MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: Montana PROJECT NO. F-46-R-4
PROJECT TITLE: Statewide Fisheries Investigations JOB NO: IV-b
STUDY TITLE: Survey and Inventory of Warmwater Lakes
JOB TITLE: Northcentral Montana Warmwater Lakes Investigations

PERIOD COVERED: July 1, 1990 through June 30, 1991


ABSTRACT

Warmwater investigations were carried out on five large reservoirs and three smaller lakes. The Bynum Reservoir fishery continues to improve with walleye approaching twenty inches and three pounds. Yellow perch, the main walleye forage, has increased dramatically. Walleye and northern pike numbers in Lake Frances and Tiber Reservoir remain at stable levels. Yellow perch and spottail shiner populations have increased in both waters. A population estimate of 1300 northern pike was calculated for Pishkun Reservoir and forage fish numbers have declined. Stomach analysis indicates that walleye and northern pike fed mostly on fish in each of these waters. Crayfish are also an important part of the diet for northern pike in Tiber Reservoir. A total of 32 artificial spawning structures for yellow perch were placed in Tiber Reservoir. Walleye were captured in gill nets set in Petrolia Reservoir during fall 1990.


OBJECTIVES AND DEGREE OF ATTAINMENT

1. To find a source of walleye eggs that can be used to satisfy management demand.

2. To improve spawning habitat to maintain natural sport fish and forage fish populations. **(State funded).**

3. To enhance over-winter survival in Split Rock Lake for yellow perch and northern pike. **(State funded).**

4. To provide 2,000 angler days use for yellow perch and 3 to 6 pound northern pike in Pishkun Reservoir.

5. To provide a walleye fishery in Bynum and Morony Reservoirs to provide 6,000 angler days for 2 pound fish.

6. To provide 25,000 angler days for 2-4 pound walleye and 4-8 pound northern pike in Tiber Reservoir and Lake Frances.

7. To maintain current population levels of walleye in Holter and Hauser Reservoirs. **(State funded).**

8. To develop a largemouth or smallmouth bass fishery in Lake Helena to provide 1,000 angler days of use. **(State funded).**

9. To develop fishable populations of largemouth bass, crappie and yellow perch in 20 farm ponds to provide 5,000 angler days use.

10. To maintain forage fish species to sustain game fish populations.

11. To evaluate need for new introductions of forage fish. **(State funded).**

12. To involve sportsman groups and general fishing public in management and planning process. **(State funded).**

Progress was made on most federally funded objectives and data are included. Data for some state funded objectives were included to update Regional files.

## PROCEDURES

Fish populations were sampled with 125 x 6 foot experimental gill nets with 25 foot sections of 0.75, 1.0, 1.25, 1.5, and 2.0 inch square mesh; 300 x 8 foot gill nets with 100 foot sections of 2.5, 3.0, and 3.5 inch square mesh; 3 x 4 foot frame trap nets (0.25 inch square mesh); and 4 x 6 foot frame trap nets (1 inch square mesh) and a 100 x 10 foot seine (0.25 inch square mesh) and by electrofishing at night. The boat was equipped with a portable generator, headlights and fixed booms with stainless steel droppers suspended in front of the bow. Captured fish were measured to the nearest tenth of an inch and weighed to the nearest hundredth of a pound. Stomach and scale samples were collected from some fish for food habit and age and growth studies. Northern Pike were tagged with Floy T-Tags while walleye were tagged with Floy Cinch-Up Tags. Brush structures were transported by boat and sunk at selected depths.

## FINDINGS

### WALLEYE EGG SOURCE

Spring trapping operations geared towards collecting walleye eggs were conducted at Bynum Reservoir and Tiber Reservoir. Insufficient numbers of ripe females were taken to collect eggs.

Bynum Reservoir

A total of 50 trap nights were fished in Bynum Reservoir from April 5-15, 1990 to monitor trends in species composition and relative abundance. In addition, short duration gill net sets were used on April 13-14 to collect walleye for tagging purposes. Traps captured approximately 19,600 white sucker, 94 yellow perch, 4 brook trout, 2 rainbow trout and 157 walleye. Gill nets caught an additional 83 walleye. Twenty-one of the walleye were recaptures of fish tagged in 1989. Walleye averaged 16.9 inches total length and water temperatures ranged from 39-43°F during the netting.

Reservoir level fluctuated approximately eight vertical feet in 1990, which was less that in recent years. Anglers reported sporadic success on walleye and large catches of yellow perch. During 1990, anglers returned 19 tags from walleye tagged in 1989 and 1990 (Table 1). One angler accounted for nearly 62% of the tags returned.

Five species were collected during the annual forage fish survey conducted on August 14, 1990 (Appendix I). Results indicate that yellow perch numbers have nearly doubled since 1989 (Hill et al. 1990). Conversely, spottail shiner numbers decreased from nearly 74 fish per seine haul in 1989 to about 13 fish/haul in 1990.

Yellow perch dominated the 1990 fall gill net catch with over 56 fish per net (Table 2). Walleye averaged 8.3 fish per gill net. The initial walleye fry introduced in 1985 were nearly 20 inches long and weighed 3 pounds in fall 1990. Stomach analysis revealed walleye fed mostly on fish. More than 70% of the walleye stomachs contained yellow perch and/or fish remains (Appendix II). Water temperatures ranged from 66°F at the surface to 65°F at 30 feet during the netting survey on September 13.

