control the pumpkinseed population and create a smallmouth bass fishery.

Metcalf Lake lies about one mile northeast of the Goat Creek Ranger Station in the Swan River valley. Predominant in the catch were largemouth bass averaging 7.9 inches in total length, not a desirable size from the stand-point of management. It is recommended that the lake be rehabilitated sometime in the future or a desirable forage species be introduced to supplement forage food supply for the largemouth bass.

Rogers Lake was netted in April 1969 shortly after ice-breakup to determine the status of the grayling population. Severe oxygen depletions were incurred during the winter of 1967-68 and a complete kill of grayling was expected. Dissolved oxygen readings of less than 1 ppm were recorded just below the ice at 2 sampling stations in February and March of 1969. Rogers Lake had been restocked with 2-3 inch grayling fingerlings in October 1967 following lake rehabilitation the same year.

Three gill net sets yielded 58 grayling of which 66 percent of the females and 100 percent of the males were sexually mature. Although several decomposed grayling were observed along the shoreline, assumed to have died from lack of oxygen, it is surprising to note the large number that had survived. Additional dissolved oxygen sampling stations will be established in the winter of 1970 to determine if some areas of the lake are more oxygenated than others.

The Swan River backwater above the Bigfork Dam was netted in the spring of 1969 in an attempt to verify a report of northern pike being caught in the lower Swan River. Two nets set in the shoal areas in depths of 2 to 6 feet failed to catch this species. Further test nettings of the Swan River backwater will be done in the event further reports are received.

Clark Fork River Drainage: McGregor Lake was netted in October 1968 to determine the success of an initial kokanee fry introduction made in 1964. Nine mature kokanee, averaging 19.4 inches, were collected from 5 gill nets. Shoreline observations to locate specific kokanee redd areas were unsuccessful. Rainbow trout and lake trout were dominant in the catch averaging 8.2 and 5.2 fish per net set respectively. Fall netting of McGregor Lake will be continued to evaluate future kokanee spawning success.

Lowell Lake is located at the headwater of the North Fork of the Bull River in the Cabinet Mountain Wilderness Area at an elevation of 6,800 feet. One overnight gill net set was unsuccessful in catching fish. The lake was recommended for stocking with westslope cutthroat fry.

Kootenai River Drainage: Lake population surveys conducted in the Kootenai River drainage include Horseshoe, Leon, Little Loon and Long Lakes. Stream population surveys were conducted for the Yaak River and the East and West Forks of the Yaak River.

Horseshoe Lake, located approximately 50 miles west of Kalispell, has a maximum depth of 133 feet with a surface area of 159 acres. Squawfish and large-scale suckers were the dominant species collected from Horseshoe Lake, averaging 33 and 10 fish per net respectively. Future management plans include lake rehabilitation and restocking with a trout species.

Leon Lake lies adjacent to Horseshoe Lake and has a surface area of 17 acres with a maximum depth of 80 feet. Small pumpkinseed and largemouth bass comprised the majority of the catch from one gill net set. This lake is scheduled for rehabilitation in the fall of 1969 and will be restocked with a trout species.

Little Loon Lake has a surface area of about 5 acres and is connected to Loon Lake by a small channel. Among the species collected from an initial population survey, was a 9 inch smallmouth bass, believed to have originated from a plant of 3 inch fingerlings stocked in Loon Lake in 1965. Future population samplings will be conducted in Loon Lake and the outlet of Loon Lake to determine the movements and distribution of smallmouth bass in the watershed.

Long Lake, located in the vicinity of Eureka, was netted to determine the relative abundance of the brook trout population. Two large brook trout averaging 17.5 inches were collected from 2 overnight net sets. Recommendations were made to supplement low numbers of brook trout with a plant of cutthroat fry.

Fish population sampling was conducted in the Yaak River and the East and West Forks of the Yaak River above the Sylvanite Ranger Station to determine the feasibility of introducing brown trout. This study was done at the request of the Libby Rod and Gun Club to improve fishing in the Yaak River. The upper portion of the Yaak River is characterized by slow meanders with deep pools, the type of habitat generally associated with brown trout populations.

