MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project No.: F-5-R-24 Title: Central Montana Fisheries Study

Job No.: I-a Title: Inventory and Survey of Waters in the Western Half of Region Four

Period Covered: July 1, 1974 to June 30, 1975

ABSTRACT

Inventory surveys were conducted on a total of 33 waters in the area. These waters include 11 lakes or reservoirs, 3 farm ponds, 2 mountain lakes, 13 streams and 4 private ponds. In addition to routine inventory, the following information was gathered on some of the waters. Fish kills were investigated in Eyraud Lakes and the Teton River. Kokanee populations were studied in Bynum and Pishkun Reservoirs while northern pike and walleye populations were studied in Lake Frances and Tiber Reservoir. Information on age, growth and food habits of burbot was also studied in Tiber Reservoir. The 1974 rainbow trout plant experienced poor survival in Eureka and Willow Creek Reservoirs and Bean Lake. Data is presented on the oil seep into Haywood Creek. Cutthroat trout were introduced into the South Fork of Birch Creek and yellow perch into Ferris Pond. Counties complying with the Stream Preservation Act include Teton and Pondera.

OBJECTIVES AND DEGREE OF ATTAINMENT

The objectives of this job were:

1. To inventory and survey waters, including new ranch ponds, in the western half of North Central Montana. Data are included.

2. To resurvey 10 large reservoirs in the study area to check on water levels, fish growth and fisherman use. Tiber Reservoir was to be studied more thoroughly to determine

the success of walleye introductions, reproduction of northern pike and the relative numbers of burbot. This work was done and data are included.

3. To measure the flows, diversions and returns of irrigation water on the Sun River to determine water conditions in the river during the irrigation season. This work was done and the data is to be presented in a special report.

4. To determine the status of fish populations in several other streams. This work was done and data are included in this report.

PROCEDURES

Fish were sampled by floating and sinking nylon gill nets, 6x 125 feet (3/4 to 2-inch mesh), a floating gill net, 8x300 feet (1¼ to 2-inch mesh), frame net traps, 3x4 feet and 4x6 feet (1/4, 1/2 and 1-inch mesh), a 300-volt DC electrofish shocker, and by hook and line. In addition, mature kokanee were sampled from creels of snag fishermen. Measurements of fish include total length to the nearest tenth of an inch and weights to the nearest hundredth of a pound. Scale and otolith samples were collected for age and growth studies. Lake temperatures were taken at various depths using a hydrographic thermometer.

ACCOMPLISHMENTS

Lakes and Reservoirs

Gill netting results for these waters are presented in Table 1. Discussion of individual lakes is included where deemed necessary.

Eyraud Lakes - A reported fish kill was investigated on Sept. 6, 1974. A few dead yellow perch (10-12 inches and 0.75-1.25 pounds) were observed in the main Eyraud Lake. Although northern pike and white sucker are present in the lakes, none were found dead. Dissolved oxygen concentrations of 8.0 ppm were found from top to bottom. Temperatures were nearly homothermous (59.2°F. on the surface and 59.0°F. on the bottom at 18 feet). Fish were not collected for analysis purposes due to the state of decomposition. Possible causes of the fish kill could be a bacterial gill infection or natural mortality from old age. Scale samples were read from two of the dead fish and both were 7 years old.

Table 1. Gill net summary of lakes and reservoirs, 1974-1975

Area (Date Sampled)	Surface Acres*	No. of Nets	Species**	No. of Fish	Length Range (Average)	Weight Range (Average)
Bynum Res. (July 2)	2,200	2	KOK	17	6.9- 7.9(7.4)	0.12-0.18(0.15)
			KOK	21	9.4-11.7(10.4)	0.27-0.63(0.41)
			KOK	3	13.2-14.2(13.6)	0.82-0.89(0.85)
			Rb	2	5.8- 6.4(6.1)	0.06-0.09(0.08)
			Rb	18	11.4-13.1(12.0)	0.47-0.66(0.51)
			Wf	1	(12.7)	(0.74)
			CSu	4	(--)	(--)
Eureka Res. (Feb. 27)	350	2	Rb	5	16.1-18.1(17.1)	1.80-2.41(2.10)
			LL	15	9.5-20.1(13.9)	0.33-3.28(1.29)
			SCu	58	7.4-13.9(--)	0.15-1.20(--)
			FSu	19	8.6-16.1(--)	0.24-1.84(--)
Lake Frances (Sept. 11)	3,100	2	NP	1	(15.2)	(0.77)
			NP	9	17.5-21.7(19.6)	1.10-2.46(1.75)
			YP	4	11.1-12.2(11.4)	0.72-1.07(0.84)
			CSu	11	16.6-18.3(17.2)	1.83-2.69(2.27)
Nilan Res. (Sept. 6)	500	1	Rb	6	10.5-12.8(11.8)	0.55-0.86(0.72)
			Rb	11	10.0-11.6(10.9)	0.42-0.70(0.54)
Pishkun Res. (Oct. 2)	1,220	3	Ct	1	(16.1)	(1.74)
			Rb	12	12.9-20.6(16.0)	0.82-3.06(1.64)
			KOK	14	14.3-19.8(16.7)	1.12-2.38(1.64)
			NP	2	(--)	(--)
			CSu	4	(--)	(--)
Shel-oole Res. (June 25)	50	1	Rb	1	(6.5)	(0.13)
			Rb	7	9.2-13.9(10.9)	0.30-1.12(0.56)
Tiber Res. (Sept. 18,19)	11,600	18	WE	102	10.0-13.9(11.9)	0.28-0.94(0.57)
			WE	4	16.2-17.2(16.8)	1.42-1.70(1.62)
			Rb	6	12.8-17.5(15.5)	0.84-1.81(1.36)
			NP	2	11.9-13.2(12.6)	0.38-0.57(0.48)
			NP	3	26.6-32.6(29.5)	4.94-9.50(6.86)
			YP	30	6.5- 9.2(8.2)	0.11-0.34(0.25)
			Carp	2	17.8-24.5(--)	2.69-7.50(--)
			CSu	105	(--)	(--)
			FSu	6	(--)	(--)
			FC	2	(--)	(--)
Willow Cr. Res. (July 3)	1,530	2	Rb	7	12.8-14.6(13.5)	0.71-1.06(0.85)
Wood Lake (June 28)	40	1	Rb	22	8.2-10.2(9.5)	0.25-0.46(0.37)
			Rb	3	16.1-16.6(16.4)	2.04-2.36(2.23)

* Approximate surface acres at time of survey.

** Species abbreviations: KOK-kokanee; Rb-rainbow trout; Wf-mountain whitefish; CSu-white sucker; LL-brown trout; FSu-longnose sucker; NP-northern pike; YP-yellow perch; Ct-cutthroat trout; WE-walleye; FC-flathead chub.

Fisheries personnel assisted the Parks and Recreation Division haul gravel to improve the access road to the Eyraud Lakes.

Bynum Reservoir - Rainbow trout and kokanee were sampled with floating gill nets on July 2. Three year classes of kokanee and two year classes of rainbow trout were collected (Table 1). Trout growth continues to be poor when compared to surrounding lakes while kokanee condition is somewhat better. Seeley and McCammon (1966) in California have found that kokanee do better than trout where both are dependent on zooplankton. Future investigations will gather more information on this subject to aid in management of the reservoir.

Scale analysis from 16 kokanee taken in the gill net sample reveal the growth rates at annulus formation for ages I, II and III were 4.1, 9.2 and 12.2 inches respectively.

