MONTANA FISH AND GAME DEPARTMENT
FISHERIES DIVISION
HELENA, MONTANA

JOB COMPLETION REPORT
RESEARCH PROJECT SEGMENT

State of Montana

Project No. F-7-R-15 Name: Northwest Montana Fishery Study

Job No. 1 Title: Inventory of Waters of the Project Area

Period Covered: July 1, 1965 to June 30, 1966

ABSTRACT:

The fish populations of 11 tributary streams to the Swan River above Swan Lake were censused with electrofishing gear to obtain general information regarding age, growth and population structure by species. Brook trout were found to be the most abundant game fish followed by Dolly Varden and cutthroat.

Fish population surveys were conducted for 21 lakes in the district to provide additional information for the management of these lakes. Contour maps of 11 lakes were produced from electronic soundings. Opening day creel census information was collected for Kilbrennan and Mary Ronan Lakes to obtain angling pressure and catch rates.

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 are made for the following waters in the project area.

(1) Swan River Drainage

Swan Lake and Swan River tributaries: Remove 18-inch size limit on Dolly Varden trout, initiate tagging study to determine movements and return to the creel of rainbow plants in the Swan Lake and Swan River.

Holland Lake: Substitute westslope cutthroat trout plants for rainbow trout when westslope cutthroat trout become available.

Pierce Lake: Reduce stocking quotas of rainbow trout. Seek a marked access site on Flathead National Forest lands.

Pick-up Lake: Lake is too shallow to manage --- discontinue stocking.

(2) Flathead River and Clark Fork Drainages

Little Bitterroot Lake: Remove beaver dams in Herrig Creek which obstruct spawning migration from the lake.

Lake Mary Ronan: Decrease catchable rainbow trout stocking quotas --- continue population sampling and collection of creel census data.

Middle Ashley Lake: Follow-up grayling fry plants.

Tally Lake: Plant kokanee on experimental basis annually for four years. Also, make several plants of lake trout fingerlings on alternate years in an effort to establish population.

Echo Lake: No change in management plans.

Lower Crow Creek Reservoir: Reduce rainbow trout stocking quotas because of annual drawdowns; do not stock during years of extreme drawdowns when gates are being repaired.

Rainbow-Dog Lake: Rehabilitate and restock with rainbow trout.

Thompson Lake, Lower: No change in management plan.

Thompson Lake, Middle: No change in management plan.

Thompson Lake, Upper: No change in management plan.

(3) Kootenai River Drainage

Alvord Lake: No immediate change in management plan.

Crystal Lake: No change in management plan.

Loon Lake (Highway 2): Continue surveillance of northern pike population.

Dickey Lake: Continue checking rainbow trout population and restock every 2 or 3 years as necessary.

Murphy Lake: No change in management plan.

Loon Lake (Pipe Cr.): Construct dike across outlet of lake to increase water level.

OBJECTIVES:

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

TECHNIQUES USED:

Experimental gill nets of graduated mesh size from 3/4 to 2 inches (bar measure) were used to sample fish populations in lakes. Individual total lengths and weights of fish were recorded and scale samples

collected for age and growth analysis. Age and growth data have not been analyzed to date but will be incorporated into the F-7-R-16 completion report. Stream populations were sampled with electrofishing gear. A Mite-E-Lite generator with a capacity of 115-volts and 1,500-watts provided the power. Lake depths were determined by use of a Bendix echo sounder. Tracings of either aerial photos, geological survey maps or Forest Service maps were enlarged with a pantograph and served as work maps. Electronic soundings provided the information for bottom contours and were transferred to the outline work map. Reduced copies of the finished lake contour maps were printed and made available for public distribution.

Alkalinity, pH, and conductivity were collected from all waters surveyed. Dissolved oxygen tests were made where necessary.

Lake and stream survey data are kept on standard survey file cards at both the district and Helena offices.

