MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATION

PROJECT NO: F-46-R-5 STUDY TITLE: SURVEY AND INVENTORY OF WARM-WATER LAKES

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

PROJECT PERIOD: JULY 1, 1991 THROUGH JUNE 30, 1992


## ABSTRACT

An abrupt change in weather during the spring walleye spawn resulted in trapping only 793 adult walleye in the upper Big Dry Arm. The poor catch rate of 2.1 fish per trap-day was the worst since frame trapping began in 1974. It was also the first time since walleye egg-taking began in 1985 that cold weather had prematurely terminated a spawning run. Although the sample size was much smaller than typical, condition factors and average weights of walleye in the 14- to 25-inch range remained essentially unchanged from previous years. Average male walleye spawners weighed 1.82 pounds and females weighed 5.31 pounds. The catch rate for northern pike during spring trapping in the upper Big Dry Arm was 1.3 fish per trap-day. This poor catch was similar to trapping results in recent years, and indicates a chronic lack of suitable spawning habitat for northern pike. The average weight of trapped northerns was 6.13 pounds, and weights ranged from 2.10-16.60 pounds. Routine summer gill net surveys were not conducted during this report period. Fall beach seining throughout the reservoir indicated that smallmouth bass natural reproduction remained good. Smallmouth were the most abundant game fish captured by seining, with a catch rate of 1.1 fish per haul. Walleye, sauger and northern pike young-of-the-year (YOY) were all seined at a rate of only 0.1 fish per haul. No YOY walleye were captured by seining in the upper Missouri Arm, indicating poor natural reproduction. Beach seining also indicated poor survival of stocked walleye fry and fingerling during 1991. Seining of forage minnows showed dramatic increases in YOY since 1990. Better survival of young may have resulted from the rising reservoir pool from May through July. Spottail shiners continue to be the most abundant forage fish sampled by seining. Monitoring cisco production with small mesh monofilament vertical gill nets showed a stable population over the last three years, with the average catch of 34 YOY per net-set. The average length of YOY cisco was five inches, which is consistent with September sampling over the last several years. Experimental gill netting for adult cisco in November indicates that the average size of spawners was 9.4 inches. The spring creel survey of lake trout fishermen near the dam showed an hourly catch rate of 0.07. The fall catch rate was 0.10 fish per hour. The average weight for angler-caught lake trout during the spring and fall creel was approximately 8 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, results presented under Findings.

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

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 Findings.

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 state funded.

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 Findings. Routine sampling with experimental gill nets was not conducted during late July-August due to writing of 5-year reservoir management plan.

7) To determine abundance and trends of spring spawning populations of walleye and northern pike. This objective was met and is reported under Findings.

8) To determine the rate of harvest for key species and angler preference for various species management. A spring and fall lake trout creel survey was conducted in 1991, and is presented under Findings.

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 under Findings.

10) To determine which designated access sites will provide the most benefit to fishermen (state funded). No information on access site use was obtained during this report period.

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, reported under Findings.

## PROCEDURES

Spring trap-net sampling was conducted in the upper Big Dry Arm and lower Missouri Arm with 4- x 6-foot frame traps of 1-inch square mesh rigged with 50-foot leads. Cisco YOY were captured with monofilament gill nets 100- x 6-foot with 1/2-inch square mesh fished vertically below the reservoir's surface. Beach seining to determine abundance, reproductive success and walleye stocking success was conducted in late summer and early fall utilizing a 100- x 9-foot beach seine of 1/4-inch square mesh. Sinking experimental gill nets 125 feet in length and 6 feet deep consisting of 25-foot panels of 3/4-, 1-, 1 1/4-, 1 1/2-, and 2-inch square mesh were fished during the fall to acquire information on cisco spawners. Lake trout spawners were captured in the fall with 300- x 8-foot sinking gill nets with 3-, 4-, and 5-inch square mesh.

## FINDINGS

### Trapping

Spring spawning game fish populations were sampled with frame traps in the upper Big Dry Arm from April 9-May 10, 1991. During the sampling period, only 793 walleye were captured. This catch was substantially less than the previous six years (Table 1), and resulted from a sudden cold snap during the spawning run. The catch rate was 2.1 walleye per trap-day, which is the lowest catch rate since sampling began in 1974. The ratio of males to females was approximately 2:1.

The average weight of female walleye was 5.31 pounds and 1.82 pounds for males (Table 2). Sizes of walleye were slightly less than those trapped in 1990, but the apparent difference may be due to a smaller sample size. The size composition of walleye trapped in 1991 shows that the percent of fish in the 4- and 5-pound category has dropped slightly, while the percent in the 3-pound range has remained nearly the same as 1990 (Figure 1). Condition factors and average weights for 1.0-inch length groups of walleye from 14-25 inches is shown in Figures 2 and 3, respectively. The condition and average weight for each length group appears to be essentially unchanged from the previous year. Examination of scales indicated the average age of walleye spawners was five years.

Northern pike were captured with frame traps in the upper Big Dry Arm at a rate of 1.3 fish per trap-day, which was slightly less than 1990 (Table 1). Lengths ranged from 20.5-38.3 inches, and weights from 2.10-16.60 pounds. The average weight and length was 6.13 pounds and 28.2 inches.

Table 1. Summary of the walleye and northern pike caught by spring trap-netting in the upper Big Dry Arm of Fort Peck Reservoir, 1974-91.

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

Table 2. Summary of average weights and sex ratios for walleye trap-netted in the upper Big Dry, 1979-91.

| Year | Average Weight Males | Sample Size | Average Weight Females | Sample Size | Sex Ratio[1] Male:Female |
|---|---|---|---|---|---|
| 1991 | 1.82 | 234 | 5.31 | 106 | 2:1 |
| 1990 | 2.08 | 362 | 5.77 | 142 | 2:1 |
| 1989 | 1.78 | 192 | 4.88 | 129 | 3:1 |
| 1988 | 1.69 | 283 | 3.68 | 239 | 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.

