

Sediment loads and erosion in forest headwater streams of the Sierra Nevada, California

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Abstract Defining best management practices for forests requires quantification of the variability of stream sediment loads for managed and unmanaged forest conditions and their associated sediment sources. Although “best management practices” are used, the public has concerns about effects from forest restoration activities and commercial timber harvests. It is necessary to know the current and/or natural range of variability to be able to determine if management activity has a significant negative impact; only long-term research can provide such data. The Forest Service in the United States has such long-term watershed research. An annual sediment load from a watershed is determined by emptying a sediment basin located in the stream channel at the end of a water year. Sediment fences, stream bank pins, survey techniques, and turbidity sensors provide measurements that can be used to determine the sources of sediment. The importance of having an undisturbed watershed for “natural range of variability” to compare with watersheds previously or currently under active management is illustrated. For example, at the Kings River Experimental Watersheds one of the managed watersheds in the rain and snow zone, produced 1.8, 15.2, and 18.7 kg/ha for water years 2004, 2005, and 2006, respectively. The increase in sediment accumulation correlates with an increase in yearly precipitation. The undisturbed watershed and the snow-dominated watersheds produce similar, and sometimes higher, sediment loads for these same years.

Key words erosion; sediment loads; headwater streams; forest management