MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATION

PROJECT NO.: F-46-R-4 STUDY TITLE: SURVEY AND INVENTORY OF WARMWATER LAKES

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

PROJECT PERIOD: JULY 1, 1990 THROUGH JUNE 30, 1991

ABSTRACT

A reservior-wide creel survey was conducted from April through September, 1990. Over 90% of the 2,677 angler parties interviewed were Montana residents. Total fishing pressure for the survey period was estimated at 137,601 hours, or 24,725 angler days. This fishing effort translates to 0.8 angler hours per surface acre. The average trip length per boat party was 5.6 hours and 4.8 hours for the average shore fisherman. Approximately 98% of the fish harvested were taken by boat. The estimated number of fish caught was 48,000 with nearly 26,000 fish kept. Walleye were the most sought after game fish, with 18,695 harvested. The walleye catch rate by boat was 0.193 fish per hour and the average weight was 2.25 pounds. Estimated harvest of other game fish included 3,128 sauger, averaging 2.81 pounds; 1,071 smallmouth bass, averaging 1.84 pounds; 1,383 lake trout, averaging 8.59 pounds; 749 northern pike, averaging 8.25 pounds. Annual spring trapping in the upper Big Dry captured 1,863 walleye or a catch per unit effort of 6.4 walleye per trap-day. The average weight for female spawners was 5.77 pounds, and 2.08 pounds for males. Over 30 million eggs were taken from 359 female walleye during trapping. Beach seining indicated that natural reproduction of smallmouth bass continues to be good throughout most of the reservoir. Young-of-year (YOY) walleye were seined in the upper Missouri Arm, evidence that natural reproduction continued in this area. Beach seining also showed that natural reproduction of northern pike remains poor. Spottail shiners continue to be the dominant forage fish sampled by beach seining, however, numbers were down from previous years. Vertical gill netting, to evaluate annual cisco production, indicated that cisco reproduction was stable for the past two years. Growth rates for YOY cisco also appeared constant for the last several years. Length of YOY averaged 5.0 inches in September. Adult cisco sampled in November averaged 9.0 inches. The annual fall creel survey was conducted in Zone 1 from mid-October through mid-November, 1990. A total of 551 anglers were interviewed, and total fishing pressure was estimated at 5,769 hours, or 1,491 angler days. The fall catch rate for lake trout boat and shore fishermen was 0.05 fish per hour. The average weight of angler-caught lake trout was 7.70 pounds. Chinook salmon were also caught at a rate of 0.05 fish per hour. Average weight of angler-caught chinook was 13.66 pounds.

OBJECTIVE AND DEGREE OF ATTAINMENT

Job Objectives:

1) To acquire a greater and consistent walleye egg supply for artificial propagation of fry and fingerlings. Accomplished entirely with state funds, findings presented in Results.

2) To determine success of walleye fry versus fingerling plants to develop future stocking guidelines. This objective was met and findings are presented under Results.

3) To determine abundance of walleye in spring spawning runs in the Missouri River upstream from Fort Peck Reservoir and assess impacts of river spawning attributable to Yellowstone River walleye stocking. This objective was partially met and is presented under Results.

4) To encourage reservoir management practices to benefit the fishery as outlined in the water level management plan by coordinating needs with the Corps of Engineers and other states on the Missouri River Natural Resources Committee. Accomplished wholly with state funds.

5) To improve aquatic habitat and spawning substrate by utilizing artificial structures. No projects were submitted, task was to be completely funded by state.

6) To determine effects of reservoir water levels on abundance, distribution, and reproduction of key sport and forage fish. This objective was partially met and is presented under Results. Routine sampling with experimental gill nets was not conducted during late July - August, due to creel survey.

7) To determine abundance and trends of spring spawning populations of walleye and northern pike. This objective was partially achieved and is reported in Results.

8) To determine the rate of harvest for key species and angler preference for various species management. An intensive reservoir-wide creel survey was conducted from April - September 1990, and is presented under Results.

9) To determine status of cisco and spottail shiners as to abundance, distribution, spawning success, and utilization by predators. This objective was met and results are reported in Results.

10) To determine which designated access sites will provide the most benefit to fishermen (state funded). Information on access site use was obtained during reservoir-wide creel survey and is presented in Results.

11) To obtain greater public involvement by attending 10 public sportsmen's club meetings and providing 5 news releases per year. Accomplished entirely with state funds.

12) To collect and tabulate commercial fish harvest, prepare commercial regulations, and conduct field inspections to determine compliance and catch of non-target species. Accomplished wholly with state funds.

PROCEDURES

Fish Sampling Techniques

Spring trap-net sampling was conducted in the Big Dry Arm and lower Missouri Arm with 4- x 6-foot frame traps of 1-inch square mesh rigged with 50-foot leads. Sinking experimental gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of 3/4-, 1-, 1¼-, 1½-, and 2-inch square mesh were fished during the fall to acquire information on cisco spawners. Beach seining to determine abundance, reproductive rates and walleye stocking success was conducted in late summer and early fall utilizing a 100- x 9-foot beach seine of ¼-inch square mesh. Monofilament gill nets 100- x 6-foot with ½-inch square mesh were fished vertically from the surface to sample YOY cisco. Lake trout spawners were captured with 300-foot gill nets with 3-,4-, and 5-inch square mesh.

Creel Survey Techniques

The lake was divided into four zones (Figure 1). Aerial and ground angler counts were used to estimate fishing pressure. Angler interviews were used to estimate catch rate, mean party size and mean angler day length. Total harvest was determined by combining data from interviews and aerial and ground counts.

Aerial Angler Counts

The sampling period for aerial angler counts was from April 8 to September 30, 1990.

The aerial angler count was stratified according to four criteria which might affect fishing pressure and harvest; month, type of day (weekend/holiday or weekday), type of fishing (boat or shore), and zone.

Flights were divided equally between weekend/holidays and weekdays for each month sampled (Table 1). Weekday flights were selected at random. All holidays were flown, and weekend flights were selected at random during each month.

The number of flights scheduled for each month was proportional to the anticipated amount of fishing pressure for that month. Each potential sampling day was divided into six, 2½- hour periods (Table 2). The 2½-hour interval corresponds to the average length of time necessary to fly the entire reservoir. The starting time for each flight was randomly

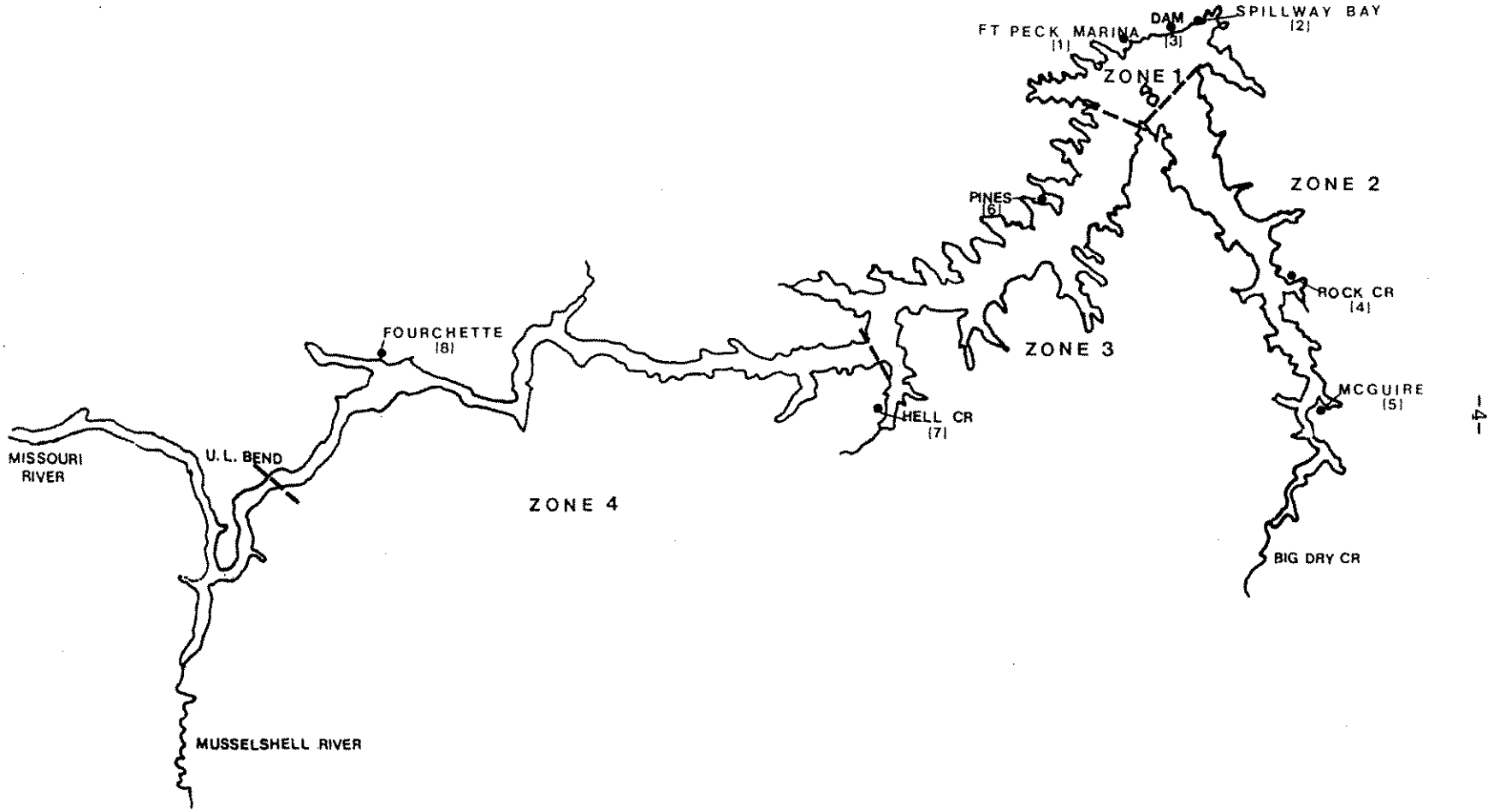

Figure 1. Four zones and eight access sites on Fort Peck Reservoir.

Table 1. Number of flights scheduled each month for Fort Peck Creel Survey, 1990.

Month	Weekday	Weekend/ Holiday	Total Days
April	4	4	8
May	5	5	10
June	7	7	14
July	8	8	16
August	5	5	10
September	4	4	8
TOTALS	33	33	66

Table 2. Daily sampling periods for flight and ground counts for Fort Peck Creel Survey, 1990.

Periods	Times
I	6:00 a.m. - 8:30 a.m.
II	8:30 a.m. - 11:00 a.m.
III	11:00 a.m. - 1:30 p.m.
IV	1:30 p.m. - 4:00 p.m.
V	4:00 p.m. - 6:30 p.m.
VI	6:30 p.m. - 9:00 p.m.

selected from these sampling intervals. Origin of flights alternated between Fort Peck Marina and U.L. Bend, heading south and west along the reservoir, or east and south, respectively. Aerial counts were considered instantaneous.

Boats were identified as fishing or non-fishing. A fishing boat was defined as a stationary or slow moving boat (no wake); fishing rods or down riggers also helped to determine boat use. Shore fishermen were also counted, and were defined as persons standing or sitting near waters edge, obviously in the act of fishing (Appendix Figure 1). Vehicles near the waters edge were not counted.

When weather or other unavoidable problems prevented a scheduled flight, it was rescheduled for the following day, or as soon as weather permitted.

Ground Interviews and Counts

Interviews and ground counts were conducted reservoir-wide from April 7 to September 30, and during lake trout fishing in Zone 1, October 14 to November 14, 1990.

