MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project No.: F-5-R-33 Title: Northcentral Montana Fisheries Study

Job No.: I-a Title: Inventory and Survey of Waters in the Western Half of Region Four

Period Covered: July 1, 1983 though June 30 1984
Report Period : April 1, 1983 through March 31, 1984

ABSTRACT

Surveys were conducted on a total of 34 waters. These include 8 large lakes and reservoirs, 9 farm ponds and small lakes, and 17 streams. Growth of rainbow trout stocked in reservoirs and lakes ranges from poor to good. DeSmet rainbow trout stocked in Bean Lake grow about equal to Arlee rainbow. Northern pike population estimates in Pishkun Reservoir were similar to those made in 1981 and 1982. Slightly over 21 percent of tagged northerns were harvested by fishermen. Increased forage for northern pike and walleye in Lake Elwell and Lake Frances is needed. Attempts to access reproduction of black crappie and yellow perch in Priest Butte Lake were negative. Several streams were electrofished to update population data for management files. Grayling were introduced into Rock Creek in the Bob Marshall Wilderness area. Rainbow trout sampled in the forks of the Sun River are of similar size to those taken in the 1981 survey. Trout population estimates in the access section of the Smith River are within the range of estimates conducted over the past 5 years.

OBJECTIVES AND DEGREE OF ATTAINMENT

1. To inventory fish populations in four streams to update management files. Information was collected from 13 streams and is included in this report.

2. To determine growth rates and angler success for rainbow trout in four reservoirs and lakes in order to evaluate stocking densities. Results appear in this report for 6 reservoirs and lakes.

3. To estimate the northern pike population in Pishkun Reservoir to determine the feasibility of stocking rainbow trout. Also, to monitor trends in the kokanee salmon population in Pishkun Reservoir. This work, was done and is included in this report.

4. To evaluate present management of farm ponds and small lakes and to investigate the fishing potential of new ponds. Information appears in this report for eight ponds and small lakes.

5. To obtain trend information on population size, fisherman harvest, and food habits of game fish in Lake Elwell and Lake Frances. Also, to determine composition and abundance of forage fish. This work was done and the data is included in the Accomplishment section.

6. To determine survival and reproduction of black crappie and yellow perch in Priest Butte Lake following their introduction. Information was collected and is included in the report.

7. To monitor stability of stream habitat and estimate brook trout populations on sections of the Teton River where flood debris was mechanically removed and where it was left. This objective will be investigated only if significant changes occur in channel morphology and river habitat. Information was collected for a portion of this objective and is included in the report

PROCEDURES

Fish were sampled with 6 x 125 foot experimental gill nets (3/4 to 2-inch mesh), 3x4 foot and 4x6 foot frame net traps, a 300-volt DC electrofish shocker; a 0-500 variable voltage D.C. electrofish shocker; and by hook and line. Measurements taken on fish include total lengths to the nearest tenth of an inch and weights to the nearest hundredth of a pound. Scale and otolith samples were collected for age and growth studies. Northern pike and walleye were marked with Floy T-tags anchored near the dorsal fin. Harvest and angler success determinations were made through voluntary angler tag returns, occasional creel census and interviews with fishermen. Stomach samples were analyzed from northern pike and walleye. Rainbow trout planted in Pishkun and Bynum Reservoirs were marked with adipose fin clips for later identification. Population estimates of northern pike were made by intensive short-term mark and recapture. Fish population estimates on the Smith River were made using the mark and recapture method described by Vincent (1971 and 1984).

ACCOMPLISHMENTS

Lakes and Reservoirs

Gill net summaries for the lakes and reservoirs inventoried appear in Table 1. Various waters are discussed individually as follows:

Bean Lake

Gill net sampling indicated good survival of 40,000 fingerling trout planted in the spring of 1983. Also, good numbers of trout planted in the spring of 1982 were represented in the catch. Roughly half the 1982 plant were Arlee strain rainbow and half were DeSmet rainbow. Both species were collected and were of similar length and weight. Continued evaluation will determine longevity of the DeSmet rainbow and if they will provide a quality fishery superior to Arlee rainbow in this lake.

Table 1. Summary of gill netting in lakes and reservoirs, 1983.

Area (Date Sampled)	Surface Areas	No. of Nets	Species[+]	No. of Fish	Length Range (Average)	Weight Range (Average)
Bean Lake (Oct 19)	200	2	Arlee Rb	59	8.4-11.2(9.6)	0.22-0.59(0.35)
			Arlee Rb	17	12.7-15.4(14.1)	0.72-1.24(1.02)
			DeSmet Rb	23	12.2-16.4(13.9)	0.67-1.35(0.97)
Bynum Res. (Oct 6)	2,500	2	Rb	13	8.2-9.6(9.2)	0.22-0.32(0.29)
				14	11.9-14.2(12.9)	0.62-08.9(0.73)
			LL	1	(11.9)	(0.54)
			WF	15	11.3-15.1(13.1)	0.50-1.10(0.84)
			WSu	2	13.7-15.9	
Eureka Res.	175	2	Rb	4	9.7-10.0(9.8)	0.32-0.38(0.35)
				1	(15.5)	(1.28)
			LL	2	22.3-24.0(23.2)	4.89-5.25(5.07)
			WSu	143		
			LNSu	2		
Holter Res. (Nov 1)	4,800	4	Rb	235	8.7-12.1(10.6)	0.32-0.76(0.51)
				43	14.2-18.8(16.9)	1.16-2.84(1.91)
			Kok	1	14.4	1.18
			LL	1	15.4	1.17
			WE	1	17.2	1.96
Newlan Res. (Oct 4)	300	2	Rb	34	6.9-11.3(9.9)	0.13-0.65(0.43)
				10	12.2-15.9(13.7)	0.69-1.60(1.04)
			Ct	1	18.0	2.23
			Eb	1	11.0	0.57
			WF	1	14.1	1.29
			LNSu		—	—
Lake Elwell (Sept 27-28)	14,500	16	WE	28	8.1-12.9(10.8)	0.14-0.74(0.44)
				67	13.0-16.4(14.5)	0.60-1.55(1.08)
				13	17.0-2.07(18.7)	1.91-3.27(2.47)
				1	(30.0)	(9 #
			NP	15	10.3-16.8(14.3)	0.27-1.08(0.75)
				53	17.4-22.8(19.2)	1.18-3.03(1.68)
				5	24.5-26.5(25.9)	4.08-5.90(4.67)
			Rb	3	15.0-21.7(18.9)	1.39-3.25(2.49)
			C.Cat	3	15.5-22.6(18.0)	1.27-4.33(2.29)
			LT	1	(23.8)	(4.23)
			YP	45	5.0-7.2 (6.0)	0.06-0.14(0.09)
				7	8.7-10.6(9.4)	095.35-0.60(0.4
			WSu	30		
			Carp	2		
Lake Frances	4,000	4	WE	35	7.6-12.9(9.4)	0.12-0.67(0.27)
				16	13.3-17.0(14.9)	0.80-1.70(1.12)
				7	17.3-19.9(18.2)	1.65-3.05(2.19)
			NP	4	18.8-22.1(20.9)	1.70-3.02(2.39)

