MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-78-R-2 STUDY TITLE: SURVEY AND INVENTORY OF WARMWATER LAKES

JOB NO.: IV-C JOB TITLE: FORT PECK RESERVOIR STUDY

PROJECT PERIOD: JULY 1, 1995 THROUGH JUNE 30, 1996

ABSTRACT

Nearly 3,300 walleye spawners were taken by spring trap netting in the upper Big Dry Arm. Approximately 76 million walleye eggs were obtained from 520 females, which resulted in the stocking of 22.4 million fry and over 1.5 million fingerling into Fort Peck Reservoir. Condition factors and average weights of most walleye length groups appeared good. The average weight of female walleye spawners was 7.9 pounds, with male spawners averaging 2.5 pounds. Walleyes captured during summer gill net sampling were also in good condition. The average weight for walleye, both sexes combined, was 2.40 pounds. Catch rates for gill-netted walleye reservoir-wide increased from 1994. Fall beach seining also showed an increase in the production of forage fish over 1994. Greater production is attributed to increasing reservoir water elevations during the summer of 1994 and spring of 1995. Smallmouth bass were the most abundant game fish seined, with 5/haul, which is the highest on record. Largemouth bass were collected at a rate of 2.5/haul, which is unusual since largemouth have never been stocked, have never been previously captured by any sampling technique, and never reported being caught by anglers. Fall, vertical gill netting for cisco indicated poor production. Lake trout creel surveys during spring and fall indicated stable catch rates relative to previous years, and good condition of angler-caught fish. Average weight of lake trout during spring and fall creel was 10.2 and 8.2 pounds, respectively. Approximately 13,000 3-7 inch pen-reared chinook salmon were released into Fort Peck Reservoir in May. Chinook salmon egg-taking was not attempted in October due to a scarcity of mature female spawners.

OBJECTIVES AND DEGREE OF ATTAINMENT

Activity 1 - Survey and Inventory

Objective: To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters. This objective was met and is presented in Findings.

Activity 2 - Fish Population Management

Objective: To Implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors. This objective was met and results are presented in Findings.

Activity 3 - Technical Guidance

Objective: To review projects by government agencies and private parties which have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. This objective was met by evaluating impact of reservoir water levels on fishery and providing Corps of Engineers with recommendations for Annual Operating Plan.

Activity 4 - Aquatic Education

Objective: To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment. Objective accomplished. A fish identification, techniques for fishing and use of equipment demonstration was given to kids at a pathway to fishing event and at the Northeast Montana Fair. Numerous presentations pertaining to the Fort Peck Fishery were given to various Sportmen's groups. Nearly 100 volunteers helped take walleye eggs at the spawning facility at Nelson Creek.

BACKGROUND

Fort Peck Reservoir is located in north-eastern Montana (Figure 1). During the spring and summer of 1995, reservoir levels continued to rise. The lake reached an elevation of 2,244.26 on August 13, 1995. This is the highest lake elevation recorded since 1975. Due to the high water levels, some boat access sites were inundated with water. A new boat ramp was constructed at the Rock Creek Recreation Area and extensions to existing ramps were also constructed.

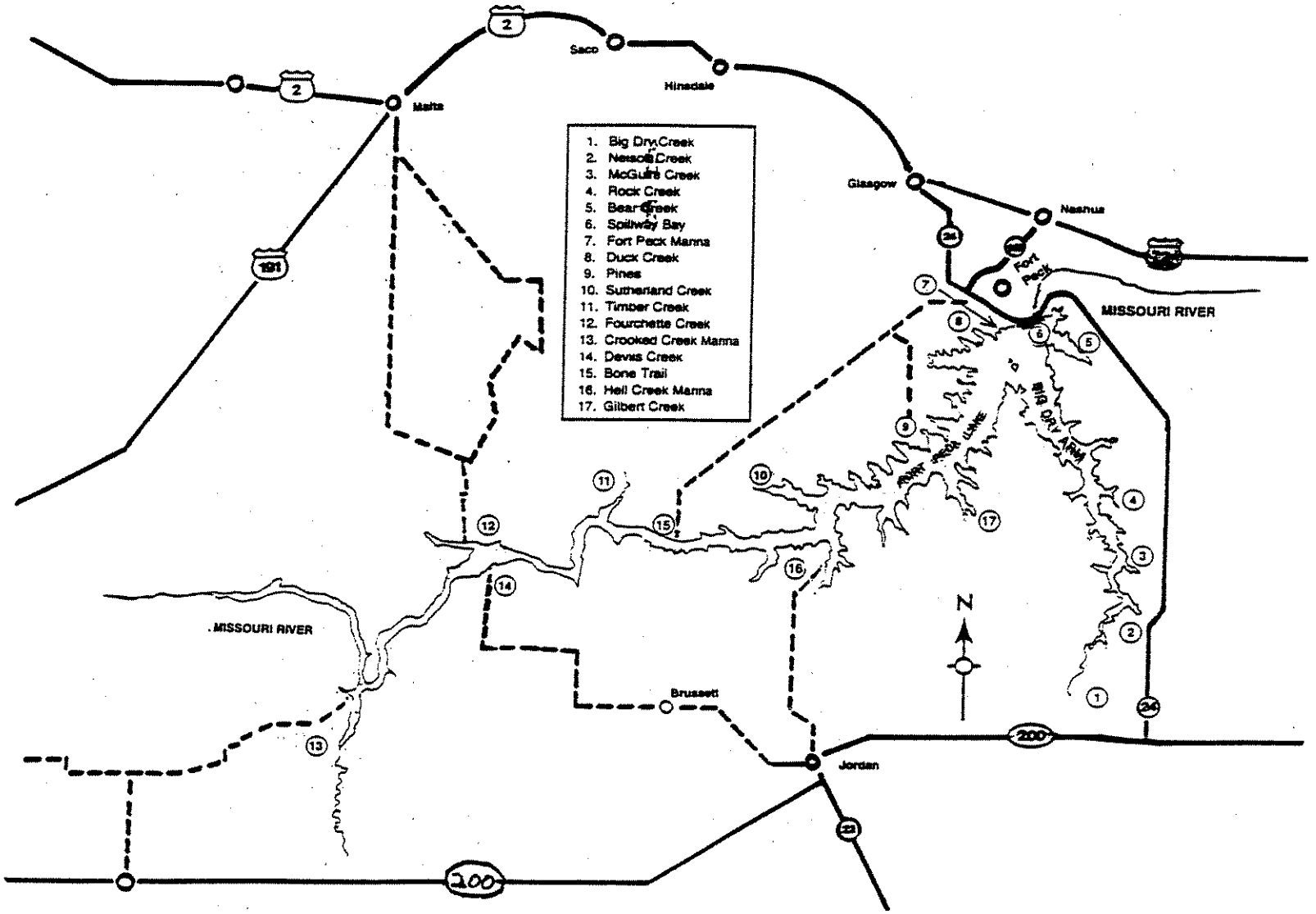

Figure 1. Fort Peck Reservoir study area.

PROCEDURES

Data Collection

Spring trap-net sampling was conducted in the Big Dry Arm and lower Missouri Arm with 4- x 6-foot frame traps of 1-inch square mesh rigged with 50-foot leads. Sinking experimental gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of 3/4-, 1-, 1 1/4-, 1 1/2-, and 2-inch square mesh were fished during late summer to monitor condition distribution and relative abundance of game species. Experimental gill nets were also used in the fall to acquire information on cisco spawners. Monofilament gill nets 100- x 6-foot with 1/2-inch square mesh were fished vertically from the water's surface to sample young-of-year (YOY) cisco. Beach seining, to determine abundance and reproductive success of game and forage fish and to determine stocking success of walleye, was conducted in late summer and early fall utilizing a 100- x 9-foot beach seine of 3/16-inch square mesh. Chinook salmon were reared in a floating cage measuring 42 x 26 x 10 feet. Timed automatic feeders were mounted on the cage to provide food for the salmon fingerlings.

Data Analysis

Relative abundance of fish species was expressed as mean catch per unit effort (CPUE) for standard trap net, gill net and seine catches. Age and growth analysis were conducted for walleye, northern pike, lake trout and cisco.

Scales and spines were sent to Bozeman Montana to be pressed and mounted. They were then aged through the use of a microscope and microfiche machine according to standard techniques (Nielsen et al. 1989). Otoliths were prepared at the Fort Peck Fisheries field station and were aged according to standard techniques (Mackay et al. 1990). Proportional stock density (PSD) and relative stock density (RSD) values were calculated for walleye (Anderson and Weithman 1978; Gablehouse 1984). Relative weights (Wr) (Wege and Anderson 1978) were calculated using the standard weight (Ws) equations developed for walleye (Murphy et al. 1990), and northern pike (Willis 1989). Fulton-type condition factors (CF) were also calculated (Nielsen et al. 1989).

RESULTS AND DISCUSSION

Spring Trap Netting

Spring spawning fish populations were sampled in the upper Big Dry Arm with frame traps from April 11-28, 1995. Walleye, northern pike, burbot and forage fish populations have been sampled using this technique since 1979.

An effort of 473 trap-days resulted in the capture of 3,284 walleye, of which 1,200 were weighed and measured. The catch rate for 1995 was 6.9 per trap day, which is lower than last year's catch of 11.2 (Table 1).

The ratio of males to females was approximately 2:1 which was the same as 1994. The average weight for female walleye spawners was 7.89 pounds and 2.51 for males. The average weight for female walleye is the largest observed since trapping began in 1979 (Table 2).

Length frequencies of male and female walleye combined are shown in Figure 2. The lengths of the fish were plotted as a percentage of the total number sampled during spring trap netting, (1992-1995). In 1994, fish that were 23 and 24 inches long comprised the largest percentage of fish collected. However in 1995, 14- and 15-inch fish constituted the largest percentage of fish collected. Male and female length frequencies were plotted separately as shown in Figures 3 and 4. After reviewing the length frequencies of male walleye in 1994 and 1995, it is evident that males were the cause of the swing in length distribution. The large number of males ranging from 13-17 inches may be due to a successful year-class of walleye.

Weight composition of trap netted male and female walleye, as well as both sexes combined are shown in Figure 5. The percent of male and female walleye combined, which were greater than 3, 4, and 5 pounds dropped substantially compared to walleye collected in 1994. This can be attributed to the large number of small males that were collected.

Condition factors and average weights for 1-inch length groups of walleye from 14-25 inches are shown in Figures 6 and 7, respectively. Since 1990 condition factors and average weight for these length groups appears to have remained the same, or improved slightly.

During spring trap netting, scale and spine samples were taken from 352 walleye. Age classes from 1-16 years were represented (Table 3). The most dominant age classes represented in the sample were four and five year-olds, which comprised 15.3% and 11.9% of the total sample. Four-year-olds averaged 14.6 inches and five-year-olds averaged 16.0 inches respectively. Figures 8 and 9 reveal that the average length and weight of aged walleye have decreased from fish aged in 1994.

Table 1. Summary of the walleye and northern pike caught during spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1974-95.

Date	Trap-days	No. Walleye	Walleye/ Trap-day	No. No.Pike	No.Pike/ Trap-day
1974 (4/22-5/03)	71	1,243	17.4	125	1.8
1975 (4/25-5/12)	97	1,114	11.5	102	1.1
1976 (4/07-5/13)	100	2,108	21.1	95	1.0
1977 (4/12-5/24)	323	1,727	5.3	431	1.3
1978 (4/17-5/05)	81	1,896	23.4	399	4.9
1979 (4/28-5/17)	63	326	5.2	268	4.3
1980 (4/14-5/06)	97	535	5.5	301	3.1
1981 (3/31-4/28)	140	371	2.7	93	0.7
1982 (4/21-5/07)	89	655	7.4	221	2.5
1983 (4/06-5/09)	106	725	6.8	87	0.8
1984 (4/10-5/04)	96	579	6.0	21	0.2
1985 (4/08-4/26)	97	1,202	12.4	69	0.7
1986 (4/07-4/24)	102	1,448	14.2	174	1.7
1987 (4/07-4/24)	220	1,512	6.9	78	0.3
1988 (4/06-4/22)	214	1,610	7.5	163	0.8
1989 (4/25-5/06)	207	2,360	11.4	383	1.9
1990 (4/05-5/04)	292	1,863	6.4	513	1.8
1991 (4/09-5/10)	375	793	2.1	491	1.3
1992 (4/07-4/29)	278	1,585	5.7	684	2.5
1993 (4/15-4/30)	172	1,945	11.3	201	1.2
1994 (4/12-4/26)	168	1,882	11.2	160	1.0
1995 (4/11-4/28)	473	3,284	6.9	648	1.4

Table 2. Summary of average weights and sex ratios for walleye trapnetted in the upper Big Dry, 1979-95.

Year	Average Weight Males	Sample Size	Average Weight Females	Sample Size	Sex Ratio[1] Male:Female
1995	2.51	942	7.89	244	2:1
1994	4.15	1,024	7.43	319	2:1
1993	2.50	446	6.47	351	1:1
1992	2.32	229	6.13	522	1:1
1991	1.82	234	5.31	106	2:1
1990	2.08	362	5.77	142	2:1
1989	1.78	192	4.88	129	3:1
1988	1.69	283	3.68	239	3:1
1987	1.22	152	2.94	94	2:1
1986	1.31	851	2.43	216	3:1
1985	1.31	606	2.54	111	5:1
1984	0.88	454	2.14	34	13:1
1983	0.80	644	3.24	37	18:1
1982	1.07	565	2.95	58	10:1
1981	2.27	209	3.70	96	2:1
1980	1.77	247	3.43	122	2:1
1979	1.50	204	3.40	61	3:1

[1]Sample size larger than fish sample used to determine average weights and lengths.

