MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: Montana PROJECT TITLE: Statewide Fisheries Investigations

PROJECT: F-78-R-1 STUDY TITLE: Survey and Inventory of Warmwater Streams

JOB NO: III-c JOB TITLE: Yellowstone River Paddlefish Investigations

PROJECT PERIOD: July 1, 1994 through June 30, 1995

REPORT PERIOD: April 1, 1994 through March 30, 1995


## ABSTRACT

Creel census at Intake and statewide for the Yellowstone-Sakakawea population in 1994 indicated a paddlefish harvest of 278 fish at Intake and an additional 192 fish at other locations. The Intake figure was a record low. Intake pressure and success rate were also at record lows. While 59% of the harvest was at Intake, only 23% of the fishing pressure was at that location. Size of male paddlefish in the angler catch is level, but size of females is probably rising very slowly. Female paddlefish made up a typical 62.8% of the Intake harvest. Data continues to indicate an increasing exploitation rate of adult paddlefish. Analysis of tag returns suggests a mean spawning interval of approximately two years for males and three years for females. Drift net catch rates indicate, along with angler success rate, a very low density of paddlefish at Intake in 1994. Angler comments on mail creel surveys indicate much angler concern with season limits, catch and release and general concern for the future of paddlefish and paddlefishing in Montana.


## OBJECTIVES AND DEGREE OF ATTAINMENT

1. Prevent overharvest of the Sakaokawea paddlefish population during the spawning migration by development of a North Dakota-Montana harvest quota. This objective was met. The Fish, Wildlife and Parks Commission approved the plan in April 1995.

2. Plan and guide contracted paddlefish research. This objective was met. The research is in progress.

3. Measure angler harvest and exploitation rate. This objective was met. (See RESULTS section).

## PROCEDURES

A partial creel census was conducted during the paddlefish season at Intake in 1994. As many anglers as possible were questioned concerning amount of time spent fishing and number of fish caught. The interview total in 1994 was 548 which amounted to 52.8% of the estimated total angler days. The season was divided into two sampling periods and calculations for angler hours, harvest and success rate were made for each period . Anglers were counted each day of the season from May 15 through June 22, when fishing activity had decreased to almost zero. Counts were made at eight randomly chosen times each day between the hours of 600 a.m. and 9:00 p.m. A twenty-four hour fishing day was used in fishing pressure calculations. Analysis of the data was accomplished by adapting formulas 5 through 32 from Spence (1970) to the census. Calculation were made by computer.

A mail survey was used to obtain paddlefish harvest information from anglers at all points on the Yellowstone River in Montana and on the Missouri River in Montana below Fort Peck Dam. These are the Montana locations where Lake Sakakawea paddlefish are harvested. Names and addresses were obtained from paddlefish tag sale records. Anglers were questioned concerning number of days fished, and number of fish caught by river reaches. Response was obtained from 54.1% of anglers buying paddlefish tags. This work was supervised by Bob McFarland of the Department's Bozeman office.

Angler caught paddlefish were weighed to the nearest pound. Body length (center of eye to fork of caudal fin) was measured to the nearest millimeter. Sex was determined by internal examinations of the gonad.

Drifted five inch bar mesh gill nets 100-150 feet long were used to obtain paddlefish for examination of gonadal condition and tagging. All paddlefish collected were tagged on the lower jaw with an individually numbered plastic band from the National Band and Tag Co.

The following procedure was used to estimate the time interval between successive migrations by individual paddlefish. Tag returns were recorded by year tagged, year returned and sex. Numbers returning in each year were summed and then converted to percentages of the total number originally tagged. The percentages for a given year were adjusted based on total harvest of fish in succeeding years to eliminate the effect of harvest size in percentage returned each year. The value of 1.00 was arbitrarily assigned to the first year of return, and return percentages for later years were adjusted proportionately.

## RESULTS

### General Observations

Record low fishing pressure, harvest and success rate were recorded at Intake in 1994. This was the first year of a one fish season limit at Intake; some anglers did not fish for this reason. River flows were also such that relatively few fish migrated to Intake. Yellowstone River flow increased from 11,700 cfs at Miles City on May 8 to 33,200 on May 16, one day after the start of the paddlefish season at Intake. This led to fair fishing for the first week of the season, but river discharge soon fell and stayed exceptionally low the remainder of the paddlefish season and relatively few paddlefish were taken.

