# PLEASE RETURN

MONTANA DEPARIMENT OF FISH, WILDLIFE AND PARKS IN COOPERATION WITH THE KOOTENAI NATIONAL FOREST, U.S.D.A.

FISHERIES DIVISION

Completion Report

# TROUT HABITAT SUITABILITY QUANTIFICATION STUDY

By

Bruce May, Bob Rainville and Joe Huston

December 1979

# MATE DOCUMENTS COLLECTION

APR 2 9 1982

MONTANA STATE LIBRARY 930 E Lyndala Ave. Helens, Montana 59601



### MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

### FISHERIES DIVISION

### Job Completion Report

State: Montana

Title: Trout Habitat Suitability Quantification Study

Project No: 3156

Period Covered: July 30, 1979 to November 30, 1979

# ABSTRACT

The Kootenai Forest Habitat Suitability System produced ratings which had only weak correlations with trout populations. The rating system was found to be too subjective and did not include several important parameters which influence trout populations, such as annual stream flow variation, minimum flows and water velocity. Recommendations are presented which would make the Kootenai System sufficiently quantitative to produce ratings which would be indicative of trout populations.

### INTRODUCTION

The Kootenai National Forest has developed a trout habitat suitability rating system to assist in its land use planning and project decision-making processes. A study was needed to determine if trout populations were correlated with the suitability ratings calculated for resident and rearing fish and acuatic insect habitats. The choice of physical factors to be analyzed is difficult because environmental variables in streams are typically correlated and confounded with each other (Reid, 1961). Later studies have substantiated Reid's ideas on multivariant control of fish populations. Numerous physical, chemical and biological factors interact to provide a given fish population size. The most important abiotic factors for fluvial fish habitats are temperature, rate of water flow, fluctuation in discharge and cover availability (Hynes, 1972). A recent study by Binns and Eiserman (1979) concluded that annual stream flow variation, late summer flows, nitrate concentrations, fish food abundance and diversity, cover, substrate, water velocity and stream width were the most important environmental factors influencing stream trout populations.

### METHODS

The habitat suitability rating system developed by fisheries biologists, Hank Newhouse and Bob Rainville of the Kootenai National Forest, was used to rate 1<sup>4</sup> sections in 7 streams. The streams rated include: 1) Big Creek, 2) Sunday Creek, 3) Callahan Creek, 4) O'Brien Creek, 5) Pete Creek, 6) East Fork of Yaak Hiver and 7) Rock Creek. The Kootenai rating system evaluates the following parameters as either good, fair, voor or none: 1) instream cover, 2) bank cover, 3) spawning habitat and 4) channel stability (Appendix 1). Substrate composition is determined from ocular examination of the stream bottom. Fools are classified using the parameters of deoth, length and cover (Duff and Cooper, 1976). Estimates were made of the percent of the stream in pools, riffles, run and glide. The width and deoth were determined for a pool and riffle from each section. Ocular estimates of flow and water velocity were made. Instantaneous water temperatures were taken and the gradients were determined with aid of a clinometer.

The relative abundance of major aquatic insect orders was estimated by counting insects from approximately three square feet of rocks taken from a riffle area. An aquatic insect index was determined from the following parameters: total alkalinities, organic debris, algae growths, substrate size, bottom stability, percent of stream in riffle and embeddedness.

Fish were collected using standard Montana electrofishing gear. Mark and recapture data were used to calculate population estimates on 14 one thousand foot-long sections. Methods described by Vincent (1971) were followed for electrofishing operations and for analyzing mark and recapture data. Approximately 48 hours elapsed between the marking and recapture runs. The estimates tend to run high due to the movement of marked fish from the section between the marking and recapture runs. The error should be similar among the sections. Length frequency distributions and age data from previous years were used to segregate fish into approximate age groups.

### FINDINGS

### East Fork Yaak River

The habitat suitabilities and population estimates for the East Fork of the Yaak are given in Tables 1 and 2, respectively. Rainbow trout (Salmo gairdneri) was the primary fish species collected from the two sections. A few rainbow X cutthroat hybrids were also caught. A total of 151 and 351 rainbow trout were caught in Sections 35 and 25, respectively. The resident suitabilities were markedly higher in Section 35 than in Section 25, yet the population estimated indicated a slightly higher population of rainbow over 7.0" in Section 25 than 35. The lower resident populations in Section 25 than in Section 35 were probably related to the differences in stream flows and widths between the sections. The flows (about 20 cfs) and width (30 feet) in Section 25 were about twice as large as those in Section 35. Binns and Eiserman (ibid.) found that stream width and late summer stream flows were important factors influencing trout densities. The aquatic insect suitabilities in both sections were the highest recorded, yet the standing crop estimates ranked only 4th and 5th out of 12 sections. Silt deposition and the lack of class 1 and 2 pools in the upper 500 feet were adversely affecting trout production in Section 25. The lack of pool formation and a large annual variation in stream flow and little instream cover appeared to be limiting trout production in Section 35.

Table 1. A summary of the trout and aquatic insect suitabilities in 14 sections from seven streams on the Kootenai National Forest. The population estimates expanded to number of fish per surface acre are given in parenthesis for resident and rearing suitabilities and in weight per surface acre for aquatic insect suitabilities.

Stream	Section	Resident Suitabilities1/	Rearing Suitabilities	Aquatic Insect Suitabilities
East Fork Yaak	35	19(70)	27( 741)	34(43.7)
East Fork Yaak	25	35(76)	28( 976)	34( 51.0)
Bee+le Creek	2	19(74)	24( 653)	18( 38.8)
Pete Creek	19	21(19)	27( 273)	22( 17.1)
Rock Creek	2	24(295)	26( 677)	21(105.1)
E.F. Rock Creek	1	19(109)	24( 385)	14( 49.2)
Big Creek	25	19(19)	34( 658)	19( 24.9)
S.F. Big Creek	8	20()	26(1,749)	18( 39.9)
Callahan Creek	20	25( 70)	34(709)	19( 48.4)
S.F. Callahan Creek	26	25(24)	36(1,099)	15( 72.6)
Sunday Creek	18	37(60)	25( 608)	21( 41.9)
Sunday Creek	6	30(271)	30(1,713)	33(133.0)
O'Brien Creek	32	34(70)	38( 400)	25( 29.0)
O'Brien Creek	7	28(112)	34( 205)	26(43.8)

 $\frac{1}{2}$  The suitability rating system is listed below:

Rating	Points
Very high	34-40
High	28-33
Moderate	22-27
Poor	15-21
Very poor	0-14

Table 2. Population estimates by length groups and approximate age classes for rainbow trout from the East Fork of the Yaak River, August, 1979. The 80% confidence limits are given in parenthesis as percent of point estimate.

Length Group	Assigned Age	Average Length in Inches	Average Weight in Pounds	Percent Age Composition	Per Surface Number	Acre Weight
	Rainbow tr	rout T37N R3	OW 835 Brid	ge on Vilyl L	ake Road	
2.6-4.4 4.5-6.9 7.0-9.2	1+ 2+ 3+&4+	3.4 5.3 7.8	.02 .06 .19	43.0 48.3 δ.7	349 392 70	7.0 23.4 13.3
Total					811 (-24.2)	43.7
Raint	ow trout 1	37N R31W S2	5 0.2 miles	upstream from	n road to Mac	
3.0-4.9 5.0-6.9 7.0-8.8	1+ 2+ 3+&4+	3.8 5.9 7.8	.02 .08 .19	64.5 28.2 7.3	679 297 76	13.6 23.8 13.6
Total					1,052 (-14.1)	51.0

# Pete and Beetle Creeks

Seventy-three brook trout (Salvelinus fontinalis), 2 rainbow trout, 13 westslope cutthroat trout (Salmo clarki leusi) and 1 mountain whitefish (Prosopium williamsoni) were collected from Pete Creek. Slimy sculpins (Cottus cognatus) and longnose dace (Rhinichthys cataractae) were abundant. The brook trout estimate appears to be too high as a result of the small sample size and only seven recaptures. The suitabilities were similar between the two sections, yet Beetle Creek (Table 3) estimates were markedly higher than the Pete Creek estimates. Part of this discrepancy is due to the high brook trout estimate for Beetle Creek. The annual stream flow variation appeared higher in Pete Creek than in Beetle Creek. Beetle Creek comprised the majority of the flow of Pete Creek at the time of sampling. The water velocities were noticeably lower in the larger Pete Creek channel than in Beetle Creek. Instream cover was much more abundant in Beetle Creek than in Pete Creek. A lack of pool development, large annual stream flow variation, low summer and fall flows, low alkalinities and low insect production were negative influences affecting trout production in Pete Creek. Steep gradient, lack of pools, low alkalinity and low insect production appeared to be limiting trout production in Beetle Creek.

Table 3. Population estimates by length groups and approximate age classes for trout from Pete Creek and Beetle Creek, August, 1979. The 80% confidence limits are given in parenthesis as percent of the point estimate.

Length Group	Assigned Age	Average Length in Inches	Average Weight in Pounds	Percent Age Composition		Surface	Acre Weight
Brook	trout - F	ete Creek -	T36N R32W	S19 (First cu	lvert o	n Rd. 338	<u>3)</u>
3.4- 6.9 7.0-11.5	1+ 2+&3+	4.7 9.2	.04 .32	93.4 6.6	273 19		10.9 6.2
Total					292	(+19.1)	17.1
Brook	trout - Be	etle Creek	<u>- T36N R336</u>	I S2 (Lower cu	lvert o	n Rd. 33	<u>3)</u>
3.5- 6.9 7.0- 8.7		4.3 7.7.	.03 .19	80.7 19.3	309 74		9.3 14.1
Subtotal					383	(+37.7)	23.4
	Cutthre	at trout -	Beetle Cree	ek – T36N R33W	S2		
2.7- 4.9 5.0- 7.0		3.9 5.8	.02 .08	59.0 41.0	203 141		4.1 11.3
Subtotal					344		15.4
Total					727	(-25.1)	38.8

## Rock Creek

One hundred westelope outthroat trout and 12 Dolly Varden (<u>Salvelinus</u> <u>malma</u>) were collected from the East Fork of Rock Creek. One hundred and thirty-four westelope outthroat trout, 124 brook trout and 3 Dolly Varden were collected from Section 2. The data from Rock Creek was not used in calculating the relationship between suitabilities and trout populations, because the estimates appeared quite high (Table 4). Mark and recapture runs were made on consecutive days resulting in a low recapture rate of marked fish. Section 2 did contain an excellent population of resident westslope outthroat ranging in size from 7.0 - 11.4 inches in total length. The resident suitability, however, was in the moderate class. Low summer flows, high annual stream flow variation and low alkalinities were limiting trout production in section 2. The high gradient, low alkalinities and lack of pool develoment were limiting trout populations in section 1.

Population estimates by length groups and approximate age classes
for trout from Rock Creek, September, 1979. The 80% confidence
limits are given in parenthesis as percent of point estimate.

Length Group	Assigned Age	Average Length in Inches	Average Weight in Pounds	Percent Age Composition	Per Number	Surface	Acre Weight
				ion T32N R26W			
	(0.5	miles beic	W Ilrst bri	dge on road 1	20)		
3.0- 4.9 5.0- 6.9 7.0-11.4	1+ 2+ 3+&4+	4.0 6.2 8.9	.03 .10 .27	37.3 29.1 33 6	231 181 <u>209</u>		6.9 18.1 <u>56.4</u>
Subtotal					621	(+30.5)	81.4
	Bro	ok trout lo	wer section	T32N R26W S2			
4.3- 6.9 7.0- 8.5		5.4 7.5	.06 .17	85.3 14.7	265 46		15.9 7.8
Subtotal					311	(-+34.8)	23.7
Total					932		105.1
Cutth	roat trout	East Fork	section T26	5N R32W S1 (Br	idge on	Rd. 150.	<u>A)</u>
3.6- 4.9 5.0- 6.9 7.0- 8.5	2+	4.1 6.1 7.6	.03 .10 .17	22.6 55.4 22.0	112 273 109		3.4 27.3 18.5
Total					494	(=24.8)	49.2

## Big Creek

Trout in Big Greek were tentatively classified as a rainbow X cuthtnoat complex, due to hybridization that has occurred between the two species. Two hundred and thirty-six hybrids and 6 longnose dace were collected from section 25 and 341 hybrids were collected from section 8. The resident suitabilities were poor for both sections and resident populations were low in section 25 (Table 5) and absent from section 8. Rearing suitabilities were very high in section 25 and moderate in section 8, yet the population of fish under 7.0 inches was 2.6 times higher in 8 than 25. Aquatic vegetation was much more abundant in 8 than 25 and the channel stability in 8 was much higher than in

-6-

25. Binns and Eiserman (ibid.) found that aquatic vegetation and bank stability were important factors influencing trout bopulations. Juvenile fish incur much higher mortality rates in unatable streams during the annual soring flood than in stable streams. Aquatic insect suitabilities were boor in both sections and the standing crop of fish in section 25 and 8 ranked 11th and 9th, respectively, out of 12 sections. A high annual stream flow variation, low summer flows and low alkalinities were limiting resident and rearing populations. A lack of class 1 and 2 pools was limiting resident bonulations along with little cover used by larger fish such as undercut banks and overhanging brush in pools.

Table 5. Population estimates by length groups and approximate age classes for trout from Big Creek, August, 1979. The 80% confidence limits are given in parenthesis as percent of point estimate.

		Average	Average	Percent		
Length	Assigned	Length	Weight	Age	Per Surface	
Group	Age	in Inches	in Pounds	Composition	Number	Weight
:	Rainbow X	Cutthroat C	omplex - Bi	g Creek - <u>T35</u>	N R30W S25	
	(1	.2 miles up	stream from	Steep Creek	Rd.)	
		-				
3.0-4.4	1+	3.8	.02	66.5	450	9.0
4.5-6.9	2+	5.3	.06	30.7	208	12.5
7.0-8.7	3+&4+	7.7	.18	2.8	19	3.4
1.0-0.1	JTOUTT					
Total					677 (-24.5)	24.9
10 001						
Rainb	ow X Cutth	roat Comple	x - South F	fork Big Creek	: - T33N R30W S8	
	(1.	6 miles ups	tream of Ga	arden Ridge Rö	l.)	
2.4-4.1	1+	3.1	.02	84.8	1,484	29.4
4.2-6.6	2+&3+	4.8	.04	15.2	265	10.5
4.2-0.0	2+0.51					
Total					1.749 (+18.7)	39.9
TOCAL					-,, ( ,	

### Callahan Creek

A total of 158 rainbow trout and 14 Dolly Varden were collected from section 20 as compared to 278 rainbow and 45 Dolly Varden in the South Fork (section 26). Resident suitabilities were moderate for both sections. Resident populations in section 26 were about 60 percent higher than in section 20 (Table 6). Rearing suitabilities were very high in both sections and population estimates for 26 and 20 ranked 3rd and 7th, resectively. Instream cover, primarily large substrate, was higher in section 26 than 20 and was instrumental in providing more rearing habitat. Aquatic insect suitabilities were poor in both sections but standing crop estimates were high with section 26 ranking second. High annual stream flow variation, low summer flows and low alkalinities were limiting production of resident and juvenile pomulations, whereas lack of class 1 and 2 pools was limiting resident trout production.

Table 6. Population estimates by length groups and approximate age classes for trout from Callahan Creek, August, 1979. The 80% confidence limits are given in parenthesis as percent of point estimate.

Length Group	Assigned Age	Average Length in Inches		Percent Age Compcition		Surface Acre Weight
Rain	bow trout	lower secti	on T31N R34	W S2O (Gate t	o Big Ei	ght Mine)
	2+	4.2 5.7 7.5	.03 .07 .17	42.3 48.7 9.0	330 379 70	9.9 26.6 11.9
Total					779	(±31.5) 48.4
	Rainbo			lahan T31N R3 k Road 4554)	4w_826	
2.9- 4.9 5.0- 6.9 7.0- 9.3	2+&3+	3.8 5.9 7.6	.02 .08 .18	56.5 35.2 8.3	603 375 90	12.1 30.1 16.1
Subtotal					1,068	( <del>-</del> 17.2) 58.3
	Dolly	Varden Sou	th Fork Cal	lahan T58N R3	E <u>89</u>	
5.0- 6.9 7.0-10.8		5.9 7.9	.08 .14	83.5 16.5	121 24	9.7 4.6
Subtotal					145	( <u>+</u> 24.1) 14.3
Total					1,213	72.6

# Sunday Creek

A total of 350 brook trout, 8 cutthroat trout and 3 sculpins were collected from section 18 as compared to 402 brook trout from section 6. The resident suitabilities ranked very high for section 18 and high for section 6 which had the highest number of resident fish (Table 7). Rearing suitabilities ranked moderate in section 18 and high in section 6 which ranked second in number of residents. Aquatic insect suitabilities ranked high in section 6 which had the highest standing crop of any section sampled. The total alkalinities in Sunday Creek (220 ppm) were the highest recorded in any of the streams sampled, indicating that Sunday was a very productive system. Flows were also quite stable and there appeared to be comparatively little annual fluctuation in stream flow. Large deposits of marl and the resulting embeddedness were limiting aquatic insect production in section 18. Angler harvest is probably reducing the number of brook trout over 6.0 inches. Sunday Creek has the reputation of being a good brook trout stream and receives considerable fishing pressure.

Table 7. Population estimates by length groups and approximate age classes for brook trout from Sunday Creek, August, 1979. The 80% confidence limits are given in parenthesis as percent of point estimates.

Length Group	Assigned Age	Average Length in Inches	Average Weight in Pounds	Percent Age Composition	Per Number	Surface Acre Weight
E	Brook trou	t lower sec	tion T33N R	24W S18 (Brid	ge on ro	ad 3738)
3.5- 5.5 5.6- 6.9 7.0-11.2	1+ 2+ 3+& <sup>4</sup> +	4.5 6.2 7.8	.04 .10 .19	75.3 15.7 9.0	503 105 60	20.1 10.5 11.3
Total					668	( <del>1</del> 14.6) 41.9
E	brook trou	t upper sec	tion T32N R	25W S6 (Bridg	e on Roa	<u>d 315)</u>
3.0- 5.5 5.6- 6.9 7.0-11.2	1+ 2+ 3+&4+	4.4 6.1 7.7	.03 .09 .19	60.9 25.4 13.7	1,209 504 271	36.2 45.4 51.4
Total					1,984	(+16.3)133.0

# O'Brien Creek

A total of 199 westslope cutthroat trout, 13 rainbow trout, 10 brook trout, 5 Dolly Varden and 3 sculpins were collected from section 32, whereas 66 brook trout, 44 cutthroat and 14 Dolly Varden were taken in section 7 (Table 8). The resident suitabilities were very high in section 32 and high in section 7, but the number of resident fish was markedly higher in 7. The estimate for residents in section 7 appeared to be high as the recapture ratio was less than expected.

