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

STATE: Montana PROJECT NO. F-78-R-1
PROJECT TITLE: Statewide Fisheries Investigations
JOB TITLE: Northcentral Montana Coldwater Lake Ecosystems

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

ABSTRACT

Four strains of rainbow trout continued to be evaluated in Region Four waters. DeSmet and AXE rainbow provided a good fishery in Eureka Reservoir and DeSmet migrated up the inlet channel to spawn. Eagle Lake stocked in Nilan Reservoir in 1994 had good survival. Arlee rainbow stocked in Pishkun Reservoir were 4.5 lb after two summers in the lake and 8-9.75 lb after three summers. Eagle Lake rainbow reached 3.5 lb after two summers in Pishkun. In Smith River Reservoir, survival of both the Arlee and the DeSmet strains of rainbow trout increased over levels observed in gill net catches during the last reporting period. Good survival of wild fish was observed from Smith River Reservoir; wild fish comprised half of the total gill net catch. Eagle Lake had fair to good survival in Ackley Lake while Arlee had poor survival. Grayling were again stocked in Lake Levale to compliment those introduced in 1993. Water levels remained low in Bean Lake and partial winterkill is suspected. As in the past, survival of Yellowstone cutthroat trout was poor in Newlan Creek Reservoir and management actions have been taken to increase trout growth and survival. Martinsdale Reservoir had good survival of 1993 and 1994 Arlee plants, but Yellowstone cutthroat survival was poor to fair. Water levels remained high in Yellow Water Reservoir resulting in excellent trout growth and good numbers in 1994. Big Casino Reservoir exhibited extremely slow first summer growth of Arlee rainbow trout and high white sucker numbers. Buffalo Wallow Reservoir was successfully rehabilitated with synergized rotenone. Lower Carter Pond was drained and the headgate repaired to stop leakage. Information from 9 ponds and reservoirs in the Choteau area, 12 in the Great Falls area and 9 in the Lewistown area are included in this report. Management recommendations are presented.

OBJECTIVES

1. To identify and monitor the characteristics and trends of fish populations, angler harvest and preferences, and habitat conditions in northcentral Montana coldwater lake/reservoir/pond

2. Use survey and inventory information to identify management problems and opportunities, then develop and implement management actions to maintain fish populations at levels consistent with habitat conditions or other limiting factors.

3. Review projects proposed by state, federal, and local agencies and private parties which have the potential to affect fisheries resources and aquatic habitats. Provide technical advice or decisions to reduce or mitigate resource damage.

4. Provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources and aquatic habitat.

5. Enhance public understanding and awareness of fishery and aquatic habitat resources and issues in northcentral Montana through oral and written communication.

PROCEDURES

Fish populations were sampled using; standard 125 x 6 ft experimental multifilament nylon gill nets with 25 ft sections of 0.75, 1.0, 1.25, 1.5 and 2.0 in square mesh; 3 x 4 ft frame trap nets (0.25 in square mesh); 4 x 6 ft frame trap nets (1.00 in square mesh); backpack electrofishing gear; hook and line; and periodic creel census. Gill nets were fished either sinking or floating. Fish were measured to the nearest tenth of an in and weighed to the nearest hundredth of a lb. Various rainbow trout strains were marked with fin clips, tetracycline or fluorescent pigment. Gill net survival ratings were grouped under the following categories: good $\geq$ 8.0 fish per net, fair = 4.0-7.9 fish per net, poor = 0.0-3.9 fish per net. Buffalo Wallow Reservoir was treated with 2.5% synergized Nusin Noxfish rotenone. The reservoir was treated with about 40 gallons of chemical for a final concentration of 2.4 mg/l. Rotenone was pumped into the bottom of the reservoir in areas greater than 10 ft deep.

FINDINGS

Rainbow Trout Strain Evaluation

Several waters in Region 4 continue to be stocked with various strains of rainbow trout. Previous reports presented the history of the strains used and management recommendations. Pertinent recent findings are discussed below, in the appropriate management area for each water.

Choteau Management Area

Bean Lake- Drought conditions during the past several years have precluded any runoff into this natural lake with a limited drainage area. Water levels continue to be lower than desired, with maximum depths of 16-17 ft. A total of 86 rainbow trout were taken in the September gill net survey (Table 1). Although not apparent from the netting, anglers reported catching fair numbers of trout in the 2-4 lb range. Good survival was found for both Arlee and AXE (Arlee x Eagle Lake) rainbow trout, which are stocked in equal numbers. In February 1995, dissolved oxygen concentration measured 3.0 mg/l at the surface and 2.5 mg/l at 10 ft. Ice fishermen reported limited success throughout the winter and observed trout swimming on their sides, suggesting possible oxygen deficiencies.

Eureka Reservoir-DeSmet and AXE rainbow are stocked in this water. In 1994, some Arlee were still present from plants made in previous years. Two floating gill nets caught 13 rainbow trout along with 5 brown trout (Table 1). The reservoir was evacuated to dead storage by the end of the summer due to irrigation demand. In addition to fish taken in gill nets, a number of rainbow trout caught by anglers were observed and measured. Examination of vertebrae for tetracycline marks indicated that the 1994 plant of DeSmet had very good survival but there was little to no survival for AXE. Good numbers of rainbow trout stocked in 1992 and 1993 were also caught but it is unknown whether they were DeSmet or AXE due to a mix-up in the marking scheme. Several minnows collected on August 26, 1994, were identified by Dr. Bill Gould (personal communication) as northern redbelly dace and northern redbelly dace X finescale dace hybrids.

Nilan Reservoir- Eagle Lake and Arlee rainbow trout are stocked in this reservoir. The 10 rainbow trout taken in two floating gill nets in September (Table 1) were all Eagle Lake strain. This contrasts to the 1993 gill netting, in which only Arlee were taken (Hill and Liknes 1994). Anglers also caught both strains in September 1994.

Pishkun Reservoir- Only three Eagle Lake rainbow, stocked four days earlier, were taken during the gill netting survey (Table 1). Predation by northern pike seems to be quite significant. Of 13 northern pike taken in gill nets, 6 had one or two newly stocked Eagle Lake in their stomachs. Trout that manage to escape predation grow quite rapidly. Along with wild rainbow trout that enter from the Sun River, stocked Arlee and Eagle Lake strains are providing a near trophy fishery in this water. Both strains weigh 3-4.5 lb after two summers in the lake. Arlee residing in the lake for three summers have been weighed at 8-9.75 lb. Fish are stocked at two sizes, 4-5 in and 8-9 in. None of the smaller fish are known to have made it into the fishery.

Table 1. Overnight gill netting results in coldwater lakes and reservoirs in the western portion of Region Four, 1994.

Water (date)	Surface acres	No. of nets	Mean hours fished/net[1]	Species/strain year planted[2]	No. of fish	Length (in.) range (mean)	Weight (lbs.) range (mean)
Bean Lake (9-23-94)	180	2 S	18.5	Rb-AXE-1994	59	8.2-10.8 (9.7)	0.25-0.59 (0.41)
				Rb-AXE-1992	2	15.4-17.4 (16.4)	1.43-2.24 (1.84)
				Rb-A-1994	33	11.0-12.7 (11.8)	0.57-0.89 (0.77)
				Rb-A-1992	2	18.0-19.1 (18.6)	2.66-3.07 (2.87)
Eureka Res. (9-28-94)	50	2 F	18.5	Rb-D-1994	10	9.9-15.1 (12.1)	0.33-1.09 (0.61)
				Rb-D-1993	2	14.1-15.4 (14.8)	0.86-1.20 (1.03)
				Rb-A-1993	1	(15.1)	(1.04)
				LL	5	13.6-21.5 (17.2)	0.85-3.49 (1.85)
				WSu	2	9.7-10.9 (10.3)	0.37-0.52 (0.45)
Nilan Res. (9-27-94)	400	2 F	19.5	Rb-I-1994	9	7.3- 9.5 (8.7)	0.16-0.34 (0.25)
				Rb-I-1993	1	(15.5)	(1.35)
Pishkun Res. (9-16-94)	900	4F,4S	15.8	Rb-I-1994	3	8.8-10.5 (9.8)	0.28-0.52 (0.41)
				KOK	5	8.8-13.0 (9.9)	0.22-0.76 (0.34)
					8	14.6-17.7 (15.9)	1.08-1.68 (1.25)
				NP	4	8.5-13.5 (11.7)	0.15-0.60 (0.40)
					5	17.8-20.3 (19.2)	1.64-2.27 (1.93)
					4	26.8-33.3 (30.7)	----
				YP	30	5.4- 8.9 (7.3)	0.08-0.42 (0.26)
					5	9.1-11.0 (9.9)	0.39-0.82 (0.53)
				WSu	6	10.8-13.0 (12.1)	0.58-1.19 (0.89)
					19	14.0-19.0 (15.8)	1.38-3.56 (2.00)
Willow Cr Res (9-27-94)	1100	3 F	18.8	Rb	62	7.2- 9.8 (8.8)	0.14-0.34 (0.26)
					10	13.8-16.5 (14.8)	0.90-1.46 (1.07)
				WSu	2	6.8-10.9 (8.9)	0.13-0.53 (0.33)

[1]- F = floating; S = sinking: [2]-Species abbreviations: Rb=rainbow trout; LL=brown trout; KOK = kokanee salmon; NP=northern pike; YP=yellow perch; WSu=white sucker: Strain abbreviations- AXE=Arlee-Eagle Lake cross; A=Arlee; D=DeSmet; I=Eagle Lake.

