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Summary of Stream Surveys in the Upper Sprague River,  
Klamath Basin, Oregon, 1991-1994.

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## INTRODUCTION

Surveys of streams describing the composition and status of habitat and fishes in Oregon have been conducted since 1990 by the Oregon Department of Fish and Wildlife (ODFW), Aquatic Inventories Project. This report summarizes surveys of 9 streams in the upper Sprague River of the Klamath Basin, Oregon, 1991-1994<sup>1</sup>. Surveyed streams (Figure 1) originate in the Yamsay and Gearhart Mountains, and were tributary to the Sycan River (Long and Calahan Creeks), North Fork Sprague River (Boulder, Dixon, and Deming Creeks), and South Fork Sprague River (Brownsworth, Leonard, Hammond, and Whitworth Creeks) subbasins. Six of these headwater tributaries (Boulder, Brownsworth, Deming, Dixon, Leonard, and Long Creeks) support populations of bull trout (*Salvelinus confluentus*), which are currently under review by the US Fish and Wildlife Service for listing as a threatened or endangered species.

## METHODS

Stream habitat surveys were conducted by two-person crews using the ODFW methodology (Moore et al. 1993). Stream reaches were identified based upon tributary junctions, hillslope and valley morphology, landuse, and attributes of stream habitat. Stream habitat among reaches was ranked by benchmarks (Table 1) developed for juvenile bull trout in Oregon (Dambacher and Jones, In press), and by benchmarks derived from Oregon streams within late successional forests (ODFW, unpublished data).

The distribution of fishes was determined at selected sites by electrofishing sampling of six habitat units without blocknets. In some streams fish distribution was assumed to be the same as that determined in 1989 by Ziller (1992). Intensive population estimates of age 1+ fish were conducted in Long Creek, during August 1991, and in Boulder and Dixon Creeks combined, during July 1992, using stratified systematic sampling (Hankin 1984) of pool and fastwater habitat types. Two-pass electroshocking was employed using blocknets with a 7 mm mesh size. A weighted estimate of the probability of capture was used when it was similar among sampled units (Bohlin 1981). Estimation of age 0+ fish populations was not attempted because electrical voltages required to collect them by electrofishing would have been excessive for larger bull trout.

## RESULTS AND DISCUSSION

### Reach Habitat Comparisons

A total of 44 stream reaches were identified within the nine streams surveyed (Figures 2-6). Habitat characteristics of each stream reach are listed in Table 2, and are ranked by habitat quality benchmarks in Table 3. Frequency distributions of reaches for

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<sup>1</sup>Survey reports of each stream are available from: Oregon Department of Fish and Wildlife, Aquatic Inventories Project, 850 SW 15th, Corvallis, OR 97333.

habitat characteristics important to juvenile bull trout (Figures 7) show that most were rated at a low quality level for shade, riffle gravel and fines, and bank erosion. Ratings for bank undercuts, and large wood debris were rated at moderate to high levels. Habitat characteristics ranked by late successional forests (Figure 8) indicated generally low to moderate levels of pool habitat and large riparian conifers were within the surveyed reaches.

Quality ratings among the habitat variables differed greatly within each stream surveyed (Table 3); no stream was rated consistently across all variables. However some streams did stand out as having many reaches with better quality ratings. For instance, Boulder Creek, the upper reaches of Brownsworth Creek, and Deming Creek generally had a moderate quality rating for riffle gravel and fines; Calahan, Hammond, Leonard and Long Creeks generally had moderate quality ratings for large wood debris.

### Fish Population Summary

There were 2 or 3 salmonid species present in each of the streams surveyed (Table 4), and no non-salmonid fishes were encountered. Exotic brown trout (*Salmo trutta*) were common to streams of Gearhart Mountain, and exotic brook trout (*Salvelinus fontinalis*) were common to streams of Yamsay Mountain (Figure 1). Bull trout were present in 12 of the reaches surveyed. There was a 1-3 km overlap in the distribution of bull trout with brown trout and redband trout (*Oncorhynchus mykiss*) (Figure 9, Ziller 1992). The overlap of bull trout and brook trout was more sharply demarcated in reach 11 of Long Creek (Figure 4). There bull trout were above a falls that was almost a complete barrier to brook trout migration prior to 1991. However, large numbers of brook trout invaded reach 11 in 1992-1993, most of which were removed by an electrofishing treatment in 1994. A small number of bull trout have been observed below the falls in the upper section of reach 10 of Long Creek.

Fish abundance was higher in reach 11 of Long Creek than in Boulder Creek. A total of 871 age 1+ bull trout were estimated in reach 11 (2.6 km) of Long Creek in 1991 (Table 5). A total of 1404 age 1+ salmonids were estimated in Boulder and Dixon Creeks (8.0 km) in 1992, including 222 bull trout, 911 brown trout, and 271 redband trout. Total fish density in reach 11 of Long Creek (0.31 age 1+ fish/m) was roughly 2 times higher than in Boulder and Dixon Creeks (0.17 age 1+ fish/m). Bull trout and brown trout both preferred pool habitat over fastwater habitat, although brown trout showed a higher preference for pool habitat (Table 6).

Most age 1+ bull trout ranged between 70 mm and 200 mm fork length in both Long Creek, and Boulder and Dixon Creeks (Figure 10). From Long Creek it is seen that only a minor number of bull trout were greater than four years of age. Though data is limited, a similar length of redband trout occurred in Boulder Creek. In contrast, brown trout larger than 200 mm fork length were relatively numerous, and were found as large as 320 mm fork length in Boulder and Dixon Creeks. Age 1+ bull trout less than 150 mm were conspicuously infrequent in Boulder and Dixon Creeks, and using age class designations from Long Creek, are likely from three separate cohorts: 1989, 1990, and 1991. This inverted age class structure may be caused by recruitment failure for these

three cohorts, but a more likely cause is size selective predation by large brown trout. An inverted age-class structure, as well as low abundance (Table 5) indicates that bull trout in Boulder and Dixon Creeks face a serious threat of extinction. Removal of the brown trout population, or at least the larger individuals that may be predacious, could be a critical first step for recovery of bull trout in Boulder and Dixon Creeks.

#### REFERENCES

- Bohlin, T. 1981. Methods of estimating total stock, smolt output and survival of salmonids using electrofishing. Institute of Freshwater Research, Swedish Board of Fisheries, Report Number 59, Drottningholm, Sweden.
- Dambacher, J.M., and K.K. Jones. (In Press). Physiography of juvenile bull trout (*Salvelinus confluentus*) populations and stream habitat in Oregon. Proceedings of the Friends of the Bull Trout Conference. Trout Unlimited, Calgary, Alberta.
- Hankin, D.G. 1984. Multistage sampling designs in fisheries research: applications in small streams. *Canadian Journal of Fisheries and Aquatic Sciences* 41:1575-1591.
- Ivlev, V.S. 1961. Experimental ecology of the feeding of fishes. *Translated from the Russian* by D. Scott. Yale University Press, New Haven, Connecticut.
- Moore, K.M., K.K. Jones, and J.M. Dambacher. 1993. Methods for stream habitat surveys: Oregon Department of Fish and Wildlife, Aquatic Inventories Project. Oregon Department of Fish and Wildlife, Research and Development Section, Corvallis OR. 27 p.
- Ziller, J.S. 1992. Distribution and relative abundance of bull trout in the Sprague River subbasin, Oregon. Pages 18-29 in Howell, P.J and D.V. Buchanan, editors. Proceedings of the Gearhart Mountain bull trout workshop. Oregon Chapter of the American Fisheries Society, Corvallis OR.

Figure 1. Location of streams surveyed in the Gearhart and Yamsay Mountains, upper Sprague River, Klamath River basin, Oregon, 1991-1994; not labeled are Hammond and Leonard Creeks, which are tributaries of Brownsworth Creek.

Figure 2. Habitat survey reaches of Boulder and Dixon Creeks, North Fork Sprague River, Oregon.

Figure 3. Habitat survey reaches of Brownsworth, Hammond, and Leonard Creeks, South Fork Sprague River, Oregon.

Figure 4. Habitat survey reaches of Long and Calahan Creeks, Sycan River, Oregon.

Figure 5. Habitat survey reaches of Deming Creek, South Fork Sprague River, Oregon.

Figure 6. Habitat survey reaches of Whitworth Creek, South Fork Sprague River, Oregon.

Figure 7. Frequency distributions of habitat characteristics for stream reaches in tributaries of the Sprague River basin, Oregon; denoted by dashed lines for benchmarks of low to high habitat quality for juvenile bull trout (Dambacher 1995).

Figure 8. Frequency distributions of habitat characteristics for stream reaches in tributaries of the Sprague River basin, Oregon; denoted by dashed lines for benchmarks of low to high habitat quality for Oregon streams in late successional forests (ODFW, unpublished data).

Figure 9. Distribution limits of fishes in Boulder and Dixon Creeks, North Fork Sprague River, Oregon, 1992. Filled circles denote upstream distribution limit, unless otherwise noted.

Figure 10. Length-frequency distribution of fishes greater than 60 mm fork length in (a) Long Creek, August 1991, and (b) Boulder and Dixon Creeks, July 1992. Roman numerals in (a) denote mean fork length for age classes, determined by scales sampled from 43 fish in August 1994 (unpublished data, Lisa Borgerson, ODFW, 850 SW 15th, Corvallis, OR 97333)

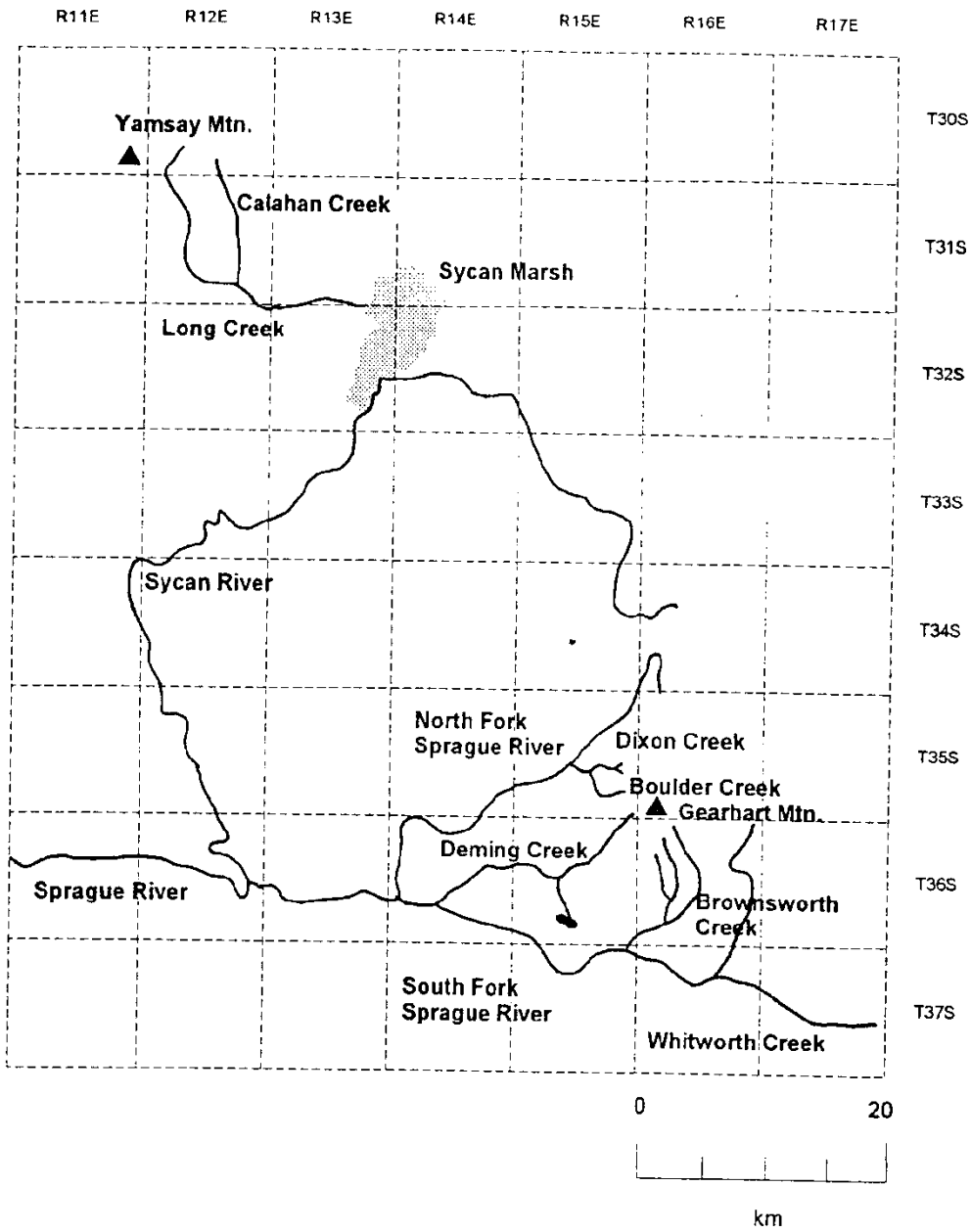


Figure 1

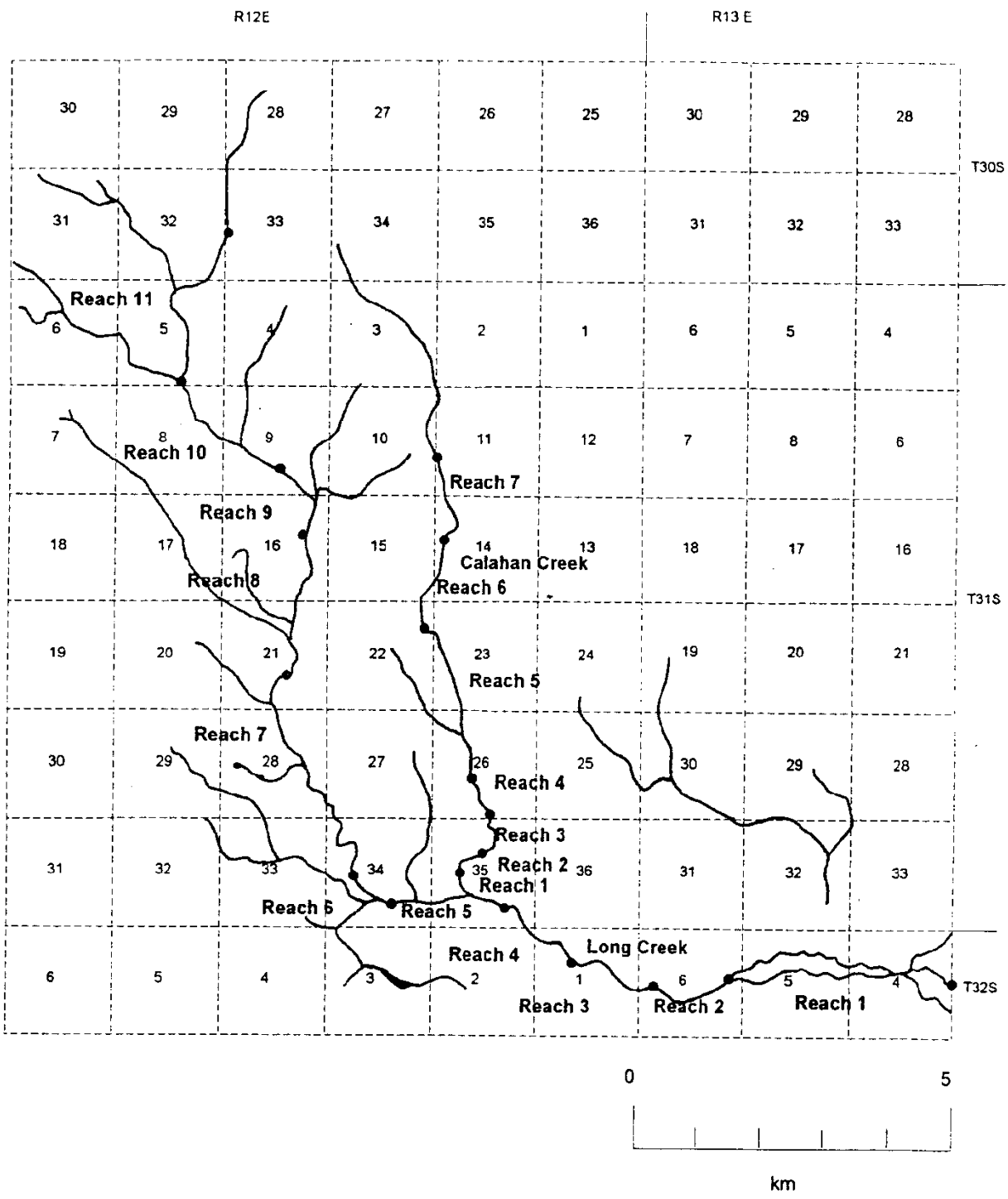


Figure 4



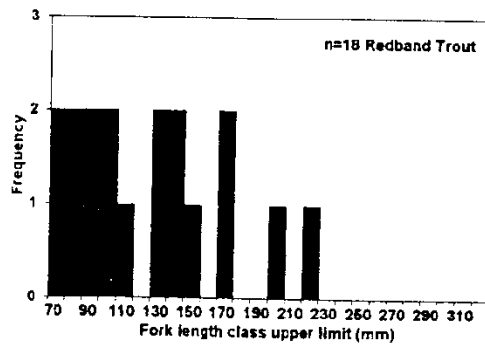
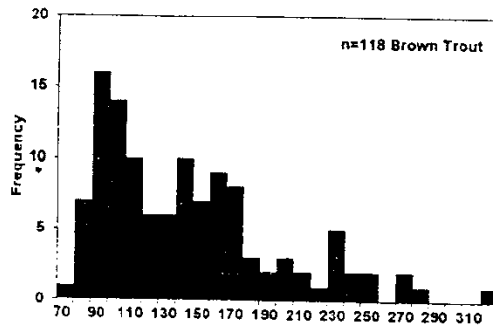
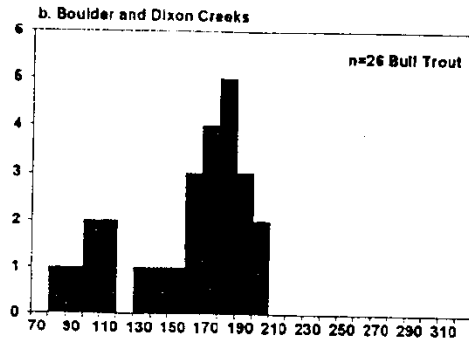
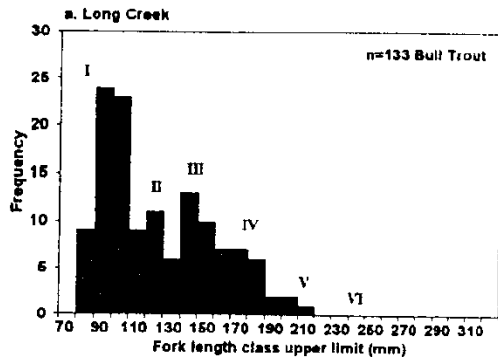


Figure 10

Table 2. Summary of habitat characteristics for stream reaches of the Sprague River basin in the Gearhart and Yamsay Mountains, Oregon

Stream	Reach	Length (m)	Gradient	Channel Form*	Land Use**	Shade % of 180 Degrees	Bank Erosion %	Undercut Banks %	Fines in Riffles %	Gravel in Riffles %	Large Boulders #/100m
Boulder Creek	1	1249	6.2	CH	MT/LG	58	0	3	17	58	24
Boulder Creek	2	626	6.3	CH	MT/LG	53	0	3	33	48	39
Boulder Creek	3	2619	7.0	CH	MT/LG	65	0	2	9	53	56
Boulder Creek	4	2119	7.0	CH	MT/LG	70	0	3	12	57	45
Brownsworth Creek	1	507	4.3	CA	HG/TH	44	6	7	15	35	43
Brownsworth Creek	2	2254	3.5	CH	HG/TH	46	15	6	15	37	28
Brownsworth Creek	3	1890	4.0	CH	HG/ST	56	29	5	21	38	24
Brownsworth Creek	4	699	3.7	CH	HG/ST	46	69	23	25	48	13
Brownsworth Creek	5	332	3.4	CA	HG/ST	66	51	9	21	56	2
Brownsworth Creek	6	1108	3.9	CH	HG/ST	71	49	14	20	55	9
Brownsworth Creek	7	438	3.5	CA	HG/ST	55	28	13	27	60	11
Brownsworth Creek	8	4445	5.2	CH	HG/ST	66	33	16	23	60	14
Calahan Creek	1	504	4.9	CH	PT/LG	63	8	3	-----	-----	80
Calahan Creek	2	517	2.1	US	PT/LG	44	31	6	-----	-----	4
Calahan Creek	3	865	2.4	CH	PT/LG	59	24	1	-----	-----	21
Calahan Creek	4	432	1.8	CA	PT/LG	56	56	4	40	50	5
Calahan Creek	5	3505	1.7	CH	PT/LG	54	35	5	45	39	5
Calahan Creek	6	816	1.4	US	HG/PT	25	35	3	-----	-----	0
Calahan Creek	7	1835	3.1	CH	HG/PT	62	26	3	-----	-----	8
Deming Creek	1	1568	3.9	CH	LG/TH	83	4	10	17	51	22
Deming Creek	2	3696	5.6	CH	LG/TH	94	0	4	11	40	28
Deming Creek	3	1968	12.0	CH	LG/ST	74	0	2	15	50	36
Dixon Creek	1	519	17.3	CH	ST/LG	54	0	4	-----	-----	10
Dixon Creek	2	867	4.6	CH	ST/LG	53	0	0	37	27	3
Hammond Creek	1	924	4.8	TC	YT	80	2	20	30	43	52
Hammond Creek	2	1346	3.8	CA	YT/LT	79	19	25	30	59	24
Leonard Creek	1	2921	6.4	TC	YT/PT	75	17	20	36	53	30
Leonard Creek	2	1438	7.7	CH	PT	76	15	17	30	33	55
Long Creek	1	4098	0.6	UA	LG	18	35	5	40	42	1
Long Creek	2	1699	1.0	UA	PT/LG	35	21	11	26	36	2
Long Creek	3	1263	1.9	CH	PT/LG	48	6	0	25	29	23
Long Creek	4	1684	1.6	CA	PT/LG	41	10	2	31	32	8
Long Creek	5	1939	1.8	CH	PT/LG	54	20	0	27	25	20
Long Creek	6	717	1.2	US	PT/LG	40	56	2	28	33	7
Long Creek	7	4547	1.4	CH	PT/LG	50	42	5	25	31	6
Long Creek	8	2677	0.9	UA	HG/PT	24	59	12	37	38	2
Long Creek	9	2228	1.6	UA	HG/PT	49	33	8	43	41	1
Long Creek	10	2277	3.4	CH	HG/PT	55	13	3	24	33	30
Long Creek	11	2635	6.5	CH	MT/LG	44	1	0	11	52	77
Whitworth Creek	1	1913	2.3	CH	PT/LT	49	13	5	68	6	31
Whitworth Creek	2	3517	2.3	UA	PT	37	51	8	66	12	11
Whitworth Creek	3	3348	5.6	CH	PT/LG	68	27	4	35	22	72
Whitworth Creek	4	1807	3.5	US	HG/PT	54	2	28	44	34	36
Whitworth Creek	5	2305	1.7	US	HG/PT	27	10	29	47	35	4

\*Channel form codes: CA-alternating hillslope and terrace constrained, CH-hillslope constrained, TC-terrace constrained, UA-unconstrained multiple channels, US-unconstrained single channel

\*\*Land use codes: TH-timber harvest, ST-second growth timber, PT-partial cut timber, MT-mature timber, LT-large timber, LG-light grazing, HG-heavy grazing

Table 2 (continued). Summary of habitat characteristics for stream reaches of the Sprague River basin in the Gearhart and Yamsay Mountains, Oregon.

Stream	Reach	Number of Pools	Pool Area %	Channel Widths per Pool	Residual Pool Depth (m)	Wood Debris		Riparian Trees Total/300 m	Conifers # > 50 cm db /300 m
						Pieces #/300 m	Volume (m <sup>3</sup> )/100		
Boulder Creek	1	6	2.6	35.9	0.4	10.3	8.3	----	----
Boulder Creek	2	4	2.5	29.5	0.4	9.6	8.7	----	----
Boulder Creek	3	68	10.1	7.8	0.3	12.9	9.1	----	----
Boulder Creek	4	30	4.8	17.2	0.2	9.2	7.0	----	----
Brownsworth Creek	1	3	3.8	30.7	0.5	4.5	1.5	549	0
Brownsworth Creek	2	13	7.3	23.4	0.3	4.1	2.0	896	0
Brownsworth Creek	3	11	5.6	31.2	0.3	4.5	4.7	1603	37
Brownsworth Creek	4	2	1.0	105.9	0.3	3.7	3.2	----	----
Brownsworth Creek	5	4	11.9	26.8	0.3	5.7	10.6	2195	0
Brownsworth Creek	6	3	0.9	92.3	0.4	7.1	18.1	6767	122
Brownsworth Creek	7	3	4.2	37.4	0.3	6.8	7.2	----	----
Brownsworth Creek	8	17	2.3	68.8	0.3	8.9	22.1	4218	177
Calahan Creek	1	7	5.8	9.9	0.3	15.7	15.3	----	----
Calahan Creek	2	14	22.9	12.3	0.2	15.5	19.6	1890	0
Calahan Creek	3	11	8.6	19.7	0.2	17.9	20.4	975	0
Calahan Creek	4	8	27.8	16.4	0.2	13.2	7.6	1158	0
Calahan Creek	5	34	13.0	27.9	0.4	15.7	17.8	1262	18
Calahan Creek	6	----	----	----	----	0.4	0.3	183	122
Calahan Creek	7	1	0.4	390.4	0.3	18.5	21.5	1768	0
Deming Creek	1	29	13.7	13.2	0.2	1.8	1.4	----	----
Deming Creek	2	57	8.5	14.4	0.3	3.2	2.6	----	----
Deming Creek	3	22	4.4	21.8	0.2	8.8	12.2	----	----
Dixon Creek	1	1	0.8	192.2	0.3	10.8	9.0	----	----
Dixon Creek	2	16	31.7	6.5	0.2	21.7	12.4	----	----
Hammond Creek	1	18	22.8	0.2	0.06	11.8	17.8	691	0
Hammond Creek	2	36	24.5	0.2	0.14	18.3	30.7	2215	0
Leonard Creek	1	93	25.3	0.2	0.13	16.0	37.5	2248	47
Leonard Creek	2	45	14.0	0.2	0.10	13.3	34.1	1524	158
Long Creek	1	154	44.1	7.2	0.4	15.3	16.0	506	61
Long Creek	2	47	31.8	7.0	0.4	26.0	33.5	780	79
Long Creek	3	6	3.9	33.4	0.5	24.6	18.9	1890	61
Long Creek	4	17	11.9	18.7	0.4	29.0	27.2	1524	61
Long Creek	5	7	4.4	45.4	0.4	15.6	19.4	2743	0
Long Creek	6	13	17.8	8.9	0.4	12.8	15.3	1280	0
Long Creek	7	53	15.4	14.3	0.5	17.4	19.8	1439	0
Long Creek	8	58	30.6	9.1	0.4	3.8	6.8	268	0
Long Creek	9	66	47.6	4.5	0.4	45.0	34.5	1768	116
Long Creek	10	13	4.7	25.4	0.4	17.6	28.4	1768	116
Long Creek	11	39	6.3	12.7	0.3	6.4	7.1	----	----
Whitworth Creek	1	30	11.7	0.2	0.20	7.8	13.3	670	20
Whitworth Creek	2	48	24.6	0.2	0.18	1.7	2.6	386	0
Whitworth Creek	3	37	8.9	0.3	0.12	17.2	14.1	2299	26
Whitworth Creek	4	20	18.1	0.3	0.05	8.1	5.7	2378	30
Whitworth Creek	5	----	----	----	----	4.2	7.9	1280	0

Table 3 Habitat quality rankings of characteristics for stream reaches of the Sprague River basin in the Gearhart and Yamsay Mountains, Oregon, H-high, M-moderate, L-low