Mature kokanee were found in both the inlet and outlet streams of Bynum Reservoir. Lengths, weights and otoliths were collected from kokanee snagged by fishermen in the outlet stream. Mature male and female kokanee were represented by age classes II+ and III+ (Table 2).

Table 2. Length and weight ranges of mature kokanee taken from Bynum Reservoir October 25, 26 and November 8, 1974. Age determination from otoliths

	Age Class	No.	Length Range (Average)	Weight Range (Average)
Male	II+	31	12.2-13.6(12.9)	0.54-0.89(0.71)
	III+	5	13.8-15.5(14.5)	0.96-1.21(1.06)
Female	II+	9	12.0-12.7(12.3)	0.56-0.70(0.63)
	III+	11	13.5-14.9(14.2)	0.82-0.90(0.85)

Eureka Reservoir - Three frame net traps were fished in Eureka Reservoir on April 18, 1974 to moniter the buildup in the sucker population. Approximately 2,000 white and longnose sucker were taken in the traps along with 2 rainbow trout and 3 brook trout. A gill net survey conducted February 27, 1975 (Table 1) indicates a complete absence of the 1974 rainbow trout plant. Winter fishermen were also unsuccessful in taking any of these fish. Poor survival of the plant may be related to the early stocking date (April 2, 1974). A similar situation developed in Eureka, Bynum, Nilan and Willow Creek Reservoirs in 1970 (Hill, 1972). It is

recommended that trout stocking in these reservoirs be made after the first of May when the lakes are warmer and food is more plentiful.

Several hundred trees in the camping area were cultivated and watered twice by fisheries personnel.

Lake Frances - Six trap days (April 16-17, 1974) were spent at Lake Frances with efforts directed at sampling northern pike and walleye populations. A total of 224 northern pike and 23 walleye were collected. Scale samples were secured from all walleye and a representative sample of northern pike. Other species captured during trap netting include 985 white and longnose sucker, 6 burbot and 1 rainbow trout.

Sixty-two northern pike females averaged 21.3 inches in length (range 17.8-33.3) while 162 males averaged 20.1 inches (range 16.7-26.0). Scale analysis indicates that approximately 75 percent of the females and 78 percent of the males were 3 and 4 years old (Table 3). The oldest female aged was 6 years while the oldest males were 5 years.

Much concern has developed over the status of the northern pike population in Lake Frances. Fishermen are concerned about large numbers of small fish, the creel limit of 3 fish and the set line regulation where 6 lines are allowed. The northern pike limit of 3 fish is based on a 1970 tagging study conducted in Pishkun Reservoir where anglers have voluntarily returned 45 percent of the tagged population (36% were returned during 1970). During 1970, the limit on northern pike was still 15 fish. Several factors have to be considered concerning the northern pike population in Lake Frances at the present time. Northern pike are vulnerable to hook and line. Water levels for the past two years have been extremely low (Figure 1) and undoubtedly have contributed to lowered fishing pressure and success. Reproductive success was poor in 1974 due to low water levels and will probably be affected again in 1975. Offspring of these year classes will not enter the fishery for from two to three years and, even then, may not contribute significantly to the fishery if reproduction was limited in 1974 and 1975. Scale samples should be taken from a representative sample of northern pike in the spring of 1975 and the reproductive success determined for 1974 and 1975. Results of these two factors will determine future creel limits for northern pike in Lake Frances.

Anglers returned 16 tags from northern pike during 1974. A total of 943 northern pike were tagged during the years 1971-73 and 116 (12.3%) have been returned. Number of tags returned and percentages for corresponding years is presented in Table 4.

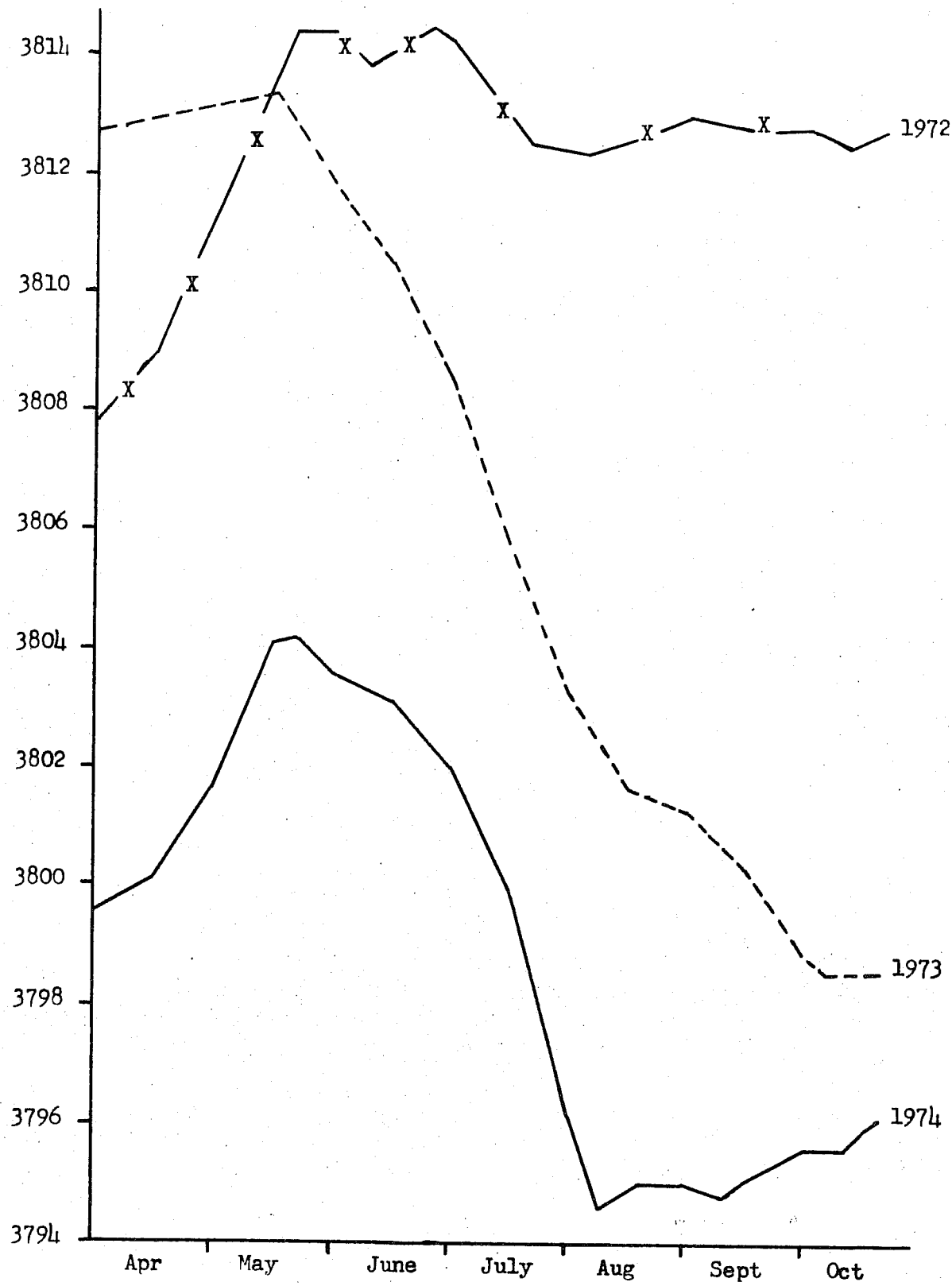

Figure 1. Water levels, Lake Frances, 1972-1974. (Elevation in ft. m. s. l.).

