MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-78-R-6 STUDY TITLE: SURVEY AND INVENTORY OF WARMWATER LAKES

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

PROJECT PERIOD: JULY 1, 2002 THROUGH JUNE 30, 2002
REPORT PERIOD: MARCH 1, 2002 THROUGH FEBRUARY 28, 2003.

ABSTRACT

The reservoir reached peak elevation in 2002 on July 17th at 2220.44 feet and a minimum elevation on December 31st, 2002 at 2214.58 feet, a loss of 5.86 feet. Spring spawning fish populations were sampled in the upper Big Dry Arm with frame traps from April 17th to May 9th, 2002. Both walleye and northern pike were spawned and the fertilized eggs were sent to the Miles City Fish Hatchery. Due to low water, the walleye building at Nelson Creek wasn't usable. The spawn was conducted on a pontoon barge used in the previous drought. Sperm extender was used again. Trap netting captured 2,373 walleye, of which 293 were weighed and measured. The catch rate in 2002 of 6.8 per-trap night was lower than the catch rate in 2001 which was 10.3 walleye per-net night, but was similar to the catch rate of 5.4 per-net night in 2000. Over 84 million eggs were taken in 2002. Both merwin traps and trap nets were used to capture walleye for spawning. All fry stocked into rearing ponds were marked with oxytetracyline to determine contribution of fingerling stocks to the fishery in the future. Marking of reservoir stocked fry was discontinued in 2002. OTC results of fry stocking indicate approximately 25% or more of walleye in the reservoir are contributed by fry stocking. A total of 1.9 million walleye fingerling and 26.55 walleye fry were stocked in various locations. A total of 160,000 northern pike were stocked in 2002. Bass were not stocked but rather traded to North Dakota for walleye fingerling. Ninety seven gill nets were set in various locations throughout the reservoir from July 17th to September 6th, 2002. Twenty species were captured for a total of 2,247 fish. Goldeye, walleye, and shorthead redhorse were the most abundant species captured overall, with catch rates of 7.5, 3.3, and 2.2 per net night, respectively. Gill net catch rates of walleye were average for a ten-year period with average size 17.4 inches and 2.8 pounds. A strong group of fish less than 14 inches is recruiting to the fishery with a strong group of fish present between 24 and 29 inches. Relative weights of walleye from 10 to 18 inches showed improvement from the 2001 values and continue to exceed values since 1996. It is expected the relative weights of walleye greater than 18 inches will be maintained over 90 next year, however declines will become obvious in 2003 for walleye less than 14 inches and begin to drop for walleye from 14-18 inches due to poor reproduction of cisco and most likely a poor 2003 cisco year class combined with poor recruitment of shoreline forage. Pike catch rates stabilized but average size is the greatest measured on Fort Peck. Use of a new net for the second year with alternating ¾ inch and 1 inch mesh was successfully used to capture walleye less than 15 inches to increase sample size used to measure return of marked fry to the fishery. Beach seining showed a declining number of forage fish. It was hoped stable water levels in the summer of 2001 would result in increased numbers of forage fish in the seines in 2002, but a decline in abundance was measured. 401,974 salmon were stocked in Fort Peck in 2002. A salmon spawn occurred in 2002 netting 64,000 eggs. A new salmon ladder was built for future use. A fair return of salmon is expected in 2003. Cisco young-of-year were at record low levels in 2002. The poor year class is likely a result of later ice cover and competition by the 2001 year class.

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 Results and Discussion. However, a creel survey was not completed as manpower doesn't exist to meet this need.

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 Results and Discussion.

Activity 3 - Technical Guidance

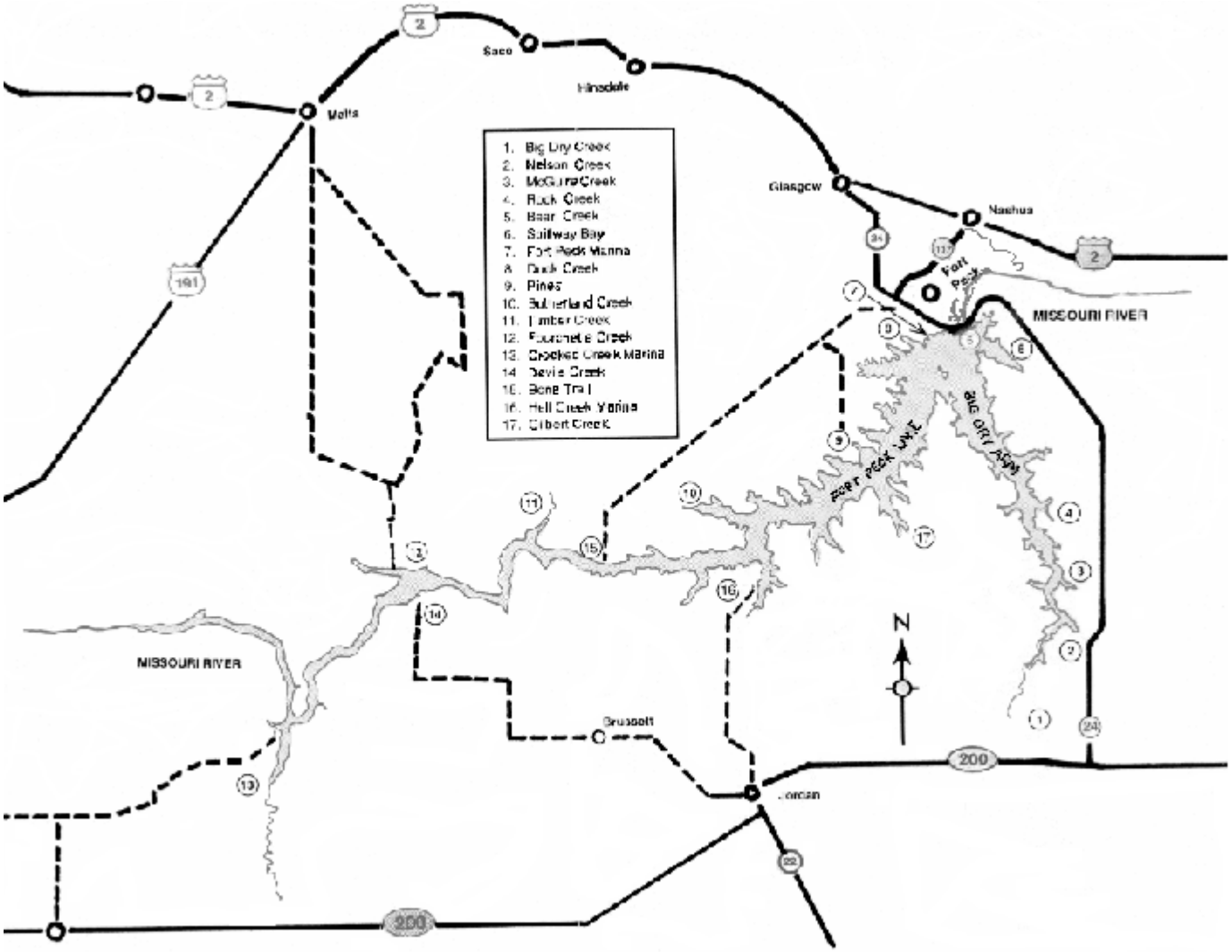
Objective: To review projects by government agencies and private parties which have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain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

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. Nearly 100 volunteers helped take walleye eggs at McGuire Creek on the pontoon boat. Objective accomplished. Several job shadow students worked with fisheries staff in the fall. Malta science classes toured the salmon spawning operation.

BACKGROUND

Fort Peck Reservoir is located in northeastern Montana (Figure 1); it is a large earth-filled dam on the Missouri River. The dam was closed in 1937 and is the largest water body in the state of Montana, with 240,000 surface acres. Full pool is reached at 2,250 feet above sea level. At full pool 1,500 miles of shoreline exists in 130 linear miles of the reservoir with a maximum depth of 220 feet. The reservoir reached peak elevation in 2002 on July 17th at 2220.44 feet and a minimum elevation on December 31st, 2002 at 2214.58 feet a loss of 5.86 feet (Figure 2). Reservoir elevations are predicted to fall even more dramatically in 2003. Continued declines in reservoir levels are detrimental to many important minnow species such as spottail shiners and emerald shiners as well as perch, pike, bass and native species such as buffalo and river carpsuckers


Saco
Hinsdale
Malta
Glasgow
Nashua
Fort Peck
MISSOURI RIVER
1. Big Dry Creek
2. Nelson Creek
3. McGuire Creek
4. Rock Creek
5. Bear Creek
6. Spillway Bay
7. Fort Peck Marina
8. Duck Creek
9. Pines
10. Rutherford Creek
11. Timber Creek
12. Fourmile Creek
13. Crooked Creek Marina
14. Devils Creek
15. Bone Trail
16. Hell Creek Marina
17. Gilbert Creek
Bear Pack Unit
Big Dry Arm
MISSOURI RIVER
Brusett
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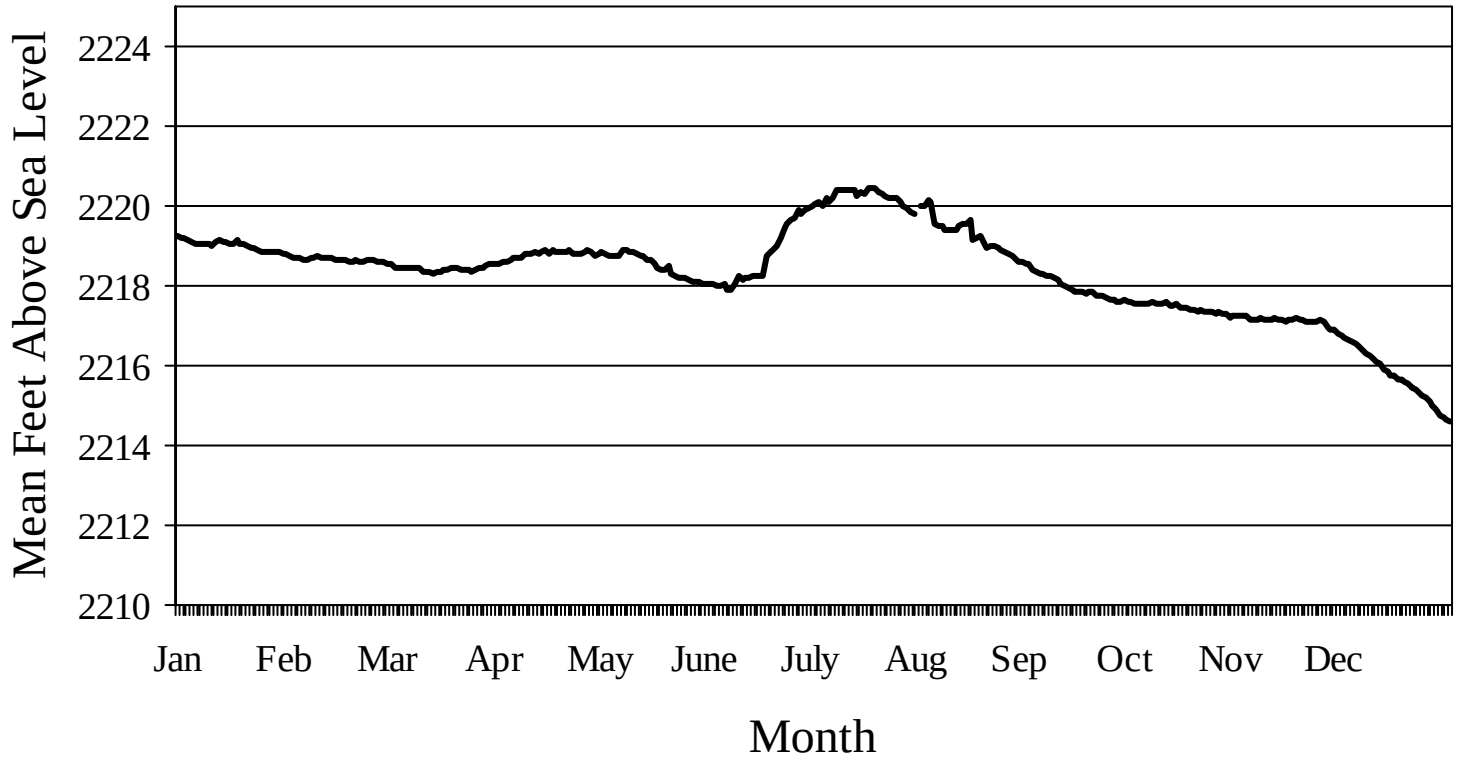

Figure 1. Fort Peck study area.
Figure 2. Daily peak elevations Jan 1 01 through Jan 31 02

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. Four merwin traps with 8' x 8' frames and 300' leads were also used to collect walleye spawners. Sinking experimental gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾ -, 1-, 1 ¼ -, 1 ½-, and 2-inch square mesh were fished during summer to monitor condition, distribution and relative abundance of game and native species. Alternating nets with 3 panels of ¾ and 2 panels of 1 inch mesh were used to collect age 4 and less walleye to evaluate OTC marks and recruitment of fry to fishery concurrently with experimental nets. Experimental gill nets were used in the fall to acquire information on cisco spawners. Monofilament gill nets 100- x 6-foot with ½-inch square mesh were fished vertically from the water's surface to sample YOY cisco. Beach seining was conducted in late summer and early fall utilizing a 100- x 9-foot beach seine of 3/16-inch square mesh, to determine abundance and reproductive success of game and forage fish. Two merwin traps were used in an attempt to capture spawning chinook salmon in October. A salmon ladder was made from 4 foot diameter culvert and 40 feet long.

Data Analysis

Relative abundance of fish species were expressed as mean catch per unit effort (CPUE) for standard trap net, gill net (fish/ net night) and seine catches (fish/haul).

Walleye scales and spines from 2001 and 2002 summer netting were sent to Bozeman, Montana, to be pressed and mounted during January 2003. Proportional stock density (PSD) and relative stock density (RSD) values were calculated for walleye (Anderson and Weithman 1978; Gablehouse 1984). Relative weights (W_r) (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).

An ongoing effort to enter historical data was begun in the winter of 2002 beginning with gill net data and seines. An attempt to finalize those data sets and start the data sets for trap netting will be goals for 2003. All the data is being cross referenced with reports for quality. The final data set will be in EXCEL and will be distributed to the regional office.

Species Present in Report

Species which have been documented in Fort Peck Reservoir are listed in Table 1. Species found in 2002, and therefore found in this report are denoted with an "X" in Table 1. Species codes are also listed in Table 1, these codes are found in tables throughout the report.

RESULTS AND DISCUSSION

Spring Trap Netting

Spring spawning fish populations were sampled in the upper Big Dry Arm with frame traps from April 17th to May 9th, 2002. Both walleye and northern pike were spawned and the fertilized eggs were sent to the Miles City Fish Hatchery. Included in this report is a summary for every species captured. Increased interest by MFWP for native species monitoring and potential management has created a need to better document the condition of these populations. This trapping is consistent and has been conducted since 1979, providing a good tool to document trends in many fish species populations. An effort of 349-trap days were committed to the walleye spawning efforts 6,455 fish were captured for a total catch rate of 18.5 fish per trap night. Eighteen species were captured; walleye were the most abundant with an average catch-rate of 6.8 fish per trap-night.

Table 1. List of species found in Fort Peck, abbreviations used in the annual report and notation if found in 2002.

Species	Scientific name	Abbreviation	Noted as present in 2002
Pallid Sturgeon	*Scaphirhynchus albus*	PAS	x
Shovelnose Sturgeon	*Scaphiryhynchus platorynchus*	SHS	x
Paddlefish	*Polyodon spathula*	PAH	x
Goldeye	*Hiodon alosoides*	GOE	x
Cisco	*Goregonus artedii*	CIS	x
Mountain whitefish	*Prosopium williamsoni*	MOW	
Chinook salmon	*Oncorhynchus tshawytscha*	CHS	x
Rainbow trout	*Salmo gairdneri*	RBT	
Brown trout	*Salmo trutta*	BNT	x
Brook trout	*Salvelinus fontinalis*	BKT	
Lake trout	Salvelinus namaycush	LAT	x
Northern Pike	*Esox lucious*	NOP	x
Carp	*Cyprinus carpio*	COC	x
Northern redbelly dace	*Phoxinus eos*	NRD	
Longnose dace	*Rhinichthys cataractae*	LOD	
Pearl dace	*Semotilus margarita*	PED	
Emerald shiner	*Notropis atherionoides*	EMS	x
Sand shiner	*Notropis husonius*	SAS	
Spottail shiner	*Notropis hudsonius*	SPS	x
Fathead minnow	*Pimephales promelas*	FHM	x
Plains minnow	Hybognathus placitus	PLM	
Silvery minnow	*Hybognathus argyritis*	SIM	
Silvery & Plains minnow	*Hybognathus spp.*	HBO	x
Brassy minnow	Hybognathus hankinsoni	BRM	
Lake chub	*Couesius plumbeus*	LAC	x
Creek chub	*Semotilus atromaculatus*	CRC	
Flathead chub	*Hybopsis gracilis*	FLC	
River carpsucker	*Carpoides carpio*	RIC	x
Blue sucker	*Cycleptus elongatus*	BSR	
Smallmouth buffalo	*Ictiobus bubalus*	SAB	x
Bigmouth buffalo	*Ictiobus cyprinellus*	BIB	x
Shorthead redhorse	*Moxostoma macrolepidotum*	SHR	x
Longnose sucker	*Catostomus catostomus*	LOS	x
White sucker	*Catostomus commersoni*	WHS	x
Black bullhead	*Ictalurus melas*	BLB	x
Channel catfish	*Ictalurus punctatus*	CCF	x
Stonecat	*Noturus flavus*	STC	
Burbot	*Lota lota*	BUR	x
Plains killifish	*Fundulus zebrinus*	PLK	
Brook stickleback	*Culaea inconstans*	BRS	
Smallmouth bass	*Micropterus dolemieu*	SMB	x
Largemouth bass	*Micropterus salmoides*	LMB	
White crappie	*Pomoxis annularis*	WHC	x
Black crappie	*Pomoxis nigromaculatus*	BLC	x
Crappie	*Pomoxis spp.*	CRA	x
Bluegill	*Lepomis macrochirus*	BLG	
Green sunfish	*Lepomis cyanellus*	GSF	
Yellow perch	*Perca Flavescens*	YEP	x
Sauger	*Stizostedion canadense*	SAR	x
Walleye	*Stizostedion vitreum*	WAE	x
Iowa darter	*Etheostoma exile*	IOD	x
Freshwater drum	*Aplodinotous grunniens*	FRD	x

Due to low water conditions the walleye spawn was conducted on the pontoon barge in Lonetree across from McGuire Creek. The Nelson creek boat ramp was dry; therefore a temporary launch was set up in McGuire Creek. The pontoon barge was set up in shallow water with the holding pens in the pontoon in about 6 feet of water. Three 10' by 20' holding pens were set up to hold green females day 1 to day 3 in about 10 feet of water. By keeping the holding pens and spawning barge in shallow water, warmer water temperatures were maintained. By the end of the spawn water temperatures remained cool unlike temperatures in 2001. Very cold temperatures and an unusually windy spawn made work difficult. Due to poor conditions very few lengths and weights were measured. In addition, daily catch rates of ripe females were low. To achieve the goal of 80 million or more eggs the spawn lasted until May 9th. The boat ramp at Nelson Creek will not be usable in the spring of 2003 and most likely 2004. This will force use of the Rock Creek Ramp or to again improvise at the McGuire recreational area.

Walleye

Trap netting captured 2,373 walleye, of which 293 were weighed and measured. The catch rate in 2002 of 6.8 per-trap night was lower than the catch rate in 2001 which was 10.3 walleye per-trap night, but was similar to the catch rate of 5.4 in 2000 (Table 2). Typically, in years with low run-off, as in 2002 and 2000 when little to no flow was measured in the Big Dry Creek the catch rate is low. Male to female ratio returned to a more common 2:1 from the 2001 ratio of 4:1. The 4:1 ratio in 2001 was rather high only being exceeded in 4 years since 1979 (Table 3). The average weight for spawners in 2002 was 7.5 pounds and 1.5 pounds for females and males, respectively (Table 3). Lengths of male and female walleye were plotted by inch groups as a percentage of the total number sampled during spring trap netting from years 1997 to 2002 (Figure 3). Many smaller males were measured in 2002, as a strong group of fish between 12 and 15 inches exists. The smaller group of fish between 21 and 25 inches represented the bulk of females captured. Walleye less than 14 inches were abundant, males from this group typically are reproductive but females are not reproductive until about 14 to 16 inches or three to four years old.

A total of 293 walleye were weighed, of which 229 and 64 were male and females, respectively. Male walleye weight composition was 14%, 11%, and 6% of the fish greater than 3, 4, and 5 pounds, respectively. Female walleye weight composition was 90%, 89%, and 83% of the fish greater than 3, 4, and 5 pounds, respectively (Figure 4).

In 2002, the total number of fish handled and the catch rate was average for the time period from 1992 to 2002 (Figures 5 and 6, respectively.) It is believed, poor runoff in the Big Dry creek (Figure 7) mixed with declining reservoir elevations, and cold spring temperatures resulted in the decline in numbers and catch rates of walleye from 2001 to 2002 during the spawn.

Condition factors and average weights for 1-inch length groups of walleye from 14-25 inches are shown in Figures 8 and 9, respectively. Condition factors show continued improvement in condition of fish from 14 to 24 inches. Condition factor of walleye 25 inches remained similar to previous years. The increase in condition of walleye is likely a result of the strong year class of cisco produced in the winter of 2000-2001. The decline in shoreline forage and the poor year class of cisco in 2002 may show up as a decline in average condition of walleye less than 18 inches next year. Due to the huge year class of cisco produced in 2001, walleye above 18 inches should continue to remain in good or improved condition. Average weights show a similar trend as condition factors.

In 2002 as in 2001, a lack of holding facilities occurred because water elevation was low and the spawning building couldn't be used. Due to the lack of holding facilities all fish were clipped on the lower caudal fin to indicate a current year mark. Green females captured were fin clipped and sent to holding pens to be held on the capture date (day 1), the next full day (day 2), and up to the second morning (day 3). Each morning the day 3 fish were examined for ripe eggs, ripe fish were sent to the pontoon boat and green or spent females were released. This procedure continued back into the day 2 pen and day 1 pen advancing fish to the pontoon if ripe, the next pen if green, and released, if spent. If a female was recaptured, as noted by the fin clip, and was green or spent it was released and not re-held. If a female was recaptured and ripe, it was sent to the pontoon boat for spawning and released. The only remaining holding pens were on the pontoon itself. Since limited space was available for holding males and spawning staff during the spawn, it

Table 2. Summary of walleye and northern pike captured during spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1975-2002.

Date		Trap-days	No. Walleye	Walleye/ Trap-day	Northern Pike	Pike/ Trap-day
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	l.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
1996	(4/15-5/02)	391	3,231	8.3	2,307	5.9
1997	(4/15-4/29)	307	3,937	12.8	2,652	8.6
1998	(4/04-4/29)	477	2,806	5.9	1,354	2.8
1999	(3/27-4/26)	434	5,673	13.1	2,573	5.9
2000	(4/04-4/28)	392	2,126	5.4	603	1.5
2001	(4/06-4/27)	328	3,362	10.3	1,922	5.9
2002	(4/17-5/09	349	2,377	6.8	1,713	4.9

Table 3. Summary of average weights and sex ratios for walleye trap-netted in the upper Big Dry of Fort Peck Reservoir, 1979-2002.

Year	Average Weight Males	Sample Size	Average Weight Females	Sample Size	Sex Ratio[1] Male: Female
1979	1.5	204	3.4	61	3:1
1980	1.8	247	3.4	122	2:1
1981	2.3	209	3.7	96	2:1
1982	1.1	565	3.0	58	10:1
1983	0.8	644	3.2	37	18:1
1984	0.9	454	2.1	34	13:1
1985	1.3	606	2.5	111	5:1
1986	1.3	851	2.4	216	3:1
1987	1.2	152	2.9	94	2:1
1988	1.7	283	3.7	239	3:1
1989	1.8	192	4.9	129	3:1
1990	2.1	362	5.8	142	2:1
1991	1.8	234	5.3	106	2:1
1992	2.3	229	6.1	522	1:1
1993	2.5	446	6.5	351	1:1
1994	4.2	1,024	7.4	319	2:1
1995	2.5	942	7.9	244	2:1
1996	3.3	690	8.5	280	2:1
1997	2.9	844	7.2	1,157	2:1
1998	2.3	558	4.8	264	2:1
1999	2.0	525	6.0	213	2:1
2000	2.4	457	6.3	346	1:1
2001	2.2	491	5.8	85	4:1
2002	1.5	229	7.5	64	2:1

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

Fig 3- length frequencies of walleye

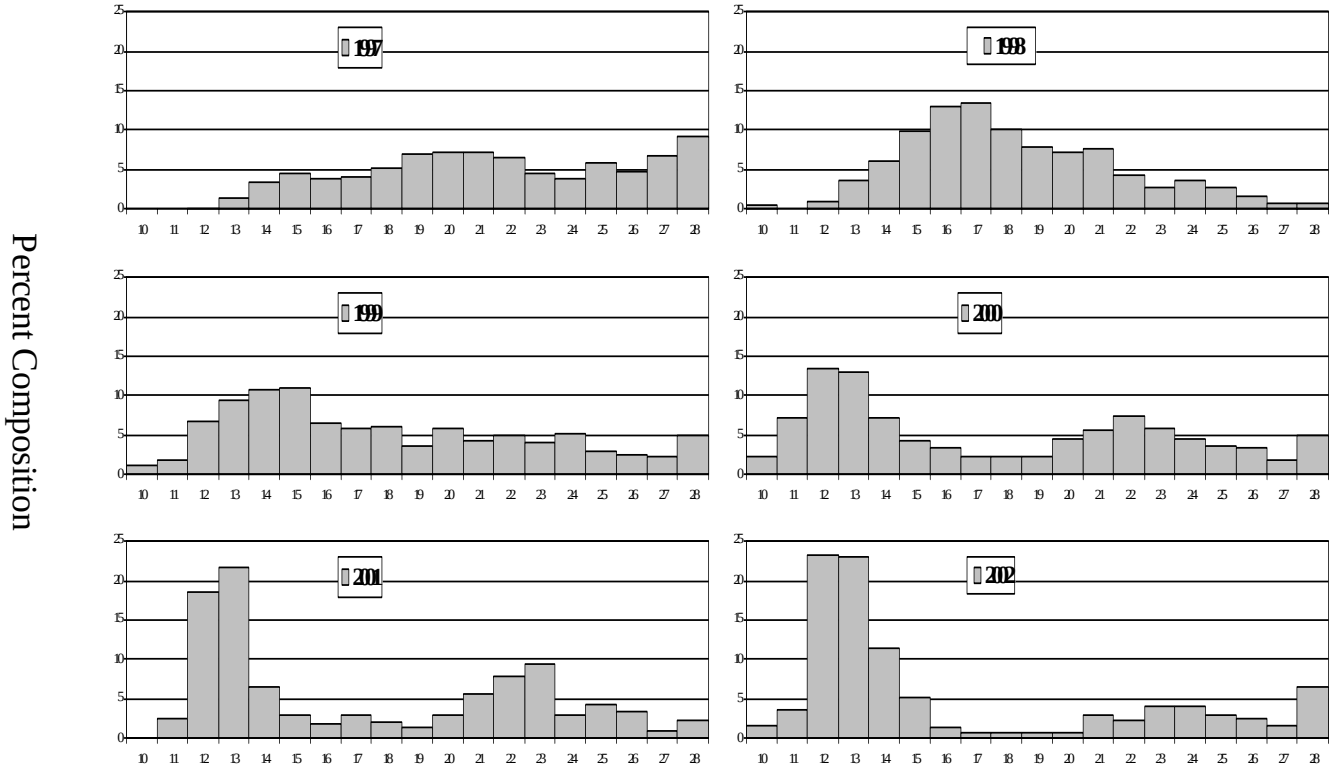

Figure 3. Length frequency of walleye (both sexes) trap netted on Fort Peck Reservoir in the upper Big Dry Arm 1997-2002.

Figure 4 percent weight composition by group and sex

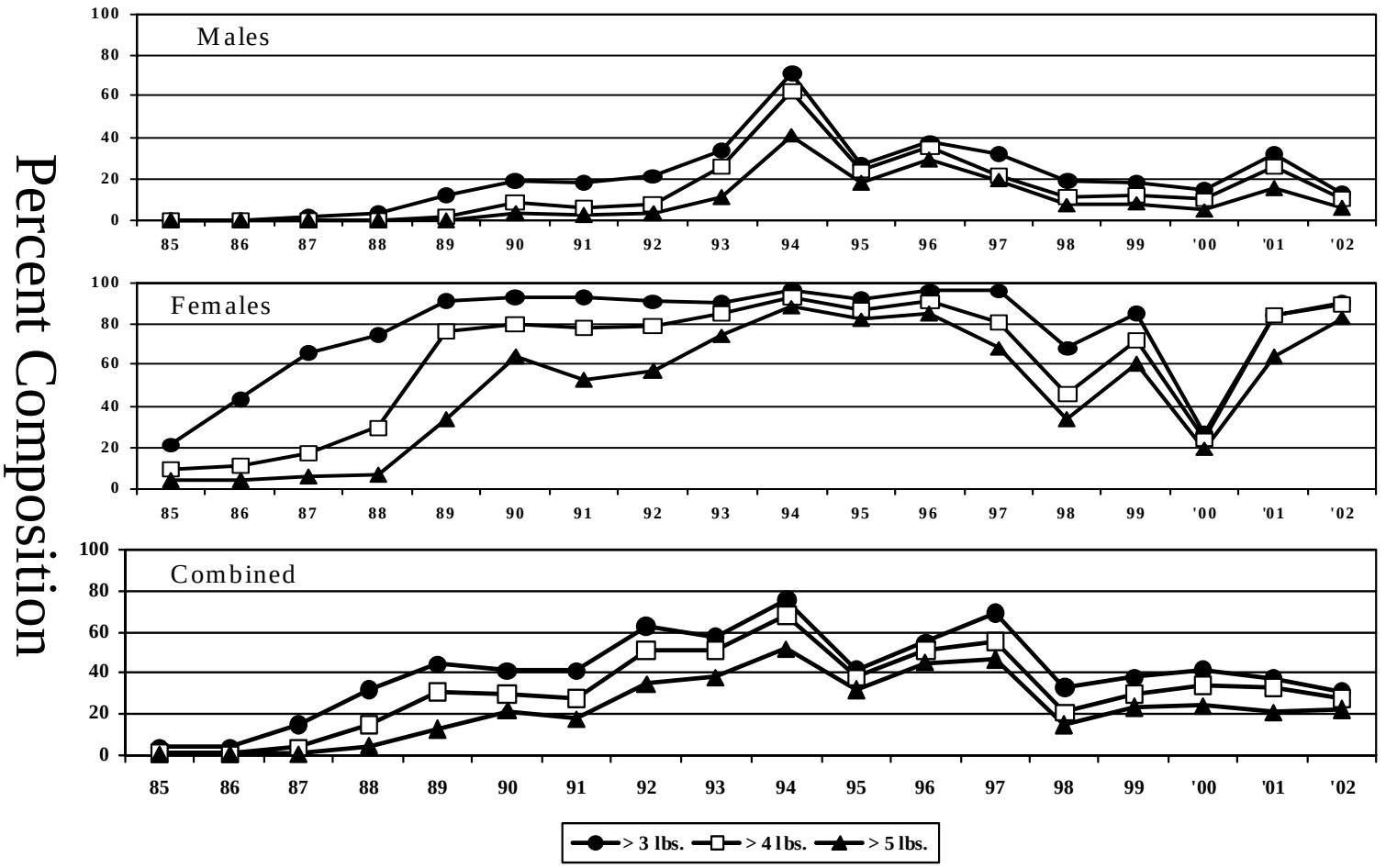

Figure 4. Change in size of male, female and combined sexes of walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1985-2002.

