

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

STATE: Montana PROJECT NO. F-46-R-2
PROJECT TITLE: Statewide Fisheries Investigations JOB NO. II-e
STUDY TITLE: Survey and Inventory of Coldwater Lakes
JOB TITLE: Northcentral Montana Coldwater Lakes Investigations

PERIOD COVERED: July 1, 1988 through June 30, 1989

ABSTRACT

Evaluation of rainbow trout strains continued in several waters. AXE hybrid rainbow trout grew better in Bean lake than in Willow Creek Reservoir. Arlee rainbow trout grew better than AXE but survival was not as good. Catchability of both strains appeared good but longevity was a problem. Poor survival of the Arlee strain in Eureka Reservoir is discussed. Arlee rainbow trout in Nilan Reservoir continue to produce an excellent fishery with good survival, fair growth, but poor longevity. No response has been observed from attempts to improve the kokanee salmon population in Pishkun Reservoir. Drought conditions and low water levels forced us to cancel trout plants scheduled in many ponds and small lakes in the region. Water levels in Bair and Smith River Reservoirs dropped lower than what would allow fish to overwinter. The planting program for East Fork Spring Creek Reservoir was changed by introducing brown trout. Survival of Arlee rainbow trout appeared greater than among Eagle Lake rainbow trout also planted during 1988 in Ackley Lake.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To recommend acceptable water levels in irrigation reservoirs, within hydrologic constraints, for maintaining fishery values of last 10 years. (State funded.)
2. To establish a self-sustaining trout fishery in Smith River Reservoir that will support 5,000 angler days annually with a catch rate of 0.4 fish per hour.
3. To provide longer-lived, larger trout with adequate growth rates in Willow Creek, Bair, Ackley, East Fork Dam and Newlan Creek Reservoirs for 50,000 angler days annually.
4. To provide 10,000 angler days fishing in Bean Lake for 1 to 3 pound rainbow trout.
5. To provide 28,000 angler days per year for 11 to 20 inch trout in Fitzpatrick Lake and Martinsdale and Eureka Reservoirs.

6. To reduce rough fish populations for maintenance of 11 to 20 inch trout in 5 lakes and ponds. (State funded).
7. To maintain (within hydrologic constraints) viable trout fisheries in 60 ponds and small reservoirs. (Partly State funded).
8. To improve the kokanee fishery in Pishkun Reservoir to satisfy 5,000 angler days annually.
9. To provide 1,000 angler days of fishing for mature salmon in the Helena Valley Regulating Reservoir.
10. To maintain current level of fishing opportunity on Bean, Ackley and Fitzpatrick Lakes and Newlan Creek Reservoir. (State funded).

Progress was made on all federally funded objectives and data are included in this report. Data for some state objectives are included in this report to provide current information for regional lakes.

PROCEDURES

Netting surveys were conducted using standard 6'x 125' experimental gill nets (nylon and monofilament). Unscheduled creel census was conducted on several waters. Fin clips, tetracycline, and fluorescent pigment marks were used to identify various strains of rainbow trout where more than one strain was stocked in a water. Kokanee salmon were stocked by boat to obtain better distribution. A Humminbird 4x6 LCR was used to locate various species prior to setting nets. We utilized an electronic thermometer to obtain temperature profiles in lakes and reservoirs.

FINDINGS

Rainbow Trout Strain Evaluations

Rainbow trout strain evaluation continued in the six lakes and reservoirs (Table 1). Eagle Lake rainbows are currently being evaluated in Ackley, Bair and East Fork Spring Creek reservoirs. This strain is apparently well suited to productive waters where it typically grows to large size, displays good catchability, and will feed on chubs. All three Region 4 reservoirs have dense sucker populations and it was hoped that Eagle Lake rainbows would utilize this potential food source.

DeSmet rainbow were planted in Smith River Reservoir, also known as Lake Sutherlin, in 1986 and 1987. The reservoir was not planted in 1988. We made these plants in an attempt to establish a naturally

Table 1. Overnight gill netting results in coldwater lakes and reservoirs in Region Four during 1988.