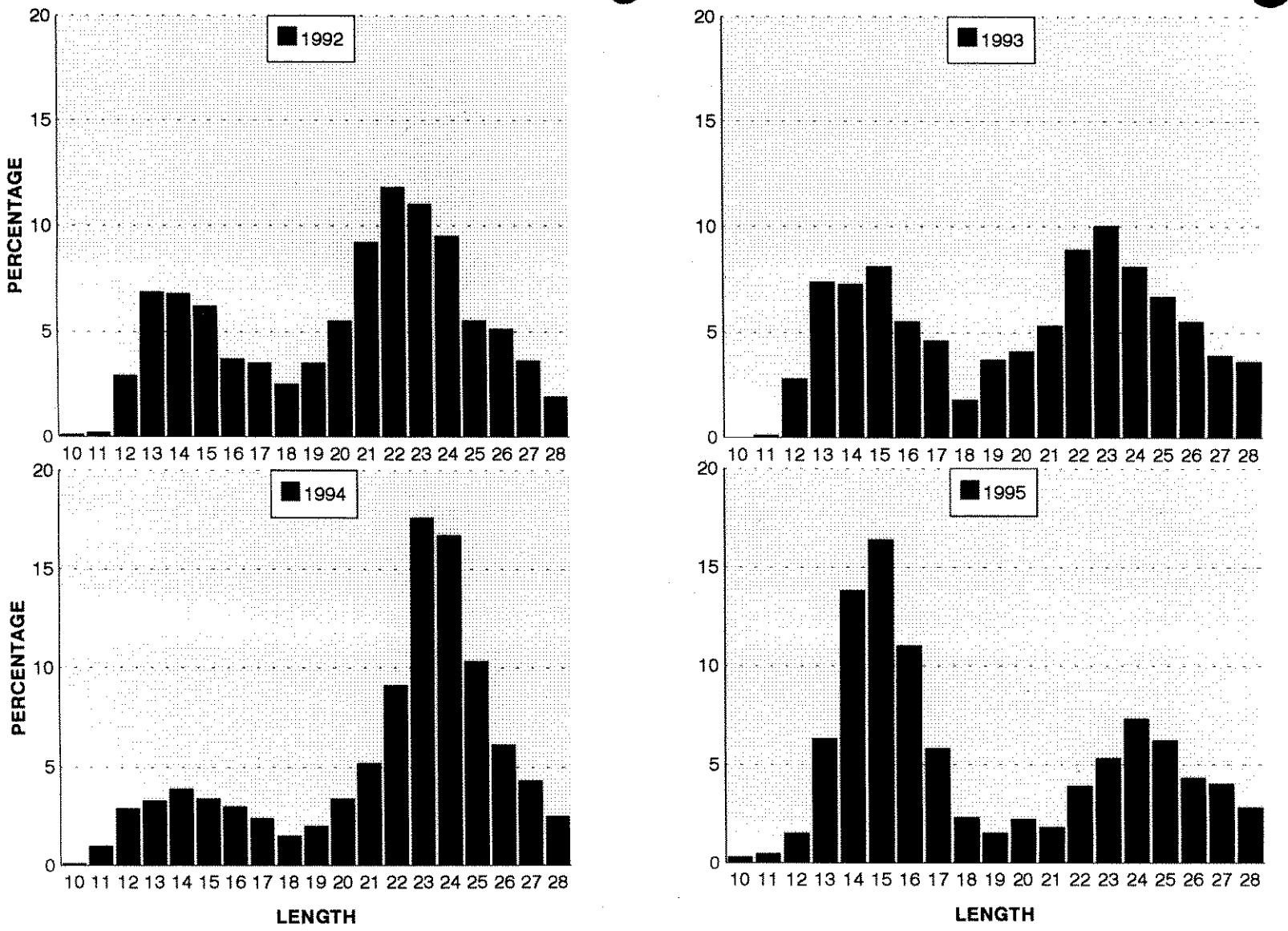

Figure 2. Length frequencies of walleye (both sexes) trap netted on Fort Peck Reservoir, 1992-95.

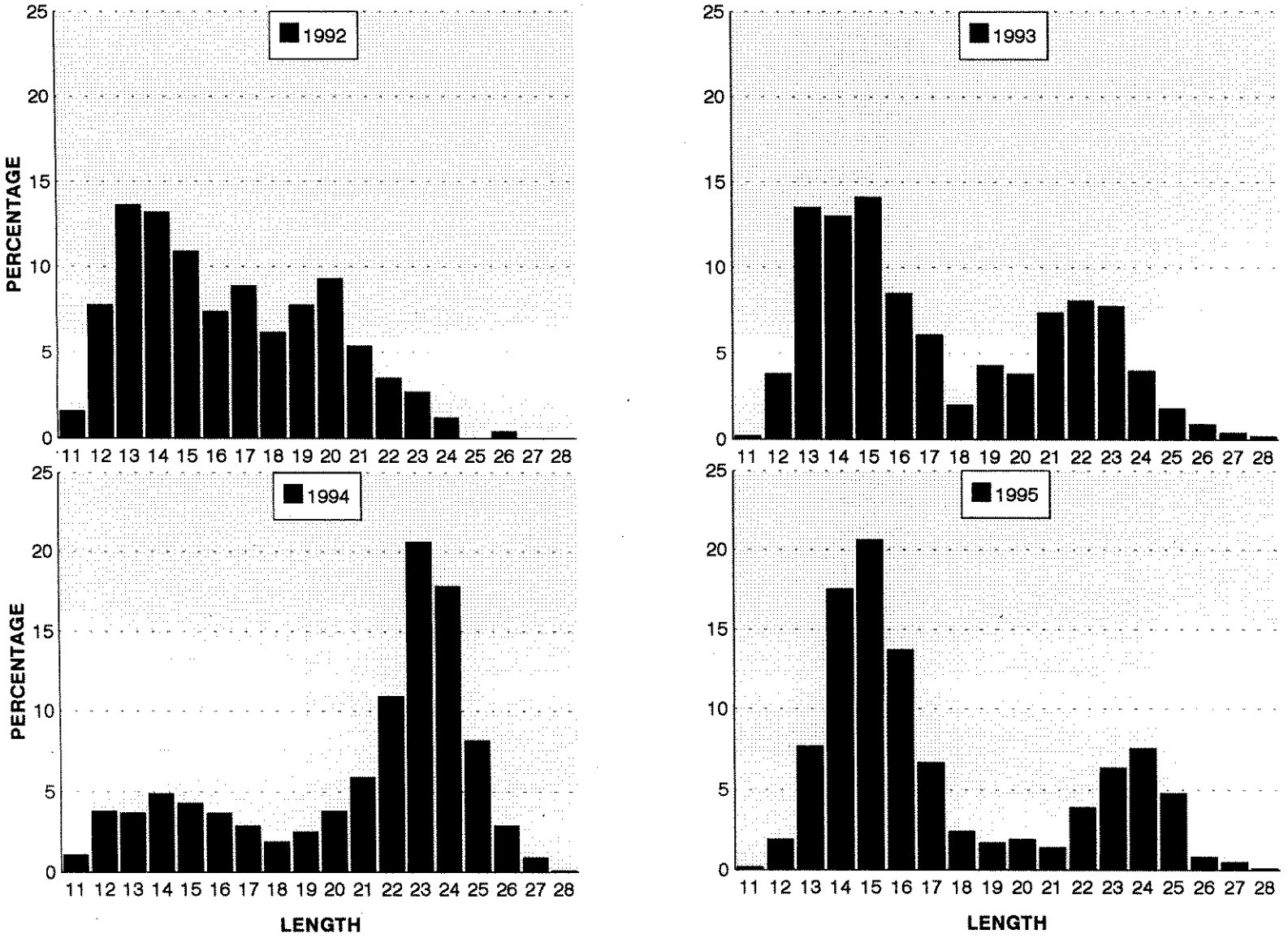

Figure 3. Length frequencies of male walleye trap netted on Fort Peck Reservoir, 1992-95.

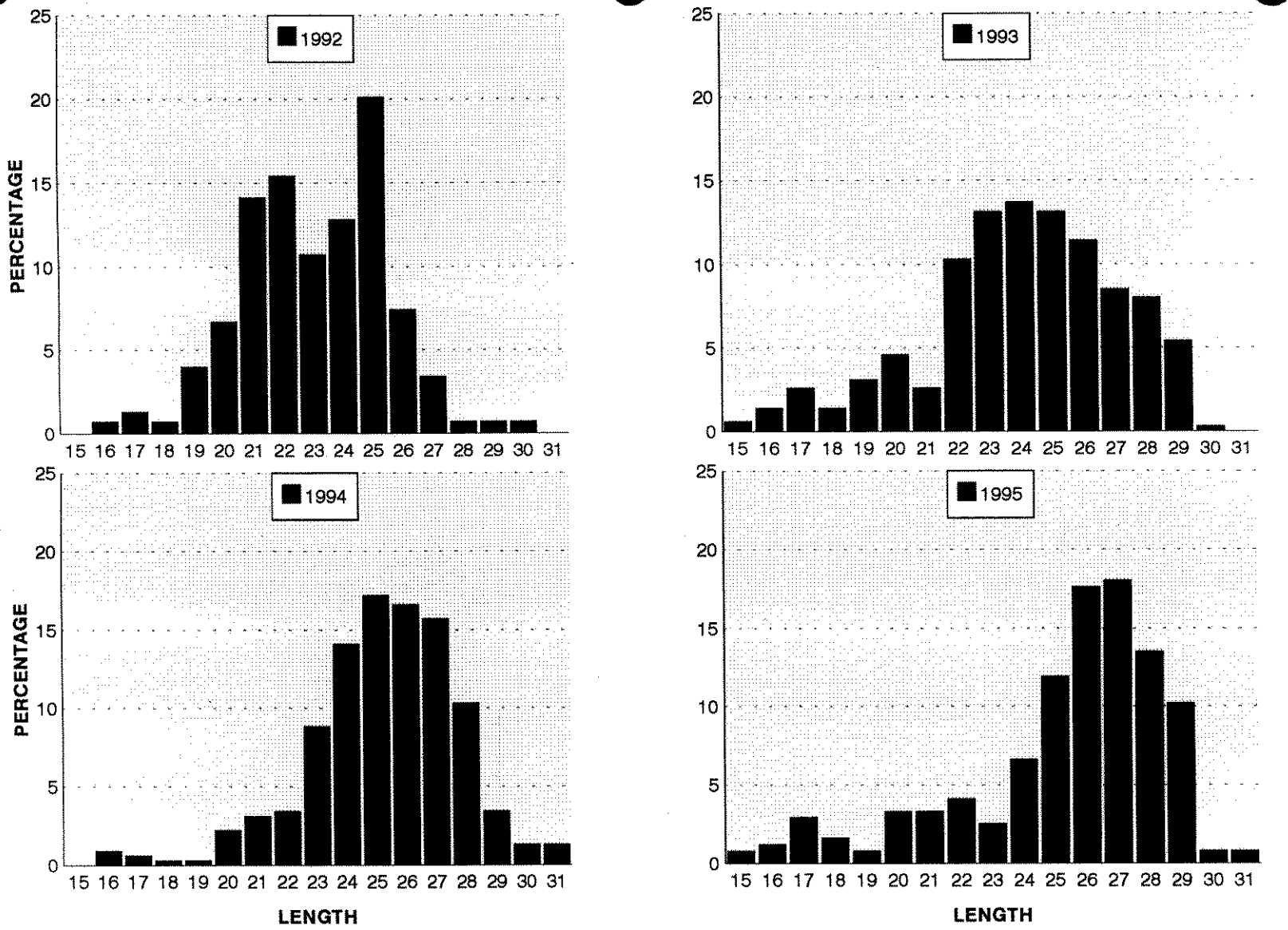

Figure 4. Length frequencies of female walleye trap netted on Fort Peck Reservoir, 1992-95.

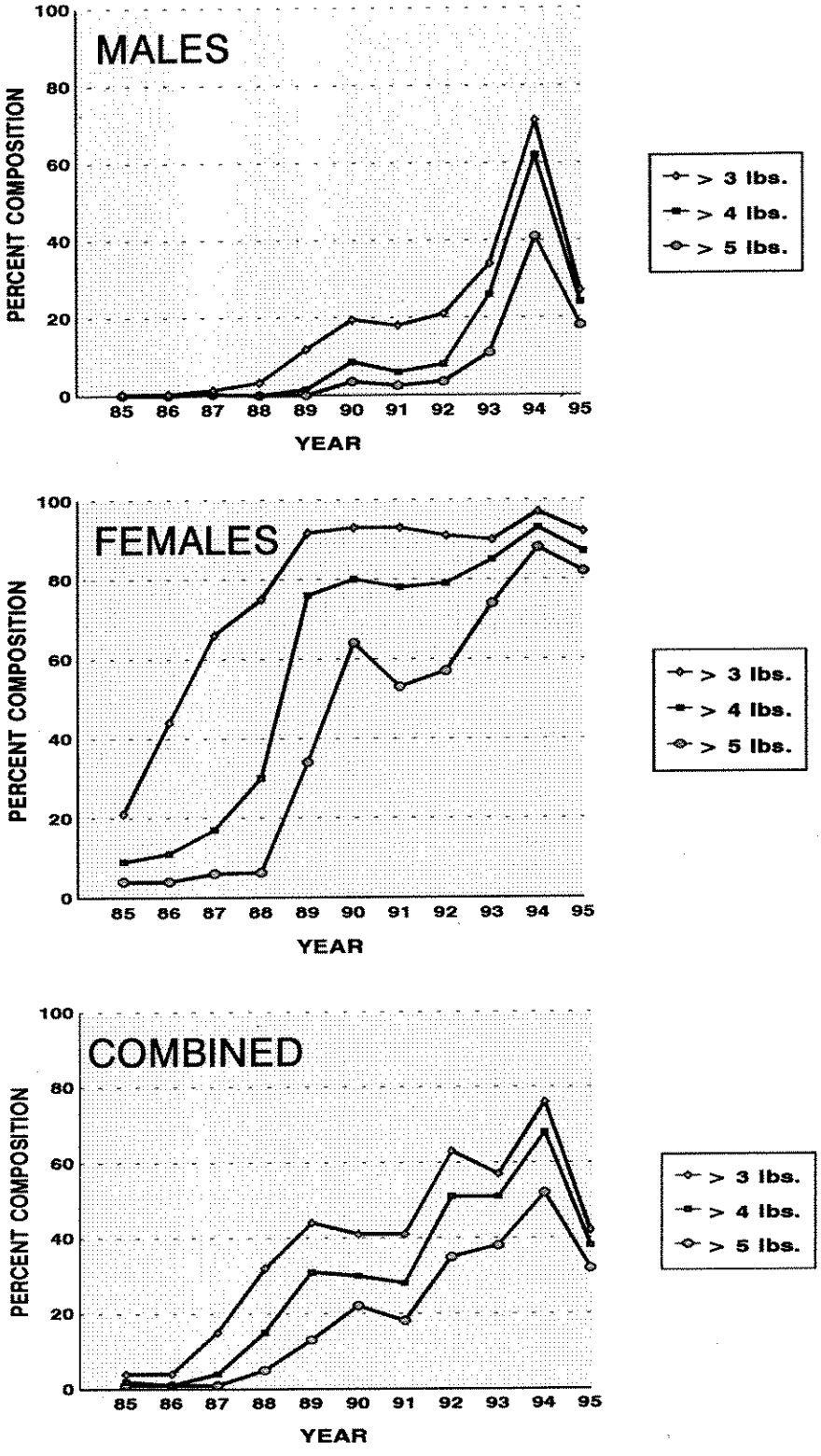

Figure 5. Change in size of male, female and combined sexes of walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1985-95.

