

Preston
Downie

LITTLE SPROWEL CREEK

INTRODUCTION

A physical fish habitat inventory on Little Sprowel Creek was completed on July 10, 17, and 18, 1989, by Gregg Moody and Michele Long, California Conservation Corps (CCC) Technical Advisors. The objective was to collect baseline data of the salmon and steelhead habitat, prior to the initiation of fish habitat enhancement. This baseline data will be used to evaluate stream enhancement efforts of Eel River Salmon Restoration (ERSR) and the CCC, Salmon Restoration Project crews, both under the direction of the California Department of Fish and Game (DFG), to be completed in the summer and fall of 1989.

WATERSHED OVERVIEW

Little Sprowel Creek is a major tributary to Sprowel Creek (Figure 1) and drains into the South Fork of the Eel River near Garberville, Humboldt County, CA. The length surveyed from the mouth at T4S R3E S34 to the forks was 1.9 miles. The watershed area of Little Sprowel Creek is 3.44 square miles. It is a second order stream. Habitat from both forks provides seasonal benefits to the overall fishery of the stream.

Little Sprowel Creek flows in a south easterly direction, from its headwaters to its mouth through a second growth redwood/douglas fir forest. The confluence is approximately 2 miles west of the town of Garberville. The entire watershed is under private ownership.

Fishery management concept is anadromous mixed production. Coho salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*) were found by Preston and Flosi (DFG) during a electrofishing survey on 6/15/89. Chinook salmon (*Oncorhynchus tshawytscha*) were observed by Bruckenstein (DFG) during the winter of 86/87. The Garberville rotary maintains a hatchbox and fish rearing facility near the mouth.

The watershed is managed for some limited logging. There are a few unpaved roads mostly along the ridges.

METHODS

Little Sprowel Creek was habitat typed using the 22 habitat types classification (Mc Cain et al). The methodology follows the draft California Stream Restoration Manual (Flosi et al. In preparation). The channel typing was conducted using the classification system of Rosgen (1985).

The minimum length of measured habitat unit was as long as the mean channel wetted width. Channel measurements was accomplished with range finders and tape measurers. Habitat type measurements included average length, average width, average depth and maximum depth (to the nearest 0.1 foot). Depth of the pool tail crest at each pool habitat unit was measured at the thalweg.

A shelter rating was calculated for each habitat unit by multiplying shelter value and percent cover. A shelter value of 1 (low), 2 (medium) or 3 (high) was given according to the shelter complexity. An estimate on percent cover within each habitat unit was recorded.

The dominant and sub-dominant substrate was estimated using nine size classes of substrate composition and was recorded for all habitat units. Embeddedness was optically estimated at the tail out of only pool habitat type units as to 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3), > 76% (value 4).

An ocular estimate of the percent crown cover was recorded for each habitat unit. The percent right and left bank covered with vegetation was estimated.

Time and water temperatures were recorded every tenth habitat unit.

RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED IN THE BACK OF THIS REPORT

Seventeen of the 22 habitat types were identified in Little Sprowel Creek. The physical habitat data is summarized in Table 1A. The most frequently occurring habitat type was low gradient riffle 45%, followed by mid channel pools 25% (Graph 1).

Table 2A summarizes the riffle, flatwater, and pool habitat types. Although the percent occurrence of riffles and pools is relatively close, 46.2% riffle and 41% pool (Graph 2), the total length of riffle habitat is more than double that of pools, 61% riffle to 28% pool (Graph 3).

Table 3A summarizes the pool habitat types. Main channel pools were the most frequent consisting of 62% of the pool habitat (Graph 4).

Table 4A is a summary of maximum pool depths by pool habitat types. All but one of the pools was less than 3 feet maximum depth.

Table 5A is a summary of the dominant substrate by habitat type. Sand, gravel, and small cobble were the dominant substrate for most of the habitat types.

Little Sprowel Creek is a B channel type. The first stream reach is a B2 channel. One hundred twenty seven habitat types were measured in the B2 channel. These comprised a length of 5689.1 feet (Table 1B). The second reach is a B3 channel a total of 85 habitat units were measured. These comprised a length of 5418.6 feet (Table 1C).

Other Conditions

Stream bank stability was good. Several slides needing treatment were noted. The bank cover consists mainly of small alders and willows. Table 1A summarizes the mean percentage right and left bank cover, along with the mean percentage of crown cover for each habitat unit. The mean percent right bank cover was 79.6%. The mean percent left bank cover was 79.9%. The estimated crown cover for the Little Sprowel Creek was 20%. The estimated crown cover for the first reach was 24.45% and for the second reach was 13.5%.