Stream	Reach	Length [m]	Bank	Undercut	Fines in	Gravel in	Pool Area	Channel	Shade	Wood Debris		Conifers
			Erosion %*	Banks %*	Riffles %*	Riffles %*		Widths per Pool**	% of 180 Degrees*	Pieces #/100 m	Volume (m3)/100 m	# >50 cm db /300 m**
Boulder Creek	1	1249	H	M	M	M	L	L	M	L	L	----
Boulder Creek	2	626	H	M	L	M	L	L	L	M	L	----
Boulder Creek	3	2619	H	L	H	M	M	H	M	M	M	----
Boulder Creek	4	2119	H	M	M	M	L	M	M	L	L	----
Brownsworth Creek	1	507	L	M	M	L	L	L	L	L	L	L
Brownsworth Creek	2	2254	L	M	M	L	L	L	L	L	L	L
Brownsworth Creek	3	1890	L	M	M	L	L	L	M	L	L	L
Brownsworth Creek	4	699	L	H	L	M	L	L	L	L	L	----
Brownsworth Creek	5	332	L	M	M	M	M	L	M	L	M	L
Brownsworth Creek	6	1108	L	H	M	M	L	L	M	L	M	L
Brownsworth Creek	7	438	L	H	L	M	L	L	M	L	L	----
Brownsworth Creek	8	4445	L	H	L	M	L	L	M	L	M	M
Calahan Creek	1	504	L	M	----	----	L	M	M	M	M	----
Calahan Creek	2	517	L	M	----	----	M	M	L	M	M	L
Calahan Creek	3	865	L	L	----	----	L	M	M	M	M	L
Calahan Creek	4	432	L	M	L	M	M	M	M	M	L	L
Calahan Creek	5	3505	L	M	L	L	M	L	L	M	M	L
Calahan Creek	6	816	L	M	----	----	----	----	L	L	L	L
Calahan Creek	7	1835	L	M	----	----	L	L	M	M	M	L
Deming Creek	1	1568	M	M	M	M	M	M	H	L	L	----
Deming Creek	2	3696	H	M	M	L	L	M	H	L	L	----
Deming Creek	3	1968	H	L	M	M	L	L	M	L	M	----
Dixon Creek	1	519	H	M	----	----	L	L	L	M	M	----
Dixon Creek	2	867	H	L	L	L	M	H	L	M	M	----
Hammond Creek	1	924	M	H	L	L	M	H	H	M	M	L
Hammond Creek	2	1346	L	H	L	M	M	H	H	M	H	L
Leonard Creek	1	2921	L	H	L	M	M	H	M	M	H	L
Leonard Creek	2	1438	L	H	L	L	M	H	H	M	H	M
Long Creek	1	4098	L	M	L	L	H	H	L	M	M	L
Long Creek	2	1699	L	M	L	L	M	H	L	H	H	L
Long Creek	3	1263	L	L	L	L	L	L	L	M	M	L
Long Creek	4	1684	L	L	L	L	M	M	L	H	M	L
Long Creek	5	1939	L	L	L	L	L	L	L	M	M	L
Long Creek	6	717	L	L	L	L	M	M	L	M	M	L
Long Creek	7	4547	L	M	L	L	M	M	L	M	M	L
Long Creek	8	2677	L	H	L	L	M	M	L	L	L	L
Long Creek	9	2228	L	M	L	L	H	H	L	H	M	L
Long Creek	10	2277	L	M	L	L	L	L	M	M	M	L
Long Creek	11	2635	M	L	M	M	L	M	L	L	L	----
Whitworth Creek	1	1913	L	M	L	L	M	H	L	L	M	L
Whitworth Creek	2	3517	L	M	L	L	M	H	L	L	L	L
Whitworth Creek	3	3348	L	M	L	L	L	H	M	M	M	L
Whitworth Creek	4	1807	M	H	L	L	M	H	L	L	L	L
Whitworth Creek	5	2305	L	H	L	L	----	----	L	L	L	L

\* Juvenile bull trout habitat quality benchmarks (Dambacher et al. 1995)

\*\* Habitat benchmarks for Oregon late successional forest streams, unpublished data. ODFW, Aquatic Inventories Project, 850 SW 15th, Corvallis, OR 97333

Table 4 Fishes present in stream reaches of tributaries in the upper Sprague River basin, Oregon, x-verified presence, ?-suspected presence, n/d-no data

Stream	Reach	Bull Trout	Redband Trout	Brook Trout	Brown Trout
Boulder Creek	1		x		x
Boulder Creek	2	x			x
Boulder Creek	3	x			x
Boulder Creek	4	x			x
Brownworth Creek	1		?		?
Brownworth Creek	2		?		?
Brownworth Creek	3		?		?
Brownworth Creek	4		?		?
Brownworth Creek	5		?		?
Brownworth Creek	6		?		?
Brownworth Creek	7		?		?
Brownworth Creek	8	x	x		x
Calahan Creek	1		?	?	
Calahan Creek	2		?	?	
Calahan Creek	3		?	?	
Calahan Creek	4		?	?	
Calahan Creek	5		?	?	
Calahan Creek	6		?	?	
Calahan Creek	7			x	
Deming Creek	1		x		
Deming Creek	2	x	x		
Deming Creek	3	x			
Dixon Creek	1	x			x
Dixon Creek	2	x			x
Hammond Creek	1		?		?
Hammond Creek	2		?		?
Leonard Creek	1	x	x		x
Leonard Creek	2	x	x		x
Long Creek	1		?	?	
Long Creek	2		?	?	
Long Creek	3		?	?	
Long Creek	4		?	?	
Long Creek	5		?	?	
Long Creek	6		?	?	
Long Creek	7		?	?	
Long Creek	8		?	?	
Long Creek	9		?	?	
Long Creek	10	x		x	
Long Creek	11	x		x	
Whitworth Creek	1	n/d	n/d	n/d	n/d
Whitworth Creek	2	n/d	n/d	n/d	n/d
Whitworth Creek	3	n/d	n/d	n/d	n/d
Whitworth Creek	4	n/d	n/d	n/d	n/d
Whitworth Creek	5	n/d	n/d	n/d	n/d

Table 5. Population estimates of age 1+ fishes in reach 11 of Long Creek (August 1991), and in Boulder and Dixon Creeks (July 1992), Sprague River basin, Oregon.

Stream	Fish Species	Habitat Type	Population Estimate	95% CI	CI % of Estimate	Fish per Square Meter	Fish per Lineal Meter
Long Creek	Bull Trout	Pool	97	18	19	0.15	0.43
		Fastwater	774	217	28	0.11	0.31
		Total	871	217	25	0.11	0.31
Boulder and Dixon Creeks	Bull Trout	Pool	52	31	60	0.037	0.096
		Fastwater	170	78	46	0.016	0.033
		Total	222	84	38	0.018	0.039
	Brown Trout	Pool	297	160	54	0.18	0.50
		Fastwater	614	541	88	0.039	0.094
		Total	911	564	62	0.053	0.13
Redband Trout Total			271*	-----	-----	-----	-----

\* From sample size of only 3 habitat units in lower portions of basin.

Table 6. Habitat electivity E (Ivlev 1961) of age 1+ salmonids Long Creek, and Boulder and Dixon Creeks, Sprague River basin Oregon; where  $E = (\% \text{ use} - \% \text{ area}) / (\% \text{ use} + \% \text{ area})$ ; negative values describe avoidance, positive values describe preference, values near zero indicate neutral selection.

Stream	Species	Fastwater Habitat	Pool Habitat
Long Creek	Bull Trout	-0.01	0.14
Boulder and Dixon Creeks	Bull Trout	-0.07	0.34
	Brown Trout	-0.14	0.54

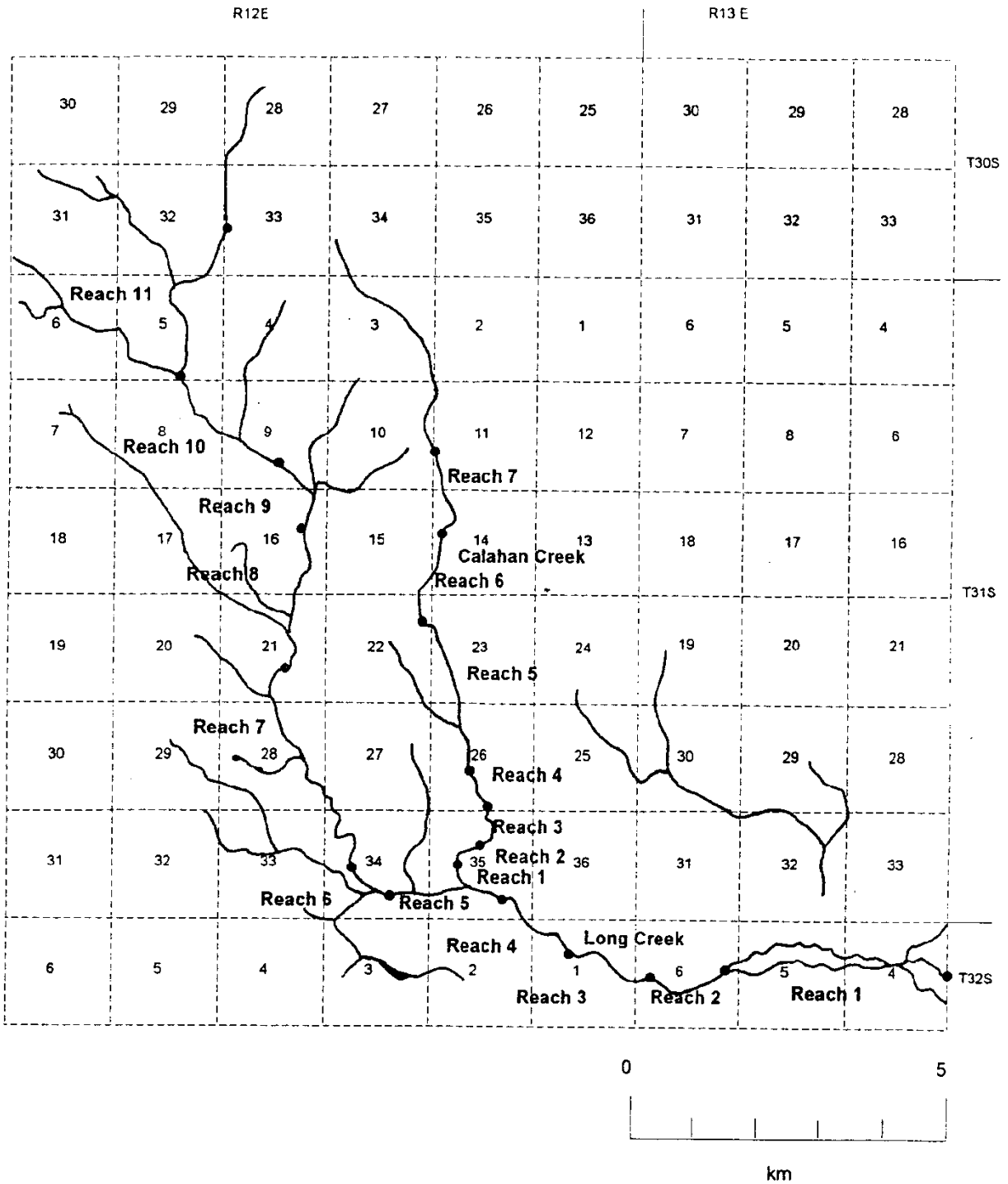


Figure 4



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ODFW AQUATIC INVENTORY PROJECT

STREAM REPORT

STREAM: Long Creek

BASIN: Sycan River

DATES: August 15, 1991 and August 10--September 1, 1993

CREW: Jason Podrabsky & Ron Lefler 1991 / Jason Podrabsky & Tracy Jansen 1993

STREAM ORDER: 4

NUMBER TRIBS: 27

USGS MAPS: Yamsay Mountain, Hamelton Butte, Sycan Marsh West

GENERAL DESCRIPTION:

The Long Creek survey begins at a fence line in the Sycan Marsh and extends 25,764 meters. Long Creek is a very diverse system. The valley has broad sections with wide floodplains or constraining terraces alternating with narrow sections with a moderate v-shape. The channel morphology was often unconstrained with multiple channels or constrained by hillslopes or alternating hillslopes and terraces. There are many marshy units and meadow reaches. Wood is abundant except in the meadow reaches. The riparian zone is dominated by small (3-30cm diameter) conifers, grasses, and shrubs. Land use is a mix of grazing and partial cut timber. Many tree frogs, Western toads, and lampreys were noted.

REACH DESCRIPTIONS:

Reach 1: (T32S-R13E-4NE) The first reach of Long Creek begins at a fence line and extends 4098 meters in a primary channel and 5556 meters in secondary channels. This reach has an index of sinuosity of 1.22. The broad valley (VWI 20) has wide floodplains and unconstrained multiple channels. Land use is moderate grazing and is owned for the first 2280 meters by the Nature Conservancy. The second half of the reach is owned by Weyerhaeuser. Riparian vegetation is primarily perennial grasses and a few small (3cm diameter) conifers. Two diversions and many Western toads were noted.

Reach 2: (T32S-R13E-6SE) Reach 2 begins where the primary and secondary channels of reach one come together and extends 1699 meters. The valley floor (VWI 3.5-20.0) has a wide floodplain. The channel is unconstrained and is divided between single and multiple channels. This reach has an index of sinuosity of 1.57. The meandering channels were covered with brush. The riparian zone is dominated by shrubs and conifers in the 30cm diameter class. Land use is partial cut timber and light grazing.

- Reach 3:(T32S-R13E-6SW) Reach 3 begins where the valley narrows and extends 1263 meters. The narrow valley floor (VWI 1.2-1.5) has a moderate v-shape. The channel is hillslope constrained. Land use is partial cut timber and light grazing. Conifers in the 30cm diameter class and shrubs make up the riparian vegetation. A golden eagle was noted capturing prey near the channel.
- Reach 4:(T32S-R12E-1NW) Reach 4 begins where the valley broadens (VWI 3.0-6.0) and has constraining terraces. The channel is constrained by alternating terraces and hillslopes and extends for 1684 meters. Land use is partial cut timber and light grazing. Riparian vegetation is dominated by shrubs and conifers in the 30cm diameter class.
- Reach 5:(T31S-R12E-35SW) Reach 5 extends for 1939 meters in a narrow valley (VWI 1.2-2.1). The valley floor has a moderate to steep v-shape. The channel is hillslope constrained. Sections of the reach have a broad valley floor with constraining terraces and a channel constrained by alternating terraces and hillslopes. Land use is partial cut timber and light grazing. The riparian vegetation is dominated by 15cm diameter conifers and shrubs. Calahan Creek enters in this reach.
- Reach 6:(T31S-R12E-34SE) Reach 6 begins where the valley broadens (VWI 2.5-5.5) into a wide floodplain and extends 717 meters. The single channel is unconstrained. Land use is partial cut timber and light grazing. Riparian vegetation is made up of shrubs and 30cm diameter conifers.
- Reach 7:(T31S-R12E-28SE) Reach 7 extends 4547 meters. The valley is predominately narrow (VWI 1.5) with a moderate v-shape, but parts of the valley floor are broad (VWI 5.0) with a wide floodplain. Land use is partial cut timber and light grazing. Riparian vegetation contains 15cm diameter conifers and annual grasses. The 400-00 road crosses the creek in this reach. Many toads and tree frogs were noted.
- Reach 8:(T31S-R12E-21SE) Reach 8 is Calahan Meadow. It extends for 2677 meters. The valley floor is broad (VWI 5-20) with a wide floodplain. The multiple channels are unconstrained. Heavy grazing and partial cut timber make up the land use. Riparian vegetation is a combination of perennial grasses and shrubs. A large abundance of tree frogs, Western toads, and beaver activity was noted.
- Reach 9:(T31S-R12E-9SE) Reach 9 begins at the end of the meadow and extends 2228 meters in a primary channel. There is an additional 1113 meters of secondary channels. The broad valley floor (VWI 3.3-20.0) has a wide floodplain. There is a combination of single and multiple unconstrained channels. This reach has an index of sinuosity of 1.33. Heavy grazing and partial cut timber are the principle land uses. Small conifers (3cm diameter) and shrubs make up the riparian vegetation. There is a lot of beaver activity and many beaver dams. Many marshy units, tree frogs, and Western toads were noted, as well as a dead lamprey.

Reach 10: (T31S-R12E-9SW) Reach 10 begins just before the 400-00 road crosses and extends for 2277 meters in a narrow valley (VWI 1.0-2.3) with a moderate v-shape. The channel is hillslope constrained. This reach has an index of sinuosity of 1.58. The reach ends at a 1.4 meter high bedrock step that is thought to be a barrier separating a population of bull trout in the upper reach from the brook trout below. Land use in this area is heavy grazing and partial cut timber. The riparian vegetation is 15cm diameter conifers and shrubs.

Reach 11: (T31S-R12E-9SW) Reach 11 begins at the bedrock step and extends 2635 meters. The survey ends at the upstream limit of bull trout distribution noted in a 1991 survey. The valley is narrow (VWI 1.0) and has a moderate v-shape. The channel is hillslope constrained. The 1993 survey ended at the first tributary junction in this reach. The last 243 meters were surveyed in 1991. Land use is mature timber and light grazing. Riparian vegetation is 30cm diameter conifers.

COMMENTS:

Long Creek is a very diverse system. It contains a wide variety of habitats and inhabitants. Tree frogs, Western toads, Sandhill cranes, golden eagles, mule deer, lampreys, brook trout, and bull trout all use this system. There is a plan proposed to alter the bedrock step in upper reach 10 in order to further isolate the bull trout and brook trout. One concern is that if the bull trout are migrating downstream to spawn, after the alteration of this step, they may not be able to return to their current territory in the upper reach.

REACH 1

T32S-R13E-4NE

REACH 1

**Valley and Channel Summary**

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	100

Valley Width Index avg: 20.0 range: 20.0-20.0

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	0	Single Channel	0
Bedrock	0	Multiple Channel	100
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	4,098	14,296	0
Secondary	5,556	15,117	0

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	3.1	Width	3.7	Width	4.3
Depth	0.44	Height	0.3	Height	0.5
W:D	12.5				

Stream Flow Type: MF Water Temp: 0.0-0.0  
 Avg. Unit Gradient: 0.6 Habitat Units/100m: 3.3

**Riparian, Bank, and Wood Summary**

Land Use: MG Riparian Veg.: P/C3

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>
Non-Erodible	0.1
Vegetation Stabilized	64.8
Boulder-cobble	0.0
Actively Eroding	35.1

Undercut Banks

Unit Average: 4.52%  
Open Sky (% of 180)  
 Unit Average: 82  
 Range: 42-94

Large Woody Debris

Average Complexity Score: 1.0			
Pieces	627	Volume (m <sup>3</sup> )	657
Pieces/100m	15.3	Volume/100m	16.0

REACH 2

T32S-R13E-6SE

REACH 2

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	100

Valley Width Index avg: 10.7 range: 3.5-20.0

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	0	Single Channel	23
Bedrock	0	Multiple Channel	77
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,699	8,445	0
Secondary	601	1,771	0

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	4.5	Width	5.2	Width	5.9
Depth	0.48	Height	0.2	Height	0.5
W:D	15.1				

Stream Flow Type: MF Water Temp: 0.0-15.5  
 Avg. Unit Gradient: 1.0 Habitat Units/100m: 4.7

Riparian, Bank, and Wood Summary

Land Use: PT/LG Riparian Veg.: S/C30

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>
Non-Erodible	0.0
Vegetation Stabilized	79.3
Boulder-cobble	0.0
Actively Eroding	20.7

Undercut Banks

Unit Average: 10.92%  
Open Sky (% of 180)  
 Unit Average: 65  
 Range: 31-83

Large Woody Debris

Average Complexity Score: 1.2			
Pieces	441	Volume(m <sup>3</sup> )	569
Pieces/100m	26.0	Volume/100m	33.5

REACH 3

T32S-R13E-6SW

REACH 3

**Valley and Channel Summary**

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	100	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index avg: 1.4 range: 1.2-1.5

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	100	Single Channel	0
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,263	6,708	0
Secondary	39	144	0

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	5.6	Width	6.3	Width	6.4
Depth	0.37	Height	0.3	Height	0.1
W:D	18.6				

Stream Flow Type: MF Water Temp: 14.0-14.0  
Avg. Unit Gradient: 1.9 Habitat Units/100m: 2.2

**Riparian, Bank, and Wood Summary**

Land Use: PT/LG Riparian Veg.: C30/S

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>	<u>Undercut Banks</u>
Non-Erodible	0.0	Unit Average: 0.00%
Vegetation Stabilized	94.4	<u>Open Sky (% of 180)</u>
Boulder-cobble	0.0	Unit Average: 52
Actively Eroding	5.6	Range: 39-67

Large Woody Debris

Average Complexity Score: 1.1			
Pieces	310	Volume(m <sup>3</sup> )	238
Pieces/100m	24.6	Volume/100m	18.9

REACH 4

T32S-R12E-1NW

REACH 4

**Valley and Channel Summary**

Valley Characteristics (Percent Reach Length)			
<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	100
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index avg: 3.8 range: 3.0-6.0

Channel Morphology (Percent Reach Length)			
<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	0	Single Channel	0
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	100		
Landuse	0		

Channel Characteristics			
<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,684	9,448	0
Secondary	253	564	0

Channel Dimensions					
<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	5.2	Width	5.3	Width	5.9
Depth	0.41	Height	0.3	Height	0.5
W:D	16.4				

Stream Flow Type: MF Water Temp: 10.0-10.0  
Avg. Unit Gradient: 1.6 Habitat Units/100m: 2.7

**Riparian, Bank, and Wood Summary**

Land Use: PT/LG Riparian Veg.: S/C30

Bank Stability			<u>Undercut Banks</u>	
<u>Bank Class</u>	<u>Percent Reach Length</u>		Unit Average: 2.08%	
Non-Erodible	0.4			
Vegetation Stabilized	89.3		<u>Open Sky (% of 180)</u>	
Boulder-cobble	0.0		Unit Average: 59	
Actively Eroding	10.3		Range: 39-72	

<u>Large Woody Debris</u>			
Average Complexity Score: 1.2			
Pieces	489	Volume(m <sup>3</sup> )	458
Pieces/100m	29.0	Volume/100m	27.2



REACH 5

T31S-R12E-35SW

REACH 5

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)			
<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	20	Constraining Terraces	9
Moderate V-shape	71	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index avg: 1.8 range: 1.2-2.1

Channel Morphology (Percent Reach Length)			
<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	91	Single Channel	0
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	9		
Landuse	0		

Channel Characteristics			
<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,939	11,388	0
Secondary	0	0	0

Channel Dimensions					
<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	5.0	Width	6.1	Width	6.4
Depth	0.36	Height	0.3	Height	0.4
W:D	17.3				

Stream Flow Type: MF Water Temp: 9.0-11.5  
 Avg. Unit Gradient: 1.8 Habitat Units/100m: 2.2

Riparian, Bank, and Wood Summary

Land Use: PT/LG Riparian Veg.: C15/S

Bank Stability		<u>Undercut Banks</u>
<u>Bank Class</u>	<u>Percent Reach Length</u>	Unit Average: 0.23%
Non-Erodible	0.0	
Vegetation Stabilized	79.8	<u>Open Sky (% of 180)</u>
Boulder-cobble	0.0	Unit Average: 46
Actively Eroding	20.2	Range: 33-72

<u>Large Woody Debris</u>			
Average Complexity Score: 1.1			
Pieces	302	Volume(m <sup>3</sup> )	375
Pieces/100m	15.6	Volume/100m	19.4

REACH 6

T31S-R12E-J4SE

REACH 6

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

Narrow Valley Floor		Broad Valley Floor	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	100

Valley Width Index avg: 4.3 range: 2.5-5.5

Channel Morphology (Percent Reach Length)

Constrained		Unconstrained	
Hillslope	0	Single Channel	100
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

Type	Length	Area	Dry Units
Primary	717	3,847	0
Secondary	130	114	0

Channel Dimensions

Wetted Surface		Active Channel		First Terrace	
Width	4.5	Width	6.2	Width	8.3
Depth	0.37	Height	0.4	Height	0.5
W:D	24.4				

Stream Flow Type: MF Water Temp: 5.0-5.0  
 Avg. Unit Gradient: 1.2 Habitat Units/100m: 4.0

Riparian, Bank, and Wood Summary

Land Use: PT/LG Riparian Veg.: S/C30

Bank Stability		Undercut Banks
Bank Class	Percent Reach Length	Unit Average: 2.21%
Non-Erodible	0.0	
Vegetation Stabilized	44.0	Open Sky (% of 180)
Boulder-cobble	0.0	Unit Average: 60
Actively Eroding	56.0	Range: 42-86

Large Woody Debris

Average Complexity Score: 1.1			
Pieces	92	Volume(m <sup>3</sup> )	110
Pieces/100m	12.8	Volume/100m	15.3

REACH 7

T31S-R12E-28SE

REACH 7

**Valley and Channel Summary**

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	86	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	14

Valley Width Index avg: 2.4 range: 1.5-5.0

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	86	Single Channel	0
Bedrock	0	Multiple Channel	14
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	4,547	24,366	0
Secondary	270	624	0

Channel Dimensions

<u>Wetted Surface</u>	<u>Active Channel</u>	<u>First Terrace</u>
Width 5.3	Width 6.0	Width 8.5
Depth 0.39	Height 0.3	Height 0.4
W:D 23.5		

Stream Flow Type: MF Water Temp: 5.5-12.5  
Avg. Unit Gradient: 1.4 Habitat Units/100m: 3.1

**Riparian, Bank, and Wood Summary**

Land Use: PT/LG Riparian Veg.: C15/A

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>
Non-Erodible	0.3
Vegetation Stabilized	58.1
Boulder-cobble	0.0
Actively Eroding	41.5

Undercut Banks

Unit Average: 4.97%  
Open Sky (% of 180)  
Unit Average: 50  
Range: 33-89

Large Woody Debris

Average Complexity Score: 1.1			
Pieces	791	Volume(m <sup>3</sup> )	900
Pieces/100m	17.4	Volume/100m	19.8

REACH 8

T31S-R12E-21SE

REACH 8

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	100

Valley Width Index avg: 14.8 range: 5.0-20.0

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	0	Single Channel	0
Bedrock	0	Multiple Channel	100
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	2,677	10,215	0
Secondary	809	1,303	0

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	3.3	Width	5.1	Width	15.8
Depth	0.45	Height	0.3	Height	0.5
W:D	13.6				

Stream Flow Type: MF Water Temp: 6.5-6.5  
 Avg. Unit Gradient: 0.9 Habitat Units/100m: 3.5

Riparian, Bank, and Wood Summary

Land Use: HG/PT Riparian Veg.: P/S

<u>Bank Stability</u>		<u>Undercut Banks</u>
<u>Bank Class</u>	<u>Percent Reach Length</u>	Unit Average: 11.76%
Non-Erodible	0.0	
Vegetation Stabilized	41.5	<u>Open Sky (% of 180)</u>
Boulder-cobble	0.0	Unit Average: 76
Actively Eroding	58.5	Range: 47-94

Large Woody Debris

Average Complexity Score: 1.0			
Pieces	101	Volume(m <sup>3</sup> )	182
Pieces/100m	3.8	Volume/100m	6.8

REACH 9

T31S-R12E-9SE

REACH 9

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	0	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	100

Valley Width Index avg: 17.0 range: 3.3-20.0

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	0	Single Channel	37
Bedrock	0	Multiple Channel	63
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	2,228	10,789	0
Secondary	1,113	5,933	0

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	5.5	Width	7.5	Width	8.4
Depth	0.40	Height	0.3	Height	0.5
W:D	15.9				

Stream Flow Type: MF Water Temp: 0.0-12.0  
Avg. Unit Gradient: 1.6 Habitat Units/100m: 4.5

Riparian, Bank, and Wood Summary

Land Use: HG/PT Riparian Veg.: C3/S

<u>Bank Stability</u>		<u>Undercut Banks</u>
<u>Bank Class</u>	<u>Percent Reach Length</u>	Unit Average: 8.29%
Non-Erodible	0.0	
Vegetation Stabilized	66.8	<u>Open Sky (% of 180)</u>
Boulder-cobble	0.0	Unit Average: 51
Actively Eroding	33.2	Range: 31-81

Large Woody Debris

Average Complexity Score: 1.3			
Pieces	1,003	Volume(m <sup>3</sup> )	769
Pieces/100m	45.0	Volume/100m	34.5

REACH 10

T31S-R12E-9SW

REACH 10

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	100	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index avg: 1.3 range: 1.0-2.3

Channel Morphology (Percent Reach Length)

<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	100	Single Channel	0
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	2,277	10,494	0
Secondary	351	892	1

Channel Dimensions

<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	5.1	Width	6.9	Width	7.9
Depth	0.32	Height	0.4	Height	0.2
W:D	18.9				

Stream Flow Type: MF Water Temp: 10.5-10.5  
 Avg. Unit Gradient: 3.4 Habitat Units/100m: 3.1

Riparian, Bank, and Wood Summary

Land Use: HG/PT Riparian Veg.: C15/S

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>
Non-Erodible	1.9
Vegetation Stabilized	84.8
Boulder-cobble	0.0
Actively Eroding	13.4

Undercut Banks

Unit Average: 2.72%  
Open Sky (% of 180)  
 Unit Average: 45  
 Range: 11-75

Large Woody Debris

Average Complexity Score: 1.1			
Pieces	401	Volume (m <sup>3</sup> )	646
Pieces/100m	17.6	Volume/100m	28.4

REACH 11

T31S-R12E-SE5

REACH 11

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)			
<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	100	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index avg: 1.0 range: 1.0-1.0

Channel Morphology (Percent Reach Length)			
<u>Constrained</u>		<u>Unconstrained</u>	
Hillslope	100	Single Channel	0
Bedrock	0	Multiple Channel	0
Terrace	0	Braided Channel	0
Alt. Terrace/Hill	0		
Landuse	0		

Channel Characteristics			
<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	2,635	7,956	0
Secondary	129	214	0

Channel Dimensions					
<u>Wetted Surface</u>		<u>Active Channel</u>		<u>First Terrace</u>	
Width	2.9	Width	5.3	Width	0.0
Depth	0.27	Height	0.2	Height	0.0
W:D	18.5				

Stream Flow Type: MF Water Temp: 52.0-60.0  
 Avg. Unit Gradient: 6.5 Habitat Units/100m: 6.6

Riparian, Bank, and Wood Summary

Land Use: MT/LG Riparian Veg.: C30

Bank Stability		<u>Undercut Banks</u>
<u>Bank Class</u>	<u>Percent Reach Length</u>	<u>Unit Average:</u>
Non-Erodible	1.5	0.11%
Vegetation Stabilized	97.5	<u>Open Sky (% of 180)</u>
Boulder-cobble	0.0	Unit Average: 56
Actively Eroding	0.9	Range: 28-75

<u>Large Woody Debris</u>			
Average Complexity Score: 1.1			
Pieces	168	Volume(m <sup>3</sup> )	187
Pieces/100m	6.4	Volume/100m	7.1

REACH 1 T32S-R13E-4NE REACH 1

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CULVERT CROSSING	2	12	1.3	0.15	15	0	0	0	0	0	0	100
GLIDE	4	149	3.7	0.31	587	0	25	30	36	9	0	0
POOL-DAMMED	1	66	3.5	0.70	232	3	50	35	5	5	5	0
POOL-LATERAL SCOUR	152	3,968	3.2	0.65	12,698	6	29	38	27	6	0	0
POOL-PLUNGE	1	7	6.6	1.20	44	0	20	40	35	5	0	0
RAPID/BOULDERS	9	143	3.1	0.24	482	0	11	22	43	24	1	0
RIFFLE	139	4,934	2.9	0.25	14,247	18	13	27	42	18	0	0
RIFFLE W/ POCKETS	10	373	2.9	0.15	1,091	0	14	25	41	21	0	0
STEP/STRUCTURE	3	2	7.9	0.05	18	0	53	13	0	0	0	0
<b>Total:</b>	<b>321</b>	<b>9,654</b>	<b>3.1</b>	<b>0.44</b>	<b>29,413</b>	<b>27</b>	<b>Avg:21</b>	<b>32</b>	<b>34</b>	<b>12</b>	<b>0</b>	<b>1</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area (m <sup>2</sup> )	Percent	Large Boulders Number	Wood #/100m <sup>2</sup>	Class
Dammed & BW Pools	1	66	3.5	0.70	232	0.79	3	1.29	1.0
Scour Pools	153	3,975	3.2	0.66	12741	43.32	6	0.05	1.0
Glides	4	149	3.7	0.31	587	2.00	0	0.00	1.0
Riffles	149	5,307	2.9	0.24	15338	52.15	18	0.12	1.0
Rapids	9	143	3.1	0.24	482	1.64	0	0.00	1.1
Cascades	0	0	.	.	0	0.00	0	0.00	.
Step/Falls	3	2	7.9	0.05	18	0.06	0	0.00	1.0
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.