Table 1. Summary of gill netting in lakes and reservoirs, 1983 - Con't

Water (Date Sampled)	Surface Acres	No. of Nets	Species	No. of Fish	Length Range (Average)	Weight Range (Average)
			NP	8	24.0-28.5(25.8)	3.70-700(4.73)
			Ling	1	(21.0)	(2.57)
			WSu	3	14.5-18.5	
			LNSu	2	18.5-21.4	
Nilan Res. (Dec 26)	—	1/	Rb	46	9.3-11.5(10.6)	0.32-0.57(0.46)
				3	16.2-16.7(16.5)	1.54-1.59(1.57)
Pishkun Res. (July 26)	1,300	3	KOK	5	7.8-11.5(10.1)	0.16-0.53(0.37)
				9	13.8-15.6(14.5)	0.85-1.31(1.01)
			NP	2	11.9-14.4(13.2)	0.35-0.72(0.54)
				2	16.9-18.5(17.7)	1.50-1.62(1.56)
			YP	37	5.7- 7.3(6.8)	0.08-0.20(0.15)
				10	9.4-10.1(9.5)	0.37-0.49(0.39)
			WSu	3	6.0- 9.2	

*Species Abbreviations:

Rb - rainbow trout; LL - brown trout; Wf - mountain whitefish; LT - lake trout; KOK - kokanee salmon; WE - walleye; NP northern pike; C Cat - Channel catfish; Ling - burbot; YP - yellow perch; WSu - white sucker; LNSu - longnose sucker.

1/ Winter Creel Census 5 fishermen - 14.5 total hours.

Bynum Reservoir

A total of 50,000 five-inch Arlee triploid rainbow trout were planted in this reservoir in the spring of 1983. Triploidy is a process in which an abrupt temperature change to newly fertilized eggs stops division of chromosomes. This process sterlizes the fish and enables them to fully utilize all of their energy towards maximum growth. In addition, longer lived fish are anticipated. Twenty thousand of these fish were marked with an adipose fin clip prior to planting for later identification. The gill net survey indicated these triploid rainbow averaged 9.2 inches and 0.29 pounds (Table 1.) Their growth and longivity will be followed in future surveys. Triploid rainbow are scheduled for 1984 also.

Eureka Reservoir

Very few trout were taken in the gill net survey (Table 1). This irrigation storage reservoir is overrun with suckers, fluctuates drastically, and therefore does not lend itself to trout management. Plans for 1984 include 30,000 Eagle Lake strain of rainbow trout. It is hoped this strain will utilize small suckers for forage.

Holter Reservoir

Below average spring runoff from the upper Missouri River drainage resulted in orderly flow through Holter Reservoir in 1983. As a result, very few trout were noted to be flushed from the reservoir. Gill net sampling in the fall of 1983 took large numbers of rainbow trout planted in late July and a good sample of trout planted in the Reservoir in 1982.

Anglers reported making good catches of two pound rainbow trout in the late summer of 1983. This relates to low runoff and low spills from Holter Reservoir in both 1982 and 1983 and results in few fish flushed over Holter Dam. Management of a quality fishery in Holter Reservoir is mainly dependent on spring runoff patterns. Introductions of new strains of rainbow trout in an attempt to provide a trophy fishery in the reservoir may be difficult if flood flows flush high numbers of these fish over the dam.

Newlan Reservoir

Past netting surveys reveal Yellowstone cutthroat trout have exhibited superior longevity over the Arlee strain of rainbow trout in this reservoir. In 1982, we recommended converting Newlan Reservoir to cutthroat trout management. A total of 25,000 cutthroat and 10,000 rainbow trout were planted in the reservoir in 1983. No rainbow trout will be planted in 1984 while 30,000 cutthroat trout fingerlings will be planted.

Gill net survey in October, 1983 did not take any of the cutthroat planted in the current year. Since cutthroat were planted in early September (3-4 inch fish) they were still too small for sampling in gill nets. Anglers reported catching a few five to six inch cutthroat in the spring of 1984.

Traffic counter data collected by the Parks Division of the Department revealed about 40,000 visitor days on this lake in 1982. The statewide fishing pressure survey indicated nearly 19,000 angler days were expended on this reservoir in 1982. Since cutthroat trout are vulnerable to angling

pressure, it is recommended the daily trout limit be reduced from 10 to 5 fish beginning in 1985. Continued survey and angler interviews will determine the effectiveness of this regulation.

Lake Elwell

Few fish were collected during spring trapping operations. In the Willow Creek Arm a total of 20 trap days (from April 4-8, 1983), captured 25 northern pike, 25 walleye, 2 rainbow trout, 12 black crappie, 1 yellow perch, 17 white sucker and 12 carp. Fifteen trap days (from April 12-15, 1983) caught 13 northern pike, 6 walleye, 3 burbot, 2 rainbow, 1 yellow perch, 9 white sucker and 6 carp in the Bootlegger Trail area. No fish were tagged in either of these areas of the reservoir. Three traps fished overnight on May 3, 1983, in the uppermost portion of the reservoir (near the Devon water plant) caught 37 Northern pike, 36 walleye, 1 burbot, 4 yellow perch, 6 carp, 1 longnose sucker and 1 white sucker. Twenty-four Northern pike and 23 walleye were tagged to document movement from this area. Tag returns indicate movement into the reservoir as far as the mouth of the Willow Creek Arm, a distance of approximately 16 miles.

The gill net survey of September 26-27 captured a total of 273 fish representing 8 species (Table 1). Walleye and northern pike showed good representation in all size ranges. Yellow perch numbers have increased somewhat when compared to past years. Stomach content analysis of northern pike and walleye indicated approximately 50% of the stomachs were empty. Walleye fed exclusively on yellow perch while northern pike fed mainly on yellow perch, followed by northern pike, walleye and rainbow trout. Analysis of northern pike and walleye scales indicated improved growth rates related to increased availability of yellow perch.

Reproductive success of forage fishes was determined by electrofishing, trap nets and visual observations. Trap nets in June, July and September took the following species in decreasing order of abundance: yellow perch, emerald shiner, black crappie, lake chub and fathead minnow. Electrofishing in June and July captured mostly small white sucker with a few yellow perch, emerald shiner, longnose dace and lake chub. Visual observations in July made in shallow water and at heads of bays revealed large numbers of young-of-the-year yellow perch and white sucker, and several northern pike. This reproductive success is attributed to water levels that flooded shoreline vegetation during spawning seasons. Greater numbers of forage fish may have been found if the appropriate water levels had been reached at an earlier date.

