CHARACTERIZING UNCERTAINTY IN UPSTREAM REGULATION ACTIONS FOR OPERATIONAL ENSEMBLE STREAMFLOW PREDICTION

by
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Abstract

The proposed work addresses NOAA Strategic Plan goal: *Serve society's needs for weather and water information*, with focus on improved water information through hydrologic forecasts for better decision making pertaining to water. The proposed research models influences of upstream regulation and its uncertainty to ensemble streamflow prediction (ESP) at downstream points and to downstream water resources management activities for basins regulated by large reservoirs. The methodology will be demonstrated through two case studies to be decided as part of the first task of this project. Suitable candidates are identified on the western slope of the Sierra Nevada. The project is proposed as a collaborative effort between the Hydrologic Research Center, Professor Aris P. Georgakakos (consultant for this proposal), Staff of the Office of Hydrologic Development Hydrology Laboratory (OHD/HL) of the National Weather Service (NWS), and the California Nevada River Forecast Center (CNRFC) of the NWS.

The methodology consists of the following tasks: *(1)* Selection of application case studies that involve upstream regulation and a downstream forecast point where ESP is applied, and development of a database for the project; *(2)* Organization of and participation in meetings with upstream regulation agencies for information gathering; *(3)* Formulation of a parametric model of upstream regulation and use of historical data to estimate model regulation parameters, β, and model simulation uncertainty (includes parametric and model structure uncertainty); *(4)* Incorporation of upstream regulation model and associated uncertainty within ESP procedure for the case studies; *(5)* Assessing the impact of upstream regulation uncertainty on the ESP at the case study forecast point *and* on the regulation of a downstream large reservoir facility through retrospective runs with historical data; *(6)* Project Final Report and development of recommendations for the operational application of the approach within the NWS operational procedures.

Significant prior involvement of the proposers with the candidate case studies through the INFORM Demonstration Project of Northern California has developed several modeling components already that will be used to facilitate and expedite the development proposed. In addition, the integrated nature of the INFORM components with CNRFC operational procedures will facilitate later transition of the developed components for probabilistic upstream regulation to operations.