For the 87 pools the pool tail embeddedness was estimated. Fifteen pools or 17.2% had a value of 1, 47 pools or 54.0% had a value of 2, 24 pools or 27.6% had a value of 3, and one pool or 1.2% had a value of 4.

The overall mean pool shelter rating for the 87 pools was 27.1. The mean shelter rating for the backwater pools was the highest at 31.43. See Table 3A.

Air and water temperatures varied. Air temperature ranged from 70 to 90 degrees fahrenheit. Water temperatures ranged from 66 to 76 degrees fahrenheit.

There are no barriers to the upstream migration of adult salmonids. A visual survey of approximately 200 feet above each fork noted 0+ and 1+ salmonids in both forks.

A diversion at 3030 feet from the mouth provides the water intake for the Garberville Rotary rearing ponds. Several other ephemeral tributaries were also taped for water intake and feed into the same water system.

RECOMMENDATIONS

The following are recommendations for fish habitat improvement on Little Sprowel Creek.

- 1) Stabilize the landslides by armoring the toes of the slides with boulders or logs. Plant red alder and willow in the riparian zone and plant upslope with coastal redwood and douglas fir.

2) Plant the riparian zone with red alder and willow and the upslope areas with coastal redwood and douglas fir, to improve the channel stability, the crown cover and ultimately lower the water temperatures.

3) Diversify the long low gradient riffle reaches into pool/riffle reaches by constructing pool habitat. By constricting the channel using boulders or log wing deflectors or constructing log weirs, pools can be developed for summer rearing habitat and gravel and small cobble will be sorted out to improve spawning habitat.

4) Add cover to the pools where logs or rootwads are available to increase the shelter rating.



