Table 6 - Lower Eel and Eel Delta Sediment Budget

Time Span 1988-2000		Lower Eel WAU														
Sediment Source		**Allen**	**Bear**	**Bridge**	**Chadd**	**Darnell**	**Dinner**	**Greenlaw**	**High Rock**	**Horse Collar**	**Jordan**	**Kiler**	**Lower Eel**	**Monument**	**North Central**	**Pepperwood**
Area	Square mile	0.9	8.5	2.2	5.4	0.9	1.4	2.06	0.88	0.39	4.69	1.7	14.73	5.38	1.49	2.09
Natural Related																
Soil Creep(1)	Tons/sq mi/yr	414	357	480	267	334	359	263	281	332	379	411	193	373	279	220
Shallow Landslides(2)	Tons/sq mi/yr	N/O	0	7	N/O	N/O	N/O	182	N/O	N/O	993	N/O	1	N/O	N/O	N/O
Deep-seated Landslides(2)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Streamside Landslides(3)	Tons/sq mi/yr	1416	1532	1308	226	558	1314	1051	N/S	N/S	1297	1062	47	485	592	345
Fire(4)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Management Related																
Hillslopes																
Surface Erosion(5)	Tons/sq mi/yr	101	74	110	49	106	94	91	40	77	91	85	30	134	161	126
Shallow Landslides(2)	Tons/sq mi/yr	N/O	322	42	4	161	550	111	N/O	N/O	1139	200	79	83	73	N/O
Deep-seated Landslides(2)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Roads																
Surface Erosion(6)	Tons/sq mi/yr	73	86	1,831	228	395	218	128	152	556	182	154	156	763	121	406
Shallow Landslides(2)	Tons/sq mi/yr	N/O	19	13	N/O	68	N/O	N/O	N/O	N/O	41	N/O	20	18	16	N/O
Gullies(7)	Tons/sq mi/yr	*339*	121	*339*	*339*	*339*	*339*	*339*	*339*	*339*	398	*339*	*339*	*339*	*339*	*339*
Other																
Streamside Landslides(3)	Tons/sq mi/yr	*1934*	*2093*	*1786*	*308*	*762*	*1795*	*1435*	*N/S*	*N/S*	*1772*	*1451*	*64*	*663*	*808*	*471*
Overall Rate	Tons/sq mi/yr	4,277	4,605	5,916	1,420	2,722	4,670	3,601	812	1,305	6,292	3,701	929	2,858	2,389	1,906
TOTAL NATURAL RELATED	Tons/yr	1,684	16,078	3,983	2,663	776	2,343	3,081	248	130	12,517	2,505	3,549	4,618	1,298	1,180
TOTAL MANAGEMENT RELATED	Tons/yr	2,251	23,109	9,150	5,018	1,592	4,195	4,337	467	379	16,992	3,787	10,141	10,758	2,262	2,804
TOTAL MANAGEMENT + NATURAL	Tons/yr	3,935	39,188	13,133	7,681	2,368	6,538	7,418	715	509	29,509	6,292	13,690	15,376	3,560	3,984
Disturbance Index		1.3	1.4	2.3	1.9	2.1	1.8	1.4	1.9	2.9	1.4	1.5	2.9	2.3	1.7	2.4

Notes:

