MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA
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TITLE: STATEWIDE FISHERIES INVESTIGATIONS
TITLE: SURVEY AND INVENTORY OF COLDWATER LAKES
TITLE: HAUSER AND HOLTER RESERVOIRS STUDY

PROJECT PERIOD: JULY 1, 1992 THROUGH JULY 1, 1994

ABSTRACT

Fisheries data were gathered on Hauser and Holter reservoirs to provide information needed to: 1) manage the fishery of the two reservoirs; 2) evaluate impacts of existing reservoir operations on the sport fishery; and 3) evaluate the success of the hatchery stocking program. The composition of fish species in the horizontal gill nets in Hauser Reservoir in 1992 and 1993 were similar to catches in previous years. Kokanee dominated the catch in floating gill nets, while white suckers dominated the sinking gill net catch. Walleye continued to make up less than 1% of the catch in sinking gill nets, in spite of yearly plants of 3,000-5,000 fingerlings since 1989. The number of kokanee in vertical gill nets avergaed 26.7/net night in 1992 and 10.2 in 1993. None of the year classes of kokanee were considered to be strong in either year. Catch rates of age class I+ and II+ fish were particularly weak in the 1993 nets. A total of 2,214 anglers were interviewed during the summer of 1992 on Hauser Reservoir, while 2,086 anglers were interviewed in 1993. Kokanee dominated the catch in both years, and yellow perch composed an all-time high percent of the catch (37.9%) in 1992. Angler catch rates of rainbow trout were 0.05/hr in both 1992 and 1993, while mean length of harvested fish was 15.1 inches in 1992 and 16.3 inches in 1993. Kokanee catch rates were 0.22/hr in both years, while mean length of harvested fish was 15.8 inches in 1992 and 16.0 inches in 1993. Yellow perch dominated the catch in the 1992/93 winter fishery on Hauser Reservoir, composing 63.1% of the catch; kokanee were the second most frequently taken fish, composing 33.8% of the catch. In Holter Reservoir, rainbow trout and kokanee dominated the catch in fall floating gill nets in 1992 and 1993. In spring floating gill nets, yellow perch composed 38.3% and 29.8% of the catch in 1992 and 1993, respectively. These numbers stood in contrast to catch rates of 0 for yellow perch for both of the previous two years (1990 and 1991). Yellow perch and white suckers dominated the catch in sinking gill nets in 1992 and 1993. Catch rates of walleye in fall sinking gill nets were 3.67 and 4.00 per net for 1992 and 1993, respectively. The average length of walleye in the nets was 22.4 and 22.0 inches for the same two years. The catch rates

for kokanee in the vertical gill nets in Holter Reservoir were 9.3/net night in 1992 and 19.3 in 1993. The catch rates in 1993 were the highest since 1986, and were primarily due to the strength of age I+ fish. A total of 2,350 anglers were interviewed during the summer on Holter Reservoir in 1992, while 1,387 were interviewed in 1993. Yellow perch dominated the catch made by anglers (61.8% in 1992 and 52.8% in 1993), followed by rainbow trout and kokanee. Catch rates for rainbow trout in 1992 and 1993 were 0.22 and 0.14/hr, respectively. The catch rates for rainbow trout in 1993 were the lowest in eight years of creel surveys, even though the mean length of harvested fish (15.9 inchees) was the greatest in eight years. In 1992, about 93% of the rainbow trout harvested were of known hatchery origin, while only 65% of rainbow trout captured in gill nets were of hatchery origin. In 1993, 86% of rainbow trout harvested were of known hatchery origin, while only 54% in gill nets were of hatchery origin. These numbers support previous work that showed that Arlee rainbow trout stocked into Holter Reservoir are more susceptible to being caught by anglers than naturally reproduced rainbow trout. Yellow perch dominated the composition of the catch during the 1992/93 winter ice fishery on Holter Reservoir. Angler catch rates for yellow perch and rainbow trout were 2.73/hr and 0.09/hr, respectively.

PROCEDURES

The study area has been previously described by Rada (1974), Berg and Lere (1983) and MDFWP (1985). A map of the two reservoirs is presented in Figure 1.

Reservoir fish were sampled with floating and sinking 6 x 125 foot experimental gill nets (0.75 to 2 inch mesh) set during the spring and fall. Nets were set in each reservoir in similar locations and at similar times of year through the period of survey. Distribution of fish species by depth was determined by using a gang of four vertical gill nets that were 150 feet deep and 12 feet wide (0.75, 1, 1.25 and 1.5 inch mesh). Vertical nets were set monthly from May through October at permanent sampling stations located at the lower end of each reservoir (the Dam station on Hauser Reservoir and the Jackson station on Holter Reservoir). Vertical nets were set to fish the entire water column.

A partial creel census was conducted on Hauser and Holter reservoirs from mid-April through late November. Procedures for this partial creel census are described by Lere (1987). Another partial creel survey was conducted during the ice fishery on the two reservoirs from late December through mid- March.

RESULTS

Hauser Reservoir

Fish Abundance and Distribution

Relative abundance of fish captured in floating gill nets in 1992 and 1993 is presented in Table 1. The composition of the catch was similar in both years, with kokanee dominating the catch in both spring and fall, followed in abundance by rainbow trout. The one exception to this was spring 1992, where white suckers comprised 24.3% of the catch. The combined total for both sucker species (35.2%) were at the highest level since the spring 1987 nets (Appendix Table 1). The large number of Utah chubs seen in the fall 1991 nets (20.2% of catch) was an apparent aberration, since catches (both in terms of percent of total catch and number per net) dropped considerably in 1992 and 1993.

Since 1986, rainbow trout catch rates in the spring nets have been fairly stable--if the extremely high catch rate in 1986 is discounted (Figure 2). Catch rates in the fall have shown a slow downward trend. About 90% and 82% of rainbow trout collected in gill nets in 1992 and 1993, respectively, were of known hatchery origin. Kokanee catch rates peaked in the spring floating nets in 1991, while a peak was seen in 1990 for the fall floating nets (Figure 3).