Willow Creek Reservoir- AXE rainbow trout are stocked in this water and September netting showed good survival of the 1994 plant with 62 fish taken (Table 1). Ten AXE from earlier plants were also captured.

Lake Levale - Approximately 1000 arctic grayling were transported by pack string and planted in this water on August 8, 1994. Grayling introduced in 1993 were observed feeding on the surface and appeared to be approximately 5-6 in long. Other wilderness users also reported observing the stocked grayling during 1994.

Miscellaneous Waters - Water levels and access problems continue to hinder management of a fishery in Fitzpatrick Lake. Fish populations were checked in Cameron Reservoir, Lake Shel-oole, and Tomsheck Pond, all in Toole County. The data is on file in the Choteau field office. Minnows from Cameron Reservoir were identified as northern redbelly dace (Gould, personal communication). An illegal introduction of yellow perch into Lake Shel-oole was documented.

Great Falls Management Area

Smith River Reservoir - DeSmet and Arlee strains of rainbow trout are being stocked and evaluated in Smith River Reservoir (Table 2). Gill net catches in fall 1994 produced higher survival for both of these strains of rainbow trout (Table 3) than was found in 1993 (Hill and Liknes 1994). The DeSmet strain had the greatest increase in survival. Survival of both strains were rated as fair. The Arlee strain was represented by the last three years of plants (1992-1994) while the DeSmet was represented by only the 1993 and 1994 plants. In 1993, growth was superior for the Arlee strain (Hill and Liknes 1994). Although the Arlee strain fish captured in 1994 had a longer mean length, growth of the two strains appeared to be somewhat similar. The Arlee strain was longer primarily because the Arlee averaged 1.4 and 3.5 in longer than the DeSmet when planted in 1994 and 1.2 in longer in 1993 (Table 2). Water temperature and time of planting should not have been major factors in survival for either the 1994 or 1993 plants of either strain. Water temperature was 56˚F for all plants, except one, during those two years (Table 2). Water temperature was 66˚F on July 25, 1994 when 5,606 surplus Arlee rainbow averaging 6.3 in were planted. This plant of surplus Arlee rainbow trout did not appear to increase gill net catches. As in 1993 sampling, we continued to catch wild fish. They comprised half of the total catch (Table 3). The wild fish did not have a tetracycline mark, were not fin clipped, and had a greater size range than found last year. Lengths varied from 7.6-15.25 in, suggesting several age classes were present.

Table 2. Planting details for Smith River and Newlan Creek reservoirs in Region 4, 1991-1995.

Water	Date Planted	Strain[1]	Hatchery[2]	Water temperature (F)	Mean length (in)	Number planted
Smith River Res.	06/13/95	DeSmet	BS	64	6.8	4,266
	06/02/95	Arlee	BS	62	4.1	12,111
	06/13/94	DeSmet	BS	56	2.8	12,683
	06/13/94	Arlee	BS	56	4.2	12,300
	07/25/94	Arlee	GS	66	6.3	5,606
	06/11/93	DeSmet	BS	56	2.7	12,000
	06/14/93	Arlee	BS	56	3.9	12,000
	08/28/92	DeSmet	BS	56	2.9	12,850
	05/26/92	Arlee	BS	56	3.9	12,104
	08/27/91	DeSmet	BS	68	2.3	11,974
	06/11/91	Arlee	BS	60	4.5	12,019
Newlan Creek Res.	07/??/95	Eagle Lake	GS	-	-	app 25,000
	06/14/95	Yct	BS	62	6.7	10,048
	06/14/94	Eagle Lake	BS	58	3.3	20,739
	09/14/94	Yct	Y	59	3.1	20,000
	09/15/94	Yct	Y	59	3.1	20,000
	6/2-22/94	Yct	Y	56	17.6	456
	04/29/93	Yct	GS	40	19.9	437
	8/3-5/93	Yct	Y	65	17.9	442
	09/17/93	Yct	Y	56	2.9	28,548
	09/08/92	Yct	Y	59	2.5	23,988
	09/11/92	Yct	Y	56	2.6	17,512
	6/19-26/91	Yct	Y	61	17.8	480

1 - Species abbreviation: Yct=Yellowstone cutthroat trout
2 - GS = Giant Springs Hatchery; BS = Big Springs Hatchery; Y = Yellowstone Hatchery.

Table 3. Overnight gill netting results in large lakes and reservoirs near Lewistown and White Sulphur Springs, Montana during 1994.

Water name (Date surveyed)	Surface acres	# of[1] nets	Mean hours fished/net	Species[2] strain & year planted	Total # of fish	Length (in) Range	Length (in) (Mean)	Weight (lbs) Range	Weight (lbs) (Mean)	Condition Factor Range	Condition Factor (Mean)
Ackley (10/17/94)	240	1F,1S	18.2	Rb-A-94	6	9.3-11.4	(10.3)	0.29-0.53	(. 39)	27.5-41.5	(35.8)
				Rb-I-94	17	7.8-10.6	(9.2)	0.18-0.36	(.25)	28.9-37.9	(32.5)
				Rb-I-93	5	14.8-16.4	(15.7)	1.20-1.45	(1.35)	32.0-38.9	(35.1)
				Rb-I-92	12	17.3-19.3	(18.5)	1.50-2.68	(2.12)	22.7-40.1	(33.6)
				WSu	22	6.2-18.3	(9.5)	0.08-2.72	(0.56)	26.2-48.2	(37.1)
				LnSu	18	9.2-17.7	(15.8)	0.25-2.55	(1.64)	29.0-46.8	(39.2)
Bair (10/4/94)	272	1F,1S	15.4	Rb-I-94	30	6.5- 9.6	(8.3)	0.09-0.30	(0.19)	27.9-37.2	(32.5)
				Rb-I-93	62	10.4-13.1	(11.6)	0.31-0.60	(0.47)	25.8-35.3	(29.6)
				WSu	234	6.3-14.6	(10.4)	0.10-1.21	(0.43)	30.5-44.0	(36.1)
Martinsdale (10/4/94)	1000	1F,1S	20.0	Rb-1994-A	74	9.9-11.5	(10.7)	0.35-0.67	(0.54)	34.8-49.8	(43.4)
				Rb-1993-A	19	12.8-15.8	(14.6)	0.94-1.48	(1.24)	33.6-45.6	(40.3)
				Rb-1992-A	2	16.7-17.5	(17.1)	1.77-2.22	(2.00)	38.0-41.4	(39.7)
				Yct 1994	4	10.8-12.3	(11.6)	0.43-0.63	(0.53)	32.2-35.7	(33.5)
				Yct 1993	14	14.6-16.0	(15.2)	0.98-1.40	(1.18)	30.8-37.6	(33.6)
				LL	6	15.3-26.0	(20.3)	1.03-7+	(3.60)	28.8-46.1	(37.0)
				Wsu	70	9.1-17.8	(13.8)	0.28-2.31	(1.18)	35.5-49.2	(42.0)
				LnSu	13	6.6-17.7	(13.1)	0.13-2.12	(1.01)	33.8-45.6	(38.8)
Newlan Creek Res. (10/27/94)	280	1F,1S	16.5	YCt	2	17.7-19.9	(18.8)	1.81-2.95	(2.38)	32.6-37.4	(35.0)
				Rb-Wild	7	8.5-14.4	(12.7)	0.24-1.03	(0.73)	30.1-39.1	(34.1)
				Rb-I-1994	7	9.3-10.0	(9.6)	0.30-0.38	(0.32)	35.0-38.0	(36.7)
				LnSu	120	6.8-17.5	(12.2)	0.14-1.66	(0.62)	22.4-44.5	(32.6)
				Burbot	4	18.9-23.8	(20.9)	1.25-3.28	(2.11)	17.9-24.3	(21.9)
Smith River Res. (10/27/94)	327	1F,1S	14.4	Rb-A-1994	5	7.6-11.4	(9.8)	0.15-0.60	(0.39)	34.2-45.8	(39.4)
				Rb-A-1993	3	14.7-15.2	(14.9)	1.16-1.47	(1.28)	36.3-41.9	(38.2)
				Rb-A-1992	1	-	(16.8)	-	(1.68)	-	(35.4)
				Rb-Wild	17	7.6-15.2	(10.2)	0.16-1.30	(0.45)	32.1-40.8	(37.0)
				Rb-D-1994	3	8.1-8.8	(8.5)	0.22-0.26	(0.24)	37.5-41.4	(39.0)
				Rb-D-1993	5	12.2-14.0	(13.4)	0.57-0.98	(0.85)	31.4-37.8	(34.8)
				BT	2	7.0-11.8	(9.4)	0.09-0.48	(0.28)	26.2-29.2	(27.7)
				MW	4	12.6-16.4	(13.7)	0.72-1.48	(0.97)	33.6-44.0	(36.8)
				LnSu	32	8.2-17.6	(14.5)	0.18-2.20	(1.23)	32.6-43.2	(37.6)
				WSu	5	12.7-16.4	(15.2)	0.87-1.80	(1.53)	40.6-45.3	(42.9)
				Burbot	7	15.6-27.0	(21.1)	0.76-4.00	(2.50)	15.6-27.0	(25.1)
Yellow Water (10/19/94)	193	1F,1S	22.2	Rb-D-1994	14	5.9- 8.2	(6.8)	0.07-0.25	(0.12)	26.7-45.3	(36.3)
				Rb-A/I-1994	33	9.2-15.0	(11.7)	0.35-1.43	(0.77)	39.3-62.9	(47.2)
				Rb-A-1993	13	17.1-19.9	(19.0)	2.75-4.50	(3.67)	44.9-63.1	(53.2)
				Rb-A-1992	7	20.4-22.0	(21.3)	4.00-5.80	(4.57)	38.6-55.8	(47.2)
				WSu	2	14.9-15.0	(15.0)	1.38-1.43	(1.41)	41.7-42.4	(42.0)

