MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
Helena, MT

Fisheries Protection, Monitoring and Enhancement Activities
In
Hauser and Holter Reservoirs
And Associated Tailwaters
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ABSTRACT

Hauser Reservoir: Hauser Reservoir saw an increase in hatchery rainbow trout stocking in 2003 due to low water at Clark Canyon Reservoir. Approximately 105,000 (6 inch) Eagle Lake rainbow were coded wire tagged and stocked in August. These fish were in addition to the 102,000 July release Arlee (5 inch) and the October release group of 7.5 inch Arlee rainbow. With the increase in rainbow stocking, angler catch rates peaked to near record highs at 0.24 rainbow per hour in 2003 declining in 2004 to 0.15 per hour. Conversely, rainbow-stocking densities declined in 2004 due to PCB issues at the Lewistown Hatchery. Only 85,000 July release (5 inch) and 85,000 October release (8 inch) Arlee Rainbow were stocked in 2004. Survival of these two groups has been evaluated since 2002; the October release Arlees (8 inch) have demonstrated a survival rate twice that of the summer released Arlee (5 inch). Return index values for the three groups evaluated in 2004 were 30.8 for the fall released Arlee (8 inch), 13.3 for the summer release Eagle Lake (6 inch) and 0.0 for the summer released Arlee (5 inch). Additionally, the 2003 October release group dominated the summer creel in 2004 comprising 31% of all rainbow trout harvested.

Walleye catch rate (all anglers) increased to 0.03 per hour and remained above the long-term average of 0.02 per hour. Catch rate for anglers specifically targeting walleye was 0.18 fish per hour. Anglers fishing specifically for walleye and "general" anglers harvested walleye at similar rates; 61% and 65% respectively.

Yellow Perch catch rates declined from 2003 highs (0.19 per hour) to 0.01 per hour. Perch collected in fall gillnets also declined in 2004 to 1.9 per net down from the 2003 spike of 9.0 per net.

Holter Reservoir

Holter Reservoir saw a substantial decrease in the number of hatchery rainbow trout stocked in 2004. Because of PCB cleanup at Lewistown Hatchery, rainbow trout production has been reduced. Only 17,000 overwintered Eagle Lake rainbow were stocked in Holter representing roughly an 80% reduction from peak production years of 2001-2002. Evaluation of hatchery rainbow trout survival continued in 2004. The standardized return index (an index of survival to fall gillnets) since 2000 indicates that age 1+ Eagle Lakes survived six times better than ago 0+ Eagle Lake and 2.5 times greater than age 0+ Arlee strain rainbow. However, it appears that the age 0+ Arlee are underrepresented in the fall gillnetting sampling because of their high angler catchability. Throughout the 2004 summer angler creel, catch rates for rainbow trout remained high despite the decrease in stocking in recent years.

Yellow perch catch rates (winter creel) fell dramatically from 2003 levels and were well below the long-term average. The numbers of angers that were interviewed in 2004 were near the long-term average and therefore catch rates are considered accurate.

Walleye catch rates declined in 2004 but remained above the long-term average. Additionally, average size of walleye in the summer creel remained consistent at 14". Spring trap netting in 2004 was discontinued after two days due to high water temperatures.

METHODS

Monitoring methods detailed in this report have been described by Berg and Lere (1983) and MFWP (1985). A map of the two-reservoir system is presented in Figure 1. A map of Hauser and Holter Tailrace electrofishing sections are presented in Figure 1. Vertical and horizontal gillnetting (timing, net size and net locations) continued in 2004 based on procedures established in Lere (1986). A modified Peterson estimate was used to determine population abundance (Ricker 1975)

General hydroacoustic methods used to estimate pelagic fish densities and total fish abundance are described in Skaar and Humphrey (1995). Hydroacoustic sampling was conducted using a HTI® 241 split beam echo sounder. A fixed 15-degree down-looking transducer was mounted on the port side of a 22-foot Almar fisheries research boat. Fish data were analyzed by size (decibels); longitudinal and depth distribution were analyzed using Hydroacoustic Technology Inc. EchoScape® software package. Vertical gillnets were set in the forebay area of each reservoir and were fished concurrent with acoustic sampling to allow for apportioning of acoustic targets by species.

The partial weekend creel survey continued on Hauser and Holter reservoirs from May through October and again during ice-covered months (January through March) as described in Lere (1987). Tailwater electrofishing methods used to estimate salmonids in the 2.5-mile section below Holter dam in 2004 were described in Hill (1973).

Two, floating metal fish traps (4'X10'X10'3") were installed under the Causeway Bridge to monitor fish movement in and out of Lake Helena. The two traps were built to collect fish moving into Lake Helena (West Trap) and out of Lake Helena (East Trap). Both traps were operational on 8/26/2004 and were operated seven days per week until 12/27/2004 at which time ice buildup made trap operation impossible. Traps were checked daily except for weekends when they were operated from Friday afternoon until Monday morning. Trap checking procedure involved counting all species and live releasing in the direction they were moving. All walleye were measured and uniquely jaw or floy tagged prior to release.

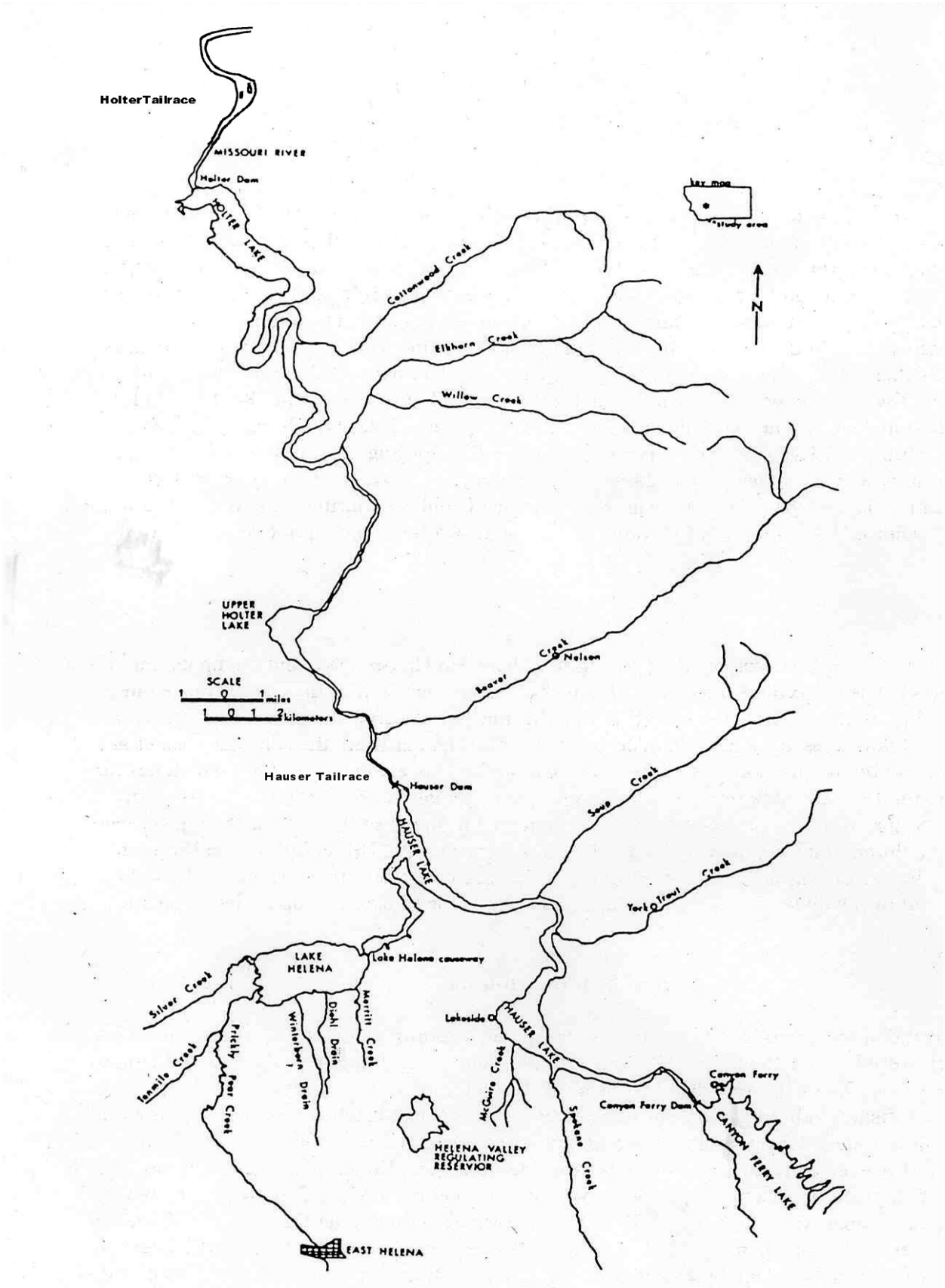


Figure 1. Map of Hauser, Holter Reservoirs and associated tailrace sections.

Hauser Reservoir

Results and Discussion:

Gillnetting

Netting trends for the principal game fish (rainbow trout, kokanee salmon, yellow perch and walleye) of Hauser Reservoir are displayed in Figure 2. Netting data for all species collected in Hauser Reservoir since 1986 is tabulated in Appendix A and B.

Spring Horizontal Gillnets

Eleven floating and six sinking gillnets were fished during May 2004. A total of 68 fish were collected in floating and 224 in sinking gillnets. Rainbow trout numbers increased to a record high of 4.7 per net following two years of good hatchery fish survival. A conversion to October released (8 inch) Arlee occurred in 2002 and continued in 2003. No kokanee were collected in spring nets. Walleye relative abundance remained the same as 2003 at 0.5 per net while both white suckers and longnose suckers, and yellow perch declined. Catch rates for these three species remained below the long-term averages. Burbot catch remained near the long-term average (0.7 per net) at 0.5 per net

Fall Horizontal Gillnets

Eleven floating and seven sinking gillnets were fished in October 2004. Floating nets collected 74 fish while sinking nets collected 263. Rainbow and kokanee salmon catch rates dropped from the near record high in 2003. Additionally, rainbow fell below the long term average of 4.5 to 2.2 per net. The majority of the kokanee salmon were mature two year old fish of hatchery origin. Walleye relative abundance remained stable at 2.6 per net. Yellow perch catch rates dropped from 9.0 per net in 2003 to 1.9 per net in 2004. Catch rates for white and longnose suckers increased but remained below long-term averages.

Vertical Gillnets

Monthly vertical netting trends are displayed in Appendix J. Vertical nets are fished in the Hauser forebay during ice-free months and are the principal monitoring tool of kokanee salmon abundance and survival. Nets were fished May through October in 2004.

A total of 31 kokanee were caught in 2004. This represents a decrease over the previous two years (2002=105; 2003=77). The kokanee population remains nearly entirely comprised of hatchery fish. Only one of 31 kokanee was classified as wild based on absence of tetracycline marks on vertebral cross-sections. In 2004, 71% of kokanee that were caught were age two; 13% were age three; 13% were age zero; and 3% were age one. It is difficult to tell weather the two

year olds were products of the 2002 late release zeros or 2003 yearling plants as both contained two tetracycline marks.

Based on these catch data, survival of 1-inch kokanee fry (319,104 in 2002) and 4-inch fingerlings (36,190 in 2002) was extremely low. Survival of 2002 late-release, 7-inch kokanee, (48,549) and over-wintered, 8-inch kokanee stocked in 2003 (75,671), was significantly better than fry or fingerlings however, these fish did not recruit to the Hauser sport fishery.

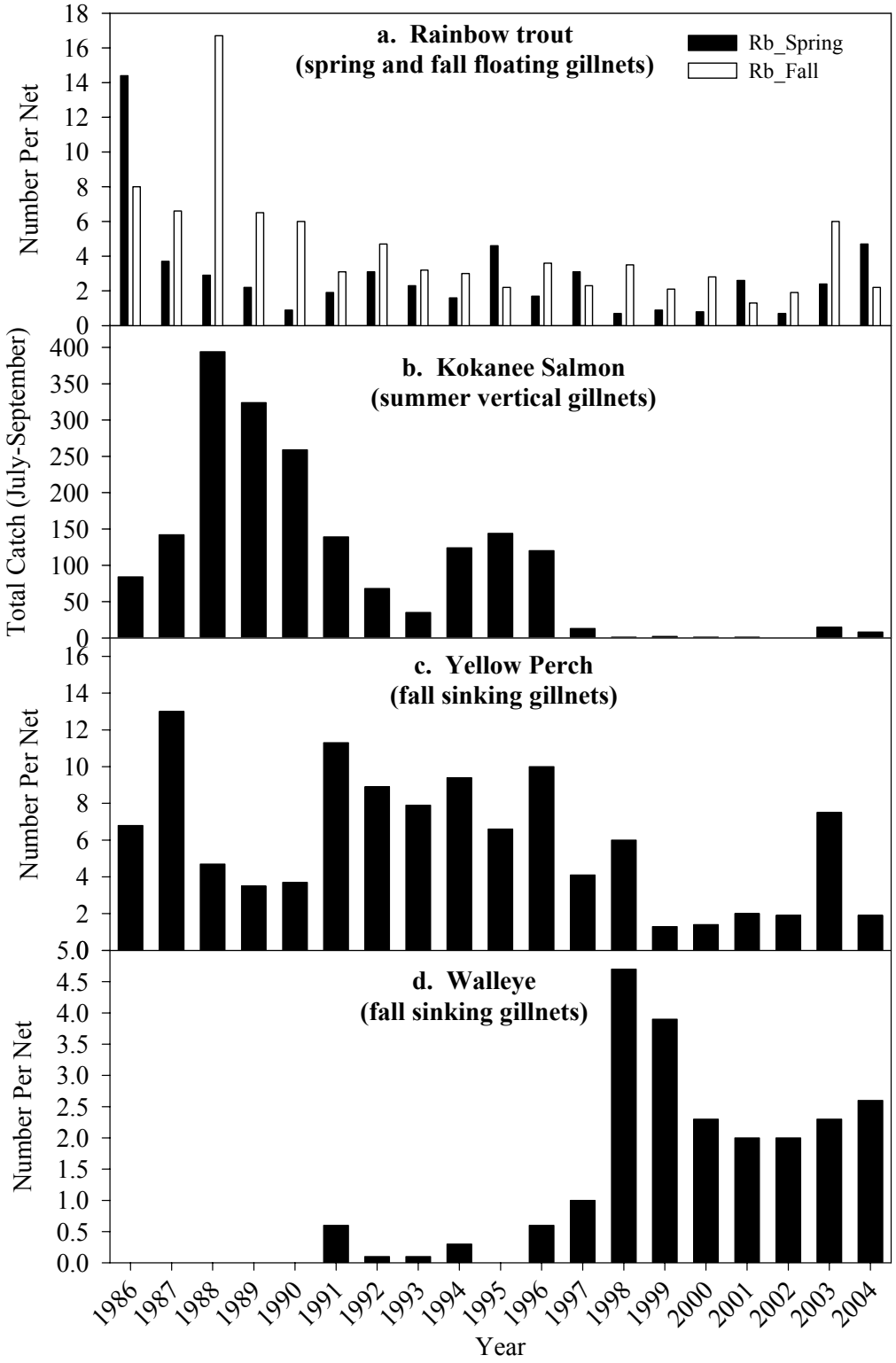


Figure 2. Hauser Reservoir gillnetting trends for principal game species (1986 through 2004). Rainbow trout, yellow perch and walleye are based on number of individuals caught per horizontal gillnets. Kokanee salmon trend is based on total catch in vertical gillnets fished in July, August and September each year.

