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A Retrospective Analysis of Model Uncertainty for Forecasting Hydrologic Change

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Abstract: GIS-based hydrologic modeling offers a convenient means of assessing the impacts associated with land-cover/use change for environmental planning efforts. Alternative future scenarios can be used as input to hydrologic models and compared with existing conditions to evaluate potential environmental impacts as part of this process. Model error, however, can be significant and potentially compounded when projecting future land-cover/use change and management conditions. To address this problem we have utilized repeat observations of land cover/use as a proxy for projected future conditions. A systematic analysis of model efficiency during simulations based on observed land-cover/use change is used to quantify error associated with simulations for a series of known “future” landscape conditions over a 24-year period. Calibrated and uncalibrated assessments of relative change over different lengths of time are also presented to determine the types of information that can reliably be used in planning efforts for which calibration is not possible.

Keywords: Hydrologic modeling; Uncertainty; Forecasting; Alternative futures.

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