Figure 5 total number of walleye handled in spawn
Figure 6 catch rate by year of walleye in trap nets

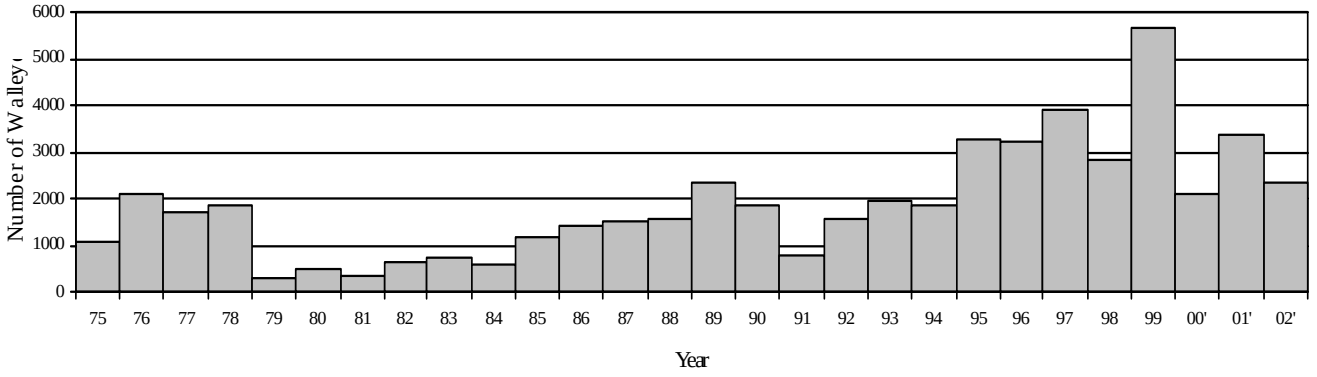

Figure 5. Actual number of walleye captured during spring trapping in upper Dry Arm from 1975 to 2002.

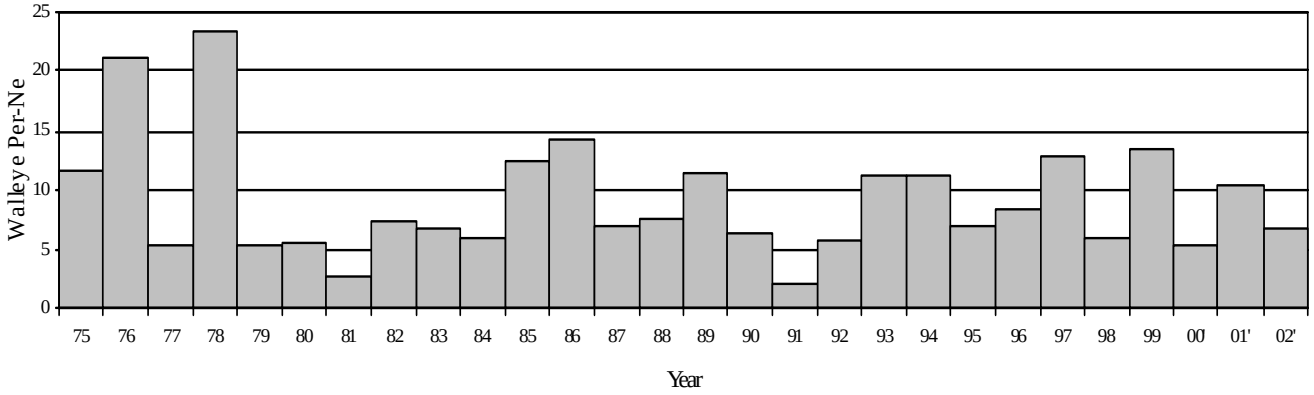

Figure 6. Number of walleye per trap-night during spring trapping in upper Dry Arm from 1975 to 2002.

Figure 7 big dry creek flows

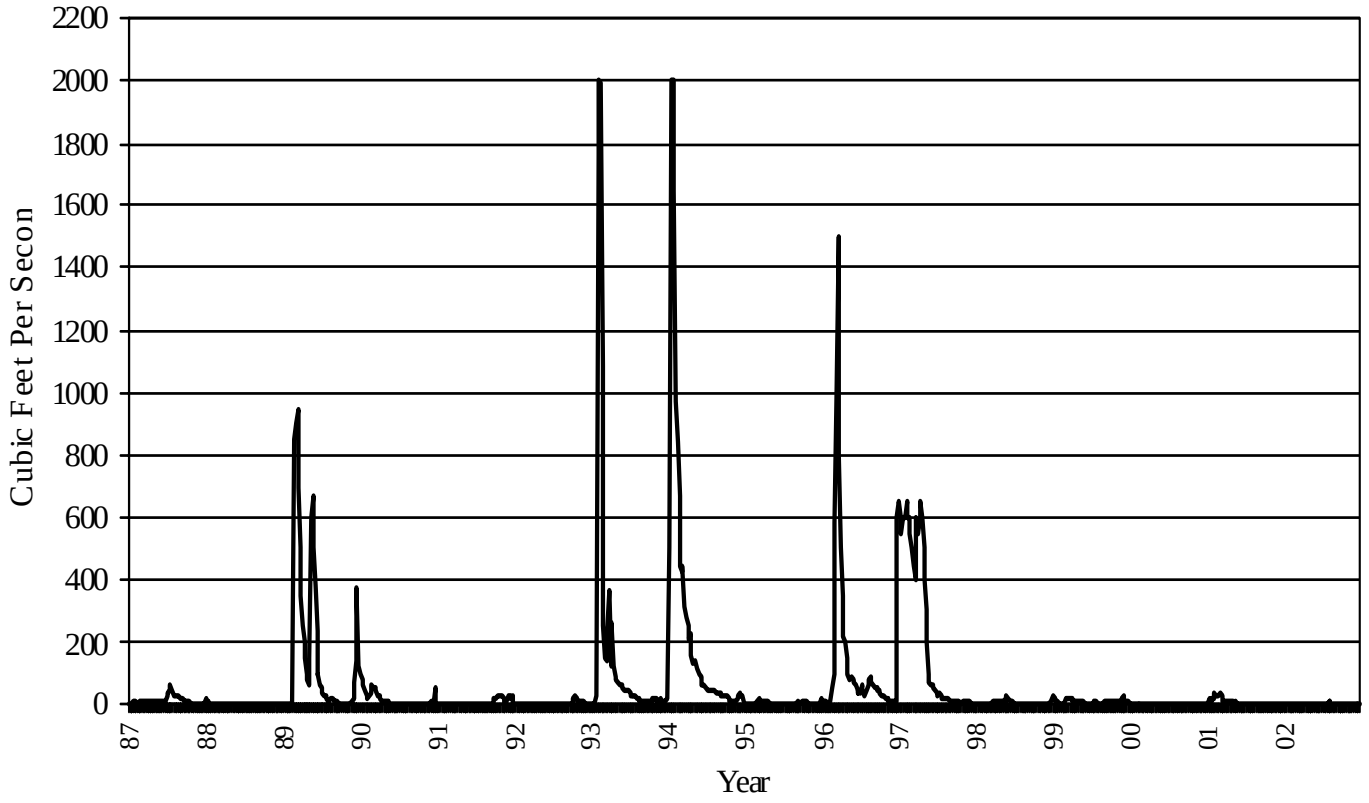

Figure 7. Annual March and April Big Dry Creek flow (CFS) from USGS gage 06131000 from 1987-2002.

Figure 8 condition factors by inch group
Figure 9 average weights by inch group

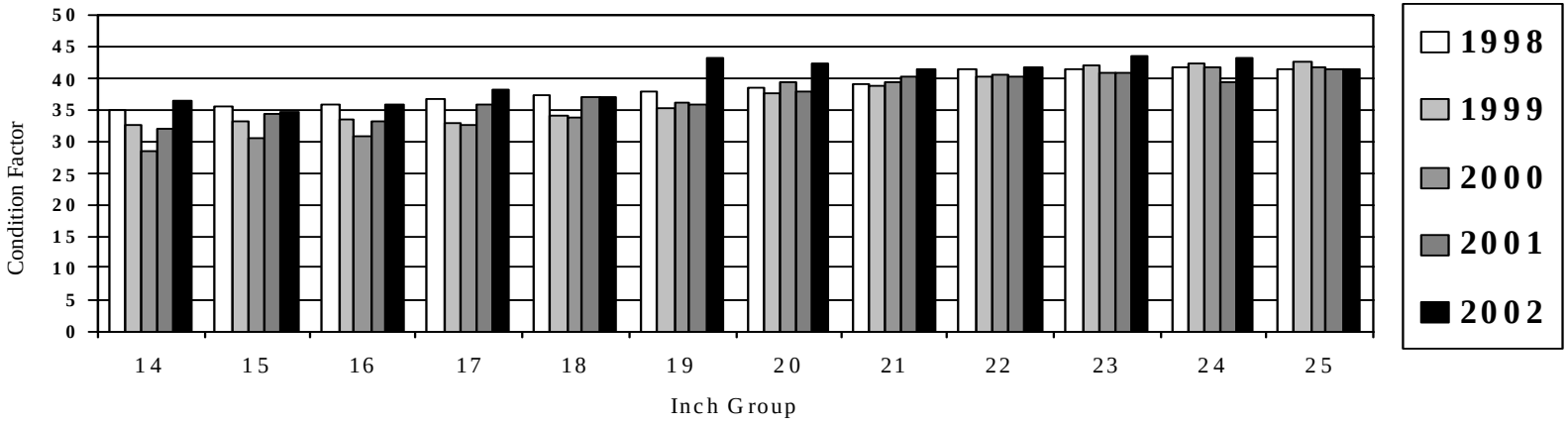

Figure 8. Average condition factors for various 1-inch length groups of walleye trap-netted in the upper Big Dry Arm of Fort Peck Reservoir, 1998-2002.

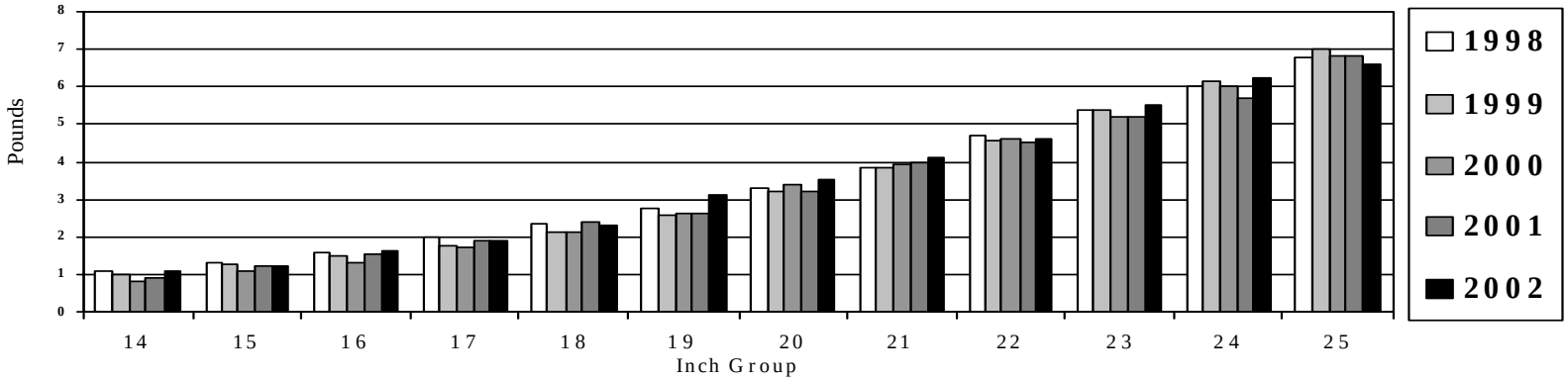

Figure 9. Average weights for various 1-inch length groups of walleye trap-netted in the upper Big Dry Arm of Fort Peck Reservoir, 1998-2002.

was determined to use 100% sperm extender procedures, based on the successful use in 2000 and 2001. Therefore, males were not fin clipped and between 20 and 100 males were brought to the pontoon for spawning separately to create sperm extender. If a male was spawned it was fin clipped and released after spawning. If a male was recaptured it was released. Recaptured males were not used in 2002 as demand for semen was low due to the limited daily number of ripe females. Eighty three walleye were recaptured in 2002 from walleye clipped during the spawning process in 2002.

Two thousand walleye were tagged with wire tags in 1997. An attempt was again made in 2002 to document recaptured tagged fish. Many fish were identified with marks near the dorsal and no tag or just the wire remaining and the identifying tag plate missing. Twenty walleye had tags documented. Five were males averaging 24.6 inches and 5.9 pounds. Fifteen were females, of which nine were not ripe and therefore weighed and measured averaging 28.1 inches and 9.3 pounds. Both groups showed above average size for their sex compared to the overall spawn and increased from the 2001 average measurements.

Northern Pike

Northern pike were spawned in 2002. Gravid females were again difficult to capture. Total numbers of northern pike captured was similar to 2001 (Table 2). A total of 1,713 northern were captured with a catch rate of 4.9 per trap net. Ninety seven northern were recaptured during the trap netting operation for a return rate of 6%. Four hundred forty nine northern pike were measured. They ranged from13 inches and 0.9 pounds to 46 inches and 27.0 pounds in 2002. Average length and weight was 29.2 inches and 6.9 pounds. Length frequency shows a trend towards larger fish with a strong showing of fish between 26 and 29 inches (Figure 10). The lack of smaller fish indicates continued poor reproduction due to loss of spawning habitat as the reservoir elevation declines. Female pike numbered 247 and males numbered 712. The remaining fish were not in reproductive condition and sex couldn't be identified. The average relative weight of pike was 105; abundance of cisco and being in spawning condition likely contribute to the high average relative weight.

Bigmouth Buffalo

Three bigmouth buffalo were captured with 1 being measured. The catch rate was less than 0.1 per trap-day, with no recaptures. The length and weight was 25.7 inches and 11.4 pounds.

Black Bullhead

Twelve black bullheads were captured with 2 being measured. The catch rate was less than 0.1 per trap-day, with no recaptures. The average length and weight was 10.8 inches and 0.6 pounds.

Black Crappie

Ninety-nine black crappies were captured with 29 being measured. The catch rate was 0.3 per trap-day, with 5 recaptures. The average length and weight was 10.7 inches and 0.8 pounds. Black crappies are not typically caught by anglers in this area.

Burbot

Forty-six burbot were captured with 15 being measured. The catch rate was 0.1 per trap-day, with 4 recaptures. The average length and weight was 28.0 inches and 5.0 pounds.

Channel catfish

Seventy-three channel catfish were captured with 6 being measured. The catch rate was 0.2 per trap-day, with no recaptures. The average length and weight was 16.8 inches and 3.7 pounds. Most catfish were smaller than the average as one of the catfish measured was 30.2 inches and 16.2 pounds. The typical catfish collected was less than 13 inches and about 0.5 pounds.

Figure 10. Pike length frequency from trap nets

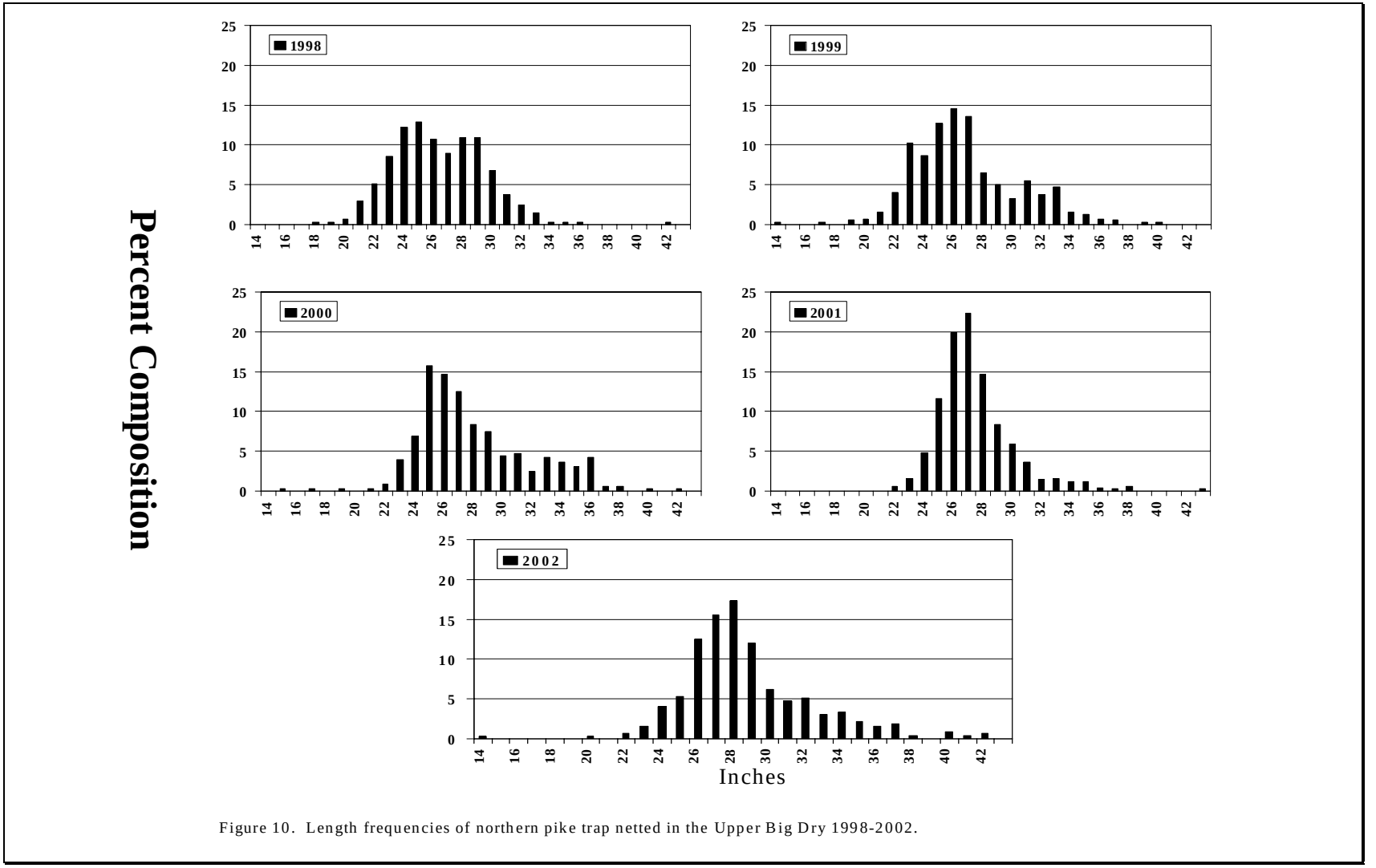

Figure 10. Length frequencies of northern pike trap netted in the Upper Big Dry 1998-2002.

Cisco

Seventy-five cisco were captured with 10 being measured. The catch rate was 0.2 per trap-day none were recaptured. The average length and weight was 10.2 inches and 0.4 pounds.

Common Carp

One hundred twenty-one carp were captured with 30 being measured. The catch rate was 0.4 per trap-day with 2 being recaptured. The average length and weight was 19.6 inches and 3.3 pounds.

Freshwater drum

Three drum were captured with none being measured. The catch rate was less than 0.1 per trap-day.

Goldeye

Forty-seven goldeye were captured with 18 being measured. The catch rate was 0.1 per trap-day with no recaptures. Average length and weight was 12.6 inches and 0.7 pounds. Nineteen males and 15 females were identified.

River Carpsucker

Three hundred twenty river carpsucker were captured with 32 being measured. The catch rate was 0.9 per trap-day with 2 recaptured. The average length and weight was 20.1 inches and 5.2 pounds.

Smallmouth Buffalo

One hundred one smallmouth buffalo were captured with 2 being measured. The catch rate was 0.3 per trap-day with no recaptures. The average length and weight was 19.7 inches and 5.0 pounds.

Sauger

Four sauger were captured with 1 being measured. The catch rate was less than 0.1 fish per trap-day with no recaptures. The length and weight was 24.2 inches and 5.4 pounds. Two sauger were identified as females, the other two were not identified and were likely not in spawning condition.

Shorthead Redhorse

Three hundred sixty-six shorthead redhorse were captured with 42 being measured. The catch rate was 1.1 fish per trap-day with 10 being recaptured. The average length and weight was 16.4 inches and 1.9 pounds.

Smallmouth Bass

Fifteen smallmouth bass were captured with 1 being measured. The catch rate was less than 0.1 per trap-day with no recaptures. Length and weight was 17.0 inches and 2.8 pounds.

White Sucker

Five hundred seventy-five white suckers were captured with 122 being measured. The catch rate was 1.7 per trap-day with 13 recaptures. Average length and weight was 14.6 inches and 1.4 pounds.

Yellow Perch

Five hundred three yellow perch were captured with 93 being measured. The catch rate was 1.4 per trap-day with 3 being recaptured. Average length and weight was 7.2 inches and 0.2 pounds.

MERWIN SPRING TRAPPING

Five merwins were used in 2002 for a total of 76 days of trapping. Merwin netting captured 19 species with walleye being the most abundant (Table 4). The overall catch rate was 17.4 fish per trap-day. The merwin traps compliment trap net catches. Trap nets are still needed in shallow water areas, such as the upper reaches of the bay and on shallow points. A request to have the merwins returned in 2002 made it necessary for the Fort Peck staff to begin efforts to secure merwin traps for the project on a permanent basis. Discussion within the hatchery system determined it was best to leave the existing merwins on location at Fort Peck and other merwins were found to fulfill needs of other projects.

Walleye

Six hundred fifty-five walleye were captured with 179 being measured. Sex was determined, resulting in 197 females and 422 males. The remaining walleye were immature or not categorized. Walleye catch rate was 8.6 per trap-day in merwin traps. The 2001-catch rate was nearly twice the rate at 17.0. The merwin catch rate in 2002 was similar to the trap net catch rate of 6.8 per trap-day in trap nets (Figure 11); in the past merwin catch rates have been much higher than trap nets. The lower catch rate of merwin traps was in part due to low water levels, as suitable locations to put the merwins are unfamiliar to the netting crew. Additionally, the wind was so bad most days it was difficult to maintain the merwins to ensure they were positioned correctly. Walleye average length and weight was 18.4 inches and 3.4 pounds. Females and males averaged 24.6 inches and 6.9 pounds, and 16.5 inches and 2.3 pounds, respectively. Length frequencies of walleye show strong classes of 22 to 26-inch fish and from 12 to 15-inch fish (Figure 12). Eleven tagged walleye from 1997 were captured with an average length and weight of 27.1 inches and 7.9 pounds. The tagged walleyes lengths ranged from 21.6 inches to 30.4 inches and weights from 3.4 pounds to 11.9 pounds.

Northern Pike

One hundred eighty-two northern pike were captured with 36 being measured. The catch rate was 2.4 per trap-day and 28 were recaptures. Average length and weight of northern pike was 28.9 inches and 6.7 pounds. Female and male averages were 33.3 inches and 11.2 pounds, and 28.1 inches and 5.9 pounds, respectively.

Other Species

Other species captured included: bigmouth buffalo, black crappie, burbot, channel catfish, cisco, carp, goldeye, river carpsucker, smallmouth buffalo, shorthead redhorse, smallmouth bass, white sucker, yellow perch, spottail shiners, and emerald shiners. The young-of-year perch, spottail shiners, and emerald shiners are not counted but were captured. Table 4 lists catch rates and average lengths and weights.

LAKE-WIDE TRAP NETTING

Lake-wide trap netting was discontinued in 2000. Timing of this gear has been changed, as increased manpower was required to maintain walleye fry ponds and to care for salmon fingerlings before release. If reinstated at the proper time, this gear could potentially locate other spawning areas to supplement the current walleye egg-take operation. Trap nets are also effective in monitoring ling; no other gear captures ling regularly.

WALLEYE STOCKING AND FORT PECK REARING PONDS

Seven ponds all near the COE Upstream Camp Ground were used in 2002 to rear walleye fingerlings. A total of 0.85 million fry were stocked in the ponds for a return of 357,256 fingerlings. This return was 42%. Typically the return from the ponds is 50% or higher. It is recommended to not use the outer perimeter ponds on the Duck Creek road unless filled in the spring or winter prior to use as walleye rearing ponds. They didn't fill in 2002, as a result all water collected was drained in late fall. The perimeter ponds were closed in November to collect runoff. It is unlikely they will naturally fill in the winter/spring of 2002/2003. Return from the perimeter ponds has been as high as 70% in the past. It is recommended to

Table 4. merwin catch rate table of species

Figure 11 merwin vs trap catch rates of walleye

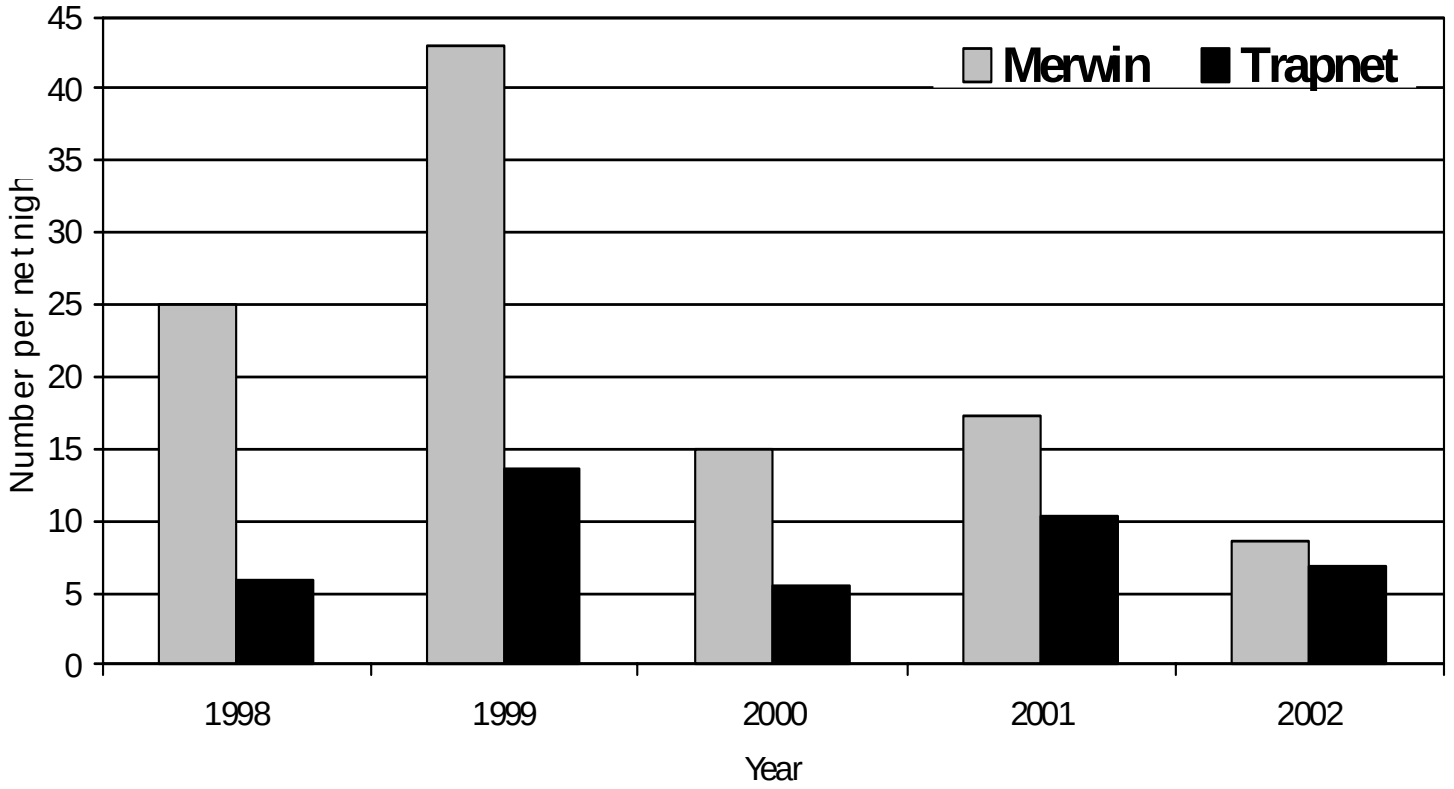

Figure 11. Comparison of Merwin net and trap-net catch rates during spawning operation in the upper Big Dry Arm of Fort Peck Reservoir 19998-2002.

Figure 12 merwin length frequency of walleye

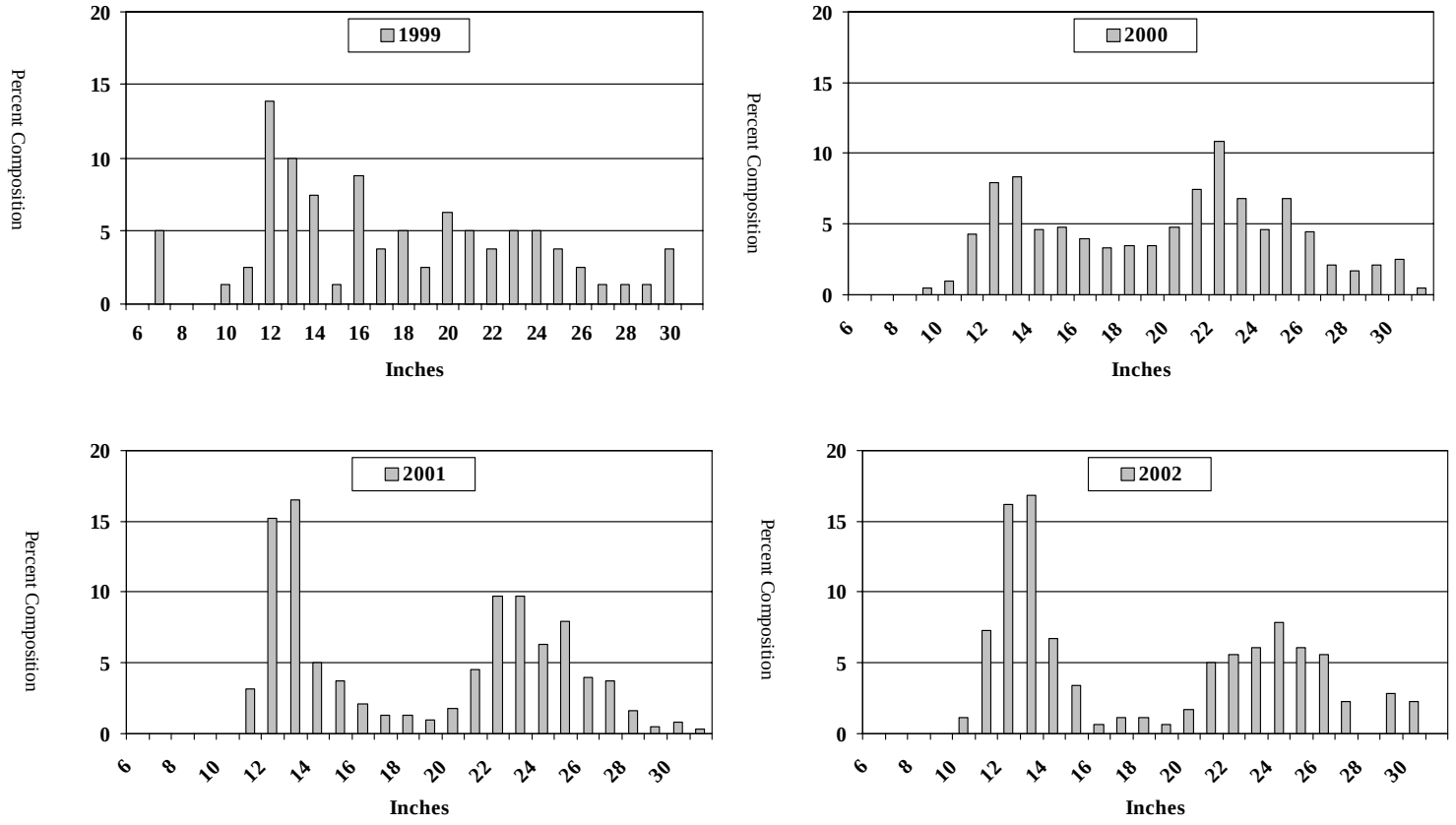

Figure 12. Length frequency of walleye captured with the Merwin trap from 1999- 2002 during the spawning operation in the upper Big Dry Arm of Fort peck Reservoir.

use these perimeter ponds when possible. However FWP lacks manpower and equipment to fill these ponds. The COE historically was responsible for filling these ponds. The perimeter ponds also lack adequate kettles to collect walleye and need to be upgraded. Three total kettles should be acquired to improve capture of fingerlings during draining of ponds, two for the perimeter ponds and 1 on pond S1.