A total of 4,030 anglers purchased paddlefish tags in 1994, down almost 30% from 1993 (Table 1). 820 nonresidents bought tags, off 40% from 1993. Both the decreased season limit and poor Yellowstone River fishing were likely responsible.

### Paddlefish Size and Sex Ratio

A total of 309 paddlefish were weighed, measured and sexed from the angler catch at Intake in 1994 (Table 2). This total included 40-50 paddlefish brought to Intake but caught in the first few miles downstream. Females made up 62.8% of the angler catch in the Intake area. This percentage in 1994 returned to a typical value after a large dip in 1993 (Table 2).

Table 3 shows average length and weight by sex for paddlefish weighed and measured at Intake. Size of males in 1994 remained very close to average values measured in recent years. Females averaged over 60 pounds for only the third year since 1979. Length was also relatively high. Females, over the years since 1979, are showing a trend of slowly increasing average size, although this may have leveled in the past three or four years. Small male paddlefish (15 pounds or less) continued to appear in the catch in percentages similar to recent years.

### Creel Census

Results from the 1994 creel census at Intake are shown in Table 4. Results for 1994 can be compared with previous years in Table 5. In 1994 anglers fished 1037 days with an average of 3.74 hours per day to catch an estimated 278 paddlefish. The success rate was 0.08 fish per hour or 0.27 fish per day. Angler days, harvest and success rate were all record lows for creel census at Intake. The low number of anglers was probably caused by both the decrease in season limit for 1994 and angler knowledge that fishing was poor. Success rate in May, when water levels were higher was about 3 times the June success rate.

Fishing pressure and creel data is available from all Montana locations where the Yellowstone-Sakakawea paddlefish population is harvested only for the years 1993 and 1994. This information is shown in Table 6. The data are based on form returns from 2,178 anglers (54.1% of the anglers purchasing tags). Results in table 6 are expanded to total paddlefish tag sales.

Harvest data for the larger area showed the same trend as Intake in comparing 1993 with 1994. Angler days and success rate in 1994 were less than half the 1993 figures (Table 6). Total fish harvest in 1994 was only about 20% of the 1993 figure. As in 1993, about 75% of the total fishing pressure was between Intake and Cottonwood Creek, and the non-Intake fishing pressure in that area considerably exceeded the Intake fishing pressure. However, because success rate was much higher at Intake than downstream, most of the harvest was at Intake. In 1994 59% of the total Montana harvest of the Yellowstone-Sakakawea stock was at Intake, while only 23% of the total fishing pressure was at Intake.

## Tagging, Tag Return and Exploitation Rate

Return rate of individually numbered plastic bands placed around the dentary bone are used to infer angler exploitation rate. Of the 6,659 paddlefish tagged in the Yellowstone River (mostly near Intake) at least 1,515 (22.8%) have been harvested by anglers (Table 8).

Because Department personnel are present at Intake continuously during the paddlefish season, most tags from Intake caught fish are recovered. A similar route for tag recovery is now present in North Dakota. Beginning in 1993 a roe-donation program brings most North Dakota caught fish to a central point (the confluence) were tag information for angler caught fish is recorded.

In 1994, 35 tags were recovered from paddlefish tagged in the Yellowstone River in Montana (Table 7). Of these, 23 were from fish caught in the Intake vicinity and 12 were caught in North Dakota. An additional 6 tags were recovered at Intake from fish tagged in North Dakota. One tag was recovered at Intake from a fish tagged in the Missouri River below Ft. Peck Dam. For Intake tagged fish all recoveries were from fish tagged between 1984 and 1994.

Data from Table 7 are grouped into four time periods in Table 8. This table suggests increasing angler exploitation rates of paddlefish. For fish tagged 1964-1970 no additional returns are likely and there will be few additional returns for the 1971-1980 period. However, for fish tagged 1981-1990 there will be significant numbers of additional returns. The 35.7% will probably exceed 40% in a few years, a substantially higher percentage than

for fish tagged in earlier time periods. When allowance is made for some angler non-return of tags and tag loss from live fish, it becomes evident that fishing is the major source of mortality in adult paddlefish.

