

**PSW Research Station, Redwood Sciences Laboratory, Arcata, California, 10/22/02**

### **State and Federal Cooperative Research at Caspar Creek**

For more than forty years, the California Department of Forestry and Fire Protection (CDF) and the USDA Forest Service, Pacific Southwest Research Station (PSW) have cooperated in a comprehensive watershed study at the Caspar Creek Experimental Watersheds on Jackson Demonstration State Forest near Fort Bragg. When formal cooperation began in 1962, the objective was to document hydrologic changes, erosion impacts, and sediment production resulting from road construction and logging second-growth forests. For the past 20 years, the two agencies have jointly evaluated potential cumulative watershed effects resulting from even-age and uneven-age silviculture, including responses in streamflow routing, sediment transport, water quality, fisheries, and other biological (algal and benthic macro invertebrate) communities. The Caspar Creek data represent the only long-term hydrologic information from managed second-growth conifer forests in the western U.S. Because of its long record and unique conditions, information from Caspar Creek will continue to be valuable to both the research and the land management communities as second- and third-growth forests are increasingly re-entered.

This long-term cooperation between CDF and PSW has been a productive division of labors. The two agencies have jointly decided which studies to undertake, with CDF supervising the construction and maintenance of research facilities and managing the experimental watersheds, and PSW designing the experiments and analyzing the data. Together, CDF and PSW have authored over 150 technical publications as a result of this joint effort.

Small experimental watersheds such as those at Caspar Creek permit detailed studies of physical and biological interactions in a relatively controlled environment. Experimental disturbances can be imposed at a temporal and spatial scale that allows the researcher a chance of correctly identifying cause and effect. Further, although such small-watershed studies are only case studies, they can establish some sideboards on the more outrageous claims that appear now and then. It is not unusual to hear claims that "logging will dry up the streams and springs" or "logging will produce devastating floods" or "logging does not increase landslides or stream sediment loads." The Caspar Creek studies have shown that none of these claims are true for the conditions found at Caspar Creek. For example, logging about half the timber volume, either by clearcut or selective cut, did not have a significant effect on important peak streamflows, that is, those flows that affecting the morphology of the channel, or on the frequency of landsliding. However, increased stormflow volume after logging was most important in explaining increased suspended sediment load. Further, logging increased soil moisture and summer lowflow, subsurface and soil pipe flow, woody debris, and modified other riparian conditions.

Results from the cooperative Caspar Creek research are being used by state and federal agencies charged with regulating how forestry practices affect flooding, water supply, water quality, riparian condition, aquatic habitat including endangered fish.

Such a long-term research and management venture between a state and federal agency is unique. The results to date and a continuation of this cooperation will be priceless to future generations. Consequently, the Department of Forestry and Fire Protection and Pacific Southwest Research Station have agreed in principle to continue cooperative research at the Caspar Creek Experimental Watersheds for the next 100 years. This may seem a long commitment, but this is the time-frame upon which forest land managers must operate. To better foster this long-term cooperative work, a barracks/office facility is now being constructed as the first phase of what will become the Jackson Demonstration State Forest Learning Center.

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North Fork Caspar Cr., subsurface site K

Storm-induced streamflow in forested upland watersheds is linked to rainfall by transient, variably saturated flow through several different flow paths. Research investigations at Caspar Creek have explored these hillslope and subsurface drainage processes with the dual objectives of identifying impacts associated with logging and road building and reducing the risk of mass failures associated with timber harvest activities in the redwood region.



North Fork Caspar Cr., NFC weir, stormflow

Concrete broad-crested weirs with a low-flow V-notch assist in answering such questions as: (1) What is the water and sediment production of north coast watersheds that have been undisturbed for many years?; (2) How are water yield, water quality, flood peaks, and stream sedimentation affected by current road-building and logging practices?; and (3) What changes take place in the channel after logging, and how do these changes affect fish and their habitat?