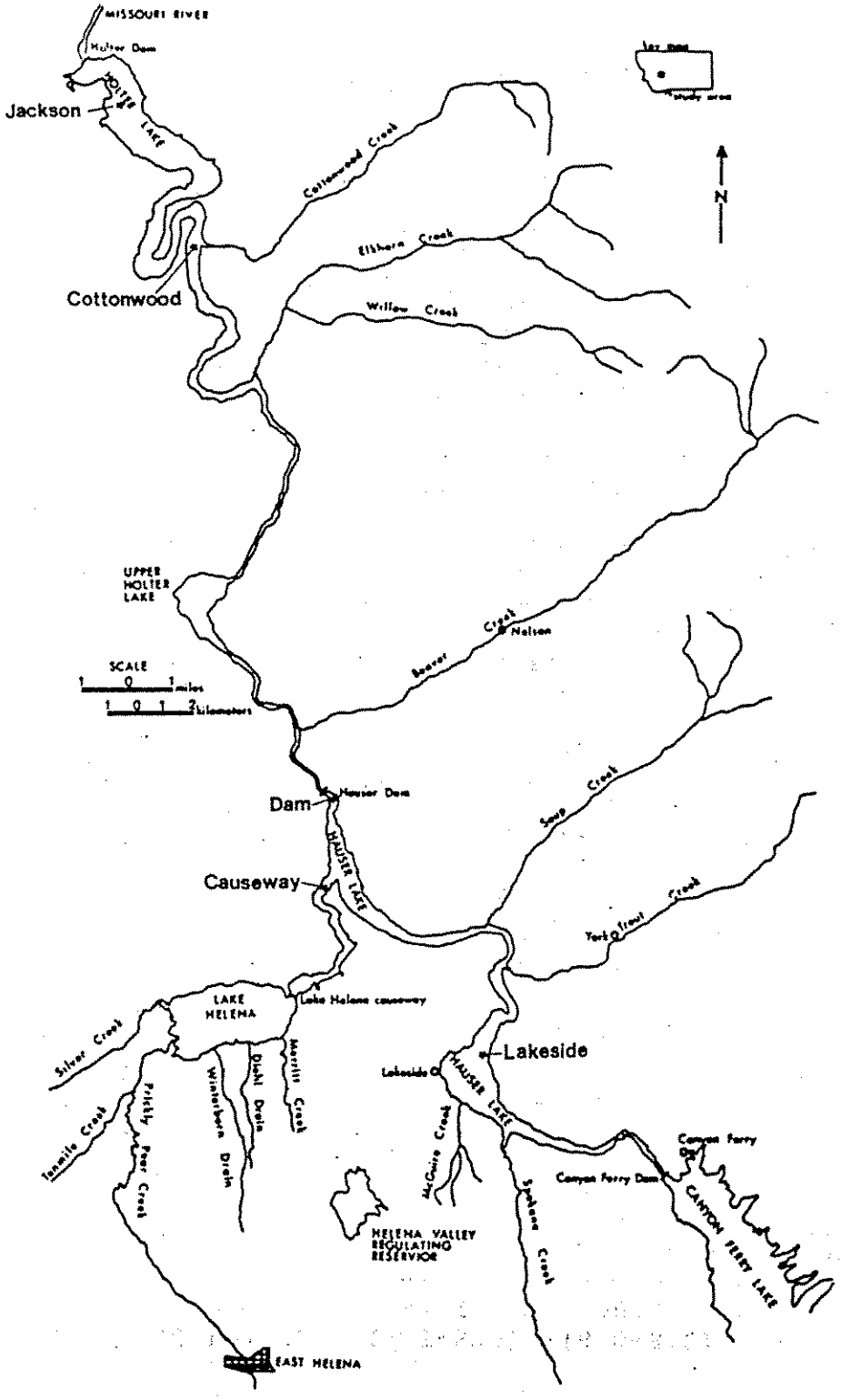

Figure 1. Map of Hauser and Holter reservoirs showing locations of permanent sampling stations. Lakeside, Causeway and Dam stations are on Hauser Reservoir. Cottonwood and Jackson stations are on Holter Reservoir.

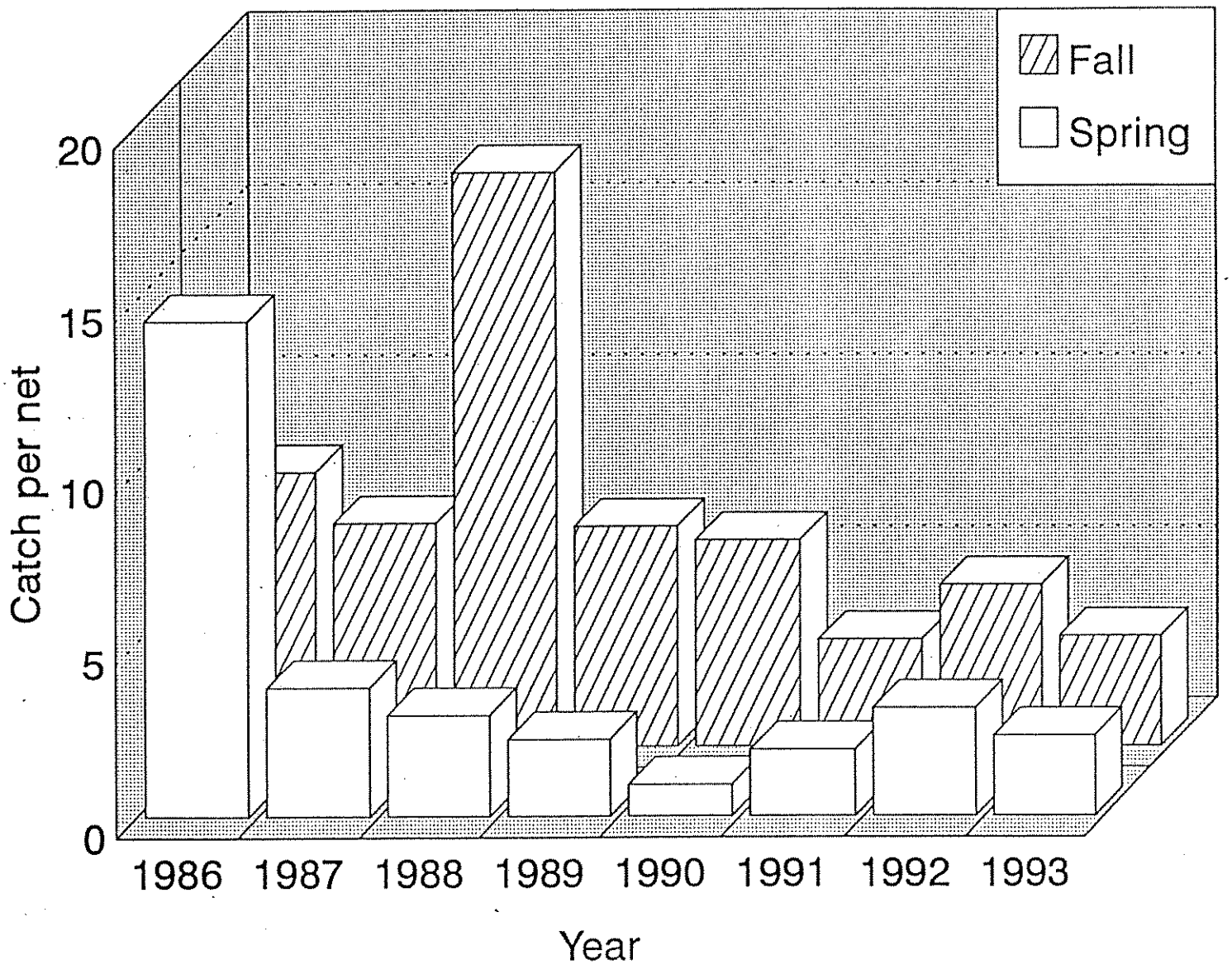

Figure 2. Catch rates for rainbow trout in floating gill nets in Hauser Reservoir, 1986-93