A total of eight interview stations were selected throughout the lake and were located at boat ramps, or fishing access sites (Figure 1 and Table 3). Ground crews counted empty boat trailers to determine the number of boats in the area (Appendix Figure 2). The composition of the trailer count, (i.e., percent of trailers used for pleasure boating or fishing) was determined by interviews. Counts were conducted during each sample period at each sample location.

Ground interviews and counts were conducted on the same days that aerial counts were made (see aerial counts above). The remaining weekend days and week days during the creel season were selected at random for ground interview and count days (Table 4). Ground counts and interviews were stratified according to: month, type of day (weekend/holiday or weekday), and zone.

Each month had an appropriate length of angler day assigned (Table 5). Creel clerks worked the entire length of an angler day up to 10 hours. In mid-summer, when the length of the angler day exceeded 10 hours, clerks were assigned to a 10-hour shift with beginning times alternating between the 1st, 2nd, or 3rd daily sampling periods (Table 2).

Interviews provided information on the type of fishing being done (boat or shore), fisherman's residence, number of anglers per boat, number and species of fish caught and kept, number of hours spent fishing per trip (Appendix Figure 3). Boat anglers were interviewed on a party basis. Boaters were asked what type of boating they were doing, pleasure boating or fishing. Fishermen were also asked to rank in order of preference, the top three game fish species they wanted the department to manage for on the reservoir. Creel clerks used number codes to identify access site, fish species and angler origin for easy data tabulation (Appendix Figure 4).

Table 3. Interview and boat trailer count sites for Fort Peck Creel Survey, 1990.

Zone	Site Number	Location
1 (Area Near Dam)	1	Fort Peck Marina
	2	Spillway Bay
	3	Shaft Houses
2 (Big Dry Arm)	4	Rock Creek
	5	McGuire Creek
3 (Mid-Missouri Arm)	6	Pines
	7	Hell Creek
4 (Upper-Missouri Arm)	8	Fourchette Creek

Table 4. Number of ground count and interview days scheduled each month for Fort Peck Creel Survey, 1990.

Month	Weekday	Weekend/ Holiday	Total Days
April	6	8	14
May	8	8	16
June	9	9	18
July	9	9	18
August	9	8	17
September	8	9	17
TOTALS	49	51	100

Table 5. Length of angler-day by month, Fort Peck Creel Survey, 1990.

Month	Angler Day	Sample Period[1]	Total (Hours)
April	8:30 a.m. - 4:00 p.m.	II - IV	7.5
May	8:30 a.m. - 6:30 p.m.	II - V	10.0
June	6:00 a.m. - 9:00 p.m.	I - VI	15.0
July	6:00 a.m. - 9:00 p.m.	I - VI	15.0
August	8:30 a.m. - 9:00 p.m.	II - VI	12.5
September	8:30 a.m. - 4:00 p.m.	II - IV	7.5
October	11:00 a.m. - 6:30 p.m.	III - V	7.5
November	11:00 a.m. - 6:30 p.m.	III - V	7.5

[1]See Table 2.

If creel clerks were unable to interview anglers, post cards (Appendix Figure 5), were attached to vehicle windshields to determine: type of fishing engaged in, number of individuals in party, species and number of fish caught and kept, and time spent fishing.

If weather or other circumstances prevented anglers from fishing, creel days were rescheduled for the following day, or as soon as weather permitted.

RESULTS

Summer Creel Survey

A census of fishing activity on Fort Peck Reservoir was conducted from April 7 - September 30, utilizing aerial and ground counts on the entire reservoir.

Aerial Counts

Actual flight count days totaled 62 for the summer sampling period, with 4 flights canceled due to weather. The total number of boats observed from the air for the entire summer season was 2,960; 2,320 were classified as fishing boats and 640 as non-fishing boats.

The highest instantaneous aerial boat count was 182, on September 2 during the 0830 flight; 155 fishing boats and 27 non-fishing boats were observed. This was the highest fishing boat count for the season. The highest instantaneous count for non-fishing boats occurred on August 5, during the 1100 flight, and totaled 58 boats.

Interview and Ground Count Data

A total of 2,677 angler parties were interviewed during the summer creel survey; 456 individual shore fishermen and 2,221 boat parties. Maximum interview days totaled 91 and maximum ground count days totaled 93.

Anger Origin

During the summer creel, the majority of anglers interviewed (91%) were residents of Montana (Table 6). Of the Montana residents, those from the eastern portion of the state made up 83%, while western Montanans comprised 8%. Of the remaining 9%, non-residents, North Dakotans comprised half.

Resident fishermen from counties adjacent to the reservoir made up 46% of the total number of interviews. Valley County accounted for 31% of the total anglers interviewed.

Species Preference

Anglers responding to the question on species preference ..."List the top 3 species you prefer the department to manage in Fort Peck Reservoir;" walleye were most frequently mentioned first (38%), northern pike were most frequently mentioned second (14%), and smallmouth bass were mentioned third most often (13%). Other fish species ranked in order of frequency mentioned were: lake trout (11%), sauger (10%), chinook salmon (5%) and others (9%) (Figure 2).

Angling Pressure

Total angler hours were estimated at 137,601 (24,725 angler days) from April 7 - September 30. Most fishing occurred in Zones 1 and 3, 40% and 30% respectively. Zone 2 received 16% of the total fishing effort and Zone 4, 14% (Table 7 and Figure 3). July was the most popular fishing month (boat and shore interviews combined) (Table 7 and Figure 4).

Only 5% of the total angler hours, or 1,427 angler days, is attributed to shore fishing. Shore fishing occurred most frequently in Zone 2, or on the Big Dry Arm (Table 8). June and July were the months when most shore fishing occurred.

The remaining 95% of angler hours, or 23,298 angler days, were spent fishing by boat. The majority fished in Zone 1, or the area near the dam (Table 9). Most boat fishing occurred in July.

The average trip length per boat party was 5.61 hours, with an average boat party size of 2.3 persons. The average time spent angling per shore fishermen was 4.82 hours.

Table 6. Origin of 2,673 anglers interviewed during Fort Peck Creel Survey April 7 - September 30, 1990 (Percent of total in parenthesis).

Montana Counties	Number Inter-Views		Montana Counties	Number Inter-views		State	Number Inter-views
1 Silver Bow	3	(<1)	29 Rosebud	20	(1)	ND	131 (5)
2 Cascade	48	(2)	30 Deer Lodge	1	(<1)	Other	
3 Yellowstone	113	(4)	31 Teton	0	---	States	104 (4)
4 Missoula	13	(1)	32 Stillwater	3	(<1)		
5 Lewis & Clark	5	(<1)	33 Treasure	10	(<1)	Canada	10 (<1)
6 Gallatin	13	(1)	34 Sheridan	27	(1)	------	-----
7 Flathead	15	(1)	35 Sanders	0	---	TOTAL	2673
8 Fergus	54	(2)	36 Judith Basin	1	(<1)		
9 Powder River	3	(<1)	37 Daniels	34	(1)		
10 Carbon	0	---	38 Glacier	3	(<1)		
11 Phillips	112	(4)	39 Fallon	2	(<1)		
12 Hill	30	(1)	40 Sweet Grass	0	---		
13 Ravalli	2	(<1)	41 McCone	218	(8)		
14 Custer	84	(3)	42 Carter	4	(<1)		
15 Lake	2	(<1)	43 Broadwater	6	(<1)		
16 Dawson	174	(7)	44 Wheatland	0	---		
17 Roosevelt	311	(12)	45 Prairie	5	(<1)		
18 Beaverhead	3	(<1)	46 Granite	0	---		
19 Chouteau	1	(<1)	47 Meagher	1	(<1)		
20 Valley	833	(31)	48 Liberty	0	---		
21 Toole	0	---	49 Park	8	(1)		
22 Big Horn	1	(<1)	50 Garfield	76	(3)		
23 Musselshell	4	(<1)	51 Jefferson	1	(<1)		
24 Blaine	8	(<1)	52 Wibaux	1	(<1)		
25 Madison	3	(<1)	53 Golden Valley	1	(<1)		
26 Pondera	1	(<1)	54 Mineral	0	---		
27 Richland	164	(6)	55 Petroleum	5	(<1)		
28 Powell	0	___	56 Lincoln	1	(<1)		

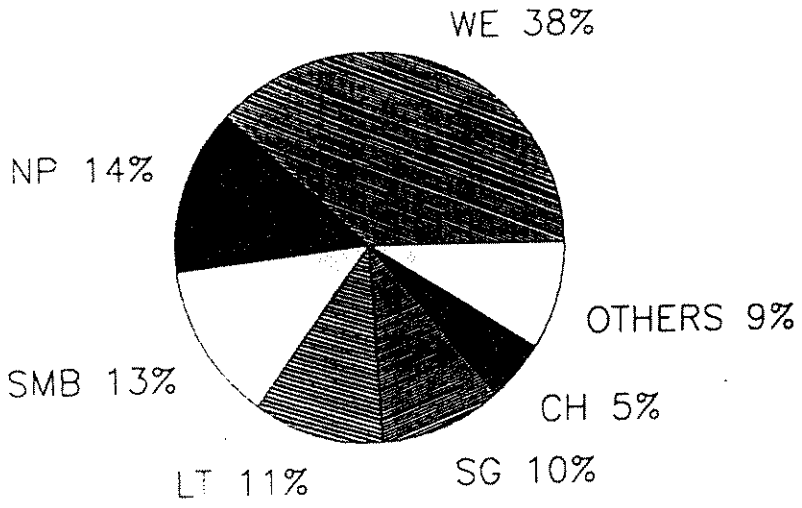

Figure 2. Species preference by percent of anglers interviewed, Fort Peck Creel Survey, April 7 - September 30, 1990.

Table 7. Summary of monthly fishing effort (boat and shore), (angler hours) by zone, Fort Peck Creel Survey, April 7 - September 30, 1990.

	Apr	May	Jun	Jul	Aug	Sep	Total
Zone 1[1]	598	6,120	6,724	25,491	10,689	5,588	55,210
Zone 2[2]	597	2,591	7,778	6,333	3,446	1,596	22,341
Zone 3[3]	109	2,785	5,916	18,713	7,338	6,183	41,044
Zone 4[4]	480	1,599	4,434	7,366	2,874	2,253	19,006
Totals	1,784	13,095	24,852	57,903	24,347	15,620	137,601[5]

[1]Area near dam.
[2]Big Dry Arm.
[3]Mid-Missouri Arm.
[4]Upper-Missouri Arm.
[5]137,601 angler hours = 24,725 angler days.

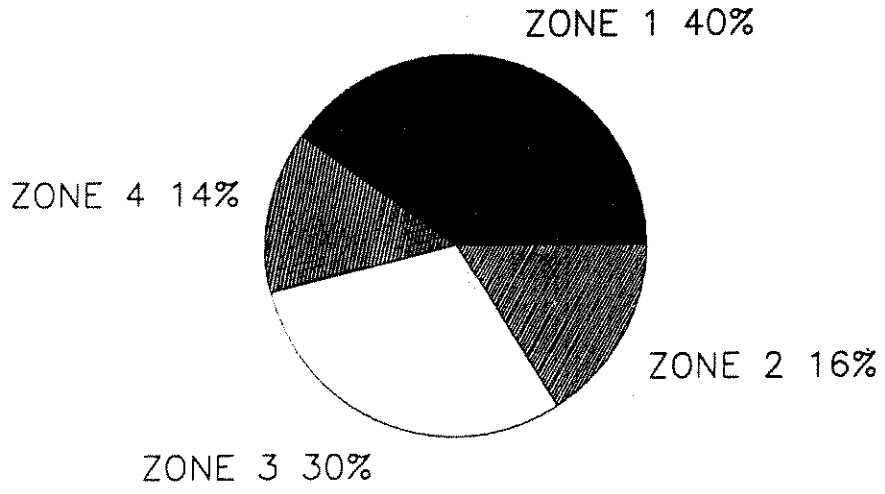

Figure 3. Fishing effort by zone, Fort Peck Creel Survey, April 7 - September 30, 1990.

