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MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

State: Montana Title: Western Montana Fishery Investigation

Project No. F-12-R-27 Title: Inventory and Survey of the Lower Clark Fork, Blackfoot and Bitterroot Rivers

Job No.: Ib

Period covered: July 1, 1980 to June 30, 1981

ABSTRACT

Electrofishing inventories of trout standing crops in the Clark Fork and Blackfoot Rivers were completed in 1979 and 1980. Significant differences in species composition and number of trout occur among the sections sampled. The primary reason(s) for the differences has not been ascertained at this time. However, a pattern in the Clark Fork River has emerged in three sections of the river with significantly larger trout populations being found below major tributary streams than above. The only exception occurs below Milltown Dam and the confluence of the Blackfoot River at Bonner, where a decrease in trout population occurs in the Clark Fork River.

Trout populations were also sampled in most of the tributary streams on the north side of Ninemile Creek and Clark Fork River from Alberton to Bonner, Fish Creek and Threemile Creek.

OBJECTIVES AND DEGREE OF ATTAINMENT

The objectives were:

1. To determine population numbers of rainbow, brown, cutthroat, and bull trout in the Clark Fork at Missoula, the Bitterroot near Hamilton, and the Blackfoot in at least two sections below the North Fork. To determine growth rates and age composition of the gamefish populations in these streams.

2. To determine species composition in all streams proposed to be crossed by the Northern Tier Pipeline in Region Two of the Department of Fish, Wildlife and Parks.

The objectives were completed with the exception of the Bitterroot River section near Hamilton. Four days of electrofishing effort were expended to capture 52 trout. The low conductivity of the Bitterroot River and resulting poor success led to the decision to scrap that estimate.

Fish population abundance was also sampled in one section of Fish Creek, three sections of Threemile Creek, and one section of a spring creek near Stevensville.

PROCEDURES

Larger river fish populations were sampled with pulsed D.C. electrofishing gear produced by Coffelt Electronics. The gear was fitted aboard a 17-foot Woolridge sled which was modified into a "boom type" electrofishing boat. The sled is powered by a 140 hp outboard jet.

Small stream electrofishing was accomplished with Smith Root type IV backpack shocker powered by a 12-volt wet cell battery.

Statistics were generated from Chapman's modifications of the Peterson mark-recapture technique as described by Vincent (1971 and 1974).

FINDINGS

Clark Fork River

Significant differences occur in trout numbers in the Clark Fork River above and below the confluence of Rock Creek. The Bonita section above Rock Creek averages 8.93 trout per 1000 linear feet of stream and the Turah section 73.88 trout per 1000 feet of stream, 8.27 times larger than Bonita (Table 1). However, trout populations in the Clark Fork River below Rock Creek still only amount to 35% of populations found in Rock Creek. The Blackfoot River upstream 11 miles from the Clark Fork River has a trout population of 342 trout per 1000 ft. of stream.

Below Milltown dam and the confluence of the Blackfoot River numbers of trout decrease by 26% from populations sampled 4 miles upstream at Turah and 84% compared to the Blackfoot River 11 miles upstream (Table 1).

Table 1. Comparison of trout population estimates between sections of Rock Creek, Clark Fork River and the Blackfoot River, 1980.

Stream and section name	River mile location	Length of section	Species	Size class	Number per 1000 ft.
Clark Fork River Bearmouth section	403	34,320	Brown trout	8.0-19.9	7.49
Bonita section	388	6,600	Brown trout	8.0-19.9	7.72
			Rainbow trout	7.0-13.0	1.21
				Total	8.93
Rock Creek Valley Moon section	2	7,900	Brown trout	6.0-19.9	155.19
			Rainbow trout	8.0-16.9	57.34
				Total	212.53
Clark Fork River Turah section	370	11,220	Brown trout	4.0-19.9	51.16
			Rainbow trout	9.0-13.9	22.72
				Total	73.88

Table 1. Cont'd.