The campground ponds were fertilized on a regular basis with alfalfa meal and plankton monitored. Plankton growth in all ponds appeared to be moderate to good throughout rearing. Additional drain lines are required to improve use of manpower while draining ponds. The ponds should be filled at least by April 20th so the water may warm and zooplankton numbers can respond to fertilizing of ponds. The COE filled 5 ponds in September and October of 2002 in an effort to have the ponds filled earlier and to avoid colonization of large insects and vertebrates. N1, a larger pond north of the road, was not filled in the fall of 2002, it is expected the COE will fill this pond in the spring of 2003.

Walleye fry used to produce fingerlings were marked with OTC in 2002; therefore all fingerling will exhibit a mark. Fry not used for fingerling production in 1999, 2000, and 2001 were marked; therefore fry stocked into the reservoir in those years had a mark. In 1999, 25% were marked and in 2000 and 2001, 100% were marked. Fry were stocked in various locations in 2002 (Table 5). Gill netting in 2002 showed fair recruitment of fish from the 1999 and 2000-year classes. Otoliths will be taken and examined on all gill netted fish less than 20 inches for the duration of the OTC study. Two more years of fry marking of fingerlings stocks are anticipated to determine contribution of fingerling plants; however, limited resources of staff and the lack of equipment necessary to read the marks or funds to contract reading of marks may force an early end to this important study.

A request to increase stocking of walleye fingerling to 3 million was made in 2002, a total of 1.9 million fingerlings were stocked and 26.55 million fry (Figures 13 and 14, respectively). Stocking of fry and fingerling occurred throughout the reservoir in areas downstream of Snow Creek and in the Dry Arm (Table 8 and Figure 15). FWP requested assistance to produce 1.5 million fingerlings from North and South Dakota. South Dakota was unable to provide fingerlings despite Montana sending 3 million eyed eggs. South Dakota was unable to return fingerlings due to poor recruitment from fry to fingerling and unusually poor eye-up on their eggs. North Dakota also experienced poor recruitment but had good eye-up on their eggs; Montana received 613,750 fingerlings from Garrison Fish Hatchery. Miles City State Fish Hatchery produced 820,850 fingerlings for Fort Peck.

OXYTETRACYCLINE MARKING OF WALLEYE

Otoliths were analyzed for OTC marks from walleye collected in the 2001 and 2002 gill nets. South Dakota loaned FWP the appropriate scope and provided guidance in starting the laboratory analysis of samples. It was determined by studies in South Dakota (Dave Lucchesi, Per Comm.) marking of fry with a 500 ppm solution provided a poor mark with a 50% non-marking rate. Marking of fry in a 750 ppm solution provided 100% marking based on experimentation in rearing ponds in South Dakota. Results in 2001 and 2002 could be doubled based on the findings of Luccesi's study. However the only correction in numbers was done for the 1999 year class. In 1999, 25% of the fry stocked were marked, therefore a multiplication factor of 4 is required to assume equal representation of the mark. Stocks in 2000 and 2001 were marked at 100%. Stocks of fingerlings in 2002 were marked at 750 ppm. In 2002, the study changed focus from fry stocks to contribution of fingerling stocks, hence the fry put in rearing ponds were marked and marking of reservoir stocked fry was discontinued.

In 2001, 213 otoliths were examined. All three year classes present were collected with an average of 27% of all fish examined showing a mark, without any corrections for lost tags or 25% marking in 1999. In 2002, 286 otoliths were examined. Four year classes marked were collected with an average of 20% of all fish examined showing a mark, without any corrections for lost tags or 25% marking in 1999. Percent of each marked year class show 1999 has the strongest showing of fish marked in the population with 96% in the 2001 sample (Figure 16.) and 65% in 2002 sample (Figure 17.), with the correction for 25% marked. If a correction of 50% lost marks is applied, the walleye in Fort Peck would have a 50% chance of being a fish originally stocked as a fry. The remaining 50% would be from fingerling stocking and natural reproduction.

Table 5. Walleye stocking on Fort Peck for 2002 by region, location, and date.

Date	Location	Region	Millions of fry	Fingerling OTC[1]	Origin
5/10/2002	McGuire	UBD	9.5		Miles City Fish Hatchery
5/10/2002	Little Bug	UBD	6.5		Miles City Fish Hatchery
6/25/2002	Little Bug	UBD		21,252	Miles City Fish Hatchery
6/25/2002	Big Bug	UBD		21,252	Miles City Fish Hatchery
5/15/2002	S. F. Rock	LBD	2.2		Miles City Fish Hatchery
5/15/2002	N. F. Rock	LBD	2.0		Miles City Fish Hatchery
5/21/2002	Sandy Arroyo	LBD	2.6		Miles City Fish Hatchery
5/21/2002	Spring Creek	LBD	2.8		Miles City Fish Hatchery
6/25/2002	Box Creek	LBD		25,100	Miles City Fish Hatchery
6/25/2002	Box Elder	LBD		25,108	Miles City Fish Hatchery
5/17/2002	Bear Creek	LMA	4.0		Miles City Fish Hatchery
5/17/2002	Spillway	LMA	3.5		Miles City Fish Hatchery
5/17/2002	Duck Creek	LMA	4.0		Miles City Fish Hatchery
6/21/2002	Main Duck Crk.	LMA		39,065	Fort Peck Fingerling Ponds
6/21/2002	Mid. Duck Crk.	LMA		39,065	Fort Peck Fingerling Ponds
6/21/2002	S.F. Duck Crk.	LMA		39,065	Fort Peck Fingerling Ponds
6/24/2002	Spillway	LMA		46,530	Miles City Fish Hatchery
6/24/2002	Bear Creek	LMA		144,511	Miles City Fish Hatchery
6/24/2002	N.F. Duck Crk.	LMA		122,698	Fort Peck Fingerling Ponds
6/27/2002	Bear Creek	LMA		28,031	Miles City Fish Hatchery
7/01/2002	N.F. Duck Crk.	LMA		81,324	Fort Peck Fingerling Ponds
7/02/2002	N.F. Duck Crk.	LMA		9,575	Fort Peck Fingerling Ponds
7/03/2002	Marina	LMA		26,464	Fort Peck Fingerling Ponds
7/03/2002	Bear Creek	LMA		28,864	Fort Peck Fingerling Ponds
7/08/2002	Spillway	LMA		241,900	Garrison NFH, North Dakota
7/24/2002	Skunk	LMA		12,079	Miles City Fish Hatchery
7/24/2002	4th Bay	LMA		36,237	Miles City Fish Hatchery
5/21/2002	Pines	MMA	2.0		Miles City Fish Hatchery
5/22/2002	Hell Creek	MMA	1.85		Miles City Fish Hatchery
6/18/2002	SF. Cattle Crkd.	MMA		78,044	Miles City Fish Hatchery
6/18/2002	NF. Cattle Ckd.	MMA		78,044	Miles City Fish Hatchery
6/18/2002	SF. Gilbert Crk.	MMA		78,044	Miles City Fish Hatchery
6/18/2002	NF. Gilbert Crk.	MMA		78,044	Miles City Fish Hatchery
6/18/2002	7th Bay	MMA		78,044	Miles City Fish Hatchery
6/18/2002	8th Bay	MMA		78,044	Miles City Fish Hatchery
6/21/2002	Hell Creek	MMA		40,688	Miles City Fish Hatchery
7/08/2002	Pines	MMA		240,000	Garrison NFH, North Dakota
7/10/2002	Hell Creek	MMA		52,950	Garrison NFH, North Dakota
7/10/2002	Sutherland	MMA		78,050	Garrison NFH, North Dakota
7/10/2002	Snow Creek	MMA		35,835	Miles City Fish Hatchery
5/7/2001	Ft. Peck Ponds		0.85[2]		Miles City Fish Hatchery
	totals		27.4	1,903,907	

1 Were marked as fry going into rearing ponds including ND walleye.
2 OTC fry stocked into Fort Peck rearing ponds.

Figure 13 fingerling stocking of walleye annually
Figure 14 fry stocking of walleye annually

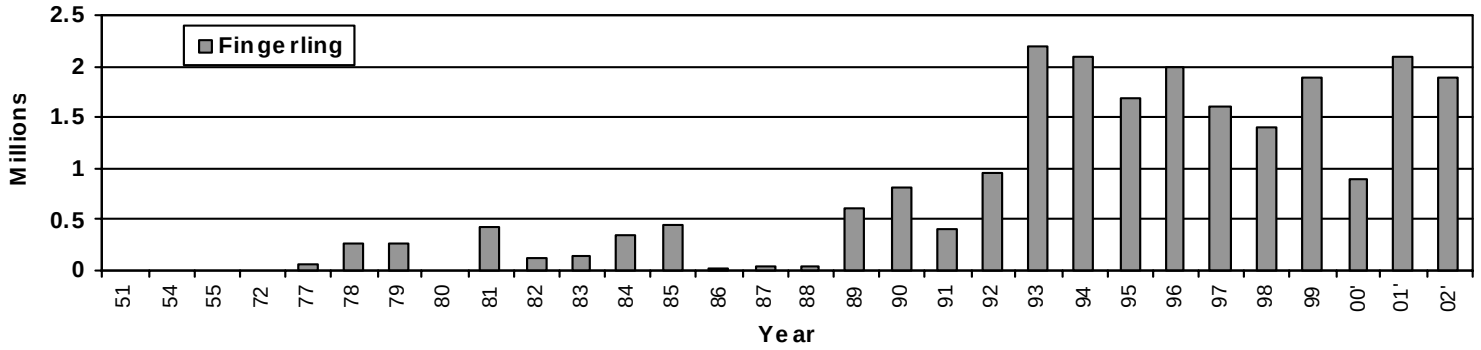

Figure 13. Number of walleye fingerling stocked in Fort Peck annually from 1951 to 2002.

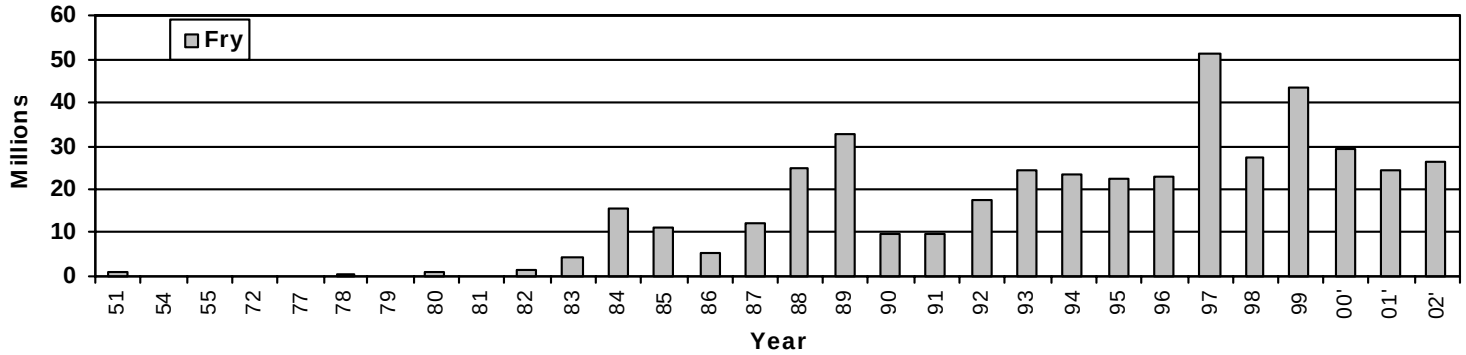

Figure 14. Number of walleye fry stocked in Fort Peck annually from 1951 to 2002.

Figure 15 stocking map for walleye fingerling and fry.

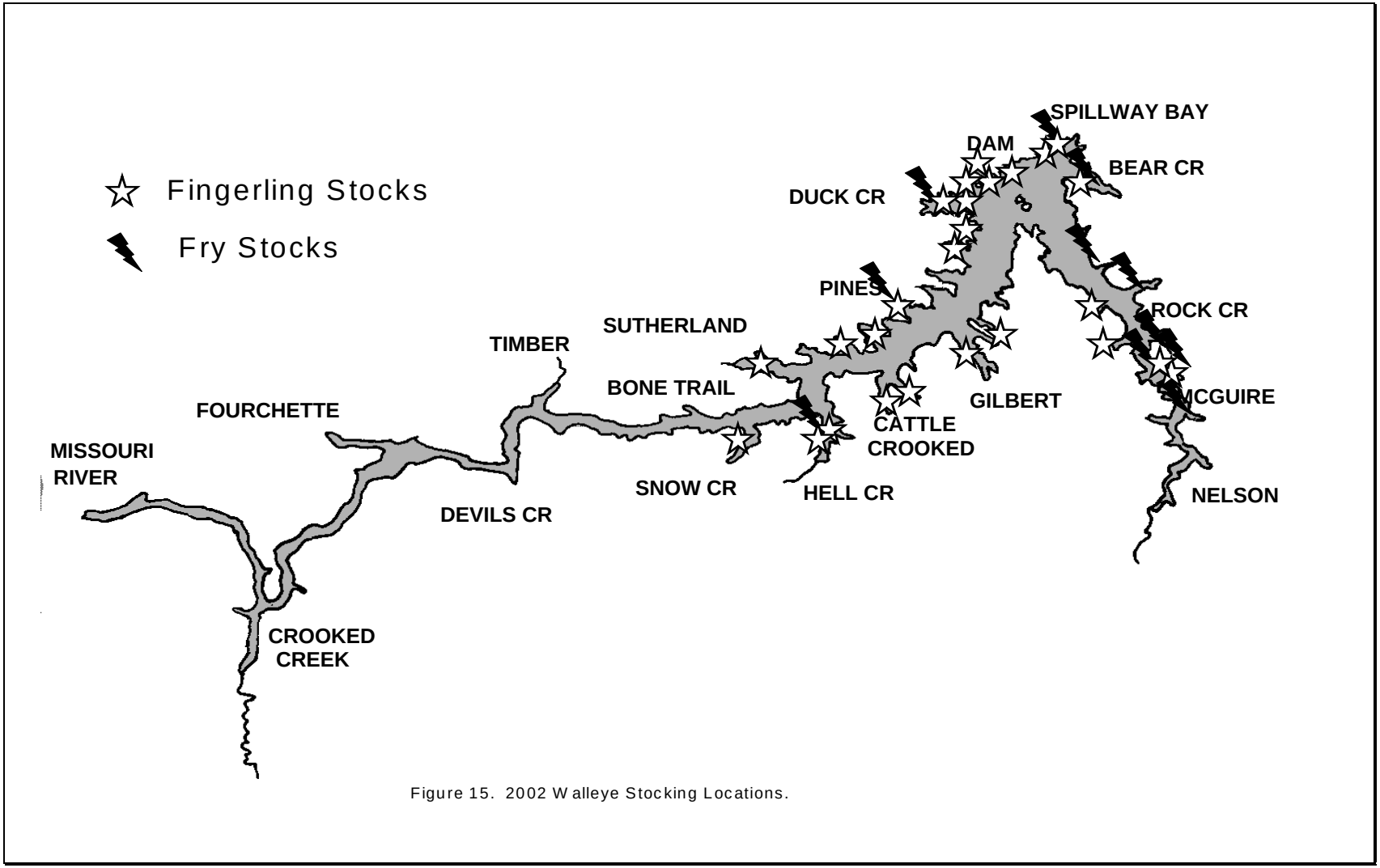

Figure 15. 2002 Walleye Stocking Locations.

Figure 16 2001 OTC results
Figure 17 2002 OTC results

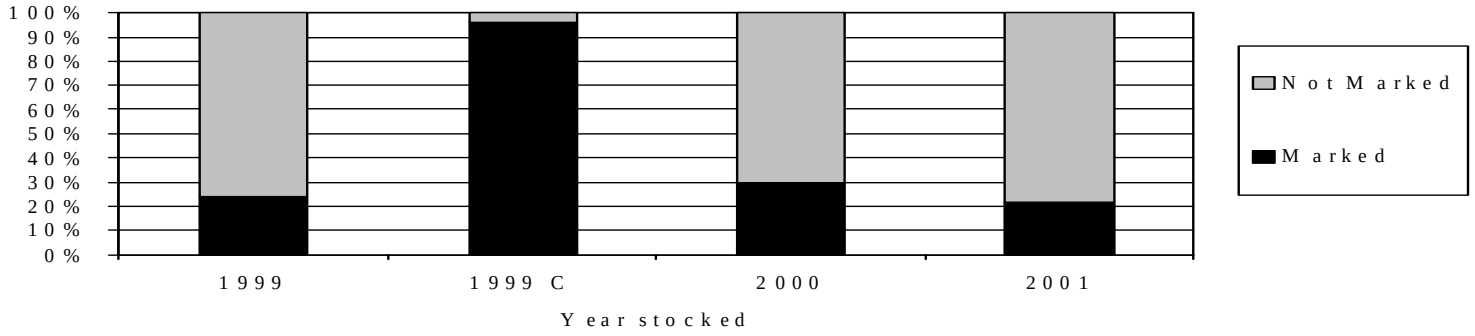

Figure 16. 2001 percent composition of marked walleye by year stocked from fry marking with OTC.

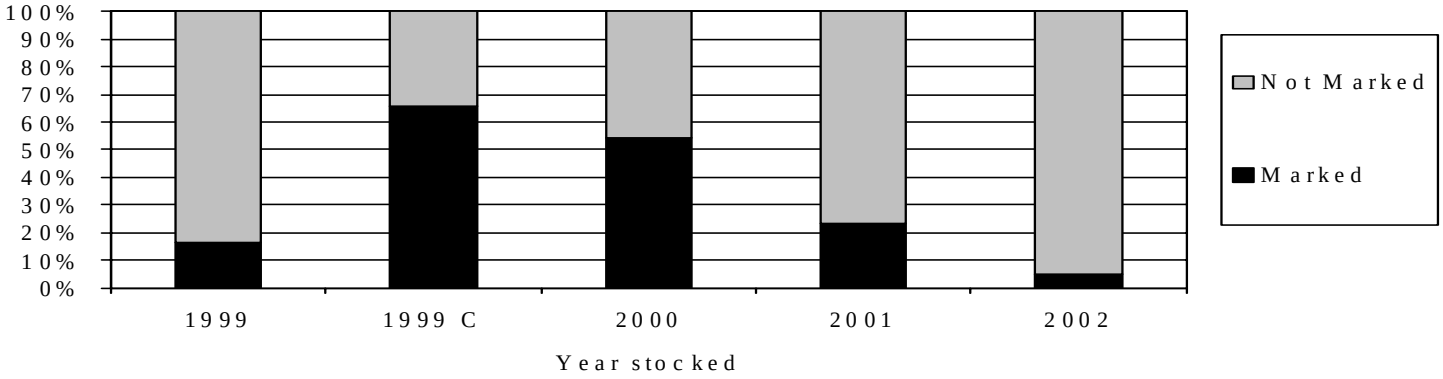

Figure 17. 2002 percent composition of marked walleye by year stocked from fry marking with OTC.

The study to continue marking fingerling during the fry stage is planned for 2003 and 2004. It's hoped the Fort Peck Hatchery will be online by 2005. Once the hatchery is online, plans will be made to single mark all walleye fry stocked for 3 years and to double mark all fingerling stocked during the same time period. The results of the study should give a good indication of contributions of fry, fingerling and natural reproduction. A microscope with the appropriate black light is needed to complete this study; a new scope with lights is approximately $15,000.

This information supports continued stocking of fry in Fort Peck as 1 in 2 fish caught are a result of fry stocking. Contributions of fingerling stocks should be forth coming from the next 4 years. Results from fry stocks should be shown for at least the next 2 years.

STOCKING OF OTHER SPECIES

Smallmouth bass were not stocked in Fort Peck in 2002. The bass were traded to North Dakota in exchange for walleye fingerling. A request for 200,000 northern pike fingerlings was placed in 2002. The spawning of northern pike provided poor quality eggs. Pike produced from the Montana egg take were used for research of coal bed methane concentrations. North Dakota filled a request for additional northern pike fingerlings with a total of 160,000 fingerlings. Northern from North Dakota were stocked as follows: 40,000 at the spillway boat ramp, 40,000 at the Pines boat ramp, 40,000 at the Duck creek boat ramp, and 40,000 at Rock Creek boat ramp. A request for 200,000 fingerlings has been placed again. Eggs should be collected during the 2003 spring spawning operation at Fort Peck to improve culture methods and to provide stocks for Fort Peck.

LAKE-WIDE GILL NETTING

Ninety -even gill nets were set in various locations throughout the reservoir from July 17th to September 6th, 2002. Gill netting provides information on species distribution, composition, and abundance, walleye condition, and game species stomach contents. Twenty species were captured for a total of 2,247 fish (Table 6). Goldeye, walleye, and shorthead redhorse were the most abundant species captured overall, with catch rates of 7.5, 3.3, and 2.2 per-net night, respectively. Fish with catch rates over 1.0 per-net night include: channel catfish, cisco, carp and northern pike. Other less common species include: black crappie, brown trout, chinook salmon, freshwater drum, pallid sturgeon, river carpsucker, smallmouth buffalo, sauger, smallmouth bass, shovelnose sturgeon, white crappie, white sucker, and yellow perch.

Walleye

Three hundred twenty-four walleye were captured, measured and weighed. The concentrations of walleye were similar in all regions except the Lower Missouri Arm which had a catch rate of 2.5 walleye per net, the remaining regions averaged 3.4 per net to 3.8 per net (Table 7). In 2001, concentrations of walleye were largest in the Upper Big dry Arm with a catch rate of 6.3 walleye per net, most were less than 1 pound. Lake-wide average length and weight in 2002 and 2001 were identical at 17.4 inches and 2.8 pounds. Lake-wide range was from 6.9 inches to 31.2 inches, and 0.1 pounds to 10.5 pounds. The largest percent of fish over a pound were found in the Middle and Lower Missouri Arms at 75% and 59% respectively. The Big Dry Arm and Upper Missouri Arm had 45% and 38% of its walleye greater than a pound, respectively (Table 7). The largest size range was found in the Upper Missouri Arm with 6.9 inches to 31.2 inches and 0.1 pounds to 10.5 pounds.

Inch group evaluations in past years have been done by percent composition. Since nearly 100% of the walleye are measured during gill netting surveys the length frequencies have been converted to the catch rate of walleye per net by inch groups. This format not only shows which size groups are most abundant, but provides the ability to compare the rate from year to year. The rate of 13 inch walleye in 2002 was about 0.4 per net, the most abundant length in 2002, compared to 1989, when 13 inch walleye were more abundant at 0.6 per net night or when they were less abundant being less than 0.2 per net in the years of

Table 6. Fish captured by 125-foot experimental gill nets in Fort Peck Reservoir, 2002.

Species[1]	UBD[2] No. Fish	UBD[2] No./ Net Day	LBD[3] No. Fish	LBD[3] No./ Net Day	LMA[4] No. Fish	LMA[4] No./ Net Day	MMA[5] No. Fish	MMA[5] No./ Net Day	UMA[6] No. Fish	UMA[6] No./ Net Day	Total No. Fish	Total No./ Net Day
BLC	----	----	----	----	----	----	----	----	24	0.9	24	0.2
BNT	----	----	----	----	----	----	----	----	1	<0.1	1	<0.1
CCF	51	3.0	15	0.8	1	0.1	6	0.4	72	2.8	145	1.5
CHS	----	----	----	----	2	0.1	----	----	7	0.3	9	0.1
CIS	63	3.7	16	0.8	2	0.1	5	0.4	54	2.1	140	1.4
COC	27	1.6	21	1.1	15	0.8	15	1.1	34	1.3	112	1.2
FRD	5	0.3	4	0.2	2	0.1	2	0.1	50	1.9	63	0.6
GOE All	158	9.3	21	1.1	52	2.6	37	2.6	459	17.7	727	7.5
Male	84	4.9	8	0.4	16	0.8	13	0.9	111	4.3	232	2.4
Female	73	4.3	13	0.7	35	1.8	24	1.7	250	9.6	395	4.0
Im.	1	0.1	----	----	1	0.1	----	----	98	3.8	100	1.0
NOP	36	2.1	28	1.4	30	1.5	17	1.2	33	1.3	144	1.5
PAL	----	----	----	----	----	----	----	----	2	0.1	2	<0.1
RIC	12	0.7	11	0.6	7	0.4	6	0.4	29	1.1	65	0.7
SAB	10	0.6	6	0.3	3	0.2	11	0.8	12	0.5	42	0.4
SAR	----	----	1	0.1	7	0.4	1	0.1	17	0.7	26	0.3
SHR	31	1.8	46	2.3	27	1.4	14	1.0	94	3.6	212	2.2
SMB	4	0.2	4	0.2	9	0.5	6	0.4	8	0.3	31	0.3
SNS	----	----	1	0.1	----	----	----	----	6	0.2	7	0.1
WAE	74	4.4	50	2.5	49	2.5	52	3.7	99	3.8	324	3.3
WHC	----	----	----	----	----	----	----	----	37	1.4	37	0.4
WHS	12	0.7	7	0.4	20	1.0	17	1.2	7	0.3	63	0.6
YEP	16	0.9	14	0.7	7	0.4	5	0.4	30	1.2	72	0.7
Totals	499	29.4	245	12.3	233	11.7	194	13.9	1076	41.4	2247	23.2
No. Net Days	17		20		20		14		26		97	

[1]See list of fish species for abbreviation definitions.
[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 Crooked Cr., Hell Cr., Sutherland Cr., Snow Cr.
[6]Upper Missouri Arm: Timber Cr., Fourchette Bay, Seven Blackfoot, Crooked Cr.

Table 7. A summary of walleye size and catch rates in 125-foot experimental gill nets for areas of Fort Peck Reservoir, 1993 to 2002.

			Length (in.)		Weight (lbs.)			Net Sets	
Area	Year	No. Sampled	Avg.	Range	Avg.	Range	% >1.0#	Total No. Sets	/ Set
Big Dry Arm	2002	124	17.2	8.1-29.2	2.6	0.20-10.0	45.2	37	3.4
	2001	139	16.4	6.9-30.0	2.4	0.10- 9.9	38.8	22	6.3
	2000	108	15.4	8.2-28.0	1.8	0.10- 8.0	37.0	34	3.2
	1999	124	12.7	7.7-29.3	0.8	0.10- 8.6	23.4	33	3.8
	1998	214	13.1	6.0-31.0	1.1	0.10-11.9	24.0	44	4.9
	1996	159	15.6	6.9-31.4	1.8	0.10-10.2	50.0	48	3.3
	1995	120	16.5	7.6-30.9	2.6	0.10-11.5	48.0	48	2.5
	1994	73	15.8	4.6-29.9	2.3	0.05-10.5	40.0	46	1.6
	1993	162	14.7	5.0-31.2	1.8	0.04-11.8	34.6	44	3.7
Lower Reservoir	2002	49	18.1	7.5-27.3	2.8	0.10- 7.3	59.2	20	2.5
	2001	27	19.1	6.9-31.3	3.5	0.10- 9.4	70.3	12	2.3
	2000	30	15.6	8.3-29.8	2.1	0.20- 9.4	36.7	12	2.5
	1999	48	16.0	7.1-29.4	2.2	0.10- 9.5	54.2	14	3.4
	1998	46	16.1	5.5-25.6	2.0	0.15- 6.0	48.7	18	2.6
	1996	57	16.6	7.4-29.6	2.0	0.10- 9.4	80.0	20	2.9
	1995	75	16.6	9.2-29.2	2.0	0.20-11.1	69.0	16	4.7
	1994	25	16.3	8.7-27.8	2.6	0.30- 8.9	36.2	20	1.3
	1993	45	16.7	6.9-28.5	2.5	0.10- 9.8	50.6	20	2.3
Middle Reservoir	2002	52	20.2	10.7-30.2	4.0	0.30-10.4	75.0	14	3.7
	2001	50	19.5	8.8-29.1	3.6	0.20- 9.2	68.0	16	3.1
	2000	70	20.0	8.5-29.9	3.6	0.20- 8.6	75.7	24	2.5
	1999	98	14.5	7.6-29.5	1.5	0.10- 9.8	31.6	19	5.2
	1998	122	17.8	5.0-30.2	2.9	0.10-10.2	59.6	24	5.1
	1996	111	18.0	8.7-30.0	2.6	0.20-10.7	74.0	24	4.6
	1995	96	17.1	7.6-30.5	2.6	0.10-11.3	72.0	24	4.0
	1994	38	16.6	7.8-29.7	2.8	0.10-11.4	42.1	24	1.6
	1993	50	15.3	6.8-28.8	2.2	0.10-10.7	38.4	24	2.1
Upper Reservoir	2002	98	15.9	6.9-31.2	2.6	0.10-10.5	37.8	26	3.8
	2001	56	17.1	7.6-26.8	2.6	0.10- 8.2	44.6	20	2.8
	2000	42	15.0	7.7-30.8	1.8	0.20- 9.2	26.2	18	2.3
	1999	59	14.1	7.6-30.5	1.4	0.10-11.2	22.0	12	4.9
	1998	71	13.8	4.0-27.0	1.1	0.10- 7.9	31.8	15	4.7
	1996	42	16.3	5.2-30.9	2.3	0.05-11.1	50.0	16	2.6
	1995	42	15.5	7.1-32.4	2.3	0.10-13.1	52.0	16	2.6
	1994	10	11.9	7.9-15.2	0.6	0.10- 1.2	22.3	12	0.8
	1993	6	16.7	10.6-25.6	2.3	0.30- 6.5	33.2	8	0.8

1988, 1994, and 1995 (Figure 18). A stronger group of fish between 12-15 inches appears to be moving into the fishery, this group of fish represents 3 and 4-year-old fish. With declining forage, these fish should become more abundant in the angler creel than in past years. The reduction in abundance of 8 and 9 inch fish since 1999, may indicate survival of stocks have been diminished as reservoir elevations decline. Walleye from 25 to 26 inches appear to be abundant for the larger walleye with catch rates of about 0.2 per net for each inch group. Nearly all walleye less than 20 inches were sacrificed to collect otoliths for OTC analysis.

Condition factors of walleye from 1994 to 1996 and 1998 to 2002 show little significant difference (Figure 19). Condition overall improves for fish greater than 21 inches. Average weight by inch group also shows little change from 1998 to present (Figure 20). Relative weights of walleye from 10 to 14 inches and 14 to 18 inches showed improvement from 2001, exceeding values since 1996 (Figure 21). It is expected the relative weights of walleye greater than 18 inches will be maintained over 90 next year, however declines will become obvious in 2003 for walleye less than 14 inches, and begin to drop for walleye from 14-18 inches due to poor reproduction of cisco in past years (Figure 22) and most likely a poor 2003 cisco year class combined with poor recruitment of shoreline forage (Figure 23). Angler catch rates of walleyes less than 18 inches should increase noticeably in 2003, as smaller walleye become hungry.

Proportional stock density (PSD) and relative stock density-preferred (RSD-P) are measures of balance for fish populations. The measures are percents of fish captured at substock (<10"), and numbers of fish of each size and larger for stock (> 10"), quality (>15"), and preferred (>20") size fish. Changes in percents in each group can be from increases or decreases in recruitment and natural or fishing mortality. In 2002, PSD remained stable, indicating good number of mid-size fish. Anderson and Weithman (1978) models of walleye PSD's suggest a range of 30-60% as favorable values for walleye populations, since 1984 Fort Peck would have fallen into the favorable category described. RSD-P decreased from 44% in 2001 to 14% in 2002, showing a better ratio of fish over 20 inches (Table 8). A ratio between 10% and 20% is considered desirable as a PSD-P. The young to adult ratio (YAR) decreased from 39% in 1999 to 14% in 2000 and to 8% in 2001, with a moderate increase to 11% in 2002. A ratio of 20% to 30% would be considered good for YAR. Recruitment has declined for the fish less than 10 inches. As anticipated, the YAR remained low in 2001and 2002, reservoir levels dropped well below any shoreline vegetation in the spring and summer of 2002. It is expected poor recruitment will result from a lack of cover. This poor recruitment will likely prevail until shoreline vegetation is covered before fry are stocked, or at minimum, before fingerling are stocked each June.