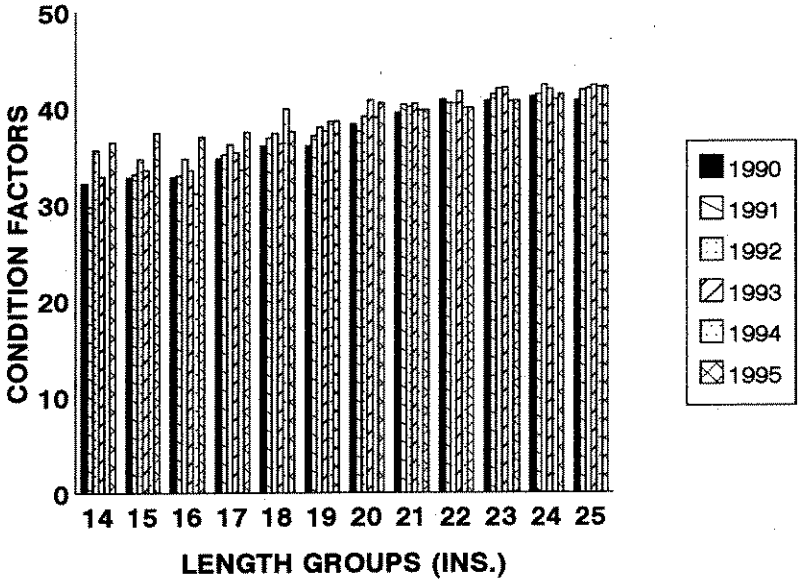

Figure 6. Average condition factors for various 1-inch length groups of walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1990-95.

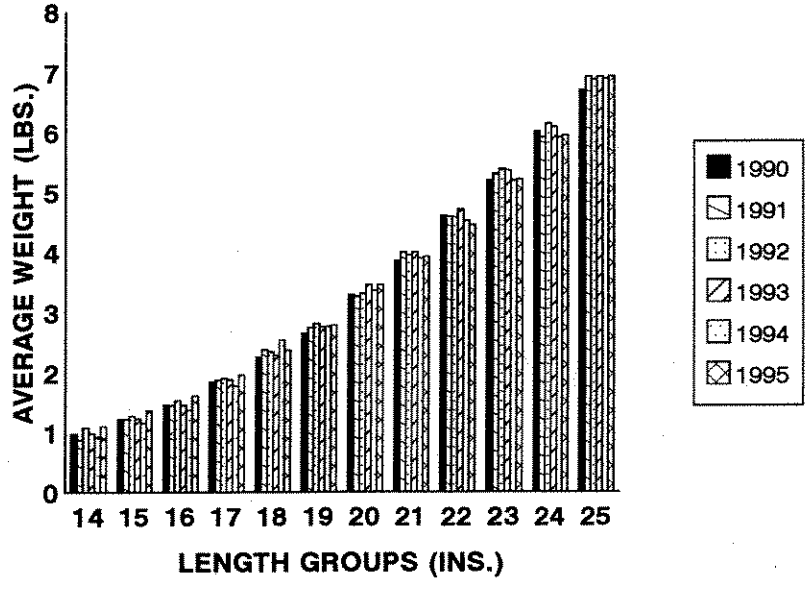

Figure 7. Average weights for various 1-inch length groups of walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1990-95.

Table 3. Age analysis and growth increment of 352 walleye taken from Fort Peck Reservoir during 1995 spring trap-netting operations. (ages based on scale and spine samples)

Age	1	2	3	4	5	6	7	8
Ave. L. (in.)	8.6	10.4	12.7	14.6	16.0	18.0	20.2	22.6
Lower L. Range	7.1	7.6	8.1	12.4	13.5	14.0	16.1	17.6
Upper L. Range	10.1	12.3	14.5	16.0	24.1	23.8	25.0	29.0
Sample Size	18	14	28	54	42	32	37	39
Growth Increment		1.8	2.3	1.9	1.4	2.0	2.2	2.4
N=352	5.0%	3.9%	8.0%	15.3%	11.9%	9.0%	10.5%	11.1%

Table 3. Continued

Age	9	10	11	12	13	14	15	16	17
Ave. L. (in.)	23.7	25.3	26.9	27.7	29.0	28.6	28.4	29.0	----
Lower L. Range	18.5	21.5	24.1	25.1	27.6	25.0	27.6	29.0	----
Upper L. Range	27.7	29.1	29.6	29.6	32.4	31.4	29.2	29.0	----
Sample Size	25	16	14	7	15	8	2	1	----
Growth Increment	1.1	1.6	1.6	0.8	1.3	-0.4	-0.2	0.6	----
N=352	7.1%	4.5%	1.8%	2.0%	4.3%	2.3%	0.6%	0.3%	----

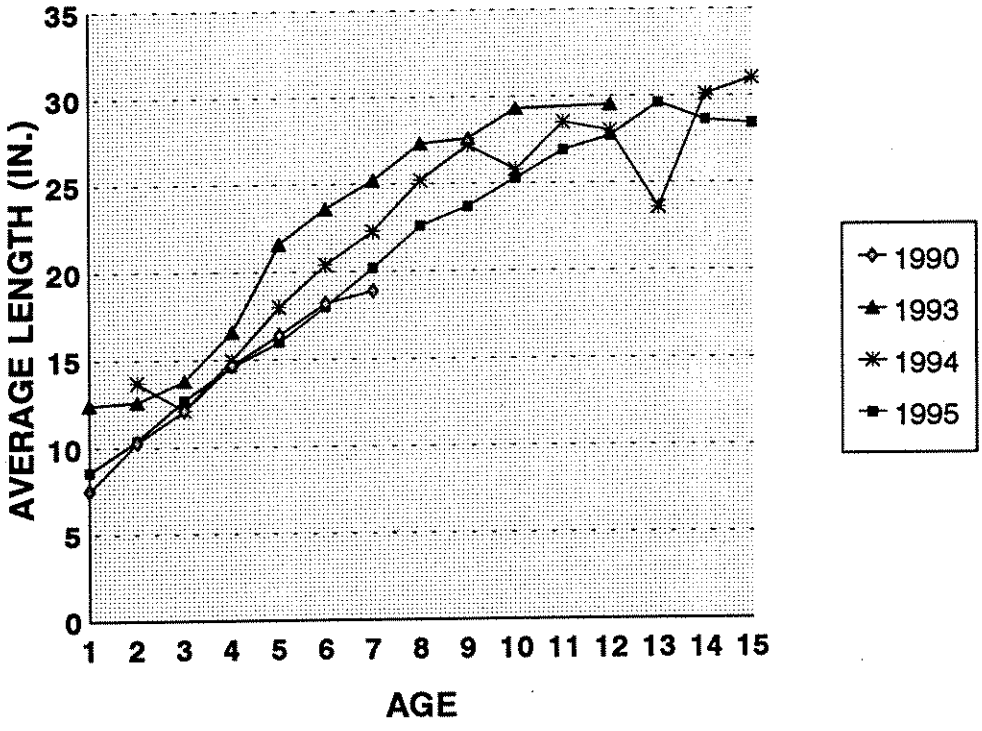

Figure 8. Average lengths for aged walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1990-95 (no data for '91 and '92).

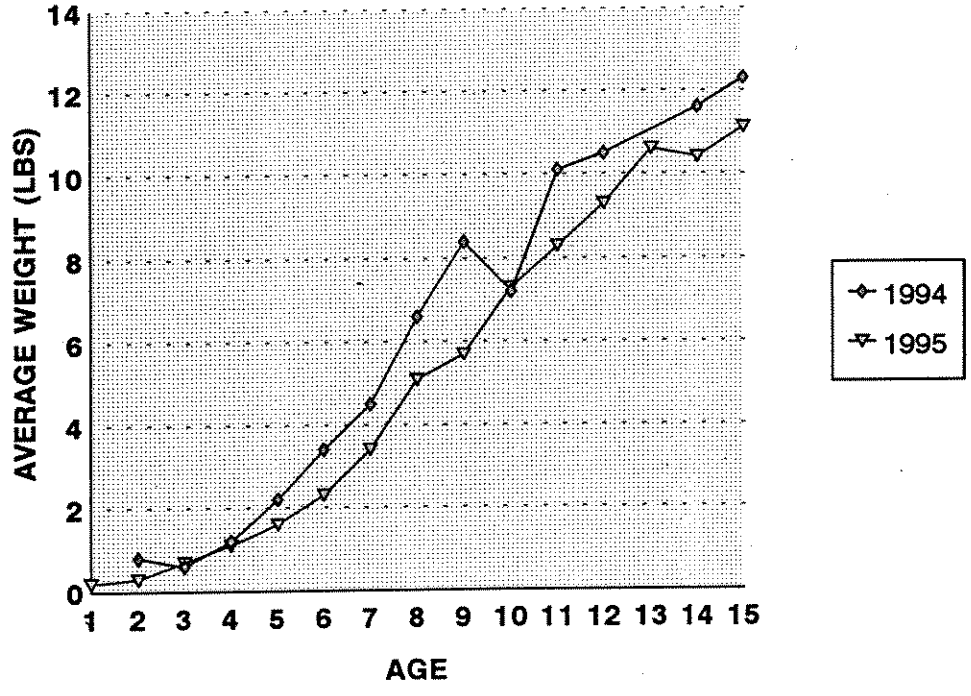

Figure 9. Average weights for aged walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1994-95.

Fish were also sampled with frame traps in the Lower Big Dry and Lower Missouri Arm from May 2-May 26, 1995 (Table 4). The walleye catch rate decreased from 1.5 fish per trap-day in 1994 to 0.6 fish in 1995. The northern pike catch rate in 1995 was similar to the catch rate in 1994 with 1.0 fish caught per trap-day. Northern pike lengths ranged from 9.5-42.0 inches and weights from 0.2-20.3 pounds. The average weight was 5.9 pounds and length was 24.7 inches. Yellow perch numbers increased over previous years with 1.2 per net collected in 1995. The increase of yellow perch numbers is probably related to ideal spawning habitat which resulted in good reproductive success. Yellow perch lengths ranged from 5.7-13.4 inches and weights from 0.1-0.6 pounds.

The average size of trap-netted burbot in 1995 increased from those collected in 1994 (Table 5). Average lengths and weights of burbot were 26.2 inches and 4.7. pounds, respectively, in 1994, while the average in 1995 was 29.1 inches and 6.7 pounds. This continuing increase in average weight of burbot may be due to the introduction of cisco in 1984. However, stomachs have never been sampled, so forage fish utilization is presently unknown.

Gill Netting

Gill nets were set at 26 different locations throughout the reservoir from July 18-August 24, 1995. Information on the distribution, composition, condition and relative abundance of sport and forage fish populations was provided by 104 net sets (Table 6).

The largest concentration of walleye was located in the Lower and Middle Missouri Arm with 4.7 and 4.0 collected per net (Table 7). This is not consistent with previous years where the largest concentration has been located in the Big Dry Arm. The overall catch rate for walleye reservoir-wide increased from 1.4 fish per net-day in 1994, to 3.2 fish per net-day in 1995.

Figures 10 and 11 show length frequencies of walleye sampled with gill nets from 1986-89 and 1992-95. Fish with lengths greater than 20 inches were uncommon from 1986-89. However, during the years of 1992-95 walleye with lengths greater than 20 inches became considerably more abundant. The increase in abundance of these larger fish is attributed to the cisco introduction. Recruitment of fish into the length groups from 10-15 inches seems to be consistent. However, fish with lengths of 17-20 inches do not appear to be very common. Figures 12 and 13 show that weights and condition factors of gill-netted walleye remain similar to previous years.

Table 4. Summary of results for various fishes caught by spring trap netting in the lower portion of Fort Peck Reservoir, 1995.

Species[1]	No.	No./ Net	Avg. Length	Avg. Weight	RANGE Length	RANGE Weight
WAE	59	0.60	19.6	3.4	12.7-29.6	0.9-11.0
SGR	7	0.07	21.9	3.7	12.3-34.6	0.7-06.2
NOP	96	1.00	24.7	5.9	9.5-42.0	0.2-20.3
YEP	110	1.20	7.3	0.2	5.7-13.4	0.1-00.6
CCF	6	0.06	15.4	1.1	13.4-18.0	0.7-01.6

[1]WAE = Walleye SGR = Sauger NOP = Northern pike
YEP = Yellow perch CCF = Channel catfish

Table 5. Summary of the burbot caught during spring trap netting in the Big Dry Arm and Lower Missouri Arm of Fort Peck Reservior, 1979-95.

Year	Number	No./Net	Avg. Length	Avg. Weights
1979	13	0.20	----	---
1980	70	0.70	24.0	2.7
1981	55	0.40	22.9	2.3
1982	18	0.20	25.3	3.6
1983	24	0.20	21.5	2.0
1984	11	0.10	20.6	2.1
1985	20	0.20	22.7	3.8
1986	12	0.10	24.9	3.7
1987	19	0.08	----	---
1988	85	0.40	25.9	5.2
1989	50	0.20	26.2	6.0
1990	20	0.10	29.4	6.0
1991	49	0.10	27.4	5.1
1992	34	0.10	25.2	4.9
1993	30	0.20	24.6	5.3
1994	2	0.01	26.2	4.7
1995	68	0.10	29.1	6.7

Table 6. Fish captured by 125-foot experimental gill nets in Fort Peck Reservoir, 1995.