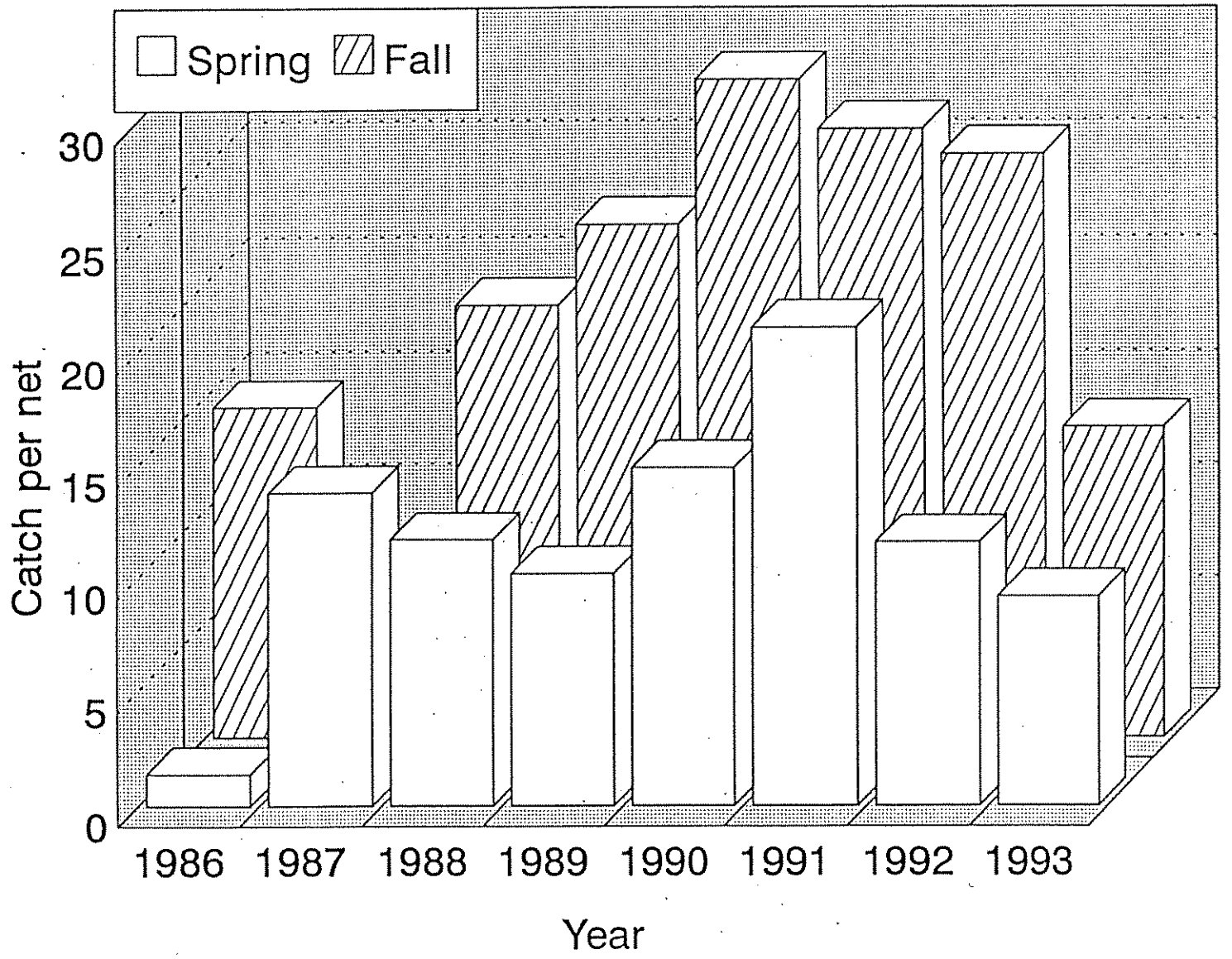

Figure 3. Catch rates for kokanee in floating gill nets in Hauser Reservoir, 1986-93

Table 1. Percent composition by species and season for floating gill net catches in Hauser Reservoir in 1992 and 1993.

	1992		1993	
Species	Spring	Fall	Spring	Fall
RB	12.7	15.0	17.2	17.7
LL	3.0	0.3	1.6	0.5
KOK	47.6	81.5	68.0	76.3
MWF	0	0.6	0	0
WE	1.1	0	0	0
YP	0	0	0.8	0
LNSU	10.9	0.3	2.5	0
WSU	24.3	0.9	9.0	1.0
CP	0.4	0	0	0
UC	0	1.4	0.8	4.5
Total # caught	267	346	122	198
Number nets	11	11	9	11

Relative abundance of fish captured in sinking gill nets in 1992 and 1993 are shown in Table 2. In both years, white suckers dominated the catch in both spring and fall. This has been true for every year since 1986 (Appendix Table 2). Yellow perch reached a peak in spring 1991 (21.5% of catch), and catches since 1991 have been substantially higher than in 1990 and the years before. Walleye continue to make up less than 1% of the catch in sinking nets, in spite of yearly plants of 3,000-5,000 fingerlings since 1989. In 1992 and 1993, five walleye were captured in sinking nets, and ranged in length from 12.5-20.8 inches. Four of the five fish were of known hatchery origin.

The number of kokanee collected in vertical nets (number per net night) averaged 26.7 in 1992 and 10.2 in 1993 (Table 3). None of the year classes can be considered to be strong in either year. The average in 1993 was less than half that of any other year, particularly because both age classes I+ and II+ appear to be weak. These low numbers in 1993 are supported by the low catch rates in both the spring and fall floating gill nets for kokanee (Figure 3).

Table 2. Percent composition by species and season for sinking gill net catches in Hauser Reservoir in 1992 and 1993.

	1992		1993	
Species	Spring	Fall	Spring	Fall
RB	0	0.7	0	0.2
LL	0.2	1.0	2.6	1.0
KOK	0.7	7.7	11.5	6.8
MWF	1.7	1.2	2.0	1.6
WE	0.7	0.1	0	0.2
YP	21.5	8.1	17.1	10.7
LNSU	19.6	18.3	23.5	18.7
WSU	53.3	59.3	40.8	57.3
CP	0	1.0	0	0
UC	0	1.8	0.8	1.4
SB	0.2	0	0	1.0
BURBOT	2.1	0.7	1.8	1.2
Total # Caught	424	765	392	513
Number nets	6	7	6	7

Table 3. Mean catch rates (fish per net night) by age class for kokanee collected in vertical nets set at the Dam Station in Hauser Reservoir from 1986 through 1993.

YEAR	NUMBER OF SETS	NUMBER OF KOKANEE PER SET				TOTAL
		AGE 0+	AGE I+	AGE II+	AGE III+	
1986	3	0	21.7	6.3	0	28.0
1987	4	0	32.3	7.5	0.2	40.0
1988	5	0.4	100.6	4.8	3.0	108.8
1989	6	0	36.7	44.0	0.6	81.3
1990	7	0.1	35.7	22.5	3.4	61.7
1991	5	0	4.2	24.4	0.4	29.0
1992	7	0	14.6	10.0	2.1	26.7
1993	6	0	5.3	3.7	1.2	10.2

Summer Creel Census

A total of 2,214 anglers were interviewed on Hauser Reservoir during the summer period (May through November) in 1992, while 2,086 anglers were interviewed from April through October in 1993. Distribution of interviews, mean hours per fishing trip and mean number of anglers per fishing party are presented in Table 4.