Tag return data is converted to annual exploitation rates for fish tagged in the years 1986 through 1993 (Table 9). Rates for earlier years are not shown because of compounding underestimation from natural mortality and unreported tags on angler caught fish. Average calculated rates range from 2.6% to 6.4%. This is a lower range than reported a year ago (Stewart 1994) because of a very low 1994 harvest. Because of unknown natural and fishing mortality, true rates may be close to 10%.

## Migration Frequency

That paddlefish in general and those in the Yellowstone-Sakakawea population do not migrate and spawn yearly is well known, but actual frequency by sex was unknown. The answer, or an approximation is needed for yield forecasting. Table 10 was generated from tag return data in the first three to four years following tagging to indicate migration and spawning frequency. Numbers in Table 10 are relative and can be compared only within in a given Table line.

For males the following can be concluded: some males in some years remigrate the first year after tagging, but the maximum return rate in each of the four years is two years after tagging. Males recaptured three years after tagging give very little conclusive information. These could be fish that have not migrated since tagging or fish that had previously migrated one or two years after tagging. The mean migrating interval may be near two years.

Among females none remigrated after one year, some do so at two years, but the largest returns were at three years. Those recaptured after four years give ambiguous answers. They could be fish remigrating at either two or three years. The mean migrating interval is probably not far from three years.

## Gill Net Catch Rate

As an indicator of paddlefish density in the Yellowstone River near Intake, we timed gill net drifts and recorded numbers of fish caught per drift beginning in 1993 (Table 11). Just as angler success rates were down at Intake, so were gill net catch rates. Probably both are measures of paddlefish density. Overall, gill net catch rates in 1994 were only 47% of the 1993 value.

## Paddlefish Angler Comments

Paddlefish anglers were invited to comment on mail harvest survey forms in 1993 and 1994. Those comments are summarized in Table 12. In 1993, 346 anglers commented. The 1994 figure was 270. Issues related to the season limit and paddlefish catch and release received the heaviest comment in both years. Other items receiving considerable comment from anglers were: concern for the future of paddlefish and paddlefishing; desire to buy one tag only at half the two tag price (1994); expressions of satisfaction with the Intake fish cleaning service (1993); satisfaction with Department fisheries and/or site management at Intake.

## Paddlefish Caviar

The Glendive Chamber of Commerce and Agriculture continued their collection of paddlefish roe at Intake for the fifth consecutive year in 1994. The very low harvest of paddlefish on the Yellowstone River severely limited their business.

The Chamber cleaned 355 fish of which 233 were females. From these fish a total of 1,166 pounds of caviar was produced. The gross income was $48,137. Sales were made at various prices, but average price was $41.25 per pound.

## LITERATURE CITED

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Paddlefish exploitation rate
Paddlefish sex ratio
Paddlefish tagging

Table 1. Number of anglers purchasing paddlefish tags.

| Year | Total | Resident | Nonresident | % Nonresident |
|---|---|---|---|---|
| 1994 | 4030 | 3210 | 820 | 20 |
| 1993[3] | 5541 | 4169 | 1372 | 25 |
| 1992 | 4779 | 3503 | 1276 | 27 |
| 1991 | 4438 | 3021 | 1417 | 32 |
| 1990 | 3960 | 2826 | 1134 | 29 |
| 1989[4] | 4255 | 3081 | 1174 | 28 |
| 1988 | 3526 | 2620 | 906 | 26 |
| 1987 | 2877[2] | 2182 | 695 | 24 |
| 1986 | 3696 | 2661 | 1035 | 28 |
| 1985 | 3593 | | | |
| 1984 | 5063 | | | |
| 1983 | 4636 | | | |
| 1982[1] | 4834 | | | |
| 1981 | 4166 | | | |

1 Tags were free in 1981

2 Resident and nonresident tag sales were calculated separately beginning in 1986.

3 Previous to 1992 tags were required only for Yellowstone River paddlefish snagging. Beginning in 1992 tags were required statewide.

