

DEVELOPMENT OF UPPER BOUNDARY CONDITIONS FOR A WATERSHED MODEL IN THE UPPER YUBA RIVER BASIN, NORTHERN SIERRA NEVADA

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Abstract: A flow and sediment transport model was developed for the Upper Yuba River watershed as part of CALFED's Upper Yuba River Studies Program to evaluate options for establishing salmonids above Englebright Dam. This model was used to simulate the deposition of sediment in Englebright Lake for the 62 years since the dam was built. The upper boundary conditions were developed using sparse data (1 to 45 meteorological stations came in and went out of operation between 1941 and 2003). Point measurements of daily precipitation and minimum and maximum air temperature were spatially distributed throughout the watershed using gradient plus inverse distance squared calculations and a digital elevation model. In addition, solar radiation and potential evapotranspiration were modeled for the watershed, including the influence of clouds. A simple procedure was used to develop 15-minute precipitation data, which was adjusted by iteration to match peak flows during the day. Dew point temperature was assumed to equal the minimum daily temperature and wind was taken to be constant over the site from the single wind station in the area. By associating the upper boundary conditions with a digital elevation model we could use that information to develop the hydrologic response units in the watershed model (using the code HSPF; Hydrologic Simulation Program--FORTRAN) and easily extrapolate the boundary conditions to the developed hydrologic response units.