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

STATE: Montana PROJECT NO. F-78-R-2
PROJECT TITLE: Statewide Fisheries Investigations
JOB TITLE: Northcentral Montana Coldwater Lake Ecosystems

PERIOD COVERED: July 1, 1995 through June 30, 1996

ABSTRACT

Various strains of rainbow trout continued to be evaluated in several lakes in Region 4 during 1995. The AXE strain of rainbow trout is providing a good fishery in Bean Lake and Willow Creek Reservoir. Poor survival of 1995 stocked DeSmet and AXE occurred in Eureka Reservoir, along with Eagle Lake and Arlee in Pishkun Reservoir. A fair fishery has developed in Nilan Reservoir with Arlee and Eagle Lake rainbow. Survival of the DeSmet strain of rainbow trout increased while survival decreased for the Arlee strain in Smith River Reservoir. Lower survival of wild fish was observed in gill net catches from Smith River Reservoir than in 1994 or 1995 but wild fish still comprised over 30% of the total catch. Survival of Yellowstone cutthroat trout in Newlan Creek Reservoir was the best observed since 1989; however, survival was rated as only fair. The rainbow trout catch in Newlan Creek Reservoir was the lowest since 1990. Eagle Lake rainbow trout continue to out-perform Arlee in Ackley Lake. Gill net data indicates that the Ackley Lake fishery has not declined and rehabilitation is not needed at this time. Big Casino Reservoir continues to have an extremely poor fishery. Illegal introductions were found in nine ponds. Six ponds and reservoirs in the Choteau area, nine in the Great Falls area and nine in the Lewistown area were surveyed.

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 ecosystems.

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.

6. Maintain and enhance public access to fishery resources in northcentral Montana.

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); 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. Rainbow trout trapped in Ackley Lake were tagged with numbered anchor tags. Various rainbow trout strains were marked with fin clips or tetracycline. Gill net survival ratings were grouped under the following categories: good ≥ 8.0 fish per net, fair = 4.0-7.9 fish per net and poor = 0.0-3.9 fish per net. Number estimates of year classes of trout were based on size structure.

Schnabel population estimates were completed on Ackley Lake. The estimate was done from trapping recaptures using the formula from Van Den Avyle 1993:

$$N = \frac{CM}{R} \qquad \text{with variance } V(1/N) = \frac{R}{(CM)^2}$$

A Chapman modification of the Peterson estimate was used for creel recaptures (Van Den Avyle 1993). Samples done were taken without replacement and the formulas used were:

$$N = \frac{(M+1)(C+1)}{R+1} - 1 \qquad V(N) = \frac{(M+1)(C+1)(M-R)(C-R)}{(R+1)^2\,(R+2)}$$

FINDINGS

Rainbow Trout Strain Evaluation

Several waters in Region 4 are 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.

Choteau Management Area

Bean Lake- Two overnight sinking gill nets set in late September captured 46 rainbow trout and 1 flathead chub (Table 1). No differentiation was made in separating the rainbow strains (Arlee and AXE). Based on visual observations and past knowledge of growth of the strains, it appears that AXE outnumbered Arlee in the sample obtained. The sample is of trout stocked in 1995, however, anglers reported catches of larger fish relating to earlier stocking years. Ample rainfall during early summer increased water levels several feet over previous years. A maximum depth of 21 feet was recorded so the likelihood of partial winterkill experienced in past years was much reduced.

Eureka Reservoir- It appears little, if any, survival occurred for AXE or DeSmet rainbow trout stocked in 1995. Two overnight floating gill nets caught only three rainbow and three brown trout (Table 1). Water level fluctuations were similar to those usually seen, but the reservoir was near full by late fall. Spawning redds were observed at the inlet to the reservoir in late March and early April. These redds are suspected to be from DeSmet but spawning success is unknown.

Nilan Reservoir- Both Arlee and Eagle Lake strains of rainbow trout were taken during fall gill netting. At least two year classes of each strain were sampled with the largest fish averaging between 16 and 17 inches (Table 1). Survival is rated as fair for these strains in Nilan Reservoir.

Pishkun Reservoir- Four sinking and three floating gill nets captured only one Eagle Lake rainbow trout from the 1995 plant. No Arlee rainbow or trout from previous plants were taken. Table 1 shows that 46 kokanee salmon were also taken during the survey along with yellow perch, northern pike and white sucker. The kokanee were either from the 1991 or 1993 stocking. Stocking of this species was discontinued after 1991 due to poor survival and difficulty in obtaining eggs. However, due to a fish surplus, kokanee were planted in Pishkun Reservoir in 1993. Analysis of stomachs of northern pike taken in gill nets did not reveal any newly stocked rainbow trout.

Table 1. Overnight gill netting results in coldwater lakes and reservoirs in the Choteau area of Region Four, 1995.

Water (date)	Surface acres	No. of nets[1]	Mean hours fished/net	Species[2]	No. of fish	Length range(mean)	Weight range(mean)
Bean Lake (9-26-95)	180	2S	19.6	Rb	46	7.7-12.2(9.8)	0.18-0.80(0.40)
				FHC	1	(6.5)	(0.10)
Eureka Res. (9-27-95)	300	2F	17.8	Rb-D	2	15.5-15.7(15.6)	1.16-1.22(1.19)
				Rb-AXE	1	(14.2)	(0.98)
				LL	3	20.2-23.8(22.2)	2.95-5.10(4.08)
Nilan Res. (9-27-95)	425	2F	21.7	Rb-I	5	7.0- 8.7(8.0)	0.15-0.24(0.19)
					12	14.9-18.9(16.2)	1.25-2.54(1.60)
				Rb-A	3	8.0-11.6(10.0)	0.19-0.68(0.45)
					4	15.7-18.3(16.7)	1.50-2.03(1.70)
Pishkun Res. (9-28-95)	1100	4S 3F	19.3	Rb-I	1	(9.6)	(0.34)
				KOK	46	13.4-18.7(16.6)	0.80-2.25(1.56)
				YP	2	9.1- 9.6(9.4)	0.40-0.49(0.45)
				NP	6	9.1-21.1(15.9)	0.13-1.52(0.94)
					1	(28.7)	(7.20)
				WSu	9	8.1-12.8(11.2)	0.30-1.00(0.75)
					58	13.2-19.9(16.6)	0.94-3.65(2.22)
Willow Cr Res. (9-26-95)	1400	3F	19.2	Rb-AXE	29	8.3-10.5(9.3)	0.23-0.38(0.30)
					24	13.2-16.5(14.1)	0.80-1.56(0.97)
				CT	1	(11.3)	(0.54)
Lk Shel-oole (7-14-95)	20	1S	13.0	Rb-A	5	6.5- 8.1(7.4)	0.09-0.21(0.15)
					20	10.2-14.2(12.2)	0.37-1.04(0.67)
				YP	5	8.3-12.5(9.9)	0.30-1.24(0.62)
				CR	1	(11.1)	(0.90)
				WSu	3	14.1-15.4(14.7)	1.17-1.50(1.34)

[1] Standard 125 foot experimental nylon gill nets: F = floating; S = sinking.

