MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

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FISHERIES DIVISION

Annual Progress Report

October 1, 1980 to September 30, 1981

LAKE KOOCANUSA POST-IMPOUNDMENT FISHERY STUDY

Libby, Montana

By

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Reservoir Investigations Project

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MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

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Annual Progress Report

Project Title: Lake Koocanusa Post-Impoundment Fisheries Study

Period Covered: October 1, 1980 through September 30, 1981

ABSTRACT

Lake Koocanusa was sampled in fall 1980 and spring 1981 to determine relative abundance of rainbow trout, cutthroat trout, bull trout, mountain whitefish, burbot, redside shiners, longnose and largescale suckers, squawfish and peamouth. Average catch per net night of rainbow trout and cutthroat continued to decline compared to previous years' catches. Growth rates of rainbow trout and cutthroat trout appear to have declined slightly since 1975. Numbers of and size of rainbow trout four years old or older have declined apparently as a function of decreasing availability of redside shiners as a food item.

Numbers of fish caught by anglers fishing the reservoir in spring 1976, 1977, 1978 and 1981 indicate catch rates per unit of effort have declined. Cutthroat trout were dominant in the creel in 1976, but were replaced by rainbow trout beginning in 1977. Rainbows comprised 68% of the angler catch in 1981.

BACKGROUND

Lake Koocanusa was created in 1972 by Libby Dam impounding the Kootenai River 17 miles upstream from Libby, Montana. This multipurpose (flood control, power production and recreation) impoundment formed by the construction of Libby Dam was not completely filled until summer 1974. May et al. (1979) presented a detailed description of reservoir operation and morphometric data on Lake Koocanusa. Full pool elevation at 2,459 feet msl creates a reservoir 90 miles long (48 in Montana and 42 in British Columbia) with a surface area of 46,500 acres and a gross storage capacity of 5,809,000 acre feet.

New reservoirs generally provide excellent sport fishing for the first years due to minimal competition and an abundance of food and space. Lake Koocanusa has been providing a good sport fishery for cutthroat trout, rainbow trout, bull trout, and burbot. The burbot and bull trout populations are from natural reproduction, whereas the cutthroat and rainbow populations have developed as a result of both natural reproduction and hatchery introductions. Large plantings of westslope cutthroat trout which were made in the reservoir and its tributaries during the years 1970 through 1976 have matured and disappeared from the population. The 1979 data indicated a progressive decline in the cutthroat population which reinforces previous biological opinion that supplemental stocking will be required to maintain a viable cutthroat population in Lake Koocanusa.

OBJECTIVES

The specific objectives for this report period were to: 1) monitor fish population trends in Lake Koocanusa with fall and spring gill net series; 2) determine growth rates of game fish species; and 3) determine catch rates and species composition of the fishermen harvest.

PROCEDURES

Fish Population Trends Sampling

Standard gill net sampling techniques and methods for measuring relative abundance and determining fish population trends in Lake Koocanusa were developed by the Department's biological and statistical staff in 1974. These methods were:

1. Sampling in spring at the Rexford sampling area (Figure 1) to determine trends of bottom-oriented fish including largescale and longnose suckers, bull trout, mountain whitefish and burbot. Fish caught in each of 20 to 25 standard experimental bottom gill nets set overnight for two nights were counted by species. A standard experimental gill net contains 25 foot long sections of 3/4 inch, 1 inch, 1-1/4 inch, 1-1/2 inch and 2 inch bar measure mesh six feet deep. The catch-per-night was analyzed using the Kruskall-Wallis non-parametric ranking test (Gooch, 1975) which sets confidence limits around the average catch.

Sampling was to be done when the reservoir was between elevation 2,350 and 2,375 feet msl during spring refill, when surface water temperatures were 50° F ± 2 degrees, and secchi disc readings were two to five feet. Since 1975, these netting criteria have been met in 1975, 1976, 1978 and 1981. Netting times have varied from May 4-5 in 1981 to June 7-8 in 1975.

2. Sampling in the fall at the Bailey Bridge, Rexford and Cripple Horse netting areas (Figure 1) to determine trends in surface-oriented fish species including rainbow and cutthroat trout, redside shiners, northern squawfish and peamouth. Twenty to twenty-five experimental surface gill nets were to be fished overnight for two nights at each netting area. Number of fish by species were counted by net each day and catch was analyzed using the Kruskall-Wallis non-paramentric ranking test. Sampling was to be conducted when Lake Koocanusa was within 10 feet of full pool elevation of 2459 feet msl, when surface water temperatures were 60° F ± two degrees and secchi disc readings 20 feet or greater. Since 1975, these netting criteria have been met each year except 1977. Calendar time of netting has varied from the last week of September to the first week of October.

Age and Growth Determinations

Scale samples for determination of age structures and growth rates were collected from about 25 fish per one-inch groups during netting operations. Samples were taken from cutthroat trout, rainbow trout, bull trout, mountain whitefish, largescale and longnose suckers, squawfish and peamouth. Impressions of the scales were made on plastic