Species[1]	UBD[2]		LBD[3]		LMA[4]		MMA[5]		UMA[6]		Total	
	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day
WE	81	3.4	39	1.6	75	4.7	96	4.0	42	2.6	333	3.2
NP	92	3.8	86	3.6	29	1.8	74	3.1	18	1.1	299	2.9
SG	1	<0.1	5	0.2	11	0.7	39	1.6	25	1.6	81	0.8
YP	24	1.0	20	0.8	4	0.3	90	3.8	47	2.9	185	1.8
GE	72	3.0	21	0.9	41	2.6	39	1.6	317	19.8	490	4.7
CC	28	1.1	2	<0.1	0	---	15	0.6	80	5.0	125	1.2
CI	82	3.4	50	2.0	24	1.5	68	2.8	135	8.4	359	3.4
Totals	380	15.8	223	9.8	184	11.5	421	17.6	664	41.5	1,872	18.0
No. Net Days	24		24		16		24		16		104	

[1]WE - walleye SG - sauger GE - goldeye NP - northern pike
YP - yellow perch CC - channel catfish CI - cisco

[2]Upper Big Dry: Nelson Cr., Short Cr., Lone Tree Cr., McGuire Cr., Bug Cr., Lost Cr.
[3]Lower Big Dry: Box Cr., S. Fork Rock Cr., N. Fork Rock Cr., Box Elder Cr., Sandy Arroyo, Spring Cr.
[4]Lower Missouri Arm: Spillway Bay, Bear Cr., N. Fork Duck Cr., S. Fork Duck Cr., Main Duck
[5]Mid Missouri Arm: Pines, Gilbert Cr., Cattle Cr., Hell Cr., Sutherland, Snow Cr.
[6]Upper Missouri Arm: Timber Cr., Fourchette Bay., Seven Blackfoot , Crooked Cr.

Table 7. A summary of walleye size and catch rates of 125-foot experimental gill nets for areas of Fort Peck Reservoir, 1995.

Area	Year	No. Sampled	Length (in.) Avg.	Length (in.) Range	Weight (lbs.) Avg.	Weight (lbs.) Range	Weight (lbs.) % >1.0#	Net Sets Total Sets	Net Sets No./ Set
Big Dry Arm	1995	120	16.5	7.6-30.9	2.55	0.10-11.5	48.0	48	2.5
	1994	73	15.8	4.6-29.9	2.33	0.05-10.5	40.0	46	1.6
	1993	162	14.7	5.0-31.2	1.79	0.04-11.8	34.6	44	3.7
	1992	144	14.5	5.6-29.8	1.58	0.03-9.80	40.0	31	4.6
	1989	219	13.6	6.4-26.5	0.94	0.10-7.03	26.0	30	7.3
	1988	86	13.3	6.6-23.4	0.88	0.06-4.26	19.8	24	3.6
	1987	106	14.1	6.5-21.4	1.04	0.12-3.33	34.7	33	3.2
	1986	109	13.4	7.3-24.6	0.86	0.07-5.40	27.8	24	4.5
Lower Reservoir	1995	75	16.6	9.2-29.2	2.02	0.20-11.1	69.0	16	4.7
	1994	25	16.3	8.7-27.8	2.60	0.30-8.90	36.2	20	1.3
	1993	45	16.7	6.9-28.5	2.53	0.10-9.80	50.6	20	2.3
	1992	70	15.9	7.2-27.0	2.02	0.10-8.30	46.4	20	3.5
	1989	93	15.5	7.8-24.1	1.61	0.13-5.60	55.0	15	6.2
	1988	57	15.1	8.1-23.9	1.46	0.14-5.30	59.6	18	3.2
	1987	48	16.3	10.8-21.5	1.61	0.32-4.08	66.7	15	3.2
	1986	---	----	---------	----	---------	----	--	---
Mid Reservoir	1995	96	17.1	7.6-30.5	2.60	0.10-11.3	72.0	24	4.0
	1994	38	16.6	7.8-29.7	2.84	0.10-11.4	42.1	24	1.6
	1993	50	15.3	6.8-28.8	2.17	0.10-10.7	38.4	24	2.1
	1992	81	16.9	7.9-29.9	2.66	0.15-11.0	50.0	24	3.4
	1989	80	16.5	10.0-24.2	1.85	0.32-5.90	58.8	18	4.4
	1988	49	15.8	8.2-22.8	1.67	0.15-4.70	57.1	21	2.3
	1987	88	14.0	8.0-22.0	0.98	0.14-4.35	30.7	21	4.2
	1986	56	13.4	8.4-22.3	0.85	0.20-3.00	30.0	21	2.7
Upper Reservoir	1995	42	15.5	7.1-32.4	2.25	0.10-13.1	52.0	16	2.6
	1994	10	11.9	7.9-15.2	0.60	0.10-1.20	22.3	12	0.8
	1993	6	16.7	10.6-25.6	2.34	0.30-6.50	33.2	8	0.8
	1992	15	16.3	7.8-29.3	2.54	0.10-10.0	35.7	8	1.9
	1989	11	19.4	9.9-25.8	3.36	0.23-6.20	63.6	6	1.8
	1988	15	11.8	7.6-19.3	0.57	0.19-2.57	13.3	12	1.3
	1987	32	12.7	8.8-20.4	0.72	0.14-2.96	18.8	12	2.7
	1986	3	11.5	9.2-14.4	0.50	0.20-0.97	0.0	6	0.5

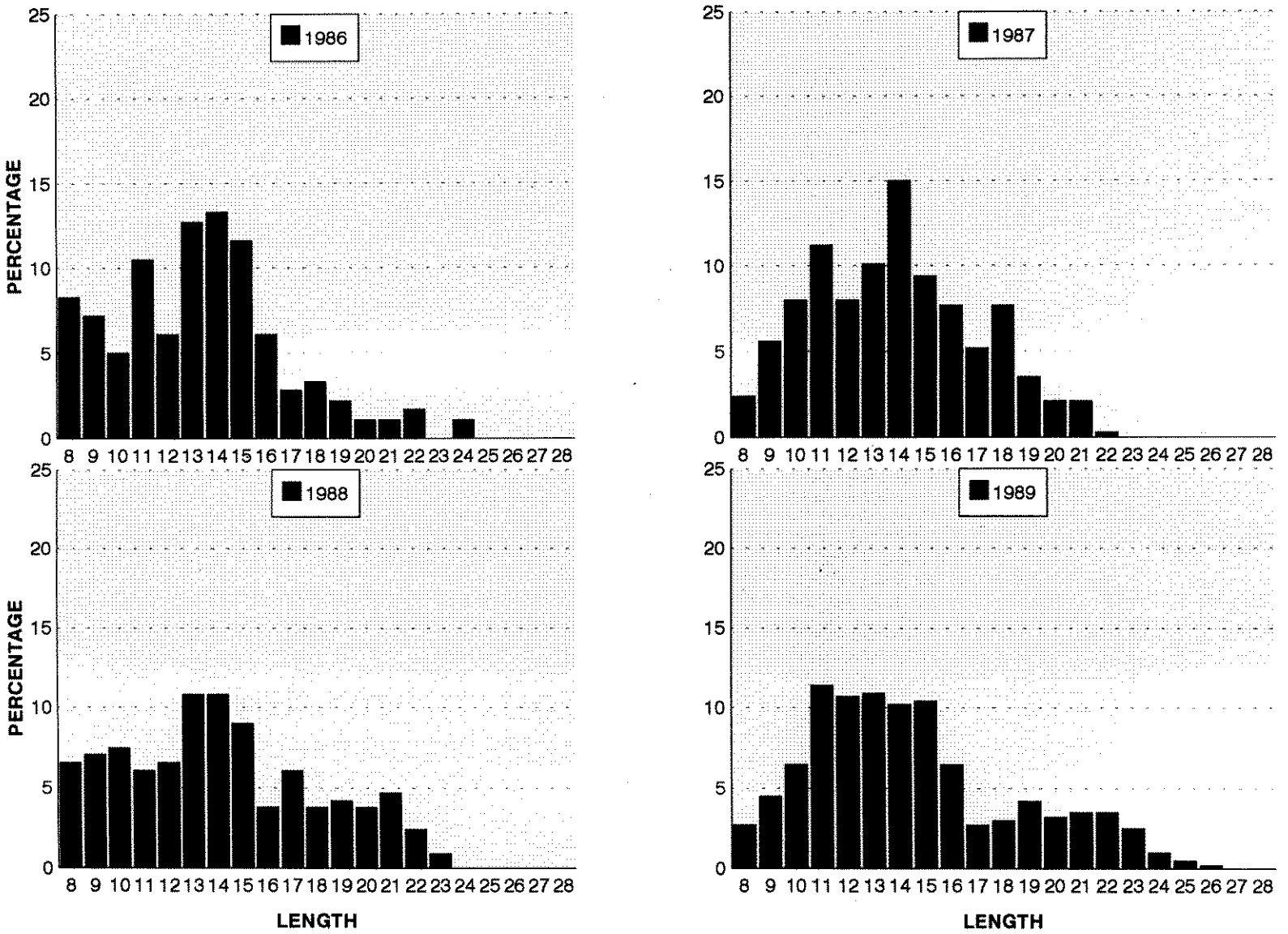

Figure 10. Length frequencies of walleye collected with experimental gill nets from Fort Peck Reservoir, 1986-89.

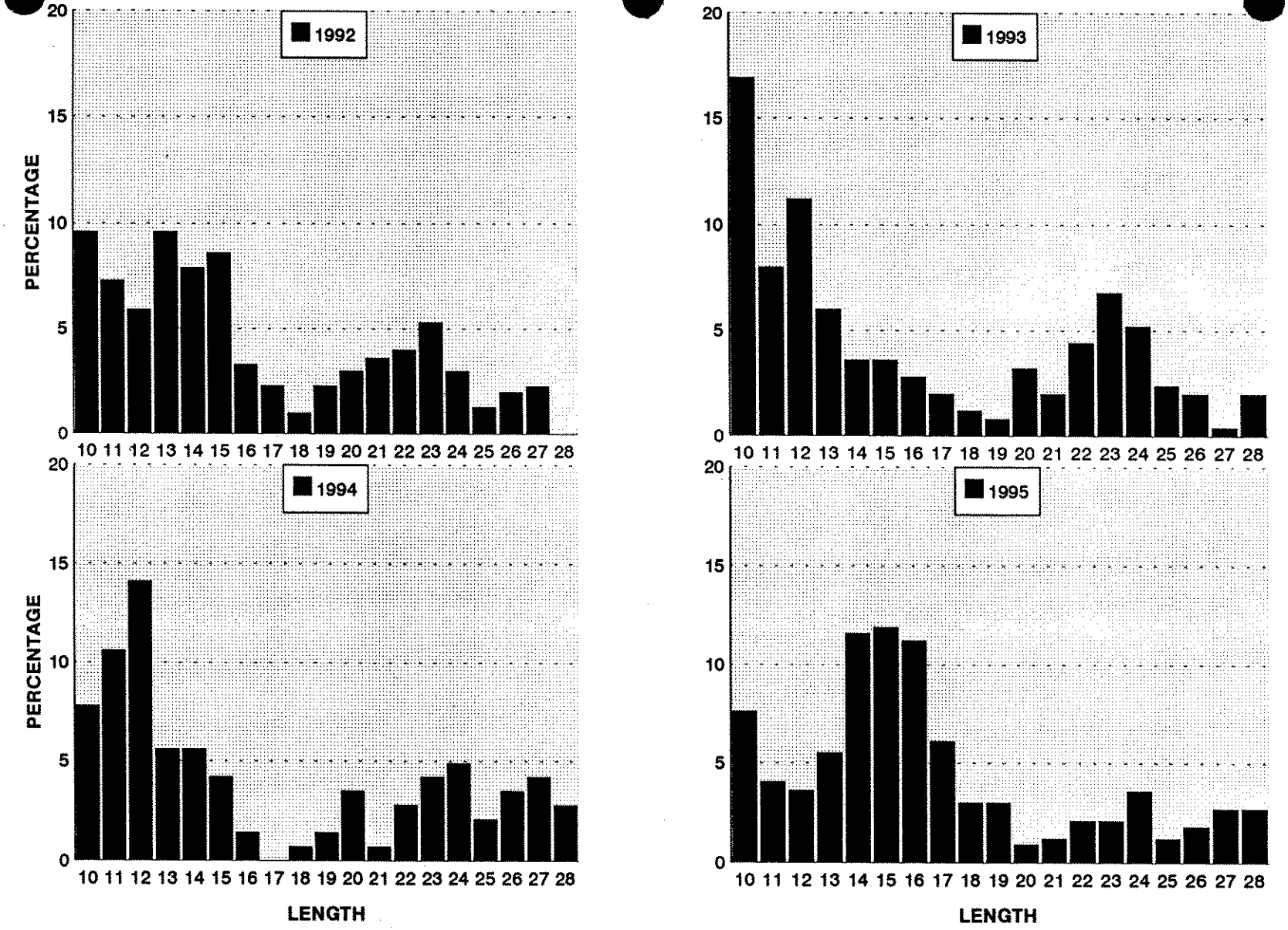

Figure 11. Length frequencies of walleye collected with experimental gill nets from Fort Peck Reservoir, 1992-95.