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

Willow Creek Reservoir- AXE rainbow trout continue to provide a good fishery in this water as indicated by good survival found during fall gill netting surveys (Table 1). Approximately equal numbers of the 1995 plant and earlier plants were taken. Growth of the AXE is considered average for this water but less than that of surrounding waters.

Miscellaneous Waters- Lake Shel-oole, a trout pond near Shelby, was polluted with an illegal introduction of yellow perch as reported previously (Tews et al. 1995). A gill net and a small mesh trap net fished in July, documented additional perch along with crappie, white sucker, fathead minnow, brook stickleback and lake chub. Water levels in July were quite low, with a maximum depth of 12 feet.

Great Falls Management Area

Smith River Reservoir - We continued to stock both the DeSmet and Arlee strains of rainbow trout in Smith River Reservoir near White Sulphur Springs. Gill net catches in fall 1995 produced lower survival for the Arlee strain but higher survival for the DeSmet strain of rainbow trout (Tables 2 and 3) than we found in 1994 (Tews et al. 1995). The Arlee catch per net, rated as poor, was the lowest observed since the reservoir refilled after 1988 (Table 3). Catch of the DeSmet strain was rated as fair, but actually was the highest survival since 1989 (Table 3). The Arlee strain rainbow trout that were caught appeared to only include individuals from the 1994 plant; catch of the DeSmet strain may have included both 1994 and 1995 plants. A change in the size of the DeSmet planted from 2.8 inches in 1994 to 6.8 inches in 1995 reduced our ability to identify each years plants. The catch of wild fish was rated as poor and was less than half of catches in 1993 and 1994 (Table 3). However, they still comprised 30% of the total catch and were captured at higher densities than the Arlee strain. The wild fish did not have a tetracycline mark, were not fin clipped, and ranged in size from 8.1-17.0 inches.

The Arlee and DeSmet strains had similar mean lengths (Table 2). Stomach contents from all 23 rainbow trout were examined; one stomach from a wild fish was empty, one DeSmet contained both insects and plankton, and 21 contained only plankton. Water temperatures and the time of planting were similar for both strains in both 1994 and 1995. Water temperature was 56° F for both plants in 1994 but increased into the low 60's in 1995. We also captured several other species of interest during the annual gill netting at Smith River Reservoir. They included mountain whitefish and burbot, which averaged 3.5 and 4.5 per net, respectively. Relatively high numbers of suckers were also netted (Table 2).

Table 2. Overnight gill netting results in large lakes and reservoirs in north central Montana during 1995.

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 (9/18/95)	240	1F,1S	19.0	Rb-A-95	5	7.5-10.0	(8.3)	-		-	
				Rb-I-95	9	7.6-10.2	(9.3)	-		-	
				Rb-A-94	12	13.6-15.2	(14.2)	-		-	
				Rb-I-94	16	13.4-14.9	(14.1)	-		-	
				Rb-I-93	5	16.1-17.5	(17.0)	-		-	
				MW	2	10.1-18.3	(14.2)	-		-	
				WSu	38	11.0-18.1	(15.6)	-		-	
				LnSu	2	7.0-16.2	(11.6)	-		-	
Bair (9/21/95)	272	1F,1S	16.6	Rb-I-95	12	6.8- 8.8	(7.9)	0.10-0.22	(0.16)	19.7-40.2	(32.3)
				Rb-I-94	18	9.8-13.5	(11.3)	0.25-0.84	(0.43)	23.1-41.0	(29.4)
				WSU	38	9.0-13.9	(10.5)	0.25-0.83	(0.43)	29.3-42.0	(35.8)
Martinsdale (9/21/95)	1000	1F,1S	23.8	Rb-1995-A	20	9.6-11.5	(10.7)	0.40-0.80	(0.60)	45.1-69.1	(52.5)
				Rb-1994-A	4	14.7-15.5	(15.1)	1.20-1.50	(1.43)	37.8-44.4	(41.3)
				LL	4	12.2-16.8	(15.3)	0.90-1.80	(1.40)	32.9-49.6	(40.0)
				WSu	76	6.1-17.0	(12.3)	0.15-2.15	(0.97)	35.6-	
Newlan Creek Res. (11/01/91)	280	1F,1S	17.8	YCt	10	9.5-10.8	(10.0)	0.26-0.38	(0.31)	27.8-32.0	(30.4)
				Rb-Wild	4	7.3-12.6	(8.8)	0.13-0.62	(0.27)	31.0-35.6	(33.6)
				Rb-I-1994	1	-	(7.8)	-	(0.16)	-	(33.7)
				LnSu	69	7.8-15.4	(12.4)	0.15-1.10	(0.63)	23.3-53.7	(32.3)
				Burbot	7	13.5-26.5	(19.6)	0.44-4.55	(2.03)	17.9-28.6	(23.2)
Smith River Res. (11/01/95)	327	1F,1S	16.5	Rb-A-1994	3	12.8-13.8	(13.4)	0.92-1.00	(0.95)	37.0-43.9	(39.6)
				Rb-Wild	7	8.1-17.0	(12.1)	0.19-1.54	(0.75)	29.6-37.8	(34.7)
				Rb-D-1995,1994	13	11.7-15.2	(13.5)	0.56-1.26	(0.89)	32.8-38.7	(35.9)
				MW	7	11.5-15.7	(14.1)	0.54-1.42	(0.99)	31.1-36.7	(34.6)
				LnSu	43	7.8-18.2	(15.6)	0.16-2.40	(1.53)	32.9-42.5	(38.1)
				WSu	5	15.7-17.5	(16.4)	1.54-2.33	(1.83)	36.9-43.5	(41.0)
				Burbot	9	11.9-22.9	(15.5)	0.36-2.96	(0.97)	16.5-24.6	(20.5)
Yellowwater (9/25/95)	193	1F,1S	22.1	Rb-All	41	7.6-18.8	(11.9)	0.25-3.20	(0.90)	28.9-58.2	(46.5)
				WSu	42	8.6-14.0	(11.4)	0.25-1.20	(1.41)	32.9-50.4	(42.0)

