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Paula L. Rees et al.

University of Massachusetts - Amherst

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Climate Change Impacts on Water Resources in the Northeast

Paula L. Rees, Sarah Dörner, Russell Adams, and David A. Ahlfeld, University of Massachusetts, Amherst, MA; John Kochendorfer, NOAA National Weather Service, Silver Spring, MD

ABSTRACT

Water supply in the NE depends upon the availability of adequate water flows and the replenishment of storage reservoirs. Under a changing climate, provision of adequate water supplies may be threatened by reduced flows in certain seasons and by diminished replenishment of stored water over many seasons. The threat to a particular water supply system depends upon the source of water used and the capacity of the particular system for responding to change. Other impacts of a changing climate are likely to include an increase in extreme weather events. For example, future projections from climate models indicate there will be a worldwide increase in both the intensity and frequency of heavy rainfall events with implications for flooding and erosion. Such events may have a profound effect on water quality, including waterborne disease outbreaks, increased delivery of non-point source contaminants, and salt water intrusion into drinking water intakes and/or groundwater. This study aims first to summarize the existing body of research related to concerns about water resources, water supply, and potential impacts of natural disasters under a warmer climate in the northeast. As a case study, vulnerability of the water supply system for the city of Boston and surrounding communities will next be explored. The source water for the city of Boston is comprised mainly of three watersheds located in western and central Massachusetts: the Quabbin Reservoir (Swift River) watershed, the Ware River watershed and the Wachusett Reservoir (Nashua River) watershed. The total watershed area is approximately 1010 km². While vulnerability of this system has been studied by other researchers, this study is based on the published results of current Global Climate Models (GCMs), which use more complex scenarios of greenhouse gas emissions than previous studies. In addition, this study seeks to expand prior work by looking at the potential impacts of a changing climate on water quality in the reservoir system.

Author Contact Information:

Paula L. Rees

rees@ecs.umass.edu