Table 3. Average calculated total lengths (TL) in inches of northern pike, Lake Frances, 1974.

Age Group	Number M	Number F	Average TL at end of year of life 1 M	1 F	2 M	2 F	3 M	3 F	4 M	4 F	5 M	5 F	6 M	6 F
II	7	9	10.0	8.1	15.0	14.2								
III	22	17	8.2	8.6	13.8	14.3	17.6	18.6						
IV	22	21	8.8	9.2	13.4	13.8	17.2	17.4	19.6	20.1				
V	5	3	8.5	10.2	13.3	15.5	17.6	19.1	20.7	22.7	22.6	25.1		
VI	-	1	--	9.3	--	14.1	--	18.7	--	22.5	--	26.5	--	30.1
Averages														
1974	56	51	8.7	8.9	13.7	14.1	17.4	18.0	19.8	20.5	22.6	25.5	--	30.1
1972	54	74	8.3	8.5	13.6	14.9	17.5	19.4	20.0	24.2	23.2	29.6	--	37.4
1971	26	110	11.1	10.7	18.1	19.2	23.8	25.0	28.1	30.0	29.7	34.6	30.9	38.5
1970	52		10.4		18.9		24.7		27.3					

Table 4. Accumulative northern pike tag returns, Lake Frances, 1971-1974.

Year	Number Tagged	No. Returns (%) by Year Tagged 1971	1972	1973
1971	173	26 (15.0)		
1972	371	7 (4.8)	23 (6.2)	
1973	399	4 (2.9)	15 (4.3)	25 (6.3)
1974	--	0 (--)	3 (6.9)	13 (3.4)
Accumulative	943	37 (21.4)	41 (11.0)	38 (9.5)

Walleye sampled during April of 1974 ranged from 12.8 to 19.2 inches total length. Three walleye were 3 years old (12.8-13.8 inches) and 20 walleye were 5 years old (17.2-19.2 inches). Average calculated total lengths at annulus formation of the entire sample

for years I-V were 4.7, 9.4, 13.5, 16.8 and 18.5 inches respectively. The fish samples represent the 1969 and 1971 introductions. A total of 1,275,000 walleye fry were stocked in Lake Frances in April 1974 and fry will be planted again in 1975 and 1976 if available.

A survey conducted in September, 1974 attempted to sample nothern pike and walleye populations along with northern pike reproduction. Two gill nets collected 10 northern pike, 4 yellow perch and 11 white sucker (Table 1). No walleye were taken. Two small mesh frame nets failed to take any young-of-the-year northern pike. Seining for reproduction was impossible due to the muddy shoreline caused by drawdown.

Nilan Reservoir - Nilan Reservoir was chemically rehabilitated in September, 1973 to remove white suckers. Approximately 101,000 four-inch rainbow trout were stocked in the reservoir in April and May of 1974. An additional 2,000 five-inch and 17,500 nine-inch fish were planted in July. Water levels held to near normal throughout the summer.

A gill net survey September 6, 1974 collected 17 rainbow trout (Table 1). Six of these averaged 11.8 inches and 0.72 pounds and represent fish planted as four and five-inch fingerlings in April and May. Eleven rainbow trout averaged 10.9 inches and 0.54 pounds. These were planted as nine-inch fish in July and were distinguished by eroded dorsal fins. Fishermen reported good catches from the reservoir beginning in August and continuing throughout the winter.

Pishkun Reservoir - A total of 14 northern pike tags were returned by fishermen during 1974. During the three years, 1970-1972, a total of 1450 northern pike were tagged in Pishkun Reservoir and a total of 459 (31.7%) have been returned. Tag returns by individual years are shown in Table 5.

Table 5. Accumulative tag returns for northern pike, Pishkun Reservoir, 1970-74.

Year	Number Tagged	No. Returns (%) by Year Tagged		
		1970	1971	1972
1970	498	178 (35.7)		
1971	559	35 (10.9)	117 (20.9)	
1972	393	4 (1.4)	28 (6.3)	42 (10.7)
1973	--	4 (1.4)	10 (2.4)	27 (7.7)
1974	--	2 (0.7)	4 (1.0)	8 (2.5)
Accumulative	1,450	223 (44.8)	159 (28.4)	77 (19.6)

Three floating gill nets were fished in Pishkun Reservoir in October 1974 to sample kokanee. A total of 14 mature kokanee were collected along with 12 rainbow and 1 cutthroat trout, 2 northern pike and 4 white sucker (Table 1).

Mature kokanee were also sampled when snagged by fishermen during November, 1974. A total of 65 male kokanee averaged 16.5 inches (range 14.6-19.8) and 1.57 pounds (range 1.05-2.38) while 46 females averaged 15.4 inches (range 13.2-17.9) and 1.27 pounds (range 0.75-2.00). Analysis of otolith samples reveal the majority of the mature kokanee to be in age class II+ (Table 6).

Table 6. Age composition, lengths and weights of mature kokanee, Pishkun Reservoir, 1974.

	Age Class	No.	Length Range (Average)	Weight Range (Average)
Male	II+	18	14.6-17.3(15.9)	1.14-1.85(1.44)
	III+	4	16.2-19.0(18.0)	1.48-2.26(1.88)
	IV+	4	18.9-19.8(19.3)	2.01-2.38(2.19)
Female	II+	12	13.2-15.3(14.6)	0.75-1.38(1.14)
	III+	3	15.2-17.2(16.4)	1.38-1.87(1.67)
	IV+	4	16.3-17.2(16.9)	1.57-2.00(1.69)

Three Arctic grayling (11-12 inches), which were caught from the reservoir near the inlet canal, were observed in a fisherman's creel in October 1974. These are the first observed from the reservoir for many years. Arctic grayling were planted in the past but none in recent years. It is not known whether there is a self-sustaining population in the reservoir or if they come down the Pishkun Supply Canal from the Sun River. Future investigations in the reservoir and the Sun River may provide further information on this species.

Approximately 500,000 walleye fry were introduced into Pishkun Reservoir in April. If available, fry will be stocked for the next two to three years.

Tiber Reservoir - Surveys were conducted during April and September of 1974 and January and February of 1975 to obtain information on burbot, northern pike and walleye populations. Netting effort included 30 trap days in April, 16 trap days and 18 gill net days in September. Creels of winter fishermen were checked during January and February.

Trap nets in April captured 282 burbot, 14 northern pike, 6 walleye, 8 rainbow trout, 47 yellow perch, 24 carp, 660 white and longnose sucker and 1 flathead chub. September trap nets collected 40 burbot, 6 northern pike, 2 walleye, 17 rainbow trout, 25 yellow perch, 69 white sucker, 2 longnose sucker and 10 emerald shiner. Gill net catches of September are summarized in Table 1.

Burbot continue to be highly sought by anglers in Tiber Reservoir. Burbot were classified as a game fish by legislative action in 1975. In anticipation of such action, the following information was gathered to aid in management of the species.

Table 7. Age composition of burbot, Tiber Reservoir, 1974-75.