4 Data for 1988 through 1992 is updated from previous reports to show complete sales

Table 2. Summary of paddlefish measurements obtained from the angler catch at Intake, Yellowstone River, 1963-1994.

| Year | No. of fish Measured | Average Total Length (Inches) | Eye-fork Length (mm) | Average Weight (pounds) | Percentage of Females |
|---|---|---|---|---|---|
| 1963 | 46 | 43.4 | | 29.6 | 0 |
| 1964 | 920 | 48.8 | | 21.0 | 2.8 |
| 1965 | 453 | 50.6 | | 21.3 | 2.9 |
| 1966 | 28 | 49.2 | | 21.2 | 0 |
| 1967 | 123 | 50.9 | | 21.8 | 0 |
| 1968 | 149 | 52.6 | | 25.0 | 4.3 |
| 1969 | 499 | 51.9 | | 23.4 | 3.7 |
| 1970 | 700 | 52.0 | | 25.6 | 11.4 |
| 1971 | 1136 | 53.1 | | 30.8 | 45.4 |
| 1972 | 1678 | 55.5 | | 34.0 | 48.2 |
| 1973 | 1696 | 53.9 | | 33.1 | 44.1 |
| 1974 | 1910 | 55.1 | | 35.6 | 51.2 |
| 1975 | 1158 | 57.3 | | 42.3 | 67.8 |
| 1976 | 940 | 57.6 | | 47.4 | 67.8 |
| 1977 | 1003 | 58.2 | | 48.2 | 64.0 |
| 1978 | 809 | 55.6 | | 43.0 | 68.0 |
| 1979 | 637 | 60.1[1] | | 50.4[2] | 67.5 |
| 1980 | - | 58.3[1] | | 49.1[2] | 80.2 |
| 1981 | 2528 | | 1086 | 46.7 | 75.1 |
| 1982 | 2004 | | 1078 | 45.1 | 71.2 |
| 1983 | 1400 | | 1086 | 50.2 | 82.6 |
| 1984 | 2691 | | 1080 | 44.0 | 69.1 |
| 1985 | 628 | | 1087 | 47.2 | 78.7 |
| 1986 | 1462 | | 1064 | 43.7 | 63.3 |
| 1987 | 1412 | | 1091 | 49.7 | 77.2 |
| 1988 | 1780 | | 1058 | 43.5 | 61.0 |
| 1989 | 1583 | | 1084 | 47.0 | 70.0 |
| 1990 | 1493 | | 1073 | 45.6 | 65.4 |
| 1991 | 2558 | | 1055 | 45.0 | 57.2 |
| 1992 | 670 | | 1087 | 48.7 | 67.3 |
| 1993 | 1659 | | 1005 | 36.9 | 35.1 |
| 1994 | 309 | | 1070 | 47.4 | 62.8 |

[1] Based on 62 measurements
[2] Based on 131 measurements

Table 3. Summary of paddlefish average length and weight, by sex, obtained from the angler catch at Intake, Yellowstone River, 1963-1994.

| | Males | | | Females | | |
|---|---|---|---|---|---|---|
| Year | Sample Size | Length (E-F,mm) | Weight (pounds) | Sample Size | Length (E-F,mm) | Weight (Pounds) |
| 1963 | 46 | | 29.6 | | | |
| 1964 | 28 | | 21.2 | | | |
| 1967 | 123 | | 21.8 | | | |
| 1968 | | | | 6 | | 42.3 |
| 1970 | 620 | | 26.3 | | | |
| 1971 | 620 | | 25.7 | 516 | | 52.6 |
| 1972 | 869 | | 23.5 | 809 | | 53.4 |
| 1974 | 932 | | 24.4 | 978 | | 55.4 |
| 1976 | 303 | | 25.9 | 637 | | 60.2 |
| 1978 | 259 | | 30.0 | 550 | | 66.0 |
| 1979 | 207 | | 25.0 | 430 | | 61.6 |
| 1981 | 630 | 954 | 27.8 | 1898 | 1130 | 53.0 |
| 1982 | 577 | 937 | 24.4 | 1427 | 1138 | 53.8 |
| 1983 | 244 | 932 | 25.8 | 1156 | 1117 | 55.3 |
| 1984 | 832 | 954 | 24.0 | 1859 | 1136 | 52.9 |
| 1985 | 134 | 914 | 24.2 | 494 | 1134 | 53.4 |
| 1986 | 537 | 932 | 24.7 | 925 | 1142 | 54.7 |
| 1987 | 322 | 916 | 25.6 | 1090 | 1143 | 56.8 |
| 1988 | 695 | 929 | 25.5 | 1085 | 1141 | 55.0 |
| 1989 | 475 | 931 | 24.8 | 1108 | 1150 | 56.9 |
| 1990 | 516 | 922 | 23.8 | 977 | 1153 | 57.1 |
| 1991 | 1080 | 916 | 24.9 | 1462 | 1159 | 60.3 |
| 1992 | 214 | 917 | 24.7 | 451 | 1170 | 60.2 |
| 1993 | 1076 | 925 | 25.2 | 583 | 1152 | 58.6 |
| 1994 | 115 | 914 | 25.9 | 194 | 1163 | 60.1 |