Table 8. Population estimates by length groups and approximate age classes for trout from O'Erien Creek, August, 1979. The 80% confidence limits are given in parenthesis as percent of point estimate.

Length Group	Assigned Age	Average Length in Inches	Average Weight in Pounds	Percent Age Composition	Per Number	Surface	Acre Weight
	Cutth	roat trout	lower secti	on T32N R33W	S32		
	(Road	381 bridge	0.7 mile be	low Rabbit Cr	eek)		
3.0- 4.9	1+	4.3	.03	72.8	342		10.2
5.0- 6.9	2+	5.6	.07	12.3	58		4.1
7.0-10.8	3+&4+	8.1	.21	19	70		14.7
Total					470	( <del>-</del> 24.0)	29.0
	Cutt	hroat trout (Road 352 b	upper sect	ion T32N R33W North Fork)	<u>87</u>		
		1		HOI OIL TOIR)			
3.7- 4.9	1+	4.0	.03	6.4	9		0.3
5.0- 6.9	2+	6.0	.09	24.8	35		3.2
7.0-11.9	3+&4+	9.0	.29	68.8	_97		28.1
Subtotal					141	(+23.0)	31.6
	B	rook trout u	upper sectio	on T32N R33W S	37		
4.1- 6.9	1+	5.3	.06	91.5	161		9.7
7.0- 7.9	2+&3+	7.5	.17	8.5	15		2.5
Subtotal					176	(-20.1)	12.2
Total					317		43.8

Rearing suitabilities were very high in both sections, but number of juveniles ranked low when compared to other sections (Table 1). Aquatic insect suitabilities were moderate for both sections. The standing crobs of trout ranked loth and 5th out of 12 sections. The lower than expected number of residents in section 32 may be a result of angler harvest. This section has good access and is only seven miles from Troy.

-10-

# DISCUSSION

The relationships between resident suitabilities and number and weight estimates are presented in Figure 1. The correlation of coefficient (R) was .36 for both the number and weight estimates, indicating a comparatively weak linear relationship between resident suitability ratings and trout populations. The relationship between rearing suitabilities and trout populations was negative (Figure 2) indicating an inverse relationship between suitabilities and juvenile fish. The rating system does not include annual stream flow variation which was found by Binns and Eiserman (ibid.) to be the most important environmental factor influencing trout populations. Late summer flows, stream width and water velocity were also not included in the Kootenai Rating System. Bank cover (actually floodplain vegetation) has little direct influence on trout populations and should be deleted. The factors influenced by floodplain vegetation: 1) water temperatures, 2) bank stability and 3) instream cover and pools due to log recruitment should be measured separately. Gradient should be deleted from the rating and the factors influenced by gradient (substrate, pool development and aquatic insect abundance) measured directly.

A productivity index is not included in the resident rating system and this helped account for the weak relationship between suitabilities and trout populations. Quantitative measurements of total alkalinity or nitrate nitrogen, aquatic insect abundance and diversity and submerged aquatic vegetation are needed to develop a productivity index.

Fish of different sizes utilize different micro habitats of which cover is an essential element. Therefore, it seems logical to evaluate cover senarately for fish over six to seven inches in length and fish under six inches in length. Interstices in the substrate provided most of the cover for small fish in the streams sampled, except for Sunday Creek, whereas undercut banks, log jams, overhanging brush and pool depths provided most of the cover for fish over 7.0 inches in length.

The suitability rating system does not take into account the different habitat preferences of cutthroat trout, rainbow trout, brook trout and Dolly Varden. A modification of the habitat rating system may be required to produce ratings which have high correlations with different trout species.

The correlation coefficients (Figure 3) for the aquatic insect suitabilities versus number of trout (.14) and weight of trout (.36) indicated a weak linear relationship. Food is just one of the environmental factors which influence trout numbers in streams. In most streams, space and cover generally limit trout populations before food (Allen, 1969) and (Chapman, 1966). It follows that aquatic insect populations by themselves often have only weak correlations with standing crops of trout.

The Kootenai Forest aquatic insect suitability rating system appears to have little value in predicting trout populations and should be replaced by a system which quantifies insect populations. Aquatic insects should be collected with a Waters-Knapp type circular sampler, which samples one square

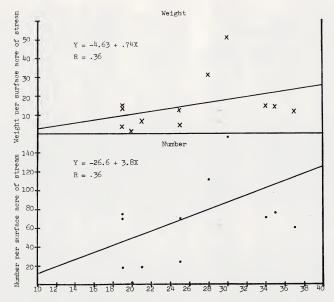


Figure 1. The correlation coefficients (R) and regression lines for resident habitat suitabilities versus numbers and weights of trout over 7.0 inches in total length.

-12-

0

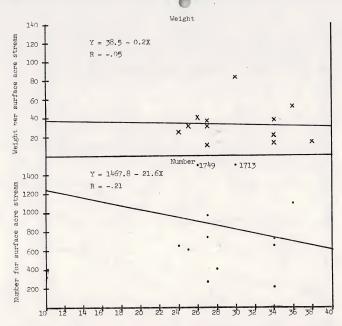


Figure 2. The correlation coefficients (R) and regression lines for rearing habitat suitabilities versus numbers of weights of trout from 3.0 - 6.9 inches in total length.

-13-

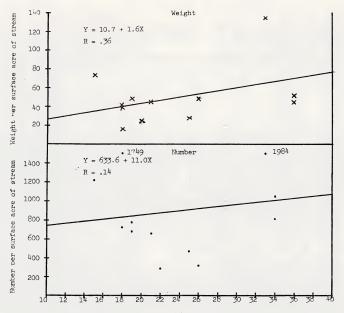


Figure 3. The correlation coefficients (R) and regression lines for aquatic insect suitabilities versus total numbers and weights of trout over 3.0 inches in total length.

-14-

foot. The insects can easily be sorted into major taxonomic groups and the populations quantified. People can be trained to separate aquatic insects into orders by trained personnel within a day or two. The aquatic insect data should then be incorporated into the resident and rearing suitability ratings.

An alternative to actual collection of insects is the method utilized by Binns and Eiserman (1979) which involved developing a good index from measurements of: 1) maximum summer water temperatures, 2) nitrate nitrogen, 3) substrate composition and 4) water velocity.

The subjective nature in which the data is collected for the Kootenai Rating System contributes to the unreliable ratings. Actual measurements should be made of the carameters rather than ocular estimates. Although this procedure requires more time, it should yroduce ratings which have higher correlations with trout populations. Sampling of areas from typical habitat types would reduce the time required for the quantitative survey. The Kootenai System currently in use may be helpful for very general surveys, but it does not produce the precise data required to generate valid suitability ratings.

### BIBLIOGRAPHY

- Allen, K. Radway. 1969. Limitations on production in salmonid populations in streams. Symposium on salmon and trout in streams 1968, p. 3-18, 1969.
- Binns, N. Allen and Fred M. Eiserman. 1979. Quantification of fluvial trout habitat in Wyoming. Trans. Am. Fish. Soc. 108(3):215-219.
- Chapman, D. W. 1966. Food and space as regulators of salmonid populations in streams. W. American Naturalist Vol. 100 No. 913:1345-357.
- Duff, Donald and James L. Cooper. 1976. Techniques for conducting stream habitat survey on national resource land. Technical Note 283. U.S. Dept. Int. Bureau of Land Management. 71 pp.
- Hynes, H. B. N. 1972. The ecology running water. Un. of Toronto Press, Toronto, Canada.
- Reid, G. K. 1961. Ecology of inland waters and estuaries. Reinhold Publishing, New York, New York U.S.A. 375 pp.
- Vincent, Richard E. 1971. Electrofishing and fish population estimates. The Prog. Fish. Cult. 33(3):163-169.

Beetle Creek Big Creek South Fork Big Creek Callahan Creek South Fork Callahan Creek East Fork Yaak River O'Brien Creek	11206001 11482001
Pete Creek Rock Creek East Fork Rock Creek Sunday Creek	11482001 11504001 05592001 05240001 07454001

# APPENDIX 1

Kootenai National Forest trout habitat suitability ratings for East Fork Yaak River, Beetle Creek, Pete Creek, Rock Creek, Big Creek, Callahan Creek, Sunday Creek and O'Brien Creek.



STREAM NUMBER & NAME: East Fork Yaak	STATIO	INS:1	DATE: 8/23/79
WIDTH	DEPTH	VELOCIT	
Present Full Present	Full		15 00 050
Pool 30 50 4.0'	7.0		
Riffle 25 45 0.8'	3.5	1-3 F	S 20-25 CFS
Run	1		
Air: 70°F GRADIENT		Clear	
Water: 5] OF STABILITY R	RATING 77	TURBIDITY:MiTky Muddy	
7 POOL(1, 2 and 3) 10 % RIFFLE	50	% RUN % GLI	de 40%
POOL CLASSES: % CLASS 1: 13 % CLASS 2:	% CLASS	3 <u>20</u> % CLA	ss 4: <u>67</u>
BOTTOM MATERIALS: Very Abundant	Abundant Cor	mon Present	None
	(41 to 70%) (11	:0 40%) (<10%)	0
Organic Debris:		5	8
Clay/Silt:		10	
Sand:		10	
Fine Gravel (0.1 to 1"):		10	
Coarse Gravel (1 to 3"):		20	
Small Rubble (3 to 6") :	20	-30	
Large Rubble (6 to 12"):	20	-30	
Boulders (>12"):	10	-15	
Bed Rock:			X
AQUATIC VEGETATION:	X		
INSTREAM COVER: Good Fair Coor	None		
Cover Types Logs $P$ (Indicate relative importance $A > C > P$ )	Р.	Water Col	lor <u>mottled</u> or <u>Clear</u>
Choppy Surface	<u> </u>	Overhanging Vegetat	ionP
BANK COVER: Good (Fair) Poor	None		
		pruce, larch	
(Indicate relative Understory	Alder, Mtn. M	apie	
	sses, thimble		
FISH FOOD ORGANISMS: Food Types: Caddisflies A Mayflies (Indicate relative		lies: PDi	/ft <sup>2</sup> ptera
abundance A>C>P) Snails: P Leeches		$\frown$	
SPAWNING HABITAT: Very Good Good		Poor	None
% Gravel >50% 35-50% Velocity Must be between 0.5 and 3 Depth Must be betwee <u>n 4</u> inches a	FPS	10-19%	< 10%
EMBEDDEDNESS 0	2/3	Full	
VALLEY BOTTOM TYPE:	100-300 ft.	< 100 ft.	
LAND FORM GRADIENT: (53) 5-10% 11	-20% 21-30%	>30%	
LIMITING FACTORS: Pool formation			

ADDITIONAL OBSERVATIONS: Much of the stream in glide, few good pools with cover, good juvenile habitat

LAND MARKS: Bridge on Vinal Lake Road INVESTIGATOR: B. May

\* = Estimates

1

Item Rated		_		ALCA	ors by Classes			
PPER BANKS	EXCELLENT	e	GOOD		FAIR		POOR	
endform Slope	Bank slope gradient 4307	(2)	Bank slope gradient 30-407		Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	
	No evidence of past or	5	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	
ass Wasting		(3)		(6)	with some raw spots eroded	(9)	sediment rearly yearlong OF	R 11
	wasting into channels.	-	future potential.	6	by water during high flows.		imminent danger of same.	· [-
	Essintially absent from	(2)	Present but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy amounts.	10
(Floatsble Objects)	immediate channel area.	-	twigs and limbs.	$\sim$	are both increasing.		predominantly larger sizes.	. Г
	90% + plant density. Vigor		70-90% density. Fever plant		50-70% density. Lower viger		< 50% density plus fever	-
from	and variety suggests a	(3)	species or lower vigor	((6)	and still fewer species	(9)	species & less vigor indi-	h
Vegetation	deep, dense root mass.	1	suggests a less dense or	<u> </u>	form a somewhat shallow and	1	cate poor, discontinuous,	
vegecación		1	deep root mass,	L	discontinuous root mass.	L	and shallow roct mass.	
LOWER BANKS								
**	Ample for present plus some	I .	Adequate, Overbank flows		Barely contains present		Inadequate, Overcark flows	-T-
Channel Capacity	increases, Peak flows co.	(1)	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	ic
	tained, W/D ratio <7.	1_	ratio 8-15,	1	floods. W/D ratic 15-25.	1		$-\Gamma$
	657 + with large, angular	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	<20% rock fragments cf	10
Bank Rock Content	boulders 12" + numerous.		boulders to cobble 6-12".	$\sim$	3-6" diametar class.	1	grovel sizes, 1-3" or less.	-1
	Rocks, old logs firmly	-	Some present, causing		Moderately frequent, moder-	-	Frequent obstructions and	-+-
Obstructions	embedded. Flow pattern		erosive cross currents and	5	ately unstable obstructions		deflectors cause bank erc-	
Flow Deflectors	of pool & riffles stable	(2)	minor pool filling. Obstruc-	((4)	& deflectors move with high	(6)	sicn yearlong. Sed. traps	1
Sediment Traps	without cutting or	1	tions and deflectors newer	$\sim$	water causing bank cutting		full, channel migration	-11
Seatment Linha	deposition.	1	and less firm.		and filling of pocls.		occuring.	
	Little or none evident.		Some, intermittently at	-	Significant, Cuts 12"-24"		Almost continuous cuts.	-+-
Cutting	Infrequent raw banks less	(4)	outcurves & constrictions.	(81	high, Root mat overhangs	121	some over 24" high. Fail-	ι.
	than 6" high generally.		Raw banks may be up to 12".	$\sim$	and sloughing evident.		ure of overhangs frequent.	p1
	Little or no enlargement		Some new increas in bar		Moderate deposition of new		Extensive deposits of pre-	-+-
Deposition	of channel or point bars.	(4)	formation, most from	((8)		12)	dominately fine particles.	1
	· · · · · · · · · · · · · · · · · · ·	$\sim$	coarse gravels.	N-e	old and some new bars.	·/	Accelerated bar development	Ki
BOTTOM			-	-			development	·
Rock Angularity	Sharp edges and corners,	(1)	Rounded corners & edges.	(2)	Corners & edges well round-	(3)	Well rounded in all dimen-	14
	plane surfaces roughened.	1	surfaces smooth & flat.	2	led in two dimensions.		sions, surfaces smooth.	1 (4
Brightness	Surfaces dull, darkened, or	(1)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	73)	Predominately bright, 65% +.	+
	stained. Gen. not "bright".	1	up to 35% bright surfaces.	E	bright, ± 15%, ie 35-65%.	(5)	exposed or scoured surfaces.	, (4
.onsolidation or	Assorted sizes tightly	(2)	Moderataly packed with	145	Mostly a Loose assortment	(6)	No packing cyident, Loose	
	pucked and/or overlapping.	1	some cverlapping.	1	with ne apparent overlap.	(0)	assortment, easily moved.	(8
Botton Size Distribution	No change in sizes evident.	(4)	Distribution shift slight.	18		525	Massortment, easily moved.	·
	Stable materials 80-100%.	1	Stable materials 50-80%.	0	Stable materials 20-50%.		Morked distribution change. Statle usterials C-207.	1.6
	Less than 5% of the bottom	1-	5-30% aftected, Scour at		30-50% affected, Deposits		More than 50% of the bottom	-
Scouring and	affected by scouring and	(6)	constrictions and where	1:21			Nore than 50% of the bottom	1
Deposition	deposition.	1	grades steeper. Some	-	constrictions, and bends.	*0.	in a state of flux or change	24 p
reportion		1	deposition in pools.		Some_filling of pools.		nearly yearlong.	1
Clinging Aquetic	Abundant, Growth largely		Common, Algal forms in low		Present but spotty, mostly			1-
Vegetation	moss like, dark green, per-	10	velocity & pool areas. Moss	(2)	in backwater areas, Season-	6	Perennial types scarce or	1
(Moss & Algae)	ennial. In swift water too.	1.1	here too and swifter waters.	(2)	al blooms make rocks slick.	2	ebsent. Vellow-green, short	14
nosa_a_nigaej	COLUMN TOTALS		horie Loo and switter waters,	-	as proger make rocks slick,	-1	term blion are be present.	
	COLORN TOTALS	9	, 6	4		37		-

Add the values in each column for a total reach score here. (E. 9 + G. 64 + F. 3 + F. = 76).

Reach score of:<35=Exellent, 39-76=Good, 77-114=Fair, :15+=Poor.