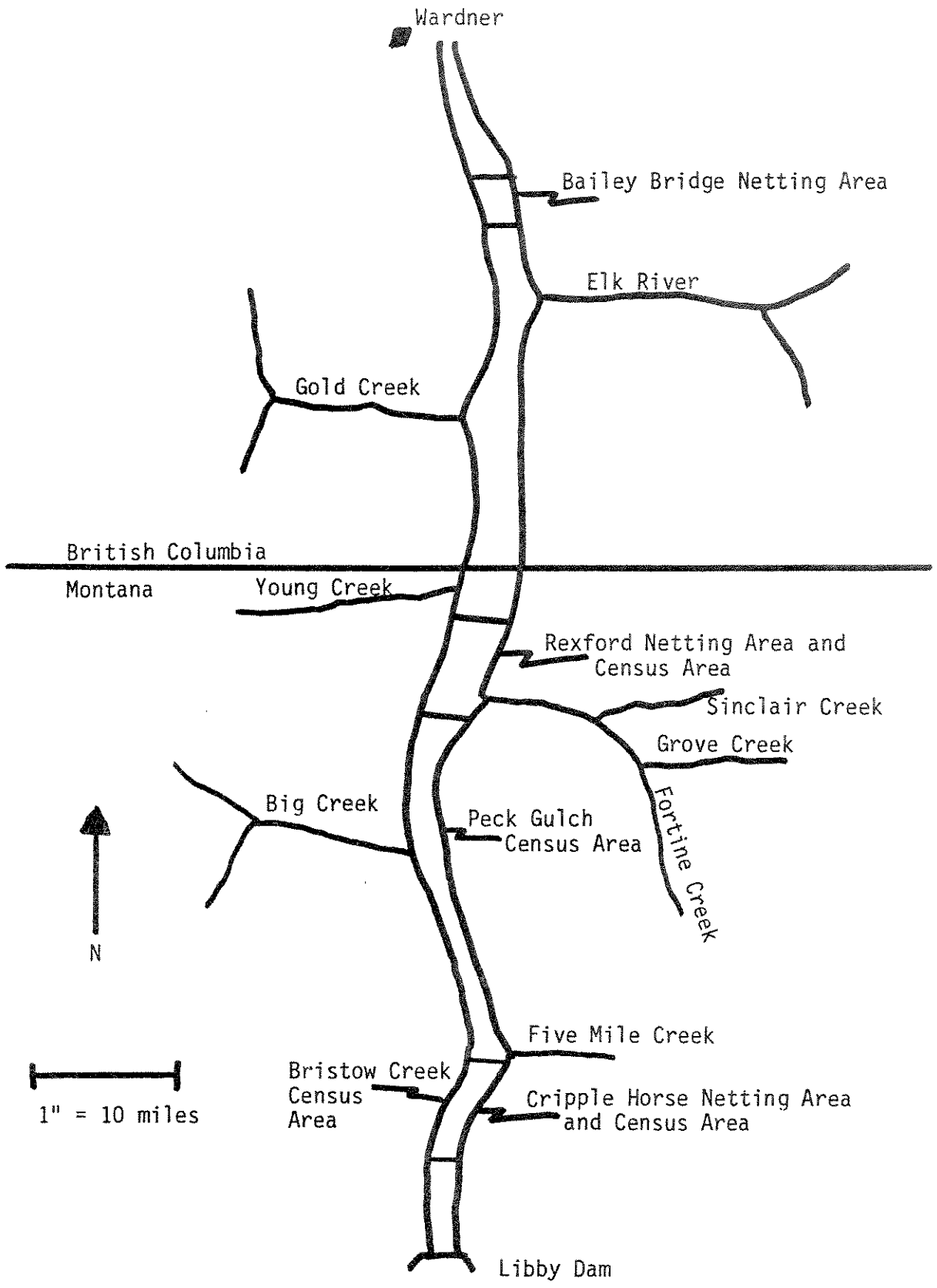

Figure 1. Map of Lake Koocanusa showing netting and creel census areas.

strips and were read using a microprojector. Growth rates and lengths at annular marks were determined assuming a straight line relationship between fish length and scale length.

Creel Census

A contact creel census is being utilized to collect angler harvest data from Lake Koocanusa. Four major access sites are being surveyed from Friday through Monday each week from April 11 to September 30, 1981. Sample areas include Barron Creek, Cripple Horse, Peck Gulch, and Rexford (Figure 1). Barron Creek landing was only sampled in April and May until reservoir elevation was high enough to allow boat access at the Cripple Horse ramp. The sampling schedule was stratified so that each area was checked in the morning or evening two to four times a week.

Data were collected from each angler contacted on: 1) hours fished; 2) number of fish caught by species; 3) size of fish creeled; 4) residency of angler; 5) bait used; and 6) fishing method. In addition, data is being collected on recreational use of the areas by campers, swimmers, boaters, and picnicers.

FINDINGS

Reservoir Population Trends - Fall Netting

Fall sampling using surface gill nets was conducted at the Bailey Bridge, Rexford and Cripple Horse netting areas September 22-30, 1980. Reservoir conditions during the netting were compatible with the established criteria. Reservoir elevation varied from two feet to four feet below full pool, surface water temperatures were 60-61° F and secchi disc readings were 20 feet at Bailey Bridge increasing to 28 feet at Cripple Horse netting area.

The average catch per net night for cutthroat and rainbow trout and redside shiners for the years of 1975 through 1980 are shown in Figure 2. The average catch per net night of cutthroat trout in 1976 was 2.2 fish per net and has gradually declined to a low of 1.0 fish per net in 1980. During 1972 through 1976, a total of 4,071,175 cutthroat trout were planted into Lake Koocanusa and its tributary streams (Table 1). The reservoir was not planted in 1977 through 1980, while only about 21,000 young-of-the-year cutthroat were planted in one tributary stream in 1977. Several reservoir tributaries were planted with a total of 416,690 young-of-the-year cutthroat in late summer 1980.

The curtailment of hatchery plants of cutthroat trout into Lake Koocanusa and its tributaries in 1977 likely is the major factor in the decline of cutthroat trout in the reservoir as measured by gill net catches. Another factor may have been a reduced number of smolts from tributary streams as a result of severe flooding in winter 1974-1975 (May and Huston, 1980).

