

EFFECTS OF CLIMATE ON FLOW AND SEDIMENT TRANSPORT IN THE UPPER YUBA RIVER BASIN, NORTHERN SIERRA NEVADA

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Abstract: The Upper Yuba River basin is in a zone of the Sierra Nevada that is not reliably influenced by the major Pacific climate cycles (El Nino, La Nina, and the Pacific Decadal Oscillation), but which is expected to experience effects from future climate change. These effects will likely include increases in springtime temperatures, earlier snow melt, and associated increases in sediment transport. As part of CALFED's Upper Yuba River Studies to evaluate options for establishing salmonids above Englebright Dam, a flow and sediment transport model was developed for the Upper Yuba River watershed. This model was used to simulate the deposition of sediment in Englebright Lake for the 62 years since the dam was built. To evaluate the sensitivity of the hydrologic processes in the basin to differences in climate, simulated streamflow and transport of sediment from the watershed under the climate cycles that have occurred during the last 62 years were evaluated in light of the watershed management practices that took place in the early 1970's. The changes in the watershed due to installation of dams and diversions on the Middle Yuba River had a much larger influence on the simulated sediment loads than the climate cycles. The simulated flow and transport were also considered under a specified increase in annual-mean air temperatures representing future climate conditions. These simulations indicated that increases in mean annual and peak flows were negligible, as were changes in sediment loads. However, springtime snow melt and run off was initiated earlier in the season.