A preliminary Environmental Review (Hill, 1984) was prepared for the introduction of spottail shiner (Notropis hudsonius) into Lake Elwell. This forage fish is able to spawn succesfully in the absence of vegetation. The yellow perch population will provide adequate forage for several years for the predator fish, but numbers will decline as shoreline vegetation is destroyed due to fluctuating levels. As yellow perch numbers dwindle, the spottail shiner is expected to replace them. If approved, and fish are available, this introduction will be made in 1984.

Lake Francis

Four gill nets fished in October produced a total of 58 walleye, 12 northern pike, 1 burbot, 3 white sucker and 2 longnose sucker (Table 1). Several age classes of walleye were represented and growth appears average to good. Northern pike reproduction appears to be lacking based on this data, possibly related to the low water levels at the present time. Yellow perch populations are at low levels also, as none were taken in the gill net survey. The Preliminary Environmental Review (Hill, 1984) prepared for the Lake Elwell introduction of spottail shiner also includes Lake Frances for the same reasons. Trap nets were set in April to obtain information on walleye and northern pike populations. Vandals pulled the traps and no information was obtained.

Pishkun Reservoir

Five trap nets were fished for six days to monitor northern pike populations. A total of 212 fish were tagged and an additional 76 were marked by a fin clip to aid in making a population estimate. Other fish taken in the traps include 5 rainbow trout, 1 kokanee salmon, 37 yellow perch and 55 white suckers. The northern pike population was estimated to be 509 fish which compares to 705 fish in 1982 and 447 fish in 1981. Rainbow trout will continue to be planted in this reservoir as long as northern pike levels stay below the much higher estimates of 1,232-2,086 fish found during 1970-72 (Hill, 1973). One of the reasons the northern pike population remains fairly low is high harvest rates. Voluntary angler tag returns for 1983 was 45, or 21.2 percent of the 212 fish tagged.

Kokanee salmon were sampled by gill nets on July 26, 1983 (Table 1). This sampling revealed three age groups: age group I, 7-8 inches; age group II, 10.1 - 11.5 inches; and age group III, 13.8 - 15.6 inches. The fall snag fishery resulted in very few salmon being taken. Of salmon snagged, 20 percent were three years old and 80 percent were four years old. Males averaged 16.1 inches and 1.20 pounds while females averaged 13.5 inches and 0.81 pounds.

Small Lakes and Farm Ponds

Water levels were checked on several small ponds. The following had marginal or very low water levels and planting with rainbow trout was not recommended: Furnell Pond, Myrvold Pond, Stephens Pond and Lock Pond.

Two waters previously stocked with rainbow trout were planted again in 1983. These include Steil Pond and Ostle Reservoir. A gill net survey in Ostle Reservoir on October 18 collected trout ranging in size from 9.1 - 10.9 inches and 0.34 - 0.49 pounds.

Approximately 3,000 yellow perch were transferred from the Lewistown area into Priest Butte Lake in May. Gill nets and trap nets were fished in September to determine survival of planted yellow perch as well as survival and reproduction of black crappie introduced in 1981. No perch and only two adult crappie were taken. Other species taken include white sucker, longnose sucker, brassy minnow, fathead minnow and lake chub.

A Preliminary Environmental Review (Hill, 1983) was prepared for increased water storage in Dickens Lake. A three-foot fill was constructed in the outlet of this natural lake. Increased water levels should decrease the possibility of winterkill in the lake.

STREAMS

Teton and Sun River Streams

Four streams were electro-fished in the Teton and Sun River drainages to update management files. Spring Creek was surveyed in conjunction with a demonstration for the Choteau 7th grade science classes. Species collected include rainbow and brook trout, white, longnose and mountain sucker, longnose dace, creel chub and mottled sculpin. The West Fork Teton River was sampled in the area of stream improvement structures installed by the Forest Service in 1981. Cutthroat and brook trout and mottled sculpins were taken. Base line data was obtained from two streams on the Sawtooth Ranch on which the Department holds a Conservation Easement. Brook trout, mottled sculpin, longnose dace and white sucker were found in Willow Creek and North Fork Willow Creek.

The North and South Forks Sun River were sampled by hook-and-line to monitor trout populations under restricted limits. A two-fish limit had been in effect from 1975-1982. In 1983, the limit was changed to three fish. Fish collected during the 1983 survey (Table 2) are of similar size to the last sampling conducted in 1981:

Table 2. Length range of trout in North and South Forks Sun River, August 2-3, 1983.

Stream (Date)	Species*	No. of Fish	Length Range	(Average)
No. Fk. Sun River (August 2)	Rb	75	6.7-16.5	(11.3)
	Ct	18	7.0-13.7	(10.3)
	RbxCt	1		(9.8)
	Eb	3	5.0-10.5	(7.8)
So. Fk. Sun River (August 3)	Rb	82	6.2-17.0	(11.8)
	Ct	14	7.0-14.0	(11.3)
	RbxCt	1		(12.5)
	Eb	9	5.0-12.3	(8.2)

*Species Abbreviations: Rb-rainbow trout; Ct-cutthroat trout; RbxCt - rainbow-cutthroat hybrid; Eb-brook trout.

Attempts were made at estimating the brook trout population in two sections of the Teton River. Not enough fish were taken during the marking run to warrant making population estimates. The river in this area has been badly dewatered during the winter months for the past few years and mortality has probably been excessive. This portion of river is also being monitored for changes in stability of stream habitat following debris removal. Some minor channel changes have occurred. The greatest limiting factor for fish in this portion of the Teton River however is low flow. Trout populations will never be healthy.

Approximately 400 grayling were introduced into Rock Creek, a tributary of the North Fork Sun River, on October 13, 1983. The fish were collected

from the Greenfields Main Canal near Fairfield . Transportation was via helicopter and pack string. Rock Creek was a barren stream in the Bob Marshall Wilderness Area. An environmental assessment was prepared by the Forest Service prior to the introduction.

Smith River Drainage

Tributaries. Sections on 8 tributary streams in the Smith River drainage were electrofished to update managment files. Electrofishing sections were near or at the same locations surveyed in 1970 and 1971 when data was collected for the Smith River Drainage Inventory and Planning Investigation (Wipperman, 1973). Electrofishing data is presented in Table 3.

Comparing data to that collected in 1970-71, most of the stream sections supported more and larger fish in 1983. Only one stream showed a marked decrease in numbers of trout present. This stream, Four Mile Creek, is near a heavily used Forest Service Campground and heavy fishing pressure may be impacting the fishery. All other stream sections were near public and private roads and access for fishermen is readily available.

Smith River. Trout population estimates were conducted in the 10,400 foot Access Section on the Smith River in early September, 1983. Estimate data for rainbow and brown trout is presented in Table 4. Population data has been gathered from this section for 6 consecutive years, while temperature and flow data have been collected at the USGS station located about four miles downstream.

