American Water Resources Association
2009 ANNUAL WATER RESOURCES CONFERENCE
November 9-12, 2009
Seattle, WA

Wednesday, Nov. 11
8:30 AM – 10:00 AM
SESSION 36: Policy and Climate Change

Adapting Water Resources Management to Climate Change: The Role of State Public Trust Doctrines - Robin Craig, Florida State University College of Law, Tallahassee, FL

The public trust doctrine is a common-law doctrine that protects public rights in water -- historically, the rights of navigation, fishing, and commerce. In the West, many of the challenges that climate change poses to water resources, aquatic ecosystems, and water supply are exacerbated by the western states' adoption of the prior appropriation system of water law, based on a "first in time, first in right" construction of water rights. This system is well known for draining western rivers and streams dry. Nevertheless, most western states, including those in the Pacific Northwest, have used the power of the common law to make their public trust doctrines more protective of water resources, both by extending the doctrine to the water itself and, in an increasing number of states, by extending the doctrine to ecological protections. This talk will discuss the potential role of state public trust doctrines in the West in climate change adaptation. It argues that common-law flexibility provides states with one mechanism for balancing water rights and the more public values of water resources, such as ecosystems and ecosystem services.

Are You Looking Forward to a Water-Constrained Future? – Jim Scholl, Malcolm Pirnie, Lansing, MI (co-authors: Craig Clifton, Carl Daamen, Suse Hayes, Greg Hoxley, John Sherwood)

Recent land use change in some parts of south-east Australia has transformed the agricultural landscape. Broadacre grazing has been displaced by grain and oilseed cropping, intensively managed dairy operations, vineyard development and ‘new forests’ (including industrial and farm forestry plantations and environmental plantings). The quantum and rapidity of these changes —particularly the development of new industrial forestry plantations— are proving to be a massive challenge to the integrity of state policy for consumptive water entitlements and environmental water allocations. The other major threat to water access in this region is climate change. Unlike land use change, its influence will extend across landscapes and will not be confined to ‘hot spot’ watersheds in which development is concentrated. Median climate change projections for this region are for rainfall to decline by 2-10% by 2070. However, observed rainfall in the region over the last decade has declined by 10 to 15% compared with the baseline period for climate change projections. During the same period, streamflows have declined by 40-50%. Although rainfall remains within the expected range of climate variability, streamflows have fallen to record low levels. This paper draws on the experience of two studies that considered the hydrological implications of recent and projected land use and climate change. Water balance modelling was used to examine how surface flows and groundwater recharge might change in response to land use change, natural interdecadal climate variability and human-induced climate change. Existing consumptive and environmental uses of water were found to be severely threatened by all three. Concerns about projected climate change and dry conditions over the past decade have prompted state and national governments to seriously consider how to secure future water supplies. Water resource planning and control over land uses and other actions which intercept streamflows (e.g. forestry plantations, farm dams) are the main tactics being deployed. In light of the results of our studies, our paper will consider the likely effectiveness of these actions and other options to manage what appears to be a highly water constrained future.

Potential Economic Costs of a Business-as-Usual Approach to Climate Change: Implications for Water Resources in Three Western States - Mark Buckley, ECONorthwest, Portland, OR (co-authors: Sarah Reich, Cleo Neculae)

Extensive research shows that western states already have experienced noticeable changes in climate and predicts that more change will occur in the future. Much of this change imposes negative economic consequences. In response, communities and businesses are considering actions that would reduce greenhouse gases contributing to climate change. Amid all this activity, many have concluded such actions should not be undertaken because their costs are too great. They reach this conclusion, however, without first seeing what the costs of not taking these actions would be.

We estimated some of the potential costs three western states, Oregon, Washington, and New Mexico, might incur over the next decades if they, the U.S., and other countries continued to behave in a business-as-usual manner. Under the business-as-usual assumption, families maintain today's consumption patterns, businesses continue producing products similar to their current ones, and communities follow current behaviors to organize land-use, transportation, and other activities. Our estimates represent costs that might materialize if climate change is not reined in, not a forecast of how things will actually unfold.

Some of the costs relate directly to the impacts of climate change on water resources in the three states. Increased stream temperatures would reduce salmon and trout populations and decrease opportunities for cold-water recreation. Increased temperatures and changes in precipitation may reduce water levels and opportunities of reservoir recreation in some years.

Reduced water supplies during the warm months would affect agricultural production in the Yakima River basin and the Rio Grande Valley. Changes in temperatures and precipitation patterns would reduce annual flows in New Mexico. Indirect effects on water resources could materialize as changes in climate and increases in demand for water.

Our findings show that failure to act to curb climate change imposes significant costs on the residents of the three states. These costs could be even greater in light of new scientific research that shows future increases in air temperature due to climate change may be much higher than previously thought.

Tap Runs Dry: Managing Urban Water Supply Now and in the Future in Canada - Grace Koshida, Environment Canada, Toronto, ON, Canada (co-authors: Erin Stratton, Joan Klaassen ,Marci Vanhoucke, Sadia Butt)

The 2007 IPCC assessment concluded that increased risk of drought will likely occur under future climate change. Urban drought (a type of socioeconomic drought) occurs when there is an adverse change in the urban water balance between supply and use. Recent events such as the water crisis that occurred in Tofino, British Columbia in 2006 and Georgia in 2007 highlight how the viability of water supplies in normally water-abundant communities can be negatively impacted by severe drought conditions. The "Tap Runs Dry" project identifies and recommends some adaptive options that could be used to extend the coping range and decrease the vulnerability of Canadian municipalities to future droughts and water supply shortages under climate change. This project focuses on evaluating temporal changes in urban drought impacts and adaptive responses. Southern Ontario, which contains approximately one-third of Canada's population of 32 million, was chosen as the study region. Responses taken by water management organizations in some of Southern Ontario's larger municipalities to deal with water shortages are documented for four severe droughts that occurred from 1988 to 2005. An inventory of water-related adaptations was created to identify both planned and reactive as well as short-term and long-term measures that were used as the droughts progressed. Typical responses to urban drought are to either decrease water demand and/or increase water supply. The vulnerability of communities to urban drought is affected by the water source used (i.e., Great Lakes, groundwater, river, combination of water sources), and other factors such as population growth, suburban sprawl, local capacity, and changing water demands by all users. Typical drought risk management and responses at the local level include monitoring of drought conditions and municipal water supplies, drought planning and preparedness (Ontario Low Water Response), and water conservation programs (components include staged non-essential water use, by-law enforcement and appropriate public education initiatives). Some challenges regarding the selection of appropriate indicators of urban drought impacts are identified. Sustainable long-term water supply plans (e.g., 50 years) should include provisions for projected climate change impacts on hydrology, water supply, and drought. Several long-term water supply plans for Southern Ontario are assessed.