

The Future Ain't What It Used To Be: Problem Definition in the Municipal Water Supply Sector

Global Climate Change and Its Potential Effects on Seattle's Water Supply

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Context

- Water utilities manage now for variability, climate change may amplify variability
- Every water system is different,
 - SPU
 - surface water supplies
 - reservoirs on two rivers in two basins
 - Tacoma
 - combination of surface and ground water
 - reservoir managed by ACOE
- SPU's key responsibilities:
 - drinking water supply
 - habitat protection / instream flow management
 - flood protection

Understanding Impacts

Need to understand effects on water supply and demand

- Components of supply:
 - precipitation, snow, reservoir storage, system operations
- Components of demand:
 - weather, elasticity of demand, demand management

Understanding Impacts: Top Down vs. Bottom Up Approaches

Climate Change and
Water Resources:

*A Primer for Municipal
Water Providers*

By Kathleen A. Miller and David Yates,
National Center for Atmospheric Research
2005

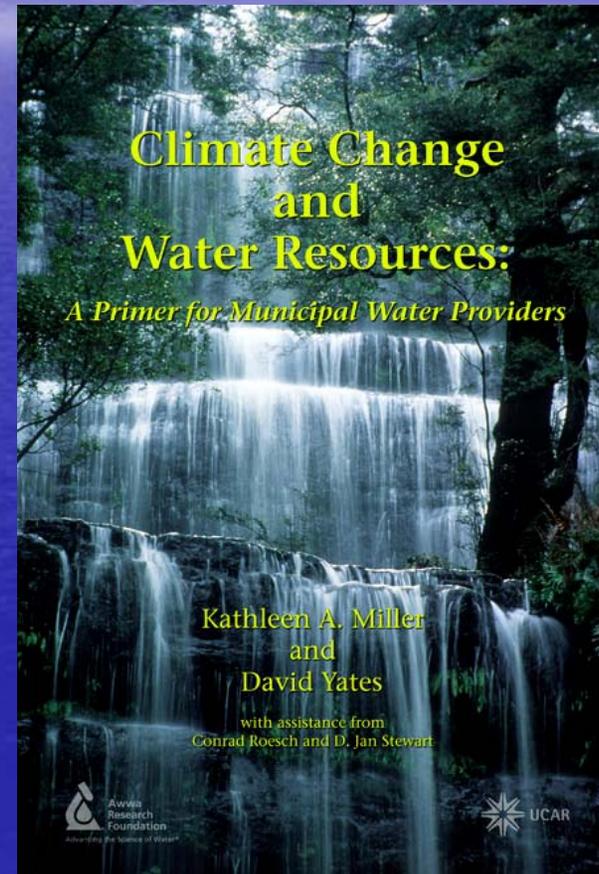


Image Credit: Kathleen A. Miller and David Yates

Understanding Impacts

Top down:

Emissions

Climate

Water

Assessment of impacts & adaptation options

Utility impacts

Change in
Resource

Vulnerabilities

Bottom up:

Image Credit: Kathleen A. Miller and David Yates

Climate Change Research: Top Down Approach

- Focus on “downscaling” Global Climate Models (GCMs) to regional scale
- UW CIG – SPU study and other research suggest the following potential impacts
 - increase in temperature, although possible cooler summers in Seattle!
 - decrease in snowpack, earlier meltoff
 - lower inflows spring and summer

Climate Change Research: Top Down Approach

- Not enough known about impacts on other key components:
 - precipitation (timing and amount)
 - how changes in operations can dampen / manage variability

Climate Change Research: Bottom Up Approach

- Identify system vulnerabilities
 - key SPU vulnerability: timing of fall rains
 - critical for replenishing reservoirs, providing flows for fisheries habitat, managing flood protection
- Insufficient research on precipitation and timing

Climate Change Adaptation: Bottom Up Approach

- NCAR report: focus on flexibility, not on one scenario
- Actively manage system to test inherent flexibility of system
- Develop management options that enhance flexibility and resiliency of supply system

Climate Change Adaptation: Managing for Variability – Winter '05

- Lowest snowpack on record
- 2nd driest winter on record
- Drought declared by Gov., water supply advisory declared by Mayor

Climate Change Adaptation: Managing for Variability – Winter '05

- **Network of sensors** - SPU relies on extensive network of sensors to provide real time data
- **Models** - data incorporated into models that guide operation of system
- **Operational adjustments** - based on existing conditions & forecasts, low likelihood of flood, stored more water in January
- **Increased communications** – internally/externally
- Returned to normal supply by mid-year

Climate Change Impacts: Research and Adaptation

- Top down research approach to downscale and frame scenarios of impacts
- Bottom up approach to identify system vulnerabilities
- Adaptively manage system to test water supply and demand components
- Invest in system flexibility and resiliency

Seattle Public Utilities

*Managing Our Water Supply
in Step with a Changing Climate*



Image Credit: Seattle Public Utilities