Lake Frances

A year-long creel census was conducted on Lake Frances from May 1989 through April 1990 (Hill and Leathe 1991). The census estimated 14,966 angler-days of fishing pressure. Anglers harvested an estimated 11,493 walleye, 5,641 northern pike, 8,360 yellow perch and 43 burbot. Anglers fished a total of 70,786 hours with hourly catch rates of 0.35 for walleye, 0.11 for northern pike and 0.29 for yellow perch.

During the creel survey period, anglers voluntarily returned 13 walleye and 18 northern pike tags from the 1989 tagging year. These returns indicate annual exploitation of around 14% for walleye and 20% for northern pike (Table 1).

Table 1. Angler harvest of walleye and northern pike, 1986-90.

| Lake | Species | Year tagged | Number tagged | Number of returns (%) 1986 | 1987 | 1988 | 1989 | 1990 | Cumulative |
|---|---|---|---|---|---|---|---|---|---|
| Bynum Res. | WE | 1989 | 126 | - | - | - | 15(11.9) | 5( 4.0) | 20(15.9) |
| | | 1990 | 219 | - | - | - | - | 14( 6.4) | 14(6.4) |
| Lake Francis | WE | 1986 | 114 | 10(8.8) | 8(7.0) | 2(1.8) | 5( 4.4) | 0( 0.0) | 25(21.9) |
| | | 1988 | 21 | - | - | 4(19.0) | 0( 0.0) | 0( 0.0) | 4(19.0) |
| | | 1989 | 202 | - | - | - | 28(13.9) | 13( 6.4) | 41(20.3) |
| | NP | 1986 | 212 | 36(17.0) | 19(8.9) | 3(1.4) | 1( 0.5) | 1( 0.5) | 60(20.3) |
| | | 1988 | 13 | - | - | 2(15.4) | 1( 7.7) | 0( 0.0) | 3(23.1) |
| | | 1989 | 430 | - | - | - | 87(20.3) | 18( 4.2) | 105(24.4) |
| Tiber | WE | 1986 | 416 | 38( 9.1) | 19( 4.6) | 9( 2.2) | 1( 0.2) | 0( 0.0) | 67(16.1) |
| | | 1987 | 444 | - | 50(11.3) | 28( 6.3) | 4( 0.9) | 3( 0.6) | 85(19.1) |
| | | 1988 | 299 | - | - | 45(15.1) | 7( 2.3) | 3( 1.0) | 55(18.4) |
| | | 1990 | 271 | - | - | - | - | 19( 7.0) | 19( 7.0) |
| | NP | 1986 | 279 | 34(12.2) | 8( 2.9) | 0( 0.0) | 1( 0.4) | 0( 0.0) | 43(15.4) |
| | | 1987 | 495 | - | 55(11.1) | 7( 1.4) | 1( 0.2) | 1( 0.2) | 64(12.9) |
| | | 1988 | 249 | - | - | 25(10.1) | 1( 0.4) | 1( 0.4) | 27(10.8) |
| | | 1990 | 346 | - | - | - | - | 33( 9.5) | 33( 9.5) |

Forage fish numbers in Lake Frances in August, 1990 were the highest on record since standardized sampling was initiated in 1986. Yellow perch averaged around 66 per seine haul and spottail shiner averaged 184 per haul (Appendix I).

Annual fall gill netting in September, 1990 produced 7.5 walleye, 4.0 northern pike, 17 yellow perch and 0.3 white sucker per net (Table 2). Over 83% of the walleye were less than 16 inches long while the majority of the northern pike were over 20 inches and most yellow perch exceeded 9 inches. Analysis of contents from 15 walleye stomachs indicated a preference for crayfish and unidentifiable fish (Appendix II). Contents of 11 northern pike stomachs were predominantly fish. Water temperature ranged from 68°F at the surface to 64°F at 30 feet on September 12, 1990.

Pishkun Reservoir

A total of 47 trap net-nights were fished in Pishkun Reservoir from April 19-27, 1990. Trends in species composition as well as a northern pike population estimate were determined. Traps collected 428 northern pike, 187 white sucker, 139 yellow perch and 2 rainbow trout. Water temperatures varied from 44-55°F during trapping.

The northern pike population was estimated to be 1302 (± 378) using the basic Schnabel method described by Rounsefell and Everhart (1960). The estimate is based on 428 marked fish

Table 2. Overnight gill netting results in warmwater reservoirs in Region Four during 1990.