Figure 1

Little Sprowel Creek

Drainage: South Fork Eel River

Table 1A - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

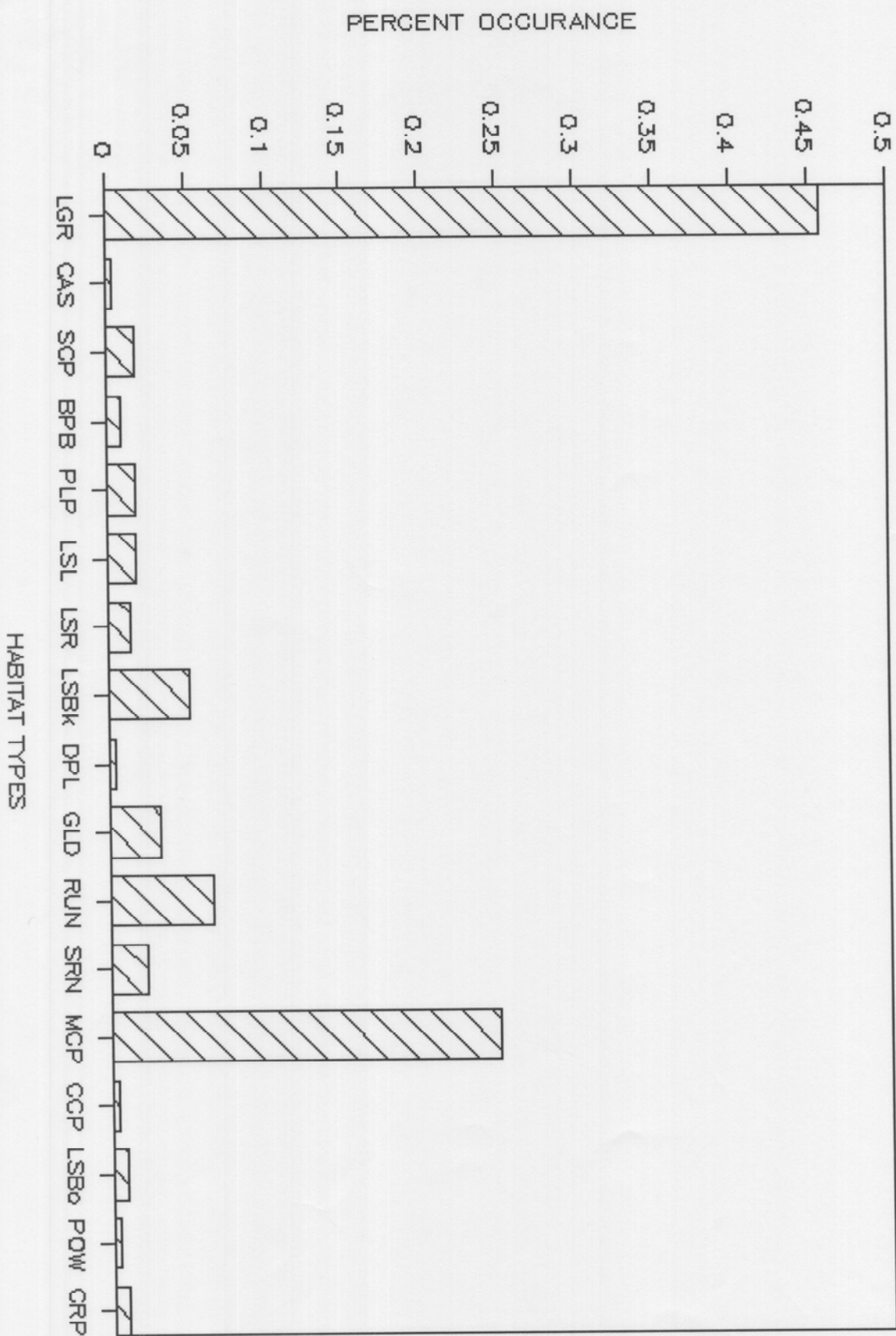
Survey Dates: July 10, 17 & 18, 1989

Confluence: T4S R3E S34

UNITS MEASURED	HABITAT TYPE	PERCENT OCCURANCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	% TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MAXIMUM DEPTH (ft.)	MEAN AREA (sq. ft.)	TOTAL AREA (sq. ft.)	MEAN VOLUME (cu. ft.)	TOTAL VOLUME (cu. ft.)	MEAN RESIDUAL POOL VOL. (cu. ft.)	MEAN SHELTER RATING	MEAN % RIGHT COVER	MEAN % LEFT COVER	MEAN % BANK COVER	MEAN % CROWN COVER
97	LGR	45.75%	68.46	6641.10	60.64%	8.92	0.32	1.70	561.65	54480	194.99	18913.93		9.85	79.64	79.69		21.34
1	CAS	0.47%	57.00	57.00	0.52%	5.20	0.38	0.70	237.12	237	90.11	90.11		40.00	60.00	60.00		0.00
4	SCP	1.89%	19.20	76.80	0.70%	6.93	0.64	1.60	133.77	535	93.05	372.21	113.56	8.75	88.75	71.25		37.50
2	BPB	0.94%	21.65	43.30	0.40%	5.30	0.77	2.46	119.99	240	93.61	187.22	72.11	55.00	65.00	45.00		40.00
4	PLP	1.89%	19.73	78.90	0.72%	12.55	1.56	2.80	218.68	875	359.70	1438.81	307.50	53.75	77.50	91.25		30.00
4	LSL	1.89%	43.35	173.40	1.58%	8.63	1.21	2.94	440.72	1763	588.98	2355.90	517.25	28.00	82.50	80.00		17.50
3	LSR	1.42%	29.00	87.00	0.79%	9.57	1.18	2.20	276.97	831	352.15	1056.46	291.35	36.67	76.67	66.67		25.00
11	LSBK	5.19%	47.62	523.80	4.78%	9.69	1.00	2.60	444.95	4894	456.68	5023.51	370.93	20.00	81.82	86.36		14.55
1	DPL	0.47%	97.00	97.00	0.89%	11.10	2.31	4.30	1076.70	1077	2487.18	2487.18	2433.34	75.00	20.00	100.00		15.00
7	GID	3.30%	44.66	312.60	2.85%	9.90	0.46	1.20	370.60	2594	160.30	1122.08		10.71	81.43	82.86		18.57
14	RUN	6.60%	43.00	602.00	5.50%	8.24	0.48	1.32	357.27	5002	174.16	2438.30		6.43	74.29	66.79		18.93
5	SRN	2.36%	40.10	200.50	1.83%	8.46	0.44	1.20	338.74	1694	156.42	782.09		20.00	70.00	86.00		19.00
53	MCP	25.00%	35.00	1855.10	16.94%	9.99	0.89	2.60	359.31	19044	342.24	18138.76	257.01	25.85	81.32	85.09		16.23
1	CCP	0.47%	9.00	9.00	0.08%	7.20	0.49	0.72	61.56	62	30.16	30.16	16.01	5.00	100.00	90.00		10.00
2	LSBo	0.94%	54.00	108.00	0.99%	9.50	0.86	1.75	513.20	1026	437.50	874.99	323.14	15.00	90.00	90.00		37.50
1	POM	0.47%	28.00	28.00	0.26%	6.40	0.40	0.80	152.32	152	60.93	60.93		20.00	85.00	60.00		30.00
2	CRP	0.94%	29.25	58.50	0.53%	10.10	1.02	2.50	274.18	548	268.03	536.07	196.65	37.50	90.00	25.00		25.00
TOTAL UNITS				LENGTH FEET					AREA SQ. FEET			TOTAL VOL. CU. FEET						
212				10952.00					95054			55908.71						

