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 estimated sediment inputs for the Northern Russian River WAU have been summarized and are presented. 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 Northern Russian River 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 (1970-2000).

The average estimated sediment input for the time period 1970-2000 for the Northern Russian River WAU is 620 tons/square mile/year. The inputs in the Northern Russian River WAU over this time frame have come from mass wasting (31%) and surface and point source erosion (69%). The breakdown of total sediment input is presented by planning watershed for the Northern Russian River WAU (Table H-1 and Figure H-1).

Road associated sediment delivery is the major contributor in the Northern Russian River WAU. By adding the contribution of road surface, point source and mass wasting sediment delivery, roads represented 87% of the sediment inputs in the Northern Russian River WAU. Roads represent a high percentage of the sediment inputs primarily because there was a relatively low amount of hillslope mass wasting sediments within the Northern Russian River WAU. There was a relatively low amount of sediment inputs from skid trails.

Roughly 340,000 cubic yards of controllable erosion is currently associated with the road network. Approximately 290,000 cubic yards of this controllable erosion is associated with the Masonite Road in Ackerman Creek. MRC is making efforts to correct road sediment inputs. Since 1998, when the company was formed, approximately 44,000 cubic yards of erosion from the road network has been controlled. This represents an improvement of greater than ten percent of the total controllable erosion within the last 5 years. Further improvements will continue to occur.

Figure H-1. Estimated Percentage of Sediment Inputs by Source for the Northern Russian River WAU, 1970-2000.

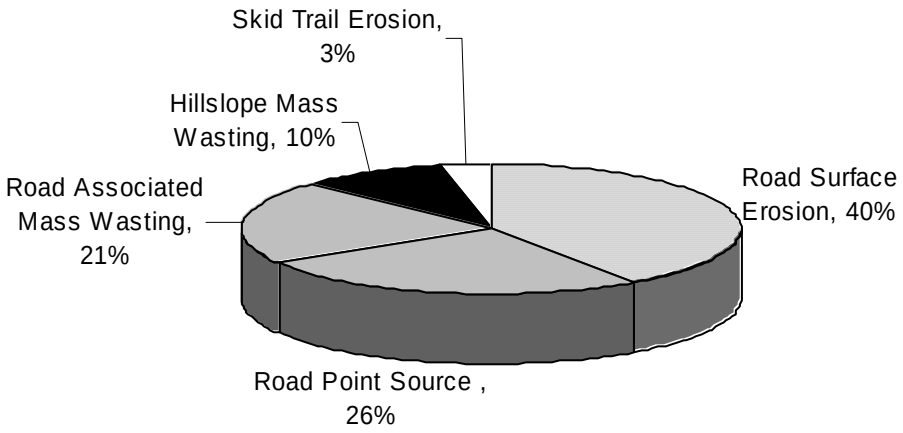

Table H-1. Estimated Sediment Inputs by Input Type for Planning Watersheds of the Northern Russian River WAU 1970-2000.

Planning Watershed	Road Surface Erosion (tons/mi^2/yr)	Road Point Source Erosion (tons/mi^2/yr)	Road Associated Mass Wasting (tons/mi^2/yr)	Hillslope Mass Wasting (tons/mi^2/yr)	Skid Trail Erosion (tons/mi^2/yr)	Total (tons/mi^2/yr)
Jack Smith Creek	220	60	10	100	20	410
Lower Ackerman Creek	350	360	570	0	0	1280
Mill Creek	320	30	0	130	0	480
Upper Ackerman Creek	250	190	140	50	20	650
Northern Russian River WAU Total	***250***	***160***	***130***	***60***	***20***	***620***

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 3 major streams of the Northern Russian River WAU. This quality rating will provide a tool to monitor the quality of the LWD in major streams over time. Currently the stream segments in Upper Ackerman Creek have a deficient LWD quality rating, while Jack Smith is marginal.

Table H-2. Instream LWD Quality Ratings for the Three Major Streams of the Northern Russian River WAU.

Stream	Calwater Planning Watershed	Instream LWD Quality Rating
Jack Smith Creek	Jack Smith Creek	Marginal
Ackerman Creek	Upper Ackerman	Deficient
Alder Creek	Upper Ackerman	Deficient

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

The Northern Russian River WAU has marginal stream shade conditions as demonstrated by the stream shade ratings (Table H-3). It is anticipated that over time with policies promoting stream shade these ratings will improve. There are no "deficient" stream shade quality ratings in the Northern Russian River WAU.