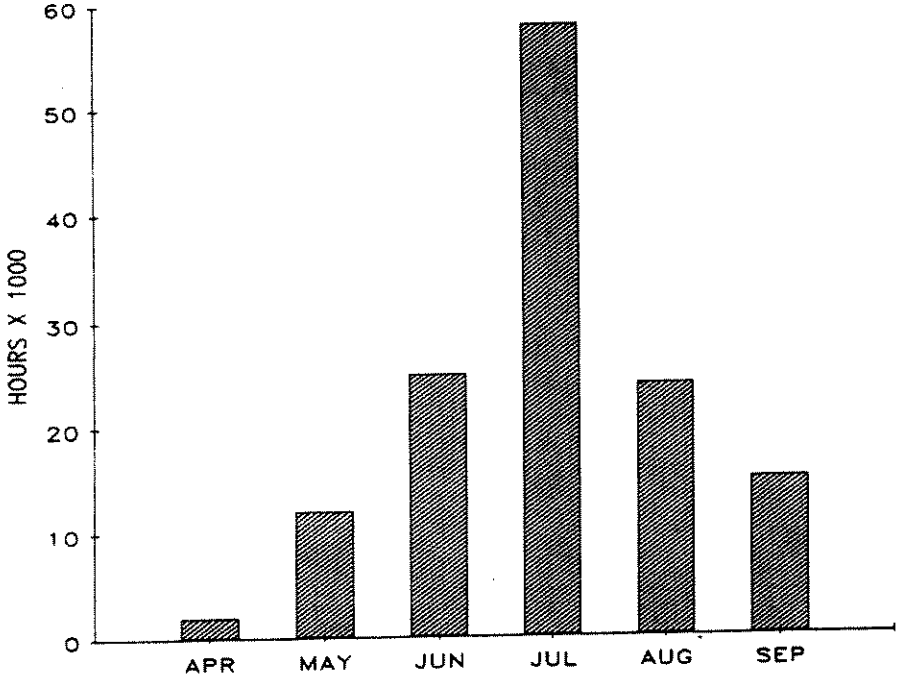

Figure 4. Fishing effort by month, Fort Peck Creel Survey, April 7 - September 30, 1990.

Table 8. Summary of monthly shore fishing effort (angler hours) by zone, Fort Peck Reservoir, April 7 - September 30, 1990.

	Apr	May	Jun	Jul	Aug	Sep	Total
Zone 1	18	131	480	445	49	246	1,369
Zone 2	274	48	853	738	117	97	2,565
Zone 3	0	255	427	443	86	67	1,278
Zone 4	480	330	233	273	26	324	1,666
Totals	772	1,202	1,993	1,899	278	734	6,878[1]

[1]6,878 angler hours = 1,427 angler days.

Table 9. Summary of monthly boat fishing effort (angler hours) by zone, Fort Peck Reservoir, April 7 - September 30, 1990.

	Apr	May	Jun	Jul	Aug	Sep	Total
Zone 1	580	5,989	6,244	25,046	10,641	5,341	53,841
Zone 2	323	2,105	6,924	5,594	3,329	1,500	19,775
Zone 3	109	2,530	5,489	18,270	7,252	6,116	39,766
Zone 4	0	1,269	4,202	7,094	2,848	1,928	17,341
Totals	1,012	11,893	22,859	56,004	24,070	14,885	130,723[1]

[1]130,723 angler hours = 23,298 angler days.

Fish Harvest

The total harvest of fish during the summer sampling period on Fort Peck Reservoir was estimated at 25,943 fish. The estimate for total number caught was 48,502. Walleye were the most abundant fish harvested (18,695), and made up 72.1% of the total harvest during the sampling period (Table 10). Sauger were the second most abundant fish harvested (3,128), and made up 12.1%. Other game fish harvested included: 1,383 lake trout (5.3%), 1,071 smallmouth bass (4.1%), 749 northern pike (2.9%), and 918 "other" species (3.5%).

Table 10. Estimated total harvest (boat and shore) of key game fish species, Fort Peck Reservoir, April 7 - September 30, 1990.

	Walleye	Northern Pike	Lake Trout[1]	Smallmouth Bass	Sauger
Total No. Caught	30,648	1,065	1,875	2,015	4,207
Total No. Harvested	18,695	749	1,383	1,071	3,128
Total Pounds Harvested	42,812	6,179	11,880	1,971	8,790

[1]Fall lake trout harvest not included in totals.

Approximately 98% of the fish harvested were taken by boat, with only 2% from shore, during the census period. The proportion of species taken from shore varied somewhat from those caught in boats (Table 11). Shore fishermen harvested proportionately more northerns (19.7%), and much fewer lake trout, walleye and sauger (Table 12). The proportion of shore-captured smallmouth was slightly less than those harvested by boat. A comparison of boat and shore catch rates, Table 13, shows similar trends and indicates that boat fishermen enjoy greater overall success than shore fishermen.

The major game fish taken by fishermen on Fort Peck Reservoir in 1990 were: walleye, sauger, northern pike, lake trout and smallmouth bass. Additional catch information on these species is provided, due to their importance.

Table 11. Estimated total boat harvest of key game fish species, Fort Peck Reservoir, April 7 - September 30, 1990.

	Walleye	Northern Pike	Lake Trout[1]	Smallmouth Bass	Sauger
Total No. Caught	30,378	943	1,875	1,991	4,178
Total No. Harvested	18,471	640	1,383	1,051	3,112
Total Pounds Harvested	42,853	5,280	11,921	1,913	8,714

[1]Fall lake trout harvest not included in total.

Table 12. Estimated total shore harvest of key game fish species, Fort Peck Reservoir, April 7 - September 30, 1990.

	Walleye	Northern Pike	Lake Trout[1]	Smallmouth Bass	Sauger
Total No. Caught	270	122	---	24	29
Total No. Harvested	223	109	---	21	16
Total Lbs. Harvested	306	776	---	44	38

[1]Fall lake trout harvest not included in totals.

Table 13. Comparison of catch rates of boat and shore fishermen interviewed on Fort Peck Reservoir, April 7- September 30, 1990.

Species	Boat Fishing Catch/ Hour	Shore Fishing Catch/ Hour
Walleye	0.193	0.043
Sauger	0.023	0.006
Smallmouth Bass	0.010	0.006
Lake Trout[1]	0.028	-----
Northern Pike	0.007	0.028
Goldeye	0.030	0.122
Miscellaneous	0.012	0.050
All Species	0.303	0.256

[1]Fall lake trout harvest not included.

Walleye

The average length of walleye caught by boat and shore anglers in 1990 was 18.0 inches, and average weight was 2.29 pounds (Table 14). Average size of fish varied by Zone, with the longest and heaviest fish being taken in Zone 4, or the upper-Missouri Arm. Lengths averaged 19.1 inches, with weights averaging 2.73 pounds. The smallest fish appeared to be in Zone 2, average length 16.6 inches and weight 1.75 pounds. Lake-wide, 39% of the walleye captured in 1990 were released.

The overall catch rate for walleye caught by boat in 1990 was 0.193 per hour. Zone 4 had the highest catch rate of 0.272 fish/hour, while Zone 1 had the poorest, at 0.141 fish/hour (Table 14).

Table 14. Walleye data from boat and shore anglers, Fort Peck Reservoir, April 7 - September 30, 1990 (catch rate is from boat anglers only).

	Lake-wide	Zone 1	Zone 2	Zone 3	Zone 4
Catch Rate					
Caught/Hr.	0.193	0.141	0.268	0.245	0.272
Kept/Hr.	0.120	0.082	0.167	0.170	0.145
Average Length (inches)	18.00	17.70	16.60	18.50	19.10
Average Weight (pounds)	2.29	2.17	1.75	2.44	2.73
Total No. Caught	30,648	10,780	5,876	9,253	4,738
Total No. Harvested	18,695	6,110	3,696	6,418	2,471
Total Pounds Harvested	42,812	13,259	6,468	15,660	6,746

Sauger

The average overall weight of sauger captured in 1990, was 2.81 pounds, with an average length of 20.3 inches (Table 15). Average size varied with Zone, with the smallest in the upper Missouri Arm (Zone 4), and the largest in the Big Dry Arm (Zone 2). Average length was 19.8 inches in Zone 4, with an average weight of 2.71 pounds. Average length in Zone 2 was 21.0 inches with an average weight of 3.15 pounds.

The reservoir-wide catch rate for sauger taken by boat during the sample period was 0.023 fish per hour. The best catch rate for sauger fished by boat occured in Zone 4, and the poorest in Zone 2, 0.090 and 0.013, respectively. Reservoir-wide, 26% of the sauger captured were released in 1990.

Table 15. Sauger data from boat and shore anglers, Fort Peck Reservoir, April 7 - September 30, 1990 (catch rate from boat anglers only).

	Lake-wide	Zone 1	Zone 2	Zone 3	Zone 4
Catch Rate					
Caught/Hr.	0.023	0.013	0.003	0.038	0.090
Kept/Hr.	0.017	0.010	0.003	0.030	0.060
Average Length (inches)	20.30	20.80	21.00	20.10	19.80
Average Weight (pounds)	2.81	2.95	3.15	2.73	2.71
Total No. Caught	4,207	861	76	1,398	1,872
Total No. Harvested	3,128	621	67	1,111	1,330
Total Pounds Harvested	8,790	1,832	211	3,033	3,604

Smallmouth bass

Throughout the reservoir, smallmouth bass captured by fishermen averaged 1.84 pounds and 14.3 inches during 1990 (Table 16). Zone 4 had the heaviest fish on average, with a mean weight of 1.99 pounds and mean length of 14.5 inches. The smallest fish were captured in Zone 1, and averaged 0.88 pounds and 11.9 inches.

The overall catch rate for smallmouth bass taken by boat was 0.010 fish per hour. Zone 4 had the best catch rate at 0.067, and Zone 1 had the poorest at 0.001. Forty-seven percent of the smallmouth caught were released.

Table 16. Smallmouth bass data from boat and shore anglers, Fort Peck Reservoir, April 7- September 30, 1990 (catch rate from boat anglers only).

	Lake-wide	Zone 1	Zone 2	Zone 3	Zone 4
Catch Rate					
Caught/Hr.	0.010	0.001	0.007	0.013	0.067
Kept/Hr.	0.005	0.001	0.004	0.007	0.034
Average Length (inches)	14.3	11.9	14.5	14.5	14.5
Average Weight (pounds)	1.84	0.88	1.98	1.76	1.99
Total No. Caught	2,015	89	138	587	1,201
Total No. Harvested	1,072	48	103	291	630
Total Pounds Harvested	1,971	42	204	512	1,254

Lake trout

The mean length for lake trout, caught from April - September reservoir-wide, was 27.1 inches and mean weight was 8.59 pounds (Table 17). The overall catch rate for lake trout was 0.028 fish per hour during the sampling period. The highest catch rate was in Zone 1; .050 fish per hour. No lake trout were recorded captured in Zone 4, and very few fish were taken in Zone 2. Zone 3 had a catch rate of .001. Twenty-six percent of the lake trout caught were released.

Northern pike

Fort Peck northern pike captured by boat and shore fishing, averaged 30.5 inches and 8.25 pounds (Table 18). The largest average size was observed in Zone 1, with mean weight of 9.63 pounds and mean length of 31.7 inches.

The best catch rate was observed in Zone 2, the Big Dry Arm. No anglers were interviewed with northern pike catches in Zone 4 during the sample period. Thirty percent of the northerns caught by anglers were released.

Table 17. Lake trout data from boat and shore anglers, Fort Peck Reservoir, April 7 - September 30, 1990 (catch rate from boat anglers only).