| Water (date) | Surface acres | No. of[1] nets | Mean hrs fished/net | Species[2] | No. of fish | Length (in) Range (Avg.) | Weight (pounds) Range (Avg.) |
|---|---|---|---|---|---|---|---|
| Bynum Reservoir (9/13/90) | 3000 | 4S | 21.0 | WE | 4 | 7.7-11.7 ( 9.7) | 0.14-0.54 (0.31) |
| | | | | | 19 | 13.6-15.6 (14.5) | 0.72-1.37 (1.01) |
| | | | | | 10 | 17.4-19.3 (18.6) | 1.94-2.82 (2.39) |
| | | | | YP | 222 | 4.4- 8.5 ( 7.2) | 0.05-0.31 (0.10) |
| | | | | | 4 | 9.1- 9.6 ( 9.4) | 0.38-0.47 (0.41) |
| | | | | Rb | 1 | (20.5) | (3.54) |
| | | | | WSu | 40 | (12.0) | (0.78) |
| | | | | | 89 | (14.4) | (1.28) |
| | | | | | 37 | (16.7) | (1.44) |
| Lake Frances (9/12/90) | 4500 | 4S | 20.5 | WE | 14 | 7.0-12.7 (10.0) | 0.12-0.62 (0.34) |
| | | | | | 11 | 13.8-15.8 (14.8) | 0.75-1.15 (1.00) |
| | | | | | 2 | 16.3-16.4 (16.4) | 1.34-1.50 (1.42) |
| | | | | | 3 | 21.5-22.2 (21.9) | 3.44-3.62 (3.52) |
| | | | | NP | 2 | 11.2-15.2 (13.2) | 0.29-0.62 (0.46) |
| | | | | | 1 | (17.3) | (1.08) |
| | | | | | 13 | 20.3-28.0 (23.8) | 2.00-7.00 (3.43) |
| | | | | YP | 16 | 5.5- 7.2 ( 7.0) | 0.09-0.18 (0.17) |
| | | | | | 51 | 9.4-10.6 ( 9.8) | 0.44-0.75 (0.53) |
| | | | | | 1 | (12.3) | (1.14) |
| | | | | WSu | 1 | (15.7) | (1.85) |
| Tiber Reservoir (9/18-20/90) | 15000 | 23S | 17.75 | WE | 43 | 5.3-12.9 (11.3) | 0.04-0.79 (0.51) |
| | | | | | 81 | 13.0-15.9 (14.6) | 0.73-1.46 (1.04) |
| | | | | | 34 | 16.0-19.9 (17.1) | 1.28-2.98 (1.75) |
| | | | | | 1 | (29.1) | (10.25) |
| | | | | NP | 16 | 8.0-15.5 (13.2) | 0.12-0.83 ( 0.51) |
| | | | | | 58 | 16.0-19.6 (17.6) | 0.76-1.73 ( 1.19) |
| | | | | | 21 | 20.0-25.2 (21.8) | 1.68-3.78 ( 2.24) |
| | | | | | 1 | (28.7) | ( 7.00) |
| | | | | YP | 29 | 5.6- 8.3 ( 7.1) | 0.07-0.32 ( 0.18) |
| | | | | | 2 | 9.3-10.1 ( 9.7) | 0.38-0.45 ( 0.42) |
| | | | | | 5 | 12.2-12.8 (12.5) | 0.84-1.20 ( 1.01) |
| | | | | Rb | 3 | 13.4-14.3 (13.8) | 1.10-1.29 ( 1.17) |
| | | | | | 4 | 19.6-20.8 (20.2) | 2.70-3.02 ( 2.86) |
| | | | | SNS | 1 | (38.0) | - |
| | | | | CCat | 1 | (25.0) | ( 6.75) |
| | | | | Wf | 1 | (10.5) | ( 0.38) |
| | | | | WSu | 2 | ( 7.0) | ( 0.14) |
| | | | | | 4 | 12.7-14.7 (14.2) | 0.90-1.46 ( 1.32) |
| | | | | | 15 | 17.2-19.0 (17.4) | 2.32-3.55 ( 2.51) |
| | | | | LnSu | 2 | ( 7.2) | ( 0.15) |
| | | | | | 9 | 16.3-19.3 (18.2) | 1.86-3.07 ( 2.81) |
| | | | | Carp | 5 | 11.5-12.8 (12.5) | 0.88-1.20 ( 1.14) |
| | | | | | 4 | 25.0-30.0 (28.5) | 10.25-16.5 (14.50) |
| Tiber Reservoir (9/18-20/90) | 15000 | 3F | 19.5 | Rb | 3 | 13.6-14.7 (14.3) | 0.94-1.30 ( 1.15) |
| | | | | | 1 | (18.9) | ( 2.64) |

1-Standard experimental gill nets (nylon and monofilament); F=Floating; S=Sinking
2-Species abbreviations: WE=Walleye; NP=Northern Pike; YP=Yellow Perch; Rb=Rainbow Trout; SNS=Shovelnose Sturgeon; CCat=Channel Catfish; Wf=Mountain Whitefish; WSu=White Sucker; LnSu=Longnose Sucker.

Table 2. (continued).

| Water | Date | Surface acres | No. of[1] nets | Mean hrs fished/net | Species[2] | No. of fish | Length (in) Avg.(Range) | Weight (pounds) Avg. (Range) |
|---|---|---|---|---|---|---|---|---|
| Petrolia Reservoir | 10/90 | 514 | 1S,1F | 17.5 | WE | 13 | 11.6(8.4-13.4) | 0.56(0.17-0.89) |
| | | | | | NP | 8 | 20.4(16.9-24.7) | 2.06(1.04-3.97) |
| | | | | | Carp | 3 | 11.9(7.1-17.2) | 1.26(0.21-2.66) |
| | | | | | WSu | 3 | 14.1(11.7-16.1) | 1.21(0.64-1.71) |

1-Standard experimental gill nets (nylon and monofilament); F=Floating; S=Sinking
2-Species abbreviations: WE=Walleye; Rb=Rainbow trout; LL=Brown trout; LT=Lake trout; MW=Mountain whitefish; KOK=kokanee salmon; NP=Northern pike; YP=Yellow perch; WSu=White sucker; Lnu=Longnose sucker

Table 3. Northern Pike population estimate, Pishkun Reservoir, 1990 (95% confidence interval).