Hatchery Rainbow Trout Survival Evaluation (Size and Season at Stocking and Strain);

Fall Horizontal Gillnets

A total of 170,251 hatchery rainbow trout were stocked in 2004 (Appendix S). This is a substantial decrease from 2003 (310,707) and 2002 (199,179) but more importantly, the number of fall release (8") Arlee rainbow trout decreased from approximately 100,000 in 2002 and 2003 to 85,000 in 2004. This reduction was due to loss of production at the Lewistown hatchery in 2004. Two hatchery groups were evaluated in 2004; 85,170 Arlee rainbow trout (5.0-5.6 inches) stocked between 6/24-6/29 and 85,081 Arlee rainbow trout (7.0-8.1 inches) stocked between 10/5-10/22. These larger, late-release fish were marked with an adipose fin clip.

Analysis of hatchery rainbow trout survival was based primarily on recruitment to fall horizontal gillnets (Appendix E). Survival of fingerling rainbow trout from 1996 through 1998 was relatively consistent with return indexes ranging from 32.4 to 37.7 (See explanation of return index in Appendix G). Even though high spring runoff and extremely low water retention characterized 1996 and 1997, rainbow survival remained constant, as fish were not stocked until early July on the declining hydrograph. From 1999 through 2001, the number of rainbow trout stocked into Hauser Reservoir doubled over pre-1998 levels. This increase was in response to the collapse of the kokanee fishery and to return to pre-1990 stocking rates. The increase in stocking rates resulted in a dramatic decline in survival. The return index for the years 1999 through 2001 declined from 9.8 to 1.4. Based on gillnet and angler catch data, the largest single biological change that occurred in Hauser Reservoir for the period 1999-2001 was record walleye recruitment (Figure 1) in 1998. Walleye predation impacts have been most dramatic on fingerling rainbow (and kokanee) plants, which have continued in 2004.

After two years to return, survival of the 2002 group of 8-inch October release Arlee rainbow has exceeded that of the July release 5" rainbows by a factor of two. In 2003, three groups of rainbow trout were stocked in Hauser; summer fingerling Arlee and fall (8") Arlee as well as 104,900-summer release Eagle Lake rainbow trout. No fingerling Arlees have been collected (return index=0) while the return index for the fall (8") Arlee group is 30.8. The summer Eagle Lake release group has a return index of 13.3 following two years in the reservoir (Appendix G). Rainbow stocked in 2004 were not collected in the fall horizontal gillnets. Timing and location of fall hatchery stocking were purposefully scheduled to avoid capture in fall gillnets.

Return to Creel

Evaluation of season and size at stocking did not begin until 2002 with the marking of 104,000 fall release Arlee rainbow. Therefore, 2003 and 2004 were the first years that the two groups of

rainbow trout (summer release 5 inch and fall release 8 inch) were available and of quality size to anglers. A total of 294 rainbow trout were measured in the 2004 summer creel (April through October). Sixty-two percent were fall release (8 inch) from 2002 and 2003 while only 19% were summer release fingerlings. The balance was comprised of 2001 summer released fingerlings (8%) and August released Eagle Lake (11%).

Table 1. Hatchery rainbow trout comparison of month of stocking, size at stocking and percent composition in the 2004 summer creel surveys in Hauser Reservoir. Age estimates based on length frequency.

Year	Hatchery*	Strain	# Stocked	Length at Stocking (in)	Month of Stocking	% in 2004 Summer creel
2001	G	Arlee	211,843	4.6-6.0	July	8%
2002	G	Arlee	100,562	4.7-5.2	July	16%
2002	G	Arlee	98,617	7.3-7.9	October	31%
2003	G	Arlee	101,806	4.7-5.0	July	3%
2003	G	Arlee	103,981	7.1-7.7	October	31%
2003	E	Eagle Lake	104,920	6.1	August	11%

*Hatchery; G=Giant Springs, L=Big Springs, E=Ennis

Creel Surveys

Summer Creel (Table 1)

In 2004, 1,269 anglers were interviewed on Hauser Reservoir totaling 3885.8 angling hours. Total number of fish recorded in the summer creel in 2004 include; 581 rainbow trout, 34 yellow perch, 32 kokanee, 137 walleye and 14 brown trout. Average shore fishing trip was 3.1 hours in 2004. Average boat based trip lasted 3.8 hours in 2004.

Summer catch rates for rainbow trout decreased from the near record high level in 2003 of 0.24 to 0.15 rainbow trout per hour in 2004. Yellow perch catch rates also decreased from 0.19 in 2003 to 0.01 perch per hour in 2004. Walleye catch rates increased from 0.01 per hour in 2003 to 0.04 in 2004. Catch rates for kokanee salmon reached 0.01 fish per hour, but brown trout remained less than 0.01 fish per hour (Table 2).

Catch rates for anglers targeting individual species or groups of similar species were higher than for the general non-specific angler. For example, anglers targeting yellow perch recorded a catch rate of 0.15 per hour while those fishing for “any fish” caught perch at the rate of 0.01 per hour.

The same trend held true for walleye and rainbow trout. Anglers specifically fishing for walleye, who comprised 18.4% of anglers, caught walleye at the rate of 0.18 per hour while general anglers, who comprised 13.5%, caught walleye at the rate of 0.002 per hour. Rainbow anglers, who comprised 54.6% of all respondents, recorded a catch rate of 0.21 per hour while general anglers catch rates for rainbows fell to 0.06 per hour.

Fish measured in the creel in 2004 included 294 rainbows (average 16.7”; range=9.7”-25.4”), 80 walleyes (average 17.5”; range=11.0”-24.6”), 23 kokanee (average 16.9”; range=12.6”-20.5”) and 15 yellow perch (average 9.8”; range=7.2”-13.7”).

Table 2. Summer catch rates, mean size, and harvest estimates of selected species in Hauser Reservoir. Harvest estimates include ice fishing statistics collected during winter season.

	RAINBOW			KOKANEE			YELLOW PERCH			WALLEYE		
Year	Catch rate (fish/hr)	Mean Size (in)	Harvest (X 1000)	Catch rate (fish/hr)	Mean Size (in)	Harvest (X 1000)	Catch rate (fish/hr)	Mean Size (in)	Harvest (X 1000)	Catch rate (fish/hr)	Mean Size (in)	Harvest (X 1000)
1986	0.25	13.5	-	0.10	16.6	-	0.13	8.6	-	0.00	N/A	-
1987	0.24	14.2	-	0.13	15.6	-	0.12	9.7	-	0.00	N/A	-
1988	0.24	15.8	-	0.24	16.3	-	0.06	9.6	-	0.00	N/A	-
1989	0.12	13.7	25.5	0.42	14.6	101.4	0.10	7.7	27.2	0.00	N/A	N/A
1990	0.10	14.9	27.8	0.22	15.7	60.9	0.17	8.9	38.9	0.00	N/A	N/A
1991	0.02	15.3	7.8	0.46	14.7	141.3	0.08	8.1	36.8	0.0001	N/A	0.03
1992	0.05	15.1	13.0	0.22	15.8	78.4	0.16	9.0	55.4	0.0005	*	0.08
1993	0.05	16.3	16.5	0.22	16.0	89.3	0.05	9.0	49.4	0.0001	N/A	0.03
1994	0.02	16.6	4.2	0.15	14.8	37.1	0.15	10.6	38.2	0.0004	N/A	0
1995	0.05	17.5	11.5	0.11	17.0	29.1	0.16	8.9	23.2	0.002	*	0.08
1996	0.05	17.5	12.4	0.10	14.1	18.6	0.31	9.4	37.2	0.002	*	0.09
1997	0.08	16.9	11.0	0.03	16.8	5.8	0.07	8.4	16.1	0.001	*	0.09
1998	0.08	16.4	10.6	0.01	16.3	1.5	0.12	9.8	28.9	0.04	16.4	3.9
1999	0.12	17.4	21.4	0.01	19.1	1.8	0.06	9.2	12.9	0.14	13.6	7.9
2000	0.06	20.5	15.0	0.00	N/A	0.06	0.01	10.1	6.8	0.02	14.2	4.9
2001	0.05	16.5	11.8	0.0002	N/A	0.04	0.01	11.2	2.0	0.05	16.2	7.6
2002	0.05	19.7	6.6	0.00	N/A	0.00	0.03	10.6	3.7	0.05	17.9	5.6
2003	0.24	15.5	21.1	0.002	N/A	0.86	0.19	8.2	6.1	0.01	17.5	1.2
2004	0.15	16.7		0.01	16.9		0.01	9.8		0.03	17.5	
Mean	0.10	16.3	14.4	0.12	16.1	37.7	0.10	9.3	25.5	0.02	16.2	2.4

Harvest estimates for 1986 - 88 were not estimated because creel surveys were not completed during winter months. * Insufficient sample size

Winter Creel

A total of 364 anglers were interviewed in 2004, which represented 1076.6 angling hours. Rainbow trout catch rates were the highest on record at 0.27 fish per hour. Yellow perch catch rates increased slightly from 0.02 in 2003 to 0.04 perch per hour in 2004. No kokanee salmon or walleye were recorded caught in 2004. Brown trout catch rates remained low at 0.01 in 2004 (Table 3).

Table 3. Total catch, number of interviews and angler catch rates for the principal game species from **winter creel** surveys on Hauser Reservoir.

			Catch Rates (fish per hour)				
Year	**# of Interviews**	**Total Fish**	**Rainbow**	**Brown**	**Kokanee**	**Perch**	**Walleye**
1989	573	882	0.18	0.01	0.23	0.2	0.00
1990	300	337	0.11	<0.01	0.18	0.2	0.00
1991	451	723	0.08	0.01	0.18	0.6	0.00
1992	566	1177	0.02	<0.01	0.30	0.45	0.00
1993	635	2234	0.04	0.01	0.47	0.88	0.00
1994	197	457	0.01	0.02	0.03	0.76	0.00
1995	323	624	0.04	<0.01	0.06	0.45	0.00
1996	247	141	0.04	<0.01	<0.01	0.15	0.00
1997	297	281	0.08	0.00	0.01	0.34	0.00
1998	197	115	0.05	0.00	0.00	0.21	0.00
1999	255	207	0.17	<0.01	<0.01	0.13	0.02
2000	266	188	0.11	0.00	<0.01	0.11	0.04
2001	306	192	0.17	0.01	<0.01	0.02	0.01
2002	103	34	0.10	0.01	0.00	0.05	0.00
2003	81	51	0.18	<0.01	0.00	0.02	<0.01
2004	364	347	0.27	0.01	0.00	0.04	0.00
MEAN	323	500	0.10	0.01	0.09	0.29	0.01

Beach Seining

Hauser Reservoir beach seining was conducted on August 16, 17 and 20, 2004. Yellow perch numbers were the highest on record since 1990. Conversely, sucker catch numbers continued to be below the long-term average. Young of the year walleye relative abundance increased from 2003, but still remained well below the record highs in 1997 and 1998. Flushing of walleye from Canyon Ferry Reservoir has been limited by lower than average runoff since 1997. Additionally, catch of age zero walleye in September sinking gillnets in Canyon Ferry has declined since 2001,

mirroring Hauser beach seine trends since 2001. Carp, numbers remained moderately low. Fathead minnow production decreased from the record highs in 2003. (Table 4).

Table 4. Number of fish per beach seine haul in Hauser Reservoir 1990-2004. (FHM=fathead minnow *Pimephales promelas*)

		Number per Haul				
Year	**Number of Hauls**	**Yellow Perch**	**Suckers**	**Walleye**	**Carp**	**FHM**
1990	2	15.5	---	0.0	---	---
1991	20	36.6	---	0.0	---	---
1992	20	1153.1	107.6	0.0	---	48.2
1993	20	145.0	1105.9	0.0	---	21.4
1994	20	52.8	729.6	0.0	7.4	10.7
1995	20	47.0	187.5	0.1	3.1	14.1
1996	19	232.0	573.6	0.0	49.5	87.8
1997	20	58.0	81.5	2.7	0.05	2.8
1998	19	670.4	361.1	3.3	28.6	24.4
1999	20	191.1	63.5	1.3	2.4	3.7
2001	20	495.7	757.9	2.3	201.3	84.6
2002	20	118.7	939.5	1.0	1132.6	70.8
2003	20	980.0	343.5	0.1	13.7	508.0
2004	20	1163.5	373.9	0.4	33.8	170.6
Mean		374.0	465.6	0.7	147.3	87.3

Hydroacoustic Surveys

Hauser Reservoir hydroacoustic surveys were conducted on September 17th 2004 between the hours of 1242 and 1642. As in previous years, surveys were completed from mid-reservoir transects around the main reservoir power lines to the Dam (Transects I through Transects M). The volumetric estimate for the lower portion of Hauser Reservoir increased to 607,000 fish (530/acre). Based on vertical gillnetting run September 14 2003, acoustic targets were apportioned by the percentage of each species collected in gillnets. Kokanee salmon comprised the majority of the estimate accounting for 340,000 of the 607,000 while 133,591 were rainbow trout (Table 5).

Table 5. Hydroacoustics estimates of Hauser Reservoir fish populations from Eldorado Bar to Hauser dam including the lower half of the Causeway arm. Estimates are apportioned by species (Kok=kokanee salmon, Rb=rainbow trout, We=Walleye).

Year	Pop. Est.	S.D.	#/Acre	Kok	Rb	We
1996	400,000	± 100,000	N/A	324,000	19,200	0
1997	200,000	± 100,000	N/A	74,000	7,800	1,800
1998	210,000	± 93,000	183	0	157,000	10,000
1999	110,000	± 81,000	96	4,000	19,400	11,300
2000	400,000	± 280,000	349	89,500	79,000	42,000
2003	258,000	± 67,600	225	63,400	181,800	4,200
2004	607,000	± 19,310	530	340,000	133,591	0

Causeway Fish Traps

Two fish traps were operated under the Causeway Bridge from 8/26/2004 through 12/27/2004. Fish were counted by species and live released in the direction of movement. Fish moving into Lake Helena during this period included; one walleye, eight rainbow trout, 259 kokanee salmon, 49 suckers (white and longnose) and 27 carp. Kokanee salmon movement into Lake Helena was spawning related as nearly all kokanee collected were sexually mature. Kokanee movement peaked in October with 173 fish counted. All walleye, carp and suckers were counted during September.