FINDINGS:

The following fish species were collected from lake and stream surveys conducted between July 1, 1965 and June 30, 1966. Game fish species found were: lake whitefish, Coregonus clupeaformis; mountain whitefish, Prosopium williamsoni; pigmy whitefish, Prosopium coulteri; kokanee, Oncorhynchus nerka; cutthroat trout, Salmo clarki; rainbow trout, Salmo gairdneri; brook trout, Salvelinus fontinalis; Dolly Varden, Salvelinus malma; arctic grayling, Thymallus arcticus; largemouth bass, Micropterus salmoides. Non-game fish species found included: peamouth, Mylocheilus caurinus; northern squawfish, Ptychocheilus oregonensis; redside shiner, Richardsonius balteatus; longnose sucker, Catostomus catostomus; large-scale sucker, Catostomus macrocheilus; pumpkinseed, Lepomis gibbosus; yellow perch, Perca flavescens.

SURVEY OF MAIN SWAN RIVER TRIBUTARIES

Fish populations of 11 streams tributary to Swan River above Swan Lake were sampled with electrofishing gear (see Figure 1). General information regarding age, growth and population structures were obtained. Streams sampled include: Beaver, Elk, Cold, Lost, South Fork Lost, North Fork Lost, Glacier, Goat, Lion, Jim and Woodward creaks.

In general, these are high gradient, snow fed streams, poor in chemical fertility and with few pools. Total dissolved solids (converted from conductivity readings) alkalinities, pH, water temperatures (between 9 A.M. and 4 P.M.) and stream flow data are presented in Table 1.

A Mite-E-Lite generator with a capacity of 115-volts and 1,500-watts was used in conjunction with a variable voltage pulsator for electrofishing. The most favorable operation was obtained by using a rectified D.C. pulse current of 150 to 200-volts at 1.0 to 1.5 amps, with a 60 percent to 70 percent duty cycle and 30 to 40 pulses per minute. Minor adjustments of this current output were required dependent on the volume of flow and conductivity for each stream.