Northern Pike

A total of 144 northern pike were captured in 2002, by gill netting, for a catch rate of 1.5 per net (Table 9). Although the catch rate in 2002 was higher than 2001, overall the catch rate continues to drop, approaching catch rates measured during the 1980's (Figure 24). Since the large 2001 year class of cisco, it was suspected 2002 would demonstrate the highest average size and relative weights measured on Fort Peck for northern pike. Average size did increase, but relative weights dropped. Since 1983, the highest recorded average length and weight was in 1993, at 28.3 inches and 6.4 pounds. Average length and weight in 2002, was 29.5 inches and 7.2 pounds. Only 5% of the northern pike caught were smaller than 20 inches with the most common inch size being 28 inches (Figure 25). Condition factors of northern pike in 2002 remained high, at 25.2. As the population consists of larger adults, high average condition should be maintained as their diets consist of cisco. Relative weights decreased from 2001, but remained high overall. This trend will likely continue if the population is comprised of large adults feeding on cisco. Northern pike length categories for stock, quality, and preferred are 14 inches, 21 inches, and 28 inches. Northern pike PSD and PSD-P were 94% and 62%, respectively. In 2001, PSD and RSD-P were 94% and 56% respectively, 2000, PSD and PSD-P were 92% and 49%, respectively, and in 1999 they were 79% and 41%, respectively. This shows a poorly balanced population of fish, with a large number of quality size northern pike as a strong group of preferred size fish. The YAR remained low at 1%, which indicates dismal reproduction. As reservoir levels continue to drop in spring, it is anticipated recruitment will continue to be poor. A request to stock 200,000 fingerlings was placed in 2002. North Dakota was able to supply 160,000 pike fingerling for stocking. Another request has been placed for 2003 at 200,000 fingerlings.

Figure 18 gillnet length frequency of wae

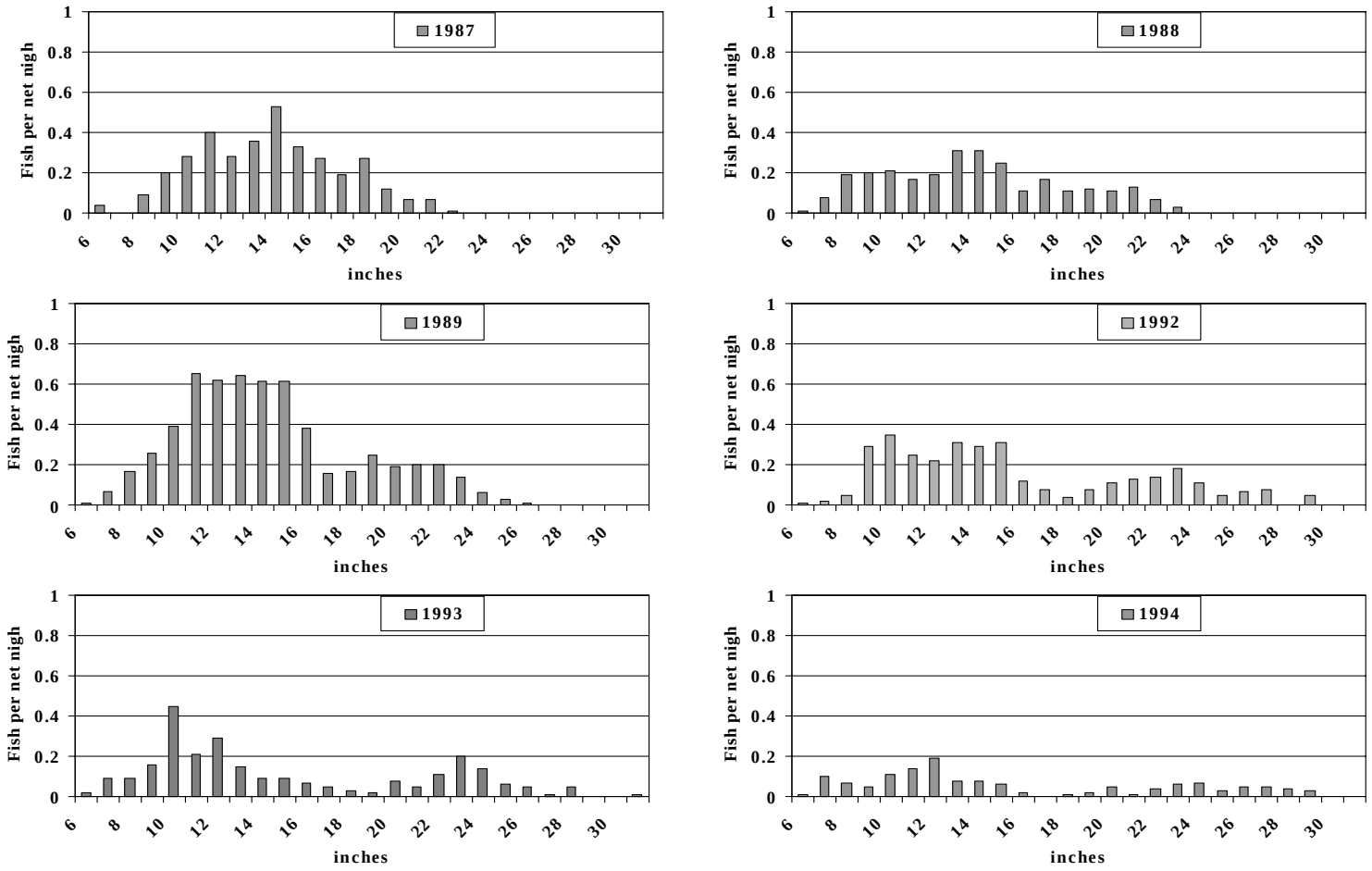

Figure 18. Length Frequencies of walleye gill netted on Fort Peck Reservoir 1987-2002.

Figure 18continued

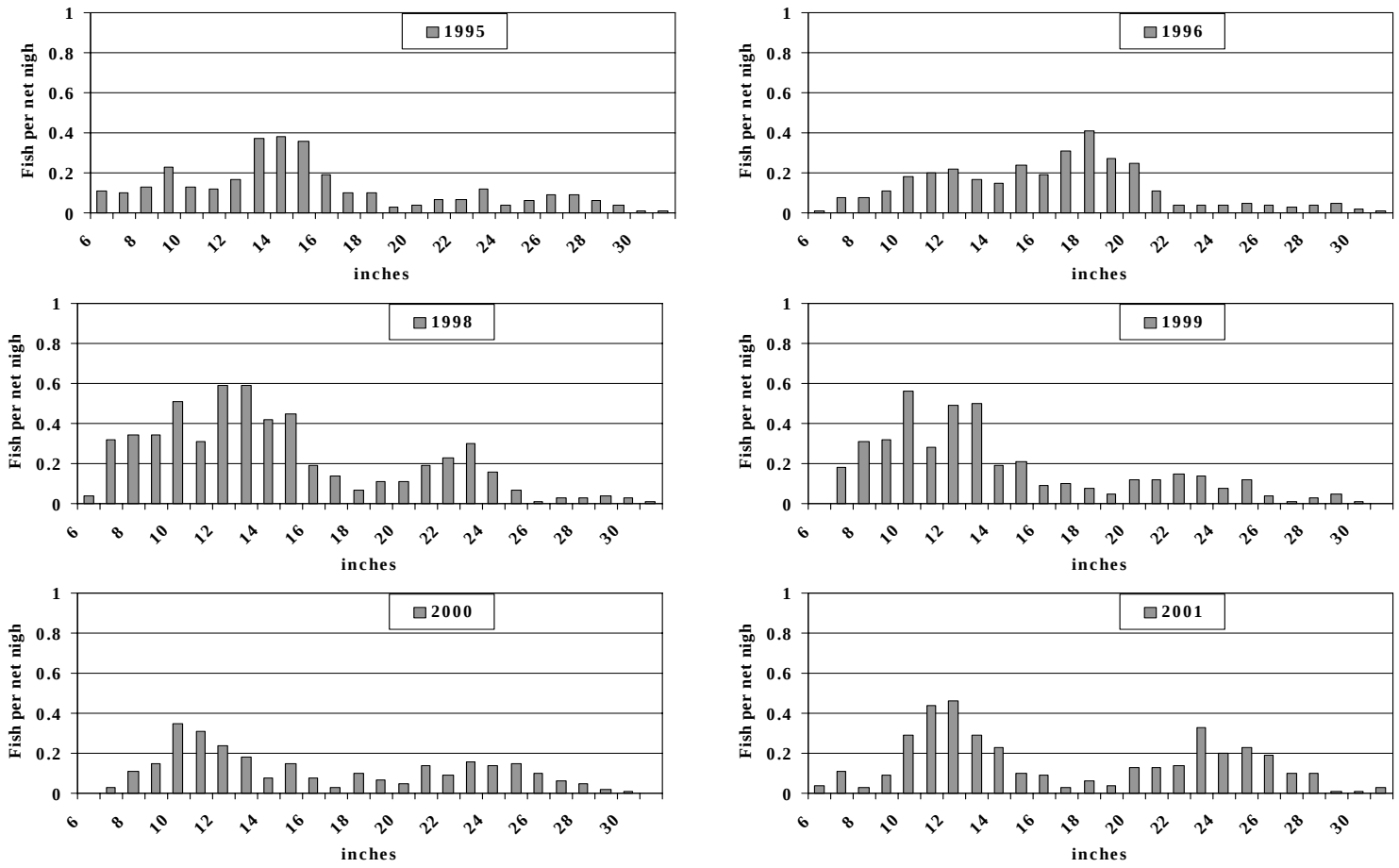

Figure 18. (Continued) Length Frequencies of walleye gill netted on Fort Peck Reservoir 1987-2002.

Figure 18 continued

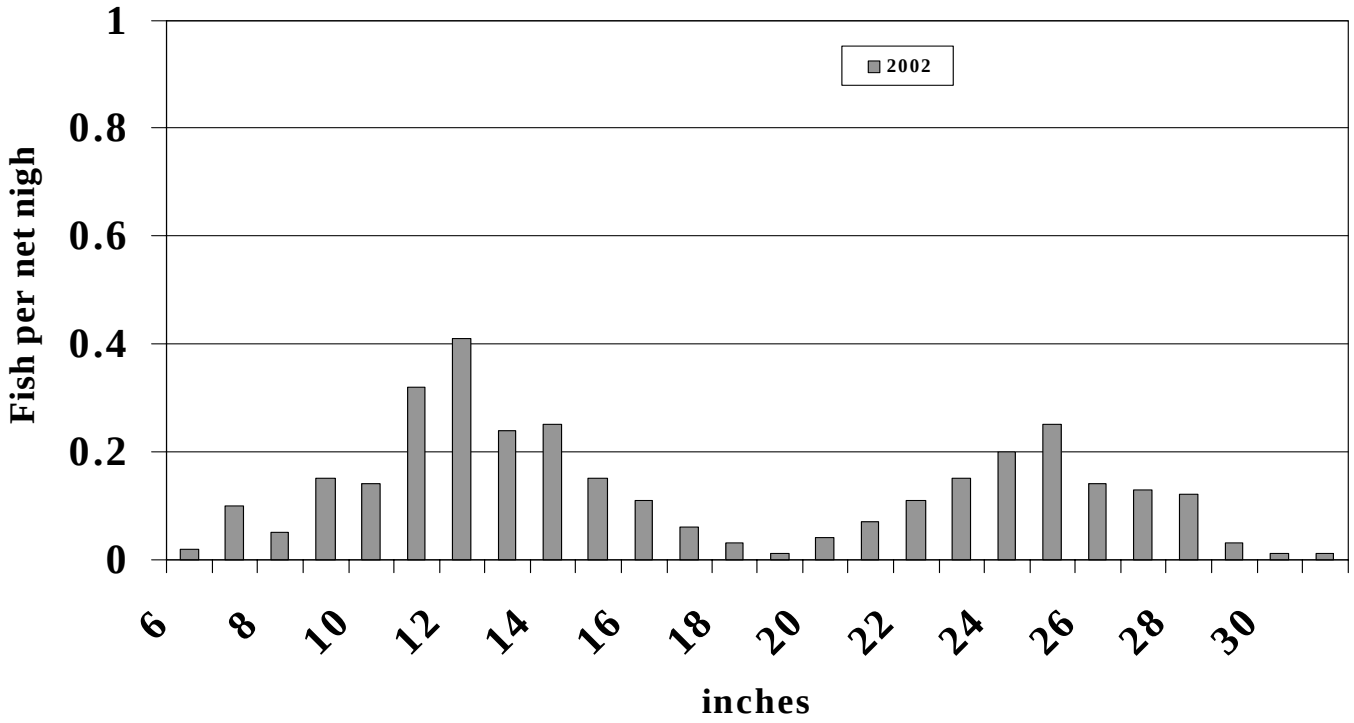

Figure 18. (Continued) Length Frequencies of walleye gill netted on Fort Peck Reservoir 1987-2002.

Figure 19 cf of walleye in gillnets by inch group
Figure 20 average weight of walleye by inch group

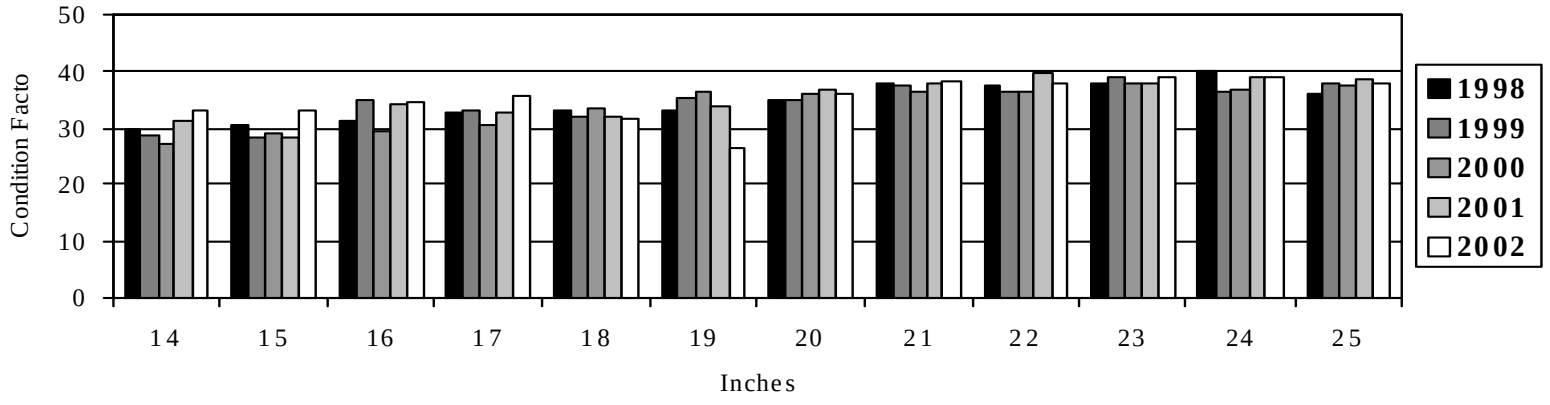

Figure 19. Average condition factors for various 1-inch length groups of walleye gill netted in Fort Peck Reservoir, 1998-2002..

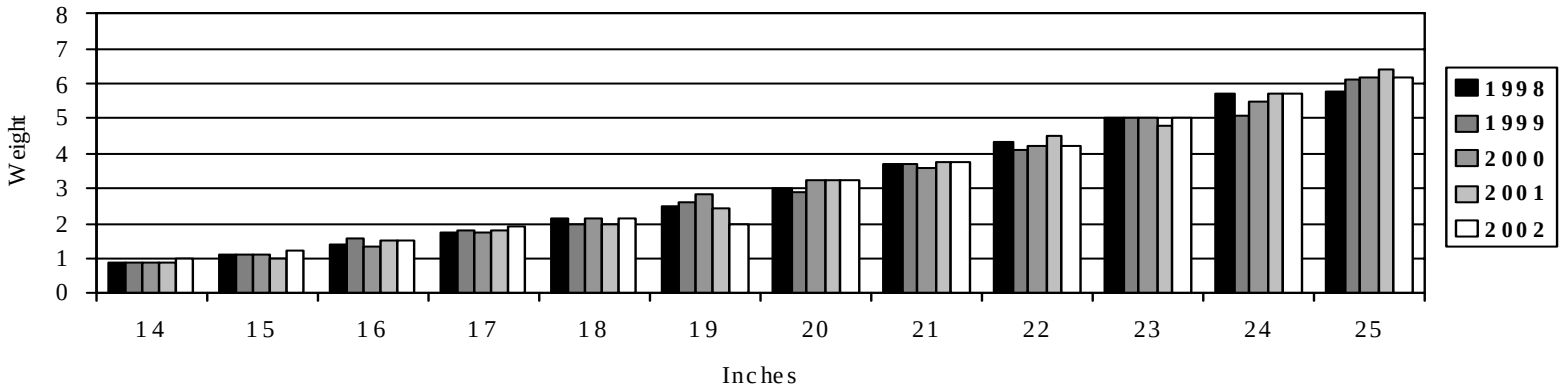

Figure 20. Average weights for various 1-inch length groups of walleye gill netted in Fort Peck Reservoir, 1998-2002.

Figure 21 relative weights of walleye size groups

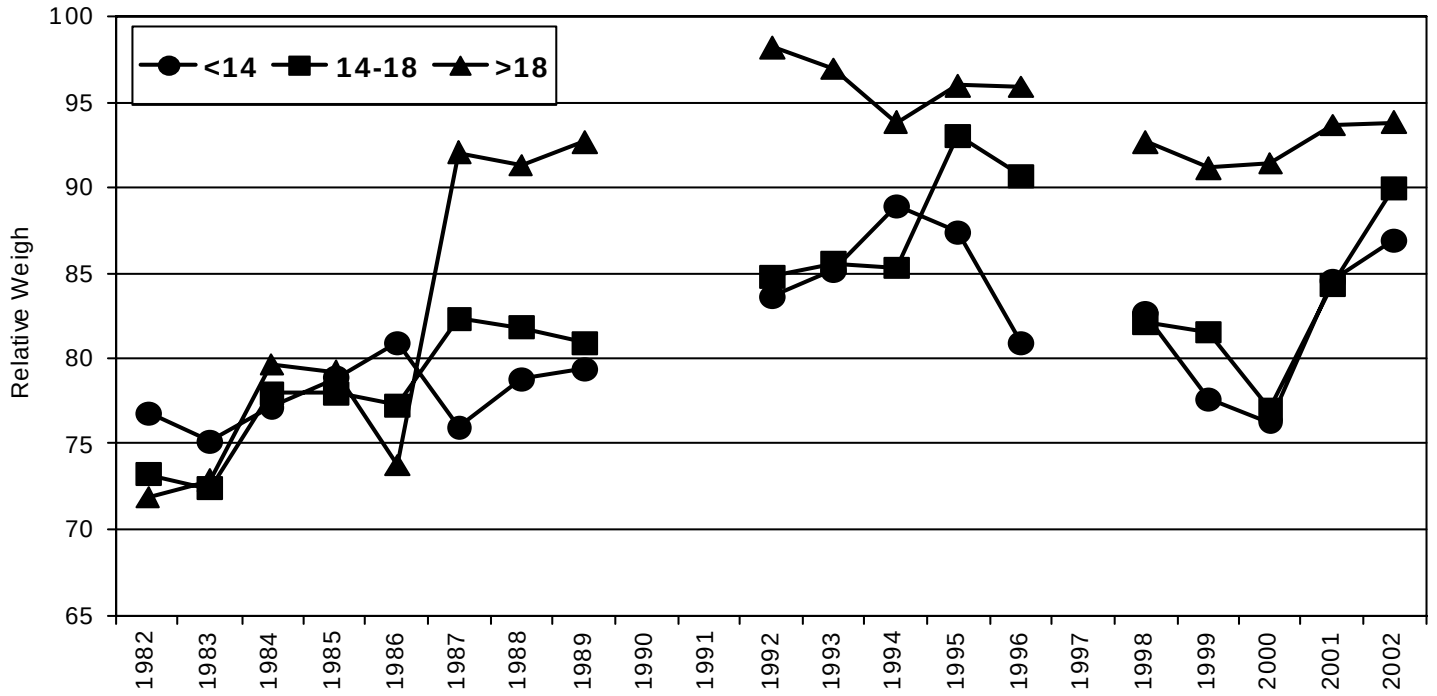

Figure 21. Relative weights of various length groups of walleye collected with gill nets on Fort Peck Reservoir, 1981-2002.

Figure 22 condition factor to cisco
Figure 23 cf to shoreline forage

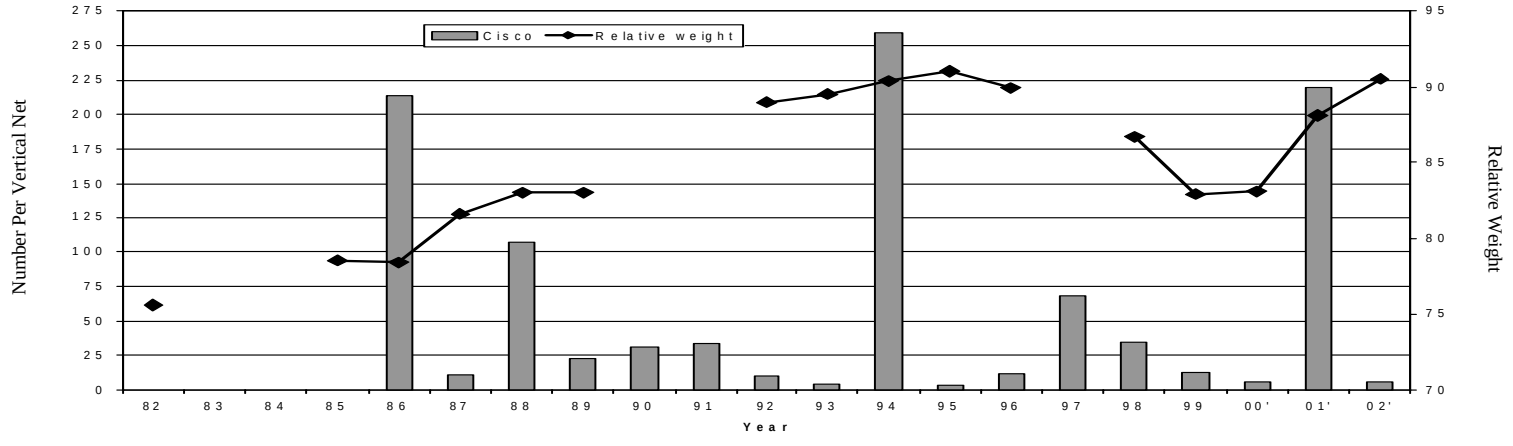

Figure 22. Walleye relative weight related to cisco young-of-year production on Fort Peck Reservoir from 1982 to 2002.

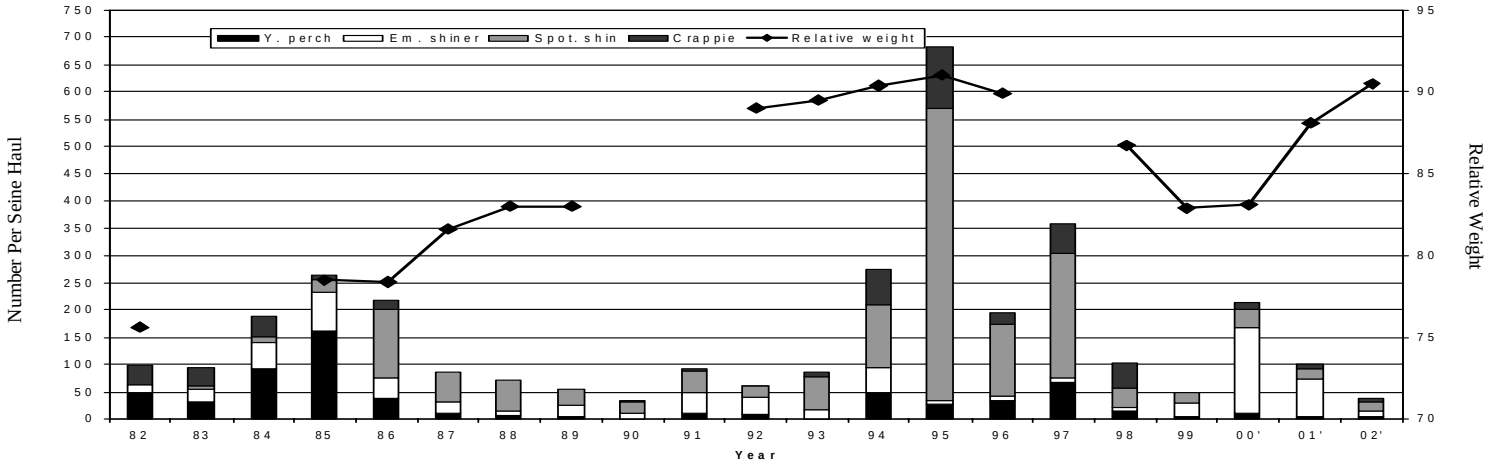

Figure 23. Walleye relative weight related to major forage fish abundance on Fort Peck Reservoir from 1982 to 2002.

Table 8. Proportional and relative stock density, along with young adult ratio of walleye sampled during lake-wide gill netting of Fort Peck Reservoir, 1984-2002 (no data for 1990-1991 and 1997).

Year	No.	Sub-Stock	Stock[1]	Quality[2]	Pre-ferred[3]	PSD[4]	RSD-P[5]	YAR[6]
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%
1996	365	30	335	229	76	68%	23%	9%
1998	413	68	345	164	89	48%	26%	20%
1999	272	64	165	44	43	27%	27%	39%
2000	250	31	219	120	84	55%	38%	14%
2001	272	19	253	134	112	53%	44%	8%
2002	323	32	291	165	41	57%	14%	11%

[1]Stock is the sum of all walleye greater than 10 inches.
[2]Quality is the sum of all walleye greater than 15 inches.
[3]Prefered is the sum of all walleye greater than 20 inches
[4]PSD is the proportional stock density (Quality/Stock)
[5]RSD-P is the relative stock density, preferred (Preferred/Stock)
[6]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 of Fort Peck Reservoir from 1983 to 2002.

						Net Sets	
Year	No. Sampled	Average Length	Average Weight	Average CF	Average Rel-Wt.	Total Sets	No./ Set
1983	40	21.2	3.2	21.4	95.6	88	0.5
1984	52	20.8	2.4	21.1	94.0	84	0.6
1985	36	24.1	3.5	22.1	97.8	87	0.4
1986	21	23.7	3.6	21.3	94.3	51	0.4
1987	60	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	47	24.4	4.5	25.0	110.2	69	0.7
1992	35	26.6	5.5	25.5	112.3	63	0.6
1993	47	28.3	6.4	26.0	113.9	74	0.6
1994	104	22.6	4.4	24.1	107.3	76	1.4
1995	295	20.1	2.5	25.6	114.6	78	3.8
1996	321	23.3	3.7	25.5	112.8	82	3.9
1998	231	24.7	4.3	23.8	104.6	74	3.1
1999	151	26.5	5.1	23.4	103.2	78	1.9
2000	134	28.0	6.0	24.3	106.5	88	1.5
2001	73	28.6	6.5	25.2	110.6	70	1.0
2002	144	29.5	7.2	25.2	102.0	97	1.5

Figure 24 pike catch rates over time

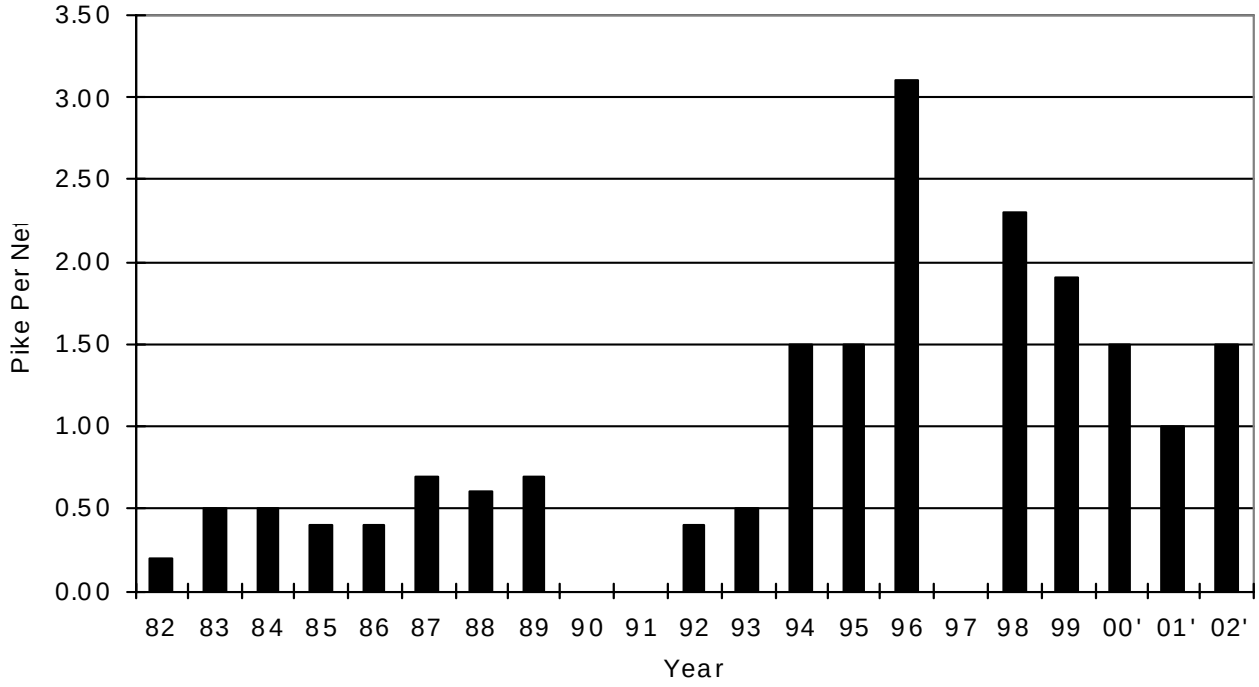

Figure 24. Average annual northern pike catch rates in gill nets from 1982 to 2002.