The majority of fish found in the traps were moving from Hauser to Lake Helena with the majority of movement occurring during the months of September and October. Species counts were three walleye, three rainbow trout, 49 kokanee salmon 22 suckers, 12 yellow perch and one brown trout. No fish were caught in December. Kokanee movement out of Lake Helena was likely related to fish that had recently been released from the Lake Helena trap. Other than walleye, fish were not marked prior to release.

Debris was not a problem during the fall months and traps stayed relatively clean.

Yellow Perch Habitat Enhancement

Habitat bundles have been submerged in Hauser Reservoir annually since 2001 in an effort to improve yellow perch spawning and recruitment. Habitat bundles have been built from trees (discarded Christmas or Juniper) and submerged using cinder blocks. Bundles have been placed in and around the Hauser Causeway as this water is the earliest to warm in the spring and

historical trap netting indicates that perch congregate to spawn in these areas. A total of 224 bundles (672 trees) were deployed in 2004 with deployment depths ranging from 15-19 feet. Appendix V details the GPS locations of 2004 habitat bundles.

Holter Reservoir

Results and Discussion:

Gillnetting

Netting trends for the principal game fish (rainbow trout, kokanee salmon, yellow perch and walleye) of Holter Reservoir are displayed in Figure 3. Detailed netting results for all species collected in spring and fall, floating and sinking gillnets from 1986 through 2004 are tabulated in Appendix C and D.

Spring Horizontal Gillnets

Nine floating and six sinking gillnets were fished during May 2004. Only 23 fish were collected in floating nets and 286 fish were captured in sinking gillnets. Rainbow trout relative abundance fell from 2002 and 2003 highs of 5.0 and 4.2 per net to 2.1 per net in 2004. Three kokanee were collected in spring nets; two hatchery products and one wild. Walleye relative abundance remained similar to 2003 at 3.8 per net while both white and longnose suckers and yellow perch declined. Perch catch rates fell to a record low at 2.3 per net. Catch rates for these three species remained below the long-term averages.

Fall Horizontal Gillnets

Nine floating and six sinking gillnets were fished in October 2004. Floating nets collected 98 fish while sinking nets collected 268. Rainbow catch rates rebounded from the near record low catch rates in 2003 (3.2 per net) to 7.8 per net in fall of 2004.

Vertical Gillnets

Monthly vertical netting results for 2004 are displayed in Appendix K. Vertical nets are fished in the Holter Reservoir forebay during ice-free months and are the principal monitoring tool of kokanee salmon abundance. Nets were fished May through October in 2004.

A total of 46 kokanee salmon were collected in vertical gillnets in 2004. Wild salmon comprised a surprising 82% of the catch. Age composition revealed that 53% were age two; 36% age one; 7% age three; and 4% were age zero. Some of these fish could be products of the unmarked kokanee egg and/or fry plants in Hauser in 2001-2002. Hatchery kokanee were stocked in Holter Reservoir in 2002 in response to extremely low survival of Hauser Reservoir stocking since 1997. A total of 166,000 (3.0-3.2") fish were stocked in mid-July. Survival of these fish has been difficult to determine, as kokanee catch rates in Holter have historically been low. Only eight of these fish were collected in 2004. In addition, kokanee recruitment is strongly

influenced by flushing out of Hauser Reservoir. For example, in 2002, 60% of the hatchery fish collected were originally stocked in Hauser Reservoir whereas in 2003, 67% were classified as Hauser hatchery plants. Flushing of Hauser hatchery kokanee salmon into Holter has continued even though spring runoff remained below average in 2002 and 2003.

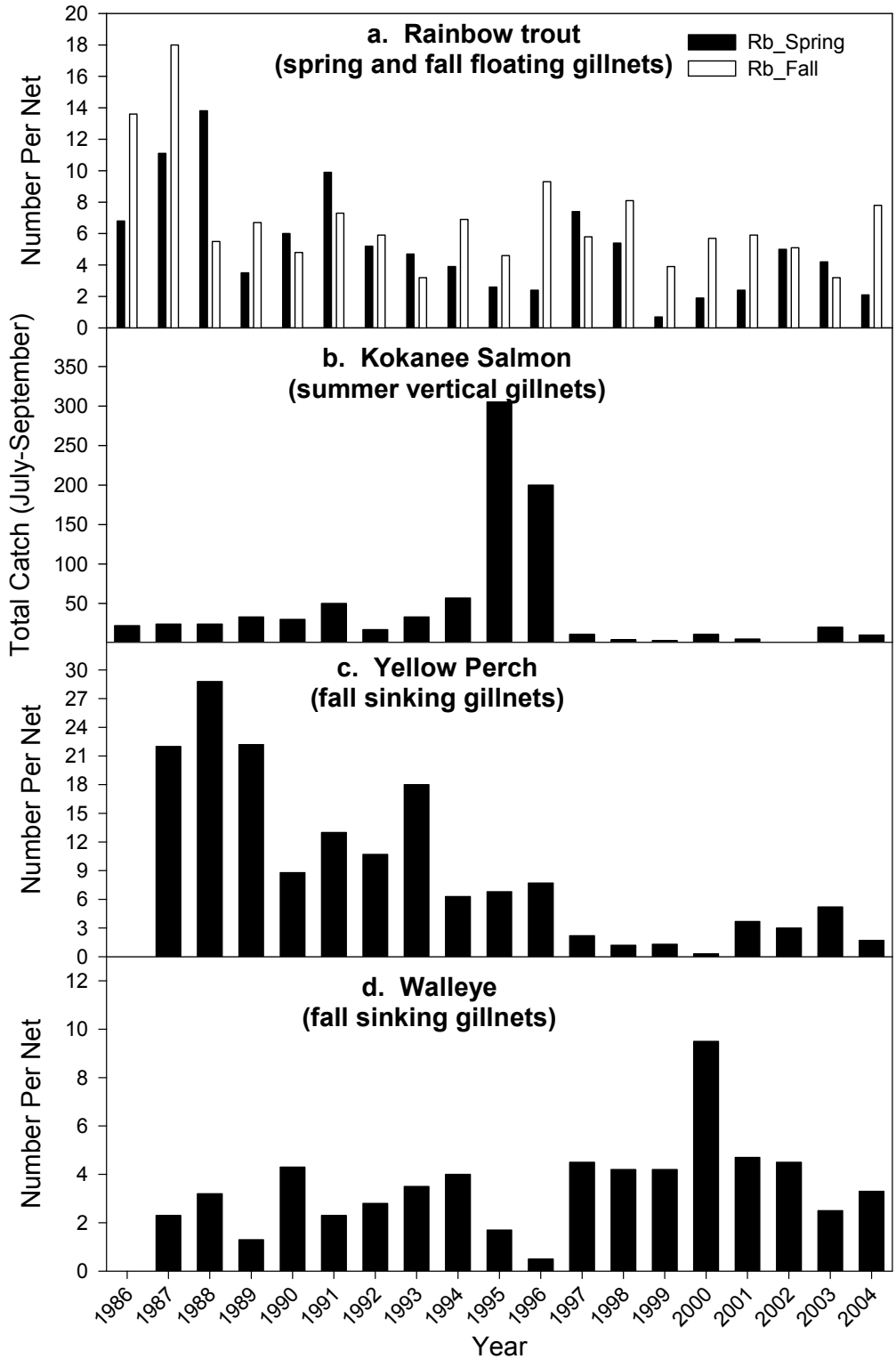


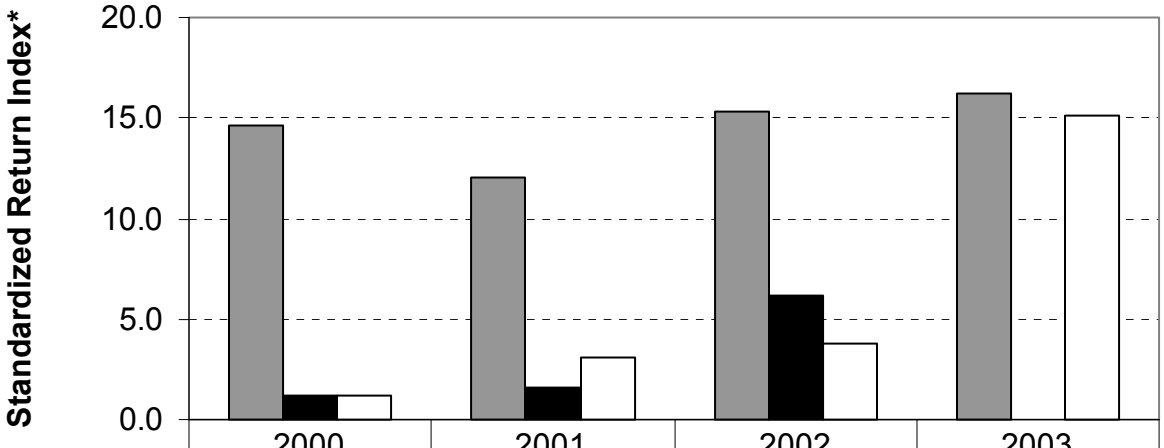
Figure 3. Holter Reservoir gillnetting trends for principal game species (1986 through 2004). Rainbow trout, yellow perch and walleye are based on number of individuals caught per horizontal gillnet. Kokanee salmon trend is based on total catch in vertical gillnets fished in July, August and September each year.

Hatchery Rainbow Trout Survival Evaluation (Size and Season at Stocking and Strain);

Fall Horizontal Gillnets

Survival of two strains and various sizes of hatchery rainbow trout has been monitored with fall (October) floating and sinking gillnets (Appendix H). This monitoring began in 1996 with the conversion from Arlee to Eagle Lake rainbow. Eleven combinations of age and strain were collected in 2004 fall gillnets. The largest contribution (33%) to the fall 2004 gillnet catch came from the 2001 and 2002 plant of age 1+ Eagle Lake Rainbow. The 2003 fall Arlee group represented 23% of the catch. In contrast, no age 0 Eagle Lake Rainbow from the 2003 and 2004 groups were caught.

Return Index values for the three test groups range from 58.4 for the 2000 Eagle Lake Age 1 group to 0.0 for the 2003 group of Age 0 Eagle Lake. The Standardized Return Index (SRI), which accounts for the number of years that a test group has been at large and could recruit to the gear, reveals the consistent return of the Age 1+ Eagle Lake strain (Figure 4). The SRI for this test group has averaged 14.5 for fish stocked from 2000 through 2003. This compares with an average of 2.2 for Age 0+ Eagle Lake and 5.8 for Arlee released at 8" in October.



	2000	2001	2002	2003
EL 1+	14.6	12.0	15.3	16.2
EL 0+	1.2	1.6	6.2	0.0
A0+	1.2	3.1	3.8	15.1

Figure 4. *Standardized Return Index. (Calculated as the total number of fish recaptured in fall gillnets through 2004, divided by the number of fish stocked, then multiplied by 100,000, then divided by the number of years at large) for the three test groups of hatchery rainbow trout stocked into Holter Reservoir from 2000 through 2003. EL1+= Age one Eagle lake stocked in the summer at 7"-8"; EL0+= Age zero Eagle Lake stocked in the summer at approximately 4"; A0+= Age zero Arlee stocked in October at approximately 8".

Return to Creel

A total of 540 rainbow trout were recorded (fish weighed and measured by the creel clerk) during the 2004 summer creel. The 2004 winter creel recorded 77 rainbow trout. Fall release Arlee rainbow accounted for 60% (summer creel) and 64% (winter creel) of rainbow caught in 2004. Age 0+ Eagle Lake comprised an estimated 12% while Age 1+ Eagle Lake made up 23%. The remaining 5% of summer creeled rainbow were not identified. During the period 2001 through 2004, Arlee rainbow have averaged 31% of the number and 56.7% of the pounds of hatchery rainbow stocked into Holter. Eagle Lake rainbow (age 0) have averaged 53.7% numerically but only 14.7% of the pounds compared to Age 1+ Eagle Lake that have averaged 15.3% numerically and 28.6% of the pounds stocked into Holter (Figure 5).

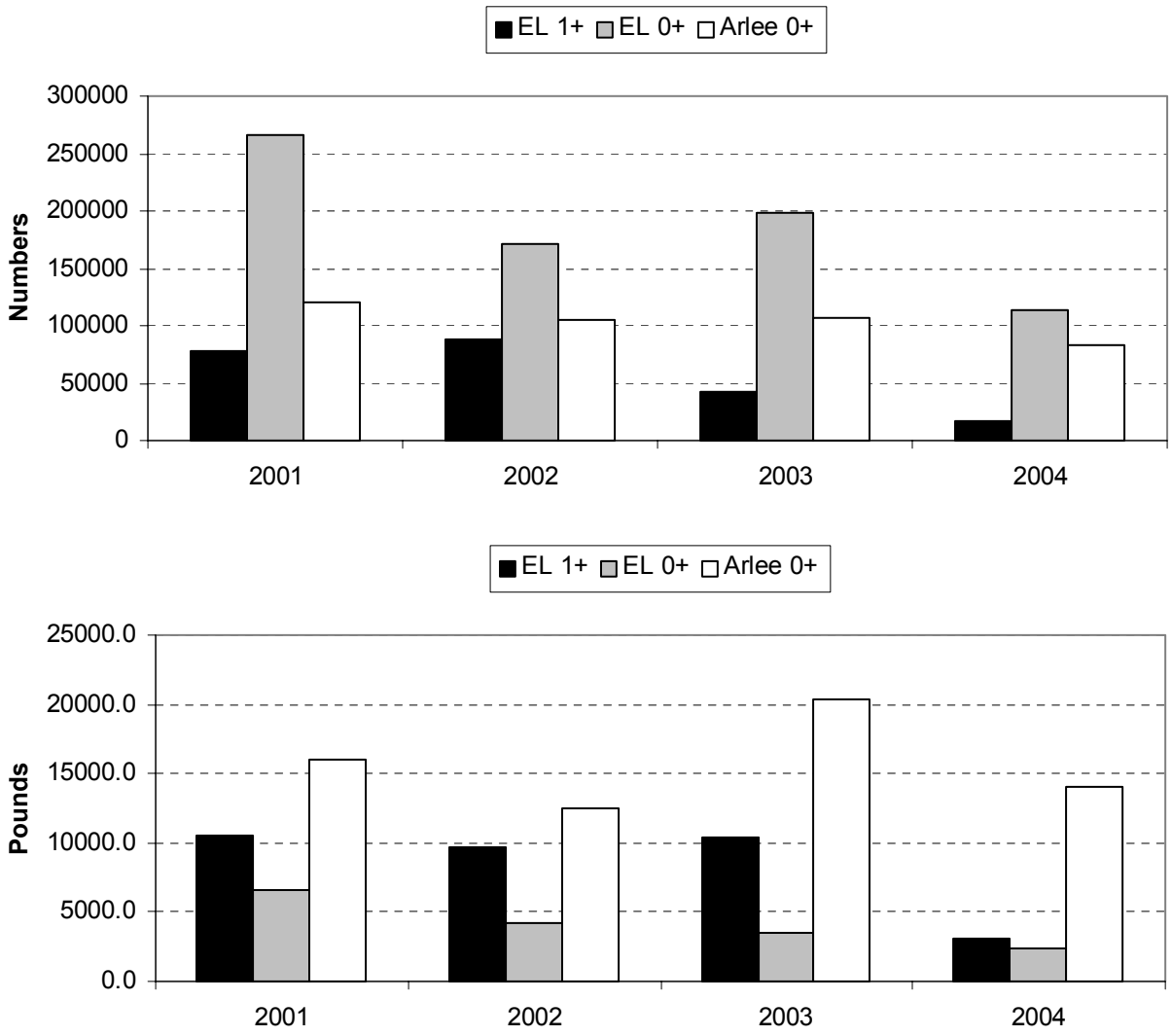


Figure 5. Number (top) and pounds (bottom) of hatchery rainbow trout stocked into Holter Reservoir 2001 through 2004. Included are the three test groups (EL1+= Age one Eagle lake stocked in the summer at 7"-8"; EL0+= Age zero Eagle Lake stocked in the summer at approximately 4"; A0+= Age zero Arlee stocked in October at approximately 8").