Cutthroat trout spawning tributaries of Lake Koocanusa are generally of poor quality and few in number. Another potential reason for the decline in cutthroat numbers in Lake Koocanusa may be too many spawners

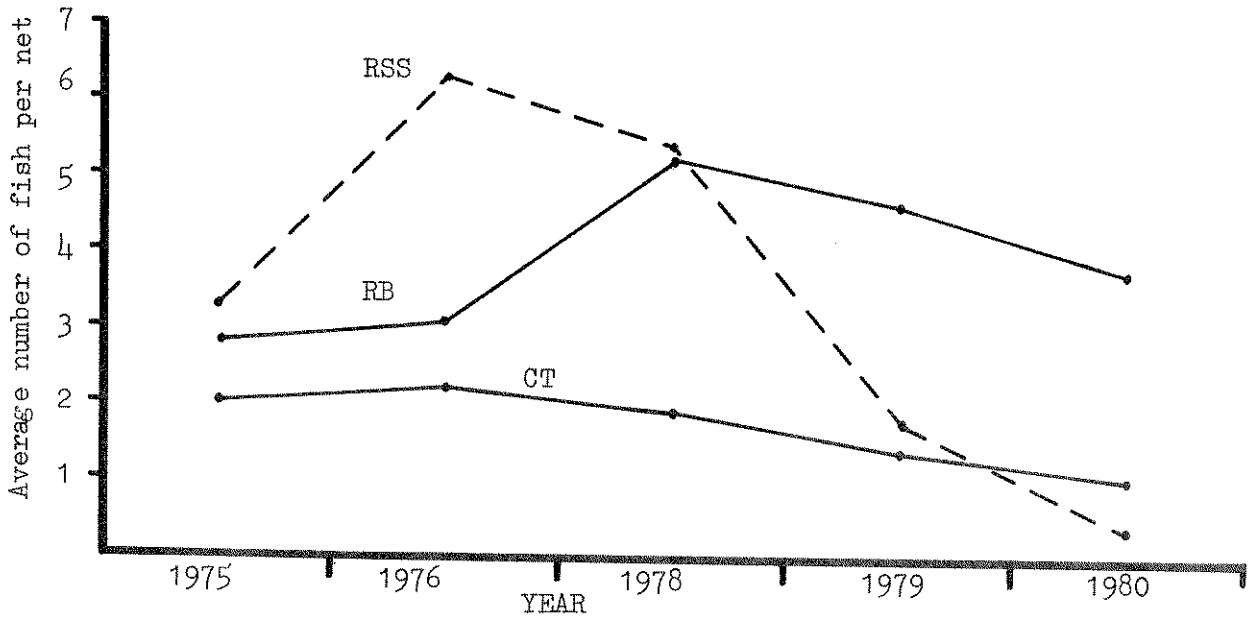

Figure 2. Average catch per surface gill net of rainbow trout (RB), cutthroat trout (CT), and redsided shiners (RSS) in Lake Koocanusa, from fall sampling, 1975-1980. The figure includes data from Rexford, Cripple Horse and Bailey Bridge netting areas.

Table 1. Number and pounds of westslope cutthroat trout planted in Lake Koocanusa and tributaries from 1970 to 1980.

Year Planted	Young of year 1-3" total length		Yearlings 4-6" total length		Total All sizes	
	Number	Pounds	Number	Pounds	Number	Pounds
Tributary Streams						
1970	50,700	26	-------	-----	50,700	26
1971	50,750	26	-------	-----	50,750	26
1972	140,871	299	-------	-----	140,871	26
1973	217,543	492	7,820	588	225,363	1,080
1974	235,046	241	-------	-----	235,046	241
1975	227,060	138	-------	----	227,060	138
1976	52,592	19	-------	----	52,592	19
1977	20,800	13	-------	----	20,800	13
1980	416,690	1,124	-------	----	416,690	1,124
Lake Koocanusa						
1972	139,232	1,743	65,055	2,133	204,288	3,876
1973	969,312	1,214	40,390	1,668	1,009,702	2,882
1974	400,720	1,790	139,956	5,790	504,676	7,580
1975	758,345	2,276	-------	-----	758,345	2,276
1976	611,782	1,732	-------	----	611,782	1,732

for the available spawning habitat. Too few spawners will result in a declining population, conversely too many spawners will often result in the same end product.

The rainbow trout net catch was 2.8 fish in 1975 increasing to 5.2 fish in 1978, dropping to 3.7 fish in 1980. Reasons for the variable catch rates of rainbow trout are not well understood at this time. It is thought that most of the rainbow trout are from natural reproduction, but it is known that a fish hatchery located on Bull River, a Kootenai River tributary about four miles above Lake Koocanusa, has leaked an unknown number of small rainbow trout into the system.

The age composition of rainbow trout caught in gill nets from Lake Koocanusa since 1974 is shown in Table 2. Age distribution for the data listed in netting year 1974 is not comparable to other years' data since procedures and methods did not follow the criteria developed for trend sampling. The netting in 1974 was done in the spring and summer. The 1974 data is useful since it clearly shows a fish population of mostly one and two year old fish. Impounding of water behind Libby Dam started in spring 1972 created new habitat with little competition for food and space between any species. Progeny of rainbow trout spawning in 1972 through about 1975 could be expected to have good survival rates under this "little competition" phase of reservoir development. Later year classes would not be expected to survive equally as well as the earlier year classes due to increased competition which may have led to the declining net catches in 1978 through 1980.

Table 2. Age composition of rainbow trout gill net catches from Cripple Horse and Rexford areas of Lake Koocanusa, 1974-1980.

Netting Year	Percent of total catch in age group				Total Fish
	1	2	3	4	
1974	30.8	45.2	21.2	2.8	321
1975	19.2	54.2	24.5	2.1	381
1976	13.9	32.0	44.4	9.7	331
1977	----	----	----	----	---
1978	9.8	60.4	24.6	5.2	492
1979	14.6	41.7	29.6	14.1	355
1980	21.1	44.2	25.3	9.4	360

Age I fish caught in 1974 (the 1973 year-class) contributed 31 percent of the total Rainbow catch in 1974, 54 percent of the catch in 1975 as age II and 44 percent of the catch in 1976 as age III fish. Rainbow trout generally spawn during their third year of life so the 1973 year class would have spawned the 1976 year-class. The 1976 year-class would have been captured in gill nets as one-year old fish in 1977, the year the reservoir was not sampled. The 1976 year-class did make up 60.4

percent of the fish caught in netting year 1978 as two year-old fish, and 29.6 percent of the total catch in netting year 1979 as three-year old fish. The 1976 year-class spawned in 1979 as three year-old fish and their progeny, the 1979 year-class contributed strongly to the 1980 netting year catch as one-year old fish.

The contribution of the 1973 year class and its subsequent generations to the rainbow trout population of Lake Koocanusa appear to be significant through netting year 1980. Its significance in future years should be determined.