Table 4. Estimate of anglers, hours fished and harvest for the 1994 paddlefish season at Intake.

| Time Period | No. of angler days | Hours/ angler day | Angler hours | No. of fish caught | Fish caught/ angler Hr | Fish Caught Per Angler day |
|---|---|---|---|---|---|---|
| 5/15-5/31 | 605 | 3.44 | 2082 | 218 | 0.10 | 0.36 |
| 6/1-6/22 | 432 | 4.17 | 1800 | 60 | 0.03 | 0.14 |
| Total/Mean | 1037 | 3.74 | 3882 | 278 | 0.08 | 0.27 |

Table 5. Comparison of paddlefish fishing pressure, harvest and success rate data at Intake from 1972 to 1994.

| Year | Angler Days | Fish Caught | Fish Kept | Fish/ Angler Day | Fish/ Angler Hour | Total Weight Harvested (pounds) |
|---|---|---|---|---|---|---|
| 1972 | 2118 | 2935 | 1805 | 1.39 | 0.40 | 61,370 |
| 1973 | 2449 | 4670 | 2675 | 1.91 | 0.46 | 88,543 |
| 1974 | 3363 | 4359 | 2182 | 1.30 | 0.39 | 70,680 |
| 1975 | 2784 | 2950 | 1473 | 1.06 | 0.28 | 77,038 |
| 1977 | 3524 | 2764 | 1410 | 0.78 | 0.34 | 67,962 |
| 1978 | 6130 | 4814 | 2887 | 0.78 | 0.49 | 124,141 |
| 1979 | 2904 | 2202 | 1727 | 0.76 | 0.07 | 87,041 |
| 1981 | 3982 | 5318 | 5318 | 1.34 | 0.81 | 248,251 |
| 1982 | 3535 | 4713 | 4713 | 1.33 | 0.45 | 212,556 |
| 1983 | 3142 | 3193 | 3193 | 0.92 | 0.38 | 160,289 |
| 1984 | 3978 | 3860 | 3860 | 0.98 | 0.35 | 169,840 |
| 1985 | 1745 | 550 | 550 | 0.34 | 0.09 | 25,960 |
| 1986 | 2521 | 1791 | 1791 | 0.73 | 0.15 | 78,267 |
| 1987 | 2386 | 2612 | 2612 | 1.13 | 0.28 | 129,816 |
| 1988 | 2320 | 2923 | 2923 | 1.25 | 0.34 | 127,151 |
| 1989 | 2208 | 2242 | 2242 | 1.00 | 0.19 | 105,374 |
| 1990 | 2877 | 2046 | 2046 | 0.65 | 0.15 | 93,298 |
| 1991 | 3332 | 4203 | 4203 | 1.19 | 0.30 | 189,135 |
| 1992 | 2396 | 762 | 762 | 0.34 | 0.09 | 37,109 |
| 1993 | 2818 | 1635 | 1635 | 0.56 | 0.13 | 60,331 |
| 1994 | 1037 | 278 | 278 | 0.27 | 0.08 | 13,177 |

Table 6. Results of the 1994 (1993 in parenthesis) state-wide paddlefish mail creel survey for fish harvested from the Yellowstone-Sakakawea population.

