MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State Montana Title Northwest Montana Fisheries Investigation

Project No. F-7-R-22 Title Fish Management Surveys

Job No. I-b

Period Covered April 1, 1972 through March 31, 1973

ABSTRACT

Opening day creel census data were collected for Kilbrennan Lake and Lake Mary Ronan. Fishing pressure estimates in 1972 were identical to the 1971 estimates; however, the total catch was down 9 percent from 1971. Total harvest estimates (opening day) for the past seven years (1966-1972) averaged 1,810 fish. The average catch per angler over this same period was 5.6 fish. The increase in catch of brook trout in excess of 10 fish per angler varied between 4.1 and 9.7 percent of the total opening day harvest.

The average catch from a total of 133 anglers checked at Lake Mary Ronan on opening day was 4.7 fish. Kokanee comprised 80 percent of the catch. Angling success in 1972 was the best recorded since 1966. Anglers were 3 times more successful in 1972 as compared to 1971.

Fish populations of seven Swan River tributary streams were sampled. Brook trout were found to be most abundant at lower elevation, low gradient streams and cutthroat, the dominant fish species at higher elevations. Physical features of tributary streams and fish species related to habitat types were determined for Goat Creek, North Fork and South Fork of Lost Creek.

Water quality data and bottom fauna samples were collected from stations in the Prospect Creek, Lake Creek and Bull Lake drainages to establish base data for streams subjected to present and future mining development.

BACKGROUND

Data other than fish population inventories are pertinent to the needs of fisheries management. This is a continuous project designed to accumulate and update information on various aspects of fisheries management procedures.

OBJECTIVES

The objective of this job is to obtain information for fisheries management and for evaluation of various management procedures.

PROCEDURES

Procedures are discussed along with the findings for each segment of the report.

FINDINGS

Opening Day Creel Census

Kilbrennen Lake

An opening day creel census was conducted at Kilbrennen Lake for the seventh consecutive year to determine the effect of a statewide ten-pound, no number limit for brook trout on total opening day harvest. The liberalized brook trout limit was adopted in 1966 as a measure to encourage increase fishing pressure for this species in Montana's lakes and streams. Theoretically, the reduction of brook trout from over-abundant populations will reduce intraspecific competition and improve the quality of the fishery.

Kilbrennen Lake, 58.5 acres, is unique in that it is the only self-sustaining brook trout lake that has a closure during the spawning period. The angling season is from mid-May through September. The lake is fed by several small springs and a small tributary stream (Feeder Creek) which provides adequate spawning habitat for brook trout. This lake probably receives more fishing pressure than any other lake in northern half of Lincoln County, most of which occurs in the months of May and June.

In 1972, a total of 297 fishermen were contacted on opening day. Fishermen were successful in catching 1,629 fish for 1,295 hours of fishing effort. The average catch per hour was 1.3 fish and the catch per angler 5.9 fish. The average length of the fishing trip was 4.4 hours. Brook trout comprised 99 percent of the catch with the remaining 1 percent being rainbow trout.

Average individual total length and weight measurements taken from 112 brook trout were 10.4 inches and 0.40 pounds. Local angling pressure, mostly from towns of Libby and Troy, made up 91.6 percent of the angling pressure while non-residents (Idaho, Washington, Michigan and California) comprised 8.4 percent of the fishermen.

Estimated fishing pressure estimates in 1972 was identical to that of 1971 although the total catch was down 9 percent. The average length of trip was about 1 1/2 hours longer in 1972 as compared to 1971. This may have been a result of a fishing derby conducted by the Libby Rod and Gun Club, encouraging anglers to fish longer for a prize winning fish.

A comparison of data (contact and expanded) for the years 1966 through 1972 is shown on Table 1. Fishing pressure and harvest data were derived from contacting all boat and shore fishermen during the census period. Expanded data were derived from fishermen boat and shore counts at the termination of the census. Total estimated fishing pressure and harvest are the sum of the contact data plus the expanded data.

