MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

Job Progress Report

State: Montana

Title: Northwest Fisheries Investigations

Project No. F-7-R-31

Title: Inventory of waters of project area

Job No.: I-a

Period Covered: July 1, 1981 through June 30, 1982

Report Period: April 1, 1981 through June 30, 1982

ABSTRACT

Provisional instream minimum flow requirements were determined for the Whitefish, Stillwater and Thompson rivers. Creel census and gill netting data is presented for Lake Mary Ronan. Gill net surveys for several regional lakes is described. Numerous stream hydraulic projects were reviewed. The size trends of mature spawning kokanee were determined for several lakes.

OBJECTIVES

Job objectives include: 1) to collect instream flow data for the Whitefish, Stillwater and Thompson rivers to select minimum flow requirements for fish and aquatic insect life; 2) to continue monitoring the kokanee population trends and fisherman success at Lake Mary Ronan; 3) to continue monitoring fish populations of lakes and streams and obtaining various chemical and physical parameters for the management of gamefish species; 4) to continue to investigate and approve stream alteration projects as required by the Montana Streambed Preservation Act; 5) to develop a fisheries management plan for high mountain lakes; 6) to monitor annual size fluctuations of kokanee spawning populations of lakes supporting wild and stocked fish.

ACCOMPLISHMENTS

Preliminary instream flow needs for trout streams in western Montana have been determined for the Whitefish, Stillwater and Thompson rivers. The flow needs to maintain suitable channel width for sustaining an optimum fishery are based on the wetted perimeter-discharge relationship. This program was developed in 1980 by Fred Nelson of the Montana Department of Fish, Wildlife and Parks.

The program uses three sets of stage-discharge data collected at high, medium and low flows. At low flow stream cross-sectional profiles are measured between head stakes set up on opposite banks. These measurements are recorded at three stations representing the upper, middle and lower reaches of each stream. The data are then transferred to computer code sheets and run out on a computer print-out program. Hydraulic parameters

can be made for various flow regimes to predict wetted stream perimeter, mean depth, mean velocity, cross-sectional area and stage height for each cross-section. A composite of the three sets of data are used to plot wetted perimeter-discharge relationships. From this data an inflection point is located where the wetted perimeter begins to decrease dramatically with associated reduced flows. Wetted perimeter-discharge curves are presented in Figures 1, 2 and 3. The inflection points plotted with each set of data relate to the suggested minimum flow recommendations for each stream reach. Time constraints prevented the collection of data for determining minimum flow recommendations for the Swan River.

A periodic winter and an opening day creel census was conducted at Lake Mary Ronan to determine the relative fishing success of kokanee and trout. Fish populations are also monitored each year by use of gill nets during late spring and fall. These two indices have been used in part to predict the relative abundance of kokanee available to the angler.

In the winter of 1982, four days were censused during the period of February 22 through March 26. Fishing pressure was extremely light, due largely to the poor catch success of kokanee. A combined total of 17 fish were caught from 63 hours of fishing effort during the days censused. The catch per angler was 0.7 fish, while the catch per man hour was 0.27 fish. During a similar four day census conducted in 1981, the combined catch was 353 fish of which 338 were kokanee, 9 rainbow trout and 6 westslope cutthroat trout. A comparison of the 1980 and 1981 winter catch results is shown in Table 1.

The catch success on the opening day of the 1982 fishing season seems to reflect upon the poor angler harvest during the winter season. A total of 85 anglers were successful in catching 26 fish, for a catch rate of 0.07 fish per hour and 0.3 fish per angler. This is in contrast to the excellent fishery experienced on the opening day in 1981 when 408 fish were harvested by 81 anglers of which kokanee comprised 83% of the catch. Fisherman success was 1.42 fish per hour and 5.04 fish per angler. Anglers successful in catching one or more fish represented 97.5% of the fishermen in 1981 as compared to only 24% in 1982. Similarly, limit catches of kokanee were caught by 11% of the anglers in 1981 as compared to 0% in 1982. A comparison of the 1982-82 opening day catch results are presented in Table 2.

The gill net catch data represent age classes II+ and III+ kokanee collected in the spring netting series. Fall kokanee collections are comprised of I+ and II+ fish. Age class III+ fish (spawning year class) are not included in the fall netting data, as these fish are nearing the end of their life cycle.

The average catch per net night of kokanee collected during the fall sampling period declined from 4.5 fish in 1980 to 0.7 fish in 1981. Similarly the catch per net night of kokanee collected during the spring sampling season declined from 4.0 fish in 1981 to 0.5 fish in 1982. A comparison of catch data is presented in Table 3.