| t<br>A | M(t)<br>B | C(t)<br>C | R(t)<br>D | M(t-1)C(t)<br>E | M(t-1)C(t)<br>R(t)<br>F | Cum. E<br>G | Cum. D<br>H | G/H<br>I |
|---|---|---|---|---|---|---|---|---|
| 1 | 52 | | | | | | | |
| 2 | 121 | 72 | 3 | 3744 | 1248 | 3744 | 3 | 1248 |
| 3 | 191 | 83 | 13 | 10043 | 773 | 13787 | 16 | 862 |
| 4 | 271 | 92 | 12 | 17572 | 1464 | 31359 | 28 | 1120 |
| 5 | 330 | 68 | 9 | 18428 | 2048 | 49787 | 37 | 1346 |
| 6 | 351 | 36 | 15 | 11880 | 792 | 61667 | 52 | 1186 |
| 7 | 389 | 52 | 14 | 18252 | 1304 | 79919 | 66 | 1211 |
| 8 | | 49 | 10 | 19061 | 1906 | 98980 | 76 | 1302 |
| | | | 76 | 98980 | 1302 | | | |

No. of recaptures is 76 ± SQRT 76 or 76 ± 8.72

1.96 standard errors: (8.72 x 1.96) = 17.1
76 ± 17.1 = 58.9, 93.1 98980 ÷ 58.9 = 1680 98980 ÷ 93.1 = 1063
Population at P of 0.05 is 1302 ± 378

(over 16 inches) and 76 recaptures (Table 3). Northern pike ranged from 16.0 - 34.1 inches total length (average = 21.7 inches).

The annual forage fish survey was conducted on August 15,1990. Numbers of small yellow perch and white sucker were less than in past years. Approximately 43 yellow perch and 13 white suckers were taken per seine haul (Appendix I). Although spottail shiner were introduced into Pishkun Reservoir in 1987 and 1989 to improve the forage base, only one fish was taken in the 1990 survey. Additional attempts to establish this species were made in June of 1990 when 3,500 yearlings were transferred from Tiber Reservoir.

Tiber Reservoir (Lake Elwell)

Trap nets were fished in two areas of Tiber Reservoir in the spring of 1990 to monitor trends in species composition and abundance (Table 4). Walleye and northern pike were tagged to aid in determining harvest rates (exploitation) and movement.

A total of 313 northern pike and 130 walleyes were tagged in the Willow Creek Arm. Northerns averaged 20.2 inches and ranged from 16.0 to 41.5 inches. Walleye averaged 16.3 inches and ranged from 14.0 to 25.8 inches. Surface water temperatures ranged from 40-53°F during trapping.

Thirty-three northern pike and 141 walleye were tagged in the Devon area, near the river inlet. Northern pike averaged 21.8 inches (range 16.0-30.8) and walleye averaged 15.4 inches (range 14.0-27.4 inches). Water temperatures were not recorded.

Anglers returned tags from 19 walleye and 33 northern pike during the 1990 fishing season that had been tagged in April of 1990. These voluntary tag returns indicate annual angler exploitation of 7.0% for walleye and 9.5% for northern pike (Table 1). Anglers also returned tags from fish tagged in 1987 and 1988. Maximum cumulative exploitation was highest for walleye tagged in 1987 (19.1% through 1990) and for northern pike tagged in 1986 (15.4% through 1990).

Table 4. Species composition and relative abundance, Tiber Reservoir, 1990 (Trap Nets).

| | Willow Creek Arm | Devon Area |
|---|---|---|
| Trapping Dates | April 10 - 18 | April 23- |
| 25 No. of trap nights | 69 | |
| 18 | | |
| Species* and number trapped | | |
| NP > 16" | 440 | 33 |
| NP < 16" | 21 | 12 |
| WE > 14" | 130 | 141 |
| WE < 14" | 9 | 135 |
| YP | 52 | 102 |
| Ling | 26 | 5 |
| WSu | 118 | 19 |
| Rb | 7 | 1 |
| Carp | 10 | 37 |
| Cr | 4 | - |
| Cat | - | 1 |

*Species abbreviations: NP=Northern pike; WE=Walleye; YP=Yellow perch; Ling=Burbot; WSu=White sucker; Rb=Rainbow trout; Cr=Crappie; Cat=Channel catfish.

Tag returns from anglers indicate limited postspawning movements for northern pike and significant postspawning movements for walleyes. Approximately 77% of angler returns on northern pike originally tagged in the Willow Creek Arm were from the same area. Likewise, 80% of returns on northerns tagged in the upper end of the reservoir near Devon came from the Devon area. All tag returns from walleye tagged in the Willow Creek Arm were returned from the same area. However, 80% of angler returns on walleyes tagged in the Devon area came from the Willow Creek Arm. These results suggest a walleye spawning run into the upper reservoir or perhaps into the Marias River upstream from the reservoir.

Sixty-two seine hauls were made in four areas of Tiber during mid-August to monitor forage fish abundance. The main forage fish species collected were spottail shiner, yellow perch and emerald shiner (Appendix I). Spottail were most abundant in the dam area, yellow perch in the Willow Creek Arm, and emerald shiner in the Bootlegger area. All forage species were more abundant in 1990 than in 1989 (Hill et al. 1990).