There appeared to be no correlation between trout populations, flow and water temperatures. Each year, river flow dropped to 90 cfs for 2 to 3 weeks in August while maximum water temperatures over 70 degrees occurred every year for 2 to 4 weeks. Trout populations by number (yearling and older) varied from 454 to 680 fish, with biomass ranging from 250 to 413 pounds (Table 5). Population estimate biomass in 1983 closely resembled that gathered in 1979, the two lowest years represented. The greatest yearling population present over the six year period was found in 1983.

It appears the trout populations in this area of the Smith River are cyclic, perhaps controlled by intra-species competition from the hoardes of mountain whitefish and environmental conditions. While angling pressure undoubtedly impacts the population, it is felt the existing level of harvest is not limiting the population.

Table 3. Electrofishing Survey from some Smith River Drainage Streams, September, 198

Water	Section Length(ft)	Location T.R.S.	Species (Trout)	Number Caught (Over 6 inches)	Length Range (inches)
Camas Creek (Sec. 2)	300	10N,4E,34	Brook	89 (51)	4.6-11.7
			Cutthroat	14 (10)	4.0- 9.0
Eagle Creek	235	13N,5E,26	Rainbow	71 (45)	2.2-12.3
			Brook	26 (23)	3.4-13.0
			Cutthroat	2 (2)	7.1-7.9
Eightmile Creek	400	10N,8E,15	Rainbow	18 (6)	2.3-6.9
			Brook	3	3.4-3.9
South Fork Eightmile Creek	375	10N,8E,24	Rainbow	23 (8)	2.4-6.9
			Brook	41 (33)	3.0-9.5
Fourmile Creek	300	9N,8E,17	Brook	11 (7)	2.3-8.9
			Cutthroat	1	5.1
Moose Creek (Sec. 1)	400	12N,7E,05	Rainbow	8 (3)	3.9-6.5
			Brook	9 (5)	4.5-10.5
			Brown	1 (1)	9.3
(Sec. 2)	450	13N,7E,23	Brook	36 (7)	4.0-11.1
			Rainbow	3 (1)	5.0-6.0
			Cutthroat	1 (1)	8.0
Thomas Creek	250	11N,4E,28	Brook	34 (10)	2.6-8.6
			Rainbow	2 (2)	6.9-8.2
			Cutthroat	6 (4)	5.0-6.1
Whitetail Creek	335	11N,5E,09	Brook	91 (30)	3.2-11.9
			Rainbow	2 (1)	5.8-6.5

Table 4. Trout Population Estimates From Access Section, Smith River, September, 1983.

Species	Age	Length (inches) Range	Length (inches) Average	Number	Weight (Pounds)
Rainbow trout	I	5.6-10.9	8.9	235	69.95
	II	10.5-13.9	12.7	59	47.72
	III	13.8-16.8	15.3	18	25.23
	IV & Older	17.6-19.3	17.9	4	7.72
Brown Trout	I	8.4-10.4	9.4	75	24.78
	II	10.5-13.9	12.7	59	47.22
	III	13.8-16.8	15.3	18	25.23
	IV & Older	17.6-19.3	17.9	4	7.72
Grand total				578	274.88
Standing crop/1000 feet				55	26.43
Standing crop/acre				48	23.10

Table 4. Trout Population Estimates From Access Section, Smith River, September, 1983.

Species	Age	Length (inches) Range	Average	Number	Weight (Pounds)
Rainbow trout	I	5.6-10.[illegible]	[illegible]	235	69.95
	II	7.2-12.4	[illegible]	133	52.78
	III	10.3-15.0	12.7	48	39.18
	IV & Older	14.5-15.7	14.9	6	7.52
				422 ± 84	169.43
Brown Trout	I	8.4-10.4	9.4	75	24.78
	II	10.5-13.9	12.7	59	47.22
	III	13.8-16.8	15.3	18	25.23
	IV & Older	17.6-19.3	17.9	4	7.72
				156 ± 45	105.45
Grand total				578	274.88
Standing crop/1000 feet				55	26.43
Standing crop/acre				48	23.10

Table 5. Summary of rainbow and brown trout fall population estimates from 1978 to 1983, yearlings and older.

Trout Species	Year 1978	1979	1980	1981	1982	1983
Rainbow	433 (195)	375 (140)	420 (232)	497 (241)	359 (193)	422 (169)
Brown	193 (218)	79 (110)	132 (136)	183 (168)	257 (182)	156 (105)
Total	626 (413)	454 (250)	552 (368)	680 (409)	616 (375)	578 (274)

1/ Number

2/ Weight

DISCUSSION AND RECOMMENDATIONS

Most of the larger reservoirs in the project area undergo drawdowns from irrigation that impact habitat, limit productivity and angler access. They are also infested with rough fish which compete with trout for food and space. Trout reproduction capability is nonexistent to poor in all the reservoirs. Management of trout populations consist of stocking adequate numbers of rainbow and cutthroat trout to provide good fishing. These numbers must be adjusted periodically to maintain good growth rates, or to allow for habitat loss due to irrigation drawdown. Rough fish infestations in Eureka, Bynum, Willow Creek and Newlan Creek Reservoir have greatly impacted growth rates of trout. In an attempt to improve growth rates or quality of the fishery in these reservoirs, we recommended introductions of Eagle Lake rainbow in Eureka Reservoir, Eagle Lake X Arlee rainbow trout in Willow Creek and Yellowstone cutthroat in Newlan Creek Resevoir. Eagle Lake rainbow trout are noted for foraging on small fish, therefore, we anticipate them utilizing small suckers for forage in Eureka and Willow Creek Reservoirs. Yellowstone cutthroat appear to exhibit greater longevity in Newlan Creek Reservoir and may compete more successfully with longnose sucker than do rainbow trout. Triploid Arlee rainbow trout were introduced in Bynum Reservoir in an attempt to provide a quality fishery in this underutilized water.

Angler complaints of a lack of quality rainbow trout (5-pounders) in upper Holter Lake prompted a recommendation to introduce 50,000 McConaughy rainbow trout in the Missouri River above the reservoir for three years. These rainbow trout exhibit a strong tendency to run into tributary streams to spawn, a long life span, feed on forage fish and grow to a large size. Holter Lake is infested with yellow perch, white suckers and carp. Holter Lake is the heaviest fished reservoir in the Region and it was recommended to increase stocking of Arlee rainbow trout from 300,000 to 325,000 fish in 1985.

Continued evaluation of DeSmet rainbow trout in Bean Lake will be made. Dazta gathered to date reveal they have survived slightly better than Arlee rainbow after two years in the lake.

Evaluation of growth and reproduction of walleye and northern pike in Lake Frances and Lake Elwell indicate growth rates are inhibited due to lack of forage. Water level manipulation has limited northern pike spawning while walleye have exhibited good reproductive success. Introductions of spottail

shiner were recommended in these reservoirs in 1984 in an attempt to improve the forage base. Repair of the spillway on Tiber Dam will result in increased water levels which will flood shoreline vegetation for several years. White crappie were also recommended to be introduced into Lake Elwell in 1984 in an attempt to provide another forage fish.

