Meeting Report

Colorado Regional Freshwater Forum:
Exploring Colorado’s Solutions to a National Challenge

October 18, 2011
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Introduction

On October 18, 2011, nearly 100 participants representing diverse interests gathered for the Charting New Waters Colorado Regional Freshwater Forum at the Denver Botanic Gardens. The Forum brought together water experts and stakeholders from Colorado and other regions to explore Colorado’s experience developing solutions to a selected set of complex freshwater challenges. The discussions centered on how solution-oriented efforts in the state can inform freshwater problem solving in other regions of the United States, and how experience from other regions can add value to the ongoing work in Colorado. The Colorado Regional Freshwater Forum was the first of three forums seeking to highlight innovative freshwater solutions and share them among leaders in different regions of the United States, and with federal decision makers.¹

The regional forums are the latest phase of work for Charting New Waters, a network of organizations organized by The Johnson Foundation at Wingspread and dedicated to catalyzing new solutions to U.S. freshwater challenges. Nearly 400 stakeholders and experts have participated in Charting New Waters since it began in 2008, including voices from business, agriculture, academia, environmental organizations, and local, state, and federal governments. The initial phase of work led to the release of Charting New Waters: A Call to Action to Address U.S. Freshwater Challenges, a consensus report issued on September 15, 2010. Since then, more than 85 organizations have publicly committed to improving U.S. freshwater resources by advancing the principles and recommendations of the Call to Action. (The consensus report can be downloaded at www.johnsonfdn.org/chartingnewwaters.org.)

Meeting Overview

Lynn Broaddus, Director of the Environment Program for The Johnson Foundation at Wingspread, welcomed participants and provided background about the Foundation, Charting New Waters, and the genesis of the Colorado Freshwater Forum. She explained that Charting New Waters seeks a new path for freshwater management through innovative, integrated freshwater solutions that are grounded in collaborative problem solving and cut across traditional boundaries. Integrated policy and management solutions along with innovative, co-beneficial strategies and outcomes are the hallmarks of the new course Charting New Waters sees for freshwater management and resources in the United States. Example recommendations from the Call to Action highlighted by Ms. Broaddus included coordination among federal, state, and local governments and other sectors of society; streamlined and effective

¹ See Appendix A for the Colorado Regional Freshwater Forum meeting agenda, Appendix B for speaker biographies, and Appendix C for the participant list.
regulation and enforcement; convening a national-scale commission to outline solutions to U.S. freshwater challenges; improving accounting and reporting mechanisms to better understand the true value of freshwater resources; and increasing public understanding of freshwater challenges and solutions.

After consultations with Colorado experts and stakeholders, the following key freshwater challenges were selected to be the focus of the Colorado Regional Freshwater Forum agenda:

- Balancing agricultural, municipal, industrial, and environmental water needs;
- Enhancing water conservation through improved efficiency; and
- Gaining traction on the water/energy nexus.

During the Forum, each of these topics was addressed by a panel featuring Colorado leaders who characterized key dimensions of the freshwater challenge and described emerging or successful solution strategies, followed by outside experts who reflected on the same issues and introduced models and lessons learned from strategies used in other regions. Each session concluded with an interactive discussion among the panelists and replies to audience questions and comments.

To gather more robust input from Forum participants, all attendees were offered an opportunity to provide additional thoughts via a web-based survey immediately following the meeting. Approximately 40 percent of the nearly 100 participants responded to this survey. Themes and highlights from both the day’s discussion and the survey results are integrated into this summary.

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2 See Appendix D for the post-forum survey questions.
Panel Highlights

Balancing Agricultural, Municipal, Industrial, and Environmental Water Needs

With a growing human population and a looming water-supply gap on Colorado’s Front Range posing serious water-supply challenges, stakeholders across Colorado are striving to develop innovative strategies to balance agricultural, municipal, industrial, and environmental water needs. Most have deemed the status quo of “buy and dry” unacceptable. (“Buy and dry” refers to purchasing agricultural water rights and transferring water away from farmland and ranchland to other uses.) Local food security, rural economic viability, and environmental degradation are key concerns. The first session of the Forum explored strategies Colorado stakeholders are devising or implementing to ensure adequate long-term water supplies for agricultural, municipal, industrial, and environmental water needs, as well as innovative water-sharing strategies from other U.S. regions that could be applicable in Colorado.

The following key recommended actions emerged from this session:

- Collaborate with unconventional partners in sectors competing for water supplies to identify multiple-benefit solutions.
- Devise mutually beneficial alternatives to traditional agriculture-to-municipal water transfers.
- Acknowledge the value of, and attend to, all water uses.
- Identify underlying stakeholder interests and acceptable tradeoffs that enable durable water-sharing solutions.
- Implement pilot projects to demonstrate multiple-benefit water management solutions.
- Be persistent in building relationships with key stakeholders and decision makers.

Colorado Perspectives

Patrick O’Toole, President of the Family Farm Alliance and the owner and operator of Ladder Ranch on the Colorado/Wyoming border north of Steamboat Springs, introduced the panel. Mr. O’Toole emphasized that the challenge of balancing water needs among competing uses in the West continues to get more complex. Farmers and ranchers are striving to produce food for a growing population, even as the water demands of municipalities and energy development are putting greater pressure on limited supplies. Often the complexity of Western water law and competing water needs deters stakeholders from seeking collaborative solutions, but finding creative ways to balance those needs is critical to solving present and future water-supply challenges. Mr. O’Toole’s Ladder Ranch offers an example of an integrated fishery and irrigation system that has created both a viable agricultural operation and an outdoor recreation business.³ In this case, traditional irrigators collaborated with the U.S. Fish and Wildlife Service and Trout Unlimited to create a stretch of fish-passable stream that benefits from agricultural return flows.⁴

³ For more information about Ladder Ranch, see www.ladderranch.com.
Olen Lund, President of the Delta County Farm Bureau and representative to the Colorado Interbasin Compact Committee (IBCC) from the Gunnison Basin Roundtable, added that while agriculture is important to Colorado’s overall economy, it is particularly important to rural communities where it serves as a stabilizing force relative to boom-and-bust industries such as energy resource development. Adequate water is necessary to support these industries, as well as the environment and quality of life on the Western slope, where former desert valleys now host riparian habitat because of irrigation. The connection between water quality and water quantity is also significant in the area. Mr. Lund described the work of the Gunnison Basin and Grand Valley Selenium Task Forces, which represent a long-term collaborative effort among irrigators, environmentalists, and local, state, and federal agencies in the Lower Gunnison River Basin and Grand Valley of Western Colorado. These task forces are working to ensure that in-stream flow is sufficient to dilute naturally occurring selenium and prevent adverse effects on fish and waterfowl.5

Gerald Knapp, Arkansas and Colorado River Basin Manager at Aurora Water, highlighted the importance of developing solutions to cope with short-term water-supply gaps (i.e., severe drought) as well as Colorado’s projected long-term municipal and industrial supply gap.6 Emerging strategies include leasing and fallowing agreements between agricultural producers and municipalities, and reducing agricultural water consumption through deficit irrigation programs to share available water supplies. Mr. Knapp cited the Aurora Water Continued Farming Program as an example; through this program, the city of Aurora, Colorado, invested funds to help farmers purchase and implement highly efficient irrigation technologies that allowed them to grow crops with less water than traditional irrigation methods. This enabled participating farmers to sell a portion of the conserved water back to the city while keeping their farms in agricultural production. The program demonstrated that it is possible to reduce on-farm consumptive use and make additional water available while increasing crop production.7

Peter Nichols – who is a Partner at Trout, Raley, Montaño, Witwer, & Freeman, P.C., the governor’s appointee to the IBCC, and co-chair of the IBCC’s Agriculture and New Supply Subcommittees – drew attention to the economic hardship and environmental problems that “buy and dry” can bring to rural communities, and he discussed water leasing as an alternative. Leasing does not work for all crops, because some perennials such as fruit trees and alfalfa cannot be allowed to fallow. However, with corn

5 For more information about the Gunnison Basin and Grand Valley Selenium Task Forces, see www.seleniumtaskforce.org.
and other rotational crops, it is possible for farmers to make water available to municipalities in fallow years. In 2008, farmers involved in the Lower Arkansas Valley Water Conservancy District incorporated the Super Ditch Company, which aims to be a bargaining agent for irrigators seeking to retain their water rights while helping meet the temporary water needs of municipalities. The approach of the Super Ditch Company is based on model leases that the Palo Verde Irrigation District in California’s Imperial Valley negotiated with the Metropolitan Water District of Southern California. It is a novel concept in Colorado, and a pilot program will be initiated in 2012.\(^8\)

**Outside Perspectives**

Sandy Denn – Vice President of the Glenn-Colusa Irrigation District in Northern California, Owner of Snow Goose Farms, and Board Member of the Family Farm Alliance – described ways in which she and others have collaborated with federal and state agencies and wildlife advocates to implement co-beneficial solutions on her rice farm near Willows, California. Snow Goose Farm is home to more than 200 species of birds, amphibians, reptiles, and other wildlife that naturally occur and live in rice fields, some of which are listed as endangered. The farm is also one of the pilot participants in the Sacramento Valley Migratory Bird Habitat Initiative (MBHI), which is sponsored by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service. The MBHI specifically targets growers in the Glenn-Colusa Irrigation District Service Area who have the ability to manage agricultural fields for resident and wintering shorebirds and waterfowl by managing water depth and timing requirements necessary to address the short- and long-term habitat goals of the species.\(^9\) Through collaborative problem solving, Ms. Denn said, it is possible for agriculture and endangered species to coexist and even be synergistic.