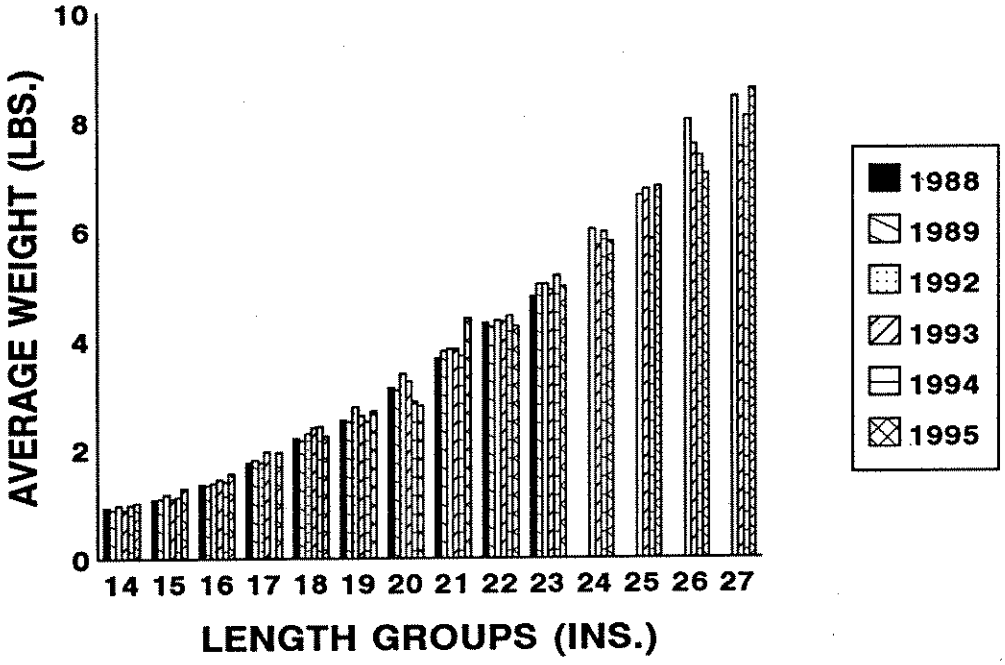

Figure 12. Average weights of various 1-inch length groups of walleye captured with experimental gill nets in Fort Peck Reservoir, 1988-95 (no data for '90 and '91).

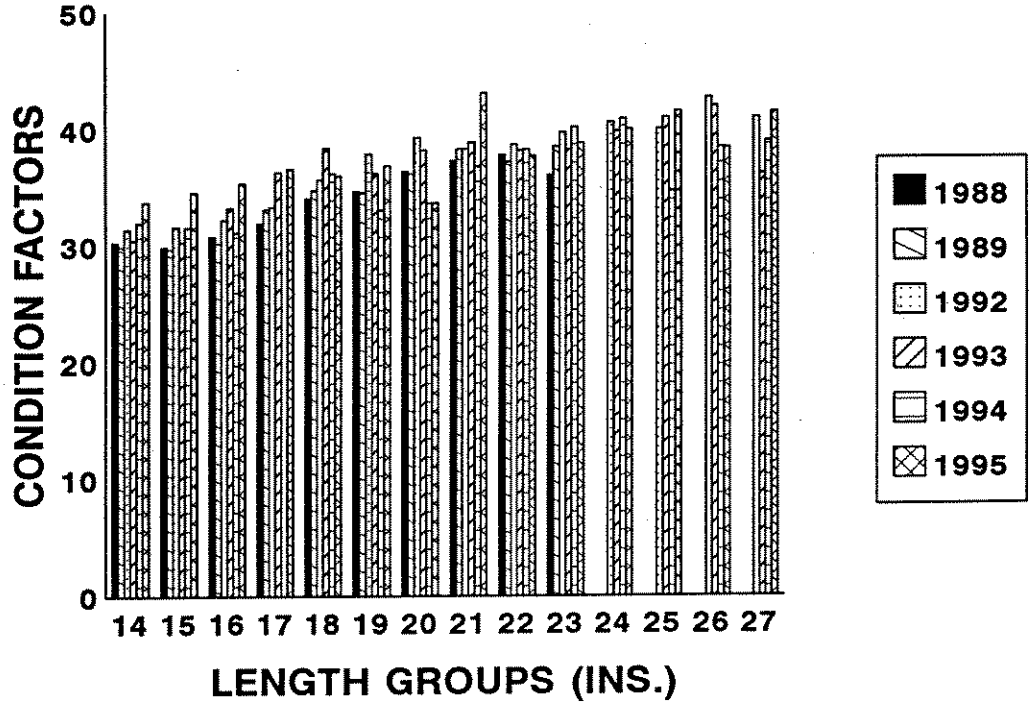

Figure 13. Average condition factors for various 1-inch length groups of walleye captured with experimental gill nets in Fort Peck Reservoir, 1988-95 (no data for '90 and '91).

Relative weights of various walleye length groups are depicted in Figure 14. Relative weights in the early to middle eighties were relatively poor and below 80%. A gradual increase in relative weights of fish 10-14 inches occurred staring in 1987. A gradual increase also occurred for those fish in the 14-18 inch lengths groups. An amazing increase in relative weights of fish greater than 18 inches occurred from 1986-87. Relative weights of walleye collected during the summer of 1986 were below 75%. Walleye were collected approximately one year later and had average relative weights above 90%, which is a 15% increase in one year. This huge increase in relative weights could be the result of the cisco introduction. Cisco were introduced in 1984, but did not naturally reproduce until 1986,as revealed by fall gill net sampling. Studies have shown that walleye greater than 18 inches utilize cisco very effectively (Colby et.al 1987). The lack of 18-inch fish, which was shown in Figures 10 and 11, could be the result of a fast growth in walleye from feeding on cisco causing them to shoot through the 18-20 inch year class. However, after looking at aged walleye it was not evident that there is an extreme dramatic growth in fish measuring 18-20 inches. Figure 15 compares walleye relative weights to abundance of forage fish collected in shoreline seine hauls. During the late 1980's and early 1990's forage fish production was minimal, but relative weights of walleye continued to increase during this period. This further supports the theory that improved walleye conditions are the result of the cisco introductions.

Proportional and relative stock density preferred of walleye collected during lake-wide gill netting were 64 and 25 respectively (Table 8). PSD and RSD-P have increased from 32 and 3 in 1984 to 64 and 25 in 1995. Condition of fish appear to be in good quality.

A total of 299 northern pike were collected in 1995 through lake-wide gill netting. They averaged 20.1 inches and 2.5 pounds (Table 9). Condition factors and relative weights averaged 25.6 and 114.6. Average lengths and weights of northern pike were the lowest since 1987. However, average number of northerns per net set was the highest since 1983. These changes can be attributed to the large amount of natural reproduction of northern pike in 1994. Conditions were perfect for northern pike to spawn and 1994 shoreline seining revealed a record amount of reproduction of northern pike. Table 10 shows the ages of 42 northern pike collected during lake-wide gill netting.

Stomachs of dead game fish in gill nets were analyzed for forage fish (Table 11). Northern pike, walleye and sauger all appear to be utilizing cisco as forage. Twenty-seven percent of the forage sampled in northern pike stomachs was cisco. Walleye and sauger also utilized cisco as forage making up 19% and 16% of their stomach content.

A total of 125 channel catfish were sampled during lake-wide gill netting (Table 12). Average lengths and weights were similar to those in previous years. The CPUE also remained similar to previous years.

Figure 16 shows the annual catch rates for goldeye taken with experimental gill nets since 1981. Catch rates for goldeye have decreased steadily since the early eighties. In 1981 the goldeye CPUE was 40 per net. In 1995 goldeye are only averaging 4.7 per net. The decline in goldeye abundance is likely the result of interspecific competition with cisco.

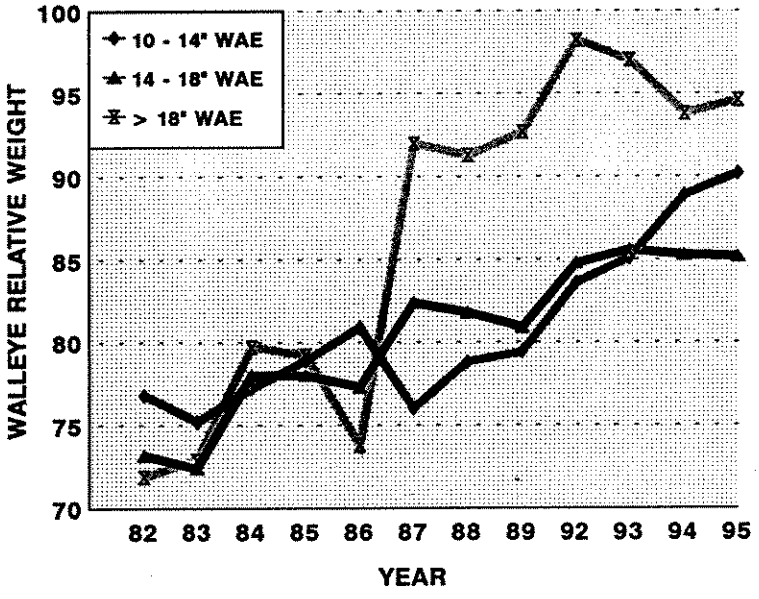

Figure 14. Relative weights of length groups for walleye collected with gill nets from Fort Peck Reservoir, 1982-95 (no data for '90 and '91).

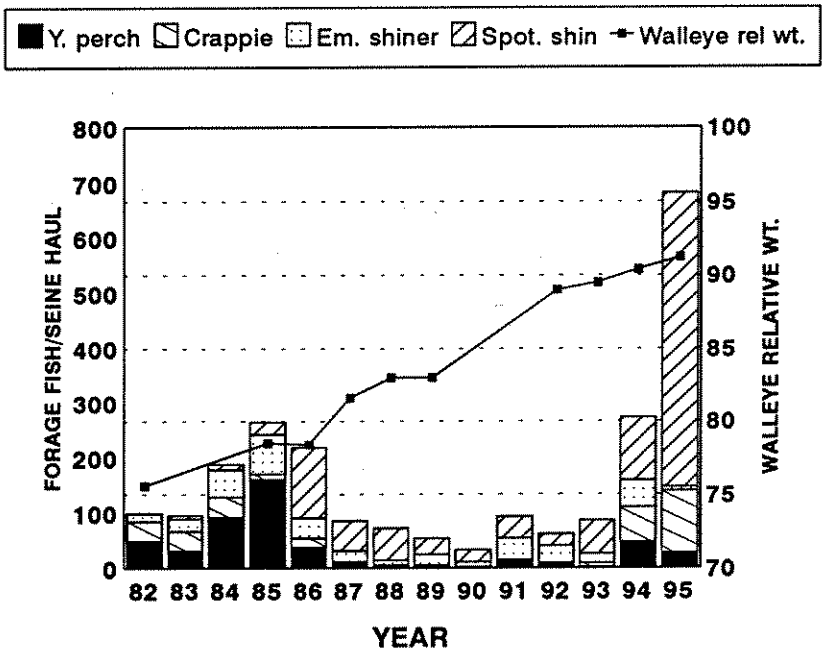

Figure 15. Walleye relative weight (solid line) in relation to forage fish abundance in shoreline seine hauls (vertical bars) on Fort Peck Reservoir, 1982-95.

Table 8. Proportional and relative stock density, along with young adult ratio of walleye sampled during lake-wide gill netting on Fort Peck Reservoir, 1984-95.

Year	Number	Substock	Stock	Quality	Pre-ferred	PSD	RSD-P	YAR
1984	242	22	221	70	7	32	3	10
1985	431	46	385	135	12	35	3	12
1986	181	38	143	56	9	39	6	27
1987	289	27	262	110	13	42	5	10
1988	212	41	171	82	23	48	13	24
1989	415	33	382	166	57	43	15	9
1992	303	47	256	131	76	51	30	18
1993	262	38	224	101	73	45	33	17
1994	142	24	118	55	43	47	36	20
1995	329	33	297	189	73	64	25	11

* PSD is the proportional stock density (Quality/Stock).
** RSD-P is the relative stock density, preferred (Preferred/Stock).
*** YAR is the ratio of young to adults (Substock/Stock).

Table 9. A summary of northern pike size, condition and catch rates in 125-foot experimental gill nets for areas of Fort Peck Reservoir, 1995.

Year	No. Sampled	Average Length	Average Weight	Average CF	Average Rel-Wt.	Net Sets	
						Total Sets	No./ Set
1983	40	21.2	3.2	21.4	95.6	84	0.5
1984	43	20.8	2.4	21.1	94.0	87	0.5
1985	36	24.1	3.5	22.1	97.8	87	0.4
1986	22	23.7	3.6	21.3	94.3	51	0.4
1987	61	19.7	2.3	23.8	106.7	81	0.7
1988	43	26.4	5.3	24.3	107.0	75	0.6
1989	46	24.4	4.5	25.0	110.2	69	0.7
1992	36	26.6	5.5	25.5	112.3	83	0.4
1993	48	28.3	6.4	26.0	113.9	96	0.5
1994	156	22.6	4.4	24.1	107.3	104	1.5
1995	299	20.1	2.5	25.6	114.6	104	2.9

Table 10. Age analysis of 42 northern pike taken from Fort Peck Reservoir during 1995 horizontal gill netting operations (age based on scale samples).

Number	Age	Average Length	Average Weight	Length Ranges Lower	Length Ranges Upper
13	1	13.3	0.6	11.5	18.5
9	2	17.8	1.6	16.5	22.8
9	3	21.5	2.8	18.6	24.8
2	4	24.4	3.8	23.7	25.0
3	5	26.3	5.1	24.4	29.2
1	6	25.7	5.6	25.7	25.7
3	7	30.7	7.4	29.4	32.8
1	8	29.8	7.8	29.8	29.8

Table 11. The percentage of various forage fish species found in stomachs of walleye, northern pike and sauger, 1995 (Samples collected through gill netting and creeling).

Total Stomach Sampled	Game Species	FORAGE SPECIES CIS	UNK	YEP	CRA	BSP	SPT
329	WAE	19%	12%	0.6%	0.3%	0.3%	0.3%
296	NOP	27%	2%	----	0.3%	----	0.3%
80	SAR	16%	9%	----	----	----	0.3%

WAE = walleye
SAR = sauger
CRA = crappie
UNK = unknown

NOP = northern pike
CIS = cisco
BSP = buffalo sp.

UNK = unknown
YEP = yellow perch
SPT = spottail shiner

Table 12. Summary of the channel catfish caught during summer gill netting in areas of Fort Peck Reservoir, 1984-95.