Water name (Date surveyed)	Surface acres	No. of ¹ nets	Mean hours fished/net	Species, strain ² & year planted	No. of fish	Length(in)		Weight(pounds)		Condition factor	
						Range	Mean	Range	Mean	Range	Mean
Ackley Res. (10/4/88)	240	1F, 1S	13.4	Rb-A-1988	21	6.4-10.3	(9.2)	0.12-0.46	(0.33)	32.2-51.3	(40.97)
				Rb-I-1988	9	6.3-7.7	(7.1)	0.09-0.18	(0.13)	24.4-41.1	(35.02)
				Rb-A-1987	1	-	(13.1)	-	(0.89)	-	(39.59)
				Rb-I-1987	54	11.9-15.3	(13.9)	0.64-1.21	(0.98)	30.8-46.3	(36.73)
				Rb-A-1986	0	-	-	-	-	-	-
				Rb-I-1986	22	16.1-18.8	(17.5)	1.38-2.43	(1.96)	32.4-42.2	(36.39)
				LL	6	10.7-18.6	(16.1)	0.45-2.42	(1.73)	35.4-47.2	(38.91)
				LnSu	24	6.7-17.3	(9.8)	0.11-1.84	(0.46)	29.5-49.0	(39.52)
				WSu	46	6.5-14.1	(10.9)	0.11-1.26	(0.64)	35.0-48.0	(41.60)
Bair Reservoir	Not netted										
Bean Lake (10/7/88)	200	2S	16	Rb-AXE-1988	44	9.4-11.4	(10.3)	0.35-0.69	(0.45)	-	-
				Rb-A-1988	15	11.7-12.7	(12.1)	0.63-0.90	(0.74)	-	-
				Rb-A-1987	3	14.9-15.3	(15.1)	1.30-1.46	(1.36)	-	-
				Rb-A	1	-	(17.0)	-	(1.93)	-	-
East Fk Spring Creek Res. (9/22/88)	100	1F, 1S	23.75	Rb-I-1987	32	8.7-13.2	(10.4)	0.25-0.80	(0.42)	31.3-41.6	(35.70)
				Rb-I-1986	2	-	(15.2)	1.30-1.40	(1.35)	37.0-39.9	(38.44)
				Rb-I-1985	1	-	(17.2)	-	(1.95)	-	(38.32)
				NP	3	24.0-26.2	(24.8)	3.50-5.22	(4.17)	25.3-29.0	(27.05)
				YP	1	-	(9.7)	-	(0.50)	-	(54.78)
				LnSu	2	10.0-10.7	(10.3)	0.40-0.43	(0.42)	35.1-40.0	(37.55)
WSu	57	6.1-11.6	(8.5)	0.10-0.68	(0.28)	32.6-75.4	(42.10)				
Smith River Res.	Not netted										
Willow Creek Res. (10/6/88)	1100	2F	23	Rb-AXE-1988	91	7.3-9.5	(8.7)	0.14-0.30	(0.24)	-	-
				Rb-AXE-1987	35	11.2-13.3	(12.5)	0.52-0.80	(0.67)	-	-
				Rb-AXE-1986	4	13.9-14.3	(14.1)	0.85-0.89	(0.87)	-	-
				Rb-	1	-	(15.5)	-	(1.22)	-	-
				WSu	4	12.6-14.8	(13.3)	0.82-1.30	(0.98)	-	-
Eureka Reservoir (10/12/88)	40	2F	19	Rb-A-1988	2	11.9-13.0	(12.5)	0.78-0.94	(0.86)	-	-
				Rb-	1	-	(17.7)	-	(2.28)	-	-
				LL	4	11.5-14.0	(12.7)	0.57-0.98	(0.76)	-	-
				LL	10	17.0-25.0	(20.2)	1.80-5.25	(3.16)	-	-
				WSu	12	-	-	-	-	-	-
Holter Reservoir	Not netted										
Martinsdale Res. (10/3/88)	1000	1F, 1S	2	Rb-A-1988	15	8.9-10.8	(9.8)	0.27-0.53	(0.41)	36.0-49.6	(43.04)
				Rb-A-1987	24	11.3-13.5	(12.5)	0.50-0.84	(0.72)	32.0-44.0	(37.06)
				LL	4	8.3-20.3	(14.2)	0.21-3.20	(1.40)	34.9-40.0	(37.46)
				WSu	78	6.1-18.4	(12.0)	0.10-2.70	(0.95)	34.5-48.1	(41.95)
Hilan Reservoir (10/6/88)	250	2F	23	Rb-A-1988	87	9.0-10.6	(9.7)	0.26-0.43	(0.35)	-	-
				Rb-A-1987	21	12.0-14.4	(13.6)	0.58-0.90	(0.82)	-	-
				LL	1	-	(26.5)	-	(7.00)	-	-
				WSu	2	8.2-9.7	(9.0)	0.23-0.40	(0.32)	-	-
				WSu	4	13.4-14.9	(14.1)	1.01-1.12	(1.07)	-	-
Newlan Creek Res. (9/15/88)	280	2F, 1S	14	Yct	80	8.2-17.4	(11.3)	0.22-1.88	(0.58)	31.3-41.0	(36.36)
				Rb	21	7.9-17.7	(13.1)	0.19-1.80	(0.89)	31.1-50.8	(37.61)
				BT	2	11.0-11.7	(11.3)	0.52-0.70	(0.61)	39.1-43.7	(41.39)
				LnSu	134	-	-	-	-	-	-
Pishkun Reservoir (7/20/88)	1300	5S	19	KOK	1	-	(15.2)	-	(1.17)	-	-
				NP	16	14.9-25.0	-	0.73-4.23	-	-	-
				YP	119	5.5-11.3	-	0.08-0.66	-	-	-
(8/4/88)	1300	2F, 3SS	19	NO FISH							