1 F=Floating;S=Sinking 2-Species abbreviations: Rb=Rainbow trout; YCt=Yellowstone cutthroat trout; MW=Mountain Whitefish;WSu=White sucker; LnSu=Longnose sucker
2-Strain abbreviations: A=Arlee; D=DeSmet; I=Eagle Lake

Newlan Creek Reservoir - During fall gill netting activities in 1995, we averaged 5 Yellowstone cutthroat trout in each net set in Newlan Creek Reservoir (Tables 2 and 4). Although we would rate this as only fair survival, this is the highest catch obtained since 1990 (Table 4). Data suggests that all these cutthroat were from a 1994 plant of 3.1 inch fish. However, these fish could also be a result of a June 1995 plant which averaged 6.7 inches in length. Ninety percent of the cutthroats stomachs contained plankton.

Eagle Lake rainbow trout were planted in Newlan Creek Reservoir in June 1994 and August 1995. The Eagle Lake rainbow sampled, even when combined with the naturally reproducing rainbow trout catch, would be rated as poor. Only a single Eagle Lake rainbow trout from the 1994 plant was captured (Table 2). The total number of rainbow caught per net, including both wild and stocked fish, was the lowest number obtained since 1990. Examination of stomach contents showed four of the five contained plankton; the other stomach contained vegetation. A total of 7 burbot were also caught in the two nets.

Great Falls, Cascade, Geyser, and Geraldine Area Waters - A total of 7 ponds were surveyed during the reporting period. Two ponds in the Cascade area (Pelican Point Ponds #1 and 2), 3 in the Geyser area (Kolar Ponds #1, 2, and 8), one in the Geraldine area (Harwood Lake), and one pond in the Great Falls area (Wadsworth Park Pond) were surveyed. Data was not summarized soon enough to be included in this report and will be presented in the appropriate report next year. However, four of the ponds (Pelican Point Ponds #1 and 2, Kolar Pond #2, and Wadsworth Reservoir) contained species that had not been previously reported in these waters. All appeared to be the result of illegal introductions; northern pike, walleye, and pumpkinseed were the three species that had been planted; northern pike were found in three of the waters, walleye in 1, and pumpkinseed in 1 pond.

Table 3. Catch rates per net of wild and DeSmet and Arlee strain rainbow trout in Smith River Reservoir, 1988-1995.

Year	Catch rate per net		
	DeSmet	Arlee	Wild
1995	6.5	1.5	3.5
1994	4.0	4.5	8.5
1993	1.5	3.0	9.0
1992	0.5	5.0	0.0
1991	0.5	13.0	0.0
1990	0.5	5.0	0.0
1989	9.0	14.5	0.0
1988 - not netted	-	-	-

Table 4. Catch rates per net of Yellowstone cutthroat and rainbow trout in Newlan Creek Reservoir, 1988-1995.

Year	Catch rate per net	
	Yellowstone cutthroat	Rainbow
1995	5.0	2.5
1994	1.0	7.0
1993	1.0	4.0
1992	1.0	10.0
1991	3.0	5.0
1990	2.5	1.5
1989	20.5	4.5
1988	40.0	10.5

Lewistown Management Area

Reservoirs in the Lewistown area had variable water levels in 1995. Winter kill was not reported during 1994-1995 and 1995-1996. Water levels and physical-chemical parameters for waters sampled in 1995 are listed in Appendix 1.

Ackley Lake - Rainbow strain evaluation continued on Ackley lake. In 1995, 30,000 Arlee and 20,000 Eagle Lake rainbow trout were planted. Eagle Lake rainbow had the adipose fin clipped. Due to a fish surplus, 10,000 more Arlee were stocked than in previous years.

Spring trap netting of rainbow trout was completed from April 17 - April 20. Spring shoreline trapping targeted rainbow trout attempting to spawn and was done to evaluate the longevity and utilization of rainbow in Ackley Lake. About 97% of the rainbow trapped were the Eagle Lake strain. Total length of the trapped fish ranged from 9.1 - 20.8 inches, with a mean TL for Eagle Lake of 18.2 inches (Table 5). Fourteen percent of the tags of these trapped fish were voluntarily returned within one year.

Schnabel and Peterson population estimates of the trapped rainbow trout were completed. The Schnabel estimate for rainbow trout based on recaptures from trapping was 829 fish with 95% CI from 634 -1213. A modified Peterson estimate using creel data recaptures found rainbow trout greater than 16 inches numbered 1617 with a 95% CI from 454 - 2780. The Schnabel estimate is probably low, since traps were set on about half of the Ackley Lake shoreline. Creel data is suspect because only 27 captures and 4 recaptures were sampled. This data does indicate that there are few large rainbow trout in Ackley Lake.

Based on fall gill netting, survival was poor for 1995 Arlee, and 1993 Eagle Lake, fair for 1994 Arlee, 1995 Eagle Lake, and good for 1994 Eagle Lake (Table 2). Eagle Lake rainbow continue to exhibit better survival than Arlee; Arlee rarely are captured past the second summer, while Eagle lake are caught through their third summer (Figure 1). Numbers of rainbow caught in gill nets was higher than seen since 1991 and overall sucker numbers declined from those seen in the past few years (Figure 2).

A few anglers have expressed concern about sucker numbers and a decline in the rainbow fishery. They feel it is time to re-poison Ackley Lake. Figure 2 shows fall gill netting trends in Ackley Lake since rotenone rehabilitation in 1985. Numbers of rainbow declined from 1988 - 1991, but have recently increased.

Average rainbow TL has not declined since rehabilitation was done (Figure 3). White sucker numbers have fluctuated greatly, but about 50% less suckers were captured in 1995 than in 1987 (Figure 2). Average white sucker size has increased from about 10 to over 15 inches (Lewistown files). Longnose sucker data show no long term trends but very few were captured in 1995 (Figure 2).