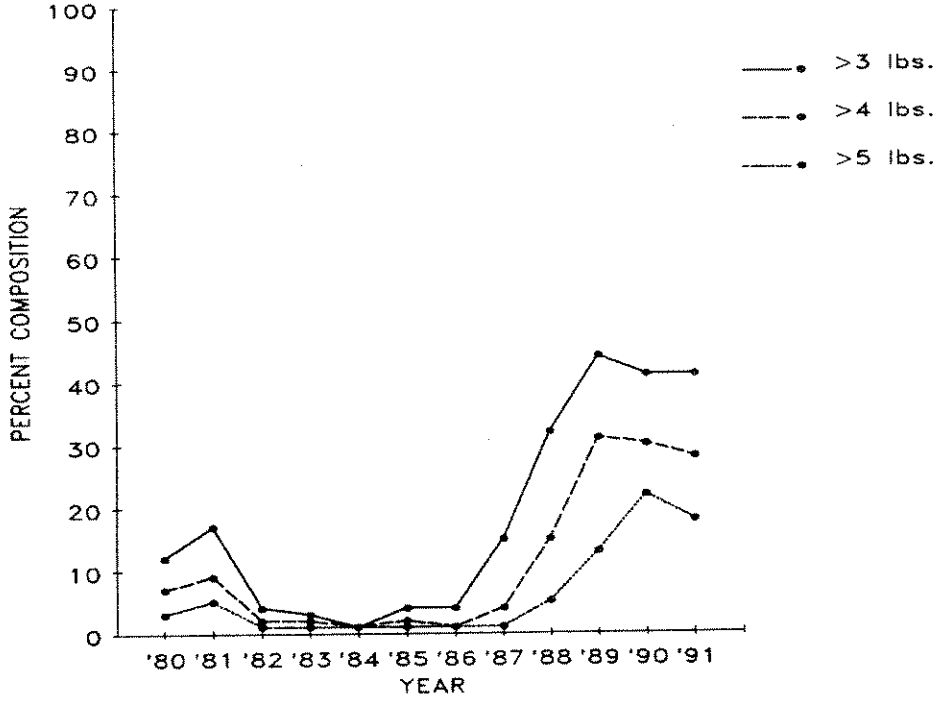


Figure 1. An illustration of the change in size of walleye captured during spring trap netting in the upper Big Dry Arm of Fort Peck Reservoir, 1980-91.

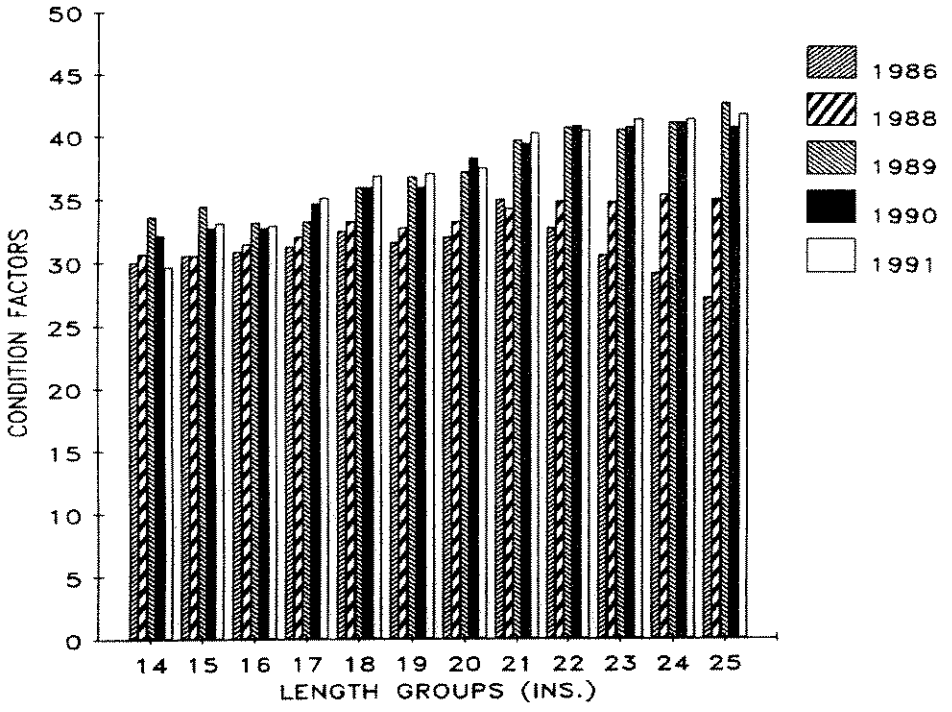


Figure 2. Condition factors for various 1.0-inch length groups of walleye trapped in the upper Big Dry Arm, Fort Peck Reservoir, 1986-91.

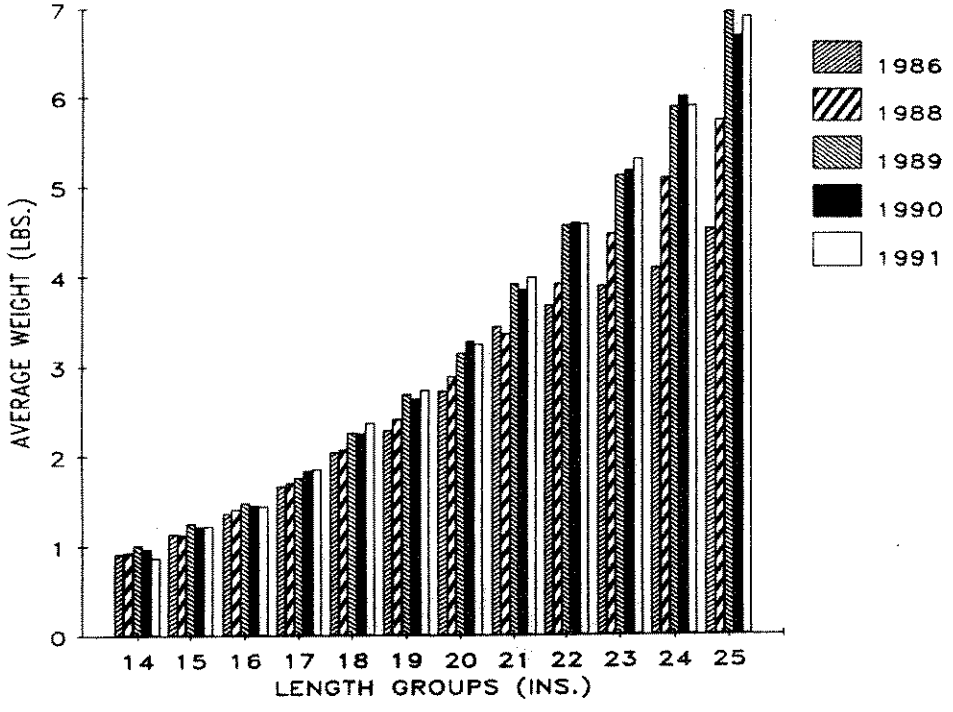


Figure 3. Average weights for various 1.0-inch length groups of walleye trapped in the upper Big Dry Arm, Fort Peck Reservoir, 1986-91.