Based on average stocking rates since 2001, the proportion at which rainbow trout return to the summer creel is significantly correlated with the pounds of trout stocked regardless of strain, size and/or season of stocking. However this relationship deviates for recruitment to fall gillnets. Age 1+ Eagle Lake recruit to fall gillnets at a disproportionately higher rate than pounds stocked and fall Arlee recruit at a disproportionately lower rate. Age 0+ Eagle Lake comprise a slightly higher proportion of the fall gillnets than the rate at which they are stocked.

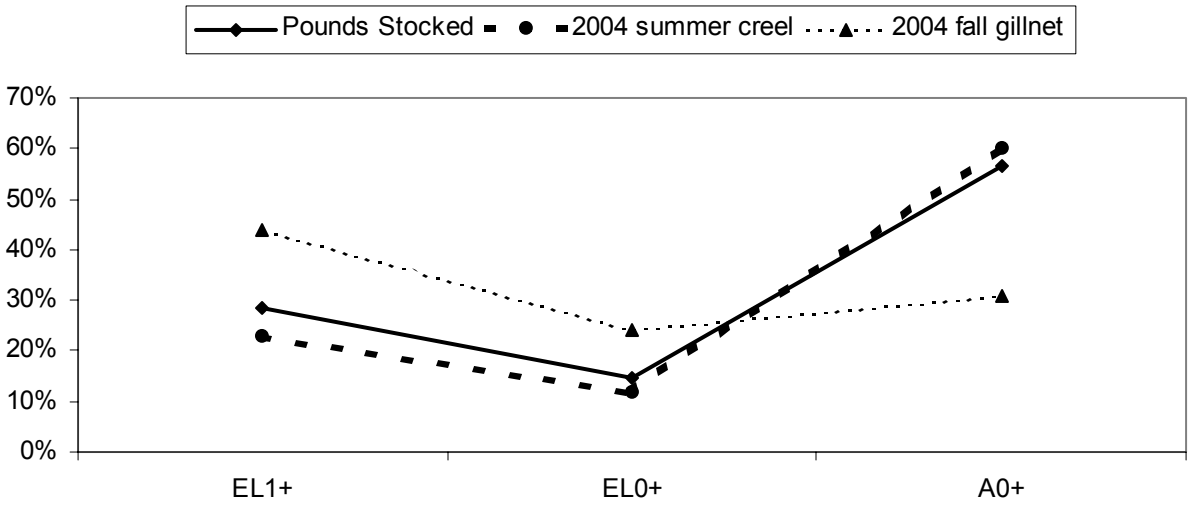


Figure 6. Average (2001-2004) percentage of pounds of hatchery rainbow trout stocked into Holter Reservoir for the three hatchery rainbow trout test groups compared to the composition of rainbow in summer creel and fall gillnets. The three test groups (EL1+= Age one Eagle lake stocked in the summer at 7"-8"; EL0+= Age zero Eagle Lake stocked in the summer at approximately 4"; A0+= Age zero Arlee stocked in October at 8".

Creel Surveys

Summer Creel

Total numbers of anglers interviewed in 2004 was 1303. These anglers accounted for 5349.9 angling hours. Total numbers of creeled fish in 2004 include; 1280 rainbow trout, 585 yellow perch, 28 kokanee, 433 walleye and 3 brown trout. Average shore fishing trip was 3.2 hours in 2004. Average boat based trip lasted 4.6 hours in 2004.

Rainbow catch rates during the 2004 summer creel averaged 0.24 per hour, with fish averaging 16.8" (Table 8). Average weight of creeled rainbow was 2.1 pounds in 2004. Rainbow harvest rates increased over 2001 levels (14,100) to 27,100 in 2002 and 39,900 in 2003. This level of harvest is near the long-term average of 35,400. No harvest estimates were calculated for 2004

as statewide pressure estimates which are integral to harvest estimates are generated only during odd numbered years.

Rainbow catch rates vary by month; in 2004 they peaked in April at 0.39 fish/hour. By area, the highest catch rates occurred out of the BLM (Holter) ramp by shore anglers. Anglers fishing around the boat ramp recorded high catch rates for large Eagle Lake rainbow that were cruising the shorelines during April and May. Anglers specifically targeting rainbow trout represented 51.8% of all Holter fishermen while 19.3% were targeting walleye in 2004.

Winter Creel

A total of 210 anglers were interviewed during the ice-fishing season (January through March) in 2004. These fishermen accounted for 695.8 angling hours in 2004. Winter catch decreased from 2003 levels. Rainbows were caught at a rate of 0.15 per hour in 2004. In addition, perch catch rates were 0.41 per hour.

Average length of rainbow trout in the winter creel was 15.8 inches while perch averaged 9.0 inches. A total of 78% of rainbows and 92% of perch caught in 2004 were kept. The majority of winter anglers (32.4%) reported they were fishing for perch. Those specifically targeting rainbow trout represented 20.0%, while general anglers ("fishing for anything that bites") comprised 23.3%.

Table 7. Angler catch rates on Holter Reservoir during the ice-fishing season; 1989 through 2004. Catch rates for walleye and brown trout were less than 0.01 for all years.

			Catch Rates (fish per hour)		
Year	**# of Interviews**	**Total Catch**	**Rainbow**	**Kokanee**	**Perch**
1989	493	4708	0.23	<0.01	2.95
1990	346	3597	0.24	<0.01	3.05
1991	547	6162	0.27	0.02	3.57
1992	166	2930	0.23	<0.01	5.60
1993	486	4487	0.09	<0.01	2.73
1994	349	4519	0.07	<0.01	3.79
1995	121	624	0.06	0.00	1.69
1996	160	403	0.25	0.00	0.65
1997	283	476	0.24	0.00	0.38
1998	139	630	0.11	<0.01	1.31
1999	136	547	0.29	0.00	0.95
2000	88	958	0.11	0.00	3.22
2001	243	564	0.06	0.00	0.50
2002	92	251	0.15	<0.01	0.46
2003	36	345	0.44	0.00	2.40
2004	210	394	0.15	0.00	0.41
Mean	243	1975	0.20	<0.01	2.10

Table 8. Summer catch rates, mean size, and harvest estimates of selected species in Holter Reservoir. Harvest estimates include ice fishing statistics collected during the winter season

	RAINBOW TROUT			KOKANEE SALMON			YELLOW PERCH			WALLEYE		
Year	Catch rate (fish/hr.)	Mean Size (in)	Harvest (x1000)	Catch rate (fish/hr.)	Mean Size (in)	Harvest (x1000)	Catch rate (fish/hr.)	Mean Size (in)	Harvest (x1000)	Catch rate (fish/hr.)	Mean Size (in)	Harvest (x1000)
1986	0.34	13.9	---	0.01	16.9	---	0.16	---	---	0.002	15.0	---
1987	0.37	13.8	---	0.01	16.7	---	0.39	8.8	---	0.02	16.1	---
1988	0.32	13.7	---	0.01	16.8	---	0.37	---	---	0.01	17.4	---
1989	0.27	14.5	57.1	0.01	16.1	2.1	0.85	9.0	330.0	0.004	20.3	0.9
1990	0.26	14.2	59.2	0.11	16.1	24.3	0.53	9.2	297.2	0.004	17.9	0.3
1991	0.27	12.6	62.3	0.10	15.2	22.4	0.40	8.6	237.7	0.003	16.4	0.5
1992	0.22	14.1	53.2	0.09	16.6	20.4	0.52	8.9	492.9	0.005	20.4	0.6
1993	0.14	15.9	33.7	0.06	16.1	12.0	0.22	9.1	313.2	0.001	18.6	0.1
1994	0.03	14.7	10.4	0.06	16.2	13.4	0.34	9.5	336.9	0.01	19.5	1.3
1995	0.16	14.1	20.1	0.03	15.7	4.3	0.08	9.5	108.6	0.003	*	0**
1996	0.21	13.8	49.3	0.16	14.1	34.0	0.04	9.5	49.3	0.02	13.2	1.9
1997	0.11	15.5	32.3	0.02	16.9	4.0	0.07	7.8	29.3	0.01	17.7	1.1
1998	0.10	15.5	15.4	0.01	16.8	1.9	0.10	9.7	82.4	0.04	15.5	4.6
1999	0.14	18.0	41.3	0.002	15.6	0.4	0.23	8.3	75.7	0.05	14.1	5.6
2000	0.05	19.6	16.0	0.001	*	0.09	0.08	7.9	139.9	0.13	14.8	24.3
2001	0.06	17.1	14.1	0.001	*	0.3	0.07	8.7	35.2	0.06	15.1	8.3
2002	0.19	17.8	27.1	0.01	*	1.6	0.06	9.0	24.1	0.06	15.0	8.0
2003	0.20	17.3	39.9	0.01	16.2	1.1	0.14	9.4	74.7	0.13	13.8	12.5
2004	0.24	16.8	***	0.005	16.3	***	0.11	9.2	***	0.08	14.0	***
Mean	0.19	15.4	35.4	0.04	16.1	9.5	0.25	8.9	175.1	0.03	16.4	5.0

Harvest estimates for 1986 - 88 were not estimated because creel surveys were not completed during winter months. *Insufficient sample size **All fish were released. ***Harvest estimates completed after 2005 statewide angler pressure estimates are finalized.

Table 9. Longevity and duration in the fishery of hatchery rainbow to fall horizontal gillnets (sinking and floating) in Holter Reservoir (1996-2004). Strain; A=Arlee, EL=Eagle Lake

			Number Caught in Nets									
Year Stocked	Strain	Age @ Release	1996	1997	1998	1999	2000	2001	2002	2003	2004	**Total**
1996	EL	1	53	18	5	6	1					**83**
1997	EL	0		18	31	15	14	1				**79**
1998	EL	1			29	8	8	2				**47**
1999	EL	0				0	15	8	0			**23**
2000	EL	1					12	17	8	1		**38**
2000	EL	0					2	6	1	0		**9**
2000	A	0					3	0	3	0		**6**
2001	EL	1						10	4	4	5	**23**
2001	EL	0						4	1	1	4	**10**
2001	A	0						2	11	0		**13**
2002	EL	1							12	3	12	**27**
2002	EL	0							4	7	8	**19**
2002	A	0							3	2	6	**11**
2003	EL	1								4	11	**15**
2003	EL	0								0	1	**1**
2003	A	0								5	16	**21**
2004	EL	1									3	**3**
2004	EL	0									0	**0**
2004	A	0									3	**3**
Number Wild			22	15	11	8	0	8	3	2	5	

2004 – 5 of 74 (7%) of fish were classified as wild.

Beach Seining

Beach seining was conducted on Holter Reservoir on August 18 and 19, 2004. A total of 20 standardized hauls were conducted. Yellow perch collected during 2004 were well below the long-term average. Sucker, carp and walleye counts were also below average. Sucker counts in 2004 were the third lowest on record and less than half of the long-term average. Walleye collection in 2004 continued to decline from the high catch of 1998, 1999 and 2001. The high catch of YOY walleye in 1998 and 2001 resulted in above average recruitment to fall gillnets. However, YOY catch in 1999 did not translate to increased recruitment in subsequent years.

Table 10. Beach seine results (number of fish per haul) in Holter Reservoir (1990 through 2004).

		Number per Haul			
Year	**Number of Hauls**	**Yellow Perch**	**Suckers**	**Walleye**	**Carp**
1990	7	125.1	---	0.0	---
1991	20	274.2	---	2.5	---
1992	20	622.2	147.2	0.0	---
1993	20	38.0	52.5	<0.1	---
1994	19	169.7	288.6	0.0	9.3
1995	16	80.3	120.9	1.0	6.6
1996	19	32.4	385.5	0.6	54.7
1997	20	32.0	327.4	0.6	0.1
1998	20	2906.2	962.3	4.2	2.7
1999	19	3005.7	616.5	4.4	2.7
2001	20	792.3	100.3	4.8	1.0
2002	20	1028.7	61.2	0.4	0.9
2003	20	844.3	110.0	1.0	2.8
2004	20	367.5	90.4	0.7	0.5
Mean		737.0	272.0	1.5	8.1

Trap Netting

Trap net results are shown in Table 11 and 12. Water temperatures in 2004 were higher than optimal and traps were discontinued after two days. Thus, net numbers for 2004 are not comparable to previous years. Nets were fished on May 4 and May 5, 2004 to tag walleyes to determine angler exploitation and the age composition of spawning walleye in Holter. Only 4 male, 4 female and 1 immature walleye were netted in 14 net nights. Average length of spawning age male walleye was 21.0 inches and females were 26.3 inches.

Table 11. Numbers and species of fish captured in trap nets in Holter Reservoir – 1995-2004.

			WALLEYE				PERCH		RAINBOW
			Total Catch		Mean Length (in)				
Year	Dates	Nets	M	F	M	F	Total	# of Clips	Total
1995	4/26-5/12	52	250	59	22.4	26.6	3,281	1,251	84
1996	4/25-5/17	69	181	60	22.9	26.0	1,558	1,100	350
1997	4/29-5/13	45	66	29	22.3	25.5	2,025	1,638	247
1998	4/28-5/8	52	32	11	19.2	26.3	1,890	1,478	124
1999	5/4-5/7	24	59	13	21.4	27.0	1,007	0	159
2000	5/2-5/5	28	66	17	18.9	26.0	291	0	50
2001	5/8-5/11	25	82	24	18.5	25.8	50	0	143
2002	4/30-5/10	53	83	24	18.6	25.1	457	0	194
2003	4/29-5/9	54	79	29	18.1	24.6	157	0	195
2004*	5/4-5/5	14	4	4	21.0	26.3	25	0	25
AVE		42	90	27	20.3	25.9	1074	N/A	157

*2004 Trapping was discontinued after two days due to high water temperatures.

