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Planning for the Impacts of Climate Change on Municipal Water Supplies

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ABSTRACT

During the past two decades, the impact of climate change on municipal water supply systems has emerged as an important and active area of research. The most recent finding of the IPCC concludes that there has been a change in climate. Among the many impacts that are expected to occur, those associated with water resources are felt to be among the most important. Current planning paradigms suggest that integrated water resources planning (IWRP) is the most appropriate approach to defining water supply needs and availability. IWRP defines a holistic approach to the management of water systems combining water supply, water demand, water quality, environmental protection and enhancement, rate structures, financial planning, and public participation. There are a variety of ways in which IWRP can incorporate climate change into water supply evaluations. These approaches range from very simple to extremely complex. Because most IWRP is long-range in nature, it is extremely important that such plans acknowledge the potential impacts of climate change and develop contingencies for coping with climate change. Four approaches for incorporating climate change into evaluating system performance are presented in this paper. These approaches range from simple modification of historic streamflow records to incorporation of the results of global circulation models. These approaches are characterized as: 1) detailed evaluations of past extreme events, 2) development regional climate change characteristics of meteorology, 3) development regional climate change characteristics of hydrology, and 4) D]development of comprehensive regional climate change assessments. There are uncertainties in the outputs of all of the approaches that must be addressed and quantified to the extent possible. Uncertainties associated with evaluating water supplies in the absence of climate change provide a frame of reference for the uncertainties associated with climate change. This paper describes all of these approaches and provides examples of their application to water supply systems in the Pacific Northwest. The relative impacts of climate change on water supply performance is also compared to other challenges faced by water supply utilities including evaluating future demands, changes in service area and changes in environmental requirements.

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