1 F=Floating;S=Sinking 2 Species abbreviations: Rb=rainbow trout; YCt=Yellowstone cutthroat trout; BT=brook trout; LL=brown trout; MW=mountain whitefish; LnSu=longnose sucker; WSu=white sucker; Strain abbreviations: A=Arlee; I=Eagle Lake; D=DeSmet

Several changes have been implemented to the strain evaluation in Smith River Reservoir. DeSmet rainbow have been stocked in June since 1993; prior to that, stocking did not occur until late August. Also, in 1995 the average size of DeSmet rainbow trout was increased to 6.8 in and the number of fish stocked was decreased from 12,000 to 4,266.

We captured several other species of interest during the annual gill netting at Smith River Reservoir. They included brook trout, mountain whitefish, and burbot, which averaged 1, 2, and 3.5 per net, respectively.

Newlan Creek Reservoir - As in 1992 and 1993, we averaged only one Yellowstone cutthroat trout in each net set in Newlan Creek Reservoir (Table 3). The two Yellowstone cutthroat trout caught in fall 1994 gill nets were broodstock fish, which suggests poor survival of the 1993 plants. The 1994 stocking of 3.1 in fish was done less than six weeks before netting and the young fish were probably too small to capture. Consequently fingerlings stocked in 1993 would have been the youngest fish which could have been effectively gill netted. Eagle Lake rainbow trout were first planted in Newlan Creek Reservoir in June 1994 (Table 2). Survival of Eagle Lake rainbow, combined with the naturally reproducing rainbow trout catch, would be rated as fair. Separately, however, survival of both rainbow types would be rated as poor. The 1994 sampling represents the fourth consecutive year that wild rainbow trout made up a greater portion of the catch than stocked Yellowstone cutthroat trout. Prior to 1995, large plants of Yellowstone cutthroat trout, 2.5-3.1 in long, were made in September (Table 2). We increased the number of fish stocked in 1994. In June 1995, the planting schedule was modified when overwintered cutthroat trout averaging 6.7 in were stocked. The number of fish stocked was reduced to approximately 10,000 (Table 2). Effects of these management changes will be not be known until fall 1995 at the earliest.

Cascade Area Ponds-We found an average of 12 Arlee rainbow trout per net in Hound Creek Reservoir during a survey in August 1994 (Table 4). This catch was lower than in August 1990 when 40 rainbow trout were captured in a single net (Hill and Liknes 1992). The number of white suckers captured per net was actually lower in 1994 (93) than in 1990 (194). Netting results presented in Hill and Liknes (1992) for the number of white suckers captured in Hound Creek Reservoir were erroneous. Food habits analysis of the rainbow trout captured showed that fish, snails, insects, and plankton were present in 4.2, 12.5, 21.0, and 37.5%, of the stomachs, respectively. In the past, 3,000 Arlee rainbow trout approximately 4 in long were planted. This plant was modified in 1995 with Eagle Lake rainbow trout of the same size substituted. The Eagle Lake plant will occur later in the summer than previous plants.

Fort Benton, Geyser, and Geraldine Area Ponds-Nets were set in both Shaw and Lanning reservoirs in June 1995; no fish were captured or observed in either water. In June 1995 we surveyed two of the Kolar reservoirs in the Geyser area. Low numbers of rainbow trout were found in Kolar #1 and only one Yellowstone cutthroat trout was netted in Kolar #2 (Table 4). Although large numbers of white suckers were found in both of these Kolar reservoirs in 1989 (Hill et al. 1990), numbers captured in 1995 were low in Kolar #1 and only 31% of the previous catch in Kolar #2. The sample of Arlee rainbow trout in Kolar #1 included fish stocked during the last two years. Kolar Reservoir #1 has been planted with 2,000 Arlee rainbow trout which averaged 3.8-4.4 in from 1994-1995, or about 540 fish per acre. Kolar Reservoir #2 has been stocked with 2.7-2.8 in long Yellowstone cutthroat trout at approximately 227 per acre and larger cutthroat averaging 6.5-7.1 in long at 75 per acre. Previous sampling of Englandt Reservoir, located in Phantom Coulee near Geraldine, produced high numbers of small black bullheads (Hill et al. 1990; Hill and Liknes 1992). The black bullheads were eliminated or severely reduced by winterkill during winter 1992-93. In 1993, we planted 4,000 3.9 in Arlee rainbow trout, 500 7.7 in Arlee rainbow trout, and 2,000 3.4 in Eagle Lake rainbow trout in Englandt Reservoir. In 1994, we planted 4,000 4.4 in Arlee rainbow trout, 2,000 6.5 in Arlee rainbow trout, and 4,032 4.3 in Eagle Lake rainbow trout. Survival of Arlee rainbow trout was good while the catch of Eagle Lake strain was fair (Table 4). Growth rates are currently excellent in Englandt Reservoir. Sampling of Tunis Reservoir indicated good survival and excellent growth for the 1994 Arlee rainbow plant (Table 4). High numbers from the 1995 plant were also captured.

Table 4. Results from overnight gill netting in cold water ponds in the central portion of Region Four, 1994-1995.

Water (Date)	Surface acres	Type of[1] nets	Mean hrs fished/net	Species[2]	Total no. of fish	Length (in) Mean (Range)	Weight (lb) Mean	Weight (lb) Range	Condition Factor Mean	Condition Factor Range	Maximum Depth (ft)
Cascade Area											
Hound Creek Reservoir (8/10/94)	20.0	1F,1S	16.4	Rb-A-1994	13	8.5 (7.5-9.6)	0.29	(0.21-0.41)	46.3	(41.0-54.5)	33
				Rb-A-1993	9	13.5	(12.5-14.3)	0.93	(0.77-1.18)	37.9	(34.5-41.1)
				Rb-A-1992	2	15.0	(14.7-15.3)	1.33	(1.28-1.37)	39.3	(38.3-40.3)
				WSu	186	11.1	(6.3-16.5)	0.75	(0.09-2.04)	44.6	(21.3-16.5)
Fort Benton/Geyser/Geraldine area											
Kolar #1 Reservoir (6/12/95)	3.7	1S	20.0	Rb-A-1994	1	14.6	-	1.22	-	39.2	- 16
				Rb-A-1993	1	16.9	-	1.81	-	37.5	-
				WSu	7	15.4	(9.9-17.9)	1.47	(0.34-1.96)	37.9	(34.2-43.5)
				LnSu	2	14.2	(14.0-14.4)	0.91	(0.88-0.94)	31.9	(29.5-34.3)
Kolar #2 Reservoir (6/12/95)	6.6	1S	20.1	Yct-1995	1	6.9	-	0.12	-	36.5	- 15
				WSu	40	13.9	(8.4-16.9)	1.26	(0.23-1.96)	45.0	(33.4-54.1)
Englandt Reservoir (8/9/94)	28.25	1F,1S	15.3	Rb-A	26	17.4	(9.6-19.8)	2.31	(0.44-3.24)	42.9	(36.7-49.7) 16
				Rb-I	10	16.1	(15.1-17.3)	1.69	(1.30-2.08)	40.0	(36.3-42.3)
Tunis Reservoir (6/13/95)	6.0	1S	17.6	Rb-A-1995	15	8.0	(7.3-8.8)	0.27	(0.19-0.38)	51.7	(43.8-58.6) ≥11
				Rb-A-1994	9	15.8	(14.0-16.8)	1.95	(1.46-2.33)	49.9	(41.8-55.5)
White Sulphur Springs area											
Keep Cool Reservoir (6/20/95)	28.2	1S	17.5	Rb-I-1994	16	13.1	(11.3-14.4)	0.95	(0.57-1.19)	41.5	(37.0-46.2) 25
				Rb-I-1993	8	17.7	(16.6-19.3)	2.18	(1.75-2.76)	39.1	(36.7-43.8)
				RbxCt	1	13.2	-	0.89	-	38.7	-
				YCt	1	12.6	-	0.77	-	38.5	-
Doggett Reservoir (Elk Creek) 6/20/95)	9.9	1S	17.8	Rb-I-1994	2	11.1	(10.8-11.3)	0.59	(0.56-0.62)	43.7	(43.0-44.5) 37
				Rb	1	6.4	-	0.14	-	53.4	-
				Rb-I-1993	7	16.0	(14.6-17.3)	1.55	(1.17-1.98)	37.2	(31.4-41.1)
				Rb-I-1992	1	18.8	-	2.97	-	44.7	-
				BT	12	7.5	(6.3-9.0)	0.20	(0.11-0.30)	44.0	(41.2-46.9)
Gipsy Lake (6/19/95)	5.9	1S	17.7	Rb	2	13.9	(11.1-16.8)	1.27	(0.55-2.00)	41.2	(40.2-42.2) 7
				RbxCt	3	7.4	(7.0-7.6)	0.11	(0.08-0.13)	27.13	(23.3-29.6)
Cook #1 Reservoir (6/19/95)	4.0	1S	15.6	Rb-A-1995	4	7.2	(6.2-7.7)	0.20	(0.12-0.26)	51.9	(45.6-57.0) 17
				Rb-A-1994	4	11.3	(10.3-12.4)	0.65	(0.44-0.83)	44.8	(40.3-50.1)
				Rb-A-1993	2	18.5	(17.1-19.9)	2.78	(2.43-3.13)	44.2	(39.7-48.6)
Cook #2 Reservoir (6/19/95)	5.0	1S	16.0	Rb-A-1995	3	8.7	(6.3-10.3)	0.32	(0.12-0.49)	44.2	(39.7-48.0) 25
				Rb-A-1994	2	14.1	(14.0-14.2)	1.31	(1.22-1.41)	46.9	(44.5-49.2)
				Rb-A-1993	4	18.2	(17.1-19.3)	2.82	(2.32-3.50)	46.4	(41.0-49.5)
				YCt	1	10.0	-	0.31	-	31.0	-
				BT	2	8.2	(6.8-9.5)	0.29	(0.17-0.41)	50.9	(47.8-54.1)