Efforts to improve forage fish numbers and their habitat in Tiber Reservoir are continuing. Negotiations between the Bureau of Reclamation and the Marias Management Committee are held each spring in attempts to provide suitable water levels for yellow perch spawning. Rising water levels in spring, 1990 inundated some vegetation used by yellow perch for spawning but suitable levels were not reached until late in the spawning season. However, forage fish seining in the summer indicated some perch reproduction did occur. Maximum reservoir water level was 2992.5 feet on July 5, 1990. Artificial perch spawning structures were placed in the reservoir by the Hi-Line Sportsmen and Great Falls Walleye Unlimited in 1990 for the second consecutive year. Structures were made with either discarded shelterbelt brush or Christmas trees. Spawning structures had dimensions of either 3 feet diameter x 8 foot long, or two foot high x 4 foot square. Structures were submerged with their tops approximately three feet below the normal annual low water level to prevent ice damage and minimize navigation hazard. Nineteen brush structures were placed in the Willow Creek Arm and 13 Christmas tree structures were placed in the Bootlegger Trail area during April, 1990.

The possibility of introducing lake herring (cisco) to provide additional forage for predatory fish in Tiber Reservoir is being investigated. Available literature is being researched and advice from biologists in neighboring states and provinces is being solicited. Reservoir zooplankton samples were collected from July through September, 1990. Additional samples will be collected during 1991 and results will be presented in a future report.

Water temperature profiles were taken in conjunction with plankton sampling in the Willow Creek Arm and the Bootlegger Trail area

approximately every two weeks from July 12 to September 18, 1990. Maximum surface temperatures of 72°F were recorded in early August. A narrow thermocline developed around 46 feet at both locations in mid-July and persisted through late August. Temperatures within the thermocline varied from 61-64°F at initial formation and later increased from 65-68°F.

Fish species abundance trends were checked in September by setting experimental sinking gill nets. Individual netting summaries for four areas of the reservoir are presented in Appendix III. Walleye were most abundant at 6.9 fish/net followed by northern pike at 4.2 fish/net and 1.6 yellow perch/net (Table 2). These species appear to have stabilized since 1986 as noted in last year's report (Hill et al. 1990). Shovelnose sturgeon and channel catfish are rarely captured in Tiber netting surveys, but one specimen of each was taken in fall 1990. Three floating gill nets were fished to specifically sample rainbow trout. Four rainbow trout ranging in length from 13.6-18.9 inches were taken (Table 2).

The overall average length of walleye continues to fluctuate around 14 inches, with the 1990 average being 14.3 inches. The 1990 netting shows a slight improvement in numbers of larger walleyes (Table 5). Twenty-two percent of the walleye sampled in fall 1990 were larger than 16 inches as compared to about 16-18% in 1988 and 1989.

Contents from 53 walleye and 59 northern pike stomachs were collected and analyzed (Appendix II). Both species showed preference for fish, with the majority being unidentifiable. Northern pike also consumed significant numbers of crayfish. More than 24% and 32% of the walleye and northern pike stomachs examined were empty.

Fish derbies have been held on Tiber Reservoir for a number of years. Sponsors of the derbies are the Hi-Line Sportsmen Association (Chester) and the Great Falls Chapter of Walleye Unlimited. Information from these tournaments is not entirely accurate because anglers are not required to bring all fish caught into the weigh station. Participants only bring in fish that may have a chance of winning a prize. Considering this bias, information is presented for three derbies held during the report period (Table 6). It is interesting to note the numbers of fish that anglers estimated they caught in the Walleye Unlimited Tournament. Also, the fairly high number of rainbow trout reported. The Walleye Unlimited derby is restricted to a maximum of 100 two-man teams and members only. The two derbies sponsored by the Hi-Line Sportsmen are unlimited and open to the general public.

Table 5. Abundance of walleye in Tiber Reservoir, 1986-1990 (expressed as percent).

| | Year | | | | |
|---|---|---|---|---|---|
| Size group (inches) | 1986 | 1987 | 1988 | 1989 | 1990 |
| <12.9 | 34.7 | 43.8 | 34.9 | 40.0 | 27.0 |
| 13.9-15.9 | 26.3 | 24.8 | 46.7 | 44.3 | 50.9 |
| 16.0-19.9 | 35.9 | 28.8 | 14.8 | 14.8 | 21.4 |
| >20.8 | 3.0 | 2.6 | 3.6 | 0.9 | 0.6 |

## Petrolia Reservoir

Thirteen walleye ranging from 8.4-13.4 inches were captured in gill nets set in Petrolia Reservoir in fall, 1990 (Table 2). Eight northern pike averaging 20.4 inches were also sampled. Fish remains were found in the stomachs of six walleye and four northern pike. Carp and perch were identified in the northern pike stomachs.

