Estimating Two Decades of Flow Data with Three Year Hydrologic Models

Kenneth McCune[1], Stephen Adams[2], Brian Bledsoe[2], Raphael Mazor[1], Ashmita Sengupta[1], Eric Stein[1]

[1]*Southern California Coastal Water Research Project, Costa Mesa, CA*

[2]*Colorado State University, Fort Collins, CO*

Abstract

Hydrologic models can be useful for predicting changes in flow regime as a factor of watershed characteristics or alteration, but calibrating these models relies on the availability of recorded flow data over a target temporal range. In order to assess the accuracy of predicting flow for an extending range of data, USGS hourly discharge data were used to develop HEC-HMS hydrologic models of Southern California watersheds, which were calibrated for a three year period then used to predict 23 years of flow. A three year calibration period (water year 2005 to 2007) was selected based on the representation of a wet, normal and dry year, from 1990 to 2010 in the South Coast Region of California. The parameters used to calibrate HEC-HMS models for a three year period produced 23 year models with acceptable Nash-Sutcliffe efficiency. Temporal resolution was also a factor in model accuracy, as hourly precipitation data yielded models with significantly higher Nash-Sut cliffe efficiency than those produced using daily precipitation data. Incomplete flow records can make it difficult to understand the long term variability in the flow regime of a watershed. Long term flow data can be estimated using HEC-HMS models calibrated with shorter data sets, given that hourly precipitation data are available for the long term period and short term models are representative of long term trends in precipitation.