MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State Montana Title Northwest Montana Fisheries Investigation

Project No. F-7-R-21 Title Inventory of waters of the project area

Job No. I-a

Period Covered April 1, 1971 through March 31, 1972

ABSTRACT

Fish population surveys were conducted for seven lakes and two streams in Region One to provide additional information for management of these waters. Water chemistry data (total alkalinity, standard conductance and pH) were collected in conjunction with most fish population surveys.

Winter dissolved oxygen concentrations were conducted for 42 lakes in February and March of 1972.

BACKGROUND

This is a continuing project designed to accumulate and update physical, chemical and biological data on streams and lakes in Region One.

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 125 feet in length and 8 feet in depth of graduated mesh size from 3/4 to inches (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 electrofishing to sample stream fish populations. Individual total length and weight of fish were recorded and

scale samples collected. Lake depths were measured with a Lowrance Fish-Lo-K-Tor. Water samples collected for complete water quality analysis were sent to the Montana Bureau of Mines for analysis. All data contained in this report are kept on file at the Region One Headquarters.

FINDINGS

The following fish species were collected from lake and stream surveys conducted between April 1, 1971 and March 31, 1972. Game species collected were: Rainbow trout (Salmo gairdneri), cutthroat trout (Salmo clarki), brook trout (Salvelinus fontinalis), Dolly Varden (Salvelinus malma), mountain whitefish (Prosopium williamsoni), kokanee (Oncorhynchus nerka), and largemouth bass (Micropterus salmoides). Non-game species found include: pumpkinseed (Lepomis gibbosus), northern squawfish (Ptychocheilus oregonensis), largescale sucker (Catostomus macrocheilus), longnose sucker (Catostomus catostomus), and peamouth (Mylocheilus caurinus).

Fish population surveys were conducted on seven lakes and two streams in Region One where additional data were needed for management. A summary of lake and stream population data is shown in Table 1 and 2.

Lake and Stream Surveys

Flathead River Drainage

Fish population surveys were conducted for the following lakes in the Flathead River Drainage: Lake Mary Ronan, Lake Five, Lake of the Woods, Halfmoon Lake, Mud Lakes, and Bitterroot Lakes.

The annual spring and fall fish population sampling was conducted for Lake Mary Ronan to monitor the relative abundance and survival of kokanee year classes. A total of 32 kokanee were collected during the spring sampling series or an average of 8.2 fish per net night. The fall catch of kokanee (non-spawning) totaled 6 fish or a catch of 1.2 fish per net night. The catch per net night of kokanee from both spring and fall collection showed a decrease when compared to spring and fall catches made in 1970.

The age composition of kokanee caught in the spring was 16 percent age II+ fish averaging 9.2 inches, 56 percent age class III+ averaging 12.6 inches, and 28 percent age class IV+ averaging 13.7 inches. The strong II+ year class from 1970 has carried over in a dominance of III+ fish in 1971.

Lake Five, Halfmoon and Mud Lakes, located in the vicinity of West Glacier, are interconnected with small tributary streams. These lakes were surveyed for the first time since being rehabilitated in May of 1968. After the lakes detoxified, Lake Five and Halfmoon were stocked in 1968, 1969, 1970 and 1971 with both subcatchable and catchable size cutthroat. Brook trout were reintroduced into Mud Lake in 1968.

Table 1. Summary of netting data collected from lakes in Region One between April 1, 1971 and March 31, 1972

Lake (I.B.M. Code No.)	Surface Acres	Number of net sets	Species (Number)1/	Percent game species	Size range (inches) (game species)	Average length (inches) (game species)
Halfmoon (08-8700-03)	54	2	Ct (42) LNSu (271) Ps (17)	13	Ct (6.7- 8.2)	Ct (8.2)
Lake Five (08-8550-03)	156	2	Ct (12) LNSu (9) Ps (1)	55	Ct (7.8-18.2)	Ct (9.2)
Mud Lake (08-9320-03)	6	1	Eb (9) Ct (1) LNSu (23) Ps (9)	21	Eb (6.2- 7.6) Ct (9.8)	Eb (6.7) Ct (9.8)
Lake of the Woods (07-7180-03)	62	3	Eb (3) Yp (65) Ps (34)	3	Eb (8.8-11.1)	Eb (10.2)
Little Bitterroot (07-7300-03)	2,925	5	Kok (55) Rb (4) Ct (1) LNSu (29) Pm (82) Yp (1)	34	Kok (10.5-12.0) Rb (9.0-19.9) Ct (11.8)	Kok (11.3) Rb (15.1) Ct (11.8)

Table 1. Continued.