1- F=Floating; S=Sinking; 2-Species abbreviations: Rb=Rainbow trout; YCt=Yellowstone cutthroat trout; RbxCt=Rainbow-cutthroat trout hybrid; BT=Brook trout; LnSu=Longnose sucker; WSu=White sucker; Strain abbreviations: A=Arlee; I=Eagle Lake.

White Sulphur Springs Area Ponds-Several ponds in the White Sulphur Springs area are no longer stocked by the state including Schafer, Schendle, and Whitetail reservoirs. The catch of Eagle Lake rainbow trout in Keep Cool Reservoir was good; a total of 24 fish were caught in one net (Table 4). The fish sampled included both 1993 and 1994 plants. A rainbow cutthroat hybrid and a Yellowstone cutthroat were also captured in the gill net. Yellowstone cutthroat trout were planted in Keep Cool Reservoir from 1984-89; these fish may be from natural reproduction which resulted from those plants. Current stocking densities of Eagle Lake rainbow trout in Keep Cool Reservoir is 89 per acre. Good survival of Eagle Lake rainbow trout was observed in Doggett (Elk Creek) Reservoir (Table 4). Growth, longevity, and survival appeared to be better than with the Arlee strain of rainbow trout sampled in 1989 (Hill et al. 1990). Fish from the 1994, 1993, and 1992 plants were captured. A single rainbow trout captured that was 6.4 in long may have been a wild fish. The stocking density in Doggett Reservoir was 76 fish per acre and fish stocked in 1993 and 1994 averaged 3.3 in. The number of brook trout captured was similar to that found in 1989 (Hill et al. 1990), however, the average size was smaller in 1995. Low numbers of rainbow trout were captured in June 1995 sampling of Gipsy Lake (Table 4). In fact, one more rainbow X cutthroat trout hybrid was captured than the total number of stocked fish caught. Gipsy Lake often winterkills and is planted with approximately 85 catchable rainbow trout per acre. The lake apparently overwintered some fish in 1994-1995. The number of Arlee rainbow trout captured in Cook reservoirs #1 and #2 during June 1995 monitoring was good (Table 4). Both reservoirs contained fish from three years of plants, 1993-1995. We had not netted Cook Reservoir #1 prior to this sampling. Sampling in Cook Reservoir #2 also produced a cutthroat trout and a brook trout. The cutthroat trout listed as a Yellowstone cutthroat in Table 4 may have been a westslope cutthroat trout. Previous sampling in 1989 also produced a cutthroat and brook trout (Hill et al. 1990). No planting records have been identified that list Yellowstone cutthroat trout as being planted in this water. Stocking densities in the Cook reservoirs are 200-250 per acre.

Lewistown Management Area

Reservoirs in the Lewistown area typically had excellent water levels in the spring of 1994 but were drawn to low levels by fall due to a hot dry summer (Table 5).

Ackley Lake - Rainbow trout strain evaluations continued on Ackley Lake. In 1994, stocking rates of Arlee and Eagle Lake rainbow trout, were similar to the last several years (Hill and Liknes 1994). A total of about 40,000 rainbow trout fingerlings were planted with equal numbers of both strains.

Table 5. Water quality parameters from waters in Central Montana in 1994.

Water	Date	Temp (°F)	Secchi (ft)	Maximum depth(ft)	Conductivity (μohms/cm)*	Comment
Ackley	10/17/94	44	-	23	424	very low
Bair	10/4/94	52	-	-	356	low
Big Casino Creek	10/3/94	52	2.2	-	623	full
Buffalo Wallow	6/2/94	65	2.2	15	2500	full
Carter (Upper)	6/8/94	62	13.1	16	3000	full
Carter (Lower)	6/8/94	60	8.0	13	1800	low
Hanson Dam	10/3/94	48	10.0	-	581	low
Martinsdale	10/4/94	51	4.5	25	495	Extremely low (two pools)
Yellow Water	10/19/94	46	2.5	>18	1350	About 3 ft below full

*corrected to 77°F

The 1994 Eagle Lake plant exhibited good survival. Survival was fair for 1992 Eagle Lake and poor for 1993 Eagle Lake and 1994 Arlee. No Arlee from other plant years were captured (Table 3). Rainbow trout catch rates were higher than in 1993 and similar to 1992, but otherwise were lower than they had been since 1985 when Ackley Lake was rehabilitated with rotenone (Figure 1). White sucker catch rates were about average for those seen since 1987, while longnose sucker catch was quite high for recent years (Figure 1). Based on fall gill netting, Eagle Lake rainbow have had consistently better survival than Arlee (Figure 2). Arlee rarely showed any survival through the 3rd summer and 5 fish per net was the maximum capture rate at the end of the second summer. In contrast, Eagle Lake have had good second summer survival and were often captured at the end of their third summer at rates exceeding 5 fish per net. Eagle Lake typically had higher survival than Arlee during the first growing season. In contrast to gill netting data, periodic creel census information suggests that Arlee and Eagle Lake have had similar survival as they are usually harvested at similar rates (Table 6). Rainbow trout in Ackley Lake had excellent first summer growth and exhibited the second fastest rainbow trout growth in the Lewistown area. Eagle Lake grew slightly more than Arlee (Table 7).

Table 6. Relative harvest of Arlee and Eagle Lake rainbow trout in Ackley Lake found during periodic creel census[1].

Year	Month(s) creeled	Number of Fish	Percent of Harvest	
			Arlee	Eagle Lake
1988	winter	35	20	80
1989	February	?	54	46
1990	summer	54	44	56
1994	June	33	52	48

[1] 1989 data from Hill et al 1990, 1990 data from Liknes et al 1991, 1994 data from Hill and Liknes 1994 and new information.