Table 4. Distribution of interviews by day of week and by method of fishing with mean hours per completed fishing trip and mean party size obtained on Hauser Reservoir during the summers of 1986 through 1993.

	PERCENT OF TOTAL INTERVIEWS					
YEAR	WEEKDAY	WEEKEND	SHORE	BOAT	MEAN HOURS FISHED/TRIP	MEAN # OF ANGLERS/PARTY
1986	38	62	58	42	3.96	2.98
1987	49	51	60	40	3.93	1.87
1988	48	52	48	52	4.18	1.93
1989	61	39	54	46	4.07	1.90
1990	48	52	55	55	4.03	1.85
1991	37	63	25	75	4.63	2.07
1992	53	47	39	61	4.67	2.37
1993	45	55	53	47	5.20	2.32
OVERALL	47	53	49	51	4.33	2.16

Table 5 presents the composition of the catch made by anglers during the summer fishery in 1992 and 1993. Kokanee continued to dominate the catch in 1992 and 1993, while yellow perch composed an all-time high percent of the catch in 1992 (37.9%). Rainbow trout rebounded in 1992 and 1993 from the all-time low in 1991 (4.3% of the catch), although the percentages are still far below the levels of the late 1980s.

Summer catch rates (fish per angler hour) for rainbow trout and kokanee are presented in Table 6. Total catch rates for rainbow trout were 0.05 for both 1992 and 1993. This was a slight rebound from the low rate in 1991 (0.02 fish per hour), but still far below the rates from 1986-1988 of greater than 0.2. Kokanee catch rates were 0.22 in both 1992 and 1993. While these rates were far below the rate in 1991 (0.46), they were very close to the overall average (0.23) since 1986.

Table 5. Composition of the catch by anglers on Hauser Reservoir during the summers of 1986 through 1993.

YEAR	NUMBER CAUGHT	PERCENT COMPOSITION OF CATCH						
		RAINBOW TROUT	BROWN TROUT	KOKANEE	YELLOW PERCH	MOUNTAIN WHITEFISH	S.MOUTH BASS	WALLEYE
1986	2,728	49.9	1.4	26.7	21.6	0.3	0.2	0
1987	3,912	47.6	0.4	30.4	20.3	1.2	0.1	0
1988	3,882	45.3	0.3	43.6	10.6	0.2	0	0
1989	3,247	18.1	0.3	65.8	15.5	0.4	0	0
1990	3,870	21.2	0.5	44.2	33.8	0.2	0	0
1991	6,935	4.3	0.2	81.5	13.7	0.3	<0.1	0
1992	3,565	11.9	0.4	49.6	37.9	0.2	0	0.1
1993	2,532	16.8	0.6	68.4	14.1	0.1	0	0

Table 6. Catch rates (fish per angler hour) and the percent harvested for rainbow trout and kokanee during the summers of 1986 through 1991 on Hauser Reservoir.

YEAR	RAINBOW TROUT				KOKANEE			
	FISH/HOUR			% KEPT	FISH/HOUR			% KEPT
	SHORE	BOAT	TOTAL		SHORE	BOAT	TOTAL	
1986	0.25	0.26	0.25	88.7	0.01	0.18	0.10	98.6
1987	0.31	0.18	0.24	80.4	0.02	0.24	0.13	92.6
1988	0.38	0.09	0.24	74.8	<0.01	0.38	0.24	93.3
1989	0.21	0.06	0.12	66.2	0.08	0.63	0.42	89.0
1990	0.19	0.05	0.10	89.8	0.02	0.35	0.22	94.0
1991	0.12	0.01	0.02	84.5	0.07	0.53	0.46	94.6
1992	0.12	0.03	0.05	79.5	0.02	0.28	0.22	93.9
1993	0.11	0.02	0.05	91.8	0.02	0.34	0.22	94.6
OVERALL	0.21	0.09	0.13	82.0	0.03	0.37	0.23	93.9

The average length, weight and condition factor for rainbow trout and kokanee harvested from Hauser Reservoir during 1992 and 1993 are presented in Table 7. Mean length for rainbow trout (16.3 inches) was at an all-time high, and condition factors for both 1992 and 1993 were higher than any previous year. Growing conditions appeared to be good for kokanee as well--based on condition factors (41.1 and 41.3 for 1992 and 1993, respectively). The mean length for kokanee was not unusual for either year, however.

Table 7. Mean length (in), weight (lbs), and condition factors for rainbow trout and kokanee harvested from Hauser Reservoir during the summers of 1986 through 1991. Ranges are in parentheses.

	RAINBOW TROUT			KOKANEE		
YEAR	MEAN LENGTH	MEAN WEIGHT	COND. FACTOR	MEAN LENGTH	MEAN WEIGHT	COND. FACTOR
1986	13.5 (7.0-20.1)	1.06 (0.14-4.06)	40.1	16.6 (8.5-22.2)	1.87 (0.20-3.94)	39.0
1987	14.2 (7.6-23.0)	1.26 (0.15-4.07)	41.2	15.6 (8.6-21.4)	1.52 (0.32-3.31)	38.2
1988	15.8 (7.9-23.9)	1.73 (0.22-6.00)	40.9	16.3 (8.2-21.8)	1.71 (0.28-3.24)	37.9
1989	13.7 (8.3-22.4)	1.17 (0.22-4.90)	39.1	14.6 (9.2-21.1)	1.13 (0.28-3.10)	35.4
1990	14.9 (7.0-23.5)	1.60 (0.30-4.95)	41.4	15.7 (8.6-23.4)	1.57 (0.26-3.97)	38.5
1991	15.3 (7.4-23.4)	1.74 (0.18-4.90)	41.0	14.7 (8.7-21.2)	1.25 (0.28-3.44)	38.3
1992	15.1 (8.5-24.3)	1.71 (0.31-8.00)	43.6	15.8 (9.4-23.1)	1.67 (0.41-3.27)	41.1
1993	16.3 (8.3-25.3)	1.89 (0.30-5.50)	42.3	16.0 (8.9-21.0)	1.72 (0.32-3.20)	41.3

Winter Creel Census

Yellow perch continued to dominate the catch in the winter ice fishery in 1992/93 (Table 8), while rainbow trout continued to slip in importance to the winter fishery. Rainbow trout composed only 2.6% of the catch in 1992/93, less than one-tenth the contribution in 1988/89.

Table 8. Composition of the catch made by anglers on Hauser Reservoir during the winter ice fishery from 1988/89 through 1992/93.

		PERCENT COMPOSITION OF CATCH				
YEAR	NUMBER CAUGHT	RAINBOW TROUT	BROWN TROUT	KOKANEE	YELLOW PERCH	MOUNTAIN WHITEFISH
1988/89	882	29.1	1.8	37.1	31.9	0.1
1989/90	337	27.2	1.4	37.0	34.3	0.1
1990/91	723	9.4	0.7	20.7	69.2	0
1991/92	1177	2.4	0.2	39.0	58.4	0
1992/93	2234	2.6	0.4	33.8	63.1	0.1

Holter Reservoir

Fish Abundance and Distribution

Relative abundance of fish captured in floating gill nets set in Holter Reservoir in 1992 and 1993 are presented in Table 9. In the spring, rainbow trout, yellow perch, white suckers and kokanee typically dominated the catch. Perch numbers increased markedly during these two years, and were at the highest levels since netting began. The increase was particularly notable since no perch were caught in the previous two years (1990 and 1991) (Appendix Table 3). In the fall, rainbow trout and kokanee dominated the catch, as they have in every year since 1986. About 65 % of rainbow trout collected in gill nets in 1992 were of hatchery origin; about 54% were of hatchery origin in 1993.