Male				Female			
Age	No.	Length Range (Average)	Weight Range (Average)	Age	No.	Length Range (Average)	Weight Range (Average)
			April				
IV	2	18.1-18.6(18.4)	0.50-1.00(0.75)	IV	1	(24.2)	(2.2
V	10	21.0-24.2(22.2)	1.00-2.00(1.42)	V	20	20.5-28.1(24.1)	1.30-5.75(2.2
VI	2	21.8-22.3(22.1)	(1.50)	VI	2	23.2-24.5(23.9)	1.25-2.50(1.8
VII	0	(--)	(--)	VII	1	(27.9)	(3.8
VIII	2	29.0-29.5(29.3)	(--)	VIII	1	(29.7)	(4.1
IX	0	(--)	(--)	IX	1	(36.7)	(7.5
X	1	(31.4)	(7.10)				
XI	0	(--)	(--)				
XII	1	(30.6)	(4.35)				
XIII	1	(31.2)	(7.50)				
Avg.	19	(23.9)	(2.35)	Avg.	26	(24.9)	(2.5
			September				
IV	5	19.2-23.4(21.8)	1.16-2.32(1.98)	IV	5	21.0-25.3(23.0)	1.59-3.38(2.3
V	4	19.4-23.0(21.8)	1.78-2.35(2.06)	V	14	22.5-27.1(24.5)	1.88-4.71(2.8
				VI	2	23.5-29.1(26.3)	2.51-5.50(4.0
Avg.	9	(21.8)	(2.01)	Avg.	21	(24.3)	(2.8
			January & February				
V	4	21.0-23.3(22.3)	1.19-1.81(1.52)	V	5	21.1-27.1(24.6)	1.25-2.38(1.9
VI	5	21.5-26.9(23.9)	1.56-3.25(2.14)	VI	6	23.0-26.9(25.8)	2.69-3.88(3.2
VII	0	(--)	(--)	VII	1	(28.4)	(--
VIII	1	(28.2)	(3.75)				
Avg.	10	(23.7)	(2.11)	Avg.	12	(25.5)	(2.5

Burbot otoliths and stomach samples were collected from 47 specimens in April and 33 in September. Data was collected from an additional 15 burbot caught on setlines by fishermen during January and February. Table 7 presents age, average length and weight for male and female burbot. The youngest male and female aged were 4 years while the oldest male was 13 years and the oldest female was 9 years. Maximum weight was 7.50 pounds. Considerable overlap in length range occurs for any particular age group. Bailey (1972) found this to be true for burbot in Lake Superior. In April, a total of 154 burbot (sexes combined) averaged 23.6 inches total length and 69 specimens averaged 2.39 pounds.

Stomach samples from burbot indicate food habits vary during different periods of the year (Table 8). Contents of stomachs were analyzed by gross field examination. Fish (six species) are important sources of food throughout the three periods checked. Yellow perch predominated the stomach contents followed by white sucker. Unidentified fish were generally small and probably were yellow perch. During April, burbot stomachs contained mostly adult fish with white suckers up to 11 inches found in some stomachs. The September and January-February examinstions revealed mostly small fish in the stomachs. As many as 65 small yellow perch and 20 white sucker were found in a single stomach in September.

Crayfish are important in the burbot diet also, being least important in the spring, increasing in the fall and most important in the winter period. Up to 13 crayfish were observed in a single stomach in April, 7 in September and 8 in February. Vegetation, sticks and rocks were common in stomachs having crayfish and are presumably taken incidentally when feeding on crayfish. Other items found in small quantities included snail shells, grass seeds and fishing bait.

Attempts were made to determine spawning dates and condition of maturity of burbot during the winter sampling period but were abandoned due to the small sample size. A few males and females were examined and thought to be spent. All others were immature. A fisherman turmed in one female burbot head and ovaries for examination. This fish was approximately 3 pounds (no length), was 6 years old and contained approximately 600,000 eggs. Future surveys will follow up on burbot population trends.

Scale samples were analyzed from 16 northern pike from Tiber Reservoir. Specimens from April and September were read as one group due to the small sample size and are presanted here to show trends. Future surveys will expand on the age and growth of this species. Forage is abundant in the reservoir and growth of northern pike is considered good. Average growth in inches for each year of life is as follows: I-11.6; II-20.5; III-25.2; IV-28.6; V-30.0; and VI-32.8.

Table 8. Percent occurrence of food items found in burbot stomachs, Tiber Reservoir, 1974-75.

Item	April (47 Stomachs) Stomachs with item	April (47 Stomachs) Percent Occurrence	Sept. (33 Stomachs) Stomachs with item	Sept. (33 Stomachs) Percent Occurrence	Jan-Feb (15 Stomach Stomachs with item	Jan-Feb (15 Stomach Percent Occurrenc
Yellow perch	18	38.3	17	51.5	2	13.3
White sucker	12	25.5	5	15.2	1	6.7
Burbot	1	2.1	-	--	-	--
Carp	-	--	2	6.1	-	--
Emerald shiner	1	2.1	-	--	1	6.7
Walleye	1	2.1	-	--	-	--
Unidentified fish	13	27.7	19	57.6	8	53.4
Total fish	35	74.5	25	75.8	9	60.0
Crayfish	13	27.7	16	48.5	10	66.7
Vegetation	4	8.5	13	39.4	2	13.3
Sticks	4	8.5	-	--	-	--
Rocks	2	4.3	3	9.1	2	13.3
Unidentified insects	2	4.3	-	--	-	--
Empty	8	17.0	4	12.1	2	13.3
Other*	2	4.3	-	--	2	13.3

* Includes snail shells, grass seeds, bait (smelt and bait on a fish hook).

During the past four years, a total of 5.1 million walleye fry have been planted in Tiber Reservoir and natural reproduction is anticipated in the spring of 1975. Further walleye stocking is not planned and future surveys will be directed at determining natural reproduction of this species. Scale analysis of 51 walleye taken in September reveal the calculated growth rates at annulus formation for years I-III were 6.5, 12.4 and 14.4 inches respectively.

Willow Creek Reservoir - Two floating gill nets were fished in Willow Creek Reservoir in July and caught seven rainbow trout (Table 1). Apparently the 1974 trout plant experienced poor survival. Although few trout were taken in the gill nets, fishermen reported good catches throughout the summer. Most of these may have been from the 1973 plant.

Wood Lake - Wood Lake is considered a marginal fishery, the maximum depth being approximately seven feet. Winterkill is common due to the shallow depth and heavy snow cover. The lake is located in the mountains near Benchmark. Since the past two winters were relatively mild, a gill net was fished in the lake to determine if there was any carryover, and 3 large and 22 smaller rainbow trout were collected (Table 1). Although carryover was experienced this past winter, it is doubtful that many fish would survive a normal winter. No change in management is proposed. Catchable trout are planted each spring and provide an "instant" fishery for the many people who use this recreational area of the Lewis and Clark National Forest.

Bean Lake - This lake is located in the northern portion of Lewis and Clark County about 14 miles south of Augusta. It is a natural lake with no permanent inlet or outlet. The surface area is about 200 acres and the maximum depth is 30 feet. In 1964, the Department purchased an 18-acre tract of land adjacent to the lake for fishing access and has extensively managed a salmonid fishery in the lake since. The lake is a popular recreation area. Fishing pressure estimates conducted for the license year 1968-69 revealed over 12,500 angler days expended on the lake.

Survey data collected from Bean Lake prior to 1968 is presented in past progress reports. Since 1968, managment of the lake has involved yearly spring stocking of 75,000 to 100,000 rainbow trout 3-5 inches in length (Table 9). Growth is rapid; these fish begin entering the catch by August and September. Fall gill net sampling reveal most of the spring planted fish average about one-half pound at the end of the first growing season (Table 9).

Problems have occurred maintaining a fishery in the lake. Gill netting in November of 1970 revealed poor survival of trout planted that spring. This was further substantiated by netting in May of 1971. However, a fair number of trout from the 1969 plant were collected during the May, 1971 sampling. These averaged 15.5 inches total length and 1.65 pounds. Subsequently, 25,000 rainbow trout 5 inches in length were planted in late June of 1971. Netting in November of 1971 revealed good numbers of current year planted trout, but it is unknown what the June plant contributed to the population.