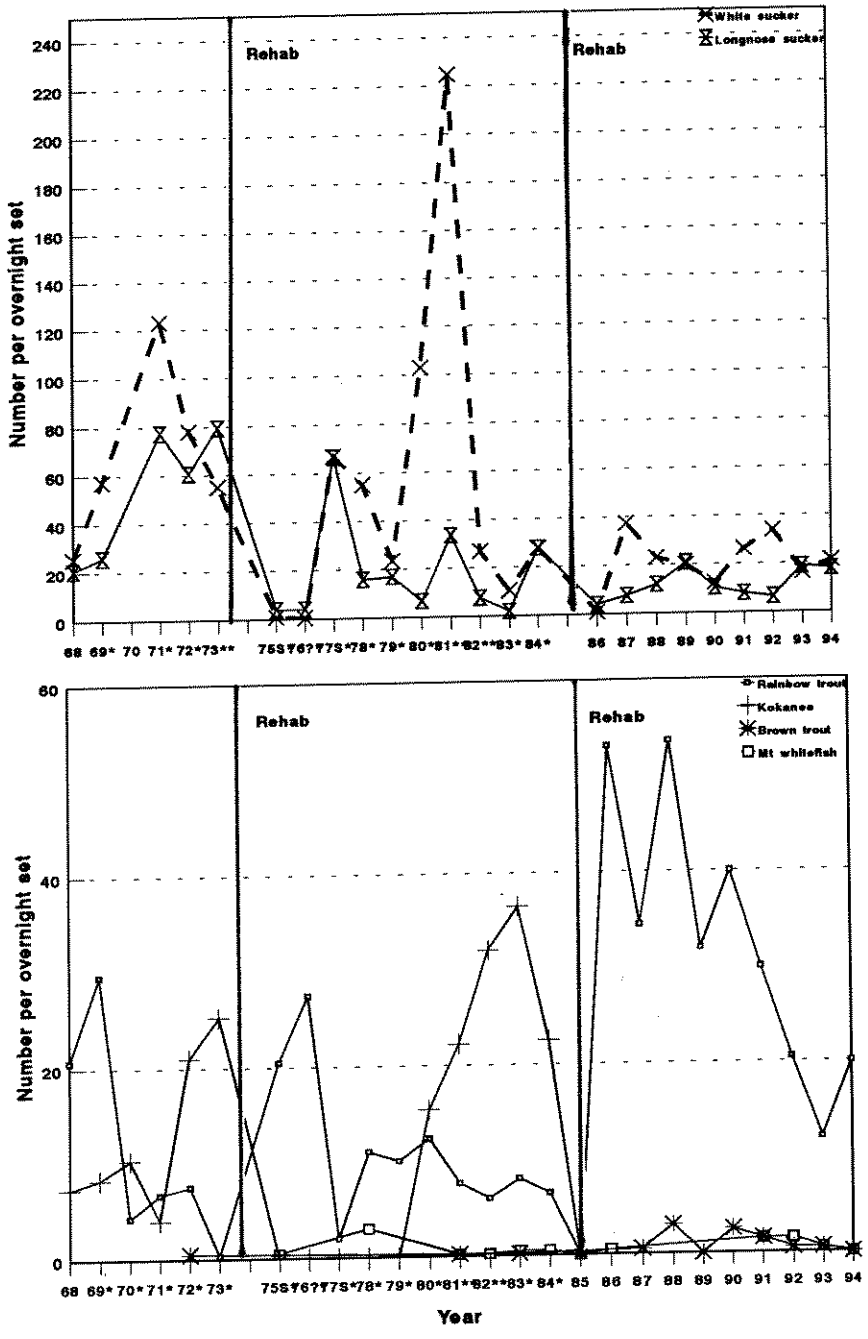
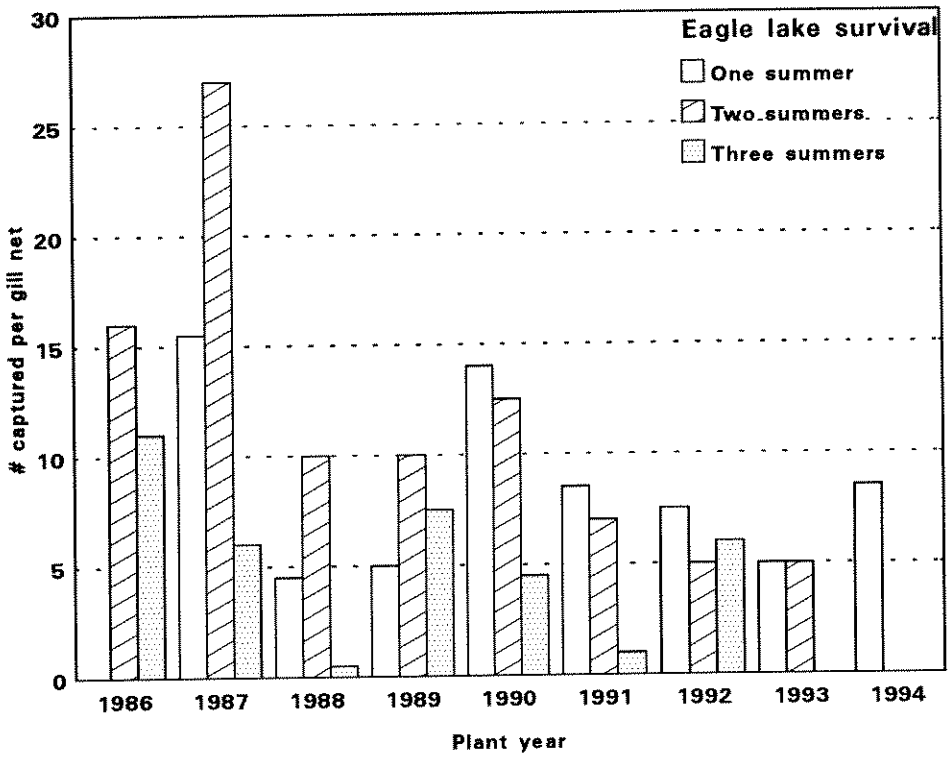


Figure 1. Ackley Reservoir gill net catch for the years 1968-1994. Years on x-axis followed by "S" had only a sinking net set. Gill netting was done in fall except years marked with a single asterisk (*) were netted in spring or summer while years marked with double asterisks (**) had spring and fall netting.



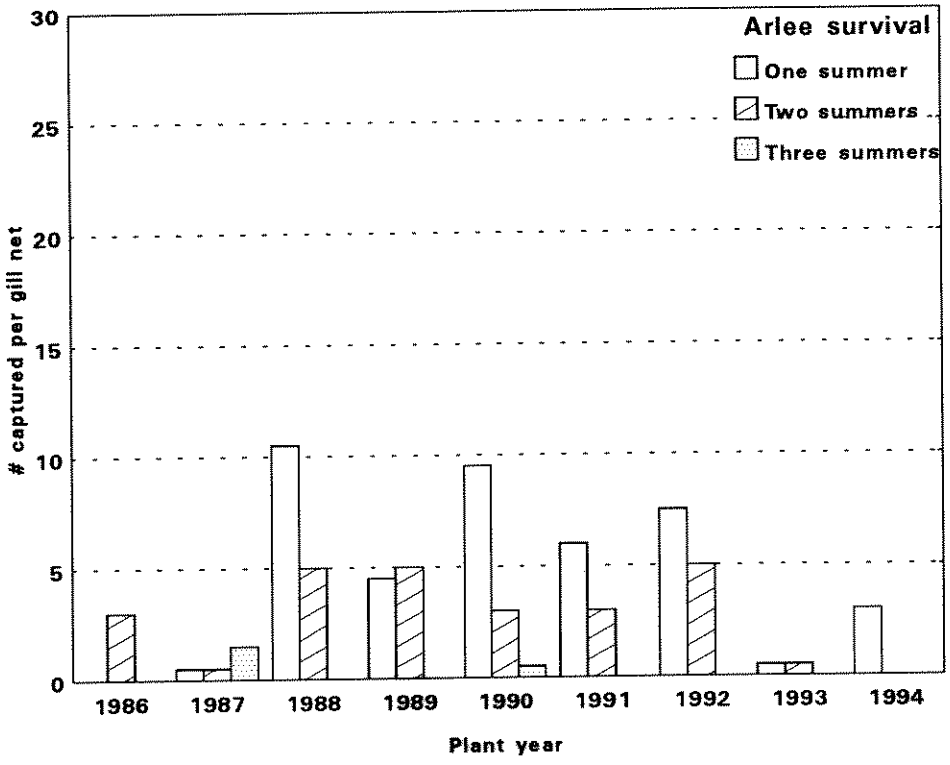


Figure 2. Fall gill net catches of Arlee and Eagle Lake rainbow trout in Ackley Lake during the years 1986-1994.

Table 7. First summer growth for rainbow trout stocked in several lakes in the Lewistown area in 1994 from fall gill netting and hatchery stocking records.

Water	Strain	Inches grown
Ackley Lake	Arlee	5.8
	Eagle Lake	6.1
Bair Reservoir	Eagle Lake	5.0
Big Casino Reservoir	Arlee	3.0
Martinsdale Reservoir	Arlee	5.6
Yellow Water Reservoir	Arlee	7.5

Bair Reservoir - Gill netting results show excellent survival of both the 1993 and 1994 Eagle Lake plant (Table 3). Rainbow trout catch was the second highest observed since 1973 (Figure 3). As in 1992 and 1993 (Hill and Liknes 1994), no rainbow trout were captured that survived 3 years. White sucker catch at 117 per net was much higher than it had been in recent years and the average total length of 10.4 in was 0.8 in greater than found in 1993 and was only 0.2 in less that the high average of 10.6 in found in 1991 (Hill and Liknes 1994). High catch of both species was probably partially due to the low water level in the reservoir during October 1994. Eagle Lake rainbow trout in Bair Reservoir exhibited the second slowest summer growth of rainbow trout in the Lewistown area (Table 7).

Martinsdale Reservoir - Water level was so low by September of 1994 (Table 5) that the reservoir formed two pools. The 1994 Arlee plant had a very high survival rate. Survival was also good for the 1993 plant (Table 3). Unlike what is found in Ackley and Bair Reservoirs, a few Arlee typically survive their third summer in Martinsdale Reservoir (e.g. Table 3, and Hill and Liknes 1994). Rainbow trout gill net catch in Martinsdale was the highest seen since gill netting data has been collected, but was only slightly higher than catch in 1991 and 1993 (Figure 4). White sucker numbers also increased but were much lower than found in several other years (Figure 4). Yellowstone cutthroat survival was good for the 1993 plant and fair for the 1994 plant but overall gill net catch of this species was also the highest recorded (Figure 4, Table 3). Several large brown trout were also captured. Rainbow trout growth in Martinsdale was intermediate for the Lewistown area (Table 7).

