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, 2003 THROUGH JUNE 30, 2004
REPORT PERIOD: MARCH 1, 2003 THROUGH FEBRUARY 29, 2004.

ABSTRACT

The reservoir reached peak elevation in 2003 on January 1st at 2214.53 feet and a minimum elevation on December 31st, 2003 at 2206.83 feet, a loss of 7.7 feet. Spring spawning fish populations were sampled in the upper Big Dry Arm with frame traps from April 11th to May 1st, 2003. Both walleye and northern pike were spawned and the fertilized eggs were sent to the Miles City Fish Hatchery. The spawn was conducted on a pontoon barge used in the previous drought. Trap netting captured 2,366 walleye, of which 564 were weighed and measured. The catch rate in 2003 of 5.4 per-trap night was lower than the catch rate in 2002 which was 6.8 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 2003. Both merwin traps and trap nets were used to capture walleye for spawning. Nearly, all fry stocked into rearing ponds were marked with oxytetracyline (OTC) to determine contribution of fingerling stocks to the fishery in the future. OTC results of fry and fingerling stocking indicate approximately 50% or more of walleye in the reservoir are contributed by fry stocking with a preliminary result of 12% from fingerling stocks. Marked fingerling will begin to fully recruit to the nets in 2004. A total of 2.27 million walleye fingerling and 23.6million walleye fry were stocked in various locations. A total of 248,785 northern pike fingerling were stocked in 2003. Ninety-six gill nets were set in various locations throughout the reservoir from July 8th to August 20th, 2003. Eighteen species were captured for a total of 2,065 fish. Goldeye, walleye, and shorthead redhorse were the most abundant species captured overall, with catch rates of 6.2, 3.1, and 2.3 per-net night, respectively. Gill net catch rates of walleye were average for a ten-year period with average size 17.3 inches and 2.8 pounds. Recruitment of smaller fish is becoming apparent as the drought continues. The 14 inch and smaller fish seem to be stacking up at 15 inches. Relative weights of walleye from 10 to 18 inches drastically declined from the 2002 values of 86 and 90 to 82. It is expected the relative weights of walleye greater than 18 inches will be maintained over 90 next year, however declining condition will remain obvious in 2004 for walleye less than 18 inches due to poor reproduction of cisco in 2003 and most likely a poor 2004 cisco year class combined with poor recruitment of shoreline forage. Pike catch rates declined to 1.3 per-net with an average size of 28.1 inches and 6.2 pounds. Use of a new net for the third 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 an increase in number of forage fish, with the bulk of the increase made of emerald shiner and *Hybognathas spp*. in the upper Missouri Arm. The remaining regions continue to carry minimal populations of shoreline forage. 412,314 salmon were stocked in Fort Peck in 2003. Two groups were released, pen reared fish which were fin clipped and another group stocked directly into the reservoir without a clip. Nearly all yearling salmon sampled in 2003 were fin clipped. A salmon spawn occurred in 2003 netting 231,645 eggs. Uncertainty clouds the return of salmon expected in 2004 as very few 2 year old males entered the spawning station. Lake trout were spawned in 2003 with 60,000 eggs collected. Average size of female and male spawning lake trout was 31.2" and 31.8", respectively and both averaged 10.8 pounds. Cisco young-of-year were at record low levels in 2003 with 3 per-net collected. The poor year class is likely a result of later ice cover. A poor spawn is expected in 2004 due to late ice cover as well. Persistent drought continues to plague the fishery.

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 didn't exist to meet this need. This year an additional 0.3 FTE and additional funds were allocated to the Fort Peck Reservoir project to re-institute the spring and fall cold water creel surveys. The survey will re-start in April of 2004. Additionally, funds have become available to contract a lake wide summer creel from May 1st through September 30th, 2004.

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. Objective accomplished. Malta science classes and Jordan rural schools toured the salmon spawning operation. Staff assisted with the Home Run Pond kids fishing opener and the ice fishing events. Staff attended Walleye Unlimited meetings in Glendive, Jordan, and Glasgow to provide information. Public presentations were given twice at the MORE show in Billings and once for the annual update meeting in Glasgow. Staff has been instrumental in providing information for the "Ask the Biologist" web page on the Walleye's Unlimited web site.

BACKGROUND

Fort Peck Reservoir is located in northeastern Montana; it is a large earth-filled dam on the Missouri River. Figure 1 shows major roads around Fort Peck, select locations and 5 sampling regions the reservoir is divided into: Upper Dry Arm, Lower Dry Arm, Lower Missouri Arm, Middle Missouri Arm, and Upper Missouri Arm. The dam was closed in 1937 and is the largest water body in the state of Montana, with 240,000 surface acres at full multiple use pool. Full flood pool is reached at 2250 and multiple use pool is reached at 2,246 feet above sea level. At full multiple use pool 1,500 miles of shoreline exists in 130 linear miles of the reservoir with a maximum depth of 220 feet. The bottom of the multiple use pool is 2234 feet above msl and the bottom of the multipurpose carryover zone is 2160 feet msl. The reservoir reached peak elevation in 2003 on January 1st at 2214.53 feet and a minimum elevation on December 31st, 2003 at 2206.83 feet a loss of 7.7 feet (Figure 2). The reservoir reached a summer peak elevation on July 2nd at 2213.53 feet. Reservoir elevations are predicted to fall into spring 2004. 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. Long term draw down will also affect survival of stocked fish such as walleye and chinook salmon.

Figure 1. Fort Peck study area.

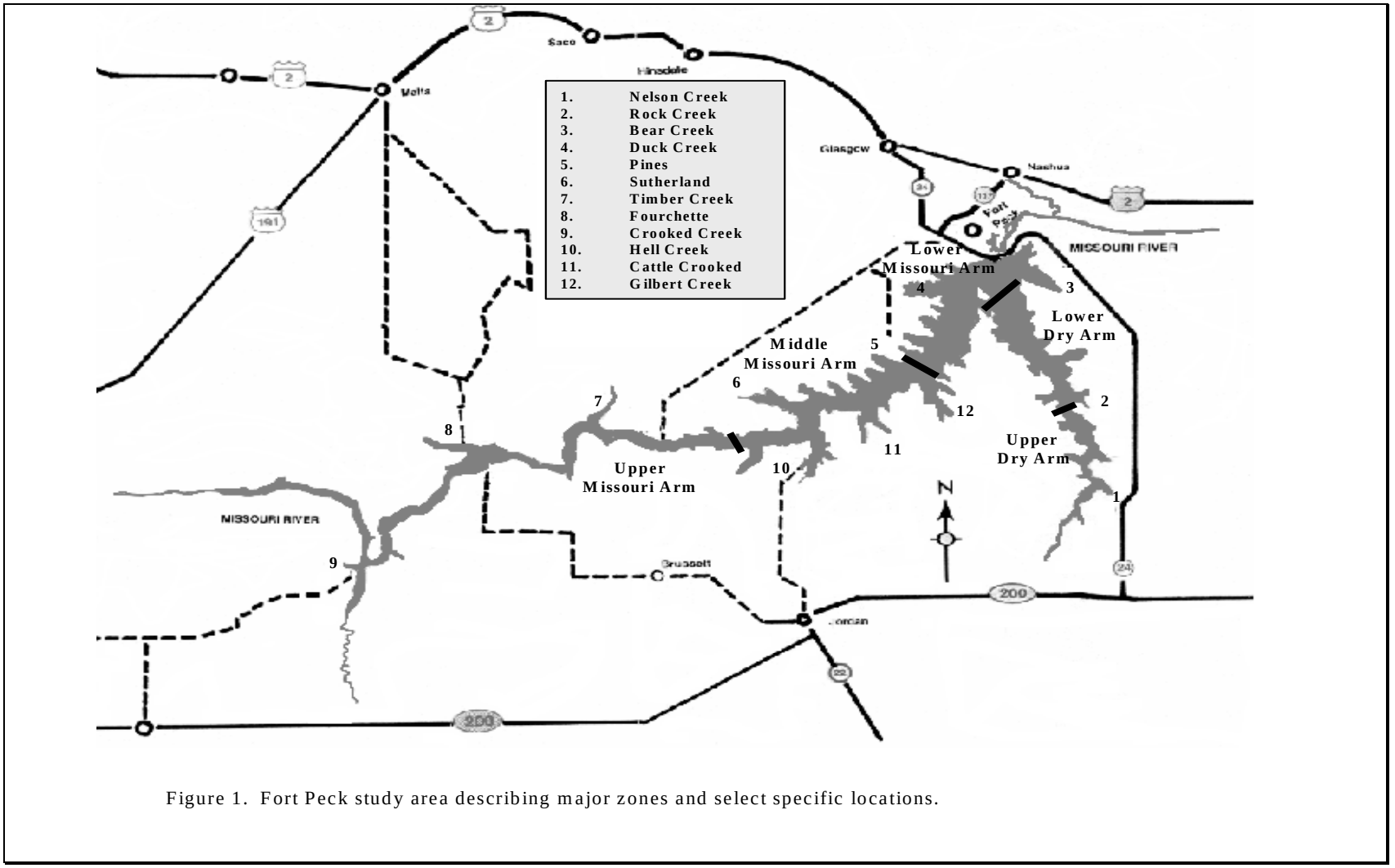

Figure 1. Fort Peck study area describing major zones and select specific locations.

Figure 2. Daily peak elevations Jan 1 through Dec 31

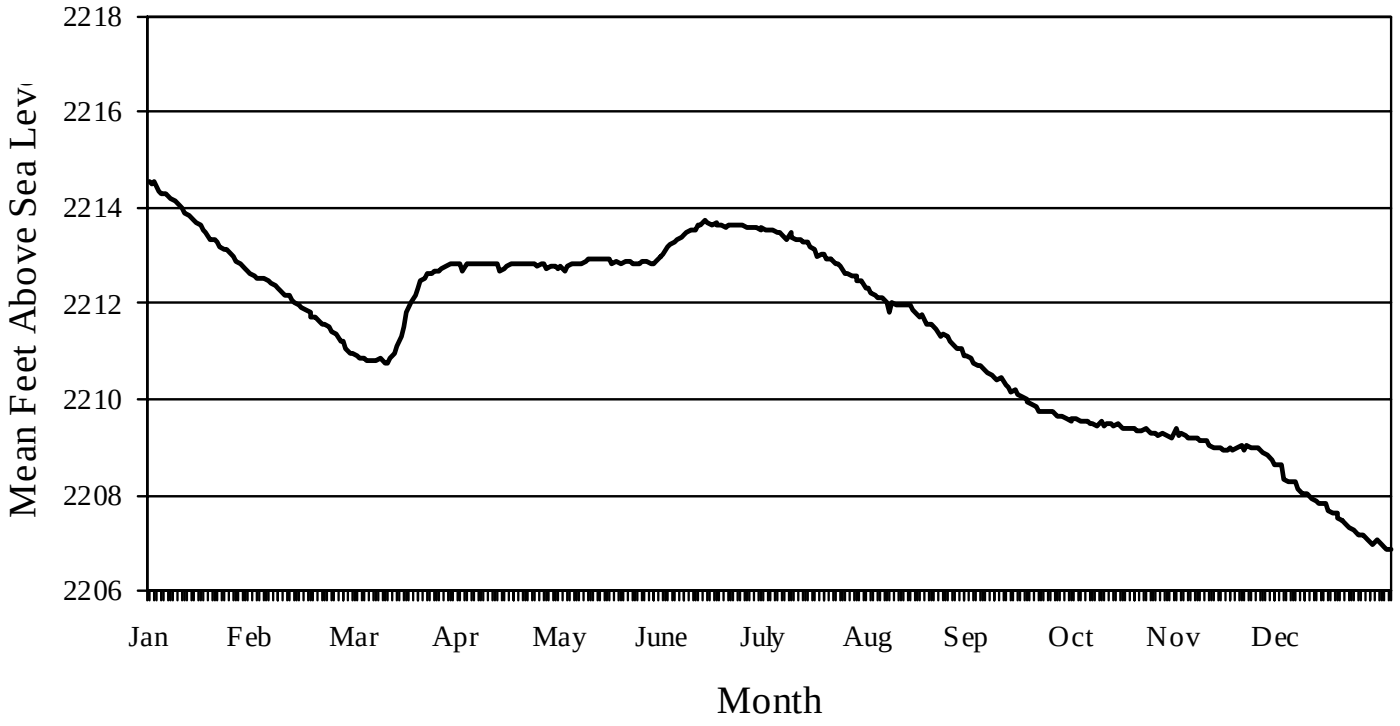

Figure 2. Daily average elevation from Jan 1, 2003 to December 31, 2003.

PROCEDURES

Data Collection

Spring trap-net sampling was conducted in the Big Dry Arm with 4' x 6' frame traps of 1-inch square mesh rigged with 30 to 50-foot leads. Merwin traps with 8' x 8' frames and 300' leads were also used to collect walleye spawners. Sinking experimental multifilament gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of ¾" -, 1"-, 1 ¼" -, 1 ½"-, and 2"square mesh were fished during summer to monitor condition, distribution and relative abundance of game and native species. Alternating multifilament nets 125 feet long and 6 feed deep consisting of 25-foot panels of ¾"- 2" - ¾"- 2"- and ¾" square mesh were used to collect age 4 and less walleye to evaluate OTC marks and recruitment of fry/fingerling 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. Merwin traps were used in an attempt to capture spawning chinook salmon in October. A salmon ladder made of 4 foot diameter culvert and 40 feet long was used to collect spawning chinook. Lake trout were samples with 300 feet long, 6 feet deep multifilament nets consisting of 100 foot panels of 3, 4, and 5-inch square mesh.

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 from 2003 summer netting were sent to Bozeman, Montana, to be pressed and mounted during January 2003. Spines from 2001, 2002, and 2003 were cut on an Isomat saw at Fort Peck with sections mounted on glass slides. Age results will be provided in the 2004 report. Otoliths from walleye, salmon and lake trout were collected. Age results will be provided in the 2004 report. 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).

Walleye otoliths were collected for Oxytetracyline (OTC) mark evaluation. OTC evaluation has been conducted at the Fort Peck office using techniques described by Luccassi (2001). South Dakota Game and Fish has temporarily provided an appropriate scope with UV capabilities for the evaluations.

An ongoing effort to enter historical data was begun in the winter of 2002 and continues in 2003 and 2004. An attempt to finalize those data sets will be a goal for 2004-2005. 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 2003, 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.

Table 1. List of species found in Fort Peck, abbreviations used in the report and notation if found in 2003.

Species	Scientific name	Abbreviation	Noted as present in 2003
Pallid Sturgeon	*Scaphirhynchus albus*	PAS	
Shovelnose Sturgeon	*Scaphiryhynchus platorynchus*	SHS	
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	x
Brown trout	*Salmo trutta*	BNT	
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	x
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	x
Lake chub	*Couesius plumbeus*	LAC	
Creek chub	*Semotilus atromaculatus*	CRC	x
Flathead chub	*Hybopsis gracilis*	FLC	x
Sturgeon Chub	Macrh*ybopsis gelida*	SNC	x
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	
Freshwater drum	*Aplodinotous grunniens*	FRD	x

RESULTS AND DISCUSSION

Spring Trap Netting

Spring spawning fish populations were sampled in the upper Big Dry Arm with frame traps from April 11th to May 1st, 2003. Both walleye and northern pike were successfully spawned and the fertilized eggs were sent to the Miles City Fish Hatchery. 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 426-trap days was committed to the walleye spawning efforts; 9,368 fish were captured for a total catch rate of 22.0 fish per-trap night (Table 2). Twenty species were captured; walleye were the most abundant with an average catch-rate of 5.6 fish per trap-night.

Due to low water conditions the walleye spawn was conducted on the pontoon barge in 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 8 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. To achieve the goal of 80 million or more eggs the spawn lasted until May 1st. The boat ramp at Nelson Creek will not be usable in the spring of 2004 and most likely not in 2005. The McGuire Creek road hasn't been drivable this winter as heavy snows have filled it in. If road conditions are poor during thaw the entire operation may have to be set up at Rock Creek and towed to a functional location, near McGuire Creek.

Walleye

Trap netting captured 2,366 walleye, of which 564 were weighed and measured. The catch rate in 2003 of 5.6 per-trap night was lower than the catch rate in 2001 and 2002 which were 10.3 and 6.8 walleye per-trap night, respectively. It was similar to the catch rate of 5.4 in 2000 (Table 3). Typically, in years with low run-off, as in 2000 to 2003 when little to no flow was measured in the Big Dry Creek the catch rate is low. Male to female ratio was uncommonly low at 1:1 only in 2000 was it the same. This may be a sign of poor recruitment of stocks combined with trapping in unfamiliar areas. In 2002 the ratio was a more common 2:1. The 4:1 ratio in 2001 was rather high only being exceeded in 4 years since 1979 (Table 4). The average weight for spawners in 2002 was 7.5 pounds and 1.5 pounds for females and males, respectively In 2003 male average size increased to 2.8 pounds the 3rd highest since 1979 (Table 4), another possible indication of poor survival of stocks hence fewer young males in the population. Female average weight continues to be high at 7.1 pounds. 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 2003 (Figure 3). Many smaller males between 12 and 15 inches were measured in 2002 with approximately 25% of the walleye less then 13 inches. However, in 2003, the percent of walleye less than 15 inches has dropped with less than 6% being smaller than 13 inches. The group of fish between 21 and 28 inches continues to appear strong. This indicates large fish are growing well and fishing mortality hasn't eliminated any size group of those large walleye. The absence of smaller male walleye accounted for the low male to female ratio in 2003. Male walleye between 12 and 15 inches or 2-3 years old typically are reproductive but females are not reproductive until about 14 to 16 inches or three to four years old.

A total of 564 walleye were weighed, of which 313 and 228 were male and females, respectively. Male walleye weight composition was 39%, 32%, and 23% of the fish greater than 3, 4, and 5 pounds, respectively. The percent of male walleye greater than 3 pounds is the 3rd highest on record; only in 1994 and 1996 were the percents higher. This may be a factor of the drought limiting recruitment of walleye. Female walleye weight composition was 87%, 84%, and 79% of the fish greater than 3, 4, and 5 pounds, respectively (Figure 4).

Table 2. Numbers, catch rate, average length and weight of fish captured by trap nets in the Upper Big Dry Arm during the walleye spawn in 2003.

Species	Number	CPUE	n	Average Length Inches	Average Weight Pounds
Bigmouth Buffalo	9	<0.1	1	25.5	12.7
Black Bullhead	16	<0.1	2	6.5	0.1
Black Crappie	161	0.4	1	10.3	0.7
Burbot	14	<0.1	8	28.0	5.4
Channel Catfish	239	0.6	48	12.9	1.2
Cisco	251	0.6	18	10.8	0.3
Carp	498	1.2	41	17.4	2.3
Flathead Chub	1	<0.1	--	----	---
Drum	5	<0.1	2	18.2	3.1
Goldeye	218	0.5	93	12.6	0.7
Longnose Sucker	1	<0.1	1	8.0	0.1
Northern Pike	1,579	3.7	345	29.5	7.2
female	224	0.5	85	33.9	11.1
male	625	1.5	250	27.9	5.7
River Carpsucker	1,220	2.9	213	18.3	3.8
Smallmouth Buffalo	154	0.4	23	22.1	6.4
Sauger	9	<0.1	3	17.4	1.9
female	5	<0.1	1	22.0	4.0
male	1	<0.1	1	14.4	0.7
Shorthead Redhorse	1,844	4.3	260	16.5	1.7
Smallmouth Bass	80	0.2	20	17.2	3.2
Walleye	2,366	5.6	564	20.8	4.5
female	1,137	2.7	228	25.0	7.1
male	1,126	2.6	313	18.0	2.8
White Sucker	537	1.3	108	15.1	1.4
Yellow Perch	166	0.4	20	7.8	0.2
TOTAL	9,368	22.0			

Table 3. Summary of walleye and northern pike captured during spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1975-2003.

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
2003	(4/11-5/01)	426	2,366	5.6	1,579	3.7

Table 4. Summary of average weights and sex ratios for walleye trap-netted in the upper Big Dry of Fort Peck Reservoir, 1979-2003.

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
2003	2.8	284	7.1	210	1:1

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

Fig 3- length frequencies of walleye

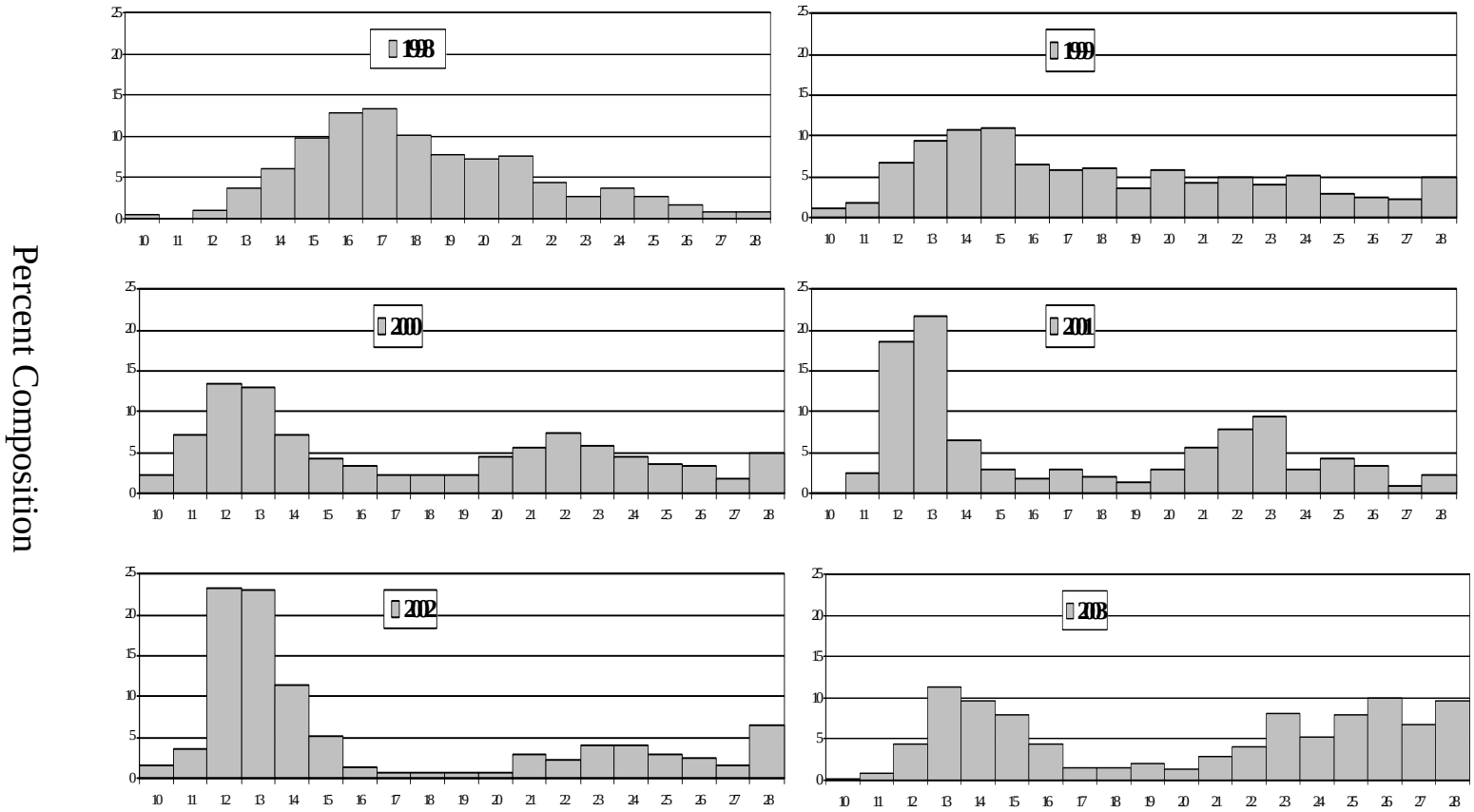

Figure 3. Length frequency of walleye (both sexes) trap netted on Fort Peck Reservoir in the upper Big Dry Arm 1998-2003.

Figure 4 percent weight composition by group and sex

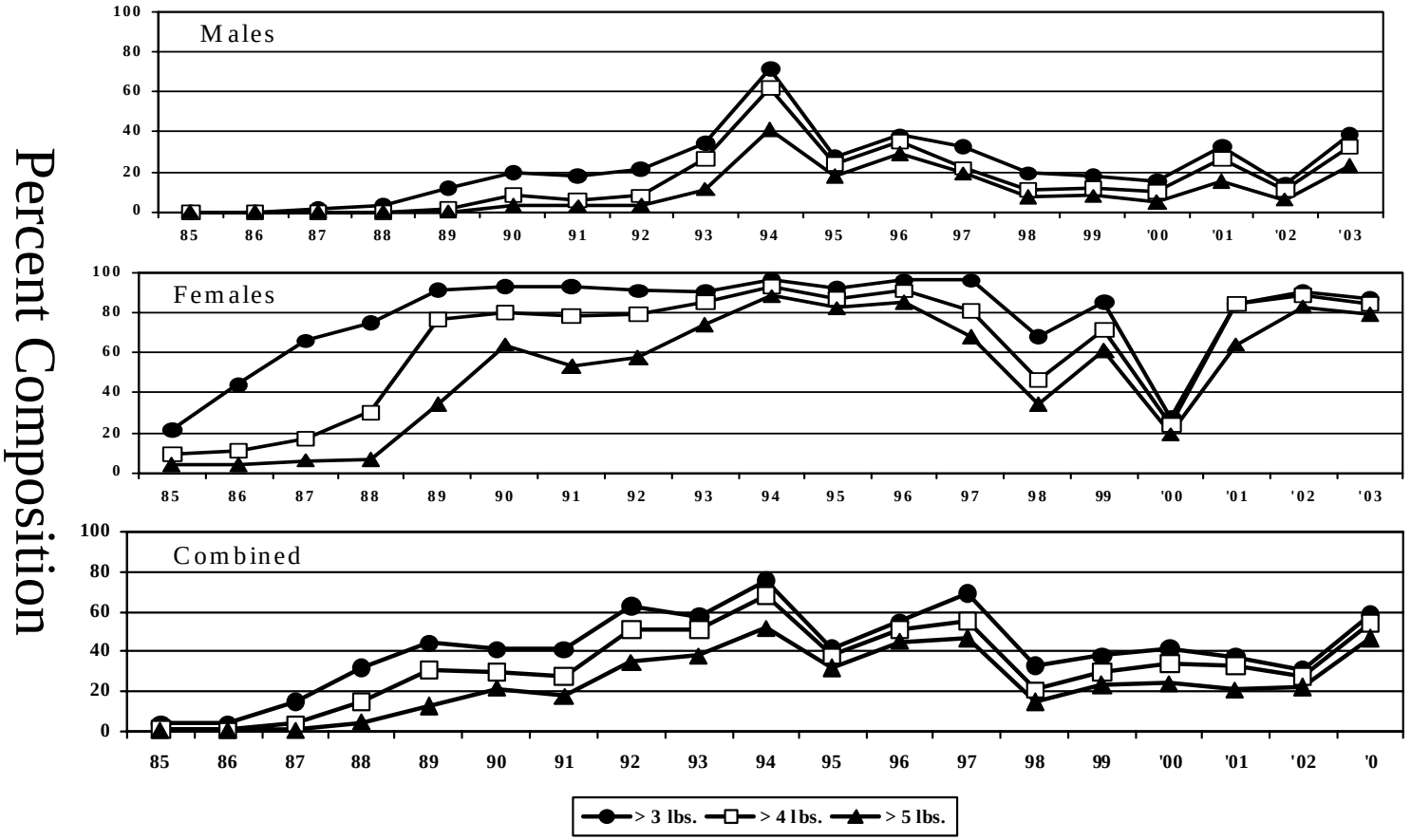

Figure 4. Change in size of male, female and combined sexes of walleye trap netted in the upper Big Dry Arm of Fort Peck Reservoir, 1985-2003.

In 2003, the total number of fish handled was average but the catch rate was slightly below average for the time period from 1992 to 2003 (Figures 5 and 6, respectively.) It is believed, poor runoff in the Big Dry creek (Figure 7) compounded with declining reservoir elevations and unfamiliar collection areas resulted in the decline in numbers and catch rates of walleye from 2000 to 2003 during the spawn. Big Dry Creek did have a short strong pulse of water move through in March but the ice was still over the reservoir and the runoff washed much mud over the ice.