Figure 25 Pike length frequency

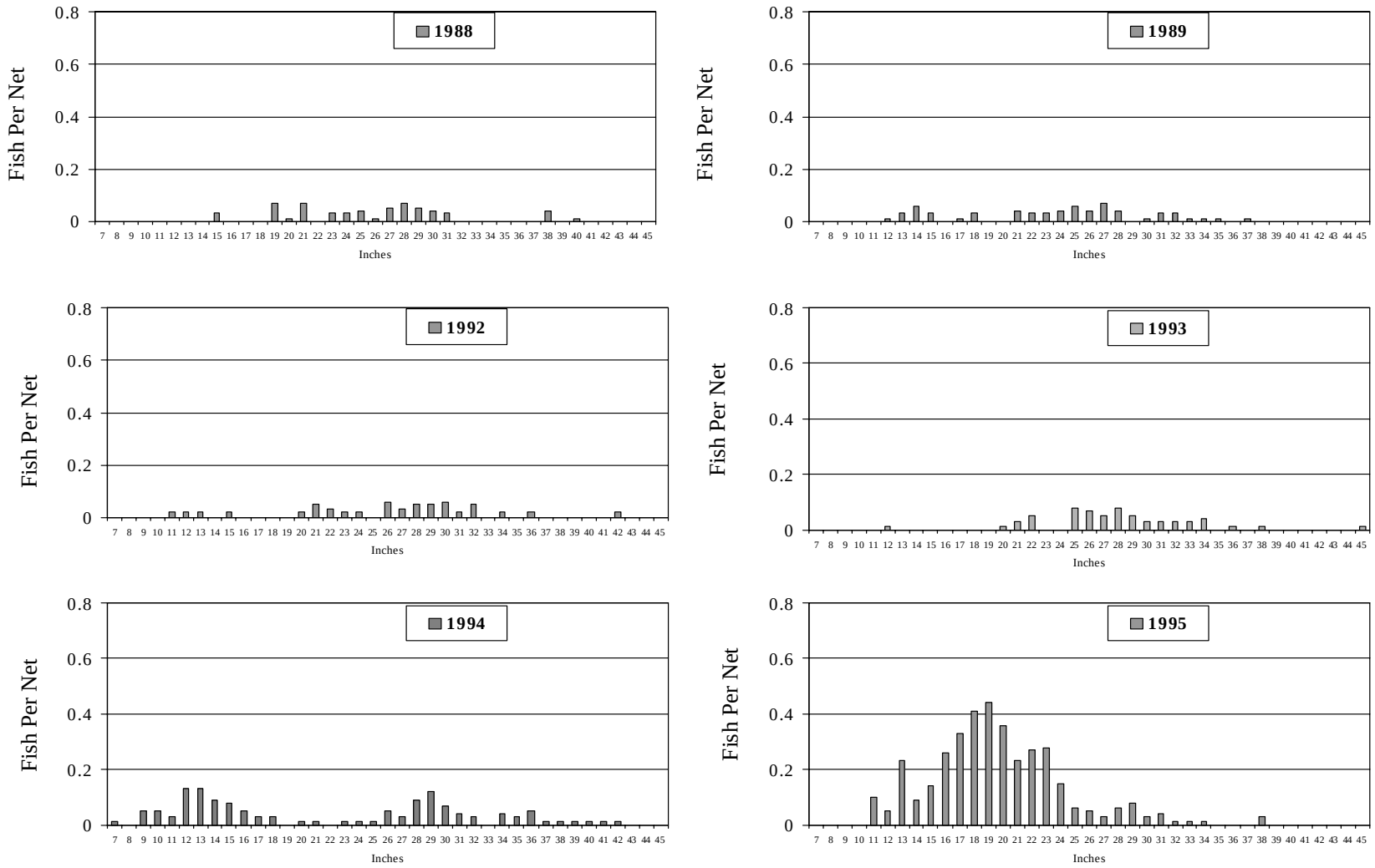

Figure 25. Length Frequencies of northern pike gill netted on Fort Peck Reservoir 1988-2002.

40

Figure 25 Pike length frequency continued

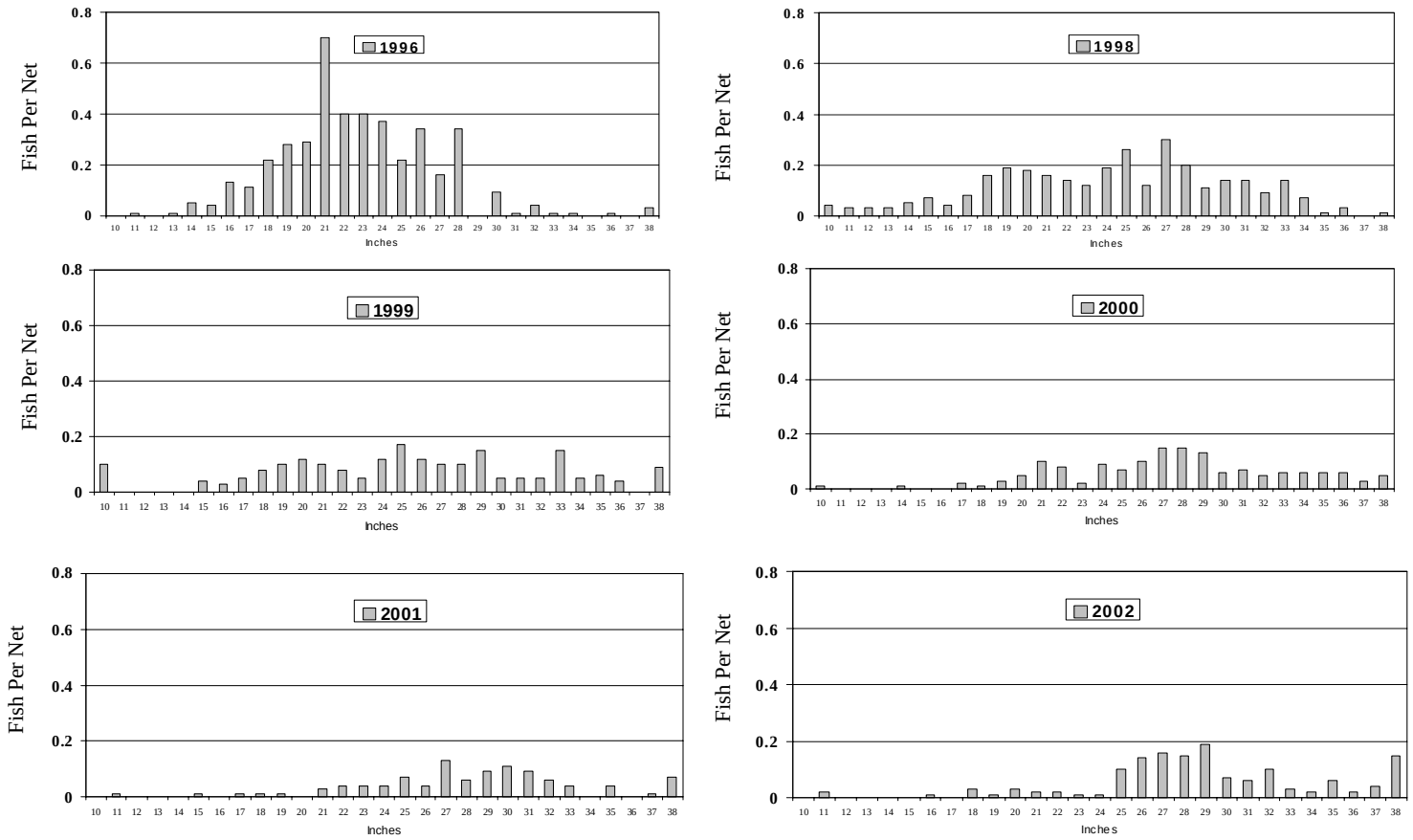

Figure 25. (Continued) Length frequency of northern pike gill netted on Fort Peck from 1988-2002.

Channel Catfish

A total of 145 channel catfish were captured in 2002 by gill netting, for a catch rate of 1.5 per net. Average length and weight continue to remain high at 18.0 inches and 2.1 pounds (Table 10). Highest catch rates were in the Upper Missouri Arm and Upper Big Dry at 2.8 and 3.0 per net, respectively. The lowest catch rate was in the Lower Missouri Arm at 0.1 fish per net. It is not clearly understood why the high catch rate of channel catfish in 2001 (3.2 per net) returned to a more normal catch rate of 1.5 per net in 2002 (Figure 26). North Dakota Lake Sakakawea reported an unusually high catch rate of catfish in 2002, similar to the rise documented in 2001 in Peck (Per. Com. Jeff Hendrickson NDG&F Feb 2003).

Sauger

Sauger numbers have declined in Fort Peck Reservoir since 1985 (Figure 26). Gill net data from 1983 to 2002 shows a steady decline since a peak in 1985, with a catch rate over 5 fish per net. The 2002 catch rate was 0.3 fish per net. This population relies on natural reproduction from the Missouri River. Average size of the 26 sauger in 2002 was 15.2 inches and 1.5 pounds The highest catch rate for sauger was found in the Upper Missouri Arm with 0.7 fish per net (Table 6). Only one sauger was captured in the entire Big Dry Arm in 2002. Abundance increases in the reservoir as sampling approaches the Missouri River.

STOMACH CONTENTS OF GILLED GAME FISH

Stomachs of 280 walleye, 128 northern pike, 22 sauger, and 11 smallmouth bass killed in gill nets were examined for forage items (Table 11). Walleye had the most diverse diets with several species of fish and invertebrates. Cisco were the most common identifiable fish found in the diets of walleye, northern pike, and sauger at 11.8%, 25.8%, and 9.1%, respectively. Unknown fish were commonly found items in the diets of walleye, northern pike, and sauger with 30.0%, 13.0%, and 14.8%, respectively. Most unidentified fish are likely cisco, particularly in the larger fish. Most fish had empty stomachs, walleye 46.1%, northern pike 57.0%, sauger 54.5%, and bass 36.4%. Eight young-of-year salmon were also captured in experimental nets, their stomach contents included insects, unknown fish, which appeared to be emerald or spottail shiners, and one had a small goldeye.

Stomachs of 103 walleye, 31 northern pike, 11 sauger, and 3 smallmouth bass killed in alternating gill nets were examined for forage items as well (Table 11) Walleye had the most diverse diets with unidentified fish being the most common item, most appeared to be small cisco and minnows. Cisco made the bulk of the diet for northern pike captured and cisco were likely the largest portion of the unidentified fish. The 11 sauger caught had mostly empty stomachs, however 27% had unidentified fish, most of which seemed to be cisco. Of the 3 bass which died, 2 had empty stomachs and 1 had a perch. All walleye less than 20 inches were sacrificed to collect otoliths, hence a large sample size of small walleye stomachs for analysis.

LAKE-WIDE ALTERNATING NETTING

A multifilament net was used in 2001 and 2002 with alternating 25 foot panels creating a 125 feet long net consisting of ¾ inch, 1 inch, ¾ inch, 1 inch, and ¾ inch panels was used to capture walleye less than 15 inches. The intent of the gear is to replace the monofilament netting to obtain information on yearling to 4 year-old walleye, and increase sample size of potentially OTC marked walleye. Information from this net may lead to a method to better evaluate recruitment of year classes based on changing stocking rates. All walleye less than 20 inches were sacrificed so collection of otoliths could be conducted for OTC evaluation.

Thirty-eight nets captured 872 fish representing 19 species, for a catch rate of 22.9 fish per set. Goldeye, yellow perch, cisco and walleye were the most abundant species captured with catch rates of 9.3, 2.5, 2.3 and 3.0 fish per net, respectively. Carp and northern pike had catch rates exceeding 1 fish per net night. The remaining species had catch rates less than 1 fish per net night (Table 12). The overall catch rate of this net is similar to the experimental nets, so time-wise in combination with experimental gill netting, 135 l

Table 10. Summary of the channel catfish caught during summer gill netting in areas of Fort Peck Reservoir, 1984-2002.

Year	Number	No./Net	Average Length	Average Weight
1984	167	2.0	14.2	0.9
1985	115	1.3	14.5	1.1
1986	105	2.0	14.6	1.1
1987	53	0.7	15.3	1.2
1988	69	0.9	15.9	1.7
1989	99	1.4	16.5	1.5
1992	165	2.6	15.0	1.4
1993	68	0.9	14.9	1.4
1994	119	1.6	14.4	1.1
1995	123	1.6	16.3	1.6
1996	93	1.1	15.6	1.4
1998	91	1.2	18.0	2.3
1999	88	1.1	17.2	2.0
2000	122	1.4	17.5	2.0
2001	222	3.2	17.6	2.1
2002	145	1.5	18.0	2.1

Figure 26. Sauger and ccg net catch rate

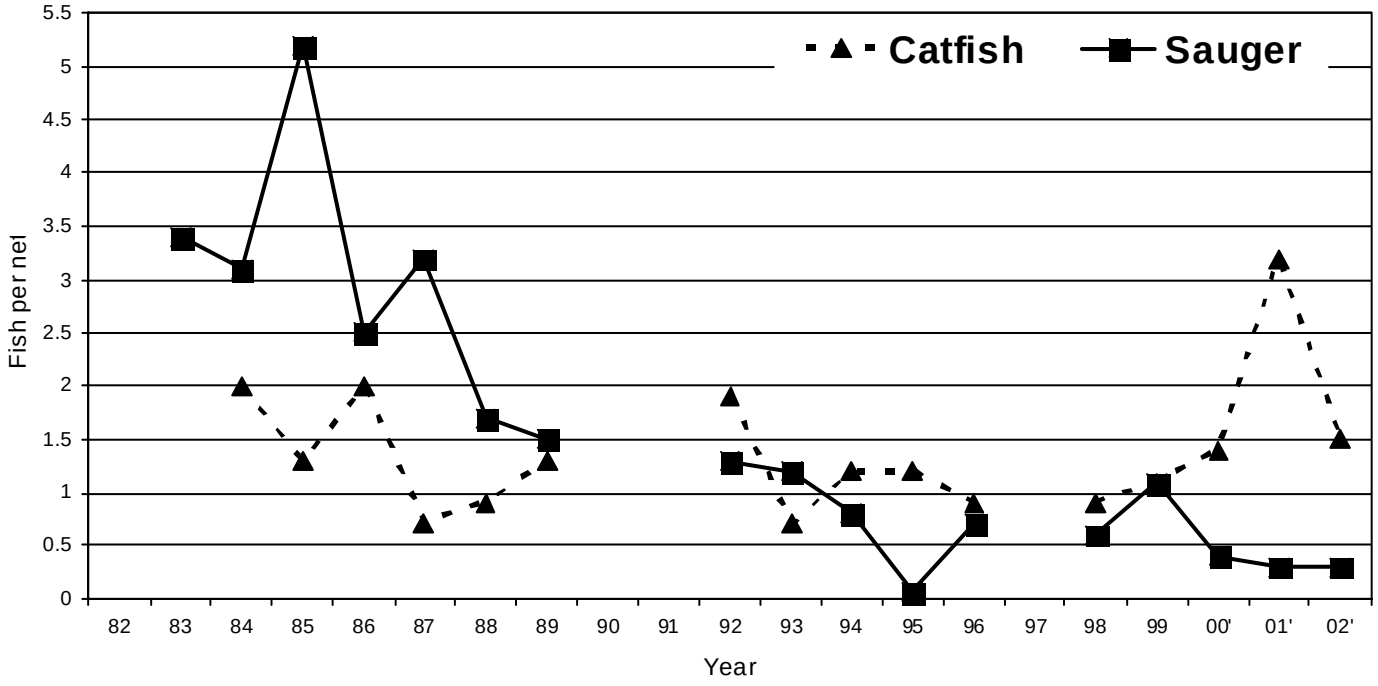

Figure 26. Channel catfish and sauger catch rates in lake-wide gill netting from 1982 to 2002.

Table 11. The percentage of various forage items found in stomachs of northern pike, sauger, walleye and smallmouth bass in 2002.

	Game Species							
	WAE SMB	WAE	NOP	NOP	SAR	SAR	SMB	
Net type[1]	Exp.	Alt.	Exp.	Alt.	Exp.	Alt.	Exp.	Alt.
Stomach #=s	280	103	128	31	22	11	11	3
Forage items								
Bigmouth buffalo	0.4%	----	----	----	----	----	----	----
Cisco	11.8%	1.0%	25.8%	16.1%	9.1%	----	----	----
Carp	----	----	----	3.2%	----	----	----	----
Crappie YOY	1.1%	2.9%	----	----	----	----	----	----
Emerald shiner	0.4%	----	----	----	----	----	----	----
Freshwater drum	0.7%	2.9%	----	----	9.1%	----	----	----
Goldeye	----	1.9%	1.6%	----	----	----	----	----
Northern pike	0.4%	----	----	3.2%	----	----	----	----
Smallmouth buffalo	----	----	0.8%	----	----	----	----	----
Smallmouth bass	0.4%	----	----	----	----	----	----	----
Spottail shiner	2.1%	1.0%	----	----	----	----	----	----
Walleye	----	1.0%	0.8%	----	----	----	----	----
Yellow perch	0.4%	----	----	----	4.5%	----	----	
	33.3%							
Unidentified fish	30.0%	30.1%	14.8%	19.4%	22.7%	27.3%	36.4%	----
Crayfish	----	----	0.8%	----	----	----	9.1%	----
Insects[2]	12.1%	8.7%	0.8%	6.5%	----	----	18.2%	----
Leech	0.4%	----	----	----	----	----	----	----
Empty	46.1%	53.4%	57.0%	54.8%	54.5%	72.7%	36.4%	
	66.7%							

1 Exp. = Experimental Alt = Alternating

2 Includes dragonfly larvae, hexagenia spp., and chironomid larvae.

Table 12. Fish captured by 125-foot alternating panel nets in Fort Peck Reservoir, 2002

Species[1]	UBD[2] No. Fish	UBD[2] No./ Net Day	LBD[3] No. Fish	LBD[3] No./ Net Day	LMA[4] No. Fish	LMA[4] No./ Net Day	MMA[5] No. Fish	MMA[5] No./ Net Day	UMA[6] No. Fish	UMA[6] No./ Net Day	Total No. Fish	Total No./ Net Day
BIB	----	----	----	----	----	----	----	----	1	0.1	1	<0.1
BLC	----	----	1	0.1	----	----	----	----	2	0.2	3	0.1
CCF	24	4.0	1	0.1	----	----	----	----	8	0.8	33	0.9
CHS	1	0.2	2	0.3	3	0.3	2	0.3	2	0.2	10	0.3
CIS	32	5.3	14	2.0	5	0.6	25	4.2	12	1.2	88	2.3
COC	8	1.3	7	1.0	5	0.6	6	1.0	19	1.9	45	1.2
CRA	----	----	----	----	----	----	1	0.2	----	----	1	<0.1
FRD	16	2.7	1	0.1	----	----	----	----	1	0.1	18	0.5
GOE All	26	4.3	10	1.4	59	6.6	73	12.2	187	18.7	355	9.3
Male	*18*	*3.0*	*3*	*0.4*	*21*	*2.3*	*27*	*4.5*	*37*	*3.7*	*106*	*2.8*
Female	*6*	*1.0*	*7*	*1.0*	*38*	*4.2*	*41*	*6.8*	*74*	*7.4*	*166*	*4.4*
Im.	*2*	*0.2*	----	----	----	----	*5*	*0.8*	*76*	*7.6*	*83*	*2.2*
LOS	----	----	----	----	----	----	----	----	1	0.1	1	<0.1
NOP	6	1.0	6	0.9	6	0.7	9	1.5	14	1.4	41	1.1
RIC	4	0.7	----	----	----	----	----	----	3	0.3	7	0.2
SAB	----	----	----	----	1	0.1	1	0.2	----	----	2	0.1
SAR	1	0.2	1	0.1	----	----	5	0.8	8	0.8	15	0.4
SHR	2	0.3	----	----	2	0.2	2	0.3	15	1.5	21	0.6
SMB	3	0.5	----	----	----	----	1	0.2	2	0.2	6	0.2
WAE	36	6.0	20	2.9	15	1.7	8	1.3	36	3.6	115	3.0
WHC	----	----	----	----	----	----	1	0.2	5	0.5	6	0.2
WHS	3	0.5	3	0.4	2	0.2	2	0.3	----	----	10	0.3
YEP	12	2.0	9	1.3	24	2.7	21	3.5	28	2.8	94	2.5
Totals	174	29.0	75	10.7	122	13.6	157	26.2	344	34.4	872	22.9
No. Net Days	6		7		9		6		10		38	

[1]See list of fish species for abbreviation definitions.
[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 Crooked Cr., Hell Cr., Sutherland Cr., Snow Cr.
[6]Upper Missouri Arm: Timber Cr., Fourchette Bay, Seven Blackfoot, Crooked Cr.

nets were set in the summer of 2002. The results from the two net types cannot be combined, although regional similarities exist, such as similar walleye catch rates for each lake region, however size structure of fish captured in the nets differ. The use of this net and experimental gill netting provides good tools to examine the fishery, netting at this year's effort required having 2 crews with 2 people in each boat. Typically only 3 people work summers under the current budget. If 4 people are not available in 2003 for netting, effort will be reduced.

Walleye

One hundred fifteen walleye were captured with 105 measuring less than 15 inches. Therefore, 91% of all walleye captured were targeted size walleye. The net was effective. Average length and weight was 10.8 inches and 0.6 pounds, respectively. The length frequency histogram indicates a strong size group of fish exists between 7 and 15 inches, representing 2 and 3 year old walleye (Figure 27). The average condition factor and relative weight were 30.7 and 88 respectively. The ranges for PSD and YAR don't apply to this type of netting as it was designed to increase catch of small fish and limit the number of larger fish. However, with more time to evaluate appropriate values, this may be a good tool to determine if a year class has adequate numbers of fish to provide angler satisfaction. The number of sub stock fish, stock size and greater and quality size and greater, was 47, 68, and 10 fish respectively. The resulting PSD would then be 15% and the YAR would be 69%. The relatively high number of sub stock fish may recruit into the experimental nets. With time, a relationship of year class strength from alternating nets to experiment nets should develop. This relationship must be measured with adequate samples of aged fish.

Northern Pike

Forty-one northern pike were captured for a catch rate of 1.1 per net. Although sample size is small, the range of size from the length frequency shows 5 fish less than 25 inches (Figure 28). This gear may also provide additional insight into northern pike recruitment before experimental gill nets. Average length, weight, condition factor, and relative weight were 31.4 inches, 9.0 pounds, 24.6, and 98.6, respectively. The PSD, PSD-P and YAR with this gear were 92%, 85%, and 5%, respectively. The PSD and PSD-P values were similar to the experimental gill net results, but the YAR ratio for the experimental nets was only 1%. This gear is more sensitive to northern pike production as well as walleye production.

Yellow Perch

This gear also shows promise in following the perch population, as it had a catch rate of 2.5 perch per set compared to a catch rate of 0.7 in experimental nets. In 2001 the catch rate was almost twice the catch rate as 2002 at 4.7 perch per net. The relative abundance of perch present may be related to changes in relative weights of game fish and may be used for future management changes. Figure 29 shows most perch in 2001 and 2002 were between 7 and 7.9 inches. The abundance of 5-6.9 inch perch declined substantially from 2001 to 2002. Age analysis of perch should be conducted with this gear to determine if growth is limited or if natural mortality is high for perch greater than 7 inches.

BEACH SEINING

Beach seining was conducted to determine reproductive success of sport and non-sport fish young-of-year, and forage fish (Table 13), and age 1+ sport and non-sport fish (Table 14) from August 6th to September 12th, 2002. Seine hauls at 101 locations captured 22 species for a total of 7,550 fish. The 2002-catch rate of 74.8 is nearly a 40% decrease from 2001, which had a catch rate of 114 fish per seine. The catch rate in 2000 was much higher at 400 fish per seine. The decrease in shoreline follows with declines in reservoir elevations (Figure 30). Changes from low elevations in August, the end of a growing season, to the following June high elevation indicate potential for reproduction (Figure 31). However the increase in 1986 in Figure 31 is insignificant as elevation change was dramatic after June of 1985 to June of 1986 as shown in Figure 30. Changes less than 3 feet above the previous year provide little needed habitat for forage fish to spawn over and for juveniles to use as cover. Despite a fairly stable summer reservoir elevation in 2001 (Figure 32), improved recruitment of emerald and spottail shiner was not documented in 2002 as hoped. Small summer spawning species such as emerald and spottail shiner likely do not fully recruit to the seine until age 1 or older. Yellow perch recruited poorly in 2001 and 2002. Only in the Upper Missouri Arm did catch rates exceed 100 fish per seine with a catch rate of 241 per sein

Figure 27 walleye length frequency from alternating nets

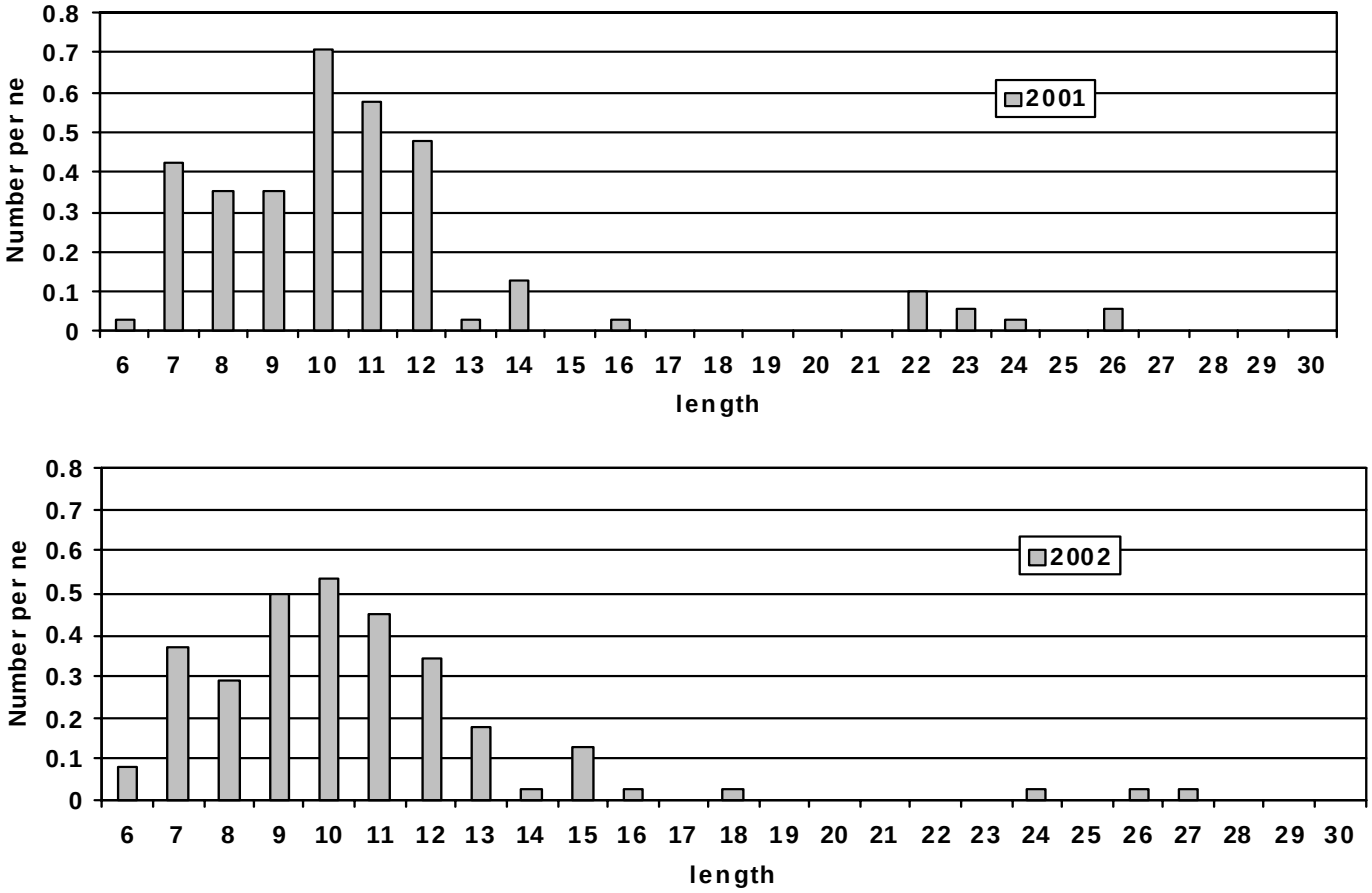

Figure 27. Length frequencies of walleye collected during lake-wide alternating gill netting on Fort Peck in 2001-2002.

Figure 28 pike lf from alt nets

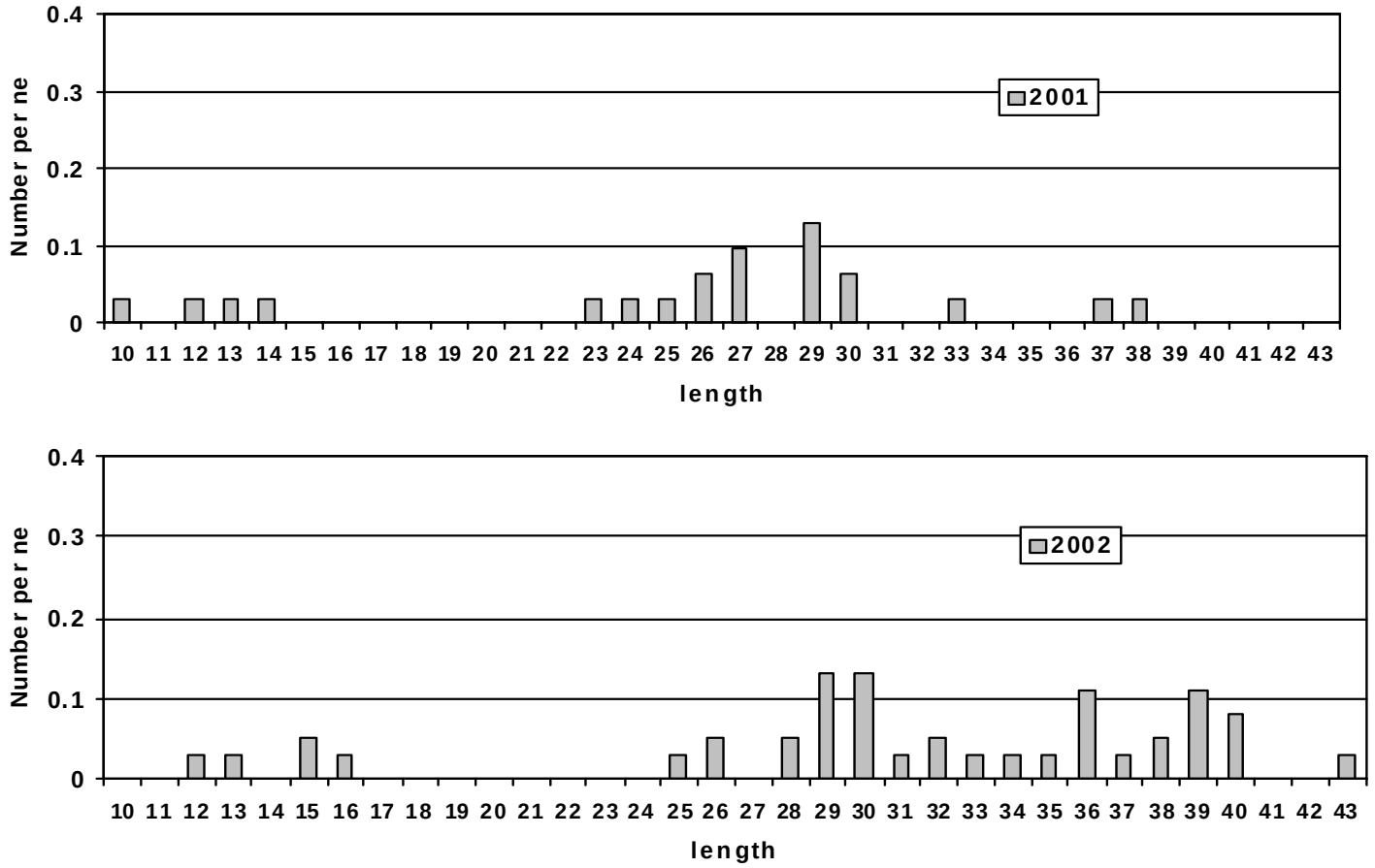

Figure 28. Length frequencies of northern pike collected during lake-wide alternating gill netting on Fort Peck in 2001-2002.