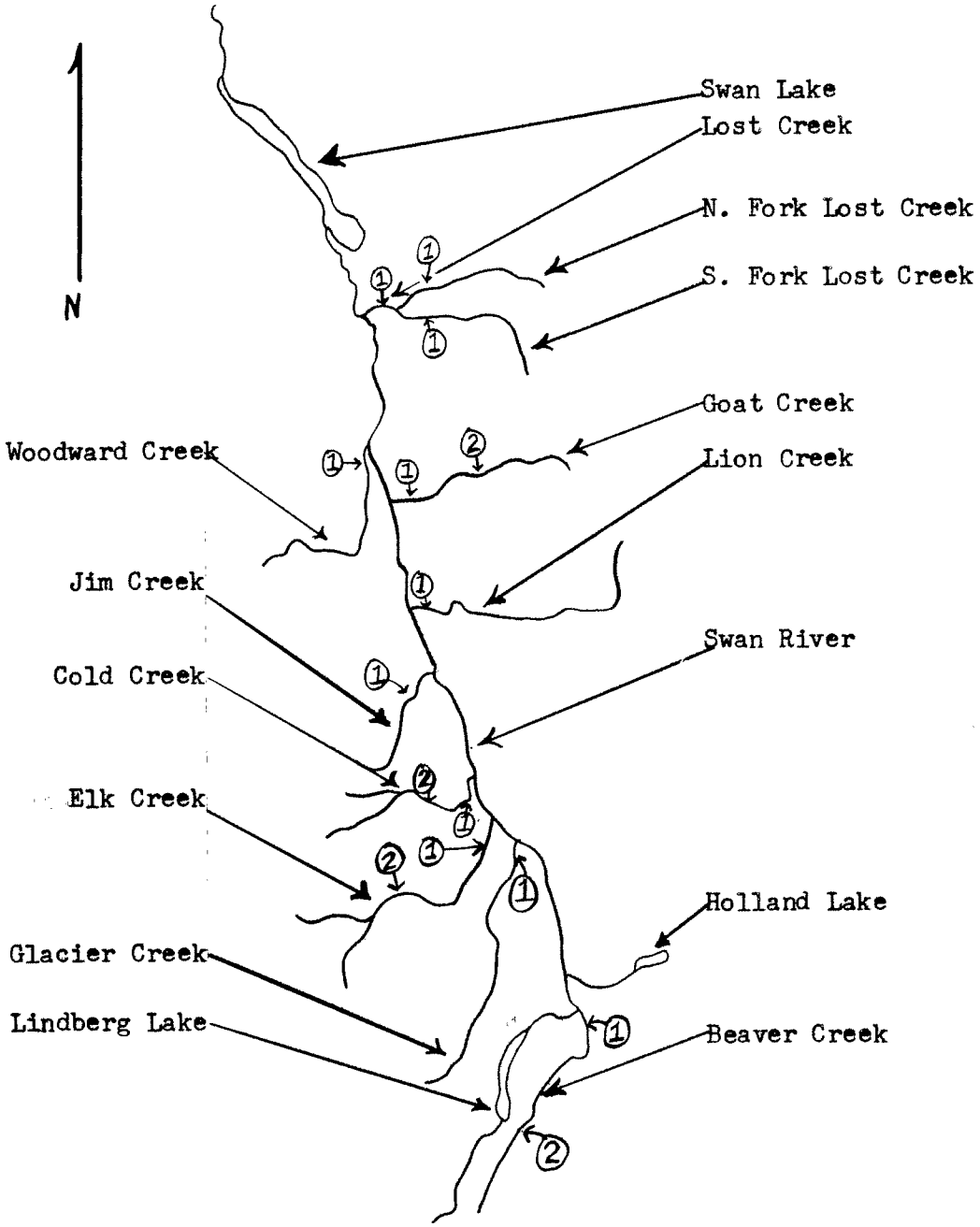

Figure 1. Location of shocking staions on tributary streams of the Swan River above Swan Lake.

① Lower Station
② Upper Station

Table 1. - Water quality data for Swan River tributaries - 1965

Stream	Date	Ave. Width (Feet)	Volume (Cfs)	Water Temp. (°F)	Specific Conductance	pH	Methyl Purple Alkanity (ppm)
Beaver 1/	8-18	19	18	52	67	7.6	50
Cold	8- 6	36	36	50	99	8.3	80
Elk	8-16	20	41	--	--	--	--
Glacier	8-15	28	66	--	--	--	--
Goat	8-16	27	27	52	--	--	--
Jim	9- 7	30	--	44	110	7.5	100
Lion	9- 3	36	39	45	126	8.2	90
Lost	9- 3	41	44	58	161	8.3	150
N. Fk. Lost	8-18	19	19	53	161	7.5	120
S. Fk. Lost	8-16	30	23	51	163	8.2	130
Woodward	8-17	31	87	46	---	---	---

1/ All data are from lower stream sections except Beaver Creek which was an upper station.

An attempt was made to establish two shocking stations, one on the upper and one on the lower portion of each stream; however, the upper station of most streams was inaccessible to road travel and could not be sampled.

A total of 15 stations was established on 11 streams between August 10 and September 9, 1965. The length of the stations varied from 250 to 450 feet depending on the ability of the shocking crew to move equipment up or downstream. Several log jams and uprooted trees were encountered and, in many instances, presented an impassable barrier to transporting equipment. The shocking success ranged from fair to poor and was dependent on stream volume and rate of flow, the conductance of the water, and the ability of the shocking crew to negotiate debris in the stream channel. Due to the inconsistency of recovery rates, the data presented is of qualitative nature only.

The numbers and percent of fish captured by species is presented in Table 2.

A total of 474 fish were captured from 11 Swan River tributaries. Of this number 452 (95.4%) were game fish species and 22 (4.6%) were non-game fish species. Approximately 19% of the total number of game fish collected were considered catchable (7 inches or over). Brook trout, present in all but two of the streams surveyed, were the most abundant species and represented 55.7 percent of the total number collected. The majority of the streams surveyed had few brook trout exceeding 7 inches in length. Beaver Creek, an exception, had a good size distribution of brook trout which ranged up to 14 inches total length.

Second in order of abundance was the Dolly Varden trout which was found in all but two streams and represented 20.9 percent of the numbers of all fish collected. Approximately 50 percent of the Dolly Varden population exceeded 7 inches in length while 5 percent were mature spawning fish and exceeded 17 inches. The largest was 21.3 inches in length, and weighed 3.30 pounds. A total of 15 Dolly Varden, 8 inches and larger, were marked with plastic jaw tags to provide information on movements