LITTLE SPROWEL CREEK HABITAT TYPES

BY PERCENT OCCURANCE



Graph 1

Little Sprowel Creek

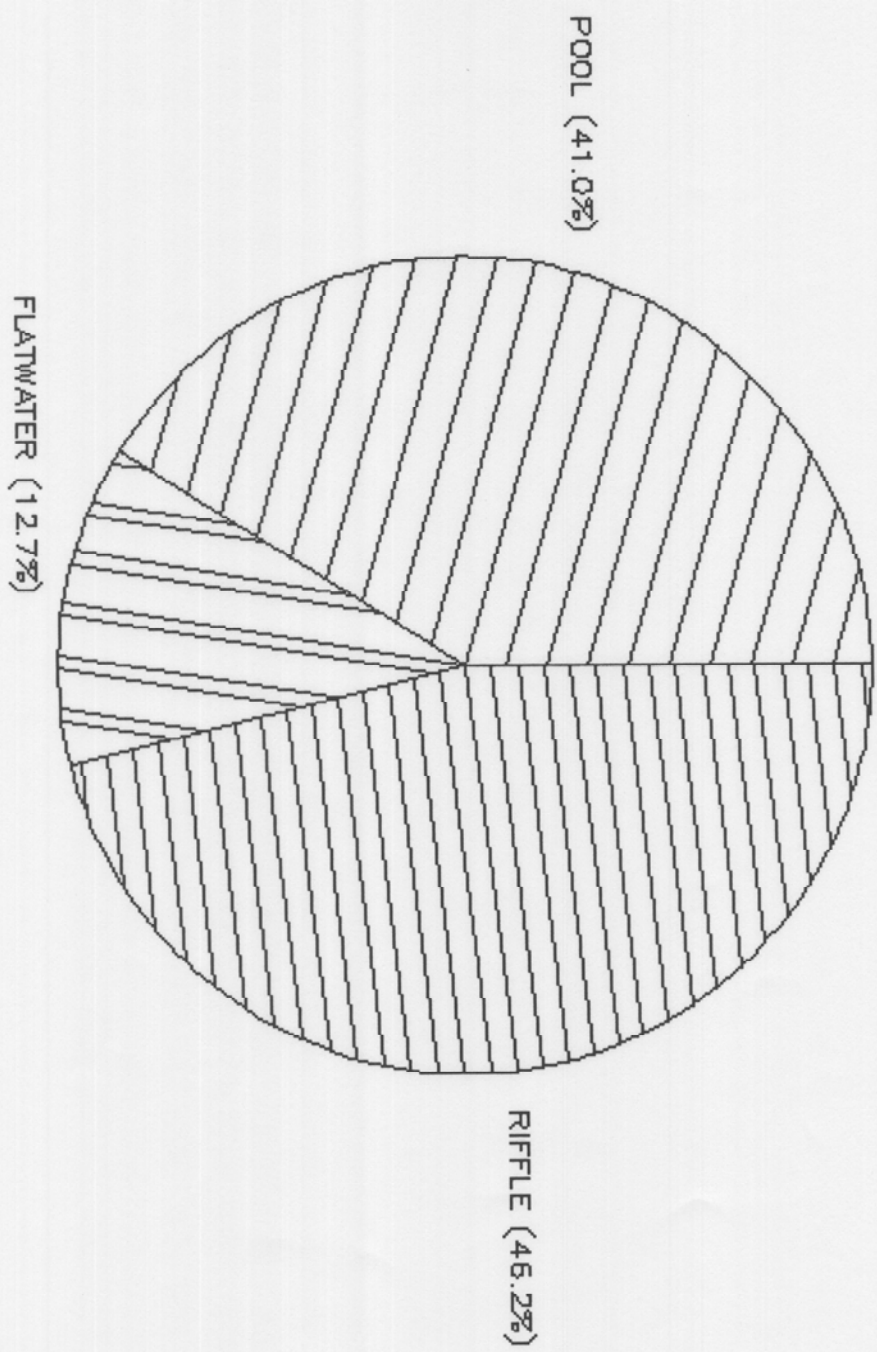
Drainage: South Fork Eel River

TABLE 1C SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS IN B3 CHANNEL TYPE Survey Dates: July 10, 17, 18, 1989