Year	Number	No./Net	Average Length	Average Weight
1984	171	2.0	14.2	0.9
1985	109	1.3	14.5	1.1
1986	110	2.0	14.6	1.1
1987	54	0.7	15.3	1.2
1988	70	0.9	15.9	1.7
1989	91	1.3	16.5	1.5
1992	157	1.9	15.0	1.4
1993	70	0.7	14.9	1.4
1994	120	1.2	14.4	1.1
1995	125	1.2	16.3	1.6

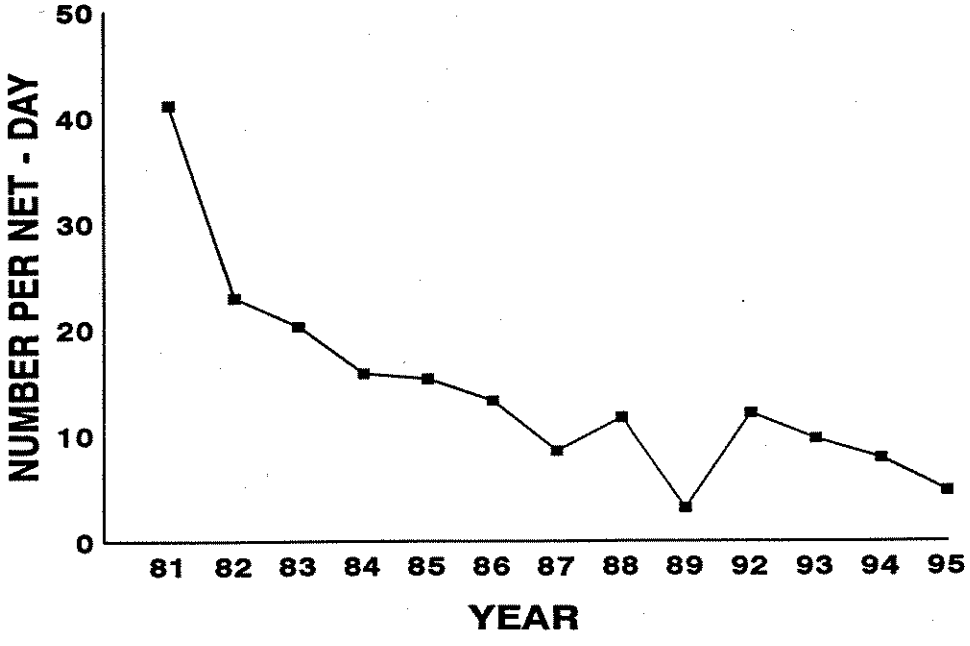

Figure 16. Annual catch rate of goldeye captured by experimental gill nets from Fort Peck Reservoir, 1981-95 (no data for '90 and '91)..

BEACH SEINING

Beach seining was conducted to determine reproductive success of sport and forage fish throughout the reservoir from August 15-September 12, 1995. Seine hauls at 195 different reservoir locations captured 137,680 fish (Table 13). Total numbers and the overall catch rates for 1995 was much greater than 1994, when only 49,629 fish were sampled. The reservoir-wide catch rate increased from 286.9 fish per seine haul, to 706.1 fish per seine haul. The apparent increase in production resulted from a continued rising reservoir pool which inundated vegetation providing spawning, rearing habitat and cover.

Smallmouth bass was the most common game fish captured by seining (Table 14). The CPUE of 5 bass per seine haul is the most ever collected. The most bass collected per seine haul in previous years was only 1.7 per haul in 1989. Largemouth bass appeared in seine hauls for the first time in 1995, averaging 2.5 per haul (Table 13). Largemouth bass adults have never been sighted and no stocking of largemouth has ever occurred in Fort Peck Reservoir. The sudden appearance, abundance and source of these YOY bass is truly an enigma. Northern pike catch per seine haul decreased from 4.3 per haul in 1994 to 0.1 per haul in 1995. Northern pike require flooded vegetation to successfully spawn. In 1994 an early spring reservoir rise resulting from local runoff flooded fresh vegetation which served as good spawning habitat for northern pike along with many other species. A spring rise did not occur during 1995, explaining the apparent poor reproduction of northern pike. The catch rate for walleye seined reservoir-wide in 1995 was 0.1 fish per haul. This was slightly better than 1994, where <0.1 walleye per haul were collected.

Figure 17 shows various seining sites sampled in the Big Dry Creek and Little Dry Creek during August 1979 (Liebelt, 1980). Walleye YOY were found in all sampling sites with the exception of sites G, I and J in 1979. As water levels receded these sites were abandoned due to the lack of water. Water levels began to increase again during the spring and summer of 1993, and continued to rise in 1994 and 1995. On August 21, 1995 sites A and B were sampled with a 100' by 10' beach seine. YOY walleye were found in both of these sampling sites. Seven seine hauls were conducted above the mouth of timber creek. Sixteen YOY walleye were sampled, which resulted in 2.3 fish per seine haul. The presence of fingerling walleye may be the result of natural reproduction, but cannot be confirmed, as walleye fry were stocked at Nelson Creek boat ramp, which is located approximately 6 or 7 miles downstream of the sampling areas. There is a possibility that these stocked walleye may have migrated into the sampling area. Seine hauls using a beach seine 50' by 4' 1/4 inch were attempted at other sites in the Big Dry Creek, but due to the presence of large amounts of silt, effective hauls could not be conducted.

Spottail shiner numbers increased from 114.2 per seine haul to 535.4 per seine haul, which is the best since spottail shiners were introduced in 1982 (Table 14). Emerald shiners decreased from 48.4 per haul in 1994 to 7.3 per haul in 1995, which is the lowest since the early 1980's. Black and white crappie production increased from 62.6 per haul in 1994, to 111.6 per haul in 1995.

Table 13. Species and number of forage minnows and young-of-year fish captured by seining in Fort Peck Reservoir, August 15 - September 12, 1995.

Species[1]	Upper Big Dry		Lower Big Dry		Lower Missouri		Mid-Missouri		Upper Missouri		Totals	
	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul
WE	17	0.4	-----	-----	5	<0.1	1	<0.1	5	0.2	25	0.1
NP	1	<0.1	12	0.3	8	0.2	4	0.1	-----	-----	25	0.1
SG	-----	-----	-----	-----	-----	-----	3	<0.1	25	0.8	28	0.1
YP	1,707	40.6	1,519	31.6	331	8.7	967	26.8	928	29.9	5,452	27.9
GE	-----	-----	-----	-----	-----	-----	-----	-----	630	20.3	630	3.2
WS	33	0.8	20	0.4	155	4.0	168	4.7	-----	-----	376	1.9
RC	1	<0.1	-----	-----	4	0.1	-----	-----	-----	-----	5	<0.1
Bsp	574	13.7	2	<0.1	55	1.4	119	3.3	629	20.3	1,379	7.0
LC	-----	-----	-----	-----	-----	-----	2	<0.1	-----	-----	2	<0.1
CP	73	1.7	14	0.3	210	5.5	220	6.1	35	1.1	552	2.8
SR	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SB	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SMB	106	2.5	164	3.4	14	0.4	667	18.5	16	0.5	967	5.0
LMB	30	0.7	44	0.9	419	11.0	-----	-----	-----	-----	493	2.5
CR	128	3.0	1,618	33.7	3,662	96.3	772	21.4	15,574	502.4	21,754	111.6
SM	-----	-----	-----	-----	-----	-----	-----	-----	-----	----9	0.3	<0.1
BU	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
FM	-----	-----	-----	-----	1	<0.1	4	0.1	-----	-----	5	<0.1
ES	1,034	24.1	17	0.4	83	2.2	85	2.4	200	6.5	1,419	7.3
ST	23,378	556.6	27,980	582.9	14,849	390.7	29,634	823.2	8,570	276.5	104,411	535.4
SSH	115	2.7	-----	-----	-----	-----	9	0.3	1	<0.1	125	0.6
Totals	27,215	648.0	31,390	654.0	19,793	520.9	32,646	906.8	26,626	859.0	137,680	706.1
No. Hauls	42		48		38		36		31		195	

[1] WE - walleye; NP - northern pike; YP - yellow perch; ST - spottail shiner; LMB - largemouth bass; RC - river carpsucker; Bsp - buffalo; GE - goldeye; SR - shorthead redhorse; SM - plains/silvery minnow; BU - burbot; SMB - smallmouth bass; WS - white sucker; SB - brook stickleback; FM - fathead minnow; ES - emerald shiner; SG - sauger; LC - lake chub; CR - crappie; CP - carp

Table 14. A summary of the total catch and catch rate for selected sport and forage fish taken by seining in Fort Peck Reservoir, 1984-95.

		Species[1]						
		WE	NP	SG	BA	YP	GE	WSU
1984	No. Hauls--21							
	No. Sampled	115	23	96	27	19,280	1,361	453
	No./Haul	0.5	0.1	0.5	0.1	91.8	6.5	2.2
1985	No. Hauls--197							
	No. Sampled	219	29	36	10	31,695	509	969
	No./Haul	1.1	0.1	0.2	0.1	160.9	2.6	4.9
1986	No. Hauls--176							
	No. Sampled	74	88	61	149	6,597	1,081	861
	No./Haul	0.4	0.5	0.3	0.8	37.5	6.1	4.9
1987	No. Hauls--185							
	No. Sampled	14	10	9	145	2,093	0	48
	No./Haul	0.1	<0.1	<0.1	0.8	11.3	0	0.3
1988	No. Hauls--174							
	No. Sampled	47	74	17	135	1,045	1	258
	No./Haul	0.3	0.4	<0.1	0.8	6.0	<0.1	1.5
1989	No. Hauls--176							
	No. Sampled	178	7	2	305	895	161	200
	No./Haul	1.0	<0.1	<0.1	1.7	5.1	0.9	1.1
1990	No. Hauls--165							
	No. Sampled	59	1	34	163	308	73	85
	No./Haul	0.4	<0.1	0.2	1.0	1.9	0.4	0.5
1991	No. Hauls--149							
	No. Sampled	0	19	10	170	1,630	13	259
	No./Haul	0.1	0.1	0.1	1.1	10.9	0.1	1.7
1992	No. Hauls--133							
	No. Sampled	18	7	22	207	1,324	1	45
	No./Haul	0.1	<0.1	0.2	1.6	10.0	<0.1	0.3
1993	No. Hauls--176							
	No. Sampled	32	12	2	45	225	37	56
	No./Haul	0.2	0.1	<0.1	0.3	1.3	0.2	0.3
1994	No. Hauls--176							
	No. Sampled	14	741	14	106	8,288	18	90
	No./Haul	<0.1	4.3	<0.1	0.6	47.9	0.1	0.5
1995	No. Hauls--195							
	No. Sampled	25	25	28	967	5,452	630	376
	No./Haul	0.1	0.1	0.1	5.0	27.9	3.2	1.9

Table 14. Continued.

		Species[1]					
		BUFF	CARP	FWD	B/WC	ES	ST
1984	No. Hauls--210						
	No. Sampled	11,414	1,853	584	7,858	10,312	2,120
	No./Haul	54.4	8.8	2.8	37.4	49.1	10.1
1985	No. Hauls--197						
	No. Sampled	363	289	640	1,907	14,109	4,444
	No./Haul	1.8	1.5	3.2	9.7	71.6	22.6
1986	No. Hauls--176						
	No. Sampled	1,378	951	713	3,011	6,443	22,436
	No./Haul	7.8	5.4	4.1	17.1	36.6	127.5
1987	No. Hauls--185						
	No. Sampled	388	509	43	40	3,688	10,027
	No./Haul	2.1	2.7	0.2	0.2	19.9	54.2
1988	No. Hauls--174						
	No. Sampled	24	154	405	12	1,449	10,089
	No./Haul	0.1	0.9	2.3	<0.1	8.3	58.0
1989	No. Hauls--176						
	No. Sampled	107	66	770	21	3,450	5,093
	No./Haul	0.6	0.4	4.4	0.1	19.6	28.9
1990	No. Hauls--165						
	No. Sampled	4	87	202	120	1,413	3,624
	No./Haul	<0.1	0.5	1.2	0.7	8.6	22.0
1991	No. Hauls--149						
	No. Sampled	101	214	112	616	5,762	5,849
	No./Haul	0.7	1.4	0.8	4.1	38.7	39.2
1992	No. Hauls--133						
	No. Samples	------	8	26	57	3,974	2,849
	No./Haul	------	<0.1	0.2	0.4	29.9	21.4
1993	No. Hauls--176						
	No. Samples	161	85	---	1,331	2,960	10,679
	No./Haul	0.9	0.5	---	7.6	16.8	60.7
1994	No. Hauls--173						
	No. Samples	161	335	19	10,835	8,366	19,753
	No./Haul	0.9	1.9	0.1	62.6	48.4	114.2
1995	No. Hauls--195						
	No. Samples	1,379	552	23	21,754	1,419	104,411
	No./Haul	7.0	2.8	0.1	111.6	7.3	535.4

[1]WE - walleye
NP - northern pike
SG - sauger
BA - smallmouth bass
YP - yellow perch
GE - goldeye
WSU - white sucker
BUFF - smallmouth & bigmouth buffalo
CARP - carp
FWD - freshwater drum
B/WC - black/white crappie
ES - emerald shiner
ST - spottail shiner