The northern pike population in Pishkun Reservoir appears to be great enough to inhibit survival of rainbow trout stocked each year. All trout were clipped for identification this year prior to stocking to determine contribution to the sport fishery. If these trout fail to survive in great enough numbers to contribute to the fishery, it will be recommended to discontinue stocking in this reservoir.

Trout streams will continue to be surveyed for population data to determine impact of angling pressure. Regulations will be adjusted as needed to maintain quality as well as quantity to the sport fishery. It appears various drainages or areas of the project area may require special regulations to maintain quality trout populations. At the present time, the 3 fish limit imposed in the upper Sun River drainage appears to have little effect on the cyclic nature of the trout populations present.

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Prepared by: William J. Hill and A. H. Wipperman

Date: September 16, 1984

Waters referred to:

14-5760	Spring Creek
14-6040	Teton River
14-6480	W.Fork Teton River
14-7080	Bynum Reservoir
14-7320	Eureka Reservoir
14-7440	Lake Frances
14-7450	Furnell Pond
14-8060	Lock Pond
14-8250	Myrvold Pond
14-8420	Ostle Reservoir
14-8540	Priest Butte Lake
14-9030	Steil Pond
14-9081	Stephens Reservoir #2
14-9240	Lake Elwell (Tiber Reservoir)
17-1184	Camas Creek
17-2480	Eagle Creek
17-2592	Eightmile Creek
17-2816	Fourmile Creek
17-5056	Moose Creek
17-6832	Smith River
17-6960	South Fork Eightmile Creek
17-7590	Thomas Creek
17-8432	Whitetail Deer Creek
17-8720	Bean Lake
17-9136	Holter Lake
17-9330	Newlan Creek Reservoir
20-4400	N. Fork Sun River
20-4450	N. Fork Willow Creek
20-5100	Rock Creek
20-5600	S. Fork Sun River
20-6550	Willow Creek
20-7130	Dickens Lake
20-7900	Nilan Reservoir
20-7950	Pishkum Reservoir

Key Words:

Rainbow trout - strain comparison
Northern pike - population estimate
Spottail Shiner Introduction

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana

Project No.: F-5-R-33 Title: Northcentral Montana Fisheries Study

Job No.: I-b Title: Inventory and Survey of Waters in the Eastern Half of Region Four

Period Covered: July 1, 1983 through June 30, 1984

Report Period: July 1983 through June 30, 1984

ABSTRACT

Netting surveys were conducted on 6 large reservoirs and 15 farm ponds located within the study area. Nine B.L.M. reservoirs and ten private ponds were investigated for fisheries potential. Streambank stabilization projects and habitat conditions were monitored and documented along Big Spring Creek and its tributaries. Invertebrate bottom samples were collected at the nine established stations along the stream and its tributaties. Trout population estimates were made in two sections of Big Spring Creek. Flow requirements for maintaining the aquatic community in Big Spring Creek and Warm Spring Creek were determined in areas of potential de-watering for hydro power development. These flows were derived by correlating discharge measurements with stream cross-section profile measurements and correlating with habitat evaluation photos taken at various flows. Cottonwood and Half Moon creeks, two small streams draining the north slope of the Big Snowy Mountains, were inventoried for cutthroat trout populations.

OBJECTIVES AND DEGREE OF ATTAINMENT

The objectives of this job were:

1. To obtain information on present management, survival, and growth of rainbow trout, cutthroat trout, kokanee, large mouth bass, yellow perch, burbot and walleye and northern pike in seven reservoirs and fourteen farm ponds. This work was done and the findings are included.

2. To survey new ponds for possible addition to our management program. Nineteen ponds were investigated for fishery potential.

3. To monitor habitat changes and rainbow trout and brown trout populations in Big Spring Creek. This work was done for two stream sections and the findings are included.

4. To continue monitoring survival of rainbow trout stocked in a section of Big Spring Creek where natural reproduction is limited. This work was done and findings are included.

5. To determine the possible impacts on aquatic life from a proposed major water withdrawal from a portion of Warm Spring Creek and a proposed small scale hydropower project on Big Spring Creek. This work was done and the findings are included.

PROCEDURES

Fish were sampled with sinking and floating nylon gill nets 125 foot by 6 foot (with graduated mesh sizes from 3/4 to 2 inch); 4-foot by 6-foot frame trap nets (1/2 - and 1 - inch mesh); 3 - by 4- foot frame trap nets (1/4 - inch mesh); a 300 volt D.C. electrofish shocker; a 0-500 variable voltage D.C. electrofish shocker; and by hook and line. Fish captured were measured to the nearest tenth of an inch (total length) and weighed to the nearest hundredth of a pound. Scales were collected for age and growth analysis. Occasional creel census and fishermen interviews were employed to check harvest, fishing pressure, and success of trout stocking in the more important reservoirs and streams. Invertebrate bottom samples were collected with a Surber Sampler. Population estimates for Big Spring Creek were made using the mark and recapture method described by Vincent (1971 and 1974). Erosion and habitat changes were measured from established transects and photo points. Information gathered was compared to data from prior years to determine rates of bank erosion. Recruitment to the trout population was studied by stocking adipose clipped fingerlings into a section of stream followed by electrofishing to determine survival in the wild. Flow measurements, channel characteristic measurements, and photos were used to determine stream flow needed for maintenance of aquatic life in Big Spring Creek and Warm Spring Creek. Techniques developed by the Instream Flow Group and the Department of Fish, Wildlife and Parks were utilized.

ACCOMPLISHMENTS

Large Reservoirs

Six of the seven larger Department of Natural Resources reservoirs located within the study area were sampled during 1983 and 1984. The results of this work are given in Table 1. War Horse Reservoir was not sampled because of extremely low water levels which made it impossible to launch a boat. Water levels in many ponds and reservoirs located along the northern and eastern portion of the study area are quite low due to extended drouth conditions and irrigation drawdown which have peristed for several years. A short narrative summary of findings on each of the other six reservoirs follows.

Ackley Lake - Inclusion of this lake into the State Park System resulted in heavy recreational demands. Changes in the management of the lake have been initiated to improve the fishery. These management changes include: 1) Discontinuation of kokanee stocking 2)Pending fall introductions of 20,000 DeSmet strain rainbow trout and 20,000 Eagle Lake strain rainbow trout. 3) Fin clipping the Eagle Lake fish to help monitor the future success of the

Table 1. Summary of Netting Data From Large Lakes and Reservoirs 1983-1984.