REACH 2

T32S-R13E-6SE

REACH 2

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
POOL-LATERAL SCOUR	46	713	4.4	0.73	3,227	7	16	30	33	19	2	C
POOL-PLUNGE	1	5	4.4	0.60	22	0	45	40	15	0	0	C
RAPID/BOULDERS	33	760	4.3	0.29	3,599	27	6	17	31	40	6	C
RIFFLE	22	565	4.2	0.29	2,317	8	7	21	36	31	5	C
RIFFLE W/ POCKETS	4	246	3.8	0.40	877	0	16	26	34	24	0	C
STEP/COBBLE	1	3	8.7	0.10	29	0	5	15	30	50	0	C
STEP/LOG	2	8	13.1	0.13	145	0	30	40	25	5	0	C
<b>Total:</b>	<b>109</b>	<b>2,300</b>	<b>4.5</b>	<b>0.48</b>	<b>10,216</b>	<b>42</b>	<b>Avg:12</b>	<b>24</b>	<b>33</b>	<b>28</b>	<b>4</b>	<b>C</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup> Class
					(m <sup>2</sup> )	Percent		
Dammed & BW Pools	0	0	.	.	0	0.00	0	0.00
Scour Pools	47	718	4.4	0.73	3249	31.80	7	0.22 1.2
Glides	0	0	.	.	0	0.00	0	0.00
Riffles	26	811	4.1	0.31	3195	31.27	8	0.25 1.0
Rapids	33	760	4.3	0.29	3599	35.23	27	0.75 1.2
Cascades	0	0	.	.	0	0.00	0	0.00
Step/Falls	3	12	11.6	0.12	174	1.70	0	0.00 2.0
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00
Dry	0	0	.	.	0	0.00	0	0.00

REACH 3

T32S-R13E-6SW

REACH 3

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
POOL-DAMMED	1	8	5.5	0.80	45	1	20	40	25	10	5	0
POOL-LATERAL SCOUR	5	49	4.4	0.80	219	10	15	26	25	21	13	0
RAPID/BOULDERS	14	1,162	5.1	0.28	6,113	267	0	10	21	34	35	0
RIFFLE	4	60	5.3	0.29	320	8	6	19	29	33	14	0
RIFFLE W/ POCKETS	1	17	5.5	0.30	95	3	10	20	30	35	5	0
STEP/LOG	3	6	10.6	0.05	59	5	32	30	20	13	5	0
<b>Total:</b>	<b>28</b>	<b>1,302</b>	<b>5.6</b>	<b>0.37</b>	<b>6,852</b>	<b>294</b>	<b>Avg: 8</b>	<b>18</b>	<b>23</b>	<b>28</b>	<b>23</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	1	8	5.5	0.80	45	0.66	1	2.22	2.0
Scour Pools	5	49	4.4	0.80	219	3.20	10	4.56	1.0
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	5	77	5.4	0.29	414	6.05	11	2.66	1.2
Rapids	14	1,162	5.1	0.28	6113	89.23	267	4.37	1.0
Cascades	0	0	.	.	0	0.00	0	0.00	.
Step/Falls	3	6	10.6	0.05	59	0.87	5	8.42	1.7
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 4

T32S-R12E-1NW

REACH 4

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	1	46	2.2	0.15	101	0	10	30	40	20	0	0
POOL-DAMMED	1	16	7.1	0.60	114	0	20	40	30	10	0	0
POOL-LATERAL SCOUR	16	207	5.0	0.72	1,082	15	12	26	27	23	10	1
RAPID/BOULDERS	24	1,389	5.3	0.28	7,515	107	2	12	24	36	27	0
RIFFLE	9	276	4.6	0.30	1,176	11	8	23	32	29	8	0
STEP/LOG	2	3	9.3	0.08	24	0	25	35	30	10	0	0
<b>Total:</b>	<b>53</b>	<b>1,937</b>	<b>5.2</b>	<b>0.41</b>	<b>10,012</b>	<b>133</b>	<b>Avg: 7</b>	<b>20</b>	<b>27</b>	<b>29</b>	<b>17</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	1	16	7.1	0.60	114	1.14	0	0.00	2.0
Scour Pools	16	207	5.0	0.72	1082	10.80	15	1.39	1.1
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	9	276	4.6	0.30	1176	11.75	11	0.94	1.2
Rapids	24	1,389	5.3	0.28	7515	75.06	107	1.42	1.1
Cascades	1	46	2.2	0.15	101	1.01	0	0.00	2.0
Step/Falls	2	3	9.3	0.08	24	0.24	0	0.00	2.0
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 5

T31S-R12E-35SW

REACH 5

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	1	56	7.1	0.35	400	44	5	15	15	25	40	0
POOL-LATERAL SCOUR	6	79	5.6	0.70	445	16	15	36	26	17	7	0
POOL-PLUNGE	1	8	6.6	0.80	51	0	20	40	20	20	0	0
RAPID/BOULDERS	16	1,372	5.8	0.28	8,048	279	0	10	20	35	34	0
RIFFLE	14	398	5.7	0.34	2,298	42	6	21	25	31	16	0
RIFFLE W/ POCKETS	1	22	5.2	0.25	117	0	10	20	40	30	0	0
STEP/BOULDERS	1	2	9.8	0.20	22	7	0	5	15	35	45	0
STEP/LOG	3	1	7.1	0.07	9	0	30	40	30	0	0	0
<b>Total:</b>	<b>43</b>	<b>1,939</b>	<b>6.0</b>	<b>0.36</b>	<b>11,388</b>	<b>388</b>	<b>Avg: 7</b>	<b>20</b>	<b>23</b>	<b>28</b>	<b>21</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area (m <sup>2</sup> )	Percent	Large Boulders Number	Wood #/100m <sup>2</sup>	Class
Dammed & BW Pools	0	0	.	.	0	0.00	0	0.00	.
Scour Pools	7	87	5.7	0.71	496	4.36	16	3.23	1.1
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	15	421	5.7	0.34	2414	21.20	42	1.74	1.1
Rapids	16	1,372	5.8	0.28	8048	70.67	279	3.47	1.1
Cascades	1	56	7.1	0.35	400	3.51	44	11.01	1.0
Step/Falls	4	4	7.8	0.10	30	0.27	7	23.18	1.0
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 6

T31S-R12E-34SE

REACH 6

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	1	33	0.5	0.10	16	10	20	10	30	30	10	0
POOL-LATERAL SCOUR	12	149	4.4	0.66	696	3	18	28	32	19	3	0
POOL-PLUNGE	1	6	2.2	0.70	12	0	25	25	10	40	0	0
RAPID/BOULDERS	11	402	3.7	0.20	1,791	25	12	23	32	26	7	0
RIFFLE	6	256	5.6	0.23	1,436	12	7	21	33	37	3	0
STEP/LOG	3	1	8.0	0.07	10	1	24	38	34	3	0	0
<b>Total:</b>	<b>34</b>	<b>847</b>	<b>4.5</b>	<b>0.37</b>	<b>3,961</b>	<b>51</b>	<b>Avg:15</b>	<b>25</b>	<b>32</b>	<b>24</b>	<b>4</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	0	0	.	.	0	0.00	0	0.00	.
Scour Pools	13	155	4.2	0.66	708	17.88	3	0.42	1.2
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	6	256	5.6	0.23	1436	36.25	12	0.84	1.0
Rapids	11	402	3.7	0.20	1791	45.21	25	1.40	1.0
Cascades	1	33	0.5	0.10	16	0.41	10	60.98	1.0
Step/Falls	3	1	8.0	0.07	10	0.24	1	10.31	1.3
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 7 T31S-R12E-28SE REACH 7

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	1	1	11.8	0.10	8	0	10	20	30	40	0	0
CULVERT CROSSING	1	15	3.6	0.30	55	0	0	0	0	0	0	100
POOL-LATERAL SCOUR	49	739	4.9	0.67	3,678	21	13	30	33	21	4	0
POOL-PLUNGE	4	36	5.1	0.95	177	0	12	30	20	27	12	0
RAPID/BOULDERS	51	2,776	4.9	0.25	14,046	194	5	15	27	34	19	0
RIFFLE	22	1,152	5.4	0.24	6,449	47	6	19	31	34	10	0
RIFFLE W/ POCKETS	1	88	5.6	0.30	493	1	5	15	25	40	15	0
STEP/LOG	18	11	7.1	0.08	83	0	29	38	27	7	0	0
<b>Total:</b>	<b>147</b>	<b>4,817</b>	<b>5.3</b>	<b>0.39</b>	<b>24,989</b>	<b>263</b>	<b>Avg:11</b>	<b>24</b>	<b>29</b>	<b>26</b>	<b>10</b>	<b>1</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area (m <sup>2</sup> )	Large Boulders Percent	Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
Dammed & BW Pools	0	0	.	.	0	0.00	0	0.00	.
Scour Pools	53	774	4.9	0.69	3855	15.43	21	0.54	1.2
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	23	1,240	5.4	0.24	6943	27.78	48	0.69	1.0
Rapids	51	2,776	4.9	0.25	14046	56.21	194	1.38	1.1
Cascades	1	1	11.8	0.10	8	0.03	0	0.00	1.0
Step/Falls	18	11	7.1	0.08	83	0.33	0	0.00	1.2
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 8

T31S-R12E-21SE

REACH 8

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	1	12	0.8	0.25	10	0	60	30	10	0	0	0
POOL-BACKWATER	1	20	1.3	0.50	26	0	40	20	20	20	0	0
POOL-BEAVER DAM	2	53	5.1	0.95	247	0	40	40	18	3	0	0
POOL-LATERAL SCOUR	54	937	3.4	0.68	3,226	8	23	27	31	19	1	0
POOL-PLUNGE	1	7	4.4	0.80	29	0	20	30	40	10	0	0
RAPID/BOULDERS	7	201	3.2	0.28	677	17	11	19	30	36	4	0
RIFFLE	52	2,254	3.1	0.24	7,292	31	15	22	38	25	1	0
STEP/LOG	2	1	5.2	0.10	4	0	35	30	30	5	0	0
STEP/STRUCTURE	2	1	6.1	0.08	7	0	60	30	10	0	0	0
<b>Total:</b>	<b>122</b>	<b>3,485</b>	<b>3.3</b>	<b>0.45</b>	<b>11,518</b>	<b>56</b>	<b>Avg:20</b>	<b>25</b>	<b>33</b>	<b>21</b>	<b>1</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Boulders #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	3	73	3.8	0.80	274	2.37	0	0.00	1.3
Scour Pools	55	943	3.4	0.68	3255	28.26	8	0.25	1.0
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	52	2,254	3.1	0.24	7292	63.31	31	0.43	1.0
Rapids	7	201	3.2	0.28	677	5.88	17	2.51	1.0
Cascades	1	12	0.8	0.25	10	0.08	0	0.00	1.0
Step/Falls	4	2	5.6	0.09	11	0.09	0	0.00	1.5
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

REACH 9

T31S-R12E-9SE

REACH 9

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
POOL-BEAVER DAM	11	328	8.8	0.84	3,143	0	48	38	14	0	0	0
POOL-DAMMED	1	26	4.9	0.90	129	0	30	40	30	0	0	0
POOL-LATERAL SCOUR	53	786	4.6	0.62	4,833	1	26	32	32	9	0	0
POOL-PLUNGE	1	7	4.7	0.70	31	0	15	25	40	20	0	0
RAPID/BOULDERS	43	1,497	3.6	0.27	5,511	16	18	26	37	19	0	0
RIFFLE	14	681	4.3	0.27	2,942	0	17	26	41	15	0	0
STEP/COBBLE	2	4	3.9	0.10	15	0	15	25	40	20	0	0
STEP/LOG	13	5	8.1	0.07	45	0	38	38	22	2	0	0
STEP/STRUCTURE	14	7	10.8	0.08	73	0	54	39	6	0	0	0
<b>Total:</b>	<b>152</b>	<b>3,341</b>	<b>5.5</b>	<b>0.40</b>	<b>16,722</b>	<b>17</b>	<b>Avg:28</b>	<b>32</b>	<b>30</b>	<b>10</b>	<b>0</b>	<b>0</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	12	354	8.5	0.84	3272	19.57	0	0.00	1.3
Scour Pools	54	793	4.6	0.62	4864	29.09	1	0.02	1.4
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	14	681	4.3	0.27	2942	17.59	0	0.00	1.6
Rapids	43	1,497	3.6	0.27	5511	32.96	16	0.29	1.4
Cascades	0	0	.	.	0	0.00	0	0.00	.
Step/Falls	29	16	9.1	0.07	133	0.80	0	0.00	1.0
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.



REACH 10 T31S-R12E-9SW REACH 10

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BOULDERS	19	922	4.2	0.31	3,998	317	5	10	18	27	38	1
CULVERT CROSSING	1	22	3.5	0.20	78	0	0	0	0	0	0	100
POOL-LATERAL SCOUR	9	84	4.7	0.70	401	12	18	25	31	20	6	0
POOL-PLUNGE	4	28	4.7	0.71	131	4	9	18	31	33	10	0
PUDDLED CHANNEL	1	202	3.3	0.00	668	88	5	10	25	40	20	0
RAPID/BOULDERS	27	1,313	4.3	0.29	5,755	231	3	11	23	36	27	0
RIFFLE	3	41	5.4	0.30	225	10	7	17	33	33	10	0
STEP/BEDROCK	1	2	3.5	0.20	8	3	0	0	0	20	20	60
STEP/BOULDERS	1	1	11.4	0.10	15	10	10	10	10	10	60	0
STEP/LOG	15	11	8.0	0.09	107	14	15	26	37	19	3	0
<b>Total:</b>	<b>81</b>	<b>2,628</b>	<b>5.1</b>	<b>0.32</b>	<b>11,386</b>	<b>689</b>	<b>Avg: 8</b>	<b>15</b>	<b>25</b>	<b>28</b>	<b>21</b>	<b>2</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area (m <sup>2</sup> )	Large Boulders Percent	Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
Dammed & BW Pools	0	0	.	.	0	0.00	0	0.00	.
Scour Pools	13	112	4.7	0.70	532	4.68	16	3.01	1.4
Glides	0	0	.	.	0	0.00	0	0.00	.
Riffles	3	41	5.4	0.30	225	1.98	10	4.44	1.0
Rapids	27	1,313	4.3	0.29	5755	50.55	231	4.01	1.0
Cascades	19	922	4.2	0.31	3998	35.11	317	7.93	1.1
Step/Falls	17	15	7.9	0.10	130	1.14	27	20.80	1.2
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	1	202	3.3	0.00	668	5.87	88	13.18	1.0

REACH 11

T31S-R12E-SE5

REACH 11

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BEDROCK	6	118	3.5	0.17	434	73	0	0	8	7	11	75
CASCADE/BOULDERS	37	954	2.7	0.29	2,886	939	0	1	28	38	32	0
GLIDE	1	1	3.9	0.21	4	0	5	5	80	5	5	0
POOL-DAMMED	7	32	2.7	0.42	89	21	5	1	46	24	10	13
POOL-LATERAL SCOUR	18	88	2.7	0.42	246	51	4	10	40	22	11	14
POOL-PLUNGE	14	57	3.0	0.54	186	53	2	3	44	30	17	4
RAPID/BEDROCK	5	64	2.4	0.07	189	30	0	0	10	2	4	84
RAPID/BOULDERS	38	842	2.8	0.23	2,382	515	0	1	36	39	22	2
RIFFLE	10	126	3.1	0.17	412	29	0	11	52	30	8	0
RIFFLE W/ POCKETS	24	452	2.6	0.20	1,226	251	0	3	40	41	15	1
STEP/BEDROCK	2	6	4.4	0.08	40	10	0	0	5	5	0	90
STEP/BOULDERS	10	16	2.9	0.15	37	42	0	0	1	10	88	1
STEP/LOG	10	10	3.9	0.12	40	8	52	3	21	8	17	0
<b>Total:</b>	<b>182</b>	<b>2,764</b>	<b>2.9</b>	<b>0.27</b>	<b>8,170</b>	<b>2022</b>	<b>Avg: 4</b>	<b>3</b>	<b>33</b>	<b>30</b>	<b>22</b>	<b>9</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area (m <sup>2</sup> )	Percent	Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
Dammed & BW Pools	7	32	2.7	0.42	89	1.09	21	23.60	1.4
Scour Pools	32	145	2.9	0.47	432	5.28	104	24.10	1.3
Glides	1	1	3.9	0.21	4	0.05	0	0.00	1.0
Riffles	34	578	2.8	0.20	1638	20.05	280	17.09	1.0
Rapids	43	906	2.8	0.21	2571	31.46	545	21.20	1.0
Cascades	43	1,072	2.8	0.27	3320	40.64	1012	30.48	1.1
Step/Falls	22	32	3.5	0.13	117	1.43	60	51.41	1.1
Small Streams (SS)	0	0	.	.	0	0.00	0	0.00	.
Dry	0	0	.	.	0	0.00	0	0.00	.

**STREAM SUMMARY**

**LONG CREEK**

Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Substrate Percent Wetted Area						Total Large Boulder
					S/O	Sand	Grvl	Cbbl	Bldr	Bdrk	
1272	35,012	4.2	0.39	144,625	15	23	31	21	8	2	3,982

**Wetted Area**

Habitat Group	(m <sup>2</sup> )	Percent
Scour Pool	31,434	21.7
Backwater Pools	4,025	2.8
Glide	591	0.4
Riffle	43,012	29.7
Rapid	56,107	38.8
Cascade	7,853	5.4
Step	788	0.5
Dry	668	0.5

REACH 1

REACH 1

RIPARIAN ZONE VEGETATION SUMMARY

Reach 1 is represented by 10 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	0	0	0
High terrace	100	100	100
Low terrace	0	0	0
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	0	0	0

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	5	2	1
Shrub cover	6	7	6
Grass/forb cover	94	93	94

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	0.8	0.0	1.8	0.0	0.8	0.0
15-30cm	0.6	0.0	0.5	0.0	1.3	0.0
30-50cm	0.5	0.0	0.6	0.0	0.4	0.0
50-90cm	0.2	0.0	0.5	0.0	0.2	0.0
>90cm	0.1	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	2.2	0.0	3.4	0.0	2.7	0.0

REACH 2

REACH 2

RIPARIAN ZONE VEGETATION SUMMARY

Reach 2 is represented by 4 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	0	13	13
High terrace	75	63	63
Low terrace	25	25	25
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	0	3	4

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	8	13	4
Shrub cover	70	59	64
Grass/forb cover	14	20	25

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	0.3	0.0	5.0	0.0	0.3	0.0
15-30cm	0.5	0.0	2.8	0.0	1.0	0.0
30-50cm	1.0	0.0	0.3	0.0	0.5	0.0
50-90cm	0.8	0.0	0.0	0.0	0.0	0.0
>90cm	0.5	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	3.0	0.0	8.0	0.0	1.8	0.0

REACH 3

REACH 3

RIPARIAN ZONE VEGETATION SUMMARY

Reach 3 is represented by 1 transects

Predominant landform in each zone

	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
Hillslope	100		100		100	
High terrace	0		0		0	
Low terrace	0		0		0	
Floodplain	0		0		0	
Wetland/meadow	0		0		0	
Roadbed	0		0		0	
Surface slope (%)	18		28		35	

Canopy closure and ground cover

	Zone 1 0-10 meters (%)		Zone 2 10-20 meters (%)		Zone 3 20-30 meters (%)	
Canopy closure	10		25		25	
Shrub cover	15		5		5	
Grass/forb cover	50		5		5	

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	5.0	0.0	7.0	0.0	4.0	0.0
15-30cm	2.0	0.0	5.0	0.0	4.0	0.0
30-50cm	1.0	0.0	2.0	0.0	0.0	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	1.0	0.0
Total/100m <sup>2</sup>	8.0	0.0	14.0	0.0	9.0	0.0

REACH 4

REACH 4

RIPARIAN ZONE VEGETATION SUMMARY

Reach 4 is represented by 2 transects

Predominant landform in each zone

	Zone 1		Zone 2		Zone 3	
	0-10 meters		10-20 meters		20-30 meters	
Hillslope	50		50		100	
High terrace	0		0		0	
Low terrace	50		50		0	
Floodplain	0		0		0	
Wetland/meadow	0		0		0	
Roadbed	0		0		0	
Surface slope (%)	33		33		48	

Canopy closure and ground cover

	Zone 1		Zone 2		Zone 3	
	0-10 meters (%)		10-20 meters (%)		20-30 meters (%)	
Canopy closure	18		20		23	
Shrub cover	11		41		10	
Grass/forb cover	45		20		9	

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1		Zone 2		Zone 3	
	0-10 meters		10-20 meters		20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	4.5	0.0	4.5	0.0	7.0	0.0
15-30cm	2.0	0.0	1.0	0.0	2.0	0.0
30-50cm	1.5	0.0	1.5	0.0	0.0	0.0
50-90cm	0.0	0.0	0.0	0.0	0.5	0.0
>90cm	0.5	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	8.5	0.0	7.0	0.0	9.5	0.0

REACH 5

RIPARIAN ZONE VEGETATION SUMMARY

REACH 5

Reach 5 is represented by 1 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	100	100	100
High terrace	0	0	0
Low terrace	0	0	0
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	20	38	45

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	45	18	20
Shrub cover	15	23	20
Grass/forb cover	60	35	25

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	10.0	0.0	9.0	0.0	14.0	0.0
15-30cm	3.0	0.0	4.0	0.0	1.0	0.0
30-50cm	2.0	0.0	2.0	0.0	0.0	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	15.0	0.0	15.0	0.0	15.0	0.0



REACH 6

RIPARIAN ZONE VEGETATION SUMMARY

REACH 6

Reach 6 is represented by 1 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	0	50	100
High terrace	0	0	0
Low terrace	100	50	0
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	0	40	13

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	0	5	15
Shrub cover	20	3	5
Grass/forb cover	75	53	8

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	1.0	0.0	1.0	0.0	10.0	0.0
15-30cm	0.0	0.0	4.0	0.0	5.0	0.0
30-50cm	0.0	0.0	0.0	0.0	0.0	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	1.0	0.0	5.0	0.0	15.0	0.0

REACH 7

REACH 7

RIPARIAN ZONE VEGETATION SUMMARY

Reach 7 is represented by 5 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	60	80	100
High terrace	0	0	0
Low terrace	40	20	0
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	19	26	29

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	10	16	18
Shrub cover	25	10	1
Grass/forb cover	29	15	7

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	3.4	0.0	3.2	0.0	6.6	0.0
15-30cm	2.0	0.0	3.4	0.0	2.0	0.0
30-50cm	1.4	0.0	0.8	0.0	0.8	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	6.8	0.0	7.4	0.0	9.4	0.0

REACH 8

RIPARIAN ZONE VEGETATION SUMMARY

REACH 8

Reach 8 is represented by 4 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	0	13	13
High terrace	75	63	63
Low terrace	25	25	25
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	0	1	2

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	4	6	8
Shrub cover	6	10	24
Grass/forb cover	89	78	65

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	1.5	0.0	1.3	0.0	0.0	0.0
15-30cm	0.3	0.0	0.3	0.0	0.0	0.0
30-50cm	0.5	0.0	0.3	0.0	0.3	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	2.3	0.0	1.8	0.0	0.3	0.0

REACH 9

REACH 9

RIPARIAN ZONE VEGETATION SUMMARY

Reach 9 is represented by 5 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	0	10	20
High terrace	50	50	40
Low terrace	30	20	20
Floodplain	20	20	20
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	0	2	4

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	14	13	17
Shrub cover	26	33	31
Grass/forb cover	69	62	47

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	2.4	0.0	4.8	0.0	6.0	0.0
15-30cm	2.2	0.0	3.0	0.0	2.2	0.0
30-50cm	1.2	0.0	0.8	0.0	1.0	0.0
50-90cm	0.0	0.0	0.0	0.0	0.0	0.0
>90cm	0.0	0.0	0.0	0.0	0.0	0.0
Total/100m <sup>2</sup>	5.8	0.0	8.6	0.0	9.2	0.0

REACH 10

RIPARIAN ZONE VEGETATION SUMMARY

REACH 10

Reach 10 is represented by 3 transects

Predominant landform in each zone

	Zone 1 0-10 meters	Zone 2 10-20 meters	Zone 3 20-30 meters
Hillslope	100	100	100
High terrace	0	0	0
Low terrace	0	0	0
Floodplain	0	0	0
Wetland/meadow	0	0	0
Roadbed	0	0	0
Surface slope (%)	28	19	22