Figure 29 perch length frequencies

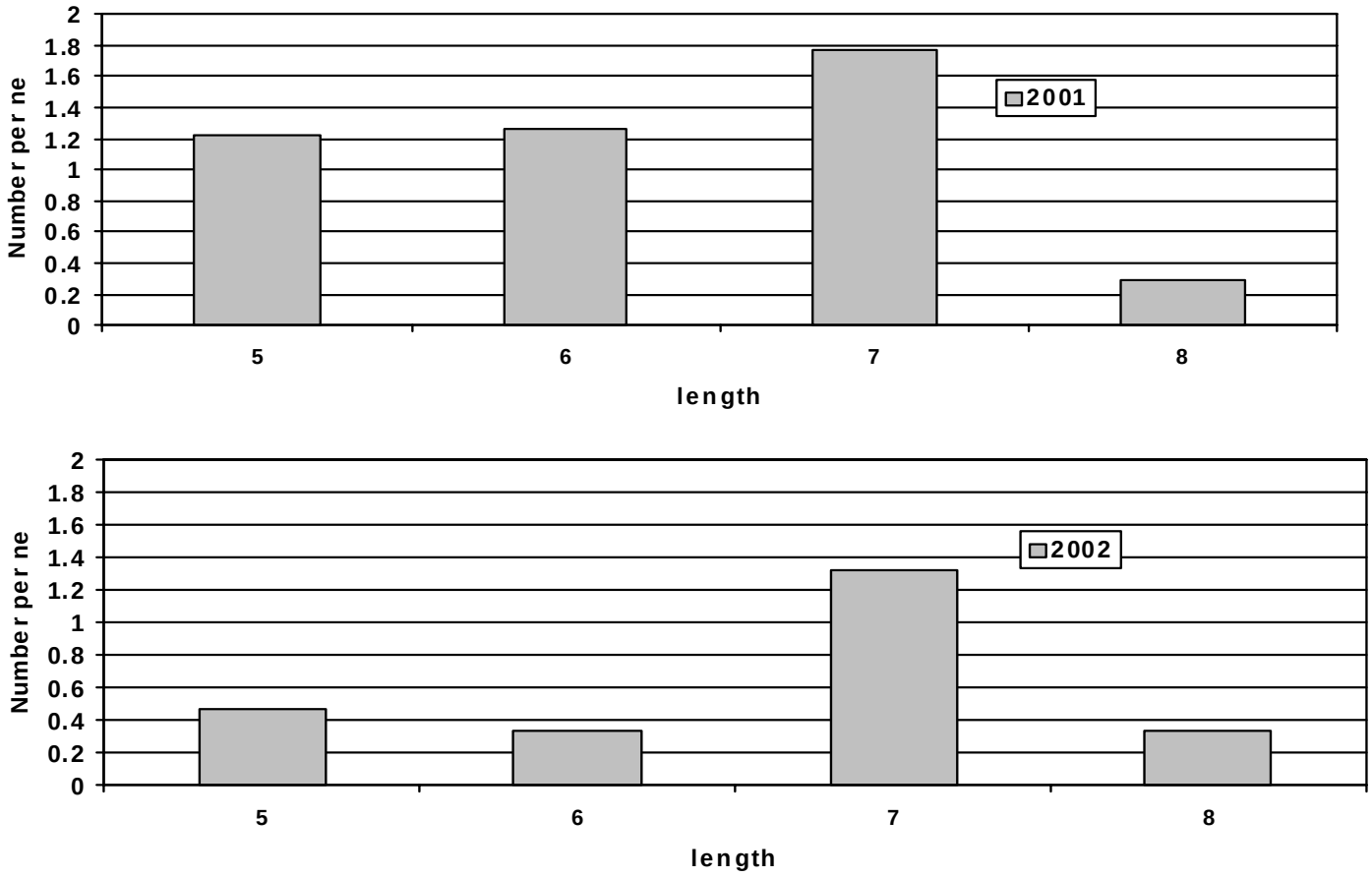

Figure 29. Length frequencies of yellow perch collected during lake-wide alternating gill netting on Fort Peck in 2001-2002.

Table 13. Species and number of forage minnows and young-of-year fish captured by seining in Fort Peck Reservoir, August 6th to September 12th, 2002.

	Upper Big Dry		Lower Big Dry		Lower Missouri Arm		Middle Missouri Arm		Upper Missouri Arm		Totals	
Species[1]	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul
BIB*	----	----	----	----	----	----	----	----	1	0.1	1	<0.
BLB	----	----	----	----	----	----	----	----	3	0.2	3	<0.1
CCF*	25	1.2	----	----	----	----	1	0.1	3	0.2	29	0.3
COC*	2	0.1	2	0.1	4	0.2	----	----	41	2.4	49	0.5
CRA*	154	7.3	69	3.3	----	----	162	10.1	287	16.9	672	6.7
EMS	318	15.1	25	1.2	22	0.8	150	9.4	454	26.7	969	9.6
FHM	6	0.3	----	----	----	----	----	----	----	----	6	0.1
FRD*	61	2.9	7	0.3	1	<0.1	7	0.4	148	8.7	224	2.2
GOE*	6	0.3	----	----	----	----	----	----	148	8.7	154	1.5
HBO	11	0.5	----	----	----	----	----	----	2102	123.6	2113	20.9
IOD	----	----	4	0.2	----	----	----	----	----	----	4	<0.1
LAC*	7	0.3	----	----	----	----	----	----	----	----	7	0.1
NOP*	4	0.2	12	0.6	10	0.4	7	0.4	----	----	33	0.3
RIC*	2	0.1	1	<0.1	----	----	----	----	52	3.1	55	0.5
SAB*	135	6.4	----	----	----	----	8	0.5	193	11.4	336	3.3
SAR*	----	----	----	----	----	----	1	0.1	51	3.0	52	0.5
SHR*	----	----	----	----	----	----	----	----	8	0.5	8	0.1
SMB*	71	3.4	63	3.0	20	0.8	29	1.8	40	2.4	223	2.2
SPS	210	10.1	169	8.0	947	36.4	22	1.4	435	25.6	1783	17.7
WAE*	----	----	----	----	----	----	----	----	39	2.3	39	0.4
WHS*	----	----	2	0.1	2	0.1	----	----	3	0.2	7	0.1
YEP*	101	4.8	6	0.3	9	0.3	235	14.7	86	5.1	437	4.3
Total	1113	53.0	360	17.1	1015	39.0	622	38.9	4094	240.8	7204	71.3

TOTALHAULS UBD= 21 LBD= 21 LMA= 26 MMA= 16 UMA= 17 TOTAL= 101

* Denotes young of year or small specimens for that species.

Table 14. Species and number of age 1 and older fish captured by seining in Fort Peck Reservoir, August 6th to September 12th, 2002.

	Upper Big Dry		Lower Big Dry		Lower Missouri Arm		Middle Missouri Arm		Upper Missouri Arm		Totals	
Species1	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul
CCF	2	0.1	2	0.1	----	----	1	0.1	15	0.9	20	0.2
COC	----	----	15	0.7	7	0.3	3	0.2	9	0.5	34	0.3
CRA	----	----	----	----	----	----	----	----	26	1.5	26	0.3
FRD	2	0.1	----	----	----	----	----	----	7	0.4	9	0.1
NOP	----	----	1	<0.1	----	----	1	0.1	1	0.1	3	<0.1
RIC	----	----	----	----	----	----	----	----	1	0.1	1	<0.1
SAB	1	<0.1	----	----	1	0.1	1	0.1	----	----	3	<0.1
SHR	----	----	1	<0.1	----	----	----	----	1	0.1	3	<0.1
SMB	5	0.2	5	0.2	10	0.6	10	0.6	9	0.5	37	0.4
WAE	----	----	----	----	----	----	----	----	7	0.4	7	0.1
YEP	----	0.1	95	4.5	61	3.8	61	3.8	21	1.2	203	2.0
Total	13	0.6	119	5.7	77	4.8	77	4.8	97	5.7	346	3.4

TOTALHAULS UBD= 21 LBD= 21 LMA= 26 MMA= 16 UMA= 17 TOTAL= 101

Figure 30 annual monthly peak elevations

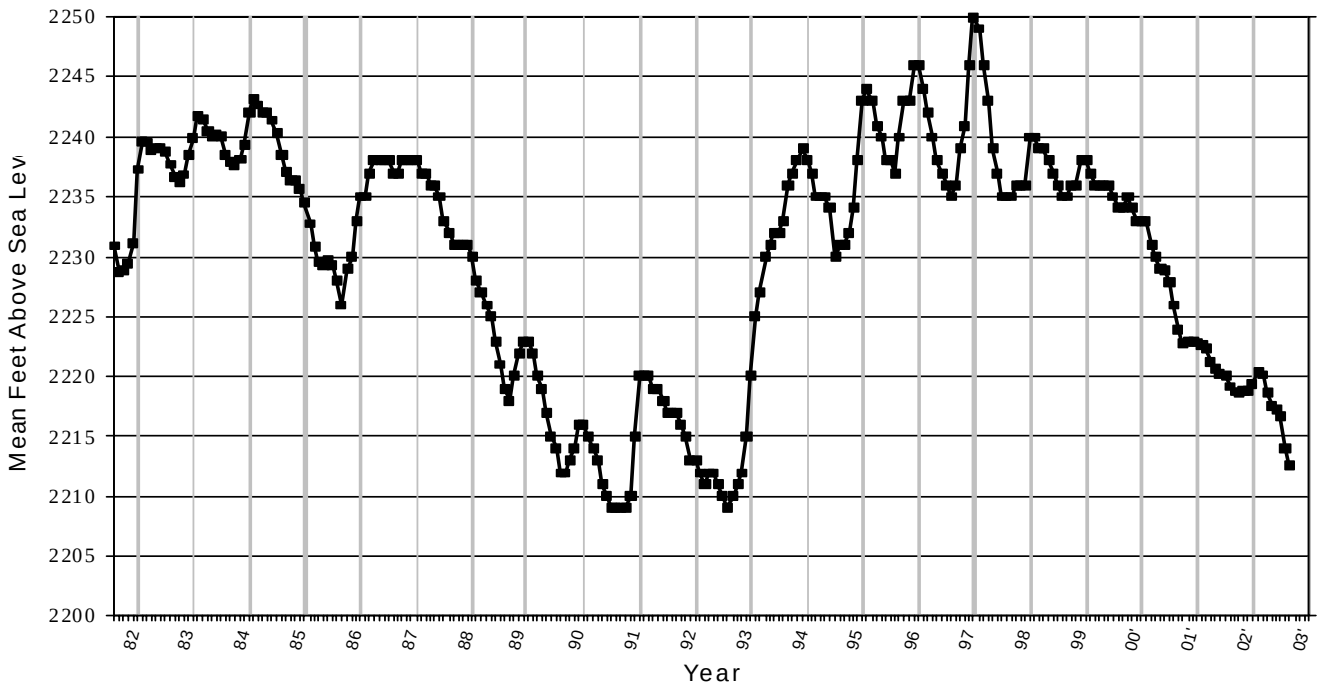

Figure 30. Annual peak monthly elevations on Fort Peck from January 1982 to February 2003 Gray bars .

Figure 31 changes in elevation from August to June of following year compared to seines

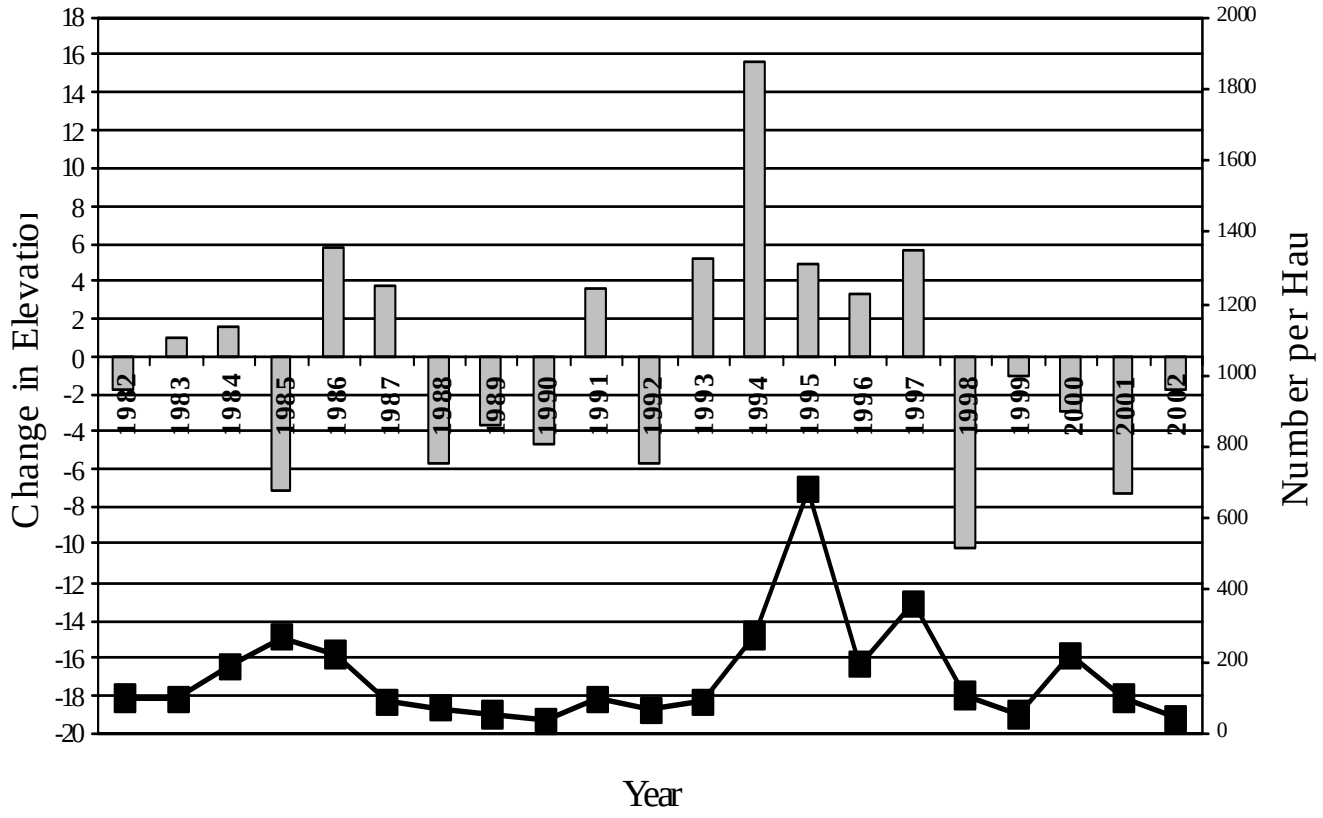

Figure 31. Change in elevation from peak in prior August to low in the following June compared to combined number of yellow perch and crappie young-of-year and total numbers of emerald and spottail shiners from 1982 to 2002.

Figure 32 2001 daily elevations

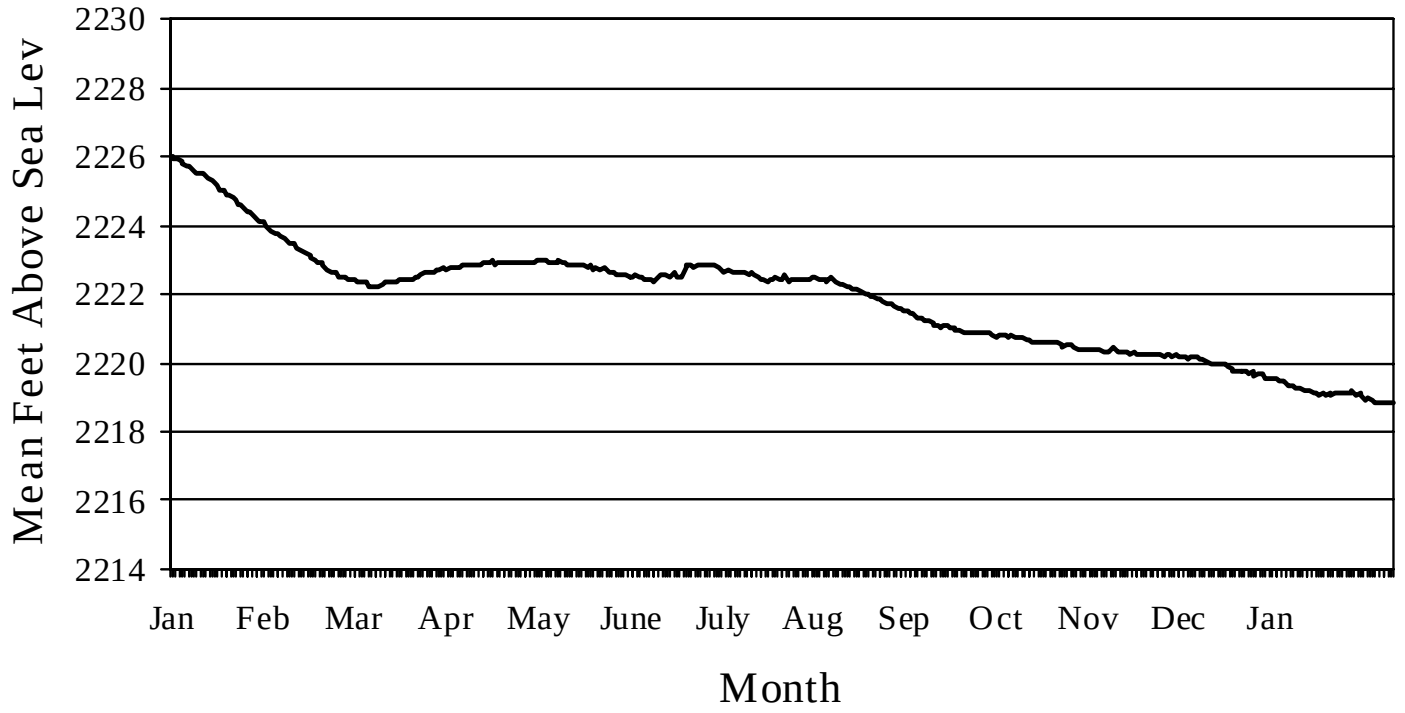

Figure 32. Daily average elevation from Jan 1, 2001 to January 31, 2002.

Hybognatus spp and spottail shiner made up 150 per seine on average of the 241 fish per seine in the Upper Missouri Arm.

Walleye

Walleye fingerling abundance was near normal for the last ten years (Table 15). The only region where walleye fingerlings were captured was in the Upper Missouri Arm. A total of 39 walleye fingerlings were caught with a catch rate of 0.4 per seine reservoir wide. Pyloric caecums were counted to identify *Stizostedion spp.* in question. Figure 33 shows an increase in fingerling catch rates since 2000. The upper most stock of walleye occurred in Snow Creek in 2002. Most of these fingerlings are likely a product of natural reproduction in the Missouri River.

Sauger

Sauger young-of-year were found mostly in the Upper Missouri Arm with a regional catch rate of 3.0 per seine, a ten fold regional catch rate from 2001. The overall catch rate of 0.5 per seine is a high value (Figure 33). The increase may be due to the reduction in the reservoir with sampling occurring in a more riverine environment. Age 1 + sauger were not captured in Fort Peck in 2001 or 2002 (Table 15).

Northern Pike

Northern pike were the least abundant game species captured in seines with a catch rate of 0.3 per seine. Northern pike fingerlings were captured in all areas except the Upper Missouri Arm similar to results from the 2001 seining effort. The largest catch rate was measured in the Lower Big Dry Arm with 0.6 per seine haul. Northern pike this year were usually captured near stocking areas; it appears the stock of pike at various boat ramps was successful. Figure 34 shows pike young-of-year numbers remain low particularly compared to the 1994 high of 14 per seine. Stocking of pike is anticipated in 2003 due to poor recruitment.

Smallmouth Bass

Smallmouth bass were the most abundant game species captured in seine hauls with a catch rate of 2.2 per haul. A reduction of more than half compared to 2001 (Figure 34). They were captured in all regions with the highest catch rates per seine in the Lower and Upper Big Dry Arm. Catch rates of bass are similar to levels prior to the filling of Fort Peck from 1994 to 1997. Smallmouth bass have successfully spread to all areas of Fort Peck. No smallmouth bass were stocked in Fort Peck in 2002. All fingerling represent natural reproduction.

Yellow Perch

Yellow perch were measured at the 3rd lowest abundance since 1990, with a catch rate of 4.3 per seine (Table 15). They were most abundant in the Middle Missouri Arm with a catch rate of 14.7 per seine. Catch rates in the remaining areas were between 0.3 found in the Lower Big Dry Arm and Lower Missouri Arm to 4.8 and 5.1 per seine in the Upper Big Dry and Upper Missouri Arm, respectively. The highest catch rate of age 1+ perch was in the Lower Big Dry Arm with a catch rate of 4.5 per seine. Lack of spawning structure and declining reservoir elevations likely are responsible for the decline in perch numbers (Figure 35).

Emerald Shiner

Emerald shiner numbers plummeted in 2002. The catch rate in 2002 was 9.6 per seine, the highest recorded since 1990 was 157.9 per seine in 2000 and the lowest was in 7.3 in 1995 (Table 15). Emerald shiners catch in all regions ranged from 0.8 per seine in the Lower Missouri Arm to 15.1 and 26.7 per seine in the upper Dry and upper Missouri Arms, respectively. This species may have benefited from a stable reservoir elevation in the summer as many small fish fell through the seine during sampling in 2001. If survival would have been good during the winter 0f 2001-2002, emerald shiner numbers should have been high in 2002. Survival was very poor based on observations made in 2001.

Table 15. Selected game and forage species table.

Table 15. A summary of the total catch and catch rate for selected sport and forage fish taken by seining in Fort Peck Reservoir, 1991-2002.

		Species[1]						
		WAE	NOP	SAR	SMB	YEP	GOE	WHS
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	14.3	<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
1996	No. Hauls—164							
	No. Sampled	71	101	84	271	5,762	95	188
	No./Haul	0.4	0.6	0.5	1.7	35.1	0.6	1.2
1997	No. Hauls—158							
	No. Sampled	108	38	20	500	10,506	24	303
	No./Haul	0.7	0.2	0.1	3.2	66.5	0.2	1.9
1998	No. Hauls—162							
	No. Sampled	43	7	18	681	2,221	560	11
	No./Haul	0.3	<0.1	0.1	4.2	13.7	3.6	<0.1
1999	No. Hauls—166							
	No. Sampled	58	33	15	437	5,172	21	29
	No./Haul	0.4	0.2	0.1	2.7	31.2	0.1	0.2
2000	No. Hauls-87							
	No. Sampled	7	32	6	60	988	26	9
	No./Haul	<0.1	0.4	<0.1	0.7	11.4	0.3	0.1
2001	No. Hauls-153							
	No. Sampled	21	27	9	748	803	63	125
	No./Haul	0.1	0.2	0.1	4.9	5.2	0.4	0.8
2002	No. Hauls-101							
	No. Sampled	39	33	52	223	437	154	7
	No./Haul	0.4	0.3	0.5	2.2	4.3	1.5	0.1

Table 15. Continued.

		Species[1]					
		BSP	COC	FRD	CRA	EMS	SPS
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. Sampled	----	8	26	57	3,974	2,849
	No./Haul	----	<0.1	0.2	0.4	29.9	21.4
1993	No. Hauls--176						
	No. Sampled	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. Sampled	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. Sampled	1,379	552	23	21,754	1,419	104,411
	No./Haul	7.0	2.8	0.1	111.6	7.3	535.4
1996	No. Hauls--164						
	No. Sampled	255	901	335	3,163	1,063	21,918
	No./Haul	1.6	5.5	2.0	19.3	6.5	133.7
1997	No. Hauls--158						
	No. Sampled	496	455	107	8,527	1,646	35,953
	No./Haul	3.1	2.9	0.7	54.0	10.4	227.5
1998	No Hauls--162						
	No. Sampled	2,306	327	1,016	7,296	1,377	5,546
	No./Haul	14.8	2.1	6.5	46.7	8.5	34.2
1999	No. Hauls--166						
	No. Sampled	----	164	211	3,168	4,663	5,996
	No./Haul	----	1.0	1.3	19.1	28.1	36.1
2000	No. Hauls---87						
	No. Sampled	2187	60	62	1036	13,736	2,828
	No./ Haul	25.1	0.7	0.7	11.9	157.9	32.6
2001	No. Hauls---153						
	No. Sampled	121	158	270	104	10,383	2,926
	No./ Haul	0.8	1.0	1.8	0.7	67.9	19.1
2002	No. Hauls---101						
	No. Sampled	337	49	224	672	969	1,783
	No./ Haul	3.3	0.5	2.2	6.7	9.6	17.7

[1]See table of species and abbreviations.

Figure 33 walleye and sauger fingerlings in seines

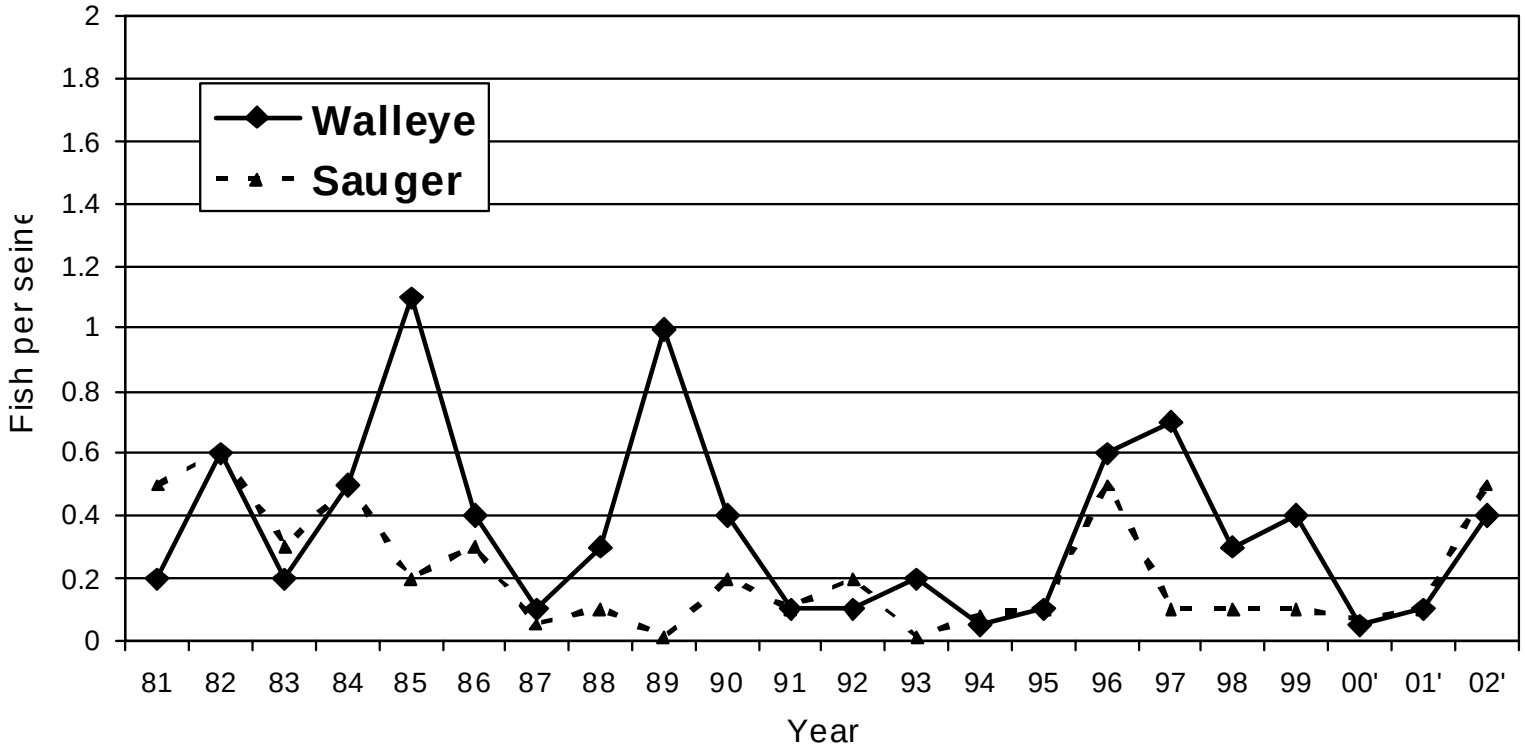

Figure 33. Catch rate of walleye and sauger young-of-year during annual seining on Fort Peck from 1981-2002.

Figure 34 pike and bass fingerlings in seines

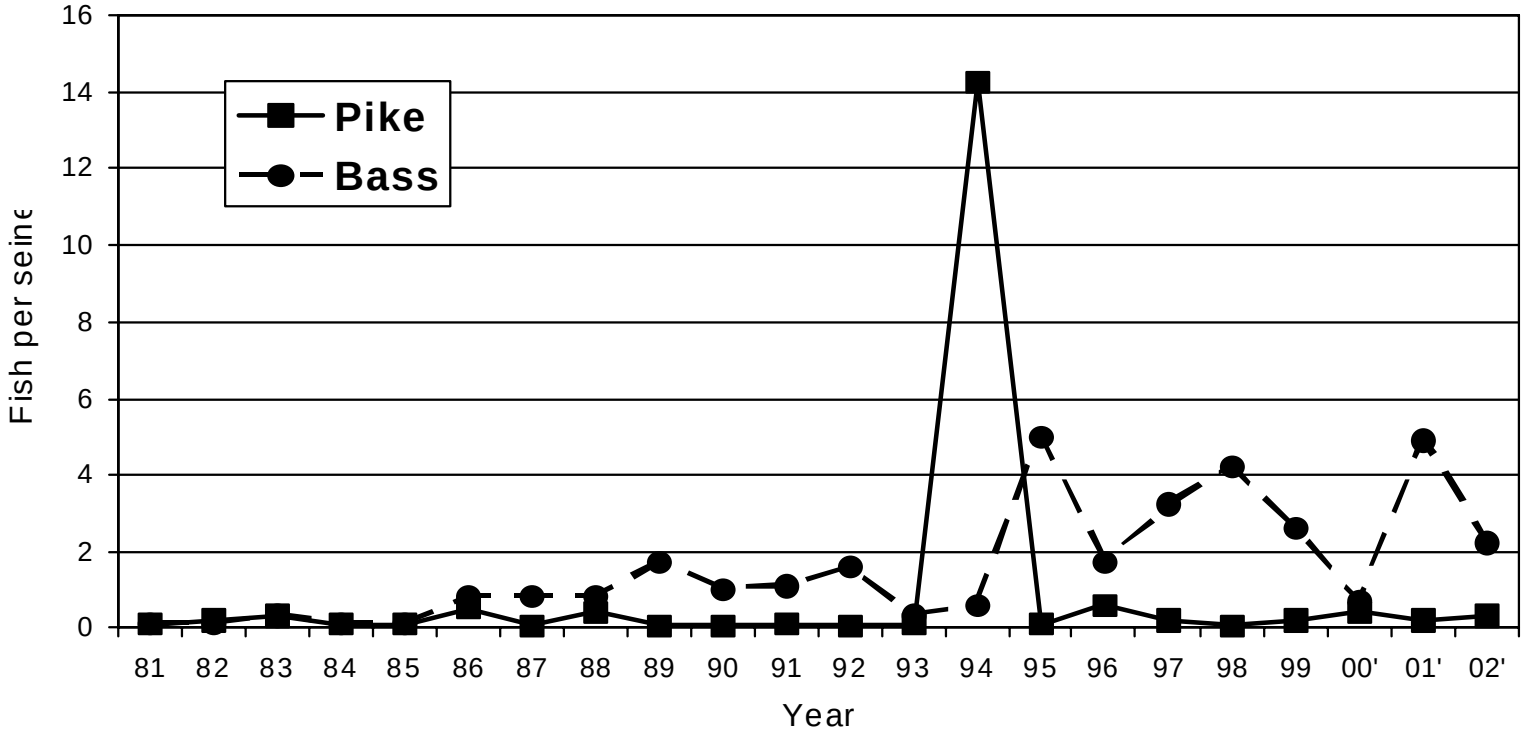

Figure 34. Catch rate of northern pike and smallmouth bass young-of-year during annual seining on Fort Peck from 1981-2002.

Figure 35 yellow perch and elevation in seines.

