Rep #
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MONTANA DEPARTMENT OF FISH, WILDLIFE & PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE: MONTANA PROJECT TITLE: STATEWIDE FISHERIES INVESTIGATIONS

PROJECT NO.: F-78-R-6 STUDY TITLE: SURVEY AND INVENTORY OF COLDWATER AND WARMWATER ECOSYSTEMS

JOB NO.: V-d TITLE: NORTHEAST MONTANA COLDWATER ECOSYSTEM INVESTIGATIONS

PROJECT PERIOD: JULY 1, 1999 THROUGH JUNE 30, 2000

ABSTRACT

Trout gill net catch-per-unit effort (CPUE) declined for the fourth consecutive year in Beaver Creek Reservoir. Trout gill net CPUE increased in Bear Paw Lake and condition is improving. Trapping has removed 121,042 suckers (22.5 tons) since 1989. The sucker population consists predominately of older fish. Crayfish numbers continue to decline due to bass predation. Smallmouth bass predation severely reduced or eliminated the 1993-97 sucker year-classes. Growth, survival and condition of rainbow trout at Grasshopper Reservoir remains good following a winterkill in the winter of 1995-96. Sucker and trout numbers in Faber Reservoir are decreasing. Condition of trout is declining. Management recommendations for all waters are presented.

OBJECTIVES AND DEGREE OF ATTAINMENT

Survey and Inventory

To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters. Objective accomplished, data presented.

Fish Population Management

To implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors. Objective accomplished, data presented.

Technical Guidance

To review projects by government agencies and private parties which have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources. Objective accomplished, fifteen 310 permit applications were processed; water level recommendations were made to Department of Natural Resources for rehabilitating the dam and spillway at Bear Paw Reservoir; other related activities are presented. Assisted with data gathering and negotiations with Rocky Boy and Ft. Belknap Indian Reservations regarding water rights.

Walleye gill net CPUE has remained steady, but averaged size decreased from 1998. Walleye were introduced in 1987 due to local demand and to help control numbers of yellow perch illegally introduced. No trout were found in 18 walleye stomachs examined in 1998; however, 5 of 24 walleye examined in 1999 had eaten trout. Perch also appear to be a major food item for walleyes.

Gill net catch-rates for yellow perch remained stable, but average size increased. Perch are becoming a much sought-after fish by anglers and good catches are made at all times of the year.

Smallmouth bass, which flushed downstream from Bear Paw Lake, have grown well in the reservoir due to the abundance of crayfish and are being caught on a regular basis. A plant of 5,000 2-inch bass was made in 1998 and 1999. Stomach content analysis of smallmouth bass indicates a preference for crayfish, followed by spottail shiners and yellow perch.

Bear Paw Lake

Bear Paw Lake is a 45 surface-acre reservoir on Beaver Creek in the Bear Paw Mountains. It is maintained with annual plants of McBride strain cutthroat and Arlee rainbow trout. Summer fishing pressure has exceeded 150 angler-days per surface acre in some years. Fishing pressure becomes excessive when acceptable-size fish are readily available. A creel reduction from 10 to 5 fish was imposed in 1987 to distribute the catch under such conditions. Suckers have historically overpopulated this reservoir. The reservoir was chemically rehabilitated in 1983 to reduce sucker numbers. Post-rehabilitation trout growth in 1984 and 1985 was excellent. However, sucker gill net catch increased from a catch per net of 9 in 1985, to 278 per net by 1990 (Figure A). Despite sucker removal efforts, the population remains high. Competition with large numbers of suckers has reduced growth rates of trout significantly. Fishing pressure has decline dramatically since 1988 due to the small size and poor condition of trout. Respondents to an angler survey indicated a desire to catch larger fish, even at the expense of catching fewer fish. The survey results also indicated a preference for cutthroat trout over rainbow trout.

