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Planning for Extreme Drought: How Communities are Thinking About and Planning for Extreme Drought

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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

uses. Many Colorado municipalities are proactively developing water resource management programs, like the Water Infrastructure and Supply Efficiency project ("WISE"), to ensure their constituents will have the water they need. Alex Davis, Principal of GBSM, a Denver-based consulting and public affairs firm, and Eric Hecox, Executive Director of South Metro Water Authority, which is based in Greenwood Village, Colorado, jointly focused their presentation on how communities think about and plan for extreme drought.

Alex Davis first presented a brief background on Western water law before talking specifically about the prior appropriation doctrine. Davis argued that, while the doctrine of prior appropriation has worked well in the West for the first century of its existence, it is now a problem. Specifically, Davis contended that the prior appropriation system is the single most overarching problem in the West inhibiting efficient planning for the next century, and meaningful solutions to our generation's complex water problems. Today, Davis argued, planning is ad hoc and splintered, thereby driving the decision-making processes down to the smallest entity. Then, each entity is pitted against every other water user in the basin or state. In other words, prior appropriation sets municipalities against municipalities; energy users against farmers; and other water users against one another.

Davis then noted the West is full of competing uses for a severely limited water supply. Currently, water supplies do not meet water demands in Colorado. The Western Slope provides eighty percent of the state's water, but only twenty percent of the population resides there; conversely, the Front Range has twenty percent of the water, but eighty percent of the population. On rivers like the South Platte, the general calling date is between 1865 and 1869. Therefore, Davis contended, the South Platte River has been over-allocated for more than one hundred years. Many other basins are also already over-allocated, so she posed the question of how we are supposed to plan for population increases in the future.

Davis explained that Planners project Colorado's population will double by 2050, increasing to five million people or more. Further, eighty percent of this population will live on the Front Range, resulting in increased demands on agriculture, energy, food, and the environment. When individuals on average use one hundred gallons of water per day to supply basic needs, five hundred gallons of water per day in food, and five hundred gallons per day in energy, communities and water planners must think holistically when it comes to conservation.

Davis said one major challenge for Planners is climate change, because scientists do not yet know how it will impact water availability. Likely climate change impacts include the potential for temperatures rising 2.5 to four degrees; a five to twenty percent reduction in water availability; and Colorado could see reduced snowpack, but also more intense rainstorms and earlier spring runoff. In short, water supply planning will become more complex.

Davis concluded by suggesting the best solutions are local in nature. There is no way the federal government can determine the best solution for the St. Vrain River, for example, as the nuances of the local governments, communities, and attitudes differ greatly on the local level. In other words, Davis contended the phrase "think globally and act locally" applies to water planning.

Davis stated that while she did not have all of the answers to the problems, communities must think about how planners create the structures to promote regional collaboration, thinking, and solutions.

Eric Hecox spoke next, describing specific local decisions that attempted to drought-proof Colorado municipalities along the Front Range. Hecox first described the South Metro Water Supply Authority (“SMWSA”), a membership organization of fifteen water providers in the South Metro area of Denver. These entities are normally pitted against each other, but are bound together by one need—all of these entities rely on the groundwater supply in a declining aquifer. That reality forced them to come together to develop alternatives, as they need the economies of scale to make water projects financially viable. SMWSA developed regional renewable water projects to use the Denver Basin Aquifer. While using the aquifer as a base supply remains a liability, it gives the region a competitive advantage against the state.

Hecox explained that, in 2002, water planning changed for many communities in Colorado. The 2002 drought year was the single worst drought on record in the state until last year (2012). The 2002 drought was a wake-up call for many state water providers. The City of Aurora was one of the hardest hit cities because it has a junior water right. Aurora implemented extreme drought restrictions, and was within months of running out of water before a late spring blizzard occurred. The drought scared Aurora into developing the Prairie Waters Project downstream of the Denver Metro Wastewater Plant. Essentially, the Prairie Waters Project became a very large reuse project with a capacity of 10,000 acre-feet per year, expandable to 50,000 acre-feet with additional infrastructure. The project includes a thirty-four mile pipeline with three pump stations, and a multi-barrier state-of-the-art treatment process. In total, the Prairie Waters Project’s infrastructure cost eight hundred million dollars. Despite the cost, Aurora conceived, planned, and built the Prairie Waters Project in less than ten years.