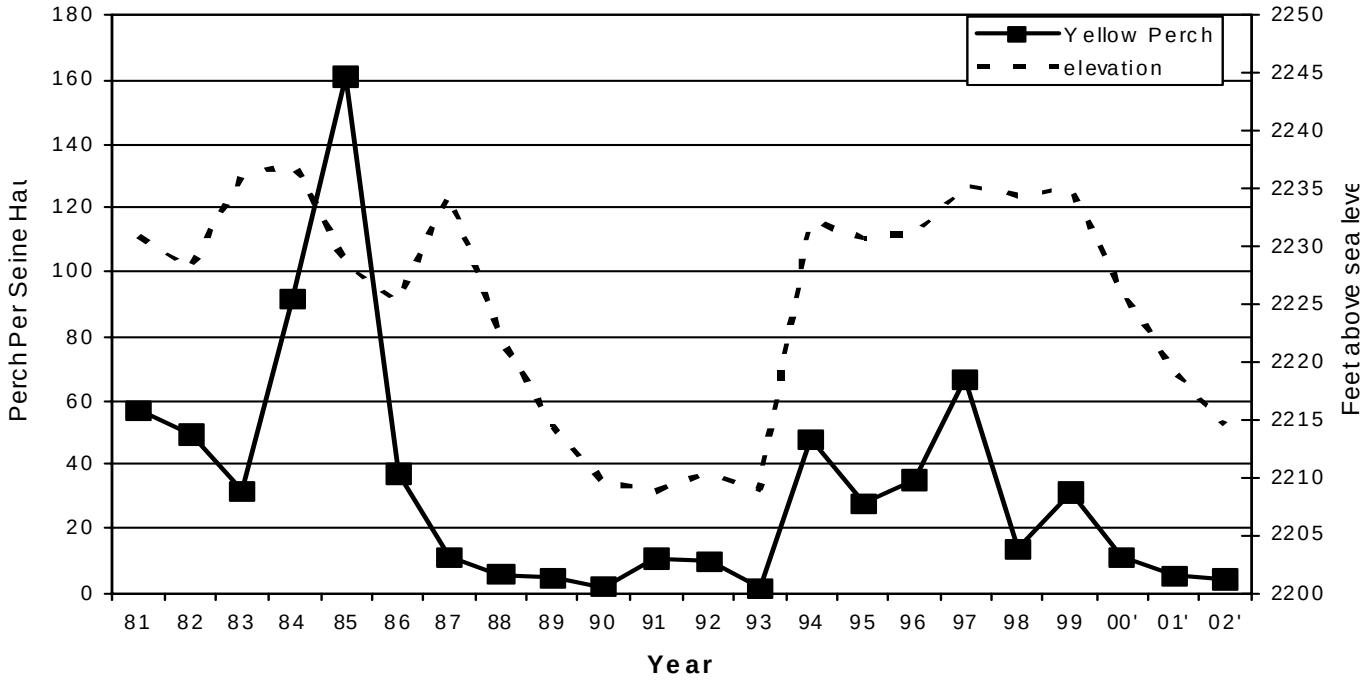

Figure 35. Young of year yellow perch per seine haul compared to minimum annual lake elevations.

Spottail Shiner

Spottail shiner numbers continued to fall to their lowest level since 1990 with 17.7 per seine (Table 15). The best catch rates of spottail shiners have been documented during rising pool years from 1993 to 1997, with catch rates ranging from 60.7 per seine to 535.4 per seine (Figure 23). The highest concentrations of spottail shiners were found in the Lower and Upper Missouri Arms with catch rates of 36.4 and 25.6 per seine haul. Spottail shiners were found in all regions of the reservoir with the lowest catch rates found in the Middle Missouri Arms with a catch rate of 1.4 per seine. The decline in spottail shiners is evidence of falling reservoir levels.

LAKE TROUT CREEL

Increased work with chinook salmon and walleye rearing ponds has precluded good lake trout creels. No surveys were conducted in 2002. This creel is the only current method to evaluate the lake trout population. Although it remains a fishery with much angler use, it continues to be forgone due to lack of manpower and funds. It is unfortunate to build one part of the Fort Peck Fishery at the expense of other fisheries. The falling lake elevations have certainly affected recruitment of this species.

CHINOOK SALMON

Salmon were stocked in a variety of sizes and at different locations (Table 16). Fish from Miles City were held in colder water and arrived as small fingerlings about 200 per pound with an average length of 2.5 inches on April 25th. Miles City sent 80,400 salmon which were released directly into the Fort Peck Marina Bay. An additional 93,465 salmon were stocked on April 25th directly in the Marina Bay from Giant Springs Fish Hatchery. Those salmon averaged 81.7 per pound with an average length of 3.4 inches.

Blue Water Springs Trout Hatchery delivered chinook salmon to the Pines Bay on two dates, March 13th and May 13th. The stock on March 13th consisted of 22,201 fish which averaged 2.97 inches and 109 per pound. These fish were stocked through the ice. A dozen salmon were held in a small holding pen over night to measure mortality. The following day 6 salmon had died and 6 were alive. Several holes were drilled in the ice in the vicinity to view the bottom for dead salmon. Less than 2 dozen dead salmon were visible on the bottom. Holding mortality was likely the cause of death for some of the dead 6 in the cage. Stocks in 1987 were put under the ice in the Marina Bay with very good success on return salmon.

Since water temperatures couldn't be equalized easily the remaining 71,744 salmon from Blue Water were delivered May 13th. These salmon averaged 4.58 pounds and 29.6 per pound and were also stocked at the Pines Boat ramp. The salmon stocked at the Pines are experimental. If a good return appears at the Pines it will be from post smolt, non-pen reared salmon. The stock in 1987 was comprised of pre and post-smolt salmon and had fish stocked under the ice and in open water. In 1987 they also came from Blue Water Hatchery.

On April 23rd Giant Springs Hatchery delivered 134,164 salmon which were reared in a pen. Those salmon were 69.3 per pound and averaged 3.6 inches. No total pounds released or mortality measurements were taken on pen reared salmon in 2002, as a storm moved the holding pen into shallow water and pulled the netting down releasing the salmon on June 13th 2002. Some salmon were still in the holding pen they were weighed and some measured to provide some information. A total of 197 pounds were released and the average size was 26 per pound therefore 5,122 salmon were released. The average length was 4.7 inches. If mortality from previous pen rearing experiences is applied at 20% the total number freed would be 107,331 salmon with a total stock weight of 4,128 pounds. This would be an increase of 2,192 pounds. However, actual measurements could not be taken for the entire release and those numbers are only speculation.

The pen reared salmon were held in a 20 feet by 40 feet by 10 feet deep with a divider creating two 20' by 20' pens. Two 12 hour belt feeders were use to feed salmon daily. Black plastic netting was also placed over the pen to prevent birds as much as possible from eating the salmon

Table 16. A summary of stocked and cage reared salmon 1993-2002.

Year	Marina 1993	Marina 1994	Marina 1995	Marina 1996	Marina 1997	Marina 1998
# stocked into cage	64,000	109,625	17,000	40,000	118,400	0
Date stocked into cage	April 19th	May 5th	May 16th	May 28th	April 26th	
# emptied from cage	55,000	100,000	13,000	40,647	118,400	
Date released into Marina Bay	June 10th	June 3	June 11	June 13	June 12	
Pounds stocked	588	1,150	122	239	493	
Pounds released	1594	-----	200	770	---	
net gain	1006	-----	78	531	---	
Size at stocking	104.5 fish/lb	95 fish/lb.	143 fish/lb.	170 fish/lb.	150 fish/lb	
Size at release	34.5 fish/lb	54 fish/lb.	65 fish/lb.	52 fish/lb.	52 fish/lb	
Total lbs. food used	2,200	388	-----	-----	4,200	

Year	Marina 1999	Marina 2000	Spillway 2000
# stocked into cage	26,000	189,772	45550
Date stocked into cage	May 18th	4/3-4/5	5/18
# emptied from cage	26,000	189,772	45550
Date released into Bay	June 9th	May 8th	June 4th
Pounds stocked	394	3,014	98.5
Pounds released	650	4,217	------
net gain	256	1,203	------
Size at stocking	66 fish/lb	63/lb	500/lb @80/lb 300/lb @18.5/lb
Size at release	40 fish/lb	45/lb	------
Total lbs. food used	339	--------	------

Table 16. (Continued)A summary of stocked and cage reared salmon 1993-2002.

Year	2001	Spillway 2001	Pines 2002	Pines 2002	Marina 2002	Marina 2002
# stocked into cage	119,565	59,950				
Date stocked into cage	4/24	5/24				
# released	88,283	46,247	22,201	71,744	80,400	93,465
Date released into Bay	June 11th	June 12th	March 13th	May 31st	April 25th	April 25th
Pounds stocked	1,848	123.0				
Pounds released	2,235	574.5	204	2,424	402	1,144
net gain	387	451.5				
Size at stocking	64.7/lb	206/lb				
Size at release	80.5/lb	80.5/lb	109/lb	29.6/lb	200/lb	81.7/lb
Total lbs. food used	935.5	241.7				

Year	Marina 2002
# stocked into cage	134,164
Date stocked into cage	April 23rd
# released	
Date released into Bay	June 13th *By a storm*
Pounds stocked	1,936
Pounds released	
net gain	
Size at stocking	69.3/lb
Size at release	26/lb
Total lbs. food used	

Fish are pen reared to ensure a better return of fish to the stocking location. However, due to high work load during the initial cage time, which overlaps with the walleye spawn, future pen rearing should be contracted or discontinued. Another solution would be to increase the Fort Peck staff with a technician used solely for salmon culture during the walleye spawn. This employee would also be able to fertilize walleye rearing ponds. If fish are to be pen reared, a stock of 125% to 130% of the fish hoped to be released, should be stocked in pens. For example, if a release of 200,000 is desired and they were all pen reared, a total of 250,000 to 260,000 fingerlings should be placed in pens to ensure a full stock.

In 2002, the large stocks in 2000 should have returned in adequate numbers to provide eggs for salmon production in 2003. The return was limited. Eggs for the 2003 stock were provided by North and South Dakota with about 15,000 eyed eggs supplied from the Fort Peck spawn.

The salmon ladder, pump, and tractor previously provided by the COE were not available in 2002. A salmon ladder, pump, and tractor were needed in 2002 as a spawn was anticipated. The Miles City State Fish Hatchery provided a pump, FWP provided funds to purchase culvert and necessary supplies for the Fort Peck staff to build a ladder. The tractor was purchased with funds from the Glasgow chapter of Walleye's Unlimited and FWP, WU donated $2,500 and FWP provided $5,000. A circular fiberglass stock tank was used as a catch basin for salmon and a holding pen was set at the outlet of the drain pipe to hold salmon until the following day.

The salmon run was limited, however the salmon ladder worked very well. A total of 85 salmon were used in the spawn and measured. Sixty-two salmon were males and 23 were females. The average length of females was 29.2 inches and average weight was 10.9 inches. The average length of males was 21.8 inches and 4.5 pounds, much smaller than the females. Most males were believed to be (2001 stocked) 2-year-olds and most females were (2000 stocked) 3-year-olds. Several salmon from the 2002 stock was also captured in the ladder and in the merwin traps. Length frequencies show very little overlap in male and female sizes for salmon captured in 2002 (Figure 36). North and South Dakota have noted years with 2 year old males typically are evidence for a good following egg take. Fifteen of the male salmon had fin clips, indicating they were from the 2001 stock. The average size of the fin clipped fish is nearly identical to the overall male structure with 21.7 inches and 4.4 pounds. No females were documented with a fin clip.

Salmon eggs were taken in 2002. A total of 64,000 eggs were shipped to the Giant Springs Hatchery, of which about 20,000 were eyed. Females were held for several days to pool eggs. The holding of females in such low numbers is an ineffective way to take viable eggs. In the salmon culture history of Fort Peck eggs have been attempted to be taken in 6 years; 1994-0 eggs, 1996-390,000 eggs, 1998-6,000 eggs, 1999-141,000 eggs, 2001-0 eggs, 2002-64,000 eggs.

The marginal return of fish compared to high expectations has created many questions in how the salmon program is conducted on Fort Peck Reservoir. Only two years have shown quality returns, 1989 and 1996. The returning salmon for those years would have been from stocks in 1986-1987 and 1993-1994. A thorough review of planting locations, numbers and weights stocked, and effects of pen rearing was initiated to determine reasons for the successes as well as failures. Some comparisons to North Dakota's Garrison and South Dakota's Oahe stocking rates were also made for this evaluation. Both states have had a very successful program the last ten years. South Dakota discontinued stocks in 2001 and 2002 because they couldn't stock big enough salmon to effectively escape predation in a system overbalanced with predators. South Dakota will need eggs from Montana and North Dakota to re-start their program.

Chinook salmon were initially stocked in 1983, and have been stocked every year since, with the exceptions of 1989, 1990, 1992, and 1998 (Figure 37). In 1983, the salmon were stocked at Nelson Creek and in 1986 they were stocked at Rock Creek. Three stocks were put in the spillway bay in conjunction with stocks in the Fort Peck Marina Bay in the years of 1991, 2000, and 2001. In 2002, salmon were also stocked at the Pines Bay. Prior to 2002, the stock in 1987 was the largest plant over 200,000 fingerlings (Figure 37) and also in total pounds stocked nearly 3,500 pounds (Figure 38). The stock in 1994 was the next largest stocking prior to 1997. Over 100,000 salmon were stocked in 1994 with a total weight of over 1,000 pounds, a third less than the 1987 stock. The run in 1996 may also have been augmented with fish

Figure 36 length frequencies of salmon in 2002

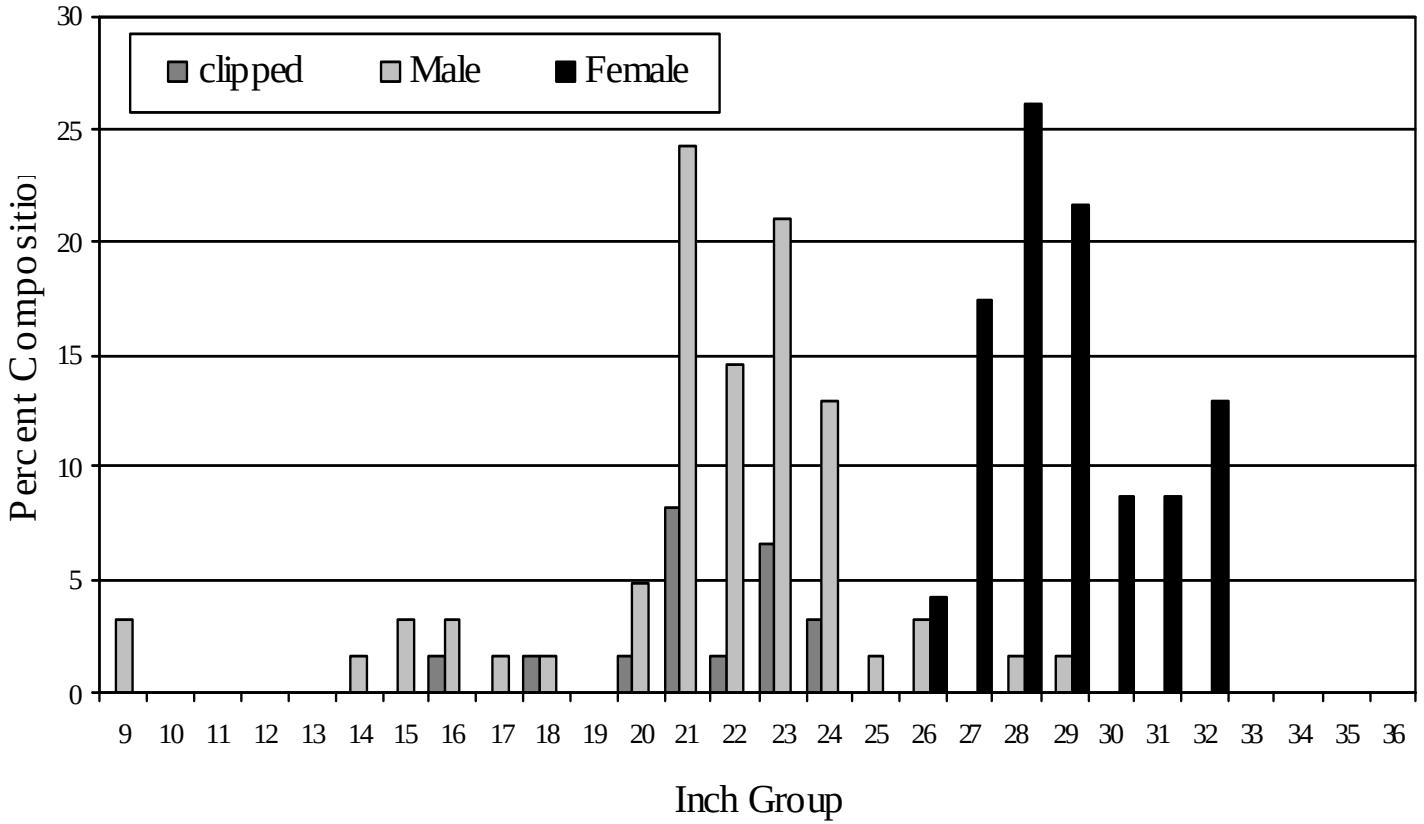

Figure 36. Length frequency of chinook salmon captured in 2002.

Figure 37 numbers and locations of salmon stocked
Figure 38 pounds and locations of salmon stocked

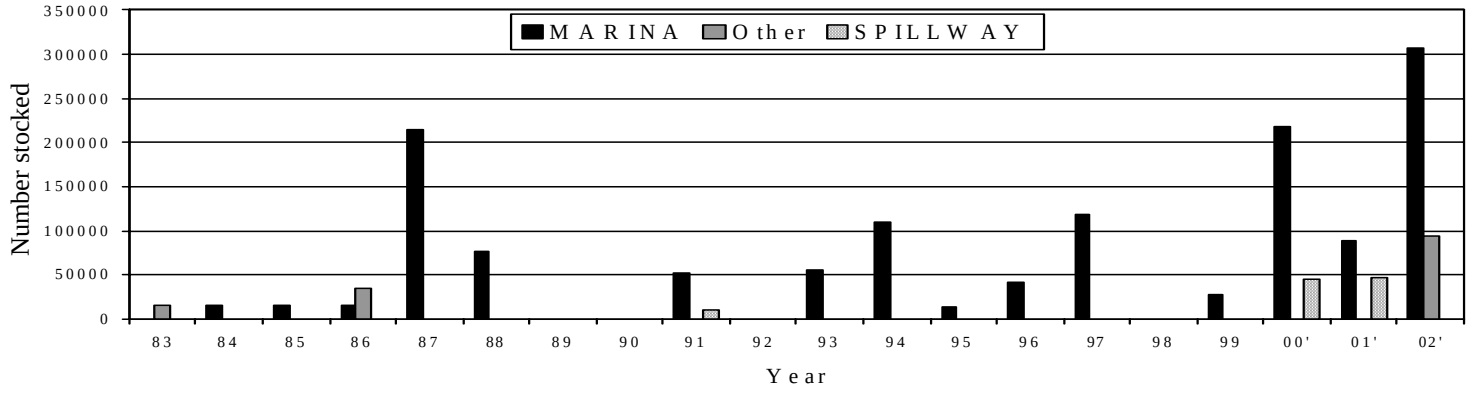

Figure 37. Numbers of chinook salmon stocked in Fort Peck from 1983-2002.

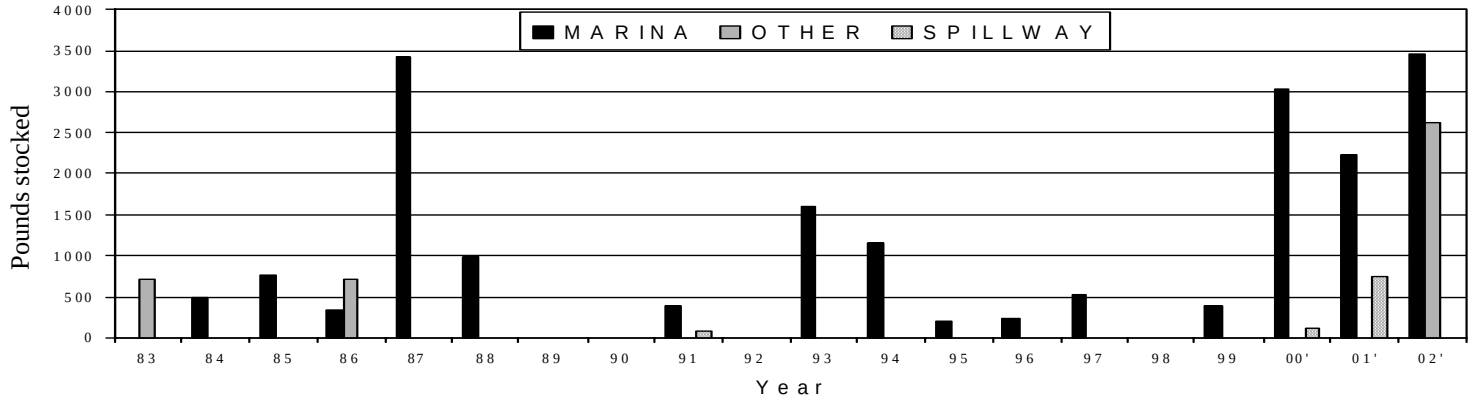

Figure 38. Pounds of chinook salmon stocked in Fort Peck from 1983-2002.

from the 1993 year class. Both males and females were very large compared to recent years. In 1996, average length for males was 31.3 inches and females were 30.6 inches in length and both averaged 12.7 pounds. Average weight of 2-year-old males in 2002, was 4.5 pounds and length was 21.8 inches and the females were 29.2 inches and 10.9 pounds. The difference in size is likely age related and thus it is believed the 1993 year class, four-year-old salmon, was a major factor in the success of the 1996 spawn (figure 39). The 1993 stock of fish was minimal in number at about 50,000 fingerlings, but the stocked total weight was over 1,500 pounds.

The time of release and pen rearing were reviewed. Pen rearing began in 1993 and has been a major component of the salmon program since. Pen rearing was initiated for two reasons; 1st to rear the salmon to a larger size to better avoid predation, the 2nd to give the salmon time to imprint to the bay. Figure 40 shows the time released related to the numbers of days past March 1st of each year. The ovals mark the day placed in the pens and the squares mark the days the salmon are released or stocked. The X axis has the year stocked. If the year is followed by a letter, it stands for the location released, R=Rock Creek, S=Spillway, and P= Pines. All other locations are at the Fort Peck Marina. A close evaluation of the stocks in 1987 were required, therefore each stocking date was graphed separately into three periods. The first two stocks in 1987 were salmon stocked through ice and the third was stocked in open water. Records indicate the first stock in 1987 from Blue Water was pre-smolt salmon, the second appeared to be smolting in transit, and the third were post-smolt salmon. Records indicated fish stocked through the ice appeared to do well and were visibly swimming under the ice the following day. In contrast, the salmon stocked in 1993 and 1994 were pen reared and released much later than the times in 1987. The stocks in 1993 and 1994 came from Miles City and were pen reared. The fish in 1993 were measured on release, (Figure 41) indicates 14% of the fish died in the holding pen. The trade-off in the holding pens is the total weight gain, in 1993 nearly a 3 times total gain was measured (Figure 42). The only other years where total release measurements were taken were in 1995 and in 2001. In 2001, the larger fish stocked in the marina had higher mortality and gained less weight overall compared to 1993. The fish initially stocked in 1993 were 104/pound and in 2001, were already 65/pound. Density in the holding pen was almost half in 1993 with 64,000 reared and over 119,000 were reared in 2001 in the same size pen. It is likely the fish stocked in 2001 had already smolted before being stocked into the pens, although evidence isn't available for either pre-smolt or smolted fish. North Dakota continues to pen rear salmon unless manpower is limited, then they release the fish directly into Garrison. South Dakota doesn't pen rear their salmon, but releases them directly into Oahe. Based on returns from salmon stocked in Montana and pen rearing information, direct stocking of larger salmon fingerlings should be done when possible. Stocks should be held until the end of May before being released into the reservoir. If larger sized fingerling are not available or cannot be produced, pen rearing should be used to increase the size of fingerlings to avoid predation. Although the stocks in 1987 were early, the fish were large compared to stocks from Miles City and comparable to stocks from Giant Springs.

Imprinting of salmon was studied in South Dakota. A doctoral thesis by Hoffnagle (1994) reported, "No differences were seen in return rates between imprinted and non-imprinted salmon even after accounting for higher mortality in the imprinted salmon." Hoffnagle measured level of plasma thyroxine, an increase has been used an index of smoltification in salmon (Folmar and Dickhoff 1981; Dickhoff et al. 1982). Hoffnagle found salmon exposed to a novel water source showed a significant increase in thyroxine levels. Thyroxine levels didn't significantly change during transport or being moved from tank to tank with the same water. Stocking from the Garrison Dam Fish Hatchery to Rodeo Bay into net pens in Garrison showed a 5 fold increase in thyroxine levels of North Dakota salmon (McCreery 1987). Hoffnagle comments the changes don't appear to be from a specific chemical, but from a general change in water chemistry. This study seemed to indicated pen rearing to hold salmon past smoltification is likely unnecessary, and pen rearing only meets one objective, to raise larger size salmon before release. Hoffnagle did caution raising larger size post-smolt chinook salmon may lead to an increase in jacking of males in their first and second years.

Comparison of the Dakota's stocking practices seemed important, as they have had successful returns on their programs more consistently than ours. Figure 43 shows the number of salmon stocked was rather high until 1990 for both states. Total numbers stocked have dropped to about 350,000 to 400,000 annually compared to the less than 200,000 typically stocked in Montana. Although stocking numbers were Figure 39 1996 salmon length frequencies

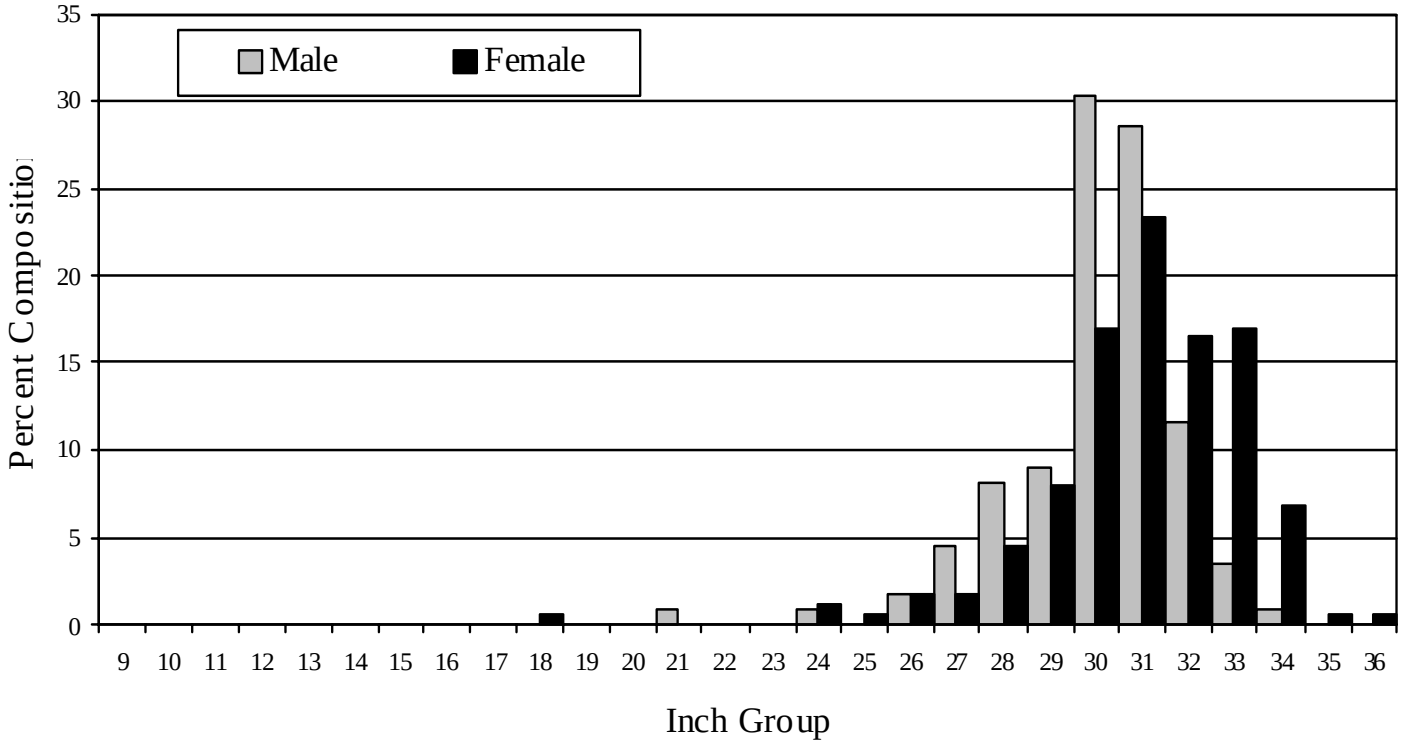

Figure 39. Length frequency of chinook salmon captured in 1996.

Figure 40. Pen rearing and stocking times

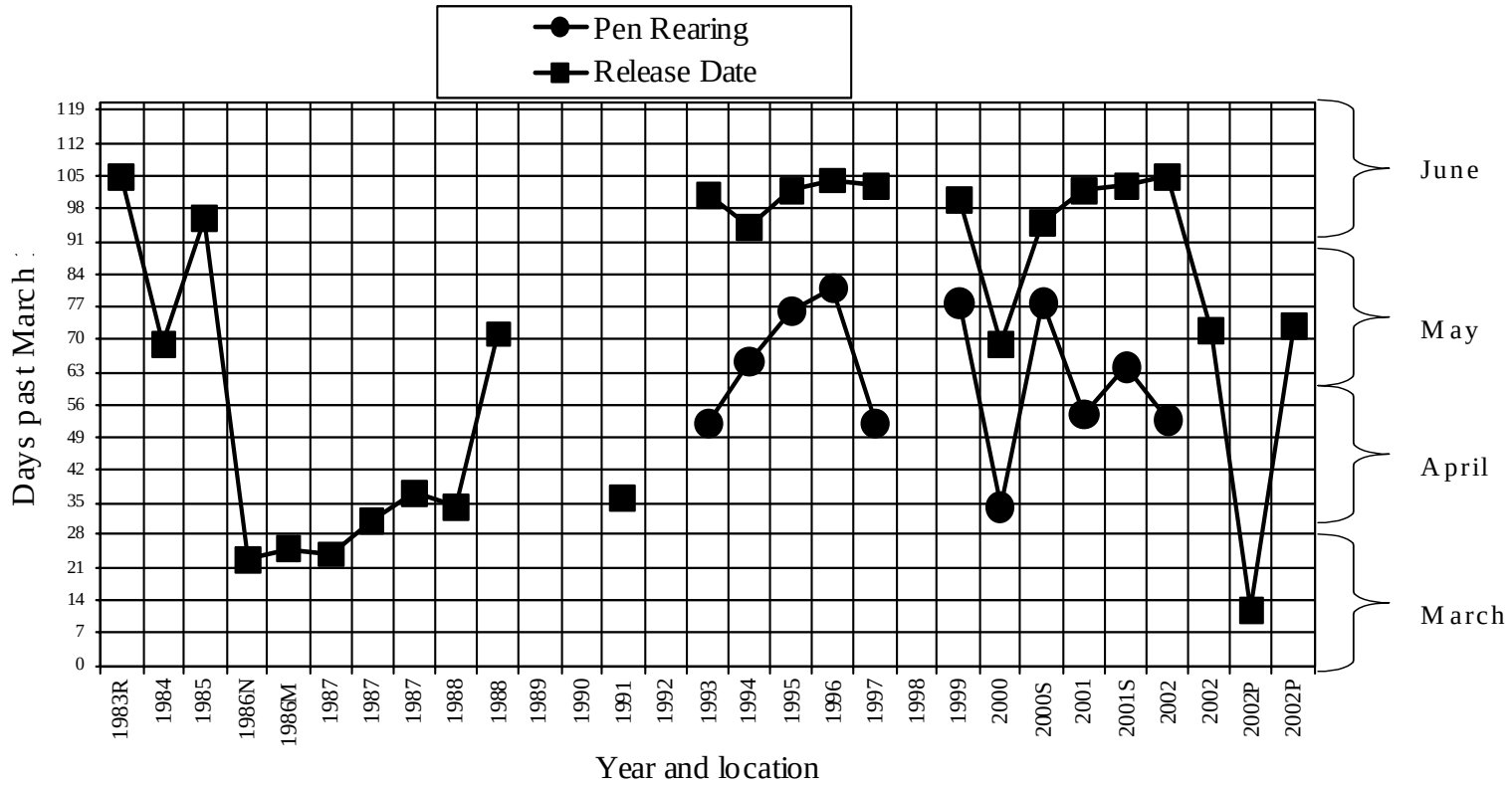

Figure 40. Release timing for chinook salmon from 1983-2002.