Table 6. Statistics of fish caught during fish derbies, Tiber Reservoir, 1990-91

| | | | Fish measured at weigh station | | | | Angler estimates | |
|---|---|---|---|---|---|---|---|---|
| | | | No. of | Length (in) | | Weight (lbs) | No. of | Length (in) |
| Sponsor | Date | Species | Fish | range | (Ave) | range (Ave) | Fish | range |
| Walleye Unlimited | 6/30-7/1 | WE | 185 | 13.5-24.8 | (15.6) | 0.80-4.90 (1.27) | 649 | 7.0-25.0 |
| | | NP | 9 | 18.0-23.5 | (21.3) | 1.50-2.90 (2.29) | 132 | 6.0-25.0 |
| | | YP | 26 | 10.3-12.8 | (11.7) | 0.50-1.11 (0.84) | 51 | 7.0-14.0 |
| | | Rb | - | - | - | - - | 15 | 16.0-24.0 |
| Hi-Line Sportsmen | 9/1-3 | WE | 49 | 10.7-28.5 | (17.7) | 0.31- 8.00 (2.11) | | |
| | | NP | 28 | 16.0-33.3 | (23.3) | 0.75-13.00 (3.29) | | |
| | | YP | 3 | 9.8-13.0 | (11.4) | 0.44- 1.00 (0.75) | | |
| | | Rb | 32 | 12.5-23.0 | (19.8) | 0.81- 4.31 (2.58) | | |
| Hi-Line Sportsmen | 2/3 | WE | 5 | 19.0-23.0 | (20.7) | 2.44- 4.25 (3.04) | | |
| | | NP | 12 | 18.0-31.0 | (22.0) | 1.13- 8.38 (2.96) | | |
| | | YP | 3 | 11.5-13.0 | (12.3) | 0.75- 1.38 (1.11) | | |
| | | Rb | 5 | 19.0-21.0 | (19.8) | 2.38- 2.94 (2.65) | | |
| | | Ling | 1 | - | (27.0) | - (4.25) | | |

Morony Reservoir

Morony Reservoir was sampled during 1990 in conjunction with Montana Power Company's FERC relicensing activities. Results are reported in Penkal (1990).

## Small Ponds and Reservoirs

### CHOTEAU AREA

Night electrofishing by boat was conducted in Eyraud Lakes in mid-July. Limited numbers of yellow perch were taken due to enormous mats of vegetation. No crappie or largemouth bass were observed. Negotiations with area landowners continue in attempts to resolve access problems to the lakes.

Several futile attempts were made to sample largemouth bass in Little Pishkun Pond. Experimental gill nets in late June collected 106 yellow perch (6.0-11.8 inches), 12 northern pike (12.4-27.0 inches) and 16 white sucker (8.0-20.3 inches). Night electrofishing in mid-July produced abundant numbers of yellow perch as well as several northern pike and white sucker. Seining in mid-August yielded over 76 young-of-the-year and yearling yellow perch per seine haul.

Two experimental gill nets set in Priest Butte Lake caught 75 white sucker, 1 longnose sucker, 1 lake chub and 1 yellow perch. No crappie or largemouth bass were taken.

### GREAT FALLS - LEWISTOWN AREA

Largemouth bass survival appeared to be good in Schoonover #1 and Silvan Reservoirs. Reports suggest limited or no survival from largemouth bass plants in Shaw Reservoir. Water levels in Schoonover Reservoir #1 continued to drop and may become critically low. Warmwater ponds in the Lewistown area will be surveyed during the next reporting period. Benes Pond, which was recently reconstructed, was surveyed in July 1990. The pond had been stocked with northern pike in previous years before the dam washed out. We restocked the pond in late May 1991 with 5,000 1.7 inch northern pike after the dam was reconstructed.

## DISCUSSION AND RECOMMENDATIONS

No walleye eggs were collected during spring trapping operations in 1990. Trapping efforts will be intensified in Tiber Reservoir in 1991 so an egg-take may be possible. It is doubtful that walleye

eggs will ever be taken from Lake Frances due to the difficulty in obtaining enough fish, particularly ripe females. Bynum Reservoir may be feasible in future years after the population stabilizes.

The walleye fishery in Bynum Reservoir continues to develop but has received relatively little use. Yellow perch numbers have increased dramatically in Bynum and should provide excellent walleye forage. Spottail shiner numbers decreased drastically when compared to previous years and it is hoped that they will recover to provide additional forage. Fingerling walleye stocking should be discontinued after 1991. Fingerling plants should be resumed in 1993 if natural reproduction does not occur in 1992.

Large numbers of small walleye have been present in Lake Frances and Tiber Reservoir for several years. Forage fish numbers have improved which should lead to enhanced walleye growth. Water level management should continue to be a priority to provide suitable yellow perch spawning. Efforts to improve perch spawning habitat by installation of spawning structures in Tiber Reservoir should continue. Artificial enhancement of perch spawning habitat in Lake Frances should also be considered.

Angler exploitation needs to be carefully evaluated to determine if harvest is adversely affecting walleye population size and age structure in Tiber, Frances and Bynum reservoirs. Fishing pressure on these reservoirs does not appear to be high in comparison to other waters. Angler effort averaged 45 angler-hours/acre for lakes over 500 acres in Wisconsin (Staggs et al. 1990). Angling effort averaged around 4-15 hours/acre on Tiber and Frances during the 1980's according to the statewide angling pressure survey.

Annual angler exploitation of adult walleye over 14" has averaged around 11%, 14%, and 9% for Tiber, Frances and Bynum respectively. These rates must be used with caution because they are based on voluntary tag returns. Evaluation of tag return rates in Nebraska suggests that voluntary compliance could be as low as 50% (personal communication with Daryl Ellison, Nebraska Game and Parks). If this is true for Montana, average exploitation on Tiber, Frances, and Bynum reservoirs could range from 18-28%. These higher theoretical exploitation rates are considered acceptable and not likely to negatively affect walleye population structure. The Wisconsin Department of Natural Resources considers 20-25% annual angling exploitation of adult walleye to be "healthy" for most walleye populations and the Wisconsin average is around 18% (Staggs et al. 1990). Voluntary tag return compliance on Central Montana reservoirs should be evaluated, probably through the use of reward tags.

Preliminary investigations have been conducted concerning potential introduction of a pelagic forage fish species like cisco into Tiber Reservoir. Additional zooplankton and water temperature monitoring needs to be done and an Environmental Analysis must be prepared

before any introduction is made. Dr. David Bennett from the University of Idaho was contracted in May, 1991 to prepare a preliminary environmental analysis of the potential effects of a cisco introduction. The scheduled completion date in March, 1992.

