

SECTION G

SEDIMENT INPUT SUMMARY

INTRODUCTION

The sediment inputs for the Albion WAU have been summarized and are presented. The purpose of this summary is to determine the relative amount of different sediment sources, to determine priorities for erosion control, and assist in interpretation of stream channel conditions in relation to sediment deposition and transport. An estimate of background sediment yield is provided to give context to the estimated sediment inputs from this watershed. Estimates of sediment yield for the Coast Range in and around Mendocino County are presented as well for comparison purposes.

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. However, this quantification is useful for source analysis, numeric targets, and allocation of responsibility as needed in a Total Maximum Daily Load (TMDL) for 303(d) listed rivers, such as the Albion River. A TMDL requires numeric standards for non-point source pollution. When the non-point source pollutant in question is sediment, the sediment input becomes a logical analytical technique for the watershed.

This section combines and summarizes the sediment input results from the Mass Wasting and Surface Erosion sections of this watershed analysis for the Albion WAU. Sediment input for the Albion WAU is estimated from erosion delivered to watercourses from hillslope mass wasting, road associated mass wasting, road surface erosion, and skid trail erosion. It is considered an estimated average for twenty-two years (1978-2000).

INPUTS

The average estimated sediment input for the past twenty years for the Albion WAU is 500 tons/square mile/year. The majority of this input in the Albion WAU comes from mass wasting (74%) and to a lesser extent surface and point source erosion from roads and skid trails (26%) (Figure G-1). Skid trail erosion was found to be a very minor component of sediment inputs for the Albion WAU, contributing only about 9% of the total estimated erosion. The breakdown of total sediment input is presented by planning watershed for the Albion WAU (Table G-1). The greatest amount of sediment inputs is estimated to be from the South Fork Albion River planning watershed. The South Fork Albion River has the highest sediment inputs from both roads and mass wasting.

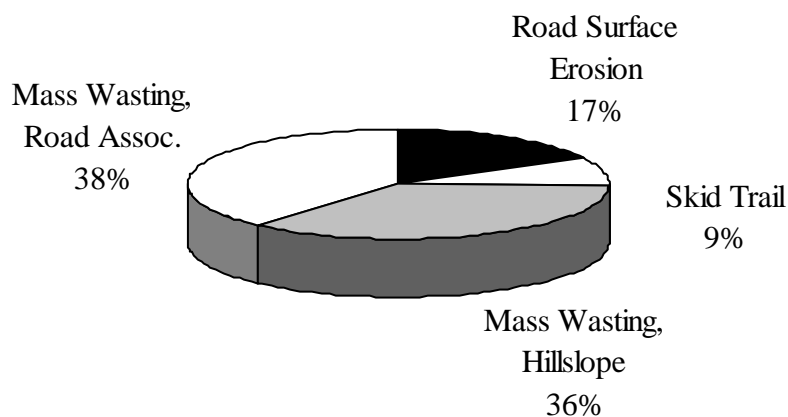
Table G-1. Estimated Sediment Inputs by Process by Planning Watershed of the Albion WAU, 1978-2000 (rounded to nearest ten).

Planning Watershed	Road Surface and Point Source Erosion (tons/mi ² /yr)	Hillslope Mass Wasting (tons/mi ² /yr)	Road Associated Mass Wasting (tons/mi ² /yr)	Skid Trails Surface and Point Source Erosion (tons/mi ² /yr)	Total (tons/mi ² /yr)
South Fork Albion	130	150	370	70	770
Lower Albion	40	270	90	20	440
Middle Albion	100	180	150	40	490
Upper Albion	20	20	50	20	110

With the exception of the South Fork and Middle Albion River planning watersheds, the road surface erosion levels are not that high in the Albion WAU. It appears that the current construction practices and maintenance of road surfaces, with a few exceptions, are good and that road surface erosion is not a major concern within this watershed.

Mass wasting is the dominant sediment contributing process in the Albion WAU. The road and hillslope mass wasting combined is 74% of the estimated sediment input in the Albion WAU. The hillslope mass wasting may or may not be influenced by past forest harvesting. However, the road associated mass wasting is directly influenced by past forest harvest. Most of the road associated mass wasting is occurring on “legacy” roads. These roads will be a priority for upgrade to a higher design standard. Future forest practices must give the potential of mass wasting careful attention in the Albion WAU to attempt and reduce this sediment input over time. The goal will be to decrease mass wasting in the Albion WAU over time.

Figure G-1. Estimated Percentage of Sediment Inputs for the Albion WAU, 1978-2000.