Figure 41. Pen rearing correction of numbers
Figure 42 pen rearing corrections of weight

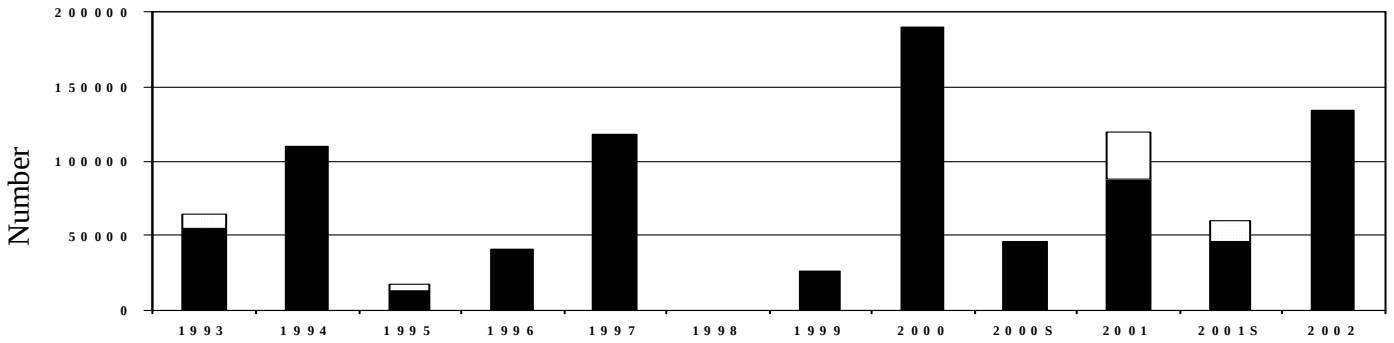

Figure 41. Changes in numbers measured after pen rearing from 1993-2002, white area denotes loss of fish.

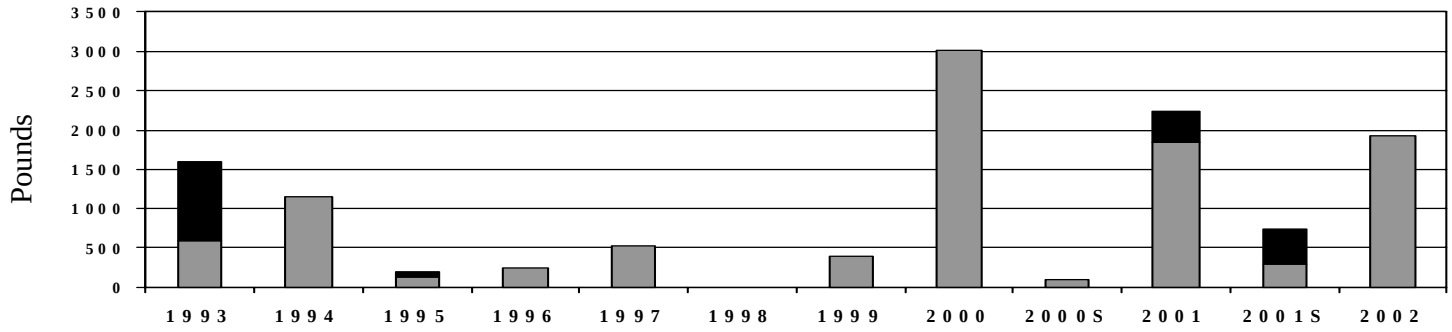

Figure 42. Changes in weight measured after pen rearing from 1993-2002, black area denotes gains in weight.

Figure 43. ND SD and MT salmon numbers stocked

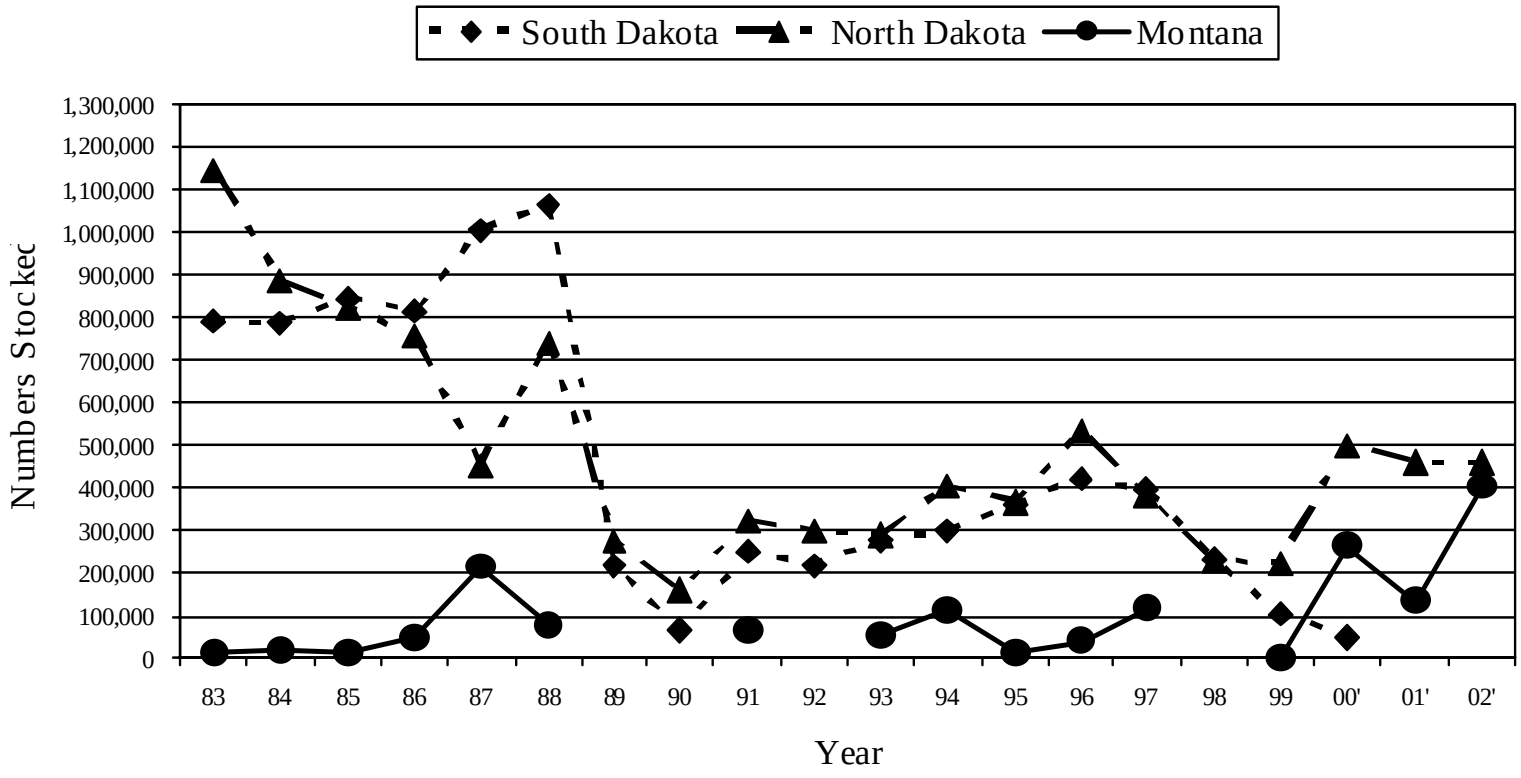

Figure 43. Annual comparison of numbers stocked in Fort Peck, Garrison, and Oahe.

reduced significantly, the total pounds stocked (Figure 44) didn't decline as dramatically as the numbers. Total weight stocked in Montana has been extremely small compared to the other states until 2000-2002. The combined stocks in 2002 at the Pines and the Marina account for the largest stock ever on Fort Peck. The stocks in 1987 and 2000-2002 approached weights stocked in the other reservoirs. The stocks in 1993 and 1994 indicate success can happen with fewer fish. The environmental conditions overall in 1993 and 1994, with substantial inflow of water and improved yearling habitat, may have been more responsible for the excellent return in 1996.

The management plan permits stocking 200,000 chinook salmon this number should be qualified to a higher level such as 200-400 thousand. The pounds of fish stocked by mid-June should be substantially higher than what has been stocked in the past with a minimum of 3,500 pounds up to 8,000 pounds. If the staff at Fort Peck is responsible for rearing fish to a larger size in holding pens, more pens will be needed to reduce densities of large stocks. Additional feeders and more manpower would be required. This could be beneficial to the hatchery system, as they could raise more small fish for delivery to holding pens, which would allow for early removal of the salmon from their facilities.

The hatchery source of reared salmon should be further evaluated. It appears, prior to fish being reared in Giant Springs which is part of the water source for Fort Peck, returns with fewer fish appeared to be better. In 1999, salmon were documented near the Marias River and scattered all over the reservoir. They were not documented above Fort Peck or scattered in 2002 as in 1999. The state of Montana may need to evaluate changes in hatchery space to put these fish into other hatcheries to remove the chance of imprinted fish attempting to return to Giant Springs. When the Fort Peck Hatchery is completed, this should greatly improve the salmon program on Fort Peck.

Plans for the 2003 stock include experimental stocks. Giant Springs is expected to deliver 200,000 fingerling salmon in late April. Those salmon should be fin clipped at the hatchery and stocked in holding pens at the Fort Peck Marina and held until the first week of June. An additional stock of 200,000 salmon from McNinney Fish Hatchery in South Dakota will be available in April or May. A total of 400,000 salmon will be stocked, but the total weight stocked should be close to 8,000 pounds. Unless cisco have a projected good spawn in the winter of 2003-2004 this will be the last large experimental stocking unless biological indicators show improvement of the system. It is necessary for Montana to make this program function more consistently to provide spawn for ourselves as well as North and South Dakota in the next couple of years.

CISCO

Young-of-year cisco

Eight, ½ inch mesh, 100 x 6 foot vertical gill nets were used to sample young-of-year cisco in the lower reservoir on October 1st and 2nd, 2002 (Table 17). A reduction in effort was necessary in 2002 to provide time to make a new salmon ladder and prepare for the salmon spawn.

The overall catch rate was 6 young-of-year per net, which is much lower than the catch rate of 219 in 2001. A total of 51 young-of-year cisco and 261 adults were caught in 2002. Average length for YOY increased from 4.4 inches in 1998, to 5.4 inches in 1999, to 5.7 inches in 2000 and fell to 5.1 in 2001, rising in 2002 to 5.5 inches. The increase in size may be a result of less competition for food than in 2001.

Reservoir elevations continued to decline in 2002 (Figure 45). Ice cover occurred January 28, 2002. Lack of ice cover during the cisco spawn combined with a previous strong year class present likely resulted in the poor 2002-year class. Early ice cover appears to correlate with increased cisco abundance; the ice rank is used to graphically show relative timing of ice cover annually. The January 17th ice cover in 2003 may also dampen the 2003 year class strength (Figure 46).

Depths at which cisco were captured in the vertical nets was documented in 1999, 2000, 2001 and 2002. The majority of cisco were captured in depths greater than 60 feet as documented in previous years, with

Figure 44. ND SD and MT salmon pounds stocked

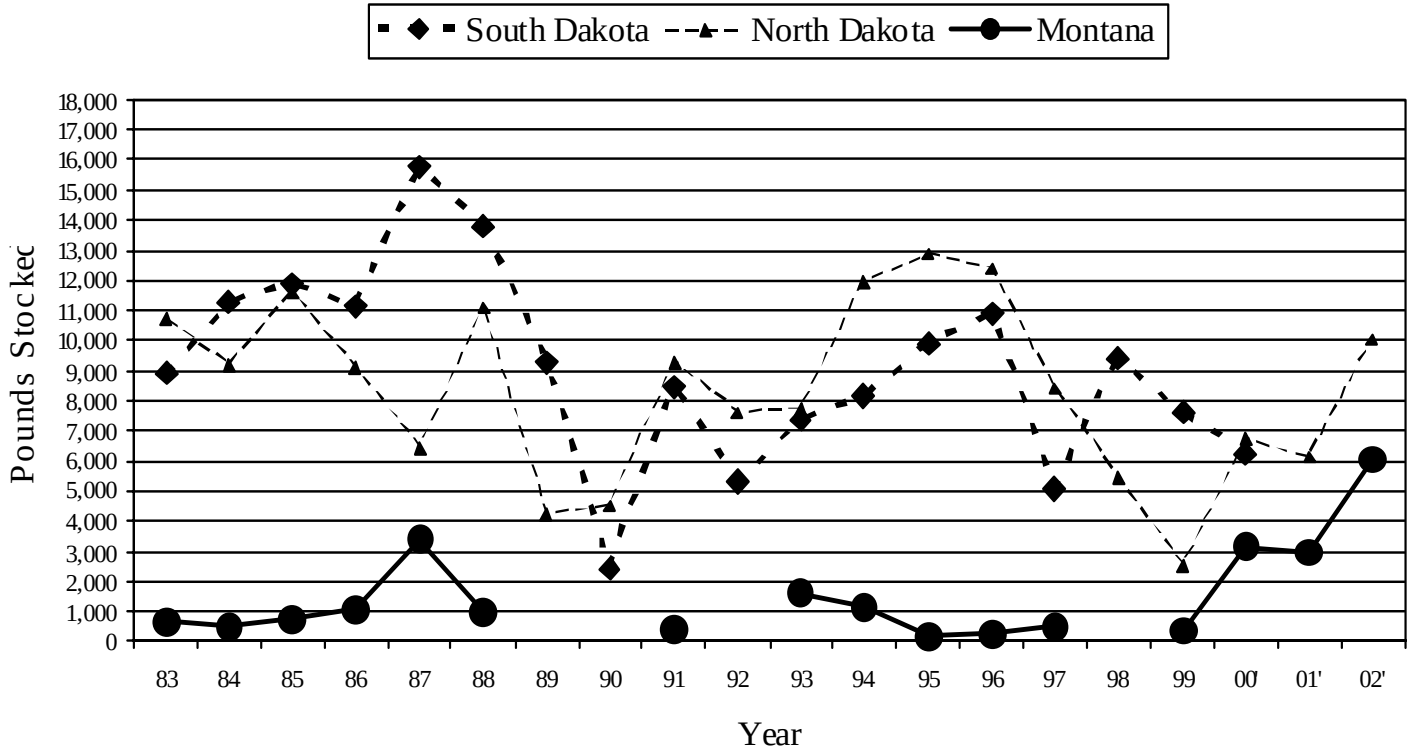

Figure 44. Annual comparison of pounds stocked in Fort Peck, Garrison, and Oahe.

Table 17. Summary of young-of-year cisco taken by vertical gill nets in Fort Peck Reservoir during September and October 1990-2002.

	Young-of-Year Per Set												
Station	'90	'91	'92	'93	'94	'95	'96	'97	'98	`99	'00	'01	'02
Upper Big Dry													
Bug Creek	1	--	--	--	26	--	--	0.5	3	2	6	--	--
Lower Big Dry													
Bear Creek West	3	12	2	--	52	--	1	29	6	5	4	143	1
Rock Creek	1	--	6	1	232	--	--	3	32	4	33	197	--
Sandy Arroyo	--	--	--	--	--	--	--	--	--	--	--	193	--
Spring Creek	--	--	--	--	--	--	--	--	--	--	--	370	--
Lower Missouri Arm													
Dam	1	--	--	--	543	20	--	81	--	--	--	--	--
Duck Creek	50	--	15	3	293	--	15	18	58	62	27	47	6
Fifth Point	--	--	--	--	--	--	--	--	--	--	--	185	--
Marina	72	--	5	4	50	2	0.5	4	0.5	35	18	77	3
Milk Coulee	--	--	--	--	--	--	--	--	70	19	33	123	18
Sage Creek	--	--	--	--	--	--	--	--	--	--	--	153	--
Shaft Houses	20	--	2	2	76	2	9	29	45	3	1	--	11
Bear Creek	41	--	8	3	45	3	13	12	139	24	66	143	5
Middle Missouri Arm													
Cattle Crooked Cr.	--	--	--	--	--	--	--	--	--	--	--	556	--
Pines-Gilbert Cr.	48	50	15	6	370	2	14	121	89	30	17	517	--
Hell-Sutherland	56	49	53	13	518	--	31	245	15	33	15	119	--
Snow Creek	--	--	--	--	--	--	--	--	--	--	16	185	--
Upper Missouri Arm													
Bonetrail	--	--	--	--	--	--	--	--	--	--	--	155	--
Devils Creek	--	--	--	--	166	--	0	34	--	--	--	--	--
Seven Blackfoot	--	--	--	--	--	--	--	--	1	0	11	--	--
Timber Creek	7	25	6	8	267	--	5	25	1	0	7	--	--
Wagon Creek	--	--	--	--	--	--	--	--	--	--	--	206	--
Avg. No. Cisco per net/night	31	84	10	4	259	3	12	69	35	19	6	219	6

Figure 45 Elevation change vs cisco yoy's

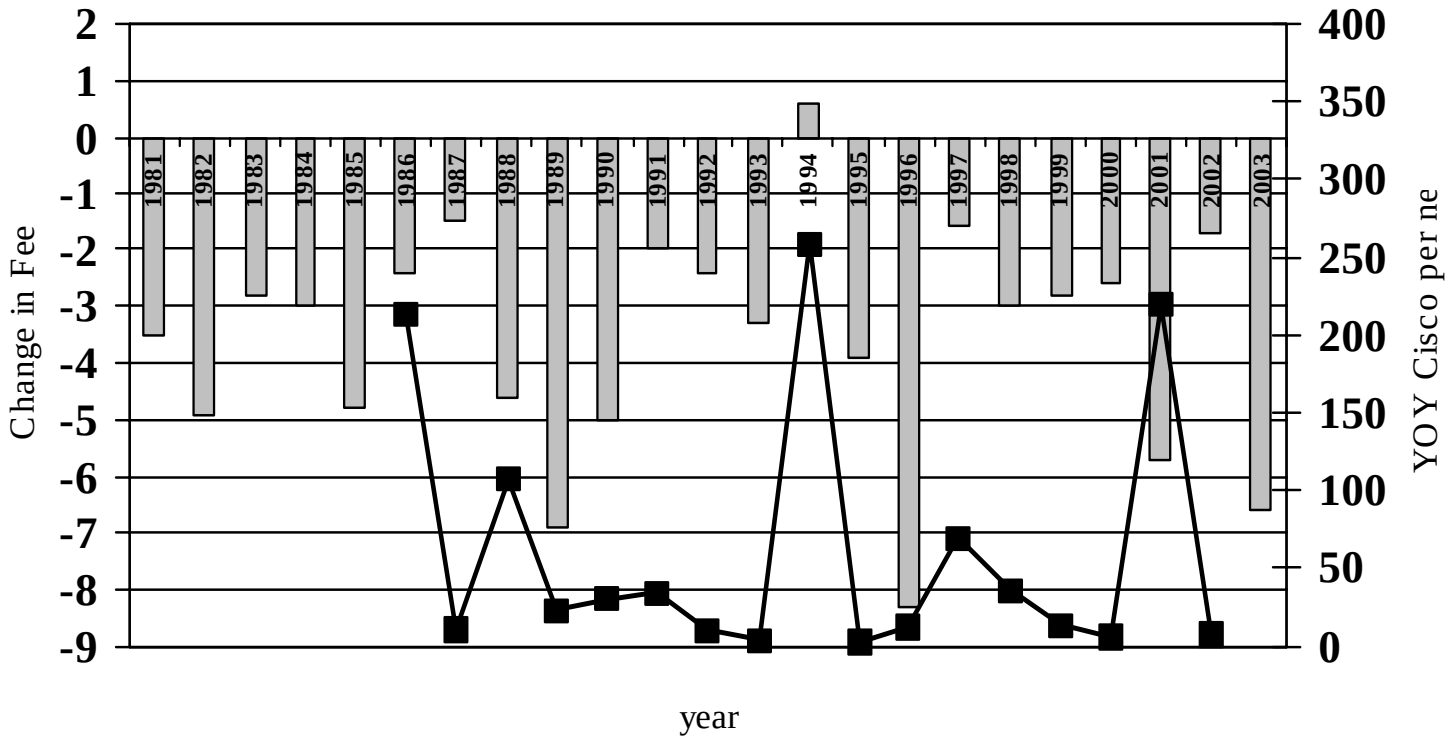

Figure 45. Fort Peck changes in reservoir elevation from December high to March low elevations from 1981 to 2002 in contrast with number of young-of-year cisco catch rate in vertical nets.

Figure 46 cisco abundance and ice rank

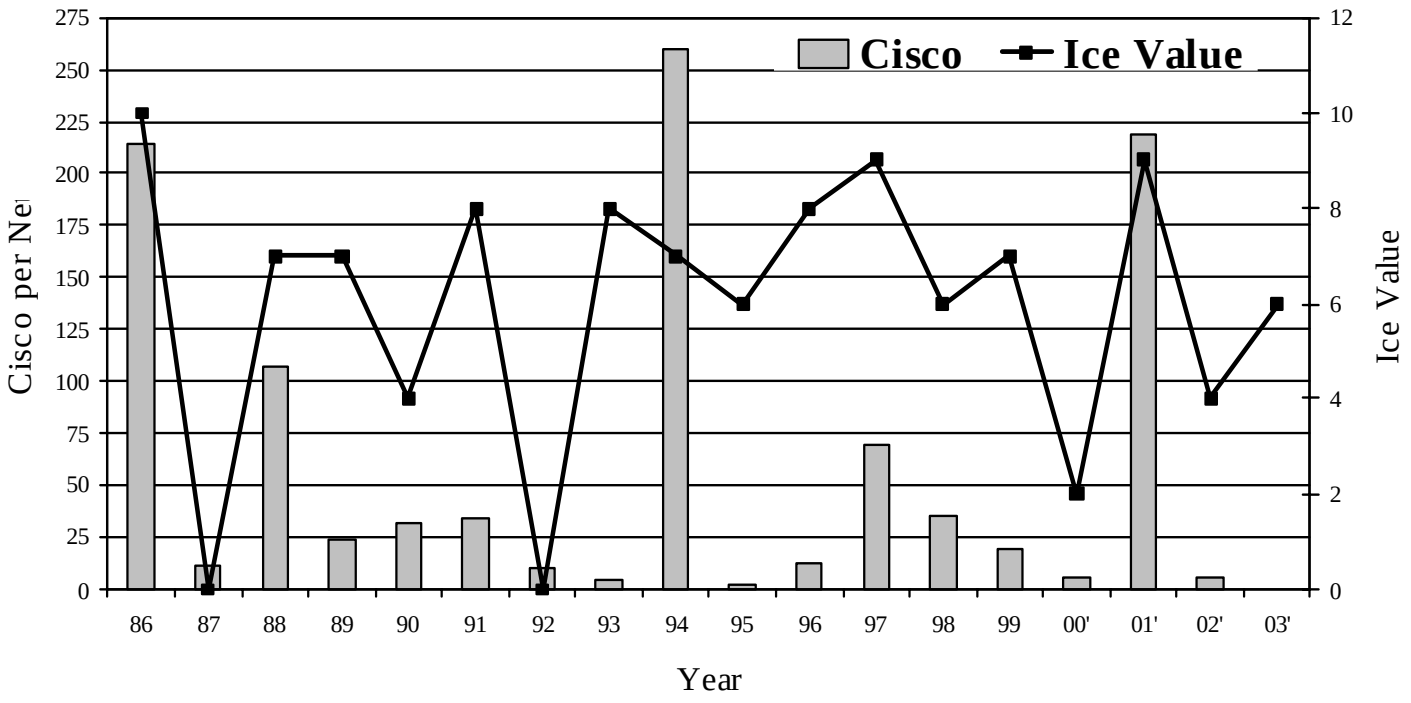

Figure 46. Number of young-of-year cisco caught per net compared to an ice on value from 1986-2003.

more young-of-year being captured between 70-80 feet than in any other depth measured (Figure 47). One spottail shiner was caught at 70 feet deep in a Duck Creek set. No other species were sampled in 2002.

Potential exists to rent a hydroacustic system in place on Hauser and Holter reservoirs. Current financial conditions will likely preclude use of this tool anytime soon. The cost to initiate this would exceed $25,000 at this time. However, the sooner this tool can be evaluated, the better. Hydroacustics may allow us to better understand not only the cisco population, but also lake trout and salmon. It may also provide information on other predators such as walleye and northern pike, which are assumed to suspend themselves around schools of cisco in deeper water.

Adult Cisco

Adult cisco were sampled outside the Fort Peck Marina breakwater, the North Fork of Duck Creek, and in Milk Coulee Bay with 2 nets each on December 3rd. A total of 6 nets were set, which collected 267 cisco resulting in a catch rate of 45 cisco per-net in 2002. The 2001 catch rate of 52 cisco per-net in 2001was similar. A total of 77 females and 189 males were collected in 2002 with catch rates of 13 females per net and 32 males per net. The 2002-catch rate shows a continued decline since 1988. It was anticipated the adult catch rate would increase as a result of the large 2001-year class, although it didn't occur in 2002. It is anticipated an increase will be recognized in 2003, once the 2001-year class fully recruits to the nets and become sexually mature.

Cisco catch rates in 2002 were similar for each site with 50 per net, 44 per net, and 40 per net at the Marina, Duck Creek, and Spillway, respectively. Male to female ratios were 2:1 overall. Average length and weight of males was 10 inches and 0.3 pounds, while females averaged 10.3 inches and 0.4 pounds in 2002. The largest female in 2002 was 16.7 inches and 1.9 pounds, while the smallest was 7.2 inches and 0.1 pounds. The largest male in 2002 was 12.4 inches and 0.7 pounds, while the smallest was 6.8 inches and 0.1 pounds.

Other Species

Other species captured during adult cisco netting included 10 goldeye, 19 pike, 6 shorthead redhorse, 3 walleye, and 7 white sucker. Catch rates of each were 1.7 goldeye, 1.3 pike, 1.0 shorthead redhorse, 0.5 walleye, and 1.2 white sucker per net in 2002. Average size of each were 11.9 inches and 0.6 pounds for the goldeye, 23.9 inches and 4.3 pounds for pike, 16.9 inches and 2.3 pounds for redhorse, 19.7 inches and 4.3 pounds for walleye, and 15.0 inches and 1.4 pounds for white sucker. Stomach contents were evaluated on 19 pike and 2 walleye. Cisco were found in 10 pike. Unidentified fish, which were most likely cisco, were also found in 3 pike and 1 pike had a perch in its stomach contents. Empty stomachs were noted in 5 pike and both walleye.

Figure 47 2002 cisco depth

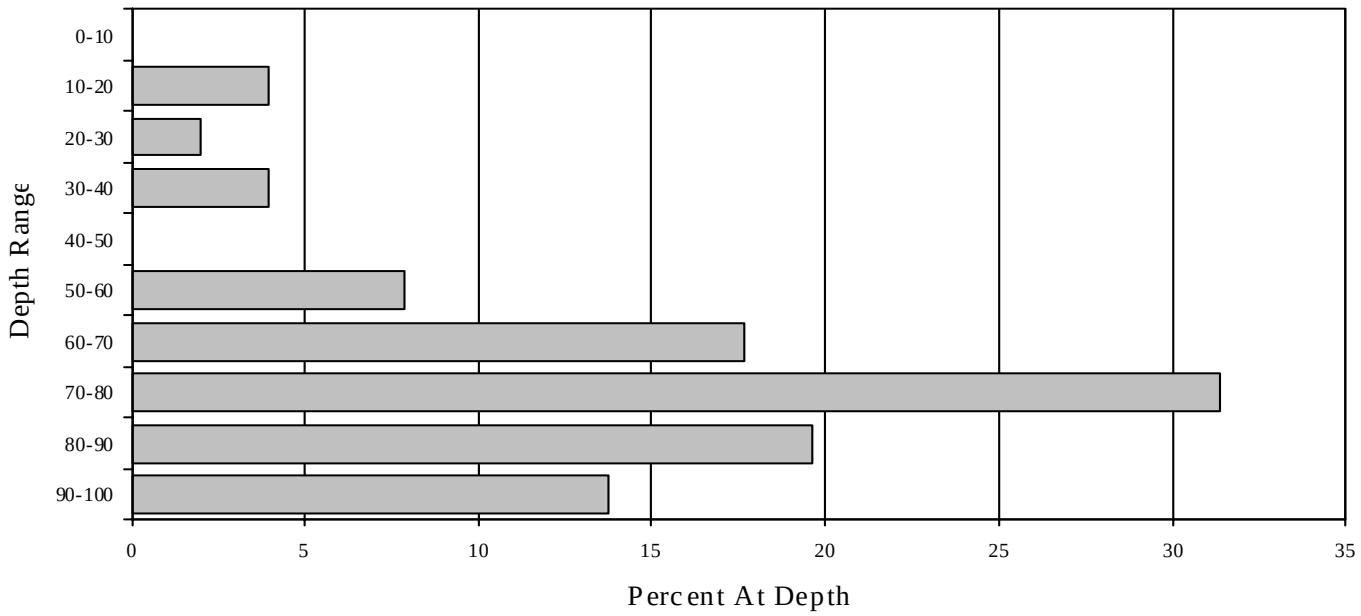

Figure 47. Depth of capture for young-of-year cisco in vertical nets on Fort Peck Reservoir in 2002.

RECOMMENDATIONS

- Spring trapping of spawners from the wild walleye population will continue to provide an egg source for sustaining this sport fishery. Secure Merwin traps on a permanent basis.

- Collect additional genetic samples to estimate amount of hybridization between walleye and sauger during the walleye spawning operations. A funding mechanism needs to be found for this recommendation.

- Evaluate OTC fry and fingerling marking as a method to estimate stocking success of fry vs. fingerling walleye. Funds to repair an old scope or purchase of a new scope needs to be obtained for Montana to independently work on this. Its possible to borrow South Dakota's scope again, but we may have to wait 2 years.

- Work with South Dakota and North Dakota to develop a stronger tri-state chinook salmon fishery. This may require traveling out of-state to help collect and spawn salmon to receive additional eggs or collection of eggs from Fort Peck to support ND or SD needs.

- An evaluation of stocking strategies indicates the size of salmon released is more important than the timing of release. Efforts should be made to increase the numbers of pounds stocked as opposed to numbers of fish.

- Continue efforts to spawn Fort Peck salmon when numbers of adults permit.

- Satellite rearing ponds will be utilized for rearing walleye fry into fingerling in 2002. Need additional catch basins and equipment to increase success. COE needs to fill perimeter ponds. Empty rearing ponds 2 weeks earlier and measure differences from holding fish longer, size at release, water temperatures, ability to hold walleye with screen.

- 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.

- Evaluate native species more closely by collecting additional length and weight information during routine sampling.

- Reservoir water levels will be monitored to determine impacts to the overall fishery. Information will be utilized to make recommendations to Corps of Engineers for Annual Operating Plan in conjunction with the Missouri River Natural Resource Committee.

- Attempt to acquire hydroacustic equipment to evaluate its usefulness to monitor the pelagic areas of Fort Peck Reservoir.

- Begin attempt to create or have additional FTE provided for Fort Peck Reservoir. An additional 2.8 FTE would aid in completing goals of the management plan. FTE of 0.21 for summer help would be immediately beneficial.

- Begin preparing for a creel survey in the year 2004 by securing funds of approximately $125,000 to contract this out. Biological information needs to be concurrently collected in creel years, unlike 1990 and 1997.

- Continue annual public informational meetings to disseminate information from the previous years work and to discuss stocking goals and work plans for the coming year beginning each March or April.
- Prepare for increased work load associated with spawning lake trout in 2003 and 2004. Consider a second pontoon boat for spawning for such work, a cost of $26,000.

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