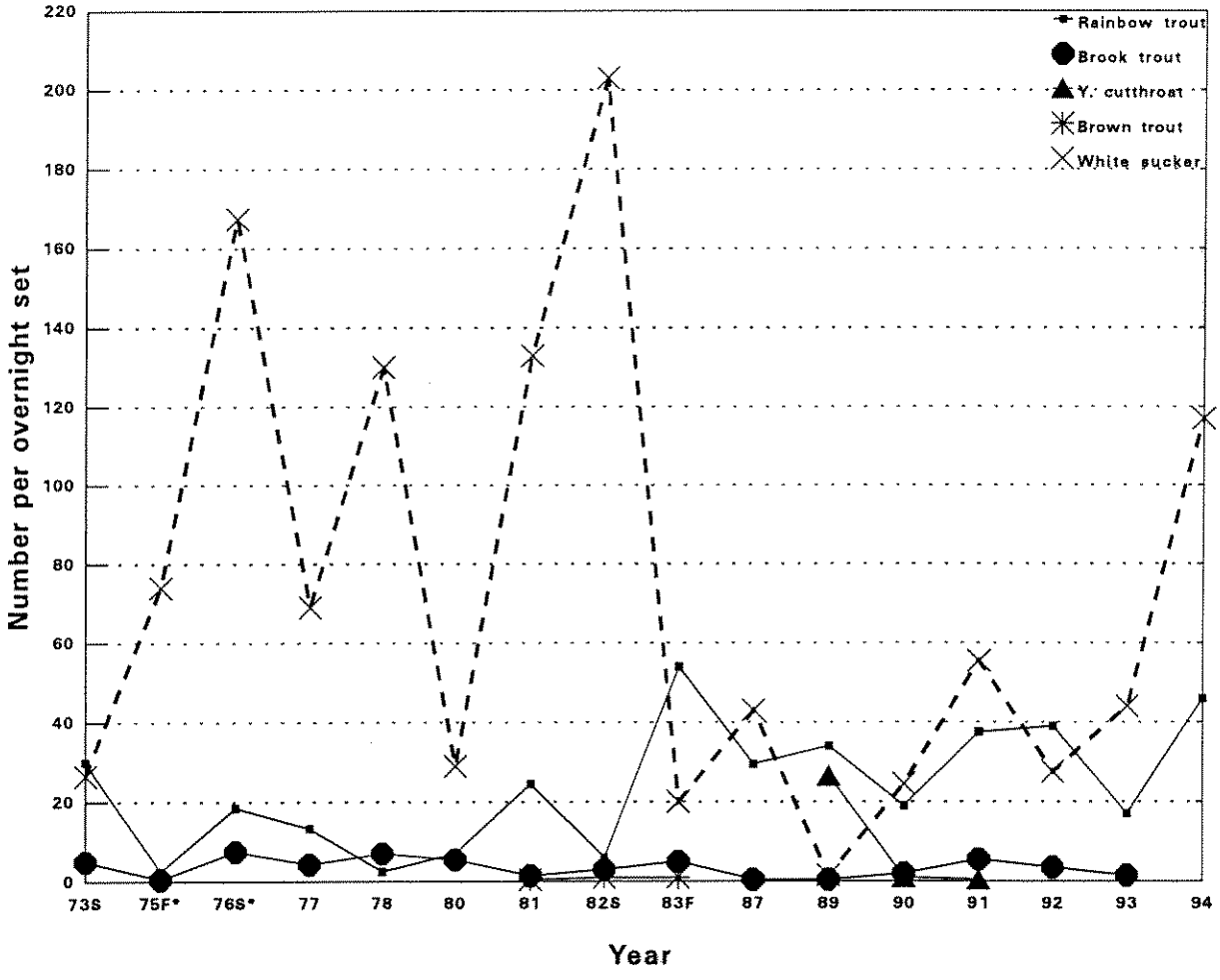


Figure 3. Combined floating and sinking gill net catches on Bair Reservoir during the fall for the period 1973-1994. Years on x-axis followed by "F" had only floating gill nets set and years followed by "S" had only sinking nets. Gill nets were set in spring or summer in years marked with an asterisk.

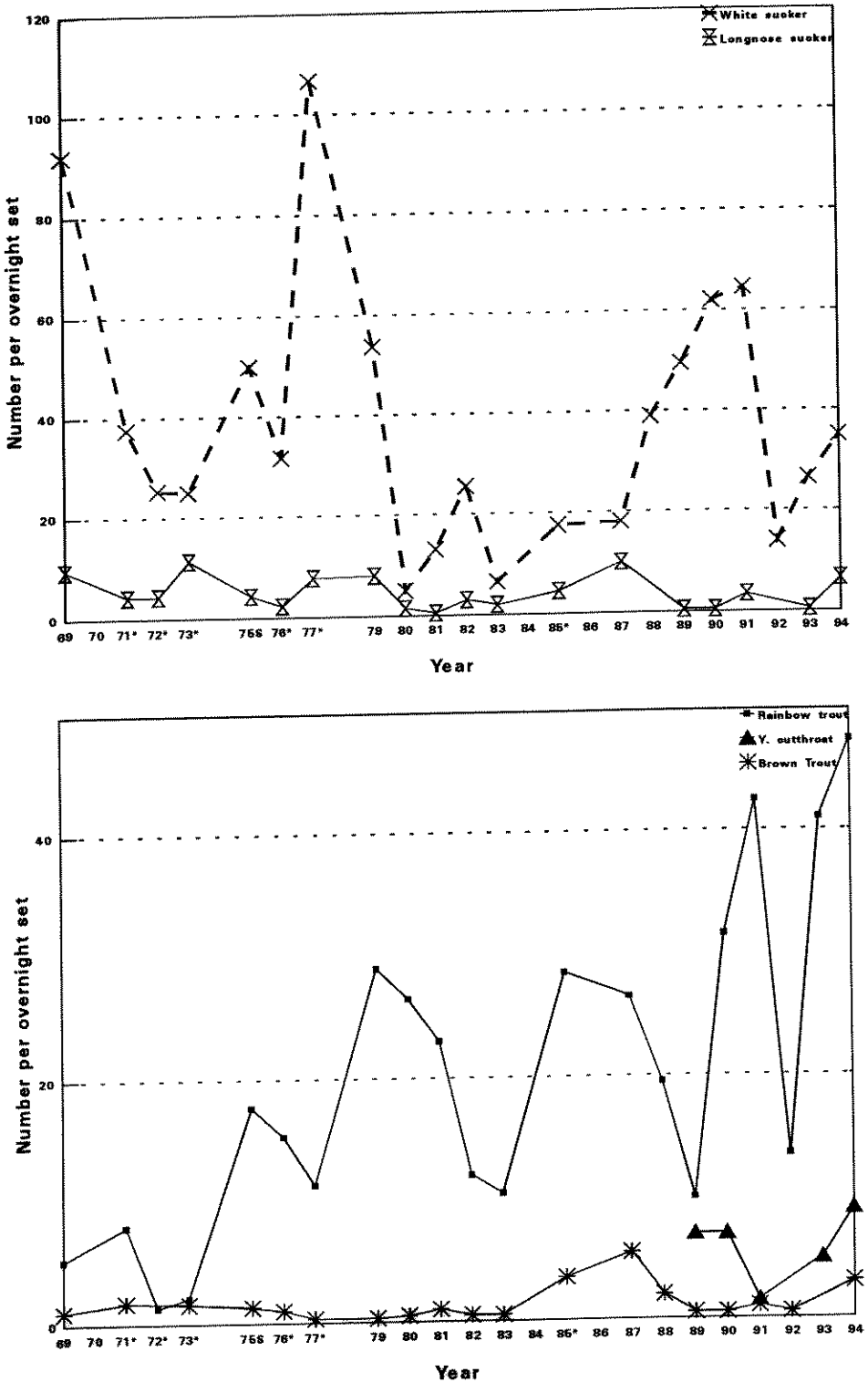


Figure 4. Composite catch in a single floating and one sinking gill net set during the fall on Martinsdale Reservoir for the period 1969-1994. Years on x-axis followed by an asterisk were netted in spring or summer.

East Fork Reservoir - Results are reported in the warmwater ecosystems counterpart to this report (Hill et al in preparation).

Yellow Water Reservoir - This reservoir remained fairly full throughout the summer of 1994 (Table 5), which contrasts with water levels that remained extremely low during the mid 1980's and early 1990's (Hill and Liknes 1993; Hill et al 1990). Response of rainbow trout to high water levels during 1993 and 1994 shows excellent potential for this reservoir to produce a trophy trout fishery. Overall gill net catch for 1994 plants was excellent. This reservoir exhibited the fastest growth of rainbow trout and highest overall condition factors found in the Lewistown area (Tables 3 and 7). The fairly high conductivity also indicates the productivity of this reservoir (Table 5). White sucker numbers remain very low, but 1994 was the first year any were netted since 1991 (Figure 5).

Big Casino Creek Reservoir - The gill net catch of rainbow trout from the 1994 plant was extremely high (Table 8), probably since Big Casino Creek Reservoir remained closed to public fishing throughout the report period. No rainbow planted in 1993 were captured and just one from the 1992 plant. White suckers remained plentiful. Figure 6 shows trends in white sucker and rainbow trout catch rate and growth. White sucker numbers have steadily increased and did not decrease in response to draining the reservoir in 1990. In 1994, white suckers were stunted with an average length of 8.5 in. Rainbow trout growth in Big Casino Creek was very poor in 1994 with about half the first summer growth found in Ackley Lake (Table 7).