. 🤇

STREAM NUMBER & NAME:	East Fork Y	aak	STATIONS :		DATE: 0/23/19
WIDTH		DEPTH	Full	VELOCITY	VOLUME
Present Full	Present 2		2.0	0.5 FS	8-10 CFS
Pool <u>17 24</u>	0.8		2.5	2.0 FS	
Riffle					
Runi Air: 80	GRADIENT				
			6	Clear	
Water: 47°F			97) TURBID	Muddy	
χ POOL(1, 2 and 3)				- % GLIDE	
POOL CLASSES: % CLASS 1:	20 % CLASS 2	: <u>14</u> \$	CLASS 3 30	% CLASS	4: 36
BOTTOM MATERIALS:	Very Abundant	Abundant	Common	Present	None
	(> 70%)	(41 to 70%)	(11 to 40%)	(< 10%)	0
Organic Debris:			X		
Clay/Silt:			Х		
Sand:		X			
Fine Gravel (0.1 to 1"):		X			
Coarse Gravel (1 to 3"):		X			
mall Rubble (3 to 6") :			X		
arge Rubble (6 to 12"):			X		
Boulders (>12"):			X		
Bed Rock:					X
QUATIC VEGETATION:			l	X	
INSTREAM COVER: Good	Fair Poor				
Cover Types	Logs A		Rocks C		mottled
(Indicate relative importance A > C > P	Undercut Bank			Water Color	clear
Importance A / C / F	Choppy Surfac	ceC	Overhan	ging Vegetatio	nA
BANK COVER: Good Fa	ir) Poor	None			
	Overstory	Spruce, fi	r, larch,	lodgepole	
Major Plant Species: (Indicate relative	Understory	Alder, dog	wood		
importance: A > C >	P) Surface Gra	ass,cow pa	rsley,bull	rush, snowb	erry,
FISH FOOD ORGANISMS:	()25/ft <sup>2</sup> )	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	1-5/f	t <sup>2</sup>
Food Types: Caddisfli	es A Mayfili	es: <u>A</u>	Stoneflies:	C Dipt	era_C
(Indicate relative abundance A>C>P) Sn	ails: Leeche	es:	SIZE	:: s 🗩	L
SPAWNING HABITAT: Very G	ood Good	(30-40) Fair	•	Poor	None
% Gravel >50 Velocity Must be b Depth Must be b	35-50 etween 0.5 and 3 etween 4 inches	3 FPS	12	10-19%	< 10%
MBEDDEDNESS 0	1/3	2/3		Full	
VALLEY BOTTOM TYPE:		100-300 ft.	< 1	00 ft.	
AND FORM GRADIENT: 51	5-10% 1	11-20% 21-	30% >30%		
IMITING FACTORS: Class	a 1&2 pools	in upper 5	00', RB in	stead of C	T, silt possib

ADDITIONAL OBSERVATIONS: Stream is near channel capacity. Has good undercut banks for fish cover, but little slumping.

LAND MARKS: Spring in middle of section 0.2 miles east of turnoff to McIntire Ranch. INVESTIGATOR: B. May \*-Estimates

Item Rated		_		ALCE	icators by Classes					
TPER EANKS	EXCELLENT	0	GOOD		FAIR		POOR			
Landform Slope	Bank slope gradient <30%	(2)	Bank slope gradient 30-40%	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	10		
	So evidence of past or	5	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	-		
tass Masting		(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OF	i hi		
	wasting into channels.	$\succeq$	future potential.	-	by water during high flows.	0	imminent danger of same	· [ - '		
	Essintially absent from	(2)	Preacht but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy acounts.	0		
(Floatsble Objects)	immediate channel area.	-	twigs and limbs.	-	are both increasing.	-	predominantly larger sizes.	. 1		
	90% + plant density. Vigor		70-90% density. Fewer plant		50-70% density. Lower viger		<50% density plug ferme			
6	and variety suggests a	(3)	species or lower vigor	(6)	and still fever species	(9)	species & less vigor indi-	k1:		
Vegetation	deep, dense root mass.		suggests a less dense or	1 Y	form a somewhat shallow and		cate poor, discontinuous.			
		J	deep root mass.	<u> </u>	diacontinuous root mass,		and shallow roct mass.	1		
LOWER BANKS		r				_		-		
	Ample for present plus some increases. Peak flows con	6	Adequate. Overbank flows	6	Earely contains present	i	Inadequate, Overtaria flows	-		
Channel Capacity		RD	rare. Width to Depth (W/D) ;	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	i (4		
	tained, W/D ratio <7.	100		100	floods. W/D ratic 15-25.	6				
		(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)		. (8		
ESHR ROCK CONCERT	boulders 12" + numerous.	-	boulders to cobble 6-12".	-	3-6" diametar class.	-	grovel sizes, 1-3" or less.	1.		
	Rocks, old logs firmly embedded, Flow pattern		Some present, causing erogive cross currents and		Moderately frequent, moder-		Frequent obstructions and	-		
Obstructions	of pool & riffles stable	100		r.	stely unstable obstructions		deflectors cause bank erc-			
Flow Deflectors	without cutting or	1(2)	minor pool filling. Obstruc-	14		(6)	sion yearlong. Sed. traps	1 (E		
Sediment Traps	deposition.		tions and deflectors newer and less firm.		water causing bank cutting		full, channel migration	1.		
				-	and filling of pocls.		occuring.			
	Little or none evident. Infrequent raw banks less	6	Some, intermittently at outcurves & constrictions.	E	Significant. Cuts 12"-24"		Almost continuous cuts,	1		
Cutting	than 6" high generally.	(4)	Raw banks may be up to 12".	6	high. Root mat overhangs	12)	some over 24" high. Fail-	116		
	Little or no enlargement		Some new increas in bar		and sloughing evident.	-	ure of overhangs frequent,	1		
	of channel or point bars.	100	formation, most from	100	Moderate deposition of new	$\sim$	Extensive deposits of pre-	-		
Deposition	or channel or point bars.	(4)	coarse gravels.	1(8)	gravel & ccarse sand on old and some new bars.	12)	dominately fine particles.	K.F		
		L	coarse gravels.	L	old and some new bars.	-	Accelerated bar development.			
BOTTOM	Sharp edges and corners.	1/1	Rounded corners & edges,			-				
Rock Angularity	plane surfaces roughened.	1.17	surfaces smooth & flat.	NY	Corners & edges well round-	(U)	Well rounded in all dimen-	(4)		
	Surfaces dull, darkened, or	1000	Mostly dull but may have	1700	ed in two dimensions.	1	sions, surfaces smooth.	1		
Brightness	surfaces dull, darkened, or	(LL)	up to 35% bright surfaces.	1(2)	Mixture, 50-50% dull and	(3)	Predominately bright, 65% *.	14		
tionsolidation or	Assorted sizes tightly	(2)	Moderataly packed with	100	bright, ± 15%, ie 35-(5%.	$\sim$	exposed or scoured surfaces.	2.11		
Particle Packing	picked and/or overlapping.	1(2)	proderately packed with	(4)	Mostly # Loose assortment	64	No packing evident. Loose	1 (8)		
Button Eize Distribution	No change in sizes evident.	100	Distribution shift slight.	100	With ne apparent overlap.		assortment, easily moved,	1		
BUTLAS SILC DISCHOULION	Stable materials 80-100%.	1447	Stable asterials 50-80%.	100	inonerate change in sizes.	12.3	Morked distribution change.	(.6)		
S vercent . table institutions	Less than 5% of the bottom		5-30% aflected. Scour at		Stable materials 20-50%.	_	Statie unterfals C-20%.	1		
Scouring and	affected by scouring and	100			30-50% affected. Deposits	20	More than 50% of the bottom			
Deposition	deposition.	1(0)	grades steeper. Some	+-2)	& scour at obstructions,	187	in a state of flux or change	(24)		
Deposition	deposition.	1	deposition in pools.		constrictions, and bends. Some filling of peels.	-1	nerrly yearlong.			
Clinging Aquatic	Abundant, Growth largely	-	Common. Algal forms in low	-	Buse Hilling of peels,	-1				
Vegetation	moss like, dark green, per-	100	velocity & pool aleas. Mosa	(0)	Present but spotty, mostly	1	Perennial types scarce or			
(Moss & Alsse)	fennisl. In swift water too,		here too and swifter waters.	(2)	in backwater aress. Season- (	(3)	ebsent. Vellow-green, short	(4)		
(.ucs a Aigae)	COLUMN TOTALS	1			al blooms make rocks slick,		term bloom are be present.			
	COLUMN TUTALS	5	2	4	69	1		- married		

add the values in each column for a total reach score here. (E. 5+G. 24+F. 68+F. 97).

Reach score ef:<38=Exellent, 39-76=Good, 77-114=Fair, 15==Poor.

STREAM NUMBER & NAME: Beet	le Creek		STATIONS: 1	(1000'lon	g) DATE: 8/22/
WIDTH		DEPTH	Full	VELOCITY	
Present Full	Present			1 FS	10 CFS
Pool 15 25	1.5		1.0 2.5'	2-3 FS	
Riffle 12' 20'	0.5'		2.5	2=3 13	10 013
Run7	GRADIENT	69			
Air: 75				Clear	
Water: 530	STABILITY I	RATING 59	TURBIDI	Muddy	
POOL(1, 2 and 3) 5				% GL 1D	
POOL CLASSES: % CLASS 1: 5	% CLASS 2:	- *	CLASS 3	% CLAS	s 4: <u>95</u>
BOTTOM MATERIALS: Ver	y Abundant	Abundant	Common	Present	None
	> 70%)	(41 to 70%)	(11 to 40%)	(<10%)	0
Organic Debris:				2	
Clay/Silt:				1	
Sand :				2	
Fine Gravel (0.1 to 1"):				2	
Coarse Gravel (1 to 3"):				3	
Small Rubble (3 to 6") :		10			
arge Rubble (6 to 12"):		20			
Boulders (>12"):		60			
Bed Rock:					Х
QUATIC VEGETATION:				X	
	air Poor	None			
	Logs P	P	Rocks A		or_Mottled
(Indicate relative	Undercut Bank	s N/A		Water Colo	r Clear
importance A > C > P)	Choppy Surface	e C	Overhang	ging Vegetati	on <u>None</u>
BANK COVER: Good Fair	) Poor	None			
Major Plant Species:	Overstory	edar, fir	, spruce		
(Indicate relative	Understory A	Alder			
importance: $A > C > P$ )	Surface G	arass, bun	chberry, s	cirpus, de	evils club
FISH FOOD ORGANISMS: Food Types: Caddisflies_			6-15/ft <sup>2</sup> Stoneflies:	C (1-5/	ft- tera P
(Indicate relative				0	
abundance A>C>P) Snail	s: Leeche	s:	SIZE	s M	L
SPAWNING HABITAT: Very Good	Good	. Fair	•	Poor	None
% Grave1 >50%	35-50		12	10-19% (5%)	< 10%
Velocity Must be betw Depth Must be betw	een 0.5 and 3 een 4 inches a	FPS and 3 feet			
	1/3	2/3		Full	
ALLEY BOTTOM TYPE:	.,	1	-		
>300 ft		100-300 ft.	~~~ \<10	00 ft.	
AND FORM GRADIENT: <5%		1-20% (21-			
IMITING FACTORS: 1) Steep 4) low aquatic in			of pools,	<ol> <li>3) low cor</li> </ol>	nductivity,

ADDITIONAL OBSERVATIONS: Culvert block and causing streambed erosion. Lower 100' of section has 2 big log jams - stream unstable below culvert.

LAND MARKS: 500' on either side of culvert on Rd. 338 INVESTIGATOR: B. May

Item Rated		-		_				
PARTA PASKS	EXCELLENT	0	GOOD		FAIR		POOR	-
andform Slope			Bank slope gradient 30-40%	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	TO
	No evidence of past or		Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	-
ass Wasting		(3)	fiostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	kı
	wasting into channels,	1	future potential.	0	by water during high flows,		imminent danger of same.	î
	Ess_ntially absent from	(2)	Present but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy appunts.	t
(Floatshie Objects)	immediate channel area.	-	twigs and limbs.	_	are both increasing.		predominantly larger sizes.	1
1 Presention	190% + plant denaity. Vigor	1	70-90% density. Fewer plant	5	50-70% density. Lower viger		< 50% density plus fever	t
6	and variety suggests a	(3)	species or lower vigor	((6)	and still fewer species	(9)	species & less vigor indi-	h
Vegetstion	deep, dense root mass.		suggests a less dense or	Ϋ́	form a somewhat shallow and		cate poor, discontinuous,	1
vegetation		1	deep root mass.		discontinuous root mass.		and shallow roct mass.	
LOWER BANKS								
· · · · ·	Ample for present plus nome	h	Adequate, Overbank flows		Earely contains present		Inadequate. Overback flows	T
Channel Capacity	increases. Peak flows co		rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	i
channer toparty	tained, W/D ratio < 7.		ratio 8-15.		floods, W/D ratic 15-25.			1
	657, + with large, angular (	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	520% rock fromeate at	$\frac{1}{\alpha}$
	boulders 12" + numerous.	12	boulders to cobble 6-12".		13-5" diameter cleas,	,	gravel sizes, 1-3" or leas,	1
	Rocks, old loga firmly	1	Some present, causing		Moderately frequent, moder-		Frequent obstructions and	⊢
Obstructions	embedded, Flow pattern	h	erosive cross currents and		ately unstable obstructions		deflectors cause bank erc-	1
Flow Deflectors	of pool & riffles stable	(2)	minor pool filling. Obstruc-	(4)	& deflectors move with high	(6)	sicn yearlong. Sed. traps	Ι.
	without cutting or	1-	tions and deflectors newer		water causing bank cutting	1	full, channel migration	10
Sediment ireps	deposition.		and less firm.	1	and filling of pocls.		occuring.	
	Little or none evident.	1	Some, intermittently at	-	Significant, Cuts 12"-24"		Almost continuous cuts,	_
Cutting		(4)		(8)		121		i
	than 6" high generally.	F	Raw banks may be up to 12".	1 /	and sloughing evident.	.12)	some over 24 nigh, Fail-	ţ1
	Little or no enlargement	5	Some new increas in bar	-	Moderate deposition of rev		ure of overhangs frequent,	1
Deposition	of channel or point bars.	1/43	formation, most from	100		(1.0)	Extensive deposits of pre-	1
Deposition		Ý	coarse gravels.	1.00	old and some new bars.	(12)	dominately fine particles.	K.,
BOTTOM		-	Transferration		ord and south new Dars.	-	Accelerated bar development.	<u> </u>
Rock Angularity	Sharp edges and corners,	1(1)	Rounded corners & edges,	1(2)	Corners & edges well round-	(2)	Well rounded in all dimen-	_
ROCK AUguisticy	plane surfaces roughened.	1.27	surfaces smooth & flat.	19	ed in two dimensions.	(3)	well rounded in all dimen-	(4
Brightness		1/13	Mostly dull but may have	125	Mixture, 50-50% dull and	73	sions, surfaces smooth.	
erthurness	stained. Gen. not "bright".	1	up to 35% bright surfaces.	100	bright, ± 15%, ie 35-(5%.	(5)	Predominately bright, 65% +,	(4
.onsolidation or	Assorted sizes tightly	1/2	Moderately packed with	100	Mostly a loose assortment	-	exposed or scoured surfaces.	
Particle Packing	pucked aud/or overlapping.	141	some overlapping.	0	with ne apparent overlap.	(6)	No packing evident. Loose	(8
Button Size Distribution	Nc change in sizes evident.	100	Distribution shift slight.	100		_	assortment, easily moved.	
BUELOG SIZE DISERIO-CLOU	Stable materials 80-100%.	1.47	Stable meterials 50-80%.	100	Stable materials 20-50%.	-2,	Marked distribution change.	
S Percent Stable Asterials	Less than 5% of the bottom		5-30% aftected. Scour at	1~	13. as le pateriais 20-50%.		Statie unterials C-207.	
	affected by scouring and	100	constrictions and where	1	30-50% affected, Deposits		More than 50% of the bottom	
Scouring and		100			a scour at obstructions,	18;	in a state of flux or change	24
Deposition	deposition.	i.	grades steeper. Some	$\sim$	constrictions, and bends.	- 1	nerrly yearlong.	
	an and the state of the state o	+	deposition in pools.		Some filling of peels.	_1		
Clinging Aquatic	Abundant. Growth largely	I	Common, Algal forms in low		Present but spotty, mostly	$\sim$	Perennial types scarce or	_
Vegetation	moss like, darr green, per-	(1)	velocity & pool areas. Mosa	(2)	in backwater areas. Season-	(3)	absent, Millow-steen, above	<u>(</u> 4
(toss & Algae)	COLUMN TOTALS	1	here too and swifter waters,	-	al blooms make rocks slick,	-1	terr bl.on ne be present	-
		18		8				

Add the values in each column for a total reach score here. (E. 18+ G. 38 + F. 3 + F. - 59).

Reach score cf:<38=Exellent, 39-76=Good, 77-114=Fair, 15-=Poor.

. 0

STREAM NUMBER & NAME:	Pete Creek		STATIONS: 500	' on eith	er DATE	: <u>8/22/79</u>
WIDTH		DEFIN		-338ELOCH	ert ab	ove Slim Cr.
Present Ful			Full	1		10-15 CFS
Pool <u>30</u> 35	1.5'		<u>4.0</u> 3.5	2-3 F		10-15
Riffle 15 20	0.5'		3.5	2-51		10 10
Run i		29				
Air: 650	GRADIENT			Clear		
Water: 530	STABILITY	RATING	(57) TURBIO	Mudriy		
2 POOL(1, 2 and 3) 5%	% RIFFLE	60-70%	* RUN	% GLI		
POOL CLASSES: % CLASS 1	: <u>10</u> % CLASS 2	: *	CLASS 3 -	% CLA	ss 4: <u>90</u>	<u> </u>
BOTTOM MATERIALS:	Very Abundant	Abundant	Common	Present	None	
	(> 70%)	(41 to 70%)	(11 to 40%)	(< 10%)	0	
Organic Debris:	1			$\frac{X}{X}\frac{1}{2}$		
Clay/Silt:						
Sand:				X 2		
Fine Gravel (0.1 to 1"):				X 5		
Coarse Gravel (1 to 3"):				+	1	
Small Rubble (3 to 6") :		20		+		
Large Rubble (6 to 12"):		30		+	+	
Boulders (>12"):		30	10			
Bed Rock:			10	1 x		
AQUATIC VEGETATION:	1		1	1	1	
INSTREAM COVER: Good	(Fair) Poo		Rocks A	Rettor Co	les moti	tled, mostly da
Cover Types (Indicate relative	Logs P	D	Rocks A	Water Col		
importance A > C >	P) Undercut Bar	· · · · · · · · · · · · · · · · · · ·	Our share	ging Vegetat		p
-	Choppy Surfa	iceA	Uvernan	iging vegetat	100	
BANK COVER: Good F	air Poor	None				
	Overstory	Larch, D-f	ir, spruce			
Major Plant Species:			. maple, d			
<pre>(Indicate relative importance: A &gt; C &gt;</pre>	P)					
	Surface		mbleberry,			
FISH FOOD ORGANISMS:	>25/ft <sup>2</sup>	16-25/ft2	6-15/ft <sup>2</sup>		/ft <sup>2</sup>	с
Food Types: Caddisfl (Indicate relative			Stoneflies:	DI	ptera	<u> </u>
abundance A>C>P) S	nails:Leect	nes:	SIZ	ES M	L	
SPAWNING HABITAT: Very	Good Goo	od Fai	r	Poor	Non	e
% Gravel >5 Velocity Must be Oepth Must be	0% 35-9 between 0.5 and between 4 inches	3 FPS	4% (	10-191	< 10	¥
EMBEODEDNESS 0 1/4	) 1/3	2/3		Fu11		
VALLEY BOTTOM TYPE		1		L_/.		
LAND FORM GRADIENT:			-30% >30%	100 ft.		
LIMITING FACTORS:1) La 4) low summer	ck of pool & fall flow	formation, ws.	2) low alk	alinities	, 3) a	quatic

ADDITIONAL OBSERVATIONS: Culvert may be barrier during spring flows.

