MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-46-R-7 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER LAKES

JOB NUMBER: II-b

JOB TITLE: WEST CENTRAL MONTANA COLDWATER LAKE INVESTIGATIONS

PROJECT PERIOD: JULY 1, 1993 THROUGH JUNE 30, 1994

OBJECTIVES AND DEGREE OF ATTAINMENT

1. Develop an average size rainbow trout in the Georgetown Lake winter creel to 14 inches.

   Rainbow average length on January 1994 catch was 12.4 inches. This is a slight increase over 1992-93 average of 12.2 inches, but substantially less than the 14.0 inch goal. A significant management change will be required to achieve the 14 inch average.

2. Develop a current mountain lake data base on all mountain lakes in Region 2.

   The majority of mountain lakes in the Flint and Anaconda ranges are managed by natural reproduction. Only lakes with the potential to support trout but with no sites for natural reproduction are stocked.

3. Increase size of kokanee in the creel to 10 inches or greater in the Georgetown Lake winter fishery.

   Average creeled kokanee size in January 1994 was 9.9 inches. Two year old fish averaged 8.5 inches and three year olds were 10.6 inches. Fluctuations in average kokanee sizes are the result of differing abundance of age 2 and 3 kokanee in the catch. Increase in size of age 3 kokanee to 10.6 inches, suggests that total kokanee numbers may be somewhat lower than in previous years. This may have resulted from low lake levels in 1992-93 which caused some nearshore spawning localities to be unavailable.

ABSTRACT

Kokanee salmon creeled by ice anglers in January 1994 averaged 9.9 inches in total length. Age 3 kokanee averaged 10.6 inches, the largest in 15 years. Age 2 kokanee were 8.5 inches in average total length. Winter fishery kokanee catch appeared to be slower than normal at .83/hour.

Georgetown Lake brook trout in the January, 1994, creel averaged 13.6 inches in total length and 0.2 fish per hour. Largest brook trout measured was 17.5 inches. Brook trout average size was the largest since in the 15 years of record, but brook trout comprised only 7% of the trout catch. Cessation of kokanee snagging in fall 1994 should benefit the brook trout fishery.

Average total length of rainbow trout in the Georgetown creel in January, 1994 was 12.4 inches. Rainbow catch was .34 per hour. Evaluation of rainbow strain performance was impossible due to marking overlap. Eagle Lake and Arlee rainbow stocking will be increased by 10,000 each in 1995 for a total of 75,000 Eagle Lake, 75,000 Arlee, and 30,000 yearling Kamloops.

January, 1994 angler harvest was 1.24 fish per hour compared to 2.4 per hour in January 1992. Kokanee catch rates accounted for the difference; .83 per hour in 1994 and 2.25 in 1992. Angler use was predominantly by residents of Anaconda, 49%, and Missoula, 22%. The majority of remainder were from other Western Montana localities. Fewer than 3% were from east of the divide in Montana or out of state.

Under ice oxygen was adequate for salmonid survival throughout the period of ice cover.

PROCEDURES

Georgetown Lake management monitoring in 1993-94 consisted of an intensive creel sampling during the January ice fishery. This data collection has been made annually since 1984-85 with small modifications. Fish are weighed, total length measured, and a few vertebrae excised from rainbow trout for examination in the laboratory for the presence of tetracycline markings. Tetracycline marks resulting from the addition of tetracycline to the hatchery diet are used to distinguish among the rainbow strains planted in Georgetown. Beginning with the 1993 stockings, Eagle Lake rainbow receive a single mark, Arlee rainbow receive 2 marks and 3 marks are placed on Kamloops rainbow.

Spawning runs of rainbows have been monitored by examination, fin clip sampling for electrophoretic analysis, and length of weight measurements. This effort utilized electrofishing for fish collection and in 1994 was reduced to a minimum due to expanded awareness of the potential for electrofishing injury to eggs and adults.

RESULTS AND DISCUSSION

Kokanee Salmon

Angler caught kokanee salmon in January, 1994 averaged 9.9 inches in total length (Table 1). Two and 3 year old kokanee averaged 8.5 and 10.6 inches respectively (Table 2). The three year old fish were the largest in the last 15 years. The larger kokanee sizes are due to reduced kokanee abundance as reflected by the 1994 catch rate of .83 kokanee per hour as compared to the 1992 rate of 2.25 kokanee per hour.

The closing of the snag fishery for kokanee will be effective in fall 1994. Some increase in kokanee spawning could occur but it seems unlikely.

Table 1. Georgetown Lake Kokanee Average Lengths in Winter Angler Creel

Year	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74
Sample Number	34	55	No	20	149	717	302	No
Average Length	12.3	10.7	data	11.4	10.9	10.6	9.9	data
Year	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82
Sample Number	No	14	346	194	119	7	127	No.
Average Length	data	11.5	10.8	9.2	7.9	8.2	8.4	data
Year	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Sample Number	No	46	96	133	187	384	403	205
Average Length	data	7.8	8.2	9.1	8.6	9.4	8.8	8.4
Year	90-91	91-92	92-93	93-94				
Sample Number	208	207	208	208				
Average Length	8.7	8.9	10.1	9.9				

Table 2. Georgetown Lake Kokanee 2nd to 3rd Year Growth Increment in January Angler Creel Sample

	78	79	80	81	84	85	86	87	88	89	90	91	92	93	94
2+ ave. length	7.8	6.9	7.2		6.9	7.2	7.5	7.5	8.2	7.9	7.9	7.7	8.0	8.7	8.5
3+ ave. length		8.7	8.3	8.8		8.4	9.3	9.2	9.7	9.5	9.3	9.3	9.4	10.2	10.6
ave. growth		0.9	1.4	1.6		1.5	2.1	1.7	2.2	1.3	1.4	1.4	1.7	2.2	1.9

Brook Trout

Brook trout comprised only 7% of the trout harvest sampled in January 1994 (Table 3). This is the lowest percentage since January, 1987. Whether this reflects a real reduction in brook trout abundance or is simply an artifact of small sample size cannot be determined. A reduced brook trout population might reflect increased juvenile competition with rainbow juveniles in spawning tributaries as well as illegal harvest by snag fishermen in previous fall seasons. Closure of the kokanee snag fishery should have a positive impact on brook trout abundance.

