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DEVELOPMENT AND MANAGEMENT OF COMMERCIAL FISHING PRACTICES IN FORT PECK RESERVOIR

Segment 6 Report
July 1, 1987 - June 30, 1988

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INTRODUCTION

The purpose of this study is to collect and evaluate information on the relative abundance, distribution, and reproductive success of commercial, forage, and sport fish populations in Fort Peck Reservoir.

The specific objectives for this segment were:

(1) Monitor and evaluate commercial harvest in Fort Peck Reservoir.

(2) Evaluate the success of recent forage fish introductions, and the effect of cisco on the commercial and sport fisheries.

(3) Determine the distribution and relative abundance of commercial, sport fish, and other species.

(4) Determine spawning success of commercial, sport fish, and forage fish species. Monitor spring spawning adults of various fish species in the Big Dry and lower Missouri River arms.

A map of the reservoir with general study areas is listed in Figure 1.

METHODS

Frame traps, 4- x 6-foot with 1-inch square mesh, were used to sample fish in spring. Leads, 50 feet long with 1- or 1 1/2-inch square mesh sizes, were attached to shore. Traps were usually checked every two to three days, depending on number of fish captured. Fish were fin-clipped to indicate previous capture. Selected species of fish were sexed, weighed, and total lengths (T.L.) measured; all species were identified and counted.

Experimental gill nets, 125- x 6-foot, were used to monitor fish distribution and composition in late summer and early fall. Each net contained five panels, 25 feet in length, with 3/4-, 1-, 1 1/4-, 1 1/2-, and 2-inch square mesh sizes.

Vertical gill nets, 100- x 6-foot, with 1/2-inch monofilament mesh, were set at various locations throughout the reservoir to capture young-of-year cisco. Adult cisco spawners were taken with a 300- x 8-foot nylon gill net, with 1 7/8-inch mesh.

Spawning success of various fish species was determined by sampling in late summer/early fall with 100- x 10-foot beach seines with 1/4- and 3/16-inch square mesh sizes.

TRAPPING

Spring trapping for spawning adult fish in the Big Dry and lower Missouri Arm was conducted from April 6 - May 13, for a total of 208 trap-days.

In the upper Big Dry Arm, frame traps were run for a total of 120 trap-days. The average number of game fish caught per day was 9.3 (Table 1). Average weights, lengths and ranges of captured game fish are shown in Table 2. No statistics on rough fish species were gathered in upper Big Dry in 1987.

Walleye continue to be the most abundant game fish taken during spring trapping in the upper Big Dry Arm (Appendix Table 1). The average number of walleye captured in 1987 was 8.6 per trap-day. Males made up 68 percent of the population; females 30 percent; immatures and unknowns 2 percent. Male walleye averaged 1.22 pounds and females 2.94 pounds. This was a slight increase in weight from 1986 for females, which averaged 2.43 pounds. Males averaged 1.31 pounds in 1986.

Northern pike were the second most abundant game fish captured, averaging 0.3 fish per trap-day. This number was down significantly from 1986, when the average number captured was 1.7 per trap-day (Appendix Table 1). The average weight for males was 3.14 pounds, and 11.5 pounds for females. Due to the small sample size, these averages are probably not representative of the true average weights of the population.

Sauger numbers continued to be low as in previous sampling years, while the catch rate for burbot increased slightly (Appendix Table 1).

Frame traps were fished a total of eight trap-days in the middle Big Dry (Table 1). The catch rate for all fish species combined was 6.3. Walleye were the most abundant game fish captured, averaging 2.1 per trap-day. The average weight of female walleye was 3.02 pounds, and 1.5 pounds for males. The catch rate for northern pike averaged 1.0 fish per trap-day. Carp were the most abundant nongame fish, averaging 1.5 per trap-day.

In the lower Big Dry Arm, traps were fished a total of 32 trap-days (Table 1). The average daily catch for all fish species combined was 9.4 per trap-day. As in the other trapping locations, walleye were the dominant game fish, averaging 2.9 fish per trap-day. Female walleye averaged 2.06 pounds, and males averaged 1.14 pounds. Northern pike were caught at a rate of 1.2 per trap-day. Carp were the most abundant nongame fish, with 3.3 fish taken each trap-day.