Table 3 Continued

Lake (I.B.M.Code No.)	No. of Net Sets	Species (Numbers)	Size Range inches (Game Species)	Percent of Game Species	Average Length inches (Game Species)	
Lower Crow Creek Reservoir (7-7520-5)	3	Rb (1), Wf (1), YP (22), FSu (19)	Rb (11.8) Wf (13.4)	5	Rb Wf	11.8 13.4
Mary Ronan (7-7700-3)	8	KOK (47), Rb (21), LMB (1), PS (68)	KOK (7.2-19.6) Rb (12.3-19.7) LMB (12.5)	50	KOK Rb LMB	11.1 15.3 12.5
Middle Ashley (7-7360-3)	1	Gr (8), SQ (14), FSu (1), Ct (1)	Gr (7.4-9.6) Ct (7.4)	38	Gr Ct	8.6 7.4
Murphy (11-9280-3)	3	Eb (1), LMB (1), Wf (6), CSu (10), FSu (5), SQ (58), PS (6)	Eb (13.7) LMB (8.4) Wf (11.0-15.2)	9	Eb LMB Wf	13.7 8.4 13.2
Pick-up (7-8250-3)	1	None	---	--	----------	
Pierce (7-8280-3)	2	Rb (7), FSu (56)	Rb (9.4-11.2)	11	Rb	10.0
**Rainbow (Dog) (5-9408-4)	5	Rb (1), PS (372), Rss (3)	Rb (12.9)	.03	Rb	12.9
Swan (7-9000-5)	20	Dv (44), Wf (43), KOK (4), Rb (3), YP (37), CRC (232), SQ (164), CSu (10), FSu (11)	Dv (7.6-31.5) Wf (6.9-12.4 KOK (9.4-9.6) Rb (11.6-12.8)	17	Dv Wf KOK Rb	15.5 9.4 9.5 12.3
Tally (7-9060-3	4	Rb (5), Eb (3), Dv (3), Wf (25), PS (23), SQ (49), CRC (23)	Rb (8.4-14.4) Eb (10.3-14.8) Dv (9.2-13.6) Wf (7.5-11.9)	30	Rb Eb Dv Wf	11.0 11.9 11.8 9.2

within the Swan Drainage. To date, no tags have been returned.

Cutthroat trout were present in 7 of the 11 streams surveyed and collectively composed 14.6 percent of the numbers of all fish collected. In samples from the upper station of Beaver Creek they comprised 64 percent of all fish collected. Since the cutthroat is distributed primarily in headwaters of these streams and few of the upper stream stations were sampled, the percentages are probably not representative of the population structure for the entire length of the stream.

Whitefish and rainbow trout collectively composed only 4.2 percent of total numbers and are not considered important game species in the tributary streams of the Swan drainage. Glacier Creek contained the only sizeable population of rainbow trout in the drainage where they made up approximately 30 percent of the total numbers captured.

Non-game fish species (squawfish, longnose sucker, and redside shiner) were relatively scarce in all streams except they were moderately abundant in Beaver Creek.

Tributary streams of the Swan River above Swan Lake are vital for maintenance of Dolly Varden trout in the river and lake system as they provide spawning and nursery areas. Relatively large numbers of juvenile Dolly Varden populate tributary streams and have been protected under an 18-inch minimum size limit. It is believed that some numbers of juvenile fish could be harvested without endangering recruitment to the lake population. This is likely to enhance the cutthroat trout fishery in lower sections of tributary streams and Swan Lake by reducing competition and predation on the juvenile cutthroat trout. Fishermen unfamiliar with Dolly Varden have often identified the juveniles as brook trout and were unknowingly in violation of the 18-inch minimum size limit. At present, the fishing pressure is negligible in these streams and it is recommended that the size limit be removed for Dolly Varden trout in the Swan River drainage above the power dam at Big Fork.

LAKE SURVEYS

Fish population surveys were conducted on 21 lakes in the district where additional data were needed for their management. A summary of the gill net catch data is presented in Table 3. Contour maps of 11 lakes have been drawn and printed from sonar depth soundings.

Swan River Drainage:

Included in the Swan River drainage survey were Swan, Holland, Lindberg, Pierce and Pick-up Lakes.