In 1981, the population structure of kokanee was comprised of a strong age class of III+ fish, with succeeding weak year classes of age I+ and II+

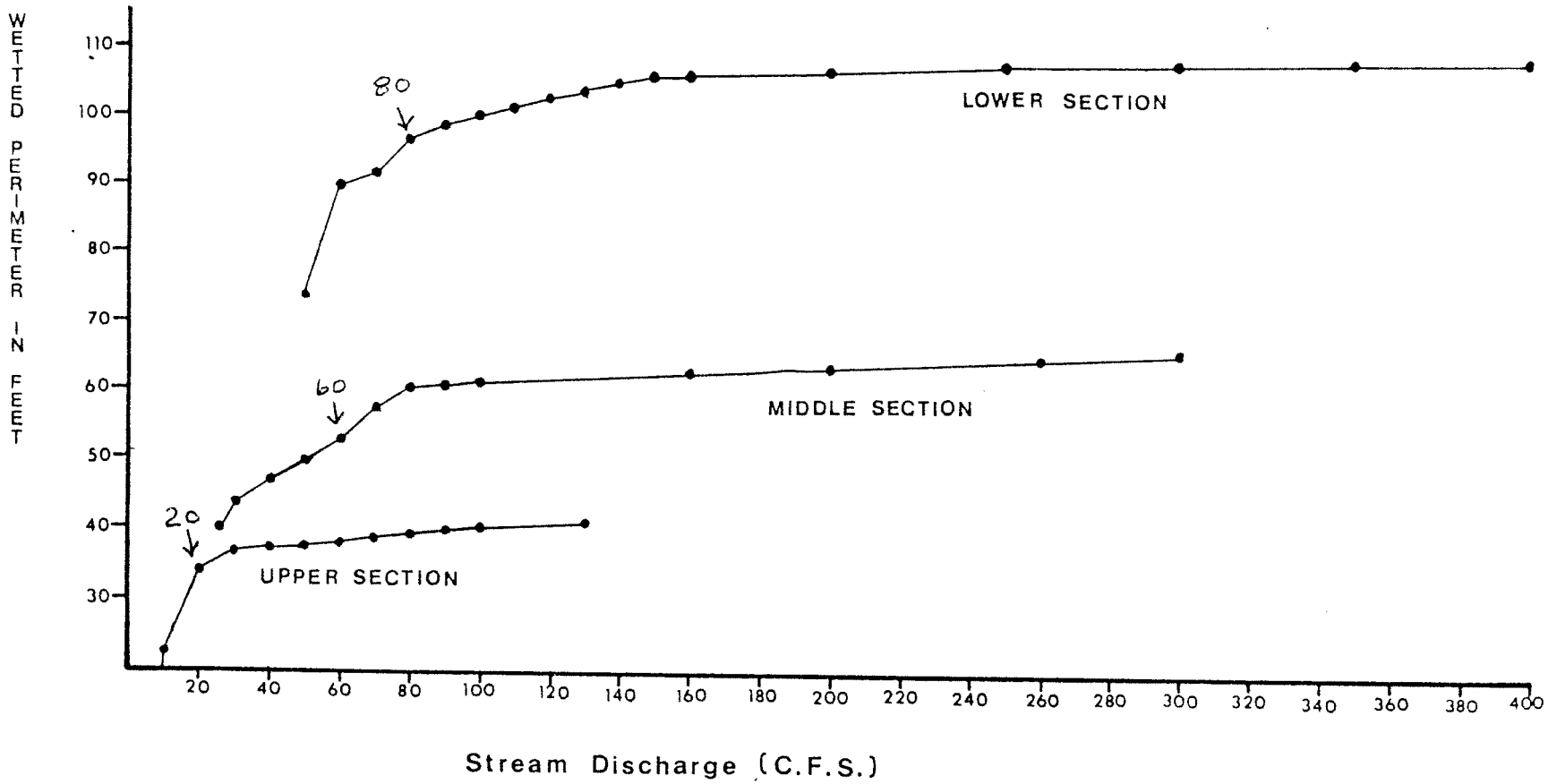

Figure 1. Wetted perimeter-discharge relationship and inflection points for three sections of the Thompson River.