In contrast to past years (Tews et al. 1995) most trout in the creel were Eagle Lake (Table 6). This was likely due to the April - June creel period. In April and May anglers were catching the same large Eagle Lake we caught in our traps. Catch rates averaged 0.35 per hour and varied greatly between month and type of angler (Appendix 2). This is a slightly higher catch rate than found in Ackley Lake during the summer 1990 creel (Liknes et al. 1991).

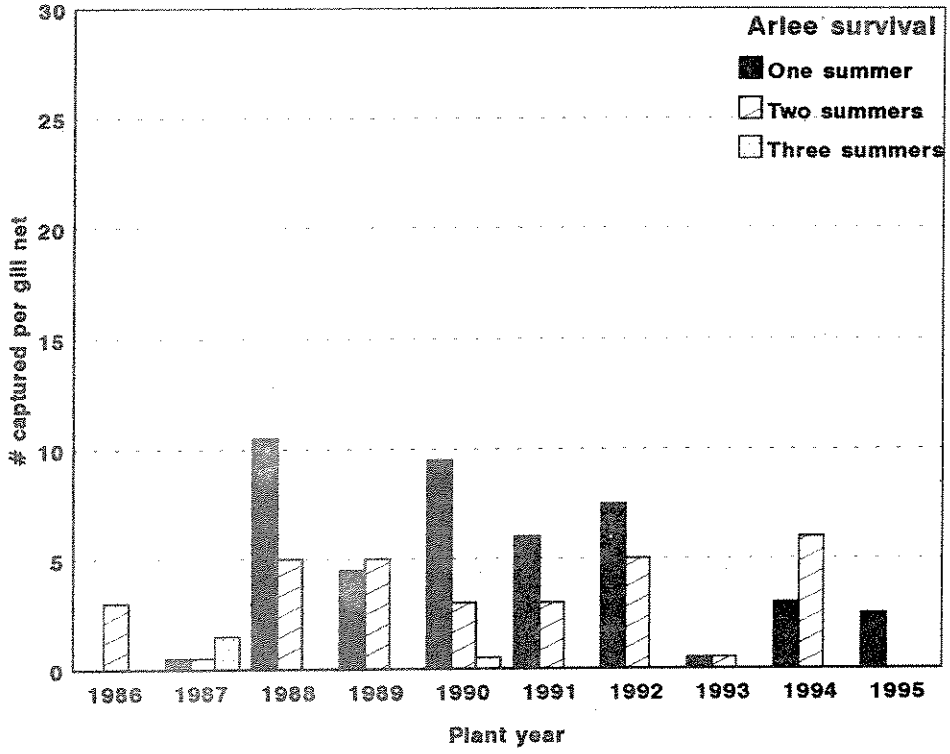
Table 5. Trap netting catch during 9 trap nights on Ackley Lake conducted April 17 -20 1995.

Species & Strain[1]	Total # of fish	Length (in) Range	Length (in) (Mean)	Weight (lbs) Range	Weight (lbs) (Mean)	Condition Factor Range	Condition Factor (Mean)
Rb-A	4	10.7-12.5	(11.3)	0.50-0.88	(0.68)	40.8-51.6	(46.5)
Rb-I	288	9.1-20.8	(18.2)	0.35-3.14	(2.23)	20.0-50.4	(36.2)
WSu	about 1700[2]	7.2-18.7	(15.3)	0.16-3.38	(1.83)	40.8-54.7	(48.2)
LnSu	about 300[2]	14.6-17.4	(16.0)	1.41-2.33	(1.88)	43.4-49.3	(45.7)

1-Rb = rainbow trout, A = Arlee strain, I = Eagle Lake strain, 2-only 39 WSu and 8 LnSu were measured, numbers reflect total estimate of trapped fish

Table 6. Rainbow trout statistics from Creel harvest data April - May 1995.

Species	Number measured	% of catch	Length Range	Length (Average)	Weight Range	Weight (Average)
Arlee	11	21	11.5-13.4	(12.2)	0.57-0.87	(0.74)
Eagle Lake	41	79	11.2-20.6	(16.9)	0.56-2.96	(1.81)



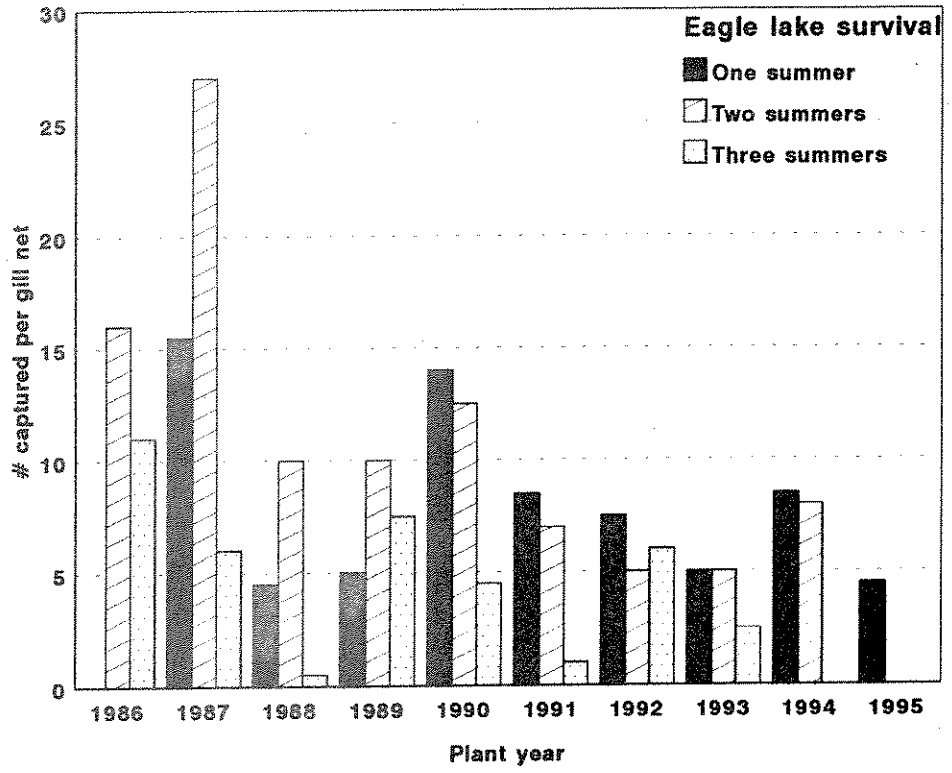


Figure 1. Fall gill net catch of various year classes of Arlee and Eagle Lake rainbow trout caught in Ackley Lake from 1986 -1995.