\* = Estimates

LAND MARKS: Culvert on Rd. 338 above Slim Creek. INVESTIGATOR:

Item Rated	Stability Indicators by Classes									
TPER BANKS	EXCELLENT		GOOD		FAIR		POOR			
		122	Bank slope gradient 30-40%	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	10		
	No evidence of past or	to	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing			
Mass Wasting		(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong Of	2 h		
	wasting into channels.	-	future potential.		by water during high flows.	1	imminent danger of same	· ^		
	Essintially absent from	(2)	Present but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy amounts.	10		
(Floatable Objects)	immediate channel area.		twigs and limbs.		are both increasing.		predominantly larger sizes.	. 11		
	190% + plant density. Vigor	h	70-90% density. Fever plant		50-70% density, Lower viger		< 50% density plus fever	+		
·		(3)	species or lower vigor	(6)	and still fever species	(9)	species & less vigor indi-	h		
Vegetation	deep, dense root mass.	<b></b>	suggests a less dense or		form a somewhat shallow and	1	cate poor, discontinuous.	[ <sup>-</sup>		
		1_	deep root mass.	i	discontinuous root mass.		and shallow roct masa.			
LOWER BANKS		r		T						
	Ample for present plus some	1	Adequate. Overbank flows	I	Earely contains present		Insoequate. Overtark flows	1		
	increases. Peak flows cu	E	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	ie		
	tained. W/D ratio <7.	100	ratio 8-15.	-	floods. W/D tatic 15-25,	_		1.		
Eank Rock Content	65% + with large, angular boulders 12" + numerous.	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	<20% rock fragments cf	(8		
Lank KOCK Concent	Rocks, old logs firmly	+	boulders to cobble 6-12".		3-6" diameter class.		grovel sizes, 1-3" or less,			
1	embedded. Flow pattern	1	Some present, causing erosive cross currents and		Moderately frequent, moder-		Frequent obstructions and			
ODSTRUCTIONS		6		1	ately unstable obstructions		deflectors cause bank erc-			
	of pool & riffles stable without cutting or	2	minor pool filling. Obstruc-	(4)	& deflectors move with high	(6)	aion yearlong, Sed, trans	ia		
	deposition.	-	tions and deflectors newer and less firm.		water causing bank cutting		full, channel migration	1		
		+		-	and filling of pocla.		occuring.			
	Little or none evident. Infrequent raw banks less	tin	Some, intermittently at outcurves & constrictions.	100	Significant. Cuts 12"-24"		Almost continuous cuts.	-		
Cutting	than 6" high generally.	1.47	Raw banks may be up to 12".	(8)	high. Root mat overhangs	12)	some over 24" high. Fail-	f16		
	Little or no enlargement	+	Some new increas in bar		and sloughing evident.		ure of overhangs frequent,	1		
	of channel or point bars.	las	formation, most from	100	Moderate deposition of new gravel & coarse sand on		Extensive deposits of pre-	-		
Deposition	of chalmer of point bars.	3	coarse gravels.	(8)		(12)	dominately fine particles.	K.F		
BOTTCH		E	COALSE KLEVELS.		old and some new bara.		Accelerated bar development.	.1		
Rock Angularity	Sharp edges and corners,	101	Rounded corners & edges,	Var	Corners & edges well round-	101				
ROCK AUGULATICY	plane surfaces roughened.	1,	surfaces smooth & flat.	0	ed in two dimensions.	(3)	Well rounded in all dimen-	(4)		
Brightness		100	Mostly dull but may have	a		765	sions, surfaces smooth.			
	stained. Gen. not "bright".	1	up to 35% bright surfaces.	1	bright, ± 15%, ie 35-(5%.	(3)	Predominately bright, 65% **	14		
.onsolidation or	Assorted sizes tightly	100	Moderately packed with	0	UTISHC, ± 15%, 10 35-(5%.	-	exposed or scoured surfaces.			
	p.cked aud/or overlapping.	121	some everlapping.	I	Mostly # loose assortment with nc apparent overlap.	(6)	No packing evident. Loose	1 (8)		
		100		0			assortment, casily moved.	1		
	Stable materials 80-100%.	1.47	Stable materials 50-80%.	C.	Stable materials 20-56%.	12)	Marked distribution change.	1.6		
3 ·ercent coore materials	Less than 5% of the bottom	1-	5-30% aftected, Scour at		30-50% affected. Deposits	{	Statie unterials C-207.	1		
Scouring and	effected by scouring and	(6)	constrictions and where	2	à scour at obstructions.		More than 50% of the bottom			
Deposition	deposition.	1.00	grades steeper, Some	12	constrictions, and bends.	10.	in a state of flux or change	(24)		
Deposition	deposition.	1	deposition in pools.	1	Some filling of pools.	- 1	nearly yearlong.			
Clinging Aquatic	Abundant, Growth largely		Common. Algal forms in low	-	Bucker I LITTING OF BOOLS,	-+		-		
Vegetation	moss like, dark green, per-	10	velocity & pool sieas. Mosa	m	Present but spotty, mostly		Perennial types scarce or	-		
(Hoss & Algae)	fennial. In swift water too.	111	bere too and swifter waters.	9	al blooms make rocks slick.	(3)	absent. Vellow-green, short	(4)		
	COLUMN TOTALS	10	ivere coo alo svifter waters,	-	as bigone make rocks slick,	_	term bloom are be present.			
		19		38 I						

add the values in each column for a total reach score here. (E. 19 + C. 38+ F. + F. 57).

Reach score of:<38=Exellent, 39-76=Good, 77-114=Fair, 113+=Poor.

. 0

-	NUMBER & NA	ar: Ro	ick Creek	(Lower	)	STATIONS:		DATE: 9/5/79
STREAM		тн -		1	DEPTH		VELOCIT	
	Present	Full	Pres			Full 7.0	0.2 FS	5-10 CFS
Pool	25	65		.2		3.6	1 FS	
Riffle	25	60		.6		3.0	F.	5 0-10 013
Run		70		NT 10%				
TEMPERA	Wator	47	STARII	ITY RATIN	g 108	TURBIDI	Clear TY:Milky	
r POOI.(	1, 2 and 3)	30	% RIFF	LE	70	0% % RUN	Muddy % GLI	DE
						CLASS 3 _17_		
BDTTOM	MATERIALS:		/ery Abundar	t Abu	ndant	Common	Present	None
			(> 70%)	(41	to 70%)	(11 to 40%)	(< 10%)	0
Organic	Debris:					10		
Clay/Si						20		
Sand:						10		
-	avel (0.1 t	0 1");				10		
	Gravel (1 t					10		
	ubble (3 to					20		
	ubble (6 to					15		
	s (>12"):					10		
	:k:							X
	VEGETATION						X	
	M COVER: G		Fair	Poor	None			
(1n	er Types dicate rela portance A	tive >C > P	Logs Undercut Choppy Su	Banke	0	locks <u>C</u> Overhang	Water Col	lor <u>mottled</u> or <u></u> ion <u>P</u>
BANK CO	VER: Good	Fa	r Poor					
							ch, fir	
(Ind	r Plant Spe licate relat	ive	Unders tor	y Mostly	/ alden	r, willow		
imp	ortance: A	> c > i	) Surface	Grass,		, thi	mbleberr	у
FISH FO Foo (In	OD ORGANISM d Types: Ca dicate rela	S: ddisfli tive	25/ft <sup>2</sup>	) 16-25/ flies:	ft <sup>2</sup>	6-15/ft <sup>2</sup> Stoneflies:		/ft <sup>2</sup> pteraC
abu	indance A>C	>P) Sni	ils:Le	eches:		SIZE	: s (M)	L
SPAWNIN	G HABITAT:	Very G	bod	Good	Fair	$\sim$	Poor	None
Vel			6 3 etween 0.5 a etween 4 inc			1% 1	10-19%	< 10%
MBEDDE	DNESS 0		1/3		2/3		Full	
	BOTTOM TYPE	\$300		100-	300 ft.	< 10	/ 10 ft.	
LAND FD	RM GRADIENT			11-20%		30% >30%		
LIMITIN	G FACTORS:							

ADDITIONAL OBSERVATIONS: Pool dev. good in lower 600',

LAND MARKS: INVESTIGATOR: B.May T26N, R32W, S.2 \* = Estimates

Item Rated				AC.B.	tors by Classes			
TPTA LANKS	EXCELLENT	0	GOOD		FAIR		POOR	
andform Slope	Bank slope gradient 430%	(2)		(4)	Bank slope gradient 40-602	(6)	Bank slope gradient 60% +	1 (8
	to evidence of past or	6	Infrequent and/or very small.		Moderate frequency & size,		Frequent or large, causing	-
ass Masting	potentia. for future mass	(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	k12
	wasting into channels.	<u> </u>	future potential.		by water during high flows.		imminent danger of same	1
	Essintially absent from	(2)	Present but mostly small	(4)	Present, volume and size	463	Moderate to heavy amounts,	10
(Floatsble Objects)	immediate channel area.	1	twigs and limbs.	-	are both increasing.	(7)	predominantly larger sizes.	1
h Bratestich	90% + plant density. Vigor		70-90% density. Fewer plant		50-70% density. Lower viger	h	< 50% density plus fewer	1
· · · · ·	and variety suggests a	(3)	species or lower vigor	(6)	and still fever species	(9)	species & less vigor indi-	11:
Vegetation	deep, dense root mass.		suggests a less dense or	•	form a somewhat shallow and	$\sim$	cate poor, discontinuous,	1
	1	1	deep root mass.	·	discontinuous root mass.		and shallow roct mass.	
LOWER BANKS		r —		_				-
	Ample for present plus some	1	Adequate. Overbank flows		Barely contains present	0	inadequate. Overtart flows	T
Channel Capacity	increases. Peak flows c	(1)	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. V/D ratio >25.	10
	tained. W/D ratio < 7.	1	ratio 8-15.		floods, W/D ratic 15-25,	10		1
	65% + with large, angular	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	((6))	< 20% rock fragments cf	(8
Bank Rock Content	boulders 12" + numerous.	+	boulders to cobble 6-12".		3-6" diameter class.	10	grovel sizes, 1-3" or less.	1.
	Rocks, old logs firmly		Some present, causing		Moderately frequent, moder-		Frequent obstructions and	+
	embedded. Flow pattern	1	erosive cross currents and		ately unstable obstructions	0	deflectors cause bank erc-	1
	of pool & riffles stable	(2)	minor pool filling. Obstruc-	(4)	a deflectors move with high	((6))	sicn yearlong. Sed. traps	1 (8
Sediment Traps	without cutting or		tions and deflectors never		water causing bank cutting	9	full, channel migration	1
	deposition.		and less firm.		and filling of pocls.	-	occuring.	
	Little or none evident.	1	Some, intermittently at		Significant. Cuts 12"-24"		Almost continuous cuts,	+-
Cutting	Infrequent raw banks less	(4)	outcurves & constrictions.	(8)	high. Root mat overhangs	[12])	some over 24" high, Fail-	116
-	than 6" high generally.		Raw banks may be up to 12".	-	and sloughing evident,	$\sim$	ure of overhangs frequent	[
	Little or no enlargement		Some new increas in bar		Moderate deposition of new	(14)	Extensive deposits of pra-	-
Deposition	of channel or point bars.	(4)	formation, most from	(8)	gravel & coarse sand on	(12)	dominately fine particles.	K.F
	P	-	coarse gravels.	L	old and some new bars.		Accelerated bar development.	. · ·
BOTTOM		Las		The star				
Rock Angularity	Sharp edges and corners,	μω	Rounded corners & edges,	(2)	Corners & edges well round-	(3)	Well rounded in all dimen-	(4)
	plane surfaces roughened.	1	surfaces smooth & flat.		ed in two dimensions.	$\frown$	sions, surfaces smooth.	1
Brightness		R1)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	(3)	Predominately bright, 65% **.	14
	stained, Gen. not "bright".	+	up to 35% bright surfaces.		bright, ± 15%, ie 35-(5%.	-	exposed or scoured surfaces.	1
.onsolidation or	Assorted sizes tightly	(2)	Moderataly packed with	(4)	Mostly a loose assortment	(6)	No packing cyident, Loose	1 (8)
Particle Packing	p.cked subjor overlapping.	100	some cverlapping.		with nc apparant overlap.	2	assortment, easily moved	
Botton Size Distribution	No change in sizes evident.	1(4)	Distribution shift slight.	(3)	Sioderate change in sizes.	(12)9	Marked distripution change	1.6)
S Percent Stable Materials	Stable materials 80-100%.		Stable reterials 50-80%.		in able materials 20-50%.	$\sim$	Statle unterfals C+207.	1
	Less than 5% of the bottom	1	5-30% aftected. Scour at		30-50% affected. Deposits	- 1	More than 50% of the bottom	_
Scouring and	affected by scouring and	(6)	constrictions and where	(12)	& scour at obstructions,	(18.)	in a state of flux or change	(24)
Deposition	deposition.	i i	grades steeper. Some		constructions, and bends.	201	neerly yearlong,	
		+	deposition in pools.		Some filling of peels.	$\simeq$		
Clinging Aquatic	Abundant, Growth largely	1	Common. Algal forms in low		Present but spotty, mostly	$\neg$	Perchnial types scarce or	
Vegetation	moss like, dark green, per-	(1)	velocity & pool sieas. Moss	(2)	'n backwater areas. Season-	(3)	absent. Sellow-steen, short	63
(Moss & Algae)	[enniel. In swift water too,	1	bere too and swifter waters,	-	al blooms make rocks slick,	-	term bl.on ter be present.	
	COLUMN TOTALS	6		2		-		-

Add the values in each column for a total reach score here. (E. 5 + G. 2 + F. 10] + F. \_ = 108).

Reach score of:<38=Exellent, 39-76=Good, 77-114=Fair, .15=Poor.

TOF AM	WINDER & NAME :	Rock Creek		STATIONS: UP	pper	DATE: 9/ 5/79
- ALL ALL ALL ALL ALL ALL ALL ALL ALL AL	WIDTH	•	DEPTH	Full	VELOCITY	VOLUME
	Present Ful 15 2			4.5	1 FS	20 CFS
001		5 20		7.9	1	
n .		GRADIENT_	4%			
MPFRA	Air: TURE Water:			TURBID	Clear ITY:Milky Muddy	
P001. (	1, 2 and 3) 10	% RIFFLE	90 (Casca	aded) % RUN	% GL I	DE3
DOL CL	ASSES: % CLASS	1:% CLASS 2:	:;	CLASS 3 12	% CLAS	s 4. <u>88</u>
		Very Abundant			Present	None
o i i o i i		(> 70%)	(41 to 70%)	(11 to 40%)	(<10%)	0
manie	Debris:				5	
lay/Si					3	
	163			1	2	
and:	avel (0.1 to 1")				4	
	Gravel (1 to 3"):				6	
	ubble (3 to 6")				5	
	Contraction of the local division of the loc			15	1	
	ubble (6 to 12")		60%			
	s (>12"):				P	
	k:				P	
	VEGETATION: M COVER: Good	(Fair) Poor	r None		1	
(In im	er Types dicate relative portance A > C > WER: Good	P) Undercut Ban Choppy Surfa	ks <u>N</u> ce <u>A</u>	Rocks <u>A</u> one Overhan	Water Cold	lor <u>dark</u> or <u>clear</u> ion <u>P</u>
		Overstory C	edar. lar	ch, fir		
	r Plant Species:					
(Ind	icate relative ortance: A > C	Understory _	Aluer, do	gwood		L
		Surface un		bleberry, d		
(in	dicate relative				P01	/ft <sup>2</sup> pteraP
		Snails: Leech Good Goo			9	None
						< 10%
Vel	ocity Must be	50% 35-5 between 0.5 and between 4 inches	0% 20- 3 FPS and 3 feet	34%	10-19%	(104
		1/3	2/3		Full	
ALLEY	BOTTOM TYPE: 53	00 ft.	100-300 ft	/) 1-30x >30x	100 ft.	
	RM GRADIENT: <					
IMITIN	G FACTORS: (1)	Low alkalini	ties, pro	ductivity (	<li>2) pool d</li>	evelopment (3)

LIMITING FACTORS: (1) Low alkalinities, productivity (2) pool development (3) high gradient (4) lack of well defined riffles for <u>food</u> production. Cascades over boulders rather than riffles.

ADDITIONAL OBSERVATIONS: Lack of overstory, high gradient tumbling <u>mt</u>. stream with pockets - <u>rubble</u> habitat -s<u>terile</u> environment, low alkalinities.