Traps in the lower Missouri Arm were fished for 48 trap-days, averaging 12.4 fish per trap-day (Table 1). Walleye were the most common game fish species taken, with 1.3 fish per trap-day. Male walleye averaged 1.25 pounds, and females averaged 2.84 pounds. The catch rate for northerns was 0.7 fish per trap-day. Carp were the dominant rough fish species, with an average of 5.6 fish captured per trap-day.

No traps were fished in the middle and upper portions of the Missouri Arm.

Table 2. Average weights, lengths, and ranges for game fish taken by frame traps in the upper Big Dry Arm, 1987.

Species (Sex)	No.	Ave. Total Length (inches)		Ave. Total Weight (pounds)	
Walleye (M)	152	16.0	(11.2-22.1)	1.22	(0.20-3.75)
Walleye (F)	94	19.8	(16.2-30.0)	2.94	(0.84-9.50)
Walleye (Unk)	4	14.1	(11.7-17.8)	0.63	(0.32-1.20)
Sauger (M)	2	13.8	(13.7-13.9)	0.54	(0.13-0.95)
Sauger (F)	0				
Sauger (Unk)	2	14.3	(14.2-14.5)	0.51	(0.21-0.80)
Northern pike (M)	7	23.1	(19.9-27.2)	3.14	(1.98-5.30)
Northern pike (F)	3	33.8	(32.0-36.0)	11.50	(9.60-13.2)
Northern pike (Unk)	2	32.2	(26.5-38.0)	11.90	(5.0-18.80)
Burbot	0				
Rainbow (Unk)	1	15.8		1.65	

Table 3. Fish captured by 125-foot experimental gill nets in Fort Peck Reservoir, 1987.

Species[1]	UBD[2]		LBD[3]		LMA[4]		MMA[5]		UMA[6]		Total	
	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day	No. Fish	No./ Net Day
WE	75	5.0	34	1.9	48	3.2	88	4.2	32	2.7	277	3.4
NP	6	0.4	31	1.7	12	0.8	10	0.5	1	0.1	60	0.7
SG	2	0.1	17	0.9	22	1.5	121	5.8	97	8.1	259	3.2
YP	13	0.9	2	0.1	6	0.4	31	1.5	88	7.3	140	1.7
GE	197	13.0	71	3.9	51	3.4	112	5.3	253	21.0	684	8.4
WS	4	0.3	10	0.6	22	1.5	14	0.7	1	0.1	51	0.6
RC	24	1.6	3	0.2	0	---	3	0.1	14	1.2	44	0.5
SB	5	0.3	7	0.4	2	0.1	0	---	1	0.1	15	0.2
C	120	8.0	45	2.5	47	3.1	91	4.3	125	10.4	428	5.3
SR	4	0.3	9	0.5	4	0.3	40	1.9	67	5.6	124	1.5
CC	28	1.9	3	0.2	1	<0.1	1	<0.1	14	1.2	47	0.6
FD	4	0.3	1	0.1	0	---	0	---	13	1.1	18	0.2
SS	0	---	0	---	0	---	2	1.0	0	---	2	<0.1
LS	0	---	0	---	0	---	0	---	4	0.3	4	<0.1
CR	0	---	0	---	0	---	0	---	1	0.1	1	<0.1
CI	30	2.0	25	1.4	33	2.2	71	3.4	97	8.1	256	3.2
PF	0	---	0	---	0	---	0	---	0	---	0	---
Totals	512	34.1	258	14.3	248	16.5	584	27.8	808	67.3	2,410	29.7
No. Net Days	15		18		15		21		12		81	

[1]WE - walleye
NP - northern pike
SG - sauger
YP - yellow perch
GE - goldeye
WS - white sucker
RC - river carpsucker
SB - smallmouth buffalo
C - carp
SR - shorthead redhorse sucker
CC - channel catfish
FD - freshwater drum
SS - shovelnose sturgeon
LS - longnose sucker
CR - black crappie
CI - cisco
PF - paddlefish