Steven Malloch, Senior Western Water Program Manager for the National Wildlife Federation in Seattle discussed his experience collaborating with diverse parties to address water-quantity challenges in the Yakima River Basin of Washington State. The Yakima River Basin Water Enhancement Project is an ongoing, integrated water resource management planning process that is bringing stakeholders together to develop co-beneficial solutions for balancing agricultural water supplies, in-stream flows, salmon habitat, and municipal water needs, as well as cope with climate change impacts.\(^10\) The current effort is cosponsored by the state of Washington and the U.S. Bureau of Reclamation and represents the latest chapter in 30 years of efforts to this end. The project goals include returning hundreds of thousands of salmon to the Yakima Basin and ensuring sustainable water supplies for families and farms. Three years into the collaborative process and with leadership from the governor’s office, stakeholders have outlined a balanced suite of solutions. These solutions enjoy unusually broad support, with environmental groups, including the National Wildlife Federation and American Rivers, supporting increased water storage, and agricultural water districts supporting fishery restoration and land acquisition and protection. Developing durable freshwater solutions, Mr. Malloch said, requires visionary leadership and willingness to accept tradeoffs that result in multiple benefits.

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\(^9\) For more information about the Sacramento Valley Migratory Bird Habitat Initiative, see [www.ca.nrcs.usda.gov/programs/whip](http://www.ca.nrcs.usda.gov/programs/whip).

Discussion and Survey Themes
Forum participants cited political challenges (such as entrenched positions), an inherent resistance to change, and inflammatory rhetoric as outstanding challenges that must be overcome to achieve transformative solutions. A number of survey respondents emphasized increased communication and cooperation among stakeholders and an openness to creative, win-win solutions as keys to balancing Colorado’s water needs. Both Forum participants and survey respondents indicated that the Basin Roundtable and IBCC processes are important mechanisms for fostering dialogue and building trust among diverse interests and examining Colorado’s freshwater challenges in a comprehensive, statewide manner. Some lamented the lack of concrete solutions that have resulted from the IBCC process after seven years. However, others emphasized that the state’s water challenges evolved over more than 150 years and will take many years to address. Participants recognized that Colorado does not have a history of solving water problems cooperatively and that persistence is crucial to forging the relationships required to catalyze breakthroughs. Generally, participants acknowledged the Basin Roundtables and IBCC as key vehicles for determining how to meet the state’s long-term water-supply needs, and supported sustaining them.

The Colorado Water Conservation Board’s Statewide Water Supply Initiative (SWSI) was noted as a key information platform for stakeholder deliberations. Yet some participants said that more robust data about how much water is being dedicated to various uses is needed, as are clear water-demand projections for emerging industrial activities such as oil shale development. A number of survey respondents highlighted agricultural water leasing and fallowing strategies as the most promising opportunity for balancing Colorado’s water needs. Some emphasized that Colorado water law, such as the requirement that all water rights decisions to go through state Water Court, needs adjustment to enable this type of cooperative arrangement. Municipal water conservation is seen as an important aspect of meeting future supply needs, but multiple respondents said that municipal conservation alone will not be sufficient. Improving agricultural water efficiency and leveraging ecosystem services were two opportunities that participants said deserve greater attention. A couple of respondents emphasized the need to ensure that environmental/in-stream flows are also attended to adequately in water-sharing agreements.

Among the key take-away messages from this panel were that devising and implementing strategies that “expand the pie” and generate multiple benefits will be essential to effectively balancing water supplies among competing uses. When stakeholders develop an understanding of one another’s values and why they disagree on certain issues, it often enables them to focus on problem solving based upon underlying

Balancing Agricultural, Municipal, Industrial, and Environmental Water Needs ~ Key Recommended Actions

- Collaborate with unconventional partners in sectors competing for water supplies to identify multiple-benefit solutions.
- Devise mutually beneficial alternatives to traditional agriculture-to-municipal water transfers.
- Acknowledge the value of, and attend to, all water uses.
- Identify underlying stakeholder interests and acceptable tradeoffs that enable durable water-sharing solutions.
- Implement pilot projects to demonstrate multiple-benefit water management solutions.
- Be persistent in building relationships with key stakeholders and decision makers.
interests instead of entrenched positions. Innovative, integrated solutions require strong leadership, good data, and constructive working relationships between people that may have previously considered themselves enemies. Learning from successful on-the-ground solutions can also help stimulate creative problem solving. Ultimately, it is important for water stakeholders, experts, and decision makers to recognize the need to manage water in a context-sensitive, place-based manner.

Enhancing Water Conservation through Improved Efficiency

Enhanced conservation and efficiency among water users – municipal and agricultural – must be a key element of Colorado’s overall strategy to meet long-term water-supply needs. However, the extent to which conservation and efficiency can close the supply gap and help to ensure supply for environmental water needs remains an open question. This Forum session explored strategies that Colorado stakeholders are implementing or devising to enhance water conservation and efficiency in the municipal and agricultural sectors; policies and legislative strategies aimed at increasing water conservation and efficiency in other U.S. regions that might be applicable in Colorado; and incentives that have been shown to motivate water users to seize opportunities for enhanced efficiency.

The following key recommended actions emerged from this session:

- Highlight interdependencies among water users as drivers for conservation.
- Facilitate water customers’ ability to implement water-conserving technologies and behaviors through the provision of understandable information and incentives.
- Promote the economic, environmental, and social benefits of water conservation to water customers and decision makers.
- Utilize water pricing in conjunction with other tactics to drive conservation.
- Create new incentives and eliminate disincentives for agricultural water conservation.
- Catalyze government action to move beyond the limits of existing conservation strategies.

Colorado Perspectives

Jennifer Gimbel, Director of the Colorado Water Conservation Board (CWCB), introduced the panel. Ms. Gimbel explained the roles that the CWCB, the IBCC, and the SWSI play in Colorado. The CWCB is a citizen board appointed by the governor and approved by the state senate, while the IBCC is a broader process that convenes representatives from every river basin in the state as well as independent representatives appointed by the governor. The SWSI provides a common technical platform for dialogue among diverse parties. These three components represent the core mechanisms for envisioning and planning the future of water in Colorado. Ms. Gimbel emphasized that participants in the IBCC process recognize that changes must be made to meet future water demand. The IBCC is developing a framework comprised of four complementary strategies to meet future supply needs: 1) alternative agricultural transfers; 2) new supply development; 3) identified projects and processes; and 4) conservation. ¹¹ Colorado has made great progress in recent years on conservation, she said, but experts

and stakeholders are not sure whether enough can be done to accommodate the state’s growing population over the long term.

Greg Fisher, Manager of Demand Planning for Denver Water, discussed a proposal to mandate low-flow toilets (1.28 gallons per flush instead of the current standard of 1.6 gallons) for all new construction and remodeling projects in Colorado. This proposal was voted down by the Water Resources Review Committee in the state legislature on October 17, 2011. Mr. Fisher expressed both disappointment and optimism about this outcome. Although the proposal failed, he said, the dialogue about conservation-oriented legislation has progressed enough that the proposal was supported by a broad base of stakeholders, including plumbers. He added that technology must be a critical component of conservation efforts, and utilities need to make it easy for customers to implement new fixtures and behaviors. Per capita water use has decreased in recent decades, demonstrating that it is possible for Colorado municipalities to use less water even as populations grow. Ultimately, water users throughout the state must recognize the interdependencies that exist between all sectors and regions, so that supply challenges can be addressed comprehensively.

Douglas Kenney, Director of the Western Water Policy Program at the University of Colorado School of Law, commented that in many respects Colorado is doing well on water planning. Regional planning through the IBCC has been a positive development, he said, with leadership on conservation coming from state agencies, utilities, and nongovernmental organizations. Colorado stakeholders now regularly discuss the implications of climate change for water planning. On the other hand, outstanding institutional challenges inhibit conservation efforts. Agricultural water conservation is underrepresented in the statewide dialogue, and it is still difficult to gain broad public buy-in for water conservation. In addition, water providers continue to compete based on a perception of unallocated supplies, and volume-based revenue models create disincentives for utilities to aggressively promote conservation. Decoupling revenues from the volume of water delivered is a promising policy solution, Mr. Kenney said, built upon models from the energy sector. The economic benefits and co-beneficial aspects of water conservation also need to be conveyed more effectively to water customers and decision makers. For instance, water conservation is substantially less expensive than building new supply projects, has no environmental impacts, and can help prevent “buy and dry.”

Reagan Waskom, Director of the Colorado Water Institute at Colorado State University, said that Colorado can conserve more water in the agricultural sector, but there are hindrances. Farms must produce food and remain profitable, he said, and transferring conserved agricultural water to other uses is difficult under Colorado water law. The system of water allocation based upon beneficial use and

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appropriation of return flows requires that conservation measures be assessed as to whether they injure downstream water rights – in other words, one water right cannot be enlarged at the expense of another. Aging, leaky infrastructure and inefficient irrigation is leading to water-quality problems and non-beneficial evaporation of water, but also generates ecosystem services such as wetlands and wildlife habitat, which some groups consider a positive outcome. Mr. Waskom pointed to a variety of technologies and practices available to conserve agricultural water – improved irrigation; efficient water delivery and application; reduction of evaporation, non-beneficial consumptive use, and crop consumptive use – but said Colorado is lagging behind the rest of the nation in applying these practices (see Figure 1). Colorado needs to draw on models from other Western states to reduce disincentives and create new incentives to promote agricultural water conservation, he said. For example, in California, Texas, Oregon, Idaho, and Utah, conservation has been codified as a beneficial use.