1. Values obtained from Surface Erosion Module, Table B-4.
2. Values obtained from query of Mass Wasting Module data base for landslides from the 1988-2000 photo period. "Natural Related" values based on landslides from management units logged >15 years ago, "Management Related" values based on landslides from managment units logged <15 years ago.
N/O = None Observed
N/S = Not Significant
3. Values estimated from PWA sediment source investigations within Bear and Jordan Creek sub-basins (PWA, 1998; PWA, 1999). "Natural Related" values based on landslides from management units logged >15 years ago, "Management Related" values based on landslides from managment units logged <15 years ago. Values for other sub-basins developed as follows:
SSLS input in Bear and Jordan = PWA average sediment input (ton/year)/(stream miles with streamside units high or very high empirical landslide potential (from Mass Wasting Map A-7).
SSLS average flux = Average(SSLS input, Bear Creek; SSLS input Jordan Creek)
SSLS input by sub-basin = [SSLS average flux (ton/strm mi/yr)*stream miles with high/very high delivery potential (strm mi)] / [basin area (mi2)]
4. Potential sediment input from fire was determined to be negligible because of the infrequent occurrence of stand replacing wildfires.
5. Values obtained from Surface Erosion Module, Table B-10.
6. Values obtained from Surface Erosion Module, Table B-20.
7. Data obtained from PWA (PWA, 1998; PWA, 1999) and NRM (NRM, unpublished data, 1999) (Italicised values are extrapolated from the data reported for Bear, Jordan, and Stitz Creek sub-basins respectively.
8. Disturbance Index = Total Management Related/Total Natural Related

Table 6 - Lower Eel and Eel Delta Sediment Budget

Time Span 1988-2000		Lower Eel WAU (cont.)									Eel Delta WAU					
Sediment Source		**Perrott**	**Sammy Kari**	**Scotia**	**Shively**	**Stafford**	**Stitz**	**Twin**	**Weber**	**TOTAL**	**Atwell**	**Dean**	**Howe**	**Nanning**	**Strongs**	**TOTAL**
Area	Square mile	0.64	1.22	1.17	3.57	0.94	4.02	2.12	1.8	68.2	4.4	1.1	6.5	4.4	12.1	28.6
Natural Related																
Soil Creep(1)	Tons/sq mi/yr	319	374	342	342	293	408	367	351	315	340	269	348	418	269	321
Shallow Landslides(2)	Tons/sq mi/yr	N/O	70	N/O	145	3000	62	918	188	88	26	N/O	157	658	10	151
Deep-seated Landslides(2)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Streamside Landslides(3)	Tons/sq mi/yr	525	594	261	489	N/S	1053	1008	1370	723	N/S	N/S	27	91	0	53
Fire(4)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Management Related																
Hillslopes																
Surface Erosion(5)	Tons/sq mi/yr	28	61	143	82	91	57	112	53	75	72	127	19	41	72	57
Shallow Landslides(2)	Tons/sq mi/yr	N/O	83	561	17	N/O	160	287	202	778	N/O	N/O	N/O	N/O	17	152
Deep-seated Landslides(2)	Tons/sq mi/yr	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
Roads																
Surface Erosion(6)	Tons/sq mi/yr	20	678	391	291	305	248	196	127	296	355	295	165	80	375	275
Shallow Landslides(2)	Tons/sq mi/yr	N/O	56	N/O	48	N/O	102	N/O	N/O	32	0	9	1	45	1	8
Gullies(7)	Tons/sq mi/yr	*339*	*339*	*339*	*339*	*339*	498	*339*	*339*	*339*	*339*	*339*	*339*	*339*	*339*	*339*
Other																
Streamside Landslides(3)	Tons/sq mi/yr	*718*	*812*	*356*	*669*	*N/S*	*1439*	*1377*	*1871*	*1129*	*N/S*	*N/S*	*36*	*125*	*0*	*54*
Overall Rate	Tons/sq mi/yr	1,950	3,067	2,394	2,422	4,028	4,027	4,604	4,501	3,774	1,131	1,038	1,092	1,797	1,082	1,410
TOTAL NATURAL RELATED	Tons/yr	541	1,266	706	3,486	3,095	6,124	4,860	3,437	76,742	1,617	306	3,478	5,111	3,381	14,996
TOTAL MANAGEMENT RELATED	Tons/yr	707	2,475	2,095	5,161	692	10,063	4,900	4,665	180,722	3,383	877	3,664	2,760	9,727	25,311
TOTAL MANAGEMENT + NATURAL	Tons/yr	1,248	3,742	2,801	8,647	3,787	16,187	9,760	8,102	257,465	5,000	1,183	7,142	7,872	13,108	40,307
Disturbance Index		1.3	2.0	3.0	1.5	0.2	1.6	1.0	1.4	2.4	2.1	2.9	1.1	0.5	2.9	1.7