Since 1986, catch rates for rainbow trout in spring floating gill nets have been relatively constant, with the exception of somewhat higher rates in 1987 and 1988 (Figure 4). In the fall nets, catch rates were substantially higher in 1986 and 1987 than in subsequent years. Since 1988, the catch rates have remained fairly stable. Kokanee catch rates in floating nets have shown dramatic changes since 1986 (Figure 5). In the spring nets, catch rates have been very low (0-2 fish/net) in all years except 1991, when the rate was 13.4/net. In the fall floating nets, catch rates climbed to a peak in 1990, and have dropped slightly every year since then.

Table 9. Percent composition by species and season for floating gill net catches in Holter Reservoir in 1992 and 1993.

	1992		1993	
Species	Spring	Fall	Spring	Fall
RB	39.2	35.3	26.1	42.0
LL	0	1.3	0	0
KOK	11.7	28.6	6.2	49.3
MWF	3.3	0	0	0
WE	0.8	0.7	3.7	2.9
YP	38.3	0	29.8	0
LNSU	0	20.0	8.1	1.4
WSU	5.8	14.0	26.1	4.3
CP	0.8	0	0	0
Total # Caught	120	150	161	69
Number nets	9	9	9	9

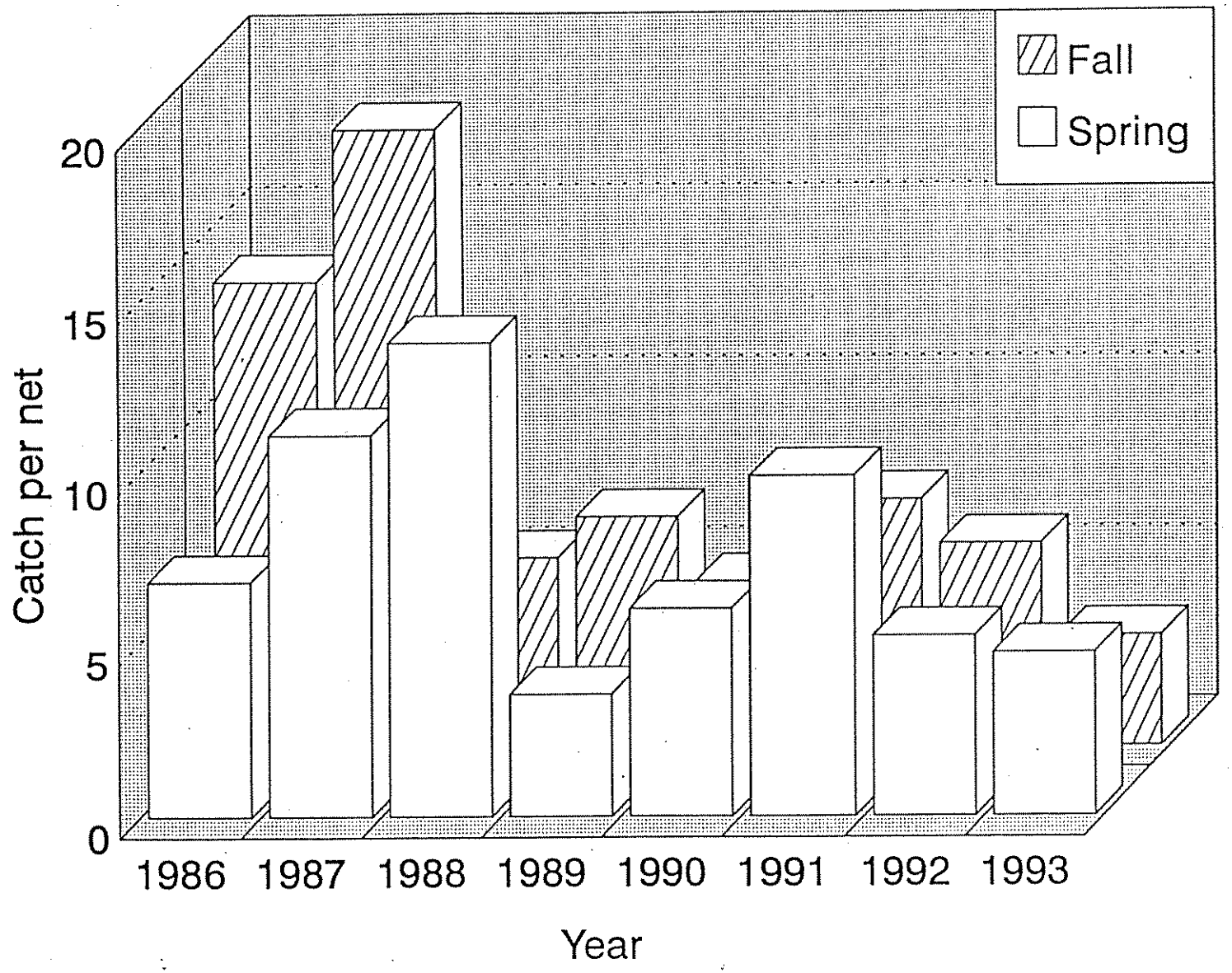

Figure 4. Catch rates for rainbow trout in floating gill nets in Holter Reservoir, 1986-93