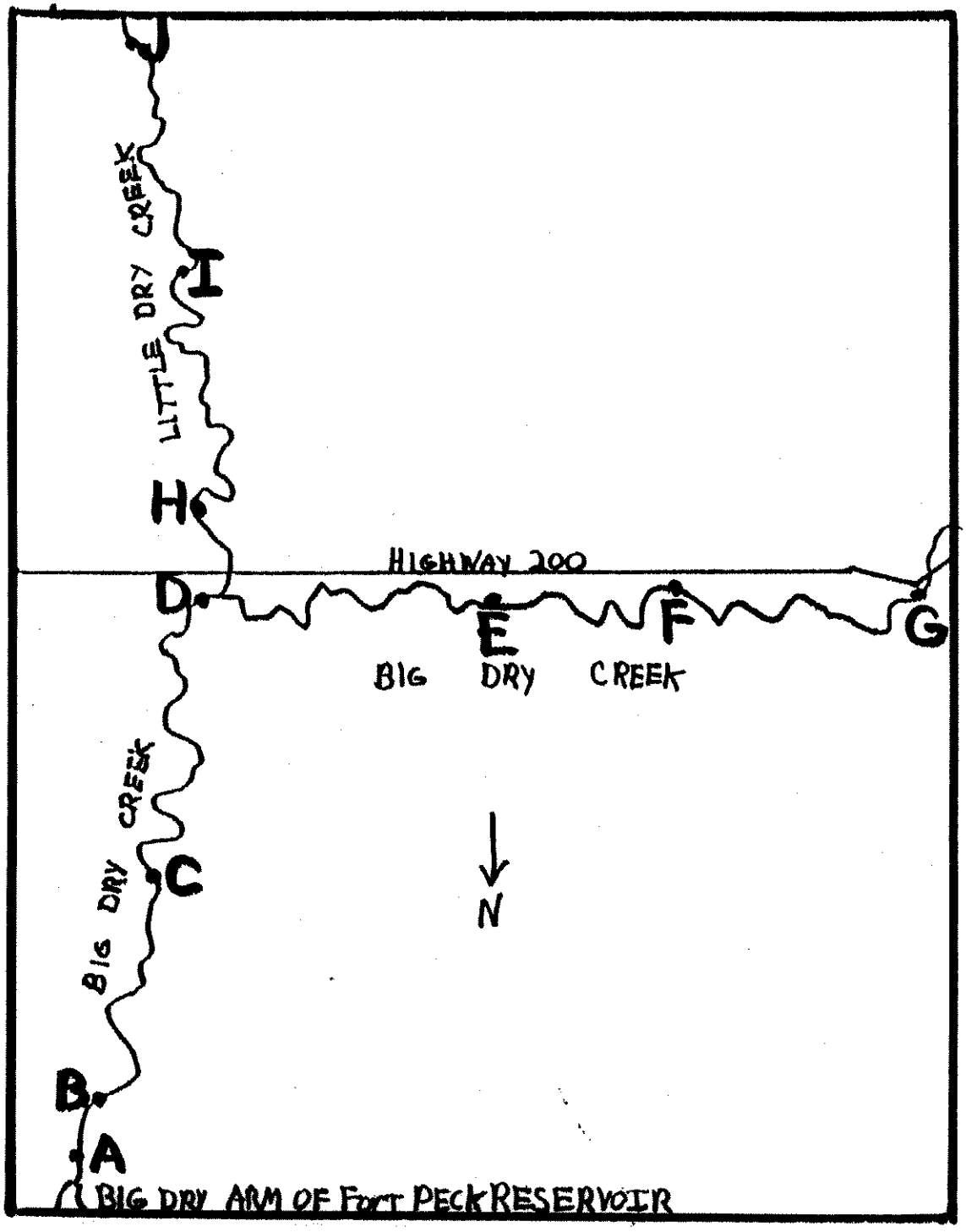

Figure 17. Stations seined in Big Dry and Little Dry Creeks to determine presence of young-of-year walleye.

A total of 22.4 million walleye fry and 1.58 million fingerling were stocked in 1995. The average catch rate for regions where walleye fry were stocked was .02 fish per seine haul. Locations where fingerling were stocked was .04 (Table 15).

Sauger production appeared to increase slightly from <0.1 fish per haul in 1994 to 0.1 fish per haul in 1995.

LAKE TROUT

Creel surveys at boat ramps near Fort Peck Dam were conducted in the spring and fall, 1995. During the spring creel from May 10-28, 202 fishermen were interviewed. The angler catch rate was 0.15 fish per hour, which was the highest catch rate since the spring creel of 1990 (Table 16). The annual fall creel survey was conducted from October 28-31, with 25 anglers interviewed. The catch rate was 0.26 fish per hour which was the highest since the fall creel of 1988. It should be noted, however, that the number of anglers interviewed was only 25.

During the spring creel, male lake trout averaged 29.4 inches and 10.2 pounds, while females averaged 29.3 inches and 10.25 pounds. The average length and weight for lake trout, combined, was 29.2 inches and 10.12 pounds. This data indicates a substantial increase in the average size and weight of lake trout caught since 1988 (Table 16).

The average length and weight for lake trout during the fall creel, sexes combined, was 26.6 inches and 8.14 pounds. Males averaged 27.4 inches and 8.3 pounds while females averaged 26.2 inches and 8.01 pounds. A summary of condition factors and average weights sampled during the fall creels from 1985-93 is shown in Figure 18. The average condition of lake trout over this time period appears to be relatively stable. This also appears to be the case for various 1-inch length groups of lake trout sampled over the last five years (Figures 19 and 20).

During the spring and fall lake trout creel surveys, stomach contents of lake trout were examined to determine utilization of cisco. At the spring creel, approximately 53% of the angler-caught lake trout contained cisco. During the fall creel only 4.5% of the lakers contained cisco. A reduction in the number of cisco observed in lake trout stomachs is typical during the fall creel due to lake trout spawning.

During the spring and fall creel surveys, otoliths from lake trout are extracted for aging. Scales are not used to age lake trout because annuli become difficult to distinguish. A total of 123 lake trout were aged and ranged from 5 to 19 years old (Table 17). Eight and nine year olds were the dominant age classes caught, with 29 and 18 collected from the two year classes. The average lengths of Fort Peck lake trout for each age class appears to be good. Lake trout sampled from six lakes in Canada were aged, and their average lengths were well below those of Fort Peck Reservoir (Scott and Crossman 1973).

Due to rising water levels, which increased lake trout spawning habitat, no eggs were taken artificially during 1995.

Table 15. Summary of walleye stocking and young-of-year abundance determined by beach seining in Fort Peck Reservoir, 1995.

Area	Fingerling	Fry	Number Seine Hauls	Number YOY WE Caught	No. WE/Haul
Bear Creek	146,789	-------	6	0	0
Box Creek	-------	1.9 mil	6	0	0
Box Elder Creek	170,000	-------	6	0	0
Bug Creek	100,000	-------	6	0	0
Cattle/Crooked Creek	-------	-------	6	0	0
Duck Creek	203,618	-------	18	2	0.1
Gilbert Creek	120,000	-------	6	0	0
Hell Creek	187,484	4.8 mil	6	1	0.2
Lost Creek	100,000	-------	6	0	0
McGuire Creek	-------	3.6 mil	6	0	0
Rock Creek	60,996	3.6 mil	12	0	0
Pines	72,336	-------	6	0	0
Sandy Arroyo	-------	1.9 mil	6	0	0
Snow Creek	-------	2.2 mil	6	0	0
Spillway Bay	-------	2.2 mil	7	0	0
Spring Creek	104,597	-------	6	0	0
Sutherland Creek	-------	2.3 mil	6	0	0
Nelson Creek	321,774	-------	6	0	0
Fourchette Bay	-------	-------	6	3	0.5
Lone Tree Creek	-------	-------	6	0	0
Short Creek	-------	-------	6	0	0
Big Dry Creek	-------	-------	12	17	1.4
Wiota Creek	-------	-------	2	1	0.5
Deadmans Coulee	-------	-------	1	1	1.0
Totals	1,587,594	22.4 mil			

Catch rate for areas where fry were stocked = 0.02
Catch rates for areas where fingerling were stocked = 0.04

Table 16. A summary of lake trout creel census of boat fishermen and size data collected near the dam, Fort Peck Reservoir, 1985-95 (spring creel: May-June and fall creel: October-November).

	No. Anglers Creeled	No. LT Caught	LT Per Trip	Avg. No.Hrs. Fished	Catch Rate/ Hour	Males Avg. Lgth. (in.)	Males Avg. Wt. (lbs.)	Females Avg. Lgth. (in.)	Females Avg. Wt. (lbs.)
1985									
Spring	72	77	1.1	3.8	0.28	20.2	3.05	20.9	3.26
Fall	97	176	1.8	3.8	0.48	21.4	3.20	22.0	3.66
1986									
Spring	56	56	1.0	3.8	0.26	21.2	2.98	20.9	2.95
Fall	206	299	1.5	4.9	0.30	21.4	3.49	23.0	4.26
1987									
Spring	58	48	0.8	4.9	0.17	22.0	3.73	22.2	4.40
Fall	240	239	1.0	4.7	0.21	23.8	5.50	23.8	5.84
1988									
Spring	153	105	0.7	4.5	0.15	24.1	5.63	24.1	5.56
Fall	164	194	1.2	4.6	0.26	25.8	7.16	24.8	6.33
1989									
Spring	207	197	1.0	5.6	0.17	25.0	6.85	26.4	8.28
Fall	142	194	0.5	4.8	0.09	26.5	7.44	25.4	7.12
1990									
Spring	451	356	0.8	5.4	0.15	26.6	8.06	27.2	9.07
Fall	551	201	0.4	3.8	0.10	26.5	7.52	27.6	8.56
1991									
Spring	550	267	0.5	6.1	0.07	27.0	8.47	26.4	8.21
Fall	215	83	0.4	3.8	0.10	26.7	7.97	27.4	8.60
1992									
Spring	437	150	0.3	4.8	0.07	26.2	7.58	26.7	7.85
Fall	129	88	0.7	3.6	0.19	27.0	7.87	26.9	7.59
1993									
Spring	380	147	0.4	6.0	0.07	27.3	8.70	27.6	9.02
Fall	168	141	0.8	4.2	0.20	26.7	7.11	27.2	8.04
1994									
Spring	299	71	0.2	5.3	0.05	29.6	10.40	28.5	9.24
Fall	81	48	0.6	3.7	0.20	27.7	8.47	28.4	9.48
1995									
Spring	202	165	0.8	5.5	0.15	29.4	10.20	29.3	10.25
Fall	25	36	1.4	5.5	0.26	27.4	8.30	26.2	8.07

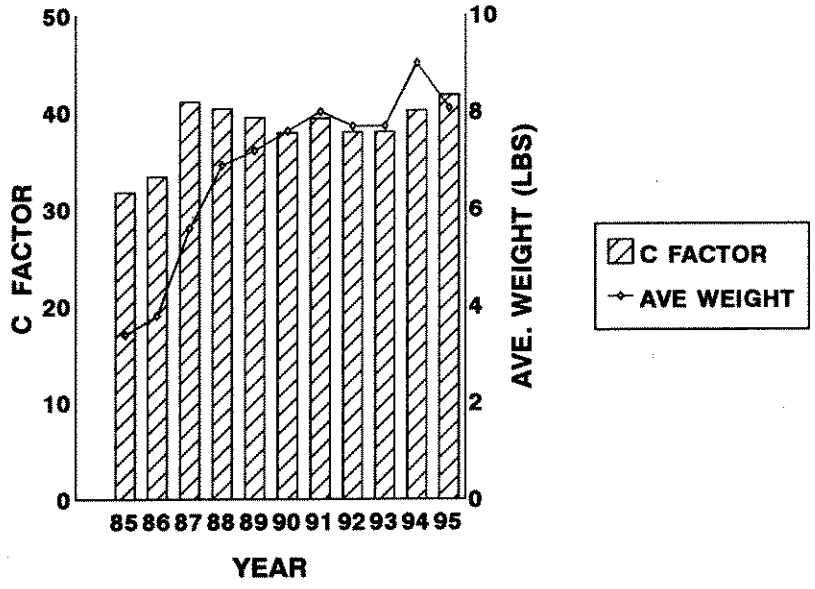

Figure 18. Condition factors and average weights of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-95.

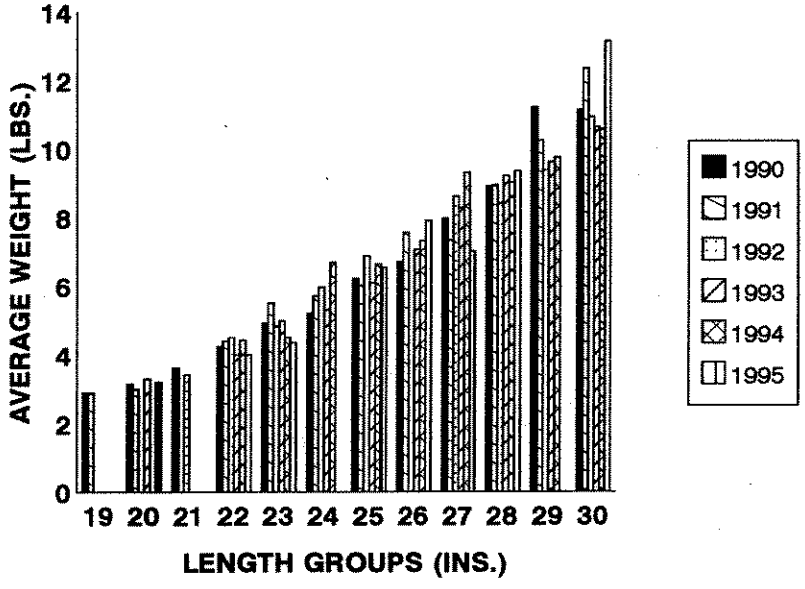

Figure 19. Average weight of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1990-95.