Table 7 - Annual Estimated LWD Recruitment in m^3/yr by Sub-Basin, Recruitment Mechanism, and CGU (equivalent to Table E-18)

Sub-basin Name	>20%			AD			ALD			CG0			CG3			CG6.5			UG0			UG3.0			UG6.5			Total of all CGU			Total LWD Recruitment in m^3/yr	Total Channel Length in Sub-Basin in km	LWD Recruitment Rates in m^3/yr-km
	E[a]	S	M	E	S	M	E	S	M	E	S	M	E	S	M	E	S	M	E	S	M	E	S	M	E	S	M	E	S	M			
Eel Delta																																	
Atwell	15.6	130.0	0.0	0.0	0.0	0.0	2.4	0.2	0.0	2.7	3.4	0.2	2.2	2.6	0.0	26.3	5.8	0.0	0.2	0.4	0.0	0.0	0.0	0.0	1.9	2.0	0.0	51.2	144.4	0.3	195.9	58.9	3.3
Dean	2.3	19.2	0.0	0.8	0.2	0.1	0.0	0.0	0.0	0.4	0.5	0.0	1.1	1.4	0.0	16.7	3.7	0.0	1.0	2.1	0.0	2.1	0.7	0.0	0.0	0.0	0.0	24.4	27.7	0.2	52.3	13.1	4.0
Howe	22.1	184.8	0.0	1.1	0.3	0.1	0.5	0.0	0.0	1.3	1.7	0.1	1.8	2.2	0.0	44.3	9.7	0.1	2.9	6.0	0.0	3.4	1.1	0.1	4.3	4.6	0.0	81.8	210.3	0.4	292.4	84.9	3.4
Nanning	14.3	119.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	3.6	0.0	13.7	4.4	0.3	12.3	13.1	0.0	42.1	140.9	0.4	183.3	57.8	3.2
Strongs	22.4	187.4	0.0	41.1	9.7	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.8	0.0	19.7	6.3	0.5	29.1	31.2	0.0	114.1	238.3	3.6	356.0	130.1	2.7
Lower Eel																																	
Allen	3.0	24.8	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.1	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.4	29.3	0.0	52.8	12.7	4.2
Bear	29.8	248.9	0.0	1.4	0.3	0.1	0.0	0.0	0.0	2.9	3.7	0.2	3.4	4.2	0.0	60.2	13.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	97.7	270.2	0.4	368.3	105.5	3.5
Bridge	8.5	71.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.6	0.0	5.5	1.8	0.1	5.9	6.3	0.0	21.2	82.1	0.1	103.5	32.9	3.1
Chadd	13.3	111.2	0.0	6.9	1.6	0.5	0.0	0.0	0.0	0.5	0.7	0.0	1.3	1.6	0.0	84.8	18.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	106.8	133.7	0.7	241.2	61.6	3.9
Darnell	2.7	22.3	0.0	0.8	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	4.0	23.1	0.1	27.1	9.0	3.0
Dinner	4.6	38.3	0.0	0.1	0.0	0.0	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	40.5	0.0	56.5	16.7	3.4
Greenlaw	4.7	38.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.4	0.1	0.8	1.0	0.0	19.7	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.3	45.7	0.1	72.1	19.1	3.8