In 2003, as in 2001, and 2002, 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 male walleye and spawning staff during the spawn, it was determined to use 100% sperm extender procedures, based on the successful use of extender since 2000. Low numbers of male walleye would have been a limiting factor as well, so sperm extender was retrospectively useful in this aspect as well. 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 2003 as demand for semen was low due to the limited daily number of ripe females.

Two thousand walleye were tagged with wire tags in 1997. An attempt was again made in 2003 to document recaptured tagged fish. Many fish were identified with scar marks near the dorsal fin with no tag or just the wire remaining and the identifying tag plate missing. Fourteen walleye had tags documented. Six were males averaging 24.9 inches and 5.5 pounds. Eight were females, of which one was ripe. Ripe females are not measured; therefore the seven remaining female walleye averaged 28.7 inches and 8.7 pounds. Both groups showed above average size for their sex compared to the overall spawn but were similar to the 2002 average measurements of tagged fish.

Northern Pike

Northern pike were spawned in 2003. Gravid females were again difficult to capture. Eggs from the pike produced 23,635 fingerlings of which 19,635 were stocked into Fort Peck and the remaining fish were stocked in Baker Lake and Gartside Reservoir. Total numbers of northern pike captured have been declining since 2001 but were higher than the 603 captured in 2000 (Table 3). A total of 1,579 northern were captured with a catch rate of 3.7 per trap-net. Three hundred forty-five northern pike were measured. Average length and weight was 29.5 inches and 7.2 pounds. Length frequency shows a trend towards larger fish with a strong showing of fish between 26 and 29 inches (Figure 8). The lack of smaller fish indicates continued poor reproduction due to loss of spawning habitat as the reservoir elevation declines. Female pike numbered 224 and males numbered 625. The remaining fish were not in reproductive condition and sex couldn't be identified.

Other Species Trapped

Eighteen other species were captured in 2003. The number captured and associated catch rates along with average length and weight are reported in Table 2. Shorthead redhorse and river carpsucker were the next most abundant species captured after walleye and northern pike. A separate report discussing these other species will be produced after all the historical data is put together in 2004 and 2005.Figure 5 total number of walleye handled in spawn

Figure 6 catch rate by year of walleye in trap nets

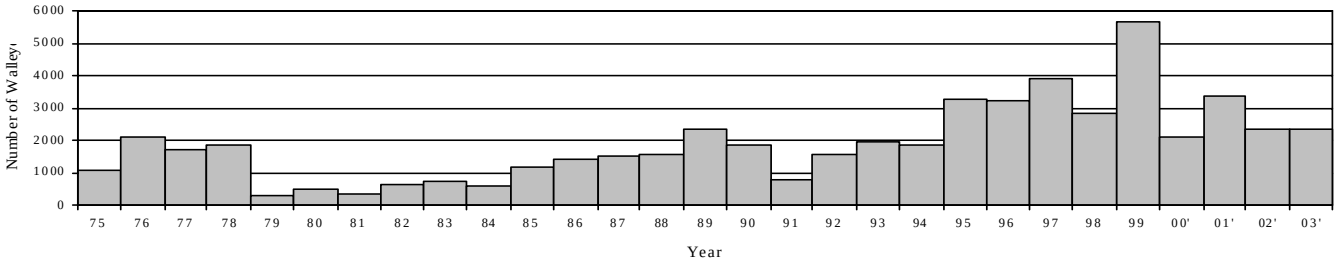

Figure 5. Actual number of walleye captured during spring trapping in upper Dry Arm from 1975 to 2003.

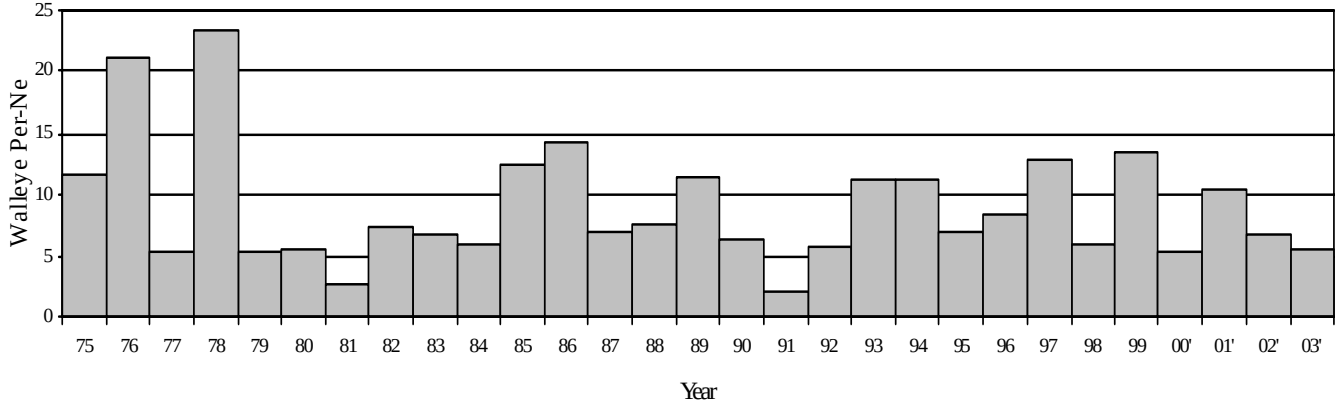

Figure 6. Number of walleye per trap-night during spring trapping in upper Dry Arm from 1975 to 2003.

Figure 7 big dry creek flows

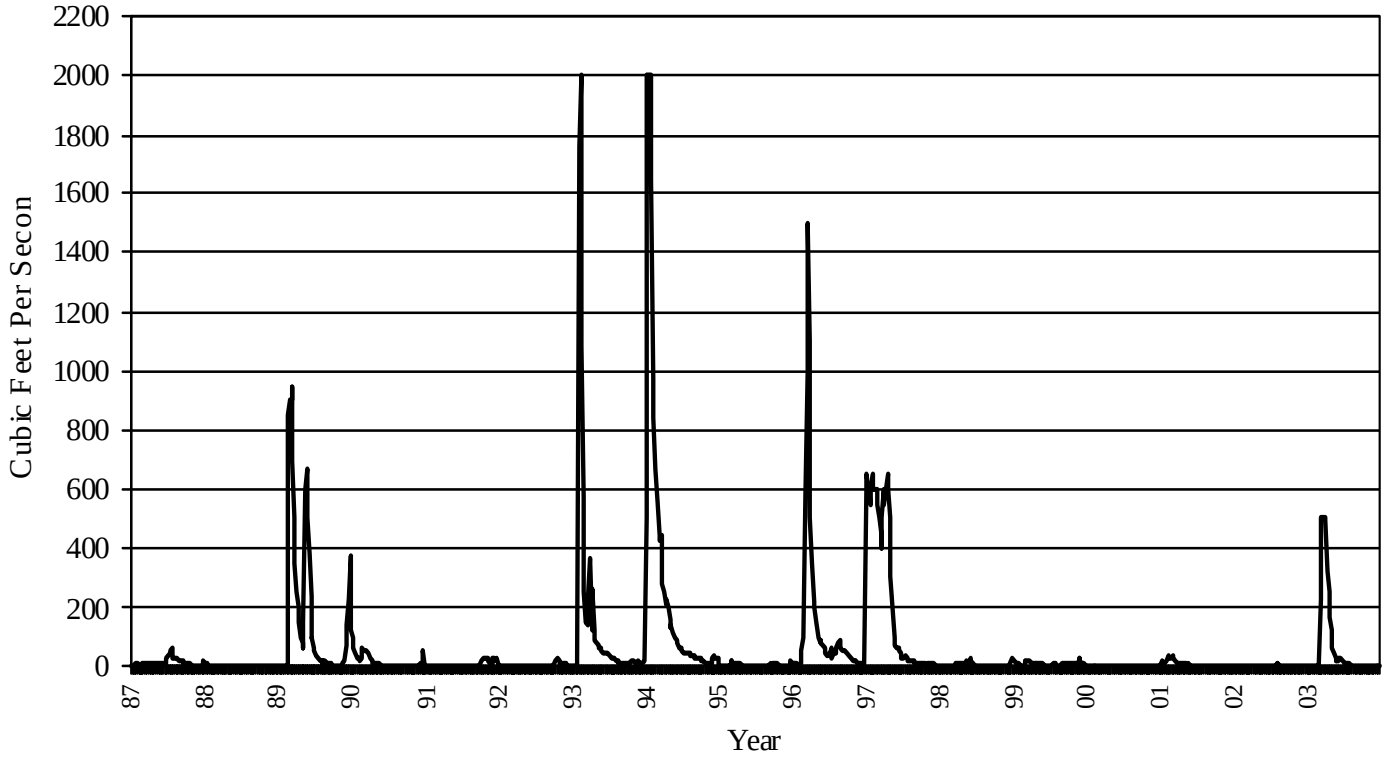

Figure 7. Annual March and April Big Dry Creek flow (CFS) from USGS gage 06131000 from 1987-2003, provisional data from USGS.

Figure 8 Nop length frequency from trap nets.

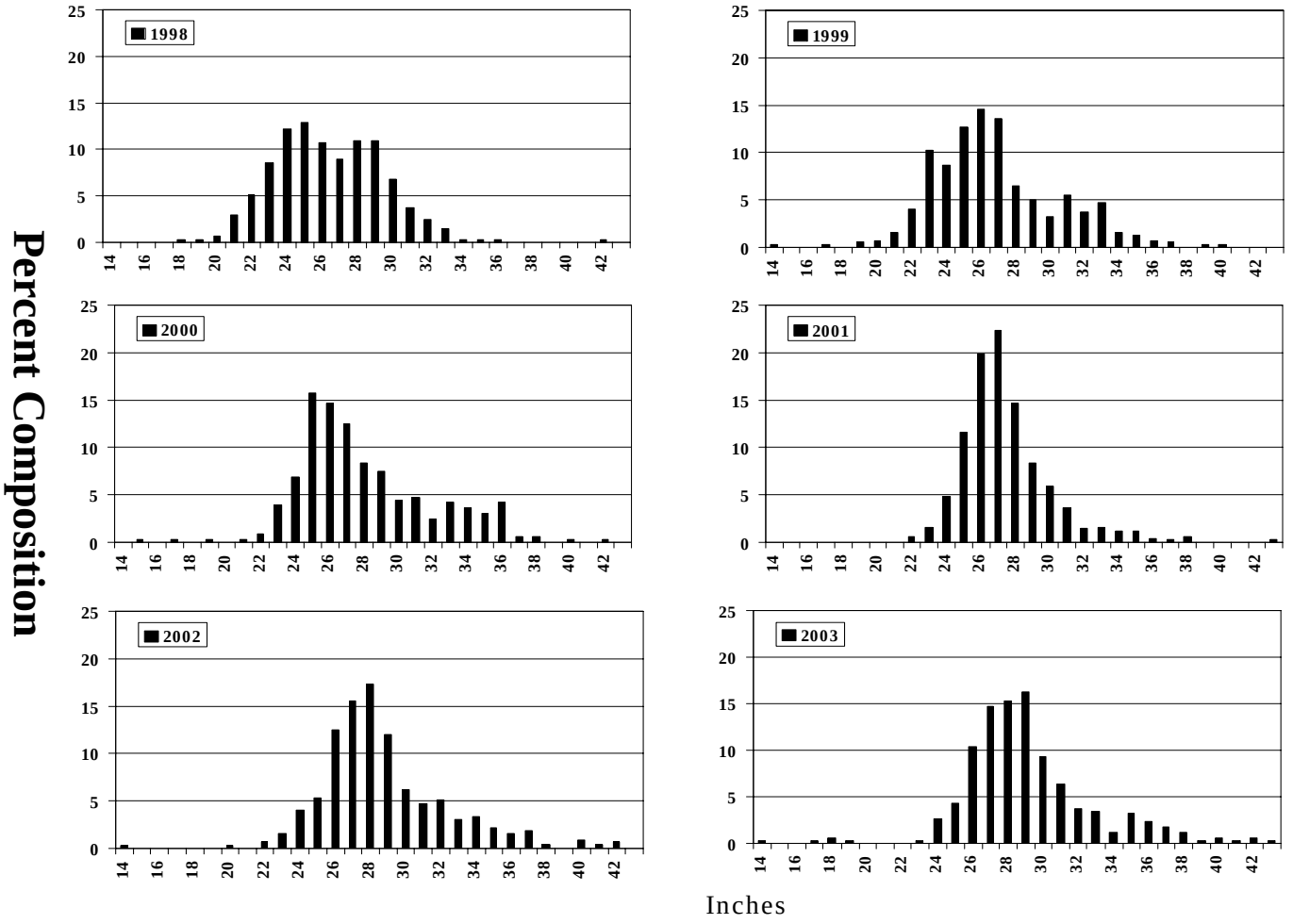

Figure 8. Length frequencies of northern pike trap netted in the Upper Big Dry 1998-2003.

MERWIN SPRING TRAPPING

Three merwins were used in 2003 for a total of 36 days of trapping. Merwin netting captured 17 species with walleye being the most abundant (Table 5). The overall catch rate was 15.7 fish per trap-day. The merwin traps compliment trap net catches. Trap nets provide the bulk of walleye and are 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 2003 made it necessary for the Fort Peck staff to begin efforts to secure merwin traps for the project on a permanent basis. Merwin traps are much easier to collect fish and require more initial set-up time, but typically have higher catch rates of fish. The COE has initiated a spillway fish tagging study. To facilitate fish collection they have provided funds to build 10 merwins, they will be available for use in 2004, the spillway tagging study likely will not occur until at least 2006 or 2007.

Walleye

Only 189 walleye were captured with 44 being measured. Sex was determined, resulting in 110 females and 76 males. The remaining walleye were immature or not categorized. Walleye catch rate was 5.3 per trap day in 2003 compared to 8.6 and 17.0 per trap-day in merwin traps in 2002 and 2001, respectively. The merwin catch rate in 2003 was likely low as there was a lack of suitable areas to set merwins. The merwins were placed in areas that were vulnerable to winds which made them difficult to maintain. The low catch rate was also likely due in part to the lack of smaller male walleye as noted in the trap net catches. In the past merwin catch rates have been much higher than trap nets (Figure 9). Walleye average length and weight was 23.9 inches and 6.3 pounds. Females and males averaged 26.6 inches and 8.2 pounds, and 20.7 inches and 3.9 pounds, respectively. Length frequencies of walleye show strong classes of 23 to 26-inch fish. Very few fish less than 15 inches were measured or captured in merwins in 2003 (Figure 10). Two tagged walleye from 1997 were captured. The male number 35 was 25.2 inches and 6.4 pounds. The female number 479 was green and was 27.4 inches and 10.4 pounds.

Northern Pike

Thirty six northern pike were captured with 10 being measured. The catch rate was 1.0 per trap-day. Average length and weight of northern pike was 31.6 inches and 11.3 pounds. Female and male averages were 38.9 inches and 23.2 pounds, and 27.8 inches and 5.3 pounds, respectively.

Other Species

Other species captured included: bigmouth buffalo, black crappie, rainbow trout, channel catfish, cisco, carp, goldeye, river carpsucker, drum, smallmouth buffalo, shorthead redhorse, smallmouth bass, white sucker, and yellow perch. Spottail shiners and emerald shiners are not counted but were captured. Table 5 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.

Table 5. Numbers, catch rate, average length and weight of fish captured by merwin traps in the upper Big Dry Arm during the walleye spawn in 2003.

Species	Number	CPUE	n	Average Length Inches	Average Weight Pounds
Bigmouth buffalo	2	<0.1	2	33.9	27.5
Black Bullhead	1	<0.1	---	-----	-----
Black Crappie	11	0.3	4	10.4	0.6
Channel Catfish	27	0.8	---	-----	-----
Cisco	25	0.7	6	11.0	0.4
Common Carp	2	<0.1	----	----	---
Freshwater Drum	1	<0.1	----	----	---
Goldeye	6	0.2	2	12.6	0.7
Northern Pike	36	1.0	10	31.6	11.3
female	*10*	*0.3*	*3*	*38.9*	*23.2*
male	*18*	*0.5*	*6*	*27.8*	*5.3*
Rainbow Trout	1	<0.1	1	24.0	4.2
River Carpsucker	100	2.8	23	17.2	3.3
Smallmouth Buffalo	30	0.8	10	21.9	6.6
Shorthead Redhorse	99	2.8	10	16.3	1.8
Smallmouth Bass	4	0.1	1	17.0	3.0
Walleye	189	5.3	44	23.9	6.3
Female	*110*	*3.1*	*27*	*26.6*	*8.2*
male	*76*	*2.1*	*15*	*20.7*	*3.9*
White Sucker	24	0.7	2	14.5	1.2
Yellow Perch	6	0.2	---	-----	-----
Total	564	15.7			

Figure 9 merwin vs trap catch rates of walleye

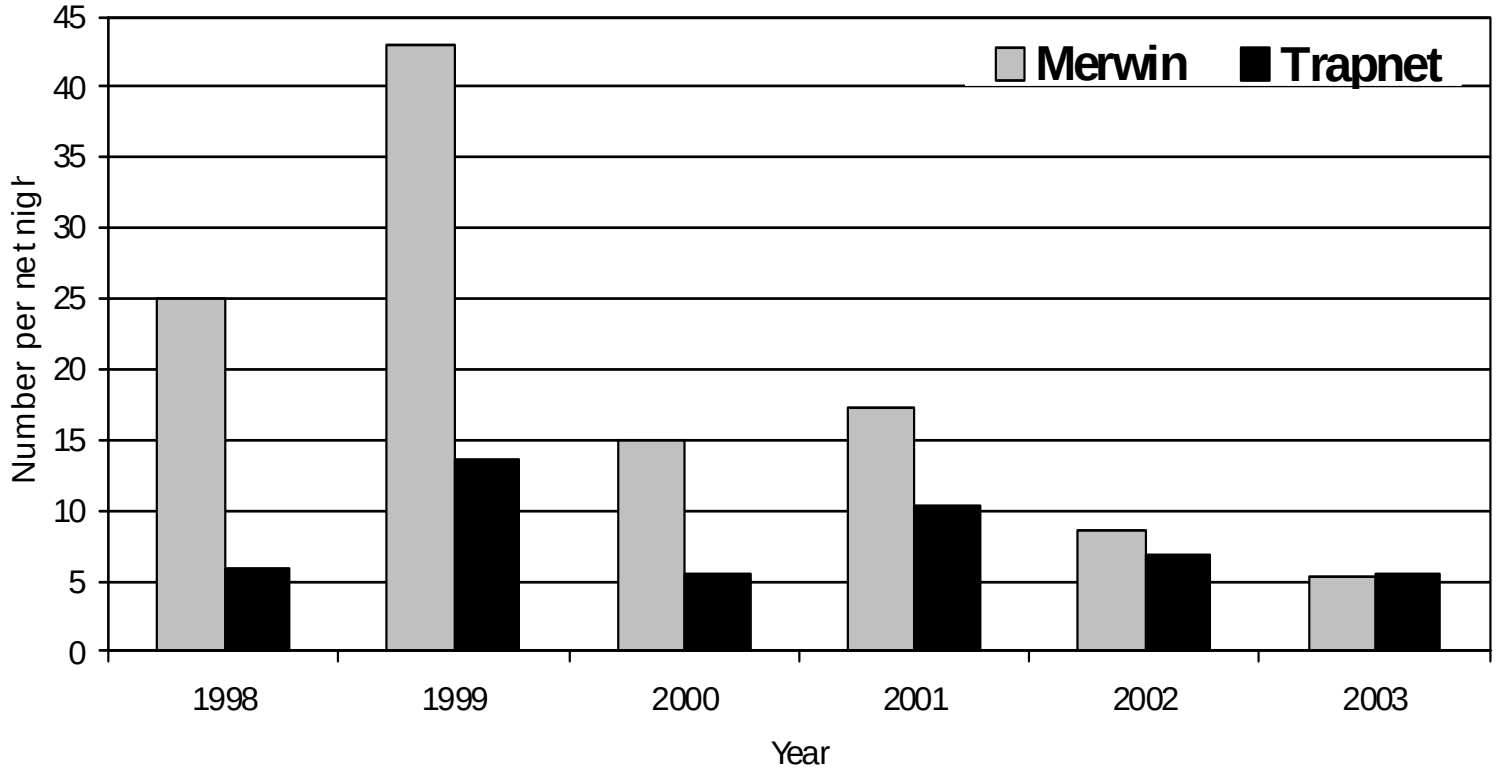

Figure 9. Comparison of Merwin and trap-net catch rates of walleye during spawning operation in the upper Big Dry Arm of Fort Peck Reservoir 1998-2003.

Figure 10. Walleye length frequency in Merwins.

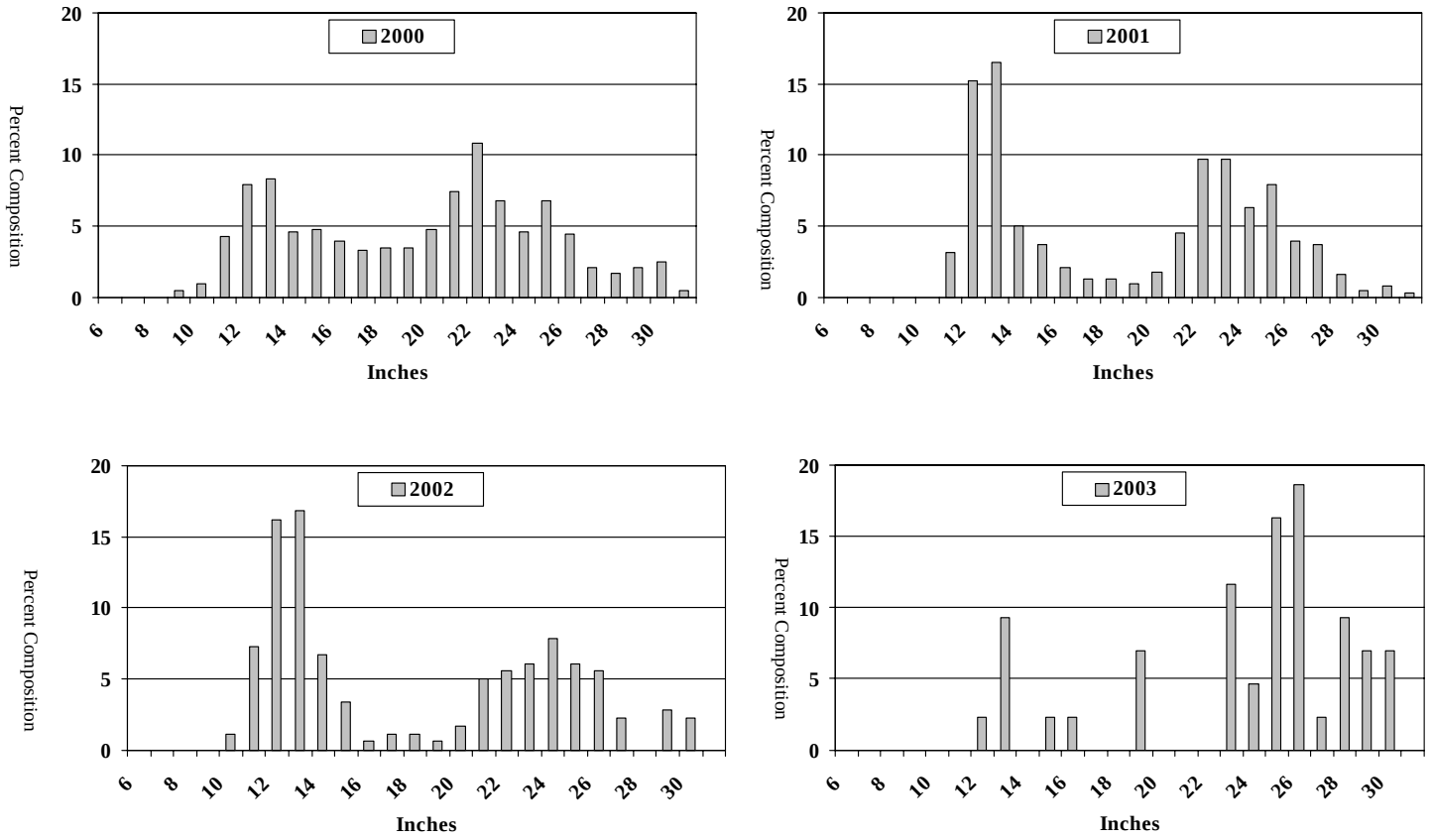

Figure 10. Length frequency of walleye captured with the Merwin trap from 2000- 2003 during the spawning operation in the upper Big Dry Arm of Fort Peck Reservoir.

WALLEYE STOCKING AND FORT PECK REARING PONDS

Seven ponds S1, S2, S3, N1, N2, N3, N4 all near the COE Upstream Camp Ground which were regularly fertilized in addition to two perimeter ponds which were not fertilized P1 and P2 were used to rear walleye fingerlings in 2003 (Figure 11). A total of 1.1 million fry were stocked in the ponds for a return of 216,019 fingerlings. This return was 19.6%. Typically the return from the ponds is 35% or greater.

Each Pond N1 and N2 was stocked with 200,000 fry each. N1 produced 16,657 fingerling an 8% return and N2 produced 53,729 fingerling a 27% return. All other ponds received 100,000 fry. Ponds, S1, S2, and S3 produced 5,260, 45,326, 408 fingerling, respectively. Pond S1 is typically a poor producing pond, this return is considered fair. Pond S3 typically is a very good producing pond. It's unclear what event caused such a poor return of only 0.5%. Ponds N3 and N4 are drained together the ponds produced 28,357 fingerling for a 14% return. The ½ full P1 pond returned 49,504 fingerling nearly a 50% return, those fingerling were the largest collected at 420/pound. The ¾ full P2 pond produced 16,778 fingerling a 17% return.

It is recommended to use the outer perimeter ponds on the Duck Creek road if they are half full or more and filled in the spring or winter prior to use as walleye rearing ponds. They didn't fill fully in 2003, but were used. P2 was about ¾ full and P1 was about ½ full at the time of stocking and draining. The perimeter ponds were closed in November 2003 to collect runoff for the 2004 stocking. It is likely they will be full in 2004 due to prairie snow pack. Return from the perimeter ponds has been as high as 70% in the past. It is recommended to use these perimeter ponds when possible, P1 should be stocked with 100,000 fry each time it's used and P2 should receive 200,000 fry when full or 100,000 when half full. Gravel was hauled into P1's's drain area, as it was washed out. The gravel created a stable bed for the water tank which is used to collect fingerling. The perimeter ponds lack adequate kettles to collect walleye and need to be upgraded; Pike Masters of Billings is considering making kettles for use in 2004. Three total kettles should be acquired to improve capture of fingerlings during draining of ponds, two for the perimeter ponds and another on pond S1. Water control into the six foot water tanks is difficult, debris plugs the screens quickly and many fingerling are likely lost by over-wash during collection. Currently, under poor reservoir elevations, fingerling washed out of the collection tanks don't make it to the reservoir as they might when the reservoir is full.

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 and were procured in the fall of 2003. The ponds should be filled at least by April 15th so the water may warm and zooplankton numbers can respond to fertilizing of ponds. The COE filled 5 ponds in October and November of 2003 in an effort to have the ponds filled earlier and to avoid colonization of large insects and vertebrates. The COE had to extend its water and electric lines to fill the ponds and used $4,000 from tournament conservation funds to accomplish this task. The heavy snow in the winter of 2003/2004 should top off all the ponds including the perimeter ponds before May.

A request to maintain stocking of walleye fingerling at 2 million or the base stock was made in 2003. The survival of stocks will likely be diminished during the remainder of the drought. Walleyes Unlimited supported this request with a formal letter in 2003. A total of 2.27 million fingerlings and 23.6 million fry were stocked in 2003 (Figures 12 and 13, respectively). Stocking of fry and fingerling occurred throughout the reservoir in areas downstream of Snow Creek and in the Dry Arm (Table 6 and Figure 14). FWP requested assistance to produce 500,000 fingerlings from North and South Dakota if needed. North Dakota produced 250,800 fingerlings from Garrison Fish Hatchery which were delivered to Montana on July 7th, 2003. Miles City State Fish Hatchery produced 1.8 million fingerlings for Fort Peck. The stocking request for Fort Peck was exceeded in 2003 by over a quarter million fingerlings.