[2]Upper Big Dry: Big Dry Cr., Nelson Cr., Short Cr., Lonetree Cr., McGuire Cr.
[3]Lower Big Dry: Box Cr., Lost Cr., N. Fork Rock Cr., S. Fork Rock Cr.
[4]Lower Missouri Arm: Spillway, Bear Cr., Duck Cr.
[5]Mid Missouri Arm: Pines, Crooked Cr., Cattle Cr., Gilbert Cr., Hell Cr., Snow Cr., Sutherland Cr.
[6]Upper Missouri Arm: Soda Cr., Crooked Cr., Musselshell River (mouth).

BEACH SEINING

To sample the abundance of YOY fish and forage fish, 185 seine hauls were made in bays throughout the reservoir. Table 5 shows a summary of seining activity in the fall of 1987. A total of 18,184 fish were sampled.

Twenty-three seine hauls in the upper Big Dry captured a total of 1,750 fish. The most common fish species were emerald shiner and yellow perch. Each comprised 25% of the total catch. Buffalo sp. ranked second in abundance, with 20%. Spottail shiners dropped from 30% in 1986, to only 8% in 1987.

In the lower Big Dry, 2,665 fish were captured in 45 seine hauls. Spottail shiners comprised 60% of the total population sampled. Emerald shiners made up nearly 30% of the total. Yellow perch YOY, contributed only 4%.

A total of 6,685 fish were taken in 48 hauls in the lower Missouri Arm. Spottail shiners were the most dominant species, comprising 91% of the total catch. Yellow perch YOY made up 5% of the population. Emerald shiners followed, with 3%.

Beach seining in the middle Missouri produced a total of 3,500 fish in 42 hauls. The most common species was spottail shiners, contributing 64% to the total catch. Yellow perch YOY followed, with 17%. Emerald shiners made up 12% of the total number captured.

In the upper Missouri Arm, 27 hauls caught 3,582 fish. Emerald shiners were most common, making up 51% of the total sampled. Yellow perch YOY comprised 18%. Silvery/plains minnows contributed nearly 15%. They were followed by carp YOY, which made up 11%.

Numbers of game fish YOY captured by seining declined from 1986. The catch rate for walleye, reservoir-wide, dropped from 0.5, to 0.1 in 1987. This decrease in YOY is difficult to explain with the number of walleye fry stocked in 1987 having been doubled from the previous year.

Northern pike YOY also appeared to decrease slightly from 1986. The number taken per haul was less than 0.1, and in 1986 it was 0.4. Lack of submerged vegetation during the early spring is probably the cause of poor reproduction. No stocking of northern pike fry or fingerlings occurred in 1987.

The catch rate for smallmouth bass YOY remained relatively high in 1987. Smallmouth were captured at a rate of 0.8 fish per haul. These young are the result of natural reproduction, as no stocking has occurred since 1982.

Goldeye reproduction appeared to drop dramatically from 1986, when 9.6 YOY where taken per seine haul reservoir-wide. No YOY goldeye were taken, at any location, while beach seining in 1987.

Table 5. Continued

[1]WE - walleye
NP - northern pike
SG - sauger
YP - yellow perch
GE - goldeye
WS - white sucker
RC - river carpsucker
Bsp - smallmouth/bigmouth buffalo
LC - lake chub
C - carp
SR - shorthead redhorse sucker
GS - green sunfish
FD - freshwater drum
RB - rainbow trout
SMB - smallmouth bass
CI - cisco
SM - silvery/plains minnow
SS - sand shiner
CR - black/white crappie
CS - common shiner
FC - flathead chub
BM - brassy minnow
FM - fathead minnow
PK - plains killifish
ES - emerald shiner
CC - channel catfish
ST - spottail shiner
LD - longnose dace
SB - stickleback