	Lake-wide	Zone 1	Zone 2	Zone 3	Zone 4
Catch Rate					
Caught/Hr.	0.028	0.050	0.0003	0.001	0
Kept/Hr.	0.021	0.040	0.0003	0.001	0
Average Length (inches)	27.1	27.1	27.1	27.1	0
Average Weight (pounds)	8.59	8.59	8.59	8.59	0
Total No. Caught	1,875	1,831	4	40	0
Total No. Harvested	1,383	1,362	4	18	0
Total Pounds Harvested	11,880	11,700	34	155	0

Table 18. Northern pike data from boat and shore anglers, Fort Peck Reservoir, April 7 - September 30, 1990 (catch rate from boat anglers only).

	Lake-wide	Zone 1	Zone 2	Zone 3	Zone 4
Catch Rate					
Caught/Hr.	0.007	0.005	0.027	0.003	0
Kept/Hr.	0.005	0.003	0.020	0.002	0
Average Length (inches)	30.5	32.5	29.6	31.7	0
Average Weight (pounds)	8.25	9.29	7.59	9.63	0
Total No. Caught	1,065	302	638	125	0
Total No. Harvested	749	197	463	88	0
Total Pounds Harvested	6,179	1,830	3,514	847	0

Fall Creel Survey

A fall creel survey was conducted in Zone 1 near the dam, utilizing ground counts and interviews from October 14 through November 14, 1990. This is an annual survey to monitor lake trout and chinook salmon fishing. A total of 551 anglers were interviewed; 234 boat fishermen and 317 shore fishermen. Total fishing pressure for the fall creel was estimated at 5,769 hours, or 1,491 angler days. Maximum interview and ground count days totaled 16.

The average trip length per boat party was 4.2 hours and 3.5 hours for the shore fishermen. The estimate for total number of fish caught during this period was 591, with 461 kept.

Lake Trout

The catch rate for lake trout (boat and shore fishermen combined) during the fall sampling period was 0.05 fish per hour, Table 19. The average length and weight for angler-caught lake trout was 26.7 inches and 7.70 pounds. Boat fishing was the best method for taking lake trout, with a catch rate of 0.089 fish per hour, and 0.015 fish per hour for shore fishermen, Table 20. The estimated number of lake trout caught and harvested is shown in Tables 21 and 22.

Chinook Salmon

The catch rate for chinook salmon (boat and shore fishermen combined) during the fall creel was 0.05 fish per hour. The average length of angler-caught salmon was 32.04 inches and average weight was 13.66 pounds, Table 19. Chinook catch rates were better from shore than from boat, 0.082 and .003, respectively. The estimated number of salmon caught and harvested is shown in Tables 21 and 22.

Table 19. Lake trout and chinook salmon data from boat and shore anglers, Fort Peck Reservoir, October 14 - November 14, 1990.

	Lake Trout	Chinook Salmon
Catch Rate		
Caught/Hr.	0.05	0.05
Kept/Hr.	0.03	0.05
Average Length (inches)	26.70	32.00
Average Weight (pounds)	7.70	13.70
Total No. Caught	342	198
Total No. Harvested	223	195
Total Pounds Harvested	1,717	2,672

Table 20. Comparison of catch rates for boat vs shore anglers, Fort Peck Reservoir, October 14 - November 14, 1990.

Species	Boat Catch Rate/Hour	Shore Catch Rate/Hour	Combined Catch Rate/Hour
Chinook Salmon	.033	.082	.048
Lake Trout	.089	.015	.046

Table 21. Estimated total boat harvest of lake trout and chinook salmon, Fort Peck Reservoir, October 14 - November 14, 1990.

	Lake Trout	Chinook Salmon
Total Number Caught	308	9
Total Number Harvested	204	8
Total Pounds Harvested	1,571	110

Table 22. Estimated total shore harvest of lake trout and chinook salmon, Fort Peck Reservoir, October 14 - November 14, 1990.

	Lake Trout	Chinook Salmon
Total Number Caught	34	189
Total Number Harvested	19	187
Total Pounds Harvested	146	2,562

Annual Fishery Survey

Trapping

Trap nets were used to sample spring spawning fish populations in the Big Dry Arm from April 5 - May 4, 1990. During this sampling period, a total of 1,863 walleye were captured; 1,080 males, 771 females, 5 unknowns and 7 immatures. The catch rate was 6.4 walleye per trap-day, which was slightly less than the previous 10-year average of 8.1 (Table 23).

Table 23. Summary of the walleye and northern pike caught by spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1974-90.

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

The sex ratio for trapped walleye was slightly less than 2:1, males:females. The average weight for female spawners was 5.77 pounds and 2.08 pounds for males. This is a slight increase in average weight for both sexes from previous years, and the highest average weight reached for females since 1979. Average weight for males has not exceeded 2 pounds since 1981 (Table 24).

Table 24. Summary of average weights and sex ratios for walleye trap-netted in the upper Big Dry, 1979-90.

Year	Average Weight Males	Sample Size	Average Weight Females	Sample Size	Sex Ratio[1] Male:Female
1990	2.08	362	5.77	142	2:1
1989	1.78	192	4.88	129	3:1
1988	1.69	283	3.68	239	2:1
1987	1.22	152	2.94	94	2:1
1986	1.31	851	2.43	216	3:1
1985	1.31	606	2.54	111	5:1
1984	.88	454	2.14	34	13:1
1983	.80	644	3.24	37	18:1
1982	1.07	565	2.95	58	10:1
1981	2.27	209	3.70	96	2:1
1980	1.77	247	3.43	122	2:1
1979	1.50	204	3.40	61	3:1

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

The size composition of the walleye trapped in 1990, shows that the number of fish in the 3-5 pound category remains high (Figure 5). Table 25 shows a greater percent of the population (22%) exceeded 5 pounds than in previous years. The percentage of fish in the 5 pound or less category, appears to be similar to 1989.

Condition factors and average weight for 1.0-inch length groups of walleye 14.0 - 25.0 inches is shown in Appendix Table 1. No significant change is apparent, with average weights and condition factors remaining somewhat similar from the previous year (Figures 6 and 7).

Table 25. A summary of size composition for walleye taken during spring trap netting in the upper Big Dry Arm of Fort Peck Reservoir, 1974-90. Percent of the population sampled is in parenthesis.

Sexes Combined	1974	1976	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
No. >1 lbs.	225	115	243	292	285	296	172	205	594	900	273	482	285	458
Percent	(98)	(100)	(95)	(77)	(75)	(45)	(24)	(35)	(81)	(79)	(74)	(91)	(89)	(89)
No. >2 lbs.	169	100	86	112	145	92	45	23	108	172	129	304	186	301
Percent	(75)	(87)	(33)	(38)	(38)	(14)	(6)	(4)	(15)	(15)	(35)	(57)	(58)	(59)
No. >3 lbs.	70	47	38	37	65	25	20	6	33	50	55	169	140	207
Percent	(31)	(41)	(15)	(13)	(17)	(4)	(3)	(1)	(4)	(4)	(15)	(32)	(44)	(41)
No. >4 lbs.	21	17	21	20	33	11	13	3	15	14	14	80	100	152
Percent	(9)	(15)	(8)	(7)	(9)	(2)	(2)	(<1)	(2)	(1)	(4)	(15)	(31)	(30)
No. >5 lbs.	5	6	5	9	20	3	6	1	8	5	5	28	42	113
Percent	(2)	(5)	(2)	(3)	(5)	(<1)	(<1)	(<1)	(1)	(<1)	(1)	(5)	(13)	(22)

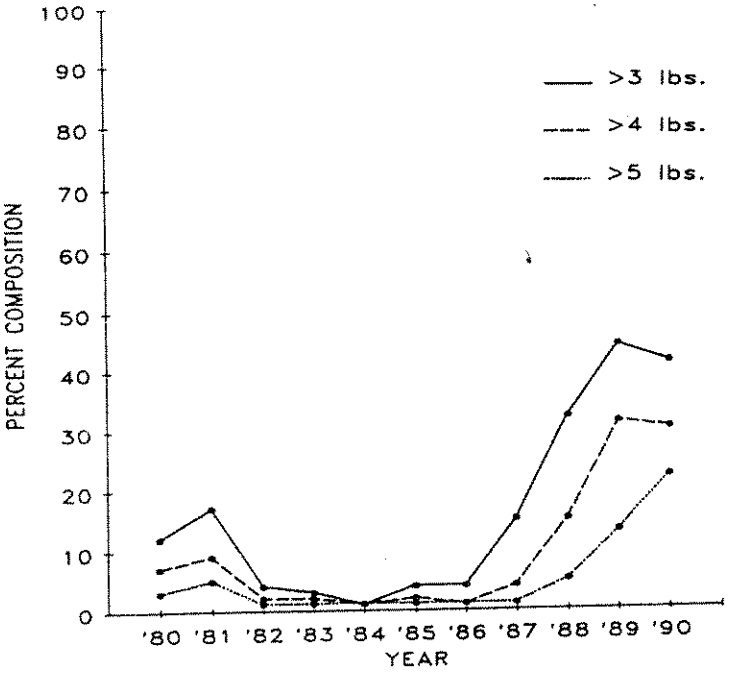

Figure 5. An illustration of the change in size of walleye captured during spring trap netting in the upper Big Dry Arm of Fort Peck Reservoir, 1980-90.

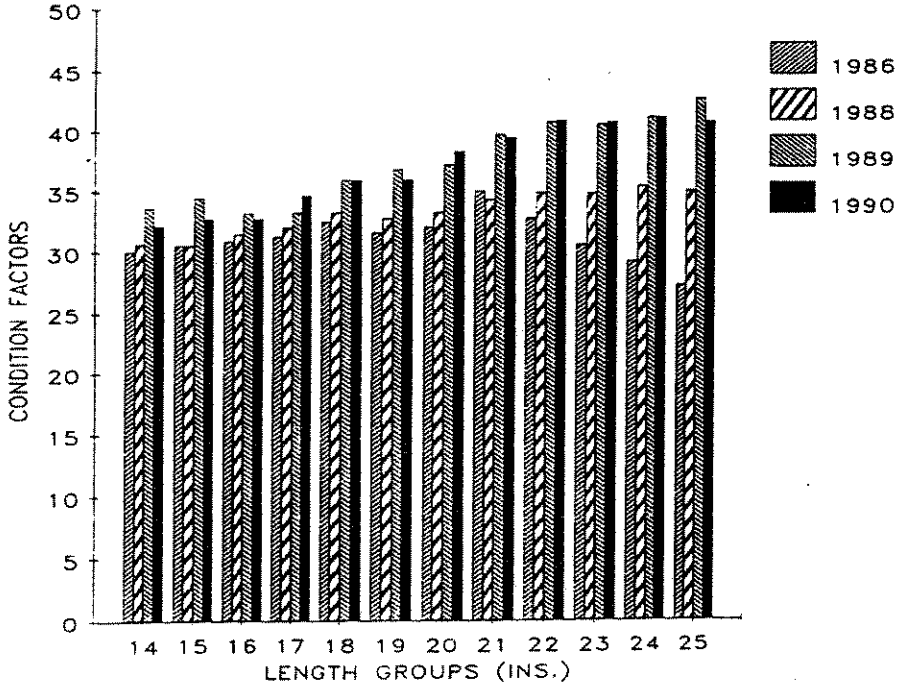

Figure 6. Condition factors for various 1.0-inch length groups of walleye trapped in the upper Big Dry Arm, Fort Peck Reservoir, 1986-90.