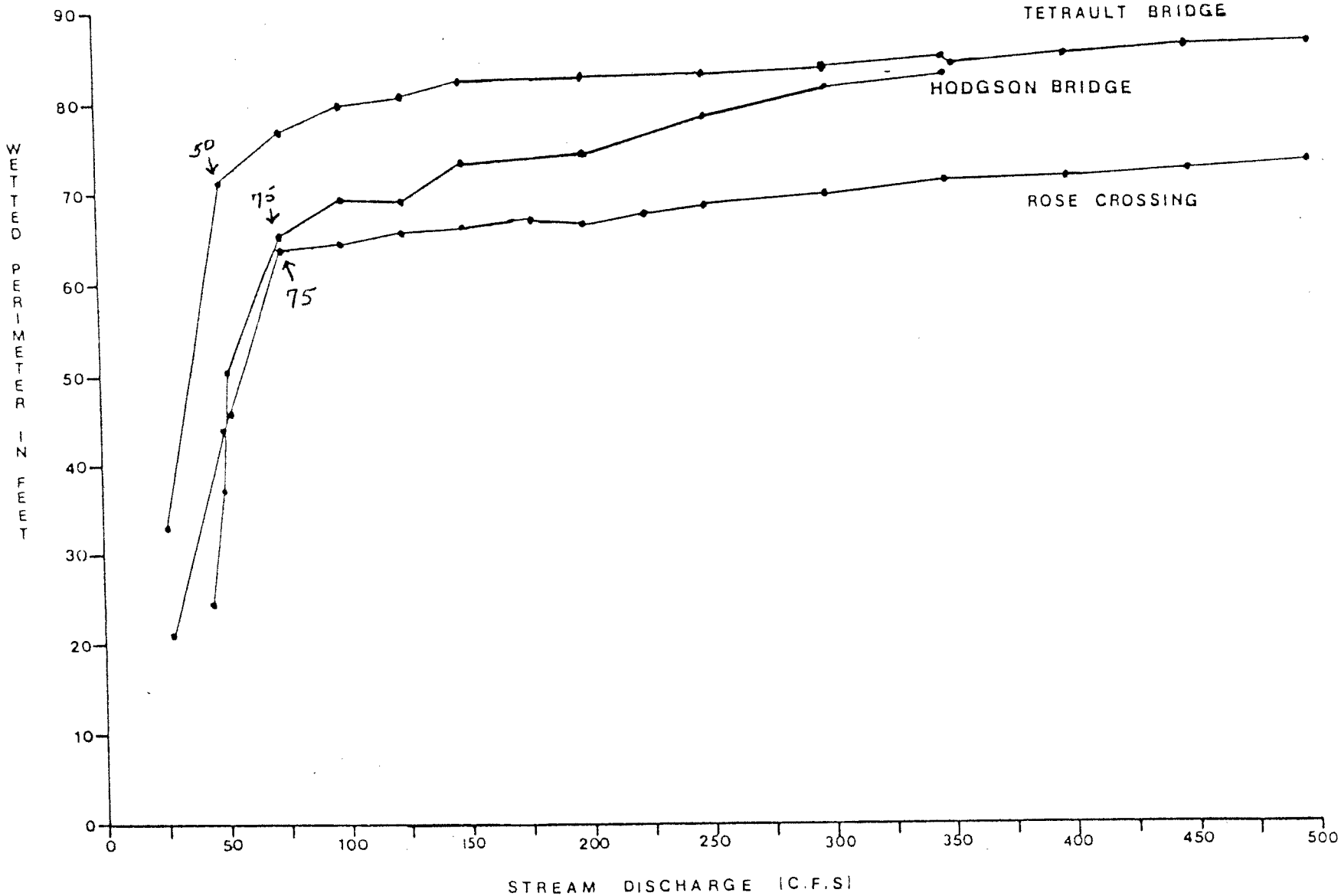

Figure 2. Wetted perimeter-discharge relationship and inflection points for three sections of the Whitefish River.