| Variable | Area 3 | Area 4 | Area 5 | Area 6 | Mean or Total |
|---|---|---|---|---|---|
| Angler days | 178(247) | 566(850) | 3346(7837) | 449(1008) | 4539(9942) |
| Percentage of Total Angler Days | 3.9(2.5) | 12.5(8.5) | 73.7(78.8) | 9.9(10.1) | 100(100) |
| Harvest | 10(25) | 34(163) | 359(1949) | 67(187) | 470(2324) |
| Percentage of Total Harvest | 2.1(1.1) | 7.2(7.0) | 76.4(83.9) | 14.3(8.0) | 100(100) |
| Fish Kept Per Angler Day | 0.06(0.10) | 0.06(0.19) | 0.11(0.25) | 0.15(0.19) | 0.10(0.23) |
| Mean Number of Fish Kept Per Angler | 0.14(0.33) | 0.13(0.47) | 0.25(0.63) | 0.33(0.68) | 0.24(0.61) |
| Number of Anglers reporting they fished area | 37(55) | 136(258) | 770(2300) | 110(204) | 1053(2817) |

Table 7 Summary of Paddlefish Tagging at Intake and tag returns 1964-1994.

| Year | Number Tagged | # Returned In 1994 | Total # Returned | Percentage Returned |
|---|---|---|---|---|
| 1964-1970 | 1703 | 0 | 278 | 16.3 |
| 1971-1980 | 3242 | 0 | 802 | 24.7 |
| 1984 | 551 | 4 | 231 | 41.9 |
| 1985 | 2 | 0 | 2 | 100.0 |
| 1986 | 153 | 2 | 41 | 26.8 |
| 1988 | 156[1] | 5 | 56 | 35.9 |
| 1989 | 10[1] | 0 | 2 | 20.0 |
| 1990 | 153[1] | 2 | 34 | 22.2 |
| 1991 | 20[1] | 2 | 4 | 20.0 |
| 1992 | 221[1] | 9 | 40 | 18.1 |
| 1993 | 268[1] | 0 | 14 | 5.2 |
| 1994 | 180 | 11 | 11 | 6.1 |
| TOTAL | 6659 | 35 | 1515 | 22.8 |

[1] Some fish tagged at downstream points as far as Crittenden Island. Most tagged in the first 5 miles immediately downstream of Intake Diversion Dam.

Table 8. Tag return rate averages for multi-year periods.

| Period | Number Tagged | # Returned Through 1994 | Percentage Returned |
|---|---|---|---|
| 1964-1970 | 1703 | 278 | 16.3 |
| 1971-1980 | 3242 | 802 | 24.7 |
| 1981-1990 | 1025 | 366 | 35.7 |
| 1991-1994 | 689 | 69 | 10.0 |

Table 9. Annual angler exploitation rates (percent) of Lake Sakakawea paddlefish as indicated by returns of angler caught fish.

| Number (%)[1] Returned In | Year tagged and (number of fish tagged) | | | | |
|---|---|---|---|---|---|
| | 1986 (153) | 1988 (156) | 1990 (153) | 1992 (221) | 1993 (268) |
| 1986 | 9 (5.9) | | | | |
| 1987 | 0 (0.0) | | | | |
| 1988 | 7 (4.9) | 22 (14.1) | | | |
| 1989 | 7 (5.1) | 3 (2.2) | | | |
| 1990 | 4 (3.1) | 8 (6.1) | 6 (3.9) | | |
| 1991 | 7 (5.5) | 14 (11.4) | 4 (2.7) | | |
| 1992 | 4 (3.4) | 1 (0.9) | 10 (7.0) | 23 (10.4) | |
| 1993 | 1 (0.9) | 3 (2.8) | 11 (8.3) | 8 (4.0) | 14 (5.2) |
| 1994 | 2 (1.8) | 5 (4.8) | 2 (1.6) | 9 (4.7) | 0 (0.0) |
| Average Annual Percentage | (3.4) | (6.0) | (4.7) | (6.4) | (2.6) |

[1] Percentage = $\frac{\text{Number caught that year x 100}}{\text{Number Tagged-Number caught previous years}}$

Table 10. Relative return rate in succeeding years of paddlefish tagged at Intake.