LAND MARKS: 500' on either side of boundary 150A T26N R32W S.1 INVESTIGATOR: B.May

Item Rated			GOOD	Aca	tors by Classes	_	
TPPER BANKS	EXCELLENT	1/22			FAIR		POOR
andform Slope	Bank slope gradient \$30%	(2)	Bank slope gradient 30-40%	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +
	No evidence of past or		Infrequent and/or very small		Moderate frequency & size,	1	Frequent or large, causing
less Wasting	potentis. for future mass	(3)			with some raw spots eroded	(9)	sediment nearly yearlong OR
(Existing or Potentis1)	wasting into channels.	1	future potential.	0	by water during high flows.		imminent danger of same.
	Essintially absent from	(2)	Present but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy amounts,
(Flostable Objects)	immediate channel area.	L	twigs and limbs.	-	are both increasing.		predominantly larger sizes.
Sank Protection	907 + plant density. Vigor		70-90% density. Fewer plant	6	50-70% density. Lower viger	-	< 50% density plus forme
from	and variety suggests a	(3)	species or lower vigor	(6)	and still fewer species	(9)	species & less vigor indi-
Vegetation	deep, dense root mass.		suggests a less dense or		form a somewhat shallow and	1	cate poor, discontinuous,
regecteren		1	deep root mass.		discontinuous rest mass.	1	and shallow roct mass.
LOWER BANKS		-					did total rock mass.
×.	Ample for present plus some		Adequate. Overbank flows	5	Barely contains present	T	Inadequate, Overthin flows
Channel Cipacity	increases. Peak flows cu	(1)	rare. Width to Depth (W/D)	(2)	peaks, Occasional overbank	la	
	tained, W/D ratio <7.		ratio 8-15.	~	floods, W/D ratic 15-25.	1	1
	65% + with large, angular	(2)	40 to 65%, mostly smell	(4)	20 to 40% , with most in the	(6)	( 207
Eank Rock Content	boulders 12" + numerous.	1	boulders to cobble 6-12".		3-6" diameter class.	100	< 20% rock fragments cf grovel sizes, 1-3" or less.
	Rocks, old logs firmly	T	Some present, causing		Moderately frequent, moder-	1	Frequent obstructions and
Obstructions	embedded, Flow pattern	1_	erosive cross currents and		ately unstable obstructions	1	requent obstructions and
Flow Deflectors	of pool & riffles stable	1(2)	minor pool filling. Obstruc-	(4)	& deflectors move with bigh	100	deflectors cause bank erc-
Sediment Traps	without cutting or	10	tions and deflectors newer	1	water causing bank cutting	1(0)	sion yearlong. Sed. traps
Seciment Traps	deposition.		and less firm.		and filling of pocla.		full, channel migration occuring,
	Little or none evident.	5	Some, intermittently at		Significant. Cuts 12"-24"	1	occuring.
Cutting	Infrequent rew banks less	Sas	outcurves & constrictions.	(2)	high. Root mat overhances	1.00	Almost continuous cuts,
Gutting	than 6" high generally.	13	Raw banks may be up to 12".	1.00	and sloughing evident.	122	some over 24" high. Fail-
	Little or no enlargement	tr.	Some new increas in bar		Moderate deposition of new		ure of overhangs frequent.
Deposition	of channel or point bars.		formation, most from	100	gravel & coarse sand on		Extensive deposits of pre-
Deposition	for chaldner or porne burst	100	coarse gravels.	(0)	fold and some new bars.	(12)	dominately fine particles. (
BOTTOM		-	Confee Statess		tord and sche new bars.	L	Accelerated bar development.
Rock Angularity	Sherp edges and corners,	1(1)	Rounded corners & edges.	1(2)	Corners & edges well round-	(2)	
ROCK Augulaticy	plane surfaces roughened.	1.	surfaces smooth & flat.	10	ed in two dimensions.	(3)	Well rounded in sll dimen- (
Brightness	Surfaces dull, darkened, or	1/13	Mostly dull but may have	125	Mixture, 50-507 dull and	785	sions, surfaces smooth.
or furness	stained. Gen. not "bright".	1	up to 35% bright surfaces.	6	shikture, 30-30% dell and	(3)	Predominately bright, 65" +, (
consolidation or	Assorted sizes tightly	(2)	Moderately packed with	1	bright, ± 15%, ie 35-(5%, Mostly # loose assortment		exposed or scoured surfaces
Particle Packing	pucked aud/or overlapping.	1(2)	some cverlapping.	3	mostly a loose assortment	(6)	No packing evident. Loose 1(
Button Size Distribution	No change is sizes evident.	tax	Distribution shift slight.	277	with ne apparent overlag.		assortment, easily moved
	Stable materials 80-100%.	1442		1 Since	inderate change in sizes.	(12)]	Marked districution change. In
s vercent scable instellars	Less than 5% of the bottom		Stable Selerials 50-804.	6		8	Statis Daterials C+207
Annual and	affected by scouring and	100	5-30% aftected. Scour at		30-50% affected. Deposits		More than 50% of the hottom
		100	constrictions and where	140	S scour at obstructions,	(18)	in a state of flux or change /2/
Deposition	deposition.	i i	grades steeper. Some	R	constrictions, and bends.	- 1	neerly yearlong,
			deposition in pools,	22	constrictions, and bends. Some filling of peels. Present but spotty, mostly		
Clinging Aquatic	Abundant. Growth largely	I				1	Perennis1 types scarce or
Vegetation	moss like, dark green, per-	(d)	velocity & pool areas. Mosa	(2)	in backunter areas. Season-	(3)	ebsent. Vellow-green, short (4
(toss & Algae)	[cnnis], In swift water too,	J	here too and swifter waters,	-	al blooms make rocks slick.		term blion as" be present.
	COLUMN TOTALS	14		10			De present, I

add the values in each column for a total reach score here. (E. 14 + G. 42 + F. + F. 56).

Reach score cf:<38=Exellent, 39-76=Good; 77-114=Fair, 115==Poor.

. 0

STREAM NUMBER & NAME:_	Big Creek		STATIONS :		DATE: 8/30/79
WIDTH		OEPTH		VELOCITY	
	ull Present		Full	1	
	2.0		6.0	0.2-0.	
Riffle 25 E	0.8'		5.0'	1-2 FS	20 CFS
Run		;			
Air: 70 <sup>0</sup>	GRADIENT_			(Clear)	
ILMPFRATURE Water: 570	F STABILITY	RATING 96 F	air TURBID	ITY: NI IKY	
z POOL(1, 2 and 3) 15	S % RIFFLE	60	# RUN	Huddy GLI	DE_25
POOL CLASSES: % CLASS					
BOTTOM MATERIALS:	Very Abundant	Abundant	Common	Present	None
			(11 to 40%)	(<10%)	0
Organic Oebris:				5	
Clay/Silt:				5	
Sand:				5	
Fine Gravel (0.1 to 1"	1.			1	
Coarse Gravel (1 to 3"			10		
Small Rubble (3 to 6")			20		
Large Rubble (6 to 12"			30		
Boulders (>12"):	/.		30		
Bed Rock:				1%	
AQUATIC VEGETATION:			1	10%	
INSTREAM COVER: Good	(Fair) Poor	None		1	
Cover Types	Logs P		Rocks A	Bottom Co	lor mottled
(Indicate relative	Undowgut Bank		-	Water Cole	
importance A > C	<ul> <li>P) Choppy Surface</li> </ul>		Overhang		
	Choppy Surrat	e /	over nany	sing vegetat	
BANK COVER: Good	(Fair) Poor	None			
	Overstory Co	edar, spru	uce, fir, l	arch	
Major Plant Species			rch, mtn. m		
<pre>(Indicate relative importance: A &gt; C</pre>				apre	
	Surface	Grass, th	imbleberry		
FISH FOOD ORGANISMS:	(25/ft <sup>2</sup> ) 1	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	1-5	/ft <sup>2</sup>
Food Types: Caddis	flies A Mayflie	es: C	Stoneflies:	C 01	ptera C
	Snails:Leeche			: (S.) M	L
			-	~	
SPAWNING HABITAT: Ver	y Good Good	s Fai	r (	Poor	None
		20-3	4%	10-19%	< 10%
	e between 0.5 and 3 be between 4 inches				
EMBEDOEONESS O	1/3	2/3		Full	
VALLEY BOTTOM TYPE:	.13 /		0	1 /	
2	300 ft.	-100-300 ft.	<10	00 ft.	
LAND FORM GRADIENT: <	5% 5-10% 1	11-20% 21	-30% >30%		
LIMITING FACTORS: ])	Low alkalinit	ies 2) hi	gh spring f	lows, low	summer flows

lack of pool formation 4) lack of bank cover (brush and undercuts).

ADDITIONAL DBSERNATIONS: Bank has lack of understory and ground cover. High scouring spring flows and bedioad movement limitprimary production. Section has good rearing habitat, but not many niches for fish over 7.0°.

LAND MARKS: 1.2 miles above Steep Creek Road - 1000' section INVESTIGATOR: B. May \*= Estimates

Item Rated	EXCELLENT			ators by Classes				
TPER BANKS		0	GOOD		FAIR		POOR	
Landform Slope	Bank slope gradient 430%	(2)	Bank slope gradient 30-407	(4)	Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	1 (8
	No evidence of past or	1.	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	_
Mass Masting	potentie. for future mass	(3)	Mostly healed over. Low	((6)	with some raw spots eroded	(9)	sediment nearly yearlong OF	
(Existing or Potentisl)	wasting into channels,	1	future potential.	5	by water during high flows.	1	imminent danger of same	·
Debris Jom Potential	Essintially absent from	(2)	Present but mostly small	(4)	Present, volume and size	(6)	Moderate to heavy amounts,	10
(Floatable Objects)	immediate channel area.	-	twigs and limbs.	$\sim$	are both increasing.		predominantly larger sizes.	1.4
Sank Protection	99% + plant density. Vigor		70-90% density. Fever plant		50-70% density. Lower viger	-	< 50% density plus fewer	
from	and variety suggests a	(3)	species or lower vigor	(6)	and still fewer species	(9)	species & less viger indi-	112
Vegetation	deep, dense root mass.	1	suggests a less dense or		form a somewhat shallow and	1	cate poor, discontinuous.	11.
		1	deep root mass.	L	discontinuous rest mass.		and shallow roct mass.	
LOWER EANKS							indiana inter mass.	- <b>i</b> -
	Ample for present plus some		Adequate. Overbank flows	6	Barely contains present	-	Inadequate. Overtack flows	
Channel Capacity	increases. Peak flows cc.	(1)	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	1
1	tained. W/D ratio <7.	1	ratio 8-15.	12	floods, W/D ratic 15-25.			1 (4
	65% + with large, angular	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	6 207 mark farmers	+
Bank Rock Content	boulders 12" + numerous.		boulders to cobble 6-12".	~	pro dismeter class.		gravel sizes, 1-3" or less.	(8
	Rocks, old logs firmly		Some present, causing		Moderately frequent, moders		Prequent obstructions and	
Obstructions	embedded. Flow pattern	5	erosive cross currents and		ately unstable obstructions		deflectors cause bank erc-	1
Flow Deflectors	of pool & riffles stable	(2)	minor pool filling. Obstruc-	(4)	6 deflectors move with high	(6)	sicn yearlong, Sed, traps	1
Sediment Traps	without cutting or	~	tions and deflectors never		water causing bank cutting	(0)	full, channel migration	(8
bedeater - rep-	deposition.		and less firm.		and filling of pocls.		occuring.	
	Little or none evident.	1	Some, intermittently at	-	Significant. Cuts 12"-24"	-	Almost continuous cuts,	-
Cutting	Infrequent raw banks less	(4)	outcurves & constrictions.	(8)		121	some over 24" high. Fail-	1
-	than 6" high generally.		Raw banks may be up to 12".	-	and sloughing evident.		ure of overhangs frequent.	£16
	Little or no enlargement		Some new increas in bar		Moderate deposition of new		Extensive deposits of pre-	-
Deposition	of channel or point bars.	(4)	formation, most from	(8)		62	deministry deposits of pre-	1
	· ·		coarse gravels.		old and some new bars.	9	dominately fine particles.	(LF)
BOTTOM							Accelerated bar development.	.i
Rock Angularity	Sharp edges and corners,	(1)	Rounded corners & edges,	(2)	Corners & edges well round- (	(3)	Vall months is a	-
	plane surfaces roughened.	1	surfaces smooth & flat.	1.1	ed in two dimensions.	9	well rounded in all dimen-	(4)
Brightness	Surfaces dull, darkened, or	(1)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	201	sions, surfaces smooth. Predominately bright, 65% *,	1
	stained, Gen, not "bright".	1.	up to 35% bright surfaces.	(-/	bright, ± 15%, ie 35-(5%,	9	rredominately bright, 65% *,	(4)
Lonsolidation or	Assorted sizes tightly	(2)	Moderately packed with	14.5				1
Particle Packing	pucked aud/or overlapping.		some cverlapping.	1 41	with ne apparent overlag.	(0)	No packing cvident. Loose	(8)
Button Size Distribution	No change in sizes evident.	(4)	Distribution shift slight.	10			assortment, easily moved.	i i
S Percent Stable Materials		1.1	Stable materials 50-80%.	107		$\times$	Marked distribution change.	1.6)
	Less than 5% of the bottom	-	5-30% aftected. Scour at		30-50% affected. Deposits	412	HELE LALET als C-707.	Ι.
Scouring and	affected by scouring and	(6)	constrictions and where	1221	& scour at obstructions.	-	More than 50% of the bottom	
Deposition	deposition.		grades steeper. Some			18.	in a state of flux or change	(24)
		1	deposition in pools,	1	Some filling of pools.	-1	nerily yearlong.	1
Clinging Aquatic	Abundant. Growth largely	-	Common. Algal forms in low		Present but spotty, mostly	-1		
	moss like, dark green, per-	a		a	in the out spotty, mostly	1	Peronnial types scarce or	
	fennial. In swift water too.	11	bere too and swifter waters,	(2)	in backunter areas. Season-	(3)	ebsent, Tellow-green, start	(4)
	COLUMN TOTALS	-	there coo and swifter waters,	-	al blooms make rocks slick,	-1	term bl.on nen be present.	
	COLUMN IUIALS	4	2	4		01	and the second se	1000

Add the values in each column for a total reach score here. (E. 4 + G. 24 + F. 68 + F. 96).

Reach score cf:<38=Exellent, 39-76=Good, 77-114=Fair, .15==Poor.

STREAM NUMBER & NAME:	Callahan Cree	k	STATIONS: T31	N R34W S2	0_ DATE: 8/17/7
WIDTH		DEPTH		VELOCITY	
Present Ful	1 Present		Full	1	
Pool 25' 21	0' 5"		51	2.5	25 CFS
kitrie	<u>,,, ,</u>		<u> </u>		20 010
Air: 75	GRADIENT	1-2%			
ILMPFRATURE Water: 55 <sup>0</sup>			TURBIDI	Clear TY:Milky	
z POOL(1, 2 and 3) _20				Muddy	DE
POOL CLASSES: % CLASS					
	Very Abundant			Present	None
BOTTOM MATERIALS:			(11 to 40%)		0
	(270%)	(41 10 70%)	111 10 40.01	X X	
Organic Debris:	+			x	
Clay/Silt:				1 x	
Sand:				X	
Fine Gravel (0.1 to 1")			X		
Coarse Gravel (1 to 3")		x	X		
Small Rubble (3 to 6")		X			
Large Rubble (6 to 12")		^	X		
Boulders (>12"):				X	
Bed Rock:				X	· · · · · · · · · · · · · · · · · · ·
AQUATIC VEGETATION:		L			
INSTREAM COVER: Good	(Fair) Poo		Rocks A	D	lor C
Cover Types (Indicate relative	Logs		COCKS /		
importance A > C >	P) Undercut Ban	····		Water Cold	
	Choppy Surfa	ce	Overhang	ing Vegetati	ion
BANK COVER: Good	air) Poor	None			
	Guarritory CC	ottonwoods	, cedar, sp	ruce, D	fir
Major Plant Species:					
(Indicate relative importance: A > C )			birch, mtn		
importance. H / C /	Surface	Thimbleber	ry, grass,	equisitur	n
FISH FOOD ORGANISMS: Food Types: Caddisf	>25/5+2 (	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	1-5/	/ft <sup>2</sup>
Food Types: Caddisf	ies P Mayfli	es: A	Stoneflies:	P Dip	otera
(Indicate relative abundance A>C>P) !				-	L
				$\sim$	
SPAWNING HABITAT: Very	Good Goo	d Fain		Poor	None
Velocity Must be	50% 35-5 between 0.5 and between 4 inches	3 FPS	1% 1	10-19%	< 10%
MBEDDEDNESS (0)	1/3	2/3		Full	
VALLEY BOTTOM TYPE		\ /			
AND FORM GRADIENT:	10 ft. x 5-10%	100-300 ft. 11-20% 21-	30% >30%	00 ft.	
INITING FACTORS 1) H	igh spring s	couring fl	ows and low	summer a	and fall flows.

LIMITING FACTORS: 1) High spring scouring flows and low summer and fall flows. 2) Lack of pool development. 3) Low alkalinities and low insect production.

ADDITIONAL OBSERVATIONS: Unstable channel that carries much bedload during runoff. Channel braided with numerous high water channels.