**Figure 1** Irrigation methods in Colorado compared to the rest of the United States

<table>
<thead>
<tr>
<th>Irrigation Method</th>
<th>Colorado</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>52%</td>
<td>39%</td>
</tr>
<tr>
<td>Sprinkler</td>
<td>47%</td>
<td>54%</td>
</tr>
<tr>
<td>Drip</td>
<td>&gt;1%</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Outside Perspectives**

Chuck Clarke, Chief Executive Officer of Cascade Water Alliance in Bellevue, Washington, said that cost-benefit analyses of conservation efforts tend to show economic advantages, with the value rising higher when environmental and social benefits are also considered (e.g., triple bottom line). As in Colorado, agriculture in Washington State is responsible for approximately 85 percent of consumptive water use. Since agriculture is such a significant user, and research shows that agricultural users will not or cannot compete if water prices escalate, it is critical to enhance on-farm water efficiency for Colorado to meet statewide conservation goals. However, policy makers must be attentive to potential unintended consequences of agricultural water efficiency, such as the elimination of ecosystem services that are linked to irrigation (e.g., wetland creation). Mr. Clark presented data showing that demand projections are rarely accurate, and he suggested that water planners utilize scenario planning to anticipate different outcomes. In Seattle, demand declined about 27 percent between 1975 and 2005, while population increased 25 percent. Other cities have seen the same trend of declining per capita water use. In examining this counterintuitive trend, Cascade Water Alliance determined that reduced demand could be attributed to a combination of conservation and optimization, mandatory utility conservation plans, and mandatory conservation programs can make a real difference in spite of population growth.

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14 This statement is based on price-elasticity data from Jeff Fulgham, former Chief Sustainability Officer at GE Power & Water, as presented by Mr. Clarke.
Mary Ann Dickinson, President and Chief Executive Officer of the Alliance for Water Efficiency (AWE) in Chicago, said that basic conservation programs have not evolved much over the past 20 years, and that we need the kind of transformational change in water conservation that we have seen in telecommunications. She drew a distinction between efficiency and conservation, stating that efficiency is primarily about technological improvements, while conservation is driven by behavior (i.e., how people use the technology). A primary focus of AWE is the integration of water conservation into utility system planning and water resources management. The AWE is also working to effect national and state policy that will recognize water-efficiency benefits the way that energy efficiency is rewarded. Growing awareness and attention to the water/energy nexus is helping to create opportunities for partnerships in that arena, Ms. Dickinson said. The AWE also focuses heavily on raising awareness about how individual consumers can help manage water resources, devising strategies to target outdoor water use as a significant opportunity to reduce residential water use. In addition, the Alliance is studying widespread revenue loss among water utilities to understand the range of variables at play. Ms. Dickinson urged Colorado participants to continue pushing conservation and efficiency efforts like the proposed statewide high-efficiency toilet legislation that was defeated in committee.

15 Graph provided by Chuck Clarke, Chief Executive Officer, Cascade Water Alliance. MGD stands for million gallons per day.
16 For more information about the Alliance for Water Efficiency, see www.allianceforwaterefficiency.org.
Discussion and Survey Themes
Several survey respondents indicated that revamped rate structures (i.e., tiered, variable, decoupling) and efficiency incentives (e.g., rebates), paired with concerted public education, are the most promising strategies for enhancing water conservation in all sectors. In Seattle and other cities, aggressive pricing has resulted in positive municipal and industrial conservation outcomes. However, this approach can cause consternation among customers when they are subjected to rising rates while consumption is going down. That is why water utilities generally need to do a better job explaining the long-term benefits of infrastructure and system investments that are financed through higher rates. To increase conservation in Colorado’s industrial sector, survey participants recommended water audit and reporting requirements and incentives for businesses that implement efficiencies. In addition, cost-saving recycling and re-use technologies being implemented by water-dependent industries should be highlighted more broadly.

A number of participants stressed that agricultural water efficiency has not yet been a significant point of discussion within the IBCC process and that Colorado can do more to make progress in the sector. Several acknowledged that it is a controversial and challenging topic, but one that stakeholders in the state must examine carefully in order to identify paths forward. Potential strategies include incentives for implementing high-efficiency technologies and practices and innovative systems for leasing conserved water. Crop substitution approaches, as well as programs that incentivize high-efficiency irrigation or leverage the synergies between agricultural water use and ecosystem services, also offer solution opportunities.

Several participants noted that agricultural efficiency is held back by the way in which the doctrine of prior appropriation is interpreted in Colorado water law, and that more work needs to be done to determine how to promote agricultural efficiency without injuring downstream users or effectively taking away farmers’ water rights. Some called for statewide dialogue to stimulate creative thinking about how to allow efficiency measures within the parameters of state statutes. The dialogue must be precise and account for differences in agricultural use from basin to basin. Sharpening the dialogue and ensuring that the agricultural sector will not be compromised will require careful crop-by-crop research and pilot studies to optimize yields with less water. The Colorado Water Institute is currently studying how to make sure adequate water remains available to agriculture while simultaneously increasing conservation in the sector. Ideally, new and innovative water-sharing systems and rules will strike a balance by which farmers are able profit from conserved water, while retaining their water rights.

Multiple participants suggested that water conservation in Colorado will not reach its full potential statewide without commitment from all sectors within the state, including the state government, municipal...
governments, and citizens. While incentives and voluntary actions are valuable, state legislation is necessary to set direction and effect major change. For example, utilities cannot change rate structures from a cost-of-service basis without legislative action or “policy with consequences.” A number of survey respondents supported legislation that mandates statewide manufacturing standards and/or plumbing codes for high-efficiency residential fixtures. Multiple respondents said municipal governments ought to focus on integrating land use and water planning and get more involved in facilitating behavioral change regarding landscaping and outdoor water use choices among residents. While Colorado water utilities are concerned about perceived “demand hardening,” substantially reducing lawn watering is unlikely to harden demand. Some thought concerns about demand hardening could be eased by setting aggressive but attainable conservation goals based on the experience of other industrialized nations, rather than comparing Colorado’s current water-use trends to past trends within the state. Ultimately, significant government action at the state and local level appears critical to moving beyond the limits of existing conservation programs.

Gaining Traction on the Water/Energy Nexus

Water needed for energy generation (e.g., power plant cooling) and energy needed for the transport, treatment, and distribution of water around the state both continue to grow. Meanwhile, expanding water demands and threats to water quality from natural gas and oil shale development are a concern in Colorado. This final Forum session explored the extent to which water and energy planning are integrated in Colorado; tools and strategies Colorado stakeholders are devising to address challenges at the water/energy nexus; and strategies and models from other regions of the United States that could be applicable to the water/energy nexus in Colorado.

The following key recommended actions emerged from this session:

- Foster opportunities for water and energy utility representatives to collaborate and build relationships.
- Develop a common vocabulary, compatible units of measurement, and shared modeling methods among the water and energy sectors.
- Establish a common methodology for water accounting and reporting across sectors.
- Utilize scenario planning to project the potential water costs of energy resource development and electricity generation, as well as the energy costs of long-range water resource plans.
- Factor the long-term water-supply needs of the energy sector into state and/or regional water plans.

Colorado Perspectives

Tom Iseman, Water Program Director at the Western Governors’ Association (WGA), introduced the panel. Mr. Iseman said that the WGA began engaging in work on the water/energy nexus in recent years because of the inextricable link between the two resources and the growing need to integrate water and

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17 The concept of demand hardening suggests that longterm conservation can reduce the water-savings potential for short-term demand management strategies during water shortages. For more information about demand hardening, see Flory, J.E., and T. Panella, Longterm Water Conservation & Shortage Management Practices: Planning that Includes Demand Hardening, (Tabors, Caramanis and Associates, 1994).
energy planning. The two key aspects of the nexus are the water used for energy resource development and energy generation, and the energy needed for treating, transporting, and distributing water. Cross-sector collaboration, better information and data, and adaptive management approaches are all critical to problem solving in this arena. The WGA is engaged with a range of water and energy experts through the Regional Transmission Expansion Planning (RTEP) project. RTEP is being led by the Western Electricity Coordinating Council and will examine how new electric generation and transmission may affect water scarcity in the West, and vice versa. The project has highlighted the need for the two sectors to develop a common vocabulary, as well as compatible units of measurement and shared modeling methods.

Stacy Tellinghuisen, Senior Energy/Water Policy Analyst with Western Resource Advocates (WRA), noted recent developments in Colorado that indicate growing awareness and attention to the water/energy nexus. The state’s original 2004 renewable energy standard (RES) stated the water benefits of renewable energy, and Xcel Energy’s 2007 RES Resource Plan, which included a high percentage of renewable energy, was approved by the Public Utilities Commission (PUC) in part because of the projected water savings. Xcel has also committed to taking 900 MW of coal-fired units offline, which will save more than 5,000 acre-feet of water per year in the Denver metro area. Ms. Tellinghuisen said that additional steps that can be taken in the energy sector include the development of metrics to project the long-term value of water being allocated to new power plants, and assessment of the risk to energy generation capacity associated with drought (utilities and customers). In January 2011, WRA released a report entitled *Every Drop Counts: Valuing the Water Used to Generate Electricity*, examining how utilities and planners value water. Water utilities do not normally account for energy requirements in their long-range resource plans, but there are opportunities to better understand the projected energy costs associated with different supply scenarios.

Alexandra Davis, Assistant Director for Water for the Colorado Department of Natural Resources (DNR), cited the progress being made on tools for integrating energy and water planning through the RTEP project, but said Colorado’s statewide supply scenarios do not have an adequate understanding of energy-related water demand. For example, the DNR knows how much water is typically required to hydraulically fracture an oil well, but does not know how many wells will be drilled. Because water rights

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18 For more information about the Regional Transmission Expansion Planning project, see: [http://www.wecc.biz/PLANNING/TRANSMISSIONEXPANSION/RTEP/Pages/default.aspx](http://www.wecc.biz/PLANNING/TRANSMISSIONEXPANSION/RTEP/Pages/default.aspx).
21 Ms. Davis has since left her position with the Colorado DNR and is now a water attorney at the firm of Vranesh and Raisch, LLP, in Boulder, Colorado.
are privately held in Colorado, farmers and cities are able to sell their water directly to energy companies, which could have significant supply implications in some areas. As energy development ramps up, municipalities may be forced to compete with energy companies for water. As demand becomes more acute, tradeoffs will become more difficult. Colorado needs a vision for how to balance current and future water demands, Ms. Davis said, as well as flexible and effective decision-making processes that will allow for adaptive solutions as energy development challenges evolve over time.