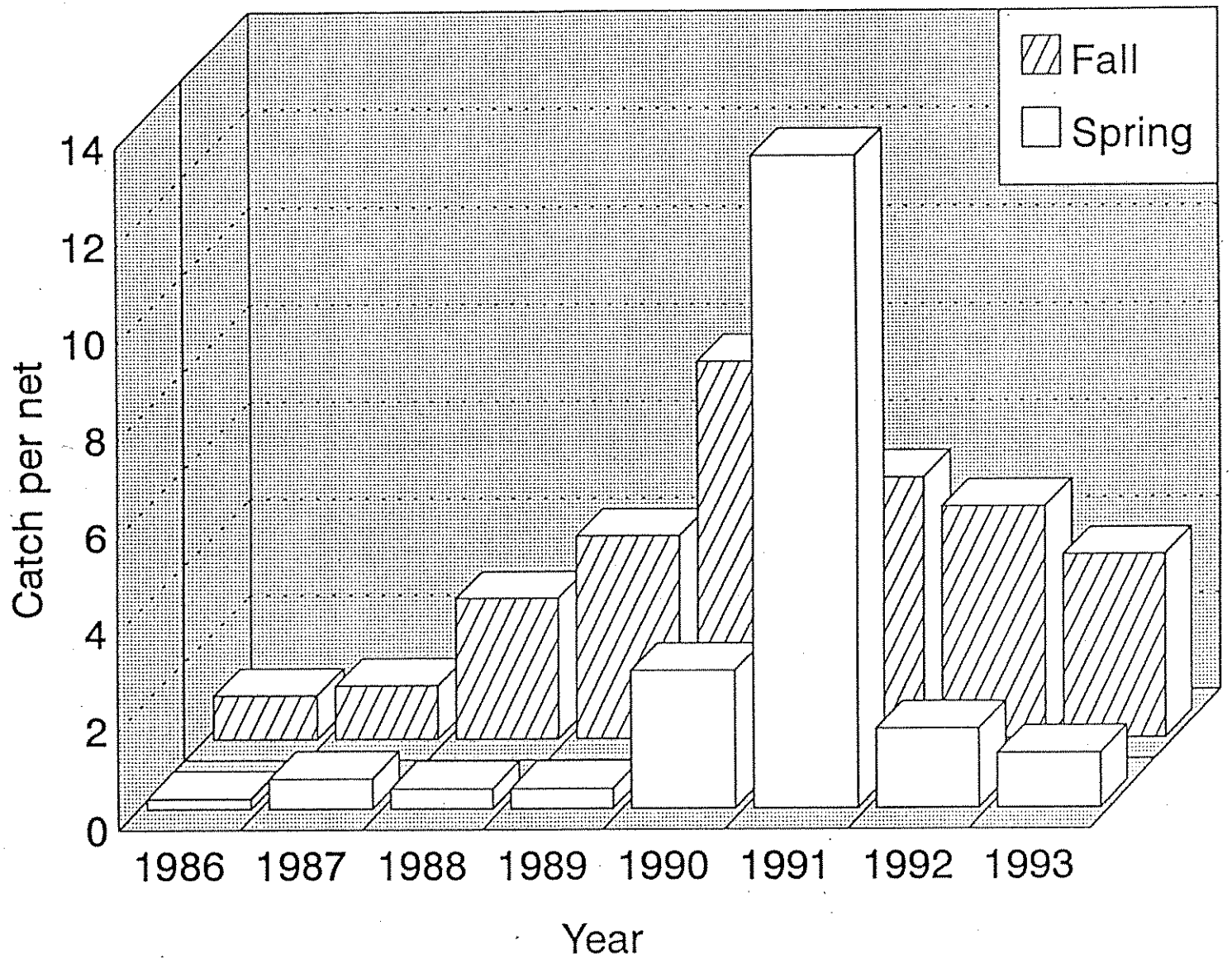

Figure 5. Catch rates for kokanee in floating gill nets in Holter Reservoir, 1986-93

Yellow perch and white suckers dominated the catch in sinking gill nets in both 1992 and 1993 (Table 10). Longnose suckers were the only other species that comprised over 10% of the catch in either season or year. Numbers for all three of these species seem to be holding relatively constant since 1986 (Appendix Table 4).

Table 10. Percent composition by species and season for sinking gill net catches in Holter Reservoir in 1992 and 1993.

	1992		1993	
Species	Spring	Fall	Spring	Fall
RB	0.2	0.8	0.4	1.5
LL	0.1	0.2	0	0.2
KOK	0.1	1.4	0.1	1.5
MWF	1.8	2.2	1.5	1.5
WE	1.6	4.2	1.9	6.0
YP	43.4	21.5	42.3	9.4
LNSU	5.4	15.5	10.4	17.0
WSU	46.9	53.8	43.2	62.3
CP	0.3	0.4	0.1	0.5
UC	0	0	0.1	0
Total # Caught	921	502	743	401
Number nets	6	6	6	6

The number of walleye collected per sinking gill net in the spring in 1992 and 1993 was similar to previous years (Table 11). Number per net in the fall sinking nets in 1992 and 1993 was higher than the previous two years, and the average lengths and weights increased as well (Table 11).

The number of kokanee captured in vertical gill nets decreased from 15.5 per net set in 1991 to 9.3 in 1992, but then increased again to 19.3 in 1993 (Table 12). The catch rates in 1993 were the highest since 1986, and were due primarily to the strength of the age I+ fish (15.3 fish/net set).

Table 11. Number of fish per net night and mean length, weight and condition factors for walleye collected in sinking gill nets set in Holter Reservoir from 1986 through 1993. Ranges are in parentheses.

YEAR	SEASON	NUMBER PER NET	MEAN LENGTH (IN)	MEAN WEIGHT (LBS)	MEAN CONDITION FACTOR
1986	SPRING	--	--	--	--
1987		2.60	12.2 (9.5-16.6)	0.70 (0.22-1.69)	31.3
1988		2.17	19.1 (11.0-27.9)	3.00 (0.40-8.00)	33.8
1989		2.50	19.6 (17.2-27.0)	2.70 (1.55-7.50)	33.1
1990		2.40	19.1 (12.3-24.6)	3.22 (0.55-6.25)	38.6
1991		2.17	15.7 (11.7-26.3)	1.75 (0.51-7.00)	34.5
1992		2.50	20.7 (12.3-30.6)	3.29 (0.66-9.40)	35.5
1993		2.33	19.2 (12.1-28.3)	2.98 (0.58-7.00)	35.6
1986	FALL	2.33	20.0 (15.0-30.0)	3.31 (1.12-10.0)	35.8
1987		3.17	16.7 (9.7-26.2)	2.05 (0.26-8.00)	36.7
1988		1.33	19.6 (15.6-25.4)	2.87 (1.52-5.00)	36.7
1989		4.33	20.5 (13.3-29.1)	3.60 (0.78-8.60)	37.9
1990		2.33	21.2 (13.5-27.2)	3.97 (0.84-9.00)	37.5
1991		2.83	20.4 (11.5-26.0)	4.08 (0.44-9.10)	40.7
1992		3.67	22.4 (12.0-27.5)	4.12 (0.66-6.80)	37.3
1993		4.00	22.0 (15.1-27.5)	4.67 (1.30-9.25)	40.3

Table 12. Mean catch rates (fish per net night) by age class for kokanee collected in vertical nets set at the Dam Station in Holter Reservoir from 1986 through 1993.

YEAR	NUMBER OF SETS	NUMBER OF KOKANEE PER SET				TOTAL
		AGE 0+	AGE I+	AGE II+	AGE III+	
1986	3	0	4.0	2.3	1.0	7.3
1987	4	0	3.0	3.0	0.5	6.5
1988	6	0	2.8	1.7	0.7	5.2
1989	5	0	9.2	4.2	0.4	13.8
1990	6	0	4.0	9.0	0.7	13.7
1991	5	0	2.2	11.2	2.0	15.5
1992	7	0	5.1	2.1	2.0	9.3
1993	6	0.2	15.3	3.3	0.5	19.3

Summer Creel Census

A total of 2,350 anglers were interviewed on Holter Reservoir during the summer period (May through November) in 1992. In 1993, a total of 1,387 anglers were interviewed from April through September. Distribution of interviews, hours per fishing trip and mean number of anglers per fishing party are presented in Table 13.

The composition of the catch made by anglers during the summers of 1992 and 1993 is presented in Table 14. Yellow perch dominated the catch made by anglers, followed by rainbow trout and kokanee. This pattern has held true since 1990, the first year that kokanee composed over 10% of the catch.

