MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

JOB PROGRESS REPORT

STATE: Montana PROJECT TITLE: Statewide Fisheries Investigations

PROJECT: F-46-R-3 STUDY TITLE: Survey and Inventory of Warm Water Lakes

JOB NO: IV-e JOB TITLE: Tongue River Reservoir Investigations

SEGMENT (FISCAL) PERIOD: July 1,1989 - June 30, 1990

REPORT PERIOD April 1,1989 - March 31, 1990

ABSTRACT

Walleye numbers at Tongue River Reservoir remain high. Fry plants in 1987 and 1988 survived in high numbers. Northern pike are present only at low levels from a 1989 plant of 20,000 swim-up fry. Crappie size at all ages has increased significantly from 1983 to 1989, probably in response to an increase in walleye numbers. Exceptionally low numbers of young of the year fish were found in seine hauls.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To increase the average size of crappie so that 10 percent of crappie in mid-summer gill net catches are at least 250 mm total length. This objective was met. Approximately 13% of crappie in 1989 gill net catches measured at least 250 mm total length.

2. To increase mid-summer gill net catches of walleye to an average of at least 2.0 walleye per overnight experimental gill net set. This objective was met. Catch rates in 1989 averaged nearly 16 walleye per gill net set.

3. To increase mid-summer gill net catches of northern pike to an average of at least 2.0 northern pike per overnight experimental gill net set. This objective was not met for reasons given in "RESULTS AND DISCUSSION."

METHODS

Fish populations were sampled with gill nets and seines. Gill nets were of the sinking experimental type, 125 feet long. A bag seine of 100 feet length and with 1/4 inch mesh was set from a boat and then hauled to shore. Crappie and northern pike were aged from acetate scale impressions.

RESULTS AND DISCUSSION

Experimental gill nets were fished in early August, 1988 over the length of the reservoir for a total of 10 net nights. Results are shown in Table 1. Overall catch rates, which were high in 1988, were nearly as high in 1989 at 96.0 fish per net night. For the first time yellow perch were more abundant than white crappie.

The objective for northern pike of 2.0 fish per overnight gill net set was not met because hatchery production of fingerlings was low and northern pike fingerlings were not planted at Tongue River Reservoir in 1989. The reservoir did receive a plant of 20,000 swim-up fry. Survival of these fish appeared to be low, but growth was excellent. Only two northern pike were sampled in gill nets (Table I). Examination of the scales indicated there were age 0+ fish despite the average size of 448 mm. Growth that fast is rather exceptional.

Walleye catch rates were again high although not quite as high as in 1988. Although only walleye fry (no fingerlings) were planted in 1987 and 1988, high numbers of yearling and 2+ size walleye were sampled in 1989. This suggests significant survival of walleye fry plants in 1987 and 1988, because few if any spawning size walleye were present in spring 1987 and 1988.

The tendency for crappie at Tongue River Reservoir to be larger when walleye are abundant has been noted in the past (Table 2). Data in 1989 further substantiated this relationship. This is likely effected through an increase in crappie growth rates with high walleye numbers.

Table 3 compares crappie mean size at age in 1983 (low walleye abundance) with 1989 (high walleye abundance). Crappie were longer at each age in 1989. The difference in size at age was significant at the 99% level of confidence.

Table 4 gives results of 11 seine hauls at the reservoir in August, 1989. This technique is usually quite effective for small young of the year fish. Average catch per seine haul in 1989 was the lowest since annual seining began in 1983. The years 1983 through 1988 averaged 241 fish per haul. The average for 1989 was 15.3 fish per haul. In the years 1983 - 1988 crappie young of the year were usually the most abundant fish in seine hauls. In 1989 no young of the year crappie were seen in seine hauls.

Table 3. Comparison of average size at ages 1+ through 5+ for white crappie at Tongue River Reservoir in August 1983 and August 1989.

Age	Mean Length(mm) and (Number aged) 1983	1989	Difference (mm)
1+	127 (1)	142 (34)	15
2+	175 (11)	226 (59)	51
3+	212 (42)	250 (7)	38
4+	252 (3)	278 (9)	26
5+	263 (2)	286 (4)	23

Table 4. Results of 11 seine hauls at Tongue River Reservoir, August, 1989.

Species	Number Caught	Mean No./ Haul	Mean Length (mm)	Mean Weight (gm)	Length Range (mm)	Weight Range (gm)
Carp	6	0.5				
Shorthead redhorse	8	0.7	290	349	150-503	40-1290
Yellow bullhead	1	0.1	144	40		
Pumpkinseed	12	1.1	114	42	75-135	10- 65
Smallmouth bass	52	4.7	155	55	100-245	10- 190
Smallmouth bass YOY	20	1.8	62		50- 77	
Largemouth bass	4	0.4	193	98	180-201	70- 120
Largemouth bass YOY	5	0.5	59		45- 77	
White crappie	2	0.2	128	25	120-137	20- 30
Black crappie	1	0.1	196	120		
Yellow perch	29	2.6	141	32	106-195	10- 70
Yellow perch YOY	23	2.1	59		53- 64	
Walleye	3	0.3	271	140	265-277	130-150
Walleye YOY	2	0.2	120		118-123	
Totals	168	15.3				

Table 1. Results of 10 overnight experimental gill net sets at Tongue River Reservoir, August 1989.

Species	No. Caught	Mean No. Per Net Set	Mean Length (mm)	Mean Weight (gm)	Length Range (mm)	Weigh Range (gm)	Percentage of Catch
Northern Pike	2	0.2	448	550	440-455	550-550	0.2
Carp	22	2.2	478	1351	305-543	350-1990	2.3
Shorthead redhorse	44	4.4	354	535	163-480	40-1350	4.5
White sucker	58	5.8	359	551	226-441	120-1020	6.0
Longnose sucker	1	0.1	385	700			0.1
Yellow bullhead	144	14.4	208	120	145-324	25-550	15.0
Black bullhead	55	5.5	188	96	133-252	30-200	5.7
Channel catfish	15	1.5	477	1232	212-633	80-2960	1.6
Pumkinseed	1	0.1	125	45			0.1
Smallmouth bass	19	1.9	240	209	156-395	30-900	2.0
Largemouth bass	1	0.1	216	140			0.1
White crappie	171	17.1	207	128	103-296	15-320	17.8
Black crappie	18	1.8	196	125	112-273	20-310	1.9
Yellow perch	250	25.0	205	102	146-261	50-220	26.0
Sauger	2	0.2	514	1185	472-555	830-1540	0.2
Walleye	157	15.7	343	391	240-516	90-1350	16.3
Totals	960	96.0					99.9

Table 2. Tongue River Reservoir walleye gill net catch rates [a] and percentage of crappie >250 mm total length in experimental gill nets, 1980-1989.

Year	Walleye Catch Rate [a]	Walleye Mean Total Length (mm)	Percentage of Crappie >250 mm Total Length
1989	15.7	343	12.8
1988	19.4	332	18.9
1987	5.6	279	4.2
1986	1.6	273	0.0
1985	0.6	463	2.7
1984	0.4	417	1.2
1983	0.2	427	3.4
1982	2.0	397	1.7
1981	5.6	377	27.8
1980	4.3	319	11.4

[a] Average number of walleye per overnight experimental gill net set.

The general paucity of young fish in 1989 seine hauls and the complete absence of crappie young of the year, coupled with two consecutive years of high walleye numbers suggests that walleye predation may be limiting the survival of young fish. The spottail shiner is being considered for introduction to supplement the supply of forage fish.

Waters Referred to: Tongue River Reservoir 7-21-9000

Key Words: Crappie Walleye Management

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