Randy Rhodes, Senior Water Resources Analyst for Xcel Energy, explained that the utility provides electricity to customers in Colorado, Michigan, Minnesota, New Mexico, North Dakota, South Dakota, Texas, and Wisconsin. Xcel’s operating companies include Northern States Power Company of Minnesota, Northern States Power Company of Wisconsin, Public Service Company of Colorado, and Southwestern Public Service Co. Xcel is the leading provider of wind-generated energy in the United States and has taken steps to reduce water consumption at its more conventional generation plants. Southwestern Public Service Co. pioneered the re-use of treated wastewater effluent as cooling water. Xcel is also converting a number of plant units from coal-fired combustion to gas combined cycle systems, which increase plant efficiency and have ancillary benefits for water consumption. The utility also has several plants that feature zero water discharge. Mr. Rhodes said that Xcel seeks cost-effective, mutually beneficial water-supply arrangements with municipalities and agricultural water users.

Outside Perspectives
Carey King, Research Associate at the University of Texas at Austin’s Center for International Energy and Environmental Policy, said that both energy and water efficiency must be improved in a variety of energy generation and development processes to support greater overall resilience. In Texas, planners for new power plants must increasingly consider dry cooling systems, to reduce pressure on surface and groundwater withdrawals. At the same time, Dr. King said, many of the energy resources being developed today (e.g., oil sands, shale oil, and gas) are marginal and of lower quality, while having higher associated water and energy costs. He reinforced the need for common units and standards of measurement for data collection on water withdrawals and/or consumption in the energy sector. Water footprinting is an emerging tool for tracking consumption and driving improved efficiency, but no standard methodology has yet been established. Dr. King suggested that too much focus on water footprinting of products and processes can take away from the larger issue of water resources management at the basin scale. We must be careful to avoid foreseeable but unintended consequences of placing restrictions on the water footprint of a product or life cycle. For example, placing an upper limit on the irrigated water footprint of biofuels might simply cause farmers to move biofuel feedstocks from irrigated to rain-fed cropland, while displacing food crops to irrigated land, with no discernible net environmental or water conservation benefit.

Ken Moraff, Deputy Director of the Office of Ecosystem Protection for U.S. Environmental Protection Agency (EPA) Region 1 in Boston, discussed efforts aimed at reducing the energy consumption of drinking water and wastewater treatment plants, which are typically significant users of energy in New England. Some plants have reduced energy use by up to one-third of previous levels. The EPA’s Region 1 is spearheading the development of a new, practical tool to assess the water/energy implications and other potential consequences associated with freshwater solutions. The tool is being designed to enable
lay users to model the potential impacts of different interventions using a variety of indicators. It will be publicly available and allow policy makers to see the likely impacts of different solution scenarios and adjust variables until they identify a holistic approach that balances a full array of environmental, economic, and social outcomes. For example, it may illustrate how more-stringent nutrient-control requirements can lead to increased energy intensity in water treatment. Ultimately, the EPA’s goal is to enable more integrated decision making that reduces unintended consequences and results in durable solutions.

**Discussion and Survey Themes**

Colorado is beginning to gain some traction on the water/energy nexus, and opportunities exist for agencies and utilities to make progress. Integrating water and energy is an emerging topic within the IBCC process in Colorado, yet there is a need for more direction setting from state agency leaders that encourages staff to experiment with adaptive management approaches to address the issue. Xcel has taken positive steps toward reducing overall water consumption at its generating stations, and is collaborating with Aurora Water to assess and improve the energy efficiency of Aurora’s pumping and treatment systems. In most cases, however, factors such as power transmission and fuel transportation are of greater concern to electric utilities than water consumption when siting new facilities. This is because water is generally a relatively small cost to the utility. Multiple survey respondents cited the Colorado Public Utilities Commission’s new requirement (as of August 2010) that energy providers report annually on the water intensity of their generating stations as an encouraging development. Several also pointed to the expansion of renewable energy, especially wind power, as a key way to save water in the energy sector.

Scenario planning and modeling tools such as the one being developed by the EPA’s Region 1 help break down assumptions and facilitate stakeholders’ ability to move beyond rhetoric and toward constructive problem solving. The WGA collaboration with the Western Electricity Coordinating Council and other parties is working in a similar vein, aiming to integrate water-supply costs and constraints into long-range energy-planning scenarios. The IBCC has also had success using scenario planning on certain topics, as it allows stakeholders to work from a common set of data. Several survey respondents said that, in addition to tools to inform the development of new policy, the public needs to be better educated about the relationship between water and energy.

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22 Explanation of the Aurora Water partnership with Xcel Energy obtained via personal communication with Richard Vidmar, Senior Resources Engineer, Aurora Water, December 8, 2011.

The water demands and potential impacts of hydraulic fracturing in oil and gas development, as well as possible oil shale development, are emerging challenges in Colorado. Public concern centers primarily on water quality, but the water quantity needs of hydraulic fracturing may exacerbate availability concerns in water-stressed areas. Stakeholders across sectors recognize the need to quantify the long-term water-supply demands of the energy sector so that they may be factored into ongoing efforts to balance consumptive and non-consumptive water needs in the state. Rules requiring the disclosure of fracturing fluid composition are important steps forward regarding water quality, but water consumption data is also critical. Potential water-quality impacts demand careful scientific scrutiny, including the use of methods such as baseline water testing and tracers that can track the migration of fracturing fluid in the subsurface. Hydraulic fracturing regulations and policies must be tailored to the geology of Colorado, or any particular state.

**Charting New Waters: A Call to Action to Address U.S. Freshwater Challenges ~ Summary of Recommendations**

- Improve the coordination of management across scales and sectors.
- Enhance the effectiveness of existing regulatory tools.
- Promote efficient, environmentally wise water management, use, and delivery.
- Ensure that decision making is based on sound science and data.
- Employ a long-range, adaptive approach to planning and management.
- Account for the full cost of water, and invest in sustainable water infrastructure.
- Educate the public about challenges and solutions.
- Develop and validate methods for freshwater ecosystem services markets.

**Conclusion: Messages from Colorado**

The Charting New Waters regional forums aim to highlight and transfer knowledge about innovative solutions that may be replicable or instructive across regions. It is clear that Colorado is facing a host of complex, multi-faceted freshwater challenges that demand integrated solutions. The solution opportunities discussed at the Charting New Waters Colorado Regional Freshwater Forum can help to inform leaders in other regions who are working to balance intense, competing water-supply demands, push conservation and efficiency efforts to the next level, or get a practical handle on the various dimensions of the water/energy nexus. Examples presented by Forum panelists illustrate that it is possible to find co-beneficial solutions to these challenges if stakeholders work together to develop mutually acceptable strategies.

Colorado is making headway on the challenges explored during the Forum, but important work remains. Alternative water-transfer strategies are gaining momentum in Colorado, and opportunities exist for enhanced agricultural water efficiency. However, the doctrine of prior appropriation seems to be inhibiting the implementation of both strategies and may require adjustments for them to become truly viable long-term solutions. Municipal and industrial water conservation and efficiency efforts could benefit from state or even federal legislative action on water-efficiency standards, while looking to other nations for attainable conservation benchmarks may help ease concerns about demand hardening. Municipal and industrial conservation strategies seem to be more replicable across different U.S. locales than agricultural conservation strategies, because many water utilities face similar challenges in terms of cost recovery and rate setting, system optimization, and consumer education. In the agricultural sector, by contrast, the diversity of landscapes, crops,
irrigation practices, as well as differences between Western and Eastern water law, point to a greater need for context-sensitive solutions. The water/energy nexus, which is an emerging issue nationally, is climbing the agenda of Colorado’s IBCC process, while the Western Governors’ Association is seeking to foster integration between the energy and water sectors through regional work on the Regional Transmission Expansion Planning project, and the Colorado PUC is requiring electric utilities to report water use.

Another key objective of the Charting New Waters regional forum series is to ground truth the principles and recommendations captured in the September 2010 Call to Action and elevate reinforcing or complementary messages that emerge from explorations of freshwater challenges and solutions in different regions of the United States. Colorado Regional Forum participants conveyed the following principles and recommendations specifically for the consideration of federal decision makers. Because water is ultimately a local issue, federal agencies should allow states and municipalities to take the lead on implementing solutions, while serving as active and supportive partners. It is critical to recognize that while some solution strategies may be transferable, they must be tailored to local environmental, economic, and social variables – i.e., one size does not fit all. Furthermore, incentives are better drivers of change than regulations, and innovative pilot projects are important incremental steps toward broader change.

Participants suggested the following specific federal actions that could help Colorado and other Western states balance competing water needs:

- Allocate adequate funding for water conservation programs such as the EPA’s WaterSense program and initiatives of the USDA Natural Resources Conservation Service;
- Establish a national water-efficiency standard for appliances and plumbing fixtures;
- Eliminate subsidies that indirectly promote excessive water use;
- Streamline regulatory processes to expedite development of new water-supply projects; and
- Increase funding for the development of water-supply infrastructure.

Striking a balance among agricultural, municipal, industrial, and environmental water needs in the important headwaters state of Colorado will require ongoing commitment to dialogue and negotiation among key stakeholders in all sectors. Building personal relationships and trust, and employing practical scenario planning tools, can help people move beyond assumptions and rhetoric and toward collaborative problem solving. According to many participants, the Colorado Regional Freshwater Forum helped demonstrate the value of open information sharing and knowledge transfer between local and outside experts, and reinforced the virtue of collaboration among diverse interests.
Objectives

- Discuss how Colorado’s experience developing solutions to a selected set of complex freshwater challenges can inform problem solving in other regions of the country and at the national scale;
- Discuss how solution models or lessons from other regions can inform freshwater problem solving in Colorado; and
- Capture key outcomes for Charting New Waters to carry forward to leaders in other regions of the United States as well as federal decision makers.