Table H-3. Stream Shade Quality Ratings for Streams in the Northern Russian River WAU.

Stream	Calwater Planning Watershed	Stream Shade Quality Rating
Jack Smith Creek	Jack Smith Creek	Marginal
Ackerman Creek	Upper Ackerman	Deficient
Alder Creek	Upper Ackerman	Deficient

Stream Temperature Quality

Stream temperature quality is evaluated by use of the mean weekly maximum temperature (MWMT) for the year 2003 for the species present in the watershed. The rating for stream temperature quality is derived from information in the draft Habitat Conservation Plan and Natural Community Conservation Plan that MRC is developing. In the case of Northern Russian River WAU the salmonid species utilizing the streams evaluated are steelhead trout; coho salmon are not present in the Northern Russian River WAU and nor is there historical record they have utilized the Northern Russian River WAU.

For steelhead trout the stream temperature quality ratings are defined below.

Species	DEFICIENT (C°)	MARGINAL (C°)	ON TARGET (C°)
steelhead	>21	17-21	<17

Table H-4. Stream Temperature Quality for the Three Major Streams in the Northern Russian River WAU.

Stream	Calwater Planning Watershed	Steelhead Temperature Quality Rating
Jack Smith Creek	Jack Smith Creek	Marginal
Ackerman Creek	Upper Ackerman	Deficient
Alder Creek	Upper Ackerman	Marginal

From the information available stream temperature ratings are favorable for only steelhead in the tributaries of the Northern Russian River WAU. Steelhead are present throughout the Northern Russian River WAU. Ackerman Creek stream temperatures are high; however, much of the stream channel flows through oak woodlands with naturally open canopy. MRC's riparian management policy will conserve shade over the stream channel; however, it is not certain that stream temperatures will lower much from this level.

Stream Gravel Quality

Stream gravel quality has been monitored in one long term stream monitoring segment in the Northern Russian River WAU (stream segment UU1). Both permeability and bulk gravel samples have been collected. The percent fine sediment from bulk gravel samples and permeability quality ratings are defined below.

Permeability Ratings	
ON TARGET (OT)	>10,000 cm/hr permeability = >55% survival index.
MARGINAL (M)	>2000 cm/hr permeability = >30% survival index.
DEFICIENT (D)	<2000 cm/hr permeability = <30% survival index.

Fine Sediment Ratings	
ON TARGET (OT)	<7% in the size class 0.85 mm using dry sieve techniques.[1]
MARGINAL (M)	7-14% in the size class 0.85 mm using dry sieve techniques.
DEFICIENT (D)	>14% in the size class 0.85 mm using dry sieve techniques.

[1] MRC used information from the Noyo TMDL for sediment (EPA 1999) to develop the target for fine sediment from dry-sieve techniques; the target is less than 7% of the gravel composition in the size class 0.85 mm. In the TMDL for the Garcia River (NCRWQCB 1997), where dry sieving is not specified, the target for gravel composition in the size class 0.85 mm is less than 14%.

Table H-5. Stream Gravel Quality Ratings for Permeability and Fine Sediment for Northern Russian River WAU Long Term Monitoring Segment, 2000.

Year	Stream Gravel Permeability Rating	Fine Sediment Rating
2000	Marginal	Marginal

Stream gravel quality is observed to be "marginal" within the long term monitoring segment (UU1) in the Northern Russian River WAU. Generally, these are not bad ratings however we look for these to improve over time.

Aquatic Habitat and Water Quality Summary

The habitat quality ratings and sediment input summaries show that large woody debris recruitment, stream temperature, and road associated sediment have the greatest need for improvement. Stream temperature and shade provide marginal to deficient conditions for steelhead trout. It is not certain given the hot climate and oak woodland habitat of Ackerman Creek that stream temperatures can be lowered much. However, efforts will be made. Currently MRC has made good improvements in its efforts to controlling road sediment with >10% of the total controllable erosion addressed in the past 5 years. Although fine sediment and permeability levels in one long term monitoring segment are marginal.

LITERATURE CITED

NCRWQCB (North Coast Regional Water Quality Control Board). 1997. Garcia River water quality attainment strategy. Santa Rosa, CA.

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

USEPA. 1999. Noyo River Total Maximum Daily Load for sediment. Region IX, San Francisco.