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Energy Production and Water Use: Preparing for a Drier Future

Alex Bayee Besong

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Energy Production and Water Use: Preparing for a Drier Future

rado water rights and riparian landowners. Kemper noted that non-profit environmental organizations are not leading the Public Trust Doctrine movement in Colorado, as they have in other states. Instead, Kemper identified Richard Hamilton and Phil Doe as the two individuals who have been the proponents and sponsors of the ballot initiatives throughout the last two decades. Kemper highlighted Doe's statement that "we will stay with this until we win."

In 2012, Hamilton and Doe submitted another Public Trust Doctrine ballot initiative that eventually fell short of the minimum signature requirement. Although every attempt by these individuals has failed to get an initiative on the ballot, Kemper stressed that there needs to be a more sustained opposition to these initiatives. Hamilton and Doe's determination and persistence suggest there will be future initiative submissions. Therefore, the CWC Board created the Special Project to provide permanent opposition to the initiatives. The Special Project strives to create more public outreach and to provide information about the potential negative effects of these initiatives on water rights holders within the state. The Special Project also serves as a forum for parties across the state to discuss important water issues.

Steve Leonhardt spoke next, explaining in further detail the potential effect of the Public Trust Doctrine ballot initiatives. The Public Trust Doctrine essentially imposes a duty on the state to administer water rights without encroaching on the public's right to water. The extent of this public right varies based on each state's interpretation of the Doctrine. California's Public Trust Doctrine (currently the most expansive state doctrine) includes fishing, navigation, and even environmental needs as public uses of water. Leonhardt explained the proposed initiative from 2012 would be stronger than the California version, because it would apply to all waters in Colorado, not just "navigable" waters. The Special Project is still in its early stages, but more information is available at the newly revamped CWC webpage: www.cowatercongress.org.

Joseph Norris

**22ND ANNUAL ROCKY MOUNTAIN LAND USE INSTITUTE
CONFERENCE: LAND USE FOR A LIFETIME, CHANGING
DEMOGRAPHICS AND SHIFTING PRIORITIES**

Denver, Colorado March 8, 2013

ENERGY PRODUCTION & WATER USE: PREPARING FOR A DRIER FUTURE

Alice Madden of the University of Colorado, Denver moderated a discussion on water consumption planning in a drought environment at the Annual Rocky Mountain Land Use Institute Conference. She described an increase in populations across the West and charged the panelists with explaining how states could engage in water resource planning.

John Stulp, Director of the Interbasin Compact Committee and Colorado Special Policy Advisor to the Governor for Water, opened the discussion by describing water availability in Colorado and the state's planning process. Stulp explained Colorado is experiencing a significant drought, with the state in an arid D4 drought condition, which is the most severe level of drought as identi-

fied by the US Department of Agriculture and their partners, who produce the Drought Monitor.

He further explained, because approximately eighty percent of Colorado's population lives on the eastern side of the state, and twenty percent of the population lives on the western side, the state diverts water from the west to the east. Further, Colorado must allow a specified amount of water to reach downstream states to comply with interstate water agreements. Stulp noted two out of every three gallons of water in Colorado go to out-of-state users. Yet these out-of-state users have never forced Colorado to curtail water rights in the ninety years since the enacting the interstate agreements. However, with climate change and extreme drought negatively affecting its water supplies, Colorado may have to curtail water rights. Stulp explained agriculture uses eighty-six percent of water in Colorado, municipalities and industry use twelve percent, and self-supplied industrial users consume only two percent. Stulp further noted that between fourteen thousand and fifteen thousand acre-feet of water go toward hydraulic fracturing processes in Colorado.

