Municipal/Industrial Water Breakout Session

Prepared by Jennifer Kay, Joe Casola, Amy Snover, and the Climate Impacts Group (CIG) at the University of Washington for King County's October 27, 2005 Climate Change Conference.

Projections for the next century suggest climate change will have important impacts on Washington State's economy and natural resources. In order to both control the costs and maximize the benefits of a changing climate, we must begin preparing now. To stimulate discussion in this session, we summarize projected climate impacts from the conference white paper, enumerate previously suggested adaptation strategies, and provide case studies to illustrate planning techniques, vulnerabilities, and/or opportunities.

Summary of projected climate change impacts on water supplies

Changes in the annual patterns of streamflow.

Projected changes in the timing and volume of streamflow are elevation dependent. For transient and snow-melt dominated basins, projected climate change would increase winter streamflow and shift peak streamflows to earlier in the spring. This could result in more incidences of low streamflow in the summer and make it more difficult to fulfill summer demands for consumptive water use and in-stream flows.

Credit: Seattle Public Utilities

Chester Morse Reservoir, Cedar River Watershed

Adaptation discussion starters

Guiding principles for planning:

1. Recognize that the past may no longer be a reliable guide to the future.
2. Integrate climate change projections into all planning processes.
3. Monitor regional climate and resources for ongoing change.
4. Expect surprises. Design policies and management practices to be flexible to changing conditions.

Could these strategies help Washington prepare for change?

Adjust reservoir operations for a changing climate. Understand basin-specific vulnerability to climate change and manage accordingly.

Encourage conservation. For example: provide incentives for purchase and use of high efficiency plumbing, appliances and irrigation systems; support outreach programs and advertising to promote conservation.

Use market forces to reduce demand during critical periods. For example: use demand response incentives to pay people to not use water during shortages; increase the cost of water during shortages.

Connect and expand water infrastructure. For example: connect regional water systems; diversify sources of water supply including groundwater; increase usable storage (including surface water storage, off-stream storage, and aquifer storage and recovery).

Support technical innovations. For example: develop advanced wastewater treatment and reuse; assess potential for desalinization through reverse osmosis.

Encourage flexibility in water allocation using water banks, water pools, and water markets.

Sources: 1) Hamlet, A. F., Preparing for Climate Change in the Pacific Northwest: A Discussion of Water Resources Adaptation Pathways. Preparatory White Paper for Climate and Water Policy Meeting, Skamania, Washington, July 2001.
2) Snover, A., Miles, E. and B. Henry, OSTP/USGCRP Regional Workshop of the Impacts of Global Climate Change on the Pacific Northwest Annex D, NOAA Climate and Global Change Program, Special Report Number 11, 1997.

Planning case study - Seattle Public Utilities Climate Change Study: Seattle Public Utilities and the University of Washington's Dept. of Civil Engineering explored the potential impacts of climate change on Seattle's Seattle's Cedar and Tolt River water supplies.[3] Assuming the amount of water demanded by the system remains constant at present levels, their results indicate the watersheds' combined reservoir inflow from June – September would fall at an average rate of 6% per decade through 2040.

[3]Wiley, M.W. (2004). "Analysis Techniques to Incorporate Climate Change Information into Seattle's Long Range Water Supply Planning," Master's thesis, University of Washington. 214 pp.

Planning case study – Lake Tapps Municipal Water Supply Project: The Cascade Water Alliance has plans to develop Lake Tapps as the primary municipal water supply for the urban areas East of Seattle. The White River, the river that supplies water to Lake Tapps, is a snow/glacier-melt dominated system. Climate change may result in earlier snow melt, reduced glacier extent, and decreased summer water supply. As a result, a recent study[1] found summer water competition between municipal water supply, recreation, and in-stream flow requirements for fish could be worse in a warmer climate.

[1]Ball, J.A. (2004). "Impacts of Climate Change on the Proposed Lake Tapps-White River Water Supply," Master's thesis, University of Washington, 55 pp.

Planning case study - Portland Public Utilities Climate Change Study: A study of the Bull Run watershed (Portland, Oregon)[2] found that while population growth has the largest impact on future water demand, climate change influences both water supply and customer demand. By 2040, climate change impacts on Portland's water supply system could be half those of regional population growth alone. As a result, Portland must find additional capacity to offset changes in hydrology and demand to meet the typical 98% reliability standard.

[2]Palmer, R.N., and M. A. Hahn. 2002. The Impacts of Climate Change on Portland's Water Supply: An Investigation of Potential Hydrologic and Management Impacts on the Bull Run System. Report prepared for the Portland Water Bureau, University of Washington, Seattle. 139 pp.

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