Stream and section name	River mile location	Length of section	Species	Size class	Number per 1000 ft.
Blackfoot River					
Johnsrud section	11	19,140	Rainbow trout	6.0-14.9	337.93
			Brown trout	4.0-15.9	4.45
				Total	342.38
Clark Fork River					
Milltown section	364	19,272	Rainbow trout	6.0-16.9	40.21
			Brown trout	6.0-20.9	14.58
				Total	54.79

Clark Fork River Turah Section

Trout populations were first sampled in the spring of 1979 in the Turah section. The section begins at the Turah fishing access site and extends 2.1 miles downstream. The trout population is comprised of brown, rainbow, westslope cutthroat, bull and brook trout. Brown trout in the summer of 1980 comprised 70 percent of the total trout population and rainbow trout 28% (Table 2).

The Turah section has experienced major channel changes within the last few years. Channels straightened upstream from this section for the I-90 construction project are suspected of increasing gravel deposition and channel instability in the area.

Table 2. Trout population estimates for the Clark Fork River, Turah section, 1979 to 1980 (11,220 feet long).

Species	Date	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
Brown trout								
	July '80	16.0 and >	28	5	3	43±	10	70.1
	Oct. '79		14	2	1	22±	9	41.32
	April '79		15	12	0			
	July '80	13.0-15.9	69	25	9	181±	55	197.3
	Oct. '79		29	21	4	131±	60	130.3
	April '79		56	35	4	409±	199	475.2
	July '80	8.0-12.9	115	44	17	290±	66	182.4
	Oct. '79		90	38	7	443±	168	198.1
	April '79		104	37	11	332±	77	158.7
Rainbow trout	July '80	13.0 and >	12	2	1	19±	8	17.4
	Oct. '79		3	0	0	-	-	
	April '79		8	3	1	17±	9	21.5

Table 2. Cont'd.

Species	Date	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
	July '80	9.0-12.9	29	17	2	179±	105	89.4
	Oct. '79		32	19	1	329±	231	146.4
	April '79		23	17	3	107±	54	61.68
	July '80	4.0-8.9	7	2	0	-	-	
	Oct. '79		22	7	0	-	-	
	April '79		25	7	0	-	-	
Cutthroat trout	July '80		7	3	0	-	-	
	Sept. '79		2	1	0	-	-	
	April '79	8.0-18.9	5	4	2	9±	4.2	5.1
Brook trout	July '80	7.0-13.0	3	4	0	-	-	
	Oct. '79		0	0	0	-	-	
	April '79		7	4	1	19±	11	5.0

Clark Fork River Bonita Section

The Bonita section is located six miles above Rock Creek; beginning at Don McFarland's post and pole plant and extending upstream 1.2 miles to the beginning of the large riprapped meander. The Bonita section has predominately brown trout with lesser numbers of cutthroat and rainbow trout; in 1980 the section produced a total of 46 trout in two days of electrofishing (Table 3).

Table 3. Trout population estimates for the Clark Fork River, Bonita Section 1979 to 1980, section length 6,600 feet.

Species	Date	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
Brown trout	7/80	16.0 and >	2	0	0	-	-	
	10/79		0	2	0	-	-	
	4/79		2	3	0	-	-	
	7/78		2	-	-	-	-	
	7/80	13.0-15.9	2	4	1	7 ±	4	7.56
	10/79		9	8	2	29 ±	15	30.97
	4/79		10	6	3	18 ±	7	20.6
	7/78		1	-	-	-	-	1.06
	7/80	8.0-12.9	8	4	0	-	-	
	10/79		9	10	1	54 ±	36	28
	4/79		4	5	1	14 ±	8	6.9
	7/78		6	-	-	-		

Table 3. Cont'd.

Species	Date	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
Rainbow trout	7/80	4.0-18.9	8	3	0	-	-	
	10/79		7	8	2	23 ±	12	10.9
	4/79		2	4	1	7 ±	4	3.4
	7/78		0	-	-	-	-	
Cutthroat trout	7/80	8.0-18.9	8	6	0	-	-	
	10/79		7	10	2	28 ±	15	11.3
	4/79		3	2	1	5 ±	2	2.7
	7/78		1	-	-	-	-	.07

Clark Fork River Bearmouth Section

The Bearmouth Section begins at the rest area for the west bound lane at Bearmouth and extends 6.5 miles downstream to the Bearmouth Chalet campground. Trout populations are predominately brown trout with uncommon occurrence of rainbow and cutthroat trout (Table 4).

Table 4. Trout population estimates for the Clark Fork River Bearmouth Section 1979, section length 34,320 feet.