Swan Lake was netted during November, 1965 and a total of 548 fish, representing 9 species, were captured from 20 overnight net sets. Game fish comprised 17 percent of the catch. The species of game fish by numbers in parenthesis and percent of the total catch are listed in the following order: Dolly Varden (44) 8.0 percent, mountain whitefish (43) 7.9 percent, kokanee (4) 0.7 percent, rainbow trout (3) .06 percent. The catch of game fish by weight was 30 percent of the total. Non-game fish made up 83 percent of the catch by numbers. Columbia River chub (232) 42.3 percent, squawfish (164) 29.9 percent, yellow perch (37) 6.8 percent, longnose suckers (11)

Table 3. Summary of Gill Net Catch Data From Lake Population Surveys 1965-66

Lake (I.B.M.Code No.)	No. of Net Sets	Species (Numbers)	Size Range inches (Game Species)	Percent of Game Species	Average Length inches (Game Species)	
Alvord (11-7840-03)	2	LMB (6), YP (76), PS (132)	LMB (6.5-12.5)	3	LMB	10.4
Crystal (11-8180-3)	2	Rb (36)	Rb (7.3-11.9)	100	Rb	9.1
Dickey (11-8220-3)	5	Eb (28), Rb (105), Wf (67), FSu (49)	Eb (6.6-15.1) Rb (7.0-10.0) Wf (6.8-14.4)	80	Eb Rb Wf	11.5 8.7 8.8
Echo (7-6180-3)	2	Eb (19), L Wf (18), PS (4), YP (6)	Eb (5.6-14.1) L Wf (17.2-23.0)	79	Eb L Wf	8.7 19.0
Holland (7-6780-3)	5	Rb (10), Dv (8), KOK (1)	Rb (7.0-15.0) Dv (9.5-27.5) Wf (7.4-10.1)	15	Rb Dv Wf	11.3 16.0 9.1
Lindberg (7-7260-3)	3	Dv (3), Eb (1),Wf(6), KOK (1), Sq (49), CRC (7), CSu (6)	Dv (12.7-16.6) Eb (7.8) Rb (12.8) Wf (7.6-8.4) KOK (8.8)	16	Dv Eb Wf Rb KOK	14.1 7.8 8.4 12.8 8.8
Little Bitterroot (7-7300-5)	8	Rb (46), P Wf (4), YP (9), CRC (705) FSu (38)	Rb (9.7-18.1) P Wf (7.2-7.4)	6	Rb P Wf	14.7 7.3
*Loon (Highway #2) (11-8940-3)	4	LMB (10), Rb (4), Wf (5), Sq (7), CRC (24), Su (29), PS (5)	LMB (7.3-11.5) Rb (11.1-13.8) Wf (7.0-13.5)	23	LMB Rb Wf	9.6 13.1 11.1
Loon (Pipe Cr.) (11-8980-3)	2	Eb (55)	Eb (6.1-13.6)	100	Eb	9.2

Table 2 - Summary of fish population data collected from Swan River tributaries September, 1965 (average length of fish in inches in parenthesis)

Stream	Section	Number of fish captured	Eb	Dv	Rb	*Ct	Wf	**Other	Gamefish longer than 7 inches	
									Number	Percent
Beaver	1	69	48 (6.4)					21	18	26
Beaver	2	83	39 (4.6)			44 (5.4)			4	5
Cold	1	17	12 (4.9)	4 (8.2)		1 (8.1)			3	18
Cold	2	10	7 (6.3)	3 (4.5)					3	30
Elk	1	14	8 (5.5)	4 (5.6	1 (7.4)		1 (2.1)		4	29
Elk	2	5	1 (4.3)	3 (8.4)			1 (11.7)		2	40
Glacier	1	24	12 (4.7)		7 (7.1)	1 (6.9)	3 (6.6)	1	5	21
Goat	1	56	34 (5.5)	20 (6.6)		1 (2.8)	1 (9.9)		16	28
Goat	2	20		20 (6.0)					4	25
Jim	1	38	19 (4.6)	17 (4.1)			2 (3.5)		1	3
Lion	1	15	7 (6.5)	7 (6.9)			1 (2.3)		5	33
Lost	1	26	20 (5.4)	6 (6.5)					7	27
N.Fk.Lost	1	16	3 (6.4)	4 (7.4)		8 (4.9)	1 (9.3)		5	31
S.Fk.Lost	1	17		7 (12.0)		10 (5.5)			8	47
Woodward	1	64	54 (4.8)	4 (7.1)		4 (4)	2 (10.5)		6	10
TOTALS		474	264 (5.1)	99 (6.0)	8 (7.1)	69 (5.3)	12 (6.1	22	91	19.2
Species Composition (percent)			55.7	20.9	1.7	14.6	2.5	4.6		100

*Includes rainbow x cutthroat hybrid
**Squawfish, longnose sucker and redside shiners.