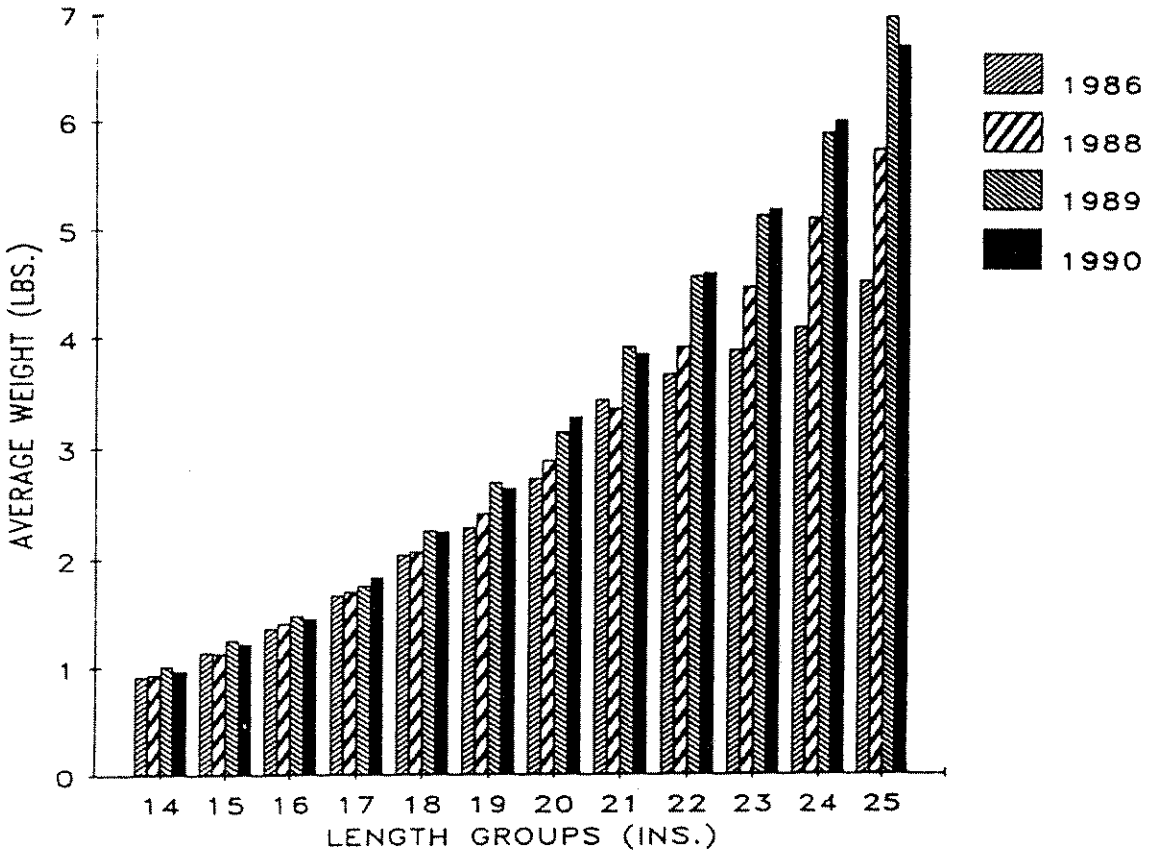

Figure 7. Average weights for various 1.0-inch length groups of walleye trapped in the upper Big Dry Arm, Fort Peck Reservoir, 1986-90.

The catch rate of 1.8 for trapped northern pike remained nearly the same as 1989 (Table 23). This is a higher catch rate than the average for the previous 10 years, but northern pike population still remains modest.

Frame traps were also used in the lower Missouri Arm from May 10-18, 1990 (Table 26). The walleye catch rate was 0.4, which was similar to 1989. The northern pike catch rate was 3.3, which was the highest since 1982. The catch rate for yellow perch was also up from previous years. These catch rates, however, may be misleading as sampling effort was much less than previous years.

Gill Netting

The annual gill net survey, usually conducted throughout the reservoir during late July and early August, was not performed due to reallocation of manpower and funds for the lake-wide creel survey.

Beach Seining

Beach seining, to determine reproductive success of sport and forage fish was conducted throughout the reservoir from July 29- August 13, 1990. A total of 165 seine hauls captured 6,714 fish (Table 27).

Table 26. A summary of the walleye, northern pike, and yellow perch caught by spring trap-netting in the lower Missouri Arm of Fort Peck Reservoir, 1969-90.

Date		Trap Mesh	Trap-Days	Walleye No.	Walleye Per T.D.	No. Pike No.	No. Pike Per T.D.	Yellow Perch No.	Yellow Perch Per T.D.
1969	(4/21-6/09)	1"	333	0	---	425	1.3	2,002	60
1971	(5/04-6/04)	1"	37	1	T[1]	68	1.8	45	12
1972	(4/21-6/29)	1"	82	0	---	104	1.3	299	36
	(5/02-5/16)	1/2"	28	0	---	20	0.7	4,816	172.0
1973	(4/05-5/18)	1"	94	0	---	111	1.2	47	5.1
	(4/05-5/18)	1/2"	121	0	---	125	1.0	4,664	38.6
1974			0						
1975		1/2"	71	0	---	6	0.9	4	0.1
1976		1"	89	0	---	146	1.6		T
1977-1980			0						
1981	(5/04-5/21)	1"	18	0	---	95	5.3	0	----
1982	(5/11-5/27)	1"	75	25	0.3	259	3.5	1	T
1983	(4/27-5/25)	1"	126	44	0.3	142	1.1	0	----
1984	(5/03-5/18)	1"	72	15	0.2	67	0.9	4	0.1
1985	(5/06-5/22)	1"	52	43	0.8	36	0.7	7	0.1
1986	(4/30-5/15)	1"	58	23	0.4	53	0.9	4	0.1
1987	(4/28-5/13)	1"	52	60	1.3	34	0.7		0.2
1988	(4/22-5/11)	1"	152	136	0.9	76	0.5	15	0.1
1989	(5/12-5/26)	1"	101	33	0.3	102	1.0	0	----
1990	(5/10-5/18)	1"	24	10	0.4	79	3.3	19	0.8

[1]T represents less than 0.1.

Table 27. Species and number of forage minnows and young-of-year fish captured by beach seining in Fort Peck Reservoir, 1990.

Species[1]	Upper Big Dry[2]		Lower Big Dry[3]		Lower Missouri[4]		Mid Missouri[5]		Upper Missouri[6]		Total	
	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul	No. Fish	No./ Haul
WE	2	.2	3	.1	10	.2	7	.2	37	1.3	59	0.4
NP	0	---	1	<0.1	0	----	0	----	0	----	1	<0.1
SG	0	---	0	----	0	----	0	----	34	1.2	34	0.2
YP	6	.5	153	4.1	99	1.9	44	1.3	6	.2	308	1.9
GE	0	---	0	----	0	----	18	.5	55	2.0	73	0.4
WS	0	---	7	.2	62	1.2	12	.3	4	.1	85	0.5
RC	0	---	0	----	15	.3	0	----	45	1.6	60	0.4
Bsp	1	.1	0	----	1	<0.1	0	----	2	.1	4	<0.1
LC	1	.1	0	----	0	----	0	----	8	.3	9	0.1
CP	1	.1	0	----	34	.6	2	.1	50	1.8	87	0.5
SR	1	.1	0	----	1	<0.1	3	.1	51	1.8	56	0.3
GS	0	---	0	----	0	----	0	----	0	----	0	----
FD	14	1.2	1	<0.1	0	----	0	----	187	6.7	202	1.2
BA	13	1.1	27	.7	41	.8	72	2.1	10	.4	163	1.0
CI	0	---	3	.1	1	<0.1	0	----	1	<0.1	5	<0.1
SM	0	---	0	----	0	----	0	----	302	10.8	302	1.8
CR	0	---	37	1.0	0	----	4	.1	79	2.8	120	0.7
FC	0	---	0	----	54	1.0	0	----	54	1.9	108	0.7
BU	0	---	0	----	0	----	0	----	0	----	0	----
FM	0	---	0	----	0	----	0	----	0	----	0	----
PK	0	0	0	----	0	----	0	----	0	----	0	----
ES	33	2.8	263	7.1	144	2.7	493	14.1	480	17.1	1,413	8.6
CC	0	---	0	----	0	----	0	----	1	<0.1	1	<0.1
ST	42	3.5	768	20.8	2,405	45.4	385	11.0	24	.9	3,624	22.0
TOTALS	114	9.5	1,263	34.1	2,867	54.1	1,040	29.7	1,430	51.1	6,714	40.7
No. Hauls	12		37		53		35		28		165	

Table 27. (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
CP - carp
SR - shorthead redhorse sucker
GS - green sunfish
FD - freshwater drum
BA - smallmouth bass
CI - cisco
SM - silvery/plains minnow
CR - black/white crappie
FC - flathead chub
BU - burbot ling
FM - fathead minnow
PK - plains killifish
ES - emerald shiner
CC - channel catfish
ST - spottail shiner

[2]Upper Big Dry: Nelson Cr., Lone Tree, McGuire Cr.
[3]Lower Big Dry: Box Cr., S. & N. Fork Rock Cr., Box Elder Cr., Sandy Arroyo Cr., Spring Cr.
[4]Lower Missouri: Bear Cr., Duck Cr., Catfish Bay, Strugeon 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

The most common young-of-year (YOY) game fish captured by seining was smallmouth bass. Seining in the mid-Missouri Arm had the highest catch rate, with the lower Missouri Arm, lower and uppper Big Dry having similar catch rates (Table 27). The upper Missouri Arm had the lowest catch rate. The reservoir-wide catch rate was 1.0 fish per haul, which was less than 1.7 fish during the 1989 survey (Table 28).

The catch rate for walleye seined reservoir-wide was 0.4 fish per haul. This was much less than 1989, which had a rate of 1.0 (Table 28). The largest concentration of YOY walleye appeared to be in the upper Missouri Arm, where 1.3 YOY were captured per haul. This is consistent with previous years and is likely the result of natural reproduction, as no walleye fry or fingerling were stocked in this area in 1990.

A total of 9.6 million walleye fry and 837,660 fingerling were stocked in 1990 (Table 29). The best catch rate for seining of YOY walleye occurred in the upper Missouri Arm. The average catch rate for regions where walleye fry were stocked was 0.22. Locations where fingerlings were stocked was similar, 0.21.

Sauger and northern pike YOY catch rates were low (Table 27) and may be the result of poor river flows and spring lake elevations, respectively.

Spottail shiners were the most abundant forage fish sampled by beach seining as they have since 1986, with 22.0 fish captured per seine haul (Table 27). This catch rate was slightly less than the previous year (Table 28), but reproduction still remains good.

Emerald shiners were not as abundant as in 1989, catch rates fell from 19.6 per haul to 8.6 (Table 28). This may have been the result of dropping lake levels.

Table 28. A summary of the total catch and catch rate for selected sport and forage fish taken by seining in Fort Peck Reservoir, 1981-90.