Location Date Sampled	Surface Acres	No and Type of Net	Species 1	No of Fish	Length Range Inches Average	Weight Range Pounds Average
Ackley Lk (Oct. 7-8 83)	247	1 Gill	Kok	79	8.1-15.6 (12.5)	0.14-1.17 (0.65)
			Rb	28	7.6-13.6 (10.6)	0.17-0.78 (0.65)
			LL	1	14.4	1.07
			WF	1	12.8	0.60
			CSu	41		
			FSu	7		
(May 14-15 1984)		2 Gill	Kok	45	9.4-13.0 (11.0)	0.26-0.70 (0.43)
			Rb	13	9.5-14.0 (10.9)	0.30-0.80 (0.43)
			WF	1	13.1	0.62
			CSu	84	-	-
			FSu	84	-	-
		1 Trap	Eb	1	13.1	0.70
			Rb	1	13.6	0.76
			WF	2	14.2	0.66
			LL	1	9.7	0.33
			CSu	853	-	-
			FSu	317	-	-
Bair Res. (Oct 17-18 1983)	272	1 Gill	Rb		7.8-11.8 (9.2)	0.16-0.48 (0.27)
			Eb	5	8.2- 9.6 (8.9)	0.14-0.20 (0.17)
			LL	1	11.3	0.51
			CSu	20	-	-
Martindale Res. (Oct 18-19 1983)	1000	2 Gill	Rb	21	8.6-10.5 (9.8)	0.24-0.44 (0.34)
			LL	1	13.8	0.82
			FSu	4	-	-
			CSu	13	-	-
Petrolia Res. (Oct 26-27 1983)		1 Gill	WE	5	13.6-20.0 (15.4)	0.98-3.84 (1.61)
			Rb	6	8.0-15.8 (12.6)	0.15-1.29 (0.72)
			YP	1	6.7	0.11
			Bullhead	1	7.2	0.19
			Carp	4	-	-
			CSu	1	-	-
		2-1/4 Traps	Rb	2	16.2-17.0 (16.6)	1.30-1.53 (1.41)
			CSu	338	-	-
			FSu	4	-	-
Smith River Res. (Oct 18-19 1983)	327	2 Gill	Rb	16	9.2-14.7 (12.5)	0.31-0.97 (0.73)
			Burbot	3		0.79-10.50 (5.85)
			CSu	40	-	-
			FSu	58	-	-
Yellow Water Res.	600	2 Gill	Rb	13	6.5-22.3 (15.2)	0.10-3.97 (1.52)
			CSu	96	-	-
			Carp	3	-	-
		1 Trap	Rb	4	14.0-21.1 (17.0)	1.08-3.60 (2.37)
			CSu	41	-	-
			Carp	25	-	-

1/ Species abbreviations: K-kokanee, Rb-rainbow trout, LL-brown trout, Eb-Brook trout, WF-whitefish, YP-yellow perch, CSu-white sucker, FSu-longnose sucker, WE-walleye

respective strains 4) Removal of approximately 34,000 white and longnose suckers weighing about 20,500 pounds in May and June of 1984.

These management changes were implemented to help alleviate a number of problems which have become apparent at Ackley including: 1) Poor fishermen harvest of mature kokanee 2)Poor growth and survival of the Arlee strain of rainbow trout 3) Very abundant sucker populations. Continued monitoring of the fish populations will be necessary to evaluate management changes.

Bair Reservoir - Growth rates for rainbow trout sampled in the reservoir are still below average. Only one known trout from an introduction made in 1980 was taken. Management plans for 1984 specified introducing the Eagle Lake strain of rainbow trout to take advantage of the abundant sucker forage base in the reservoir. Water levels in the reservoir are so low that total rehabilitation may be possible during the fall of 1984 to remove the suckers.

Martindale Reservoir - Recreational use at this popular area is heavy throughout the summer and fall. Survival of trout from the 1982 plant appears to be very low. Netting failed to take any fish from the 1982 plant. Limited creel census work confirms the poor success of the 1982 plants. A similar situation exists in Deadman's Reservoir (near Martindale) and possible causes should be examined.

Petrolia Reservoir - Most rainbow trout checked from the reservoir have scars and open sores from an external parasite copepod, Lernaea. Petrolia reservoir is the only water in this area where the parasite has been found. The only fish species in the reservoir infected by Lernaea appears to be the rainbow trout. A northern pike was checked from a fry introduction made in 1983 that was nearly eighteen inches long. This exceptional growth indicates an abundance of forage fish and a potential partial solution to the rough fish population which inhabit Petrolia. Another plant of northern pike fry was made in the spring of 1984.

Smith River Reservoir - Netting surveys confirmed the potential effectiveness of burbot for partial control of sucker populations. Very few small suckers have been sampled since the introduction of burbot into the lake. Growth and survival of rainbow trout is above average when compared to other waters in the area of similar size. A winter burbot fishery has developed on the reservoir providing some additional fishing recreation.

Yellow Water Reservoir - Growth rates for rainbow trout are above average in the lake. Yellow Water is a heavily fished water but is extremely low because of extended drouth conditions and irrigation drawdown. The probability of a fish kill in late fall or winter is high. If the lake drains to dead storage, it may be appropriate to rehabilitate the water to remove carp and white suckers.

Farm Ponds

Fifteen farm ponds and small reservoirs stocked by te Department were netted during the report period and the results are given in Table 2. Nine B.L.M. reservoirs and ten private ponds were checked to determine their fisheries potential. Fish were introduced into several of these new ponds. A number of the ponds along the northern and eastern portions of the project

Table 2. Results Of Sampling Ponds and Reservoirs, 1983-1984.

Pond (Year)	No of Nets	Species	No of Fish	Length Range inches (Average)	Weight Range pounds (Average)
Benes Pond (1984)	1	N.P.	6	17.0-18.1 (17.5)	1.28-1.55 (1.43)
Buffalo Wallow Res. (1984)	1	Rb (1984)	29	9.8-12.4 (10.9)	0.43-0.96 (0.66)
		Rb	1	17.9	3.01
		Ct	9	9.6-10.8 (10.2)	0.39-0.59 (0.49)
Carters Pond (1984)	1	Rb	3	11.5-14.4 (12.7)	0.56-1.18 (0.79)
Catfish Res. (1984)	1	YP	1	8.6	0.43
Drag Res. (1984)	1	Rb (1984)	14	6.1- 8.0 (6.9)	0.09-0.16 (0.13)
		Rb	11	12.6-16.5 (14.3)	0.78-2.12 (1.36)
		Ct	21	7.9- 9.6 (9.0)	0.16-0.36 (0.26)
East Fk. Res. (1983)	1	Rb	8	6.6-11.8 (8.3)	0.07-0.66 (0.20)
		LL	3	12.9-17.9 (15.8)	0.90-2.49 (1.80)
		CSu	61	—	—
		FSu	10	—	—
Forest Lake (1983)	1	Ct	33	7.0-12.6 (9.7)	0.12-0.70 (0.35)
Hanson Cr. Dam (1983)	1	Rb	12	10.3-15.9 (11.7)	0.45-1.67 (0.67)
Hassler Res. (1984)	1	Rb	27	10.2-14.0 (12.1)	0.45-1.10 (0.77)
Jakes Dam (1984)	1	YP	27	5.7-11.2 (9.4)	0.09-0.66 (0.43)
		NP	1	28.5	7.00
Johnston Res. (1984)	1	No Fish	-	—	—
Olson Res. (1984)	1	Rb	1	8.1	0.17
Peterson Res. (1984)	1	No Fish	-	—	—
Rindal Res. (1984)	1	No Fish	-	—	—
Stafford Res. (1984)	1	No Fish	-	—	—

area are dry or have water levels so low following several years of drouth that the fish populations will probably be lost.