Table 12. Walleye caught in spring trap nets; sorted by size categories, sex, percentage in slot (20”-28”) and average age on Holter Reservoir (1999 through 2004). The current walleye fishing regulation is all walleye between 20 to 28 inches must be released.

	< 20”		20”-28”		> 28”		% in slot		Ave. Age	
Year	M	F	M	F	M	F	M	F	M	F
1995	64	0	184	48	2	9	74	84	5.6	7.6
1996	22	0	153	45	1	12	87	79	6.0	6.8
1997	14	0	52	23	0	5	79	82	7.0	7.9
1998*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1999	19	0	39	9	0	4	67	69	6.9	9.2
2000	40	0	28	13	0	4	41	76	5.4	8.5
2001	54	3	28	11	0	9	34	48	6.0	9.2
2002	65	3	19	18	0	4	23	72	5.2	8.1
2003	62	2	14	24	3	3	18	83	5.3	7.7
2004**	2	0	2	3	0	1	50	75	7.3	9.0
AVE	38.0	0.9	57.7	21.6	0.7	5.7	52.6	74.2	6.1	8.2

*1998 trap nets were fished primarily for yellow perch.

**2004 Trapping was discontinued after two days due to high water temperatures.

Walleye Tagging

In an effort to estimate angler harvest, walleye caught in trend and trap net operations have been tagged with dangler and more recently monel (jaw tags). From 1988 through 2004 a total of 238 of 1797 tags (13.2%) implanted into Holter reservoir walleye have been returned. First-year tag return percentages have ranged from 0% in 1993 and 1994 to 9.1% in 2000. First year tag return

rate for 2004 was 0.0%, although only 8 walleye were tagged in Holter. The long-term average is 4.1%, so a sample size of 25 is theoretically needed for even one tag to be returned. Cumulative rates of return for walleye that have had at least 10 years to be recovered (1988 through 1993) have ranged from 12% to 36%.

Holter Tailrace Electrofishing

A mark-recapture electrofishing estimate was conducted on the 2.5 reach of the Missouri River below Holter Dam (Figure 2) on September 9, 2004 and September 23, 2004. A total of 894 rainbow, 401 brown trout, 24 burbot, 7 walleye and 1 yellow perch were collected during the two nights of electrofishing. Two boom-mounted electrofishing boats were used for the mark and recapture runs. Electrofishing temperatures during electrofishing ranged from 56-60F.

The rainbow trout population estimate for the 2.5-mile reach was 8,132 (SD$\pm$927). The brown trout estimate for this reach was 239 (SD$\pm$61). These estimates standardized to a one-mile reach length are 3,253 rainbow and 96 brown trout per mile.

Average length of rainbow trout (N=894) was 17.0 inches while brown trout (N=401) averaged 17.4 inches (Appendix U). Relative weights averaged 87.0 for rainbow trout and 98.7 for brown trout. Burbot (N=24) averaged 16.5 inches while walleye (N=7) averaged 15.1 inches.

APPENDICES

Appendix A. Number of fish per net and percent composition of catch in Hauser Spring Floating (upper) and Spring Sinking (lower) Gillnets (1986-2004).

Number per net (percent composition) by species for **spring floating** gillnet catches in **Hauser Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB	14.4(29.0)	3.7(9.7)	2.9(17.7)	2.2(13.2)	0.9(5.4)	1.9(7.8)	3.1(12.7)	2.3(17.2)	1.6(7.0)	4.6(39.0)	1.7(9.5)	3.1(19.2)	0.7(10.8)	0.9(50.0)	0.8(57.1)	2.6(65.2)	0.7(66.9)	2.4(65.0)	4.7(76.5)
LL	0.1(0.2)	0.5(1.3)	0.1(0.6)	0.3(2.0)	0.3(1.6)	0.2(0.7)	0.7(3.0)	0.2(1.6)	0.5(2.0)	0.1(1.0)	0.3(1.9)	0.1(0.7)	0.1(1.5)	0.1(5.6)	0	0.6(14.1)	0	0.3(7.5)	0.2(2.9)
KOK	1.4(2.9)	13.8(36.0)	11.7(71.3)	12.4(74.2)	14.9(88.6)	21.1(85.6)	11.6(47.6)	9.2(68.0)	12.5(56.1)	6.8(58.1)	12.9(73.4)	6.8(41.8)	1.1(16.9)	0	0	0.1(2.3)	0.1(8.3)	0.2(5.0)	0
MWF	0.1(0.2)	0	0.2(1.2)	0	0	0.1(0.4)	0	0	0	0	0	0	0	0	0	0	0	0	0
WE	0	0	0	0	0	0	0.3(1.1)	0	0.1(0.4)	0	0	0.1(0.7)	0	0	0	0.1(2.3)	0	0.1(2.5)	0.1(1.5)
YP	0	0	0	0	0	0	0	0.1(0.8)	0.1(0.4)	0	0	0	0	0	0	0	0	0	0
LNSU	26.3(52.9)	13.7(35.8)	1.0(6.1)	0.9(5.3)	0.3(1.6)	0.5(1.8)	2.6(10.9)	0.3(2.5)	4.6(20.9)	0.1(1.0)	0.8(5.7)	3.0(18.5)	2.5(38.6)	0.6(33.3)	0.1(7.1)	0.4(9.2)	0.1(8.3)	0.5(12.5)	1.1(17.6)
WSU	6.9(13.8)	6.3(16.4)	0.5(3.1)	0.9(5.3)	0.5(2.7)	0.4(1.5)	5.9(24.3)	1.2(9.0)	2.8(12.7)	0.1(1.0)	1.4(9.5)	3.1(19.2)	2.1(32.3)	0.2(11.1)	0.5(35.7)	0.3(6.9)	0.2(16.5)	0.3(7.5)	0.1(1.5)
CARP	0.2(0.5)	0	0	0	0	0	0.1(0.4)	0	0	0	0	0	0	0	0	0	0	0	0
U.CHUB	0.2(0.5)	0.3(0.8)	0	0	0	0.6(2.2)	0	0.1(0.8)	0.1(0.4)	0	0	0	0	0	0	0	0	0	0
TOT #	448	383	164	151	185	271	267	122	244	105	158	146	65	18	14	43	12	40	68
# NETS	9	10	10	9	11	11	11	9	11	9	9	9	10	10	10	11	11	11	11

Number per net (percent composition) by species for **spring sinking** gillnet catches in **Hauser Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB		0.2(0.2)	0	0	0	0	0	0	0.2(0.4)	0	0	0.3(0.4)	0	0.3(1.0)	0	0.2(0.6)	0	0	0
LL		1.4(1.5)	0.8(1.2)	0.8(0.9)	0.7(0.7)	1.2(1.2)	0.2(0.2)	1.7(2.6)	1.3(3.0)	1.2(1.4)	1.0(1.4)	1.0(1.2)	0.67(1.6)	0.5(1.5)	0.2(0.5)	0.2(0.6)	0	0.5(1.0)	0
KOK		1.0(1.1)	2.8(4.2)	1.7(1.7)	2.5(2.7)	3.3(3.1)	0.5(0.7)	7.5(11.5)	3.2(7.2)	1.5(1.9)	0.2(0.2)	0.5(0.6)	1.2(2.9)	0	0	0	0	0	0
MWF		3.6(3.8)	3.7(5.4)	2.3(2.4)	1.8(2.0)	3.2(3.0)	1.2(1.7)	1.3(2.0)	0.7(1.5)	2.2(2.7)	0.7(0.9)	0.5(0.6)	3.7(9.0)	0	0	0.8(2.9)	0.5(2.8)	1.0(1.9)	1.7(4.5)
WE		0	0	0.2(0.2)	0	0	0.5(0.7)	0	0.3(0.8)	0	0	0.3(0.4)	17.7(43.4)	0.8(2.5)	1.3(3.8)	6.5(23.1)	1.0(5.7)	0.5(1.0)	0.5(1.3)
YP		4.4(4.7)	7.2(10.6)	5.5(5.8)	12.3(13.5)	14.5(13.7)	15.2(21.5)	11.2(17.1)	5.8(13.3)	2.5(3.1)	3.7(5.1)	4.7(5.5)	15.6(38.5)	2.7(8.0)	1.8(5.2)	0.8(2.9)	0.7(3.8)	4.0(7.7)	3.2(8.5)
LNSU		21.8(23.0)	12.2(17.9)	21.3(22.3)	17.8(19.5)	22.2(20.9)	13.8(19.6)	15.3(23.5)	14.2(32.2)	15.0(18.6)	10.3(14.3)	33.8(40.0)	0	9.5(28.8)	10.8(31.2)	9.5(33.7)	8.2(46.2)	7.5(14.4)	5.2(13.8)
WSU		62.0(65.5)	40.7(60.0)	63.2(66.0)	53.3(58.4)	59.0(55.7)	37.7(53.3)	26.7(40.8)	18.0(40.9)	57.0(70.7)	54.7(75.6)	42.5(50.3)	15.7(38.5)	17.5(53.1)	19.3(55.7)	9.3(33.1)	5.8(33.0)	38.0(73.1)	26.3(70.5)
CARP		0	0	0	0	0	0	0	0	0.8(1.0)	0.5(0.7)	0	0	0	0	0	0	0	0
U.CHUB		0.2(0.2)	0.3(0.5)	0.3(0.3)	2.8(3.1)	2.0(1.9)	0	0.5(0.8)	0	0.2(0.2)	0	0	0	0	0	0	0	0	0
BURBOT		0	0.2(0.2)	0.2(0.2)	0	0.3(0.2)	1.5(2.1)	1.2(1.8)	0.3(0.8)	0.33(0.4)	1.3(1.8)	0.8(1.0)	1.2(2.9)	1.7(5.1)	0.7(2.0)	0.8(2.9)	1.5(8.5)	0.5(1.0)	0.5(1.3)
SM.BUFF		0	0	0.2(0.2)	0	0.2(0.3)	0.2(0.2)	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL #	0	473	407	574	548	635	424	392	264	484	434	434	244	198	208	169	106	312	224
# NETS	0	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Appendix B. Number of fish per net and percent composition of catch in Hauser Fall Floating (upper) and Fall Sinking (lower) Gillnets (1986-2004).

Number per net (percent composition) by species for **fall floating** gillnet catches in **Hauser Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB	8.0(31.3)	6.6(44.2)	16.7(42.0)	6.5(20.9)	6.0(16.5)	3.1(8.1)	4.7(15.0)	3.2(17.7)	3.0(17.0)	2.2(13.1)	3.6(17.5)	2.3(44.6)	3.5(44.2)	2.1(46.0)	2.8(67.4)	1.3(38.9)	1.9(22.1)	6.0(9.3)	2.2(32.9)
LL	0.6(2.5)	0.2(1.2)	0.6(1.4)	0.3(0.9)	0.2(0.5)	0.3(0.7)	0.1(0.3)	0.1(0.5)	0.2(1.0)	0.4(2.2)	0.3(1.3)	0.4(7.1)	0.1(1.2)	0.2(4.0)	0.9(21.7)	0.5(13.9)	0.9(10.5)	0.3(2.5)	0.3(4.1)
KOK	14.6(57.3)	3.7(25.1)	19.1(47.9)	22.6(73.2)	28.9(79.3)	26.7(70.0)	25.6(81.5)	13.7(76.3)	9.2(52.1)	13.5(81.4)	15.5(74.6)	2.1(41.1)	2.6(32.6)	1.5(32.0)	0.1(2.2)	0.6(19.4)	3.7(43.2)	8.5(78.8)	3.7(56.2)
MWF	1.1(4.3)	0	0.4(0.9)	0.1(0.3)	0.3(0.7)	0.2(0.5)	0.2(0.6)	0	0.1(0.5)	0.1(0.5)	0	0	0	0	0	0	0.6(6.3)	0.2(1.7)	0
WE	0	0	0	0	0	0.2(0.5)	0	0	0	0	0.4(1.8)	0.1(1.8)	1.0(12.8)	0.1(2.0)	0.2(4.3)	0.4(11.1)	0.7(8.4)	0.6(5.1)	0.2(2.7)
YP	0.2(0.7)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LNSU	0.4(1.4)	1.9(12.9)	1.0(2.5)	0.3(0.9)	0.1(0.2)	0	0.1(0.3)	0	2.5(13.9)	0	0.2(0.9)	0.1(1.8)	0.1(1.2)	0.2(4.0)	0.2(4.3)	0.4(11.1)	0.6(7.4)	0.3(2.5)	0.3(4.1)
WSU	0.3(1.1)	2.4(16.0)	0.2(0.5)	0.1(0.3)	0.1(0.2)	0	0.3(0.9)	0.2(1.0)	2.1(11.9)	0.4(2.2)	0.4(1.8)	0.2(3.6)	0.4(5.8)	0.5(10.0)	0	0.1(2.8)	0.2(2.1)	0	0
CARP	0	0	0	0	0	0	0	0	0	0	0.1(0.4)	0	0	0	0	0	0	0	0
U.CHUB	0.4(1.4)	0.1(0.6)	1.9(4.8)	1.1(3.5)	0.9(2.5)	7.7(20.2)	0.5(1.4)	0.8(4.5)	0.6(3.6)	0.1(0.5)	0.4(1.8)	0	0.18(2.3)	0	0	0.1(2.8)	0	0	0
TOTAL #	281	163	438	339	401	420	346	198	194	183	228	56	86	49	46	36	95	118	73
# NETS	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11

Number per net (percent composition) by species for **fall sinking** gillnet catches in **Hauser Reservoir.**