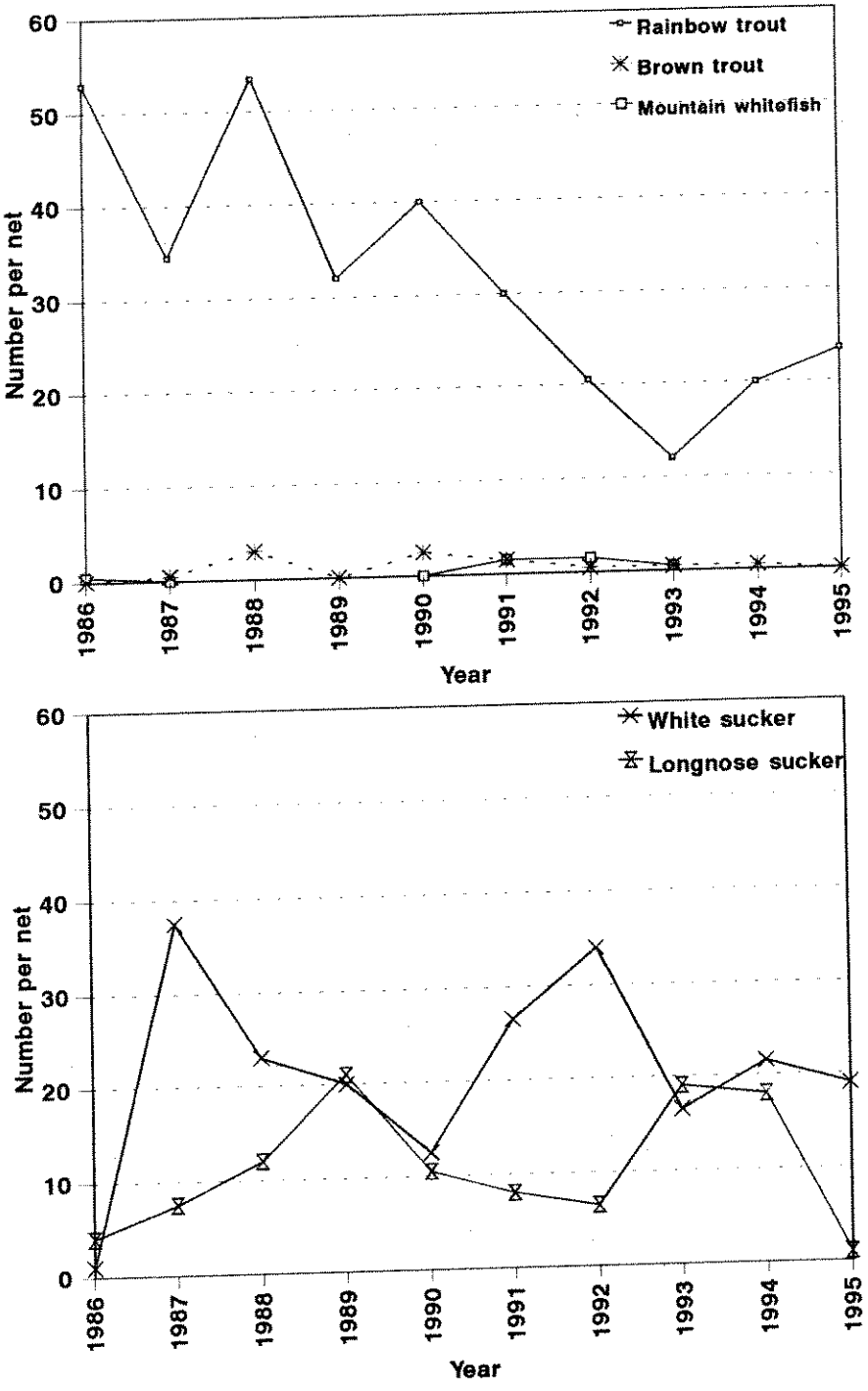


Figure 2 . Fall catch from floating and sinking gill nets on Ackley Lake 1986 - 1995.

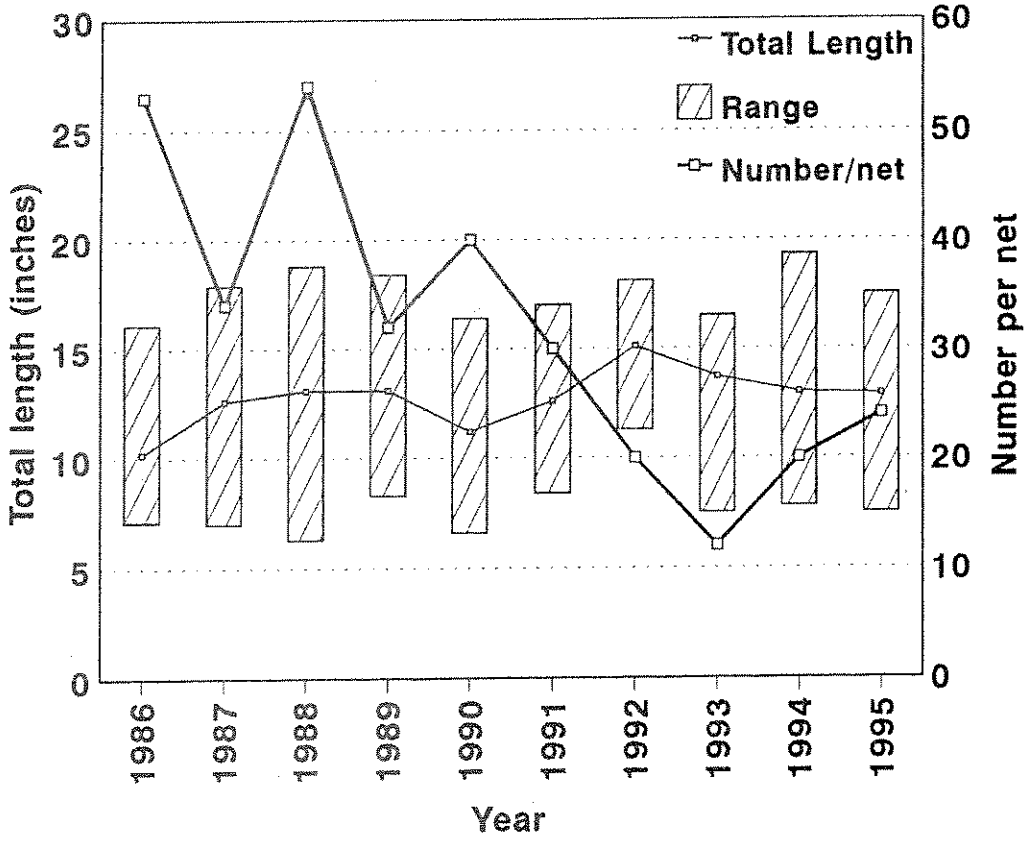


Figure 3. Average and range of total length of rainbow trout and number of rainbow trout captured during fall gill netting in Ackley Lake from 1986-1995.