Fish were also sampled with frame traps in the lower Missouri Arm from May 15-May 30, 1991 (Table 3). The walleye catch rate increased from 0.4 fish per trap-day in 1990 to 0.6 fish in 1991. Northern pike were caught at a lower rate than the previous year, 2.2 fish per trap-day. Northern pike lengths ranged from 15.8-42.0 inches and weights from 0.90-20.80 pounds. The average weight was 7.26 pounds and length was 29.7 inches. The number of yellow perch sampled remained extremely low as in past surveys.

Gill Netting

The annual gill netting survey, normally conducted throughout the reservoir in mid-summer, was not attempted in 1991. Manpower and funds were reallocated to complete the 5-year reservoir fisheries management plan. The gill netting survey designed to provide information on fish distribution, species composition, and relative abundance of sport and forage fish populations is scheduled in summer, 1992.

Beach Seining

Beach seining was conducted throughout the reservoir from August 20-September 10, 1991, to determine reproductive success of sport and forage fish species. A total of 149 seine hauls captured approximately 18,067 fish (Table 4). As in past years, the most common YOY game fish captured by seining was smallmouth bass (Table 5). The highest catch rate for smallmouth YOY occurred in the mid-Missouri Arm, followed by the upper Big Dry Arm (Table 4). Catch rates in the upper Missouri and lower Big Dry were similar, while the lower Missouri produced the poorest catch. The reservoir-wide catch rate of 1.1 YOY per haul was nearly the same as 1990 (Table 5).

The catch rate for YOY walleye seined reservoir-wide was 0.1, which was less than the 0.4 fish captured in 1990. Surprisingly, no YOY were sampled in the upper Missouri Arm, an area which has had good production in previous years. The apparent poor natural reproduction of YOY walleye in this area may have resulted from the abrupt temperature drop reported during the spring walleye egg-take in the Big Dry Arm. Beach seining to evaluate stocking of walleye fry and fingerling showed poor overall results (Table 6). Approximately 405,000 walleye fingerlings and 9.6 million fry were stocked in 1991. The average catch rate in regions where fry were stocked exclusively was zero, and 0.17 in regions where only fingerling were planted.

Northern pike and sauger YOY catch rates remained low as has been the case for the past several years (Table 5).

Beach seining for YOY forage minnows showed a dramatic rise in numbers since 1990. Catch rates for yellow perch, silvery/plains minnows, emerald shiners, and spottail shiners showed tremendous increases in production (Figure 4). As water levels have dropped in recent years, production of these species has also declined (Figures 5 and 6). Although the rise in pool was not early enough to coincide with spring spawning fish species, it apparently inundated sufficient shoreline vegetation during the summer to provide excellent cover and greatly enhanced survival of many YOY.

Table 3. A summary of the walleye, northern pike, and yellow perch caught by spring trap-netting in the lower Missouri Arm of Fort Peck Reservoir, 1969-91.

| 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 | 60.0 |
| 1971 | (5/04-6/04) | 1" | 37 | 1 | T[1] | 68 | 1.8 | 45 | 12.0 |
| 1972 | (4/21-6/29) | 1" | 82 | 0 | --- | 104 | 1.3 | 299 | 36.0 |
| | (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 |
| 1991 | (5/15-5/30) | 1" | 96 | 54 | 0.6 | 211 | 2.2 | 8 | T |

[1]T represents less than 0.1.

Table 4. Species and number of forage minnows and young-of-year fish captured by beach seining in Fort Peck Reservoir, August 20-September 10, 1991.

| Species[1] | Upper Big Dry | | Lower Big Dry | | Lower Missouri | | Mid-Missouri | | Upper Missouri | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Fish | No./ Haul | No. Fish | No./ Haul | No. Fish | No./ Haul | No. Fish | No./ Haul | No. Fish | No./ Haul | No. Fish | No./ Haul |
| WE | ----- | ----- | 1 | <0.1 | 4 | 0.1 | 3 | 0.1 | ----- | ----- | 8 | 0.1 |
| NP | 1 | <0.1 | 15 | 0.5 | 2 | <0.1 | 1 | <0.1 | ----- | ----- | 19 | 0.1 |
| SG | ----- | ----- | ----- | ---- | ----- | ---- | 5 | 0.2 | 5 | 0.2 | 10 | 0.1 |
| YP | 333 | 22.2 | 581 | 19.4 | 325 | 6.8 | 330 | 10.6 | 62 | 2.5 | 1,631 | 10.9 |
| GE | ----- | ----- | ----- | ---- | ----- | ---- | ----- | ----- | 13 | 0.5 | 13 | 0.1 |
| WS | 12 | 0.8 | 71 | 2.4 | 162 | 3.4 | 14 | 0.5 | ----- | ----- | 259 | 1.7 |
| RC | 221 | 14.7 | 25 | 0.8 | 2 | <0.1 | 2 | 0.1 | 23 | 0.9 | 273 | 1.8 |
| Bsp | 3 | 0.2 | 10 | 0.3 | 6 | 0.1 | 26 | 0.8 | 56 | 2.2 | 101 | 0.7 |
| LC | 327 | 21.8 | 17 | 0.6 | 44 | 0.9 | ----- | ----- | ----- | ----- | 388 | 2.6 |
| CP | 108 | 7.2 | 4 | 0.1 | 38 | 0.8 | 32 | 1.0 | 32 | 1.3 | 214 | 1.4 |
| SR | ----- | ----- | 4 | 0.1 | ----- | ---- | ----- | ----- | 6 | 0.2 | 10 | 0.1 |
| GS | ----- | ----- | ----- | ---- | ----- | ---- | ----- | ----- | 1 | <0.1 | 1 | <0.1 |
| FD | 2 | 0.1 | ----- | ---- | ----- | ---- | 6 | 0.2 | 104 | 4.2 | 112 | 0.8 |
| BA | 22 | 1.5 | 26 | 0.9 | 6 | 0.1 | 97 | 3.1 | 19 | 0.8 | 170 | 1.1 |
| CI | ----- | ----- | ----- | ---- | 2 | <0.1 | ----- | ----- | ----- | ----- | 2 | <0.1 |
| SM | 4 | 0.3 | ----- | ---- | ----- | ---- | 12 | 0.4 | 2,347 | 93.9 | 2,363 | 15.9 |
| SS | 269 | 17.9 | ----- | ---- | ----- | ---- | ----- | ----- | ----- | ----- | 269 | 1.8 |
| CR | ----- | ----- | 133 | 4.4 | 8 | 0.2 | 111 | 3.6 | 364 | 14.6 | 616 | 4.1 |
| ES | 520 | 34.7 | 570 | 19.0 | 813 | 16.9 | 1,885 | 60.8 | 1,974 | 79.0 | 5,762 | 38.7 |
| CC | 1 | <0.1 | ----- | ---- | ----- | ---- | ----- | ----- | 5 | 0.2 | 6 | <0.1 |
| ST | 25 | 1.7 | 1,398 | 46.6 | 2,111 | 44.0 | 2,146 | 69.2 | 159 | 6.4 | 5,859 | 39.2 |
| SB | 1 | <0.1 | ----- | ---- | ----- | ---- | ----- | ----- | ----- | ----- | 1 | <0.1 |
| Totals | 1,849 | 173.3 | 2,855 | 95.2 | 3,523 | 73.4 | 4,670 | 150.6 | 5,170 | 206.8 | 18,067 | 121.3 |
| No. Hauls | 15 | | 30 | | 48 | | 31 | | 25 | | 149 | |