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB	1.0(0.7)	2.0(1.4)	0.5(0.5)	1.8(1.8)	0.3(0.3)	0.7(0.7)	0.7(0.7)	0.1(0.2)	0.6(0.4)	0.3(0.3)	0.3(0.4)	0.4(0.8)	0	0	0	0.1(0.3)	0	0	0.4(1.1)
LL	1.4(1.0)	0.5(0.4)	0.5(0.5)	0	0.7(0.7)	0.4(0.4)	1.1(1.0)	0.7(1.0)	1.1(0.9)	0.4(0.5)	1.1(1.4)	0.1(0.5)	0	0.1(0.3)	0	0.4(1.0)	0.3(0.7)	0	0.6(1.5)
KOK	0.6(0.4)	5.8(4.2)	9.8(9.1)	18.3(18.3)	10.7(11.1)	20.7(20.6)	8.1(7.7)	5.0(6.8)	5.1(4.0)	15.6(18.9)	1.4(1.8)	0.4(0.8)	0.7(1.0)	0	0	0	0.6(1.3)	0.2(0.3)	1.0(2.7)
MWF	5.0(3.6)	3.2(2.3)	2.8(2.6)	0.5(0.5)	2.0(2.1)	1.7(1.7)	1.3(1.2)	1.1(1.6)	1.1(0.9)	0.3(0.3)	0.6(0.7)	0.1(0.5)	0.6(0.8)	0	0.7(1.7)	0.3(0.7)	0.6(1.3)	0.3(0.6)	1.3(3.4)
WE	0	0	0	0	0	0.6(0.6)	0.1(0.1)	0.1(0.2)	0.3(0.2)	0	0.6(0.7)	1.0(1.8)	4.7(6.5)	3.9(7.5)	2.3(5.4)	2.0(4.7)	2.0(4.7)	2.3(4.3)	2.6(6.9)
YP	6.8(4.9)	13.0(9.3)	4.7(4.3)	3.5(3.5)	3.7(3.8)	11.3(11.2)	8.9(8.1)	7.9(10.7)	9.4(7.4)	6.6(8.0)	10.0(12.5)	4.1(7.3)	6.0(8.3)	1.3(2.5)	1.4(3.4)	2.0(4.7)	1.9(4.3)	9.0(16.6)	1.9(5.0)
LNSU	40.4(28.9)	22.5(16.1)	26.0(24.1)	14.7(14.7)	15.5(16.1)	16.7(16.6)	20.0(18.3)	13.7(18.7)	15.3(12.0)	14.9(18.1)	17.1(21.4)	10.0(17.7)	21.3(29.4)	14.9(28.7)	14.1(33.4)	16.0(37.6)	15.4(36.1)	12.3(22.7)	10.9(29.1)
WSU	84.8(60.5)	92.3(66.0)	63.0(58.3)	59.3(59.4)	61.0(63.4)	45.3(45.0)	64.9(59.3)	42.0(57.3)	57.6(45.1)	41.6(50.5)	47.7(59.4)	34.7(61.4)	39.0(53.8)	30.9(59.7)	22.9(54.1)	21.4(50.3)	19.0(44.5)	29.3(54.0)	18.3(49.0)
CARP	0	0	0	0.2(0.2)	0	0	1.1(1.0)	0	38.1(29.1)	0.1(0.2)	0	0	0	0.1(0.3)	0.1(0.3)	0.1(0.3)	0.4(1.0)	0	0
U.CHUB	0	0.2(0.1)	0.2(0.1)	1.3(1.3)	2.2(2.3)	1.7(1.7)	2.0(1.8)	1.4(1.4)	0.9(0.7)	0.3(0.3)	0.3(0.4)	0	0	0.1(0.3)	0	0	0	0	0.1(0.4)
BURBOT	0	0	0	0.3(0.3)	0.2(0.2)	0.4(0.4)	0.7(0.7)	0.9(1.2)	0.3(0.2)	2.3(2.8)	1.1(1.4)	5.3(9.3)	0.1(0.2)	0.4(0.8)	0.7(1.7)	0.1(0.3)	2.6(6.0)	0.8(1.5)	0.3(0.8)
SM.BUFF	0	0.3(0.2)	0.5(0.5)	0	0	1.1(1.1)	0	0.7(1.0)	0	0	0	0	0	0	0	0	0	0	0
TOTAL #	700	839	648	600	577	705	765	513	902	576	562	396	507	362	296	298	299	326	261
# NETS	5	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	6	7

Appendix C. Number of fish per net and percent composition of catch in Holter Spring Floating (upper) and Spring Sinking (lower) Gillnets (1986-2004).

Number per net (percent composition) by species for **spring floating** gillnet catches in **Holter Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB	6.8(25.5)	11.1(47.1)	13.8(64.3)	3.5(25.0)	6.0(61.5)	9.9(34.5)	5.2(39.2)	4.7(26.1)	3.9(34.0)	2.6(63.9)	2.4(36.7)	7.4(53.6)	5.4(84.5)	0.7(21.7)	1.9(81.4)	2.4(40.7)	5.0(71.4)	4.2(61.3)	2.1(82.6)
LL	0	0.4(1.6)	0.3(1.2)	0	0.1(1.3)	0	0	0	0	0	0	0	0	0	0	0.1(1.8)	0	0	0
KOK	0.2(0.6)	0.6(2.6)	0.4(1.7)	0.4(2.7)	2.8(28.2)	13.4(46.9)	1.6(11.7)	1.1(6.2)	3.4(30.1)	0.6(13.9)	3.4(51.7)	1.1(8.0)	0	0	0	0	0	0	0
MWF	0.7(2.5)	0.4(1.6)	0.3(1.2)	0.1(0.9)	0	0.3(1.2)	0.4(3.3)	0	0.1(1.0)	0	0	0	0.1(1.7)	0	0	0	0.1(1.6)	0	0
WE	1.3(5.0)	1.8(7.4)	0.9(4.1)	0.3(1.8)	0.5(5.1)	4.0(13.9)	0.1(0.8)	0.7(3.7)	0.7(5.8)	0.1(2.8)	0.1(1.7)	0.2(1.6)	0	0.4(13.0)	0	0.9(14.8)	0.4(6.3)	0.3(4.8)	0
YP	0	4.8(20.1)	4.0(18.7)	1.3(8.9)	0	0	5.1(38.3)	5.3(29.8)	1.7(14.6)	0	0	0	0	0.7(21.7)	0	0	0	0.4(6.5)	0
LNSU	10.8(40.4)	2.4(10.1)	0.9(4.1)	5.4(38.4)	0.1(1.3)	0.1(0.4)	0	1.4(8.1)	0.9(7.8)	0.1(2.8)	0.3(5.0)	1.7(12.0)	0.3(5.2)	0	0	0.9(14.8)	0.3(4.7)	0.4(6.5)	0
WSU	6.7(24.8)	1.9(7.9)	0.8(3.5)	3.1(22.3)	0.3(2.6)	0.8(2.7)	0.8(5.8)	4.7(26.1)	0.6(4.9)	0.7(16.7)	0.3(5.0)	3.4(24.8)	0.6(8.6)	1.4(43.4)	0.4(17.1)	1.7(27.8)	1.0(14.3)	1.3(19.4)	0.4(17.4)
CARP	0.3(1.2)	0.4(1.6)	0.3(1.2)	0	0	0.1(0.4)	0.1(0.8)	0	0.2(1.9)	0	0	0	0	0	0	0	0.1(1.6)	0.1(1.6)	0
TOTAL #	161	189	171	112	78	258	120	161	103	36	60	125	58	23	21	54	63	62	23
# NETS	6	8	8	8	8	9	9	9	9	9	9	9	9	7	9	9	9	9	9

Number per net (percent composition) by species for **spring sinking** gillnet catches in **Holter Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB		1.6(0.9)	1.5(1.4)	1.0(1.1)	1.2(1.0)	1.0(0.7)	0.3(0.2)	0.5(0.4)	0.5(0.5)	2.0(2.3)	0.5(0.7)	0.7(0.8)	0	0.3(0.5)	0	0.3(0.5)	0	0.6(1.0)	0.5(1.1)
LL		1.4(0.8)	0.2(0.2)	0.2(0.2)	0.8(0.7)	0.2(0.1)	0.2(0.1)	0	0	0.5(0.6)	0.3(0.5)	0	0	0	0.2(0.3)	0	0	0	0.3(0.7)
KOK		0	0.3(0.3)	0	0	0.8(0.6)	0.2(0.1)	0.2(0.1)	0.2(0.2)	0.8(1.0)	2.2(3.1)	0	0	0	0	0	0.2(0.3)	0	0.5(1.1)
MWF		3.0(1.7)	4.0(3.6)	4.7(5.1)	4.8(4.0)	8.7(5.8)	2.8(1.8)	1.8(1.5)	1.8(2.0)	0.8(1.0)	1.5(2.2)	1.0(1.1)	0.2(0.2)	0.2(0.2)	0	0.5(0.8)	0.5(0.7)	0.2(0.3)	0.3(0.7)
WE		2.6(1.6)	2.2(2.0)	2.5(2.8)	2.4(2.0)	2.2(1.4)	2.5(1.6)	2.3(1.9)	4.8(5.3)	1.0(1.2)	2.7(3.9)	3.0(3.4)	3.8(5.3)	7.5(10.4)	6.2(10.2)	4.3(7.1)	7.5(11.2)	3.2(4.9)	3.8(8.1)
YP		95.8(57.2)	37.3(34.0)	26.8(29.5)	46.8(39.2)	75.2(50.4)	66.7(43.4)	52.3(42.3)	25.7(28.1)	26.5(30.9)	6.8(9.9)	5.0(5.7)	5.7(7.8)	3.2(4.4)	3.3(5.4)	4.0(6.6)	10.7(15.9)	9.8(15.0)	2.3(4.9)
LNSU		27.6(16.5)	19.3(17.6)	10.2(11.2)	13.6(11.4)	17.7(11.9)	8.3(5.4)	12.8(10.4)	11.7(12.8)	5.17(6.0)	12.2(17.6)	11.5(13.0)	9.3(12.8)	5.3(7.4)	4.5(7.4)	6.8(11.3)	5.0(7.4)	3.2(4.9)	2.3(4.9)
WSU		35.4(21.2)	44.7(40.7)	45.2(49.7)	49.4(41.4)	43.3(29.1)	72.0(46.9)	53.5(43.2)	46.7(51.0)	48.5(56.6)	42.5(61.6)	67.0(76.0)	53.8(73.9)	55.7(77.0)	45.0(74.0)	39.7(65.4)	43.2(64.3)	48.4(74.0)	37.0(77.9)
CARP		0.2(0.1)	0	0.3(0.4)	0	0	0.5(0.3)	0.2(0.1)	0.2(0.2)	0.2(0.2)	0.3(0.5)	0	0	0	0.5(0.8)	0.5(0.8)	0.2(0.3)	0	0.2(0.4)
U.CHUB		0	0.2(0.2)	0	0.4(0.3)	0	0	0.2(0.1)	0	0.2(0.2)	0	0	0	0	0	0	0	0	0
BURBOT		0	0	0	0	0	0	0	0	0	0	0	0	0.2(0.2)	0.2(0.3)	0	0	0	0.2(0.4)
TOTAL #	0	838	658	545	597	894	921	743	549	514	414	529	437	434	365	364	403	327	285
# NETS	0	5	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	5	6

Appendix D. Number of fish per net and percent composition of catch in Holter Fall Floating (upper) and Fall Sinking (lower) Gillnets (1986-2004).

Number per net (percent composition) by species for **fall floating** gillnet catches in **Holter Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB	13.6(77.2)	18.0(76.6)	5.5(41.5)	6.7(52.1)	4.8(34.7)	7.3(53.7)	5.9(35.3)	3.2(42.0)	6.9(42.5)	4.6(20.0)	9.3(39.1)	5.8(64.2)	8.1(55.3)	3.9(83.3)	5.7(73.9)	5.9(76.8)	5.2(48.5)	3.2(69.0)	7.8(71.4)
LL	0.1(0.8)	0.5(2.2)	0.3(1.9)	0.1(0.9)	0	0.3(1.9)	0.2(1.3)	0	0.1(0.7)	0	0.1(0.5)	0.3(3.7)	0.1(0.8)	0	0.2(2.9)	0.1(1.4)	0.3(3.1)	0.2(4.8)	0.1(1.0)
KOK	0.9(4.9)	1.1(4.8)	2.9(21.7)	4.2(33.0)	7.8(56.5)	5.4(39.8)	4.8(28.6)	3.8(49.3)	7.6(46.6)	17.4(76.5)	13.0(54.4)	0.8(8.6)	0.1(0.8)	0	0.2(2.9)	0.2(2.9)	3.3(30.9)	0.7(14.3)	2.3(21.4)
MWF	0.6(3.3)	0	0.4(2.8)	0.1(0.9)	0.2(1.6)	0.4(2.8)	0	0	0.2(1.4)	0	0	0.2(2.5)	0	0.11(2.4)	0.2(2.9)	0.1(1.4)	0.2(2.1)	0	0.1(1.0)
WE	1.7(9.7)	0.1(0.5)	0	0.3(2.6)	0	0	0.1(0.7)	0.2(2.9)	0	0.4(2.0)	1.3(5.6)	1.6(17.3)	0.2(1.5)	0.22(4.8)	0.6(7.2)	0.8(10.1)	1.2(11.3)	0.3(7.1)	0
YP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LNSU	0.6(3.3)	1.6(6.9)	1.6(12.3)	0.9(7.0)	0.9(6.5)	0.1(0.9)	3.3(20.0)	0.1(1.4)	0.4(2.7)	0.2(1.0)	0	0	1.78(12.1)	0.11(2.4)	0	0.2(2.9)	0	0	0.2(2.0)
WSU	0.1(0.8)	2.1(9.0)	2.6(19.8)	0.3(2.6)	0.1(0.8)	0.1(0.9)	2.3(14.0)	0.3(4.3)	1.0(6.2)	0.1(0.5)	0.1(0.5)	0.2(2.5)	4.33(29.5)	0.22(4.8)	0.8(10.1)	0.2(2.9)	0.4(4.1)	0.2(4.8)	0.2(2.0)
CARP	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11(2.4)	0	0.1(1.4)	0	0	0
U.CHUB	0	0	0	0.1(0.9)	0	0	0	0	0	0	0	0.1(1.2)	0	0	0	0	0	0	0.1(1.0)
TOTAL #	123	188	106	115	124	108	150	69	146	205	215	81	132	42	69	69	97	42	98
# NETS	7	8	8	9	9	8	9	9	9	9	9	9	9	9	9	9	9	9	9

Number per net (percent composition) by species for **fall sinking** gillnet catches in **Holter Reservoir**.