Since 1966, opening day fishing pressure estimates have fluctuated from 243 anglers in 1966 to a high of 407 in 1967. The increase in angling pressure was concurrent with the influx of Libby Dam construction work force in 1967. The angling pressure over a seven-year period averaged 334 anglers.

Total harvest estimates for the seven-year period averaged 1,810 fish with a low of 1,106 fish in 1969 to a high of 2,808 fish in 1968. Brook trout comprised

between 98 to 99 percent of the total harvest during this period. Rainbow trout made up the remainder of the catch. The average catch per angler rate was highest in 1968 when 7.3 fish per angler were creeled. The lowest was 3.2 fish per angler in 1969 and the seven-year average was 5.6 fish.

The increase in the opening day brook trout harvest attributed to the ten-pound, no number limit varied between 4.1 and 9.7 percent (1966-1972). The smallest increase of 4.1 percent in 1966 was probably due to fishermen not being aware of the regulation change. Over the past four years, the annual opening day harvest due to the liberalized brook trout limit varied between 5.3 and 9.4 percent. In 1972, 158 fish were caught in excess of the former 10 fish limit.

Based on opening creel information trends over the past seven years, the ten-pound, no number limit adopted in 1966, has had no appreciable effect on reducing the quality and quantity of brook trout fishing in Kilbrennen Lake. Although total harvest and catch rates of brook trout fluctuate from year to year, there appears to be no downward trend of harvest or increase in fishing pressure. The variations in harvest are probably due to strong year classes of older age fish rather than the over-harvest resulting from a change in the brook trout bag limit. It is recommended that opening day creel census be conducted every third or fourth year to monitor trends in brook trout harvest, fishing pressure and size distribution of fish.

Lake Mary Ronan

A qualitative type creel census was conducted at Lake Mary Ronan on the opening day of the 1972 fishing season to monitor harvest rates and compare them with previous years. A total of 133 anglers interviewed caught 622 fish at the rate of 4.7 fish per angler and 1.31 fish per hour. Kokanee comprised 80 percent of the catch, rainbow 15 percent, and largemouth bass 5 percent. Angling success in 1972 was the best recorded since the opening day census was initiated in 1966. The average angler was 3 times more successful in 1972 as compared to 1971. A comparison of opening day creel census data for the years 1966 through 1972 is shown in Table 2.

Swan River Drainage Inventory

Stream population sampling was conducted for seven tributary streams in the Swan River Drainage in 1972. Electrofishing gear was used to sample fish populations to determine the relative abundance, size and species distribution.

A total of 461 fish were collected from the streams sampled. Collectively, cutthroat were most numerous comprising 51 percent of the catch, followed by brook trout and Dolly Varden. Brook trout appeared to be the dominant species in the lower elevation streams and cutthroat trout the dominant species at higher elevations. Non-game species were absent from the catch of streams sampled in 1972. A summary of streams sampled with electrofishing gear is shown in Table 3.

Hook and line sampling over longer sections of streams was conducted in late July and early August on three tributary streams. A foot reconnaissance of 1 1/2 miles of the North Fork of Lost Creek and 1 1/2 miles of South Fork of Lost Creek in T24N R17W S5 was conducted on July 26, 1972. The physical aspects of the stream sections were characterized by long shallow pools, few meanders and a

moderate stream gradient (1.5 to 1.9 percent). The deepest pools were found where log jams diverted the stream and scoured out large depressions, the deepest being about five feet. These usually occurred on the bend of a sharp meander. Bottom types were primarily boulder and rubble (approximately 95 percent) and 5 percent gravel. Water temperatures ranged from 51° to 53°. Fallen logs, log jams and large boulders provided the bulk of the cover. A dense forest canopy created excellent overhead shade cover. The streams appeared to be fairly stable with only a few new channel cuts being noticeable. No beaver dams or spring seep areas were observed in these stream sections.