Canopy closure and ground cover

	Zone 1 0-10 meters (%)	Zone 2 10-20 meters (%)	Zone 3 20-30 meters (%)
Canopy closure	28	25	23
Shrub cover	20	3	0
Grass/forb cover	13	4	0

Average number of trees in a 5-meter wide band

Diameter class (cm)	Zone 1 0-10 meters		Zone 2 10-20 meters		Zone 3 20-30 meters	
	Conifer	Hardwood	Conifer	Hardwood	Conifer	Hardwood
3-15cm	8.0	0.0	7.3	0.0	5.7	0.0
15-30cm	1.0	0.0	1.0	0.0	2.7	0.0
30-50cm	0.7	0.0	0.3	0.0	0.3	0.0
50-90cm	0.0	0.0	0.3	0.0	1.0	0.0
>90cm	0.3	0.0	0.3	0.0	0.0	0.0
Total/100m <sup>2</sup>	10.0	0.0	9.3	0.0	9.7	0.0

RIPARIAN ZONE VEGETATION

Reach 1

Reach 1

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)				Diameter class (cm)					Notes
					Canopy	Shrub	Grass		3-15	15-30	30-50	50-90	>90	
120	LF	1	HT	0.0	10	0	100	Conifer	0	4	3	1	0	
								Hardwood	0	0	0	0	0	
120	LF	2	HT	0.0	10	10	90	Conifer	0	2	3	1	0	
								Hardwood	0	0	0	0	0	
120	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
120	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
120	RT	2	HT	0.0	10	0	100	Conifer	0	0	0	1	0	
								Hardwood	0	0	0	0	0	
120	RT	3	HT	0.0	0	0	100	Conifer	0	2	0	0	0	
								Hardwood	0	0	0	0	0	
60	LF	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
60	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
60	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
60	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	1	
								Hardwood	0	0	0	0	0	
60	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
60	RT	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	LF	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	RT	2	HT	0.0	0	10	90	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
90	RT	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
30	LF	1	HT	0.0	10	0	100	Conifer	0	1	0	0	0	
								Hardwood	0	0	0	0	0	
30	LF	2	HT	0.0	0	0	100	Conifer	1	0	0	0	0	
								Hardwood	0	0	0	0	0	
30	LF	3	HT	0.0	0	0	100	Conifer	0	1	0	0	0	
								Hardwood	0	0	0	0	0	
30	RT	1	HT	0.0	0	0	100	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
30	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
30	RT	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
240	LF	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	

240	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
240	LF	3	HT	0.0	0	0	100	Conifer	3	3	0	0	0
								Hardwood	0	0	0	0	0
240	RT	1	HT	0.0	10	0	95	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
240	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
240	RT	3	HT	0.0	10	0	95	Conifer	5	1	0	0	0
								Hardwood	0	0	0	0	0
270	LF	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
270	LF	2	HT	0.0	0	0	100	Conifer	0	3	0	0	0
								Hardwood	0	0	0	0	0
270	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
270	RT	1	HT	0.0	50	0	95	Conifer	5	0	1	0	0
								Hardwood	0	0	0	0	0
270	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
270	RT	3	HT	0.0	0	0	100	Conifer	0	1	1	0	0
								Hardwood	0	0	0	0	0
150	LF	1	HT	0.0	0	0	100	Conifer	0	0	1	0	0
								Hardwood	0	0	0	0	0
150	LF	2	HT	0.0	10	0	100	Conifer	0	0	0	1	0
								Hardwood	0	0	0	0	0
150	LF	3	HT	0.0	0	0	100	Conifer	0	1	1	2	0
								Hardwood	0	0	0	0	0
150	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
150	RT	2	HT	0.0	10	0	90	Conifer	0	0	1	1	0
								Hardwood	0	0	0	0	0
150	RT	3	HT	0.0	10	0	90	Conifer	0	2	1	0	0
								Hardwood	0	0	0	0	0
210	LF	1	HT	0.0	0	0	100	Conifer	1	0	0	0	0
								Hardwood	0	0	0	0	0
210	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
210	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
210	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
210	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
210	RT	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
180	LF	1	HT	0.0	0	70	30	Conifer	0	1	0	0	0
								Hardwood	0	0	0	0	0
180	LF	2	HT	0.0	0	70	30	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
180	LF	3	HT	0.0	0	60	40	Conifer	0	0	1	0	0
								Hardwood	0	0	0	0	0
180	RT	1	HT	0.0	10	40	60	Conifer	0	0	0	1	0
								Hardwood	0	0	0	0	0
180	RT	2	HT	0.0	0	40	60	Conifer	0	0	2	1	0
								Hardwood	0	0	0	0	0
180	RT	3	HT	0.0	0	50	50	Conifer	0	1	0	0	0
								Hardwood	0	0	0	0	0
300	LF	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
300	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
300	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0

300	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
300	RT	2	HT	0.0	5	0	95	Conifer	15	0	0	0	0
								Hardwood	0	0	0	0	0
300	RT	3	HT	0.0	5	0	100	Conifer	0	1	0	0	0
								Hardwood	0	0	0	0	0

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RIPARIAN ZONE VEGETATION

Reach 2

Reach 2

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)				Diameter class (cm)					Notes
					Canopy	Shrub	Grass		3-15	15-30	30-50	50-90	>90	
330	LF	1	LT	0.0	20	80	20	Conifer	0	2	1	1	1	
								Hardwood	0	0	0	0	0	
330	LF	2	LT	0.0	0	20	80	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
330	LF	3	LT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
330	RT	1	LT	0.0	20	80	20	Conifer	0	0	1	1	1	
								Hardwood	0	0	0	0	0	
330	RT	2	LT	0.0	20	80	20	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
330	RT	3	LT	0.0	20	80	20	Conifer	1	1	0	0	0	
								Hardwood	0	0	0	0	0	
390	LF	1	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
390	LF	2	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
390	LF	3	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
390	RT	1	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
390	RT	2	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
390	RT	3	HT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
360	LF	1	HT	0.0	20	90	10	Conifer	1	0	1	1	0	
								Hardwood	0	0	0	0	0	
360	LF	2	HT	0.0	20	90	10	Conifer	1	1	0	0	0	
								Hardwood	0	0	0	0	0	
360	LF	3	HT	0.0	10	90	10	Conifer	0	1	1	0	0	
								Hardwood	0	0	0	0	0	
360	RT	1	HT	0.0	0	20	0	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	OVER ANOTHER STREAM CHNL
360	RT	2	HT	0.0	0	20	0	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	OVER ANOTHER STREAM CHNL
360	RT	3	HT	0.0	0	80	20	Conifer	0	2	0	0	0	
								Hardwood	0	0	0	0	0	
420	LF	1	HT	0.0	0	80	20	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
420	LF	2	HT	0.0	0	80	20	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
420	LF	3	HT	0.0	0	80	20	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
420	RT	1	HT	0.0	0	30	20	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
420	RT	2	HS	20.0	60	0	10	Conifer	19	10	1	0	0	
								Hardwood	0	0	0	0	0	
420	RT	3	HS	30.0	0	0	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	

RIPARIAN ZONE VEGETATION

Reach 3

Reach 3

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)			Diameter class (cm)					Notes	
					Canopy	Shrub	Grass	3-15	15-30	30-50	50-90	>90		
450	LF	1	HS	20.0	20	20	30	Conifer	5	2	1	0	0	
								Hardwood	0	0	0	0	0	
450	LF	2	HS	25.0	30	5	5	Conifer	4	1	1	0	0	
								Hardwood	0	0	0	0	0	
450	LF	3	HS	40.0	30	5	5	Conifer	3	2	0	0	0	
								Hardwood	0	0	0	0	0	
450	RT	1	HS	15.0	0	10	70	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
450	RT	2	HS	30.0	20	5	5	Conifer	3	4	1	0	0	
								Hardwood	0	0	0	0	0	
450	RT	3	HS	30.0	20	5	5	Conifer	1	2	0	0	1	
								Hardwood	0	0	0	0	0	

RIPARIAN ZONE VEGETATION

Reach 4

Reach 4

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)				Diameter class (cm)					Notes
					Canopy	Shrub	Grass		3-15	15-30	30-50	50-90	>90	
510	LF	1	LT	0.0	40	20	60	Conifer	4	3	0	0	0	
								Hardwood	0	0	0	0	0	
510	LF	2	LT	0.0	40	80	20	Conifer	3	1	1	0	0	
								Hardwood	0	0	0	0	0	
510	LF	3	HS	30.0	50	5	5	Conifer	7	2	0	0	0	
								Hardwood	0	0	0	0	0	
510	RT	1	HS	60.0	20	20	10	Conifer	5	1	2	0	1	
								Hardwood	0	0	0	0	0	
510	RT	2	HS	60.0	30	20	10	Conifer	4	1	1	0	0	
								Hardwood	0	0	0	0	0	
510	RT	3	HS	60.0	20	20	10	Conifer	2	2	0	1	0	
								Hardwood	0	0	0	0	0	
480	LF	1	LT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
480	LF	2	LT	0.0	0	60	40	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
480	LF	3	HS	30.0	10	10	10	Conifer	5	0	0	0	0	
								Hardwood	0	0	0	0	0	
480	RT	1	HS	70.0	10	5	10	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
480	RT	2	HS	70.0	10	5	10	Conifer	2	0	1	0	0	
								Hardwood	0	0	0	0	0	
480	RT	3	HS	70.0	10	5	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	

RIPARIAN ZONE VEGETATION

Reach 5

Reach 5

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)				Diameter class (cm)					Notes
					Canopy	Shrub	Grass		3-15	15-30	30-50	50-90	>90	
540	LF	1	HS	30.0	70	20	60	Conifer	7	1	0	0	0	
								Hardwood	0	0	0	0	0	
540	LF	2	HS	30.0	10	25	40	Conifer	3	2	0	0	0	
								Hardwood	0	0	0	0	0	
540	LF	3	HS	30.0	10	25	30	Conifer	10	1	0	0	0	
								Hardwood	0	0	0	0	0	
540	RT	1	HS	10.0	20	10	60	Conifer	3	2	2	0	0	
								Hardwood	0	0	0	0	0	
540	RT	2	HS	45.0	25	20	30	Conifer	6	2	2	0	0	
								Hardwood	0	0	0	0	0	
540	RT	3	HS	60.0	30	15	20	Conifer	4	0	0	0	0	
								Hardwood	0	0	0	0	0	

RIPARIAN ZONE VEGETATION

Reach 6

Reach 6

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)				Diameter class (cm)					Notes
					Canopy	Shrub	Grass		3-15	15-30	30-50	50-90	>90	
570	LF	1	LT	0.0	0	40	50	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
570	LF	2	HS	80.0	10	5	5	Conifer	1	4	0	0	0	
								Hardwood	0	0	0	0	0	ROCKY OUTCROP
570	LF	3	HS	15.0	10	10	10	Conifer	6	3	0	0	0	
								Hardwood	0	0	0	0	0	
570	RT	1	LT	0.0	0	0	100	Conifer	1	0	0	0	0	
								Hardwood	0	0	0	0	0	
570	RT	2	LT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
570	RT	3	HS	10.0	20	0	5	Conifer	4	2	0	0	0	
								Hardwood	0	0	0	0	0	

RIPARIAN ZONE VEGETATION

Reach 7

Reach 7

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)			Diameter class (cm)					Notes	
					Canopy	Shrub	Grass	3-15	15-30	30-50	50-90	>90		
630	LF	1	LT	0.0	0	90	10	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
630	LF	2	HS	30.0	10	10	10	Conifer	3	0	0	0	0	
								Hardwood	0	0	0	0	0	
630	LF	3	HS	30.0	10	0	0	Conifer	6	1	0	0	0	
								Hardwood	0	0	0	0	0	
630	RT	1	HS	30.0	10	10	30	Conifer	0	1	1	0	0	
								Hardwood	0	0	0	0	0	
630	RT	2	HS	30.0	0	0	0	Conifer	1	1	0	0	0	
								Hardwood	0	0	0	0	0	
630	RT	3	HS	30.0	10	0	0	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
660	LF	1	LT	0.0	20	20	40	Conifer	2	3	3	0	0	
								Hardwood	0	0	0	0	0	
660	LF	2	LT	0.0	20	50	40	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
660	LF	3	HS	15.0	10	10	20	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
660	RT	1	HS	30.0	10	5	20	Conifer	3	1	1	0	0	
								Hardwood	0	0	0	0	0	
660	RT	2	HS	40.0	20	5	20	Conifer	2	6	2	0	0	
								Hardwood	0	0	0	0	0	
660	RT	3	HS	20.0	10	0	30	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
600	LF	1	HS	30.0	10	30	10	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	SHRUBS=<3 CM PINES
600	LF	2	HS	30.0	20	0	0	Conifer	2	1	1	0	0	
								Hardwood	0	0	0	0	0	
600	LF	3	HS	50.0	40	0	0	Conifer	2	5	1	0	0	
								Hardwood	0	0	0	0	0	
600	RT	1	LT	0.0	0	60	40	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
600	RT	2	HS	30.0	10	0	0	Conifer	1	3	1	0	0	
								Hardwood	0	0	0	0	0	
600	RT	3	HS	30.0	0	0	0	Conifer	3	0	0	0	0	
								Hardwood	0	0	0	0	0	
690	LF	1	LT	0.0	0	30	70	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
690	LF	2	LT	0.0	0	30	70	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
690	LF	3	HS	20.0	20	0	10	Conifer	4	1	2	0	0	
								Hardwood	0	0	0	0	0	
690	RT	1	HS	30.0	10	0	30	Conifer	1	0	1	0	0	
								Hardwood	0	0	0	0	0	
690	RT	2	HS	30.0	20	0	10	Conifer	3	3	0	0	0	
								Hardwood	0	0	0	0	0	
690	RT	3	HS	30.0	30	0	5	Conifer	8	0	0	0	0	
								Hardwood	0	0	0	0	0	
720	LF	1	HS	20.0	20	0	30	Conifer	6	2	0	0	0	
								Hardwood	0	0	0	0	0	

720	LF	2	HS	30.0	30	0	0	Conifer	4	1	0	0	0
								Hardwood	0	0	0	0	0
720	LF	3	HS	30.0	30	0	0	Conifer	4	1	1	0	0
								Hardwood	0	0	0	0	0
720	RT	1	HS	45.0	20	5	10	Conifer	3	3	0	0	0
								Hardwood	0	0	0	0	0
720	RT	2	HS	40.0	30	0	0	Conifer	0	2	0	0	0
								Hardwood	0	0	0	0	0
720	RT	3	HS	30.0	20	0	0	Conifer	4	2	0	0	0
								Hardwood	0	0	0	0	0

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RIPARIAN ZONE VEGETATION

Reach B

Reach 8

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)			Diameter class (cm)					Notes	
					Canopy	Shrub	Grass	3-15	15-30	30-50	50-90	>90		
810	LF	1	HT	0.0	0	5	95	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
810	LF	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
810	LF	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
810	RT	1	HT	0.0	0	0	100	Conifer	1	0	0	0	0	
								Hardwood	0	0	0	0	0	
810	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
810	RT	3	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
780	LF	1	HT	0.0	0	10	90	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	3 WILLOW CLUMPS
780	LF	2	HT	0.0	0	60	30	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	6 WILLOW CLUMPS
780	LF	3	HT	0.0	0	50	50	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	5 WILLOW CLUMPS
780	RT	1	HT	0.0	30	0	60	Conifer	3	1	1	0	0	
								Hardwood	0	0	0	0	0	
780	RT	2	HS	10.0	50	0	10	Conifer	4	1	1	0	0	
								Hardwood	0	0	0	0	0	
780	RT	3	HS	15.0	60	0	10	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
750	LF	1	HT	0.0	0	10	90	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
750	LF	2	HT	0.0	0	10	90	Conifer	1	0	0	0	0	
								Hardwood	0	0	0	0	0	
750	LF	3	HT	0.0	0	60	40	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	4 WILLOW THICKETS
750	RT	1	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
750	RT	2	HT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
750	RT	3	HT	0.0	0	40	60	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	3 WILLOW THICKETS
840	LF	1	LT	0.0	0	10	90	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
840	LF	2	LT	0.0	0	10	90	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
840	LF	3	LT	0.0	0	20	80	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	2 WILLOW CLUMPS
840	RT	1	LT	0.0	0	10	90	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
840	RT	2	LT	0.0	0	0	100	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
840	RT	3	LT	0.0	0	20	80	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	3 WILLOW CLUMPS



RIPARIAN ZONE VEGETATION

Reach 9

Reach 9

VEGETATION DETAIL

Unit	Side	Zone	Surface	Slope	Cover (percent)			Diameter class (cm)					Notes	
					Canopy	Shrub	Grass	3-15	15-30	30-50	50-90	>90		
930	LF	1	FP	0.0	0	40	50	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
930	LF	2	FP	0.0	10	30	70	Conifer	9	2	0	0	0	
								Hardwood	0	0	0	0	0	
930	LF	3	FP	0.0	30	20	60	Conifer	3	1	1	0	0	
								Hardwood	0	0	0	0	0	
930	RT	1	FP	0.0	10	10	80	Conifer	1	2	1	0	0	
								Hardwood	0	0	0	0	0	
930	RT	2	FP	0.0	20	10	80	Conifer	2	3	0	0	0	
								Hardwood	0	0	0	0	0	
930	RT	3	FP	0.0	20	10	80	Conifer	2	0	1	0	0	
								Hardwood	0	0	0	0	0	
870	LF	1	HT	0.0	0	10	90	Conifer	0	0	1	0	0	
								Hardwood	0	0	0	0	0	
870	LF	2	HT	0.0	0	20	80	Conifer	3	0	0	0	0	
								Hardwood	0	0	0	0	0	
870	LF	3	HS	20.0	20	0	10	Conifer	6	1	1	0	0	
								Hardwood	0	0	0	0	0	
870	RT	1	HT	0.0	10	20	80	Conifer	5	2	0	0	0	
								Hardwood	0	0	0	0	0	
870	RT	2	HT	0.0	20	10	90	Conifer	6	0	1	0	0	
								Hardwood	0	0	0	0	0	
870	RT	3	HT	0.0	20	20	80	Conifer	3	1	0	0	0	
								Hardwood	0	0	0	0	0	
900	LF	1	LT	0.0	30	10	90	Conifer	1	1	1	0	0	
								Hardwood	0	0	0	0	0	
900	LF	2	LT	0.0	30	30	60	Conifer	1	2	2	0	0	
								Hardwood	0	0	0	0	0	
900	LF	3	LT	0.0	30	60	40	Conifer	1	0	1	0	0	
								Hardwood	0	0	0	0	0	
900	RT	1	HT	0.0	30	20	80	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
900	RT	2	HT	0.0	10	30	70	Conifer	1	4	0	0	0	
								Hardwood	0	0	0	0	0	
900	RT	3	HT	0.0	0	10	90	Conifer	4	2	0	0	0	
								Hardwood	0	0	0	0	0	
960	LF	1	HT	0.0	30	50	40	Conifer	2	2	1	0	0	
								Hardwood	0	0	0	0	0	
960	LF	2	HT	0.0	20	40	50	Conifer	0	2	0	0	0	
								Hardwood	0	0	0	0	0	
960	LF	3	HT	0.0	10	40	40	Conifer	6	3	0	0	0	
								Hardwood	0	0	0	0	0	
960	RT	1	HT	0.0	10	20	60	Conifer	1	3	1	0	0	
								Hardwood	0	0	0	0	0	
960	RT	2	HT	0.0	0	60	40	Conifer	0	0	0	0	0	
								Hardwood	0	0	0	0	0	
960	RT	3	HT	0.0	20	60	40	Conifer	4	3	1	0	0	
								Hardwood	0	0	0	0	0	
990	LF	1	LT	0.0	20	10	90	Conifer	1	1	1	0	0	
								Hardwood	0	0	0	0	0	

990	LF	2	HS	15.0	20	20	60	Conifer	2	2	1	0	0
								Hardwood	0	0	0	0	0
990	LF	3	HS	15.0	20	10	10	Conifer	1	0	0	0	0
								Hardwood	0	0	0	0	0
990	RT	1	LT	0.0	0	70	30	Conifer	1	0	0	0	0
								Hardwood	0	0	0	0	0
990	RT	2	LT	0.0	0	80	20	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0
990	RT	3	LT	0.0	0	80	20	Conifer	0	0	0	0	0
								Hardwood	0	0	0	0	0

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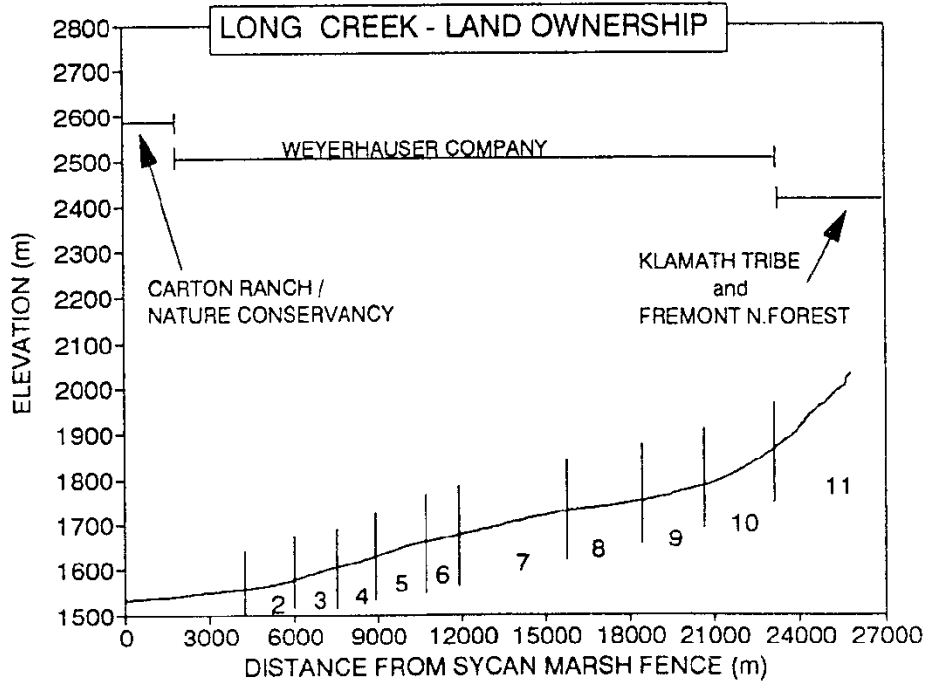
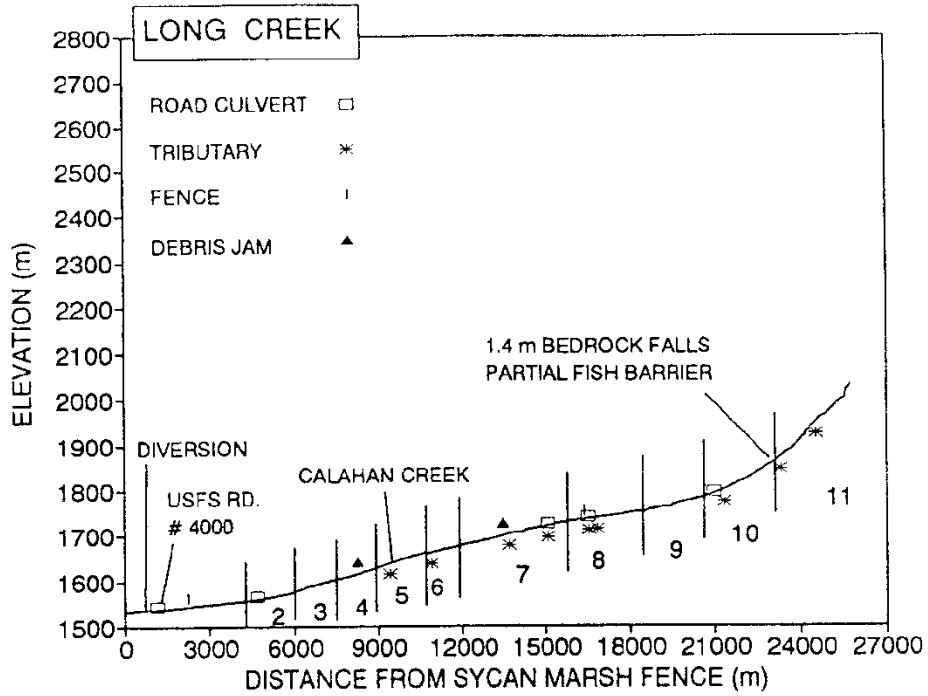
RIPARIAN ZONE VEGETATION

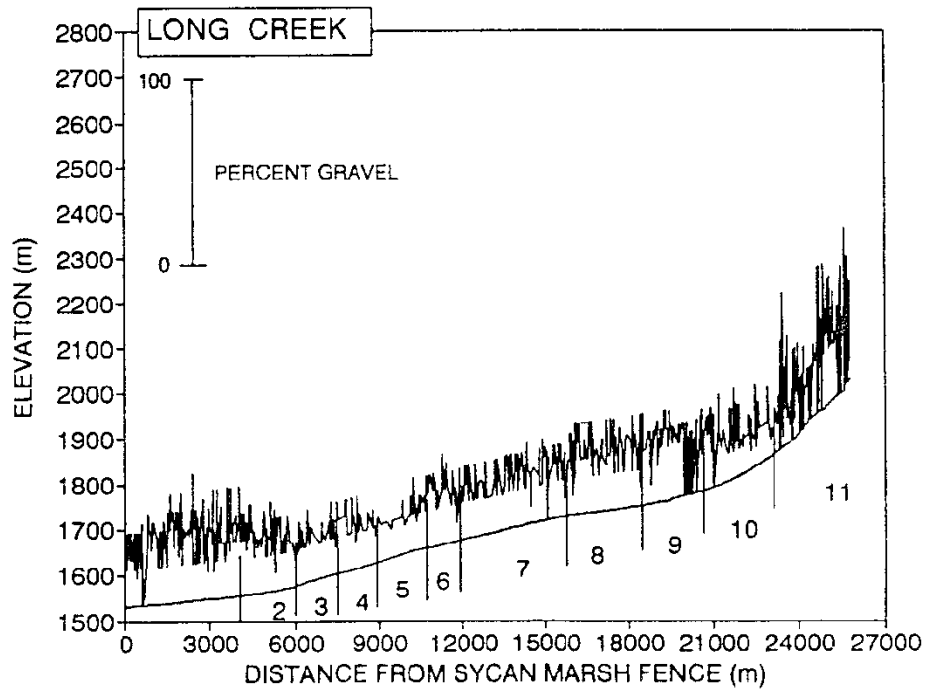
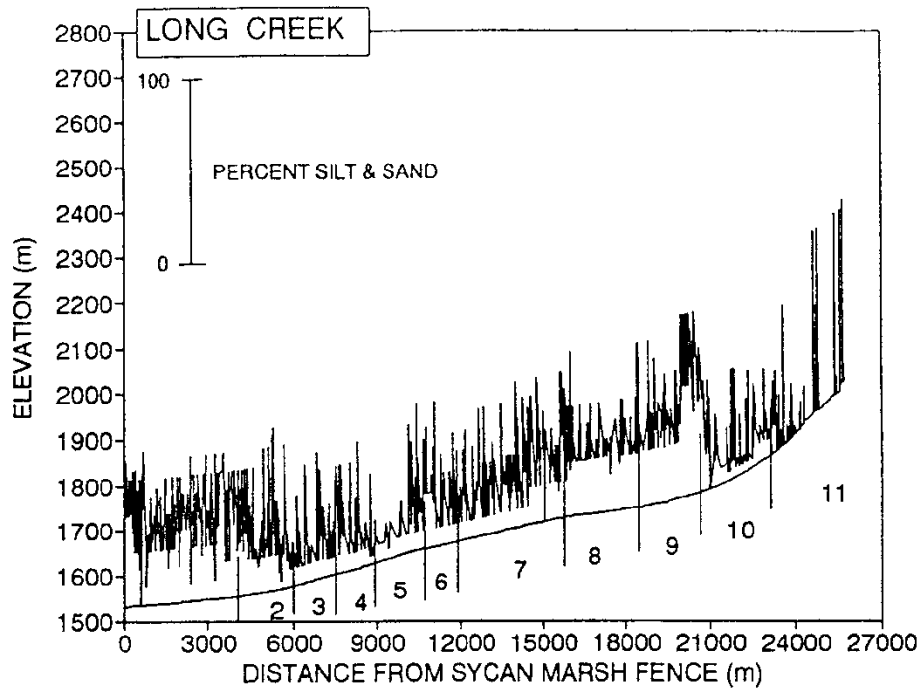
Reach 10