LAND MARKS: INVESTIGATOR: B. May

Item Rated			ors by Classes					
TPER BANKS	EXCELLENT	$\sim$	GOOD		FAIR		POOR	
Slope .		(2)	Bank slope gradient 30-40%		Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	T
	to evidence of past or	1	Infrequent and/or very small		Moderate frequency & size,	1	Frequent or large, causing	_
ass Wasting	potentia, for future mass	(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	h
	wasting into channels,		future potential.		by water during high flows.	ł.	imminent danger of same	1
	Essintially absent from	(2)	Present but mostly small		Present, volume and size	(6)	Moderate to heavy amounts,	-
(Floatsble Objects)	immediate channel area.	1	twigs and limbs.	(7)	are both increasing.		predominantly larger sizes.	$\Gamma$
h Bratastion	90% + plant density. Vigor	1	70-90% density. Fewer plant	0	50-70% density. Lower viger		< 50% density plus fever	+
6	and variety suggests a	(3)	species or lower vigor	((6))	and still fewer species	(9)	species & less vigor indi-	h
Vegetation	deep, dense root mass.	1	suggests a less dense or	1	form a somewhat shallow and		cate poor, discontinuous,	1.
VegetBLLOW		1	deep root mass.		discontinuous root mass.		and shallow roct masa.	
LOWER BANKS	8						for man.	_
	Ample for present plus some	T	Adequate, Overbank flows	1	Barely contains present	-	Inadequate. Overtary flows	-
Channel Capacity	increases. Peak flow? c.	(1)	Tare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	:0
Guannes depeters	itained. W/D ratio <7.		ratio 8-15,	1	floods. W/D ratic 15-25.			ile
	1657 + with large, angular	(62)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	C 20% rock fungerants	10
Eank Rock Content	boulders 12" + numerous.	(3)	boulders to cobble 6-12".	1.	3-6" diametar class,		grovel sizes, 1-2" or less.	10
	Rocks, old logs firmly	T	Some present, causing		Moderately frequent, moder-		Frequent obstructions and	+-
	embedded. Flow pattern		erosive cross currents and	1	ately unstable obstructions		deflectors cause bank erc-	1
Obstructions	of pool & riffles stable	(2)	minor pool filling. Obstruc-	100	& deflectors move with high	165	sich yearlong, Sed, traps	1
Flog Dellecrors	without cutting or	1	tions and deflectors never	0	water causing bank cutting	(0)	sich yearlong. Sed. traps	10
Sediment Traps	deposition.		and less firm.		and filling of pocls.		full, channel migration occuring.	1
	Little or none evident.	1-	Some, futermittently at	-	Significant, Cuts 12"-24"		loccuring,	
	Infrequent ray banks less	as	outcurves & constrictions.	(8)	bigh. Root mat overhangs	1 2 2	Almost continuous cuts,	1
Cutting	than 6" high generally.	177	Raw banks may be up to 12".	100	and sloughing evident.	127	some over 24" high. Fail-	£16
	Little or no enlargement		Some new increas in bar		Moderate deposition of new		ure of overhangs frequent,	1
	of channel or point bars.	100	formation, most from	100		100	Extensive deposits of pre-	
Deposition	of champer of point bars.	1.47	coarse gravels.	100	old and some new bars.	2	dominately fine particles.	Kat
BOTTOM	1 1	1	coarse grave.s.	J	old and some new pars.	194	Accelerated bar development.	
	Sharp edges and corners,	1/1	Rounded corners & edges,	Tax	Corners & edges well round-	74.1		
Rock Angularity	plane surfaces roughened.	111	surfaces smooth & flat.	100	ed in two dimensions.	(3)	Well rounded in all dimen-	(4
		1/15	Mostly dull but may have	755	ed in two dimensions.	9	sions, surfaces smooth.	1
Brightness	stained. Gen. not "bright".	la b	up to 35% bright surfaces.	(2)	Mixture, 50-50% dull and	Q)	Predominately bright, 65% ***	14
	Assorted sizes tightly	(2)	Moderately packed with	1	bright, ± 15%, ie 35-(5%.		exposed or scoured surfaces.	1.
.onsolidation or		1(2)		19	Mostly # lcose assortment	(6)	No packing evident, Loose	1 (8
Particle Packing	ipcked aud/or overlapping.	100	some cverlapping.	200	with ne apparent overlap.		assortment, easily moved.	1
Bottom Size Distribution	No change in sizes evident.	1(4)	Distribution shift slight.	15	Moderate change in sizes.	22)	Marked distribution change.	1.6
S Percent Stable Materials	Stable materials 80-100%.		Stable asterials 50-80%.	EV	able naterials 20-50%.		Statie Laterials C-207.	Ē
	Less than 5% of the bottom	1	5-30% aftected. Scour at	L	30-50% affected. Deposits	8	More than 50% of the hotton	-
Scouring and	affected by scouring and	(6)	constrictions and where	(12)	& scour at obstructions,	18.1	in a state of flux or choose	124
Deposition	deposition.	i i	grades steeper. Some		constrictions, and bends.	20)	neerly yearlong.	1
		+	deposition in pools.		Foune in Ling of poels.	$\sim$		1
Clinging Aquatic	Abundant, Growth largely		Common. Algal forms in low		Present but spotty, mostly	-1	Peronnial types scarce or	_
Vegetation	moss like, dark green, per-	(1)	velocity & pool mieas, Muss	(2)	in backunter areas. Season-	(3)	ebsent, Vellow-green, short	(4)
(toss & Algae)	Connial, In swift water too,	1	here too and swifter waters.		al blooms make rocks slick.	9	term bluon tan be present.	
	COLUMN TOTALS		1			COLUMN A	ve present, i	-

Add the values in each column for a total reach score here. (E. 5 + C. 44 + F. 40 + F. 4 = 93).

Reach score cf:<38=Exellent, 39-76=Good, 77-114=Fair, 115+=Poor.

			h Fork Cal	DEPTH		VELOC1TY	
	WID1 Present	Full	Present	02PTH	Full		
001	10'	100'	16"		6'	1.0	
iffle	15	100'	6"		5'	2.0	10 CFS
un							
	Air:	60 <sup>0</sup>	GRAD1ENT_			Clear	
LMPERA	TURE Water:	50	STABILITY	RATING Fain	TURBIDI	TY:MIIky	
				85	\$ RUN	Muddy	nr 10
	1, 2 and 3)						
OOL CL	ASSES: % C	LASS 1:	% CLASS 2:	· %	CLASS 3 8	% CLA	55 4: 92
OTTOM	MATER1ALS :	Ve	y Abundant		Common	Present	None
			> 70%)	(41 to 70%)	(11 to 40%)		0
rganic	: Debris:					<u>X</u>	
lay/Si	lt:					X	
and:						<u>^</u>	
*****	avel (0.1 t						
	Gravel (1 t			<u>x</u>	Χ		
	Rubble (3 to			ŷ			
	Rubble (6 to			X			
	∙s (>12"):			Χ			X
	:k:						1 x
	VEGETATION	and the second s				1	
	M COVER: G	00d -			A		
	ver Types idicate rela	tive	Logs		ocks <u>A</u> ne	Bottom Co	or clear
in	portance A	> C > P)	Undercut Banl				ion None
		$\sim$	Choppy Surrad	ceP	Overnang	jing vegetat	Ion None
	WER: Good	Fair	) Poor	None			
ANK CO			Overstory	Spruce, fi	r, cedar		
ANK CC							
Majo	or Plant Spe			Alder			
Majo (Ind	or Plant Spe licate relat portance: A	ive	Understory _		whichoway		
Majo (Ind	licate relat	ive	Understory	Grass, thi			
Majo (Ind imp	Dontance: A	ive >C>P) S:	Understory	Grass, thi 16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup> )	1-5,	/ft <sup>2</sup>
Majo (Ind imp ISH FC Foo	dicate relat portance: A DOD ORGANISM od Types: Ca	ive > C > P) S: ddisflies	Understory	Grass, thi	6-15/ft <sup>2</sup> )	1-5 P01	/ft <sup>2</sup> pteraP
Majo (Ind imp ISH FC Foo (Ir	dicate relat portance: A DOD ORGANISM od Types: Ca dicate rela	ive > C > P) S: ddisflies tive	Understory	Grass, thi 16-25/ft <sup>2</sup> ( es:C	6-15/ft <sup>2</sup> Stoneflies:	P 01	ptera <u>P</u>
Majo (Ind imp ISH FC Foo (Ir abu	dicate relat portance: A DOD ORGANISM od Types: Ca dicate rela	ive > C > P) S: ddisflies tive >P) Snai	Understory Surface >25/ft <sup>2</sup> PMayflin s: Leeche	Grass, thi 16-25/ft <sup>2</sup> ( es:	6-15/ft <sup>2</sup> Stoneflies:	PD1	ptera <u>P</u>
Majc (Ind imp ISH FC Foc (Ir abu PAWNIN	dicate relat cortance: A DOD ORGANISM od Types: Ca indicate rela undance A >C AG HABITAT:	ive > C > P) S: ddisflies tive >P) Snai Very Goo	Understory	Grass, thi 16-25/ft <sup>2</sup> ( es: es: d Fair	6-15/ft <sup>2</sup> ) Stoneflies: SIZE	P D1	Detera <u>P</u>
Majc (Ind imp ISH FC Foc (Ir abu PAWNIN 2 G Vel	ficate relat portance: A DOD ORGANISM Dd Types: Ca Idicate rela Indance A >C G HABITAT: Gravel Jocity Mu	ive > C > P) S: ddisflies tive > P) Snai Very Goo > 50% st be bet	Understory	Grass, thi 16-25/ft <sup>2</sup> es: d Fair 0% 20-34 3 FPS	6-15/ft <sup>2</sup> ) Stoneflies: SIZE	P 01	ptera <u>P</u>
Majo (Ind imp ISH FC Foc (Ir abu PAWNIN 2 G Vel Dep	ficate relat portance: A DOD ORGAHISM d Types: Ca didicate rela indance A ≥C G HABITAT: Gravel locity Mu oth Mu	ive > C > P) S: ddisflies tive > P) Snai Very Goo > 50% st be beth st be beth	Understory	Grass, thi 16-25/ft <sup>2</sup> es: d Fair 0% 20-34 3 FPS and 3 feet	6-15/ft <sup>2</sup> ) Stoneflies: SIZE	P D1 :: S M ( Poor) [0]19%	Detera <u>P</u>
Majo (Ind imp ISH FC Foo (Ir abu PAWNIN 2 G Vel Dep MBEDDE	ficate relat portance: A DOD ORGAHISM d Types: Ca dicate rela undance A ≥C IG HABITAT: Gravel locity Mu th Mu DNESS ①	ive > C > P) s: ddisflies tive > P) Snai Very Goo > 50% st be beth st be beth	Understory	Grass, thi 16-25/ft <sup>2</sup> es: d Fair 0% 20-34 3 FPS	6-15/ft <sup>2</sup> ) Stoneflies: SIZE	P D1	Detera <u>P</u>
Majo (Ind imp ISH FC Foo (Ir abu PAWNIN 2 G Vel Dep MBEDDE	ficate relat portance: A DOD ORGAHISM d Types: Ca didicate rela indance A ≥C G HABITAT: Gravel locity Mu oth Mu	ive > C > P) s: ddisflies tive > P) Snai Very Goo > 50% st be beth st be beth	Understory	Grass, thi 16-25/ft <sup>2</sup> es: d Fair 0% 20-34 3 FPS and 3 feet	6-15/ft <sup>2</sup> ) Stoneflies: SIZE	P 01 : S M ( Poor 0 19% Full	ptera <u>P</u> D None

i

LIMITING FACTORS: 1) Lack of pool development, 2) High scouring spring flows and low summer & fall flows. Low alkalinities and poor insect production.

\* = Estimates

ADDITIONAL OBSERVATIONS:

LAND MARKS: Bridge over stream. Road to Goat Creek. INVESTIGATOR: B.May

Item Rated				ors by Classes				
TPER BANKS	EXCELLENT	(C)	GOOD		FAIR		POOR	
andform Slope	Bark slope gradient <30%	1(2)	Bank slope gradient 30-407.	(4)	Bank slope gradient 40-602	(6)	Bank slope gradient 602 +	1 (8
	to evidence of past or	5	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	
ass Vasting		ദ്രാ	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment cearly yearlong OR	1 12
	wasting into channels,	F	future potential.		by water during high flows.	1.1	imminent danger of same	
	Essintially absent from	(2)	Present but mostly small	((4))	Present, volume and size	(6)	Moderate to heavy amounts.	(8
(Floetshie Objects)	imediate channel area.		twigs and limbs.	-	are both increasing.		predominantly larger sizes.	1.
1 Presention	90% + plant density. Vigor		70-90% density. Fewer plant		50-70% density. Lower viger	<b></b>	< 50% density plus fewer	-+
6-m	and variety suggests a	1033	species or lower vigor	(6)	and still fewer species	(9)	species & less vigor indi-	k12
Vegetation	deep, dense root mass.	m	suggests a less dense or		form a somewhat shallow and		cate poor, discontinuoua,	1
i cacionali i canto de la calendaria de la c		5	deep root mass.	_	discontinuous reat mass.		and shallow roct mass.	
LOWER BANKS		-					1000 1000	H
· · ·	Ample for present plus some		Adequate, Overbank flows		Barely contains present	6	Inadequate, Overtack flows	
Channe: Capscity	increaser. Peak flows c	(1)	rare, Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D rstio >25.	1
	tained, W/D ratio <7.		ratio 8-15.		floods. W/D ratic 15-25.	-		1 (4
	657 + with large, angular	((2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	<20% rock fregments of	+
Bank Rock Content	boulders 12" + numerous.	M	boulders to cobble 6-12".		3-6" diametar class.	1	grovel sizes, 1-3" or less.	(8
	Rocks, old logs firmly	T	Some present, causing	-	Moderately frequent, moder-		Prequent obstructions and	
	embedded. Flow pattern	1	erosive cross currents and	0	ately unstable obstructions		deflectors cause bank erc-	1
Play Deflectors	of pool & riffles stable	(2)	minor pool filling, Obstruc-	(4)	& deflectors move with high	(6)	sion yearlong, Sed, traps	1
Sediment Trapa	without cutting or	1	tions and deflectors newer	0	water causing bank cutting	1.00	full, channel migration	(8
beautient staff	deposition.	1	and less firm.		and filling of pocls.	1	occuring.	1
	Little or none evident.	1	Some, intermittently at	-	Significant. Cuts 12"-24"		Almost continuous cuta,	
	Infrequent raw banks less	(4)	outcurves & constrictions.	(8)	high, Root mat overhangs	121	some over 24" high. Fail-	İ
	than 6" high generally.		Raw banks may be up to 12".	0	and sloughing evident.		ure of overhangs frequent.	\$16
	Little or no enlargement	T	Some new increas in bar		Moderate deposition of new	-	Extensive deposits of pre-	·
Deposition	of channel or point bars.	(4)	formation, most from	(8)		121	dominately fine particles.	1
			coarse gravels.	1	old and some new bars.	-	Accelerated bar development.	K.F)
BOTTOM				-		-	Accelerated bar development.	.i
Rock Angularity	Sharp edges and corners,	(1)	Rounded corners & edges.	(2)	Corners & edges well round-	(3)	Well rounded in all dimen-	1
	plane surfaces roughened.	1	surfaces smooth & flat.	p	ed in two dimensions.	- 1	sions, surfaces smooth.	(4)
Brightness	Surfaces dull, darkened, or	(1)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	3	Prodominaces smooth.	<u> </u>
	stained. Gen. not "bright".	1	up to 35% bright surfaces.		bright, # 15%, ie 35-(5%,	5	Predominately bright, 65% +,	(4)
Lonsolidation or	Assorted sizes tightly	(2)	Moderately packed with	163	Mostly a loose assortment	763	exposed or scoured surfaces. No packing cvident, Loose	
Particle Packing	packed and/or overlapping.	1.	some overlapping.	~	with ne apparent overlap.	(0)	ne packing cyldent, Loose	(8)
Bution Size Distribution	No change in sizes evident.	(4)	Distribution shift slight.	12		33	assortment, easily moved.	i
S Percent Stable Materials	Stable materials 80-100%.	1	Stable materials 50-80%.		Stable materials 20-50%.	2	Marked distribution change.	(.6)
	Less than 5% of the bottom		5-30% affected, Scour at		30-50% affected. Deposits		Statle unterials C-207.	L
Scouring and	affected by scouring and	(6)	constrictions and where	121	S scour at obstructions.	100	More than 50% of the bottom	
Deposition	deposition.	1	grades steeper. Some	/	constrictions, and bends.	-01	in a state of flux or change	(24)
	1		deposition in pools,		Some filling of poels.		neerly yearlong.	
Clinging Aquatic	Abundant, Growth largely	1	Common. Algal forms in low	-	Present but spotty, mostly			
Vegetation	moss like, dark green, per-	a	velocity & pool areas. Moss	(2)		1	Peronnial types scarce or	
(toss & Algae)	ennish. In swift water too.	1.1	here too and swifter waters,	(2)	al blooms make rocks slick.	1	etsent. Vellow-green, short	(4)
	COLUMN TOTALS	11	FUELE LOC BIG SWITTER WITERS,	22	as erome make rocks slick,	_	terr blon as be present.	
						1 1		

Add the values in each column for a total reach score here. (E. 11 + G. 22 + F. 51 + F. 4 = 88 ).

Reach score of:<38=Exellent, 39-76=Good, 77-114=Fair, .15=Poor.

CTOCAN NUM	ACD & NAME . SI	unday (Lower	)	STATIONS:		DATE: 8/29/79
STREAM MUM	WIOTH .	and teoner	OEPTH		VELOCITY	
P	resent Full			Full		- 00.05.055
Pool	25 30	3.0'		5.0'	0.2 F	
Riffle	25 32	0.8'		2.5'	<u>1 FS</u>	20_CFS
Run			14			
U MPERATUR	Air:	GRADIENT_			Clear	
TURFERRIUS	Water:	STABILITY	RATING 63	TURBIDI	TY:MITky Muddy	
		% RIFFLE			x GL IC	
POOL CLASS	ES: % CLASS 1:	45 % CLASS 2	<u>19</u> *	CLASS 3 27	% CLAS	s 4: <u>9</u>
BOTTOM MAT	ERIALS:	Very Abundant	Abundant	Common	Present	None
		(> 70%)	(41 to 70%)	(11 to 40%)	(< 10%)	0
Organic Oe	bris:		X			
Clay/Silt:			Х		E	
Sand:			Х			
Fine Grave	1 (0.1 to 1"):			X		
Coarse Gra	vel (1 to 3"):			X		
Small Rubb	le (3 to 6") :			X		
Large Rubb	le (6 to 12"):				X	
Boulders (	>12"):				X	
Bed Rock:						X
AQUATIC VE	GETATION:	X	L	L		
INSTREAM C	OVER: Good	Fair Poor				
Cover	Types	Logs A	I	Rocks P		or tan (marl)
(Indic	ate relative tance A > C > P	) Undercut Ban				or <u>clear</u>
Inpor		Choppy Surfa	ceP	Overhang	ging Vegetati	ionA
BANK COVER	: Good (Fa	Ir) Poor	None			
	_	Ovensterv	Fir. larch	, cedar, s	oruce	
Major P	lant Species:					
(Indica	te relative	Understory _	Alder, dog	wood, birc		
import	ance. A/C/	Surface	Sedges, th	imbleberry	, snowber	ry, birchberry
	ORGANISMS:	>25/ft <sup>2</sup>	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	1-5	/ft <sup>2</sup>
Food T	ypes: Caddisfli	es_C_ Mayfli	es: C	Stoneflies:	C D1	ptera P
(Indio	ate relative	ails: Leech			s m	L
	ABITAT: Very 0		d Fai	- (	Poor	None
% Grav Veloci Depth	ity Mustbelt	35-5 between 0.5 and between 4 inches	D% 20-3 3 FPS and 3 feet	4%	10-19%	<10%
EMBEDDEDNE		1/3	2/3	(7/8)	Full	
VALLEY BOT	TOM TYPE:		100 000 0		DO ft.	
LAND FORM	GRADIENT: 300	5-10%	100-300 ft. 11-20% 21	-30% >30%	JU IT.	
LIMITING F	ACTORS :					

ADDITIONAL OBSERVATIONS: Bottom coated with marl.