SPECIES	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
RB		4.0(4.3)	2.5(2.5)	2.7(2.6)	1.5(1.8)	2.5(3.1)	4.2(4.4)	0.7(0.8)	1.0(1.5)	1.8(2.7)	3.3(3.9)	1.3(1.8)	1.7(2.8)	0.5(1.0)	0.3(0.7)	0.7(1.3)	1.0(1.8)	0	0.7(1.5)
LL		0.2(0.2)	0.3(0.3)	0	0	0	0	0.2(0.2)	0.2(0.2)	0	0	0.2(0.2)	0	0	0	0	0	0	0
KOK		0.3(0.4)	0.2(0.2)	0.5(0.5)	0.5(0.6)	1.5(1.9)	1.5(1.6)	1.2(1.4)	1.0(1.5)	0.8(1.2)	1.8(2.1)	4.8(6.4)	0.2(0.3)	0	0.2(0.3)	0	0	0	0.7(1.5)
MWF		1.7(1.8)	2.0(2.0)	0.5(0.5)	1.5(1.8)	3.5(4.3)	1.2(1.3)	1.8(2.2)	1.0(1.5)	0.2(0.2)	0.5(0.6)	0.5(0.7)	0.8(1.4)	1.0(2.0)	0	0.2(0.3)	0	0	0.2(0.4)
WE		2.3(2.5)	3.2(3.1)	1.3(1.3)	4.3(5.2)	2.3(2.9)	2.8(3.0)	3.5(4.2)	4.0(6.0)	1.7(2.4)	0.5(0.6)	4.5(6.0)	4.2(7.0)	4.2(8.5)	9.5(19.1)	4.7(8.9)	4.5(8.3)	2.5(5.0)	3.3(7.5)
YP		22.0(24.0)	28.8(28.8)	22.2(21.8)	8.8(10.6)	13.0(16.0)	10.7(11.3)	18.0(21.5)	6.3(9.4)	6.8(10.0)	7.7(9.0)	2.2(2.9)	1.2(2.0)	1.3(2.7)	0.3(0.7)	3.7(7.0)	3.0(5.5)	5.2(10.4)	1.7(3.7)
LNSU		22.0(24.0)	21.5(21.5)	22.3(21.9)	17.0(20.4)	12.5(15.4)	19.2(20.3)	13.0(15.5)	11.3(17.0)	16.0(23.4)	11.0(12.9)	15.0(20.0)	10.2(17.2)	5.3(10.8)	8.7(17.4)	10.7(20.3)	8.0(14.8)	6.5(13.0)	8.3(18.7)
WSU		39.3(42.8)	41.7(41.6)	52.2(51.2)	49.7(59.6)	45.5(56.2)	54.8(58.1)	45.0(53.8)	41.7(62.3)	41.0(60.0)	59.8(70.0)	46.2(61.4)	41.0(69.3)	36.8(74.9)	30.8(61.9)	32.8(62.3)	37.5(69.2)	35.7(71.6)	29.7(66.4)
CARP		0	0	0.2(0.2)	0	0.2(0.2)	0	0.3(0.4)	0.3(0.5)	0	0.7(0.8)	0.5(0.7)	0	0	0	0	0	0	0
BURBOT		0	0	0	0	0	0	0	0	0	0.2(0.2)	0	0	0	0	0	0.2(0.3)	0	0.2(0.4)
TOTAL #		551	601	611	500	486	566	502	401	410	513	451	355	295	299	316	325	299	268
# NETS		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6

Appendix E. Stocking records, creel survey results, harvest and gillnet trends for **rainbow trout** in Hauser Reservoir.

Year	Stocking (X1000)	Summer Catch Rates (fish/hr.)	Winter Catch Rates (fish/hr.)	Ave. size (inches) Summer Creel	Harvest (X1000)	Spring Floaters (fish/net)	Fall Floaters (fish/net)	% wild from Floaters
1986	212.6	0.25	N/A	13.5	N/A	14	8	
1987	212.8	0.24	N/A	14.2	N/A	4	7	
1988	211.8	0.24	N/A	15.8	N/A	3	17	4
1989	244.5	0.12	0.18	13.7	25.5	2	7	7
1990	154.0	0.10	0.11	14.9	27.8	1	6	4
1991	138.1	0.02	0.08	15.3	7.8	2	3	11
1992	126.4	0.05	0.02	15.1	13.0	3	5	11
1993	118.6	0.05	0.04	16.3	16.5	2	3	16
1994	105.1	0.02	0.01	16.6	4.2	2	3	
1995	106.7	0.05	0.04	17.5	11.5	5	2	
1996	94.2	0.05	0.04	17.5	12.4	2	4	
1997	98.7	0.08	0.08	16.9	11.0	3	2	15
1998	98.1	0.08	0.05	16.4	10.6	1	3	11
1999	174.3	0.12	0.17	17.4	21.4	1	2	9
2000	189.2	0.06	0.11	20.5	15.0	1	3	23
2001	211.8	0.05	0.17	16.5	11.8	3	1	5
2002	199.2	0.05	0.10	19.7	11.8	1	2	21
2003	310.7	0.24	0.18	15.5	21.1	2	6	4
2004	170.3	0.15	0.27	16.7		5	2	8
Mean	**167.2**	**0.11**	**0.10**	**16.3**	**14.7**	**3**	**5**	**11**

%wild in 1986-87 were not estimated because hatchery fish were not marked before 1986.
%wild in 1994-96 were not estimated because hatchery fish were not marked in 1994.

Appendix F. Stocking records, catch rates, harvest and gillnet trends for **rainbow trout** in Holter Reservoir

Year	Stocking (X1000)	Summer Catch Rates (fish/hr.)	Winter Catch Rates (fish/hr.)	Ave. size (inches) Summer Creel	Harvest (X1000)	Spring Floaters (fish/net)	Fall Floaters (fish/net)	% wild from Floaters
1986	357.3	0.34	N/A	13.9	N/A	7	14	
1987	323.0	0.37	N/A	13.8	N/A	11	18	
1988	322.9	0.32	N/A	13.7	N/A	14	6	44
1989	366.8	0.27	0.23	14.5	57.2	4	7	37
1990	347.3	0.26	0.24	14.2	59.2	6	5	27
1991	420.1	0.27	0.27	12.6	62.3	10	7	37
1992	382.8	0.22	0.23	14.1	53.2	5	6	33
1993	361.0	0.14	0.09	15.9	33.7	5	3	42
1994	290.5	0.03	0.07	14.7	10.4	4	7	66
1995	317.5	0.16	0.06	14.1	20.1	3	5	52
1996	106.2	0.21	0.25	13.8	49.3	2	9	20
1997	371.4	0.11	0.24	15.5	32.3	7	6	29
1998	141.5	0.10	0.11	15.5	15.4	5	8	12
1999	400**.7**	0.14	0.29	18.0	41.3	1	4	25
2000	331.9	0.05	0.11	19.6	16.0	2	6	7
2001	461.4	0.06	0.06	17.1	14.1	2	6	11
2002	364.2	0.19	0.15	17.8		5	5	8
2003	346.9	0.20	0.19	17.3		4	3	7
2004	213.9	0.24	0.15	16.8		2	8	7
Mean	**334.1**	**0.19**	**0.19**	**15.3**	**37.5**	**5**	**7**	**29**

%wild in 1986-87 were not estimated because hatchery fish were not marked before 1986.

Appendix G. Recruitment of hatchery rainbow trout to fall horizontal gillnets (sinking and floating) in Hauser Reservoir (1996-2004)
A=Arlee; EL=Eagle Lake

HAUSER RESERVOIR														
					Number in Fall Horizontal Gillnets (percent of total)									
Year	**Stocking (X1000)**	**Strain**	**Age @ Release**	**Release Date**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**Return Index***
1996	94.2	A	0	Summer	21/42 (50%)	8/28 (29%)	5/38 (13%)	1/23 (4%)						37.1
1997	98.7	A	0	Summer		13/28 (46%)	9/38 (24%)	8/23 (35%)	2/31 (6%)					32.4
1998	98.2	A	0	Summer			21/38 (55%)	9/23 (39%)	2/31 (6%)	4/15(27%)	1/21(5%)			37.7
1999	174.3	A; EL	0	Summer				3/23 (13%)	4/31 (13%)	6/15(40%)	4/21(19%)			9.8
2000	189.2	A	0	Summer					16/31 (52%)	4/15(27%)	2/21(10%)			11.6
2001	211.8	A	0	Summer						1/15(7%)	0/21(0%)	2/66(3%)		1.4
2002	100.5	A	0	Summer							7/21(33%)	10/66(15%)		16.9
2002	98.6	A	0	Fall							4/21(19%)	24/66(36%)	4/27(15%)	32.5
2003	101.8	A	0	Summer								0/66(0%)	0/27(0%)	0.0
2003	104.0	A	0	Fall								22/66(33%)	10/27(37%)	30.8
2003	104.9	EL	0	Summer								4/66(6%)	10/27(37%)	13.3
2004	85.2	A	0	Summer									0/27(0%)	0.0
2004	85.1	A	0	Fall									0/27(0%)	0.0

***Return Index. Calculated as the total number of fish recaptured in nets, divided by the number of fish stocked, then multiplied by 100,000.**

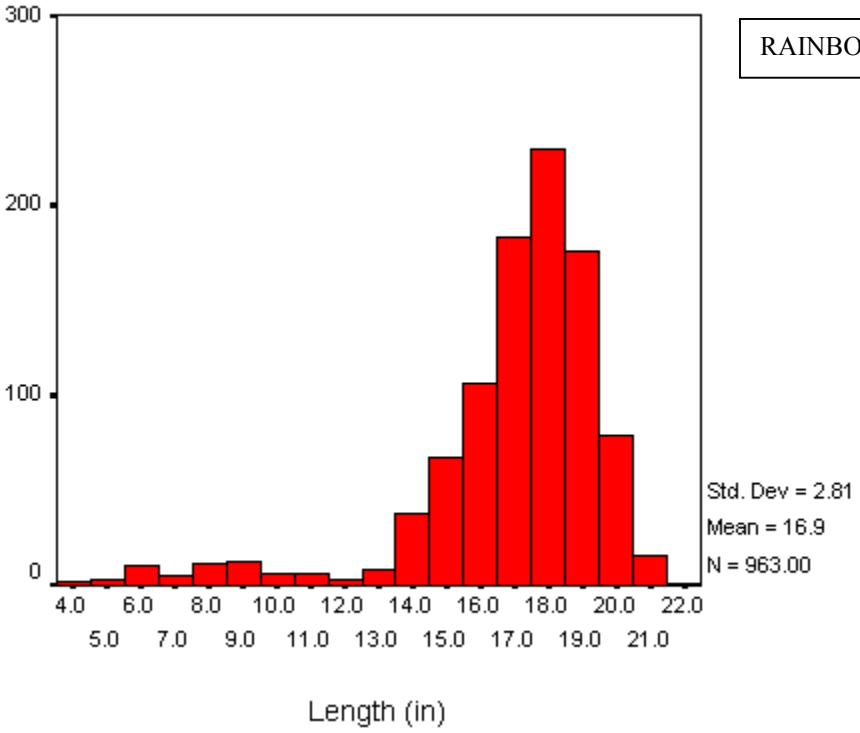
Appendix H. Recruitment of hatchery rainbow trout to fall horizontal gillnets (sinking and floating) in Holter Reservoir (1996-2004)
A=Arlee; EL=Eagle Lake

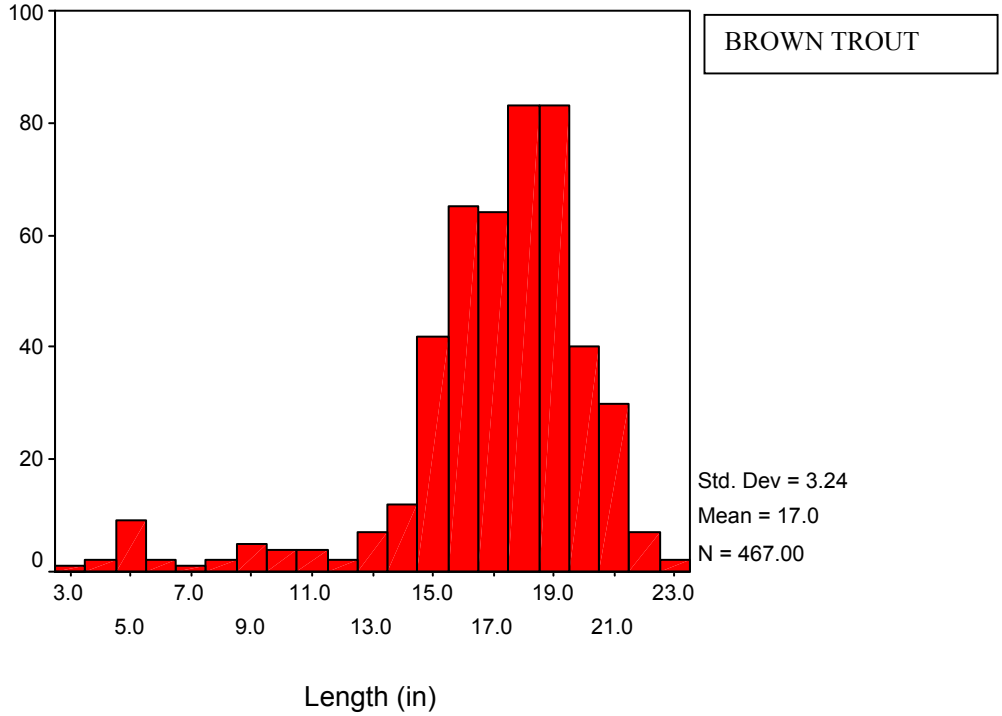
HOLTER RESERVOIR														
					Number in Fall Horizontal Gillnets (percent of total)									
Year	**Stocking (X1000)**	**Strain**	**Age @ Release**	**Release Date**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**Return Index***
1996	106.2	EL	1	Summer	53/92 (58%)	18/62 (29%)	5/76 (7%)	6/37 (16%)	1/55 (2%)					78.2
1997	371.4	EL	0	Summer		18/62 (29%)	31/76 (41%)	15/37 (41%)	14/55 (25%)	1/59(2%)				21.3
1998	141.5	EL	1	Summer			29/76 (38%)	8/37 (22%)	8/55 (15%)	2/59(3%)				33.2
1999	400.7	EL	0	Sum/Fall				0/37 (0%)	15/55 (27%)	8/59(14%)	1/51(2%)			6.0
2000	75.3	EL	1	Summer					12/55 (22%)	17/59(29%)	8/51(16%)	2/29(7%)	5/70(7%)	58.4
2000	191.6	EL	0	Summer					2/55 (4%)	6/59(10%)	1/51(2%)	0/29(0%)		4.7
2000	65.0	A	0	Fall					N/A	0/59(0%)	3/51(6%)	0/29(0%)		4.6
2001	77.5	EL	1	Summer						10/59(17%)	4/51(8%)	2/29(7%)	12/70(17%)	36.1
2001	263.9	EL	0	Summer						4/59(7%)	1/51(2%)	1/29(3%)	7/70(10%)	4.9
2001	120.0	A	0	Fall						N/A	11/51(22%)	0/29(0%)	0/70(0%)	9.2
2002	88.1	EL	1	Summer							12/51(24%)	4/29(14%)	11/70(16%)	30.6
2002	170.7	EL	0	Summer							4/51(8%)	7/29(24%)	10/70(14%)	12.3
2002	105.4	A	0	Fall							N/A	2/29(7%)	6/70(9%)	7.6
2003	43.1	EL	1	Summer								4/29(14%)	3/70(4%)	16.2
2003	197.7	EL	0	Summer								0/29(0%)	0/70(0%)	0.0
2003	106.1	A	0	Fall								N/A	16/70(23%)	15.1
2004	17.0	EL	1	Summer									0/70(0%)	0.0
2004	114.0	EL	0	Summer									0/70(0%)	0.0
2004	83.0	A	0	Fall									N/A	N/A