Eb=brook trout, Dv=Dolly Varden, Rb=rainbow, Ct=cutthroat trout, Wf=whitefish.

Table 3 Continued

Lake (I.B.M. Code No.)	No. of Net Sets	Species (Numbers)	Size Range inches (Game Species)	Percent of Game Species	Average Length inches (Game Species)	
Thompson, Lower (5-9152-3)	3	Eb (8), Wf (6), YP (51), FSu (15), CSu (5), SQ (14)	Eb (7.2-13.1) Wf (12.4-14.4)	15	Eb Wf	9.4 13.5
Thompson, Middle (5-923203)	3	KOK (51), Wf (8), LMB (2), PS (5), YP (15), FSu (2), SQ (2)	KOK (10.8-13.5) Wf (12.5-13.7) LMB (10.0-16.6)	72	KOK Wf LMB	12.5 13.1 13.3
Thompson, Upper (5-9760-3	3	LMB (2), Wf (16), PS (14), YP (88), SQ (13), CSu (2)	LMB (13.6-14.6) Wf (12.0-14.1)	13	LMB Wf	14.1 12.6

* Includes net data for July and September
** Includes net data for February and May

Abbreviations: Eb brook trout, Rb-rainbow trout, Ct-cutthroat trout, KOK-kokanee, Dv-Dolly Varden, Wf-whitefish, L Wf-lake whitefish, P Wf-pigmy whitefish, Gr-grayling, LMB-largemouth bass, YP-yellow perch, PS-pumpkinseed, FSu-longnose sucker, CSu-largescale sucker, SQ-northern squawfish, CRC-peamouth, Rss-redside shiner.

2.0 percent and largescale suckers (10) 1.8 percent. Total non-game fish weight was 70 percent of the total weight of all fish in the sample.

Holland Lake is located near the head of Swan River drainage. Recently the U. S. Forest Service has constructed a large camping and boat launching facility to accommodate increasing numbers of tourists. Increased fishing pressure and poor fishing success were responsible for continuing rainbow trout stocking program for Holland Lake. The lake has been managed primarily for rainbow trout. Dolly Varden, mountain whitefish and kokanee are less important in the catch. Plans are to stock westslope cutthroat trout instead of rainbow trout when the westslope cutthroat trout become available. In 1962, prior to the initiation of a rainbow trout stocking program, less than 2 percent of the fish taken in gill nets were game fish. Netting data collected in the fall of 1965 showed a 15 percent increase in game fish numbers over 1962 with rainbow trout being the dominant species.

Lindberg Lake was netted in July, 1965. Non-game fish species (squawfish, peamouth and suckers) composed 84 percent of the catch. Game fish species (mountain whitefish, Dolly Varden, rainbow trout and kokanee, in that order) made up the remaining 16 percent of the sample. It is recommended that westslope cutthroat trout be introduced in an effort to reestablish this speies, once native to the lake.

Two overnight gill nets were set in Pierce Lake in June, 1966. Approximately 11 percent of the catch consisted of rainbow trout. Because of limited public access to the lake, it is recommended stocking quotas of rainbow trout be reduced.

Pick-up Lake, an isolated water, located a few miles north of the Condon Ranger Station, was netted to determine the success of an experimental fry plant of westslope cutthroat trout made in 1963. One overnight gill net caught no fish. In all probability it is a marginal trout lake and the introduction failed due to winter oxygen depletion.

Flathead River and Clark Fork Drainages:

Included in the Flathead River drainage surveys were Little Bitterroot Lake, Lake Mary Ronan, Middle Ashley Lake, Tally Lake, Echo Lake and Crow Creek Reservoir. In the Clark Fork drainage Rainbow (Dog) and three Thompson Lakes were surveyed.

Little Bitterroot Lake was netted both in the spring and fall for population analysis. A total of 807 fish were collected from 8 overnight gill net sets. Of these fish, 705, or 87 percent, were peamouth. Rainbow trout, the most abundant game species, numbered 46 and composed 6 percent of the fish captured. A small number of pigmy whitefish were also collected. Herrig Creek, a tributary to the lake, was observed for approximately one-half mile for spawning rainbow trout. Numerous spawners were observed in the first quarter of a mile of stream but many abandoned beaver dams limited migration to the better spawning areas in the upper portion of the creek.