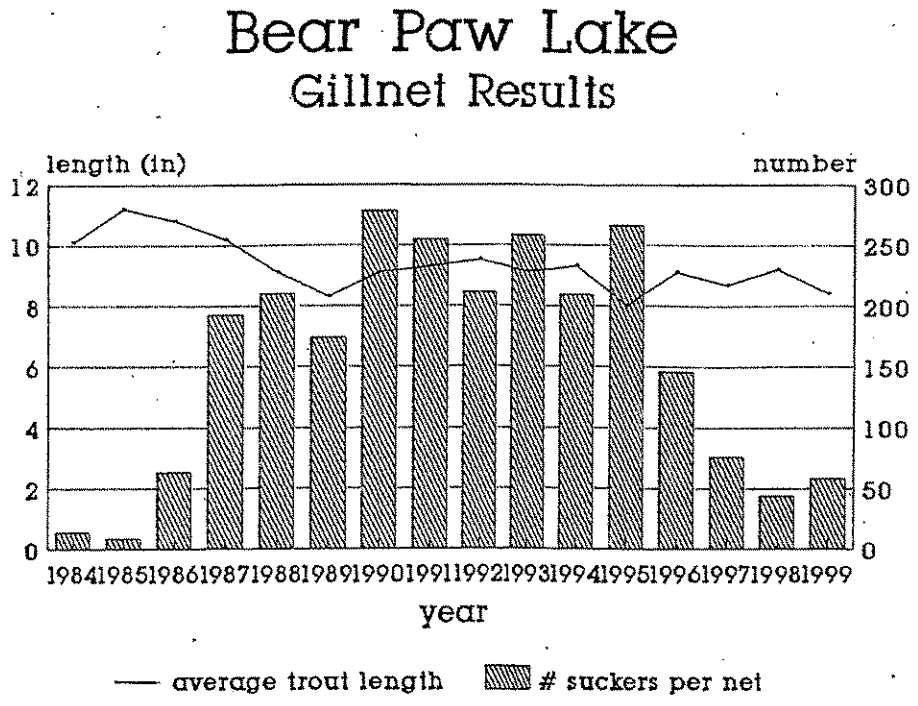

Figure A. Comparison of white sucker increases, after chemical rehabilitation in 1983, with trout growth in Bear Paw Lake.

Drawdown and chemical rehabilitation has been attempted twice. This, however, is not a preferred option for sucker control in this reservoir, primarily due to the loss of recreation, detoxification time, invertebrate loss, bank sloughing, and subsequent trout mortality.

Gill-netting trend data has been collected for a number of years in early September. Utilizing 1988 as a base year, numbers of mature (>10 inches) and juvenile sucker (<10 inches), as they appeared in the catch, were compared with trout CPUE and condition (Table 2). The trout gill-net catch has remained good, and average size and trout condition has improved. Eagle Lake strain rainbow trout had been utilized experimentally since 1986, but were replaced in 1991 with spring

Table 3. Number and poundage of white suckers removed from Bear Paw Lake from 1989 to 1999.

Year	Number	Pounds
1989	12,545	8,986
1990	44,622	10,206
1991	18,140	4,733
1992	4,133	828
1993	5,239	1,050
1994	6,995	810
1995	5,653	2,100
1996	1,991	670
1997	13,485	8,091
1998	6,708	5,206
1999	8,239	7,459
Totals	121,042	44,933

