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# Evaluating HSPF runoff and water quality predictions at multiple time and spatial scales

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## ABSTRACT

Watershed models are widely used to describe runoff dynamics and associated pollutant loadings, but are rarely tested for accuracy. This study evaluates the accuracy of the Hydrological Simulation Program - FORTRAN (HSPF) model for predicting concentrations and loads of total suspended solids, copper, and fecal bacteria in Ballona Creek, an arid, highly-impervious, urban watershed with dynamic flows that can increase by three within an hour due to stormwater runoff. The model was calibrated by collecting data at sub-hourly intervals from small homogeneous land use sites and then validated with sub-hourly data collected at an instream site that received cumulative discharges from 74% of the watershed. Validation data were collected for seven storms ranging from one-half to three times the median storm size. The average storm load prediction error for hydrology was 24% with bias of only -1%. The error rate was higher for the constituents, but in all cases less than twice the error for hydrology. Predictions for constituent concentration at any time within the storm were generally within 75% of measured, though mistiming of the hydrograph led to overpredictions of constituents in the early part of two of the validation storms. The study's results suggest that constituent modeling is feasible even on short time scales and that the greatest gains in future model refinement will come from improving the hydrological component of the model. Constituent predictions would also be improved by a better approximation of the way in which runoff dynamics are partitioned between particulate and dissolved phases.

## Full Text

ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/AnnualReports/2005_06AnnualReport/AR0506_293-304.pdf