The percent of rainbow trout over 18.0 inches in total length declined from 9 percent of the catch in 1976 to 1 percent in 1980 (Figure 3). The large number of fish over 18 inches total length in 1975 and 1976 is likely a function of the apparent lack of inter and intra-species competition for food and space in the new reservoir.

A food habit study by McMullin (1979) showed that rainbow trout 15.5 inches total length and larger derived 67 percent of their energy from forage fish, almost all redside shiners. Average catch per net night of redside shiners (Figure 2) has declined from six fish in 1976 to less than one in 1980. Experimental gill nets used for this study sample only the redside shiners larger than about four inches total length. Actual population numbers of shiners may not have decreased since "normal" populations do not contain many individuals over four inches total length. Yet, a decrease of the larger redside shiners after 1976 could be partially responsible for the decline in larger rainbow trout.

Average catch per net night for squawfish and peamouth are shown in Figure 4. Catch of squawfish peaked in 1976 at 5.1 fish per net night and has declined to 2.3 fish in 1980. Peamouth net catch rates have varied from year to year, but have shown a definite trend toward higher catch rates since 1975. Peamouth appear to adapt well to fluctuating reservoir environments and are one of the most abundance fish species found in Noxon Rapids and Cabinet Gorge Reservoirs.

Reasons for the apparent decline in numbers of redside shiners and squawfish and the increase in peamouth are not known at this time. It is suspected that fluctuating reservoir levels, sloughing and silting of reservoir shoreline affecting suitability of spawning areas in the reservoir may be factors governing abundance of these three fish species. Each of these species do most of their spawning in the reservoir proper although squawfish may spawn in some of the tributary streams.

Reservoir Population Trends-Spring Netting

The average catch per net night by species is shown in Figure 5 for the bottom net sampling conducted in the Rexford area of Lake Koocanusa from 1975-1981. Reservoir conditions during the netting conducted May 4-5, 1981 were similar to previous years. Surface water temperature was 48° F, secchi disc reading was 3.0 feet, and the

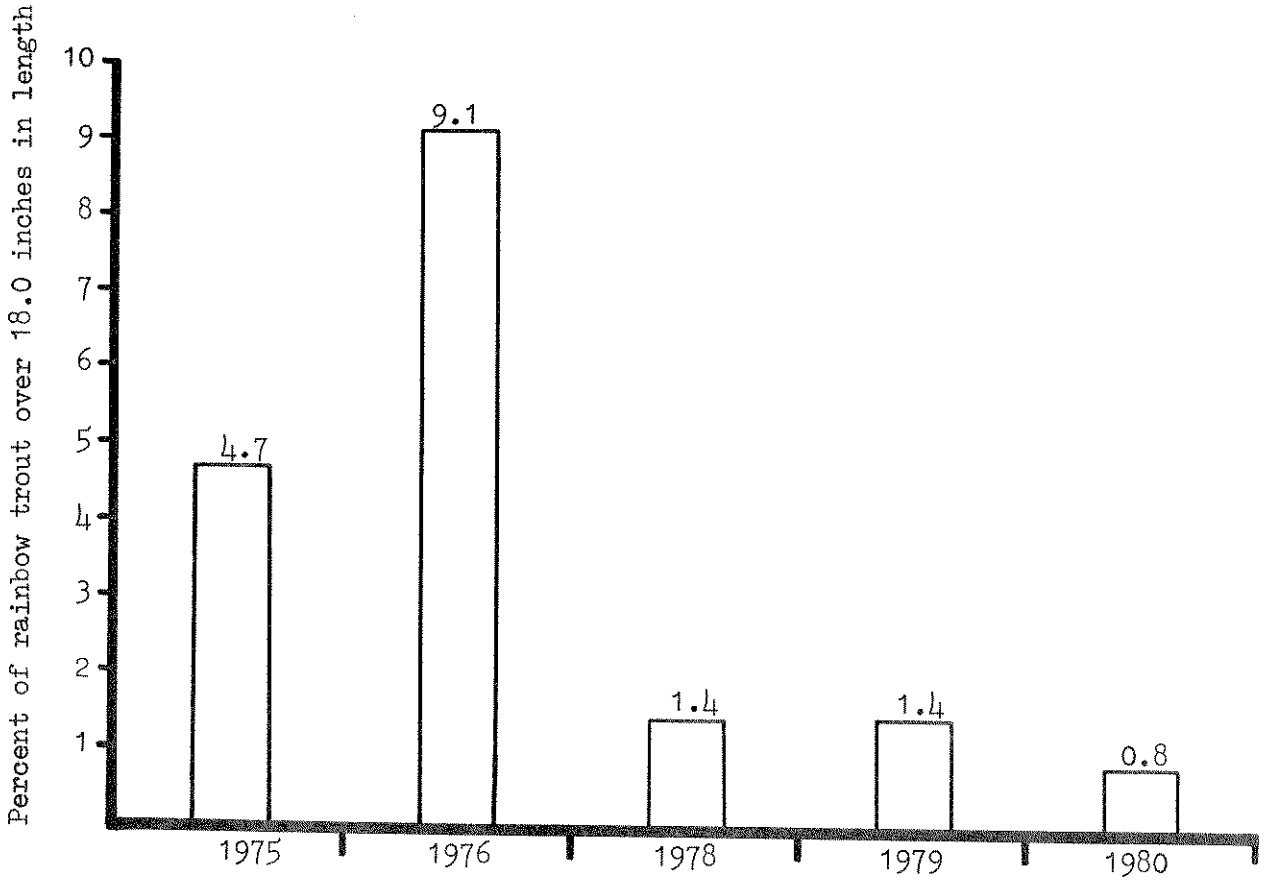

Figure 3. Percent of rainbow trout over 18.0 inches in total length in surface gill nets fished in the fall in Lake Koocanusa, 1975-1980.