High Rock	1.8	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.0	19.9	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	20.1	0.0	42.7	9.4	4.6
Horse Collar Creek	0.7	5.6	0.0	0.9	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.3	0.0	9.9	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.6	9.4	0.1	22.0	5.2	4.2
Jordan	17.6	146.8	0.0	1.5	0.4	0.1	0.0	0.0	0.0	0.8	1.0	0.1	1.4	1.8	0.0	27.7	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.0	156.0	0.2	205.3	60.0	3.4
Kiler	7.0	58.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.8	0.0	11.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0	62.0	0.0	81.1	23.4	3.5
Lower Eel	18.3	153.0	0.0	12.0	2.8	0.9	0.4	0.0	0.0	0.1	0.1	0.0	0.2	0.3	0.0	47.3	10.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.9	0.0	83.7	172.5	1.0	257.2	77.6	3.3
Monument	20.9	175.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	1.1	0.1	2.0	2.5	0.0	80.6	17.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	104.5	196.2	0.2	300.9	78.9	3.8
North Central	4.0	33.6	0.0	2.5	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.0	7.2	34.9	0.2	42.3	14.5	2.9
Pepperwood	4.0	33.0	0.0	8.1	1.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.2	35.9	0.6	52.7	18.8	2.8
Perrott	1.5	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2	0.0	12.6	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.1	16.8	0.0	31.9	7.5	4.3
Sammy & Kari	3.7	30.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	4.6	0.0	8.0	35.3	0.0	43.2	14.7	2.9
Scotia	3.5	29.2	0.0	2.7	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	30.5	0.2	40.0	13.0	3.1
Shively	5.0	41.7	0.0	8.7	2.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	2.2	0.0	13.2	4.2	0.3	7.5	8.1	0.0	35.4	58.2	1.0	94.5	31.8	3.0
Stafford	2.0	16.4	0.0	1.5	0.4	0.1	3.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	17.5	0.1	27.0	10.3	2.6
Stitz	13.4	111.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	1.8	2.2	0.0	0.0	0.0	0.0	1.2	2.5	0.0	16.2	5.2	0.4	7.4	7.9	0.0	40.2	130.1	0.4	170.7	52.0	3.3
Twin	7.0	58.4	0.0	0.4	0.1	0.0	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.3	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.3	62.4	0.1	88.7	25.5	3.5
Weber	5.2	43.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.5	0.0	0.6	0.7	0.0	25.4	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.6	50.4	0.1	82.1	20.8	3.9

