ABSTRACT

Road decommissioning work has been studied in the South Fork Caspar Creek experimental watershed since 1998, when a 4.6 km (2.8 mi) segment of Forest Road 600 was decommissioned. A total of 26 watercourse crossings and eight cross-drain relief culverts were removed, while an additional eight minor crossings remained untreated. A detailed time study documented costs associated with the different treatments implemented at these sites. Gully measurements were made after one and three over-wintering periods. Additional measurements consisted of a longitudinal profile with three to five cross-sections at nine benchmarked sites and a detailed topographic survey at a tenth crossing where the road crossed the main stem of the South Fork. Surveying work was completed at these sites after one and four winter periods. Mean erosion volumes measured at the treated crossing sites following one and three over-wintering periods were 24.6 m^3 (32 yd^3) and 27.4 m^3 (36 yd^3), respectively. Erosion volumes were mainly created after the first winter, with a 17% increase following three over-wintering periods. Only three decommissioned crossings continue to erode after eight winters. After three winters, gully erosion equated to four percent of the total volume of fill material removed at the stream sites. Approximately 50% of the total eroded volume measured was produced by only three of the decommissioned crossings, which is consistent with results from past studies, where most of the erosion volume is produced by a small percentage of the excavated crossings. Gullied stream crossings along the decommissioned roads accounted for nearly one third of the total inventoried erosion volume and 57% of the sediment load in the South Fork Caspar Experimental Watershed during the first post-treatment winter. The erosional costs associated with road decommissioning in this study were significantly greater than anticipated during project planning. Detailed pre-project survey work, operator skill, and diligent project inspection are critical to ensure proper excavation at treated crossing sites. In addition, boulder armoring of major crossings may help reduce post-treatment gullying.

INTRODUCTION AND LITERATURE REVIEW

While forest roads in general are known to be a major anthropomorphic cause of sedimentation in forest streams in the western United States (Megahan and Kidd 1972; Reid and Dunne 1984; Furniss and others 1991; Luce and Black 1999; MacDonald and others 2004), roads located within riparian zones are especially prone to sediment delivery to stream channels (WFPB 1997). Several studies in diverse geologic settings have concluded that roads located within 60 m (200 ft) of a stream channel deliver considerably more sediment than those located more than this distance. Rice and others (1979) described roads within 60 m of the stream channel as delivering sediment to stream channels in the South Fork Caspar Creek watershed, where the study described in this paper took place. Ketcheson and Megahan (1996) reported that sediment flow from most cross-drains extends less than 60 m in the Idaho batholith. More recently, Coe (2006) reported that sediment travel distance from forest roads was generally less than 40 m (130 ft) in the central Sierra Nevada.

Road decommissioning (abandonment)[4] near streams is a practice that has been used extensively in northwestern California to reduce long-term road sediment delivery, thereby lessening impacts to sensitive aquatic resources such as listed

[4] California Forest Practice Rules define “abandonment of roads” as procedures that permanently close a road in a manner that prevents erosion, maintains hillslope stability, and re-establishes natural drainage patterns (CAL FIRE 2007).