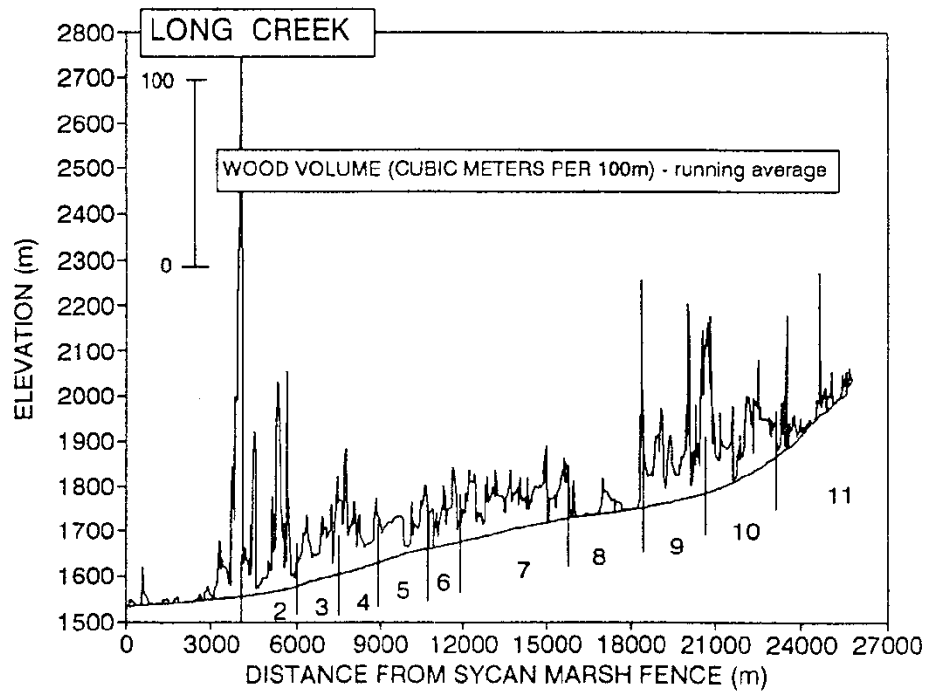
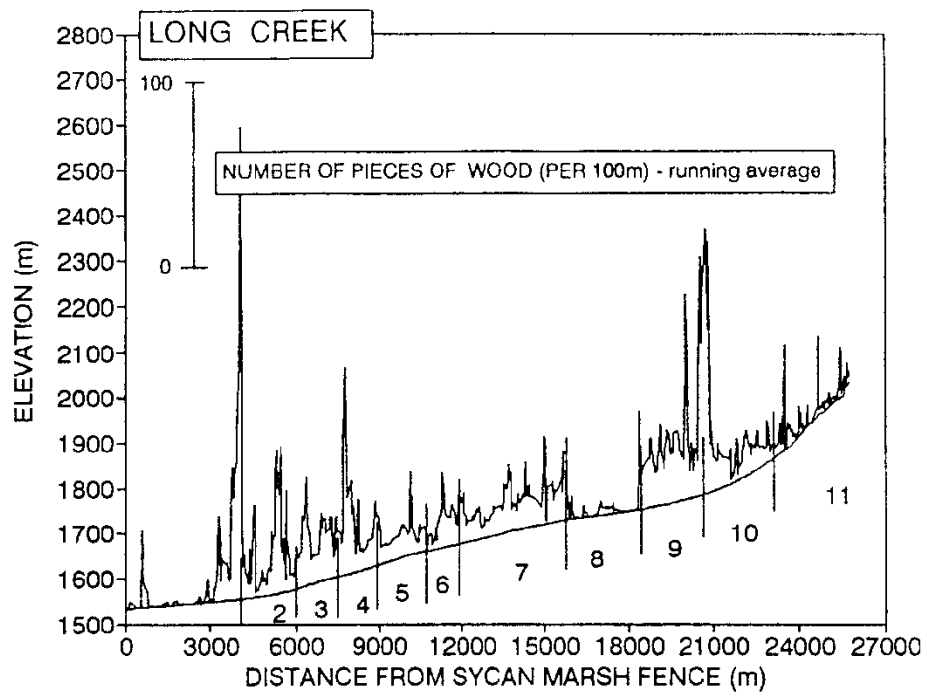
Reach 10

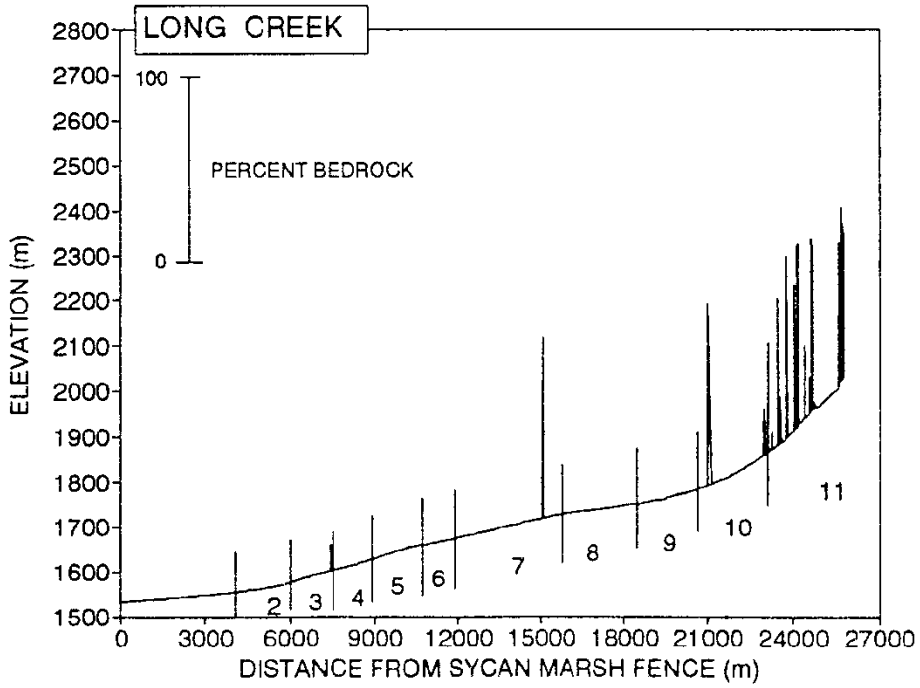
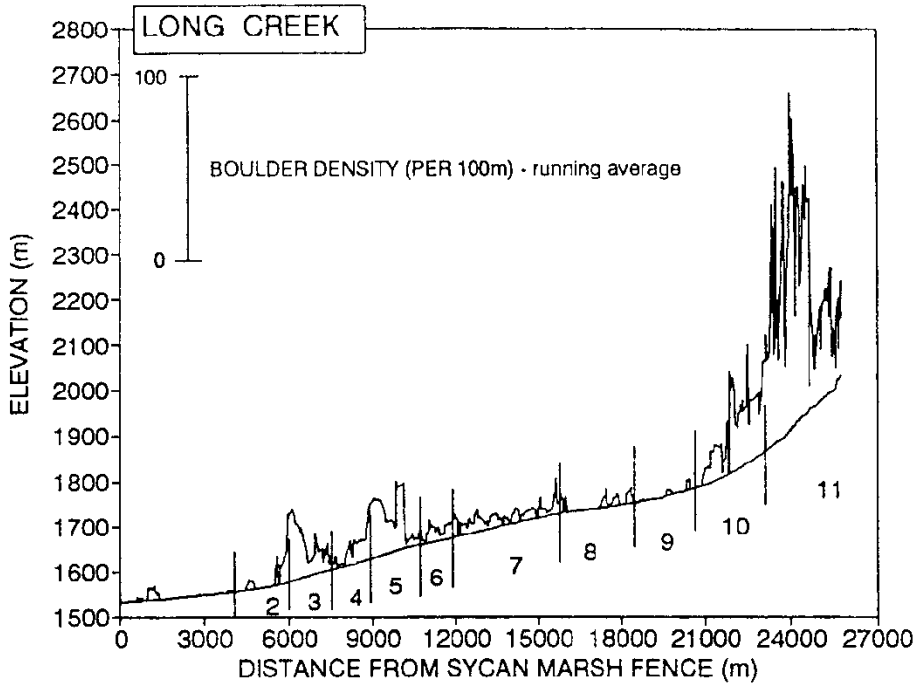
VEGETATION DETAIL

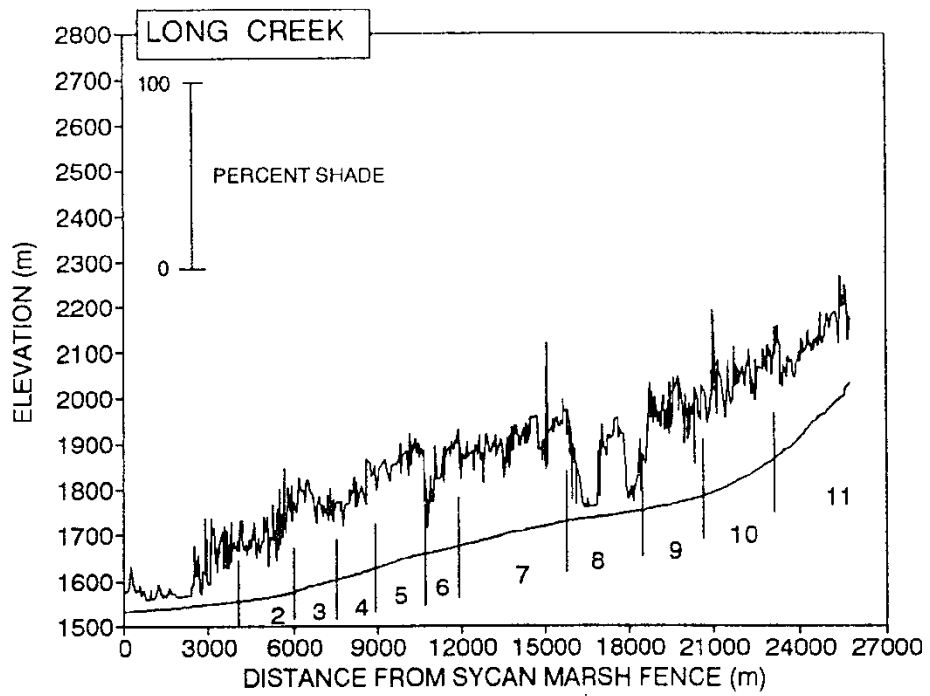
Unit	Side	Zone	Surface	Slope	Cover (percent)			Diameter class (cm)					Notes	
					Canopy	Shrub	Grass	3-15	15-30	30-50	50-90	>90		
1050	LF	1	HS	30.0	20	0	10	Conifer	6	1	0	0	0	
								Hardwood	0	0	0	0	0	
1050	LF	2	HS	10.0	0	0	5	Conifer	5	1	0	0	0	
								Hardwood	0	0	0	0	0	
1050	LF	3	HS	10.0	10	0	0	Conifer	7	0	0	0	0	
								Hardwood	0	0	0	0	0	
1050	RT	1	HS	10.0	20	20	20	Conifer	8	1	1	0	0	
								Hardwood	0	0	0	0	0	
1050	RT	2	HS	15.0	30	10	10	Conifer	4	1	0	0	0	
								Hardwood	0	0	0	0	0	
1050	RT	3	HS	30.0	20	0	0	Conifer	2	1	0	1	0	
								Hardwood	0	0	0	0	0	
1020	LF	1	HS	20.0	10	0	10	Conifer	7	0	0	0	1	
								Hardwood	0	0	0	0	0	
1020	LF	2	HS	10.0	0	0	0	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
1020	LF	3	HS	10.0	10	0	0	Conifer	4	2	0	0	0	
								Hardwood	0	0	0	0	0	
1020	RT	1	HS	10.0	10	80	10	Conifer	2	0	0	0	0	
								Hardwood	0	0	0	0	0	
1020	RT	2	HS	20.0	20	10	10	Conifer	4	1	0	0	0	
								Hardwood	0	0	0	0	0	
1020	RT	3	HS	10.0	0	0	0	Conifer	2	1	0	0	0	
								Hardwood	0	0	0	0	0	
1080	LF	1	HS	40.0	50	10	20	Conifer	1	0	0	0	0	
								Hardwood	0	0	0	0	0	
1080	LF	2	HS	40.0	20	0	0	Conifer	4	0	0	0	0	
								Hardwood	0	0	0	0	0	
1080	LF	3	HS	50.0	30	0	0	Conifer	1	1	0	2	0	
								Hardwood	0	0	0	0	0	ROCK OUTCROP
1080	RT	1	HS	60.0	60	10	10	Conifer	0	1	1	0	0	
								Hardwood	0	0	0	0	0	
1080	RT	2	HS	20.0	80	0	0	Conifer	3	0	1	1	1	
								Hardwood	0	0	0	0	0	
1080	RT	3	HS	20.0	70	0	0	Conifer	1	3	1	0	0	
								Hardwood	0	0	0	0	0	







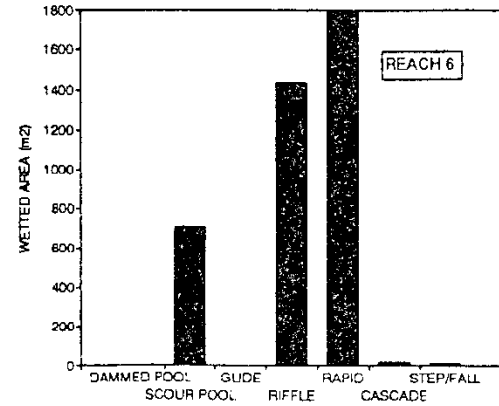
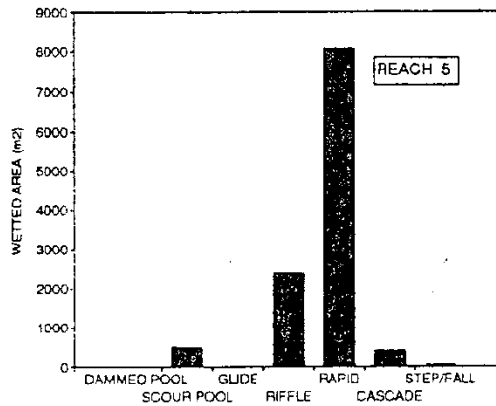
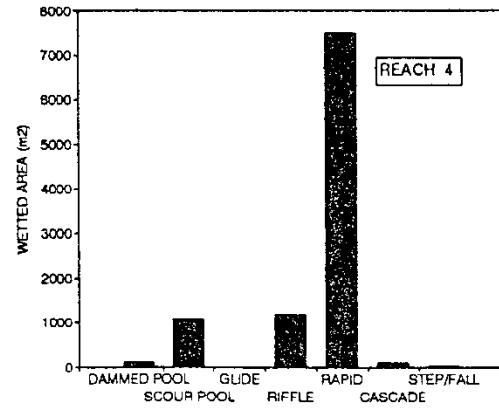
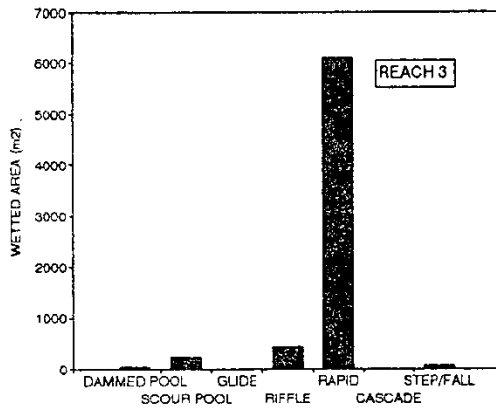
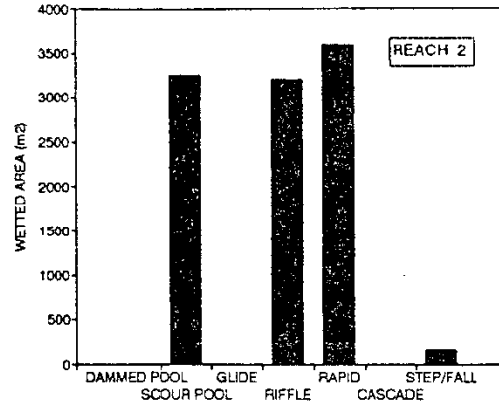
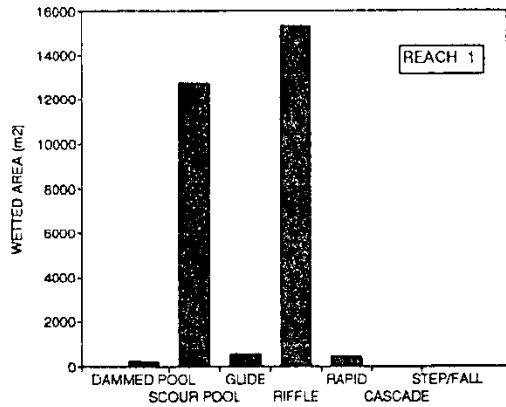






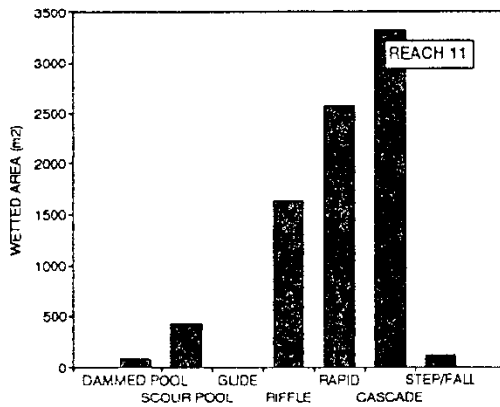
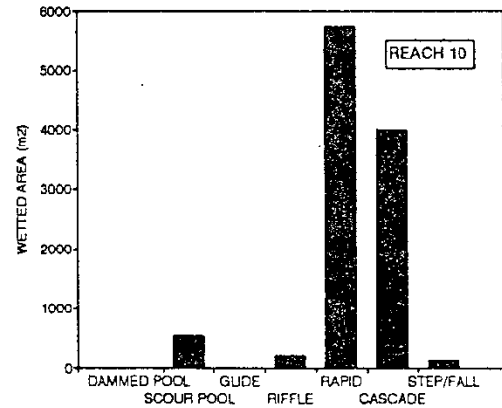
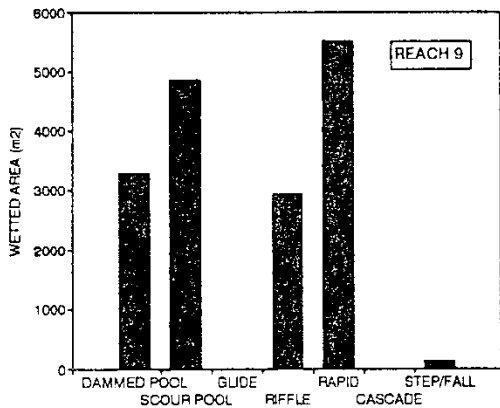
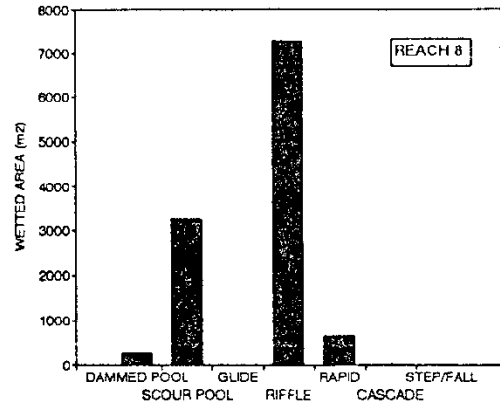
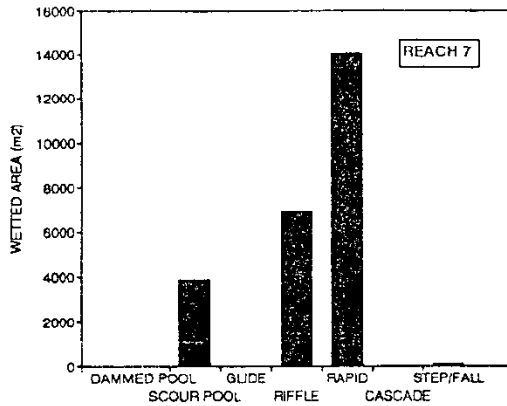
# LONG CREEK: HABITAT DISTRIBUTION

## REACHES 1-6



# LONG CREEK: HABITAT DISTRIBUTION

## REACHES: 7-11



LONG CREEK COMMENT SUMMARY

UNIT	TYPE	DISTANCE	CODE	NOTE 1	NOTE 2
1	LP	38			FENCE LINE, FRY
2	RP	61		/SM SIDE CHNL	SM SIDE CHNL
5	LP	154		CLAMS OR MUSSELS	BROOK, FRY, MUSSELS
9	LP	268		2 JUV TOADS	TOAD, FRY
15	LP	435			FRY
17	LP	492			FRY
19	LP	546			FRY
21	LP	565			FRY
25	LP	637			TROUT
26	SS	637			WOODEN STRUCTURE- PHOTO
27	DP	703		/DIVERSION CHNL, 1.5M WIDE	DIVERSION CHNL LF+RT
29	SS		BD	BV DAM H=.25M	
30	LP				RIP SURVEY
31	SS		BD	H=.25M, BV DAM	
35	CC			.9M DIAM	.9M DIAM
36	GL			JUV TOADS	RT CHNL-FENCE LINE
39	RI			TOADS	TOAD
41	RI			TOADS	
43	RI				TOAD
49	LP			TOADS	TOADS
51	CC			.9M DIAM	.9M DIAM, CULVERT DIVERSION
61	RI	1019		TOADS	
62	LP	1096			TOAD
63	RI	1159	BC		SYCAN MARSH ROAD
64	LP	1189		BC-SYCAN MARSH RD	
66	LP	1266			ROAD ALONG RT
81	RI	1706		TOAD	
95	RI	2251		FENCE XING	START WEYERHAUSER PROPERT
96	LP	2281		WEYERHAEUSER LAND	
99	RB	2384			METAL PIPE IN BANK
197	LP				TROUT+FRY
207	LP				TROUT+FRY
214	LP				FENCELINE-WEY CO
223	RI				FENCELINE
268	LP		BA		OLD BV
279	LP		BA		OLD
281	LP				BT
294	LP				MARSHY
349	RB	4672	BC	BC	FLAGGED
380	RI	5338	BA		
398	RP			SEVERAL CHNLS COVERED W/BRUSH	
458	RB	7060	/SS	/SS	
473	LP	7431	/SS	/SS	
475	SL	7474		H=.65M, LOG JAM	
505	SL	8279		H=.5M, LOG JAM	
511	RB	8744	OLD BA		
517	RI	8941	/SS	/SS	
522	RB	9437	/TJ	/TJ, CALAHAN CR	CALLAHAN CR
548	RI	10482			SIGNS OF GRAZING
560	RB			BOTH CHNLS ADDED	

## LONG CREEK COMMENT SUMMARY

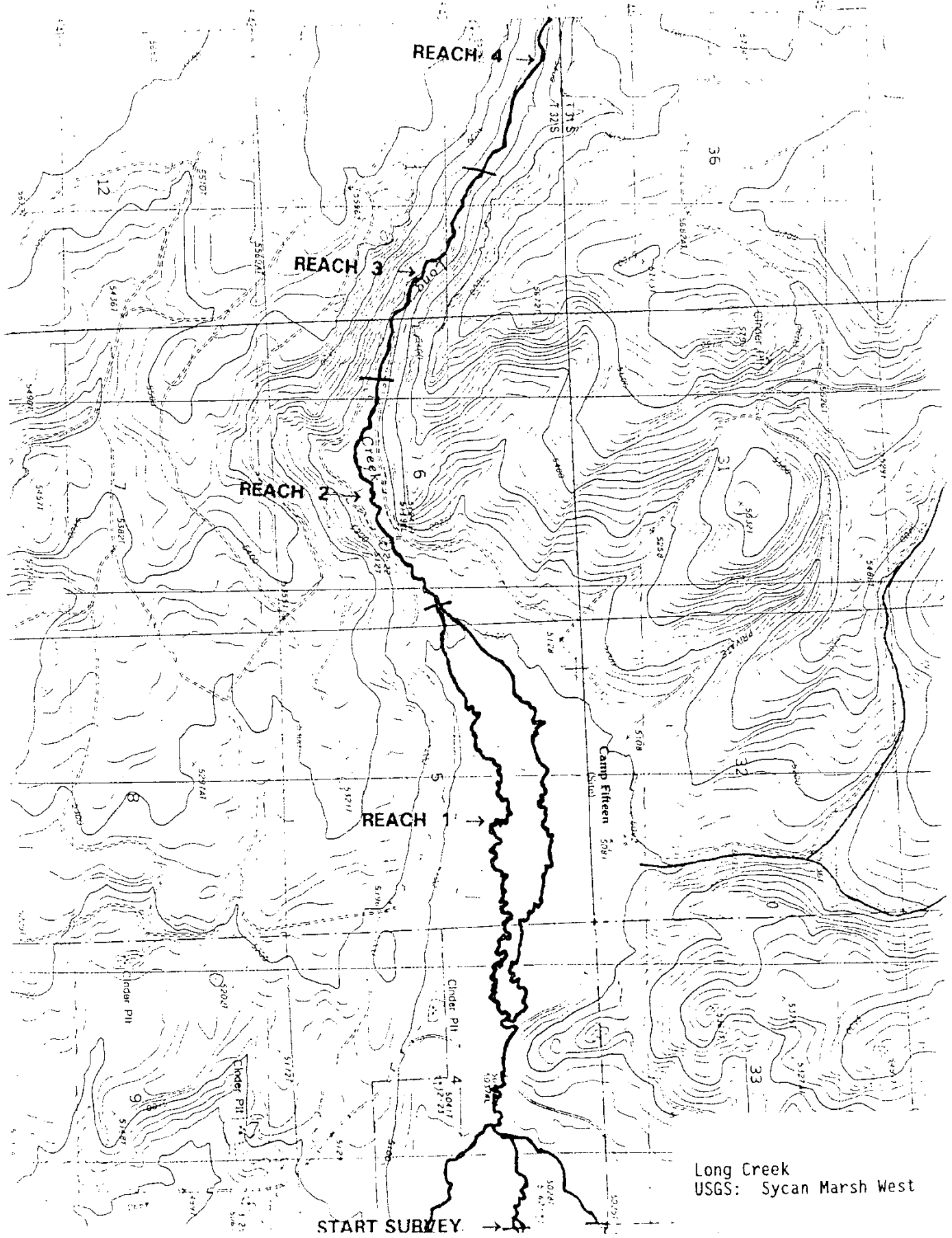
UNIT	TYPE	DISTANCE	CODE	NOTE 1	NOTE 2
563	RB	10892			(PINK LC 19 FLAG)
564	LP	10902	TJ/	TJ/, (LC-19)	(PINK LC 20 FLAG)
566	RI	10914			LOTS OF GRAZING
580	LP			ALL CHNLS	
582	LP				FRY
592	RB	11589		FRESH WATER CLAM	
626	LP	12675	/SS		
627	RB	12775	/SS	/SS	
642	RB	13419	WL		RUFFED GROUSE
645	SL	13491		H=.3M, LOG JAM	
654	RB	13636	/SS		
657	LP	13704	TJ/	TJ/	
701	CC	15056	CC	2 CULVERTS @1.1M DIAM	400-00 ROAD, 2 CULVERTS
702	RI	15090	SS/	SS/	
703	LP	15112	TJ/	TJ/, .5M WIDE	
704	RB	15249		TEMPMENTER/	WEY CO TEMPMENTER/
708	RB	15351	/SS	/SS	
722	SL	15770		H=.6M, LOG JAM	
737	RI	15988			CALAHAN MEADOW
744	RI	16099			TREE FROGS
752	RI	16340			FROGS
757	LP	16403			FRY
758	RI	16470		OLD FENCE XING, (LC-37)	FENCELINE-(LC 37-PINK FLAG)
759	LP	16495	OLD BC	FAILED BRIDGE	
760	RI	16526	TJ/	TJ/	
769	LP	16655			MANY FISH
776	RI	16862	TJ/	TJ/, .3M WIDE, /CORRAL	OLD CORRAL ON RT
777	RB	16895	OLD BA		
783	RI	17025	WL		KINGFISHER
792	RI	17322	BA	/OLD BV HUT	OLD BV HUT
794	RI	17436	SS/	SS/	
796	BW			NUMEROUS FRY	MANY FRY
801	RI	17625	SS/	SS/	TREE FROGS
809	RI	17898			TREE FROGS
810	LP				TOADS, FLAGGED+RIP SURVEY
811	LP	17908			TOADS
814	RI	18088	SS/	SS/	MANY TOADS+TADPOLES
821	LP				FRY
822	LP	18181			TROUT, FROGS
826	LP	18326	OLD BA		
830	LP				TOADS
832	RI	18390	BA	(LC-48)	PINK LC 48 FLAG
834	SS	18398	BD	H=.45M, BV DAM	
836	SS	18417	BD	H=.25M, BV DAM	
837	BP	18451		/OLD BV DEN	FRY, BV HUT, FROGS
840	RI		BA		FLAGGED+RIP SURVEY
841	LP				FRY
846	RI	18623		(LC-49)	PINK LC 49 FLAG, TREE FROGS
848	LP				TOADS
850	LP				MANY FRY