Annual summer catch rates (fish per angler hour) for rainbow trout and yellow perch are presented in Table 15. The catch rates for rainbow trout in 1992 and 1993 (0.22/hr and 0.14/hr, respectively) were lower than in 1991 (0.27/hr) and lower than the overall average (0.27/hr). Catch rates for yellow perch increased from 0.40/hr in 1991 to 0.52/hr in 1992, but dropped to a quite low rate again in 1993 (0.22/hr). The angler catch rate for kokanee was 0.09/hr in 1992 and dropped slightly to 0.06/hr in 1993. These rates were down slightly from the 1991 kokanee catch rate of 0.10/hr. Catch rates for anglers specifically seeking to catch walleye were 0.05/hr in 1992, dropping to 0.01/hr in 1993. Although the 1993 catch rate was the lowest since 1986, it may not be reliable because it was based on only 33 angler interviews.

Table 13. Distribution of interviews by day of week and by method of fishing with mean hours per completed fishing trip and mean party size obtained on Holter Reservoir during the summers of 1986 through 1993.

	PERCENT OF TOTAL INTERVIEWS					
YEAR	WEEKDAY	WEEKEND	SHORE	BOAT	MEAN HOURS FISHED/TRIP	MEAN # OF ANGLERS/PARTY
1986	25	75	34	66	3.88	2.43
1987	34	66	41	59	4.02	2.23
1988	44	56	40	60	4.54	2.17
1989	38	62	41	59	4.13	2.10
1990	35	65	40	60	4.08	2.21
1991	42	58	48	52	4.02	2.17
1992	45	55	26	74	4.19	2.50
1993	52	48	39	61	3.83	2.50
OVERALL	39	61	39	61	4.09	2.29

Table 14. Composition of the catch by anglers on Holter Reservoir during the summers of 1986 through 1993.

		PERCENT COMPOSITION OF CATCH					
YEAR	NUMBER CAUGHT	RAINBOW TROUT	BROWN TROUT	KOKANEE	YELLOW PERCH	MOUNTAIN WHITEFISH	WALLEYE
1986	1,893	67.5	0.3	1.0	30.9	<0.1	0.3
1987	4,339	46.3	0.1	1.8	49.6	<0.1	2.2
1988	2,968	45.0	0.2	1.8	52.2	0	0.8
1989	4,848	23.7	<0.1	0.7	75.2	0	0.4
1990	5,109	28.5	0	12.5	58.5	0	0.5
1991	4,223	34.9	<0.01	12.5	52.0	0.2	0.4
1992	6,823	26.3	<0.1	11.3	61.8	<0.1	0.6
1993	1,828	32.1	0.1	14.8	52.8	<0.1	0.2

The average length, weight and condition factor for rainbow trout and kokanee harvested from Holter Reservoir during 1992 and 1993 are presented in Table 16. Rainbow trout harvested in 1993 were of a greater length (15.9 in), weight (1.76 lbs) and condition factor (41.9) than in any previous year. About 93% of rainbow trout harvested in 1992 and examined for marks were of known hatchery origin. These data are in contrast to gill netting data which indicated 65% of the rainbow trout population in Holter Reservoir was of hatchery origin. This same trend was seen in 1993, where 86% of harvested rainbow were of hatchery origin, while only 54% of gill netted fish were of hatchery origin. As in previous years, there is a strong indication that Arlee rainbow trout stocked into Holter Reservoir are more susceptible to being caught by anglers than naturally reproduced rainbow trout.

Table 15. Catch rates (fish per angler hour) and the percent harvested for rainbow trout and kokanee during the summers of 1986 through 1993 on Holter Reservoir.

	RAINBOW TROUT				YELLOW PERCH			
	FISH/HOUR			%	FISH/HOUR			%
YEAR	SHORE	BOAT	TOTAL	KEPT	SHORE	BOAT	TOTAL	KEPT
1986	0.27	0.37	0.34	81.8	0.30	0.10	0.16	91.3
1987	0.24	0.41	0.37	85.9	0.61	0.31	0.39	72.7
1988	0.19	0.38	0.32	81.8	0.70	0.22	0.37	76.2
1989	0.22	0.29	0.27	70.8	0.40	1.06	0.85	83.1
1990	0.27	0.25	0.26	67.8	0.48	0.55	0.53	65.7
1991	0.36	0.19	0.27	78.1	0.31	0.47	0.40	76.3
1992	0.19	0.23	0.22	76.6	0.52	0.52	0.52	76.8
1993	0.21	0.10	0.14	87.7	0.18	0.24	0.22	90.3
OVERALL	0.24	0.28	0.27	78.8	0.44	0.43	0.43	79.0

Table 16. Mean length (in), weight (lbs), and condition factors for rainbow trout and kokanee harvested from Holter Reservoir during the summers of 1986 through 1993. Ranges are in parentheses.

	RAINBOW TROUT			KOKANEE		
YEAR	MEAN LENGTH	MEAN WEIGHT	COND. FACTOR	MEAN LENGTH	MEAN WEIGHT	COND. FACTOR
1986	13.9 (8.1-20.8)	1.17 (0.2-4. 4)	40.8	16.9 (14.3-20.1)	2.17 (1.4-3.0)	43.4
1987	13.8 (7.5-22.2)	1.11 (0.2-3.7)	41.0	16.7 (10.1-21.0)	2.01 (0.4-3.8)	41.9
1988	13.7 (7.5-20.8)	1.17 (0.2-3.3)	41.6	16.8 (13.0-23.2)	1.96 (0.9-4.0)	42.2
1989	14.5 (8.9-21.3)	1.26 (0.3-2.9)	39.7	16.1 (14.1-19.5)	1.99 (1.3-3.6)	43.8
1990	14.2 (8.0-20.1)	1.17 (0.2-3.7)	39.1	16.1 (11.7-21.0)	1.79 (0.6-3.9)	42.1
1991	12.6 (8.1-24.5)	0.83 (0.3-5.0)	37.9	15.2 (9.7-20.2)	1.63 (0.4-3.1)	44.1
1992	14.1 (8.2-19.8)	1.20 (0.2-3.7)	41.5	16.6 (9.5-23.2)	2.08 (0.4-3.6)	44.4
1993	15.9 (9.0-24.3)	1.76 (0.1-6.0)	41.9	16.1 (12.2-21.9)	1.99 (0.8-3.9)	46.7

Winter Creel Census

As in previous years, yellow perch dominated the composition of the catch during the winter of 1992/93 (Table 17). Harvested rainbow trout averaged 14.6 inches in length, while yellow perch averaged 9.1 inches. Catch rates for rainbow trout and yellow perch were 0.09/hr and 2.73/hr, respectively. These catch rates were much lower than in the winter of 1991/92, where rainbow trout were caught at a rate of 0.23/hr and yellow perch at a rate of 5.60/hr.

Table 17. Composition of the catch made by anglers on Holter Reservoir during the winter ice fishery from 1988/89 through 1992/93.