Table 9. Planting Records and Gill Net Catch Statistics for Rainbow Trout from Bean Lake, 1968-1974.

Year	Planting record: Date	Size	Number	Netting Month	Catch per overnight gill net: Current year plant No.[1]	Av. L.	Av. Wt.	Previous year plant No.[2]	Av. L.	Av. Wt.
1968	Mar. 7-8	3"	55,300							
	Apr. 29	5"	25,600	Oct.	33	10.6	0.49			
1969	Apr. 17 to May 7	4"	100,975	Apr. Oct.	20	10.6	0.46	34	11.3	0.60
1970	Apr. 21	3"	75,900	June Nov.	2	11.4	0.63	21	11.7	0.66
1971	Apr. 8	3"	76,650	May				4	12.9	1.02
	June 22-23	5"	25,059	Nov.	57	10.6	0.48			
1972	Apr. 6	4"	40,800	May				25	11.3	0.63
	May 2-4	3-5"	35,900	Oct.	24	11.5	0.61			
1973	Apr.10-11	3"	75,900	Apr. Jan.[3]	16	13.1	1.03	33	12.2	0.75
1974	Apr. 3	3"	76,000	June				13	15.3	1.83
	Sept. 26	5"	20,000	Sept.	12	12.4	1.02			

1/ Yearling trout.

2/ Two year old trout.

3/ Sample taken in 1974 but treated as 1973 data.

Gill net samples collected in 1974 again revealed low numbers of trout from the 1973 and 1974 plants. Growth of fish collected was exceptional (Table 9) indicating low population densities. Another supplemental plant of 20,000 trout was made in the lake in September, 1974.

Fishermen complained of poor fishing in Bean Lake during the fall and winter of 1974-75. Two experimental gill nets fished through the ice overnight in late February, 1975 captured only 5 rainbow trout. Three of these fish were planted in April, 1974 and they averaged 13.7 inches in length and 1.35 pounds. The 2 other trout weighed over 4 pounds. One 6 pound trout was caught while angling. This is probably the largest fish taken from the lake over the past 10 years.

Review of the stocking data reveals poor survival of trout occurred in years when fish were all planted on one date or in one load. These years were 1970, 1973 and 1974. Also, it is suspected that fish planted early in the spring immediately after ice-out experience low survival. Survival of fish in relation to stocking periods will be investigated in 1975. Half of the fish will be planted immediately after ice-out and the other half will be stocked about a month later. A representative portion of the second plant will be marked to differentiate the two plants in later surveys.

Water quality of Bean Lake may be another factor affecting fish survival. In February of 1975, conductivity of the lake water was over 3000 micromhos/cm at 25° C. This is more than double a measurement made in 1959. Since Bean Lake has no outlet, one would expect the water to gradually become harder but not at the rate found. One source of pollution exists from runoff on areas near the lake where livestock are fed in the winter. After ice-out in the spring of 1975, a water sample will be collected and analyzed for nutrients and other chemical parameters.

Small Lakes and Farm Ponds

Cameron Reservoir and Tunnel Lake were gill netted to follow population trends. Yellow perch were introduced into Ferris Pond. Two mountain lakes, Lake Levale and Sock Lake, were sampled by hook and line. At the request of the following landowners, private ponds were surveyed to determine their suitability for fish survival; Larry Banks, Henry Hawks, George Lederer and Robert Winkowitsch.

Streams

Haywood Creek - Oil continues to seep slowly as the result of the exploratory drilling operations of October 1971-January 1972 (Hill, 1973). In addition to oil seepage from the bank adjacent to the creek on June 4, 1974, oil was coming out of the ground on top, away from the bank. The oil moved toward the creek, went underground and presumably came out again in the bank below. Humble Oil has sorbent material along the banks and was successful in retrieving only a portion of the seeping oil.

South Fork of Birch Creek - This stream and its tributaries were surveyed in 1972 (Hill, 1973). No fish were found above natural barriers located on the South Fork of Birch Creek. Approximately 170 Upper Missouri River strain cutthroat trout were collected from Baldy Creek in the Highwood Mountains and transferred to the South Fork of Birch Creek on August 5, 1974. Transfer was made by hatchery truck to Choteau and then by helicopter to the South Fork. Extremely warm air temperatures raised the water temperature of the helicopter tanks to 70°F; temperature of the South Fork of Birch Creek was only 51°F. After tempering, only five fish had died. Fish were planted at two locations, near the mouths of Circus Creek and Pinto Creek. A follow-up survey was conducted on August 7 and a total of 11 live cutthroat trout were observed between the two planting sites. No additional mortality was observed.

Big Muddy Creek drainage - Fish populations were sampled in 10 stream sections in Muddy Creek and associated tributaries. Fish data is presented in Table 10.

Stream Preservation Act Activities - During this report period, Pondera County and Teton County complied with the Stream Preservation Act. During December, Pondera County installed a temporary culvert crossing on Sheep Creek west of Dupuyer to facilitate replacing of a bridge backwall and stringers. Teton County proposes a channel change, riprap and replacing a bridge with an arch type culvert on the North Fork of Willow Creek west of Choteau. The proposed alterations are tentatively scheduled for August, 1975.

Sun River - Data for the Sun River is presented in a special report, entitled "Water Quality and Quantity of the Sun River from Gibson Dam to Vaughn, 1973-1974".

Teton River - A fish kill occurred in the Teton River in the vicinity of Collins during August of 1974. On August 21, an investigation was conducted and it was determined that a hog barn waste lagoon on the New Rockport Hutterite Colony west of Collins had washed out and that wastes ran into the river, causing the

Table 10. Electrofishing results of streams, 1973-74.

Area (Location)	Date	Species*	No. of Game Fish	Length Range (Average)	Weight Range (Average)
Tributaries to Big Muddy Creek					
T22N-R3W-2	8-14-73	FC			
T23N-R2W-36	8-14-73	Rb	2	8.9- 9.3(9.1)	0.37-0.41(0.39
		Eb	3	10.8-14.4(12.5)	0.57-1.52(0.94
		CSu,LD,FC			
T22N-R1W-11	8-15-73	Rb	1	(17.4)	(2.08
T22N-R1W-4	8-15-73	Rb	2	7.4- 9.5(8.5)	0.16-0.41(0.29
		LL	1	(7.8)	(0.16
T22N-R1W-22	8-15-73	Eb	94	3.3- 5.8(4.1)	0.01-0.09(0.03
		Eb	11	8.7-13.0(11.3)	0.25-0.96(0.64
		Mt.Su			
T22N-R1W-24	8-15-73	LL	2	7.5- 8.0(7.8)	0.16-0.18(0.17
		LD,Mt.Su			
		FC, CSu			
Big Muddy Creek					
T22N-R2W-5	8-14-73	Rb	2	7.1- 7.6(7.4)	0.14-0.17(0.16
		CSu,LD,FC			
T23N-R2W-35	8-14-73	Rb	3	5.9- 9.5(8.0)	0.08-0.36(0.23
		CSu,LD,FC			
		Sc, Mt.Su			
T23N-R1W-30	8-14-73	Rb	6	4.5- 6.8(5.6)	0.03-0.12(0.08
		Sc,LD,FC			
		Mt. Su			
T22N-R1W-3	12-4-74	Rb	4	9.1-12.3(10.1)	0.36-0.81(0.47
		LD,CSu			
		FC,FSu			
Teton River					
T25N-R3W-25	8-29-74	No fish			
T25N-R2W-14	8-29-74	No fish			
T25N-R1W-15	8-29-74	No fish			
T25N-R1E-12	8-29-74	No fish			
T25N-R3E-23	8-29-74	No fish			
T25N-R4E-34	8-29-74	Carp,FC			
T24N-R6E- 9	8-28-74	FC,CSu			
T24N-R8E- 1	8-28-74	FC,CSu			
T25N-R9E-28	8-28-74	FC,CSu			
T25N-R9E-12	8-28-74	Carp,FC,CSu			

* Species abbreviations: FC-flathead chub; Rb-rainbow trout; LD-longnose dace; Mt,Su-mountain sucker; Eb-brook trout; LL-brown trout; FSu-longnose sucker; CSu-white sucker; Sc-sculpin.

fish kill. According to Colony personnel, excessive rain and unwanted irrigation water collected in a duck pond directly above the lagoon and when the pond overflowed, the lagoon washed out.