| Year fish tagged (x) | Number Tagged | Relative return rate in year x+1 | x+2 | x+3 | x+4 |
|---|---|---|---|---|---|
| | | **Males** | | | |
| 1984 | 218 | 1.00 | 1.36 | 0.86 | |
| 1986 | 63 | 0.00 | 1.00 | 0.68 | |
| 1988 | 57 | 1.00 | 1.48 | 0.21 | |
| 1990 | 82 | 0.00 | 1.00 | 0.60 | |
| | | **Females** | | | |
| 1984 | 333 | 0.00 | 1.00 | 1.16 | 0.00 |
| 1986 | 88 | 0.00 | 1.00 | 1.46 | 1.23 |
| 1988 | 100 | 0.00 | 1.00 | 1.91 | 0.83 |
| 1990 | 71 | 0.00 | 1.00 | 0.76 | 0.00 |

Table 11. Paddlefish catch per unit effort for gill nets drifted in May and June 1993 and 1994 between Intake Diversion Dam and Cottonwood Creek.

| Year | Drift Time (Hours) | Number of Paddlefish Caught | Paddlefish Caught per Hour |
|---|---|---|---|
| 1993 | 17.47 | 182 | 10.4 |
| 1994 | 33.67 | 165 | 4.9 |

Table 12. Summary of Yellowstone River paddlefish angler comments from mail creel surveys in 1993 (346 surveys with comments) and 1994 (270 surveys with comments.)

| Comment | | Number of Surveys 1993 | 1994 |
|---|---|---|---|
| | **Comments Related to Licensing and Regulations** | | |
| 1. | Prefer a two fish season limit | 38 | 59 |
| 2. | Prefer a one fish season limit | 32 | 16 |
| 3. | Want regulations to allow catch and release | 58 | 35 |
| 4. | Don't allow catch and release | 9 | 3 |
| 5. | Want a three fish season limit | 3 | 0 |
| 6. | Increase length of season | 3 | 5 |
| 7. | Limit number of nonresident snaggers | 7 | 4 |
| 8. | Issue tags only through drawing | 4 | 7 |
| 9. | Not worth the trip for only one fish | 6 | 25 |
| 10. | Close season for one or more years to protect paddlefish | 7 | 6 |
| 11. | Paddlefishing license cost too high | 5 | 12 |
| 12. | Cheaper to paddlefish in N.D.; will go there in future because of cost or more liberal limit. | 2 | 4 |
| 13. | Want same regulations in MT & ND | 3 | 9 |
| 14. | Want same regulations on Missouri and Yellowstone | 0 | 10 |
| 15. | Want a minimum size limit | 4 | 0 |
| 16. | Make gaffing illegal | 5 | 0 |
| 17. | Keep paddlefish bow fishing legal | 2 | 0 |
| 18. | Sell one tag at half two tag price | 0 | 30 |
| 19. | One fish limit encourages illegal release | 0 | 3 |
| 20. | Should have had out-of-state publicity on reg. changes | 0 | 3 |
| 21. | Fewer people will fish with one fish limit | 0 | 4 |

| Comment | No. of Surveys 1993 | 1994 |
|---|---|---|
| **Comments Related to Other Fisheries Management Issues** | | |
| 22. Department should stock young paddlefish | 2 | 4 |
| 23. Concerned for future of paddlefish and paddlefishing/ numbers may be decreasing | 22 | 13 |
| 24. Don't let radicals close season | 4 | 0 |
| 25. Need more or continued paddlefish research | 3 | 0 |
| 26. Pleased with MT paddlefish management | 0 | 6 |
| 27. Department should not net fish in snagging area | 0 | 12 |

Table 12. Continued.

| | | |
|---|---|---|
| **Comments Related to Intake Services and Facilities** | | |
| Like fish cleaning service | 16 | 0 |
| Pleased with Dept. fisheries and/or site management | 60 | 9 |
| Want better access to south side of river | 4 | 0 |
| Unhappy with Intake facilities or crowding | 11 | 0 |
| Had difficulty finding place to buy tags | 2 | 0 |
| Rebuild diversion dam, rocks have washed down, fish not stopping | 0 | 2 |
| Other Comments | | |
| Pleased to see roe put to use | 4 | 0 |
| Outlaw sale of roe | 2 | 0 |
| Paddlefishing has become too commercialized | 0 | 2 |
| Walleye eating too many small paddlefish | 0 | 2 |
| Concern for hooks, line or sinkers left in river | 5 | 0 |
| Fines for illegal paddlefishing too high | 0 | 2 |