LONG CREEK COMMENT SUMMARY

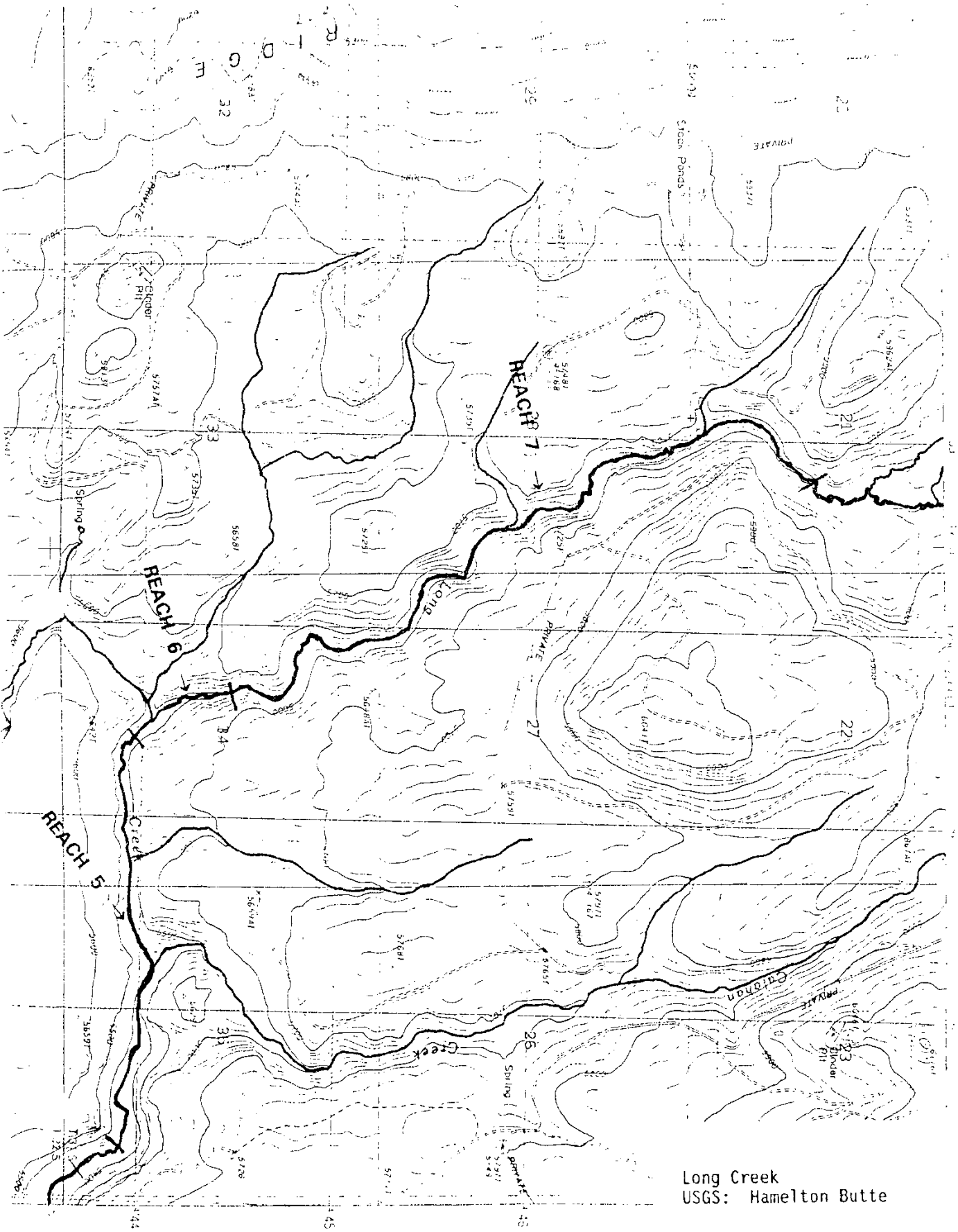
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852	LP				8' BT
853	RI				FRY
854	LP				FRY
864	LP	18836			FRY
872	RI	19074			FRY
886	RI	19436	/SS	/SS	TOADS
895	RB	19728	/SS, /SS	/SS, /SS	
898	RB	19796	/SS	/SS	
906	SS	19972	BD	H=.8M, BV DAM	
909	SS		OLD BD	BV DAM=1.2M HIGH	
910	BP			MANY SM CHNLS	
911	RB				MARSHY, FLOODED
913	SS	20022		H=.3M, BV DAM	OLD BD
916	SS	20052	BD	H=.5M, BV DAM	
918	LP		BA		FLOODS-RIP
920	LP		BA	FLOOD PLAIN+MARSHY	FLOODS-RIP
921	SL		BA		
922	LP			MARSHY UNIT W/MANY CHNLS	
923	SS	20091	BD	H=.3M, BV DAM	
928	DP	20171	BA		
929	SS	20171	BD		
930	BP	20199			BV HUT
932	SS	20225	BD	H=.9M, BV DAM	
934	SS	20248	BD	H=.6M, BV DAM	
938	SS	20302	BD	H=.6M, BV DAM	
939	BP	20344		MANY SM CHNLS	MARSHY
940	SS	20345		H=.4M, BV DAM	
942	SS	20402	BD	H=1.2M, BV DAM	
943	BP	20437			FRY
946	SS	20459	BD	H=.4M, BV DAM	
947	BP	20479			FRY
948	RB	20548	BA		
950	SS	20583	BD	H=.25M, BV DAM	
951	RB	20737			FLOODED RIP IN AREAS
955	SS		BD	H=.2M, BV DAM	
977	RB				TREE FROGS
979	LP				FRY
1002	LP				TOAD
1011	RB	20891			TREE FROGS
1016	CC	21003	CC	2 CULVERTS @1.0M DIAM	2-1m DIAM CULVERTS-400 ROAD
1023	RB	21330	TJ		
1024	RB		/TJ	/TJ	
1027	RB	21531	/SS, BA	/SS	
1041	PD			WIDTH=AC	FRY
1054	SL	22015		H=1.0M	
1061	CB	22299		H=1.1M	
1066	RB	22450	/SS	/SS	
1067	SL	22451		H=1.3M	
1087	CB	23047		USFS BOUNDARY	* NAT. FOR. PROPERTY BOUNDAR
1090	SR	23127		H=1.4M	FLAGGED-POSSIBLE BARRIER

## LONG CREEK COMMENT SUMMARY

UNIT	TYPE	DISTANCE	CODE	NOTE 1	NOTE 2
1091	CB	23153		START OF BULL TROUT	
1092	LP	23159			BOUNDARY MARKERS+ FLAGS
1093	CB	23250		POLES IN RIPARIAN	
1094	RB	23283	/SS	FLOW METER READS 6	FLOW METER @ 0.6
1096	LP	23292			/ELECTR. FLOWMETER ON HILL
1097	CB	23327	TJ/	TJ/	FLAGGED-END 1993 SURVEY
1098	SB	23328			START 1991 SURVEY
1105	LP	23391		TEMP 51 F/10:00	
1190	CB	24561	TJ/		TRIB 1 M WIDE ON LEFT
1191	RP	24576			TEMP 45 @ 8:15
1216	CB	24858		BNDRY KLAMATH IND. RESERV.	
1270	CR	25743			SPRING SEEP ON RIGHT BANK
1272	SR	25763		END SURVEY, LAST BULL TROUT	

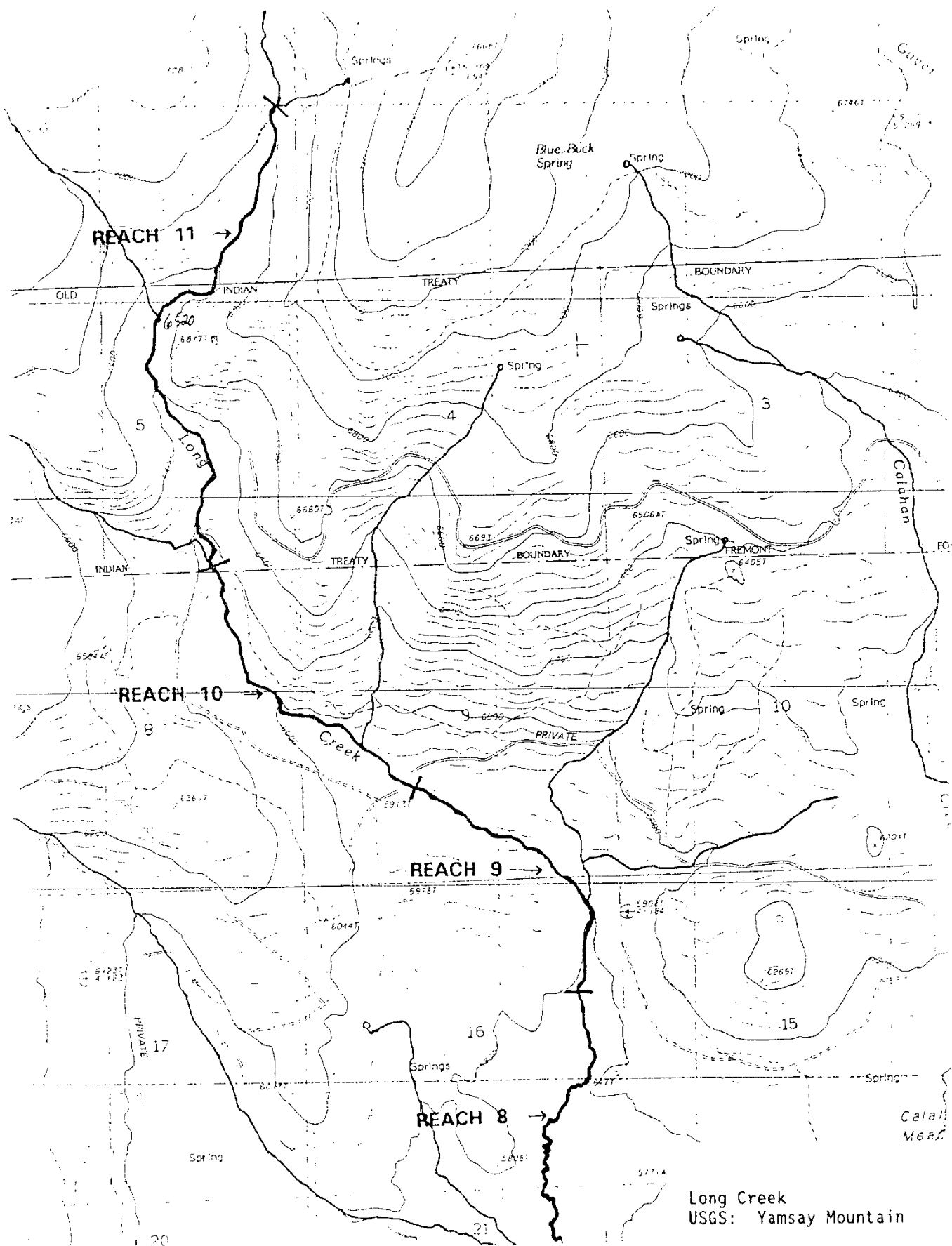


Long Creek  
USGS: Sycan Marsh West



Long Creek  
USGS: Hamelton Butte





Long Creek  
 USGS: Yamsay Mountain



Long Creek - Reach 1 - Unit 1. Lateral scour pool in O1 channel.

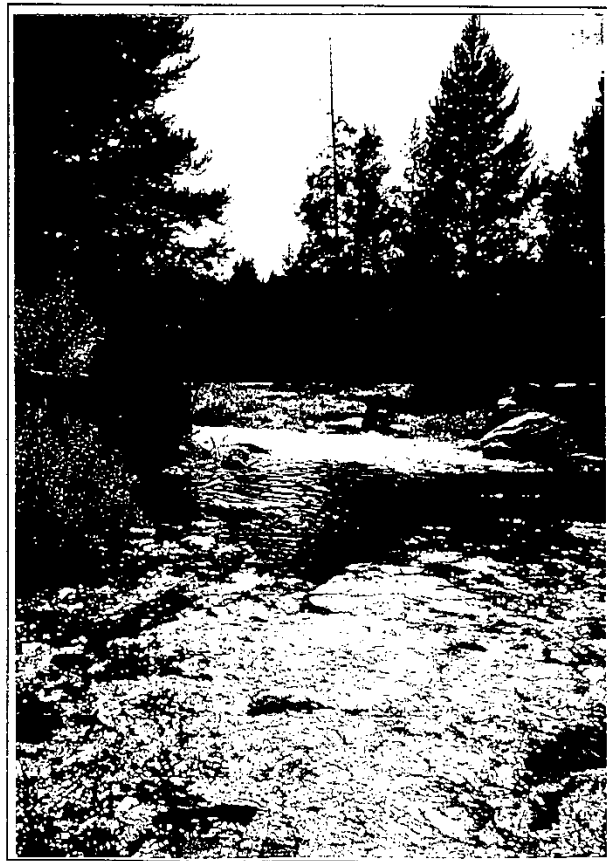


Long Creek - Reach 1 - Unit 28. Lateral scour pool in O2 channel.



Upper: Long Creek - Reach  
2 - Unit 399. Riffle  
in a meandering  
channel.

Right: Long Creek - Reach  
2 - Unit 349. Rapid  
over boulders.





Long Creek - Reach 3 - Unit 431. Lateral scour pool.



Long Creek - Reach 4 - Unit 459. Lateral scour pool.



Long Creek - Reach 5 - Unit 516. Rapid over boulders.



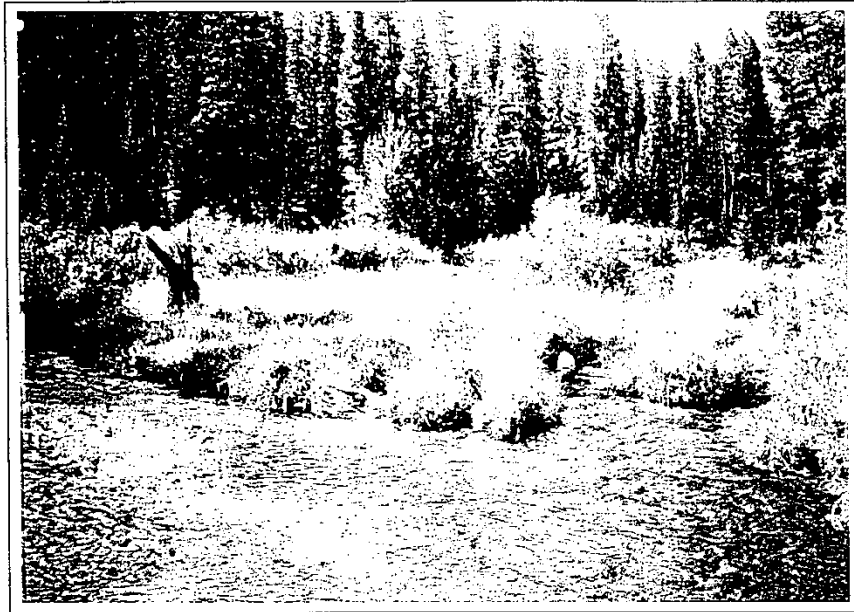
Long Creek - Reach 5 - Unit 520. Rapid over boulders.



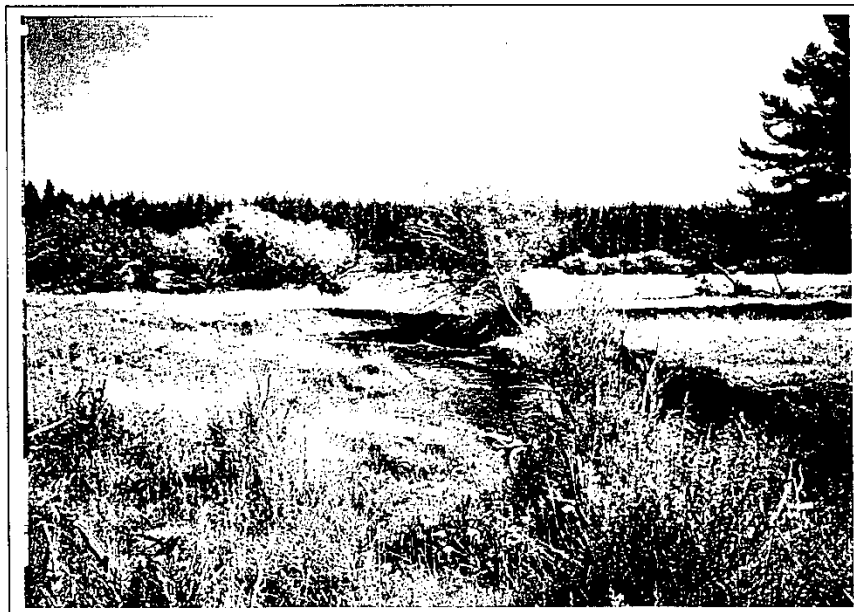
Long Creek - Reach 6 - Unit 555. Rapid over boulders.



Long Creek - Reach 7 - Unit 616. Rapid over boulders.



Long Creek - Reach 7 - Unit 646. Rapid over boulders.



Long Creek - Reach 8 - Unit 750. Riffle.



Long Creek - Reach 9 - Unit 859. Riffle.



Long Creek - Reach 9 - Unit 910. Beaver pool creates marshy area.





Long Creek - Reach 10 - Unit 1010. Lateral scour pool.



Long Creek - Reach 10 - Unit 1090. Step over bedrock is a possible barrier between brook and bull trout populations.

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**SUMMARY OF FISH SURVEY INFORMATION**


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Stream: LONG CR  
 Basin: KLAMATH RIVER

SAMPLE DATE: 08/29/92  
 MAP CODE: LC1

EPA CODE: 1801020205700.00  
 LOCATION:

Method: Snorkeling or Single pass electroshocking without blocknets  
 Densities represent known minimum number of fish

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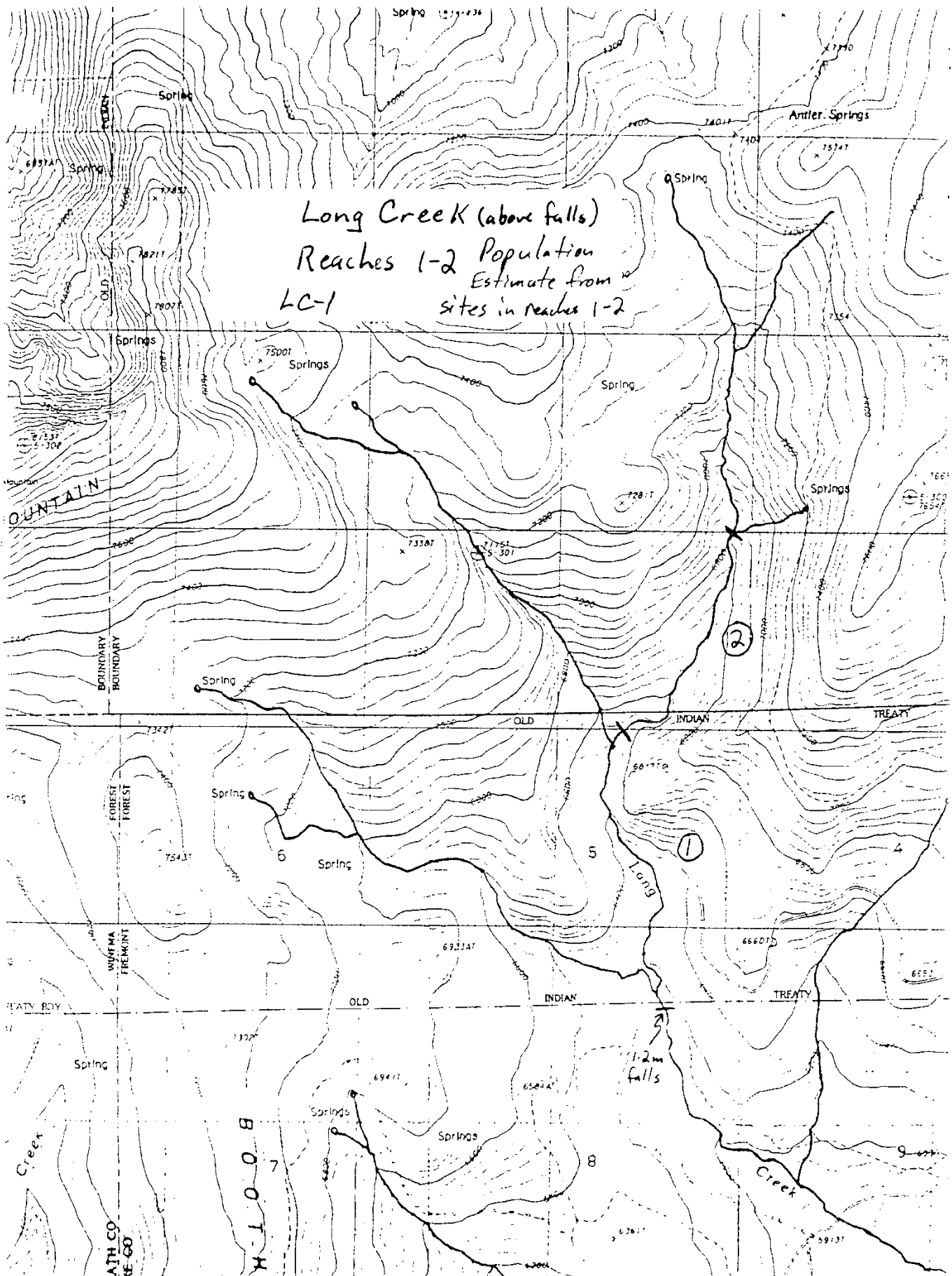
**HABITAT UNIT AND SPECIES INFORMATION**
**LENGTH FREQUENCY**

SPECIES	CM	3-6	6-9	9-12	12-14	14-17	17-23	23-30	30-40	>40	TOTAL
	IN	2	3	4	5	6	7-9	9-12	12-16	>16	
BUT		3	33	43	19	24	11	0	0	0	133
X		0	0	0	0	0	0	0	0	0	0

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FISH SURVEY: SAMPLE SITE SUMMARY

Basin: KLAMATH  
Stream: LONG CR

SAMPLE DATE: 09/04/90  
MAP CODE: LC-1

EPA CODE: 1801020202000.00  
TOWNSHIP: 31S RANGE: 12E SECTION: SW9

Method: Single pass electroshocking without blocknets  
Densities represent known minimum number of fish

REACH DESCRIPTION

Valley		Riparian Zone		Stream			
CHAN CONST	CT	VEG	CM	AC WIDTH	3.0	AC HEIGHT	0.3
CONST FREQ	40	ADJ FEA LF	HT	SLOPE	1.5	ASPECT	330
VWI	10.0	ADJ FEA RT	HT	STR FLOW	MF	WATER TEMP	12.5
LAND USE	SG	OPEN SKY	39%				

COMMENT CODE:

Sediment Characteristics (percent)

Sand	Gravel	Cobble	Boulder	Bedrock
0	0	0	0	0

SPECIES INFORMATION

LENGTH FREQUENCY

SPECIES	CM	3-6	6-9	9-12	12-14	14-17	17-23	23-30	30-40	>40	TOTAL
	IN	2	3	4	5	6	7-9	9-12	12-16	>16	
BT		5	5	11	10	4	1	0	0	0	36
BUT		0	4	0	0	0	1	0	0	0	5
X		0	0	0	0	0	0	0	0	0	0

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 FISH SURVEY: SAMPLE SITE SUMMARY  
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Basin: KLAMATH  
 Stream: LONG CR

SAMPLE DATE: 09/06/90  
 MAP CODE: LC-2

EPA CODE: 1801020202000.00  
 TOWNSHIP: 31S RANGE: 12E SECTION: SE5

Method: Single pass electroshocking without blocknets  
 Densities represent known minimum number of fish  
 -----

REACH DESCRIPTION

Valley		Riparian Zone		Stream			
CHAN CONST	CT	VEG	CM	AC WIDTH	4.5	AC HEIGHT	0.2
CONST FREQ	35	ADJ FEA LF	HT	SLOPE	2.5	ASPECT	335
VWI	20.0	ADJ FEA RT	HT	STR FLOW	MF	WATER TEMP	8.5
LAND USE	SG	OPEN SKY	42%				

COMMENT CODE:

Sediment Characteristics (percent)

Sand	Gravel	Cobble	Boulder	Bedrock
20	60	15	5	0

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SPECIES INFORMATION

LENGTH FREQUENCY

SPECIES	CM 3-6	6-9	9-12	12-14	14-17	17-23	23-30	30-40	>40	TOTAL
	IN 2	3	4	5	6	7-9	9-12	12-16	>16	
BT	0	2	4	13	2	1	0	0	0	22
TR	1	0	0	0	0	0	0	0	0	1
X	0	0	0	0	0	0	0	0	0	0

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FISH SURVEY: SAMPLE SITE SUMMARY

Basin: KLAMATH  
Stream: LONG CR

SAMPLE DATE: 09/06/90  
MAP CODE: LC-3

EPA CODE: 1801020202000.00  
TOWNSHIP: 31S RANGE: 12E SECTION: SE5

Method: Single pass electroshocking without blocknets  
Densities represent known minimum number of fish

REACH DESCRIPTION

Valley		Riparian Zone		Stream			
CHAN CONST	CH	VEG	CM	AC WIDTH	4.3	AC HEIGHT	0.2
CONST FREQ	40	ADJ FEA LF	HS	SLOPE	5.0	ASPECT	360
VWI	10.0	ADJ FEA RT	HS	STR FLOW	MF	WATER TEMP	12.0
LAND USE	MT	OPEN SKY	50%	COMMENT CODE: BULL TROUT			

Sediment Characteristics (percent)

Sand	Gravel	Cobble	Boulder	Bedrock
10	35	35	10	10

SPECIES INFORMATION

LENGTH FREQUENCY

SPECIES	CM 3-6	6-9	9-12	12-14	14-17	17-23	23-30	30-40	>40	TOTAL
	IN 2	3	4	5	6	7-9	9-12	12-16	>16	
BUT	1	1	3	0	3	0	0	0	0	8
X	0	0	0	0	0	0	0	0	0	0

FISH SURVEY: SAMPLE SITE SUMMARY

Basin: KLAMATH  
Stream: LONG CR

SAMPLE DATE: 09/10/90  
MAP CODE: LC-5

EPA CODE: 1801020202000.00  
TOWNSHIP: 31S RANGE: 12E SECTION: SE5

Method: Single pass electroshocking without blocknets  
Densities represent known minimum number of fish

REACH DESCRIPTION

Valley		Riparian Zone		Stream			
CHAN CONST	CH	VEG	CM	AC WIDTH	5.0	AC HEIGHT	0.3
CONST FREQ	50	ADJ FEA LF	HS	SLOPE	4.0	ASPECT	5
VWI	5.0	ADJ FEA RT	HT	STR FLOW	MF	WATER TEMP	12.8
LAND USE	MT	OPEN SKY	44%	COMMENT CODE: JUST BELOW			