LAND MARKS: Bridge 3738 in 5.18' on either side INVESTIGATOR: B. May

Item Rated			ors by Classes					
TARTA PANKS	EXC ELLENT	0	GOOD		FAIR		POOR	-
dfam Slone	Bark slope gradient 430%	(2)	Bank slope gradient 30-40%		Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	TO
	No evidence of past or	5	Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	
ass wasting		(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	h
(Existing or Potential)	wasting into channels,	-	future potential.		by water during high flows.	-	imminent danger of same.	1
Debris Jom Potential	Essintially absent from	(2)	Present but mostly small		Present, volume and size (	(6)	Moderate to heavy amounts.	10
(Floatshle Objects)	immediate channel area.		twigs and limbs.		are both increasing.	$\sim$	predominantly larger sizes.	1
i i i i i i i i i i i i i i i i i i i	1907. + plant density. Vigor	0	70-90% density. Fewer plant	-	50-70% density. Lower viger		< 50% density plus fewer	+
from	and variety suggests a	(3)	species or lower vigor	(6)	and still fewer species	(9)	species & less vigor indi-	k1
	deep, dense root mass.	$\sim$	suggests a less dense or	<u> </u>	form a somewhat shallow and		cate poor, discontinuous,	11
Vegetation		1	deep root mass.		discontinuous root mass.		and shallow roct mass.	
LOWER BANKS	1						1000 1000	
DOWNER OFFICE	Ample for present plus some	T	Adequate, Overbank flows	-	Earely contains present	· · · ·	Inadequate. Overtain flows	-
Channel Capacity	increases. Feak flows c	(1)	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. V/D ratio >25.	10
Citatiner Separaty	tained. W/D ratio <7.		ratio 8-15.	$\sim$	floods. W/D ratic 15-25.	-		10
	65% + with large, angular	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	1:61	<20% rock fragments cf	10
Eank Rock Content	boulders 12" + numerous.	1	boulders to cobble 6-12".	1.1	3-6" diametar class.	19	grovel sizes, 1-3" or less.	10
	Rocks, old logs firmly	1	Some present, causing		Moderately frequent, moder-		Frequent obstructions and	-+
	embedded. Flow pattern		erosive cross currents and		ately unstable obstructions		deflectors cause bank crc-	1
Obstructions	of pool & riffles stable	(2)	minor pool filling, Obstruc-	(4)		165	sicn yearlong. Sed. traps	1.
Flow Derfectors	without cutting or	1	tions and deflectors newar	1	water causing bank cutting	0	full, channel migration	0
	deposition.		and less firm.		and filling of pocls.		occuring.	1
	Little or none evident.	1	Some, intermittently at	1E	Significant. Cuts 12"-24"		Almost continuous cuts,	+-
	Infrequent raw banks less	las	outcurves & constrictions.			120	Almost continuous cuts,	i.
Cutting	than 6" high generally.	147	Raw banks may be up to 12".	100	and sloughing evident.	120	some over 24" high, Fail-	\$16
	Little or no enlargement	1-	Some new increas in bar		Moderate deposition of new		ure of overhangs frequent,	-
	of channel or point bars.	Tan	formation, most from	100		1121	Extensive deposits of pre-	1
Deposition	of challer of point sais.	D	coarse gravels.	100	old and some new bars.	(12)	dominately fine particles.	KAF
BOTTOM		L	Coarse gravess.		ord and some new pars.		Accelerated bar development.	<u>.                                    </u>
Rock Angularity	Sharp edges and corners,	1/15	Rounded corners & edges,	(2)	Corners & edges well round-	(2)	11.11	
ROCK Angularity	plane surfaces roughened.	1	surfaces smooth & flat.	100	ed in two dimensions.	(3)	Well rounded in all dimen-	(4
	Surfaces dull, darkened, or	tin	Mostly dull but may have	1/25	Mixture, 50-50% dull and	755	sions, surfaces smooth.	1
Brightness	stained. Gen. not "bright".	0	up to 35% bright surfaces.	(4)	bright, ± 15%, ie 35-(5%,	(3)	Predominately bright, 65% +,	. (4
	Assorted sizes tightly	100	Moderataly packed with	105			exposed or scoured surfaces.	!
.onsolidation or		W		190	Mostly a loose assortment	(6)	No packing evident. Loose	1 (8
Particle Packing	No change in sizes ovident.	Kar.	some cverlapping.	10	with ne apparent overlap.		assortment, easily moved.	i
Botton Size Distribution		(U)	Distribution shift slight.	1(0)	inderate change in sizes.	12)	Marked distribution change.	1.6
5 Percent Stable Materials	Stable materials 80-100%.		Stable netcrisis 50-80%.		Stable materials 20-50%.		Statle untertais C-207.	1
	Less than 5% of the bottom	has	5-30% aftected. Scour at	L	30-50% affected. Deposits	- 1	More than 50% of the bottom	-
Scouring and	affected by scouring and	O		12)	a scour at obstructions,	18)	in a state of flux or change	24
Deposition	deposition.	i i	grades steeper. Some		constrictions, and bends.	- 1	neerly yearlong.	1
			deposition in pools.	-	Some filling of pools.	_1		1
Clinging Aquatic	Abundant. Growth largely	h	Common. Algal forms in low		Present but spotty, mostly	í	Peronnial types scarce or	-
Vegetation	moss like, dark green, per-	E	velocity & pool sieas. Moss	(2)	in backwater areas. Season-	(3)	absent. Mellow-green, short	(4)
(toss & Algse)	[ennis]. In swift water too,	L	bere too and swifter waters,	-	al blooms make rocks slick,	_	term bl.on ney be present.	1
	COLUMN TOTALS	- 22		10		<u> </u>	the second	1000

Add the values in each column for a total reach score here. (E. 23 + G. 10 + F. 30 + F. \_\_\_\_ = 63 ).

Reach score cf:<38=Exellent, 39-76=Good, 77-114=Fair, 15==Poor.

			day (Uppe	<u>r)</u>	\$1	ATTONS:		DATE: 8	/ 51/ /
	WIOT	н .	Present	DEP	тн	u11	VELOCITY		ME
	Present	Full 15	2.0			3.5	1 FS	* 5-10	CFS
001	10	12	0.8			2.5	2 FS	* 5-10	CFS
un	8	16	1 0.0						
un -	Air:	65	GRADIENT	1.5%			-		
LMPFRA	TURE		STABILITY	RATING	70	TURBIOI	(Clear) TY:Hilky Huddy		
P001. (	I, 2 and 3)	20	% RIFFLE	80		% RUN	% GL I	30	
OOL CL	ASSES: % CL	ASS 1:	% CLASS 2	9	% CI	LASS 3 <u>13</u>	% CLA	ss 4: <u>78</u>	
оттом и	MATERIALS:	Ver	y Abundant	Abunda	nt	Common	Present	None	
			> 70%)	(41 to	70%)		(<10%)	0	
rganic	Oebris:					20			
lay/Si	1t:					20	10		
and:									
ine Gr	avel (0.1 to	1"):					10		
oarse	Gravel (1 to	3"):				20		·	
ma11 R	ubble (3 to	6") :							
arge R	ubble (6 to	12"):				10			
oulder	s (>12"):					10			
ed Roc	k:			<u> </u>				<u></u>	
QUATIC	VEGETATION							1	
NSTREA	M COVER: (Ge	od I	Fair Poo		ne	·		dank	
	er Types	tve	Logs /					lor <u>dark</u> or -	
(In	dicate relat				D	Overhand		ion A	
(In	dicate relat portance A								
(In im	dicate relai portance A ;	> C > P)	Choppy Surfa		·				
(In im	dicate relat	> C > P)	Choppy Surfa ) Poor	None					
(In im	dicate relat portance A , VER: Good	Fair	Choppy Surfa ) Poor Overstory	None Spruce	fir,	larch,lodg	jepole		
(In im IANK CO Majo (Ind	dicate relat portance A ; WER: Good	Fair	Choppy Surfa Poor Overstory	None Spruce	fir,	larch,lodg	jepole		
(In im BANK CO Majo	dicate relat portance A , VER: Good	Fair	Choppy Surfa ) Poor Overstory Understory	None Spruce, Alder,	,fir, ntn. r	larch,lodg	jepole	eberry	
(In im BANK CO Majo (Ind imp	dicate relat portance A WER: Good r Plant Spec licate relat ortance: A	c > P) (Fair) (tes: live) > C > P)	Choppy Surfa ) Poor Overstory Understory Surface	None Spruce Alder,n Grass 1	,fir, ntn.π forbs	larch,lodg maple,dogw	gepole wood,goos	eberry	
(In im BANK CO Majo (Ind imp	dicate relat portance A WER: Good r Plant Spec licate relat ortance: A	c > P) (Fair) (tes: live) > C > P)	Choppy Surfa ) Poor Overstory Understory Surface	None Spruce Alder,n Grass 1	,fir, ntn.π forbs	larch,lodg maple,dogw	gepole wood,goos	eberry /ft <sup>2</sup>	
(In im BANK CO Majo (Ind imp FISH FO FOO	dicate relat portance A , VER: Good in Plant Spec licate relat iortance: A MOD ORGANISM: di Types: Cat	c > P Fair ties: ve > C > P disflies tive	Choppy Surfa Poor Overstory Understory Surface >25/ft <sup>2</sup> Mayf11	None Spruce Alder,m Grass 16-25/ft <sup>2</sup> es:	fir, ntn.r forbs	larch,lodg maple,dogw -15/ft <sup>2</sup> toneflies:	gepole wood,goos	eberry	
(In im BANK CO Majo (Ind imp FISH FO FOO (In abu	dicate relat portance A , VER: Good in Plant Spec licate relat iortance: A MOD ORGANISM: di Types: Cat	C > P Fair Fair Ve > C > P S: idisflies ive >P) Snai	Choppy Surfa ) Poor Overstory Understory Surface >25/ft <sup>2</sup> Mayf11 1s: Leech	None Spruce. Alder,n Grass 1 16-25/ft <sup>6</sup> es: es: d	fir, ntn. r forbs 6 5 Fair	larch,lodg maple,dogw -15/ft <sup>2</sup> toneflies:	gepole wood,goos 1-5 01 c: S M Poor	eberry /ft <sup>2</sup> ptera	
(In im BANK CO (Ind imp FISH FO (In abu SPAWNIN % G Vel	dicate relat portance A ; WER: Good Ir Plant Spec Licate relat NOD ORGANISM (d Types: Ca dicate relat Indance A > C IG HABITAT: iravel octty Mut	<pre>&gt; C &gt; P)</pre>	Choppy Surfa ) Poor Overstory Understory Surface >25/ft <sup>2</sup> Mayf11 1s: Leech	None Spruce, Alder,n Grass 1 16-25/ft <sup>6</sup> es: es: d 0% 3 FPS	<u>, fir, intn. r</u> forbs 6 6 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7	larch,lodg maple,dogw -15/ft <sup>2</sup> toneflies:	1-5 01 01 01 01	/ft <sup>2</sup> /ft <sup>2</sup> ptera	
(In im BANK CO (Ind imp FISH FO FOO (In abu SPAWNIN % G Vel Dep	dicate relat portance A ; WER: Good Ir Plant Spec Licate relat NOD ORGANISM (d Types: Ca dicate relat Indance A > C IG HABITAT: iravel octty Mut	<pre>&gt; C &gt; P)</pre>	Choppy Surfa Poor Overstory Surface >25/ft <sup>2</sup> Mayfl1 Is:Leech d Goo 35-55 meen 0.5 and	None Spruce, Alder, Grass 1 16-25/ft <sup>6</sup> es: es: d 0% 3 FPS and 3 fe	<u>, fir, intn. r</u> forbs 6 6 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7	larch,lodg maple,dogw -15/ft <sup>2</sup> toneflies:	gepole wood,goos 1-5 01 c: S M Poor	/ft <sup>2</sup> ptera L None	
(In im Majo (Ind imp FISH FO FOO (In abu SPAWNIN % G Vel Dep MBEDDE (ALLEY	dicate relation portance A , weR: Good r Plant Speed licate relation ortance: A 000 orGANISM di Types: CasANISM di Types: CasANISM MULTINA DI Types: CasANISM di Type	> C > P Fair ites: ive > C > P idisflies: ive >P) Snai Very Goo >Soz st be bet > 100  f	Choppy Surfa Poor Overstory Understory Surface >25/ft <sup>2</sup> Mayf11 Is: Leech d Goo Surface Mayf11 Is: Leech d Goo Surface (1/3)	None <u>Spruce</u> , <u>Alder</u> , <u>Grass</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u>if</u> <u></u>	fir, forbs 6 5 Fair 20-342 eet 2/3	larch, lodg maple, dogw -15/ft <sup>2</sup> toneflies:	1-5 01 01 01 01 01 01 01 01 01 01 01 01 01	/ft <sup>2</sup> ptera L None	

ADDITIONAL OBSERVATIONS: <u>Overmature</u> spruce along bank, poor understory except for sides on streambank. Stream is quite silty. Upper section (500') has only class 4 \_\_\_\_\_\_\_\_, lower section has good pool dev.

LAND MARKS: Bridge on Rd. 315 in Sec. 6 500' on either side. INVESTIGATOR: B. May \*= Estimates

Item Rated				Stability Indicators by Classes						
TPER EANKS	EXCELLENT	-	GOOD		FAIR		POOR			
PPER EANS	Bark slope gradient 4307.	(2)			Bank slope gradient 40-602	(6)	Bank alope gradient 60% +	Ta		
	to evidence of past or		Infrequent and/or very small,		Moderate frequency & size.		Frequent or large, causing	1		
dean Verting	potentie, for future mass	(3)	Mostly healed over, Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	hi		
	wasting into channels.	-	future potential.		by water during high flows.		imminent danger of same.	1		
Debris Jom Potential	Las.ntielly absent from	(2)	Present but mostly small	(4)	Present, volume and size	762	Moderate to heavy amounts,	(8		
	mediate channel area.		twigs and limbs.		are both increasing.	$\mathcal{O}$	predominantly larger sizes.	1		
(Floatsble objects)	90% + plant density. Vigor		70-90% density. Fever plant	07	50-70% density. Lower viger		< 50% density plus fewer	+		
Sank Protection		(3)	species or lower vigor	145	and still fewer species	(9)	species & less vigor indi-	k1:		
from	deep, dense root mass.		suggests a less dense or		form a somewhat shallow and		cate poor, discontinuous.	L.,		
Vegetation	deep, dense toot matte		deep root mass.	<u> </u>	diacontinuous root mass.		and shallow roct mass.			
LOWER BANKS		-								
	Ample for present plus come		Adequate. Overbank flows	0	Barely contains present		inadequate. Overtars flows	T		
		(1)		((2)	peaks, Occasional overbank	(3)	common. W/D ratio >25.	14		
Channer opposition	tained. W/D ratio <7.		ratio 8-15,		floods. W/D ratic 15-25.	-		1		
	65% + with large, angular	(2)	40 to 65%, mostly small	(4)	20 to 40% , with most in the	(6)	<20% rock fragments cf	1 (8		
	boulders 12" + numerous.		boulders to cobble 6-12".	-	3-6" diametar class.	$\leq$	grovel sizes, 1-3" or less.	1		
	Rocks, old logs firmly		Some present, causing		Moderately frequent, moder-		Frequent obstructions and	-		
Chetructions	embedded. Flow pattern		erosive cross currents and		ately unstable obstructions	$\sim$	deflectors cause bank erc-	1		
Flow Deflectors	of pool & riffles stable	(2)	minor pool filling. Obstruc-	(4)		(6)	sicn yearlong. Sed. traps	1 (8		
Sediment Traps	without cutting or		tions and deflectors newer		water causing bank cutting	$\smile$	full, channel migration	1		
Sediment Iraps	deposition.		and less firm.		and filling of pocla,		occuring.	1		
	Little or none evident.	-	Some, intermittently at		Significant, Cuts 12"-24"		Almost continuous cuts.	1-		
Cutting	Infrequent raw banks less	(4)	outcurves & constrictions.	(3)	high, Root mat overhangs	12)	some over 24" high. Fail-	116		
Coccing	than 6" high generally.	1	Raw banks may be up to 12".		and aloughing evident.		ure of overhangs frequent.	1		
	Little or no enlargement		Some new increas in bar		Moderate deposition of new		Extensive deposits of pre-	-		
Deposition	of channel or point bars.	(4)	formation, most from	(8)	gravel & coarse sand on	(12)		K.F		
Deposition		1	coarse gravels.		old and some new bars.		Accelerated bar development.	<b>[</b> ]		
BOTTOM				~						
Rock Angularity	Sharp edges and corners,	j(1)	Rounded corners & edges,	W	Corners & edges well round-	(3)	Well rounded in all dimen-	(4		
	plane surfaces roughened.	-	surfaces smooth & flat.	1	ed in two dimensions.		sions, surfaces smooth.			
Brightness		(1)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	(3)	Predominately bright, 65% +,	14		
	stained, Gen. not "bright".	1	up to 35% bright surfaces.	6	bright, ± 15%, ie 35-(5%,		exposed or scoured surfaces.	!		
	Assorted sizes tightly	(2)	Moderately packed with	(4)	Mostly a Loose assortment	(6)	No packing cvident. Loose	1 (8		
Particle Packing	pucked audior overlapping.	-	some overlapping.	K	with ne apparent overlap.		assortment, easily moved.	1		
Button Size Distribution	No change in sizes evident.	(4)	Distribution shift slight.		Moderate change in sizes.	12)	Marked distribution change.	1.6		
5 Percent Stable Materials	Stable materials 80-100%.	j	Stable materials 50-80%.		Stable materials 20-50%.		Statie unterials C-20%.	Ī		
	Less than 5% of the bottom	1	5-30% aftected. Scour at		30-50% affected. Deposits		More than 50% of the bottom			
Scouring and	affected by scouring and	(6)	constrictions and where	152)	& scour at obstructions,	18)	in a state of flux or change	24		
Deposition	deposition.	1	grades steeper. Some	1	constrictions; and bends.		neerly yearlong.			
		1	deposition in pools.		Some filling of pools.					
Clinging Aquatic	Abundant, Growth largely	1	Common. Algal forms in low	6	Present but spotty, mostly		Percnnial types scarce or			
Vegetation	moss like, dark green, per-	(1)	velocity & pool areas. Mosa	(2)	in backwater areas. Season-	(3)	absent. Mellow-green, short	(4)		
Cioss & Algae)	fennial. In swift water too.	1	here too and swifter waters,	2	al blooms make rocks slick,		term blion ar be present.			
	COLUMN TOTALS									

Add the values in each column for a total reach score here.(E.6 + G.45 + F.19 + F. = 70).