Figure 11, Fingerling pond Map.

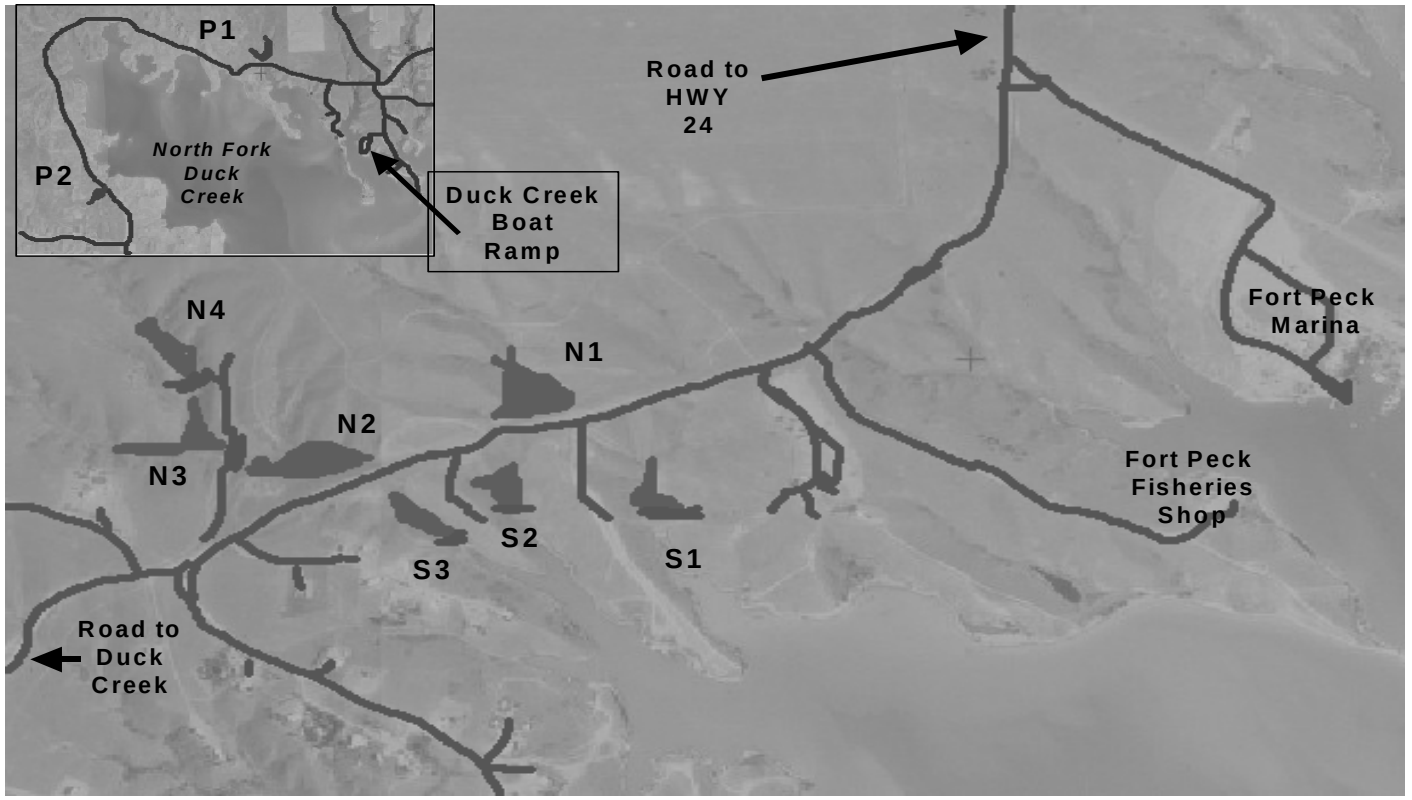

Figure 11. Location of Fort Peck Rearing Ponds.

Figure 12 fingerling stocking of walleye annually
Figure 13 fry stocking of walleye annually

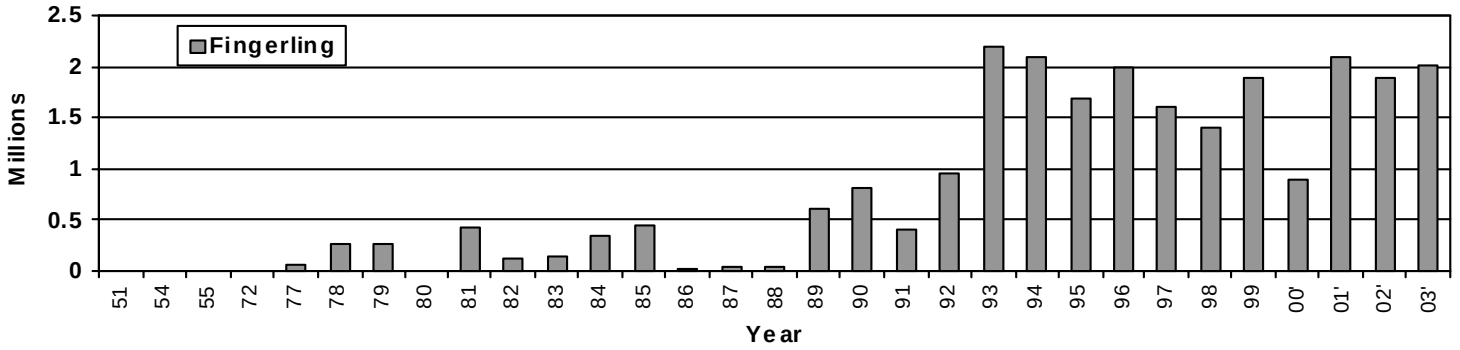

Figure 12. Number of walleye fingerling stocked in Fort Peck annually from 1951 to 2003.

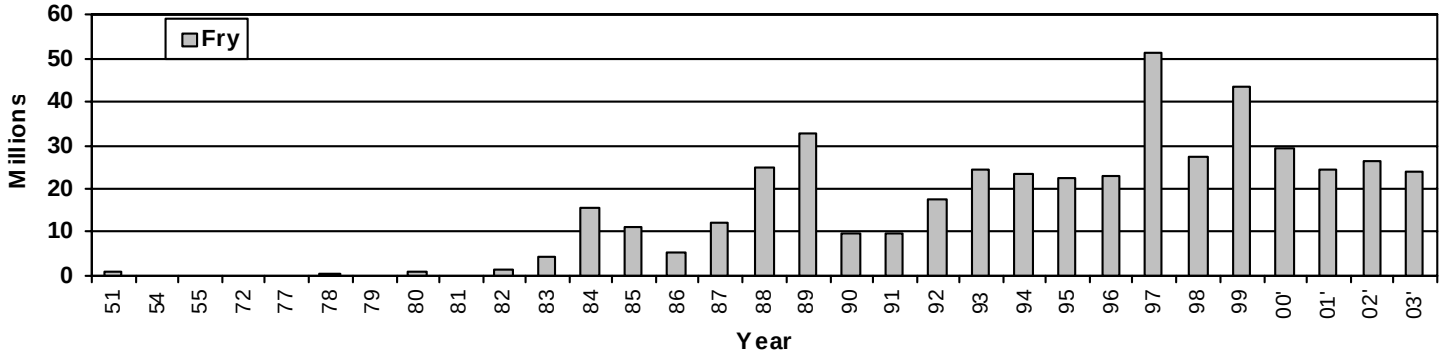

Figure 13. Number of walleye fry stocked in Fort Peck annually from 1951 to 2003.

Table 6. Number of walleye stocked on Fort Peck for 2003 by region, location and Date.

Date	Location	Region	Millions of Fry	Fingerlings OTC[1]	Origin
4/29/2003	McGuire Creek	UBD	2.5		Miles City Fish Hatchery
4/29/2003	Short Creek	UBD	2.4		Miles City Fish Hatchery
5/5/2003	Lost Creek	UBD	1.3		Miles City Fish Hatchery
6/24/2003	Little Bug	UBD		45,335	Miles City Fish Hatchery
6/24/2003	Lost Creek	UBD		45,335	Miles City Fish Hatchery
6/24/2003	McGuire Creek	UBD		70,000	Miles City Fish Hatchery
5/5/2003	Box Creek	LBD	2.0		Miles City Fish Hatchery
5/5/2003	Box Elder	LBD	1.7		Miles City Fish Hatchery
5/5/2003	N. F. Rock Creek	LBD	2.0		Miles City Fish Hatchery
5/12/2003	Sandy Arroyo	LBD	1.4		Miles City Fish Hatchery
5/12/2003	Spring Creek	LBD	0.9		Miles City Fish Hatchery
6/17/2003	Box Elder	LBD		69,440	Miles City Fish Hatchery
6/18/2003	Sandy Arroyo	LBD		65,186	Miles City Fish Hatchery
6/19/2003	Box Creek	LBD		45,000	Miles City Fish Hatchery
6/19/2003	N. F. Rock Creek	LBD		129,688	Miles City Fish Hatchery
6/19/2003	S. F. Rock Creek	LBD		60,000	Miles City Fish Hatchery
6/24/2003	Spring Creek	LBD		90,671	Miles City Fish Hatchery
5/9/2003	Marina	LMA	0.1		Miles City Fish Hatchery
5/16/2003	N.F. Duck Creek	LMA	1.3		Miles City Fish Hatchery
5/16/2003	N.F. Duck Creek	LMA	1.3		Miles City Fish Hatchery
5/27/2003	Marina	LMA	0.7		Miles City Fish Hatchery
6/6/2003	N.F. Duck Creek	LMA		101,959	Miles City Fish Hatchery
6/6/2003	Spillway Bay	LMA		101,959	Miles City Fish Hatchery
6/8/2003	N.F. Duck Creek	LMA		101,867	Miles City Fish Hatchery
6/10/2003	N.F. Duck Creek	LMA		5,260	Fort Peck Ponds
6/11/2003	Bear Creek	LMA		58,800	Miles City Fish Hatchery
6/12/2003	4th Bay	LMA		45,326	Fort Peck Ponds
6/13/2003	Skunk	LMA		76,692	Miles City Fish Hatchery
6/18/2003	N.F. Duck Creek	LMA		408	Fort Peck Ponds
6/18/2003	N.F. Duck Creek	LMA		16,778	Fort Peck Ponds
6/20/2003	N.F. Duck Creek	LMA		16,657	Fort Peck Ponds
6/24/2003	Spillway Bay	LMA		53,729	Miles City Fish Hatchery
6/25/2003	Main Duck	LMA		14,179	Fort Peck Ponds
6/25/2003	Main Duck	LMA		14,178	Fort Peck Ponds
6/27/2003	Mid Duck Creek	LMA		16,501	Miles City Fish Hatchery
6/27/2003	S. F. Duck Creek	LMA		33,003	Miles City Fish Hatchery
7/08/2003	Spillway Bay	LMA		250,800	Garrison North Dakota
5/2/2003	Cattle Crooked	MMA	2.1		Miles City Fish Hatchery
5/2/2003	Hell Creek	MMA	2.0		Miles City Fish Hatchery
5/2/2003	Sutherland	MMA	2.0		Miles City Fish Hatchery
6/5/2003	Hell Creek	MMA		160,341	Miles City Fish Hatchery
6/10/2003	Pines	MMA		151,977	Miles City Fish Hatchery
6/13/2003	8th Bay	MMA		28,364	Miles City Fish Hatchery
6/13/2003	Gilbert Creek	MMA		85,094	Miles City Fish Hatchery
6/13/2003	N. F. Cattle Crooked Crk.	MMA		42,547	Miles City Fish Hatchery
6/13/2003	S. F. Cattle Crooked Crk	MMA		42,547	Miles City Fish Hatchery
6/13/2003	7th Bay	MMA		28,364	Miles City Fish Hatchery
6/13/2003	8th Bay	MMA		28,364	Miles City Fish Hatchery
6/20/2003	Snow Creek	MMA		88,648	Miles City Fish Hatchery
6/20/2003	Sutherland	MMA		88,648	Miles City Fish Hatchery
4/29-5/9	Fort Peck Ponds		1.1[2]		Miles City Fish Hatchery
	Totals		23.6	2,273,645	

Figure 14 stocking map for walleye fingerling and fry.

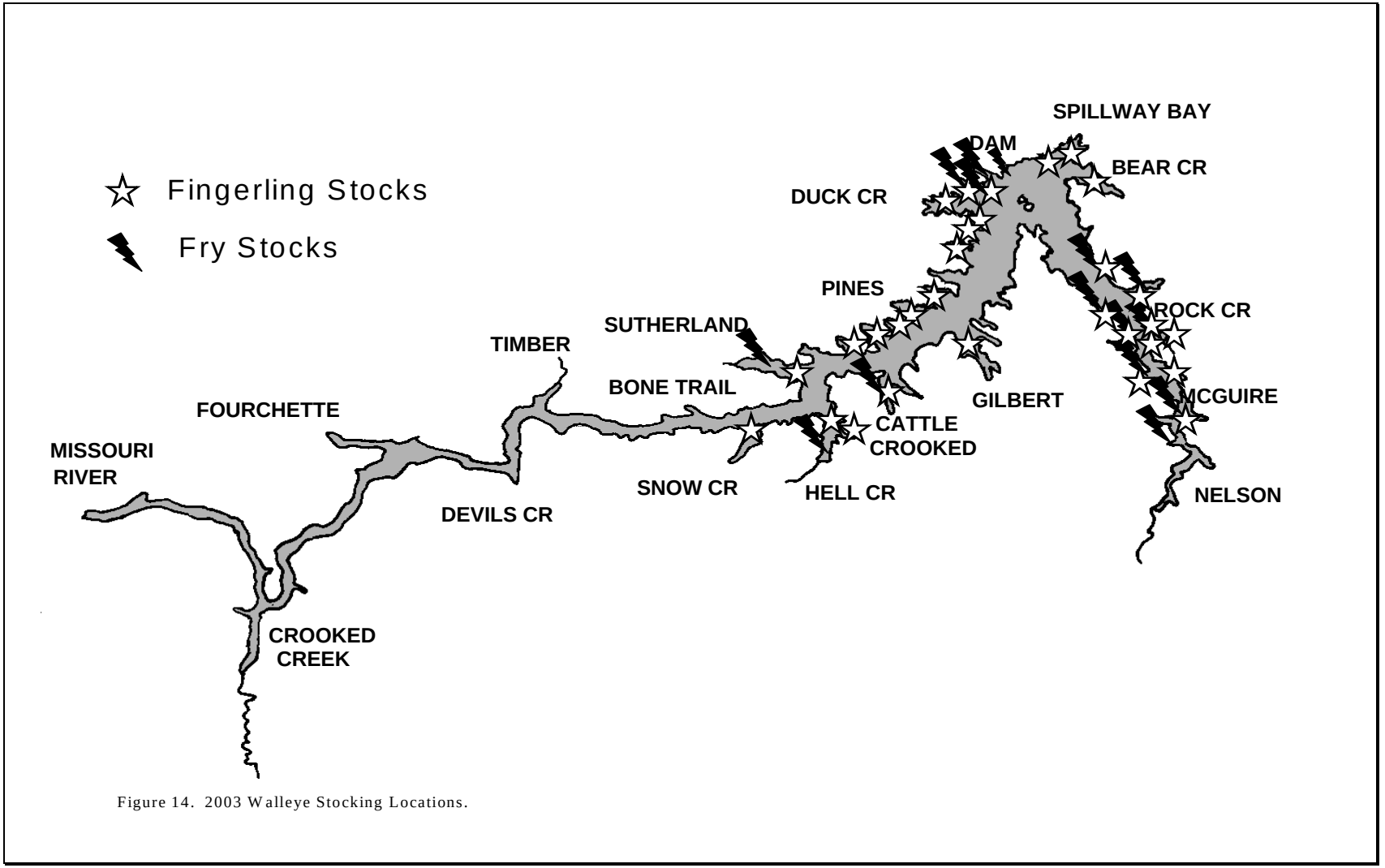

Figure 14. 2003 Walleye Stocking Locations.

OXYTETRACYCLINE MARKING OF WALLEYE

Walleye fry used to produce fingerlings were marked with OTC in 2003; with the exception of the fingerling stocked from the perimeter ponds for a total of 166,515 marked fingerling from the ponds. Since the perimeter ponds didn't fully fill, it was suspected they may become too hot to support walleye. It was decided to drain these ponds first prior to full heating; therefore 200,000 fry were taken from an anticipated reservoir stock. It was forgotten that these fish were not marked. A total of 66,282 unmarked fingerlings were produced. A total of 2,273,644 fingerlings were stocked. Therefore 97.1% of all fingerling should exhibit a mark. Future calculations of marked walleye will have to incorporate 102.9% as a correction factor for the 2003 stocks.

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. All of the fingerlings stocked in 2002 were marked as fingerling.

Otoliths were analyzed for OTC marks from walleye collected in the 2001, 2002 and 2003 gill nets. South Dakota again 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 and 2003 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. In 2003, 288 otoliths were examined. The 1999 to 2002 year classes were sampled. No young of year were examined. In 2003, 39 fish had a mark for an overall 13.5% occurrence. 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 15.) and 65% in 2002 sample (Figure 16) and 60% in the 2003 samples (Figure 17.), with the correction for 25% marked. If a correction of 50% lost marks is applied, the walleye in Fort Peck would have nearly a 50% chance of being a fish originally stocked as a fry. The first fingerling returns from 2002 show 12% of that year class are from fingerling stocks.

If all assumptions for corrections were incorporated into the 2002 year class 12% would be from fingerling stocks 50% from fry stocks and 38% would be from unrecognized marks or natural reproduction. This would be based on a small sample size and for a group of fish not fully recruited to the gill nets. Data collected in 2004 will begin to fully measure the contribution of fingerling stocks to the fishery. It should also be noted overall recruitment of either stocking type is being conducted in a drought. The effects of the drought each year make Fort Peck a hostile area for any type of stock.

The study to continue marking fingerling during the fry stage is planned for 2004. Otoliths will be taken and examined on all gill netted fish less than 20 inches for the duration of the OTC study or until 2008. 2004 will be the last year of fry marking of fingerlings stocks, until the new Fort Peck Fish Hatchery comes on line. 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. A scope was secured for use from South Dakota Game and Fish, a need exists to purchase our own scope. Both regions 4 and 7 have sent samples for analysis, further supporting an in-state need for procuring our own scope.

Figure 15 2001 OTC results
Figure 16 2002 OTC results
Figure 17, 2003 OTC results

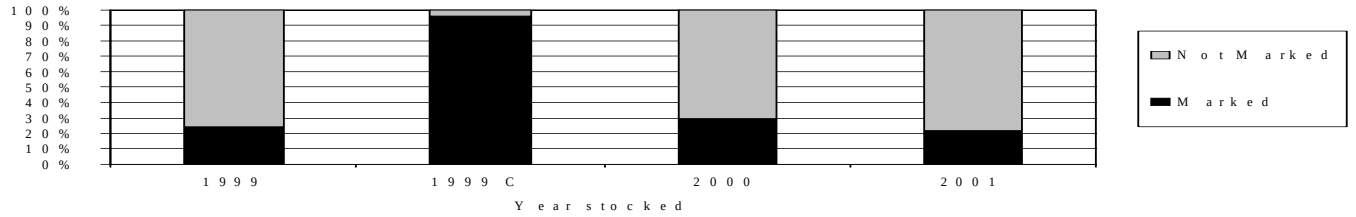

Figure 15. 2001 percent composition of marked walleye by year stocked from fry marking with OTC.

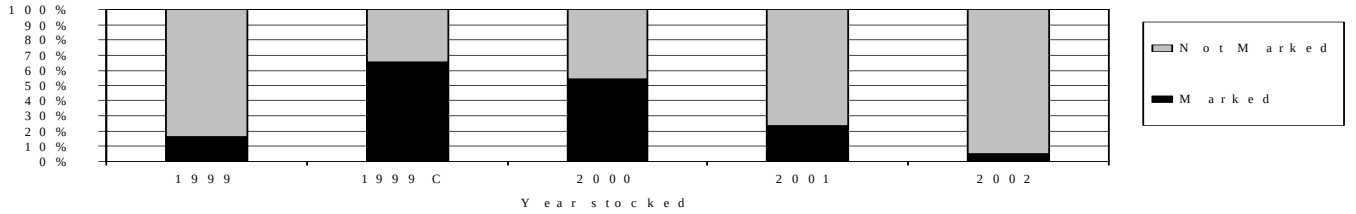

Figure 16. 2002 percent composition of marked walleye by year stocked from fry marking with OTC.

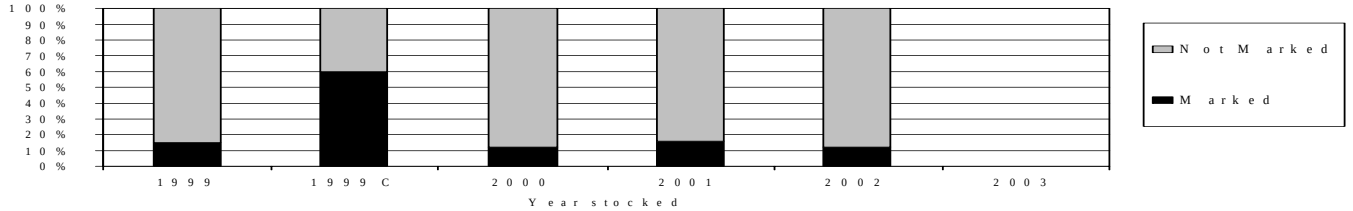

Figure 17. 2003 percent composition of marked walleye by year stocked from fry marking with OTC.

STOCKING OF OTHER WARM WATER SPECIES

Smallmouth bass were not stocked in Fort Peck in 2003. Bass were traded to North Dakota in exchange for walleye fingerling for Fort Peck. A request for 200,000 northern pike fingerlings was placed in 2003. Miles City provided 19,635 fingerlings from the Fort Peck egg take and North Dakota filled a request for additional northern pike fingerlings with 229,150 fingerlings for a total of 248,785 fingerlings. Northern were stocked as follows: 51,875 at the spillway boat ramp, 35,200 at Lone Tree Bay, 35,200 at McGuire Creek, and 126,510 at Rock Creek boat ramp. A request for 200,000 fingerlings has been placed again. Eggs should be collected during the 2004 spring spawning operation at Fort Peck to improve culture methods and to provide stocks for Fort Peck.

LAKE-WIDE GILL NETTING

Ninety-six gill nets were set in various locations throughout the reservoir from July 8th to August 20th, 2003. Gill netting provides information on species distribution, composition, and abundance, walleye condition, and game species stomach contents. Eighteen species were captured for a total of 2,065 fish (Table 7). Goldeye, walleye, and shorthead redhorse were the most abundant species captured overall, with catch rates of 6.2, 3.1, and 2.3 per-net night, respectively. Fish with catch rates equal to or over 1.0 per-net night include: channel catfish, cisco, carp, northern pike and white sucker. Other less common species include: bigmouth buffalo, black crappie, chinook salmon, freshwater drum, river carpsucker, smallmouth buffalo, sauger, smallmouth bass, white crappie, and yellow perch.

Walleye

Three-hundred-one walleye were captured, measured and weighed. The lake-wide average catch rate was 3.1 walleye per net, which was similar to the 2002 catch rate of 3.3 walleye per-net (Figure 18). Average length and weight was 17.3 inches and 2.8 pounds, in 2003. Four size groups of walleye make up the fishery, substock less than 10 inches, stock size fish 10 to 14 inches, angler quality size 14 to 18 inches, then preferred size by anglers of 18 inches and greater. It's likely the substock fish are not fully recruited to the nets meaning not all fish less than 10 inches are equally captured. This group of fish is the first indication of potential year class strength based on 2 year old fish. The 10-14 inch fish are fully recruited to the nets and indicate relatively how many fish are about to enter the angler fishery. In 1998, 1999, and 2001 a strong group of walleye less than 14 inches was apparent (figure 18). Apparent poor survival of fish less than 10 inches since 2000 appears to be reducing the number of fish less than 14 inches in 2002 and 2003. The number of fish between 14 and 18 inches is typically less than expected. Growth begins to accelerate at this time as they convert to a cisco diet. In addition the fish seem to move to deeper water in pursuit of cisco and are sampled in smaller proportion then expected. The proportion of walleye over 18 inches is typically strong despite low numbers of the 14-18 inch group.

Concentrations of walleye were greatest in the upper Big Dry Arm with a catch rate of 5 per-net (Figure 19). The lowest catch rate of 2.1 walleye per-net was documented in the lower Missouri Arm. The middle Missouri Arm had a catch rate of 2.6 walleye per-net. The lower Big Dry and upper Missouri Arm had catch rates of 3.2 walleye per-net. Capture of walleye less than10 inches remained less than 1 per-net in all regions. In 2001, the Upper Big Dry had the highest catch rate from 1994 to 2003 at nearly 9 walleye per-net with the catch being dominated by the 10 to 14 inch fish (Figure 19).

A more detailed examination of length frequency shows the 14 and 15 inch walleye are the most dominate in the catch but overall catch of any size has continues to diminish since 1999 (Figure 20). The more abundant 12 to 14 inch fish in 2001 may explain the slightly higher number of walleye between 18 and 22 inches in the catch in 2003. The increase may also be due to the poor reproduction of cisco, making walleye forage more often in shallower water where netting occurs.

Relative weights of walleye greater than 18 inches showed modest improvement from 2002 at nearly 95 (Figure 21). These walleye are able to successfully feed on the cisco produced in 2001. The smaller sizes of walleye apparently are unable to successfully forage on the large cisco and are finding it difficult to

Table 7. Fish captured by 125-foot experimental gill nets in Fort Peck Reservoir, 2003.

	UBD[2]		LBD[3]		LMA[4]		MMA[5]		UMA[6]		Total	
Species[1]	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day
BIB	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.0
BLC	0	0.0	0	0.0	0	0.0	0	0.0	4	0.2	4	0.0
CCF	30	1.9	11	0.6	1	0.1	1	0.1	86	4.3	129	1.3
CHS	0	0.0	0	0.0	0	0.0	0	0.0	4	0.2	4	0.0
CIS	34	2.1	27	1.4	3	0.2	17	0.9	14	0.7	95	1.0
COC	18	1.1	28	1.4	18	0.9	16	0.8	26	1.3	106	1.1
FRD	1	0.1	5	0.3	0	0.0	7	0.4	46	2.3	59	0.6
GOE All	92	5.8	22	1.1	48	2.4	106	5.3	323	16.2	591	6.2
Male	42	2.6	6	0.3	14	0.7	26	1.3	113	5.7	201	2.1
Female	50	3.1	16	0.8	34	1.7	72	3.6	160	8.0	332	3.5
Im.	0	0.0	0	0.0	0	0.0	8	0.4	50	2.5	58	0.6
NOP	31	1.9	26	1.3	20	1.0	30	1.5	19	1.0	126	1.3
RIC	27	1.7	12	0.6	2	0.1	4	0.2	38	1.9	83	0.9
SAB	26	1.6	11	0.6	3	0.2	19	1.0	10	0.5	69	0.7
SAR	1	0.1	0	0.0	4	0.2	10	0.5	11	0.6	26	0.3
SHR	12	0.8	21	1.1	19	1.0	35	1.8	129	6.5	216	2.3
SMB	7	0.4	8	0.4	13	0.7	7	0.4	9	0.5	44	0.5
SxW	0	0.0	0	0.0	1	0.1	0	0.0	1	0.1	2	0.0
WAE	80	5.0	64	3.2	42	2.1	51	2.6	64	3.2	301	3.1
WHC	0	0.0	0	0.0	0	0.0	0	0.0	27	1.4	27	0.3
WHS	7	0.4	6	0.3	45	2.3	33	1.7	3	0.2	94	1.0
YEP	16	1.0	9	0.5	11	0.6	12	0.6	40	2.0	88	0.9
Total	382	23.9	250	12.5	230	11.5	348	17.4	855	42.8	2065	21.5
No. Net Days	16		20		20		20		20		96	

[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.

