

SECTION H SYNTHESIS

INTRODUCTION

The synthesis module presents a compilation of results with an attempt to summarize the most significant hillslope hazards and aquatic resource conditions for improvement. The information compiled will be a summary of sediment inputs, presentation of aquatic habitat condition ratings (on target, marginal, deficient), and any water quality information available. The synthesis module presented here differs from the protocols presented in the Washington state watershed analysis manual (Version 4.0, Washington Forest Practices).

Sediment Inputs

The purpose of this summary is to demonstrate the relative amount of different sediment sources, indicate priorities for erosion control, and assist with interpretation of stream channel conditions in relation to sediment deposition and transport. A sediment budget provides quantification of sediment inputs, transport, and storage in a watershed (Reid and Dunne, 1996). In this case we are not doing a true sediment budget, only an estimation of the sediment inputs. Care must be used when interpreting these estimated values; by no means can the estimates be considered absolute. Rather, the sediment input estimates are best interpreted for relative comparisons between processes and planning watersheds.

This section combines and summarizes the sediment input results from the Mass Wasting and Surface and Point Source Erosion modules of the watershed analysis. Sediment input for the Southcoast Streams WAU is estimated from hillslope mass wasting, road associated mass wasting, road surface and point source erosion, and skid trail erosion. The sediment inputs are shown as an average rate for past conditions (1943-2004).

The average estimated sediment input for the time period 1943-2004 for the Southcoast Streams WAU is 497 tons/square mile/year. The inputs in the Southcoast Streams WAU over this time frame have come from mass wasting (51%) and surface and point source erosion (32%) and skid trail erosion (17%). The breakdown of total sediment input is presented by planning watershed for the Southcoast Streams WAU (Table H-1 and Figure H-1).

Mass wasting is the largest contributor to sediment delivery in the Southcoast Streams WAU. By adding together the contribution of road surface, point source, skid trails and road-associated mass wasting sediment delivery, roads represented 79% of the sediment inputs in the Southcoast Streams WAU.

Roughly 6,544 cubic yards of controllable erosion is currently associated with the road network in Southcoast Streams. Since 1998, when the company was formed, approximately 810 cubic yards of erosion from the road network has been treated. A majority of this erosion control work, however, was completed prior to the road inventory in Southcoast Streams, so credit for treating controllable erosion cannot be taken at this time.

Figure H-1. Estimated Percentage of Sediment Inputs by Source for the Southcoast Streams WAU, 1943-2004.

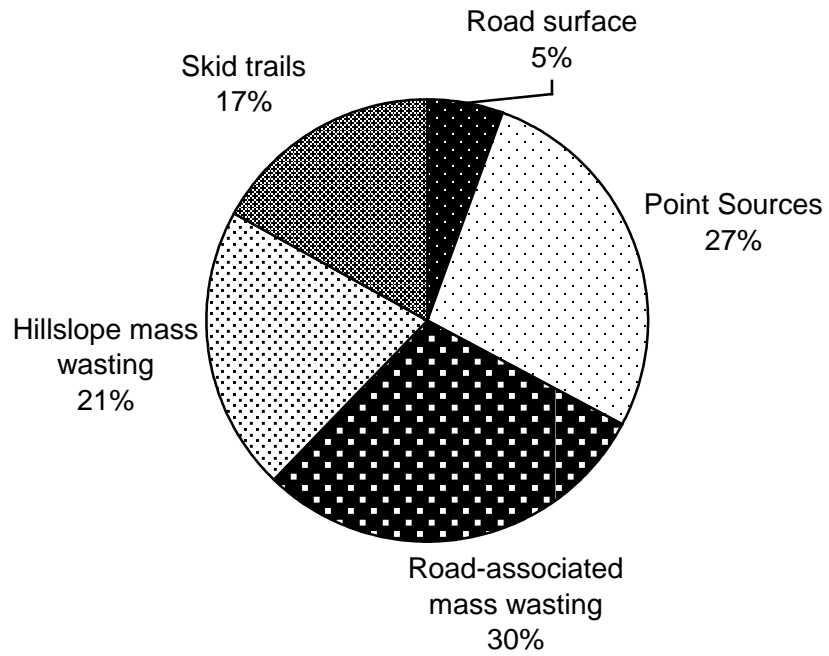


Table H-1. Estimated Sediment Inputs by Input Type the Southcoast Streams WAU 1943-2004.