[a]Primary recruitment mechanisms include bank erosion (E), landslides (S), and mortality (M).

Table 8a - LEED Hart Crowser / NMFS APFC Matrix (NMFS 1997) Correlation Table

Type of parameter	Element	NMFS Parameter (NMFS 1997)	NMFS Criteria	NMFS Reference Basis	HC Watershed Analysis parameter	HC Criteria	HC method	HC references
Water Quality	Temperature	Not specified; total range?	11.6-14.6°C (53.2-58.2°F)	--------	--------	--------	--------	
		MWAT [=max(7-day running avg. of avg. Tw)]	16.8 C (62.2oF) late summer juvenile rearing	--------	MWAT (=max(7-day running averages of daily Tavg))	<= 16.8 C	existing monitoring data	
	Sediment/Turbidity	%fines < 0.85mm by weight (sieve analysis)	%fines <0.85mm --> <11 - 16%	--------	Ocular embeddedness estimate	gravel embedded >25% in fines for >50% of gravel patches in survey reach	ocular estimate validated by measurement of residue or discoloration on several sample pebbles; >25% = Y for majority of spawning gravels present in survey reach	
		--------	--------	--------	Total Suspended Solids [mg/l]	20 to 650[mg/l]: behavioral modifications in juvenile salmonids	existing monitoring data	Berg and Northcote 1985; Sigler 1988
		Turbidity	--------	--------	Turbidity [NTU]	22 to 265 NTU: sublethal effects on salmonids	existing monitoring data	Bisson and Bilby 1982; Sigler et al. 1984; Sigler 1988
			no visible increse in turbidity due to timber operations in class I, II & III watercourses and inside ditches that discharge directly to watercourses.	--------	visual observations of turbidity	--------	visual observations of exceptional turbidity during channel surveys and observation locations	
	Chemical Contamination/Nutrients	----------	Low levels of chemical contamination from agricultural, Industrial and other sources, no excess nutrients, no CWA 303(d) designatied reaches; complies with Basin Plans	--------	--------	--------	--------	--------
Channel Condition:	Width/depth ratio	Width/depth ratio	Maintain w/d in prop. func. stms; improve in degraded	--------	Width/depth ratio	--------	bankfull width, bankfull average depth measured at riffle or glide (non-pool) segment of stream that is representative of entire subreach	--------
	Bank erosion	Avg. % of stream length experiencing active erosion	On average, <10% banks eroding	--------	Avg. % of streamlength (either side of channel) with active erosion	--------	Field estimates of length of channel experiencing notable bank erosion (on one or both banks) noted for each subreach and calculated for entire study reach	--------
	Floodplain connectivity		Maintain off-channel areas; maintenance of overbank flows, etc.; restore connectivity where feasible	--------	--------	--------	--------	--------
Habitat Elements	Access/barriers	Access/barriers	Any man made barriers present in watershed allow upstream and downstream fish passage at all flows	--------	locations of potential barriers	Up and downstream [juvenile] fish passage at all flows possible	show reported locations on distribution map; passage judged by experienced fish biologist using methods specified in Methods manual (PALCO 2000)	
	Substrate	Pebble Count D50	Pebble count (D50) --> 65-95 mm [at least half # of particles are larger than 65mm (baseballs) AND at least half are smaller than 95mm (softballs)].	--------	dominant/subdominant substrate: % of substrate calls of each type presence/absence of spawning gravels: Total area [m^2] % area % of habitat units	Gravel OR Cobble dominant and subdominant >50% of calls	dominant/subdominant substrate (by ocular estimate of areal coverage); area of subreach made up of anadromous (>=2 m^2, gravel to small cobbles) fish spawning patches	
	Large Woody Debris (LWD) for stream Class I & II, cw>4 meters	Log10 (debris piece frequency [pcs/100 m])	Log_{10} (debris frequency[pcs/100 m]) >= -1.12*(log_{10} channel width in m) + 0.46*100	Bilby and Ward 1989	debris piece frequency [pcs/cw]	--------	LWD = d>10cm, l(in-channel)>=2m f = total # pcs / (reach length/avg. channel width)	Martin and Benda, 2001
		Geometric mean piece diameter (cm)	Geometric mean diameter (cm) >= 2.14 (channel width in m) + 26.43	Bilby and Ward 1989	--------	--------	--------	--------
		Geometric mean piece length (m)	Geometric mean (total piece)length (m) >= 0.43*(channel width in m)+3.55	Bilby and Ward 1989	--------	--------	--------	--------