[2]Upper Big Dry: Stone House, Big Dry Cr. Bay, Nelson Cr., Lone Tree, McGuire Cr.
[3]Lower Big Dry: Box Cr., S. & N. Fork Rock Cr., Rock Cr. Park, Box Elder Cr., Sandy Arroyo Cr., Spring Cr.
[4]Lower Missouri: Bear Cr., Duck Cr., Catfish Bay, Sturgeon Bay, Spillway Bay.
[5]Mid Missouri: Pines, Gilbert Cr., Crooked Cr., Hell Cr., Sutherland Cr.
[6]Upper Missouri: Timber Cr., Blackfoot Cr., Fourchette Cr., Devils Cr., Musselshell, Crooked Cr., Soda Cr.

Table 6. Total pounds (round weight) of commercial species harvested from Fort Peck Reservoir by commercial fishermen, 1957 - 1987.

Year	Buffalo sp.	River Carpsucker	Carp	Carp & R.[1] Carpsucker	Channel[2] Catfish	Goldeye	Freshwater Drum	Sucker sp.	Total
1957	15,308	7,200	1,500	---	---	---	---	---	24,008
1958	176,091	---	---	25,837	100	17	107	---	202,152
1959	154,770	2,687	13,850	---	462	---	1,875	62	173,706
1960	26,435	11,500	50	---	585	---	---	---	38,570
1961	15,950	950	610	---	790	---	---	---	18,300
1962	130,842	---	---	---	22,215	---	---	---	153,057
1963	263,696	3,440	5,707	---	15,576	49	688	---	289,156
1964	145,706	3,775	1,012	---	7,492	---	1,350	---	159,335
1965	184,003	---	1,400	---	11,666	---	550	---	197,619
1966	266,142	---	---	22,935	16,879	42	2,581	---	308,579
1967	389,083	---	---	35,775	10,066	56,050	4,012	---	494,986
1968	452,230	---	---	100,774	7,749	53,318	5,445	1,625	621,141
1969	323,648	64,718	13,719	---	4,503	199,279	11,759	186	617,812
1970	437,308	49,731	8,944	---	10,619	68,384	19,287	56	594,329
1971	279,831	31,658	1,403	---	13,746	186,310	8,019	1,429	522,396
1972	474,025	40,327	10,992	---	8,060	61,830	9,228	141	604,603
1973	546,657	13,045	3,975	---	2,704	130,061	8,018	---	704,460
1974	376,850	16,719	---	---	1,011	93,825	94	---	488,499
1975	274,091	6,512	---	---	688	129,299	---	---	410,590
1976	402,543	8,456	---	---	---	91,358	---	---	502,357
1977	343,930	8,500	---	---	---	121,868	---	---	474,298
1978	243,166	6,075	---	---	---	105,919	---	---	355,160
1979	224,200	12,862	4,475	---	---	258,780	---	---	500,317
1980	178,777	8,454	5,662	---	---	356,755	509	---	550,157
1981	260,389	6,473	20,788	---	---	244,322	301	---	532,273
1982	123,100	4,357	---	---	---	208,736	---	---	336,193
1983	111,464	1,876	5,060	---	---	403,628	91	---	522,119
1984	64,113	636	---	---	---	362,313	11	---	427,073
1985	---	---	---	---	---	295,120	---	---	295,120
1986	12,115	47	103	---	---	222,163	---	---	234,428
1987	4,526	500	---	---	---	129,990	---	---	135,016
Total	6,900,989	310,498	99,250	185,321	134,911	3,779,416	73,925	3,499	11,487,809

[1]Not differentiated by commercial fishermen when reported.
[2]Not allowed as commercial species after June 30, 1975.

sample size of northerns, average weight comparisons between years is inappropriate. Stocking of 100,000 northern pike fingerlings is anticipated in the spring of 1988, to supplement poor natural spawning.

Table 9. Percent of game fish stomachs containing cisco. Fish captured in gill nets, Fort Peck Reservoir, 1987.