1-Standard experimental gill nets (nylon and monofilament); F=Floating; S=Sinking; SS=Suspended

2-Species abbreviations: Rb=Rainbow trout; LL=Brown trout; Yct=Yellowstone cutthroat trout; BT= Brook trout; KOK=Kokanee salmon; NP=Northern pike; YP=Yellow perch; WSu=White sucker; LuSu=Longnose sucker
Strain abbreviations: A=Arlee; AXE=Arlee x Eagle Lake Hybrid; I=Eagle Lake

reproducing population in the reservoir that would use two available spawning streams. The DeSmet is a wild strain that reproduces well in some areas, has relatively slow growth and good longevity, faircatchability, and feeds on zooplankton and macroinvertebrates.

A hybrid cross between Arlee and Eagle Lake rainbow trout strains, which will be referred to in this report by the term AXE, has been planted in Willow Creek reservoir since 1984 and were introduced to Bean Lake in 1988. This hybrid reportedly displays similar or better growth and catchability than the Arlee strain and better ability to overwinter successfully.

Ackley Lake

Gill netting at Ackley Lake allowed us to continue the Arlee-Eagle Lake rainbow trout strain evaluation (Table 1). Survival of Arlee rainbow trout in 1988 appears superior to the Eagle Lake strain planted the same season and to other Arlee plants made in previous years. The Arlee rainbow trout plant occurred in mid-May rather than than mid-April and may have influenced survival.

Bair and Smith River Reservoir

Extremely low water levels in Bair and Smith River reservoirs prevented us from sampling these waters. In fact, fish were trapped and transplanted from Smith River Reservoir to nearby waters in September 1988 when water elevations dropped to critically low levels where fish could not have overwintered.

East Fork Spring Creek Reservoir

Survival of Eagle Lake rainbow trout through the second growing season appeared adequate but the average size was low (Table 1). Switching strains does not appear to have changed this from a marginal fishery for small trout. During May 1988 brown trout were planted in the reservoir. We plan on evaluating the growth of the brown trout and the utilization of the dense population of stunted suckers present in the reservoir as a food source.

Bean Lake

Bean Lake has historically been planted with Arlee rainbow trout. In addition, progeny rainbow from eggs collected in the wild were planted in 1980 and DeSmet rainbow were stocked in 1982 and 1984. The wild rainbow had fair survival initially but essentially disappeared by the second summer (Hill and Wipperman 1982 and 1983). DeSmet rainbow showed good survival and longevity superior to Arlee but did not grow as well as Arlee (Hill and Wipperman 1986).

Poor survival of Arlee rainbow trout has occasionally failed to provide a fishery in Bean Lake. However, in most years, survival is good and this strain has exhibited good growth and catchability. Longevity continues to be a factor where improvement should occur. In 1988, 20,000 Arlee were stocked on April 26, and 20,000 AXE were planted on June 22. The latter were marked with tetracycline. Gill net surveys in October indicate survival was better for AXE rainbow (Table 1) but growth was better for Arlee rainbow. Both strains appear equally catchable as determined through creel checks of ice fishermen.