Streams

Big Spring Creek - Flows in Big Spring Creek during the report period were average to below average. Late summer and fall flows are expected to be below average because of reduced snow pack coupled with extended hot dry weather. Precipitation for 1984 thru July was only about 58% of normal. Moderate stream flows resulted in reduced erosion rates and habitat distribution within the upper watershed. Moderate runoff plus the dampening influence upon stream flows created by the watershed dams have allowed some vegetation in the riparian zone to heal.

Erosion and other naturally occurring stream channel stabilization processes thoughout the lower watershed were monitored and documented with photos and measurements. The photos are used to update our erosion slide series which documents the effects of stream channelization.

Invertebrate bottom samples were collected at the nine established stations located along Big Spring Creek and its tributaries and the results are given in Table 3. The total number of invertebrates collected from all the sampling sites in 1983 (9276) was the second highest number recorded in the fifteen years the samples have been collected. The high invertebrate numbers are directly related to the moderate to low stream flows thoughout later 1982 and nearly all of 1983 exept for June. Even though precipitation in June was above normal, much of the moisture soaked into the ground and stream flow was not significantly altered. The correlation between moderate stream flows and high invertebrate numbers seen during the report adds additional credibility to the conclusion that the primary limiting factor for invertebrate production in Big Spring Creek is extended high spring flows. A similar pattern was observed in 1977 when the highest number of invertebrates was collected.

Trout population estimates were made in two sections of Big Spring Creek during the fall of 1983. The results of these population estimates are summarized in Table 4.

Because of a gradual decline in the rainbow trout population in Section B, a study was started in 1979 to determine if the problem was related to spawning success and recruitment. Twenty thousand 4-6 inch rainbow trout were marked and planted in and near the section in 1979 and again in 1981. Two electrofishing trips through the section in 1982 took a total of 7 marked fish and in 1983 no marked fish were taken, indicating relatively poor survival and recruitment into the population of these hatchery fish. By 1983, rainbow trout numbers within the section had declined to about the same number present in 1978 prior to the stocking of hatchery fish. It appears that between 500-600 wild fish is the carrying capacity of section B under existing stream flows, habitat conditions, and fishing pressure.

Brown trout numbers in section B declined about 45% from estimates made in 1982 but the population is so small that it is difficult to draw conclusions from the data.

Table 3. Number and families of organisms collected in two one-square foot bottom samples from nine stations on Big Creek and East Fork on August 10, 1983.

Organism	Hatchery	East Fork	Burleigh's	Montana Power	St. Leo's School	Above Sewer	Below Sewer	Trestle	Spring Cr. Colony
Trichoptera									
Brachycentridae	479	75	377	1091	138	546	545	23	28
Leptoceridae	91	1	71	265	27	98	48	23	20
Rhyacophilidae	196	4	47	64	74	20	42	13	6
Hydropsychidae		33	3	118	1	88	37	592	141
Hydroptilidae		114	2	46	6	71	29	17	18
Helicopsychidae								2	5
Psychomyiidae				2		5			
Limniphilidae							3	1	28
Gastropoda									
Planorbidae		4		3	1				1
Physidae	1	15	2	7		7	39	4	2
Diptera									
Ephydridae									
Tipulidae	7	6	49	244	24	281	70	212	16
Tendipedidae	5	40	3	26	2	82	368	22	17
Rhagionidae		78						5	296
Empididae		2		3	1		1	1	
Simuliidae	1	9			2			13	2
Tabanidae				1					
Ephemeroptera									
Baetidae	39	70	61	120	29	35	290	405	237
Heptageniidae	7		26	3	1				
Plecoptera									
Perlodidae			2	6		1		1	2
Chloroperlidae				1					
Perlidae			2	1			1		
Nemouridae	2								
Anneuda									
Oligochaeta	2			1	3		8		
Coleoptera									
Elmidae	1	17	2	30	9	6	10	27	24
Hydracarina				2		9	10		
Odonata							Planaria (4)		

Table 3. Number and families of organisms collected in two one-square foot bottom samples from nine stations on Big Creek and East Fork on August 10, 1983 - (Continued).

Organism	Hatchery	East Fork	Burleigh's	Montana Power	St. Leo's School	Above Sewer	Below Sewer	Trestle	Spring Cr. Colony
Gomphidae		9							
Pelecypoda									
Sphaeriidae				1					
Isopoda									
Asellidae							9		
Station Totals	831	477	647	2035	318	1250	1514	1361	843
Org. No./Sq. Foot	415	238	323	1017	159	625	757	680	421
No. of Families	12	15	13	21	14	13	17	16	16

Total 9276

Table 4. Summary of trout population estimates for Big Spring Creek made in 1981, 1982 and 1983.

Trout Species	Section B 1981 No	Section B 1981 Wt 1/	Section B 1982 No	Section B 1982 Wt	1983 No	1983 Wt	Section D 1981 No	Section D 1981 Wt	Section D 1982 No	Section D 1982 Wt
Rainbow	5598	787	1317	528	489	327	2311	1071	3109	1741
Brown	73	166	71	144	39	75	438	386	417	349
Total	5671	953	1388	672	528	402	2749	1457	3526	2090
Per 1000 ft	970	163	237	115	90	69	701	371	899	533
Per Acre	974	164	238	115	91	69	674	357	864	512

Section	(Year)	Rb Group	Rb No.	Rb Size Range	LL Group	LL No.	LL Size Range
B	(1982)	I	857	5.3 - 11.4	II	7	11.5 - 14.3
		II	228	10.0 - 12.8	III	25	14.8 - 17.4
		III	232	12.3 - 14.0	III & Older	42	16.5 - 20.9
B	(1983)	I	45	5.0 - 9.8	II	7	12.0 - 14.5
		II	198	9.3 - 12.3		9	14.5 - 16.3
		III	208	11.4 - 14.3	IV	6	16.7 - 16.9
		IV	29	13.6 - 15.1	V & Older	17	17.0 - 22.0
		V & Older	8	14.8 - 17.6			
D	(1981)	I	1343	5.0 - 10.1	I	41	5.5 - 9.4
		II	449	9.6 - 12.8	II	173	9.5 - 12.8
		III	259	12.7 - 15.0	III	112	12.2 - 14.9
		IV	137	14.3 - 15.7	IV	39	14.1 - 16.2
		V & Older	121	15.4 - 18.1	V & Older	72	15.2 - 24.0
D	(1983)	I	1429	5.0 - 10.6	I	95	5.0 - 6.1
		II	805	9.9 - 12.6	II	86	8.4 - 11.3
		III	600	12.3 - 14.4	III	93	11.3 - 13.8
		IV	176	13.7 - 15.0	IV	37	13.2 - 15.1
		V & Older	99	15.0 - 18.9	V & Older	106	14.6 - 20.4