[1]WE - walleye
NP - northern pike
SG - sauger
YP - yellow perch
GE - goldeye
WS - white sucker
RC - river carpsucker
Bsp - buffalo
LC - lake chub
CP - carp
SR - shorthead redhorse
GS - green sunfish
FD - freshwater drum
BA - smallmouth bass
CI - cisco
SM - plains/silvery minnow
SS - sand shiner
CR - crappie
ES - emerald shiner
CC - channel catfish
ST - spottail shiner
SB - brook stickleback

Table 5. A summary of the total catch and catch rate for selected sport and forage fish taken by seining in Fort Peck Reservoir, 1981-91.

| | | 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 |
| 1991 | No. Hauls--149 | | | | | | | |
| | No. Sampled | 8 | 19 | 10 | 170 | 163 | 13 | 259 |
| | No./Haul | 0.1 | 0.1 | 0.1 | 1.1 | 10.9 | 0.1 | 1.7 |

Table 5. 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 |
| 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 |

[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 6. Summary of walleye stocking and young-of-year abundance (determined by beach seining) in Fort Peck Reservoir, 1991.

| Area | Fingerling | Fry | No. Seine Hauls | No. YOY WE Caught | No. YOY WE/Haul |
|---|---|---|---|---|---|
| Rock Creek | ------- | 3.2 mil | 8 | 0 | 0 |
| Box Creek | 44,304 | ------- | 6 | 0 | 0 |
| Box Elder Creek | ------- | ------- | 5 | 1 | 0.2 |
| Spillway Bay | 63,361 | 2.9 mil | 12 | 1 | 0.1 |
| Bear Creek | ------- | 1.5 mil | 6 | 0 | 0 |
| Fort Peck Marina Bay | 27,710 | 2.0 mil | 10 | 1 | 0.1 |
| Duck Creek | 82,033 | ------- | 9 | 2 | 0.2 |
| Sage Creek | 69,199 | ------- | 0 | 0 | 0 |
| Pines Bay | 40,574 | ------- | 3 | 0 | 0 |
| Hell Creek | 77,614 | ------- | 6 | 1 | 0.2 |
| Sutherland Creek | ------- | ------- | 5 | 2 | 0.4 |
| STOCKING TOTALS | 404,795 | 9.6 mil | | | |

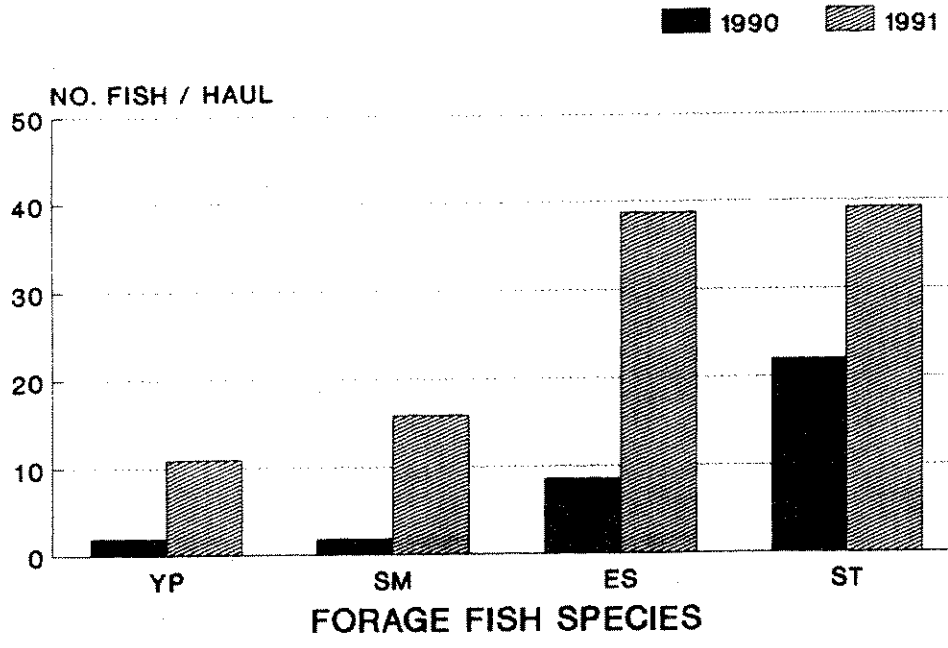


Figure 4. Comparison of beach seining results for various forage fish species (YP=yellow perch, SM=plains/silvery minnow, ES=emerald shiner, ST=spottail shiner), Fort Peck Reservoir, 1990-91.