Bair Reservoir- The number of rainbow trout caught in gill nets declined dramatically from 1994, with catch rated as fair for 1995 Eagle Lake and good for 1993 Eagle Lake. White sucker numbers declined dramatically from the 234 captured in 1994 (Table 2 and Tews et al. 1995).

Martinsdale Reservoir-Gill netting captured about 25% of the rainbow netted in 1994 but numbers of brown trout and white suckers did not decline (Table 2 and Tews et al. 1995). Survival was rated as good for 1995 Arlee and poor for 1994 Arlee. No Yellowstone cutthroat were caught despite stocking 10,000, 5 - 6 inch fish in 1994 and 1995 and 40,000 3.1 inch cutthroat in 1994. The last time cutthroat were not captured was in 1992, after a two year stocking hiatus (Tews et al. 1995, Hill and Liknes 1993).

Yellowwater Reservoir-White suckers had a 20 fold increase from 1994 - 1995, and have reached numbers in gill nets typical to the pre-drought conditions of the late 1980's (Table 2 and Tews et al. 1995). Numbers of rainbow captured overall was excellent, but the largest fish was only 3.2 pounds. In 1994 several rainbow greater than four pounds were taken. Anglers mentioned catching rainbow 6-7 pounds during the early summer 1994.

Small Lewistown Area Reservoirs

Five small reservoirs in the Lewistown area were gill netted during 1996 and results presented in Table 7. Illegal introductions were found in three of these reservoirs. Box Elder had green sunfish, Fritzner had lake chub and white sucker, and Peterson Pond held lake chub. Peterson is spring fed and no lake chubs were captured when the reservoir was last netted in 1991 (Hill and Liknes 1992)

Big Casino Reservoir- The fishery in Big Casino Reservoir continues to be disappointing. White suckers and rainbow were both captured at lower numbers in gill nets than they were in 1994 (Figure 4). There were still over 100 white suckers caught per net. Size of both of these species has decreased since Big Casino Reservoir was drained in 1990 (Figure 5). Average rainbow size has decreased from 11.2 inches in 1991 to 8.6 inches in 1995, while white suckers have decreased from 11.7 to 8.6 inches. Some of these differences probably relate to variation in stocking size. In 1991 catchable rainbows of 8.6 inches average total length were stocked. From 1992 - 1994 fingerling rainbow of about 4 inches were stocked. In 1995, both fingerling and catchable rainbow were stocked. Addition of catchable trout in 1995 appears to have had little impact on average trout size (Figure 5).

Table 7. Overnight gill netting results in small reservoirs in north central Montana during 1995.

Water name (Date surveyed)	# of 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)
Box Elder (5/31/95)	1 S	21.2	Rb-A-95	1	-	(6.3)	-	(0.10)	-	(40.0)
			Rb-A-94	11	12.9-15.9	(14.6)	1.00-1.57	(1.33)	38.1-49.4	(42.2)
			Rb-A-93	1	-	(18.5)	-	(2.58)	-	(40.8)
			Green sunfish	5	4.5- 7.0	(6.1)	0.07-0.30	(0.22)	76.3-115	(91.5)
Big Casino Creek (9/19/95)	1F/1S	14.8	Rb-A/I-95	34	6.8-11.3	(8.3)	0.10-0.52	(0.38)	30.5-42.9	(35.6)
			WSu	222	6.0-14.6	(8.6)	0.06-1.03	(0.26)	12.6-62.0	(34.4)
Fritzner (5/23/95)	1 S	18.6	Rb-A-95	7	5.6- 6.4	(6.0)	0.08-0.11	(0.09)	35.2-51.3	(43.3)
			Rb-A-94	1	-	(13.3)	-	(0.90)	-	(38.2)
			WSu	1	-	(15.3)	-	(1.83)	-	(51.1)
			LCh	1	-	(5.9)	-	(0.09)	-	(43.8)
Rindall (6/13/95)	1 S	23.0	Rb-A-95	8	5.9- 7.4	(6.5)	0.08-0.13	(0.10)	30.5-48.0	(38.7)
			Rb-A-94	19	10.6-13.0	(12.1)	0.45-0.87	(0.66)	30.1-42.4	(37.2)
			Rb-A-93	1	-	(14.8)	-	(1.40)	-	(43.9)
			WSu	1	-	(14.4)	-	(1.25)	-	(41.9)
Peterson (4/24/95)	1 S	18.5	Rb-A-95	1	-	(6.4)	-		-	
			Rb-A-94	13	10.7-14.3	(11.9)	0.47-1.03	(0.66)	34.8-42.1	(38.5)
			LCh	33	5.5- 7.1	(6.4)	-		-	