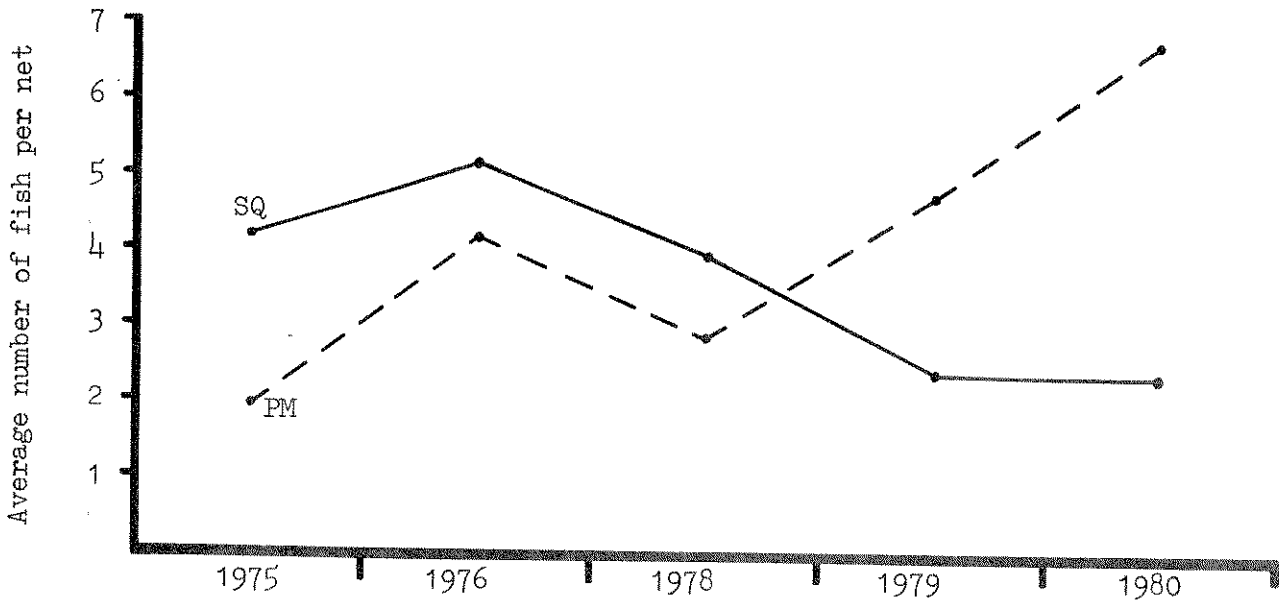

Figure 4. Average catch per surface gill net from fall sampling in Lake Koocanusa of northern squawfish (SQ) and peamouth chub (PM), 1975-1980.

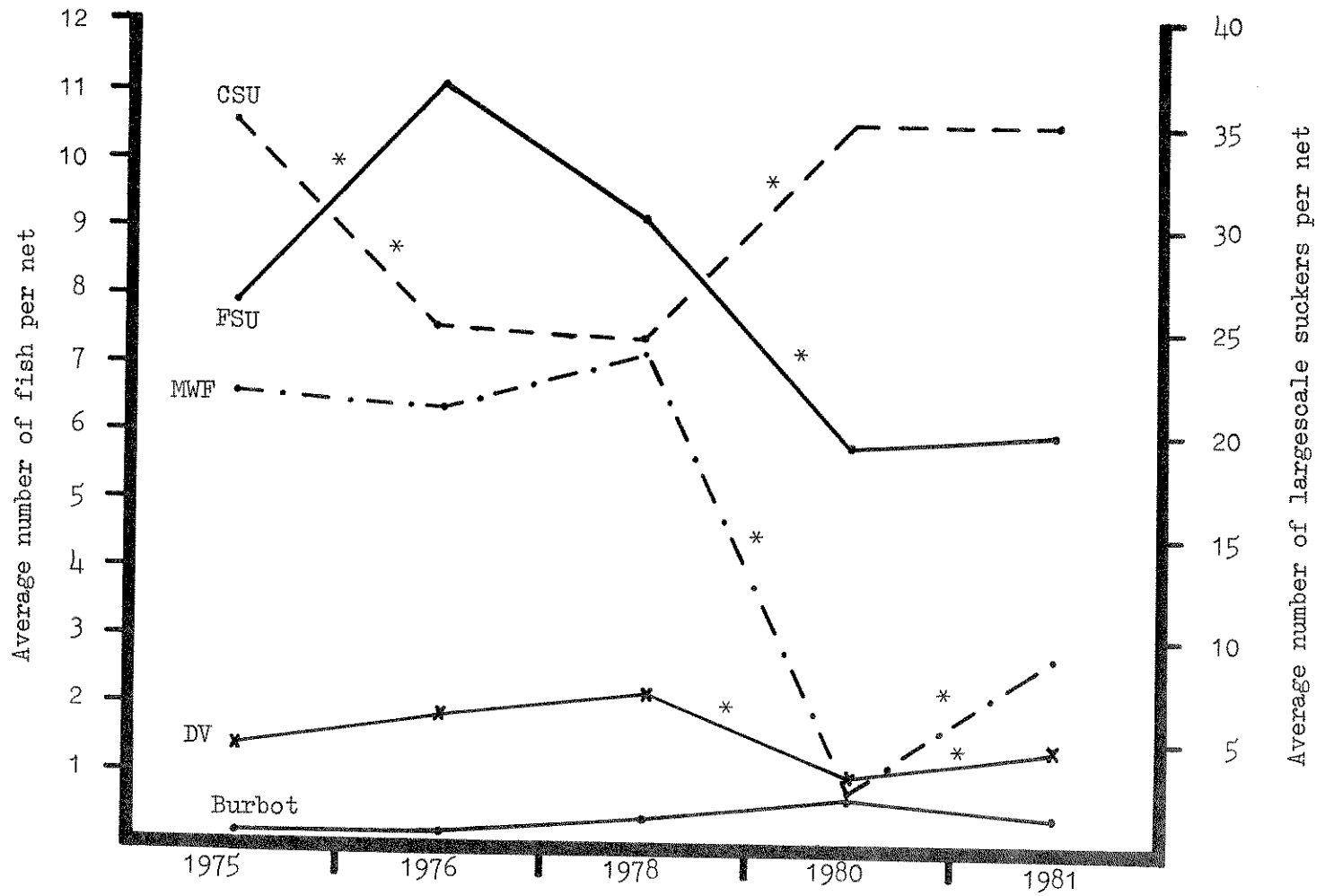

Figure 5. Average catch per bottom gill net of bull trout (DV), mountain whitefish (MWF), burbot, largescale sucker (CSU), and longnose suckers (FSU). Lake Koocanusa, Rexford Area, 1975-1980.

reservoir elevation ranged between 2,369-2,373 msl.