A water sample that presumably contained the same material as did the lagoon was collected from a pothole in the drainage below the lagoon and adjacent to the river. This sample was submitted to the Montana Department of Health, however, the chemical or chemicals responsible for the fish kill were never identified. Since the Colony would not state what chemical they were using as a disinfectant or insecticide, several veterinarians, hog operators and ranch supply dealers were contacted. Chemicals most commonly used in a hog operation were toxaphene and lindane.

Dead or dying fish were observed from the source of the kill to the mouth of the Teton River at Loma, a distance of approximately 150 miles. Fish killed include: sauger, catfish, burbot, goldeye, white sucker, longnose sucker, shorthead redhorse, carp, river carpsucker, flathead chub, stonecat, longnose dace and unidentified minnow species. Through a count of dead fish at measured distances along both banks of the river at all locations checked, it was estimated that 400,000 fish were killed. An average of 50 fish per 100 feet of river was observed.

Follow-up surveys were conducted August 28 and 29 in which the Teton River was electrofished at 10 locations (Table 10) below the source of the fish kill to determine the extent of the mortality. No fish were taken in about 80 miles of river below the source of the kill. Below this point carp, flathead chub and suckers were taken. Several fish were collected and frozen for testing.

To minimize the chances of a similar situation occurring in the future, the Colony should relocate their lagoon or re-route the extra water to prevent overflow into the lagoon.

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Prepared by: William J. Hill

Date: June 30, 1975

Code numbers of waters referred to in this report are:

14-1640	Dupuyer Creek
14-2360	Haywood Creek
14-4040	North Fork Willow Creek
14-5400	South Fork Birch Creek
14-6000	Teton River Sec. 01
14-6840	Eyraud Lake
14-7080	Bynum Reservoir
14-7120	Cameron Reservoir
14-7320	Eureka Reservoir
14-7440	Lake Frances
14-8935	Shel-oole Reservoir
14-9240	Tiber Reservoir
17-8720	Bean Lake
20-0750	Big Muddy Creek
20-6050	Sun River Sec. 01
20-6100	Sun River Sec. 02
20-7650	Lake Levale
20-7900	Nilan Reservoir
20-7950	Pishkun Reservoir
20-8150	Sock Lake
20-8400	Tunnel Lake
20-8500	Willow Creek Reservoir
20-8550	Wood Lake

MONTANA DEPARTMENT OF FISH AND GAME
FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project No.: F-5-R-24 Title: Central Montana Fisheries Study

Job No.: I-b Title: Inventory of Waters in the Eastern Half of Region Four

Period Covered: July 1, 1974 to June 30, 1975

ABSTRACT

Netting surveys were conducted on sixteen ponds and reservoirs in the Central Montana study area. Twenty BLM reservoirs and twelve ponds on the C. M. Russell National Wildlife Range were inspected. Three private ponds were rehabilitated with rotenone-base fish toxicant at the owner's expense. Largemouth bass and black crappie were collected and transplanted into several reservoirs. Erosion was documented at several locations along Big Spring Creek. Two sections were electrofished to gather information for fish population estimates. Preliminary estimates indicate brown trout were down in numbers and rainbow trout numbers were up in both sections compared to estimates made in 1968. Invertebrate bottom samples were collected from Big Spring Creek at the established stations. Electrofishing inventory information was collected from eleven streams within the study area. Emphasis was given to tributaries of the East Fork of Big Spring Creek, tributaries of the North Fork of the Musselshell River and the North Fork of Flatwillow Creek. Management recommendations and limited background information are included in the findings section.

OBJECTIVES AND DEGREE OF ATTAINMENT

The objectives of this job were:

1. To inventory and survey waters, including new ranch ponds, in the eastern half of North Central Montana. About half of the 59 ponds on the management program were to be checked to determine water levels and growth rates of trout. This work was done and data are included.

2. To resurvey nine large reservoirs in the study area to determine water levels, fish growth and fisherman use. Four large reservoirs were resurveyed and the data are included. Others will be surveyed in 1975.

3. To obtain trout population estimates on three established sections of Big Spring Creek to determine changes, if any, since the 1968 inventory. This work was done and data are included.

4. To determine the status of fish populations and fish habitat in other streams of the study area. This work was done and data are included.

PROCEDURES

Fish were sampled with floating and sinking 6x125-foot experimental nylon gill nets (3/4 to 2-inch mesh); 3x4-foot frame trap nets (1/4-inch mesh), 4x6-foot frame trap nets (1/2 and 1-inch mesh), 300 volt D.C. shocker; and by hook and line. Fish collected were measured to the nearest tenth of an inch and weighed to the nearest hundredth of a pound. Scales were taken for age and growth analysis. Fish population estimates for Big Spring Creek were made using the mark and recapture method described by Vincent (1971). Population numbers for other streams are based on fish captured on one trip through each section. No blocking nets were used. These are all small streams having only 2 to 5 cfs flow and averaging less than 5 feet wide. A Surber sampler was used to collect stream bottom invertebrate samples which were preserved in formalin for later study. Dissolved oxygen concentrations of ponds were measured with a Hach chemical kit.

ACCOMPLISHMENTS

Large Reservoirs

Four of the larger Department of Natural Resources reservoirs in the central Montana area were netted during 1974 and the results are given in Table 1. In addition to netting results, fish population data gathered by other methods are also included in the table. Findings on these reservoirs are summarized as follows:

Ackley Lake- Following rehabilitation of Ackley Lake in October, 1973, growth and survival of planted rainbow trout improved considerably. Fishing success was very good during the fall and winter of 1974.

Table 1. Summary of fish sampled from large lakes and reservoirs, 1974

Location (Date Sampled)	Surface Acres	No. of Nets	Species **	No. of Fish	Length Range (Average)	Weight Range (Average)
Ackley Lake (May 8-9)	247	1	Rb	39	1974 Plants	
			FSu	5		
Creel Census (Jan. 13, 1975)			Rb	41	10.9-12.8(11.9)	0.44-0.84(0.60)
Creel Census (Feb. 17, 1975)			Rb	20	10.4-12.8(11.8)	0.42-0.79(0.61)
Petrolia Res. (April 22-27)	515	4*	Carp	437		
			Ling	65		
			CSu	28		
			Walleye	16	9.6-29.5(18.8)	0.24-10.50(3.24)
War Horse Res. (April 16-18)	1200	4*	CSu	532		
			Carp	76		
			NP	12	22.7-29.8(24.8)	2.46-6.08(3.68)
			BH	9	9.2-13.1(11.1)	0.41-1.18(0.82)
			LMB	9	12.7-14.1(13.6)	0.82-1.57(1.30)
(June 13)		1	Carp	30		
			CSu	6		
Some taken with hook and line			LMB	11	13.0-14.5(13.7)	0.95-1.85(1.39)
(July 25)		2	Carp	25		
Some taken with hook and line			LMB	17	6.5- 9.3(7.7)	0.17-0.51(0.27)
			LMB	2	13.8-14.0(13.9)	1.60-1.66(1.63)
Yellow Water Res. (August 22)	600	2	CSu	106		
			BH	2	9.9-10.0(9.9)	0.54-0.62(0.58)

* Trap Nets

** Species abbreviations: Rb-rainbow trout; FSu-longnose sucker; CSu-white sucker; NP-northern pike; BH-black bullhead; LMB-largemouth bass.