A total of 52 rainbow trout, 11 brook trout and 5 whitefish were collected by electro-fishing from three 500 foot sections of the Yaak River. In addition to game fish species, numerous sculpins, redside shiners and longnose dace were collected. Sparse populations of rainbow and cutthroat trout were found in the section shocked on the West Fork of the Yaak River while comparatively larger populations of small rainbow and brook trout were found in the East Fork of the Yaak River.

In view of the large numbers of forage fish species observed and the relatively low numbers of trout species an introduction of brown trout was recommended with the stipulation that no conflict occur with fisheries programs of other states and provinces downstream. In response to the brown trout introduction proposal, the Canadian Province of British Columbia advised against the brown trout introduction because of the possible predation on rainbow trout in the Kootenay Lakes. The recommendation was thus rescinded and an alternate program of catchable cutthroat was recommended in its place.

Table 3. Winter dissolved oxygen concentrations collected for 42 lakes during February and March, 1969

Collection Date	Lake	Depth At Sample Station	Dissolved oxygen concentrations in ppm[1/]		
			Surface	Mid-Depth	Bottom
2/13	Alkali	-	3.7	1.4 (15')	0.7 (30')
2/13	Lost	13'	0.1	-	0.1 (13')
2/13	Timber	-	6.3	6.1 (15')	3.9 (30')
2/13	Frank	13'	5.0	-	3.2 (13')
2/13	Rock	15'	5.0	-	1.1 (15')
2/13	Long	-	-	2.2 (15')	-
2/14	Baker	15'	0.0	0.0 (11')	0.0 (15')
2/14	Othrup	11'	0.6	0.3 (6')	0.7 (11')
2/14	Carpenter	33'	8.8	6.7 (20')	5.2 (33')
2/14	Sophie	20'	10.3	-	8.0 (20')
2/14	Moran	-	8.9	2.3 (15')	-
2/26	Rogers L. Sta. (I)	10'	0.7	0.2 (7')	-
2/26	Rogers L. Sta. (II)	13'	0.7	0.2 (7')	-
3/18	Rogers L.	15'	0.4	0.2 (5')	0.0 (15')
2/26	Rainbow L. (Hwy. 2)	28+'	5.5	4.6 (15')	1.5
2/26	Bootjack	20'	4.4	3.8 (10')	1.5 (18')
2/26	Little McGregor	20'	4.0	2.0 (10')	0.6 (18')
3/ 3	Ashley	-	10.0	8.6 (25')	8.6 (50')
3/ 3	Bitterroot	-	10.3	9.4 (25')	9.2 (50')
3/ 3	McGregor	-	10.3	9.2 (25')	9.4 (50')
3/ 7	Lake Mary Ronan (1)	28'	9.3	8.8 (20')	6.9 (28')
	Lake Mary Ronan (2)	43'	9.4	4.3 (30')	3.4 (43')
	Lake Mary Ronan (3)	35'	9.4	9.0 (20')	3.9 (35')
3/ 7	Skagg Lake	12'	5.1	2.9 (6')	1.1 (18')
3/ 7	Kilbrennan Lake	20'	6.6	4.0 (10')	1.1 (30')
3/ 7	Skinner	8'	9.5	8.1 (4')	1.2 (8')
3/ 9	Schoolhouse	18'	0.9	0.0 (9')	0.0 (18')
3/10	Hoskins	28'	4.5	1.0 (14')	0.7 (28')
3/10	Vinal	40'	4.5	1.2 (20')	1.2 (40')
3/10	Rainbow (Pipe Creek)	7'	4.0	-	1.8 (7')
3/10	Loon (Pipe Creek)	22'	0.5	0.0 (11')	0.0 (22')
3/11	Bull Lake	-	10.3	8.6 (15')	8.0 (28')
3/11	Spar Lake	40'	9.6	8.9 (20')	8.8 (40')
3/11	Grouse Lake	30'	1.2	-	0.0 (20')
3/13	Skyles	18'	9.5	-	0.0 (15')
3/13	Spencer	10'	7.8	2.2 (5')	0.1 (10')
3/13	Sunrise	20'	7.5	1.1 (10')	0.7 (15')
3/13	Cliff	18'	5.4	1.1 (10')	0.9 (15')
3/19	Rainbow-Dog	18'	9.4	4.9 (10')	2.6 (18')
3/26	Fran	15'	7.3	-	2.3 (12')
3/26	Russ	17'	6.6	-	4.3 (14')
3/29	Thornberg	35'	5.0	0.4 (10')	0.0 (20')
3/29	Rainbow (Whitefish)	8'	0.1	0.0 (5')	-
3/29	Dollar	45'	3.6	0.5 (25')	0.0 (45')
3/29	Woods	15'	-	-	0.5
3/29	Little Beaver	40'	7.5	1.1 (20')	0.0 (40')