Agenda

8:00 a.m.  Registration & Continental Breakfast

9:00 a.m.  Welcoming Remarks
Lynn Broadus, Director, Environment Program, The Johnson Foundation at Wingspread
9:10 a.m.  
**Introductions and Agenda Review**  
*John Ehrmann, Senior Partner, Meridian Institute*

9:30 a.m.  
**Background on Charting New Waters & the Colorado Regional Freshwater Forum**  
*Lynn Broaddus, The Johnson Foundation at Wingspread*

- Why did Charting New Waters (CNW) select Colorado for a regional forum?
- How does Colorado’s experience connect to the Principles and Recommendations outlined in *Charting New Waters: A Call to Action to Address U.S. Freshwater Resources*?
- How will CNW utilize the outcomes of this regional forum?

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**A Note about the Forum Panel Format**

The following format will be used for each of the three featured panels on the agenda. Colorado leaders will first characterize key solution strategies underway or under consideration, emphasizing successful approaches and remaining implementation challenges. Experts from other parts of the nation will then reflect on Colorado’s emerging solutions and outstanding challenges, and introduce models and/or lessons learned from strategies used in other parts of the United States or world. Colorado leaders and outside experts will then engage in a facilitated discussion about what may or may not work in Colorado. The audience will also have opportunities to engage with panelists in a facilitated question-and-answer session.

10:15 a.m.  
**Challenge #1: Balancing Agricultural, Municipal, Industrial, and Environmental Water Needs**

With a growing population and looming water-supply gap on the Front Range posing serious water-supply challenges, stakeholders across Colorado are striving to develop innovative strategies to balance agricultural, municipal, industrial, and environmental water needs. This session will explore the following key questions:

- What strategies are Colorado stakeholders devising or implementing to ensure adequate long-term water supply for agricultural, municipal, industrial, and environmental water needs?
What innovative water-sharing strategies or models from other regions of the United States and/or the world might be applicable in Colorado?

**Introduction:** Patrick O’Toole, President, Family Farm Alliance (Savery, WY)

**Panelists:**
- Olen Lund, President, Delta County Farm Bureau; Colorado Interbasin Compact Committee Representative, Gunnison Basin Roundtable (Paonia, CO)
- Gerald Knapp, Arkansas and Colorado River Basin Manager, Aurora Water (Rocky Ford, CO)
- Peter Nichols, Partner, Trout, Raley, Montaño, Witwer & Freeman, P.C.; Governor’s Appointment, Interbasin Compact Committee, Co-Chair, Agriculture and New Supply Subcommittees (Carbondale, CO)
- Sandy Denn, Vice President, Glenn-Colusa Irrigation District; Owner/Farmer, Snow Goose Farms; Board Member, Family Farm Alliance (Willows, CA)
- Steven Malloch, Senior Western Water Program Manager, National Wildlife Federation (Seattle, WA)

11:45 a.m. **Break**

12:00 p.m. **Lunch**

Lunch will be served in Mitchell Hall after the break.

12:45 p.m. **Challenge #2: Enhancing Water Conservation through Improved Efficiency**

Enhanced conservation and efficiency among water users – municipal and agricultural – must be a key element of Colorado’s overall strategy to meet long-term water supply needs. The extent to which conservation and efficiency can close the supply gap and help ensure supply for environmental water needs, remains an open question. This session will explore the following key questions:

- What strategies are Colorado stakeholders implementing or devising to enhance water conservation and efficiency in the municipal and agricultural sectors?
- What policies or legislative strategies aimed at increasing water conservation and efficiency in other U.S. regions and/or the world might be applicable in Colorado?
What types of incentives have been shown to motivate water users to seize opportunities for enhanced efficiency?

**Introduction:** Jennifer Gimbel, Director, Colorado Water Conservation Board (Denver, CO)

**Panelists:**
- Greg Fisher, Manager of Demand Planning, Denver Water (Denver, CO)
- Douglas Kenney, Director, Western Water Policy Program, University of Colorado School of Law (Boulder, CO)
- Reagan Waskom, Director, Colorado Water Institute, Colorado State University (Fort Collins, CO)
- Chuck Clarke, CEO, Cascade Water Alliance (Bellevue, WA)
- Mary Ann Dickinson, President & CEO, Alliance for Water Efficiency (Chicago, IL)

**2:15 p.m.**  
**Break**

**2:30 p.m.**  
**Challenge #3: Gaining Traction on the Water/Energy Nexus**

Water-supply demand for energy generation and energy demand for the transport, treatment, and distribution of water around the state continue to grow. Meanwhile, water-supply demand and threats to water quality are also expanding in Colorado as natural gas development ramps up around the state, and oil shale development looms on the horizon. This session will explore the following key questions:

- To what extent are water and energy planning integrated in Colorado?
- What tools or strategies are Colorado stakeholders devising to gain traction on challenges at the water/energy nexus?
- What strategies or models used to address the water/energy nexus in other regions of the United States and/or the world might be applicable in Colorado?

**Introduction:** Tom Iseman, Water Program Director, Western Governors’ Association (Denver, CO)

**Panelists:**
- Stacy Tellinghuisen, Senior Energy/Water Policy Analyst, Western Resource Advocates (Boulder, CO)
- Alexandra Davis, Assistant Director for Water, Colorado Department of Natural Resources (Denver, CO)
Meeting Report  Colorado Regional Freshwater Forum

- Randy Rhodes, Senior Water Resources Analyst, Xcel Energy (Denver, CO)
- Carey King, Research Associate, Center for International Energy and Environmental Policy, University of Texas at Austin (Austin, TX)
- Ken Moraff, Deputy Director, Office of Ecosystem Protection, U.S. EPA Region 1 (Boston, MA)

4:00 p.m.  Takeaways for CNW to Carry Forward
_John Ehrmann, Meridian Institute_

Reflect on the discussion and learning of the day, and identify specific lessons and messages that The Johnson Foundation and Charting New Waters can carry forward to other regions of the United States, as well as federal decision makers.

4:30 p.m.  Wrap Up and Next Steps
_John Ehrmann, Meridian Institute_

_Lynn Broaddus, The Johnson Foundation at Wingspread_

4:45 p.m.  Adjourn to Reception
Participants adjourn to the Orangery for a reception.

5:30 – 6:00 p.m.  Taping of Colorado State of Mind (Optional)
Interested participants are invited to reconvene in Mitchell Hall to observe a special taping of Rocky Mountain PBS’s Colorado State of Mind.

7:00 p.m.  Reception Ends
Meeting Report  Colorado Regional Freshwater Forum

APPENDIX B
Biographies

Charting New Waters

Colorado Regional Freshwater Forum:
Exploring Colorado’s Solutions to a National Challenge

Tuesday, October 18, 2011

Biographies

Chuck Clarke, Chief Executive Officer, Cascade Water Alliance

Chuck Clarke is CEO of Cascade Water Alliance, a nonprofit corporation of five cities and three water and sewer districts that provide water to almost 400,000 residents and more than 22,000 businesses.

Under Chuck’s leadership, Cascade embarked on an extensive, inclusive public process to determine how best to deliver water supply to its members over the next 50 years and beyond. In December 2009, Cascade acquired Lake Tapps, the last major water resource in the region.

Prior to joining Cascade, Chuck was the Director of the Seattle Public Utilities (SPU). The SPU is responsible for managing four utilities: water, wastewater, solid waste, and drainage. The SPU provides water to 1.4 million customers.

Prior to joining the SPU, Chuck served as one of former Seattle Mayor Paul Schell’s deputy mayors. He is also the former Regional Administrator for the Environmental Protection Agency, managing its operations in Alaska, Washington, Oregon, and Idaho. Chuck has served as Director for the Washington State Departments of Community Development and Ecology. In Vermont, he served as Agency Director of the Vermont Agency of Natural Resources.
Chuck currently serves as Chair of the Water Supply Forum serving Snohomish, King, and Pierce Counties, is a Board Member of the Association of Metropolitan Water Agencies, and is a founding member of the Water Utility Climate Alliance.

**Alexandra Davis, Assistant Director for Water, Colorado Department of Natural Resources**

As Assistant Director of the Colorado Department of Natural Resources, Alexandra Davis works with the Division of Water Resources, the Water Conservation Board, the Division of Wildlife and other state agencies regarding interstate river compacts, state water rights issues, and federal reserved water rights.

Prior to joining the Natural Resources Department, Alex was the First Assistant Attorney General in Colorado. In this role, she supervised the attorneys working in the attorney general’s water unit. She also litigated water rights cases for the State Engineer’s Office, the Colorado Water Conservation Board, and the Division of Wildlife for over 11 years. She spent one year in Billings, Montana, as a Special Assistant U.S. Attorney representing the Department of Interior Agencies in the Montana general water rights adjudication.

Alex is a graduate of Pitzer College in California and the University of Colorado School of Law.

**Sandy Denn, Vice President, Glenn-Cousa Irrigation District; Owner/Farmer, Snow Goose Farms; Board Member, Family Farm Alliance**

Sandy Denn and her husband Wallace Denn own and operate Snow Goose Farms, their family-owned rice farm, near Willows in Northern California. Sandy holds an Associate of Arts Degree (1996) and a Law Degree (2005) and is a licensed Notary Public. However, her chief business activity is co-management of the farm with her husband. Twenty years ago, Sandy and Wally mutually decided that Sandy’s time would also be well-spent helping to direct the policies of the Glenn-Colusa Irrigation District (GCID) toward a positive and proactive role in the many issues and challenges facing the district.

Sandy has been the vice president of the Glenn-Colusa Irrigation District Board of Directors since first being elected in 1993. She serves on several GCID committees, dealing with issues of conjunctive use, surface storage, district annexation and detachment, and groundwater/well development. Sandy has also recently begun representing the GCID on the Family Farm Alliance and the California Farm Water Coalition Boards of Directors. For eight years she served as Board president of the Central Valley Project Water Association.