Confluence T4N R3E S34

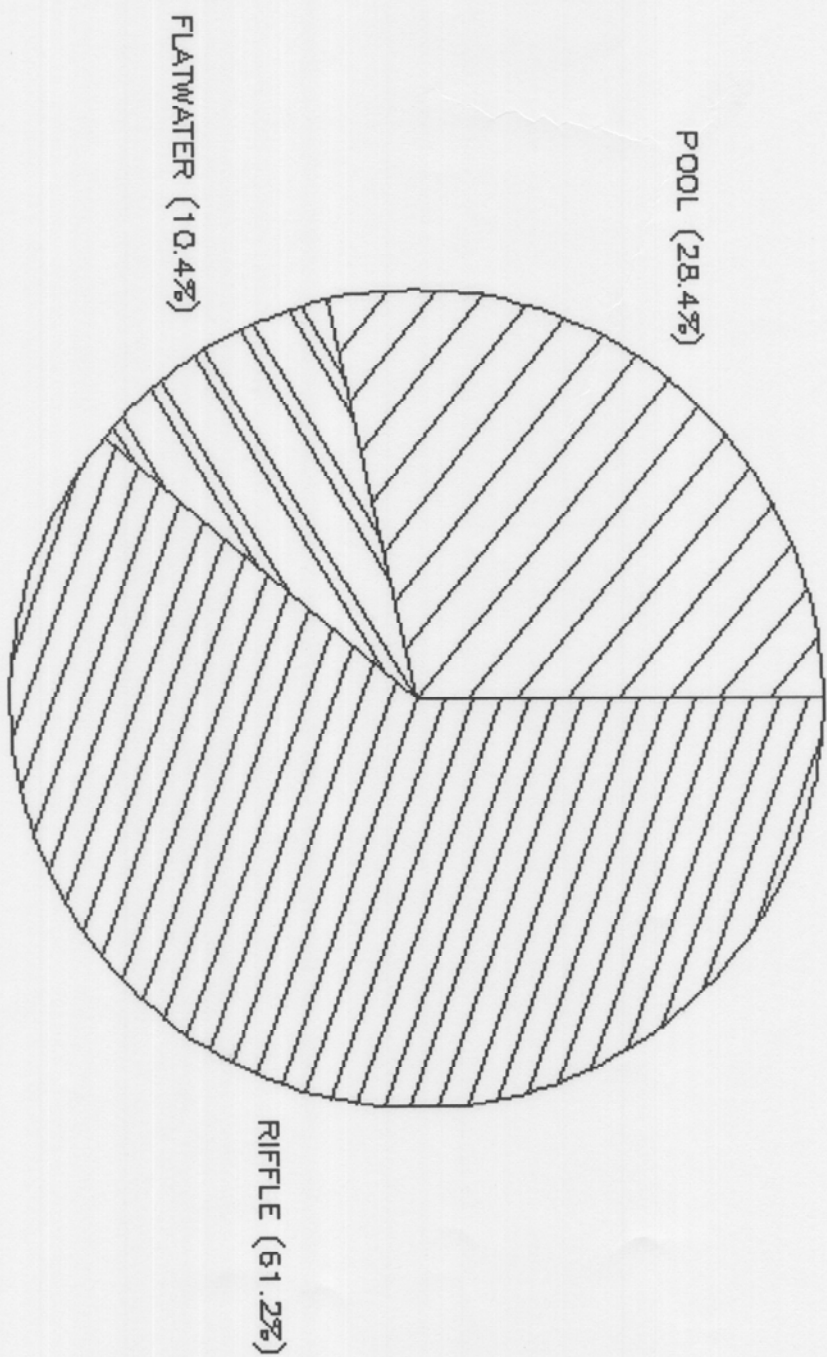
UNITS MEASURE	HABITAT TYPE	HABITAT PERCENT OCCURANCE	(ft.)			(ft.)			(ft.)			(sq. ft.)			(cu. ft.)(cu. ft.)(cu. ft.)			MEAN			MEAN %			MEAN %		
			MEAN LENGTH	TOTAL LENGTH	% TOTAL LENGTH	MEAN WIDTH	MEAN DEPTH	MAXIMUM DEPTH	MEAN AREA	TOTAL AREA	MEAN VOLUME	TOTAL VOLUME	MEAN RESIDUAL POOL VOL.	MEAN SHELTER RATING	MEAN % RT. BANK COVER	MEAN % LEFT BANK COVER	MEAN % CROWN COVER									
38	LGR	44.71%	90.34	3433.00	63.36%	9.75	.42	1.10	767.14	29151.19	280.35	10653.37		11.18	78.03	81.05	12.11									
1	CAS	1.18%	57.00	57.00	1.05%	5.20	.38	.70	237.12	237.12	90.11	90.11		40.00	60.00	60.00	.00									
1	SCP	1.18%	38.00	38.00	.70%	7.50	.83	1.42	285.00	285.00	236.55	236.55	210.90	5.00	95.00	95.00	.00									
1	BPB	1.18%	28.20	28.20	.52%	6.10	.80	1.48	172.02	172.02	137.62	137.62	94.61	90.00	40.00	60.00	.00									
2	PLP	2.35%	13.30	26.60	.49%	15.65	1.74	2.80	211.93	423.85	415.15	830.30	369.95	87.50	70.00	87.50	45.00									
3	LSL	3.53%	51.80	155.40	2.87%	9.57	1.37	2.94	552.83	1658.48	759.90	2279.69	671.23	32.33	76.67	73.33	18.33									
1	LSR	1.18%	40.00	40.00	.74%	9.90	.92	1.32	396.00	396.00	364.32	364.32	285.12	20.00	80.00	100.00	.00									
7	LSBK	8.24%	43.61	305.30	5.63%	9.91	1.08	2.10	435.38	3047.68	481.35	3369.44	405.73	25.00	78.57	94.29	14.29									
4	GLD	4.71%	46.53	186.10	3.43%	8.95	.57	1.20	376.58	1506.31	197.51	790.04		15.00	80.00	82.50	15.00									
7	RUN	8.24%	61.24	428.70	7.91%	8.73	.57	1.32	517.45	3622.15	259.26	1814.85		8.57	70.00	76.43	15.71									
3	SRN	3.53%	47.83	143.50	2.65%	9.23	.49	1.20	438.60	1315.80	216.27	648.81		30.00	66.67	83.33	5.00									
17	MCP	20.00%	33.93	576.80	10.64%	10.07	.95	2.08	338.79	5759.42	333.38	5667.45	255.44	39.12	81.18	87.06	15.29									
TOTAL UNITS 85				LENGTH FEET 5418.60						AREA SQ. FEET 47575.02							TOTAL VOL. CU. FEET 26882.55									