Figure 18 gillnet catch of walleye lake wide by size group

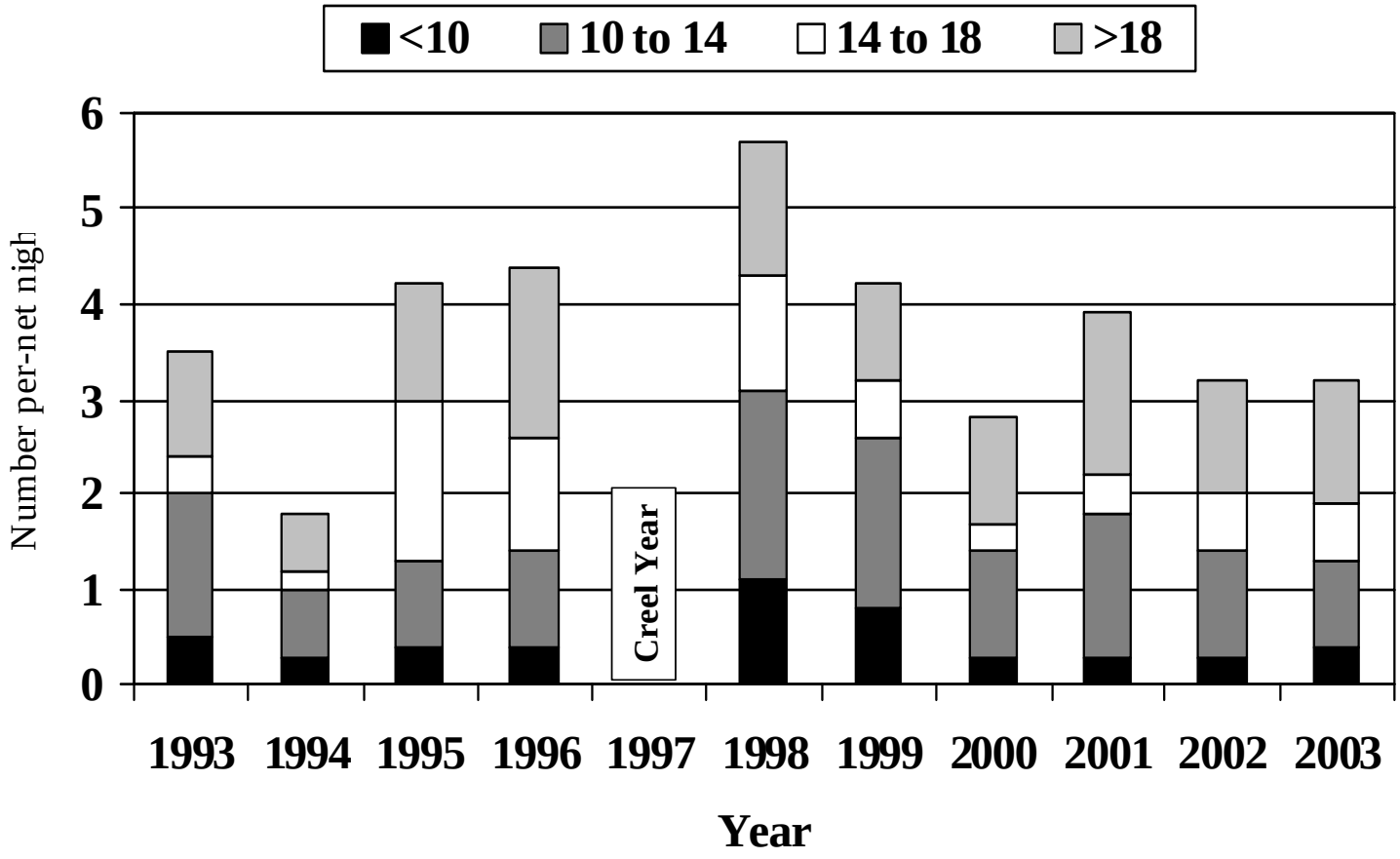

Figure18. Lake-wide contribution of walleye size to gill-net catch by year, 1993 to 2003.

Figure 19. Regional catch rate of walleye by size group

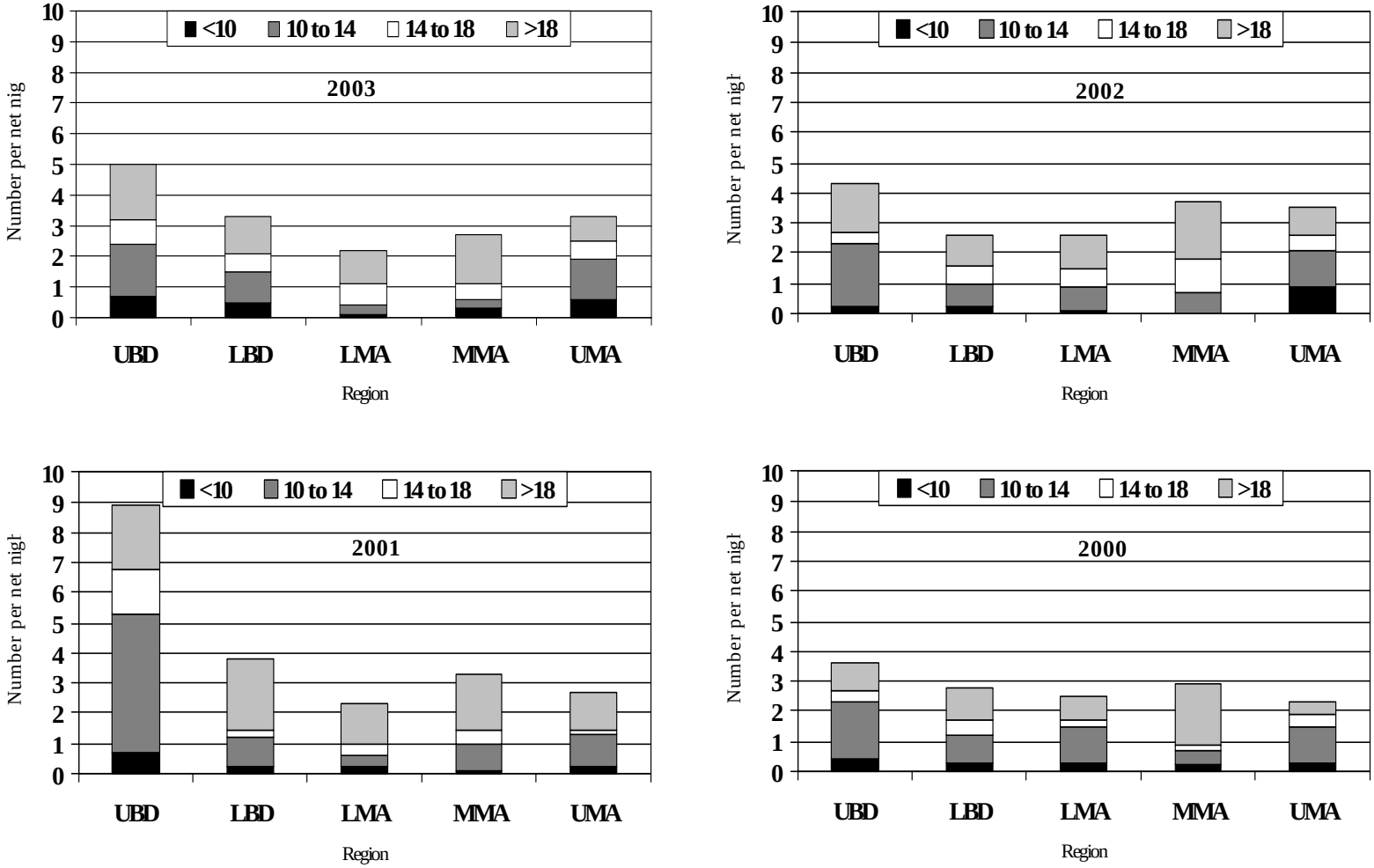

Figure 19. Regional contribution of walleye size to gill-net catch from 1994 to 2003.

Figure 19 Continued

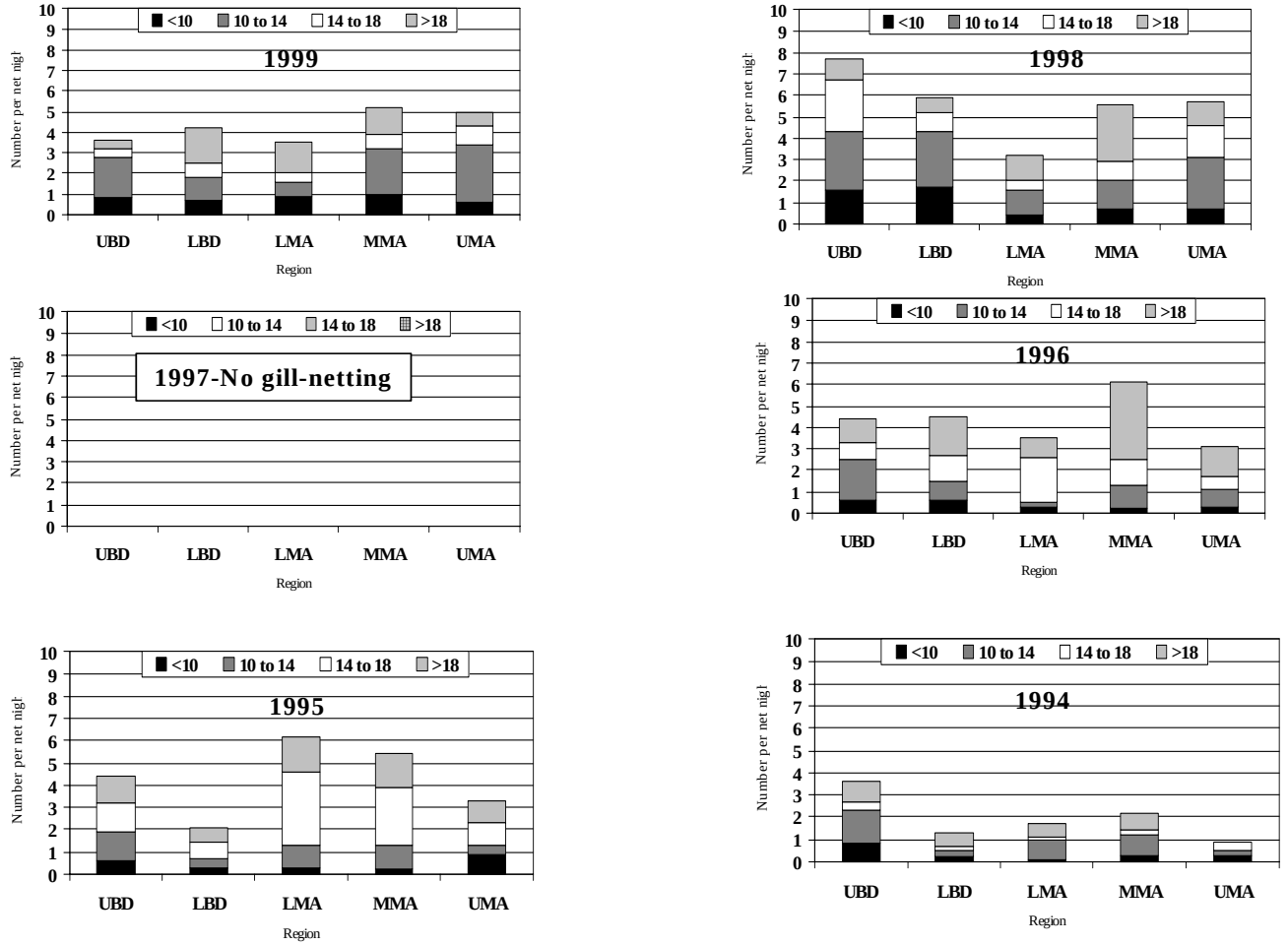

Figure 19. Continued. Regional contribution of walleye size to gill-net catch from 1994 to 2003.

Figure 20. length frequency of walleye lake wide by inch

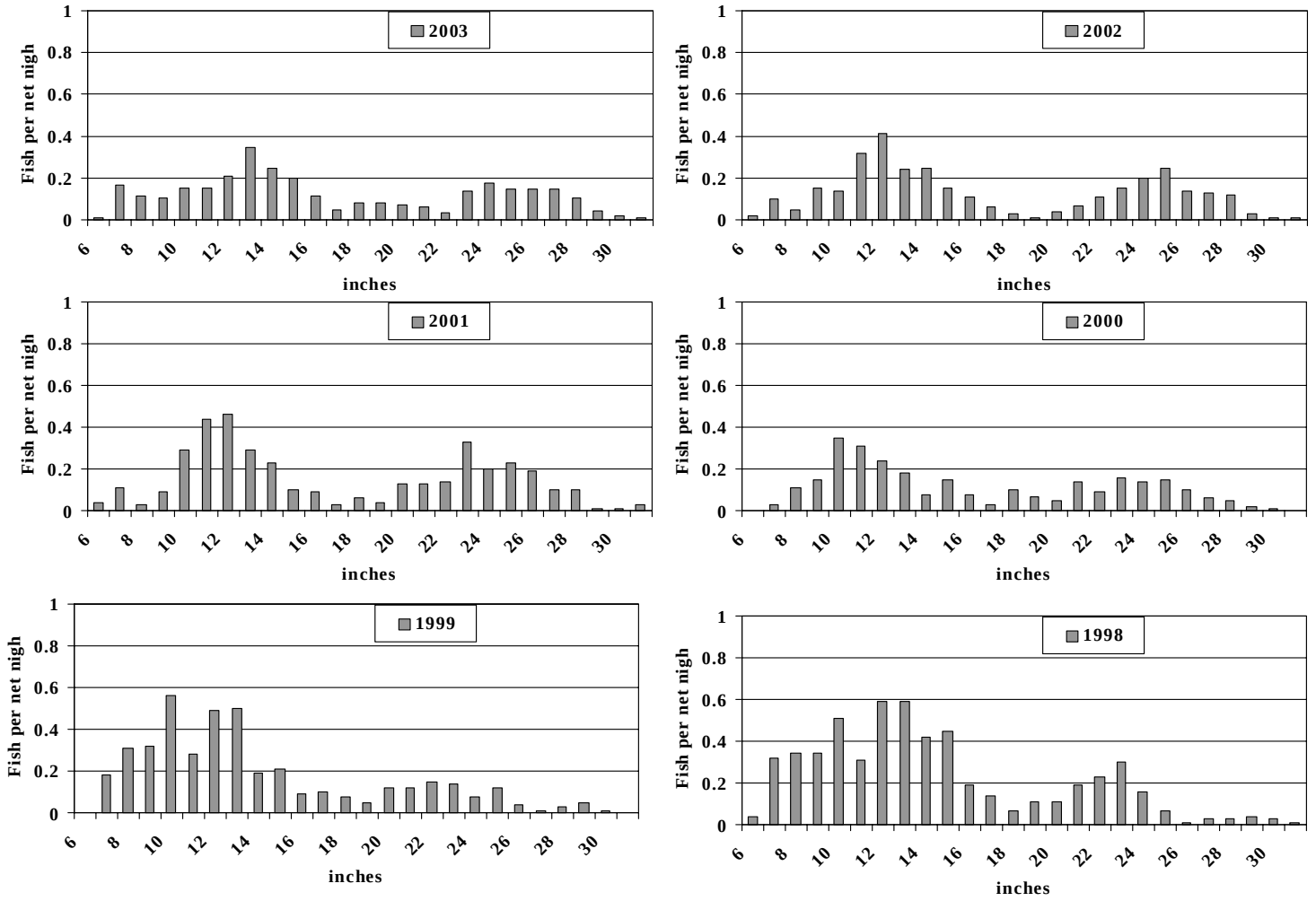

Figure 20. Length Frequencies of walleye gill netted on Fort Peck Reservoir 1998-2003.

Figure 21 relative weights of walleye size groups

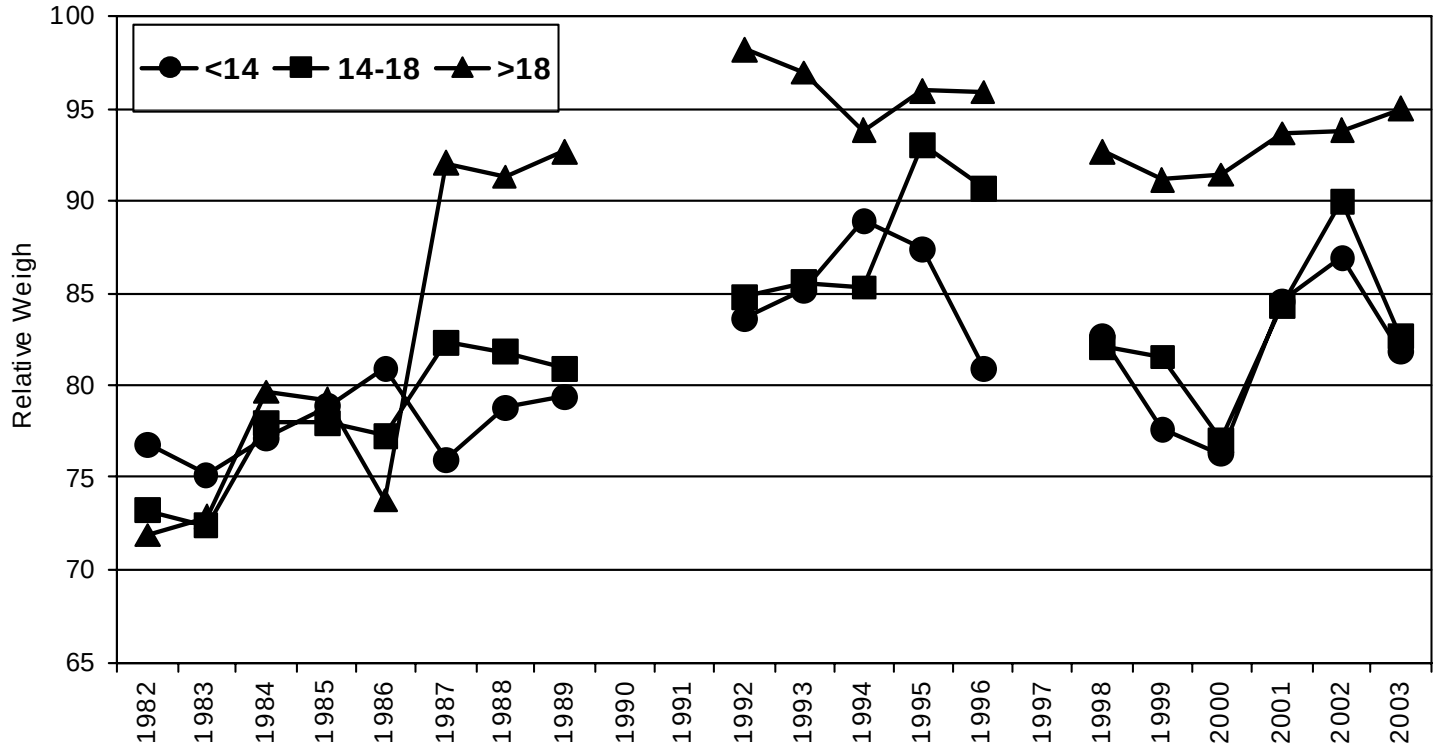

Figure 21. Relative weights of various length groups of walleye collected with gill nets on Fort Peck Reservoir, 1982-2003.

forage on shoreline prey as their condition had dropped to approximately 82. These values are near values measured in the last drought and as cisco were just becoming established. It is expected the relative weights of walleye greater than 18 inches will be maintained over 90 next year. However declines in relative weight will likely continue in walleye less than 18 inches due to probable poor reproduction of cisco in 2004 and in the past 2 years (Figure 22) and likely poor 2004 recruitment of shoreline forage (Figure 23). Angler catch rates of walleyes less than 18 inches and less should increase noticeably in 2004, as smaller walleye become hungry. Anecdotally, anglers were happier with the catch in 2003 than in the past couple of years.

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 2003, 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 with a value of 59% in 2003. RSD-P has remained high ranging from 40% in 2003 to 44% in 2001. The high values indicate an abundance of larger fish with a small stock size available (Table 8). The value of 14% was incorrectly reported in the 2002 report; it should have been 43%. A ratio between 10% and 20% is considered desirable as a PSD-P for a balanced population. 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 13% in 2003. 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 2001, 2002 and 2003, reservoir levels dropped well below any shoreline vegetation in the spring and summer of 2002 and 2003. 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 126 northern pike were captured in 2003, by gill netting, for a catch rate of 1.3 per-net (Table 9). Overall the catch rate continues to drop, slowly approaching catch rates measured during the 1980's (Figure 24). Since the large 2001 year class of cisco, it was suspected 2003 would demonstrate the highest average size and relative weights measured on Fort Peck for northern pike; however the average weight and length declined. Average length and weight in 2002, was 29.5 inches and 7.2 pounds the all time high recorded compared to the 28.1 inches and 6.2 pounds measured in 2003. Only 7% of the northern pike caught were smaller than 22 inches with the most common inch size being 27 inches (Figure 25). Condition factors of northern pike in 2002 remained high, at 25.0. 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 98% and 55%, respectively in 2003, a poorly balanced population consisting of large adults and few recruits. In 2002, 2001, 2000, and 1999 PSD was 94%, 94%, 92%, 79%, respectively with PSD-P values of 62%, 56%, 49%, and 41%, respectively. The YAR remained low at 5% but was an improvement over the 1% measured in 2002. The low value indicates dismal reproduction. The smaller pike were collected near areas of stocking with a few exceptions indicating limited natural reproduction in areas of the Dry Arm and Lower Missouri Arm. As reservoir levels continue to drop in the winter of 2004, it is anticipated recruitment will continue to be poor. A request to stock 200,000 fingerlings was placed in 2003 and met. Another request has been placed for 2004 at 200,000 fingerlings.

Channel Catfish

A total of 129 channel catfish were captured in 2003 by gill netting, for a catch rate of 1.3 per-net (Figure 26.). Average length and weight continue to remain high at 17.6 inches and 2.1 pounds (Table 10). Highest catch rates were in the Upper Missouri Arm and Upper Big Dry at 4.3 and 1.9 per-net, respectively. The lowest catch rate was in the Lower and Middle Missouri Arms at 0.1 fish per-net.

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

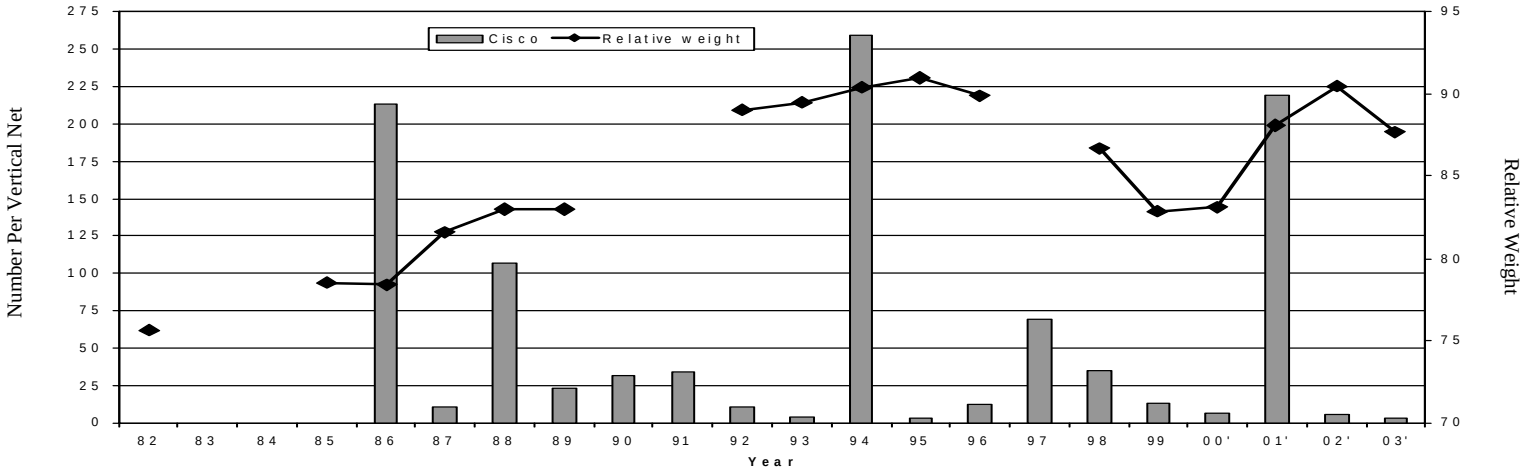

Figure 22. Walleye relative weight related to cisco young-of-year production on Fort Peck Reservoir from 1982 to 2003.

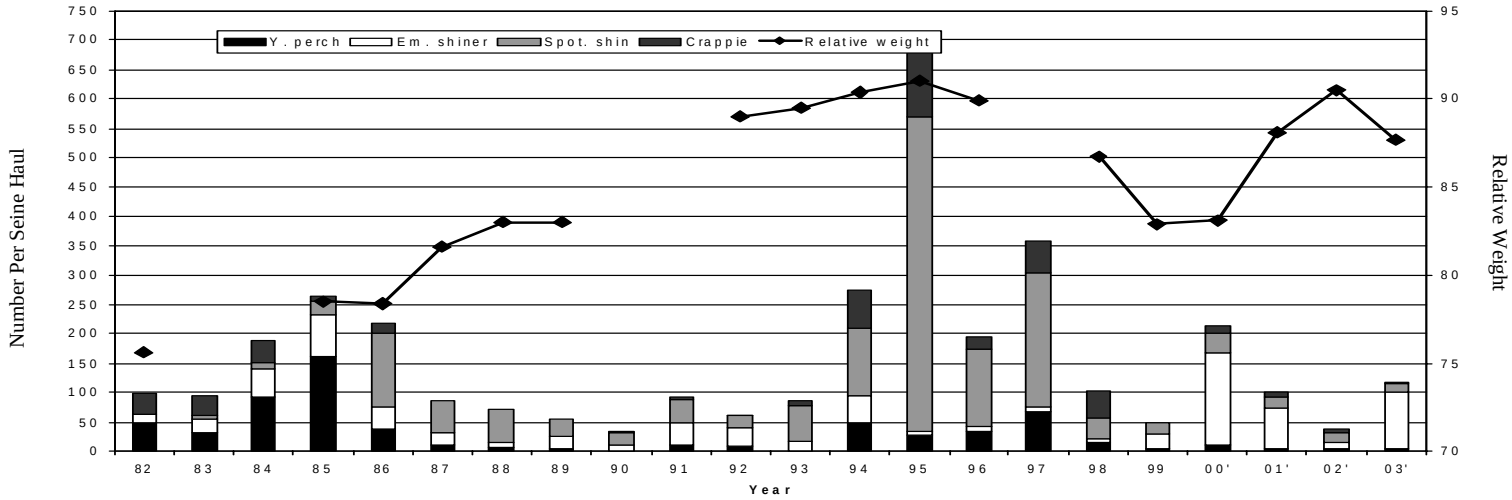

Figure 23. Walleye relative weight related to major forage fish abundance on Fort Peck Reservoir from 1982 to 2003.

Table 8. Proportional and relative stock density, along with young adult ratio of walleye sampled during lake-wide gill netting of Fort Peck Reservoir, 1984-2003 (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%	43%	11%
2003	301	38	263	156	105	59%	40%	14%

[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 (Preferre

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 2003.