<i>Planning Watershed</i>	<i>Road Surface Erosion (tons/mi²/yr)</i>	<i>Road Point Source Erosion (tons/mi²/yr)</i>	<i>Road Associated Mass Wasting (tons/mi²/yr)</i>	<i>Hillslope Mass Wasting (tons/mi²/yr)</i>	<i>Skid Trail Erosion (tons/mi²/yr)</i>	<i>Total (tons/mi²/yr)</i>
Lower Alder Creek	0	0	45	57	28	130
Lower Brush Creek	0	0	3	0	4	7
Mallo Pass Creek	4	35	62	24	30	155
North Fork Alder Creek	4	35	23	14	12	88
Point Arena Creeks	18	29	13	9	6	75
Upper Brush Creek	1	37	1	0	3	42
Grand Total	27	136	146	104	84	497

HABITAT QUALITY RATINGS

The habitat quality ratings for LWD, stream temperature, stream shade, stream gravel permeability, and fine sediment are presented here. Some of the ratings were previously presented in this watershed analysis.

LWD Quality Ratings (as reported in Section D, Riparian Function)

Table H-2 shows the instream LWD quality rating for the planning watersheds of the Southcoast Streams WAU. This quality rating will provide a tool to monitor the quality of the LWD in major streams over time. Currently all three planning watersheds have a deficient LWD quality rating.

Table H-2. In-stream LWD Quality Ratings for the Southcoast Streams WAU.

Calwater Planning Watershed	Percent of segments[†] with low or moderate demand	Percent of segments[†] meeting at least half of the key piece target	In-stream LWD Quality Rating[*]
Lower Alder Creek	22%	22%	DEFICIENT
Mallo Pass Creek	75%	100%	MARGINAL
NF Alder Creek	0%	50%	DEFICIENT
Point Arena Creeks	0%	0%	DEFICIENT

[†] – normalized by segment lengths

^{*} – includes debris jams

Stream Temperature and Shade Quality Ratings (as reported in Section D, Riparian Function)

MRC uses two sequential sets of criteria to determine if a watershed has “on-target” effective shade and temperature quality. The first is based on most recent three year average maximum weekly average temperature (MWAT), the second on canopy cover. The Upper Southcoast Streams planning watershed has marginal stream shade and temperature conditions whereas Lower Southcoast Streams is rated as on-target as indicated by the stream shade ratings (Table H-3). It is anticipated that these ratings will improve over time with policies promoting stream shade.

Table H-3. Stream Shade and Temperature Quality Ratings for Streams in the Southcoast Streams WAU.

Planning watershed	Number of segments surveyed	% segments with MWAT < 15 deg C and/or average canopy greater than target	% segments with >70% average canopy	Stream Shade Quality Rating
Mallo Pass Creek	89-3	12.5	100%	ON-TARGET
Lower Alder Creek	89-1	15.7	82%	ON-TARGET
NF Alder Creek	89-2	17.1	67%	MARGINAL
Point Arena Creek	94-1	12.9	100%	ON-TARGET

V-star measurements (the ratio of fine sediment volume to pool volume) were taken in 2007 and then in 2008 after the lightning complex fires. The mean of the V-star observations (Tables H-5 and H-6) indicate that this long term monitoring segment exhibits fine sediment deposition characteristic of regional index streams with little to moderate disturbance, as observed in the study by Knopp 1993. The index streams observed by Knopp 1993 indicated mean V-star values ranging from 0.17 to 0.28 whereas the moderately to highly disturbed watersheds resulted in mean values of 0.37 to 0.42. Another way of interpreting the V-star data is that this segment is not storing a significant amount fine sediment within the pools. It is interesting to note that fine sediment deposition actually decreased after the fires which the opposite of what one might expect since the channels did not burn.

Table H-5. V-star data for Mallo Pass Creek Long Term Monitoring Segments, 2007.

Pool number	V*
3	0.60
4	0.60
5	0.42
7	0.26
10	0.36
11	0.44
12	0.52
17	0.33
18	0.50
20	0.47
High	0.60
Low	0.26
Mean	0.37
Variance	0.0017
Standard Error	0.041

Table H-6. V-star data for Mallo Pass Creek Long Term Monitoring Segments, 2008.

Pool number	V*
1	0.23
2	0.22
9	0.38
11a	0.25
11b	0.28
13	0.15
14	0.24
15	0.40
16	0.21
17	0.25
High	0.40
Low	0.15
Mean	0.24
Variance	0.0003
Standard Error	0.017

Aquatic Habitat and Water Quality Summary

The habitat quality ratings and sediment input summaries show that large woody debris recruitment, canopy (in the North Fork Alder watershed), and road associated (primarily mass wasting associated with roads) sediment have the greatest need for improvement.

LITERATURE CITED

Knopp, C. 1993. Testing Indices of Cold Water Fish Habitat. Final Report for Development of Techniques for Measuring Beneficial Use Protection and Inclusion into the North Coast Region's Basin Plan by Amendment of the.....Activities, September 18, 1990. North Coast Regional Water Quality Control Board in cooperation with California Department of Forestry. 57 pp.

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Reid, L. and T. Dunne. 1996. Rapid evaluation of sediment budgets. Catena Verlag GMBH. Reiskirchen, Germany.

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