

FIFTH PROGRESS REPORT, 1967

COOPERATIVE WATERSHED MANAGEMENT RESEARCH

FLOOD AND SEDIMENT REDUCTION
IN THE CONIFER ZONE OF CALIFORNIA

by

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PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION

in cooperation with the

STATE OF CALIFORNIA

Department of Water Resources

And

Department of Conservation, Division of Forestry

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INTRODUCTION

Cooperative Watershed Management research in the Lower Conifer Zone of California started in 1961. Research in the Lower Conifer Zone was designed to obtain information and develop principles about the effect of land management in the Zone upon water quality, floods and sedimentation, water timing, and water yield. The research was conducted by the Pacific Southwest Forest and Range Experiment Station of the U. S. Forest Service with the cooperation of the State of California, Department of Water Resources, and the Division of Forestry. In 1965, the Station entered into a cooperative agreement with the Humboldt State College for joint research on the Caspar Creek Study.

In early 1966, the orientation of the Project's research was modified to give added emphasis to problems associated with floods and sedimentation. Studies concerning water yield which were under way, however, are being continued to a logical point of termination.

The current research effort of the Project has been enhanced a great deal through cooperative agreements with several agencies. The State of California, Department of Water resources has provided funds and technical guidance for the conduct of all phases, of the project's research program. The Department of Conservation, Division of Forestry at Jackson State Forest conducts the field work for Caspar Creek study. The East Bay Municipal Utilities District provides the use of their land for portions of the study of mass soil movement. The University of California at Berkeley provides computer facilities and technical guidance.

Since 1961, the research has been jointly funded by the Department of Water Resources and the Forest Service. A general curtailment of the Project's research was necessary during F.Y. 1968 due to a 75 percent reduction in the State's financial contribution. As a result of this cut-back in funds, it has not been possible to prepare a detailed technical report of the Project's research as we have in previous years. In July 1967, it was mutually decided that the reduced State to funds would be used primarily to finance the research on soil moisture storage and depletion which was underway at the Challenge Experimental Forest. Consequently, the emphasis of this report is on that phase of the research. However, a brief statement of progress is included for the research on mass soil movement and the Caspar Creek study.

As in the past; the research findings will be published in technical journals. When these publications become available, they will be furnished to the State.

EFFECT OF LOGGING ON STREAMFLOW, SEDIMENTATION, AND FISH HABITAT

In 1962 the California Division of Forestry, the California Department of Water Resources, and the Experiment Station entered into a cooperative agreement. This agreement involves the joint study of two experimental watersheds in second-growth redwood-Douglas-fir forest type located on the Jackson State Forest near Fort Bragg, California. The area is under intensive management by the Division of Forestry. The purpose of the study is to develop quantitative data on the impact of road building and logging on California's north coast watersheds.

The watershed pair consists of the north and south forks of Caspar Creek which flows into the Pacific Ocean about 5 miles south of Fort Bragg. Each watershed is roughly 1000 acres in size. Both support excellent stands of dense second-growth Douglas-fir and redwood timber varying in age from 65 to 80 years.

The north fork is the control watershed while the south fork will be logged. After a calibration period the major road system needed for logging was constructed in the south fork. After the impact of the road building operation is studied, the logging operation itself will be performed. Both operations are to be performed using the "best" knowledge of the side slope and streambank protection available through research and experience, consistent with logging economics.

Weir construction in each fork was completed in November 1962. These installations consist of continuous streamflow measuring equipment, suspended sediment sampling facilities (both hand and stage triggered), and provision for measuring changes in sediment bed-load collected behind the weir. Two recording and five non-recording rain gages have been installed throughout the watersheds. All of these records have been collected since 1962.

More recently, a photographic record of selected stations along the south fork has been kept, giving data which will be invaluable in the final analysis. All data collection has been handled by the Jackson State Forest personnel. The Station has provided the instrumentation and data processing needs.

In July 1965, the Station entered into a cooperative agreement with Humboldt State College to conduct research on the effects of roads and logging on the ecology of the Caspar Creek streams. Data collected since this time has included solar radiation, stream turbidity, type of stream bottom materials, and sampling of stream bottom and drift organisms.

The preliminary calibration period was ended by the road building operation which was carried out during the summer of 1967. The road building in the south fork was begun after a statistical study by Dr. Donald Seegrist (reported in the 1966 Progress Report) showed that records to that time demonstrated the feasibility of predicting the south fork's flow from the north fork control. Road building involved the main road near the canyon bottom and the major spurs.

The road building will. be followed by a four or five year "recalibration" period which will allow evaluation of the effect of the roads on streamflow sedimentation and fish habitat. Data of streamflow, precipitation, sedimentation, etc. will be collected as before. When statistical data indicate the new relationship between the forks (probably 4 or 5 years) the logging will be done. The last phase of the study will be the statistical evaluation of the effects of logging, followed by an evaluation of the post-logging recovery rate of the watershed.