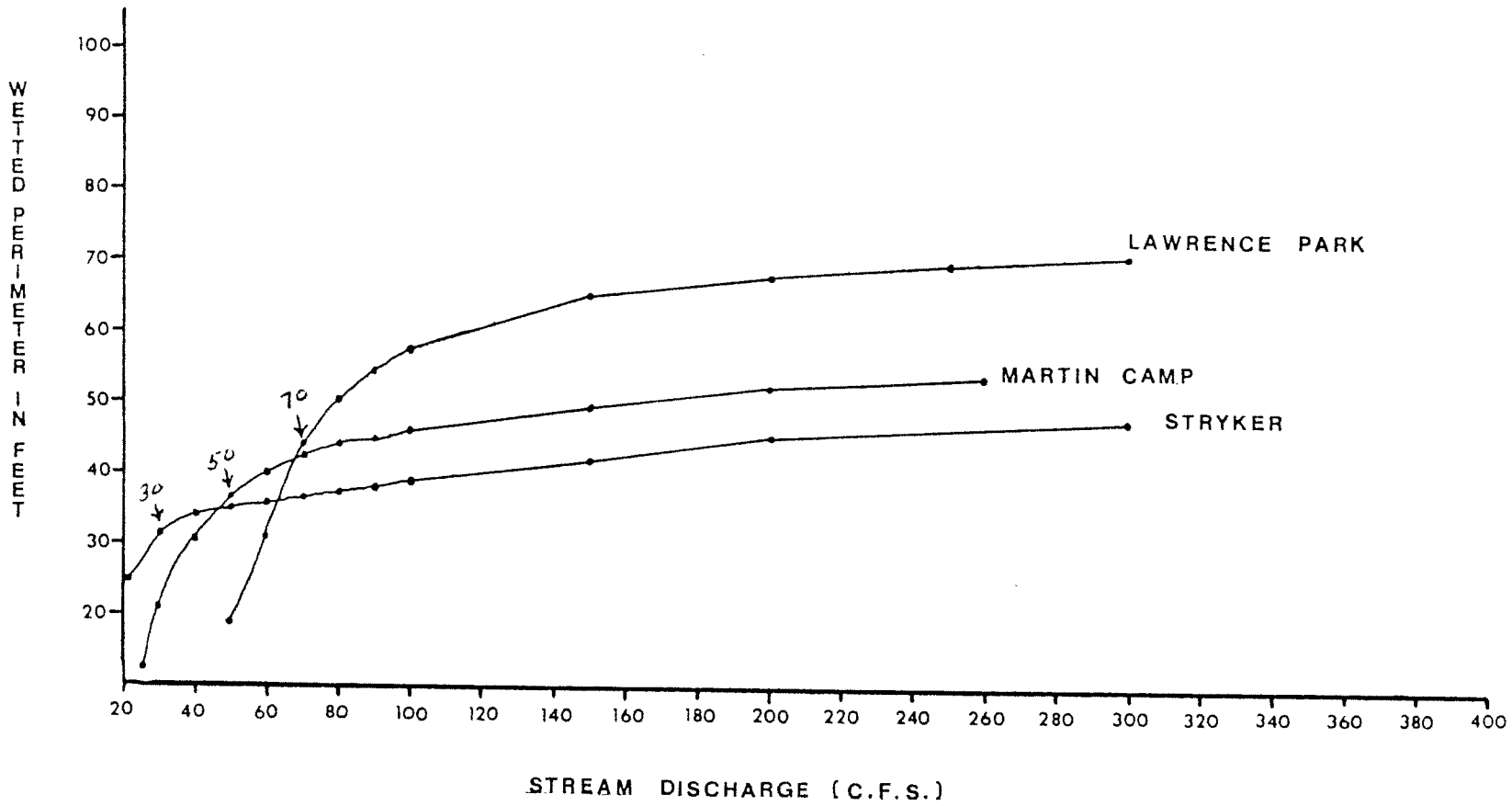

Figure 3. Wetted perimeter-discharge relationship and inflection points for three sections of the Stillwater River.

Table 1. Summary of winter creel census results, 1981 and 1982. Catch per hour in parenthesis.

Year	fishermen	No. hours fished	No. fish	Kokanee	Rainbow	Cutthroat	Catch per angler	Catch per hour (all fish)	Catch per hour (kokanee)
1981	107	311.2	353	338	6	9	3.3	1.14	1.08
1982	25	63.0	17	4	9	4	0.7	0.27	.06

Table 2. Summary of Lake Mary Ronan opening day creel census data for 1981 and 1982.

Year	No. anglers	No. fish caught	Ave. catch per angler	Ave. catch per hour	Species			
					KOK	RB	CT	LMB
1981	81	408	5.04	1.42	355(1.23)	14(0.05)	32(0.11)	7(0.03)
1982	85	26	0.31	0.07	6(0.02)	10(0.03)	6(0.02)	4(0.01)

Table 3. Average gill net catch per net night of kokanee, spring and fall netting series.

Year	Spring			Fall		
	Sinking net	Floating	Total	Sinking net	Floating	Total
1981	1.0(3)[1/]	6.7(3)	4.0(6)	8.3(3)	0.6(3)	4.5(3)
1982	0.8(3)	1.0(3)	0.5(6)	1.0(3)	0.3(3)	0.7(3)

1/ Number of nets set.

fish. In 1982, the age II+ and III+ fish, both weak year classes, entered the fishery resulting in poor catch success.