Table 8a - LEED Hart Crowser / NMFS APFC Matrix (NMFS 1997) Correlation Table

Type of parameter	Element	NMFS Parameter (NMFS 1997)	NMFS Criteria	NMFS Reference Basis	HC Watershed Analysis parameter	HC Criteria	HC method	HC references
		Mean debris piece volume (cu. m) mean piece volume = pi * (1/2 *geometric mean diameter)^2 * geometric mean piece total (in & out of channel) length	Mean debris piece volume (cu. m) >= 0.23 (channel width in m)-0.67;	Bilby and Ward 1989	--------	--------	--------	--------
		--------	--------	--------	LWD loading [m^3/100m]	--------	each log length (in-channel) recorded and diameter tallied into classes: S = 10-30 cm, M=30-60cm, L=60-100cm, X=>100cm Diameter used in calculations for each piece is midpoint of class diameter; Lengths to nearest meter Each debris piece volume (Vi [cu. m]) = avg[pi * (1/2 *avg diameterclass diameter[m])^2 * piece in-channel length[m]] Loading[m^3/100m] = sum(Vi[m^3])/reachlength[m]/100	
		Key piece frequency [pcs/100 m (pcs/100 ft)]	cw=5 m (15 ft), f = 11 pcs/100m (3.3 pcs/100 ft) =6 m (20ft), f = 8.2 (2.5) = 8 m (25ft), f=6.6 (2.0) = 9 m (30ft), f=5.6 (1.7) =11 m (35ft), f=4.6 (1.4) =12m (40ft), f=3.9 (1.2) =14m (45ft), f=3.6 (1.1) =15m (50ft), f=3.3 (1.0) =17m (55ft), f=3.3 (1.0) =18m (60ft), f=2.6 (0.8) =20m (65ft), f=2.6 (0.8)	Fox 1994	Key piece frequency [pieces/100m]	--------	Number of key pieces in survey reach/(reachlength[m]/100m)	Fox 1994
		Avg. key piece diameter [cm (in)]	cw=5 to 6 m (15 to 20 ft), d = 40 cm (16 in) =6 to 11 m (20 to 35 ft), d = 55 cm (22 in) =11 to 15 m (35 to 50 ft), d = 65 cm (25 in) >15 m (50ft), d = 70 cm (28 in)	Fox 1994	--------	--------	--------	--------
		Avg. key piece length [m (ft)]	cw=5 to 6 m (15 to 20 ft), l = 8 m (27 ft) =6 to 11 m (20 to 35 ft), l = 10 m (32 ft) =11 to 15 m (35 to 50 ft), l = 18 m (59 ft) >15 m (50ft), l = 24 cm (78 ft)	Fox 1994	--------	--------	--------	--------
		Mean key debris piece volume V_avg [m^3 (ft^3)] V_avg = avg(Vi) where Vi = volume of each key piece, calculated as Vi = pi * (d/2)^2 * l(in-channel???)	cw=5 to 6 m (15 to 20 ft), V = 1 m^3 (35 ft^3) =6 to 11 m (20 to 35 ft), V = 2.5 m^3 (88 ft^3) =11 to 15 m (35 to 50 ft), V = 6 m^3 (212 ft^3) >15 m (50ft), V = 9 m^3 (318 ft^3)	Fox 1994	--------	--------	--------	--------
		--------	--------	--------	Key piece volume loading [m^3/100m]	--------	Same as for LWD but analysis limited to pieces identified in field as Key pieces	
	Large Woody Debris (LWD) for stream Class I & II, cw < 4 meters	piece frequency: f = [pcs/100m] and f=pcs/channel width	none given		piece frequency: f=pcs/channel width	--------	same as for channels >4m wide	
		Geometric mean piece diameter (cm)	none given		----------	--------	--------	
		Geometric mean piece length (m)	none given		----------	--------	--------	
		Mean debris piece volume V_avg [m^3 (ft^3)]	none given		----------	--------	--------	
		LWD loading = total volume / 100m	none given		LWD loading = total volume / 100m	--------	same as for channels >4m wide	
		Key piece frequency [pcs/100 m (pcs/100 ft)]	none given		Key piece frequency/100m	--------	same as for channels >4m wide	