	Percent Stomachs Containing Cisco					
Region	Walleye	Number Sampled	No. Pike	Number Sampled	Sauger	Number Sampled
Upper Big Dry	--	(0)	--	(0)	-	(0)
Lower Big Dry	15	(34)	13	(31)	0	(17)
Lower Missouri	15	(48)	0	(12)	0	(22)
Middle Missouri	2	(88)	2	(10)	1	(121)
Upper Missouri	9	(32)	0	(1)	0	(97)

The relative abundance of sauger increased slightly according to both frame trap and gill net sampling. The catch rate for sauger captured in traps was 0.24 per trap-day in 1987, and 0.18 per trap-day in 1986. Sauger were caught in gill nets at a rate of 3.2 per net-day during 1987, and 2.5 per net-day in 1986. Reservoir-wide, the average size of sauger increased from 0.52 pounds in 1986, to 0.70 pounds in 1987. This increase in size may also be attributed to more abundant forage, as stated earlier.

The annual, reservoir-wide, experimental gill net survey continues to show that the goldeye, the primary commercial fish, is still the most abundant fish species in Fort Peck. The goldeye, in past years, has made up nearly 50% of the annual gill net catch. This proportion, however, dropped to only 28% in 1987. The number of adult goldeye taken per net-day also continued to decline, as it has since 1981 (Figure 4). Harvest by commercial fishermen is assumed to be responsible for the long term decline in abundance of adult goldeye.

A comparison of capture rates for YOY cisco taken in vertical gill nets during 1986 and 1987, indicates that the reproductive success of cisco in 1987 was poor. The reason for the small '87 year-class is not obvious, however, there are two theories which merit consideration. In spring 1986, nearly 14 million cisco fry were released into the reservoir to augment natural spawning that occurred in fall 1985; no plants were made in 1987. In addition to the cisco stocking in 1986, the reservoir was ice covered for 3.5 months during the winter of 1985-1986; the main body of the

Figure 2. Average Weight Of Commercially Caught Goldeye
Upper Fort Peck Reservoir