Petrolia Reservoir - Trap netting in Petrolia confirmed that the walleye population stabilized at a low level. The limiting factor appeared to be forage fish. Based on these findings, a recommendation was made for introducing yellow perch to establish a forage base and provide a perch fishery.

War Horse Reservoir - The status of War Horse Reservoir is still uncertain pending the results of negotiations over control between the U. S. Fish and Wildlife Service and the War Horse Irrigation group. Declining water levels over the past few years have adversely affected the fishery. No evidence was found to indicate northern pike, introduced in 1973, have spawned successfully. Black bullhead and largemouth bass populations are low. The future of the fishery is closely related to the pending negotiations over control and the availability of water.

Yellow Water Reservoir - Extremely low water in Yellow Water for the past two years has resulted in a drastic decline in the fishery. Based on netting results and depth measurements, the recommendation was made to discontinue planting of rainbow trout. Future management plans depend on the availability of water.

Plans for 1975 include gill netting in Bair, Sutherlin and Martinsdale Reservoirs to check on growth rates, survival and abundance of game vs. non-game fish following rehabilitation. Burbot are scheduled to be introduced into Sutherlin Reservoir in April, 1975.

Small Lakes and Farm Ponds

Twelve small lakes and farm ponds stocked by the state and one private pond were netted during 1974. The results are given in Table 2. As a result of this work, management recommendations were made for several of these ponds. Three private ponds were treated with rotenone base fish toxicant to remove undesirable fish.

Twenty BLM reservoirs and twelve ponds on the C. M. Russell National Wildlife Range were checked to determine if they could support fish. As part of this work, largemouth bass were introduced into six ponds and black crappie into two other ponds.

Eleven ponds were sampled for winter dissolved oxygen concentrations. Oxygen levels ranged from 2-17 ppm, with the majority of ponds averaging 4-5 ppm.

Ponds and lakes stocked by the state should be netted every two to three years as a check on growth, survival and abundance of game fish versus non-game fish. Occasional creel checks on the more important ponds provide information on fishing success and fishing pressure useful in management.

Table 2. Summary of fish netted in small lakes and farm ponds, 1974

Pond	No. of Nets	Species	No. Fish	Length Range (Average)	Weight Range (Average)
Barta	1	Rb	19	6.8-14.1(10.2)	0.09-1.22(0.46)
Benes #2	2*	CR**	368		
Buffalo Wallow	1	Rb	3	18.4-20.0(19.4)	2.78-3.72(3.34)
		Ct**	11	16.4-18.5(17.4)	1.80-2.72(2.22)
Carters	2	Rb	5	1974 Plants	
		Rb	7	13.8-19.5(15.5)	1.26-3.98(2.02)
Deerfield	2	Rb	2	20.0-20.0(20.0)	3.68-4.22(3.95)
Forest Lake	1	Ct	15	8.9-14.4(11.2)	0.24-1.00(0.48)
Hanson Creek	1	Rb	5	8.3- 9.5(8.8)	0.25-0.33(0.27)
Holgate	1	Rb	17	8.3-11.8(9.7)	0.23-0.65(0.34)
Johnson	3	Rb	3	14.6-20.3(18.2)	1.45-3.75(2.88)
Kingsbury	1		0		
Stafford	2		0		
Urs	1	Rb	7	8.0-17.9(13.7)	0.23-2.39(1.30)
Yeager (Private)	2	Rb	2	13.5-17.2(15.4)	1.78-2.85(2.32)

* Trap Nets

** CR- Black crappie; Ct- cutthroat trout.

Streams

Big Spring Creek - Five inches of moisture during the latter part of May and first part of June resulted in high flows in Big Spring Creek for nearly a month. High water eroded 30-40 feet of streambanks at several locations on the Satran property, which is located immediately upstream from the area channelized in 1961. Stakes were placed along several bends to help measure the erosion. Photos were taken before, during and after high water to document the problem.

Bottom samples were collected from the nine established stations along Big Spring Creek and East Fork of Spring Creek. The results are given in Table 3. These are collected as part of a continuing study to determine bottom fauna changes in response to changes in siltation. The completion of East Fork Dam is expected to result in a considerable reduction in the amount of silt entering Big Spring Creek. Another problem on East Fork contributing to the sediment load was a highway slide area. Repairs were made by the Highway Department during the summer of 1974 which should eliminate siltation from this source.

Two of the five proposed watershed flood control projects, Hanson Creek Dam and East Fork Dam, have been completed. Work is scheduled to begin on Casino Creek Dam this summer. It is unlikely that all five dams will be constructed because of rising construction costs. Two drops in the Mill Ditch Diversion Canal, another part of the flood control project, have caused problems with upstream movements of trout. The City of Lewistown and the SCS are working on plans for a gate on the ditch to divert the flow into the old stream channel enabling migrating trout to by-pass the obstructions.

Snow removal from the streets of Lewistown is no longer being dumped into Big Spring Creek. The State Board of Health would not renew the City's dumping permit.

= Burleigh sect.
= Tresch sect.

Two of the established shocking sections on Big Spring Creek, Section B and Section D, were electrofished to check fish populations at the time the catchable plant was discontinued, to investigate reproductive success and to evaluate the effects of the year round fishing season. Preliminary population estimates from Section B revealed total trout numbers were 20 percent greater than estimates made in 1968 (Marcoux, 1969), however, brown trout had decreased by 66 percent. About the same number of trout were present in Section D as in 1968 but brown trout had decreased 58 percent. Rainbow trout had increased in both sections to compensate for the decrease in brown trout. It appears that the average size of fish from both sections has decreased. Additional information will be included in a later report following more detailed analysis.