LITTLE SPROWEL CREEK
HABITAT TYPES BY % OCCURANCE



Graph 2

LITTLE SPROWEL CREEK
HABITAT TYPES BY % TOTAL LENGTH



Graph 3

Drainage: South Fork Eel River

Survey Dates: July 10, 17, 18, 1989

Confluence: T4S R3E S34

[illegible]

Drainage: South Fork Eel River

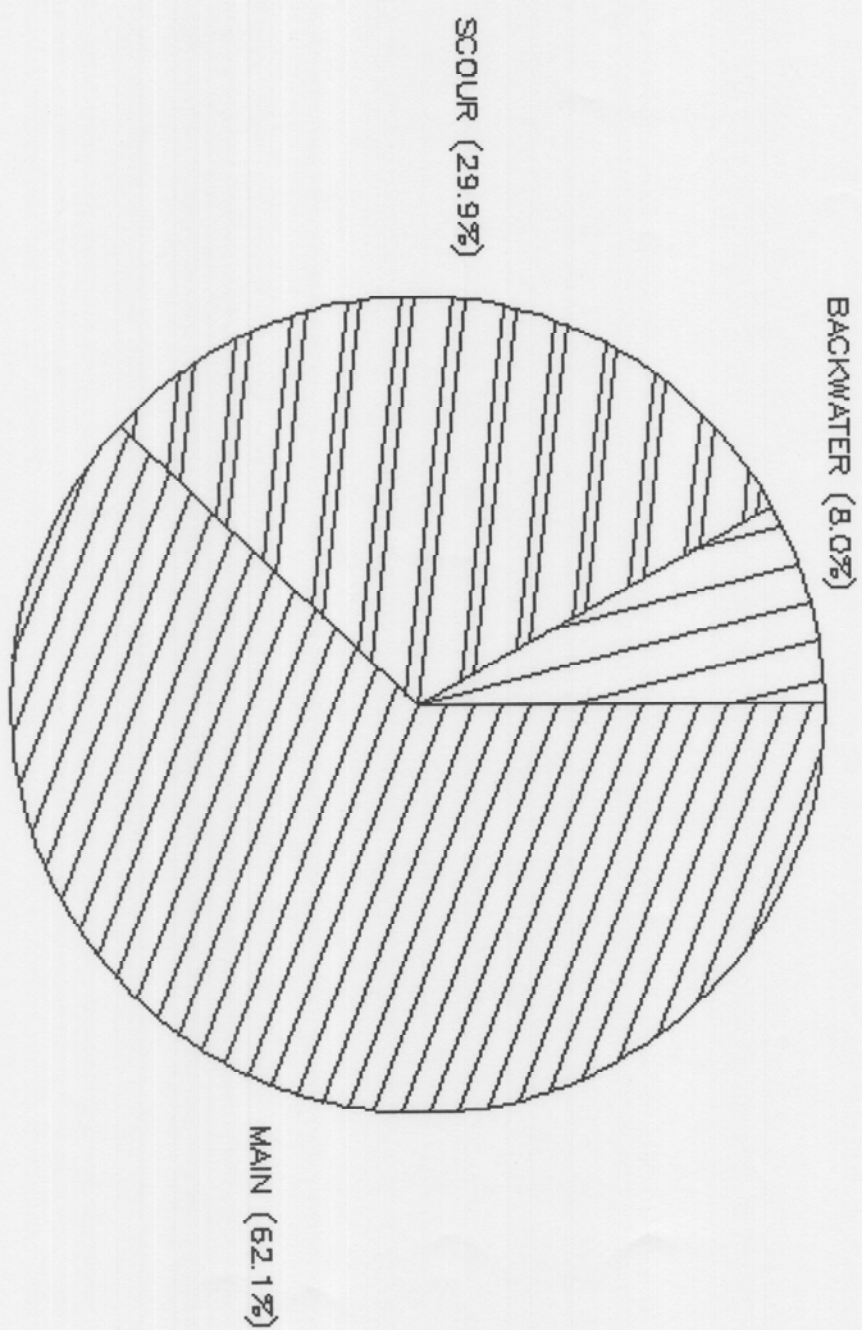
Survey Dates: July 10, 17, 18, 1989

Confluence: T4S R3E S34

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LITTLE SPROWEL CREEK
POOL TYPES BY % OCCURANCE



Graph 4

Little Sprudel Creek

Drainage: South Fork Eel River

TABLE 18 SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS IN B2 CHANNEL TYPE Survey Dates: July 10, 17, 18, 1989

Confluence: T4S R3E S34

UNITS MEASURE	HABITAT TYPE	HABITAT % OCCUR.	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	% TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MAXIMUM DEPTH (ft.)	MEAN AREA (sq. ft.)	TOTAL AREA (sq. ft.)	MEAN VOLUME (cu. ft.)	TOTAL VOLUME (cu. ft.)	MEAN RESIDUAL POOL VOL. (cu. ft.)	MEAN SHELTER RATING	MEAN % RT. BANK COVER	MEAN % LEFT BANK COVER	MEAN % CROWN COVER
59	LGR	46.46%	54.37	3208.10	56.39%	8.39	.32	1.7	429.31	25329.19	210.84	12439.41		8.98	80.68	78.81	27.29
3	SCP	2.36%	12.93	38.80	.68%	6.73	.58	1.6	83.36	250.09	45.22	135.66	31.17	10.00	86.67	63.33	50.00
1	BP8	.79%	15.10	15.10	.27%	4.50	.73	.98	67.95	67.95	49.60	49.60	46.21	20.00	90.00	30.00	80.00