Species	Date	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
Brown trout	9/79	16.0 and >	16	20	7	44 ±	15	70.2
	9/79	13.0-15.9	29	27	6	119 ±	47	121.3
	9/79	8.0-12.9	27	13	4	78 ±	33	40.0
Rainbow trout	9/79	4.0-18.9	5	4	1	14 ±	8	10.8
Cutthroat trout	9/79	8.0-18.9	14	8	0	-	-	

Clark Fork River Milltown Section

The Milltown section begins at the apron of the Milltown Dam and extends 3.65 miles downstream to approximately 200 yards below the railroad bridge crossing. An adequate sample was attained with 3 marking runs and 2 recapture runs. We noted that the catch was best during overcast days. A large population of Northern squawfish, longnose and largescale suckers along with mountain whitefish inhabit the section but were deleted from our sample in order to concentrate on salmonids. The predominate salmonid in 1980 was rainbow trout comprising 72% of the fall population estimate (Table 5).

Table 5. Trout population estimates for the Milltown Section, October, 1980.

Species	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval	Biomass estimate (lbs)
Rainbow trout	6.0-9.9	95	30	10	269 ±	80	51
	10.0-12.9	129	41	16	320 ±	74	176
	13.0 & larger	63	26	9	172 ±	52	166
	Total	287	97	35	775 ±	129	393
Brown trout	Total (6.0-20.9)	44	24	3	281 ±	147	252
Bull trout		2	-	-	-	-	
Brook trout		1	-	-	-	-	
Westslope cutthroat		9	-	-	-	-	

Blackfoot River Johnsrud Section

The Johnsrud section is located 11 miles from Bonner and extends 3.6 miles in length straddling upstream and downstream from Johnsrud Park.

Rainbow trout are predominate in the section comprising 90% of the trout numbers. Cutthroat, brown and bull trout add the remaining 10% (Table 6).

Table 6. Electrofishing catch and population estimates for the Johnsrud section of the Blackfoot River, July, 1980.

Species	Size Class (in.)	Marked (M)	Captured (C)	Recaptured (R)	estimate (N)	80% confidence interval	Biomass estimate (lbs)
Rainbow trout	6.0-9.9	339	293	17	5,553 ±	1599	1166
	10.0-11.9	82	70	7	737 ±	296	372
	12.0-14.9	45	30	7	178 ±	51	131
Total	3.0-16.9	571	506	31	9,355 ±	2020	1669
Westslope cutthroat trout	6.0-14.9	59	20				
Brown trout	4.0-15.9	7	16				
Bull trout	7.0-22.9	12	12				

Westslope cutthroat captured could be separated into two distinct groups on noticeable differences in appearance; one group having deformed dorsal and sometimes pectoral or pelvic fins, the other group with normal healthy fins. Cutthroat exhibiting the deformed fins comprised 25% of the total 70 captured.

Bitterroot River Hamilton Section

The Hamilton section begins at the supply ditch diversion west of Hamilton and extended 1.5 miles downstream to the Hiway 93 bridge crossing south of Hamilton. Electrofishing was poor at best; four days of effort yielded 52 trout. The conductivity of the Bitterroot River is extremely low for successful electrofishing at 600 volts of output power only 0.5 ampere of current were produced. We attempted night electrofishing to improve success with no significant increase. The length-frequencies of fish captured are in Table 7.

Table 7. Length frequencies of trout captured in the Bitterroot River July, 1980.

	Length class (inches)														
Species	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Rainbow trout	1	1	1			1	2	7	6	5	8	13	2	3	2
Brown trout								1	2	2	1	1	1	1	1

Fish Creek Beaver Slough Section

The beaver slough section of Fish Creek was electrofished in August 1980. The section is 1.5 miles long; starting at the first bridge crossing (near beaver slough) and extending downstream to a campsite that has a "bladed" in access.

Rainbow trout predominated in the electrofishing catch followed by brook trout, westslope cutthroat, and bull trout (Table 8 and 9).

Table 8. Electrofishing catch and population estimates for the beaver slough section of Fish Creek, August, 1980.