Stulp went on to give overview of the Interbasin Compact Committee Reports, which were based on the 2010 Statewide Water Supply Initiative. Even with proposed projects that may make additional water available to users, Stulp explained Colorado will nonetheless experience an annual 390,000 acre-foot shortfall. Stulp noted the Colorado Water Conservation Board ("CWCB") considered several water availability scenarios in preparing the reports. The CWCB's main recommendation was to minimize the effects of "buy and dry," where (generally municipal) water purchasers obtain water supplies from agricultural users and "dry out" that land. CWCB also recommended increased conservation efforts, while maintaining non-consumptive water allocations for tourism and recreation.

Kristen Averyt, Associate Director for Science at the Cooperative Institute for Research in Environmental Sciences ("CIRES"), spoke next. Her presentation concerned the energy-water nexus and specifically focused on electricity generation and water use. Averyt noted, in the United States, generating electricity accounts for forty one percent of all water withdrawals. Industry withdraws the water primarily to run and cool power plants. Averyt explained the electricity sector is the only energy sector where water needs are actually growing nationally and internationally.

Notably, thirteen percent of energy produced in the US is used to clean, convey, and pump water. In California, water-related energy uses consume about twenty percent of the electricity supply. These water-related uses consume much of the energy by moving, conveying, and storing water. Averyt then explained power plants are the primary contributor to thermal pollution in the country. Additionally, in some areas, electricity withdrawals account for more than ninety percent of all water withdrawals in the municipality. In the Lower Colorado and Rio Grande regions, power plants primarily use groundwater and recycled water, due to the scarcity of surface water.

Averyt further noted water availability from the Colorado River is expected to decline by ten to fifteen percent over the next forty years. Averyt projected a twenty to thirty percent increase in water stress, based on current power plant demand for water, and electricity generation is vulnerable to water

shortage. Last, Averyt presented research on how low-carbon energy production impacts water use. She explained that producing energy under a carbon budget might mean a 1.5-2 million acre-foot increase in the monthly average volume of water available for storage in Lakes Mead and Powell. At the current coal-to-natural-gas-production ratios, Averyt projected a net decline of two million acre-feet in water available for storage in both Lakes over the next forty years. Averyt further noted low-carbon energy productions means states would preserve more water in groundwater aquifers.

Amelia Nuding, Water and Energy Analyst at Western Resource Advocates, next discussed managing energy and water during drought in the West. Specifically, she presented research on how power plants use energy during a drought. Nuding noted several of the challenges facing electricity generators include insufficient water resources, degraded water quality, and high water temperatures not suitable for power plant processes.

Nuding further highlighted case studies demonstrating how several states have reacted to drought. In one case study, Texas risked losing roughly 3,000 megawatts of electricity due to lack of water. Texas responded by bringing power plants back online to supplement the existing energy supply. Texas also had to curtail 1,200 water rights to manage the problem (primarily senior agricultural rights).

Nuding then presented additional research focusing on the impact of drought in the West on power generation mixes. The study postulated that, due to the drought, coal production will decrease; natural gas production will increase; hydroelectric production will decrease; renewable energy production will stay the same; electricity prices will increase; and carbon dioxide emissions will increase, primarily due to the drop in hydroelectric power.

Nuding also outlined a three-fold approach to dealing with a drought environment: (i) utilities need to share more information on water use and water intensity with their respective states; (ii) communities need to realize the value of water and the opportunity costs of using water; and (iii) society must recognize the risk of drought and the impact drought has on energy production. Nuding concluded by noting most energy companies and water commissions run their water conservation programs independently. She argued, because there may be opportunities for synergies in combining water conservation efforts, utilities and water commissions should integrate their conservation programs.

The panelists concluded by acknowledging that, as population increases, the need for energy increases. Therefore, communities need to find more efficient ways to use water in the production of energy.

Alex Bayee Besong

PLANNING FOR EXTREME DROUGHT: HOW COMMUNITIES ARE THINKING ABOUT AND PLANNING FOR EXTREME DROUGHT

The recent drought conditions throughout much of the West have forced some local and state officials toward the cutting edge of planning and adapting to extreme drought. Water resource management in extreme drought has significant implications to municipal, industrial, and agricultural water and land