2	PLP	1.57%	104.00	208.00	3.66%	9.45	1.38	2.5	1151.85	2303.70	1906.95	3813.90	1634.68	20.00	85.00	95.00	15.00
1	LSL	.79%	18.00	18.00	.32%	5.80	.73	1.3	104.40	104.40	76.21	76.21	55.33	15.00	100.00	100.00	15.00
2	LSR	1.57%	23.50	47.00	.83%	9.40	1.32	2.2	217.45	434.90	346.07	692.14	294.47	45.00	75.00	50.00	37.50
4	LSBK	3.15%	54.63	218.50	3.84%	9.30	.86	2.6	461.70	1846.79	413.52	1654.06	310.03	11.25	87.50	72.50	15.00
1	DPL	.79%	97.00	97.00	1.71%	11.10	2.31	4.3	1076.70	1076.70	2487.18	2487.18	2433.34	75.00	20.00	100.00	15.00
3	GLD	2.36%	42.17	126.50	2.22%	11.17	.31	.65	362.63	1087.88	110.68	332.04		5.00	83.33	83.33	23.33
7	RUN	5.51%	24.76	173.30	3.05%	7.74	.39	1.1	197.09	1379.66	89.06	623.45		4.29	78.57	57.14	22.14
2	SRN	1.57%	28.50	57.00	1.00%	7.30	.36	.8	188.96	377.92	66.64	133.28		5.00	75.00	90.00	40.00
36	MCP	28.35%	35.51	1278.30	22.47%	9.95	.87	2.6	369.01	13284.27	346.43	12471.32	257.75	19.58	81.39	84.17	16.67
1	CCP	.79%	9.00	9.00	.16%	7.20	.49	.72	61.56	61.56	30.16	30.16	16.01	5.00	100.00	90.00	10.00
2	LSBo	1.57%	54.00	108.00	1.90%	9.50	.86	1.75	513.20	1026.40	437.50	874.99	323.14	15.00	90.00	90.00	37.50
1	POM	.79%	28.00	28.00	.49%	6.40	.40	.8	152.32	152.32	60.93	60.93		20.00	85.00	60.00	30.00
2	CRP	1.57%	29.25	58.50	1.03%	10.10	1.02	2.5	274.18	548.35	268.03	536.07	196.65	37.50	90.00	25.00	25.00
TOTAL UNITS 127				LENGTH FEET 5689.10					AREA SQ. FEET 49332.07			TOTAL VOL. CU. FEET 36410.4					