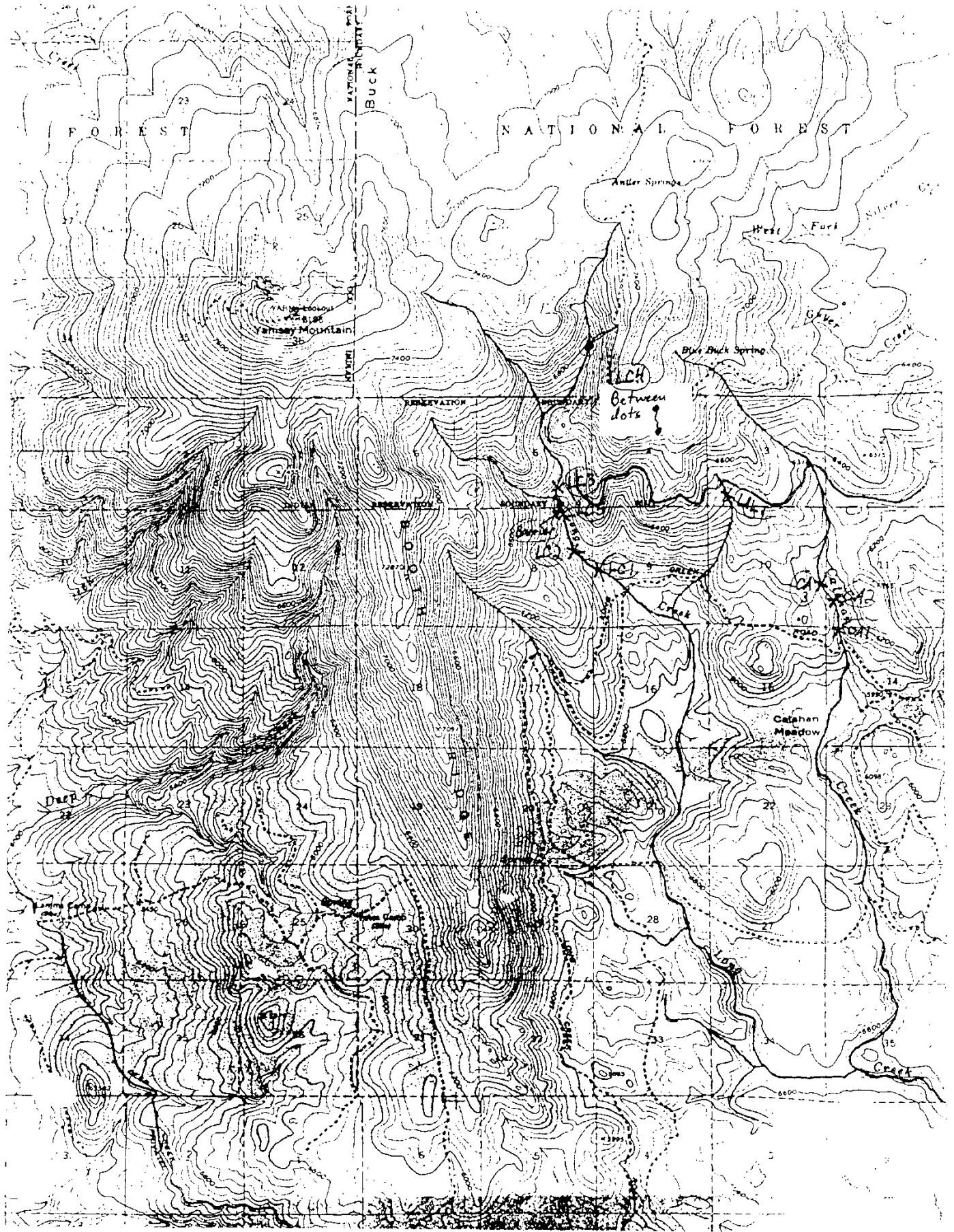
Sediment Characteristics (percent)

Sand	Gravel	Cobble	Boulder	Bedrock
0	0	0	0	0

SPECIES INFORMATION

LENGTH FREQUENCY

SPECIES	CM 3-6	6-9	9-12	12-14	14-17	17-23	23-30	30-40	>40	TOTAL
	IN 2	3	4	5	6	7-9	9-12	12-16	>16	
BT	0	0	1	0	0	0	0	0	0	1
BUT	0	0	1	0	0	0	0	0	0	1
HYB	0	0	0	0	0	0	0	1	0	1





ODFW AQUATIC INVENTORY PROJECT

STREAM REPORT

STREAM: Long Creek

BASIN: Klamath

DATES: August 15-28, 1991

CREW: Jason Prodrabsky / Ron Lefler / Jeffrey Dambacher

STREAM ORDER: \_\_\_\_\_ BASIN AREA: \_\_\_\_\_ NUMBER OF TRIBUTARIES:

USGS MAPS:

GENERAL DESCRIPTION: The survey of Long Creek began at a 1.2 meter high bedrock falls that was an almost complete barrier to upstream moving brook trout. The falls were roughly 16 river-kilometers upstream of the Sycan marsh. An isolated population of bull trout lived in the 2,638 meters of channel that were surveyed above the falls. In an extensive electrofishing population estimate in this section of stream, only one brook trout was observed above the falls, and no brook x bull trout hybrids. Below the falls brook trout were abundant, and there also existed small numbers of bull trout and brook x bull trout hybrids. The above falls portion of Long Creek was dominated by rapid (36%), cascade (32%), and riffle (22%) habitat. Stream substrate was dominated by gravel (33%), cobble (30%), and boulder (22%) sized sediment. Mature timber and light grazing were the dominant land uses.

REACH DESCRIPTIONS:

Reach 1: (T31S-R12E-SE5) Length 1,517 meters. This reach began at a 1.2 meter high bedrock falls. The reach was constrained by high terraces and hillsides within a broad valley floor (74%), and hillsides within moderate v-shaped hillslopes (26%). A major unnamed tributary entered the stream 200 meters above the falls, and contributed roughly 60 percent of the flow. A small tributary entered the channel near the end of this reach. The valley width index was 3.7 (VWI is the ratio of the active channel width to the width of the valley floor), and the average unit gradient was 6 percent. Stream habitat was dominated by rapids (36%), cascades (33%), and riffles (19%). Cobble (32%), boulder (29%), and gravel (27%) substrate dominated the stream channel.

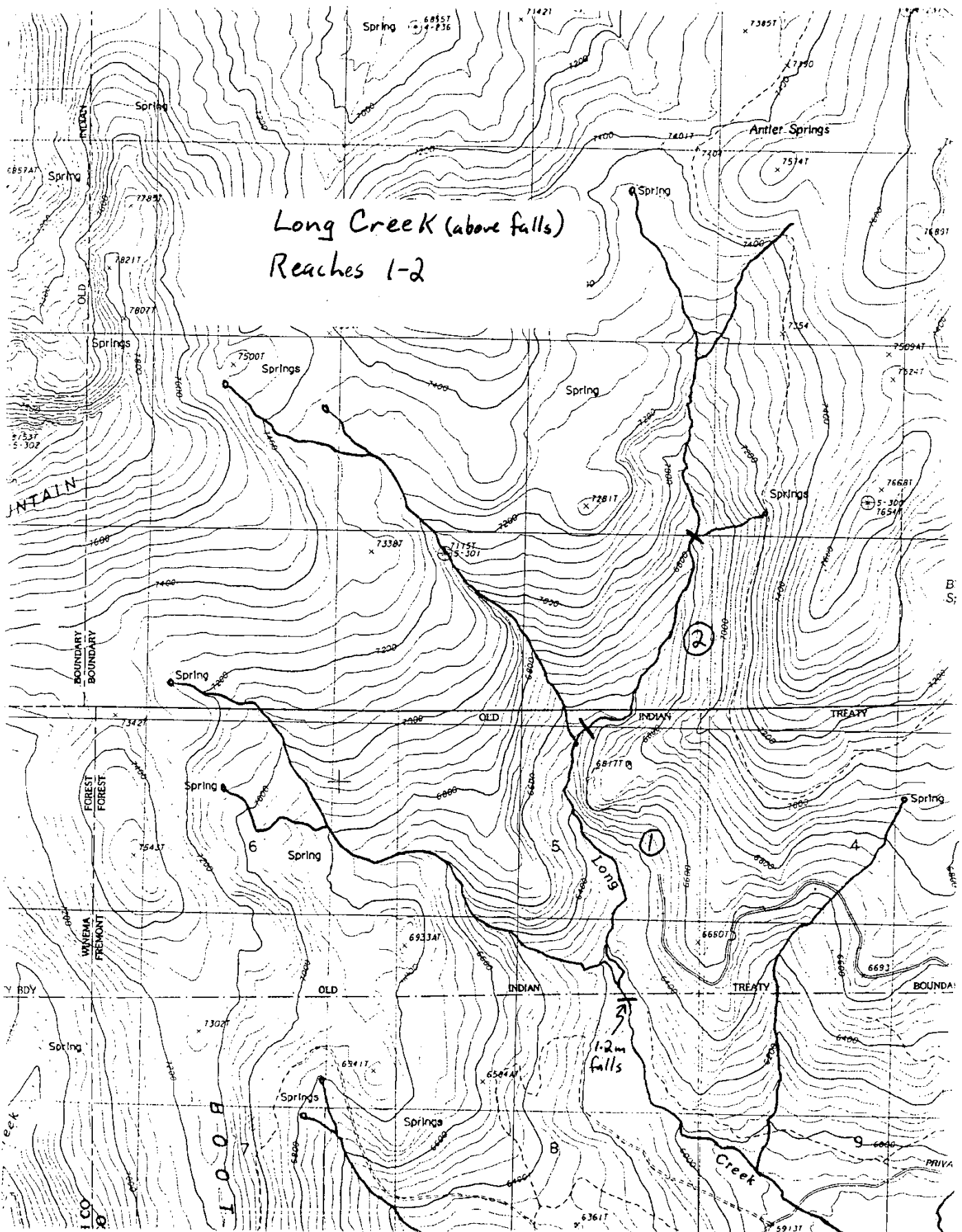
Reach 2: (T31S-R12E-NE5) Length 1,121 meters. This reach was constrained by terraces and bordered by moderate v-shaped

hillslopes. The VWI was 2.2 and the average unit gradient was 6.7 percent. The historic boundary for the Klamath Indian Reservation crossed the lower section of this reach. The reach ended at a bedrock and boulder falls that were the upstream limit of fish in the stream. The hillside to the east of the reach end contained numerous spring seeps that contributed flow to the channel. Stream habitat was dominated by rapids (35%), cascades (31%), and riffles (26%). The stream substrate was dominated by gravel (40%), and cobble (28%) sediment.

**CONCERNS/RECOMMENDATIONS:**

The section of channel surveyed appeared to be subject to severe flood flows. The small tributary near the top of reach 1 had carried a recent debris torrent. Storm events could be of great risk to this small isolated population, as refugia appeared to be lacking in this stream. There were numerous deposits of sediment in reach 1 that appeared to be reworked debris flow sediment. If one of these deposits moved downstream and covered the falls, then brook trout could easily invade the upper two reaches. Also brook trout and brook x bull trout hybrids were attempting to negotiate the falls at the time of the survey, and one brook trout had apparently succeeded. The plunge pool below the falls and some small crevices in the falls themselves could be filled to better limit upstream fish passage.

**COMMENTS:**



## Valley and Channel Summary

## Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	74
Moderate V-shape	26	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index: 3.7

## Channel Morphology (Percent Reach Length)

<u>Unconstrained</u>		<u>Constrained</u>	
Single Channel	0	Hillslope	26
Multiple Channel	0	Bedrock	0
Braided Channel	0	Terrace	0
		Alt. Terrace/Hill	74

## Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,517	4,699	0
Secondary	63	105	0

## Channel Dimensions

<u>Wetted Surface</u>	<u>Active Channel</u>	<u>First Terrace</u>
Width 3.0	Width 6.1	Width 46.4
Depth 0.3	Height 0.2	Height 4.3

Stream Flow: MF                      Water Temp: 51.0-54.0  
 Avg. Unit Gradient: 6.0              Habitat Units/100m: 6.8

## Riparian, Bank, and Wood Summary

Land Use:              MT/LG                      Riparian Veg.: CM

## Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>	<u>Undercut Banks</u>
Non-Erodible	2.7	Unit Average: 0.23%
Vegetation Stabilized	94.3	
Actively Eroding	3.0	

<u>Wood Complexity</u>		<u>Open Sky Above Stream (% of 180°)</u>	
Average Unit Score:	1.0	Unit Average:	55
Average Wood Cover:	0.3%	Range:	39-64

ACH 2

NE5-T31S-R12E

REACH 2

HABITAT DETAIL

Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (#>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BEDROCK	2	52	5.3	0.1	268	16	0	0	5	3	3	90
CASCADE/BOULDERS	13	302	2.3	0.2	709	164	0	0	38	43	19	0
GLIDE	1	1	3.9	0.2	4	0	5	5	80	5	5	0
POOL-DAMMED	4	18	2.9	0.4	56	4	8	0	60	18	3	13
POOL-LATERAL SCOUR	8	36	1.9	0.3	70	13	1	6	51	16	3	23
POOL-PLUNGE	4	20	3.0	0.4	64	7	3	0	53	33	13	0
RAPID/BEDROCK	4	51	2.3	0.1	151	30	0	0	13	3	5	80
RAPID/BOULDERS	17	381	2.6	0.2	968	136	0	0	42	41	17	0
RIFFLE	4	53	2.7	0.2	160	7	0	0	60	34	6	0
RIFFLE W/ POCKETS	13	262	2.5	0.2	686	91	0	4	48	38	8	0
STEP/BEDROCK	1	5	7.7	0.1	39	7	0	0	10	10	0	80
STEP/BOULDERS	3	2	3.2	0.1	6	13	0	0	0	0	100	0
STEP/LOG	6	5	3.6	0.1	14	0	83	0	13	3	0	0
<b>Total:</b>	<b>80</b>	<b>1,186</b>	<b>2.7</b>	<b>0.2</b>	<b>3,195</b>	<b>488</b>	<b>Avg: 7</b>	<b>1</b>	<b>40</b>	<b>28</b>	<b>14</b>	<b>10</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders		Wood Class
					(m <sup>2</sup> )	Percent	Number	#/100m <sup>2</sup>	
Dammed & BW Pools	4	18	2.9	0.4	56	1.75	4	7.14	1.8
Scour Pools	12	56	2.3	0.3	134	4.19	20	14.93	1.3
Glides	1	1	3.9	0.2	4	0.13	0	0.00	1.0
Riffles	17	315	2.6	0.2	846	26.48	98	11.58	1.0
Rapids	21	432	2.5	0.2	1119	35.02	166	14.83	1.0
Cascades	15	353	2.7	0.2	977	30.58	180	18.42	1.2
Step/Falls	10	12	3.9	0.1	59	1.85	20	33.90	1.2

Valley and Channel Summary

Valley Characteristics (Percent Reach Length)

<u>Narrow Valley Floor</u>		<u>Broad Valley Floor</u>	
Steep V-shape	0	Constraining Terraces	0
Moderate V-shape	100	Multiple Terraces	0
Open V-shape	0	Wide Floodplain	0

Valley Width Index: 2.2

Channel Morphology (Percent Reach Length)

<u>Unconstrained</u>		<u>Constrained</u>	
Single Channel	0	Hillslope	0
Multiple Channel	0	Bedrock	0
Braided Channel	0	Terrace	100
		Alt. Terrace/Hill	0

Channel Characteristics

<u>Type</u>	<u>Length</u>	<u>Area</u>	<u>Dry Units</u>
Primary	1,121	3,086	0
Secondary	66	109	0

Channel Dimensions

<u>Wetted Surface</u>	<u>Active Channel</u>	<u>First Terrace</u>
Width 2.7	Width 4.7	Width 45.3
Depth 0.2	Height 0.2	Height 2.0

Stream Flow: MF                      Water Temp: 60.0-60.0  
 Avg. Unit Gradient: 6.7              Habitat Units/100m: 6.7

Riparian, Bank, and Wood Summary

Land Use:                      MT/LG                      Riparian Veg.: CM

Bank Stability

<u>Bank Class</u>	<u>Percent Reach Length</u>	<u>Undercut Banks</u>
Non-Erodible	0.0	Unit Average: 0.00%
Vegetation Stabilized	99.9	
Actively Eroding	0.1	

Wood Complexity

		<u>Open Sky Above Stream (% of 180°)</u>
Average Unit Score:	1.1	Unit Average: 56
Average Wood Cover:	1.8%	Range: 33-75

STREAM SUMMARY

LONG CREEK

Number <u>Units</u>	Total Length	Avg Width	Avg Depth	Total Area	Substrate						Total Large
	(m)	(m)	(m)	(m <sup>2</sup> )	S/O	Sand	Grvl	Cbbl	Bldr	Bdrk	Boulder
187	2,766	2.9	0.3	7,999	3	3	33	30	22	9	2041

<u>Habitat Group</u>	Wetted Area	
	(m <sup>2</sup> )	Percent
Scour Pool	572	7.2
Backwater Pools	89	1.1
Glide	4	0.1
Riffle	1751	21.9
Rapid	2840	35.5
Cascade	2582	32.3
Step	161	2.0

ACH 1

SE5-T31S-R12E

REACH 1

HABITAT DETAIL

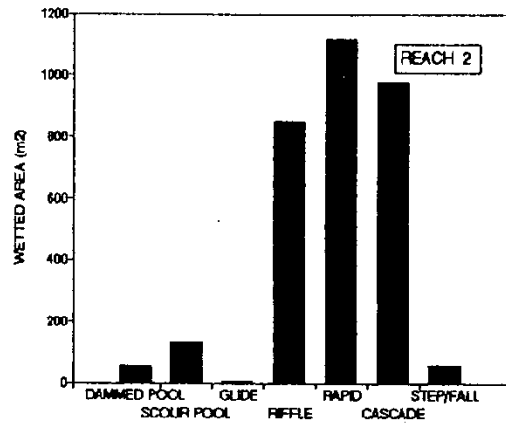
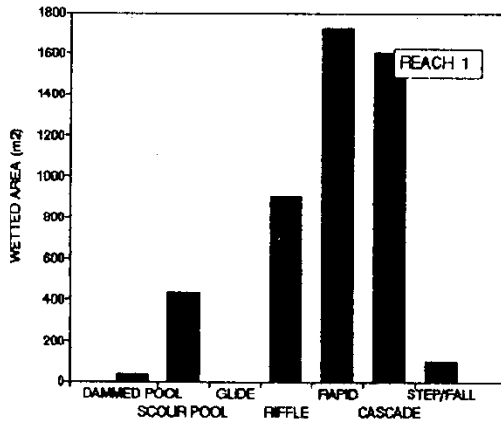
Habitat Type	Number Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Total Area (m <sup>2</sup> )	Large Boulders (>0.5m)	Substrate Percent Wetted Area					
							S/O	Snd	Grvl	Cbbl	Bldr	Bdrk
CASCADE/BEDROCK	4	56	2.5	0.2	166	57	0	0	9	9	15	68
CASCADE/BOULDERS	21	500	2.6	0.3	1,439	678	0	1	24	37	39	0
POOL-DAMMED	3	13	2.5	0.5	33	17	2	3	28	33	20	13
POOL-LATERAL SCOUR	10	92	3.3	0.5	288	36	4	10	32	26	22	6
POOL-PLUNGE	12	46	3.1	0.6	150	56	2	5	38	30	21	5
RAPID/BEDROCK	1	13	2.9	**.*	38	0	0	0	0	0	0	100
RAPID/BOULDERS	24	537	3.0	0.2	1,683	463	0	2	31	39	24	3
RIFFLE	7	95	3.7	0.2	365	33	0	15	45	30	9	1
RIFFLE W/ POCKETS	11	190	2.7	0.2	540	160	0	1	30	44	22	2
STEP/BEDROCK	2	3	1.7	0.1	6	3	0	0	0	0	0	100
STEP/BOULDERS	8	16	2.8	0.2	37	39	0	0	3	18	79	1
STEP/LOG	4	9	5.6	0.3	59	11	0	2	33	21	43	0
<b>Total:</b>	<b>107</b>	<b>1,580</b>	<b>3.0</b>	<b>0.3</b>	<b>4,804</b>	<b>1553</b>	<b>Avg: 1</b>	<b>4</b>	<b>27</b>	<b>32</b>	<b>29</b>	<b>8</b>

HABITAT SUMMARY

Habitat Group	No. Units	Total Length (m)	Avg Width (m)	Avg Depth (m)	Wetted Area		Large Boulders Number	Wood #/100m <sup>2</sup>	Wood Class
					(m <sup>2</sup> )	Percent			
Dammed & BW Pools	3	13	2.5	0.5	33	0.69	17	51.52	1.0
Scour Pools	22	139	3.2	0.5	438	9.12	92	21.00	1.2
Slides	0	0	.	.	0	0.00	0	0.00	.
Riffles	18	285	3.1	0.2	905	18.84	193	21.33	1.0
Rapids	25	550	3.0	0.2	1721	35.82	463	26.90	1.0
Cascades	25	566	2.6	0.3	1605	33.41	735	45.79	1.0
Step/Falls	14	27	3.4	0.2	102	2.12	53	51.96	1.0