		PERCENT COMPOSITION OF CATCH				
YEAR	NUMBER CAUGHT	RAINBOW TROUT	BROWN TROUT	KOKANEE	YELLOW PERCH	MOUNTAIN WHITEFISH
1988/89	4704	7.3	<0.1	0	92.3	0.4
1989/90	3597	7.2	0	<0.1	92.6	0.2
1990/91	6162	6.9	0	0.4	92.4	0.3
1991/92	2930	3.9	0	<0.1	96.0	0
1992/93	4487	3.3	0	<0.1	96.6	0

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Montana Department of Fish, Wildlife and Parks. 1985. Upper Missouri River reservoir operating guidelines for fish, wildlife and recreation. 38 pp.

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Prepared by: Don Skaar
Date: September 27, 1994
Waters referred to:

Hauser Reservoir	17-9056
Holter Reservoir	17-9136

APPENDIX TABLES

Appendix Table 1. Percent composition by species and season for floating gill net catches in Hauser Reservoir from 1986 through 1991.

	1986		1987		1988		1989		1990		1991	
SPECIES	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL
RB	29.0	31.3	9.7	44.2	17.7	42.0	13.2	20.9	5.4	16.5	7.8	8.1
LL	0.2	2.5	1.3	1.2	0.6	1.4	2.0	0.9	1.6	0.5	0.7	0.7
KOK	2.9	57.3	36.0	25.1	71.3	47.9	74.2	73.2	88.6	79.3	85.6	70.0
MWF	0.2	4.3	0	0	1.2	0.9	0	0.3	0	0.7	0.4	0.5
WE	0	0	0	0	0	0	0	0	0	0	0	0.5
YP	0	0.7	0	0	0	0	0	0	0	0	0	0
LNSU	52.9	1.4	35.8	12.9	6.1	2.5	5.3	0.9	1.6	0.2	1.8	0
WSU	13.8	1.1	16.4	16.0	3.1	0.5	5.3	0.3	2.7	0.2	1.5	0
CARP	0.5	0	0	0	0	0	0	0	0	0	0	0
U.CHUB	0.5	1.4	0.8	0.6	0	4.8	0	3.5	0	2.5	2.2	20.2
TOTAL # CAUGHT	448	281	383	163	164	438	151	339	185	401	271	420
NUMBER OF NETS	9	11	10	11	10	11	9	11	11	11	11	11

Appendix Table 2. Percent composition by species for sinking gill net catches in Hauser Reservoir from 1986 through 1991.

RESERVOIR	SPECIES	1986 SPRING	1986 FALL	1987 SPRING	1987 FALL	1988 SPRING	1988 FALL	1989 SPRING	1989 FALL	1990 SPRING	1990 FALL	1991 SPRING	1991 FALL
HAUSER	RB		0.7	0.2	1.4	0	0.5	0	1.8	0	0.3	0	0.7
	LL		1.0	1.5	0.4	1.2	0.5	0.9	0	0.7	0.7	1.2	0.4
	KOK		0.4	1.1	4.2	4.2	9.1	1.7	18.3	2.7	11.1	3.1	20.6
	MWF		3.6	3.8	2.3	5.4	2.6	2.4	0.5	2.0	2.1	3.0	1.7
	WE		0	0	0	0	0	0.2	0	0	0	0	0.6
	YP		4.9	4.7	9.3	10.6	4.3	5.8	3.5	13.5	3.8	13.7	11.2
	LNSU		28.9	23.0	16.1	17.9	24.1	22.3	14.7	19.5	16.1	20.9	16.6
	WSU		60.5	65.5	66.0	60.0	58.3	66.0	59.4	58.4	63.4	55.7	45.0
	CARP		0	0	0	0	0	0	0.2	0	0	0	0
	U. CHUB		0	0.2	0.1	0.5	0.1	0.3	1.3	3.1	2.3	1.9	1.7
	BURBOT		0	0	0.2	0	0.5	0.2	0	0	0.2	0.2	0.4
	S. BUFF.		0	0	0.2	0	0.5	0.2	0	0	0	0.3	1.1
	# CAUGHT	0	700	473	839	407	648	574	600	548	577	635	705
	# OF NETS	0	5	5	6	6	6	6	6	6	6	6	7

Appendix Table 3. Percent composition by species and season for floating gill net catches in Holter Reservoir from 1986 through 1991.

	1986		1987		1988		1989		1990		1991	
SPECIES	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL
RB	25.5	77.2	47.1	76.6	64.3	41.5	25.0	52.1	61.5	34.7	34.5	53.7
LL	0	0.8	1.6	2.2	1.2	1.9	0	0.9	1.3	0	0	1.9
KOK	0.6	4.9	2.6	4.8	1.7	21.7	2.7	33.0	28.2	56.5	46.9	39.8
MWF	2.5	3.3	1.6	0	1.2	2.8	0.9	0.9	0	1.6	1.2	2.8
WE	5.0	9.7	7.4	0.5	4.1	0	1.8	2.6	5.1	0	13.9	0
YP	0	0	20.1	0	18.7	0	8.9	0	0	0	0	0
LNSU	40.4	3.3	10.1	6.9	4.1	12.3	38.4	7.0	1.3	6.5	0.4	0.9
WSU	24.8	0.8	7.9	9.0	3.5	19.8	22.3	2.6	2.6	0.8	2.7	0.9
CARP	1.2	0	1.6	0	1.2	0	0	0	0	0	0.4	0
U. CHUB	0	0	0	0	0	0	0	0.9	0	0	0	0
TOTAL # CAUGHT	161	123	189	188	171	106	112	115	78	124	258	108
NUMBER OF NETS	6	7	8	8	8	8	8	9	8	9	9	8

Appendix Table 4. Percent composition by species for sinking gill net catches in Holter Reservoir from 1986 through 1991.

RESERVOIR	SPECIES	1986 SPRING	1986 FALL	1987 SPRING	1987 FALL	1988 SPRING	1988 FALL	1989 SPRING	1989 FALL	1990 SPRING	1990 FALL	1991 SPRING	1991 FALL
HOLTER	RB	4.3	0.9	2.5	1.4	2.6	1.1	1.8	1.0	3.1	0.7	4.4	
	LL	0.2	0.8	0.3	0.2	0	0.2	0	0.7	0	0.1	0	
	KOK	0.4	0	0.2	0.3	0.5	0	0.6	0	1.9	0.6	1.6	
	MWF	1.8	1.7	2.0	3.6	0.5	5.1	1.8	4.0	4.3	5.8	1.3	
	WE	2.5	1.6	3.1	2.0	1.3	2.8	5.2	2.0	2.9	1.4	3.0	
	YP	24.0	57.2	28.8	34.0	21.8	29.5	10.6	39.2	16.0	50.4	11.3	
	LNSU	24.0	16.5	21.5	17.6	21.9	11.2	20.4	11.4	15.4	11.9	20.3	
	WSU	42.8	21.2	41.6	40.7	51.2	49.7	59.6	41.4	56.2	29.1	58.1	
	CARP	0	0.1	0	0	0.2	0.4	0	0	0.2	0	0	
	U. CHUB	0	0	0	0.2	0	0	0	0.3	0	0	0	
		551	838	601	658	611	545	500	597	486	894	566	
# OF NETS		6	5	6	6	6	6	6	5	6	6	6	