The bull trout catch rate increased from 1.4 fish per net in 1975 to 2.1 fish in 1978, then dropped to 0.8 fish in 1980. The catch increased to 1.4 fish per net in 1981. The decline in catch in 1980 is thought to be sampling error rather than actual changes in population abundance since the 1980 sampling was done at a reservoir elevation about 20 feet higher than the maximum elevation set forth in netting criteria.

The catch of mountain whitefish ranged from 6.5 to 7.2 fish per net from 1975-1978, but dropped to only 0.6 fish in 1980. The catch increased in 1981 to 2.7 fish per net. The decline in mountain whitefish may be partially due to sampling error, but it does appear that a reduction in the population has occurred. The spawning run of whitefish into the Tobacco River was smaller in 1979 and 1980 than in previous years and angler success during the run was quite low (Loren Netzloff, personal communication).

The catch of 6.0 longnose suckers per net and 35.6 largescale suckers in 1981 was almost identical to the 1980 catch. The catch of largescale suckers has ranged from 23.5 to 37.3 fish per net, while the longnose catch has varied between 5.8 to 11.1 fish per net. Although the catch rates of largescale suckers have fluctuated from year to year, there does not appear to be a trend of increasing or decreasing populations from 1975-1981. The netting data shows that longnose populations have declined from 1976-1981, indicating that they are not as suited to the reservoir environment as largescale suckers.

Burbot net catches increased from 0.1 fish per net in 1975 to 0.6 fish in 1980, then declined to 0.4 fish in 1981. The overall trend since 1975 indicates an increasing population. The catch in 1981 probably is a result of sampling variability rather than changes in population abundance.

Age and Growth

Work was continued on analysis of fish scales collected from cutthroat and rainbow trout, bull trout, mountain whitefish, squawfish, peamouth and suckers. These data were to be calculated by an age-growth computer program, but the program resulted in inaccurate information. The computer program is now being modified to correct error sources.

Growth rates of rainbow trout and cutthroat trout assuming a straight line proportion between body length and scale length are presented in Tables 3, 4 and 5. Only rainbow trout that reared in a tributary stream part or all of one year are included in Table 3. This method was used to eliminate as many fish as possible that may have been released from a hatchery and limit the sample to naturally spawned fish.

Table 3. Growth of year classes 1971 through 1978 rainbow trout, Lake Koocanusa. Number of fish aged is given in parenthesis.

Year Class	Average length in inches at annulus I		II		III		IV	
1971	2.6	(21)	10.8	(21)	14.6	(37)	16.8	(1)
1972	3.1	(24)	12.3	(44)	15.8	(11)	15.9	(1)
1973	3.0	(72)	11.2	(70)	15.4	(27)	18.8	(2)
1974	2.4	(34)	10.3	(42)	14.5	(9)	16.9	(6)
1975	2.3	(43)	10.9	(43)	14.6	(29)	16.3	(15)
1976	2.2	(69)	11.4	(102)	14.9	(38)	16.1	(9)
1977	2.7	(35)	12.0	(59)	14.3	(42)	----	----
1978	2.1	(36)	11.9	(78)	----	----	----	----

The data in Table 3 indicates variable growth rates between year classes and growth increments of the same age fish in different years. Average size of fish at annulus II has varied from 10.3 inches to 12.3 inches total length. The range of average fish lengths at any annulus show no clear trends of increasing or decreasing growth rates.

Growth rates of migration-age II westslope cutthroat trout are presented in Table 4. Migration-age II fish are those fish that lived two complete years in a reservoir tributary emigrating to the reservoir during the third year of life. The growth data presented does not include any hatchery-reared cutthroat.

Table 4. Growth of migration class II westslope cutthroat year classes from Rexford and Cripple Horse areas of Lake Koocanusa. Number of fish aged is given in parenthesis.

Year Class	Average length in inches at annulus I	II	III	IV
1972	2.5(52)	4.1(56)	12.1(56)	----
1973	2.5(33)	4.3(33)	12.8(39)	----
1974	2.2(14)	4.4(18)	11.8(15)	13.5(10)
1975	2.4(38)	4.2(38)	11.9(30)	13.4(8)
1976	2.3(41)	4.3(41)	11.7(34)	13.6(2)
1977	2.0(13)	4.0(13)	12.1(36)	----

Growth rates of the cutthroat trout while the fish were rearing in tributary streams were very uniform from year to year. Length attained after one summer in the reservoir (annulus III) does show some variability with growth apparently slowing starting with the 1974 year class.

Creel Census

Data collected from a census of anglers fishing in Lake Koocanusa in the spring (March, April and May) is summarized in Table 5. The data from 1976, 1977 and 1978 were collected from the lower 30 miles of the reservoir, whereas the data in 1981 were gathered from anglers fishing from the Canadian Border to Libby Dam, a distance of 48 miles.

The catch rate of trout in Lake Koocanusa in the spring has declined from 0.43 fish per man hour of effort in 1976 to 0.24 fish in 1981. This reduction in catch rates parallels declines noted in net catches of cutthroat and rainbow trout during the same period. Average catch per net night for both species in fall 1976 was 7.1 fish declining to 5.2 fish in fall 1980.

Table 5. Angler harvest of cutthroat, rainbow and bull trout from a partial creel census of Lake Koocanusa in spring, 1976, 1977, 1978 and 1981.

