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RESERVOIR OPERATION AND HYDROPOWER DEVELOPMENT UNDER CLIMATE VARIABILITY SCENARIOS

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ABSTRACT: According to the Interlaboratory Working Group, advanced hydropower technologies are needed to improve upon available techniques for producing hydropower. The improvements include increasing hydropower generation and other operational efficiencies, especially by optimizing the use of water. Their report highlights the need to minimize or eliminate adverse environmental impacts on water quality, the aquatic species, and downstream water levels. As the United States develops a comprehensive energy policy, it is safe to assume that hydropower production will play a significant role in any strategic energy initiatives. Hydropower production is a very attractive sustainable and renewable energy alternative with relatively minimal negative environmental impact. Therefore the impact hydropower in a ;green"; era of sustainable energy development could be significant. In the last few years the need for energy independence and the reduction of greenhouse gases have led to the addition (or at least consideration) of increasing amounts of wind and solar energy sources. Research objectives include:
(i) The impact of climate variability on the water system and particularly in regard to hydropower production. This will investigate the role of variability in climate and river flow for sustainable reservoir operations. Additionally, many of the world's major rivers, including the Colorado, have seen reduced flows over the past 50 years. The reduced inflows to the Colorado River in recent years is placing enormous stress on the water managers in their ability to provide reliable water supply to satisfy all competing constituencies and has resulted in complex new operating policies
(ii) The development of adaptive operational models for multi-purpose reservoir systems under climate change scenarios
(iii) Exploration of the performance of operational models under extreme conditions that may be exacerbated by climate change conditions. This work may seek to develop methods to generate flood scenarios under changing climate and models which will complement the stationary Probable Maximum Flood (PMF) estimates currently used to account for the impact of climate change on dam/reservoir performance.

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