Lake (I.B.M. Code No.)	Surface acres	Number of net sets	Species (Number)[1]	Percent game species	Size range (inches) (game species)	Average length (inches) (game species)
Lost Lake (05-9378-03)	16	1	Eb (14) LNSu (25)	36	Eb (6.3-11.5) LNSu (6.5- 9.7)	Eb (9.0)
Lake Mary Ronan[2] (07-7700-03)	1,517	6	Kok (22) Rb (5) Ps (87)	30	Kok (8.8-14.4) Rb (9.6-19.5)	Kok (12.3) Rb (12.4)
Lake Mary Ronan[3] (07-770-03)	1,517	5	Kok (22) Rb (3) LMB (1) Ps (142)	18	Kok (7.9-16.8) Rb (9.5-11.3) LMB (17.0)	Kok (13.6) Rb (10.3) LMB (17.0)

1/ Species abbreviations: Ct= cutthroat trout, Eb= Brook trout, Rb= rainbow trout, LMB=largemouth bass, Kok= kokanee, LNSu= Longnose sucker, Ps= Pumpkinseed, Yp= yellow perch.

2/ Spring netting series (5-5-71)

3/ Fall netting series (10-4-71)

Table 2. Summary of fish population data collected by electrofishing from Region One, April 1, 1971 through March 31, 1972.

Stream (I.B.M. Code No.)	Length of Stream Section (Feet)	Species (Number)[1/]	Size range (inches) (game species)	Percent Game Species	Average Length (species) (game species)
Kootenai River Drainage					
Stanley Creek 11-6480-01	1200	Eb (130) Wct (14) Rb (4)	Eb (1.5- 8.3) Wct (5.2-11.0) Rb (3.2- 7.3)	100	Eb (4.8) Wct (7.8) Rb (6.0)
Ross Creek (Campground section) 11-5640-01	600	Wct (71)	Wct (2.0- 9.2)	100	Wct (5.4)
Ross Creek (Lower section) 11-5640-01	600	Eb (16) Wct (11) Wf (1)	Eb (3.9- 7.0) Wct (4.6- 7.8) Wf (9.9)	100	Eb (5.8) Wct (5.6) Wf (9.9)

[1/] Eb= brook trout, Wct= westslope cutthroat trout, Rb= rainbow trout, Wf= mountain whitefish

Although excellent fishing has been reported for these lakes, small longnose suckers and pumpkinseed sunfish appeared in the gill net catch made in September of 1971. The catch composition from two overnight gill net sets was 55 percent cutthroat averaging 9.2 inches, 41 percent longnose suckers averaging 6.4 inches and 4 percent sunfish averaging 3.7 inches. The reappearance of longnose suckers was even more dramatic in Halfmoon Lake. The catch composition in Halfmoon Lake from two overnight gill net sets was 82 percent longnose sucker averaged 8.4 inches, 13 percent cutthroat averaging 8.2 inches and 5 percent pumpkinseed sunfish averaging 3.8 inches. One overnight net set in Mud Lake caught 55 percent longnose suckers averaging 9.1 inches, 21 percent sunfish averaging 4.7 inches, 21 percent brook trout averaging 6.7 inches and 2 percent cutthroat trout, averaging 9.8 inches.

Numerous spring seeps located throughout the lake system apparently have provided adequate cover escapement for fish during rotenone application. Because of the unsuccessful rotenone treatment and direct connection to underground waters, no further rehabilitation of these waters with chemicals is contemplated. It is recommended that cutthroat trout introductions be continued until the trout fishery begins to decline from competition by non-game species. At this time, a reassessment of management plans will be made.

Lake of the Woods, a 62-acre lake with a maximum depth of 15 feet was netted in May of 1971, to determine relative size and species composition of the fish populations. In former years, this lake supported populations of brook and rainbow trout but the trout fishery declined in recent years due to the increasing number of spinyray fishes. Three overnight gill net sets caught a total of 65 yellow perch, 34 pumpkinseed sunfish and 3 brook trout. Recommendations were made to renovate the lake with rotenone and restore the lake to a trout fishery.

Little Bitterroot Lake was sampled with five gill nets in 1971 to determine the size and distribution of mature kokanee. Kokanee were found to be well distributed throughout the lake with catches ranging from 4 to 27 fish per net, averaging 11 fish per net night. The species composition of the catch was 48 percent peamouth, 32 percent kokanee, 17 percent longnose suckers, 2 percent rainbow and cutthroat trout and 1 percent yellow perch. The kokanee collected averaged 11.3 inches and originated from fry plants made in 1968 and 1969. Recommendations were made to continue annual introductions of kokanee fry and determine the success and size variation of mature kokanee.