Year	Number Anglers	CPMH[1]	Number caught and average length in inches					
			RB[2]		WCT		DV	
			Number	Length	Number	Length	Number	Length
1976	264	0.43	158(30)[3]	14.6"	319(62)	14.8"	40(8)	14.1"
1977	379	0.31	280(51)	14.1"	260(47)	14.0"	9(2)	17.5"
1978	349	0.34	329(59)	13.8"	216(39)	13.5"	15(2)	12.6"
1981	699	0.24	567(68)	13.8"	288(27)	13.7"	45(5)	14.5"

1/ Catch per man hour of effort.
2/ RB is rainbow trout, WCT is cutthroat trout and DV is bull trout.
3/ Number in parenthesis is percent of total catch by year.

The species composition of the angler catch has changed considerably from 1976-1981. Rainbow trout comprised 30 percent of the catch in 1976 as compared to 68 percent in 1981, whereas cutthroat trout made up 62 percent of the catch in 1976 and only 27 percent in 1981. These changes in species composition of fish creeled by anglers were in accord with changes in species composition of the fall netting data. Rainbow trout comprised 59 percent of the trout net catch in 1976 with the remainder being cutthroat trout. In 1980, the net catch consisted of 81 percent rainbow trout and only 19 percent cutthroat trout.

The average size of rainbow trout caught in 1976 was 14.6 inches in total length as compared to 13.8 inches in 1978 and 1981. The cutthroat trout creeled also showed a decrease in average size from 14.8 inches in 1976 to 13.5 in 1978, and 13.7 inches in 1981. The cutthroat and rainbow trout caught in 1981 both averaged 0.97 pounds. Anglers contacted were satisfied with the size of the fish they creeled. The largest rainbow trout checked in spring 1981, was 18.5 inches in total length and weighed 2.12 pounds, whereas the largest cutthroat was 16.7 inches long and weighed 1.55 pounds.

Bull trout are caught incidentally, while fishing for cutthroat and rainbow trout. They do provide variety and an occasional trophy fish. A 24.8 inch bull weighing 4.92 pounds was caught in the spring of 1981. Other game species creeled included burbot, mountain whitefish and kokanee. It is suspected that kokanee in Lake Koocanusa originated from the Bull River hatchery in British Columbia. Spawning runs of kokanee have returned to the hatchery outlet (personal communication, Gerry Oliver, British Columbia Fish and Wildlife Branch). The only other sources would be migrants from Glen Lake and Dickey Lake which are in the Tobacco River drainage.

The establishment of a significant kokanee population will probably result in competition for zooplankton with rainbow and cutthroat trout. McMullin (1979) pointed out that a reduction in zooplankton densities could be detrimental to trout population.

Angler Return of Spawning Trout Tagged in Big Creek

A total of 770 rainbow, cutthroat and rainbow X cutthroat trout hybrids were tagged in spring 1980 with numbered anchor tags as they ascended or descended Big Creek during spawning movements. Anglers returned 47 tags from fish caught in 1980 and 14 tags from fish caught in the first six months of 1981. The return of 61 tags represents a return rate of 7.9 percent, but it is expected the true angler harvest rate is higher due to non-return of tags by anglers.

There was considerable variation in tag return rates between rainbow, cutthroat trout, and rainbow-cutthroat hybridgs (Table 7). Only 5.8 percent of the cutthroat trout tags were returned compared to 7.7 percent of the rainbow trout tags and 24.5 percent of the hybrid tags. Hybrid fish are often more aggressive than their parent species, less wary, and less able to learn how to avoid being caught (Childers and Bennett 1967).

Table 6. Number and percent of tags returned by anglers in 1980 and 1981 from rainbow, cutthroat and rainbow X cutthroat trout hybrids tagged in Big Creek in spring 1980.

Species	Number tagged	Number of tags returned in year 1980		1981		Total	
Rainbow	91	6	(6.6%)	1	(1.1%)	7	(7.7%)
Cutthroat	601	26	(4.3%)	9	(1.5%)	35	(5.8%)
Hybrids	78	15	(19.2%)	4	(5.3%)	19	(24.5%)
TOTALS	770	47	(6.1%)	14	(1.8%)	61	(7.9%)

The locations of angler recapture of trout tagged in Big Creek in spring 1980 are shown in Figure 6. Twelve of the 61 tag returns were from Big Creek during the spawning run, and the remainder were from Lake Koocanusa. Most of the fish caught by anglers from the reservoir were

