

Applications of Long-Term Watershed Research to Forest Management in California: 50 Years of Learning from the Caspar Creek Watershed Study

Peter H. Cafferata, California Department of Forestry and Fire Protection, P.O. Box 944246, Sacramento, CA. 94244; (916) 653-9455; pete.cafferata@fire.ca.gov

Leslie M. Reid, U.S. Forest Service Pacific Southwest Research Station

Initial stream discharge, suspended sediment, and rainfall measurement began in the Caspar Creek watershed located in western Mendocino County on October 1, 1961. During the following 50 years, this basin has been the site of a long-term cooperative study between the U.S. Forest Service Pacific Southwest Research Station (PSW) and the California Department of Forestry and Fire Protection (CAL FIRE). The Caspar Creek watershed is one of only a small number of watersheds in the United States with a continuous record of streamflow and sediment for this length of time. Two major watershed experiments have been carried out at Caspar Creek to study the hydrologic effects of second-growth harvesting of coast redwood and Douglas-fir. Lessons learned from these studies have been applied to address numerous forestry-related issues in California.

Registered Professional Foresters prepare Timber Harvesting Plans (THPs) and other types of plans that require approval by state agencies prior to approval for commercial timber harvesting operations. These documents require that the anticipated impacts of the project, both individually and cumulatively, be analyzed and disclosed for public review. Larger scale documents such as aquatic Habitat Conservation Plans (HCPs) and Program Timberland Environmental Impact Reports (PTEIRs) assess potential impacts at a landscape level. Results from the Caspar Creek studies are used in these types of documents to make reasoned assessments of potential watershed-related impacts. Examples of applications include: (1) prediction of changes in peak flows associated with timber harvesting, (2) evaluation of expected changes in annual water yield and summer low flows, (3) estimation of rates of landsliding and hillslope erosion in tractor and cable-logged areas, (4) assessment of the relative contributions of sediment from different source areas on the landscape, (5) prediction of large wood recruitment to stream channels, (6) prediction of changes in water temperatures following riparian zone harvesting, (7) assessment of the relative importance of fog drip in annual water yield, (8) consideration of nutrient export rates following clearcut harvesting, and (9) evaluation of biological impacts to salmonids and macroinvertebrate communities.

Results from Caspar Creek watershed studies have also been instrumental in the development and refinement of numerous California Forest Practice Rules addressing watershed-related topics. Results from peakflow studies have been used by state agencies to design strategies to control hydrologic changes from logging in privately owned coast redwood forests. Results from Caspar Creek are often cited by state and federal agencies charged with regulating the effects of forestry practices on flooding, water supply, water quality, riparian condition, and aquatic habitat (e.g., Official Responses for THPs), as well as by citizens commenting on THPs. Finally, Caspar Creek studies have led to development of new monitoring methods that provide more detailed information while reducing monitoring costs and effort.