						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
2003	126	28.1	6.2	25.0	101.1	96	1.3

Figure 24 pike catch rates over time

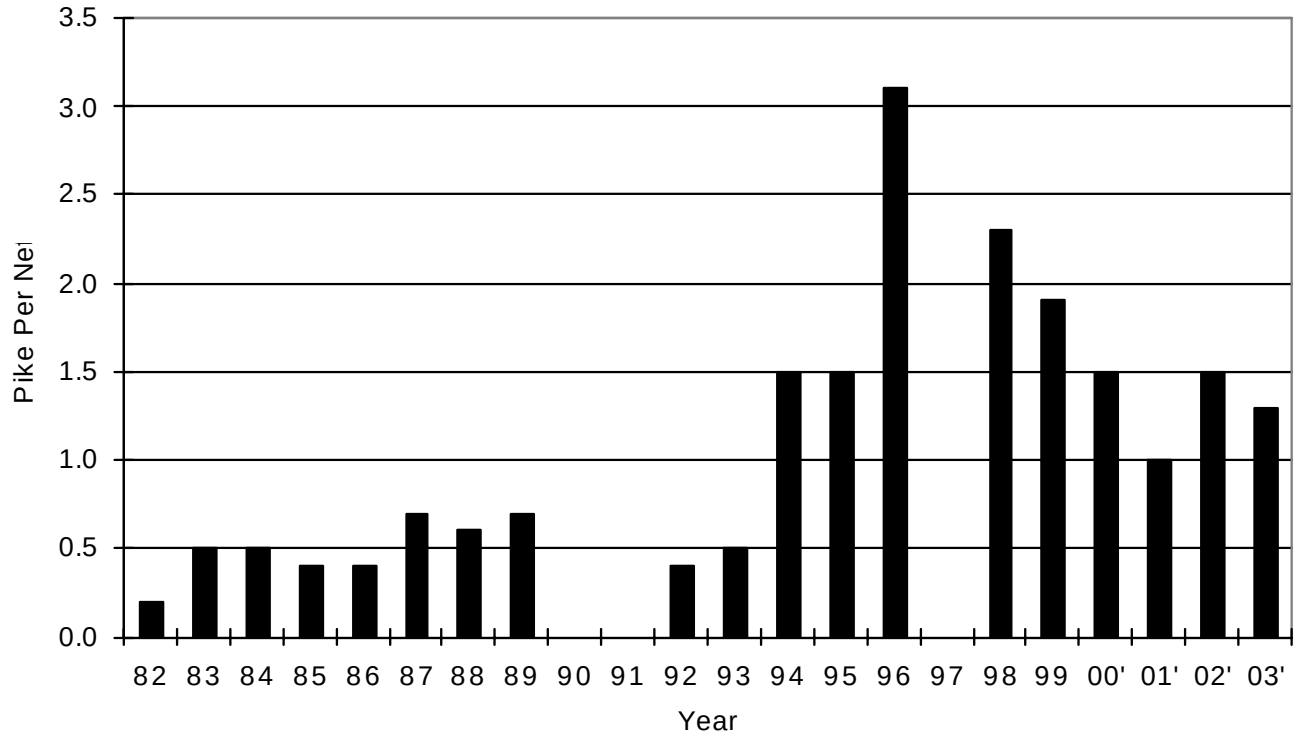

Figure 24. Average annual northern pike catch rates in gill nets from 1982 to 2003.

Figure 25 Pike length frequency

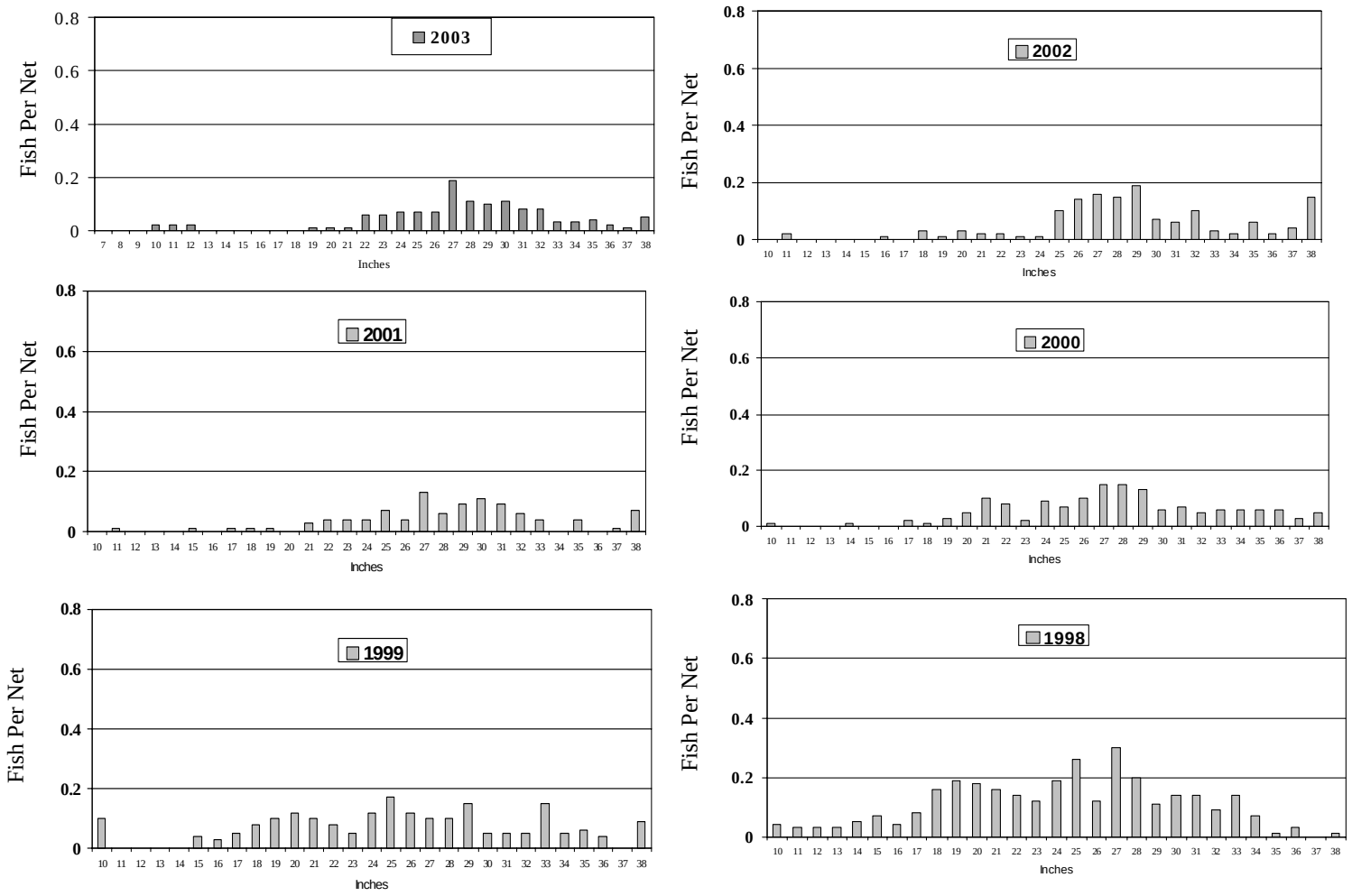

Figure 25. Length frequency of northern pike gill netted on Fort Peck from 1998 to 2003.

Table 10. Summary of the channel catfish caught during summer gill netting in areas of Fort Peck Reservoir, 1984-2003.

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

Figure 26. Sauger and ccg net catch rate

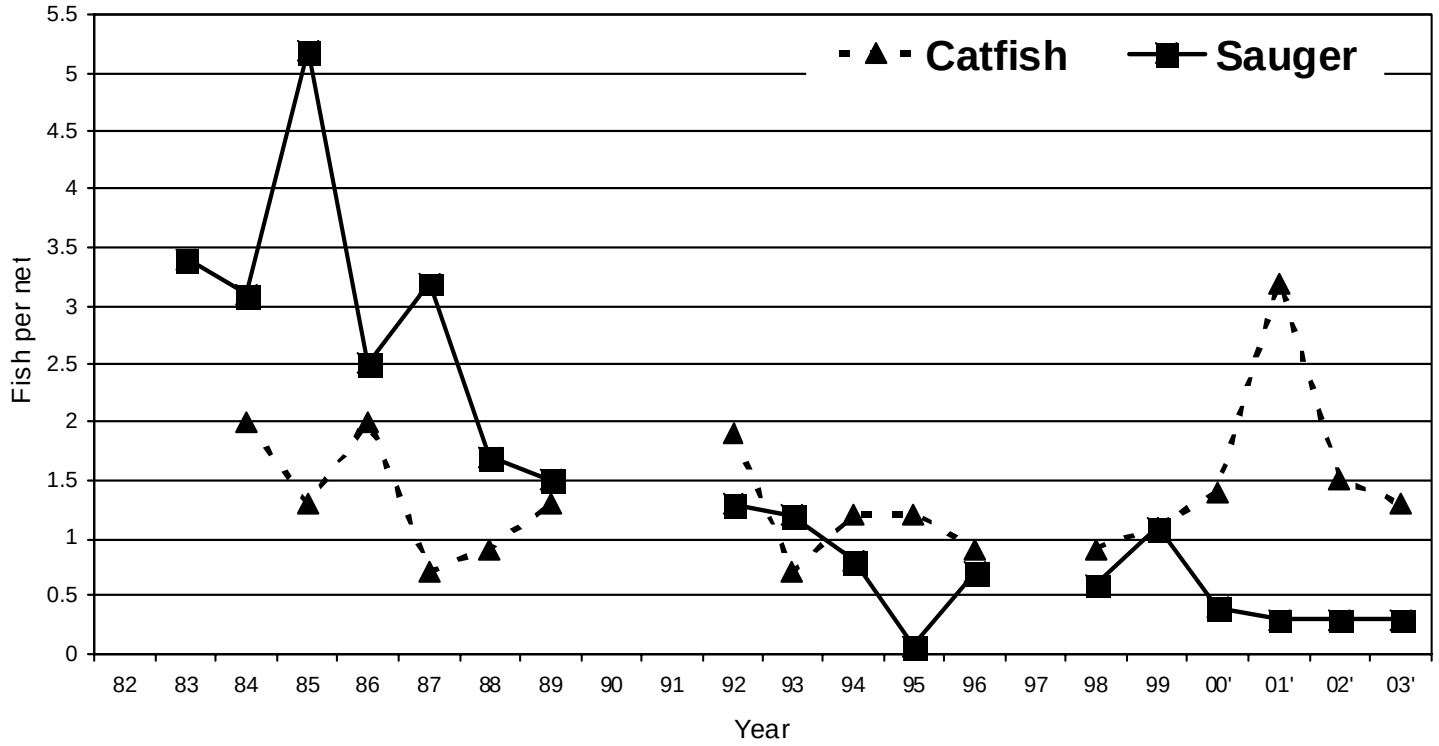

Figure 26. Channel catfish and sauger catch rates in lake-wide gill netting from 1982 to 2003.

Sauger

Sauger numbers have declined in Fort Peck Reservoir in 1985 and remained low since (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 2003 catch rate was 0.3 fish per net, the same since 2001. This population relies on natural reproduction from the Missouri River. Average size of the 26 sauger in 2003 was 17.5 inches and 2.1 pounds The highest catch rate for sauger was found in the Upper Missouri Arm with 0.6 fish per net (Table 7). Only one sauger was captured in the entire Big Dry Arm in 2003. Abundance increased in the reservoir as sampling approached the Missouri River. The Middle Missouri Arm had nearly the same catch rate as the Upper Missouri Arm at 0.5 per net and the Lower Missouri Arm had a catch rate of 0.2 per net. As the Upper Missouri Arm shrinks it's expected to see more riverine fish move into the Middle Missouri Arm.

STOMACH CONTENTS OF GILLED GAME FISH

Stomachs of 265 walleye, 111 northern pike, 19 sauger, and 11 smallmouth bass killed in gill nets were examined for forage items (Table 11). Walleye and pike had the similar diets with fish dominating their diets. Invertebrates were found in walleye, sauger, and bass. Cisco were the most common identifiable fish found in the diets of walleye, northern pike, and sauger at 6%, 15%, and 11%, respectively. Unknown fish were commonly found items in the diets of walleye, northern pike, and sauger with 29%, 10%, and 38%, respectively. Most unidentified fish are likely cisco, particularly in the larger fish. Most fish had empty stomachs, walleye 52%, northern pike 72%, sauger 63%, and bass 27%. Stomachs of four young-of-year salmon captured in experimental nets were examined; their stomach contents included 1 with insects, 1 with an unknown fish, and 2 with empty stomachs. No salmon collected in 2002 had an empty stomach. Forage conditions seem to be tough for small salmon as well as other small predators.

Stomachs of 106 walleye, 18 northern pike, 8 sauger, and 2 smallmouth bass killed in alternating gill nets were examined for forage items (Table 11). Walleye had the most diverse diets with unidentified fish being the most common item. Cisco made the bulk of the diet for northern pike captured and cisco were likely the largest portion of the unidentified fish. The 8 sauger caught had mostly empty stomachs, however 38% had unidentified fish. Of the 2 bass which died, 1 had an empty stomach and 1 had an emerald shiner in its stomach. All walleye less than 20 inches were sacrificed to collect otoliths, hence a large sample size of small walleye stomachs for analysis. Stomachs of three young-of-year chinook salmon were examined; 1 had an empty stomach and 2 had eaten insects.

LAKE-WIDE ALTERNATING NETTING

A multifilament net was used from 2001 to 2003 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. It is important to remember this netting has occurred only in the drought, it will be interesting to see how this tool works when reservoir levels and productivity increase. It's expected many more small walleye, pike, perch, and possibly young salmon will be collected.

Thirty-four nets captured 1,017 fish representing 16 species, for a catch rate of 29.9 fish per set. Goldeye, cisco, walleye, and yellow perch were the most abundant species captured with catch rates of 11.0, 4.2, 3.6 and 3.5 fish per net, respectively. Channel catfish, carp, and shorthead redhorse 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 they take as long as experimental nets to work. So in time wise combination with experimental gill netting, 130 nets were set in the summer of 2003. The results from the two net types cannot be combined, although regional similarities exist, such as similar walleye catch rates for each region, however size structure of targeted fish differs.

Table 11. The percentage of various forage items found in stomachs of northern pike, sauger, walleye and smallmouth bass in 2003.

	Game Species							
Net type[1]	WAE Exp.	WAE Alt.	NOP Exp.	NOP Alt.	SAR Exp.	SAR Alt.	SMB Exp.	SMB Alt.
Stomach #=s	265	106	111	18	19	8	11	2
Forage items								
Cisco	6%	---	15%	17%	11%	---	---	---
Chinook Salmon	---	---	1%	---	---	---	---	---
Emerald shiner	---	1%	---	---	---	---	---	50%
Goldeye	---	1%	---	---	---	---	---	---
Spottail shiner	2%	2%	---	---	---	---	---	---
White Sucker	---	---	3%	6%	---	---	---	---
Unidentified fish	29%	24%	10%	6%	11%	38%	27%	---
Crayfish	---	---	---	---	---	---	18%	---
Insects[2]	11%	11%	---	---	---	13%	55%	---
Empty	52%	65%	72%	72%	79%	63%	27%	50%

1 Exp. = Experimental Alt = Alternating

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

Table 12. Fish captured by 125-foot alternating panel nets in Fort Peck Reservoir, 2003.

	UBD[2]		LBD[3]		LMA[4]		MMA[5]		UMA[6]		Total	
Species[1]	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day
BLC	0	0.0	0	0.0	0	0.0	0	0.0	1	0.1	1	0.0
CCF	27	5.4	9	1.3	1	0.1	3	0.4	17	2.4	57	1.7
CHS	2	0.4	6	0.9	0	0.0	2	0.3	2	0.3	12	0.4
CIS	18	3.6	36	5.1	18	2.6	46	5.8	26	3.7	144	4.2
COC	5	1.0	17	2.4	4	0.6	4	0.5	14	2.0	44	1.3
FRD	0	0.0	0	0.0	0	0.0	1	0.1	12	1.7	13	0.4
GOE ALL	24	4.8	16	2.3	18	2.6	137	17.1	179	25.6	374	11.0
Male	*9*	*1.8*	*6*	*0.9*	*5*	*0.7*	*39*	*4.9*	*30*	*4.3*	*89*	*2.6*
Female	*13*	*2.6*	*8*	*1.1*	*13*	*1.9*	*57*	*7.1*	*80*	*11.4*	*171*	*5.0*
Im.	*2*	*0.4*	*2*	*0.3*	*0*	*0.0*	*41*	*5.1*	*69*	*9.9*	*114*	*3.4*
NOP	4	0.8	6	0.9	5	0.7	4	0.5	5	0.7	24	0.7
RIC	6	1.2	2	0.3	2	0.3	2	0.3	2	0.3	14	0.4
SAB	3	0.6	3	0.4	0	0.0	1	0.1	3	0.4	10	0.3
SAR	0	0.0	0	0.0	2	0.3	3	0.4	5	0.7	10	0.3
SHR	6	1.2	6	0.9	0	0.0	4	0.5	20	2.9	36	1.1
SMB	2	0.4	1	0.1	2	0.3	2	0.3	0	0.0	7	0.2
WAE	28	5.6	35	5.0	10	1.4	20	2.5	29	4.1	122	3.6
WHS	1	0.2	1	0.1	14	2.0	4	0.5	9	1.3	29	0.9
YEP	9	1.8	19	2.7	16	2.3	26	3.3	50	7.1	120	3.5
Total	135	27.0	157	22.4	92	13.1	259	32.4	374	53.4	1017	29.9
No. Net Days	5		7		7		8		7		34	

[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.

Walleye

One hundred twenty-two walleye were captured with 108 measuring less than 15 inches and 112 less than 20 inches. Therefore, 92% of all walleye captured were target size walleye. The net was effective. Average length and weight was 11.8 inches and 0.9 pounds, respectively. The length frequency histogram indicates a strong size group of fish exists between 7 and 13 inches, representing 2 and 3 year old walleye (Figure 27). The average condition factor and relative weight were 30.5 and 86 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 46, 62, and 14 fish respectively. The resulting PSD would then be 18% and the YAR would be 61%. The YAR dropped from the 2002 value of 69%, further indicating a decline in recruitment. 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. It will be interesting to see if numbers of small walleye increase in the nets when good recruitment is expected as the reservoir re-fills in the future.

Northern Pike

Twenty-four northern pike were captured for a catch rate of 0.7 per-net. Although sample size is small, the range of size from the length frequency shows 6 fish less than 25 inches (Figure 28). This gear may also provide additional insight into northern pike recruitment before they fully recruit to experimental gill nets. Average length, weight, condition factor, and relative weight were 27.8 inches, 6.7 pounds, 24.0, and 97, respectively. The PSD, PSD-P and YAR with this gear were 95%, 81%, and 14%, respectively. The PSD value was similar to the experimental gill net results, but the YAR ratio for the experimental nets was only 5%. 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 3.5 perch per set compared to a catch rate of 0.9 in experimental nets. The relative abundance of perch present may be related to changes in relative weights of game fish and may be used for future management recommendations. Figure 29 shows most perch in 2001 and 2002 were between 7 and 7.9 inches, but in 2003 were more abundant between 6 and 6.9 inches. Scales were collected from a sub-sample of perch in 2003. Scales are not expected to be collected in 2004. Age analysis of perch scales will be reported in the 2004 report.

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 14th to September 12th, 2003. Seine hauls at 152 locations captured 24 species for a total of 39,790 fish. The 2002-catch rate of 74.8 was tripled in 2003 with a catch rate of 258.1 per seine. The overall catch rate in 2001 was 114 fish per seine. The catch rate in 2000 was 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. A fairly stable to increasing summer reservoir elevation in 2002 (Figure 32) may have lead to some improved recruitment of emerald shiners but not for spottail shiner (Table 15). 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 from 2001 to 2003 with catch rates less than 5.5 per seine annually. Only in the Upper Missouri Arm did catch rates exceed 100 fish per seine with an incredible catch rate of 1127.1 per seine. *Hybognatus spp* and emerald shiner made up 661.9 and 435.0 per seine, accounting for all but 30 fish per seine in each haul.

Figure 27 walleye length frequency from alternating nets

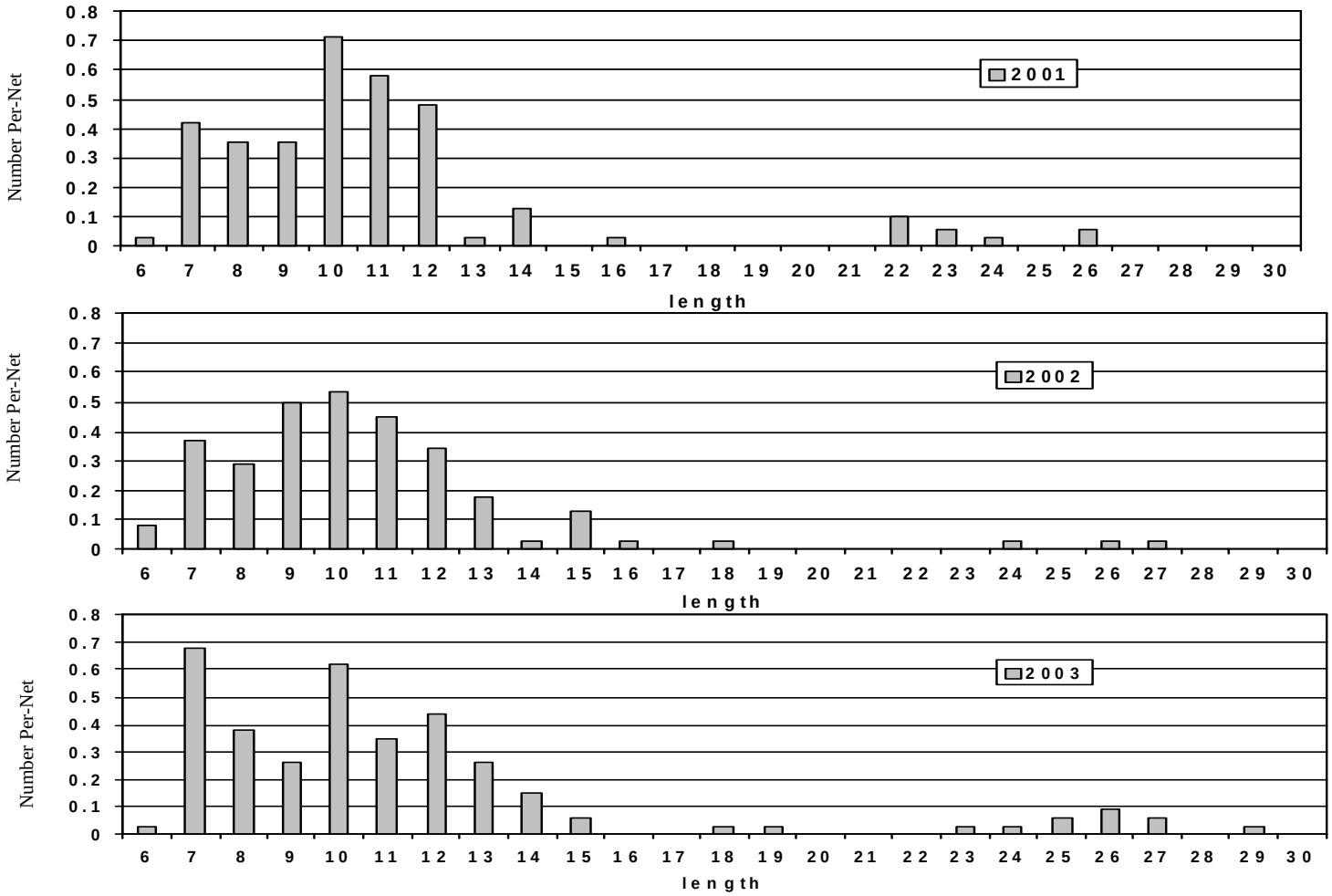

Figure 27. Length frequencies of walleye collected during lake-wide alternating gill netting on Fort Peck in 2001-2003.

Figure 28 pike lf from alt nets

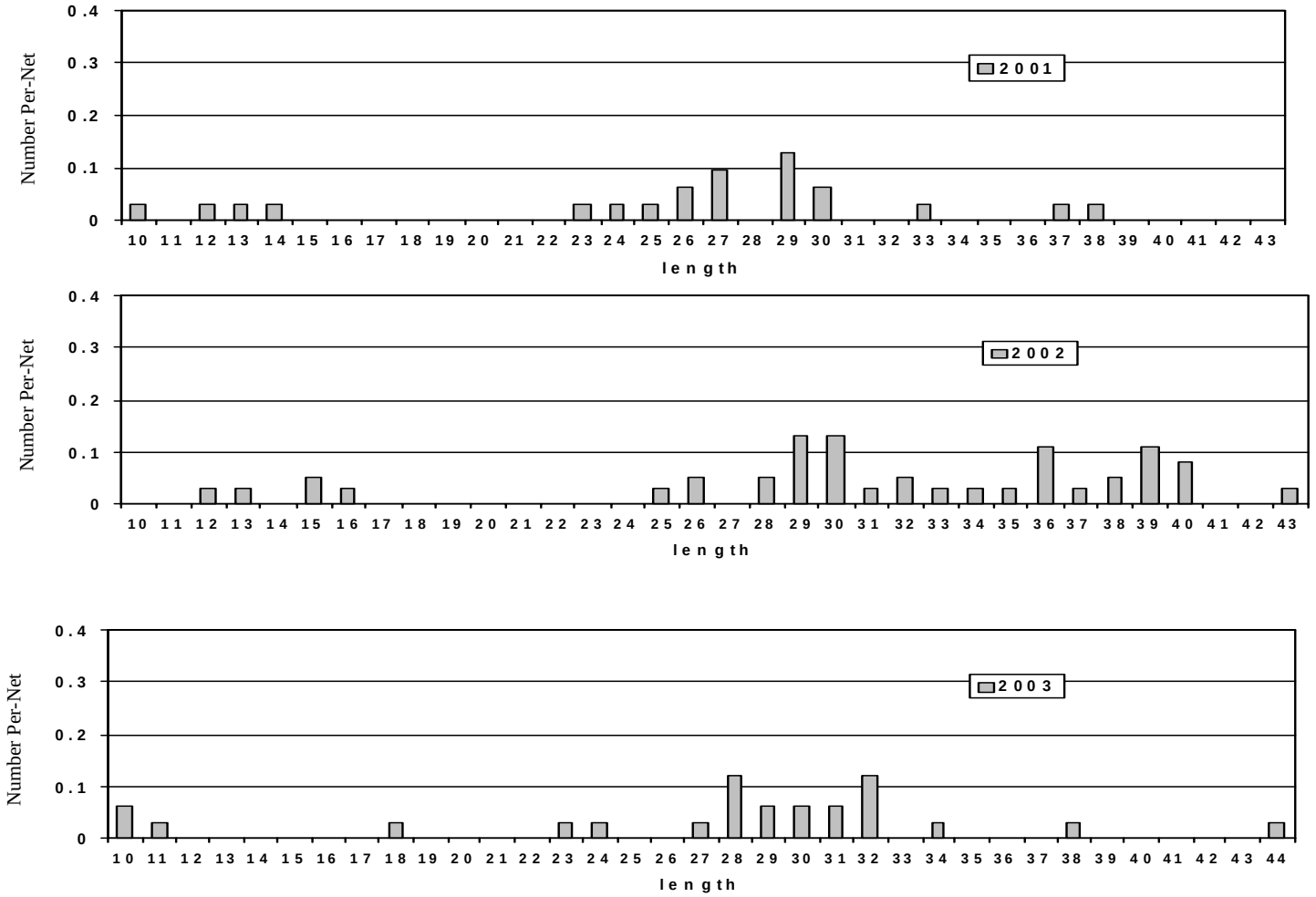

Figure 28. Length frequencies of northern pike collected during lake-wide alternating gill netting on Fort Peck in 2001-2003.