		Species[1]						
		WE	NP	SG	SMB	YP	GE	WSU
1981	No. Hauls--142							
	No. Sampled	33	18	70	19	8,099	1,359	459
	No./Haul	0.2	0.1	0.5	0.1	57.0	9.6	3.2
1982	No. Hauls--195							
	No. Sampled	116	34	113	23	9,604	1,410	1,392
	No./Haul	0.6	0.2	0.6	0.1	49.3	7.2	7.1
1983	No. Hauls--263							
	No. Sampled	52	70	70	77	8,324	0	1,120
	No./Haul	0.2	0.3	0.3	0.3	32.0	0	4.3
1984	No. Hauls--21							
	No. Sampled	115	23	96	27	19,280	1,361	453
	No./Haul	0.5	0.1	0.5	0.1	91.8	6.5	2.2
1985	No. Hauls--197							
	No. Sampled	219	29	36	10	31,695	509	969
	No./Haul	1.1	0.1	0.2	0.1	160.9	2.6	4.9
1986	No. Hauls--176							
	No. Sampled	74	88	61	149	6,597	1,081	861
	No./Haul	0.4	0.5	0.3	0.8	37.5	6.1	4.9
1987	No. Hauls--185							
	No. Sampled	14	10	9	145	2,093	0	48
	No./Haul	0.1	<0.1	<0.1	0.8	11.3	0	0.3
1988	No. Hauls--174							
	No. Sampled	47	74	17	135	1,045	1	258
	No./Haul	0.3	0.4	<0.1	0.8	6.0	<0.1	1.5
1989	No. Hauls--176							
	No. Sampled	178	7	2	305	895	161	200
	No./Haul	1.0	<0.1	<0.1	1.7	5.1	0.9	1.1
1990	No. Hauls--165							
	No. Sampled	59	1	34	163	308	73	85
	No./Haul	0.4	<0.1	0.2	1.0	1.9	0.4	0.5

Table 28. Continued

		Species[1]					
		BUFF	CARP	FWD	B/WC	ESH	SPSH
1981	No. Hauls--142						
	No. Sampled	1,252	1,047	1,122	3,388	2,488	----
	No./Haul	8.8	7.4	7.9	23.9	17.5	----
1982	No. Hauls--195						
	No. Sampled	4,577	742	658	6,958	2,764	0
	No./Haul	23.5	3.8	3.4	35.7	14.2	0
1983	No. Hauls--263						
	No. Sampled	2,345	1,582	245	9,244	5,859	1,681
	No./Haul	8.9	6.0	0.9	35.1	22.3	6.4
1984	No. Hauls--210						
	No. Sampled	11,414	1,853	584	7,858	10,312	2,120
	No./Haul	54.4	8.8	2.8	37.4	49.1	10.1
1985	No. Hauls--197						
	No. Sampled	363	289	640	1,907	14,109	4,444
	No./Haul	1.8	1.5	3.2	9.7	71.6	22.6
1986	No. Hauls--176						
	No. Sampled	1,378	951	713	3,011	6,443	22,436
	No./Haul	7.8	5.4	4.1	17.1	36.6	127.5
1987	No. Hauls--185						
	No. Sampled	388	509	43	40	3,688	10,027
	No./Haul	2.1	2.7	0.2	0.2	19.9	54.2
1988	No. Hauls--174						
	No. Sampled	24	154	405	12	1,449	10,089
	No./Haul	0.1	0.9	2.3	<0.1	8.3	58.0
1989	No. Hauls--176						
	No. Sampled	107	66	770	21	3,450	5,093
	No./Haul	0.6	0.4	4.4	0.1	19.6	28.9
1990	No. Hauls--165						
	No. Sampled	4	87	202	120	1,413	3,624
	No./Haul	<0.1	0.5	1.2	0.7	8.6	22.0

[1]WE - walleye
NP - northern pike
SG - sauger
SMB - smallmouth bass
YP - yellow perch
GE - goldeye
WSU - white sucker

BUFF - smallmouth & bigmouth buffalo
CARP - carp
FWD - freshwater drum
B/WC - black/white crappie
ESH - emerald shiner
SPSH - spottail shiner

Table 29. Summary of walleye stocking and young-of-year abundance (determined by beach seining) in Fort Peck Reservoir, 1990.

Area	Number Walleye Stocked Fingerling	Fry	No. Seine Hauls	No. YOY WE Caught	No. YOY WE/ Haul
N. Frk. Rock Cr.		1.7 mil	6	0	0
Hell Cr.	102,598	1.0 mil	9	1	0.1
McGuire Cr.		2.0 mil	6	2	0.3
Pines		1.9 mil	6	3	0.5
Marina		1.4 mil	10	2	0.2
N. Duck Cr.		1.6 mil	7	1	0.1
Spillway Bay	125,134		8	6	0.8
Gilbert Cr.	83,850		6	2	0.3
Box	114,936		6	2	0.3
Sandy Arroyo	62,400		6	0	0
Snow Cr.	126,344		--	--	---
Cattle/Crooked Cr.	65,563		7	0	0
Sutherland	29,920		7	1	0.1
Bear Cr.	126,915		8	0	0
Fourchette			6	5	0.8
UL Bend & Ghost Coulee			12	24	2.0
Devil's Cr.			3	8	2.7
TOTALS	837,660	9.6 mil			

Catch rate for areas where fry were stocked = 0.22.
Catch rate for areas where fingerling were stocked = 0.21.
Catch rate for upper Missouri Arm, less Timber Creek (no walleye stocked) = 1.3

Cisco

Small mesh, vertical gill nets were used to sample YOY cisco at 11 sites throughout the reservoir from September 17-27, 1990. A catch rate of 31.0 YOY cisco per net-set was a slight increase over 1989, when 22.9 fish were taken per net-set (Table 30). A sample of 224 YOY cisco ranged in length from 4.3 - 5.7 inches, and averaged 5.0 inches. YOY lengths were similar in 1989, ranging 4.3 - 5.5 inches and averaging 5.0 inches.

Experimental gill nets were used to sample adult spawners near the Fort Peck Marina on November 30, 1990. From a sample size of 100 fish, lengths ranged from 15.5 - 8.0 inches. The average weight for females was 0.34 pounds and 0.25 pounds for males. Average total lengths for males and females was 9.33 and 9.68, respectively.

Lake Trout

A spring and fall creel survey of lake trout fishermen in the vicinity of the dam has been conducted since 1985. Information on harvest, size and angler catch rates have been collected. A total of 451 anglers were interviewed in the spring and 551 in the fall, 1990. Catch rates for boat fishermen were 0.15 fish/hour and 0.10 fish/hour for spring and fall, respectively (Table 31). The average number of hours fished per individual was 5.4 in spring, and 3.8 in fall.

The average length of lake trout caught by anglers in the spring was 27.3 inches and ranged 19.1 - 34.2 inches; males averaged 26.6 inches and 8.06 pounds, females averaged 27.2 inches and 9.07 pounds. Results from the fall creel shows lake trout averaged 26.7 inches and ranged 20.4 - 33.5 inches; males averaged 26.5 inches and 7.52 pounds, females averaged 27.6 inches and 8.56 pounds. A summary of the average weight and condition factors for lake trout sampled during the annual fall creel survey is shown in Figure 8.

Average weights and condition factors for various 1.0-inch length groups of 1990 lake trout ranging from 19.0 - 30.0 inches is depicted in Figures 9 and 10. The condition factors and average weights for most length groups appears to be slightly less than in 1989.

Examination of lake trout stomachs during spring creel, showed that greater than 90% contained at least one cisco. Fall creel showed that less than 4% of the stomachs examined held cisco. The lower percentage of lake trout with cisco in the fall was probably due to spawning.

Low reservoir levels during the last 4 years have dewatered over 50% of the rock rip-rap on the face of the dam. Low elevations may be impacting lake trout production, as this area is suitable spawning habitat. Due to the potential negative effect on lake trout, egg taking was initiated in the fall of 1990 to augment the population. On October 30 and 31, two gill nets were set each day to capture spawning lake trout. On the first day of netting 21 ripe females were captured and 22 were taken on the second day. A total of 339,000 eggs were fertilized and transported to Miles City Hatchery.

Table 30. Summary of young-of-year cisco taken by vertical monofilament gill nets in Fort Peck Reservoir during August, 1986, and 1987, and during September 1988, 1989, and 1990[1].

Station	Number Sets					Number Sampled					Number/Set				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Bear Cr.	4	4	4	4	4	154	52	28	93	165	39	13	7	23	41
Shaft Houses	2	2	2	2	2	324	20	11	11	40	162	10	6	6	20
Dam	2	2	2	2	2	642	11	17	5	1	321	6	9	3	1
Bear Cr.	2	2	--	2	2	439	20	-----	16	7	220	10	---	8	3
Marina	2	2	2	2	2	153	2	91	33	144	77	1	46	17	72
S.F. Duck Cr.	2	1	2	2	2	893	24	302	172	99	447	12	151	86	50
Pines-Gilbert Cr.	4	4	4	4	4	1,864	42	1,244	94	191	466	11	311	26	48
Hell-Sutherland Cr.	2	2	2	2	2	596	13	299	145	112	298	6	150	73	56
Timber Cr.	1	--	1	1	1	5	---	178	6	7	5	----	178	6	7
Devil's Cr.	1	--	1	1	--	1	---	46	2	---	1	----	46	2	--
N.F. Rock Cr.	1	2	2	2	2	46	47	328	17	2	46	24	164	9	1
Bug Cr.	1	2	2	2	2	15	31	22	1	2	15	16	11	1	1
TOTALS	24	23	24	26	25	5,132	262	2,566	595	770	213.8	11.4	107	22.9	31

[1]1989 - August 30-September 28.
1990 - September 17-September 27.

Table 31. A summary of lake trout creel census of boat fishermen and size data collected near the dam, Fort Peck Reservoir, 1985-90 (spring creel: April - May and fall creel: October - November).

	No. Anglers Creeled	No. LT Creeled	LT Per Trip	Avg. No.Hrs. Fished	Catch Rate/ Hour	Males Avg. Lgth. (in.)	Males Avg. Wt. (lbs.)	Females Avg. Lgth. (in.)	Females Avg. Wt. (lbs.)
1985									
Spring	72	77	1.1	3.8	0.28	20.2	3.05	20.9	3.26
Fall	97	176	1.8	3.8	0.48	21.4	3.20	22.0	3.66
1986									
Spring	56	56	1.0	3.8	0.26	21.2	2.98	20.9	2.95
Fall	206	299	1.5	4.9	0.30	21.4	3.49	23.0	4.26
1987									
Spring	58	48	0.8	4.9	0.17	22.0	3.73	22.2	4.40
Fall	240	239	1.0	4.7	0.21	23.8	5.50	23.8	5.84
1988									
Spring	153	105	0.7	4.5	0.15	24.1	5.63	24.1	5.56
Fall	164	194	1.2	4.6	0.26	25.8	7.16	24.8	6.33
1989									
Spring	207	197	1.0	5.6	0.17	25.0	6.85	26.4	8.28
Fall	142	194	0.5	4.8	0.09	26.5	7.44	25.4	7.12
1990									
Spring	451	356	0.8	5.4	0.15	26.6	8.06	27.2	9.07
Fall	551	201	0.4	3.8	0.10	26.5	7.52	27.6	8.56

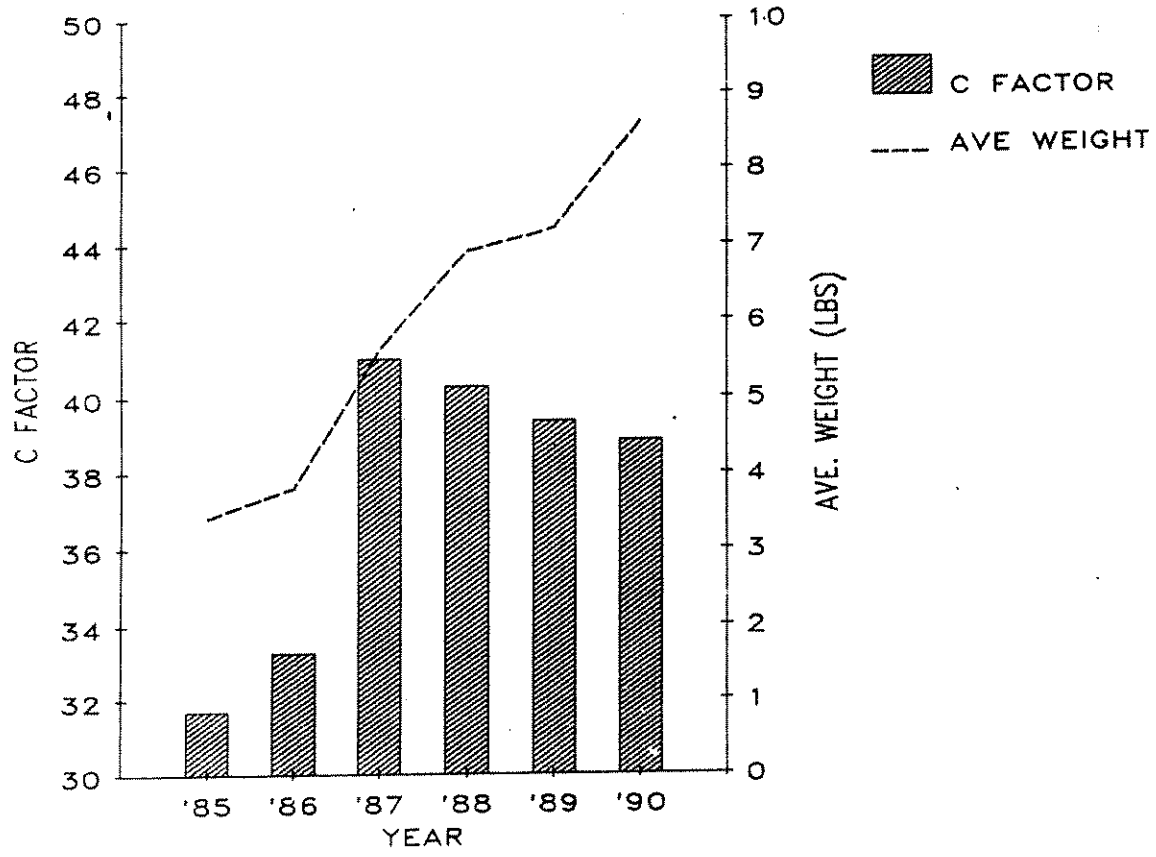

Figure 8. Condition factors and average weight of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-90.