Buffalo Wallow Reservoir Rehabilitation - Prior to an illegal introduction of yellow perch, this pond provided an excellent salmonid fishery. Growth and survival of stocked rainbow trout declined dramatically following perch introduction. Perch became extremely abundant by 1994 and the population consisted of small stunted fish (Table 8). These stunted perch were too small to provide an acceptable fishery and an EA was written to rehabilitate the pond. The reservoir was rehabilitated on September 23, 1994. Prior to treatment, about 1 ft of the reservoir was siphoned off. FWP (Montana Department of Fish, Wildlife and Parks) estimated the reservoir was at 50 acre-ft during treatment. Pond temperature was 60°F, weeds had died off and reservoir level was about 3 ft below full pool with a maximum depth of 13 ft. After poisoning, on September 30, 1994 approximately 100,000 dead yellow perch were observed around the perimeter of the reservoir. Most of these fish were about 6.5 in long. Five yellow perch greater than 12 in and a very few rainbow trout were observed. Two sinking gill nets set in Buffalo Wallow from 10/14/94 - 10/19/94 did not catch any fish (Table 8), indicating the rehabilitation was successful.

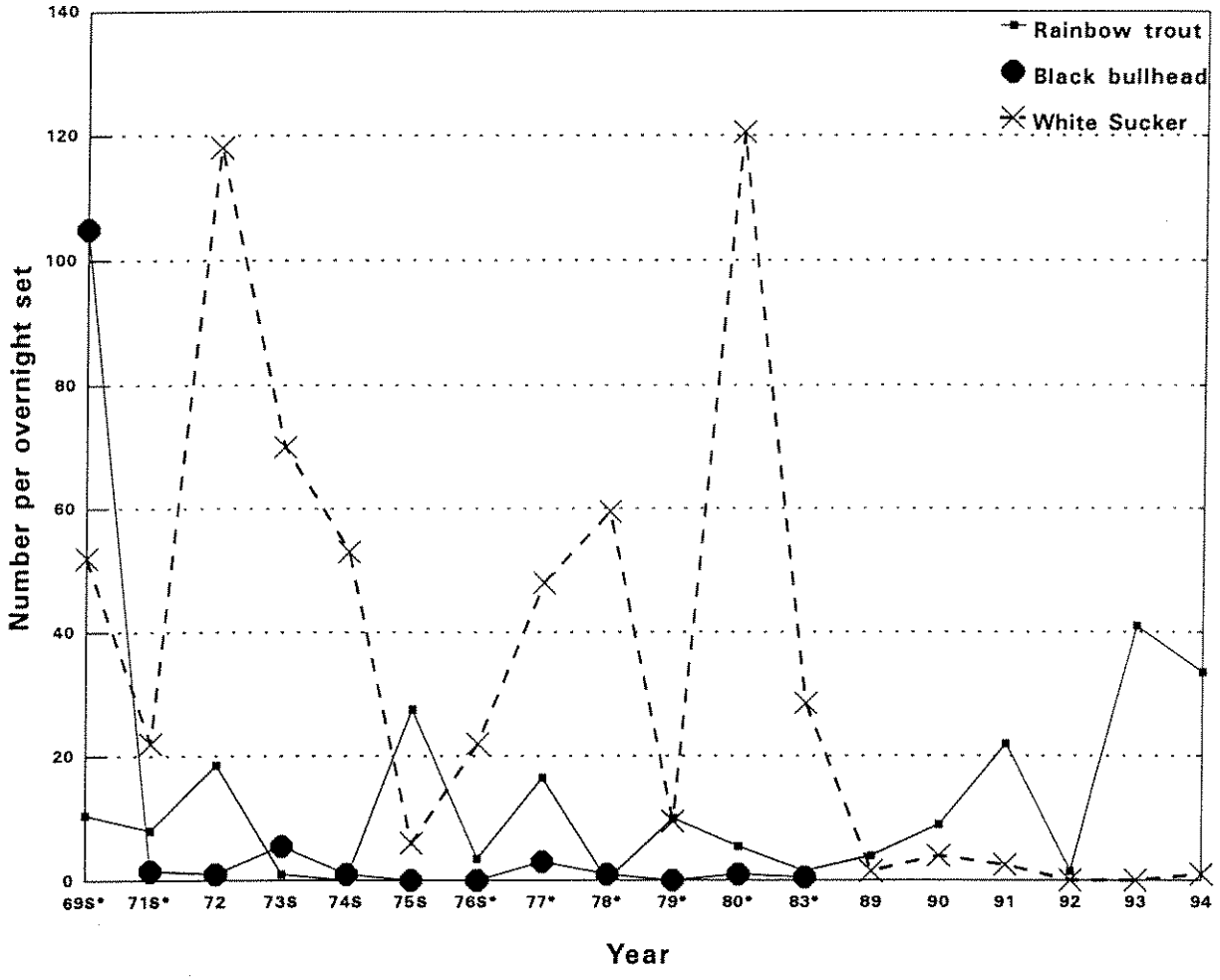


Figure 5. Fall gill netting results from Yellow Water Reservoir during the years 1969-1994. Only sinking nets were set in years on x-axis followed by "S". Years marked with an asterisk were netted in spring.

Table 8. Overnight gill netting results in small reservoirs in Lewistown area of north central Montana during 1994.

Water name (Date surveyed)	Surface acres	# of1 nets	Mean hours fished/net	Species strain & year planted	Total # of fish	Length (in) Range	Length (in) (Mean)	Weight (lbs) Range	Weight (lbs) (Mean)	Condition Factor Range	Condition Factor (Mean)
Big Casino Creek (10/3/94)	17.5	1F,1S	18.7	Rb-A-94	74	6.6- 8.9	(7.3)	0.08-0.23	(0.12)	23.3-40.2	(31.4)
				Rb-A-92	1	-	(16.8)	-	(2.24)	-	(47.2)
				WSu	338	6.6-14.8	(8.5)	0.10-1.07	(0.22)	25.7-41.0	(33.4)
Buffalo Wallow (4/17/94)[2]	8										
		3 Traps	About 15	YP	about 15,000	2-7 in					
(10/14/94)		2 S	About 130	No Fish							
Carter-Lower (6/8/94)		1S	18.2	Rb-A-1994	45	6.0- 8.4	(7.2)	0.09-0.29	(0.17)	37.8-55.6	(44.7)
				Rb-A-1993	20	13.1-16.0	(14.5)	0.96-1.54	(1.27)	36.1-46.7	(41.3)
Carter-Upper (6/8/94)		1S	14.7	Rb-A-1994	27	5.5- 8.5	(7.2)	0.07-0.31	(0.18)	39.9-56.0	(48.1)
				Rb-A-1993	7	13.9-16.7	(15.6)	1.42-2.40	(1.90)	45.3-52.9	(49.7)
Hanson Dam (10/3/94)		1S	16.3	Rb-A-1994	23	8.5-12.1	(10.0)	0.22-0.68	(0.39)	34.4-47.0	(38.7)