The 1990 northern pike population estimate in Pishkun Reservoir was less than observed in the early 1970's and higher than found in the late 1970's and early 1980's. Stocking of rainbow trout is being considered to provide additional fishing opportunity since kokanee stocking has been largely unsuccessful. However, predation by northern pike may seriously compromise rainbow stocking success.

Success of walleye fingerling plants into Morony Reservoir should continue to be evaluated by annual fall gill netting. Fingerling plants should continue for at least another year and movement of these fish through the dam and into the river downstream should be evaluated. Abundance of gamefish and forage fish in Petrolia Reservoir should be monitored each fall. Additional artificial habitat structures to provide cover and spawning substrate for yellow perch should be placed in Petrolia if continued assistance from local anglers can be secured. Walleye plants have been scheduled on an alternate year basis but low water levels or a reduced forage base may force cancellation of the stocking in some years. No additional plants of northern pike are anticipated because of adverse effects on the walleye food supply and the high potential for natural reproduction. Spottail shiners should be introduced to provide additional forage in Petrolia if no significant negative impacts are identified in a scheduled Environmental Assessment.

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**DATE:** September 1991

**PRINCIPAL FISH SPECIES INVOLVED:**

Walleye, northern pike, largemouth bass, black crappie, yellow perch, spottail shiner

**CODE NUMBERS OF WATERS REFERRED TO IN REPORT:**

14-7080 Bynum Reservoir
14-6840 Eyraud Lake
14-7440 Lake Frances
14-8540 Priest Butte Lake
14-9240 Tiber Reservoir
16-4463 Benes Pond
16-8275 Silvan Reservoir
17-8773 Shaw Reservoir
17-9296 Morony Reservoir
17-9509 Schoonover Reservoir #1
18-8720 Petrolia Reservoir
20-7730 Little Pishkun Pond
20-7950 Pishkun Reservoir

Appendix I. Forage fish / reproduction surveys, 1989 (100 x 10 feet with 0.25 inch seine).

| Water | Date | Water temp(°F) | No. of pulls | Number of fish / pull[1] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | WE | NP | YP | Cr | SPS | EMS | WSu | Carp | Ling | Crayfish | LCH | Sculpin | FHC | LND | Fathead minnow |
| Bynum Reservoir | 8/14/90 | 72 | 16 | 0.4 | N/A | 64.1 | N/A | 12.9 | N/A | 6.8 | N/A | N/A | 0.1 | N/A | - | N/A | N/A | N/A |
| Lake Francis | 8/13/90 | 70 | 16 | 2.9 | 0.3 | 65.6 | N/A | 183.9 | N/A | 18.9 | N/A | 0.2 | 0.2 | N/A | 0.1 | N/A | N/A | N/A |
| Pishkun Res. | 8/15/90 | 70 | 18 | N/A | 0.7 | 43.1 | N/A | Tr. | N/A | 13.0 | N/A | N/A | 0.7 | N/A | N/A | N/A | N/A | N/A |
| Tiber Reservoir | | | | | | | | | | | | | | | | | | |
| Devon | 8/23/90 | 70 | 15 | 1.1 | - | 5.2 | - | 31.1 | 13.7 | 0.6 | 1.3 | - | 1.7 | 3.7 | 0.1 | - | - | - |
| BT | 8/22/90 | 69 | 14 | 0.4 | 1.9 | 51.3 | - | 86.1 | 94.5 | 1.8 | 5.0 | - | 9.0 | 0.1 | 0.1 | 0.1 | - | - |
| WCA | 8/21/90 | 70 | 14 | 0.1 | 0.6 | 120.0 | 0.3 | 34.9 | 11.6 | 3.0 | 4.1 | - | 2.4 | 0.2 | - | - | - | 0.1 |
| Dam | 8/20/90 | 70 | 19 | 0.2 | 0.4 | 68.3 | 0.2 | 158.0 | 6.1 | 4.5 | 3.3 | - | 0.8 | 0.1 | 0.1 | - | 0.1 | - |
| All areas combined | - | - | 62 | 0.4 | 0.7 | 60.9 | 0.1 | 83.3 | 29.2 | 2.6 | 3.4 | - | 3.3 | 1.0 | 0.1 | Tr. | Tr. | Tr. |

1-Species abbreviations: WE=walleye; NP=northern pike; YP=yellow perch; Cr=crappie; SPS-spottail shiner; EMS=emerald shiner; WSu=white sucker; Ling=burbot; LCH=lake chub; FHC=flathead chub; LND=longnose dace.

Appendix II. Food preference of northern pike and walleye, 1990.

| Water (date) | Species[1] | Number of stomachs | Number empty | Number of stomachs with food item | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | YP | SS | Fish remains | Shrimp | Crayfish | Leeches | Vegetation | WE | N.Pike |
| Bynum Reservoir (9/13/90) | WE | 17 | 5 | 5 | - | 7 | - | 1 | - | 3 | - | - |
| Lake Francis (9/12/90) | WE | 15 | 5 | 1 | - | 4 | 1 | 4 | - | 1 | - | - |
| | NP | 11 | 6 | - | - | 3 | - | - | 1 | - | 2 | - |
| Tiber Reservoir (9/18-20/90) | WE | 53 | 13 | 11 | 2 | 28 | - | 2 | - | 5 | 1 | - |
| | NP | 59 | 19 | 5 | 1 | 16 | - | 21 | - | - | 1 | 1 |

1-Species abbreviations: NP=northern pike; WE=walleye.