Species	Size class (in.)	Marked (M)	Captured (C)	Recaptured (R)	Number estimate (N)	80% confidence interval
Rainbow trout	3.0-6.9	88	110	4	1975 ±	1011
	7.0-10.9	63	61	6	566 ±	241
	11.0-14.9	3	5	1	11 ±	6
Total					2552 ±	876
Brook trout Total	3.0-9.9	30	29	4	186 ±	89
Westslope cutthroat trout Total	4.0-14.9	11	19	2		
Bull trout Total	5.0-21.8	15	12	1		

Table 9. Length frequency of electrofishing catch from the beaver slough section of Fish Creek August, 1980.

Species	Length class (inches) 3	4	5	6	7	8	9	10	11	12	13	14	15	16+
	Age I+				Age II+					Age 3+, 4+, 6+				
Rainbow trout	6	50	89	53	46	45	26	7	3	2	1	2		
Brook trout	3	2	15	18	14	5	4							
	Age I+				Age II+		Age III+				Age 5+			
Westslope cutthroat trout	1	2	3		7	6	4	3	1		1	1		
	Age I+				Age II+		Age III+						Age 7+	
Bull trout		1	2		11	6	4	1					1	

Threemile Creek

In cooperation with the SCS, three sections of Threemile Creek were electrofished to evaluate the impacts of a proposed irrigation project on trout populations. The proposed system has the potential for enhancing flows in Threemile Creek. Threemile Creek suffers from extreme low flows in lower reaches and poor trout populations; exemplified by the section one mile below the diversion in Table 10. Threemile Creek has potential to be a fine small trout stream if summer flows could be enhanced.

Table 10. Summary of Threemile Creek fish population inventory data, September, 1980 in the vicinity of crossings for the Proposed Threemile Irrigation Project.

Location of Section	Length of section (ft)	Species	Number Marked (M)	Number Captured (C)	Number Recaptured (R)	Estimated number in section (N)	80% confidence interval
Above diversion	400	brook trout	12	30	1	201	± 143
		sucker1/	1	9	0	---	---
Below diversion 100 yds	900	brook trout	39	41	15	105	± 26
		sucker	14	33	5		
Below diversion 1 mile	250	brook trout	12	3	2	17	± 6
		sucker	8	13	1		

1/ longnose sucker

Northern Tier Stream Surveys

Streams were surveyed in the vicinity of the Proposed Northern Tier pipeline crossings as of June 1980. Several changes in alignment of the pipeline since the surveys were conducted may place the crossing in a stream environment differing from the survey results. The results of the surveys are summarized in Table 11.

Table 11. Summary of electrofishing catch for streams in the lower Clark Fork River drainage sampled June, 1980.

Stream name	Location of Sec T	R	Sec.	Length of section	Fish 1/ species	Number caught	Size range	Water Code
Beecher Creek	17N	24W	16a	175-200'	WSCT	9	2.7-5.8"	0416-10
Big Blue Cr.	17N	23W	30BA	--	WSCT	1	2.4"	0496-01
Butler Cr. (9 Mile)	16N	22W	19c	200'	WSCT	1	3.1"	1008-01
					EB	16	2.1-6.2"	
					Cott.	4	2.3-2.9"	
Butler Cr.	14N	20W	26	250'	WSCT	3	3.2-7.2"	0992-01
Burnt Cr. (E. Fk.)	17N	24W	14DB	100'	WSCT	2	4.8-5.2"	
Camp Cr.	17N	24W	24DB	200'	WSCT	7	3.2-4.5"	1168-01
Camp Cr. (W. Fk.)	17N	23W	19cc		Not shocked			
Edith Cr.	15N	21W	22	100'	Not shocked			2528-10
Fournier Cr.	15N	20W	30c		Not shocked			2944-10
Grant Cr.	14N	20W	32	1500'	WSCT	6	5.0-8.5"	2698-01
Houle Cr.	15N	21W	8c	Not shocked	Cott.	1	3.2"	3520-10
Josephone Cr.	16N	23W	8DA	200'	EB	5	3.0-5.6"	3728-01
Josephone Cr. unnamed trib.	16N	23W	8DA		Not shocked			
Kennedy Ct.	16N	23W	13	300'	EB	7	2.1-6.1"	3792-01
Little Blue	17N	24W	36AD	200'	EB	1	4.0"	4032-10
					LL	1	4.2"	
Marion Cr.	16N	23W	7BA	200'	EB	17	1.4-5.4"	4416-10
McCormick Cr.	16N	23W	15	200'	EB	6	4.0-5.9"	4544-01
					WSCT	1	3.9"	
					Cott.	1	2.8"	
Mill Cr.	15N	21W	25d	300'	LL	3	3.2-9.9"	4800-01
					Cott.	2	1.8-2.2"	
Okeefe	14N	20W	4	250'	WSCT	7	2.4-6.4"	5344-01
Pine Cr.	16N	23W	6cc	150'	EB	1	4.5"	5600-01
Roman Cr.	15N	21W	21d	200'	WSCT	15	2.2-5.8"	6016-10
Six-mile	15N	22W	12ad	200'	WSCT	4	4.7-7.4"	6368-01
Six-mile unnamed trib.	15N	22W	12cc	50'	No fish caught			
Six-mile trib.	15N	22W	12ab	100'	WSCT	4	2.3-4.3"	
					EB	3	4.0-5.8"	
Soldier Cr.	17N	24W	24b	250'	EB	4	3.7-4.9"	6560-01
					WSCT	4	3.4-4.3"	
Spring Cr.	16N	22W	29		Not shocked			
St. Louis Cr. (Main Fk)	17N	24W	8aa	175-200'	WSCT	8	3.8-6.5"	6048-01
Stony Cr.	16N	22W	32d	250'	WSCT	2	5.0-5.7"	6992-10
					Cott.	6	1.6-2.5"	
Stony Cr. unnamed trib.	16N	22W	33c		Not shocked			
W. Fk. Beecher Cr.	17N	24W	9DB	200'	EB	3	3.2-5.0"	
					WSCT	3	3.4-5.2"	
W. Fk. Burnt Cr.	17N	24W	15ac	175-200'	WSCT	8	2.1-4.1"	
W. Fk. St. Louis	17N	24W	5cb		Not shocked			