Little Sprowel Creek

Drainage South Fork Eel River

TABLE 4A SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES

Survey Dates: July 10, 17, 18, 1989

Confluence: T4S R3E S34

=====													
UNITS MEASURED	HABITAT TYPE	HABITAT < 1 FOOT	HABITAT < 1 FOOT	1-<2 FT.	1-<2 FT.	2-<3 FT.	2-<3 FT.	3-<4 FT.	3-<4 FT.	> 4 FEET	> 4 FEET		
		PERCENT OCCURANCE	MAXIMUM DEPTH	PERCENT OCCURANCE	MAXIMUM DEPTH	PERCENT OCCURANCE	MAXIMUM DEPTH	PERCENT OCCURANCE	MAXIMUM DEPTH	PERCENT OCCURANCE	MAXIMUM DEPTH		
4	SCP	4.60%	2	50.00%	2	50.00%	0	.00%	0	.00%	0	.00%	
2	BPB	2.30%	1	50.00%	1	50.00%	0	.00%	0	.00%	0	.00%	
4	PLP	4.60%	0	.00%	2	50.00%	2	50.00%	0	.00%	0	.00%	
4	LSL	4.60%	0	.00%	2	50.00%	2	50.00%	0	.00%	0	.00%	
3	LSR	3.45%	0	.00%	2	66.67%	1	33.33%	0	.00%	0	.00%	
11	LSBK	12.64%	1	9.09%	7	63.64%	3	27.27%	0	.00%	0	.00%	
1	DPL	1.15%	0	.00%	0	.00%	0	.00%	0	.00%	1	100.00%	
53	MCP	60.92%	9	16.98%	35	66.04%	9	16.98%	0	.00%	0	.00%	
1	CCP	1.15%	1	100.00%	0	.00%	0	.00%	0	.00%	0	.00%	
2	LSBo	2.30%	0	.00%	2	100.00%	0	.00%	0	.00%	0	.00%	
2	CRP	2.30%	0	.00%	1	50.00%	1	50.00%	0	.00%	0	.00%	

TOTAL
MEASURED
87

Drainage: South Fork Eel River

Survey Dates: July 10, 17, 18, 1989

Confluence: T4S R3E S34

UNITS MEASURED	HABITAT TYPE	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL	# UNITS	% TOTAL
DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT DOMINANT																			
97	LGR	0	.00%	2	2.06%	58	59.79%	32	32.99%	1	1.03%	4	4.12%	0	.00%	0	.00%	0	.00%
1	CAS	0	.00%	0	.00%	0	.00%	1	100.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
4	SCP	1	25.00%	0	.00%	0	.00%	3	75.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
2	BPB	1	50.00%	0	.00%	1	50.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
4	PLP	0	.00%	1	25.00%	3	75.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
4	LSL	0	.00%	2	50.00%	1	25.00%	1	25.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
3	LSR	0	.00%	2	66.67%	0	.00%	1	33.33%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
11	LSBK	1	9.09%	3	27.27%	4	36.36%	2	18.18%	1	9.09%	0	.00%	0	.00%	0	.00%	0	.00%
1	DPL	0	.00%	0	.00%	1	100.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
7	GLD	1	14.29%	1	14.29%	5	71.43%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
14	RUN	0	.00%	2	14.29%	8	57.14%	3	21.43%	0	.00%	0	.00%	0	.00%	0	.00%	1	7.14%
5	SRN	0	.00%	3	60.00%	1	20.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	1	20.00%
53	MCP	12	22.64%	14	26.42%	15	28.30%	9	16.98%	2	3.77%	0	.00%	1	1.89%	0	.00%	0	.00%
1	CCP	0	.00%	0	.00%	1	100.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
2	LSBo	1	50.00%	0	.00%	0	.00%	0	.00%	1	50.00%	0	.00%	0	.00%	0	.00%	0	.00%
1	POM	0	.00%	0	.00%	0	.00%	1	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%
2	CRP	0	.00%	1	50.00%	1	50.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%	0	.00%