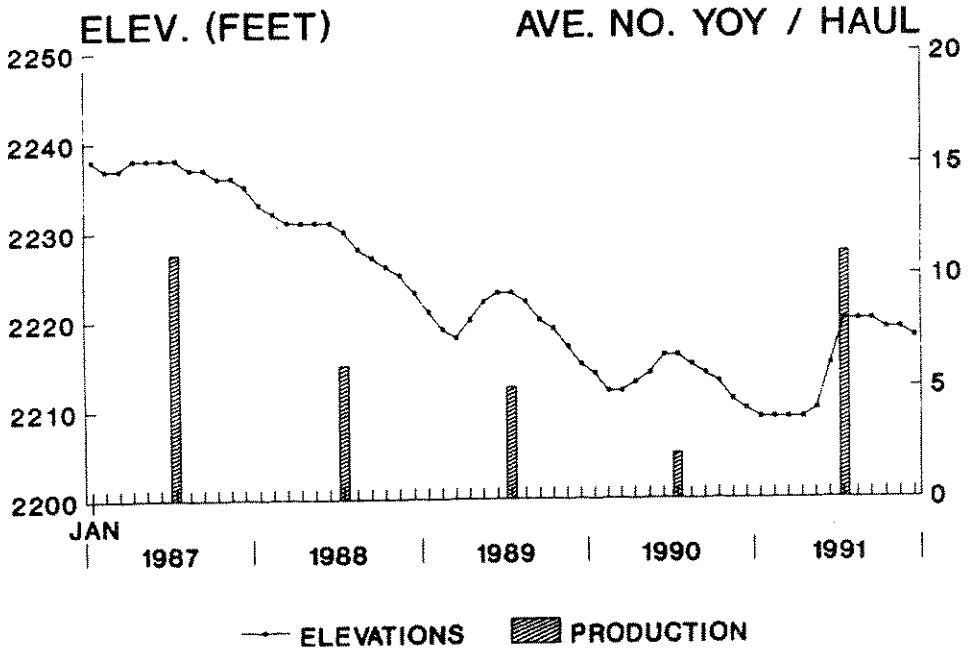


Figure 5. Mean monthly reservoir elevations and annual yellow perch production as determined by beach seining, Fort Peck Reservoir, 1987-91.

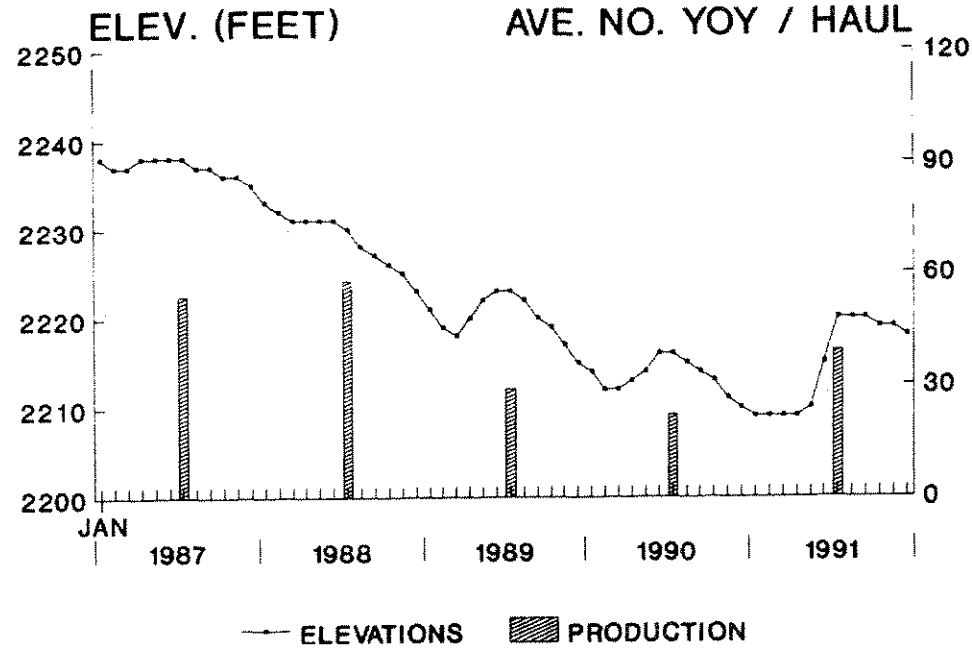


Figure 6. Mean monthly reservoir elevations and annual spottail shiner production as determined by beach seining, Fort Peck Reservoir, 1987-91.

Cisco

Cisco YOY were sampled throughout the reservoir with small mesh, vertical gill nets from September 23-September 27, 1991. Prior to the survey period, some gill nets were refurbished with a heavier-gauge material than was used in previous years and catch rates appeared to decrease as a result. Because of the potential sampling bias resulting from the change in material, only data obtained from nets constructed from the original fabric were used. Catch rates for YOY cisco from these nets averaged 34 fish and indicated little change in production from the previous two years (Table 7 and Figure 7). A sample of 101 YOY cisco ranged from 4.4-5.8 inches in length and averaged 5.3 inches. This average size is slightly larger than 1990 when YOY averaged 5.0 inches.

Adult cisco spawners were sampled with experimental gill nets near Fort Peck Marina on November 21, 1991. A sample size of 100 adults averaged 9.37 inches and ranged from 8.2-13.3 inches in length. Average weight for females was 0.26 pounds and 0.23 pounds for males. Average total length for females was 9.47 inches and 9.35 inches for males.

Table 7. Summary of young-of-year cisco taken by vertical monofilament gill nets in Fort Peck Reservoir during August, 1986 and 1987, and during September, 1988-91.

| Station | Number Sets | | | | | | Number Per Set | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
| Bear Cr. | 4 | 4 | 4 | 4 | 4 | - | 39 | 13 | 7 | 23 | 41 | -- |
| Shaft Houses | 2 | 2 | 2 | 2 | 2 | - | 162 | 10 | 6 | 6 | 20 | -- |
| Dam | 2 | 2 | 2 | 2 | 2 | - | 321 | 6 | 9 | 3 | 1 | -- |
| Bear Cr. | 2 | 2 | -- | 2 | 2 | 1 | 220 | 10 | --- | 8 | 3 | 12 |
| Marina | 2 | 2 | 2 | 2 | 2 | - | 77 | 1 | 46 | 17 | 72 | -- |
| S.F. Duck Cr. | 2 | 1 | 2 | 2 | 2 | - | 447 | 12 | 151 | 86 | 50 | -- |
| Pines-Gilbert Cr. | 4 | 4 | 4 | 4 | 4 | 1 | 466 | 11 | 311 | 26 | 48 | 50 |
| Hell-Sutherland Cr. | 2 | 2 | 2 | 2 | 2 | 1 | 298 | 6 | 150 | 73 | 56 | 49 |
| Timber Cr. | 1 | -- | 1 | 1 | 1 | 1 | 5 | ---- | 178 | 6 | 7 | 25 |
| Devil's Cr. | 1 | -- | 1 | 1 | -- | - | 1 | ---- | 46 | 2 | -- | -- |
| N.F. Rock Cr. | 1 | 2 | 2 | 2 | 2 | - | 46 | 24 | 164 | 9 | 1 | -- |
| Bug Cr. | 1 | 2 | 2 | 2 | 2 | - | 15 | 16 | 11 | 1 | 1 | -- |
| Totals | 24 | 23 | 24 | 26 | 25 | 4 | 213.8 | 11.4 | 107 | 22.9 | 31 | 34 |