Figure 29 perch length frequencies

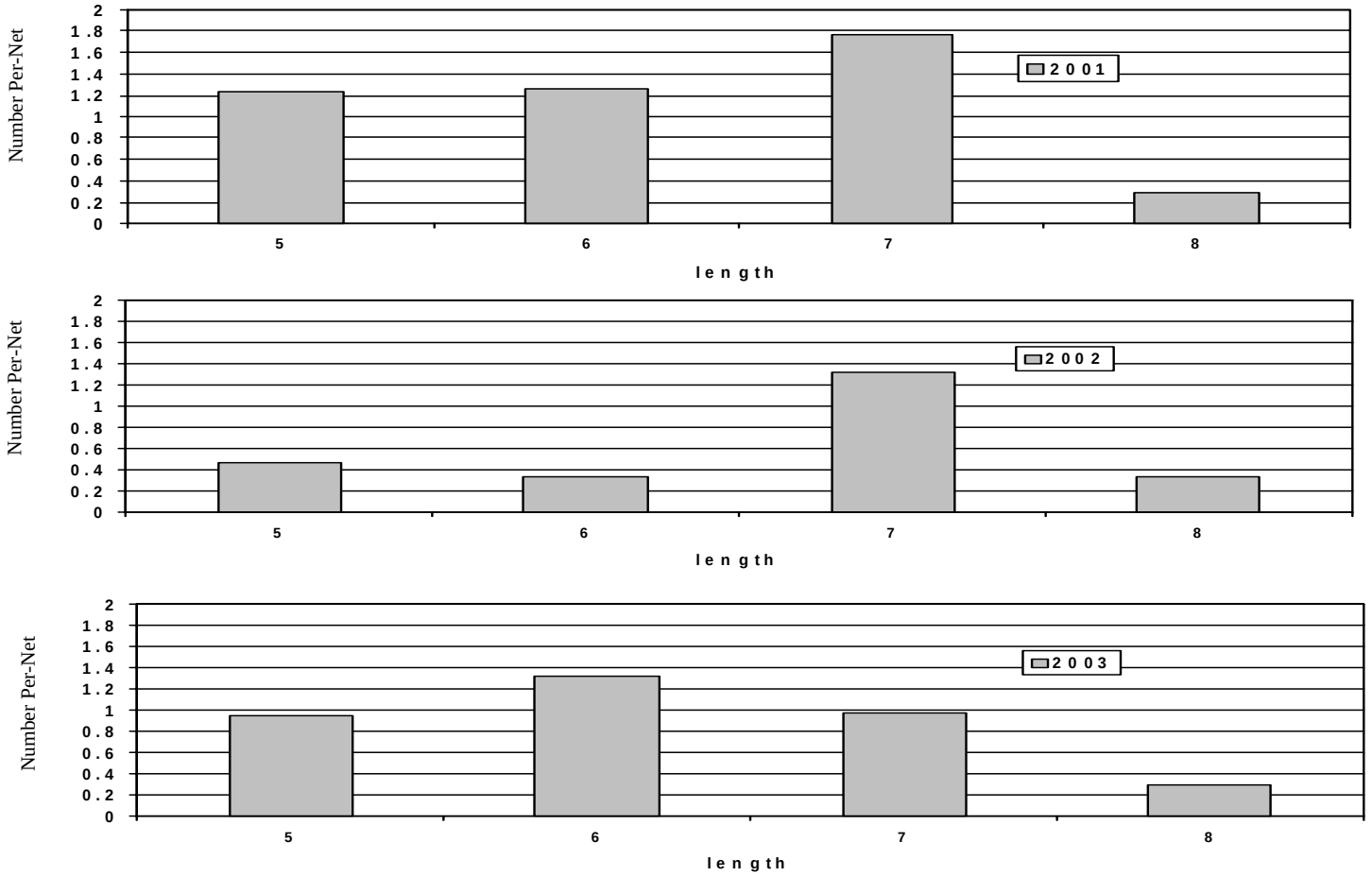

Figure 29. Length frequencies of yellow perch collected during lake-wide alternating gill netting on Fort Peck in 2001-2003.

Table 13. Species and number of forage minnows and young-of-year fish captured by seining in Fort Peck Reservoir, August 14th to September 12th, 2003.

	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*	0	0.0	4	0.1	0	0.0	20	0.7	0	0.0	24	0.2
BRM	2	0.1	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0
CCF*	3	0.1	0	0.0	0	0.0	0	0.0	4	0.1	7	0.0
COC*	6	0.2	18	0.6	83	2.9	7	0.2	2	0.1	116	0.8
CRA*	245	7.9	26	0.8	9	0.3	1	0.0	102	3.4	383	2.5
CRC	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	3	0.0
EMS	457	14.7	419	13.5	85	2.9	302	10.1	13049	435.0	14312	94.2
FHM	10	0.3	2	0.1	0	0.0	0	0.0	0	0.0	12	0.1
FLC	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
FRD*	119	3.8	6	0.2	15	0.5	14	0.5	140	4.7	294	1.9
GOE*	2	0.1	0	0.0	0	0.0	0	0.0	4	0.1	6	0.0
HBO	3	0.1	1	0.0	0	0.0	19	0.6	19858	661.9	19881	130.8
NOP*	19	0.6	41	1.3	24	0.8	5	0.2	0	0.0	89	0.6
RIC*	0	0.0	27	0.9	4	0.1	6	0.2	343	11.4	380	2.5
SAB*	15	0.5	5	0.2	22	0.8	8	0.3	1	0.0	51	0.3
SAR*	0	0.0	0	0.0	0	0.0	1	0.0	23	0.8	24	0.2
SAS	10	0.3	0	0.0	0	0.0	0	0.0	0	0.0	10	0.1
SHR*	1	0.0	1	0.0	0	0.0	0	0.0	230	7.7	232	1.5
SMB*	82	2.6	30	1.0	45	1.6	131	4.4	28	0.9	316	2.1
SNC	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
SPS	1325	42.7	316	10.2	470	16.2	164	5.5	16	0.5	2291	15.1
SxW*	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
WAE*	5	0.2	3	0.1	4	0.1	1	0.0	0	0.0	13	0.1
WHS*	22	0.7	0	0.0	6	0.2	2	0.1	0	0.0	30	0.2
YEP*	461	14.9	109	3.5	29	1.0	138	4.6	11	0.4	748	4.9
Total	2790	90.0	1008	32.5	796	26.5	819	27.3	33814	1127.1	39227	258.1
Total Hauls	31		30		30		31		30		152	

*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 14th to September 12th, 2003.

	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
CCF	11	0.4	1	0.0	2	0.1	6	0.2	7	0.2	27	0.2
COC	16	0.5	22	0.7	14	0.5	22	0.7	141	4.7	215	1.4
CRA	7	0.2	0	0.0	1	0.0	0	0.0	2	0.1	10	0.1
FRD	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	2	0.0
GOE	0	0.0	0	0.0	0	0.0	2	0.1	2	0.1	4	0.0
NOP	1	0.0	3	0.1	0	0.0	0	0.0	1	0.0	5	0.0
RIC	4	0.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.0
SAB	4	0.1	0	0.0	0	0.0	0	0.0	0	0.0	4	0.0
SAR	0	0.0	0	0.0	0	0.0	0	0.0	3	0.1	3	0.0
SMB	8	0.3	11	0.4	4	0.1	10	0.3	9	0.3	42	0.3
WAE	3	0.1	0	0.0	1	0.0	1	0.0	0	0.0	5	0.0
WHS	4	0.1	0	0.0	0	0.0	0	0.0	1	0.0	5	0.0
YEP	165	5.3	33	1.1	12	0.4	23	0.8	4	0.1	237	1.6
Total	223	7.2	70	2.3	34	1.1	65	2.2	171	5.7	563	3.7
Total Hauls	31		30		30		31		30		152	

Figure 30 annual monthly peak elevations

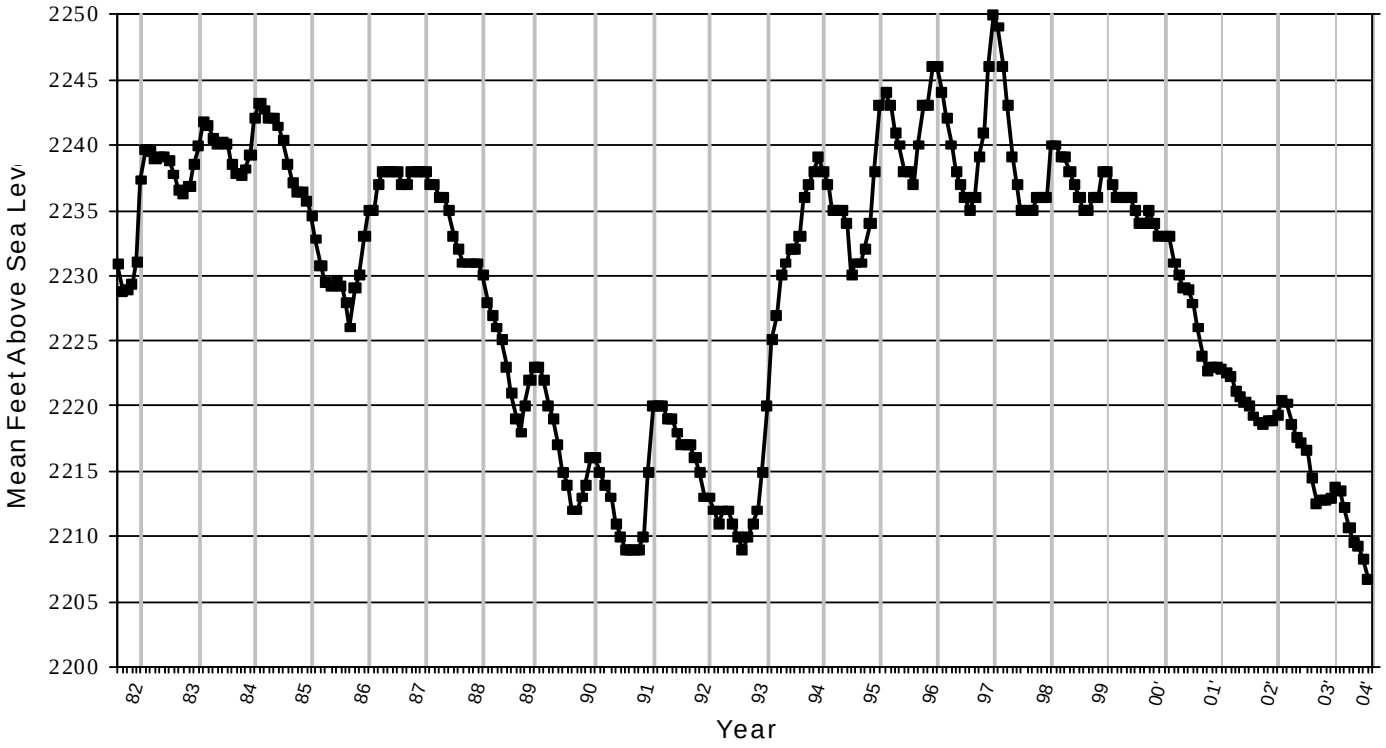

Figure 30. Annual peak monthly elevations on Fort Peck from January 1982 to January 2004. Gray bars indicate June in each year.

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

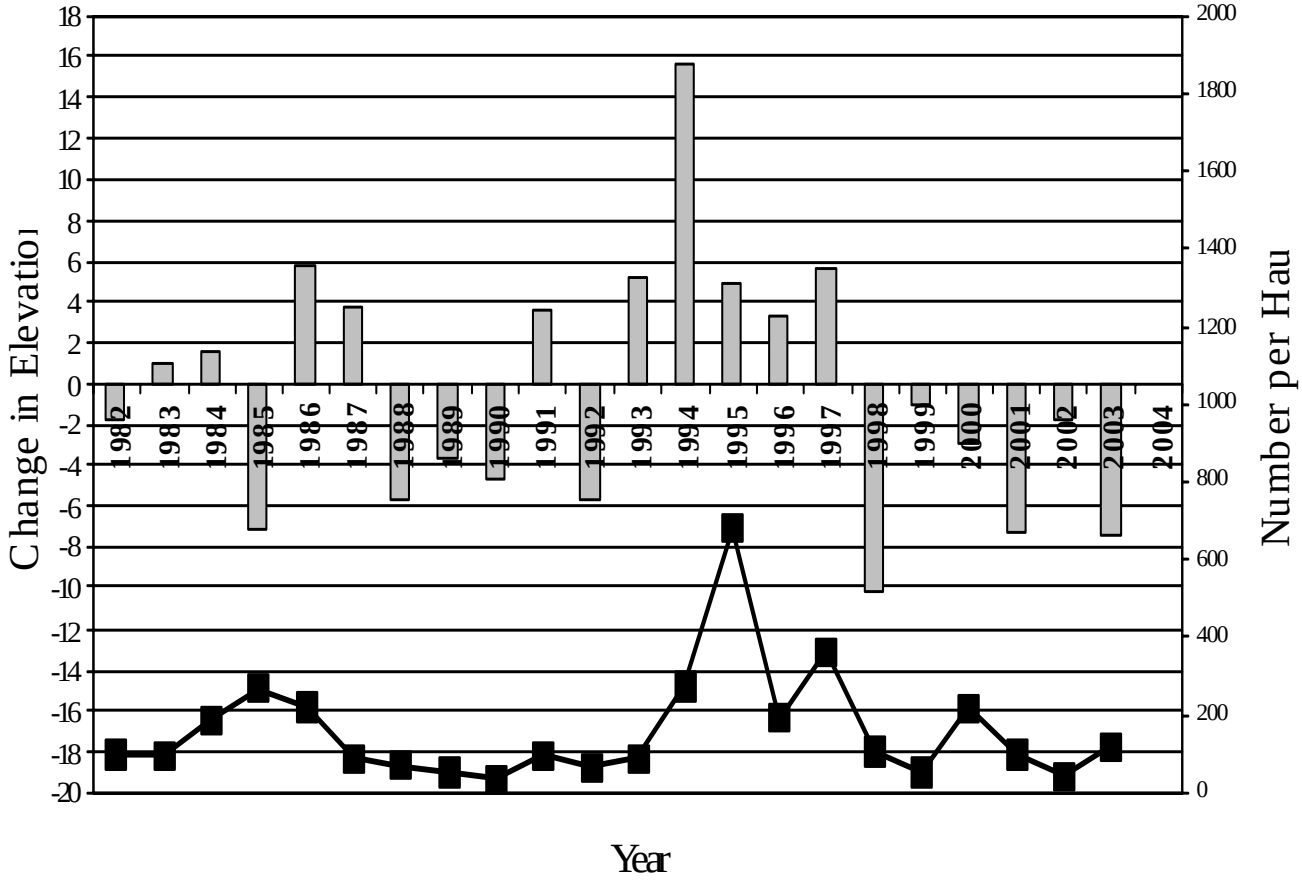

Figure 31. Change in elevation from peak in prior August to low in the following June compared to combined number of yellow perch and crappie young-of-year and total numbers of emerald and spottail shiners from 1982 to 2003.

Figure 32 2001 daily elevations

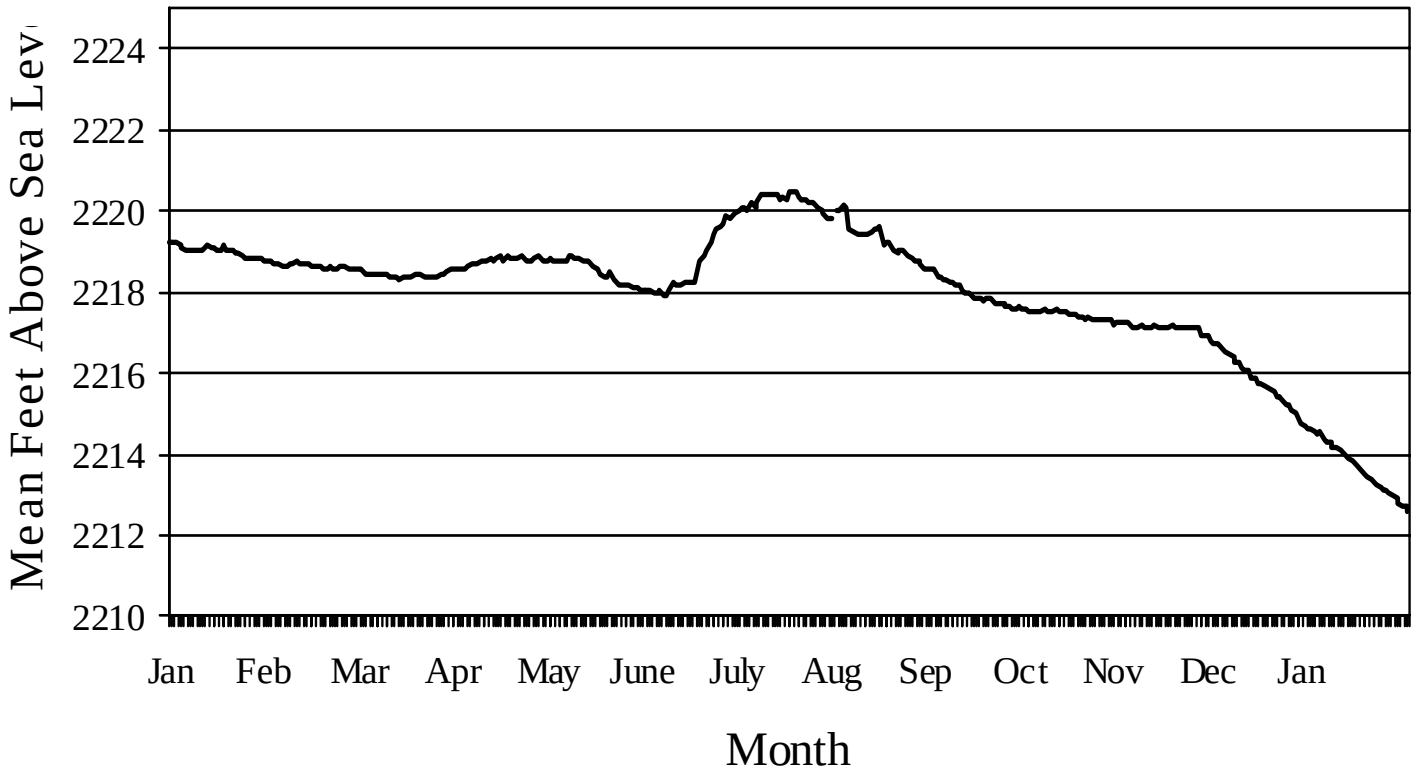

Figure 32. Daily average elevation from previous year; Jan 1, 2002 to January 31, 2003.

Table 15. A summary of the total catch and catch rate for selected sport and forage fish taken by seining in Fort Peck Reservoir, 1991-2003.

		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
2003	No. Hauls-152							
	No. Sampled	13	89	24	316	748	6	30
	No./Haul	0.1	0.6	0.2	2.1	4.9	<0.1	0.2

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
2003	No. Hauls---152						
	No. Sampled	75	116	294	383	14,312	2,291
	No./Haul	0.5	0.8	1.9	2.5	94.2	15.1

[1]See table of species and abbreviations.

Hybognatus spp. are typically associated with river habitats. As the reservoir declines the upper reaches may be more suitable for the western and plains minnows to reproduce. Spottail shiner numbers remained low in 2003. The best concentration of spottail shiner was found in the Upper Big Dry Arm with a rate of 42.7 per seine.

Walleye

Walleye fingerling abundance was near normal for the last ten years (Table 15). The only region where walleye fingerlings were not captured was in the Upper Missouri Arm. A total of 13 walleye fingerlings were caught with a catch rate of 0.1 per seine reservoir wide. Pyloric caecums were counted to identify *Stizostedion spp.* in question. Figure 33 shows a return to low catch rates of walleye fingerlings. Since no walleye fingerling were captured in the Upper Missouri Arm it's suspected all fingerlings captured are a result of stocking efforts.

Sauger

Sauger young-of-year were found mostly in the Upper Missouri Arm with a regional catch rate of 0.8 per seine. The overall catch rate of 0.2 per seine is a more typical value compared to other years from 1981 to 2003 (Figure 33). The increase may be due to the reduction in the reservoir with sampling occurring in a more riverine environment. Three age 1 + sauger were captured in Fort Peck in the Upper Missouri Arm (Table 14).

Northern Pike

Northern pike were captured in seines with a catch rate of 0.6 per seine. Northern pike fingerlings were captured in all areas except the upper Missouri Arm. The largest catch rate was measured in the lower Big Dry Arm with 1.3 per seine haul. Northern pike this year were captured near stocking areas as well as several bays that were not stocked; it appears the stock of pike at various boat ramps was successful and some natural reproduction was more successful than expected in some locations in 2003. Figure 34 shows pike young-of-year numbers overall 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 2.1 per haul. A reduction of more than half compared to 2001 (Figure 34). They were captured in all regions with the highest catch rate per seine in the middle Missouri Arm at 4.4 per seine. Overall catch rates of bass are average for the time period from 1994 to 2003. Smallmouth bass have successfully spread to all areas of Fort Peck. No smallmouth bass were stocked in Fort Peck in 2003. All fingerling represent natural reproduction.

Yellow Perch

Yellow perch were measured at the 3rd lowest abundance since 1991, with a catch rate of 4.9 per seine (Table 15). They were most abundant in the upper Big Dry Arm with a catch rate of 14.9 per seine. Catch rates in the remaining areas were between 0.4 found in the upper Missouri Arm to 4.6 in the middle Missouri Arm. The highest catch rate of age 1+ perch was in the upper Big Dry Arm with a catch rate of 5.3 per seine. Lack of spawning structure and declining reservoir elevations likely are responsible for the decline in perch numbers (Figure 35).

Figure 33 walleye and sauger fingerlings in seines

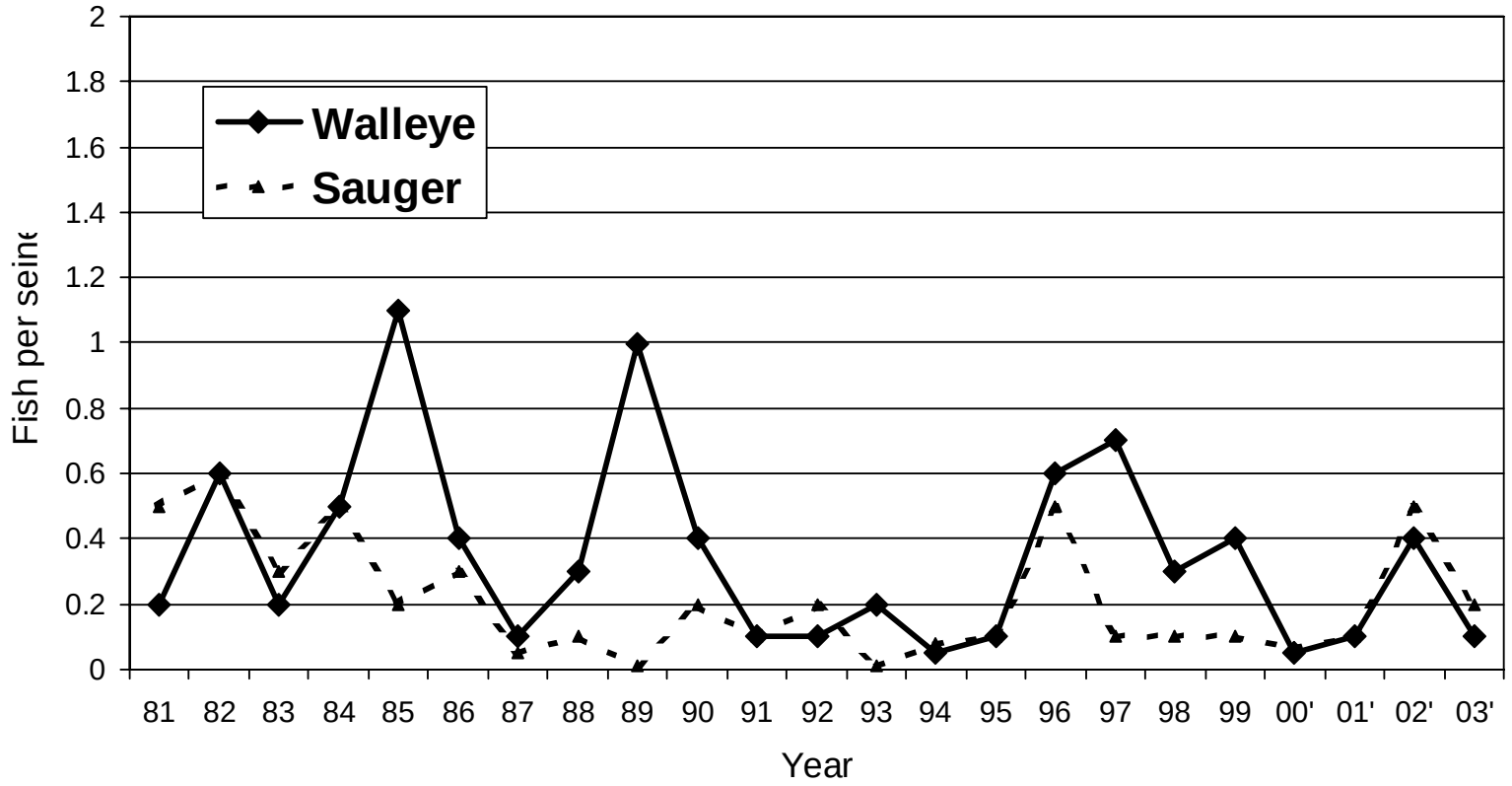

Figure 33. Catch rate of walleye and sauger young-of-year during annual seining on Fort Peck from 1981-2003.

Figure 34 pike and bass fingerlings in seines

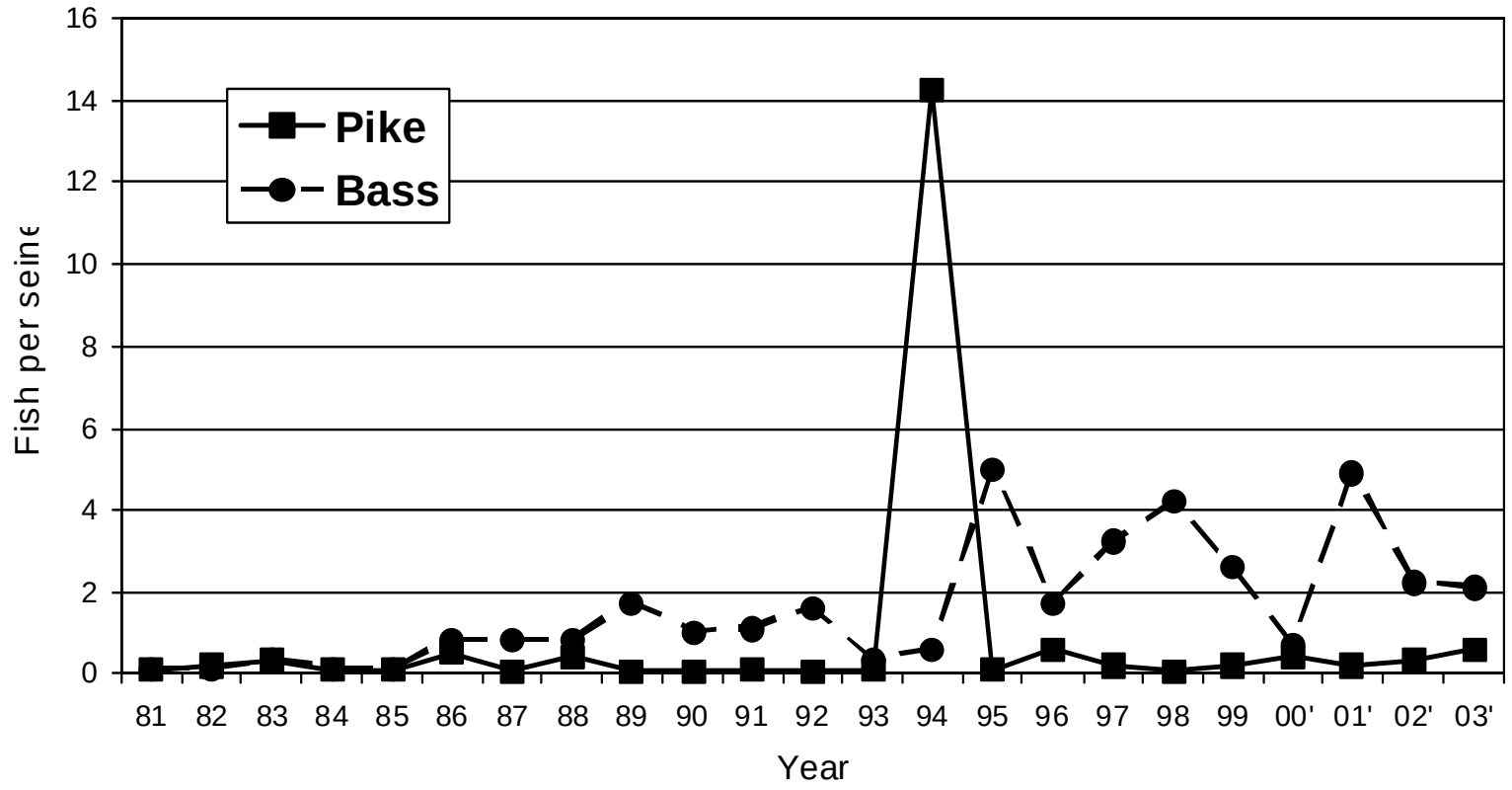

Figure 34. Catch rate of northern pike and smallmouth bass young-of-year during annual seining on Fort Peck from 1981-2003.

Figure 35 yellow perch and elevation in seines.

