

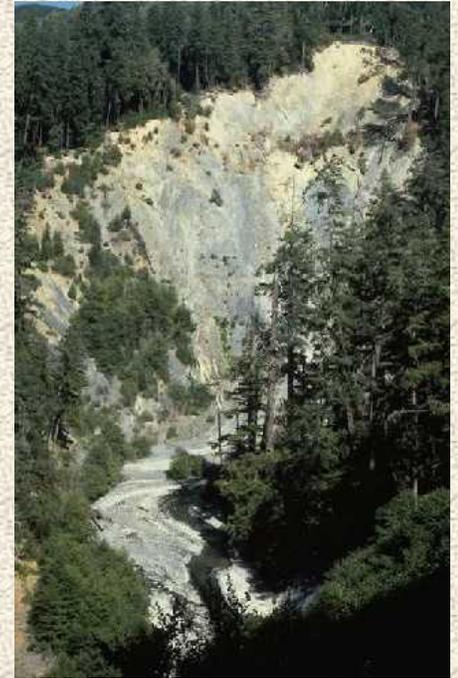
Project Title: Inventory and Monitoring of Sediment Sources and Transport

Investigators:

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Landslides are a major sediment source in north coastal watersheds, and the frequency of landsliding can be increased by road construction and timber harvest.

Project Description:

Land use disturbances have caused accelerated erosion on steep forested hillslopes of northwestern California. The resulting loss of soil diminishes on-site productivity. The excess sedimentation in many north coastal rivers also results in destruction of pool habitat and spawning gravel quality. Through Public Law 95-250, Congress mandated studies of erosion and sedimentation in the Redwood Creek basin. The monitoring in this study is designed to track sediment from its sources (road failures, gullies, landslides, etc.) through tributaries and the mainstem of Redwood Creek in order to calculate where damage from sedimentation is still occurring or is likely to occur. Monitoring of streams draining watersheds of differing land use will show the effects of timber harvest, road construction and revegetation on sediment loads, runoff, peak flows, low flows and stream temperature.

The inventory involves mapping erosion features (landslides, earthflows, bank erosion, gullies and road failures) in the Redwood Creek basin and will quantify the amounts of sediment contributed to stream channels by these processes. A large flood in January, 1997 initiated or reactivated many erosional features. The inventory will analyze 1997 aerial photographs to quantify changes in the spatial distribution, magnitude, and intensity of erosional processes from this flood.

The monitoring effort consists of evaluating channel stability (bank erosion, scour and fill, channel shifting) in streams and rivers. Particle sizes of channel bed substrate, sediment transport rates, water discharge and stream temperature are also parameters in the monitoring program.

Purpose:

The purpose of the research is to establish a monitoring protocol to evaluate erosional problems, channel stability, and sediment transport in a highly erosive watershed. A knowledge of the type, size, timing and causes of erosion and sedimentation problems is the first step in prioritizing restoration projects, implementing improved land use practices, and preventing future damage. Linkages between erosional problems on the hillslope and damage to downstream anadromous aquatic habitat will be documented. National and state park managers, and adjacent private landowners will use this information in guiding future erosion control work in the Redwood Creek basin.

Progress/Results:

Post-flood assessments are commencing to document where and why hillslope and channel failures occurred. Precipitation records from several local weather stations have been analyzed to determine the duration, intensity and recurrence interval of the recent storms. U.S. Geological Survey records of water and sediment discharge were analyzed to determine how the 1997 flood (a 12-year flood) compared to earlier floods. (Sediment analysis from the lab is not yet complete). Aerial photographs from the Redwood National Park collection were used to document the occurrence and size of new and reactivated streamside landslides in the Redwood Creek basin.

Products - Completed:

Ozaki, V. L. and M. A. Madej. 1996. Long-term channel response to large floods and sedimentation. p. 137-140 in the Proceedings of the conference of Coast Redwood Forest Ecology and Management, J. Le Blanc, ed. 170 p. Arcata, California.

Planned:

Post-1997 flood assessments will document types of flood damage, where most damage occurred, why roads and hillslopes failed, and how future damage can be prevented. Aerial photographic analysis will be extended to the entire Redwood Creek basin, with an emphasis on logged hillslopes, to document the location, size and mechanisms of landslides, road failures and gullies. Road-related failures will be stratified according to date of construction and hillslope position to determine if recent improvements in road-building standards has decreased the failure rate on newer roads. Channel transects will be resurveyed in the summer of 1998 to quantify the location and amount of bank erosion and channel in-filling.

Keywords: Landslides, gullies, erosion, sedimentation, timber harvest, aquatic habitat, sediment discharge, watersheds

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