Reach score of:<35\*Exellent, 39-76=Good, 77-114\*Fair, 115\*=Poor.

STREAM NUMBER & NAME: O'E	Brien Cr. (L	ower)	STATIONS: T59	N R33W S3	2_DATE: 8/16/79
WIOTH		OEPTH		VELOCITY	VOLUME
Present Full	Present		Full	1	
001					
iffle					
lun .		1 0.%			
Air: 500	GRADIENT			Clear	
Water: 54			TURB1D		
POOL(1, 2 and 3) 25	% RIFFLE	35	% RUN	20 % GLIC	DE 20
OOL CLASSES: % CLASS 1:	4 % CLASS 2	<u>13</u> ×	CLASS 3 26	% CLAS	s 485_57_
OTTOM MATERIALS:	Very Abundant			Present	None
	(> 70%)	(41 to 70%)	(11 to 40%)		0
Irganic Oebris:				Trace	
lay/Silt:				Trace	
and:				Trace	
ine Gravel (0.1 to 1"):				5	
oarse Gravel (1 to 3"):			20	1	
mall Rubble (3 to 5") :			20		
arge Rubble (6 to 12"):			30		
loulders (>12"):			20	5	
Bed Rock:				5	
QUATIC VEGETATION:				^	
INSTREAM COVER: Good					
Cover Types	Logs		Rocks A	Bottom Co	for mottled
(Indicate relative importance A > C > P	) Undercut Ban				or clear
importance in y o y .	Choppy Surfa	ceC	Overhan	ging Vegetat	ionA
MANK COVER: Good Fa	ir Poor	None			
	Overstory A	lder,Bog M	Birch-A,P_P	ine,Fir,S	pruce-P
Major Plant Species:					,Grasses(C)
<pre>(Indicate relative importance: A &gt; C &gt;</pre>					
	Surface_UO	gwood, Ald			
FISH FOOD ORGANISMS:	>25/ft <sup>2</sup>	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	1-5	/ft <sup>2</sup>
Food Types: Caddisfli	ies <u>A (&gt;25</u> )Mayf11	es: <u>P(6-15</u>	_Stoneflies:_P	(1-5)_01	ptera
(Indicate relative abundance A>C>P) Sr	nails: — Leech	es:	\$1Z	E: 🕥 M	L
SPAWNING HABITAT: Very G	Good Goo	d Fat		Poor	None
% Gravel >50 Velocity Must be & Depth Must be b	0% 35-5 Detween 0.5 and Detween 4 inches	3 FPS	34%	10-19%	< 10%
EMBEDDEDNESS 0	1/3)	2/3		Full	
> 300	X ) ft.	\	<1	00 ft.	
LAND FORM GRADIENT: (59	5-10%	11-20% 21			
and a standard	-f authable	foods (2)	though cade	lic are ab	undant, these

LIMITING FACTORS: Lack of suitable foods (although caddis are abundant, these are retreat building micro-caddis and not readily available to fish).

ADDITIONAL DBSERVATIONS: Braided channel near the upper end of the section. Two log jams in upper end of section, not barriers, bridge crossing for the O'Brien Creek Road. Slumping bank, approx 20' high, approx 250' below bridge.

lst-Large bending pool 500' above bridge. LAND MARKS: Last-Run with gravel bar on right with alder overhanging 1/2 channel INVESTIGATOR: width 500' below bridge. Deaver \*= Estimates

Item Rated	THE CLASS			ICE	tora by Classes				
TPPER EANKS	EXCELLENT	-	GOOD		FAIR		POOR		
endform Slope	Bank slope gradient 430%	(2)	Bank slope gradient 30-407.	(4)	Bank slope gradient 40-602	(6)	Bank slope gradient 60% +	T	
	to evidence of past or	1.	Infrequent and/or very small		Moderate frequency & size,	-	Frequent or large, causing	-	
ass Wasting	potentis, for future mass	103	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	tediment nearly yearlong OF	h	
	wasting into channels,	5	future potential.		by water during high flows.		imminent danger of same	· ^	
	Essintially absent from	(2)	Present but mostly small		Present, volume and size	(6)	Moderate to heavy amounts,	+	
(Floatsble Objects)	immediate channel area.		twigs and limbs.	-	are both increasing.		predominantly larger sizes.	1.	
Sank Protection	907 + plant density. Vigor	1	70-90% density. Fewer plant	6	50-70% density. Lower viger		< 50% density plus fever	+	
from	and variety suggests a	(3)	species or lower vigor	(6)	and still fewer species	(9)	species & less vigor indi-	h	
Vegetation	deep, dense root mass,	1	suggests a less dense or	-	form a somewhat shallow and		cate poor, discontinuous,	- 14	
vegetacton		1	deep root mass.		discontinuous root mass.		and shallow roct mass,		
LOWER BANKS	1						and sharrow roct mass.	_ <u>i</u> _	
Dinon dining	Ample for present plug some	F	Adequate, Overbank flows	5	Earely contains present	r	Tandan and a second		
Channe' Capacity	increases. Peak flows c -	a	rare, Width to Depth (W/D)	(2)	peaks, Occasional overbank	in	Inadequate. Overisis flows common. W/D ratio >25.	1	
Channel Copacity	tained. W/D ratio <7.	1-1	ratio 8-15.	19	floods. W/D ratic 15-25.	10,	common. W/D ratio >25.	10	
	657 + with large, angular	(2)	40 to 65%, mostly small (	10	20 to 40% , with most in the	100	1.000	_	
	boulders 12" + numerous.			p	3-6" diametar class.	(0)		10	
	Rocks, old logs firmly	5	Some process advardan		Moderately frequent, moder-		grovel sizes, 1-3" or less,	1	
	embedded. Flow pattern	1.3	Some present, causing		moderately frequent, moder-		Frequent obstructions and	-	
Obstructions	of pool & riffles stable			1	ately unstable obstructions		deflectors cause bank erc-	1	
Flow Deflectors	without cutting or	122	minor pool filling. Obstruc- tions and deflectors newer	(4)	a deflectors move with high	(6)	sion yearlong, Sed, frang	- İ i	
Sediment Traps					water causing bank cutting		full, channel migration	1	
	deposition.	1	and less firm.		and filling of pocls.		occuring.		
	Little or none evident.		Some, intermittently at		Significant. Cuts 12"-24"		Almost continuous cuts.	+-	
	Infrequent raw banks less	100	outcurves & constrictions.	(8)	high. Root mat overhaugs	12)	some over 24" high. Fail-	h	
	than 6" high generally.	-	Raw banks may be up to 1.2".	La	and sloughing evident.		ure of overhange frequent.	1.	
	Little or no enlargement		Some new increas in bar	NU	Moderate deposition of new	_	Extensive deposits of pre-	+-	
Deposition	of channel or point bars.	(4)	formation, most from	(8)	gravel & coarse sand on	(12)	dominately fine particles.	1	
		1	coarse gravels.		old and some new bars.	/	Accelerated bar development.	K.1	
BOTTOM				-			determined bar development.	<u> </u>	
Rock Angularity	Sherp edges and corners,	(1)	Rounded corners & edges,	(2)	Corners & edges well round-	(3)	Well rounded in all dimen-	1.0	
	plane surfaces roughened.	1	surfaces smooth & flat.	2	ed in two dimensions.	(3)	sions, surfaces smooth.	(4	
Brightness	Surfaces dull, darkened, or	(1)	Mostly dull but may have	10	Mixture, 50-50% dull and	755	Brons, surfaces smooth.	1	
	stained. Gen. not "bright".	1	up to 35% bright surfaces.	0	bright, ± 15%, ie 35-(5%.	(5)	Predominately bright, 65% +,	(4	
Lonsolidation or	Assorted sizes tightly	(2)	Moderataly packed with	NES	Mostly a loose arsortment	10	exposed or scoured surfaces.		
	pucked audyor overlapping.	1	Jaone cverlapping.	0	with ne apparent overlap.	(0)	No packing evident, Loose	1 (8	
Button Size Distribution	No change in sizes evident.	145		20			assortment, easily moved.	1	
	Stable materials 80-100%.	1.47	Stable materials 50-80%.	Track 1	Stable materials 20-50%.	1233	Marked distribution change.	1.6	
a servente stable interrula	Less than 5% of the bottom		5-30% aftected, Scour at	HФ			Statie Leterisis C-20%.	ľ.	
Scouring and	affected by scouring and	100			30-50% affected. Deposits		More than 50% of the bottom	-	
Deposition	deposition.	1(0)	constrictions and where	187	& scour at obstructions,	18)	in a state of flux or choose	424	
Deposition	deposition.	i	grades steeper. Some	in	constrictions, and bends. Some filling of pools. Present but spotty, mostly	- 1	nerily yearlong.	r	
			deposition in pools.	LTA	Some filling of pools,	. 1		1	
Clinging Aquatic	Abundant, Growth largely	1	Common. Algal forms in low	3)	Present but spotty, mostly	1	Perconnial types scarce or	-	
Vegetation	moss like, dark green, per-	(1)	velocity & pool areas. Mosa	(2)	in packwater areas. Season-	(3)	ebsent, Vellow-green, short	11	
(ioss & Algse)	ennisl. In swift water too,	1	here too and swifter waters,		al blooms make rocks slick.	1	term bloom new be present.		
	COLUMN TOTALS			59		-	De present.		

Add the values in each column for a total reach score here. (E. 16 + G. 59 + F. + F. - 75).

Reach score of:<38=Exellent, 39-76=Good, 77-114=Fair, 115==Poor.

				ND221/ C 7	otre, 9/16/70
STREAM NUMBER & NAME:	O'Brien Cr.	(Upper)	STATIONS: 160		
WIOTH		OEPTH	Full	VELOCITY	VOLUME
Present Full	Present		Pull	1	
Pool					
Riffle					
Run Air: 64 <sup>0</sup>	GRADIENT	20/			
				Clear	
Water: 48			TURBIO	ITY:Milky Muddy	
1 POOL(1, 2 and 3) 22	% RIFFLE	40	% RUN	28 % GL10	DE 10
POOL CLASSES: % CLASS 1:	% CLASS 2:	<u>8</u> *	CLASS 3 21	% CLAS	ss 4: <u>71</u>
BOTTOM MATERIALS:	Very Abundant	Abundant	Conmon	Present	None
	(> 70%)	(41 to 70%)	(11 to 40%)	(<10%)	0
Organic Oebris:				Trace	
Clay/Silt:				Trace	
Sand:				Trace	
Fine Gravel (0.1 to 1"):				5	
Coarse Gravel (1 to 3"):				10	
Small Rubble (3 to 6") :			10		
Large Rubble (6 to 12"):			30		
Boulders (>12"):			30		
Bed Rock:			15		
AQUATIC VEGETATION:				X	
INSTREAM COVER: Good	(Fair) Poor	n None			
Cover Types	Logs	P	Rocks A	Bottom Co	lor
(Indicate relative	Undercut Banl	(S	P	Water Cold	or clear
importance A > C > F	Choppy Surfac	e C	Overban	ging Vegetat	ionA
BANK COVER Good Fa					
BANK LOVEK: GODD ) FO					
H. L. M. L. Condens			Birch,Dogwo		
Major Plant Species: (Indicate relative	Understory A	lder,Dogwo	od,Willow-	A, Thimble	berry,Rose, Raspber
importance: A > C >			I-A,Willow-		
					2
FISH FOOD ORGANISMS: Food Types: Caddisfl	$> 25/ft^2$	16-25/ft <sup>2</sup>	6-15/ft <sup>2</sup>	- 1-5,	/ft <sup>2</sup>
(Indicate relative	les <u>cio-zo</u> mayrin			$\sim$	
abundance A>C>P) Sr	hails: Leech	es:	SIZ	E:() M	L
*SPAWNING HABITAT: Very (	Good Goo	d Fa <b>i</b>	r	Poor	None
	0% 35-5 between 0.5 and 3 between 4 inches	3 FPS	4%	10-19%	< 10%
*EMBEODEONESS 0	(1/3)	2/3		Full	
*VALLEY BOTTOM TYPE:		1	/	1 /	
	1 5-10%	100-300 ft. 11-20% 21	-30% >30% <sup>&lt;1</sup>	00 ft.	
*LIMITING FACTORS: None					

AOUITIONAL OBSERVATIONS: In the upper 500' there is approx 60' of cascading riffle. Backwater from Beaver Dam begins to have effect just at lower end of this section. Fish Present - WCT, BT, DV

lst - large western red cedar on right 500' above crossing. LAND MARKS: last - beginning of backwater from beaver dam 500' below INVESTICANOM: Deaver

Item Rated	Stability Indicators by Classes							
IMATO PARKS	EXCELLENT	-	GOOD		FAIR		POOR	
Since Slope					Bank slope gradient 40-60%	(6)	Bank slope gradient 60% +	10
	to evidence of past or		Infrequent and/or very small		Moderate frequency & size,		Frequent or large, causing	
isss Wasting		(3)	Mostly healed over. Low	(6)	with some raw spots eroded	(9)	sediment nearly yearlong OR	k1:
(Existing or Potentis1)	wasting into channels.	-	future potential.		by water during high flows.		imminent danger of same.	1
a Lave lom Potential			Present but mustly small	(4)	Present, volume and size	(6)	Moderate to heavy amounts.	10
(Flostsble Objects)	immediate channel area. (	(4)	twigs and limbs.		are both increasing.		predominantly larger sizes.	1
h B strahlan	90% + plant density. Vigor	L .	70-90% density. Fever plant		50-70% density. Lower viger		< 50% density plus fever	+
f	and variety suggests a	(3)	species or lower vigor	(6)	and still fever species	(9)	species & less vigor indi-	11
Vegetation	deep, dense root mass.	E	suggests a less dense or	•	form a somewhat shallow and		cate poor, discontinuous.	1
vegetation		10	deep root mass.		discontinuous root mass.		and shallow roct mass,	1
LOWER BANKS								-
	Ample for present plus some	l	Adequate. Overbank flows	6	Barely contains present		inadequate. Overisis flows	T
Channel Capacity		(1)	rare. Width to Depth (W/D)	(2)	peaks. Occasional overbank	(3)	common. W/D ratio >25.	10
	teined, W/D ratio <7.	-	ratio 8-15.	-	floods, W/D ratic 15-25,			1.
	65% + with large, anguler	(2)	40 to 65%, mostly small	((4)	20 to 40% , with most in the	(6)	<20% rock frequents cf	10
Bank Rock Content	boulders 12" + numerous.	-	boulders to cobble 6-12".	1-	3-6" diametar class.		grovel sizes, 1-3" or less.	1.
	Rocks, old logs firmly	1	Some present, causing		Moderately frequent, moder-		Frequent obstructions and	+-
	embedded. Flow pattern	1 .	erosive cross currents and		ately unstable obstructions		deflectors cause bank erc-	
The Deflectors		(2)	minor pool filling. Obstruc-	(4)		(6)	sich yearlong, Sed, trans	10
Sediment Traps	without cutting or	1	tions and deflectors newsr	$\sim$	water causing bank cutting		full, channel migration	1.
Contract	deposition.		and less firm.	-	and filling of pocls,		occuring.	
	Little or none evident.		Some, intermittently at	1	Significant. Cuts 12"-24"		Almost continuous cuts,	+-
	Infrequent raw banks less		outcurves & constrictions.	(8)	high. Root mat overhangs	12)	some over 24" high, Fail-	r1e
	than 6" high generally.	16	Raw banks may be up to 12".		and sloughing evident.	_	ure of overhangs frequent	1.
	Little or no enlargement	1-	Some new increas in bar		Moderate deposition of new		Extensive deposits of pra-	+
Deposition	of channel or point bars.	(4)	formation, most from	(3)	gravel & coarse sand on	(12)	dominately fine particles.	K. 6
-		1	coarse gravels.		old and some new bars.		Accelerated bar development,	ſ
BOTTOM				-				
Rock Angularity		(1)	Rounded corners & edges,	(2)	Corners & edges well round-	(3)	Well rounded in sll dimen-	14
	plane surfaces roughened.	-	surfaces smooth & flat.	-	ed in two dimensions.	$\sim$	sions, surfaces smooth.	1.
Brightness		KI)	Mostly dull but may have	(2)	Mixture, 50-50% dull and	(3)	Predominately bright, 65% th.	174
	stained. Gen. not "bright".	1	up to 35% bright surfaces.	1-	bright, ± 15%, ie 35-(5%,		exposed or scoured surfaces.	1
.onsolidation or	Assorted sizes tightly	(2)	Moderately packed with	(4)	Mostly a Loose assortment	(6)	No packing evident. Loose	1 (8
Particle Packing	pucked audior overlapping.	ł	some cverlapping.		with no apparent overlap.	1	assortment, easily moved	1
Button Size Distribution	No change in sizes evident.	(4)			Moderate change in sizes.	12)5	Marked distribution change	1.6
S Percent Stable Materials	Stable materials 80-100%.		Stable materials 50-80%.	10	Stable materials 20-56%.	. 8	Stable unterfals C-207.	ī
	Less than 5% of the bottom	1	5-30% aftected. Scour at	-	30-50% affected. Deposits	1	More than 50% of the bottom	-
Scouring and	affected by scouring and	(6)	constrictions and where	12)	& scour at obstructions,	18)	in a state of flux or change	24
Deposition	deposition.	i	grades steepen. Some		constrictions, and bends.		neerly yearlong.	F
			deposition in pools.		Some filling of pools,			
Clinging Aquatic	Abundant, Growth largely		Common. Algal forms in low		Present but spotty, mostly	~1	Persnnial types scarce or	
Vegetation	moss like, dark green, per-	j(1)	velocity & pool sieas. Moss	(2)	in packwater areas. Season-	(32)	ebsent. Vellow-green, short	(4)
(toss & Algae)	[ennial. In swift water too,	1.	here too and swifter waters,	-	al blooms make rocks slick,	9	term blion nem be present.	
	COLUMN TOTALS	26		38				

add the values in each column for a total reach score here. (E. 26 + 6.38 + F.6 + F. - 70).

Reach score cf:<38=Exallent, 39-76=Good, 77-114=Fair, \_134=Poor.

. . . .

Form R-1 2500-5 (6-73)

0 . .