Sandy’s other water-related activities important to agriculture in the Sacramento and San Joaquin valleys include a seat on the Trinity Area Management Working Group, having been appointed by retiring Secretary of the Interior Dirk Kempthorne, and a seat on the AB303
Technical Advisory Panel, assisting the Department of Water Resources in the distribution of grant funds for groundwater management plan development throughout California.

Mary Ann Dickinson, President and CEO, Alliance for Water Efficiency

Mary Ann Dickinson is the President and CEO of the Alliance for Water Efficiency, a nonprofit organization dedicated to promoting the efficient and sustainable use of water in the United States and Canada. Based in Chicago, the Alliance works with more than 335 water utilities, water conservation professionals in business and industry, planners, regulators, and consumers. Prior to joining the Alliance in July 2007, Mary Ann was Executive Director of the California Urban Water Conservation Council, a nonprofit organization composed of urban water-supply agencies, environmental groups, and other entities managing statewide water conservation in California and implementing the nation’s first set of Best Management Practices.

Mary Ann has more than 35 years of experience, having worked at the Metropolitan Water District of Southern California, the South Central Connecticut Regional Water Authority, and the Connecticut Department of Environmental Protection. A graduate of the University of Connecticut with a degree in environmental planning, she has authored numerous publications on water conservation, land use planning, and natural resources management, and has co-produced two films, which have aired on public television and community cable stations. She is Chair of the Efficient Urban Water Management Specialist Group for the International Water Association, President of the California Irrigation Institute, a Trustee and past Chair of the American Water Works Association National Water Conservation Division, and has presented numerous papers on water conservation in Spain, France, Australia, Korea, Jordan, Israel, Italy, Chile, China, Romania, South Africa, Brazil, Canada, and all across the United States.

Jennifer Gimbel, Director, Colorado Water Conservation Board

As the director of the Colorado Water Conservation Board, Jennifer Gimbel carries out the policies and directives of the Board relating to the conservation, development, and utilization of the state’s water resources, and works closely with the State Engineer, General Assembly, the Executive Director of the Department of Natural Resources, and the Governor on water resource issues for the state of Colorado. She acts as the representative for the state on interstate and intrastate water issues, including issues relating to flood control, water conservation and drought planning, water information, river restoration, and environmental aspects of water management. As Director, she is involved with federal and state legislation pertaining to water resources and represents the state of Colorado on commissions and entities such as the Arkansas River Compact Administration, the Upper Colorado River Commission, the Colorado River Basin Salinity Control Forum, the Western States Water Council, and the Missouri Basin States Association.

Jennifer has more than 20 years of experience as a water attorney, working first for the Wyoming Attorney General and then for the Colorado Attorney General on water, natural
resource, and environmental issues. Before accepting the Director position, Jennifer worked for the U.S. Department of the Interior and the U.S. Bureau of Reclamation on Indian water rights, collaborative efforts on the Middle Rio Grande in New Mexico, and state and federal water rights issues.

**Greg Fisher, Manager of Demand Planning, Denver Water**

Greg Fisher is Manager of Demand Planning at Denver Water. He is responsible for long-term water demand projections, long-term capital planning, and monitoring and planning for Denver Water’s conservation program. He has been with Denver Water for 11 years and has an Economics degree from Middlebury College. Greg also serves on the Board of the Colorado Water Resources and Power Development Authority.

**Tom Iseman, Water Program Director, Western Governors’ Association**

Tom Iseman is the Program Director for Water Policy at the Western Governors’ Association, where he works on water supply, drought, and climate issues for the 19 Western states and the U.S.-flag Pacific Islands. Prior to joining the WGA, Tom worked on water resource issues for the U.S. Department of the Interior and The Nature Conservancy. Tom has extensive experience in statewide and regional water-supply planning, including with Colorado’s Statewide Water Supply Initiative, the Upper Colorado River Endangered Fish Recovery Program, and the Federal Energy Regulatory Commission’s hydropower relicensing. Tom grew up in Englewood, Colorado, and received a B.A. in History from Princeton University (focusing on Western water issues) and an M.S. from the University of Michigan in aquatic ecology.

**Douglas Kenney, Director, Western Water Policy Program, University of Colorado School of Law**

Dr. Doug Kenney is a Senior Research Associate at the Natural Resources Law Center, located within the University of Colorado School of Law, where he directs the Western Water Policy Program. He has written extensively on several water-related issues, including law and policy reform, river basin and watershed-level planning, the design of institutional arrangements, water resource economics, and alternative strategies for solving complex resource issues. Among his publications are *In Search of Sustainable Water Management: International Lessons for the American West and Beyond* (2005, Edward Elgar Publishing) and *The Water-Energy Nexus in the Western United States* (2011, Edward Elgar Publishing). He is also affiliated with the CU/NOAA Western Water Assessment, exploring the link between climate change/variability and Western U.S. water management. Doug has served as a consultant to a variety of local, state, multi-state, and federal agencies, including several Interior Department agencies, the EPA, the U.S. Forest Service, and special commissions (e.g., the Western Water Policy Review Advisory Commission); and national governments and nongovernmental organizations in Asia and Africa. Additionally, he has made presentations in (at least) 17 states, six nations, and four continents. He has a B.A. in biology from the University of Colorado, an M.S. in Natural
Resources Policy and Administration from the University of Michigan, and a Ph.D. in Renewable Natural Resource Studies from the University of Arizona.

**Carey King, Research Associate, Center for International Energy and Environmental Policy, University of Texas at Austin**

Dr. Carey King researches energy systems, how they work together, and how they impact the environment. Much of his recent work has focused on the nexus between energy and water for projecting water demand for electricity generation and alternative automobile fuels. He is actively engaged in understanding how the concept of net energy can relate the quality of energy resources and technologies to economics, the economics of carbon capture and sequestration integrated with enhanced oil recovery, the integration of renewable energy and storage systems in the electric grid, and the creation of tools to help the public and policy makers understand the tradeoffs among different electricity generation sources. Currently his research interests include energy generation, usage, conservation, policy, and education as well as decision making and policy development for natural resources. Carey is currently a Research Associate at the Center for International Energy and Environmental Policy at the Jackson School of Geosciences. He received his B.S. and Ph.D. in Mechanical Engineering at the University of Texas at Austin.

**Gerald Knapp, Arkansas and Colorado River Basin Manager, Aurora Water**

The city of Aurora lies in the South Platte River basin of Colorado and its water supply comes not only from the South Platte, but also from the Arkansas River and Colorado River basins. The water supply includes transferred agricultural water rights and new appropriations. In 1988, Gerald Knapp started with the city of Aurora’s Water Department to re-vegetate formerly irrigated lands in the Arkansas River valley near Rocky Ford. He quickly rose to the Arkansas & Colorado River Basins Manager position and currently oversees Aurora’s water operations and future water development in these basins. With an agricultural background and an engineering degree, Gerald has been developing programs and processes for the city of Aurora to mitigate or create alternatives to negative economic, social, and environmental effects from the purchase and transfer of agricultural water rights. Aurora has implemented re-vegetation, continued farming, leasing/fallowing, and local community financial programs. These have led to successful techniques for returning lands to native grasses, provided opportunities to keep agriculture in production, created the Rocky Ford School District Foundation, and provided income to farmers and water to Aurora in a severe drought. Gerald continues to explore alternative methods for keeping agriculture in production and securing water resources for Aurora. He anticipates positive outcomes from water-sharing concepts using reduced irrigation production methods, including changed cropping patterns or “crop stressing.”
Olen Lund, President, Delta County Farm Bureau; Colorado Interbasin Compact Committee Representative, Gunnison Basin Roundtable

Olen, his wife Debbie, and daughter Laura, live and work on the family farm where Olen was born and raised in the North Fork Valley in the east end of Delta County, Colorado. They also have two sons, Bob and Mike, who were the fourth generation of Olen’s family to graduate from Paonia High School and are now attending college in Golden, Colorado.

After graduating from Paonia High School, Olen received a Bachelor of Science Degree in Metallurgical Engineering from the Colorado School of Mines and a Master of Science Degree in Welding Engineering from The Ohio State University.


In addition to being an active farmer and having served as Delta County Commissioner for the past 6 years, Olen is currently Treasurer and Superintendent of the Paonia Ditch Company, serves on the Gunnison Basin Water Roundtable, serves on the Colorado Interbasin Compact Committee, is President of the Delta County Farm & Livestock Bureau, is Vice Chair of the Colorado Counties, Inc., Agriculture, Wildlife, and Rural Affairs Committee, is Chair of the Painted Sky Resource Conservation & Development Board, Delta County Representative on the Club 20 Board of Directors, and a member of the Public Lands Partnership executive committee.

Steven Malloch, Senior Western Water Program Manager, National Wildlife Federation

Steven Malloch joined the National Wildlife Federation (NWF) in 2008 as Senior Western Water Program Manager. Steve’s responsibility at NWF is creating programs that link providing habitat for fish and wildlife with adapting water systems to climate disruption. Prior to joining the NWF, he consulted with foundations and NGOs on water policy and campaigns, served as Executive Director for the Western Water Alliance, and worked as Washington D.C. counsel for Trout Unlimited’s Western Water Project. Before shifting to the nonprofit sector, Steve practiced environmental law and litigation in San Francisco with Graham & James. Steve started his career in water as a hydrogeologist, working on water supply and contamination projects primarily in the Western United States. He holds degrees in geology and law from the University of California at Davis, and an M.S. in Water Resources Administration from the University of Arizona. He is admitted to the bar in Washington and California.
Ken Moraff, Deputy Director, Office of Ecosystem Protection, U.S. Environmental Protection Agency Region 1

Ken Moraff is Deputy Director of the Office of Ecosystem Protection in the EPA’s New England regional office, with responsibility for federal clean air, clean water, and climate change programs in the six New England states. He has led major environmental projects, including the Boston Harbor and Charles River cleanups. He has also served as manager of EPA-New England’s enforcement program and as a staff attorney. He is a graduate of Cornell University and Harvard Law School.