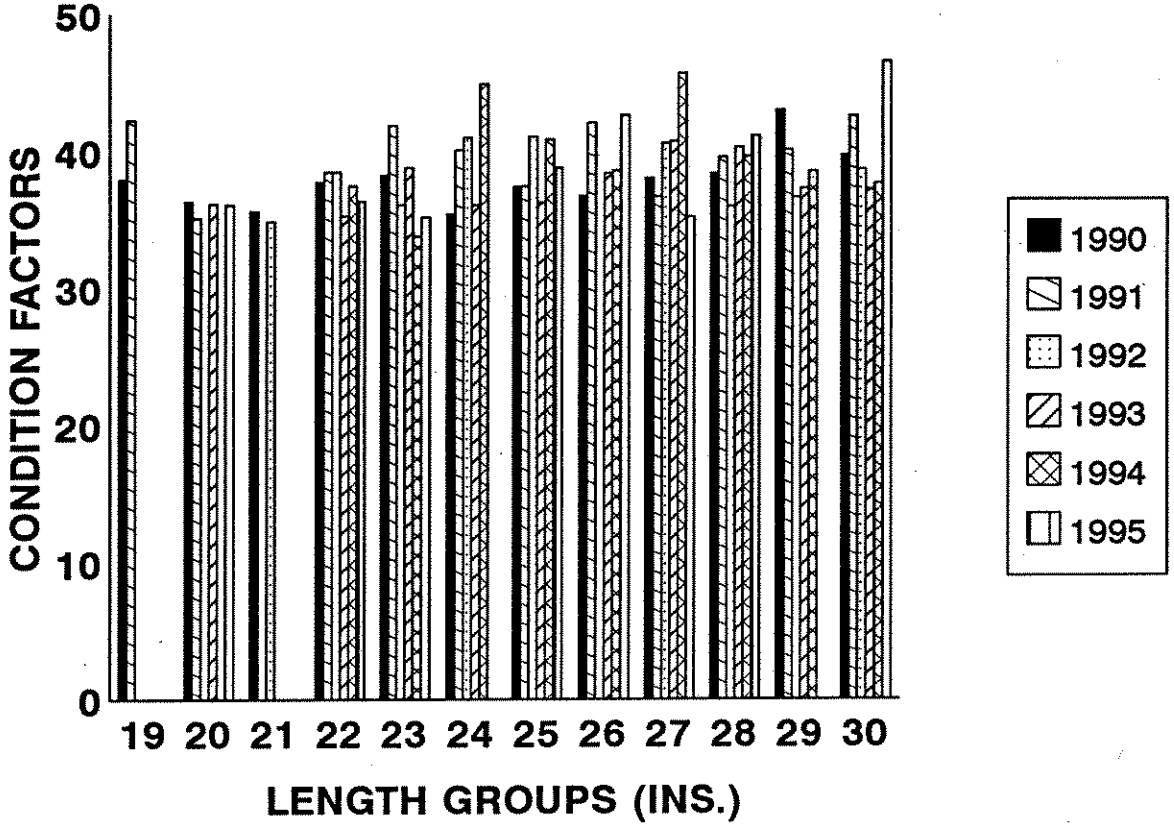

Figure 20. Condition factors of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1990-95.

Table 17. Age analysis and growth increment of 123 lake trout taken during the 1995 spring and fall creel surveys on Fort Peck Reservoir (age based on otolith samples).

Age	5	6	7	8	9	10	11	12
Ave. L. (in.)	22.8	24.1	26.4	27.4	27.7	29.4	30.3	30.9
Lower L. Range	22.3	22.2	20.7	23.0	26.0	28.0	28.9	28.8
Upper L. Range	23.2	25.6	28.3	31.5	30.3	31.9	33.1	32.3
Sample Size	2	5	14	29	18	13	8	11
Growth Increment		1.3	2.3	1.0	0.3	1.7	0.9	0.6

Table 17. Continued

Age	13	14	15	16	17	18	19	20
Ave. L. (in.)	31.0	31.6	32.6	29.8	33.3	32.9	34.4	----
Lower L. Range	29.4	30.1	31.0	29.4	32.7	32.6	33.4	----
Upper L. Range	32.6	33.2	34.6	30.1	33.7	33.2	35.4	----
Sample Size	6	5	3	2	3	2	2	----
Growth Increment	0.1	0.6	1.0	-2.8	3.5	-0.4	1.5	----

CHINOOK SALMON

A floating cage with the dimensions of 24- x 40- x 10-feet deep was anchored in the Marina Bay. Netting for the cage was composed of 3/16 nylon mesh which had to be cleaned periodically with a broom to prevent algae accumulation. Large mesh nets were draped over the cage to prevent avian predation on caged salmon. The cage was separated in the middle by a net so two compartments could hold different groups of fish. One automatic feeder was mounted on the cage.

Salmon eggs were obtained from South Dakota and were hatched and reared at the Miles City Fish Hatchery. A total of 17,000 fingerling salmon were stocked into the cage on May 16, averaging 143 fish/lb., totaling 122 pounds (Table 18). The fish were reared for 27 days and a total of 13,000 fingerling were released into Fort Peck Reservoir on June 11, averaging 65 fish/lb., totaling 200 pounds.

Approximately 95% of the total salmon released on June 11, 1995 were fin-clipped at 65/lb. Salmon were fin-clipped so absolute growth and survival information could be obtained during future spawning runs.

During the months of September and October many male chinook salmon attempted to make a spawning run in the Marina Bay. Informal interviews were conducted with many anglers. Most anglers reported catching male chinooks weighing 6-12 pounds. No attempt was made to artificially spawn chinook salmon due to the lack of females making a spawning run. An attempt will be made to take eggs in 1996. We anticipate 3-year-old females will be sexually mature at that time, and will possibly attempt to spawn.

Cisco

Small mesh, vertical gill nets were used to sample YOY cisco throughout the reservoir from September 25-October 19 (Table 19). The overall catch rate was 3.0 YOY per net set, which was dramatically less than 259.4 cisco per net collected in 1994. A total of 29 YOY cisco were captured in 1995. The average size was 5.0 inches, with lengths ranging from 4.7- 5.4 inches.

Figure 21 compares lake elevations and annual cisco production from 1986-95. Although water levels have dropped since 1986, it is not believed that low water has significantly impacted cisco. Cold water habitat is believed to have been sufficient during this period, as no major fish kills during summer months were observed, or reported.

A total of 138 and 40 cisco scale samples were taken during vertical gill netting in 1994 and 1995 (Tables 20 and 21). The majority of fish collected in 1994 were 3 and 4-year-olds. In 1995, 3-year-olds were the most abundant age-class collected. Cisco lengths ranged from 4.7 inches to 17.7 inches.

Two horizontal experimental gill nets were set off of Markle's Point on November 28, to sample cisco spawners. A total of 26 cisco spawners were collected averaging 10.7 inches. Six were females and 14 were males, with the majority being in spawning condition.

Table 18. A summary of cage reared salmon in Marina Bay.

	1993	1994	1995
# stocked into cage	64,000	109,625	17,000
Date stocked into cage	April 19	May 5	May 16
# emptied from cage	55,000	-----	13,000
Date released into Marina Bay	June 10	June 3	June 11
net loss	9,000	-----	4,000
% loss	14.1	-----	23.5
escapement	-----	-----	-----
% escapement	-----	-----	-----
mortality loss	9,000	-----	4,000
% mortality loss	14.1	-----	23.5
Pounds stocked	588	1,150	122
Pounds thinned	----	-----	-----
Pounds released	1,594	-----	200
net gain	1,006	-----	78
Size at stocking	104.5 fish/lb.	95 fish/lb.	143 f/lb.
Size at release	34.5 fish/lb.	54 fish/lb.	65 f/lb.
Total lbs. food used	2,200	388	-----
Pounds food utilized	1,540	-----	-----
Total conversion rate	2.3	-----	-----
Utilized conversion rate	1.6	-----	-----
# fish fin-clipped at release	54,500	0	12,351
% fin-clipped	99%	0	95%
Average water temperature	51°	49°	54°

Table 19. Summary of young-of-year cisco taken by vertical gill nets in Fort Peck Reservoir during August 1986 and 1987, and during September 1988-1995.

Station	Young-of-Year Per Set									
	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
Bear Cr.	39	13	7	23	41	--	8	3	45	3
Shaft Houses	162	10	6	6	20	--	2	2	76	2
Dam	321	6	9	3	1	--	--	--	543	20
Bear Cr. West	220	10	--	8	3	12	2	--	52	--
Marina	77	1	46	17	72	--	5	4	50	2
So. Fork Duck Cr.	447	12	151	86	50	--	15	3	293	--
Pines-Gilbert Cr.	466	11	311	26	48	50	15	6	370	2
Hell-Sutherland	298	6	150	73	56	49	53	13	518	--
Timber Cr.	5	--	178	6	7	25	6	8	267	--
Devils Cr.	1	--	46	2	--	--	--	--	166	--
No. Fork Rock Cr.	46	24	164	9	1	--	6	1	232	--
Bug Cr.	15	16	11	1	1	--	--	--	26	--
	214	11	107	23	31	34	10	4	259	3

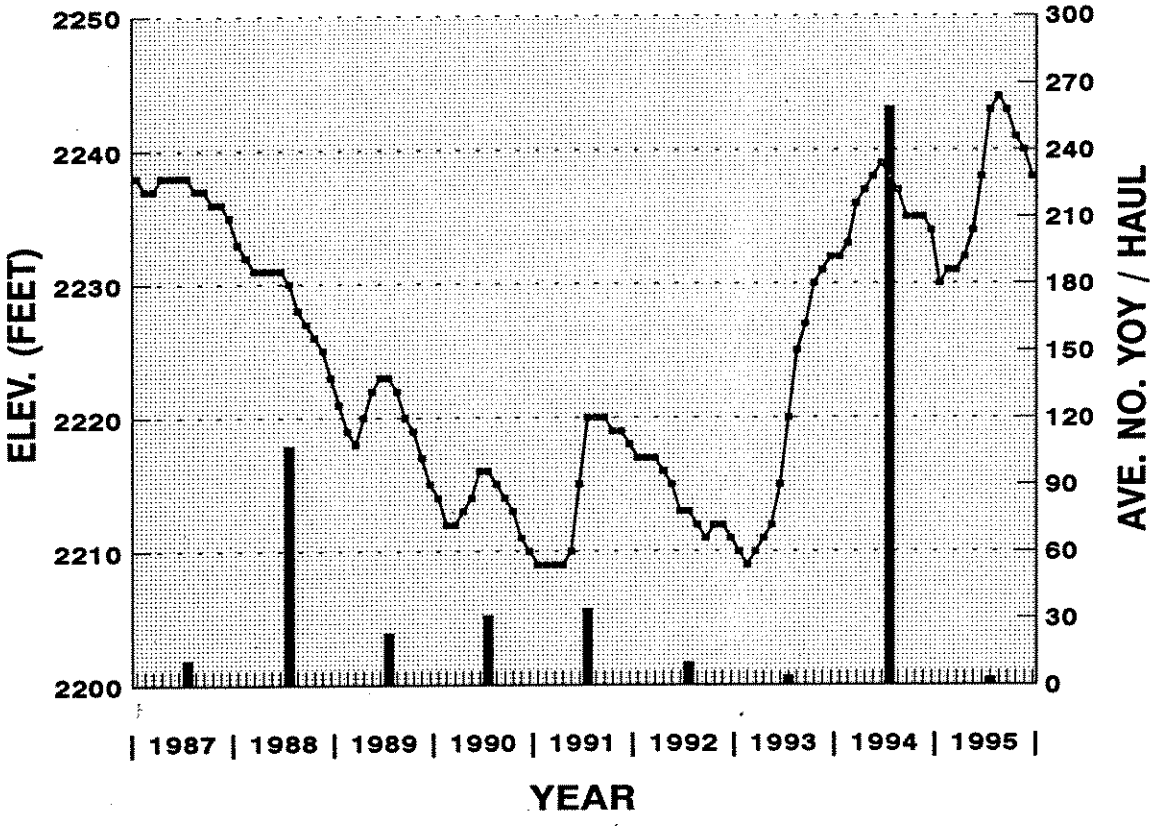

Figure 21. Mean monthly reservoir elevations and annual cisco production as determined by vertical gill netting, Fort Peck Reservoir, 1987-95.

Table 20. Age analysis of 138 cisco taken from Fort Peck Reservoir during 1994 fall horizontal and vertical gill netting operations (age based on scale samples).

No.	Age	Average Length	Average Weight	Length Ranges Lower	Upper
4	2	9.8	0.3	9.4	9.9
48	3	10.4	0.4	9.3	11.7
54	4	10.9	0.4	9.6	12.3
25	5	11.6	0.6	9.7	12.6
5	6	12.9	1.0	11.1	17.7
2	7	12.1	0.7	12.0	12.1

Table 21. Age analysis of 40 cisco taken from Fort Peck Reservoir during 1995 fall horizontal and vertical gill netting operations (age based on scale samples).

No.	Age	Average Length	Average Weight	Length Ranges Lower	Upper
5	0	5.0	0.01	4.7	5.4
9	1	6.5	0.07	6.1	6.9
5	2	9.2	0.20	7.9	9.8
13	3	10.4	0.30	9.7	12.0
7	4	11.5	0.50	10.8	12.8
1	5	11.8	0.50	12.9	12.9

Rearing Ponds

Five ponds located in the Duck Creek area of Fort Peck Reservoir were utilized in 1995 for rearing walleye fry into fingerlings for eventual release into Fort Peck Reservoir. Four of these ponds were built in the 1980's and one was constructed by the Corps of Engineers with the help of Walleyes Unlimited funds. The four ponds constructed in the 1980's were used in the past for rearing walleye when the water levels of Fort Peck Reservoir were high enough to pump water into the ponds or when spring runoff was sufficient to fill the ponds. Due to high water levels on Fort Peck Reservoir in 1995, the Corps of Engineers was able to use a 6-inch Crissafoli pump to fill the rearing ponds. All ponds were filled during the months of April and May. Each pond was fertilized weekly with alfalfa pellets at a rate of 150 pounds per acre. Ponds 1, 2, 4 and 5 were stocked on 5/10/96 with 100,000 walleye fry each. Pond 3, which is the largest, was stocked with 200,000 walleye fry. Walleye were reared for approximately one month and draining of ponds to obtain and stock walleye fingerling began on June 16, 1995. Water was drained into a screened horse trough which held the walleye fingerling along with many other organisms. A sample count was conducted to determine the number of walleye produced in the pound. All walleye were weighed and a final count of production in each pond was recorded. Pond 2 did not produce any fingerling, and pond 5 only produced 5,000. Pond 1, 3, and 4 produced 30,000, 108,618 and 60,000 fingerling, respectively.

RECOMMENDATIONS

- Spring trapping of spawners from wild walleye population will continue to provide an egg source for sustaining fishery.

- Rearing of larger chinook salmon fingerlings will be continued in 1996 to improve survival and reduce predation by gamefish species.

- Satellite rearing ponds will be utilized for rearing walleye fry into fingerlings in 1996.

- Routine sampling with frame traps, experimental gill nets, vertical gill nets and beach seines will continue to obtain information on game and forage fish distribution, abundance, production and condition.

- Reservoir water levels will be monitored to determine impacts to overall fishery, information will be utilized to make recommendations to Corps of Engineers for Annual Operating Plan.

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