Lake Mary Ronan was netted in both spring and fall. Data were collected from eight overnight gill net sets in both netting periods. Kokanee and rainbow trout were the dominant species collected and composed 50 percent of the total catch. Resort owners have complained of declining catches of kokanee during the past two years. Poor survival of kokanee fry plants is believed to be responsible. A large percent of the 1965 gill net catch was yearling kokanee which indicates a good survival of the 1964 plant. It is believed this strong year class will be reflected in better catch rates when it enters the fisherman's creel in its 4th year of life, the summer of 1967.

Middle Ashley Lake or Lone Lake was sampled with one overnight gill net set to determine the success of grayling fry and fingerling introductions in 1965 following treatment with toxaphene to reduce the squawfish population in 1963. Netting data indicate that the introduction has been successful and grayling made up 33 percent of the population sample. Grayling are now distributed upstream to the irrigation outlet structure below Ashley Lake. Squawfish have reentered the lake from Ashley Creek, reestablishing themselves and now make up 58 percent of the gill net catch. Additional plants of grayling fry should be made until such time as poor survival of plants is noted.

Tally Lake is the deepest known natural lake in Montana with a maximum depth of 492 feet and an average depth of more than 250 feet. Non-game fish, mainly squawfish, peamouth and pumkinseed, composed 70 percent of the catch from 4 overnight gill net sets. Mountain whitefish, Dolly Varden, brook trout and rainbow trout, in that order, made up the remaining 30 percent of the population sample. It is recommended that lake trout be planted and that for four years kokanee also be planted in an attempt to establish them as forage fish.

Echo Lake was netted in early April, 1966 in an attempt to locate northern pike spawning areas. Unauthorized plantings of northern pike have been made in former years by fishermen and occasional catches of this species have been reported. Two gill net sets near the inlet of the lake in 3 to 4 feet of water failed to catch northern pike. No change in management procedures is recommended.

Rainbow (Dog) Lake was netted both during the winter and spring of 1965. A total of 5 overnight gill net sets yielded an average of 75 pumpkinseeds per set but only one rainbow trout was caught. Since the first appearance of pumpkinseeds in the early 60's, the rainbow fishery has steadily declined. It is recommended the lake be rehabilitated and restocked with rainbow trout.

Lower Crow Creek Reservoir, an irrigation storage reservoir, was gill-netted in early spring of 1966 with three overnight net sets which caught only two game fish. Every 3 or 4 years the reservoir level is reduced to the old stream channel for headgate repairs. Severe losses of fish which escape downstream are believed to be correlated with the drawdowns. It is recommended that annual stocking quotas be reduced and that no plants be made during the years scheduled for extreme drawdown for headgate repairs.

The three Thompson Lakes were surveyed and three overnight gill net sets were made in each during October, 1965. The netting was done in conjunction with sounding and mapping of the lakes. Yellow perch

were found to be the most abundant species in the Upper and Lower Thompson Lakes comprising 65 and 51 percent of the catch by numbers respectively whereas kokanee was the most abundant in the catch from Middle Thompson Lake, making up 60 percent of the total numbers. Middle Thompson Lake was sampled during the kokanee spawning period which probably reflects the large percentage of kokanee taken in the sample.

Kootenai River Drainage:

Included in the survey of lakes in the Kootenai River drainage are Alvord, Crystal, Loon (Highway #2), Dickey, Murphy and Loon (Pipe Creek).

Alvord Lake was netted and sounded in preparation for future rehabilitation. In former years this lake has supported excellent brook trout population but in more recent years pumpkinseed, yellow perch and largemouth bass became established and the brook trout fishery disappeared. Access to the lake is limited and the organic nature of the lake bottom make complete eradication of undesirable fish unlikely. It is recommended that the rehabilitation project be deferred until road access to the lake can be improved and a better fish toxicant is available.

Crystal Lake was rehabilitated in 1962 with toxaphene and stocked with rainbow trout in 1964 and 1965. The lake was netted in October, 1965 to determine the success of these plants. A total of 36 rainbow averaging 9.1 inches were captured from 2 overnight gill net sets.

Three overnight net sets were made in Loon Lake (Highway #2) in October, 1965 to determine the success of a recent smallmouth bass introduction. Clandestine plants of northern pike were made by fishermen and confirmed by gill net sampling in the early spring of 1964. Neither smallmouth bass or northern pike were captured in the 1965 net sets.