***Return Index. Calculated as the total number of fish recaptured in nets, divided by the number of fish stocked, then multiplied by 100,000.**

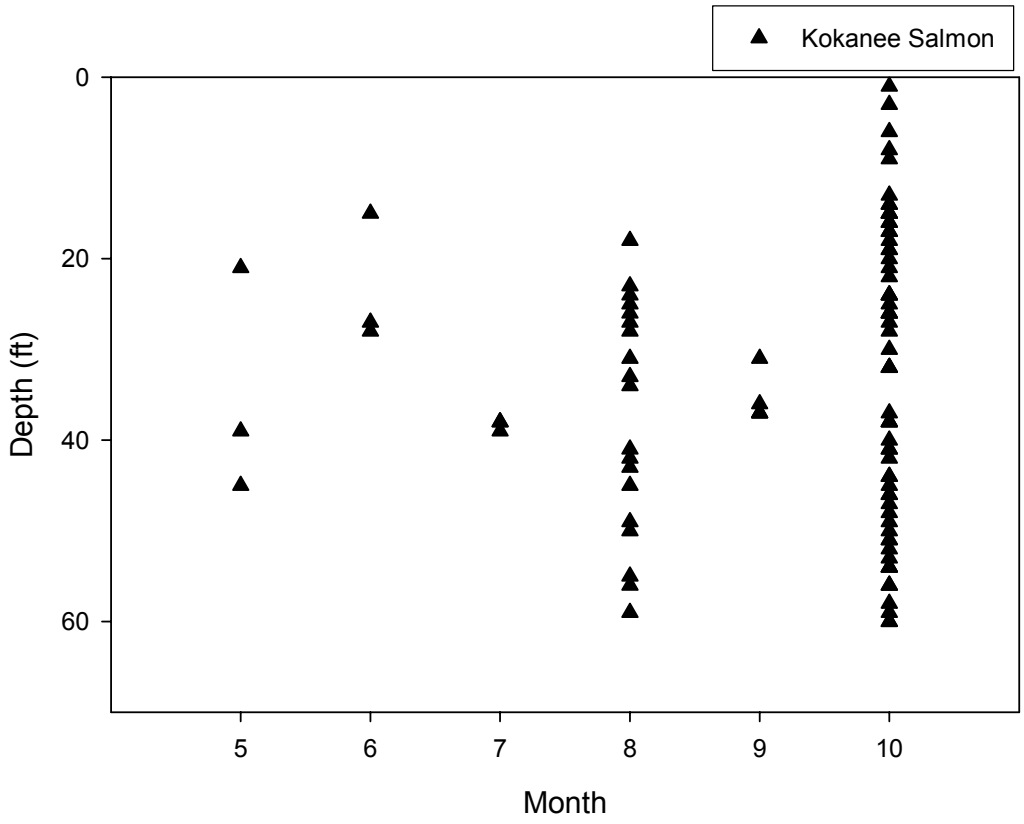
A total of 74 rainbow were collected in 2004 fall sinking and floating horizontal gillnets. Only 70 rainbow are used in computing recruitment as one fish was classified as wild and three were products of the 2004, fall Arlee release group.

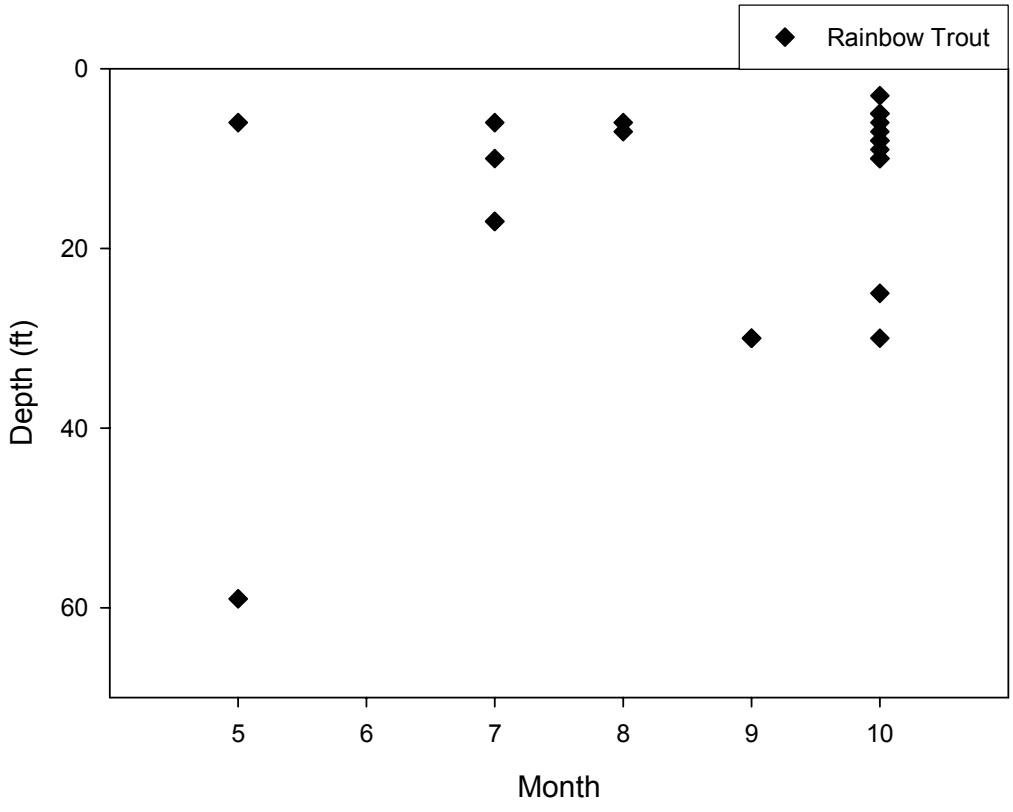
Appendix I. Length Frequency of rainbow (upper) and brown (lower) trout collected during electrofishing sampling in Holter tailrace section (September, 2004).



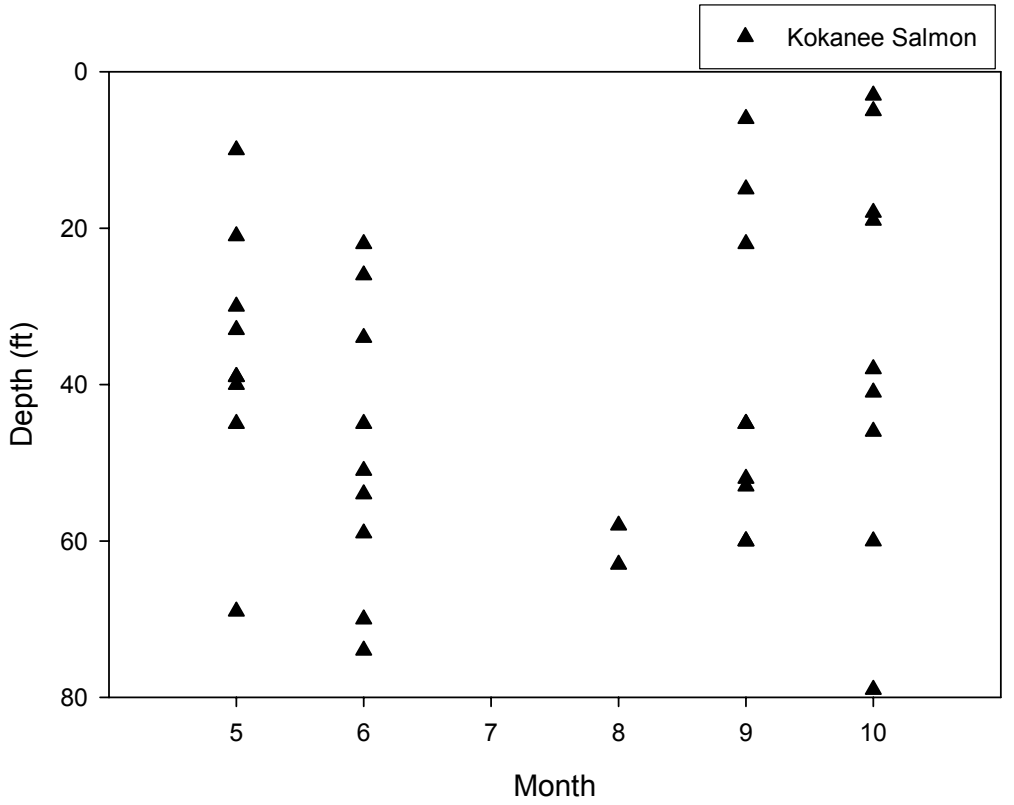


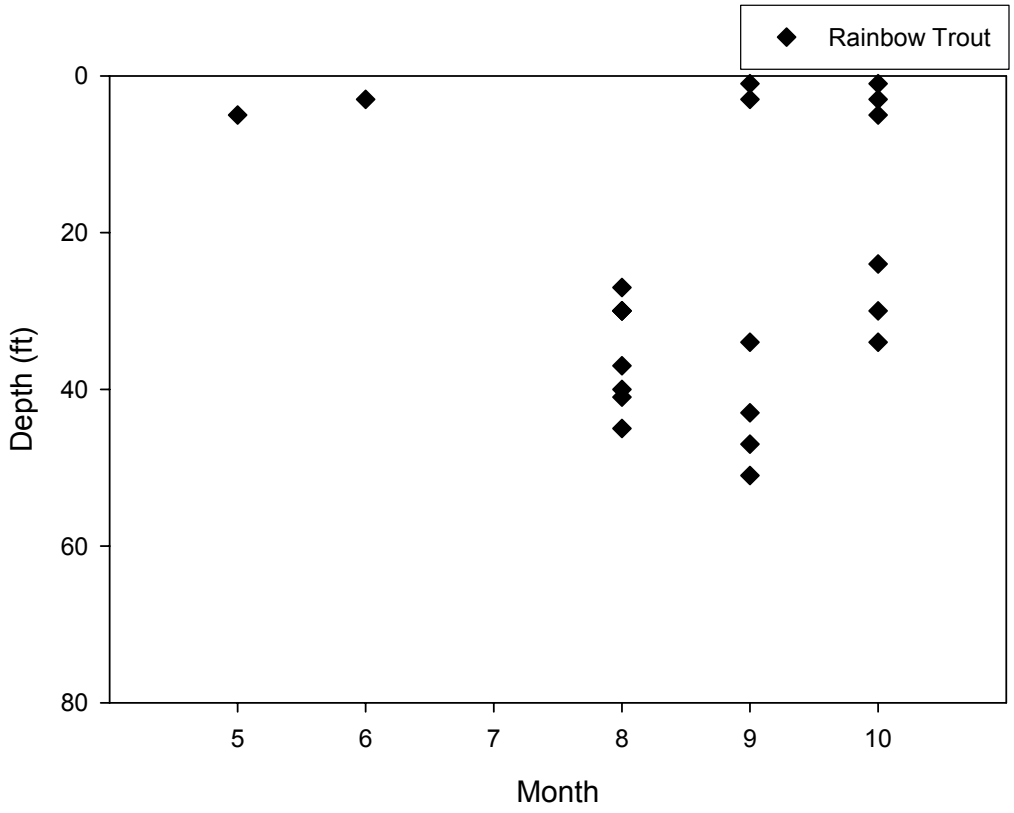
Appendix J. Depth of kokanee salmon (upper figure) and rainbow trout (lower figure) collected in vertical gillnets set in the Hauser Reservoir forebay, May through October 2004.





Appendix K. Depth of kokanee salmon (upper figure) and rainbow trout (lower figure) collected in vertical gillnets set in the Holter Reservoir forebay, May through October 2004.





Appendix L. Habitat bundle locations deployed in 2004 in Hauser Reservoir.

DATE	GROUP #	BUNDLES PER GROUP	AREA	GPS LOCATION		DEPTH(ft)
				LATITUDE	LONGITUDE	
4/27/2004	1	10	El Dorado M	N46^{0}43'56.1"	W111^{0}52'12.2"	15
4/27/2004	2	11	El Dorado M	N46^{0}43'56.1"	W111^{0}52'12.2"	15
4/27/2004	3	10	El Dorado M	N46^{0}43'56.1"	W111^{0}52'12.2"	15
4/27/2004	4	10	El Dorado M	N46^{0}43'56.1"	W111^{0}52'12.2"	15
4/27/2004	5	11	El Dorado M	N46^{0}43'56.1"	W111^{0}52'12.2"	15
4/27/2004	6	10	El Dorado M	N46^{0}43'54.1"	W111^{0}52'10.6"	15
4/27/2004	7	10	El Dorado M	N46^{0}43'54.1"	W111^{0}52'10.6"	15
4/27/2004	8	10	El Dorado M	N46^{0}43'54.1"	W111^{0}52'10.6"	15
4/27/2004	9	10	Main Hauser	N46^{0}43'53.6"	W111^{0}52'34.1"	15
4/28/2004	10	14	Juniper Bay	N46^{0}43'02.0"	W111^{0}52'28.6"	15-18
4/29/2004	11	14	Juniper Bay	N46^{0}43'02.8"	W111^{0}52'28.9"	17
4/29/2004	12	14	Juniper Bay	N46^{0}43'05.8"	W111^{0}52'28.6"	17
4/29/2004	13	14	Main Hauser	N46^{0}44'39.6"	W111^{0}52'35.9"	16-17
4/29/2004	14	14	Main Hauser	N46^{0}44'40.1"	W111^{0}52'36.5"	18
4/29/2004	15	14	Juniper Bay	N46^{0}43'07.1"	W111^{0}52'29.5"	16-17
4/29/2004	16	14	Juniper Bay	N46^{0}43'07.2"	W111^{0}52'29.4"	18-19
4/29/2004	17	14	Causeway	N46^{0}44'21.9"	W111^{0}53'05.3"	19
4/29/2004	18	14	Causeway	N46^{0}44'20.6"	W111^{0}53'06.6"	16
4/29/2004	19	6	Main Hauser	N46^{0}44'35.8"	W111^{0}52'34.0"	17

TOTAL=	224

224	X3	
BUNDLES	TREES/BUNDLE	= 672 TREES

Appendix M. Causeway Trap: Fish Count Data - 2004.

Counts of Fish Moving Into Lake Helena

	Walleye	Rainbow	Kokanee	Sucker spp.	Carp	Yellow Perch	Brown Trout
September 2004	1	17	42	25	27	0	0
October 2004	0	1	173	3	0	0	0
November 2004	0	0	42	8	0	0	0
December 2004	0	0	2	13	0	0	0

Counts of Fish Moving Into Hauser Reservoir

	Walleye	Rainbow	Kokanee	Sucker spp.	Carp	Yellow Perch	Brown Trout
September 2004	3	2	4	5	0	12	0
October 2004	0	1	29	17	0	0	0
November 2004	0	0	4	0	0	0	1
December 2004	0	0	0	0	0	0	0

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