Table 3. Georgetown Lake Creel Samples of Rainbow and Brook Trout.

	Summer		Winter									
	1979	1980	1980	1981	1987	1988	1989	1990	1991	1992	1993	1994
Number Sampled												
Rainbow	88	774	141	730	244	303	221	305	302	300	301	300
Brook	4	124	11	123	18	57	23	47	45	75	56	22
Brook Trout Length												
Average	10.1	10.8	11.8	11.1	12.1	12.1	12.2	12.0	13.1	12.7	13.4	13.6
Maximum					17.2	16.5	16.0	17.2	16.9	17.3	16.9	17.5
Rainbow/Brook Ratio	22:1	6:1	13:1	6:1	14:1	5:1	10:1	6:1	6:1	4:1	5:1	14:1
Brook Trout % of Catch	4	14	7	14	7	16	9	13	13	20	15	7

Rainbow Trout

The 12.4 inch average size of January, 1994 angler caught rainbows (Table 4) is second lowest in the last eight years. The most likely explanation for a size decrease is harvest expansion. As the quality of angling in Georgetown improved after the 1985 regulation changes, anglers responded by an increased utilization of the lake. While no empirical data exist to support this contention, it is rather clear, qualitatively, to experienced observers.

In an attempt to respond to the decline in rainbow average size, stocking for 1995 will be increased by 10,000 each for Eagle Lake and Arlee rainbow from 65,000 to 75,000 of each annually. The most reliable method to increase Georgetown rainbow size would be to further restrict harvest. Whether additional restrictions would be acceptable to the angling community will be explored before the next round of regulation setting.

Table 4. Georgetown Lake Rainbow Average Lengths in Winter Angler Creel

Year	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74
Sample Number	214	306	No	247	555	1407	888	No
Average Length	11.7	11.3	data	11.1	10.1	10.6	10.7	data
Year	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82
Sample Number	No	45	247	171	165	30	124	No
Average Length	data	10.4	10.6	10.0	9.9	11.2	9.7	data
Year	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90
Sample Number	No	3	42	296	242	303	227	305
Average Length	data	9.7	9.8	11.5	12.8	12.8	13.4	13.4
Year	90-91	91-92	92-93	93-94				
Sample Number	302	300	301	300				
Average Length	13.9	12.6	12.2	12.4				

Rainbow catch rate was .34 fish per hour in January, 1994 as compared to .13 in January, 1992.

No analysis of strain performance in this reporting period due to confounding of tetracycline marks. Presently all hatchery rainbows are receiving some combination of tetracycline marks. This will allow assessment of natural recruitment of rainbows since they will be the only group lacking tetracycline marks.

Spawning Georgetown rainbows were examined in the North Fork of Flint Creek in May of 1994. Twenty spawners averaged 19.4 inches total length and 2.88 pounds in weight, Table 5. Hook scarring was 10%. The largest spawner handled was a 22.5 inch male weighing 4.82 pounds.

Table 5. Georgetown Lake Tributaries Spawning Rainbow

North Fork Flint Creek

Date 5/23/90			Date 5/24/91		
Number	50	L 17.5	Number	96	L 17.6
Number Male	26		Number Male	34	
Number Female	24		Number Female	62	
Number Hook Scarred	7		Number Hook Scarred	8	
Date 5/17/93			Date 5/6/94		
Number	18	L 18.9	Number	21	L 19.4
Number Male	4		Number Male	9	
Number Female	14		Number Female	11	
Number Hook Scarred			Number Hook Scarred	2	

Creel Survey

January, 1994 data collection included contacting 256 anglers during ten survey days. Comparison of 1994 and 1992 data is presented in Table 6. Two hundred fifty-six fishermen were interviewed in 1994. Catch per hour was 1.24 salmonids in 1994 and 2.4 in 1992. The major fraction of the difference was the increased difficulty of the 1994 kokanee catch, .83 per hour in comparison to 2.25 kokanee per hour in 1992. Brook trout catch rates were effectively unchanged in 1994, .02 as compared to 1992, .03 per hour. Rainbow catch rates were greater, .34 per hour, in 1994 than in 1992, .13 per hour.

Table 6. Georgetown Lake January Angler Creel

	1992	1994
Fish/hour	2.4	1.24
Rainbow/hour	.13	.34
Brook/hour	.03	.02
Kokanee/hour	2.25	.83

Place of origin of January anglers was remarkably consistent in 1994 and 1992. About half the anglers were from Anaconda, 20% from Missoula and 20% from the Butte, Deer Lodge, and Philipsburg area.

Oxygen Concentration

Oxygen concentration under the ice in winter 1993-94 at Georgetown Lake was adequate to sustain salmonids throughout the period of ice cover (Table 7).

Table 7. Georgetown Lake Under Ice Dissolved Oxygen Concentrations (ppm) 1993-94.

	Surface	1m	2m	3m	4m	5m
December	10.5	9.8	8	5.4	2.5	2.5
January	10	9.2	5	1.5	.8	.5
February	8.2	6.7	5.4	1.3	.7	.4
March	6.5	5.2	5	1.3	.5	.7

Waters Referred to:
Georgetown Lake
North Fork of Flint Creek
Stuart Mill Creek

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Date: August 1994

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