Hecox then explained the Prairie Waters Project created a WISE Partnership between the cities of Denver, Aurora, and the SMWSA. WISE creates a secondary water supply system to mitigate droughts for the Front Range. Aurora also incorporated a cost-sharing mechanism into the expensive project. SMWSA also benefits from a renewable water supply. This WISE Partnership impacts over two million people.

In addition to the local partnership benefits, Hecox believes the WISE Partnership also has regional benefits. Denver, Aurora, and SMWSA are in a partnership. This project builds regional cooperation and recognizes the complex relationships that exist within the Region. Further, this opens the door to regional cooperation and provides a sustainable supply to SMWSA without compromising Aurora or Denver’s water supplies. Through this project, several of the largest cities in Colorado hope to better cope with future drought.

In sum, as continued drought and lack of water plagues agriculture, municipalities, and the energy industry, local water entities are becoming increasingly aware of their need to plan for the future. By following the example of the WISE Partnership, perhaps other communities can also work together to overcome the biggest challenge—facilitating cooperation among many disparate

water users to solve the complex problems of water resource management.

Amy Wegner Kho

THE COLORADO RIVER: INTERGOVERNMENTAL AGREEMENTS

As part of its three-day annual conference, the Rocky Mountain Land Use Institute hosted a discussion on recent developments in Colorado River use. The discussion focused on the unique and sometimes competing land use interests in Colorado that can pit interests on one side of the Continental Divide against interests on the other side.

“The Colorado River: Intergovernmental Agreements” specifically focused on the 2011 Colorado River Cooperative Agreement (“CRCA”), which brought together Western Slope and Front Range parties in an effort to settle ongoing conflicts and also consider cooperative conservation efforts. Eric Kuhn, General Manager of the Colorado River Water Conservation District (“CRWCD”), outlined the general Western Slope view. Covering fifteen counties, CRWCD is one of Colorado’s four major conservation districts (their respective boundaries defined by a specific water basin). According to Kuhn, as the conservation district of the Colorado River Basin, CRWCD strives to conserve water in the basin, protect statewide interests, and promote responsible development on both sides of the Divide. Tom Gougeon, a member of Denver Water’s five-person Board of Water Commissioners, joined Kuhn and represented the Front Range (and more specifically Denver) view.

Mr. Kuhn began by describing how land use policy inextricably links to water use and conservation. For the Western Slope, encouraging settlement and agricultural development requires extensive irrigation and access improvements. From at least the 1930s, the Bureau of Reclamation has played a vital role in creating more arable land and encouraging agriculture on the Western Slope.

But as Western Slope irrigation projects took shape and grew under the auspices of the Bureau of Reclamation, Denver continued to grow and strain its own water supply from the South Platte system. Denver and the Front Range had similar goals in agriculture and irrigation as the Western Slope, but Denver’s large population growth forced the city to look beyond the South Platte to supply its residents. As a solution, Denver turned to the Colorado River Basin and constructed transbasin water infrastructure to supply the burgeoning Denver population.

The decision to turn to the Colorado River was predictable: 80% of the state’s population lives along the Front Range, but about 80% of the state’s water flows west and away from Denver by the Colorado River and its tributaries. As Kuhn noted, major projects bringing Western Slope water to the Front Range, including the Moffatt System on the Fraser River and Dillon Reservoir on the Blue River, pull water from headwater streams. Kuhn also explained that projects on the Fraser River and the Blue River are just “one pass” from the Front Range (Berthoud and Loveland Passes, respectively) making them Denver’s most accessible options.