Fish inhabiting these sections were cutthroat trout and Dolly Varden as determined by hook and line sampling. Fish caught at random in the South Fork of Lost Creek included two Dolly Varden ranging from 6.0 to 15.0 inches and six cutthroat ranging from 7.0 to 12.0 inches. A total of 9 cutthroat ranging from 7.6 to 13.1 inches were taken from the North Fork of Lost Creek. No brook trout were caught or observed in either stream section. These particular stream sections would rate from good to excellent as a quality wild cutthroat trout fishery.

Goat Creek, was similarly sampled by hook and line over a 2.7 mile stream section located at T23N R19W S16 and 17 on August 2, 1972. This section of stream has a gradient of 1.3 percent and is characterized by frequent pools ranging in depth of 2 - 4 feet. Bottom types were judged to be 50 percent rubble, 30 percent coarse gravel and 10 percent silt. Overhead canopy cover and stream side vegetation cover was rated as excellent.

Goat Creek did not appear to have stable conditions as did the North Fork and South Fork of Lost Creek. The creek divides in several areas forming numerous side channels with bottom types of fine gravel and silt. One old abandoned beaver pond was observed creating a silt-laden pond. Despite numerous downfalls obstructing the stream channel, fish passage of migratory Dolly Varden is possible.

Fish caught in the Goat Creek section include 13 brook trout 5.5 to 10.6 inches, 9 Dolly Varden 4.7 to 20.0 inches, 1 mountain whitefish and 3 cutthroat trout 4 to 6 inches. This section of stream could be rated as brook trout-Dolly Varden type habitat.

Future emphasis on the Swan River tributary stream survey's will be placed on catagorizing stream habitat types as related to fish species composition. Surveys of this type will be conducted on foot covering stream sections of various types of habitat and sampling streams with either a back-pack shocker or hook and line sampling.

Staff gauges located near the mouths of tributary stream were read at regular intervals to determine seasonal flow regimes. Velocity and volume flows were recorded with a Price current meter at various flow regimes. Low flow measurements were recorded in late summer and early fall for most tributary streams.

Water quality data were collected periodically during the spring and summer months. Data collected include alkalinity, conductivity, pH and turbidity. Water quality data and maximum-minimum stream flow measurements are presented in Table 4.

Water quality and stream population inventories will continue for the Swan River tributaries in 1973.

Water Quality Base Data

Water quality data were collected for several streams in northwestern Montana to establish base line data for waters subjected to possible chemical alteration from recent and proposed mining developments.

In January, 1971, the U.S. Antimony Corporation began operation of an antimony ore concentrator and the construction of two small tailings ponds. The operation is located approximately 15 miles upstream from the mouth of Prospect Creek near Thompson Falls.

Recent exploratory cooper mine development in the Spar Lake area by the Bear Creek Mining Company (subsidery of Kendicott Copper Co.) initiated the need for water quality sampling of streams in the Bull River and Lake Creek drainages.

Water quality monitoring was initiated in January of 1970 and was conducted for a years duration through December, 1971. Sampling stations were established above and below mining influence zones on the Bull River (3), Lake Creek (2), Stanley Creek (1), Ross Creek (1), Prospect Creek (3) and Cox Creek (1). Water quality analysis was contracted to the Montana Bureau of Mines in Butte. Water quality parameters include several of the heavy metals and nutrient elements. All water quality parameters were coded on IBM cards, copies of which are kept on file at the regional and Helena offices.

Aquatic invertebrate sampling was initiated in the spring of 1972 to measure relative abundance and species composition of the aquatic insect populations. Samples were collected above and below mining influence zones. Seasonal collections (spring, summer, fall and winter) were taken for most sampling stations. Squarefoot samples (round samples described by Waters and Knapp, 1961) from the left side, right side and middle of the wetted stream perimeter were sampled at each sampling location. Samples were preserved in formalin and sent to Helena where identification of insects was made to Order. Insect organisms were enumerated and measured volumetricly. Classification of tolerant and sensitive insect organisms was determined. Bottom fauna collection data are kept on file at both the Helena and Region One offices.