Background Sediment Yield

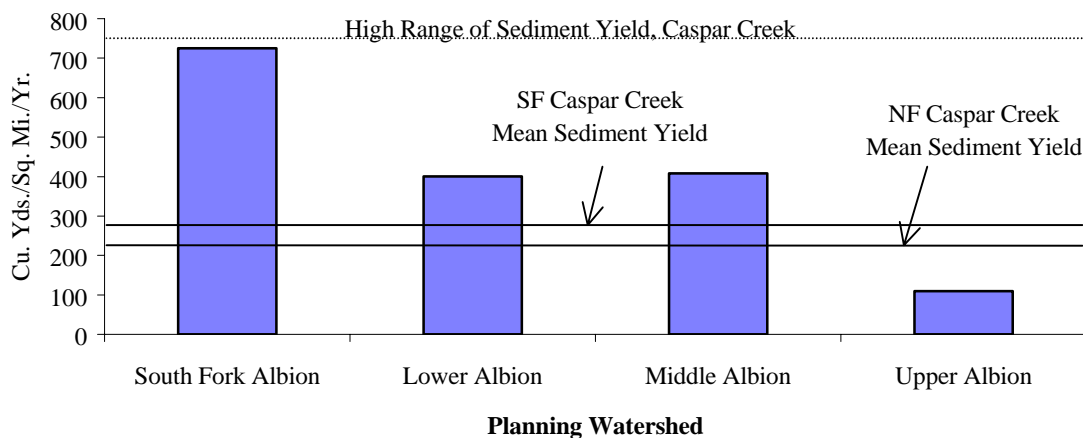
Information on background sediment yield in the Coast Range of Mendocino County is limited. The best data set comes from the Caspar Creek watershed on the Jackson Demonstration State Forest, Mendocino County. However, this data set is relatively short and may not represent the entire range of sediment inputs over time. Furthermore, the range of geologic conditions and topography in the Coast Range, which influence sediment input, is not represented in one watershed's data set (i.e. Caspar Creek). Direct comparison between the Caspar Creek sediment yield with the Albion WAU sediment yield is probably not reasonable. Caspar Creek sediment yield is collected in smaller watersheds than the Albion WAU. Sediment yield increases with watershed size. Many areas of the Albion WAU have much steeper topography than Caspar Creek creating a greater likelihood of erosion. Nonetheless, the Caspar Creek data represents the best information we have on sediment inputs from a mature second-growth redwood forest in the Mendocino County Coast Range, but comparisons must be interpreted carefully.

Total sediment yield from Caspar Creek, ranges from as low as 4.7 cubic yards/sq. mile to as high as 745 cubic yards/sq. mile in any given year. The average sediment yield ranges from 278 cubic yards/sq. mile/yr. for the South Fork Caspar Creek to 212 cubic yards/sq. mile/yr. for the North Fork Caspar Creek. This is based on 1978-1989 North Fork Caspar Creek and 1986-1998 South Fork Caspar Creek sediment yield. Sediment yield information is available prior to 1978, however the methods used at that time are believed to over-estimate sediment yield (Lewis, 1999) so the information from the pre-1978 time period is not used. The time frame for the South Fork Caspar sediment yield (1986-1998) is considered recovered from previous harvesting, however there were some road associated sediment inputs during this time period.

Sediment yield is episodic, based on stochastic erosion and hydrologic events. Thus in any given year sediment yields can be very high or very low. The high variation of the Caspar Creek sediment yield in any given year illustrates this point. The sediment inputs estimated for the Albion WAU are shown as an average input rate over a 20 year time period, though in any given year this amount will vary.

The sediment inputs for each planning watershed, converted to cubic yards, are compared to the unmanaged sediment yields from the North and South Forks of Caspar Creek (Figure G-2).

Figure G-2. Sediment Yield from Albion WAU by Planning Watershed Compared to Background Sediment Yields as Represented by Caspar Creek in Unmanaged Conditions.



The total sediment input for any planning watershed in the Albion WAU is within the annual variation of background sediment yield for unmanaged second-growth conditions, as represented by the high range of Caspar Creek sediment yields. However, all but one planning watershed's sediment input rates are above mean annual background rates. Given the differences in the two watersheds, the Caspar Creek sediment yields are probably a low estimate of a background rate for the Albion WAU. However, the goal should be to lower current sediment input rates in the Albion WAU, particularly the South Fork Albion planning watershed closer to estimated background rates.

Sediment Inputs Compared to Nearby Watersheds

The sediment inputs of the Albion WAU were estimated to average 500 tons/sq. mi./yr. for 22 years. In the nearby Navarro River watershed the total load was estimated at 1600 tons/sq. mi./yr. (Mendocino County, 1998). The Navarro River watershed does have areas of Franciscan melange which have considerably higher erosion rates than typical Coast Range geology. Sediment inputs as estimated by watershed analysis by MRC for the Garcia and Noyo River watersheds are 1040 and 494 tons/sq. mi./yr., respectively. The sediment inputs for the Albion WAU are currently lower than other nearby watersheds, excepting the Noyo River. The sediment inputs for the Albion WAU are slightly higher than the Noyo River.

LITERATURE CITED

Lewis, Jack.. 1999. Personal communication March 29, 1999.

Mendocino County Water Agency. 1998. Navarro Watershed Restoration Plan. Mendocino County, Ukiah.

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