Table 8a - LEED Hart Crowser / NMFS APFC Matrix (NMFS 1997) Correlation Table

Type of parameter	Element	NMFS Parameter (NMFS 1997)	NMFS Criteria	NMFS Reference Basis	HC Watershed Analysis parameter	HC Criteria	HC method	HC references
		Avg. key piece diameter [cm (in)]	none given		----------	-------	-------	
		Avg. key piece length [m (ft)]	none given		----------	-------	-------	
		Mean key debris piece volume V_avg [m^3 (ft^3)]	none given		----------	-------	-------	
		LWD loading = total volume / 100m	none given		key piece volume loading = total key piece volume / 100m	--------	same as for channels >4m wide	
	Large Woody Debris (LWD) for stream Class III	several	several	--------	Class III stream conditions were only generally described	--------	--------	
	Pools in streams with gradient >=3% and ave. widths < 10 m	Pool to pool spacing	1 pool per every 3 bfs channel widths on average	--------	Pool to pool spacing	1 pool per every 3 bfs channel widths on average	habitat unit survey pool counts/reach length / avg. channel width	
		Pool area	>=20% of the total stream surface area	--------	Pool area	>=20% of the total stream surface area	length of survey reach made up of pool type habitat/total reach length	
		# of pools associated with LWD	>=90% of pools	--------	# of pools associated with LWD	>=90% of pools	# of pools formed by LWD / total number of pools in survey reach	
	Pools in streams with ave. gradient <3% and ave. widths 10 to 19 m	Pool to pool spacing	1 pool per every 6 channel widths on ave.	--------	Pool to pool spacing	1 pool per every 6 channel widths on ave.	habitat unit survey pool counts/reach length / avg. channel width	
		Pool area	>=25% of total stream surface area, 50% of stream surface area composed of pool habitat	--------	Pool area	>=50% of stream surface area composed of pool habitat	length of survey reach made up of pool type habitat/total reach length	
		# of pools associated with LWD	>=50% of pools	--------	# of pools associated with LWD	>=50% of pools	# of pools formed by LWD / total number of pools in survey reach	
	Pool Quality		Pools > 1 m deep, based on min residual summer depth (holding pools), with good cover and cool water, minor reduction of pool volume by fine sediment	--------	description	Pools > 1 m deep, based on min residual summer depth (holding pools), with good cover and cool water, minor reduction of pool volume by fine sediment	notes and pool data	
		Residual maximum pool depth	>=.914m	Platts 1983	% of pools having maximum pool depth >1m	>=1m	difference between pool maximum depth and residual (minimum tailout) depth % of pools in reach	
		Pool Volume-->	see sediment criteria	--------	--------	--------	--------	
		Pool Cover-->	see LWD, bank stability, and riparian criteria	--------	shelter rating (Flosi et al. 1998)	--------	Flosi et al. 1998	Flosi et al. 1998
	Off-channel Habitat		Maintain existing backwater with cover, and low energy off-channel areas (ponds, oxbows, etc.)	--------	--------	--------	--------	
	"Hot Spots" and Refugia		Maintain existing habitat "hot spots" (good habitat in limited areas) and refugia (havens of habitat safety where populations have a high probability of serving periods of adversity) at the macro scale (e.g. intact reaches, drainages, etc.); existing refugia are sufficient in size, number and connectivity to maintain viable populations or sub-populations	USDA 1993 (SAT Report)	--------	--------	--------	
Flow/Hydrology	Changes in Peak/base Flows		Compare to undisturbed watershed with similar size, geology and geography	--------	Change in Qpeak	--------	PALCO 2000	PALCO 2000
	Increase In Drainage Network		Zero or minimum increases in drainage network density due to roads; zero increase in volume capacity in natural channels so as not to degrade channel conditions	--------	--------	--------		
Watershed Condition	Road management		Entire road network are storm-proofed, armored or retired. Inspected annually and during use and heavy rain events.	--------	--------	--------		
	Disturbance history		-------	--------	--------	--------		
	Riparian buffer (Class I & II stream) (Only key piece recruitment potential, canopy cover, and streambank erosion were assessed.)		Quadratic mean tree diameter (QMD) of fully-stocked stands --> >=24 in. dbh or >= targeted ave. 'key piece" LWD diameter, whichever is greater	--------	Riparian condition classification with adequate key piece recruitment potential	Small Channels: riparian veg CMD, MMD, or larger Large channels: riparian veg CLD or CMD	C = Conifer; M=Mixed con/decid M=Medium (12" to 24" dbh); L=Large (>24" dbh)	
			Overstory tree canopy closure --> Ave. of at least 85 percent overstory tree canopy closure	--------	Total shade	>= 85%	convex densiometer mid-channel	
			Stream bank stability --> "good" to "Excellent" stream bank stability afforded by root systems of large trees supplemented by large wood and shrub layer	Pfankuch 1978	% bank erosion	<10%	field observation data and notes (see above)	consistent with Channel Condition criterion
	Riparian buffer (Class III stream)	several	several	--------	Class III stream conditions were only generally described	--------	--------	