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**EXPLORING SYSTEM-WIDE ALTERNATIVES OF DAM OPERATIONS TO ACHIEVE ENVIRONMENTAL  
BENEFITS IN THE CONNECTICUT RIVER**

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**ABSTRACT:** The Nature Conservancy, U.S. Army Corps of Engineers, University of Massachusetts, and the U.S. Geological Survey have partnered to examine the role of dam operations on altered hydrology in the Connecticut River watershed. Specifically, alternative scenarios of system-wide dam management are being explored to naturalize river flows and improve aquatic and riparian biodiversity while continuing to provide flood control, water supply, and hydropower generation. Over 3,000 dams have been identified in the Connecticut River basin, and a system-wide approach is needed to understand interactions between dam operations and ultimate effects on river flows and river-dependent communities. We are developing a set of basin-wide hydrologic models including (1) a regression-based approach to generate unregulated river flows, (2) modifications to the unregulated flow model to predict flows under climate change scenarios, (3) a rule-based dam operations model (HEC-ResSim), and (4) a goal-based optimization model. The models will provide unregulated, current, and alternative (under various dam operations and climate change scenarios) daily flow time series at sites throughout the basin, including dams and sites of conservation interest, such as floodplain forests or mussel beds. We will pair this hydrologic information with ecological information of river-dependent species and communities to develop flow restoration scenarios that will improve ecological conditions, be functional at a system-wide scale, and provide for human water management needs. These technical efforts will create a decision support tool to help guide dam operations throughout the watershed and inform enhanced stewardship of the water and ecological resources of the Connecticut River.

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