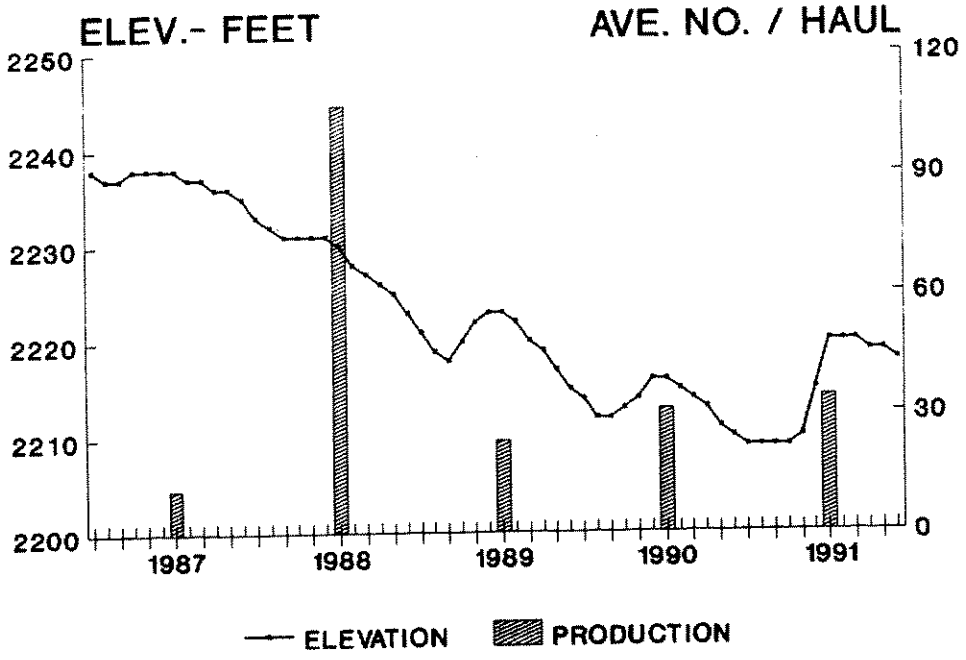


Figure 7. Mean monthly reservoir elevations and annual cisco production as determined by vertical gill netting, Fort Peck Reservoir, 1987-91.

Lake Trout

Lake trout creel surveys were conducted in the vicinity of Fort Peck Dam during spring and fall, 1991. The spring creel ran from May 11-June 8, with 550 anglers interviewed. The catch rate for lake trout was 0.07 fish per hour, which is the poorest fishing success since the creel began in 1985 (Table 8). During the fall creel, October 8-November 15, 215 anglers were interviewed with a lake trout catch rate of 0.10 fish per hour. A 2-week cold snap significantly reduced the amount of fishing that occurred during this period, but catch rates were very similar to those observed during fall creel surveys in 1989 and 1990 (Table 8).

Table 8. A summary of lake trout creel census of boat fishermen and size data collected near the dam, Fort Peck Reservoir, 1985-91 (spring creel: April-May and fall creel: October-November).

| | No. Anglers Creeled | No. LT Caught | LT Per Trip | Avg. No.Hrs. Fished | Catch Rate/ Hour | Males Avg. Lgth. (in.) | Males Avg. Wt. (lbs.) | Females Avg. Lgth. (in.) | Females Avg. Wt. (lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| 1985 | | | | | | | | | |
| Spring | 72 | 77 | 1.1 | 3.8 | 0.28 | 20.2 | 3.05 | 20.9 | 3.26 |
| Fall | 97 | 176 | 1.8 | 3.8 | 0.48 | 21.4 | 3.20 | 22.0 | 3.66 |
| 1986 | | | | | | | | | |
| Spring | 56 | 56 | 1.0 | 3.8 | 0.26 | 21.2 | 2.98 | 20.9 | 2.95 |
| Fall | 206 | 299 | 1.5 | 4.9 | 0.30 | 21.4 | 3.49 | 23.0 | 4.26 |
| 1987 | | | | | | | | | |
| Spring | 58 | 48 | 0.8 | 4.9 | 0.17 | 22.0 | 3.73 | 22.2 | 4.40 |
| Fall | 240 | 239 | 1.0 | 4.7 | 0.21 | 23.8 | 5.50 | 23.8 | 5.84 |
| 1988 | | | | | | | | | |
| Spring | 153 | 105 | 0.7 | 4.5 | 0.15 | 24.1 | 5.63 | 24.1 | 5.56 |
| Fall | 164 | 194 | 1.2 | 4.6 | 0.26 | 25.8 | 7.16 | 24.8 | 6.33 |
| 1989 | | | | | | | | | |
| Spring | 207 | 197 | 1.0 | 5.6 | 0.17 | 25.0 | 6.85 | 26.4 | 8.28 |
| Fall | 142 | 194 | 0.5 | 4.8 | 0.09 | 26.5 | 7.44 | 25.4 | 7.12 |
| 1990 | | | | | | | | | |
| Spring | 451 | 356 | 0.8 | 5.4 | 0.15 | 26.6 | 8.06 | 27.2 | 9.07 |
| Fall | 551 | 201 | 0.4 | 3.8 | 0.10 | 26.5 | 7.52 | 27.6 | 8.56 |
| 1991 | | | | | | | | | |
| Spring | 550 | 267 | 0.5 | 6.1 | 0.07 | 27.0 | 8.47 | 26.4 | 8.21 |
| Fall | 215 | 83 | 0.4 | 3.8 | 0.10 | 26.7 | 7.97 | 27.4 | 8.60 |

A sample of 145 lake trout caught by anglers during the spring creel averaged 8.24 pounds and 26.6 inches. Males averaged 27.0 inches and 8.47 pounds, while females averaged 26.4 inches and 8.21 pounds. A sample of 45 lake trout from the fall creel, averaged 8.02 pounds and 26.8 inches; males averaged 26.7 inches and 7.97 pounds; females, 27.4 inches and 8.6 pounds. A summary of average weights and condition factors for lake trout sampled during the fall creel is shown in Figure 8.