It appears that the survival of two succeeding year classes of kokanee, those stocked in 1979 and 1980, was very poor. The factor or factors contributing to the heavy mortality of these two age groups are unknown. However, occasional catches of small kokanee during the summer months may indicate a good survival of age class I+ kokanee. The success of 1982 fall gill net catches of age class I+ kokanee and the winter angling success in 1983 should verify the strength of this age class of kokanee.

The fish populations of several lakes in Region 1 were sampled with gill nets to determine the status of the fishery. Lakes sampled during the report period include Peck, Van, Hubbart, and Lagoni lakes.

Peck Lake, a shallow 28-acre lake in the upper Swan River drainage was sampled in June of 1982 with two floating gill nets set overnight to determine survival of hatchery plants of westslope cutthroat trout. A total of 11 cutthroat and 12 longnose suckers was collected. The cutthroat average 14.9 inches, ranging in size from 10.5 to 16.9 inches. Longnose suckers averaged 9.6 inches, ranging in size from 8.5 to 11.9 inches and have appeared in the population for the first time. Several adults were observed spawning in the lake outlet. It is believed the suckers have been brought in from an outside source. The presence of a wide size range of fish, with a proportional number of larger fish indicates the plants of fish (1500, alternate year plants of 4-5 inch fish) were adequate for maintaining the fishery.

Van Lake, a 58-acre cutthroat trout lake in the Swan drainage, was sampled in June of 1982 to determine the effect of competition by an over-abundance of redside shiners. Redside shiners were observed in large schools over the entire lake area at all depths. A total of 19 westslope cutthroat trout were collected in two bottom and one floating gill net sets. These fish averaged 13.3 inches and ranged from 8.0 to 17.2 inches. In addition, 60 redside shiners ranging from 5.5 to 6.3 inches were captured in the 3/4 inch panel of the nets. A cursory examination of the shiners stomach contents indicated a diet exclusively of dragonfly nymphs. The majority of the cutthroat trout stomachs were empty but it is believed that the major food item of the larger fish is the redside shiner. To better utilize the existing shiner population, species management will be changed to rainbow trout. Recommendations were made to plant larger fish (7-9 inch fish) and retired hatchery broodstock to utilize this potential food source.

Lagoni Lake, a 23-acre lake in the upper Stillwater drainage was chemically treated with liquid rotenone to reduce undesirable fish species. Prior to the renovation, a barrier structure was constructed at the outlet to prevent reinfestation of undesirable fish from Stillwater Lake. The lake will be restocked with cutthroat trout in the spring of 1983. Funding for materials (cost of rotenone and barrier construction) was assumed by the U.S. Forest Service.

Hubbart Reservoir, an irrigation storage reservoir located in the Little Bitterroot River drainage, was treated with rotenone in October of

1972. The reservoir was drawn down to the old existing stream channel to make repairs on the outlet gate structure. The drawdown provided an opportunity to treat the reservoir at comparatively little cost.

In May of 1982, the reservoir was sampled with three gill nets to determine the extent of rough fish reinfestation entering from the upstream river system. The catch composition was 86% longnose suckers, 9% rainbow trout and 5% peamouth. Redside shiners, although not netted, were observed in large numbers along the shoreline. Squawfish and yellow perch which comrpised 44% and .06% of the catch, respectively, in pre-rehabilitation netting efforts, did not enter the catch in 1982. In the event of an extreme drawdown in the future, it is recommended that the reservoir channel be rehabilitated with a rotenone-base toxicant and restocked with rainbow trout after detoxification.

A total of 48 hydraulic stream projects affecting fisheries habitat were reviewed during the project period in Region 1. A breakdown of projects submitted by various government agencies is as follows: County 4, State Highway 8, State Department of Lands 16, U.S. Forest Service 12 and municipal agencies 5. These projects were investigated in the field followed by specific written recommendations to minimize the impact on fisheries habitat.

The mountain lake survey project was inactive during the project period.

The size and age composition of mature spawning kokanee has been monitored annually each fall for the past several years in northwestern Montana lakes. Kokanee populations are sampled from both stocked lakes and lakes which support self-sustaining fish populations. Fish are collected by one of several methods beach seining in conjunction with hatchery egg taking operations, gill netting and electrofishing. The information derived from this data is used, in part, to develop management strategies for individual lakes.