2 Data from Mike Poore; FWP Region 5

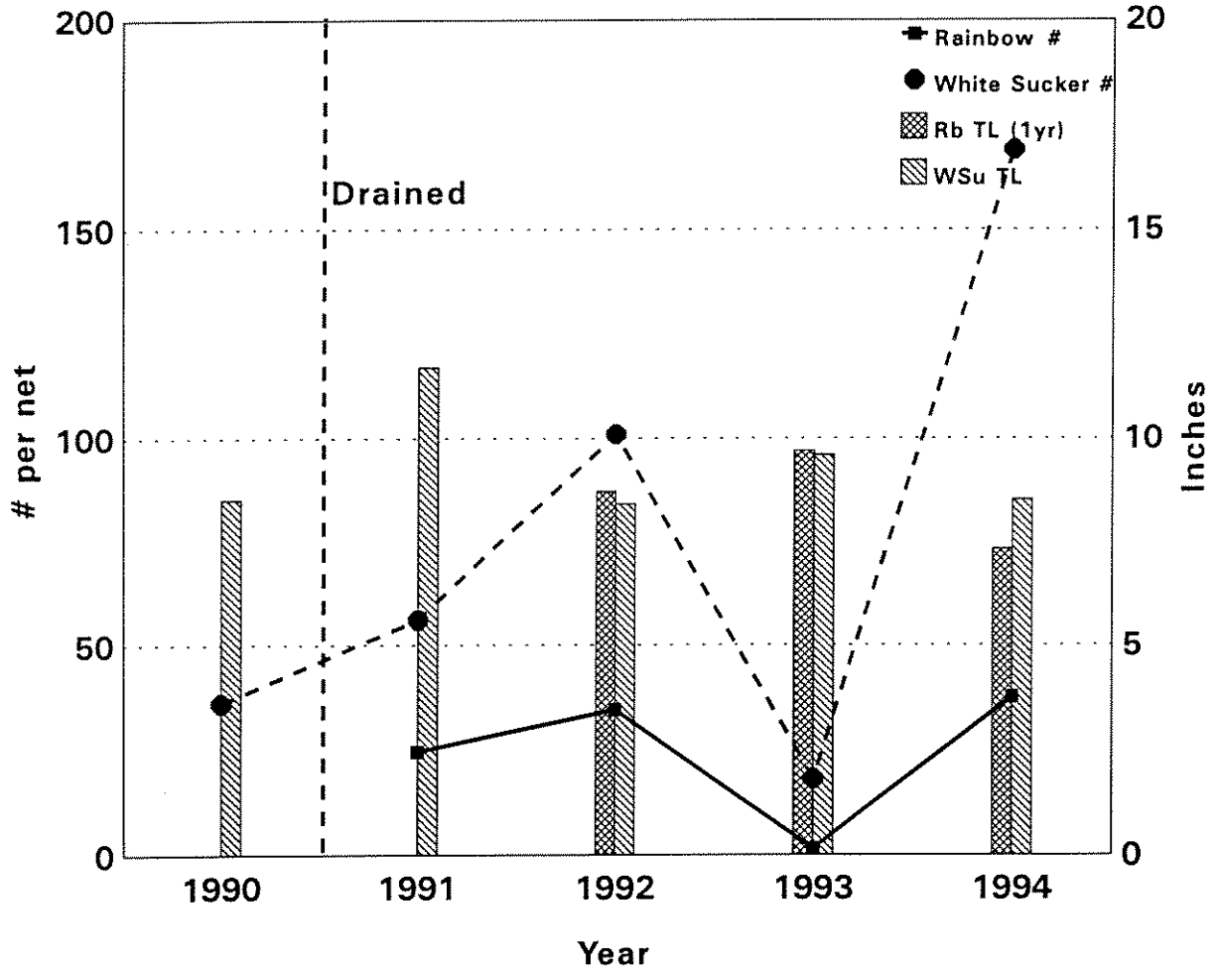


Figure 6. Growth and abundance of rainbow trout and white suckers caught in fall gill nets set in Big Casino Creek Reservoir during the years 1990-1994.

The reservoir was restocked with catchable and fingerling rainbow trout in the spring of 1995.

Lower Carter Pond - Gill netting of Lower Carter Pond found successful over-wintering and good growth of rainbow trout during 1993 and 1994. Survival for both plant years was excellent (Table 8). Lower Carter Pond has had a leakage problem for several years, preventing over-wintering except in extremely wet years. By September 1994, maximum depth was less than 8 ft and winter kill seemed imminent due to the low water level. The pond was drained the first week in November to check the integrity of the trickle tube. With assistance from the U.S. Fish and Wildlife Service, landowner Tom Carter, Carl Patten and the Snowy Mountain Chapter of Trout Unlimited it was determined that the headgate was not seating properly due to corrosion. The headgate was filed down and leakage was extremely reduced. The pond filled during the spring of 1995 and was planted with catchable and fingerling rainbow trout.

Miscellaneous waters - Upper Carter Pond showed good survival of 1994 plants and fair survival for 1993 plants (Table 8). This pond has typically been extremely productive as is indicated by the conductivity (Table 5). Hanson Dam pond had good survival of 1994 plants but no other rainbow were netted (Table 8).

DISCUSSION AND RECOMMENDATIONS

Choteau Area -Rainbow trout strain evaluations should continue on several waters. It is recommended to continue with the present strains being stocked. Water levels of Bean Lake are considered to be fairly critical. The possibility of obtaining water from a nearby irrigation canal should be investigated. However, this is a very sensitive topic, and preliminary discussions with one water user indicate that there is little interest on their part in providing water to assist the fishery. DeSmet rainbow were observed spawning in the inlet canal to Eureka Reservoir in 1994. Monitoring should expand in future surveys to determine whether eggs hatch and what contribution they may make to the fishery in the lake. The five-year experimental stocking of rainbow trout in Pishkun Reservoir is scheduled to continue through 1996. Although predation is occurring by northern pike, some trout stocked at 8-9 in are surviving and producing a trophy fishery. A decision on whether to continue stocking of rainbow will be made following the 1996 field season.

Great Falls Area- The rainbow trout strain evaluation should continue in Smith River Reservoir. Two strains should continue to be planted; both the Arlee and DeSmet strains are adequate. Substitution of another strain for the Arlee could be considered. Overwintered Desmet rainbow trout should be planted for at least 2-3 more years. Also, spawning tributaries should be surveyed

and fry traps or adult weirs should be installed to identify spawning areas utilized by wild fish. Some of these areas may have some potential for habitat enhancement. In Newlan Creek Reservoir, we should continue plants of overwintered Yellowstone cutthroat trout and the Eagle Lake rainbow trout for another year to assess the effect of these management changes. Additional field work including increased gill netting, monitoring of rainbow trout reproduction, trap netting, and trapping of Newlan Creek should also be planned for future years. Consideration should be given to any salmonid strain or species that will provide some sucker control. Other techniques of sucker control should also be examined. We should continue to stock Eagle Lake rainbow trout in Hound Creek Reservoir for at least two more years. Another strain of rainbow trout should be stocked in Kolar Reservoir #1 at the same stocking densities. In Kolar Reservoir #2, we should consider doubling the stocking density of Yellowstone cutthroat fingerlings or switch to a strain of rainbow trout such as DeSmet or Eagle Lake. We should continue to stock the larger Yellowstone cutthroat in Kolar #2. The current stocking density of Arlee rainbow trout should be maintained or increased in Tunis Reservoir. The stocking density in Doggett (Elk Creek) Reservoir should be increased. The stocking program for Keep Cool Reservoir should be maintained as long as it produces a good fishery. We should continue to stock catchable rainbow trout in Gipsy Lake. The stocking programs should be maintained as is on both of the Cook reservoirs. Additional fieldwork should done on the water running into Cook Reservoir #2. If no westslope cutthroat trout are found, consideration should be made to planting DeSmet rainbow trout in an effort to establish a naturally reproducing population.

Lewistown Area -Ackley Lake continues to provide a good fishery. However Arlee have shown limited survival past the first summer. Exploitation rates should be investigated to see if regulations and/or stocking should be changed. Ackley lake has no inlet suitable for spawning. Development of a fish ladder and spawning habitat in the inflow channel should be investigated to see if a wild trout fishery can be developed. Big Casino Reservoir needs management action to reduce white sucker numbers. Rainbow trout growth is extremely slow and large numbers of stunted white suckers are found in the pond. Draining the reservoir and poisoning would be a short term solution since Big Casino Creek will continue to provide white suckers to the reservoir. Introduction of a predator fish, such as walleye, to control the sucker population should be investigated. Buffalo Wallow Reservoir should be netted in 1996 to check trout growth and to insure yellow perch are no longer present. Small trout ponds in the Lewistown area should be periodically monitored. Some of them have not been sampled in over 10 years.

ACKNOWLEDGEMENTS

The authors acknowledge the following individuals for assistance in this project. Paul Hamlin, Kelly Smith and Troy Humphrey assisted in all aspects of data collection and analysis. Gerry Downey, Jerry O'Hara, Nadelle Forseth, Jim Drissell, Darrin Johnson, Randy Rodencal, Steve Leathe and Cathy Weigand assisted with field work and data collection. Steve Leathe assisted in packing grayling to Lake Levale. Kent Gilge provided expertise for rehabilitation of Buffalo Wallow Reservoir. Volunteers helped clip fins from various rainbow strains. Hatchery personnel were helpful in coordinating various marking schemes for the different rainbow trout.

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Date: September 12, 1995

Principal Fish Species Involved: Rainbow trout, Yellowstone cutthroat trout, brown trout, arctic grayling, kokanee salmon, eastern brook trout, burbot, white sucker, longnose sucker.

Code Numbers of Waters Referred to in Report:

14-7120	Cameron Reservoir
14-7320	Eureka Reservoir
14-7370	Fitzpatrick Lake
14-8935	Lake Shel-oole
14-9282	Tomsheck Pond
14-9380	Tunis Reservoir
16-1870	Lanning Reservoir
16-4300	Ackley Lake
16-4620	Lower Carter Pond
16-4620	Upper Carter Pond
16-4628	Big Casino Creek Reservoir
16-5070	Englandt Reservoir
16-5535	Hanson Reservoir
16-6340	Kolar Reservoir #1
16-6360	Kolar Reservoir #2
17-8720	Bean Lake
17-8773	Shaw Reservoir
17-8864	Cook Reservoir #1
17-8865	Cook Reservoir #2
17-8928	Doggett (Elk Creek) Reservoir
17-8960	Gipsy Lake
17-9140	Hound Creek Reservoir
17-9184	Keep Cool Reservoir
17-9330	Newlan Creek Reservoir
17-9506	Schendle Reservoir
17-9507	Schafer Reservoir
17-9616	Smith River Reservoir
17-9840	Whitetail Reservoir
18-7340	Buffalo Wallow Reservoir
18-7750	Bair Reservoir
18-8380	Martinsdale Reservoir
18-9500	Yellow Water Lake
20-7650	Lake Levale
20-7900	Nilan Reservoir
20-7950	Pishkun Reservoir
20-8500	Willow Creek Reservoir

Reviewed
Mike Aderhold
R4 Supervisor
Sept. 18, 1995