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Proposed Contribution: River Basin Decisions Support Systems Experience

Water resource systems require decisions at time scales varying from minutes in loading hydroelectric generating units to weeks and months for reservoir operations. At shorter time scales these decisions are based on deterministic analyses. At longer time scales allowances for uncertainty may be intuitive - primarily coloured by recent experience, or based on hydrologic ensembles. In some applications hydrologic ensembles are developed from initial hydrologic conditions and historical weather data – more commonly the ensembles are based solely on records of river discharge.

Computer based decision support systems that use ensembles of unregulated local inflows consider each member of an ensemble to be equally likely. The members are input to simulation or optimization routines that model the operating constraints and objectives and provide information that supports actual decisions. Many years of actual experience with reservoir operations have shown that optimization with inputs of ensemble conditional forecasts based on initial hydrologic conditions can provide marginally improved operating decisions.

A common bottom line question among water resource system managers is, “What is the value of a decision support system”. Ensemble forecast are often an input to such computer systems but their benefits are not obvious because of the relative importance of uncertainties and the multitude of institutional and physical constraints on operation. The utility of ensemble forecasts can be estimated by reconstructing and optimizing at each step in the actual operating history of a water resources system. This can be a tedious process unless the decision support software was designed initially for such a test.