The average weight and condition factors for various 1.0-inch length groups of fall-creeled lake trout, ranging from 19.0-30.0 inches, is shown in Figures 9 and 10. The condition and average weight for most length groups appears to be similar to previous years.

A small number of chinook salmon were captured by anglers during the fall creel. A sample of 16 salmon averaged 35.2 inches and 19.71 pounds. Most fish captured were snagged by shoreline fishermen in the Fort Peck Marina Bay.

Lake trout stomachs were examined during both spring and fall creel surveys. Approximately 40% of the angler-caught lake trout contained cisco in the spring. During the fall survey, only 16% of the stomachs contained cisco. A reduction in the number of cisco observed in stomachs during the fall is typical due to spawning activity of the lake trout.

Although the reservoir rose slightly in 1991, water levels were below normal pool during fall lake trout spawning. Approximately 12 vertical feet of rock rip-rap on the dam face remained dewatered. Due to the potential negative impact to natural lake trout production, egg taking was undertaken for the second consecutive year to augment the population. On November 15, two 300- x 8-foot gill nets were set to capture spawning lake trout. Approximately 40 lake trout adults were captured. Nearly 130,000 eggs were spawned from 17 ripe females and fertilized with 11 ripe males. Lake trout fingerlings hatched from these eggs are scheduled for stocking in Fort Peck Reservoir in summer, 1992.

Commercial Fishing

Only one commercial fishing permit was issued in 1991. No significant changes were made in commercial fishing regulations. The one commercial operator reported harvesting only 31 pounds of goldeye, 1,925 pounds of buffalo sp. and 72 pounds of carp for the entire year.

To monitor the condition of goldeye, two 300- x 8-foot gill nets were set on June 11, 1991 in the Duck Creek area. A total of 47 goldeye were captured averaging 12.5 inches in length and weighing 0.57 pounds. Lengths ranged from 10.2-14.9 inches and weights 0.35-1.00 pounds.

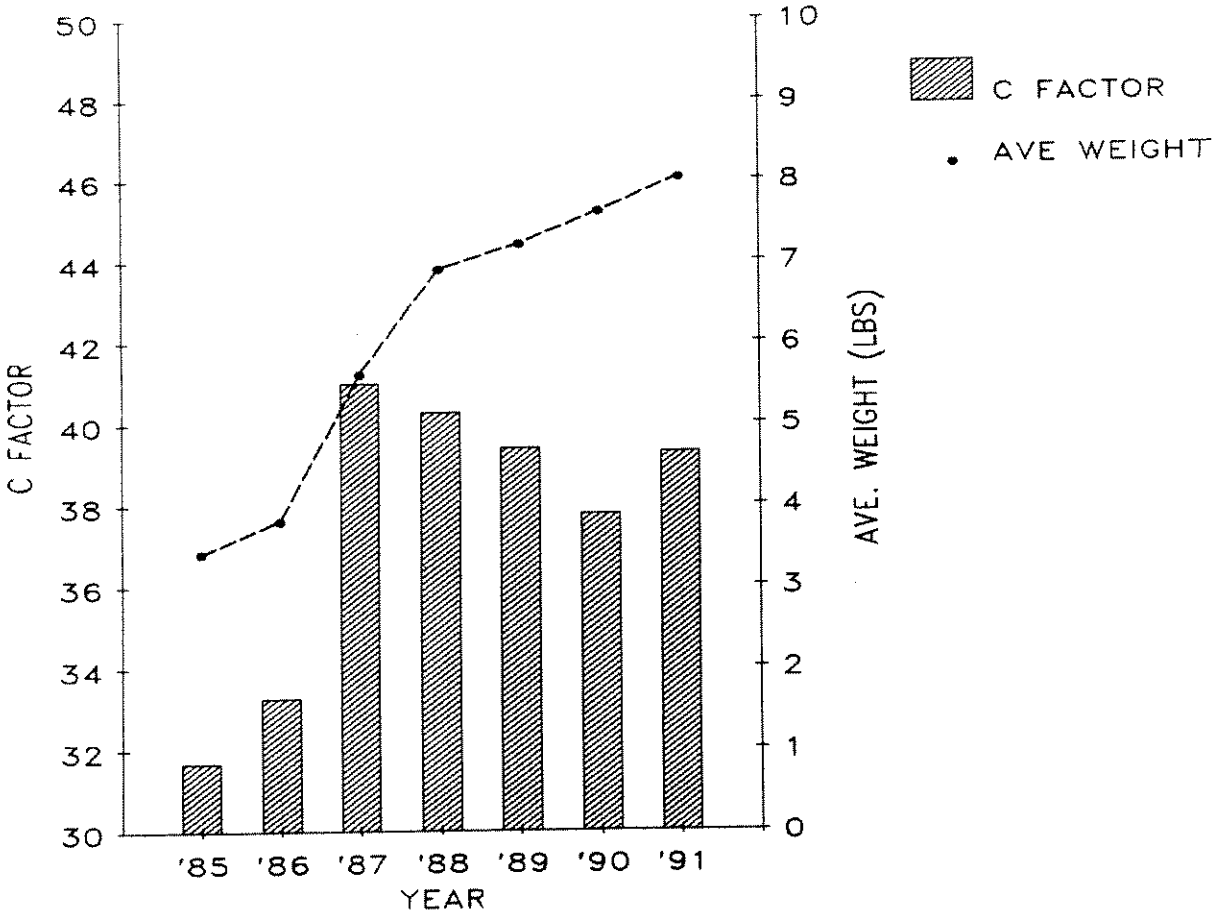


Figure 8. Condition factors and average weight of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-91.