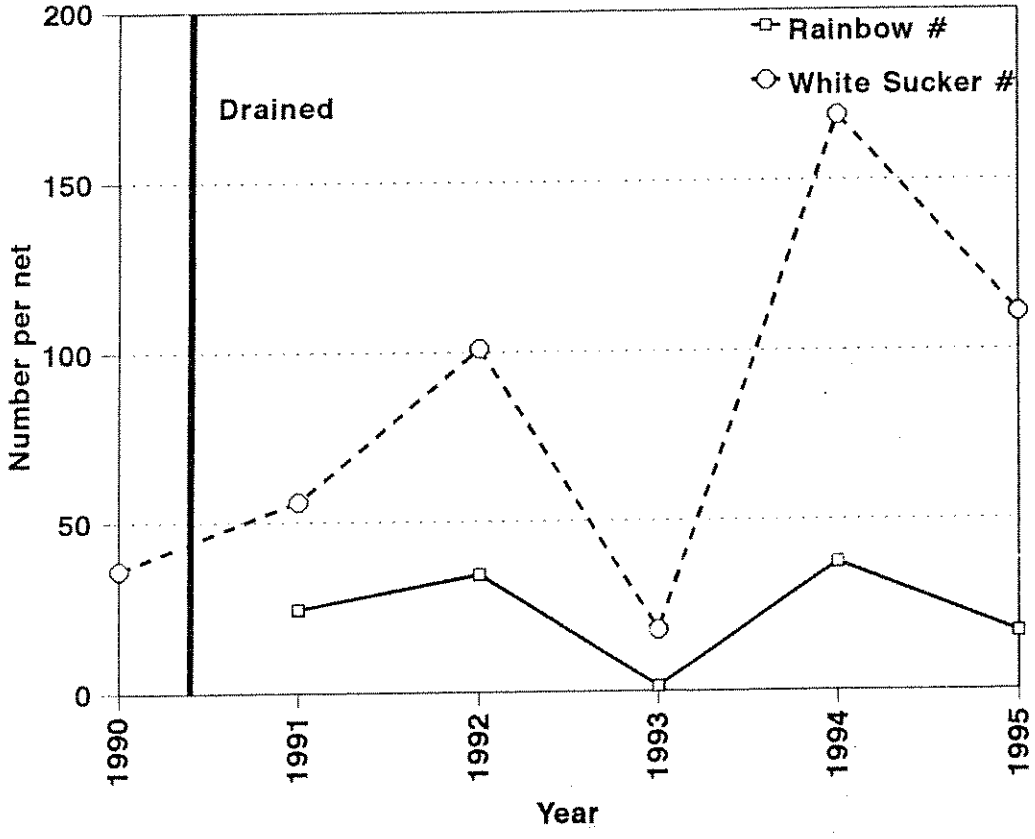
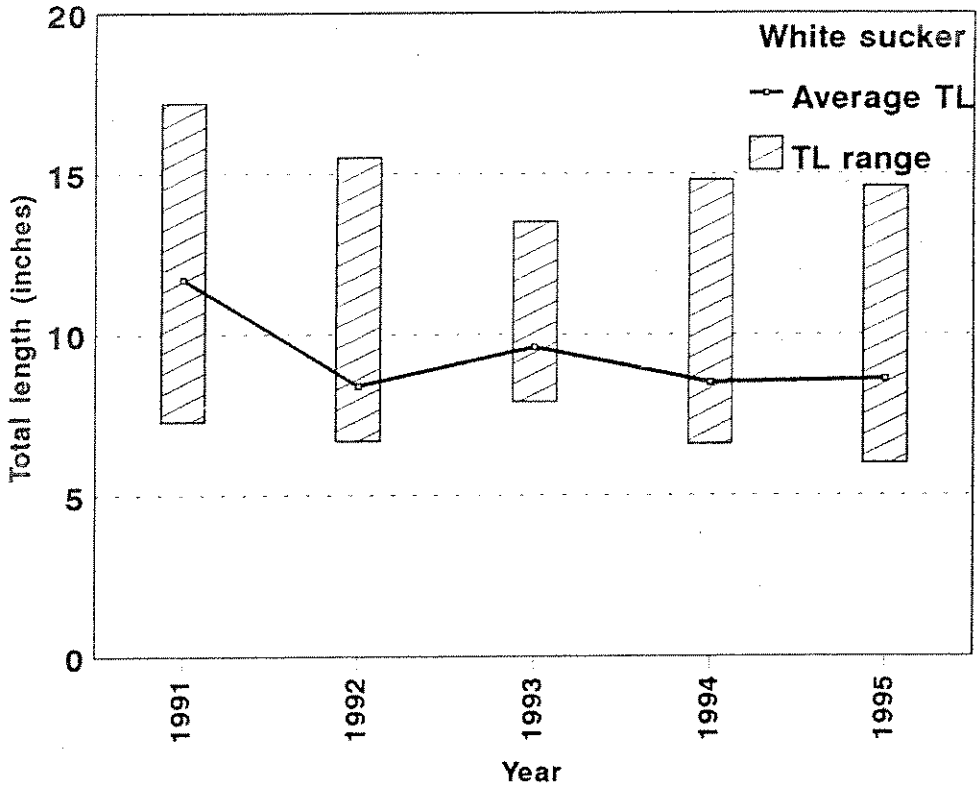


Figure 4. Gill netting results from Big Casino Reservoir from 1990 - 1995.



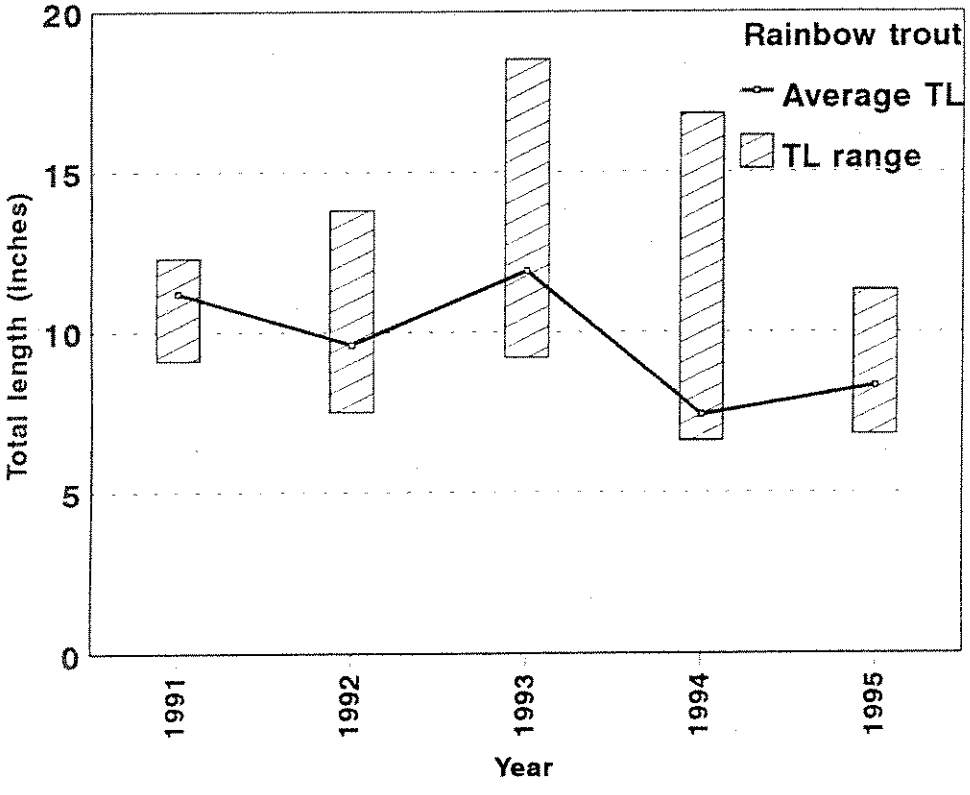


Figure 5. Average and range of total length for rainbow trout and white suckers captured in Big Casino Reservoir 1991 - 1995.