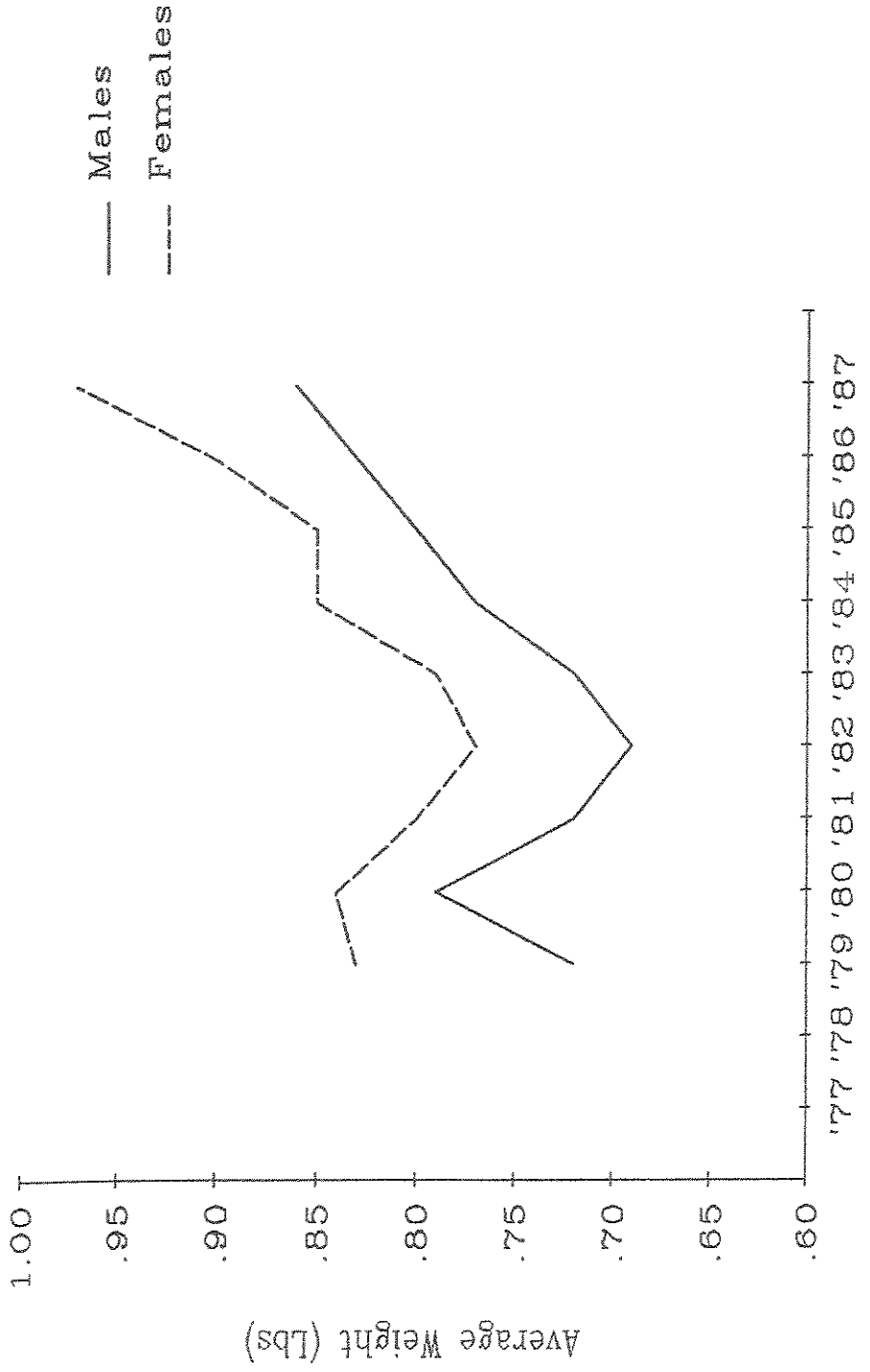

Figure 4. Catch Rate For Goldeye Captured In Experimental Gill Nets – Ft. Peck Res.