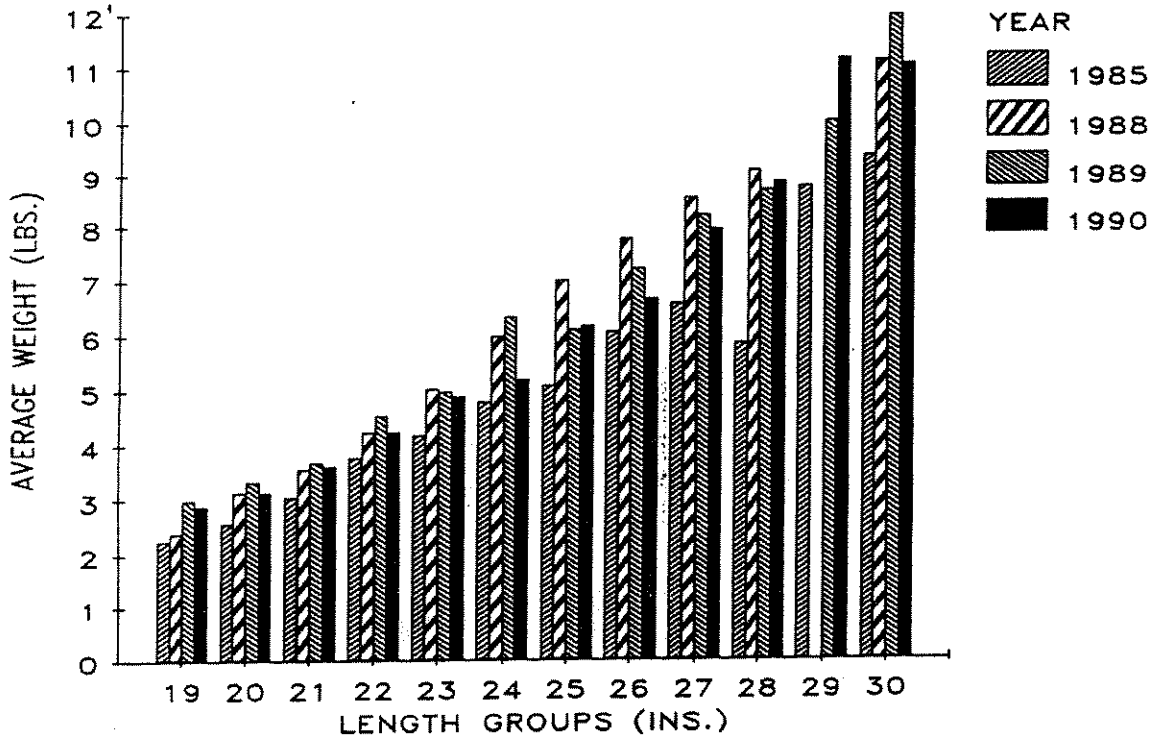

Figure 9. Average weight of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-90.

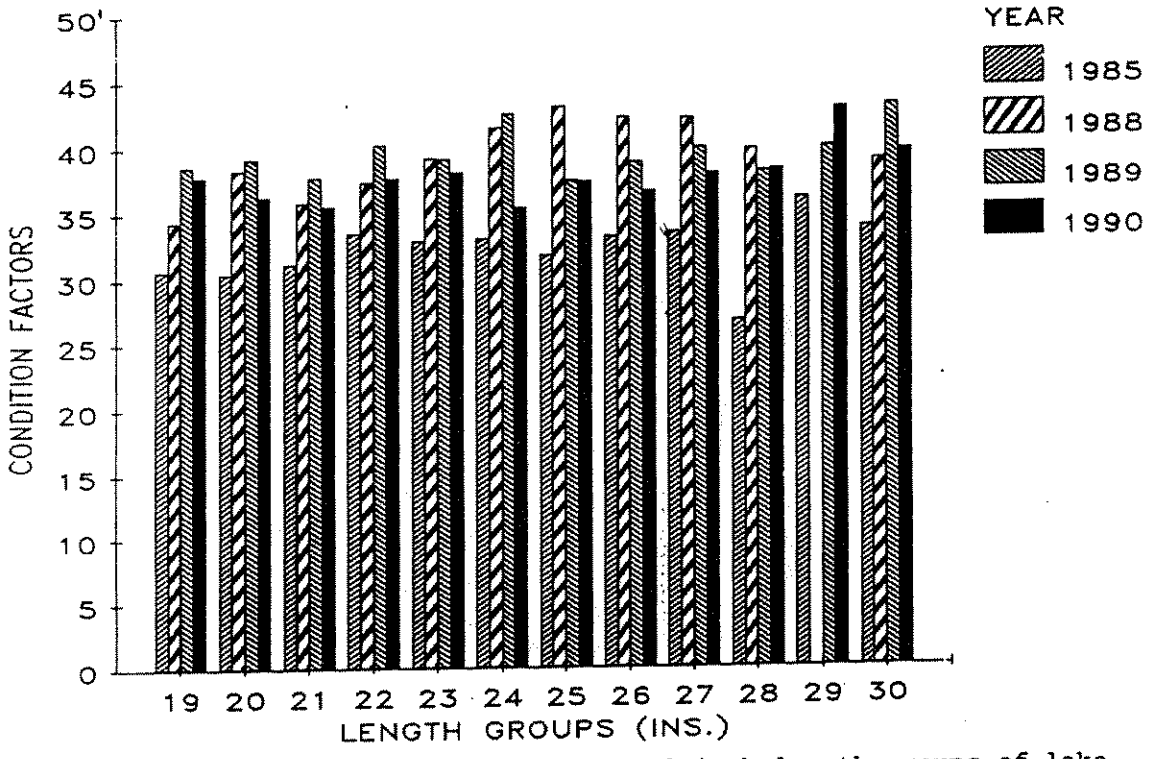

Figure 10. Condition factors of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-90.

Commercial Fishing

One commercial fishing permit was issued in 1990. No substantive changes were made in commercial fishing regulations from 1989.

Commercial fishermen reported harvesting only 1,305 pounds of goldeye, round weight. This is the smallest goldeye harvest on record since 1966 (Appendix Table 2). Other fish species harvested included: 1,470 pounds of buffalo spp. and 183 pounds of river carpsucker.

DISCUSSION

The present creel survey shows that relative to other Missouri River main stem reservoirs, Fort Peck Reservoir receives very light fishing pressure. Table 32 compares fishing pressure and harvest on five main stem reservoirs. The number of angling hours per surface acre on Fort Peck is the lowest, with only 0.8 hours. One can reasonably conclude that the game fish populations are not threatened by over-harvest. The low harvest of walleye and other fish is likely the result of too few fishermen, rather than a problem of too few fish. This reasoning is supported by comparing harvest rates for Fort Peck with other Missouri reservoirs, Table 32. Total fish harvest rates for the 3 largest reservoirs are similar; 0.20 for Sakakawea, 0.18 for Oahe and 0.16 for Fort Peck. Walleye harvest rates (catch/hour) are also similar; 0.129 for Sakakawea, 0.072 for Oahe, and 0.105 for Fort Peck.

Walleye were the most pursued game fish species during the survey, making up nearly 72% of the total fish harvested by anglers. The best time to fish for walleye appeared to be in July and August. The region of the reservoir with the best catch rates was the upper Missouri arm. The good walleye fishing in this area may be due to natural reproduction, which is indicated by good catches of YOY walleye during annual beach seining for the past several years (Wiedenheft, 1990). Natural reproduction of walleye on a reservoir-wide basis is very limited, however, and maintenance and improvement of the fishery depends heavily on continuance of present fry and fingerling stocking programs. A reservoir-wide average weight of 2.25 pounds for angler-caught walleye and good condition factors for fish in the 10- to 30-inch length groups indicates an adequate forage base.

Sauger were the second most abundant game fish in the creel, making up 12% of all fish captured by anglers. The best catches of sauger occurred in June and July in the upper Missouri arm. The good sauger fishing in this area is also due to good natural reproduction influenced by the proximity of the Missouri and Musselshell Rivers. The exceptional average weight of 2.8 pounds for sauger caught by anglers indicates that forage is adequate for fish in 13- to 26-inch length groups.

Lake trout harvested in the spring and fall contributed over 6% of the total fish harvested. The best time to fish for lake trout appears to be in late May or October, with the majority of fish taken in the area adjacent to the dam. Average weight of lake trout harvested by anglers exceeded 8 pounds. Good average weights and condition factors for lake trout in length groups from 14-37 inches indicates an adequate forage base.

Prior to 1988, lake trout spawning habitat in the vicinity of the dam was virtually unaffected by reduced water levels, however, with the recent drought, up to 50% of the rock rip-rap on the dam face has been dewatered. The actual effect on lake trout production has not been ascertained, but prudent management for this species calls for a limited stocking program to supplement natural reproduction during periods of low pool.

Smallmouth bass harvest contributed 4% of the total fish harvest during the summer creel survey. While this may not appear significant on a reservoir-wide basis, it is apparent that this species contributes a significant amount to the creel in the upper Missouri arm. Average weights of nearly 2 pounds for angler-caught fish, and average condition factors above 50 for fish in 9- to 20-inch length groups, demonstrates adequate forage. While the present smallmouth bass fishery is sustained entirely by natural reproduction, limited stocking may be warranted in the lower Missouri arm to provide a more accessible smallmouth bass fishery to the public. If limited stocking is initiated, creel surveys should be conducted to determine the effect on smallmouth bass catch rates in the area.

Reservoir-wide creel surveys, such as the one conducted in 1990, are essential in evaluating the success or failure of fisheries management programs, as well as keeping abreast of the fishing pressure, harvest and general use of the resource by the fishing public. Similar lake-wide creel surveys should be conducted in the future at 5-year intervals, and if apparant fishing use warrants, at more frequent intervals. Future creel surveys will require additional manpower and funding as lake levels return to normal. Higher reservoir elevations will greatly increase surface area and distribution of anglers, especially in the upper reaches of the Missouri Arm. During the 1990 creel, with the average lake elevation at 2,214 feet, boat ramps at Crooked Creek and Nelson Creek were completely dewatered. Once reservoir levels return to normal, it is assumed that operation of Nelson Creek boat ramp will not greatly affect overall fishing pressure in the Big Dry; however, fishing pressure in the upper Missouri may increase significantly with Crooked Creek boat ramp providing the nearest access for anglers from Billings and Lewistown. Additional manpower for future creel surveys in this area will be required due to its remoteness.