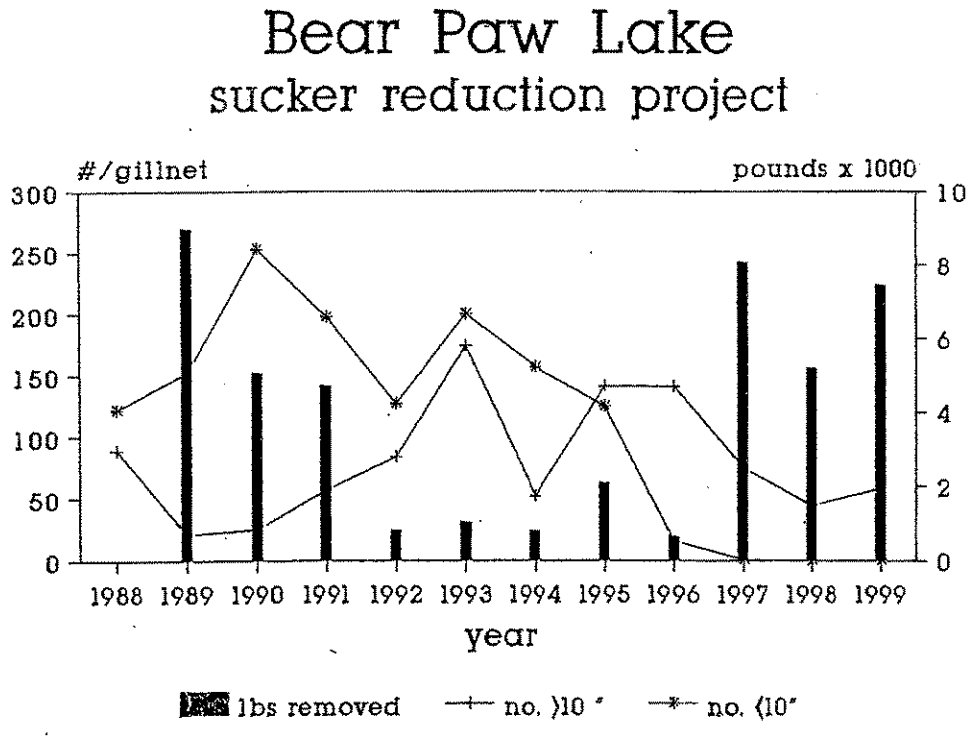

Figure B. Number of juvenile and adult suckers captured per gill net in each year of the study associated with the pounds of suckers removed each year, 1988-99.

suckers, while adult bass were expected to prey heavily on crayfish. Adult smallmouth bass were not expected to consume a significant number of the catchable-size trout stocked annually. Though the primary objective is to improve trout growth, smallmouth bass should make an outstanding addition to the fishery.

A concern that arose during the lengthy environmental review process was that a "no action" alternative, or delay in implementing an action, might cause frustrated fishermen to attempt their own predator introduction. A similar situation (sucker over-population) occurred downstream in Beaver Creek Reservoir in 1982. Unknown individual(s) introduced northern pike into this existing trout fishery apparently to control sucker numbers. Gill netting in Bear Paw Lake in 1992 proved that this was indeed the case, as a single adult walleye was captured. It is believed that only a few fish were illegally introduced and the probability of successful reproduction in this reservoir is extremely low. A fisherman reported catching a northern pike from Bear Paw Lake in 1994, but the report could not be confirmed.

Following an environmental review, 25,000 smallmouth bass fingerlings, averaging 1.3 inches, were introduced into Bear Paw Lake in August of 1992. It was hoped that YOY suckers would suffer immediate depredation losses; however, the bass were too small to effectively feed on YOY suckers. A cool August and September undoubtedly reduced growth rates of bass and over-winter survival of this introductory plant was questionable. No bass were captured in 56 trap-days of effort in the spring of 1993. However, electrofishing the shoreline in mid-July captured 23 age I smallmouth bass, ranging in length from 2.2-5.1 inches. All but two of the bass were taken from the dam face rip-rap. Bass preferred rocky substrate over emergent/submerged vegetation, which was plentiful. A total plant of 40,000 1.7-inch bass was made in July and August of 1993. Another plant of 24,000 fingerlings was made in 1994. No bass were stocked in1995 due to unavailability. A plant of 20,000 bass was made in 1996 and 5,000 were planted in 1998. Stocking of bass was discontinued in 1999, once natural reproduction was documented.

