Dworshak Dam-Storage Optimization - Improving Power Generation with Historic and Climate Change Hydrology

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Abstract. As U.S. energy consumption continues to increase and construction of new infrastructure is costly and becoming more difficult, therefore new methods must be evaluated in order to maximize energy production from current infrastructure. Dynamic programming (DP) has proven to be useful in updating operational policies for improved power generation while still meeting other operational constraints. In this analysis, a generalized dynamic programming model, CSUDP, was utilized to evaluate energy production due to monthly operations at Dworshak Dam in north central Idaho. Based on both historic and climate change hydrologic input data the results of the DP modeling indicates that energy production can be increased up to 10 percent from the observed generation while still meeting other project purposes. In addition, operations at Dworshak Dam were evaluated with expanded generation capacity. Modeling with expanded generation capacity showed a substantial increase in energy production and predicted a beneficial balancing of particular climate varying streamflow predictions. Even though benefits of dynamic programming have been shown to improve power generation from current infrastructure at minimal cost, actual operations may not change for years or at all because doing so will require a paradigm shift for many reservoir managers.