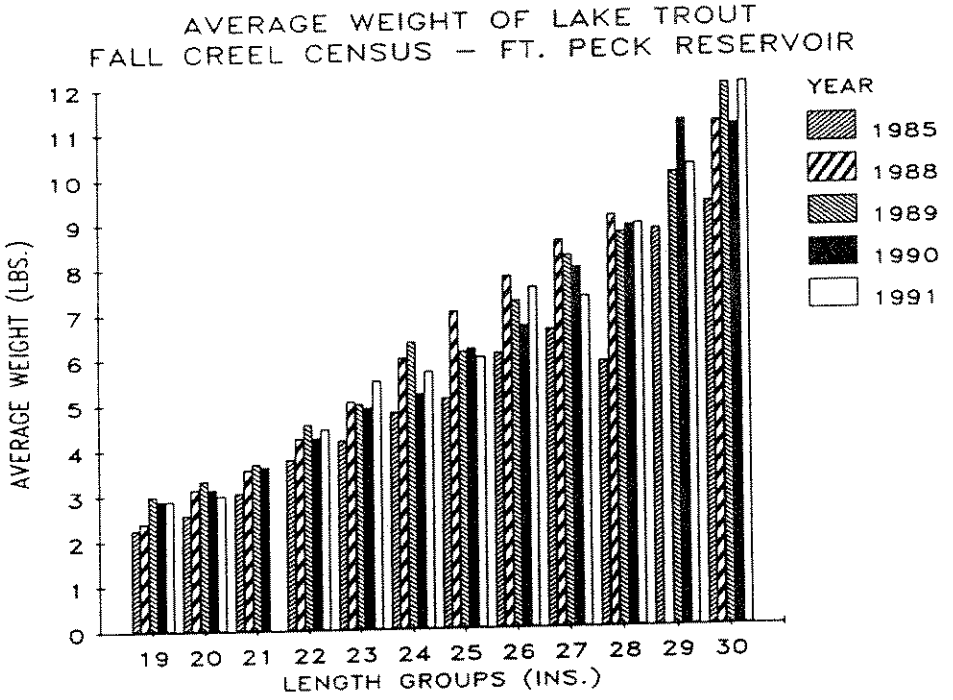


Figure 9. Average weight of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-91.

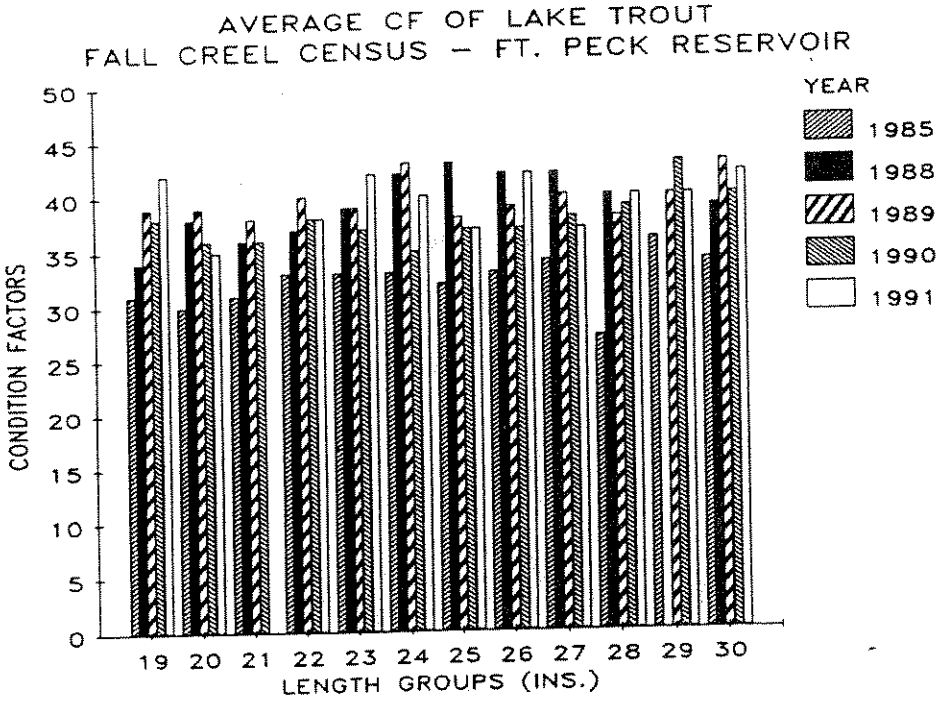


Figure 10. Condition factors of various 1-inch length groups of lake trout sampled during fall creel, Fort Peck Reservoir, 1985-91.

## Discussion

Spring, 1991, was the first time since walleye egg-taking was initiated in 1985 that a spawning run had been interrupted by severe weather. During normal years, the walleye egg-take from the Big Dry Arm spawning run has averaged 30 million eggs. Only 3.8 million eggs were taken in 1991.

The spring cold snap apparently impacted walleye spawning activity in the upper Missouri Arm as well. Since 1988, good catches of YOY walleye in this region during fall beach seining have indicated that successful natural reproduction was occurring. Sampling in the upper Missouri Arm in 1991, however, captured no YOY walleye.

Beach seining indicated that survival of stocked walleye, especially fry, was poor in 1991. The reason for poor survival is unknown. A rising pool during the spring and summer should have been beneficial by improving zooplankton abundance and enhancing rearing cover for walleye by flooding shoreline vegetation.

The gradual rise in reservoir pool from May through July was found to benefit many forage fish species occupying the littoral zone. Reservoir-wide beach seining showed dramatic increases in YOY over sampling in 1990. Although the rise in water level was not early enough to enhance conditions for early spring spawners, a higher pool later in the spring did inundate shoreline vegetation, which provided cover for YOY. This phenomenon was also observed by fisheries biologists on Lake Sakakawea, ND. End-of-year evaluation of Corps of Engineers mainstem reservoir operations made by reservoir biologists mentioned increased fish productivity associated with the spring/summer rise in pool.

Sampling with vertical gill nets indicated that reduced water levels has had little affect on cisco production. It is assumed that the present reservoir draw-down has not significantly dewatered cisco eggs, nor negatively affected survival of young. Apparently declining water levels had no obvious effect on cold water habitat, as no major cisco fish kills were observed or reported.

The overall condition of game fish species appears to be good and will probably continue as long as forage fish abundance remains stable. With the increase in many littoral zone forage fish populations in 1991 and stable cisco production, the short-term outlook for forage appears excellent.

If the reservoir water level continues to be operated below normal pool, it is recommended that lake trout egg-taking efforts during fall spawning continue in 1992. Stocking may reduce the potential negative impact resulting from dewatered lake trout spawning habitat on the face of the dam.

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Date: June 30, 1992