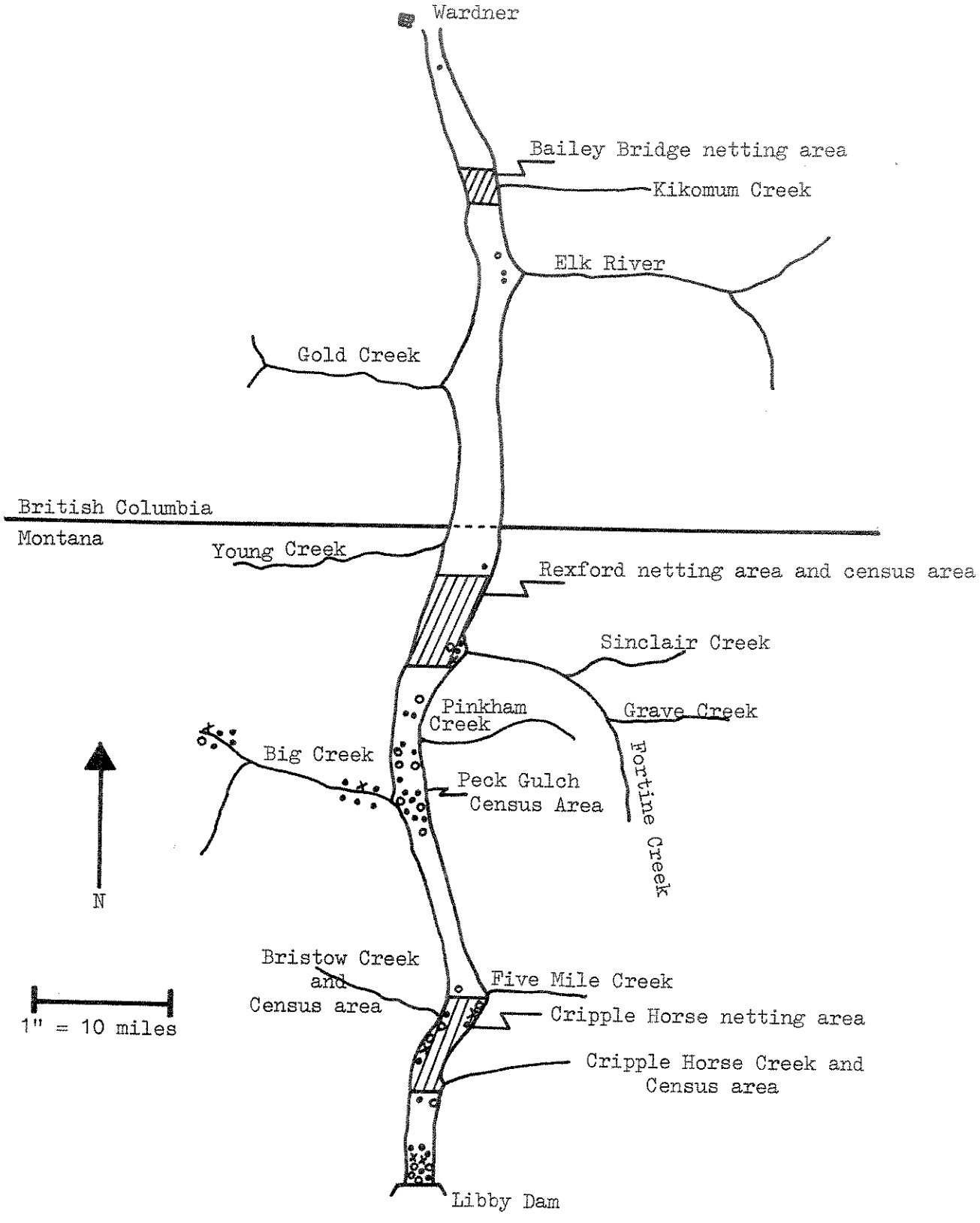

Figure 6. Map of Lake Koocanusa showing location of tag returns of cutthroat trout (•), rainbow trout (x), and rainbow x cutthroat hybrids (o).

within the general area of Big Creek and the area of the reservoir downstream from Five Mile Creek to Libby Dam. Three cutthroat, one rainbow and one hybrid were caught near Tobacco River Bay, while three cutthroat trout and one hybrid were caught in British Columbia. It would appear that most of the fish caught by anglers were caught downstream from the mouth of Big Creek. Angler harvest of rainbow and cutthroat trout tagged in Tobacco River in 1979 indicated most of these fish were caught upstream from the mouth of the Tobacco River.

Location patterns of the harvest of tagged fish may not be totally related to movement patterns. The areas of greatest tag return also coincide with the three areas of the reservoir having boat landings useable at drawdown levels of more than 30 feet.

VALUE OF STUDIES

Preservation, improvement and maintenance of spawning tributaries of Lake Koocanusa is a long-term management option for insuring adequate game fish populations in the reservoir. Kootenai National Forest funded Montana Department of Fish, Wildlife and Parks to collect data necessary to file for instream flow reservation on 10 forest streams. Lake Koocanusa tributaries selected for instream flow reservation requests included Young Creek, Pinkham Creek, Fortine Creek and Tabacco River. Kootenai National Forest Service crews removed potential barriers inhibiting upstream movement of spawning fish in the upper five miles of South Fork Big Creek in summer 1980.

Sinclair Creek, a small tributary of Tobacco River, near Eureka, Montana, was once the domestic water supply for Eureka. A small dam located about four miles upstream from its confluence with Tobacco River prevented further upstream movement of spawning cutthroat trout and rainbow trout. The town of Eureka abandoned Sinclair Creek as their water source in the early 1970's. Montana Department of Fish, Wildlife and Parks requested permission to remove this dam in 1976, but this request was denied.

The Eureka Rod and Gun Club requested permission to remove this dam in calendar year 1981 and the Eureka city council granted their request. Montana Department of Fish, Wildlife and Parks submitted a grant-in-aid request for $1,966 from the Renewable Resource Development Fund to be awarded to the Eureka Rod and Gun Club for construction of a fish ladder over the Sinclair Creek dam. This grant to the Eureka Rod and Gun Club was approved in late June, 1981.

Montana Department of Fish, Wildlife and Parks and Soil Conservation Service personnel designed a fish ladder suitable to pass fish over the dam in July, 1981. Construction of this ladder is scheduled for late August and early September, 1981 with labor and equipment provided by Eureka Rod and Gun Club members, City of Eureka and Lincoln County. This fish ladder should provide access into about five miles of Sinclair Creek for spawning fish from Lake Koocanusa.

RECOMMENDATIONS

Recommendations for the continuation of this project are broken down into field work and report writing for the remainder of fiscal-year 1981 and fiscal-year 1982.

Field Work - Fiscal-year 1981, 1982

1. Conduct fall gill net trend sampling at the three established netting areas in fall 1981 and fall 1982 and spring gill net trend sampling in 1982 at the Rexford area.

2. Determine where kokanee are spawning within the Lake Koocanusa tributary system. This effort will require close cooperation with British Columbia Fish and Wildlife Branch personnel since it is thought that most kokanee spawning occurs in British Columbia.

3. Continue collection of angler harvest data from fishermen utilizing Lake Koocanusa. The calendar year 1981 creel census will be terminated October 11, 1981. Note: this creel census is scheduled to be repeated in calendar year 1983 when hatchery fish planted in 1981 and 1982 have started to enter the angler harvest.

4. Spawning runs of rainbow trout and cutthroat trout entering Young Creek should be enumerated. Utilization of Sinclair Creek above the water works dam by spawning trout from the reservoir should be measured by making redd or fish counts.

Report writing, fiscal-year 1982

Data collected from all aspects of Lake Koocanusa investigations including Young Creek and other tributary development should be compiled into a single report or series of reports on the development of the reservoir fishery. These data should be integrated with available limnological information. Several segments of the Lake Koocanusa investigations such as the development of Young Creek should be written as separate reports for publication in appropriate scientific journals. It is anticipated that write-up of reports will require at least three years for completion since considerable field work is anticipated between now and September 30, 1983.

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