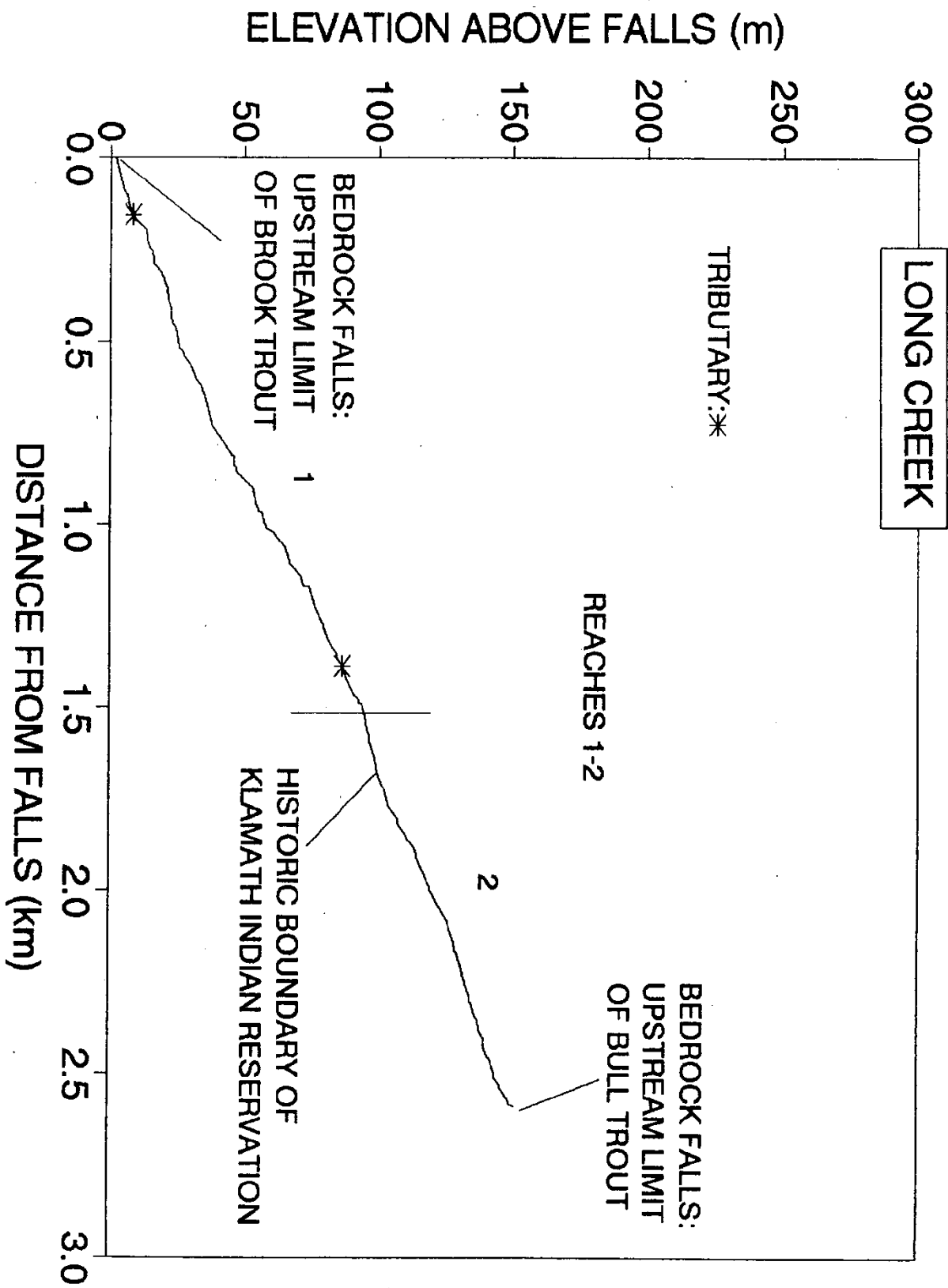


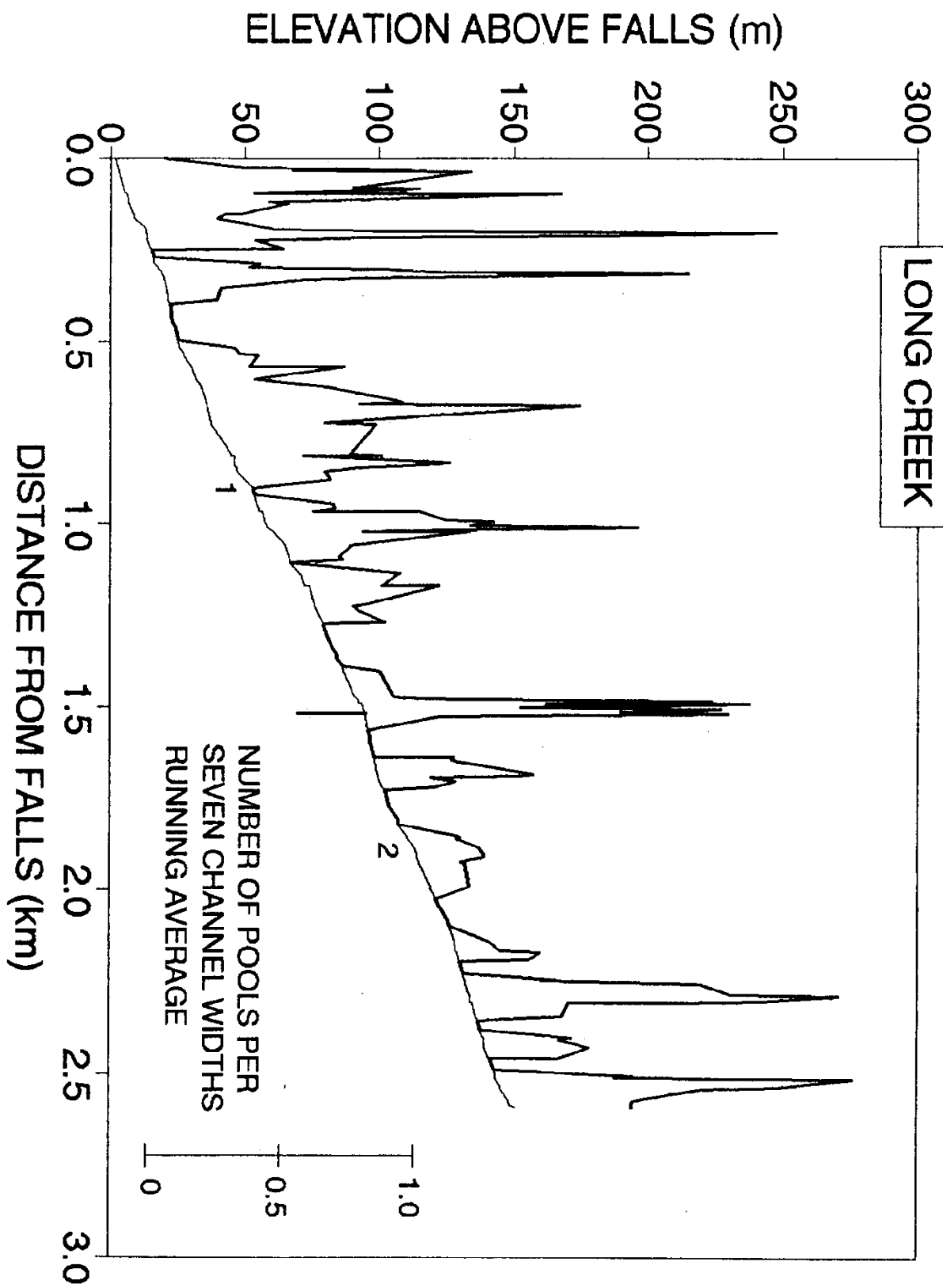
# LONG CREEK: HABITAT DISTRIBUTION

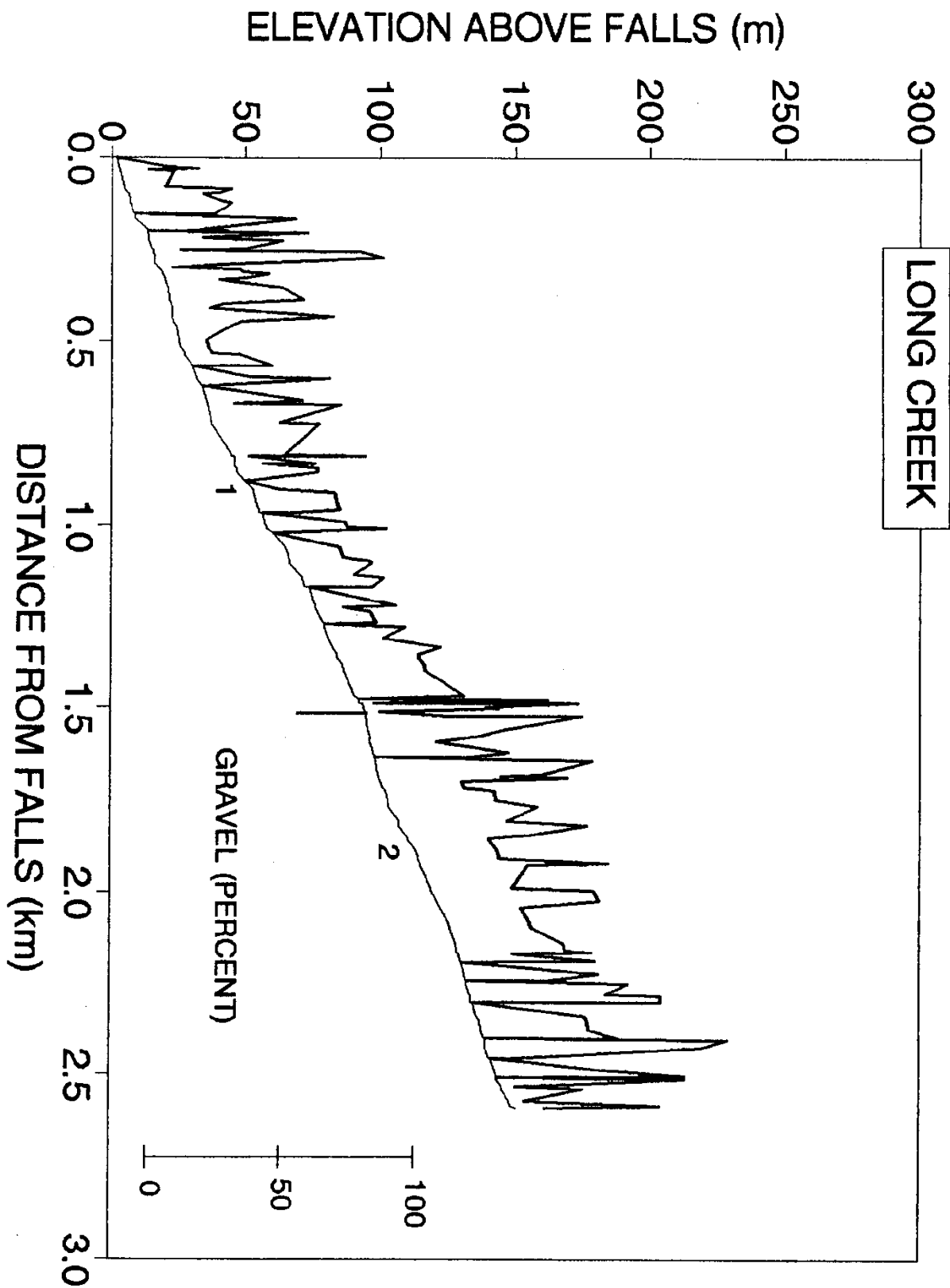


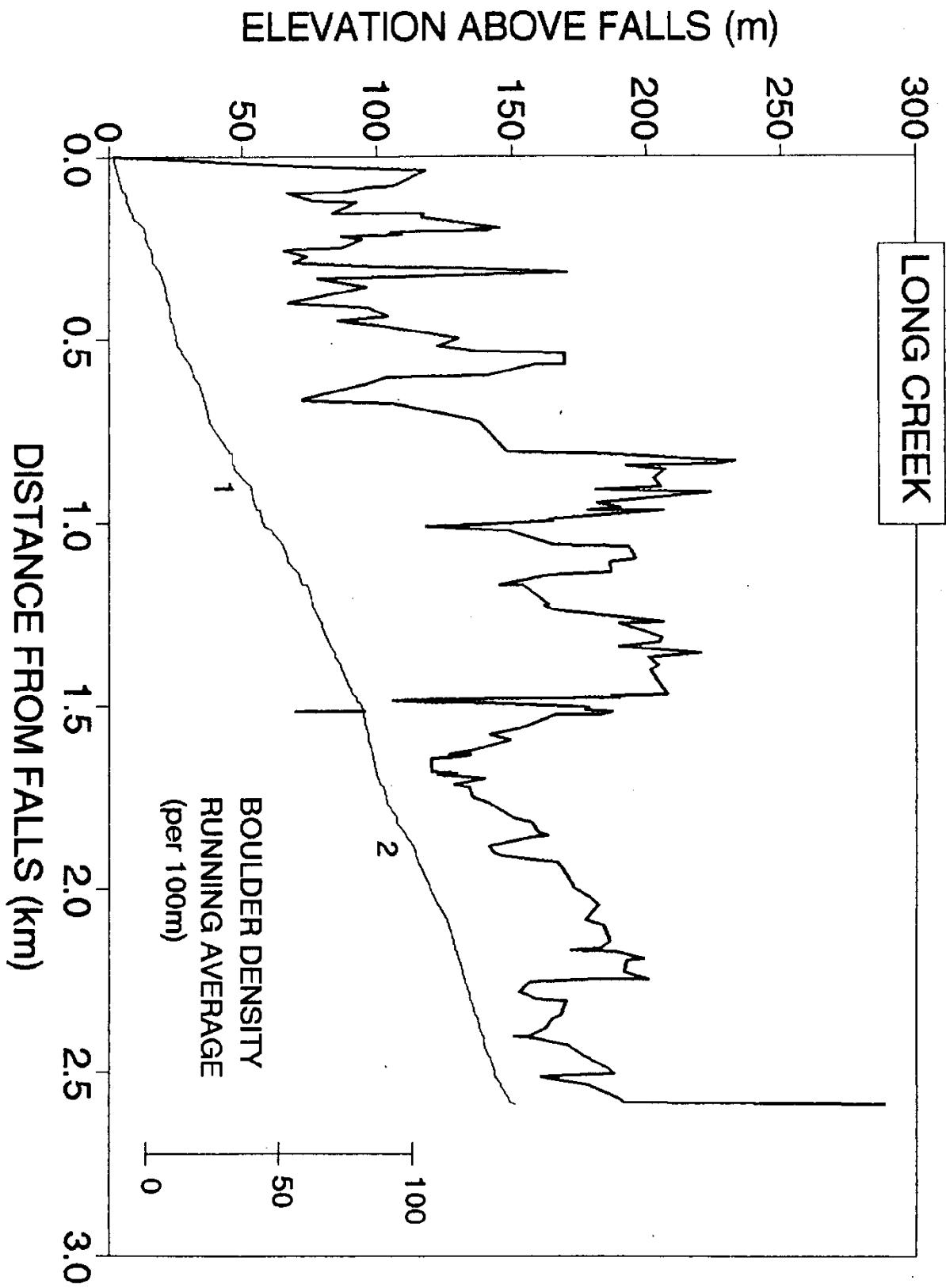
LONG CREEK, WOOD SUMMARY

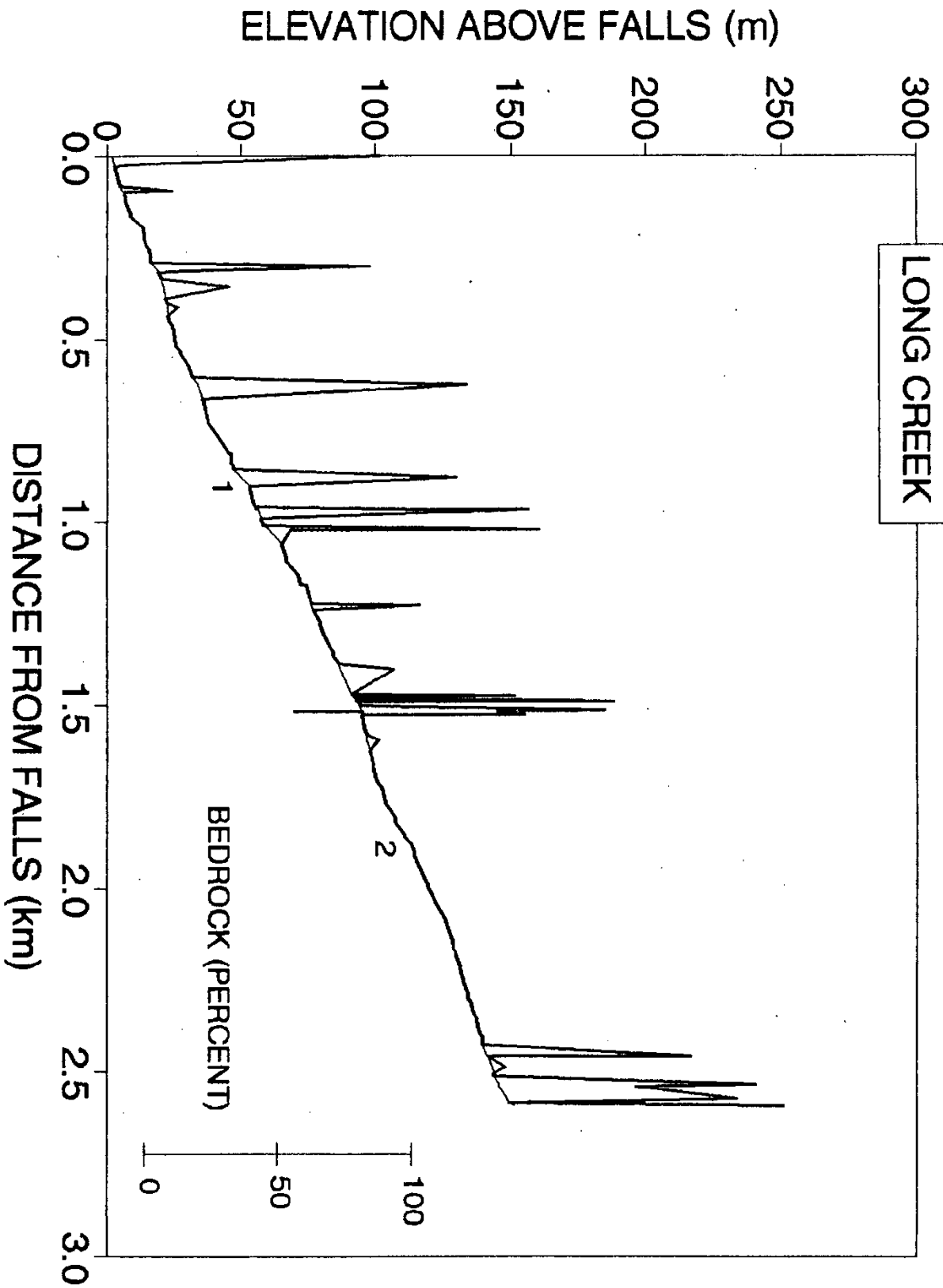
REACH	(m) DISTANCE	PIECES	(m <sup>3</sup> ) VOLUME	PIECES /100m	VOLUME 100/m
1	1471	111	117	8	8
2	1121	73	79	7	7

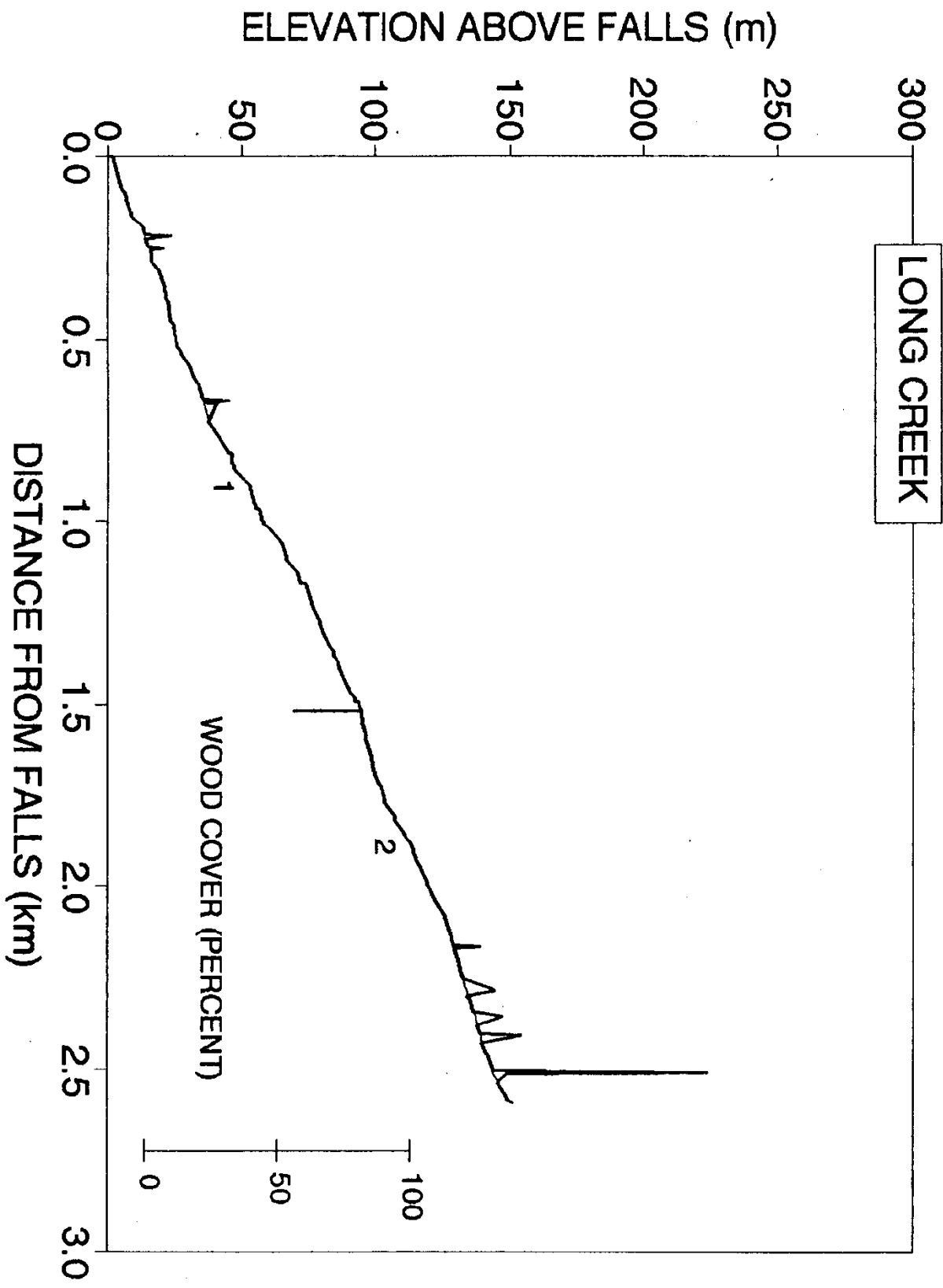




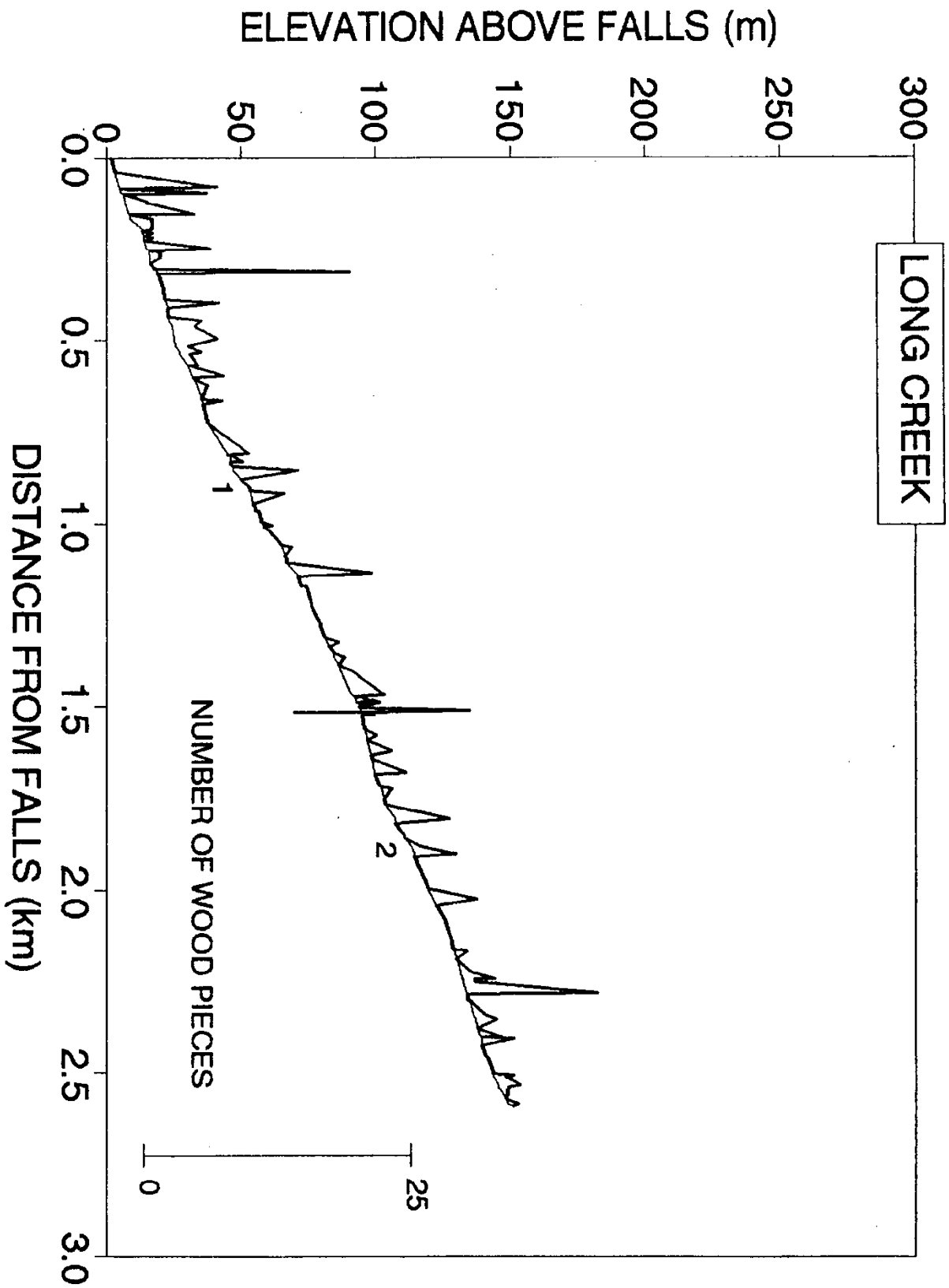


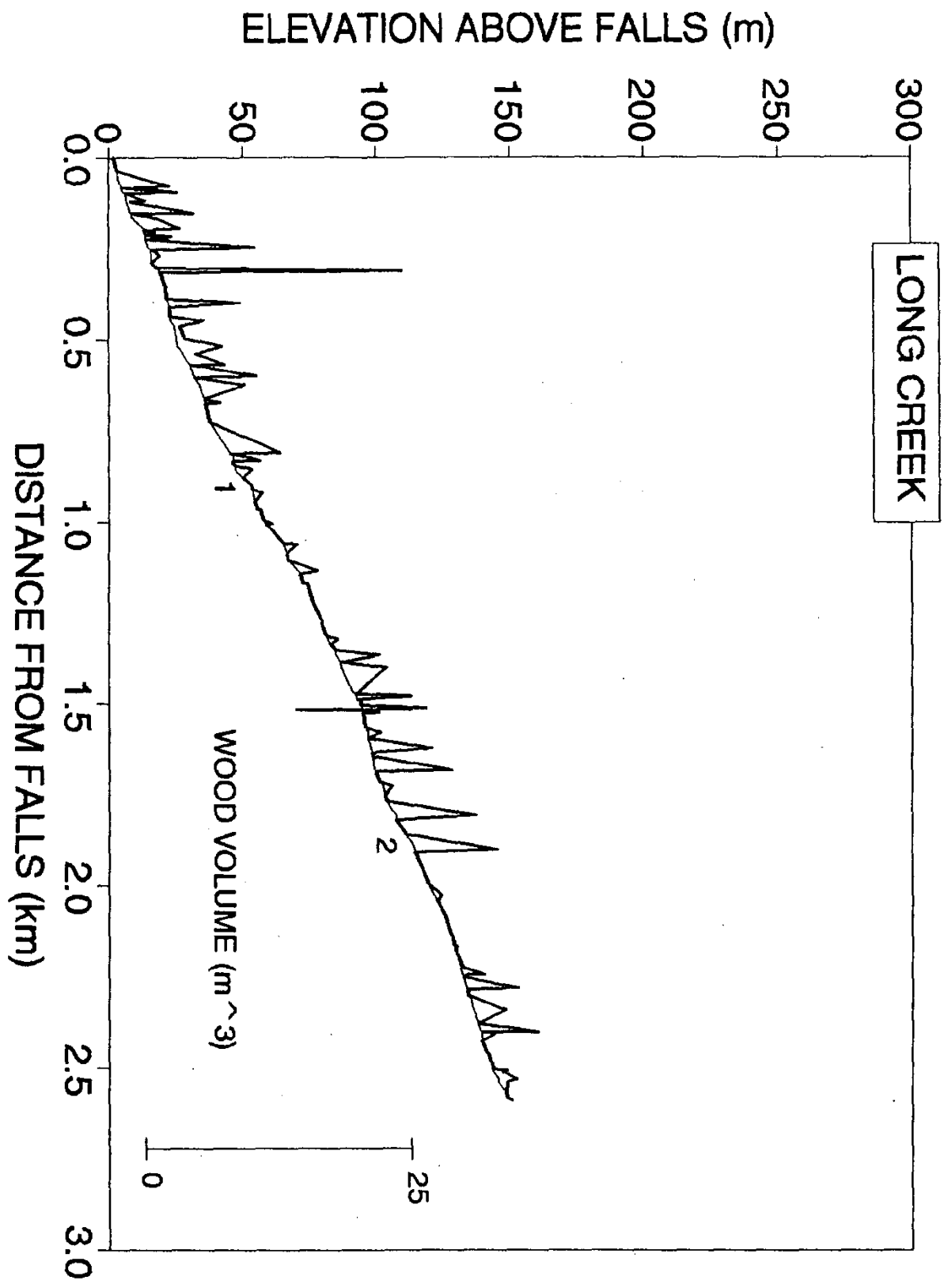


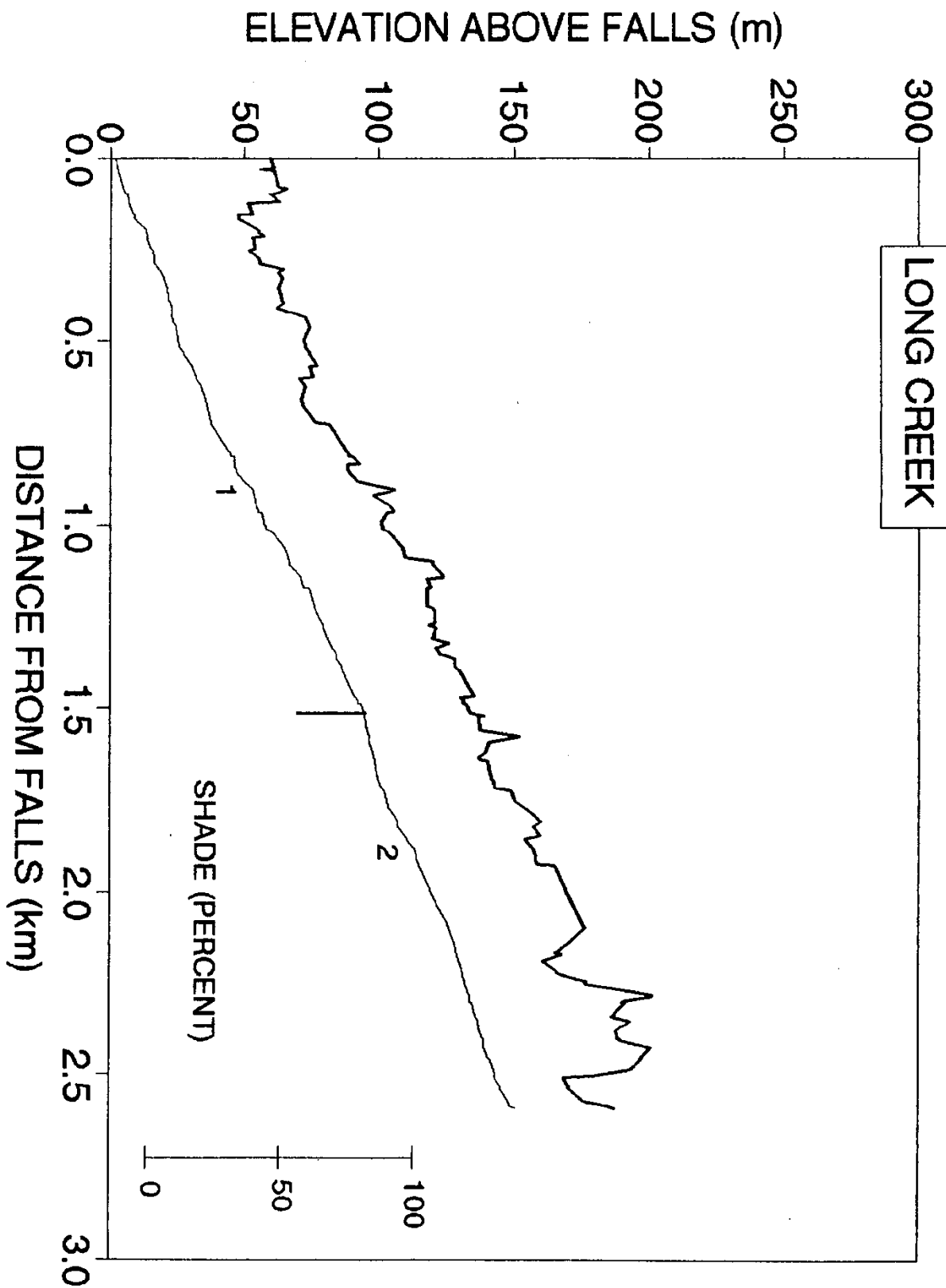












LONG CREEK COMMENT SUMMARY: 1991 SURVEY

Reach	Unit	Type	Chanl	Distance (km)	Code	Note 1	Note 2
1	1	SR	00	0.00		SMALL FALLS; START OF BULL TR.	FALLS 1.2 m HIGH
1	12	RB	00	0.20	TJL	TRIB ON LEFT W/ 60% FLOW	
1	20	LP	00	0.27		TEMP 51 F/10:00	
1	105	CB	00	1.44	TJL		TRIB 1 M WIDE ON LEFT
1	106	RP	00	1.45			TEMP 45 @ 8:15
2	131	CB	00	1.73		BNDRY KLAMATH IND. RESERVATION	
2	185	CR	00	2.62			SPRING SEEP ON RIGHT BANK
2	187	SR	00	2.64		END SURVEY, LAST BULL TROUT	

UNIT NUMB	UNIT LENG	UNIT WIDTH	VER LENGTH	VER WIDTH
10	21.0	5.5	26.5	5.4
20	3.2	3.0	3.5	2.5
30	15.0	4.0	14.8	4.1
60	45.0	4.0	39.1	3.9
70	25.0	2.5	28.9	2.7
80	10.0	2.8	14.0	3.1
90	6.0	5.5	5.1	4.2
100	30.0	2.5	23.2	2.2
110	5.0	2.0	5.4	2.1
120	6.5	2.0	7.1	1.8
130	33.0	2.9	37.0	2.6
140	26.0	2.3	29.9	2.8
157	4.0	2.5	3.6	2.8
158	5.5	1.5	4.8	1.5
166	3.5	3.5	3.0	3.0
170	40.0	2.7	36.5	2.9
182	7.0	3.5	7.8	3.5
183	19.0	6.0	20.2	5.5
SUM	304.7	58.6	309.2	56.8
LENGTH RATIO	0.986	WIDTH RATIO	1.036	

LENGTH	
Regression Output:	
Constant	0
Std Err of Y Est	3.280902
R Squared	0.941087
No. of Observations	18
Degree of Freedom	17
X Coefficient(s)	0.893587
Std Err of Coef.	0.036285
WIDTH	
Regression Output:	
Constant	0
Std Err of Y Est	0.405501
R Squared	0.901885
No. of Observations	18
Degree of Freedom	17
X Coefficient(s)	1.042801
Std Err of Coef.	0.028741

LONG CREEK, KLAMATH BASIN