Fish population sampling using electrofishing gear was conducted previously in 1970 and is reported in completion report F-7-R-20, Job I-a and F-7-R-21, Job I-a. Stream population surveys include: Prospect Creek (3 sections) Bull River (3 sections), Stanley Creek (1 section) and Ross Creek (2 sections).

It would appear that present water quality parameters of streams in the proposed mining influence zones are within tolerance limits of supporting wild trout populations. Thriving wild trout population as evidenced by fish population sampling in 1970 support these data.

Because of monetary and personnel limitations, the Montana Department of Fish and Game will discontinue water quality sampling. However, the U.S. Forest Service has expressed interest in continuing water quality monitoring and will set up their own sampling system. The Montana Department of Fish and Game will continue monitoring game fish populations and will sample fish populations in stream drainages where further mining development is proposed.

RECOMMENDATIONS

It is recommended that the project be continued to obtain information needed for evaluation of the success of various management procedures no covered by routine inventory type surveys.

LITERATURE CITED

Waters, Thomas F. and Robert J. Knapp. 1961. An improved stream bottom fauna sampler. Trans. Am. Fish. Soc., Vol. 90, No. 2. 225-226pp.

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Waters referred to:

Beaver Creek	7-0240-01
Cedar Creek	7-0740-01
Condon Creek	7-0880-01
Cold Creek	7-0860-01
Cold Creek, So. Fk.	7-4080-10
Cold Creek, No. Fk.	7-3160-10
Dog Creek	7-1180-01
Elk Creek	7-1340-01
Glacier Creek	7-1700-01
Goat Creek	7-1720-01
Jim Creek	7-2240-01
Kraft Creek	7-2340-10
Lion Creek	7-2420-01
Lost Creek	7-2560-01
Lost Creek, So. Fk.	7-4200-01
Lost Creek, No. Fk.	7-3200-01
Piper Creek	7-3440-10
Pony Creek	7-3500-01
Rumble Creek	7-3760-01
Soup Creek	7-4020-01
Squeezer Creek	7-4340-01
Woodward Creek	7-5100-01

Table 1. Summary of opening day creel census data collected at Kilbrennan Lake, 1966 through 1972

Year	CONTACT DATA			EXPANDED DATA				
	Anglers	Fish	Catch per Angler	Anglers	Fish	Anglers Hours	Total (lbs)	Catch (lbs per surface acre)
1966	177	1042	5.9	243	1328	1070	611	10.4
1967	335	2077	6.1	407	2460	1702	900	15.3
1968	357	2597	7.3	386	2808	940	1053	18.0
1969	335	1055	3.2	384	1106	1484	677	11.6
1970	262	1328	5.1	301	1478	1260	872	14.9
1971	275	1623	5.9	309	1824	925	894	15.2
1972	297	1629	5.5	309	1667	1327	667	11.4
7-year Average	291	1622	5.6	334	1810	1244	811	13.9

Table 2. Summary of opening day creel census collected from Lake Mary Ronan, 1966 through 1972

Year	Fishermen contacted	Number fish caught	Average catch per angler	Average catch per hour
1966	65	248	1.2	0.32
1967	98	118	1.2	0.25
1968	215	348	1.6	0.25
1969	62	58	0.9	0.18
1970	100	127	1.3	0.35
1971	52	76	1.5	0.57
1972	133	622	4.7	1.31

Table 3. Summary of stream population sampling of seven Swan River tributary streams, 1972.