Dickey Lake was sampled with 5 overnight gill net sets in June, 1966 to determine the success of recent rainbow trout introductions. An average of 21 rainbow per net were captured indication excellent survival.

The Murphy Lake population sample indicated squawfish and large-scale suckers were the most abundant species. Largemouth bass, although not taken in large numbers, is the principal game fish species.

OPENING DAY CREEL CENSUSES

Kilbrennan Lake

Creel census information was obtained at Kilbrennan Lake (60 acres) on the opening day of the state-wide general fishing season May 22, 1966. The census was to determine the effect of a new law allowing a 10-pound no number limit on brook trout limit 1/ might have on the harvest of that species in Kilbrennan Lake. In most Montana

1/ in addition to general bag limit

waters, where brook trout are present, this species tend to over-populate and produce a poor quality fishery of small undesirable fish. Thus, the liberalized brook trout limit was adopted by the Montana Fish and Game Commission and put into effect on May 22, 1966.

The management of Kilbrennan Lake is quite unique from other lakes in the district in that the brook trout is protected during spawning by a closed season. The season opens with the general stream season and closes October 1st. All other lakes in the district with the exception of those closed for the entire year, certain reservoir lakes and Lake Mary Ronan, are open year around. Kilbrennan Lake supports a self-sustaining population of brook trout which is not supplemented by hatchery fish. This type of management has proved quite successful for the past eight years.

A total of 177 anglers were contacted between the hours of 10 A.M. and 6:30 P.M. May 22, 1966. This was estimated to be about 75 percent of the fishing pressure for the day. Data were gathered from 1,042 fish of which 98 percent by number were brook trout and 2 percent were rainbow trout. The average catch per angler trip was 5.9 fish (Table 4). Total weights were taken from 57 fish and total lengths were recorded from 108 individuals. The average weight and total length of brook trout was 0.46 pounds and 10.9 inches respectively.

A total of 22 (12 percent) of the total number of anglers contacted exceeded the 10-fish trout limit which would have been permitted under the 1965-66 regulations. These 22 fishermen caught 224 brook trout or an average of 12.5 fish per angler. In terms of numbers of fish harvested, the liberalized brook trout limit increased the estimated total harvest by 82 fish, compared to what would have been harvested on opening day under the former 10-fish limit. The maximum number of brook trout caught by a single party of fishermen was 40 fish, taken by three fishermen. By using an average weight of 0.46 pounds per fish, as determined from the sample of individual weight, this amounted to a total weight of 20.7 pounds or 6.9 pounds of brook trout per angler.

At present, there appears to be no apparent danger of over harvesting brook trout at Kilbrennan Lake by allowing 10 pounds in the brook trout bag limit. None of the 177 anglers checked on opening day approached the allowable 10 pound brook trout limit. It is recommended that the opening day census be repeated in 1967 to further evaluate the effect of the liberalized brook trout limit on harvest and catch rates.

Lake Mary Ronan

Opening day fishing pressure was light and harvest rates were low at Lake Mary Ronan. Strong winds, accompanied by occasional snow flurries, discouraged many fishermen from venturing out onto the lake. The maximum number of boats on the 1,500 acre lake was 33 at the 10 A.M. boat count. Creel census information was obtained at three resort establishments on the lake. A summary of data is presented in Table 4.

A total of 65 fishermen were checked, of which 62 were boat fishermen. Only 31 of the 65 anglers or 48 percent were successful in catching one or more fish for a total catch of 80 fish. The catch rate was 0.31

fish per hour for an average trip of 3.8 hours duration and considered as low compared to opening day standards. The average catch per angler was 1.21 fish. Composition of the catch was 79 percent rainbow, 15 percent kokanee and 6 percent largemouth bas. Recommendations are that opening day creel census be conducted in May, 1967 for comparison with previous years data.

Table 4. - Summary of opening day creel census data

Lake	No. of Anglers	Hours Fished	Ave. Length of trip	Ave. Catch per angler	Ave. Catch per hour
Kilbrennan	177	784	4.4	5.9	1.3
Lake Mary Ronan	65	248	3.8	1.2	.3

Prepared by Robert Domrose

Approved by George D. Holton

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