Peter Nichols, Partner, Trout, Raley, Montaño, Witwer, & Freeman, P.C.; Governor’s Appointment, Interbasin Compact Committee, and Co-Chair, Agriculture and New Supply Subcommittees

Peter Nichols is a partner with Trout, Raley, Montaño, Witwer, & Freeman, P.C. (Denver, Steamboat, Carbondale) practicing water, water quality, and water-related environmental and land use law. He was the principle author of “Water and Growth in Colorado: A Review of Legal and Policy Issues,” published by the Natural Resources Law Center of the University of Colorado School of Law, as well as other scholarly works on growth, water quality, and the environment. Peter is also a leader in adapting legal mechanisms to protect water for conservation purposes, such as conservation easements and rotating land fallowing/water leasing. Governors Hickenlooper and Ritter appointed him to the Interbasin Compact Committee, where he co-chairs the New Supply and Agricultural Transfers Subcommittees; he was also elected a member of the Metro Denver Roundtable. Peter also serves as special assistant attorney general for Colorado and New Mexico on Clean Water Act issues. He previously served on numerous other governmental panels, including the Colorado Water Quality Control Commission (chair), the Garfield County Planning and Zoning Commission, and Governor Romer’s “Smart Growth” and “Environment 2000” projects. Peter is also Past President of the Colorado Water Congress. A current member of the board of the Colorado Water Trust, he was the organization’s inaugural executive director. Peter earned a J.D. from the University of Colorado School of Law, and holds an M.P.A., also from CU, and a B.A. from The Colorado College. He is a member of the Colorado, Colorado District Court, the First, Second, Tenth, and Eleventh Circuit Courts of Appeals, and U.S. Supreme Court bars. Peter is a former (and still occasional) international mountaineering guide.

Patrick O'Toole, President, Family Farm Alliance

Patrick O'Toole, a member of the Family Farm Alliance’s Board of Directors since 1998 and a former member of Wyoming’s House of Representatives, was named as the organization’s fifth President in March 2005. Pat is a cattle and sheep rancher and hay grower with strong backgrounds in irrigated agriculture and Wyoming politics. He and his family live near Savery, Wyoming.
Pat and his wife, Sharon, live on a ranch that has been in her family since 1881. It straddles the Wyoming/Colorado border and has long afforded Pat the opportunity to view some unique water issues firsthand. Carbon County, Wyoming, is in the headwaters of both the Little Snake River, a Colorado River tributary, and the North Platte River, a tributary of the Missouri. Pat served in Wyoming’s 64-member House from 1986 to 1992. His assignments included the Select Water Committee. Pat is also on the Board of Directors for Produced Water Development.

Pat’s interest in water intersected with the Family Farm Alliance while he was serving on the Clinton Administration’s Western Water Policy Review Advisory Commission. Pat was the only commissioner representing Western irrigated agriculture and, in the end, refused to sign the report, opting instead to prepare a dissenting alternative report.

Pat is presently serving on a blue-ribbon panel to advise the USDA’s NRCS on the conservation title of the 2012 Farm Bill. Water is listed as a top priority in the discussion. His other efforts include participating in the Johnson Foundation Freshwater Summit, and AGree – a new initiative that will tackle long-term food and agriculture policy issues.

Pat and Sharon met while students at Colorado State University (where he graduated with a degree in philosophy). They have three children, including a daughter, son, and five grandchildren living on the ranch. Another daughter lives in Denver.

Randy Rhodes, Senior Water Resources Analyst, Xcel Energy

Randy Rhodes has been employed by Xcel Energy and its predecessor companies for 27 years. His primary responsibilities involve managing company water resources as required for reliable electrical generation. Xcel Energy has numerous water rights to provide water supplies to its generation facilities in all of the major river basins of Colorado, as well as in the panhandle of Texas and west Texas. Challenges include acquiring reliable water resources at the lowest achievable cost to ensure reliable electrical generation in an increasingly competitive market, and dealing with declining groundwater levels in Texas. About one-half of Xcel Energy’s water supply in Colorado is derived from contractual supplies, which is an increasing trend. Randy is proud of developing an integrated water supply for Xcel Energy’s generating stations in Colorado’s South Platte basin, which greatly reduces costs and improves reliability.

Randy’s previous experience includes a stint with a Denver-area consulting firm working on water-supply and water-rights issues, and working for a petroleum services company involved in drilling and exploration in the northern Rockies. Prior to that, he was a Peace Corps volunteer on the island of Montserrat in the Eastern Caribbean. Randy has a B.S. in Watershed Science from Utah State University and an M.S. in Earth Resources from Colorado State University. He resides in Denver.
Stacy Tellinghuisen, Senior Energy/Water Policy Analyst, Western Resource Advocates

Stacy Tellinghuisen is a Senior Energy/Water Policy Analyst for Western Resource Advocates, a nonprofit conservation organization dedicated to protecting the West’s water, land, and air. Stacy works on both sides of the energy/water nexus, researching the impacts of energy development on water resources and the energy impacts of new and existing water supplies. Before joining Western Resource Advocates, she was an energy/water analyst for the California Sustainability Alliance, where she researched the energy intensity of Southern California’s water supplies. Stacy has worked on water issues for the city of Moab, Utah, and taught natural history to school groups in parks throughout California and Utah. She received a Master of Environmental Science and Management from the University of California, Santa Barbara, and a Bachelor’s degree from Carleton College.

Reagan Waskom, Director, Colorado Water Institute, Colorado State University

Dr. Reagan Waskom currently serves as the Director of the Colorado Water Institute and as Director of the Colorado State University (CSU) Water Center, where his responsibility is to address water research and information needs for the state of Colorado. Reagan is a member of the Department of Soil & Crop Sciences faculty with a joint appointment to the Department of Civil and Environmental Engineering at CSU. In addition, Reagan currently serves as the Regional Director of the USDA-CSREES Integrated Water Program. Reagan received his B.S. and M.S. degrees from Texas A&M University and his Ph.D. from Colorado State University in Environmental Soil Science.

Reagan’s recent research and outreach projects include: Water-sharing arrangements in the Colorado River Basin, ecosystem services from irrigated agriculture, irrigation water optimization in water-limited environments, evaluation of Western households’ perceptions and preferences for water use and acquisition, the impact of produced water on agricultural lands, the evaluation of municipal water conservation programs, the development of best management practices for crop production, and surveys of current irrigation management practices to evaluate constraints to adoption. Reagan’s current teaching responsibility at CSU is for GRAD592 – the Graduate Water Resources Seminar. In addition, Reagan supervises the CSU Extension Water Outreach program and personnel.
Charting New Waters Team

Lynn Broaddus, Director, Environment Program, The Johnson Foundation at Wingspread

Dr. Lynn Broaddus joined The Johnson Foundation at Wingspread in December 2008, and is responsible for shaping the Foundation’s Environmental Program with an emphasis on the freshwater crisis facing the United States. Since that time, Lynn has convened national leaders in government, business, and nongovernmental organizations to examine our freshwater challenges, specifically as they relate to climate change, infrastructure, agriculture, energy, and public health. That work resulted in the release of a national report, Charting New Waters: A Call to Action on U.S. Freshwater Challenges, issued by a diverse group of stakeholders convened by The Johnson Foundation at Wingspread focused on changing U.S. freshwater policy.

Prior to joining The Johnson Foundation, Lynn served for six years as executive director of Milwaukee Riverkeeper®, a water advocacy organization. Before joining Riverkeeper, she spent 12 years working for The Nature Conservancy and a related organization, NatureServe, where her role as director of U.S. Network Partnerships focused on negotiating data-sharing agreements among the nation’s Natural Heritage Programs.

Lynn holds a Bachelor’s degree in environmental sciences from the University of Virginia, a Master’s in business administration from the University of Wisconsin-Milwaukee, and a Doctorate in botany and genetics from Duke University. She serves on the boards of River Network, River Alliance of Wisconsin, and the Nelson Institute for Environmental Studies (University of Wisconsin-Madison).

Wendy Butler, Special Initiatives Coordinator, The Johnson Foundation at Wingspread

Wendy joined The Johnson Foundation in 1995 as a conference support specialist handling logistics for all conferences, events, and local meetings. In 2005, she became a program assistant, supporting all aspects of the environmental conferences, including agenda planning and development, follow-up, and research projects. In 2008, as the special initiatives coordinator, Wendy began work on the Foundation’s Convening for Impact project to review and assess the Foundation’s approach and practices in regard to conferences to ensure that these programs are generating impact. Currently, she is also working with the Environment Program, focusing on freshwater and related initiatives. Wendy has a degree in Liberal Arts with an emphasis in Organizational Behavior from the University of Wisconsin, Green Bay, and is currently pursuing a Master’s Degree in Leadership Studies at Marquette University. She lives in Franklin with her husband, Dennis, and daughter Maggie.
John Ehrmann, Managing and Senior Partner, Meridian Institute

Dr. John Ehrmann is a founder and Senior Partner of Meridian Institute. He has pioneered the use of collaborative decision-making processes for more than two decades at the local, national, and international levels. He has designed and implemented projects in national and international forums; in public policy arenas involving legislation, negotiated regulations, and Federal Advisory Committees; in organizational management and strategic planning settings; in communities and site-specific disputes; and with stakeholder groups advising nongovernmental organizations and companies. His work has focused on environmental and natural resources issues, energy and climate change, health policy, science and technology, and the economic and social challenges associated with developing sustainable practices for communities and industries.

In addition to his extensive involvement in convening and facilitating collaborative processes, John also works to promote the use of collaborative decision making. He lectures and has published numerous articles on collaborative decisions in public policy issues. He serves as an adjunct faculty member for the University of Wyoming and provides advice to the Ruckelshaus Institute and School of Environment and Natural Resources on the use of collaborative problem solving in natural resource decision making.