Fish population surveys were conducted for Lost Lake in the Clark Fork River Drainage.

Lost Lake, a 16-acre lake with a maximum depth of 25 feet, is located approximately 50 miles west of Kalispell. An initial survey was conducted to determine species composition and relative abundance of game fish populations. Brook trout comprised 36 percent of the catch as compared to 64 percent for longnose suckers. The skin of both fish species was heavily encysted with the larval genus Neascus, flatworm parasite. No changes in present management plans are anticipated.

Fish populations surveys were conducted for Stanley Creek and Ross Creek in the Kootenai River Drainage.

Both Stanley Creek and Ross Creek are major tributaries to Lake Creek draining lands where several mining claims have been established by the Kendicott Mining Company. An initial population survey inventory was conducted in August of 1971 to provide base line data on trout populations prior to mining development in the area. A summary of the stream population data is presented in Table 2.

Stanley Creek arises from a spring source flowing at a constant 42° F. with a volume flow estimated to be 45 cfs. The fish population sampling section lies approximately one mile below the stream source. A 1200 foot section of Stanley Creek was sampled with electrofishing gear to determine species and size structure of existing trout populations. A total of 148 fish were collected of which brook trout comprised 88 percent of the catch as compared to 9 percent for cutthroat trout and 4 percent for rainbow trout. Approximately 36 percent of the catch exceeded 6 inches in length.

Two sections (600 feet each) of Ross Creek above and below mining influence areas were sampled. The upper section is located near the headwaters of Ross Creek at the Ross Creek campground. The entire catch (71 fish) was comprised of cutthroat trout averaging 5.4 inches with a size range from 2.0 to 9.2 inches. Cutthroat trout exceeding 6 inches in length made up 31 percent of the catch. The fish population in the campground area seems to hold up well in a relatively heavy use area.

The lower section (600 feet) is located approximately one mile above Bull Lake and below the proposed mining influence zone. Brook trout is the dominent species in this section comprising 57 percent of the catch. Cutthroat trout made up 39 percent of the catch as compared to 4 percent for mountain whitefish. Approximately 29 percent of the total catch exceeded 6 inches in length.

A continuing effort will be made to determine the present status of fish population structure of other streams in the proposed mining development area. Base line data have been collected for three sections of the Bull River in the Clark Fork Drainage. Proposed stream population sampling will be conducted for Lake and Keeler Creeks.

Winter Dissolved Oxygen Measurements

Winter dissolved oxygen samples were collected from 42 lakes in Region One in late February and March of 1972 (Table 3). Heavy and prolonged snow accumulation prevailed through the winter of 1971-72. During the sampling period, the accumulations of packed snow on the ice ranged between 1 and 7 inches with an ice cover ranging from 12 to 20 inches.

Profile oxygen measurements were taken immediately beneath the ice surface, at mid-depth and near the bottom. In most cases, oxygen profile measurements were taken at the deepest portion of the lake basin.

Critical dissolved oxygen levels for fish life were found in several of the shallow pothole lakes near Creston. These lakes include Circle, East Bass, Garlick, Harbin, Kid, and Sawdust Lakes with maximum surface dissolved oxygen

Table 3. Winter Dissolved oxygen concentrations from 42 lakes (Surface, Mid-Depth and Bottom) during February and March, 1972.