In order to evaluate changes in the forage base due to bass predation, baseline data on sucker and crayfish populations was gathered prior to the smallmouth bass introduction (Figure D). Population data has been gathered annually. A mark-recapture estimate has been made of the sucker population since 1992; however, no sucker estimate was attempted in 1999, due to time and manpower constraints.

the dam face. As YOY bass infiltrated the rocky habitat, they were often cannibalized by older bass. Suckers did not frequent the dam face, but utilized the warmer, weedier upper reservoir causing predator and prey to be spatially separated by late summer. This behavior was observed in each of the three years since introduction. Shoreline rock was placed at two mid-reservoir locations to protect shorelines from wind erosion and provide bass cover. Bass immediately colonized the structures. More detailed food habit analysis is presented in a previous report by Gilge (1994).

Due to the apparent spatial separation of bass and suckers and the short period of active feeding by bass, it was felt that a suitable level of predation may not be exerted upon the sucker population. The use of walleye was investigated and an Environmental Assessment prepared in 1995 (Gilge, 1995). Walleye fingerlings (5,000 1.5-inch) were introduced in May of 1995, and an additional 500 4-inch fish were planted in early fall. An additional plant of 4,000 walleye fingerlings was made in 1996. Three walleye from the 1996 plant were netted in 1997 and ranged in length from 7.6-7.9 inches. Walleye were again planted in 1997. Walleye netted in 1998 ranged from 7.2-10.5 inches. Walleye stocking was discontinued in 1998 as the desired level of predation was achieved.

In light of the reduced juvenile sucker population, it may be feasible at this time to remove large numbers of adult suckers and rely on the existing predator population to keep juvenile recruitment to a minimum.

Grasshopper Reservoir

This reservoir winterkilled during the winter of 1995-1996 and was restocked with Arlee rainbow trout. Survival and condition of trout is good. Over-winter water levels have been marginal in recent years due to increased irrigation demand downstream. Winterkill is likely in most years.

Faber Reservoir

This reservoir is one of the most popular fishing access sites in north central Montana. It has been a consistent producer of quality rainbow trout for three decades.

Adult largemouth bass were found in the reservoir in 1990, the result of an illegal introduction. Shoreline seining and electrofishing were conducted in August of 1993 to determine if bass had successful reproduced. No YOY bass were found; however, numerous YOY white suckers and several adult suckers were captured. This is the first observation of suckers in the reservoir. Two gill nets set the following week captured 25 rainbow trout and 81 adult suckers. Similar gill net sets in 1987 produced 51 trout and no suckers. The suckers ranged in length from 10.6-13.3 inches. In 1994, the same net sets produced only eight rainbow trout, but 128 suckers. No fish from the 1994 fingerling plant were captured, which indicates a probably loss of the entire year-class. In 1995, only four trout were netted along with 169 suckers. The trout catch increased in 1996, while the sucker catch declined sharply (Figure E). Both trout and sucker catches increased in 1997, and survival of fish plants improved. Trout and sucker densities increased again in 1998, but declined in1999. Trout condition, though still good, appears to be on the decline as was expected. An Environmental Assessment was prepared for the introduction of smallmouth bass to the reservoir in an attempt to control recruitment of young suckers. Smallmouth bass were introduced in 1998. Very few bass have been observed since that time.

Gilge, Kent W.; 1995. Effects of Introducing Walleye into Bear Paw, Environmental Assessment For MDFWP, 19pp.

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Momot, W.T., H. Gowing, and P.D. Jones; 1987. The Dynamics of Crayfish and their Role Ecosystems. American Midland Naturalist 99:10-35.

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Waters referred to:

15-4570-03	Beaver Creek Reservoir
15-4560-05	Bear Paw Lake
15-5380-07	Grasshopper Reservoir
15-0320-01	Beaver Creek
15-5140-01	Faber Reservoir

Key Words or Fish Species:

Arlee, Eagle Lake rainbow trout, sucker removal, crayfish, population estimates smallmouth bass, walleye, dietary studies.

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