The present data indicates that future lake-wide creel surveys may be conducted without costly aerial boat counts. Boat trailer and shore counts in the vicinity of major boat accesses appeared to provide accurate counts of fishermen. Ground counts do not add additional cost or time , as counts can be conducted during angler interviews. Angler counts by air may detect fishermen using obscure launching sites, however, numbers are insignificant. During the 1990 summer creel survey, total fishing pressure determined solely from either ground counts or aerial counts, differed by approximately 13%, Table 33.

Table 32. Comparison of fishing effort and harvest rates for Missouri main stem reservoirs (Fort Peck Reservoir elevation at 2,214 msl and surface area of 170,489 acres).

	Angler Hrs./ Surface Acre	Walleye Harvest/Hr.	Total Fish Harvest/Hr.
Lake Sakakawea, ND[1] (Owen, 1989)	4.0	0.129	0.20
Lake Oahe, SD[2] (Lower 1/3 only, Riis, 1989)	4.3	0.072	0.18
Ft. Peck Reservoir, MT[1] (Present study)	0.8	0.105	0.16
Lake Francis Case, SD[1] (Stone, 1985)	5.5	0.560	0.60
Lake Sharpe, SD[1] (Riis, 1986)	13.6	0.279	0.33

[1]Summer.
[2]Summer and early fall.

Table 33. Comparison of total fishing pressure determined from various angler count methods, Fort Peck Reservoir, 1990.

	Combined Aerial & Ground Counts (Hours)	Aerial Counts (Hours)	Ground Counts (Hours)
Fishing Pressure			
Shore	6,878	17,554	3,848
Boat	130,723	134,067	127,858
Combined	137,601	151,821	131,705

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_____, 1986. Angler use and sport fish harvest study on Lake Sharpe, South Dakota, 1984-85. South Dakota Department of Game, Fish and Parks, Dingell-Johnson Project F-2-R, Wildlife Division Report. pp. 86-88.

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Prepared by William D. Wiedenheft

Date September 30, 1991

APPENDIX

CREEL CENSUS FORMS

Appendix Figure 1.

FORT PECK RESERVOIR PRESSURE CENSUS
FLIGHT CARD

Date __/__/__ (mm dd yy) Observer: _____ (code) Wind Speed: _____ mph

Landing Time : _____Hrs.

Take-off Time : _____Hrs.

Total Flight : _____Hrs.

General Weather Cond.: _____
(1) Sunny, Clear (2) Cloudy
(3) Partly Cloudy (4) Precip.

****

BOAT AND ANGLER COUNT BY ZONE

ZONE I (FT. PECK AREA)
Entry Time_____Hrs.
No. Fishing Boats _____
No. Non-Fishing Boats _____
No. Shore Fishermen _____

Boat Concentration Area _____
(code)

ZONE II (BIG DRY ARM)
Entry Time_____Hrs.
No. Fishing Boats _____
No. Non-Fishing Boats _____
No. Shore Fishermen _____

Boat Concentration Area _____
(code)

ZONE III (MID - MISSOURI ARM)
Entry Time_____Hrs.
No. Fishing Boats _____
No. Non-Fishing Boats _____
No. Shore Fishermen _____

Boat Concentration Area _____
(code)

ZONE IV (UPPER MISSOURI ARM)
Entry Time_____Hrs.
No. Fishing Boats _____
No. Non-Fishing Boats _____
No. Shore Fishermen _____

Boat Concentration Area _____
(code)

COMMENTS: _____
_____
_____

Appendix Figure 2.

FORT PECK GROUND ANGLER COUNT FORM

Date __/__/__ (mm dd yy)   Day of Wk ____ (code 1-7)   Census Day ____   Clerk No. _____

****

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Zone: _____(1-4)   Location: ____________________________ (1-8)
Time: _____

No. Boat Trailers _____
No. Shore Fishermen _____

Appendix Figure 3.

FORT PECK ANGLER INTERVIEW FORM

Date __/__/__ (mm dd yy) Day of Wk ____ (1-7) Census Day ____ Clerk No. _____

****

ID# ____ Zone ____ (1-4) Contact Site: __________ (1-10)
Angler Origin: (see code) ___________
Fishing Method: (boat=1 shore=2) __________
No. Anglers in Boat: (record once per party) ___________
Completed Trip: (comp=1 incomp=0) __________
Start Angling (time): ___________
End Angling (time): ___________
Total Angling Hours : ___________
Top 3 Species You Prefer Dept to Manage in Ft Peck: ___ ___ ___ (see codes)

Species	No.Caught	No.Kept	Length	Weight	Sex	Scales	Stomach

ID# ____ Zone ____ (1-4) Contact Site: __________ (1-10)
Angler Origin: (see code) ___________
Fishing Method: (boat=1 shore=2) __________
No. Anglers in Boat: (record once per party) ___________
Completed Trip: (comp=1 incomp=0) __________
Start Angling (time): ___________
End Angling (time): ___________
Total Angling Hours : ___________
Top 3 Species You Prefer Dept to Manage in Ft Peck: ___ ___ ___ (see codes)

Species	No.Caught	No.Kept	Length	Weight	Sex	Scales	Stomach

ID# ____ Zone ____ (1-4) Contact Site: __________ (1-10)
Angler Origin: (see code) ___________
Fishing Method: (boat=1 shore=2) __________
No. Anglers in Boat: (record once per party) ___________
Completed Trip: (comp=1 incomp=0) __________
Start Angling (time): ___________
End Angling (time): ___________
Total Angling Hours : ___________
Top 3 Species You Prefer Dept to Manage in Ft Peck: ___ ___ ___ (see codes)

Species	No.Caught	No.Kept	Length	Weight	Sex	Scales	Stomach

Appendix Figure 4.

ACCESS SITE KEY

1. Ft. Peck Marina
2. Spillway Bay
3. Shaft Houses
4. Rock Creek
5. McGuire Creek
6. Pines
7. Hell Creek
8. Fourchette
9. Devils Creek
10. Other

FISH SPECIES KEY

Game Fish:
- 01 - Rainbow trout
- 06 - Lake trout
- 23 - Northern pike
- 24 - Channel catfish
- 26 - Burbot
- 73 - Smallmouth bass
- 81 - Sauger
- 82 - Walleye
- 87 - Chinook salmon
- 00 - Other

Forage Fish:
- 20 - Yellow perch
- 34 - Goldeye
- 125 - Cisco
- 145 - Spottail shiner

ANGLER ORIGIN KEY

1. Silver Bow - Butte
2. Cascade - Great Falls
3. Yellowstone - Billings
4. Missoula - Missoula
5. Lewis & Clark - Helena
6. Gallatin - Bozeman
7. Flathead - Kalispell
8. Fergus - Lewistown
9. Powder River - Broadus
10. Carbon - Red Lodge
11. Phillips - Malta
12. Hill - Havre
13. Ravalli - Hamilton
14. Custer - Miles City
15. Lake - Polson
16. Dawson - Glendive
17. Roosevelt - Wolf Point
18. Beaverhead - Dillon
19. Chouteau - Fort Benton
20. Valley - Glasgow
21. Toole - Shelby
22. Big Horn - Hardin
23. Musselshell - Roundup
24. Blaine - Chinook
25. Madison - Virginia City
26. Pondera - Conrad
27. Richland - Sidney
28. Powell - Deer Lodge
29. Rosebud - Forsyth
30. Deer Lodge - Anaconda
31. Teton - Choteau
32. Stillwater - Columbus
33. Treasure - Hysham
34. Sheridan - Plentywood
35. Sanders - Thompson Falls
36. Judith Basin - Stanford
37. Daniels - Scobey
38. Glacier - Cut Bank
39. Fallon - Baker
40. Sweet Grass - Big Timber
41. McCone - Circle
42. Carter - Ekalaka
43. Broadwater - Townsend
44. Wheatland - Harlowton
45. Prairie - Terry
46. Granite - Philipsburg
47. Meagher - White Sul Springs
48. Liberty - Chester
49. Park - Livingston
50. Garfield - Jordon
51. Jefferson - Boulder
52. Wibaux - Wibaux
53. Golden Valley - Ryegate
54. Mineral - Superior
55. Petroleum - Winnett
56. Lincoln - Libby
57. North Dakota
58. Canada
59. State East of Rockies
60. State West of Rockies
61. Foreign Country

Appendix Figure 5.

The information you provide will allow the Department to better manage the Fort Peck fishery. Please fill out blanks and mail. THANK YOU! *Montana Department of Fish, Wildlife & Parks*

Id._____ Location_____ Date_____

No. in party_____

Pleasure Boat_____
Fishing Boat_____
Shore Fishing_____

	Number Kept	Number Released
Walleye	_____	_____
Sauger	_____	_____
Lake Trout	_____	_____
Northern Pike	_____	_____
Smallmouth Bass	_____	_____
Other:		
_____	_____	_____

Time started fishing_____ stopped fishing_____

May place in mail box at boat ramp.

Appendix Table 1. Average condition factors (C) and average weights for various 1.0-inch length groups of walleye captured in frame traps, Fort Peck Reservoir (Upper Big Dry only).

Length Inches	1986 (C) Factor	1986 Ave. Wt.	1986 Number Sampled	1988 (C) Factor	1988 Ave. Wt.	1988 Number Sampled	1989 (C) Factor	1989 Ave. Wt.	1989 Number Sampled	1990 (C) Factor	1990 Ave. Wt.	1990 Number Sampled
14.0-14.9	30.1	.92	(155)	30.7	.94	(27)	33.7	1.02	(26)	32.3	0.97	(44)
15.0-15.9	30.6	1.14	(213)	30.6	1.13	(53)	34.5	1.26	(29)	32.8	1.22	(65)
16.0-16.9	30.9	1.37	(258)	31.5	1.42	(53)	33.2	1.48	(30)	32.8	1.46	(35)
17.0-17.9	31.3	1.67	(198)	32.1	1.71	(56)	33.3	1.76	(30)	34.7	1.84	(39)
18.0-18.9	32.5	2.05	(96)	33.3	2.07	(56)	36.0	2.26	(19)	36.0	2.25	(44)
19.0-19.9	31.6	2.29	(35)	32.8	2.41	(60)	36.8	2.69	(11)	36.0	2.64	(40)
20.0-20.9	32.1	2.73	(30)	33.3	2.89	(46)	37.2	3.15	(29)	38.3	2.28	(36)
21.0-21.9	35.0	3.44	(19)	34.3	3.36	(57)	39.7	3.92	(34)	39.4	3.85	(28)
22.0-22.9	32.8	3.68	(12)	34.9	3.92	(45)	40.7	4.57	(30)	40.8	4.60	(30)
23.0-23.9	30.6	3.89	(5)	34.8	4.47	(34)	40.5	5.13	(33)	40.7	5.18	(26)
24.0-24.9	29.2	4.10	(3)	35.4	5.10	(13)	41.1	5.89	(19)	41.1	6.00	(31)
25.0-25.9	27.2	4.53	(2)	35.0	5.73	(10)	42.6	6.95	(4)	40.7	6.68	(22)

Appendix Table 2. Total pounds (round weight) of commercial species harvested from Fort Peck Reservoir by commercial fishermen, 1957-90.

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
1988	38,342	610	2,276	---	---	36,792	---	---	78,020
1989	---	---	---	---	---	6,289	---	---	6,289
1990	1,470	183	---	---	---	1,305	---	---	2,958
Total	6,940,801	311,291	101,526	185,321	134,911	3,823,802	73,925	3,499	11,595,076

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