1/ Weight in pounds

Sec B = 5.82 Acres - 5843 feet

Sec D = 4.08 Acres - 3920 feet

Population estimates made in section D were compared to estimates made in 1981 since no estimate was made in the section during 1982. The total rainbow trout population estimate in section D was up about 35% when compared to 1981 figures. The increase was mainly noted in age groups II and III although all age groups showed an increase except for V and older. Inspection of the rainbow trout age structure in section D indicates a healthy population with good spawning success and adequate survival and recruitment into the population.

Brown trout population estimates for section D were about the same as those in 1981. An increase was noted in age groups I and V and older but a decrease was noted in all other age groups.

During November 1983, Fergus Electric Cooperative Incorporated filed a water use permit for a small hydro project to be incorporated into the mill ditch diversion channel of Big Spring Creek. Potential impacts from this project could be severe from a fisheries standpoint. During the 1983 field season habitat evaluation work and flow measurements were made in an attempt to determine minimum flow requirements in the old stream channel through town. A discharge figure of 37 cfs for the stream channel through town was considered adequate to maintain the integrity of the aquatic community plus allow fish passage. This judgement was based on discharge measurements correlated with habitat evaluation photos taken at various flows of interest. Some modification of the control gate may be required for fish pasage if water velocities at the bottom of the gate are excessive.

Another part of the proposed mitigation package would be two fish ladders installed in the Mill Ditch Diversion Channel to allow fish passage. These structures would require approximately 15 cfs for operation. The proposed combined total discharge of 52 cfs reserved for fish passage within the two channels along with the construction of two fish ladders should adequately protect the high quality fishery and aquatic community.

Warm Spring Creek - In 1981 a proposal was filed to construct a hydroelectric project, diverting 100 cfs of water from Warm Spring Creek in an existing irrigation ditch, to a power generating turbine about 3 miles downstream. Since recorded low flows in the stream are about 136 cfs, the diversion of 100 cfs would have a major impact upon the fishery and potential impact upon other wildlife. Using the WETP computer program and data collected from several cross sections it was determined that 90-95 cfs approximates the minimum flow needed to maintain fish populations at the existing level.

Recently the applicant re-filed his application with several proposed changes. His new proposal would only impact about a mile of stream, which is much more acceptable from a fish and wildlife standpoint. The applicant also agreed to reduce his water filing and to leave a minimum year around flow in the stream channel of 75 cfs. This flow should be adequate to protect most of the existing aquatic community as well as the wildlife resource.

Louse Creek - A short section of Louse Creek was electrofished. This work is part of a continuing study to inventory and sample waters located within the project area. Electrofishing captured 136 brook trout from 400 feet of stream. This was an increase of 183% over the number of fish taken in the same section during 1982.

Cottonwood Creek - The headwaters of Cottonwood Creek within the National Forest were checked for cutthroat trout. Much of the steam is intermittent by mid-summer but cutthroat were observed in most areas of flowing water. Fish were observed into the upper reaches of the East Fork of Cottonwood Creek.

Half Moon Creek - Half Moon Creek within the National Forest was checked for cutthroat trout. Similar to Cottonwood Creek, the stream flows through a limestone canyon where the water flow is intermittent by mid-summer. Cutthroat trout were sampled and observed in most reaches of flowing water. Fish were found in the very upper reaches of the stream.

DISCUSSION AND RECOMMENDATIONS

Water levels in all the larger reservoirs located within the project area are very low due to extended drouth conditions and irrigation drawdown. Rough fish populations which compete with trout for space and forage are at high levels. Extremely low water in Ackley, Bair and Yellow Water reservoirs gives us the opportunity to eradicate the existing rough fish. This should be done if chemical is available. Traditionally trout growth and survival following rehabilitation in these reservoirs has been excellent an should be closely monitored for the next few years.

Water levels in Martinsdale, Petrolia Smith River and War Horse Reservoirs are low but not low enough to allow rehabilitation. Utilization and control of rough fish populations in Petrolia and War Horse has been attempted through the introduction of predator species including walleyes, burbot and northern pike. These introductions have had limited success, but it appears that northern pike have the most potential and should be closely watched. Continued stocking of northern pike is recommended.

Farm ponds along the northern and eastern portions of the project area are dry or so low following several years of drouth that the fish populations will probably be lost. In many cases, we will be starting new in attemptimg to provide fishing within these areas. With the increased availability of various warm water species provided by the improved Miles City Hatchery, fishing opportunity and diversity should be improved.

Continued monitoring, evaluation and surveying of streams located within the project area should continue to be a primary objective. This work is particularly important because of the fragile nature, limited number and high value of the streams in the area.

The number and average size of trout in section D of Big Spring Creek are increasing each year in response to stable stream flows and abundant invertebrate populations. In spite of the high numbers, the condition factor of the fish has remained very good. The section should be closely monitored to see just how high the standing crop of trout will reach and when the condition factor will begin to decline.

Potential impacts to several streams from proposed hydropower projects could be fairly severe. Additional work should be done to determine minimum flows, flushing flows, timing and duration of specific flows and various mitigation recommendations. Probably even more important is the continual

checking and monitoring required to assure that our recommendations are incorporated into the projects

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Prepared by: Michael D. Poore

Date: July 31, 1984

Code Numbers of Waters Referred to in the Report Are:

16-0300	Big Spring Creek Sec. 01
16-0310	Big Spring Creek Sec. 02
16-0900	Cottonwood Creek
16-2160	Louse Creek
16-3920	Warm Spring Creek
16-4300	Ackley Lake
16-4463	Benes Reservoir
16-4950	East Fork Spring Creek Reservoir
16-5535	Hanson Creek Reservoir
16-5700	Hassler Pond
16-6420	Carters Pond (Lower)
16-7955	Rindal Reservoir
16-8380	Stafford Reservoir
17-9616	Smith River Reservoir
18-2940	Half Moon Creek
18-7340	Buffalo Wallow Reservoir
18-7395	Catfish Reservoir
18-7510	Forest Lake
18-7560	Drag Reservoir
18-7750	Bair Reservoir
18-8380	Martinsdale Reservoir
18-8720	Petrolia Reservoir
18-9440	War Horse Reservoir
18-9500	Yellow Water Reservoir