1/ Dissolved oxygen reading standardized with a standard solution of sodium thiosulfate.

Winter Dissolved Oxygen Concentrations

Dissolved oxygen determinations were made for 42 lakes in the district during the late winter months of February and March of 1969 (Table 3). Snow and ice accumulation of greater than average depths (20 to 30 inches) prompted the monitoring of dissolved oxygen concentrations in several trout lakes. In most instances, dissolved oxygen samples were collected from the surface (immediately below the ice) at mid-depth and near the bottom. Of the 42 lakes sampled, critical levels of 1.5 ppm or less at the surface were recorded for 6 lakes (Table 3). These include Rogers, Lost, Grouse, Schoolhouse, Loon and Rainbow (Highway 93) Lakes. Fish population surveys will be conducted on most of these lakes in the spring of 1969 to determine if low winter oxygen levels resulted in winter fish mortality.

Opening Day Creel Census

Lake Mary Ronan: A total of 215 fishermen were censused at Lake Mary Ronan on the opening day (May 19th) of the 1968 general fishing season. These anglers were successful in catching 348 game fish in 1,386 hours angling effort. The catch per angler was 1.62 fish and the hourly catch rate was 0.25 fish. The species composition of the catch was 51 percent kokanee, 37 percent rainbow and 11 percent largemouth bass. The average length of kokanee and rainbow caught was 14.9 and 15.5 inches respectively. A comparison of opening day creel census data for the years of 1966 through 1968 is shown in table 4.

Table 4. Summary of opening day creel census data for Lake Mary Ronan.

Year	Fishermen Contacted	Fish Caught	Average Catch Per Fishermen	Average Catch Per Hour
1966	65	248	1.20	0.32
1967	98	118	1.20	0.25
1968	215	348	1.62	0.25

The catch per angler increased by 0.4 fish in 1968 as compared to 1967 while the hourly catch rate remained constant. In 1968, the Lake Mary Ronan creel census was conducted through the entire length of the general fishing season. Total fishing pressure and catch estimates for the entire 1968 fishing season will be presented in Job Completion Report F-7-R-18, Job No. 3.

RECOMMENDATIONS

It is recommended that the project be continued to obtain additional information on chemical, physical and biological characteristics of waters in the project area for purposes of evaluating present and instigating new management practices.

Management recommendations for all lakes are presented in the Findings Section.

Prepared by Robert J. Domrose
Robert J. Domrose

Date May 22, 1970

Code numbers of waters referred to in this report are as follows:

1-11782003
1-11902003
1-11980003
1-11834003
1-11946003
1-11932003
1-11806003
1-11962003
1-11924003
1-05939203
1-11798003
1-05909603
1-07522003
1-07730005
1-05921603
1-07862003
1-11864003
1-11958503
1-11950003
1-11854003
1-11994003
1-11940203
1-11898003
1-11804003
1-11964003
1-11844003
1-08968003
1-07880003
1-07662003
1-05940803
1-07643503
1-07846503
1-07910003
1-07836003
1-07600003
1-07958003
1-07728003

Additional code numbers of waters included in lake and stream surveys are listed in table 2.