Date	Lake	Depth at Sample Station	Surface	Mid-Depth	Bottom
2/16	Ashley	200'	10.4	8.5 (100')	4.2 (200')
2/16	Bitterroot, Little	240'	11.4	9.2 (120')	7.1 (240')
2/24	Blaine	120'	7.0	5.1 (60')	5.5 (120')
2/15	Blanchard	20'	6.5	5.6 (10')	1.7 (20')
3/ 8	Cabin	---	8.5	8.4 (7.5')	0.1 (15')
3/ 8	Circle	12'	2.3	0.8 (6')	0.8 (12')
3/ 3	Cree	---	5.8	1.4 (---)	0.5 (---)
2/25	Dickey	72'	6.3	6.4 (36')	2.3 (72')
3/ 2	Double	---	7.7	7.1 (---)	1.9 (---)
3/ 2	East Bass	13'	2.8	1.5 (6')	0.9 (13')
2/28	Echo	75'	9.8	3.6 (37')	2.2 (75')
2/16	Foy	140'	2.9	1.3 (70')	0.0 (140')
2/28	Foy	70'	3.5	3.3 (35')	0.9 (70')
3/ 2	Garlick	10'	2.8	1.7 (5')	1.5 (---)
3/ 3	Gilbertson	25'	8.3	1.5 (12')	0.1 (25')
2/25	Glenn	35'	6.7	5.6 (17')	0.9 (35')
3/ 8	Grayling #2	12'	6.8	6.7 (6')	6.5 (12')
3/ 3	Harbin	9'	1.5	1.4 (5')	1.2 (9')
2/22	Holland	130'	9.1	8.4 (65')	2.3 (130')
3/ 3	Kid	7'	2.1	1.8 (3')	1.5 (7')
2/28	Lake of the Woods	18'	8.9	7.8 (9')	2.5 (18')
2/22	Lindberg	115'	10.5	8.2 (65')	1.4 (115')
2/18	Loon (Ferndale)	45'	6.0	5.1 (22')	0.5 (45')
2/14	Loon (Hwy 2)	110'	9.0	5.2 (55')	1.0 (110')
2/23	Loon (Kraft Cr.)	7'	1.6	---	1.7 (7')
3/ 3	McGilvary	17'	6.1	5.5 (9')	2.8 (17')
2/14	McGregor	190'	10.5	9.7 (85')	5.6 (190')
2/25	Murphy	25'	9.8	6.5 (12')	2.3 (25')
3/ 8	Olive	18'	5.8	1.3 (9')	0.3 (18')
2/22	Pierce	30'	6.5	4.7 (15')	0.5 (30')
2/24	Plummer	15'	5.3	4.7 (8')	2.1 (15')
3/ 2	Pratt	10'	4.3	4.8 (5')	3.8 (10')
2/29	Rogers (Station #1)	18'	4.2	4.1 (9')	3.0 (18')
2/29	Rogers (Station #2)	12'	7.8	3.4 (6')	3.0 (12')
2/29	Rogers (Station #3)	13'	6.0	4.7 (7')	4.0 (13')
3/ 2	Sawdust	18'	0.8	0.5 (9')	0.4 (18')
2/14	Smith	7'	5.0	---	7.1 (7')
2/25	Stillwater, Lower	50'	9.7	1.9 (25')	0.8 (50')
2/24	Swan	120'	10.1	7.3 (60')	9.9 (120')
3/ 3	Swimming	6'	5.6	5.0 (3')	4.5 (6')
3/ 3	Tamrack	24'	9.1	4.4 (12')	0.4 (24')
2/14	Thompson, Lower	90'	6.6	2.1 (45')	0.0 (90')
2/14	Thompson, Middle	160'	6.1	4.1 (80')	0.0 (160')
2/23	Van	35'	5.0	2.8 (17')	1.1 (35')
2/15	Whitefish	220'	10.8	9.5 (110')	5.4 (220')

readings of 3.0 ppm. Other lakes exhibiting low surface reading were Foy's (3.5 ppm) and Loon (Kraft Creek Drainage - 1.5 ppm). In several lakes a rapid decrease in dissolved oxygen occurred at the mid and bottom sampling depths.

Rogers Lake which has a history of winter fish kills from low oxygen concentrations, exhibited a relatively high D.O. reading at all depths. The range of D.O. reading at three stations on Rogers Lake ranged from 7.8 to 3.0 ppm.

It is recommended that winter dissolved oxygen sampling of other lakes in Region One be continued to monitor oxygen levels during winters of heavy snow accumulations.

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 the purpose of evaluating present and instigating new management practices.

Prepared by Robert Domrose

Date May 30, 1973

Waters Referred to:

Code numbers of waters referred to other than those in tables 1 and 2 are as follows:

7-5220-03	7-6420-03	7-7420-03	7-8530-03
7-5380-03	7-6460-03	11-8940-03	7-8700-03
7-5400-04	7-6480-03	7-7440-20	7-7600-20
7-6500-03	11-8380-03	7-7760-03	7-9000-05
7-5720-03	7-6540-03	5-9216-03	7-9020-03
7-5860-03	7-6640-03	7-8060-03	5-9152-03
11-8220-03	7-6780-03	7-8140-03	5-9760-03
7-6020-03	7-7180-03	7-8280-03	7-9480-03
7-6140-03	7-8400-03	7-8283-03	7-9540-03
7-6180-03	7-7260-03	7-8340-03	