Willow Creek Reservoir

Each year since 1984, we have planted 75,000 Arlee-Eagle Lake hybrid (AXE) rainbow trout in Willow Creek Reservoir. Examination of the growth histories of the Arlee and AXE strains suggests that Arlee grow faster (Table 2). The growth of AXE rainbow trout in Willow Creek Reservoir is less than the growth for the strain in Bean Lake (Table 1), which suggests a greater availability of preferred food items at Bean Lake. Survival rates are comparable but AXE may be slightly greater. Longevity is similar for both strains with few fish reaching the third growing season. Catchability of AXE rainbow has been good.

Other Large Reservoirs

Eureka Reservoir

Survival of Arlee rainbow trout in Eureka Reservoir continues to be extremely poor (Table 1). Only two fish from the 1988 plant were sampled in gill nets in October. Principal factors affecting survival include the extremely low water levels experienced during several drought years as well as escapement through the outlet works. Brown trout enter the reservoir via the Teton River and are providing the bulk of the fishery.

Nilan Reservoir

Nilan Reservoir continues to provide an excellent fishery with Arlee rainbow trout. Survival has been good and growth rates remain stable. A total of 108 rainbow trout representing two year classes were collected in gill nets in October (Table 1). A combination of high harvest and poor longevity results in few trout remaining into the third year following stocking.

Pishkun Reservoir

Gill nets were fished on two occasions to assess the kokanee salmon

Table 2. Growth comparisons of Arlee and AYE rainbow, Willow Creek Reservoir.
 (Based on fall Rill netting).

Planting Year	Strain	1st Year Growth			2nd Year Growth		
		No. of Fish	Length Range (Avg.)	Weight Range (Avg.)	No. of Fish	Length Range (Avg.)	Weight Range (Avg.)
1977	Arlee	17	10.3-12.9(11.5)	0.42-0.86(0.61)			
1978	"	108	9.4-11.1(10.3)	0.30-0.54(0.42)	20	12.9-13.7(13.4)	0.76-1.13(0.89)
1979	"	15	9.9-11.1(10.5)	0.30-0.50(0.41)	9	12.7-13.7(13.3)	0.74-0.92(0.82)
1980	"	14	9.4-10.2(09.8)	0.32-0.41(0.36)	9	13.2-15.0(14.1)	0.74-1.19(0.93)
1981	"	36	9.5-10.8(10.3)	0.37-0.49(0.43)	15	13.4-14.7(14.0)	0.80-1.24(1.02)
1982	"		(No survey)			(No survey)	
1983	AYE	21	6.7-08.2(07.2)	0.10-0.16(0.13)	38	12.3-14.3(13.2)	0.68-0.92(0.78)
1984	"	8	8.2-10.0(09.9)	0.12-0.40(0.26)	19	12.2-13.6(12.8)	0.59-0.80(0.69)
1985	"	21	7.3-09.2(08.3)	0.15-0.30(0.23)	24	11.5-13.0(12.4)	0.55-0.71(0.64)
1987	"	35	8.3-09.8(09.0)	0.22-0.30(0.27)	14	11.2-13.8(12.2)	0.49-0.78(0.59)
1983	"	91	7.3-09.5(08.7)	0.14-0.30(0.24)	35	11.2-13.3(12.5)	0.52-0.80(0.67)

population in Piskun Reservoir. Only one kokanee was taken during the two sampling dates (Table 1). A fish locator was used to locate concentrations of fish prior to setting the nets. Large numbers of fish were observed near the bottom at depths of 30-40 feet and also suspended around 20 feet. Sinking gill nets on July 20 indicated that fish on the bottom were yellow perch. On August 4, nets were fished on the surface and suspended but no fish of any species were caught. A total of 300,000 kokanee approximately 2 inches in total length were stocked in early May. It is possible that these were the fish suspended at 20 feet and they were too small to become entangled in the nets. Predation by northern pike on kokanee does occur. Of 16 northern pike stomachs analyzed from the July 20 survey, kokanee were found in 2 stomachs.