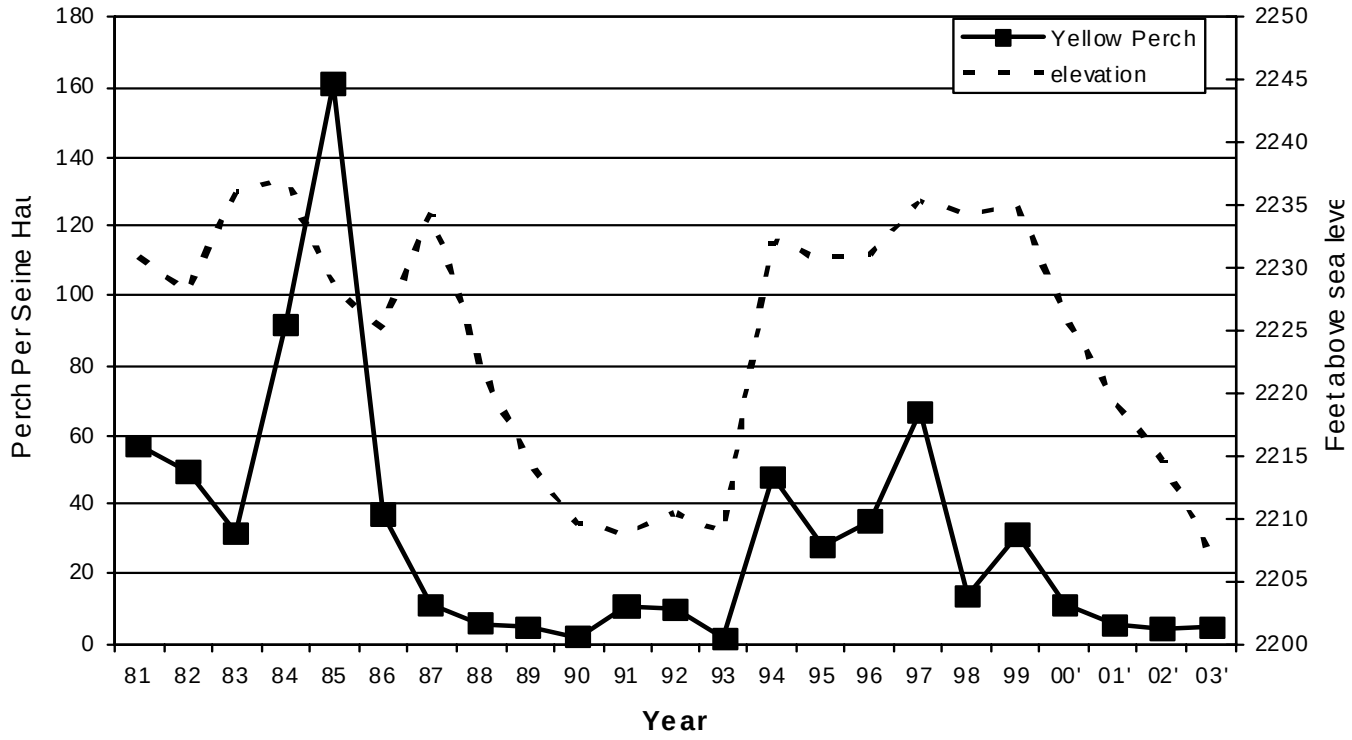

Figure 35. Young of year yellow perch per seine haul compared to minimum annual lake elevations 1981 to 2003.

Emerald Shiner

Emerald shiner numbers recovered in 2003 in the upper Missouri Arm. The catch rate in 2002 was 9.6 per seine, the highest recorded since 1990 was 157.9. In 2003 the catch rate was 94.2 per seine (Table 15). Emerald shiners catch in all regions ranged from 2.9 per seine in the Lower Missouri Arm to 14.7 and 435 per seine in the upper Dry and upper Missouri Arms, respectively. This species may have benefited from a stable reservoir elevation in the summer of 2002 and a modest rise in the summer of 2003. Although the number of emeralds appears good, most were found in a few seines in the Upper Missouri Arm and not well spread throughout the reservoir.

Spottail Shiner

Spottail shiner numbers maintained at low levels in 2003. They are at their lowest level since 1990 with 15.1 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 Upper Big Dry Arm and Lower Missouri Arm with catch rates of 42.7 and 16.2 per seine haul. Spottail shiners were found in all regions of the reservoir with the lowest catch rate found in the Upper Missouri Arm with a catch rate of 0.5 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 2003. A third FTE and funds were redirected to Fort Peck to fill this void beginning in the spring of 2004. The creel will be conducted spring and fall. An independent summer creel is also expected in 2004.

CHINOOK SALMON

The largest chinook salmon stock in Fort Pecks history occurred on April 22nd, 2003 in the Marina (Table 16). Giant Springs State Fish Hatchery salmon were fin clipped during the 3rd week in March with personnel from Fort Peck reservoir and river staffs as well as many volunteers from the Great Falls area. Some fish were able to bypass the screens in the raceways and avoided being fin clipped. Giant Springs delivered a total of 179,696 salmon which were placed into a rearing pen. McNinney South Dakota State Fish Hatchery provided an additional 232,618 salmon fingerling. They were not clipped and were released directly into the reservoir, both stocks averaged between 67 and 69 fish per pound. A total of 412,314 salmon with a combined weight of 5,919 pounds were stocked all in the same day.

The pen reared salmon were held in a 20 feet by 40 feet by 10 feet deep pen, the divider wasn't set up. Feeders were placed on the pen and maintained by the Marina concessionaire, who was contracted. Black plastic netting was also placed over the pen in an attempt to prevent birds from eating the salmon. The pen was held near the boat ramp so the trucks could directly dump salmon into it. The pen was towed by boat to the opposite side of the Marina Bay in water slightly over 10 feet deep. During the towing it is likely the pen was ripped near the bottom, as a hole over 2 feet long was found when the salmon were released.

The salmon were released on June 13th, 2003. Random sub-samples were taken to count and weigh fish; number of clipped fish was also documented. The salmon averaged 28.7 per pound upon released with 86% fin clipped. Had all the fish survived this would have been a net gain over 3,700 pounds, the fish would have obviously been feeding on wild food as 1,574 pounds of feed was used. However, when released 70,522 were estimated to be in the pen, therefore the, "possible", mortality of salmon would show a net decrease in total weight but a strong increase in average size. The loss is documented in Table 16 as this was directly measured. The tear in the net would have easily allowed for escape of all the fish; however it was very near the bottom of the net and may have been in the mud for much of the holding period. Its likely many fish escaped during transporting the pen and during the lifting process during the release. It is impossible to ascertain, truly how many survived and when or if they escaped from the pen. If water levels aren't favorable for moving the loaded pen in 2004, the fish will be boated to the pen.

Table 16. A summary of stocked and cage reared salmon 1993-2003.

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 1993-2003.

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	80.5/lb	206/lb				
Size at release	64.7/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	Marina 2003	Marina 2003
# stocked into cage	134,164	179,696	
Date stocked into cage	April 23rd	April 22nd	
# released		70,522	232,618
Date released into Bay	June 13th	June 13th	April 22nd
	By a storm	*hole in pen*	*not clipped*
		86% clipped	
Pounds stocked	1,936	2,684	3,325
Pounds released		2,432	
net gain		-252 lbs	
Size at stocking	69.3/lb	67.3/lb	69.1/lb
Size at release	26/lb	28.7/lb	
Total lbs. food used		1574.5 lbs	

Salmon are pen reared to ensure a better return of fish to the stocking location. This premise will be tested by this year's stock. All the fish were of the same basic size when stocked however the pen reared fish were larger upon their final release. If more fin clipped fish return in 2005 and 2006 then pen rearing can be assumed to be effective. If more fish return or a 50/50 return occurs, pen rearing isn't effective in generating a better return of fish. The torn pen may ultimately confuse results unless an unusually high number of fin clipped salmon show up. If salmon 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 run in 2003 improved from previous years. The run was comprised of mostly 3 year old fish from the 2001 stock as noted by the high percentage of fish greater than 26 inches (Figure36). In 2002, a strong group of 2 year old males was documented between 20 and 24 inches, in 2003 an expected group of males in the same size didn't appear (Figure 36). If the number of 2 year old males is an indication of what's to come the return in 2004 may be poor. The expected year class in 2004, should in large part be from the 2002 stocks with some 4 year old females from the 2001 stock. The stock in 2002 was comprised of smaller fish ranging from 26 to 200 per pound; the small size may be detrimental to improved survival, however 134,000 were pen reared to possibly 26 per pound, a count wasn't available as a storm pulled the pen to shore and released all but a small number of salmon. The number stocked in 2002 exceeded the 200,000 goal. This year class may have found it difficult to feed as shoreline forage has been limited and cisco had a poor spawn in 2002. The possible difficulty in finding food may have created high mortality for this year class which could explain the poor return of 2 year old males in 2003.

A total of 179 salmon in 2003 compared to 85 salmon in 2002 were used in the spawn and measured. Eighty-five salmon were females and 94 were males. The average length of females was 29.7 inches and average weight was 10.7 pounds. The average length of males was 26.5 inches and 10.6 pounds. There were 28 of 75 spawned females and 14 of 64 spawned males clipped in 2001 (Figure 36). Of the fish less than 10 inches all presumed to be from males from the 2003 stocks 12 of 14 were fin clipped or 86%. This would indicate all were from the pen rearing operation.

Salmon eggs were taken in 2003. A total of 231,645 eggs were shipped to the Giant Springs Hatchery, of which about 38,000 hatched. 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. The iodine process is likely hindering the salmon program (Peterson, MTFWP per com). Many times eggs have been left in iodine for over 1.5 hours. Apparently in landlocked salmon this is detrimental (Sayler, SDF&G per com), it is recommended that a 75 ppm solution be used for 30 minutes. The salmon program has been hit and miss, which makes it difficult to effectively manage manpower. More people need to be available on a daily basis for spawning even though the days of spawning are unknown. The additional man power is needed to manage handling of eggs; the existing staff is barely adequate to just take the eggs. In the salmon culture history of Fort Peck eggs have been attempted to be taken in 7 years; 1994-0 eggs, 1996-390,000 eggs, 1998-6,000 eggs, 1999-141,000 eggs, 2001-0 eggs, 2002-64,000 eggs, and 2003-213,645 eggs.

A short overview of the salmon program shows the 2003 stock was the largest in number and weight (Figures 37 and 38). Pen rearing dates were similar to other years (Figure 39). If some salmon didn't escape from the pen, its unlikely, significant loss of numbers was measured along with loss of total weight of salmon put in the pens (Figures 40 and 41). If no fish escaped this would be the first time the combined weight of fish in the pen was less than the initial weight. The salmon in the pen were much larger then when initially stocked in 2003.

Figure 36 length frequencies of salmon in 2002, and 2003.

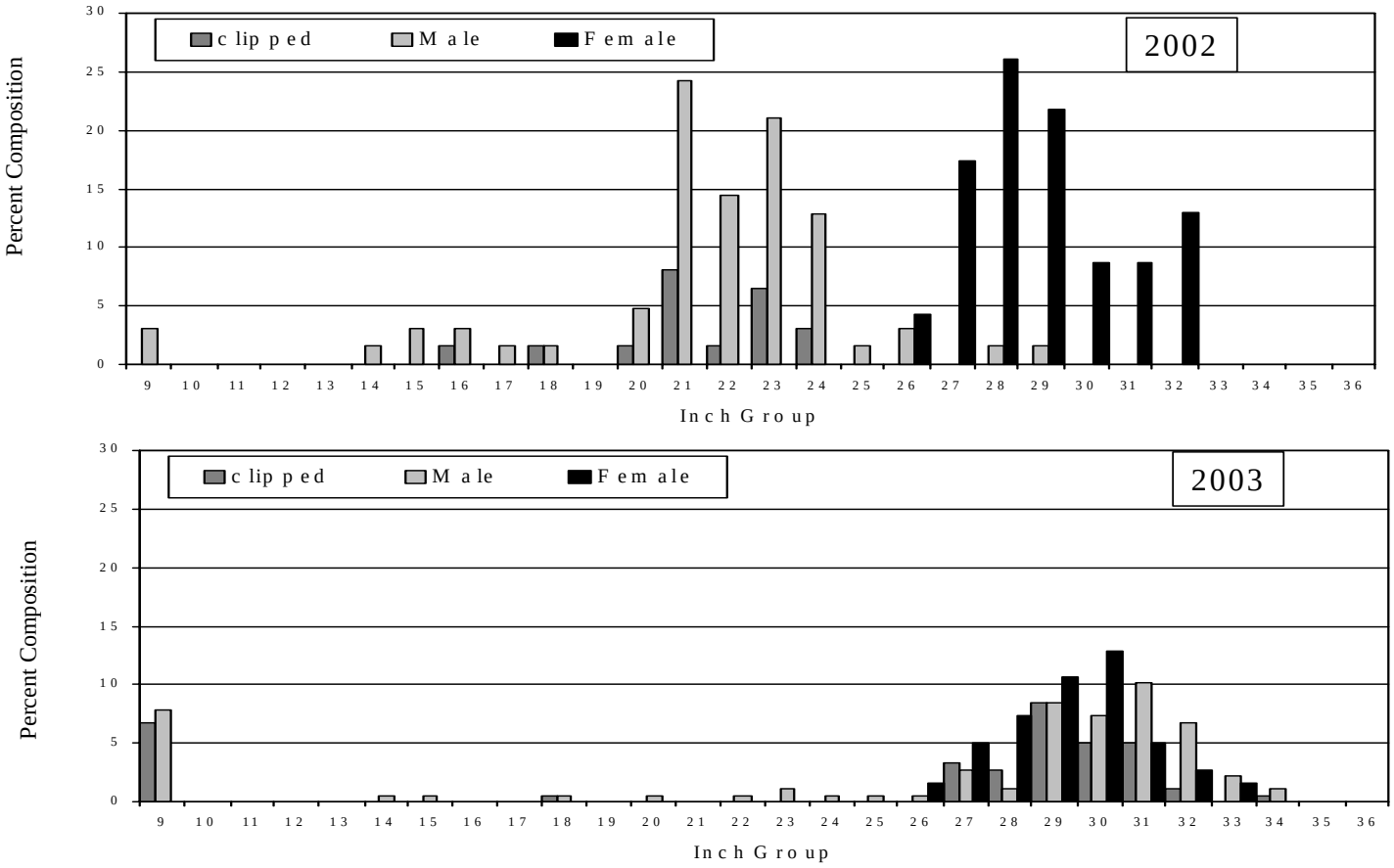

Figure 36. Length frequency of chinook salmon captured in 2002 and 2003.

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

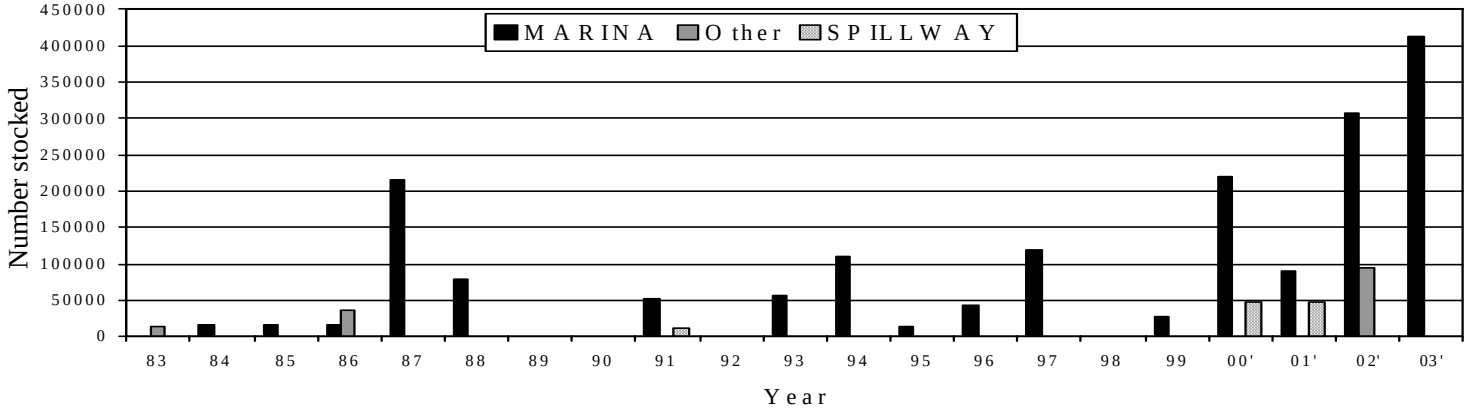

Figure 37. Numbers of chinook salmon stocked in Fort Peck from 1983-2003.

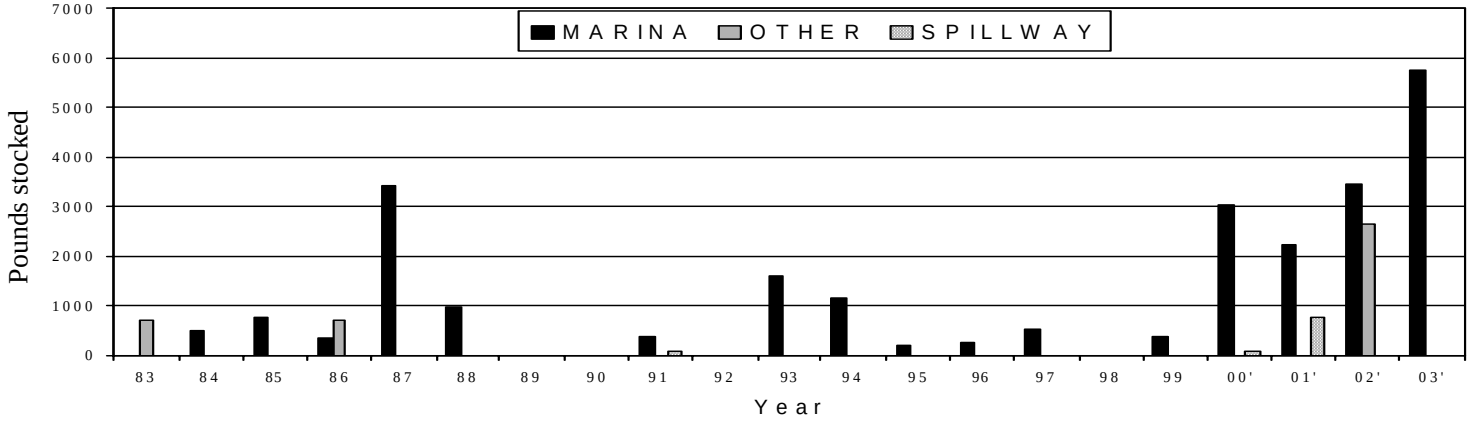

Figure 38. Pounds of chinook salmon stocked in Fort Peck from 1983-2003.

Figure 39. Pen rearing and stocking times

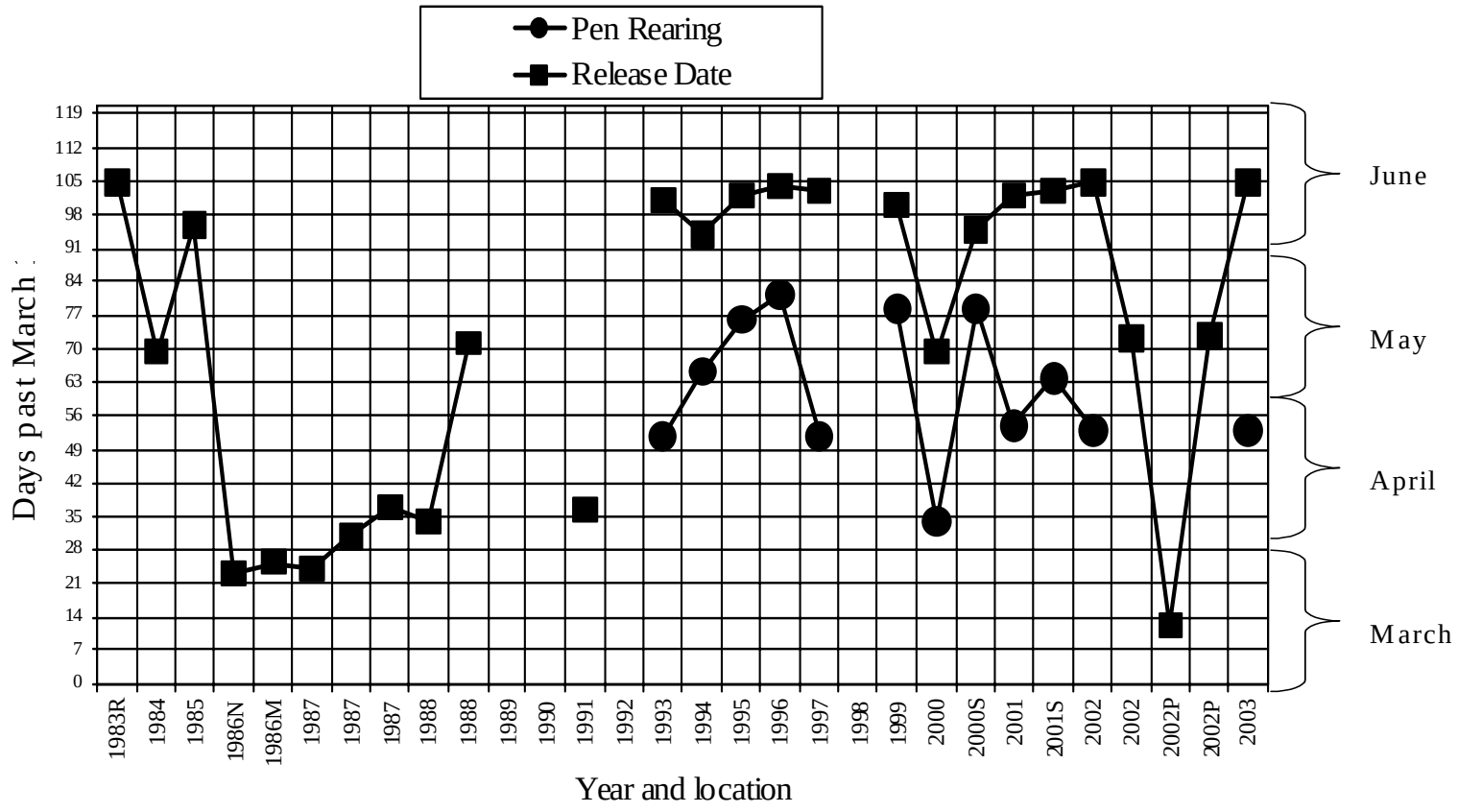

Figure 39. Release timing for chinook salmon from 1983-2003.

Figure 40. Pen rearing correction of numbers
Figure 41 pen rearing corrections of weight

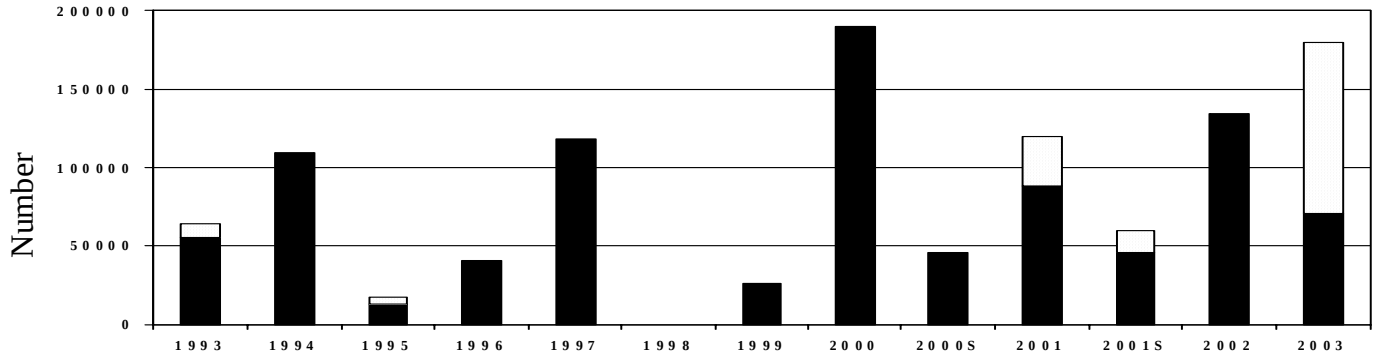

Figure 40. Changes in numbers measured after pen rearing from 1993-2003, white area denotes loss of fish.

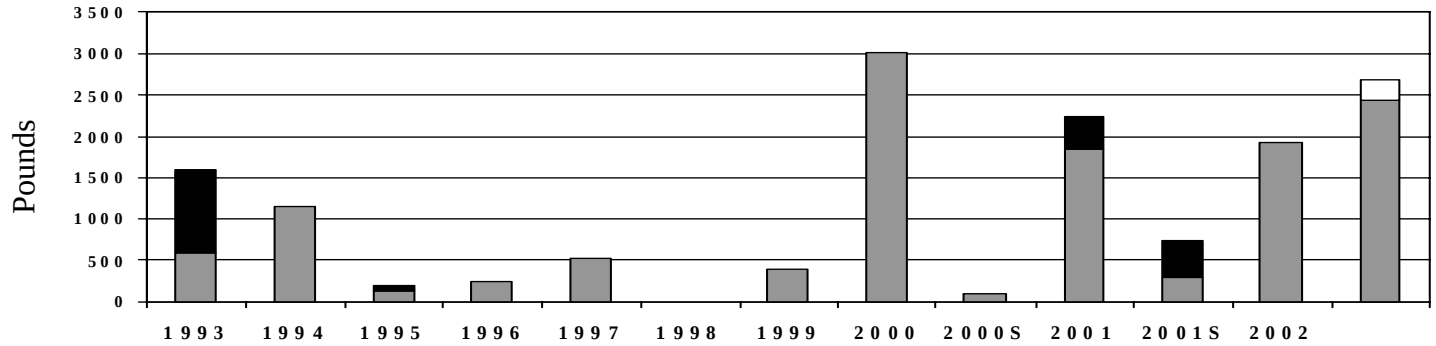

Figure 41. Changes in weight measured after pen rearing from 1993-2003, black area denotes gains in weight, white area denotes loss of weight.

Since this is just one population of a combined three state program its important to see how stocking rates of number and weight compare. Over 400,000 were stocked in 2003, how many escaped the pens is unknown so the total number pre-pen holding (a unique place holder compared to other years was used for 2003) is shown in Figure 42. If 25% of the holding pen fish died prior to release, based on past mortality rates, the total stocked would be approximately 365,000. Figure 43, shows total weight pre-pen holding for Montana in 2003 only. If only a few fish escaped prior to release and most escaped as the pen was lifted and considering mortality of 25% this weight would increase to 8,500 pounds.

Gill net catch rates of yearling salmon indicate they move throughout the reservoir as they were caught in all the regions except the Lower Missouri Arm, which is were they were released. Sixteen were captured in experimental and alternating nets combined (Tables 7 and 12). Four in experimental nets were captured in the Upper Missouri Arm from Seven Blackfoot to below Brandon Butte with a regional catch rate of 0.2. The alternating net appears to be more efficient in collecting small salmon with a total collection of 12 individuals. The overall alternating catch rate was 0.4 per net. They were caught in Box Creek, Lost Creek, Pines Bay, Seven Black Foot, and Fourchette Bay with 6 being caught in Box Creek. The alternating net may provide insight into the salmon program as well as being useful for monitoring young of year and yearling walleye, pike, and perch. The alternating nets are typically set in shallow water from 8 to 16 feet deep and in the warmest portions of the bays. It's interesting that these cold water salmon are commonly captured in these areas. These areas likely hold more baitfish and more insects, suitable in size for these smaller salmon to feed upon. If these nets indicate survival of stocks it appears the 2003 stock may have been successful. Another note of interest is most of the salmon caught had a fin clip. Its unclear, why the South Dakota reared fish didn't appear in higher numbers if at all in the nets or during the spawning operation.

Plans for the 2004 stock include experimental stocks. Giant Springs is expected to deliver 170,000 fingerling salmon in late April, as of February 25th, 2004 the hatchery reported holding 182,4000 salmon. Those salmon delivered in April will not be fin clipped and will be raised in the pen. Of the salmon at Giant Springs 8,000 to 10,000 may be kept at the hatchery, depending upon available space until mid August. It's hoped they can be raised to no more than 8 per pound. They will be fin clipped in May or June at the hatchery. The fall stocked salmon will be stocked directly into the Marina Bay. South Dakota has had successful returns with equivalent size salmon in the past. This strategy maximized returns when survival of small size salmon was limited by lack of suitable forage and an abundance of predators, in South Dakota. If the number of salmon available for stocking is limited for Fort Peck, stocking larger fish later in the year may improve our returns. The stock in 2004 will be directed to begin answering that question. The Fort Peck Hatchery will help expand this type of work once it is completed.