Stream	Length of Section	Species (number)	Size Range -inches- (game species)	Average Length -inches- (game species)
Beaver Creek (Mid section)	600	Eb (114) Ct (24)	Eb (2.0-12.4) Ct (3.0- 7.5)	Eb (5.0) Ct (4.7)
Beaver Creek (Upper section)	550	Ct (105)	Ct (2.2- 8.2)	Ct (4.3)
Cold Creek	500	Eb (12) Ct (1) DV (13)	Eb (4.3- 9.2) Ct (6.1) DV (3.3- 7.4)	Eb (6.8) Ct (6.1) DV (4.8)
Elk Creek	600	Eb (1) Ct (2) DV (4)	Eb (4.9) Ct (3.1- 7.3) DV (4.0- 5.6)	Eb (4.9) Ct (5.2) DV (4.6)
Glacier Creek	600	Eb (5) Ct (10) DV (15)	Eb (4.2-11.7) Ct (3.3- 7.5) DV (2.2- 7.4)	Eb (6.7) Ct (5.7) DV (4.9)
Kraft Creek	600	Eb (35) Ct (25) DV (2)	Eb (3.2- 8.0) Ct (2.9- 7.9) DV (5.0- 5.4)	Eb (5.7) Ct (5.0) DV (5.2)
No. Fk. Cold Creek	600	Ct (50) DV (1)	Ct (2.2- 6.6) DV (7.0)	Ct (4.4) DV (7.0)
So. Fk. Cold Creek	600	Ct (20) Eb (22)	Ct (2.9- 7.4) Eb (2.0- 9.5)	Ct (4.8) Eb (5.4)

Species Abbreviations: Eb = Brook trout, Ct = Cutthroat trout, DV = Dolly Varden.

Table 4. Upper and lower limits of various water quality parameters, Swan River tributaries, 1972

Stream	pH (units)	Total Alkalinity (ppm)	Conductance (Micro mhos/cm)	Turbidity (J.T.U.)	Min - Max Flow (CFS)
Beaver Creek	7.5 - 7.8	25 - 59	57 - 97	3 - 15	9.2 - NA
Cedar Creek	7.8 - 8.0	72 - 120	148 - 220	0 - 19	19.7 - 290
Condon Creek	7.2 - 7.8	61 - 78	111 - 178	0 - 22	5.5 - 68
Cold Creek	7.9 - 8.0	65 - 90	132 - 136	3 - 10	22.0 - 205
Cold Cr., S. Fk.	7.9 - 8.0	59 - 127	115 - 209	0 - 16	1.1 - NA
Dog Creek	7.4 - 7.9	55 - 65	84 - 134	0 - 10	3.5 - 55
Elk Creek	8.0 - 8.1	56 - 87	112 - 152	0 - 25	41.8 - 294
Glacier Creek	7.2 - 7.6	20 - 42	49 - 65	0 - 23	37.7 - NA
Goat Creek	7.9 - 8.2	115 - 151	235 - 342	0 - 15	16.9 - 323
Jim Creek	7.9 - 8.2	60 - 100	114 - 165	1 - 9	25.9 - NA
Lion Creek	7.8 - 8.2	75 - 115	153 - 238	0 - 11	12.9 - 760
Lost Creek	8.0 - 8.2	100 - 153	201 - 321	0 - 15	15.4 - 410
Lost Cr., S. Fk.	8.2 - 8.3	110 - 150	182 - 250	0 - 6	14.1 - NA
Lost Cr., N. Fk.	8.2 - 8.3	97 - 138	219 - 245	0 - 5	10.3 - NA
Piper Creek	7.5 - 7.9	25 - 77	63 - 165	0 - 15	7.1 - 104
Pony Creek	7.4 - 7.9	71 - 94	151 - 198	0 - 15	2.2 - 41
Rumble Creek	7.6 - 8.1	71 - 98	153 - 216	0 - 55	1.8 - 46
Soup Creek	8.0 - 8.3	149 - 192	276 - 324	0 - 23	2.4 - 89
Squeezer Creek	8.0 - 8.1	105 - 133	199 - 234	2 - 18	8.3 - 206
Woodward Creek	8.0 - 8.1	83 - 100	171 - 179	0 - 8	34.8 - 103

NA - Not Available