1/ Fish species abbreviations
WSCT - Westslope cutthroat trout
EB - brook trout
Cott. - Undesignated sculpin
LL - brown trout

DISCUSSION

Clark Fork River

Information on trout populations for the Clark Fork River from Anaconda to Missoula is revealing a pattern of trout standing crops related directly to the inflow of tributary streams with good water quality. Trout numbers increase significantly below Warm Springs Creek, the Little Blackfoot River, (personnel communication with project biologist Jim Vashro), and Rock Creek, whereas poor populations occur upstream from these tributaries. Several parameters of water quality may be involved singly or in combination including water temperature, sediment transport/turbidity, nutrient concentrations, dissolved oxygen concentrations, and heavy metals concentrations.

However, the Milltown Dam section on the Clark Fork River below the confluence of the Blackfoot River does not follow this pattern. The number of trout declines respectively 16% and 74% from populations found upstream in the Clark Fork at Turah and the Blackfoot River near Johnsrud Park. Below Milltown Dam the Clark Fork River has a stable channel and receives a significant input of high quality water from the Blackfoot River which should provide better fish habitat and better populations of trout. Significant flushes of sediment and organic matter occurring annually from Milltown Dam may be involved in the decline. The extent of the impact downstream, the quantity of sediment released, and the indirect impacts of the release are not thoroughly documented. However, bioassays run in 1970 (Marcoux 1972) indicated a mortality of 40% of trout 7-9 inches long five miles below the dam. Flushes of lesser magnitudes on a nearly annual basis since 1970 may have resulted in the existing suppressed trout population.

RECOMMENDATIONS

Alternatives to flushing settled materials above Milltown dam downstream should be exhaustively explored. Research on water quality, fish populations and sediment movement should be continued to document changes if better alternatives are found.

LITERATURE CITED

Marcoux, R. 1970. Western Montana Fishery Study Mult., 8 pages, F-12-R-17 Job No. I-a. Montana Dept. of Fish & Game.

Vincent, R.E. 1971. River electrofishing and fish population estimates. Prog. Fish-Cult. 33(3): 163-169.

_____. 1974. Addendum to river electrofishing and fish population estimates. Prog. Fish-Cult. 36(3): 182.

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Water referred to:
Rock Creek, Sec. 1 06-5263
Clark Fork River Sec. 3 06-1121
Blackfoot River Sec. 2 04-0600
Bitterroot River Sec. 03-0500
Fish Creek 05-2768
Threemile Creek 03-6375
Clark Fork River tributaries in Table 11.

Key Words:
Trout-numbers
Trout-biomass
Sediment
Low Head Dam