LAKE TROUT SPAWN

Lake trout were spawned in 2003 due to reduced available spawning habitat. Over 80% of suitable spawning habitat on the dam has been exposed. The spawn created many problems, hatchery space was essentially non-existent, fish health was difficult to organize, and basic staff was limited. A total of 59,654 eggs were sent to Miles City Fish Hatchery on November 10th, 2003. A 73% eye up was reported by the hatchery with a hatch up at best of approximately 43,000 fry. It is very unlikely the hatchery will keep the fish and rear them to 2+ inches as requested, due to limited hatchery space. Thirteen females were spawned out of 23 females captured. Eggs couldn't be taken until fish health samples could be collected. As their staff is limited and samples can only be taken Monday to Wednesday, lake trout females were pooled. It's likely the number of eggs collected could have been doubled had these constraints been eased. All spawned fish were sacrificed for fish health sampling. As the hatchery will likely produce less than 35,000 very small fingerlings for stock, it's plausible the stock will be unable to recruit enough 10+ year old fish to replace the brood sacrificed for fish health analysis.

A total of 208 male, 23 female, and 2 immature trout were captured. The condition of the females upon capture were 17 ripe, 3 dead but ripe, 2 green, and 1 spent. One female had a cinch tag numbered 1 attached near the posterior end of the dorsal fin. This tag was likely placed in the fish around 1990.

Figure 42. ND SD and MT salmon numbers stocked

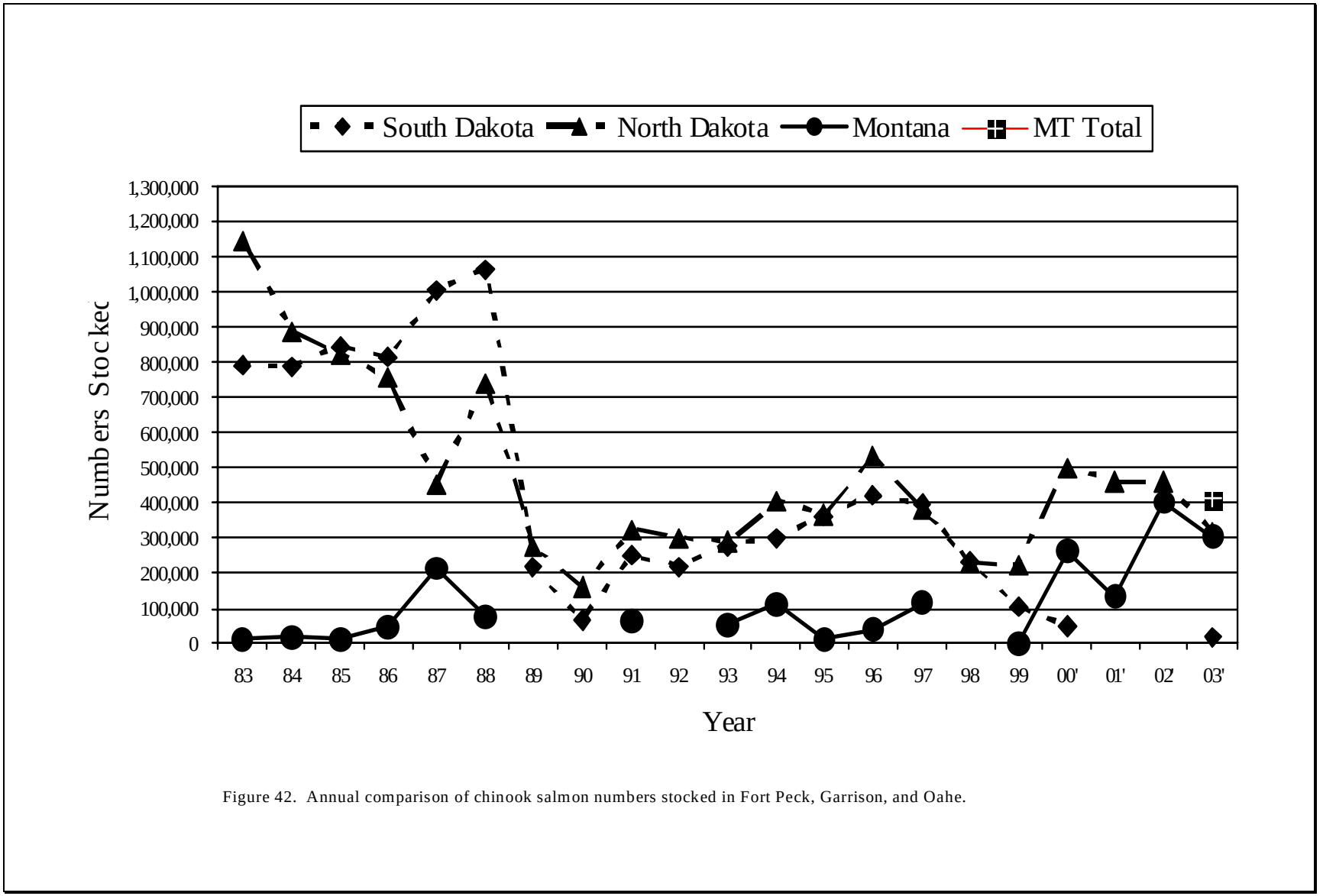

Figure 42. Annual comparison of chinook salmon numbers stocked in Fort Peck, Garrison, and Oahe.

Figure 43 ND SD and MT salmon weights stocked

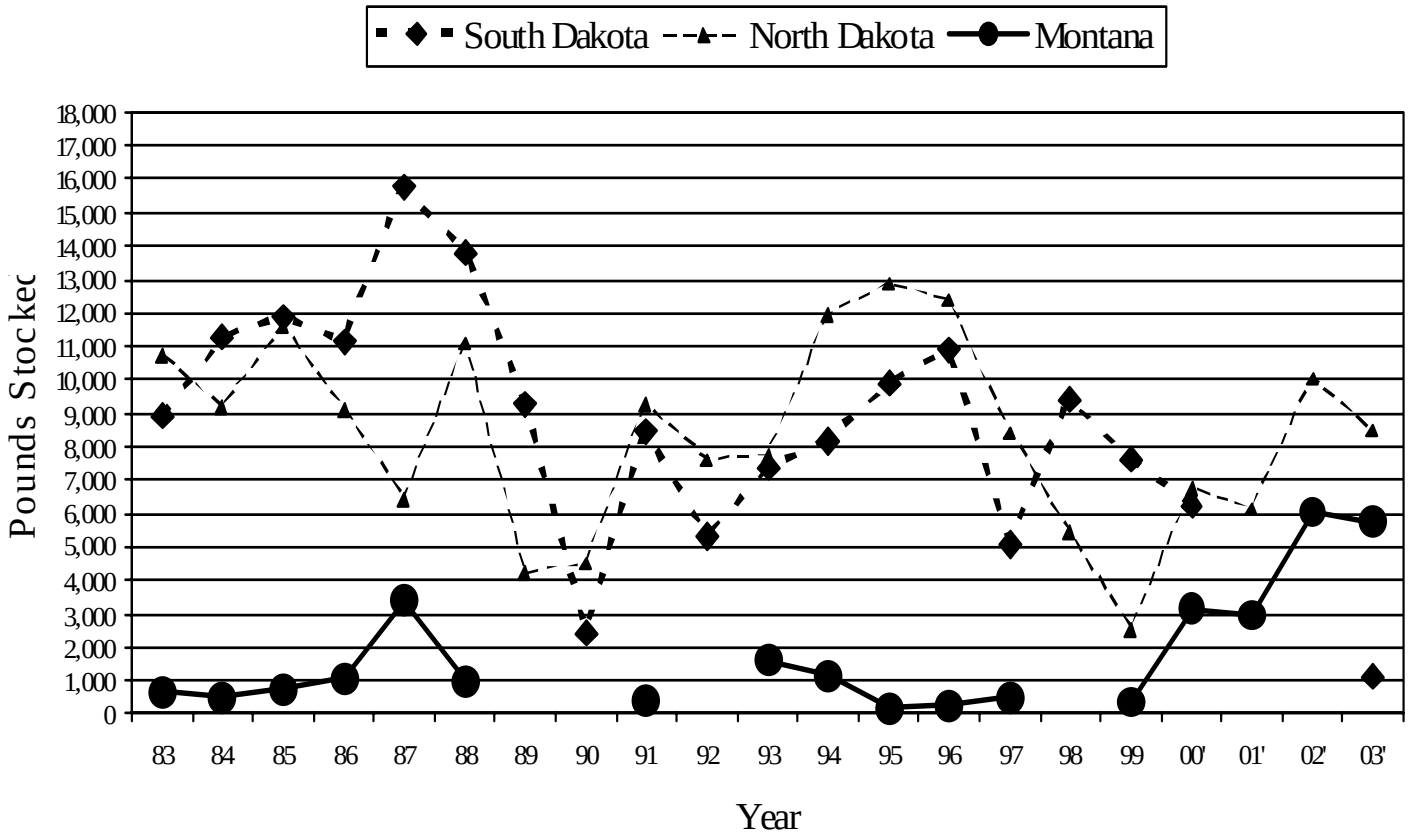

Figure 43. Annual comparison of chinook salmon pounds stocked in Fort Peck, Garrison, and Oahe.

All the males were in reproductive condition with 26 being killed in the nets. Two immature fish were captured 1 died in the nets the other was released. The female and male spawning lake trout averaged 31.2" and 31.8", respectively and both averaged 10.8 lbs. Overall catch in the nets showed and average of 30.4" and 10.4 pounds for the females and 30.1" and 10.7 pounds for the males. The immature fish averaged 21.5" and 3.5 pounds

Lake trout were captured in the same size nets from 1990 to 1993 and again in 2003 for spawning. Comparisons of length frequencies show few immature fish are captured during the spawn and the size of fish captured are similar (Figure 44). This may be a factor of the droughts occurring during the sampling, but more likely the smaller immature fish don't occupy the spawning area. This gear may be used annually to monitor the fishery in the future as net mortality seems to be small overall. In the past, fish from the creel survey have been used for fish health samples so fewer fish need to be sacrificed during spawning. It's anticipated this will be resumed once this creel is reinstated in 2004. It's also likely a lake trout spawn will occur in the fall of 2004. Unfortunately, at this time the Fort Peck Hatchery will not be allowed to rear lake trout as it was not included on the legislatively authorized list. Many of the problems will exist for the future spawns.

CISCO

Young-of-year cisco

Twenty-eight, ½ inch mesh; 100 x 6 foot vertical gill nets were used to sample young-of-year cisco in the Fort Peck Reservoir from September 30th to October 7th, 2003 (Table 17). The lower Big Dry, Lower Missouri, and middle Missouri Arms were samples. Neither upper arms were sampled because they lacked areas over 80 feet deep.

The overall catch rate was 3 young-of-year per-net in 2003, compared to 6 young-of-year per-net in 2002, which is much lower than the catch rate of 219 in 2001. A total of 81 young-of-year cisco and 339 adults were caught in 2003. 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, remaining at 5.5 in 2003.

Reservoir elevations continued to decline in 2003 (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 appears to have dampened the 2003 year class strength. In 2004, the ice cover was also on January 17th, it's plausible the cisco spawn will be poor once again. Lack of inter-specific competition my make for better survival of what spawn is successful (Figure 46).

Depths at which cisco were captured in the vertical nets was documented in 2003. Less than 13% of young-of-year cisco were captured between 30 and 59 feet. Over 87% of cisco young-of-year were captured in depths greater than 60 feet as documented in previous years. Three spottail shiner, one adult catfish, 1 chinook salmon, seven crappie, 1 drum, and 2 goldeye were caught in the vertical nets in 2003.

Adult Cisco

Adult cisco were sampled outside the Fort Peck Marina breakwater and the North Fork of Duck Creek with 2 nets each on December 2nd. A total of 4 nets were set, which collected 189 cisco resulting in a catch of 47 cisco per-net in 2003. The 2003 results were similar to the 267 cisco resulting in a catch rate of 45 cisco per-net in 2002. It was anticipated the adult catch rate would increase as a result of the large 2001-year class, although it didn't occur in 2003. It is anticipated an increase will be recognized in 2004, once the 2001-year class fully recruits to the nets and become sexually mature. Females outnumbered males with 101 females to 88 males. As the 2001 year class fully recruits the number of male cisco should increase dramatically. The male to female ratio was 0.8:1 in 2003, compared to the 2:1 ratio measured in 2002.

Figure 44. Lake trout length frequencies.

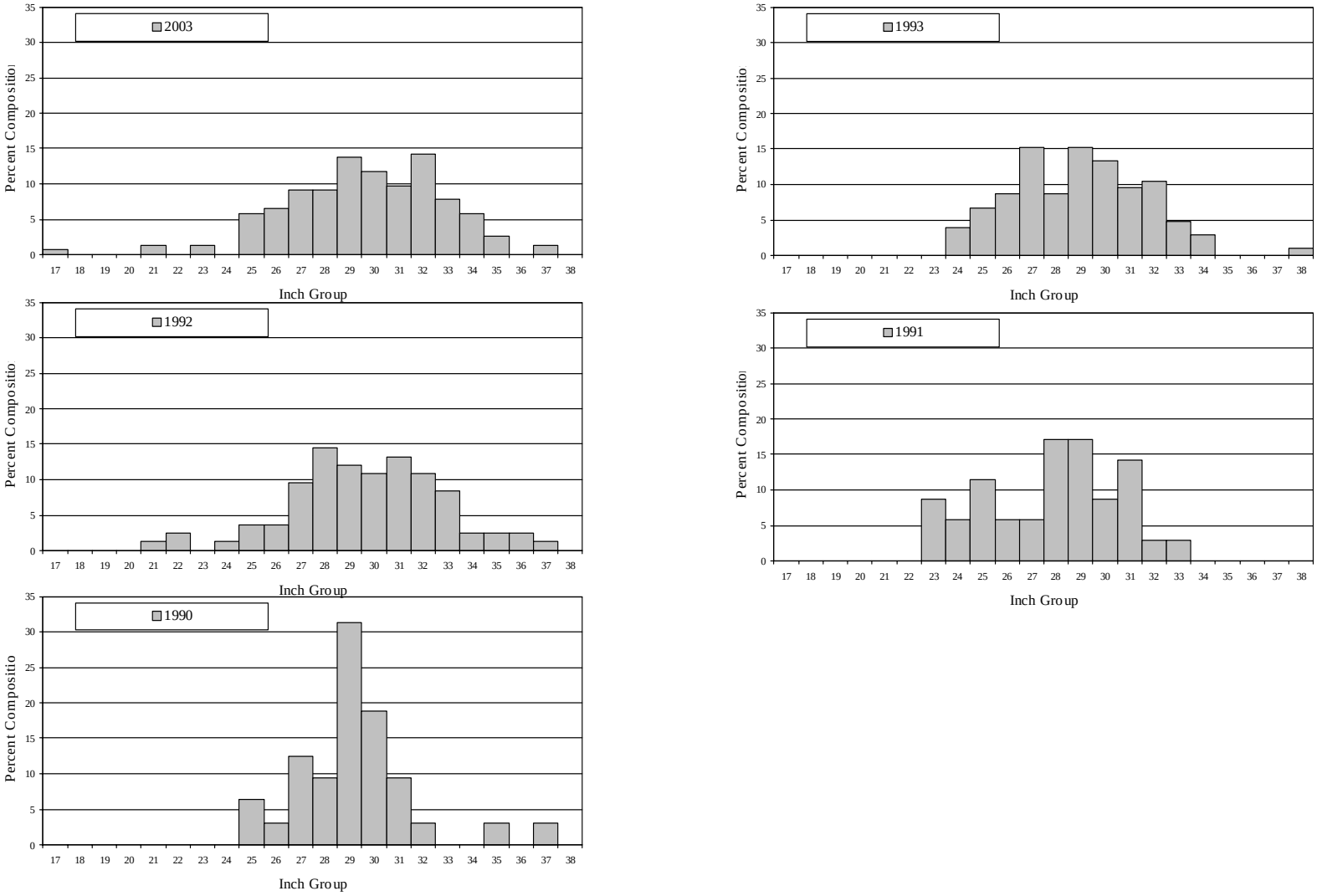

Figure 44. Length frequency of lake trout captured from 1990 to 1993 and 2003.

Table 17. Summary of young-of-year cisco taken by vertical gill nets in Fort Peck Reservoir during September and October 1990-2003.

	Young-of-Year Per Set													
Station	'90	'91	'92	'93	'94	'95	'96	'97	'98	`99	'00	'01	'02	'03
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	1
Rock Creek	1	--	6	1	232	--	--	3	32	4	33	197	--	--
Sandy Arroyo	--	--	--	--	--	--	--	--	--	--	--	193	--	3
Spring Creek	--	--	--	--	--	--	--	--	--	--	--	370	--	3
Lower Missouri Arm														
Dam	1	--	--	--	543	20	--	81	--	--	--	--	--	--
Duck Creek	50	--	15	3	293	--	15	18	58	62	27	47	6	13
Fifth Point	--	--	--	--	--	--	--	--	--	--	--	185	--	--
Marina	72	--	5	4	50	2	0.5	4	0.5	35	18	77	3	1
Milk Coulee	--	--	--	--	--	--	--	--	70	19	33	123	18	19
Sage Creek	--	--	--	--	--	--	--	--	--	--	--	153	--	1
Shaft Houses	20	--	2	2	76	2	9	29	45	3	1	--	11	1
Bear Creek	41	--	8	3	45	3	13	12	139	24	66	143	5	11
Middle Missouri Arm														
Cattle Crooked Cr.	--	--	--	--	--	--	--	--	--	--	--	556	--	7
Pines-Gilbert Cr.	48	50	15	6	370	2	14	121	89	30	17	517	--	7
Hell-Sutherland	56	49	53	13	518	--	31	245	15	33	15	119	--	14
Snow Creek	--	--	--	--	--	--	--	--	--	--	16	185	--	--
Upper Missouri Arm														
Bonetrail	--	--	--	--	--	--	--	--	--	--	--	155	--	--
Devils Creek	--	--	--	--	166	--	--	34	--	--	--	--	--	--
Seven Blackfoot	--	--	--	--	--	--	--	--	1	--	11	--	--	--
Timber Creek	7	25	6	8	267	--	5	25	1	--	7	--	--	--
Wagon Creek	--	--	--	--	--	--	--	--	--	--	--	206	--	--
Avg. No. Cisco per net/night	31	84	10	4	259	3	12	69	35	19	6	219	6	3

Figure 45 Elevation change vs cisco yoy's

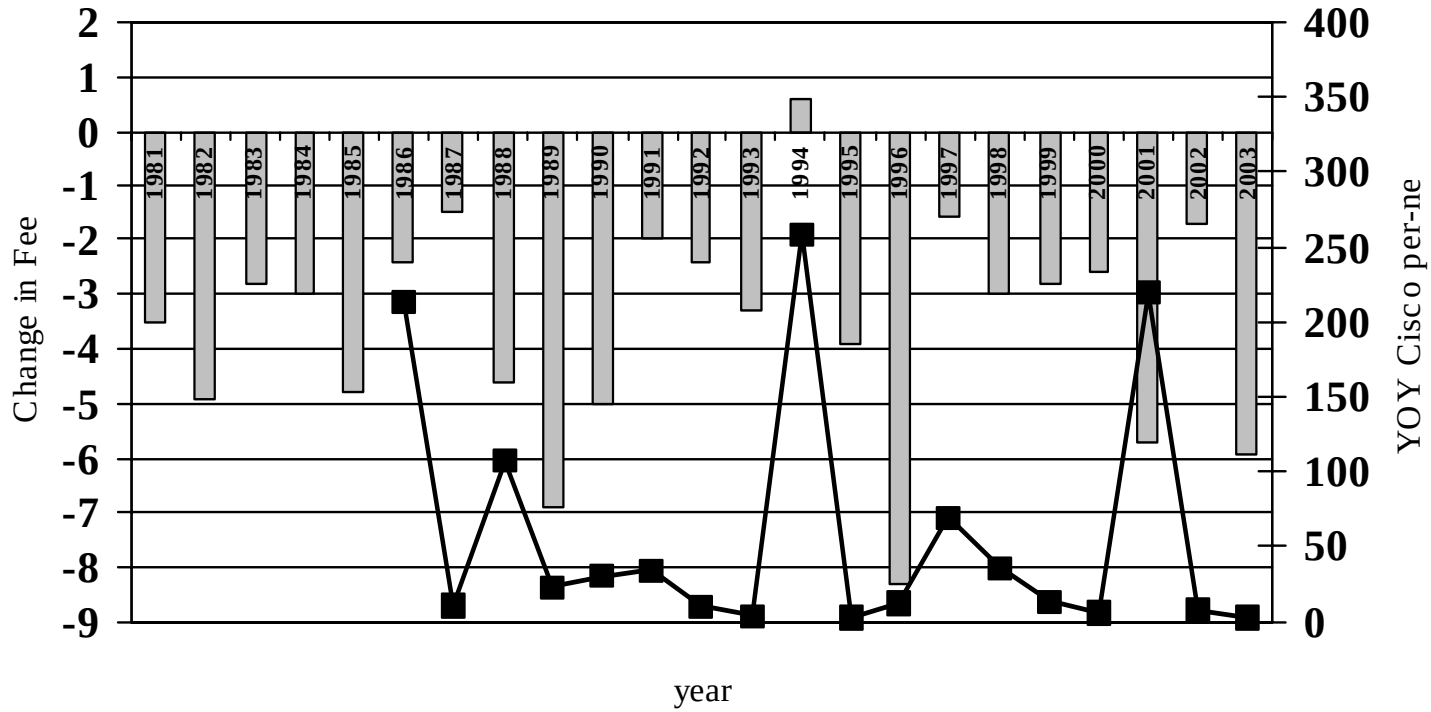

Figure 45. Fort Peck changes in reservoir elevation (bars) from December high to March low elevations from 1981 to 2003 in contrast with number of young-of-year cisco catch rate (line) in vertical nets.

Figure 46 cisco abundance and ice rank

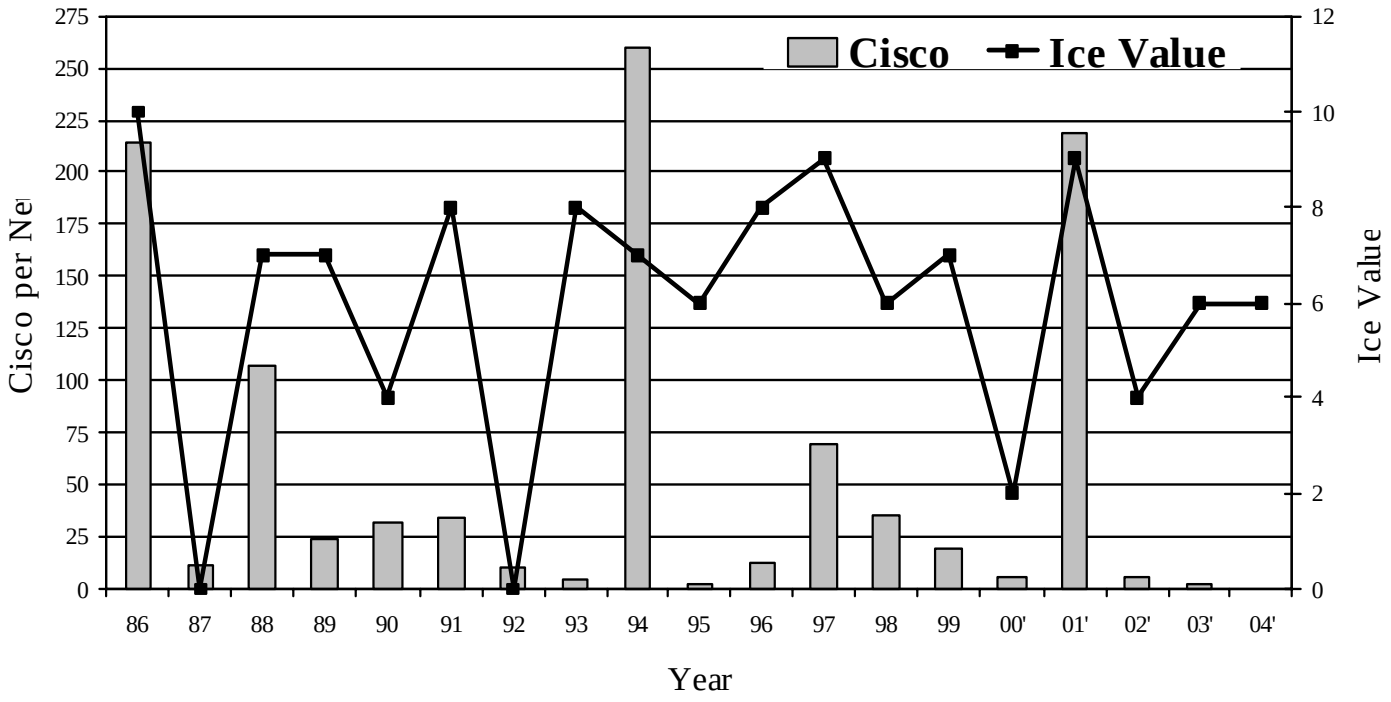

Figure 46. Number of young-of-year cisco caught per net compared to an ice on value from 1986-2003.

Average length and weight of females and males was 9.2 inches and 0.2 pounds and 9.8” and 0.3 pounds, respectively. The largest female in 2003 was 12.5 inches and 0.7 pounds, while the smallest was 8.3 inches and 0.2 pounds. The largest male in 2002 was 18.1 inches and 2.2 pounds, while the smallest was 8.3 inches and 0.2 pounds. This is believed to be the first time a male was the largest specimen captured during spawning.

Other Species

Other species captured during adult cisco netting included 22 goldeye, 6 pike, 1 walleye, 2 sauger, 3 perch and 5 white sucker. Catch rates of each were 5.5 goldeye, 1.5 pike, 0.3 walleye, 0.5 sauger, 0.8 perch and 1.3 white sucker per net in 2003. Average size of each were 12.3 inches and 0.6 pounds for the goldeye, 27.4 inches and 5.6 pounds for pike, 17.9 inches and 1.8 pounds for sauger, 9.7 inches and 0.2 pounds for the walleye, 14.8 inches and 1.7 pounds for white sucker, and 8.1 inches and 0.2 pounds for the perch.

RECOMMENDATIONS

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

- Continue use of sperm extender in the 2004 walleye spawn.

- Provided walleye eggs to researchers developing methods to produce sterile walleye.

- 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, before future samples will be taken.

- 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 a new scope needs to be obtained for Montana to independently work on this. It’s possible to borrow South Dakota’s scope occasionally.

- Set-up boats with new stocking tanks for hauling fingerling walleye to stocking locations in the reservoir.

- Continue hiring Fort Peck Marina staff to feed salmon during the walleye spawn.

- 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. This upcoming year plans are in place to produce some large fall stock fingerlings.

- 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 2004. Need additional catch basins and equipment to increase success, Pike Masters in Billings may assist with this project in 2004. All 9 ponds likely will be functional in 2004.
- Begin draining rearing ponds in early and mid-June and measure differences from holding fish for a shorter time such as size at release, water temperatures, and ability to hold walleye with screen. This was in part tried in 2003 and seemed successful. Additional fittings and hose were acquired in 2003. These items need to be put in place. This should increase efficiency of staff time for this process.

- 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 continuing to collect 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.

- Continue attempt to create or have additional FTE provided for Fort Peck Reservoir. An additional 2.4 FTE would aid in completing goals of the management plan. FTE of 0.7 for summer help would be immediately beneficial. O.3 FTE were acquired in 2003 for the cold water creel.

- Conduct 2 creel surveys in 2004. The coldwater survey done with FWP staff and contract out a warm water summer survey. Approximately $75,000 has been allocated. 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 2004 and 2005. Hold a meeting with hatchery staff, fish health staff and egg take staff to create a plan to make spawning of salmon and lake trout easier for all. Consider a second pontoon boat for spawning for such work, a cost of $35,000.

- Continue transferring or entering historical data into excel to create a full data base of all documented work with Fort Pecks Fishery.

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