Box Elder- Rainbow exhibited excellent growth despite the presence of green sunfish. Gill net catch was considered excellent for 1994 Arlee and poor for 1995 and 1993 Arlee. Bluegill had been reported from Box Elder in 1989 (Hill et al. 1990) but may have been misidentified. About 2 weeks after Box Elder was netted the reservoir dried up due to irrigation withdrawals, so the green sunfish may have been eliminated.

Fritzner- Catch was good for 1995 rainbow and poor for 1994 rainbow. One white sucker and one lake chub were also caught. Fritzner is fed by a well so the white sucker and lake chub must have been illegally planted.

Peterson-Catch of 1994 Arlee was excellent. Thirty-three lake chub were captured indicating a huge population of large lake chub in the lake.

Rindall Reservoir- This reservoir was netted for the first time since 1984. Catch was good for 1995 Arlee and excellent for 1994 Arlee. One three year old rainbow and 1 white sucker were also captured (Table 7). No suckers were captured in this reservoir when it was netted from 1967 - 1984 (Lewistown file).

DISCUSSION AND RECOMMENDATIONS

We recommend continued stocking of Arlee and AXE in Bean Lake and AXE only in Willow Creek Reservoir. Past evaluations have shown that these strains do best in these waters. Rainbow trout strain evaluations should continue with DeSmet and AXE in Eureka Reservoir, and Eagle Lake and Arlee in Nilan Reservoir. The spawning potential of DeSmet in the inlet ditch to Eureka Reservoir should continue to be monitored. In Pishkun Reservoir, the experimental plants of Eagle Lake and Arlee will conclude in 1996. The success/failure of stocking trout into this northern pike lake will be evaluated following the 1996 field season, and a decision made whether to continue planting. We recommend continued stocking of rainbow trout in Lake Shel-oole. The exotic species that were illegally introduced into Lake Shel-oole will not be eradicated in the near future because the individuals responsible will more than likely do it again.

Evaluation of two rainbow trout strains should continue in Smith River Reservoir. We should continue to schedule the stocking of DeSmet rainbow for a June planting date using overwintered fish 6-7 inches in length. We should also consider switching from the Arlee to the Eagle Lake strain if 3-4 inch fish can be provided for a June planting date. Spawning enhancement in the tributaries should be considered. 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. If possible, we should schedule the Eagle Lake plant for a June stocking date rather than later in the summer.

Rainbow trout strains have been evaluated on Ackley Lake for 10 years and Eagle Lake consistently out-perform Arlee. Both strains should continue to be planted at Ackley Lake. Stocking rates should be changed to 10,000 Arlee and 30,000 Eagle Lake. Strain evaluation should be discontinued; time expended marking fish would be better spent elsewhere. Gill netting data indicate there is no need to poison Ackley Lake at this time. Big Casino Creek Reservoir needs major management action to remove the stunted sucker population. We plan to drain, poison and temporarily block the inlet to eliminate suckers within Big Casino Creek Reservoir. Suckers will quickly repopulate the reservoir from Big Casino Creek so we plan to introduce an experimental walleye population for sucker control. Peterson Reservoir should be stocked with Eagle Lake due to the lake chub population.

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

Code Numbers of Waters Referred to in Report:

14-7320	Eureka Reservoir
14-8935	Lake Shel-oole
16-4300	Ackley Lake
16-6340	Kolar Reservoir #1
16-6360	Kolar Reservoir #2
16-6385	Kolar Reservoir #8
16-4620	Lower Carter Pond
16-4628	Big Casino Creek Reservoir
16-7642	Peterson Pond
16-1578	Fritzner Reservoir
17-8720	Bean Lake
17-9040	Harwood Lake
17-9330	Newlan Creek Reservoir
17-9394	Pelican Point Pond #1
17-9394	Pelican Point Pond #2
17-9616	Smith River Reservoir
18-7220	Box Elder Reservoir
18-7750	Bair Reservoir
18-8380	Martinsdale Reservoir
18-8840	Rindall (Satterfield) Pond
18-9500	Yellow Water Lake
20-7900	Nilan Reservoir
20-7950	Pishkun Reservoir
20-8470	Wadsworth Reservoir
20-8500	Willow Creek Reservoir

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Appendix 1. Water quality parameters from waters in Central Montana in 1994.

Water	Date	Temp (°F)	Secchi (ft)	Maximum depth(ft)	Conductivity (µohms/cm)*	Comment
Ackley Lake	9/18/95	59.5	7.0	32.0	454	
Bair Reservoir	9/21/95	55.9	9.0	55 +	375	
Casino Creek	9/19/95	54.8	2.5	16.2	710	
Fritzner full	5/23/95	59.2	0.5	20.0	2670	2 ft below
Martinsdale	9/21/95	56.2	5.0	60	426	
Rindall full	6/13/95	70.1	2.5	12.0	1761	0.5 ft below
Yellowwater	9/25/95	56.8	4.0	30+	1680	3 ft below full

Appendix 2 . Creel survey data April-May 1995 from Ackley Lake.

Month	Type	# Interviews	# hours fished	# Rb kept	# Rb caught	harvest rate (#/hour)	Catch rate (#/hour)
April	Boat	5	14.5	13	18	0.90	1.24
	Shore	34	98.2	30	38	0.30	0.39
May	Boat	2	2.0	0	0	0.00	0.00
	Shore	33	86.9	18	28	0.21	0.32
June	Boat	0	0.0	-	-	-	-
	Shore	8	46.1	2	2	0.04	0.04
Total	Boat	7	16.5	13	18	0.79	1.09
	Shore	75	231.2	50	68	0.22	0.29
	All	82	247.7	63	86	0.25	0.35