A total of 15 lakes were sampled in 1981. A summary of the data is shown in Table 4. Kokanee populations are maintained totally or are supplemented by hatchery stocking for 10 lakes. Lakes successful in maintaining a thriving kokanee fishery by stocking include Lake Mary Ronan, Bitterroot, Glen, Lindbergh and Lake Blaine. Lakes having limited success in maintaining fishable populations of kokanee include Bull, McGregor, Whitefish, Dickey and Holland.

In 1976, the spawning year class of kokanee from Whitefish Lake declined dramatically as did the average length of fish. Only remnant populations of succeeding spawning year classes were collected in subsequent fall sampling attempts. Although stocking densities were increased from 200,000 to 300,000 fry, no measurable improvement of the fishery was evident. In an attempt to increase fry survival, kokanee fry will be reared in the hatchery for a longer period of time and released into the lake in late June or early July as two-inch fingerlings. This program was initiated in 1981 and will continue for a four-year evaluation period. This management measure will also be initiated for Bull, Dickey, and Holland lakes where survival of kokanee fry introductions has had little success in sustaining an acceptable kokanee fishery.

Table 4. The average total length of mature spawning kokanee collected from 15 lakes in Northwest Montana. Average length in inches and average weight in pounds.

Lake	Collection date	Males			Females		
		Average length	Average weight	Range (length)	Average length	Average weight	Range (length)
Bull	10-15	13.2(1)*	0.77	----	----	----	----
Spar	10-15	17.5(32)	2.01	14.6-20.9			
McGregor	10-19	20.0(1)	2.54	----	----	----	----
Mary Ronan	10-12	18.6(20)	----	17.5-20.3	17.4(61)	----	15.3-18.8
Whitefish	10-29	16.2(8)	1.40	15.7-17.0	----	----	----
Middle Thompson	10-28	14.2(82)	1.02	10.4-19.0	13.6(45)	0.93	12.5-17.9
Ashley	11-5	11.3(75)	0.45	10.6-12.5	11.1(33)	0.45	10.4-12.0
Bitterroot	11-5	10.6(135)	0.40	9.7-11.8	10.4(28)	0.39	9.7-12.8
Glen	11-15	11.6(29)	0.52	11.1-12.9	11.5(30)	0.47	10.7-12.5
Dickey	11-16	11.4(31)	0.43	10.1-12.1	11.2(13)	0.38	10.6-11.8
Blaine	11-18	11.7(47)	0.49	11.2-12.4	11.2(33)	0.44	10.7-12.0
Tally	11-18	9.0(111)	0.21	8.5- 9.6	9.0(9)	0.20	8.7- 9.2
Lindbergh	11-22	10.0(24)	0.32	9.4-10.5	9.9(22)	0.29	9.5-10.2
Holland	11-22	10.9(27)	0.39	10.3-11.7	10.8(6)	0.39	10.5-10.9
Swan	11-30	10.1(128)	0.31	9.4-10.9	9.7(62)	0.25	9.2-10.3

*Sample size in parenthesis.

Recent downward trends in the average size of kokanee collected from Bitterroot Lake have initiated changes in the stocking densities. In 1980, a high water year, full pool elevations were reached in late fall. Shoreline gravel bars normally dewatered in late fall were inundated thus providing optimum kokanee spawning. To compensate for the expected increase of fry production, supplemental stocking was temporarily suspended. Supplemental stocking of kokanee fry in future years will be determined by fall lake levels.

The size of kokanee in Glen and Lindbergh Lakes has been declining in recent years. A reduction in stocking densities for those lakes is also being considered.

An assessment of lake kokanee populations in Region 1 will be prepared in a future report.

Prepared by: Robert J. Domrose

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Waters referred to:

Lake Mary Ronan	07-7700
Holland Lake	07-6780
Lindbergh Lake	07-7260
Dickey Lake	11-8220
Glen Lake	11-8380
Van Lake	07-9480
Bitterroot Lake	07-7300
Whitefish River	07-4980
Stillwater River	07-4420
Thompson River	07-7248
Peck Lake	07-8220
Hubbart Reservoir	07-6840
Lagoni Lake	07-7100
Ashley Lake	07-5220
Bull Lake	11-8040
Spar Lake	11-9640
McGregor Lake	05-9216
Whitefish Lake	07-9540
Middle Thompson Lake	05-9232
Lake Blaine	07-5380
Tally Lake	07-9060
Swan Lake	07-9000

Key words:

Minimum flow
Fishing success
Kokanee size/measurement