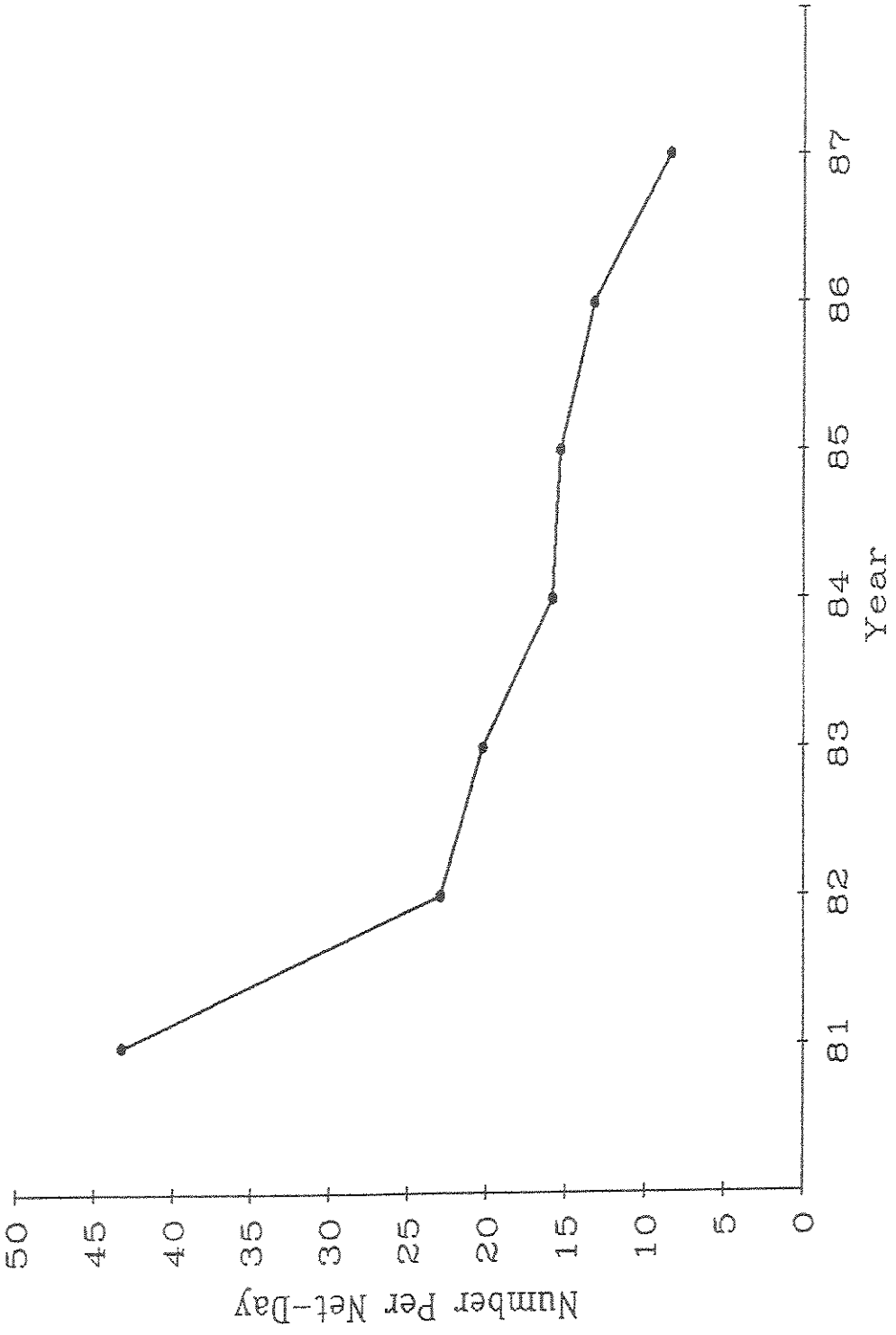

Figure 1. Catch Rates For Walleye
Experimental Gill Nets – Ft. Peck Reservoir

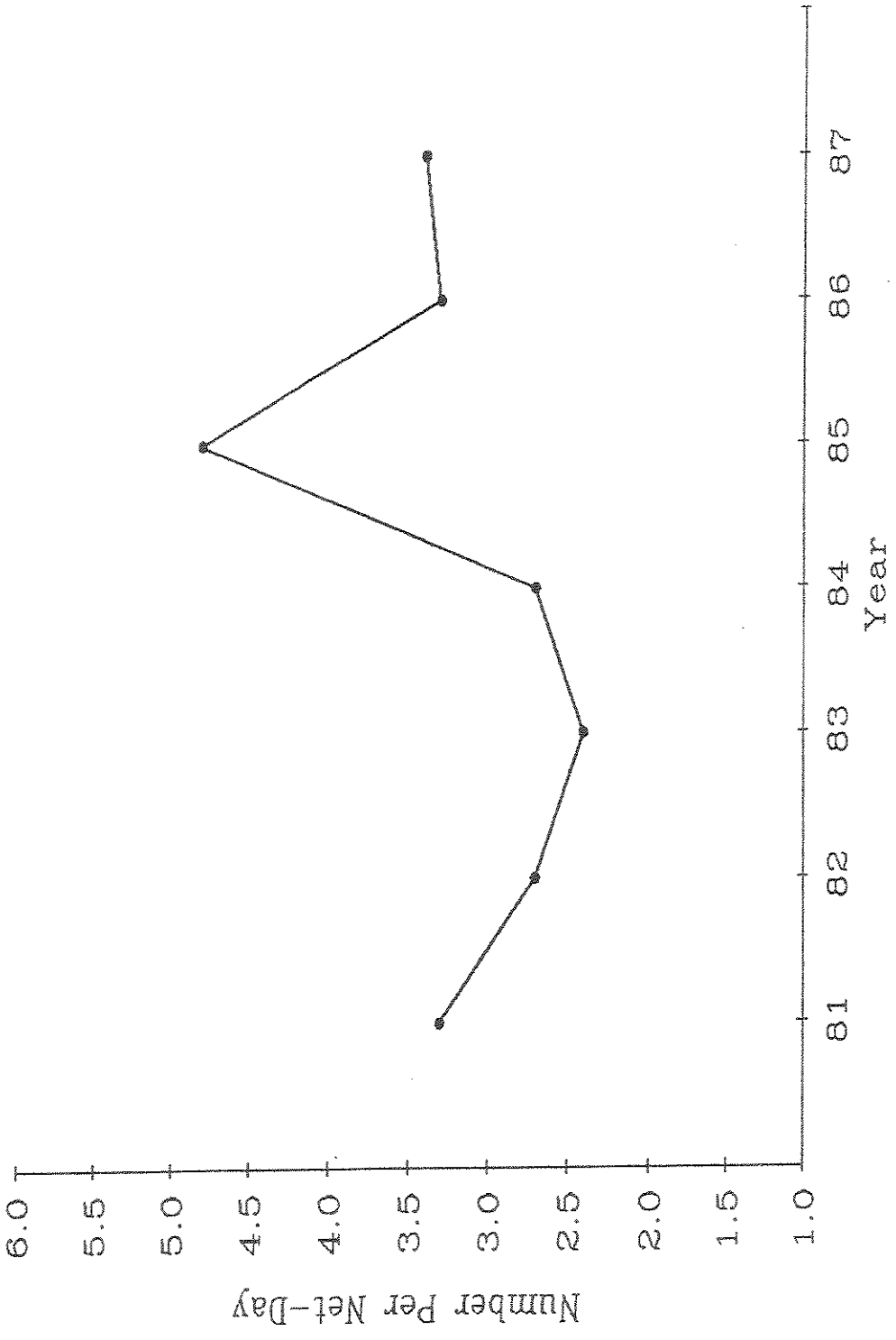

Table 1. Continued

Date	Species[1] GE	CC	B	BLB	BB	RT	FD	Total[2] Fish	Trap-Days
1987	--	--	32 (0.3)	--	--	1 (<0.1)	--	1,113 (9.2)	120
1986	104 (1.0)	29 (0.3)	6 (<0.1)	2 (<0.1)	2 (<0.1)	2 (<0.1)	--	2,501 (24.5)	102
1985	74 (0.8)	61 (0.6)	10 (0.1)	17 (0.2)	3 (<0.1)	--	1 (<0.1)	2,888 (29.8)	97
1984	5 (<0.1)	15 (0.2)	8 (0.1)	--	--	1 (<0.1)	--	1,069 (11.1)	96
1983	26 (0.2)	28 (0.3)	13 (0.1)	1 (<0.1)	1 (<0.1)	2 (<0.1)	3 (<0.1)	1,703 (16.1)	106
1982	151 (1.7)	16 (0.2)	11 (2.2)	1 (<0.1)	4 (<0.1)	2 (<0.1)	--	2,037 (22.9)	89
1981	114 (0.8)	16 (0.1)	44 (0.3)	--	--	--	--	1,374 (9.8)	140
1980	12 (0.1)	--	70 (0.7)	--	--	--	--	2,222 (22.9)	97
1979	121 (1.6)	--	30 (0.4)	--	--	--	--	1,261 (16.8)	75
1978	265 (3.3)	3 (<0.1)	47 (0.6)	28 (0.3)	7 (0.1)	1 (<0.1)	--	3,522 (43.2)	81
1977	--	36 (0.1)	46 (0.2)	377 (1.3)	--	--	22 (0.1)	4,070 (13.8)	295

[1]WE - walleye, SG - sauger, YP - yellow perch, NP - northern pike, RC - river carpsucker, WS - white sucker, SR - shorthead redhorse sucker, SB - smallmouth buffalo, C - carp, GE - goldeye, CC - channel catfish, B - burbot, BLB - black bullhead, BB - bigmouth buffalo, RT - rainbow trout, FD - freshwater drum

[2]May include more species than those listed; less than 0.1 fish caught per trap-day.