Holter Reservoir

Holter Reservoir was not netted during management surveys within this reporting period.

Martinsdale and Newlan Creek Reservoirs

The Arlee rainbow trout planted in Martinsdale reservoir were represented at a rate higher than even the 1988 plant in fall gill net surveys (Table 1). Although the 1987 plant did not grow as fast as in other waters, the growth displayed is adequate when low water levels in the reservoir are taken into consideration. The fall survey at Newlan Creek Reservoir showed a continuation of healthy populations of stocked McBride strain Yellowstone cutthroat trout and wild, naturally reproducing rainbow trout (Table 1).

Helena Valley Regulating Reservoir

Fishery data gathered from the Helena Valley Regulating Reservoir during 1988 will be summarized and presented in the next annual report.

Small Ponds, Lakes, and Reservoirs

Lewistown Area Ponds

We did not survey any coldwater ponds in the Lewistown area during the reporting period. However, we did sample ponds in the eastern portion of Region Four in May-June 1988 and July 1989. Data from the most recent work will be summarized in the next annual report.

Choteau Area Ponds

Most of the ponds in the area experienced very low water levels or dried up due to drought conditions. For this reason, scheduled trout stockings were canceled in the following waters: Henry, Lindseth, Myrvold, Stephens, and Stewart ponds, Cameron and Ostle reservoirs, as well as Fitzpatrick Lake and Lake Shel-oole.

DISCUSSION AND RECOMMENDATIONS

Arlee rainbow trout continue to provide a good fishery in Nilan Reservoir. Survival and catchability in 1988 was good with fair to good growth rates. Very poor survival of Arlee was experienced in Eureka Reservoir, however, growth of the survivors was excellent. Poor survival may relate to low water levels, predation by brown trout and escapement out of the reservoir. Bean Lake Arlee showed poor to fair survival with good growth and catchability. Longevity of Arlee rainbow is poor in all three waters, with few fish remaining into the third summer following stocking. High harvest rates are probably a contributing factor.

Survival and catchability of AXE rainbow is good in Bean Lake and Willow Creek Reservoir. Growth is better in Bean Lake and is attributed to large numbers of invertebrate organisms. AXE growth rates are lower than ARlee in both waters. Longevity is similar with both strains, that being short-lived.

The following recommendations will be carried out in 1989. Continue with Arlee rainbow in Nilan Reservoir. Stock Bean Lake with equal numbers of Arlee and AXE rainbow trout and monitor growth and longevity into second and third years. Convert Willow Creek Reservoir back to Arlee, which should improve growth. Plant AXE in Eureka Reservoir and change stocking location to avoid escapement through outlet. Initial survival is expected to be better than Arlee. Growth of AXE should be better in Eureka than in Willow Creek because of larger invertebrate populations.

Reestablishment of the kokanee salmon fishery in Piskun Reservoir continues to be a problem due to poor survival or other unknown causes. Annual plants of 300,000 kokanee fry will be made through 1991. Predation by northern pike will be monitored. If a fishery hasn't developed by 1991, kokanee stocking will be discontinued.

Several ponds and small lakes in the Choteau area were not planted in 1988 due to the drought. These waters will be restocked as water levels improve.

LITERATURE CITED

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Principal Fish Species Involved:

Rainbow trout, brown trout, Yellowstone cutthroat trout, kokanee salmon

Code Numbers of Waters Referred To In Report:

14-7120 Cameron Reservoir
14-7320 Eureka Reservoir
14-7370 Fitzpatrick Lake
14-7620 Henry Pond
14-8055 Lindseth Pond
14-8250 Myrvold Pond
14-8420 Ostle Reservoir
14-8935 Lake Shel-cole
14-9081 Stephens Pond
14-9091 Stewart Pond
16-4300 Ackley Lake
16-4950 East Fork Spring Creek Reservoir
17-9075 Helena Valley Regulating Reservoir
17-9136 Holter Reservoir
17-9330 Newlan Creek Reservoir
17-9616 Smith River Reservoir
17-8720 Bean Lake
18-7750 Bair Reservoir
18-8380 Martinsdale Reservoir
20-7900 Nilan Reservoir
20-7950 Pishkun Reservoir
20-8500 Willow Creek Reservoir