Appendix III. Gill net summaries by area, Tiber Reservoir, 1990.

| Area (date) | No. of nets | Species | No. of fish | Length (in) range | Length (in) (mean) | Weight (lbs) range | Weight (lbs) (mean) |
|---|---|---|---|---|---|---|---|
| Devon (9/20/90) | 4 | WE | 4 | 9.5-12.4 | (11.5) | 0.26-0.57 | (0.47) |
| | | | 1 | - | (14.1) | - | (0.87) |
| | | | 1 | - | (16.9) | - | (1.65) |
| | | NP | 2 | 21.1-28.7 | (24.9) | 2.07-7.00 | (4.53) |
| | | YP | 3 | 5.6- 8.3 | ( 6.6) | 0.09-0.32 | (0.17) |
| | | | 1 | - | (12.3) | - | (0.84) |
| | | Wf | 1 | - | (10.5) | - | (0.38) |
| | | WSu | 1 | - | (17.2) | - | (2.36) |
| | | LnSu | 2 | - | ( 7.2) | - | (0.15) |
| | | | 2 | 17.5-19.3 | (18.4) | 2.34-3.07 | (2.71) |
| | | CCat | 1 | - | (25.0) | - | (6.75) |
| Bootlegger (9/19-20/90) | 6 | WE | 5 | 10.3-12.6 | (11.7) | 0.36-0.64 | (0.51) |
| | | | 4 | 13.3-15.1 | (14.5) | 0.82-1.08 | (0.96) |
| | | | 1 | - | (16.3) | - | (1.70) |
| | | NP | 10 | 10.0-15.5 | (14.1) | 0.22-0.81 | (0.58) |
| | | | 4 | 16.2-17.0 | (16.5) | 0.76-1.04 | (0.93) |
| | | | 5 | 20.7-22.7 | (21.6) | 1.79-2.55 | (2.15) |
| | | YP | 3 | 7.3- 8.2 | ( 7.7) | 0.20-0.26 | (0.22) |
| | | | 1 | - | ( 9.3) | - | (0.38) |
| | | Rb | 2 | 13.4-14.3 | (13.9) | 1.10-1.29 | (1.20) |
| | | | 3 | 19.6-20.8 | (20.2) | 2.70-3.02 | (2.86) |
| | | SNS | 1 | - | (38.0) | - | - |
| | | Carp | 1 | - | (30.0) | - | (14.75) |
| Dam (9/19/90) | 5 | WE | 14 | 7.5-12.7 | (11.2) | 0.14-0.72 | (0.50) |
| | | | 29 | 13.3-15.8 | (14.7) | 0.73-1.46 | (1.07) |
| | | | 22 | 16.0-19.9 | (17.2) | 1.28-2.98 | (1.81) |
| | | | 1 | - | (29.1) | - | (10.25) |
| | | NP | 2 | 10.2-10.4 | (10.3) | 0.20-0.26 | (0.23) |
| | | | 18 | 16.3-19.6 | (17.7) | 0.87-1.57 | (1.22) |
| | | | 3 | 20.1-22.3 | (21.4) | 1.68-2.36 | (2.11) |
| | | Rb | 1 | - | (13.7) | - | (1.13) |
| | | WSu | 4 | 12.7-14.7 | (14.2) | 0.90-1.46 | (1.32) |
| | | | 5 | - | (17.2) | - | (2.32) |
| | | LnSu | 2 | 16.3-18.7 | (17.5) | 1.86-2.98 | (2.42) |
| | | Carp | 1 | - | (11.5) | - | (0.88) |
| | | | 3 | 25.0-29.5 | (28.0) | 10.25-16.5 | (14.42) |

Appendix III. continued.

| Area (date) | No. of nets | Species | No. of fish | Length (in) range | Length (in) (mean) | Weight (lbs) range | Weight (lbs) (mean) |
|---|---|---|---|---|---|---|---|
| Willow Creek Arm (WCA) (9/18/90) | 8 | WE | 20 | 5.3-12.9 | (11.2) | 0.04-0.79 | (0.52) |
| | | | 47 | 13.0-15.9 | (14.5) | 0.73-1.45 | (1.03) |
| | | | 10 | 16.0-18.0 | (16.9) | 1.41-1.92 | (1.64) |
| | | NP | 4 | 8.0-15.4 | (12.4) | 0.12-1.73 | (0.48) |
| | | | 36 | 16.0-19.4 | (17.7) | 0.86-1.73 | (1.21) |
| | | | 12 | 20.0-25.2 | (22.1) | 1.72-3.78 | (2.32) |
| | | YP | 18 | 5.6- 8.2 | ( 7.3) | 0.07-0.25 | (0.19) |
| | | | 1 | - | (10.1) | - | (0.45) |
| | | | 2 | 12.2-12.8 | (12.5) | 0.96-1.20 | (1.08) |
| | | Rb | 1 | - | (20.3) | - | (2.86) |
| | | WSu | 2 | - | ( 7.0) | - | (0.14) |
| | | | 9 | 17.4-19.0 | (17.6) | 2.52-3.55 | (2.63) |
| | | LnSu | 5 | - | (18.4) | - | (3.00) |
| | | Carp | 4 | - | (12.8) | - | (1.20) |