Other Streams - Results of electrofishing surveys on streams are given in Table 4. Nine sections were electrofished on the three main tributaries of the East Fork of Big Spring Creek. This work to determine the distribution of rough fish above the East Fork Dam was part of a plan to rehabilitate the watershed prior to stocking the dam. Rough fish were widely distributed throughout the Middle and West Forks but none were found in the East Fork above a barrier located at the George Vogl Ranch. Rehabilitation was not attempted because of problems involved in terminating the

Table 4. Summary of fish taken by electrofishing on streams, 1974

Name of Stream (Location)	Length of Section	Date Sampled	Species**	No. of Fish	Length Range (Average)
Big Spring Creek					
East Fork					
(T14N R19E Sec. 23)	400'	July 3, 1974	Eb, Cot, JSu		
(T14N R19E Sec. 23)	400'	July 3, 1974	Eb, Cot		
(T14N R19E Sec. 26)	400'	July 2, 1974	Eb, Cot		
(T14N R19E Sec. 35)	400'	July 2, 1974	Eb, Cot		
(T13N R19E Sec. 11)	200'	July 2, 1974	No Fish		
West Fork					
(T14N R19E Sec. 34)	250'	July 3, 1974	JSu, DA		
(T14N R19E Sec. 33)	350'	July 3, 1974	JSu, DA, Cot, FH		
Middle Fork					
(T13N R19E Sec. 2)	200'	July 3, 1974	FSu, DA, Cot		
(T13N R19E Sec. 2)	200'	July 3, 1974	JSu, DA, FH		
Judith River					
(T16N R16E Sec. 27)	1200'	Aug. 2, 1974	Rb	7	5.1- 6.9(6.1)
			LL	8	7.0-16.5(11.8)
			WF	9	5.5-14.8(7.6)
			FSu	20	
			Carp	5	
			GE	4	
Warm Spring Creek					
(T17N R17E Sec. 24)	400'	May 16, 1974	SMB	1	(5.6)
(T17N R17E Sec. 16)	400'	May 16, 1974		0	

Table 3. Number and families of organisms collected in two one-square foot bottom samples from nine stations on Big Spring Creek and East Fork on July 31, 1974

Organisms	Fish Hatchery	East Fork	Burleigh's	Montana Power	St. Leo School	Above Sewer	Below Sewer	Trestle	Falls
Trichoptera									
Brachycentridae	1390	2	645	141	315	242	27	13	4
Leptoceridae	250		75	170	220	975	15		
Rhyacophilidae	172		54	36	225	70		61	11
Limnephilidae								6	
Hydropsychidae	30	2	36	2	1	4	1	14	3
Hydroptilidae		7				23			
Psychomyiidae		2							
Ephemeroptera									
Heptageniidae		7	10	18		2	3		5
Baetidae	20	11	22	79	12	33	18	44	42
Plecoptera									
Perlodidae	2		2	1					
Nemouridae	3								
Perlidae	1								
Diptera									
Tendipedidae	3	15	50	37	4	60	16	70	16
Simuliidae		5	70	110		1	30	1	4
Tipulidae			5	1	2	37		3	2
Rhagionidae		2				1			
Coleoptera									
Elmidae			2	3		1		1	1
Hemiptera									
Corixidae		1						1	
Mollusca									
Spaeriidae	7		2						
Planorbidae	8		2	2	2	3			
Physidae	10	2		1	1	7			
Tricladida									
Planariidae	16					7		2	
Station Totals	1912	56	975	601	782	1466	110	216	88
Avg. No./Sq. Ft.	956	28	487	300	391	733	55	108	44
No. of Families	13	11	13	13	9	15	7	11	9

Table 4. Continued

Name of Stream (Location)	Length of Section	Date Sampled	Species	No. of Fish	Length Range (Average)
Musselshell River Drainage					
Fawn Creek (T10N R10E Sec. 11)	400'	June 27, 1974	Eb	44	1.6-6.5(3.9)
Lion Creek (T10E R 9E Sec. 3)	400'	June 28, 1974	Eb	36	3.6-9.0(4.6)
S. Fork Flatwillow (T12N R21E Sec. 10)	300'	Aug. 15, 1974	Eb	80	3.0-13.0(6.9)
			JSu	2	
(T12N R21E Sec. 12)			Eb	15	4.0-9.4(7.3)
			FSu	20	
			CSu	1	
			JSu	19	
Spring Creek (T10N R10E Sec. 15)	400'	June 27, 1974	Eb	86	2.8-10.5(4.1)
(T10N R10E Sec. 21)	400'	June 28, 1974	Eb	154	1.5-11.0(4.1)
(T 9N R10E Sec. 10)	400'	June 28, 1974	Eb	10	4.0-4.8 (4.5)
			Rb	1	(4.4)
			LL	3	4.5-12.0(7.0)
Whitetail Creek (T10N R10E Sec. 16)	200'	June 27, 1974	Eb	58	3.0-9.1 (4.2)

** Species abbreviations: Eb-brook trout; Rb-rainbow trout; LL-brown trout; CSu-white sucker; FSu-longnose sucker; JSu-mountain sucker; Cot-sculpin; DA-longnose dace; FH-fathead minnow; WF-mountain whitefish; GE-goldeye; SMB-smallmouth bass.

toxicant's flow downstream. Complete removal of rough fish from the drainage is unlikely because of the length of stream involved and the presence of many beaver dams, springs and small tributaries.

Initial inventory electrofishing was done on four tributaries of the North Fork of the Musselshell River. This work, involving Spring Creek, Fawn Creek, Whitetail Creek and Lion Creek, was done to collect baseline data on the fishery prior to some proposed logging and road building.

Electrofishing on Warm Spring Creek to check on smallmouth bass introduced in 1973 and on the Judith River was not very successful because of gear limitations. Another attempt to gather fish population data from these two streams with better electrofishing gear is planned for 1975.

As part of a continuing study starting in 1973 on the North Fork of Flatwillow Creek (Poore, 1973), three sections were electrofished to check fish populations within, above and below an area sprayed with 2-4-D to kill willows. Results of this work are given in Table 5. Section 1, above the sprayed area, and Section 2, within the sprayed area, were lengthened 200 feet in 1974. Even then, only about half as many trout were taken in Section 1 while trout numbers remained the same in Section 2 when compared to 1973 data. The number of trout nearly doubled in Section 3 below the sprayed area. Plans for 1975 include electrofishing the three sections again because of the variations in the data from the two years.

Measurements taken in late July, 1974 from stakes placed on two bends within the sprayed area showed five feet of bank erosion had occurred since August, 1973. Accelerated erosion of valuable bottomland resulting from willow removal negates any potential gain in grazing land cleared.

Table 5. Results of electrofishing from three sections on the North Fork of Flatwillow Creek, July 23 and 24, 1974

	Section 1 (1000') Above Sprayed		Section 2 (1000') Sprayed		Section 3 (400') Below Sprayed	
Species	Total	Under 6"	Total	Under 6"	Total	Under 6"
Rainbow trout	12	3	16	5	7	0
Brook trout	16	2	9	1	45	3
Suckers	39	3	18	4	68	6
Brown trout	0	0	1	0	2	2

LITERATURE CITED

Marcoux, Ronald. 1969. Fish Populations in Big Spring Creek, Montana. Unpublished Masters Thesis, Montana State University.

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Vincent, Richard. 1971. River Electrofishing and Fish Population Estimates. The Progressive Fish-Culturist, Vol. 33, No. 3. pp. 163-169.

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Code numbers of waters referred to in this report are:

16-0300	Big Spring Creek Sec. 01
16-0310	Big Spring Creek Sec. 02
16-1445	East Fork Spring Creek
16-1820	Judith River Sec. 02
16-3920	Warm Spring Creek
16-4300	Ackley Lake
16-4400	Barta Pond
16-4464	Bene's Pond #2
16-4620	Carter's Pond
16-4888	Deerfield Reservoir
16-5535	Hanson Creek Reservoir
16-5960	Holgate Reservoir
16-6260	Kingsbury Pond
16-8380	Stafford Dam
16-8660	Urs Pond
17-9616	Smith River Reservoir
18-2460	Fawn Creek
18-2640	Flatwillow Creek
18-3420	Lion Creek
18-5820	Spring Creek
18-6780	Whitetail Creek
18-7340	Buffalo Wallow Reservoir
18-7510	Forest Lake
18-7750	Bair Reservoir
18-7945	Johnson Reservoir
18-8380	Martinsdale Reservoir
18-8720	Petrolia Reservoir
18-9440	War Horse Reservoir
18-9500	Yellow Water Reservoir