John received his undergraduate degree from Macalester College and his Ph.D. in Natural Resource Policy and Environmental Dispute Resolution from the University of Michigan’s School of Natural Resources. His doctoral dissertation involved developing a practice-based model of the policy dialogue that can be applied to both practice and research. Between 1983 and 1997, John was executive vice president at The Keystone Center. In September 1997, he became one of the founders of Meridian Institute.

David Marks, Vice President, Outreach Strategies

David Marks is a Vice President at Outreach Strategies where he focuses on planning and implementing successful media relations and advocacy campaigns for coalitions, nonprofits, policy organizations, and corporate clients.

David is an experienced communications and public affairs professional who has worked on Capitol Hill, in federal agencies, and for government relations and public affairs firms. For more than five years he served as Press Secretary and Spokesman for Sen. Jeff Bingaman (D-NM), chairman of the U.S. Senate Energy and Natural Resources Committee.

David has a wealth of knowledge on energy and environmental issues, including on policies related to climate change, renewable energy, clean technologies, sustainability, and water resources. His expertise in these issues has helped in developing and managing effective public affairs campaigns at the state and national levels.
At Outreach Strategies, David focuses on strategic communications counsel, policy issues management, media relations, and stakeholder engagement. He holds a B.A. in Political Science from Wittenberg University and an M.A. in Public Policy from Georgetown University.

**Molly Mayo, Partner, Meridian Institute**

Molly Mayo joined Meridian Institute in April 2000 and now serves as a Partner. Molly provides neutral, third-party facilitation and conflict resolution services to complex environmental and public health projects; designs and coordinates local and regional multi-party decision-making processes; facilitates community-based watershed groups; designs effective communications systems; and builds trusted relationships among polarized interest groups.

Prior to joining Meridian, Molly served as an independent facilitation and mediation consultant, focusing on local and regional watershed groups. In addition, she worked as an Associate for four years at the Colorado Center for Environmental Management, where she designed and facilitated stakeholder involvement and collaborative decision-making processes for environmental cleanup and technology development projects.

Molly’s diverse background also includes work as a communications contractor in Antarctica and a Community Relations Specialist. In the latter role, she managed and coordinated public involvement, community relations, risk communication, and public education projects for various environmental and public health projects. She participated in an internship in Stockholm, Sweden, for Cooperation for Peace and was an NGO representative for a preparatory conference for the United Nations Conference on Environment and Development.

Molly holds a Bachelor of Arts in Political Science/Economics with a concentration in Environmental Studies from Colorado College, where she was a Women’s Educational Society Scholar.

**Tad Segal, President, Outreach Strategies**

Tad Segal is an accomplished public affairs expert specializing in complex communications campaigns that impact public policy. He has served at some of the highest levels of government and corporate America and has played a leading role in shaping numerous successful public affairs campaigns.

Tad led the public affairs practice at Widmeyer Communications, where he managed a series of engagements on behalf of clients in the climate, environment, energy, and transportation fields.
He also served as Senior Vice President at Venn Strategies, a boutique lobbying firm focused on tax, health care, and nonprofit issues, and is the founder of WinCampaign, a political campaign and grassroots management firm serving national, state, and local campaigns.

Tad led the Washington, D.C., communications operation for United Parcel Service (UPS), where he served as the company’s main spokesperson and communications counselor on all domestic and international government relations, crisis communication, and corporate reputation management issues. While at UPS, he designed and executed an international communications strategy that helped the company win a highly competitive aviation route authority to fly directly into China.

In Congress, Tad served as Communications Director to U.S. Senator Alan Simpson. Tad is also a former producer for the McLaughlin Group and McLaughlin One on One television programs, and was a State Capital Bureau reporter in Cheyenne.

He holds a B.A. in Journalism from the University of Rhode Island and an M.A. in Public Communication from American University in Washington, D.C., where he also served as adjunct faculty, teaching a master’s level course in political communication.

**Susie Seidelman, Environment Program Associate, The Johnson Foundation at Wingspread**

Susie Seidelman is the Environment Program Associate at The Johnson Foundation at Wingspread, where she focuses much of her work on the selection, planning, and implementation of conferences with impact and clear, actionable goals at their core. She also plans an environmental lecture series, represents the Environment Program locally, and has been one of the leads on an intensive website redesign for the Foundation. Previously, Susie was a teaching assistant and Master’s student in the Media Studies program at the University of Wisconsin-Milwaukee. She has also worked with Wisconsin Public Radio, The City of Milwaukee Election Commission, and Public Allies Milwaukee. Susie received her Bachelor’s degree from Oberlin College in 2003. She lives in Milwaukee with her wife Laura, dog Maury, and cat Captain. They all enjoy spending time by the Milwaukee River.

**Brad Spangler, Mediator and Program Manager, Meridian Institute**

A Mediator and Program Manager based out of Meridian Institute’s Dillon, Colorado, office, Brad Spangler has seven years of experience convening and facilitating multi-party collaborative processes. He has worked on a variety of issues in the environmental and public health policy arenas, including freshwater quality and quantity, renewable energy, carbon sequestration, forest management, endocrine-disrupting chemicals, children’s health protection, food safety, and community resilience to natural disasters.
Prior to joining the Meridian team in April 2008, Brad was a Senior Associate at RESOLVE, where he was responsible for a range of duties including process design, agenda development, facilitation, project management, stakeholder communications, issues research, meeting summary and report writing, and meeting logistics. He began working in the field of conflict resolution in 2000 at the Conflict Research Consortium in Boulder, Colorado, where he helped build CRInfo and Beyond Intractability, two Web-based resources for the field. Brad has also completed two facilitation training courses with the Interaction Institute for Social Change.

Born and raised in Summit, New Jersey, Brad finished high school in Burlington, North Carolina, and received his B.A. in Anthropology from the University of North Carolina-Chapel Hill in 1997. He earned an M.A. in Cultural Anthropology and an Interdisciplinary Graduate Certificate in Environmental Policy from the University of Colorado-Boulder in December 2002. During the summer of 2002, he interned with the National Parks Conservation Association’s Southeast Regional Office as a participant in the University of Tennessee’s Southern Appalachian Man and Biosphere internship program.
## List of Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Title/Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalsoum Abbasi</td>
<td>Project Engineer</td>
<td>Colorado Springs Utilities</td>
</tr>
<tr>
<td>Frank Akers</td>
<td>President and CEO</td>
<td>Oak Ridge Strategy Group</td>
</tr>
<tr>
<td>Marc Alston</td>
<td>Community Climate Response Consultant</td>
<td>River Network</td>
</tr>
<tr>
<td>Joshua Baile</td>
<td>Owner</td>
<td>HYDROLYSIS</td>
</tr>
<tr>
<td>Gregory Baker</td>
<td>Manager of Aurora Water Public Relations</td>
<td>Aurora Water</td>
</tr>
<tr>
<td>Jenny Bishop</td>
<td>Water Services Project Engineer</td>
<td>Colorado Springs Utilities</td>
</tr>
<tr>
<td>Carmen Boggs</td>
<td>Activity Coordinator</td>
<td>U.S. Bureau of Reclamation</td>
</tr>
<tr>
<td>Carlee Brown</td>
<td>Water Policy Specialist</td>
<td>Western Governors’ Association</td>
</tr>
<tr>
<td>Richard Brown</td>
<td>President</td>
<td>Sand Dollar Research</td>
</tr>
<tr>
<td>Patti Bruck</td>
<td>Faculty, Film Studies</td>
<td>University of Colorado</td>
</tr>
<tr>
<td>Chuck Clarke</td>
<td>Chief Executive Officer</td>
<td>Cascade Water Alliance</td>
</tr>
<tr>
<td>Michael Cohen</td>
<td>Senior Associate</td>
<td>Pacific Institute</td>
</tr>
</tbody>
</table>
Libby Comeaux
Convener
The Downstream Neighbor

Amy Conklin
Owner
Amy S. Conklin LLC

Beth Conover
Consultant
Gates Family Foundation

Tahne Corcutt
Associate
Northbridge Environmental

Jeff Crane
Executive Director
Colorado Watershed Assembly

Helen Cregger
Senior Vice President
Piper Jaffray & Co.

Sean Cronin
Executive Director
St. Vrain and Left Hand Water Conservancy District

Alexandra Davis
Assistant Director for Water
Colorado Department of Natural Resources

Mari Deminski
Assistant Attorney General
Colorado Attorney General’s Office

Sandy Denn
Farmer/Water Consultant
Snow Goose Farms/Glenn-Colusa Irrigation District

Mary Ann Dickinson
President and CEO
Alliance for Water Efficiency

The Honorable Randy Fischer
State Representative
Colorado House of Representatives

Greg Fisher
Manager of Demand Planning
Denver Water

Liz Gardener
Suburban Conservation Coordinator
Denver Water

Valerie Gates
Funder

Jennifer Gimbel
Director
Colorado Water Conservation Board

Thomas Gougeon
President
Gates Family Foundation

Christine Hashimoto
Board of Supervisors
Douglas County Conservation District

Taylor Hawes
Colorado River Program Director
The Nature Conservancy

Cynthia Hessin
Executive Producer
Rocky Mountain PBS

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Water Program Director
Western Governors’ Association
Greg Kail  
Director of Communications  
American Water Works Association

Kathryn Lowe  
Senior Research Associate  
Colorado School of Mines

Melinda Kassen  
Principal  
WaterJamin Legal & Policy Consulting

James Luey  
Senior Scientist  
U.S. EPA

Doug Kemper  
Executive Director  
Colorado Water Congress

Jeff Lukas  
Senior Research Associate  
Western Water Assessment

Doug Kenney  
Director, Western Water Policy Program  
University of Colorado School of Law

Olen Lund  
President, Delta County Farm Bureau;  
Colorado Interbasin Compact Committee  
Representative, Gunnison Basin Roundtable

Carey King  
Research Associate  
University of Texas at Austin

Jordan Macknick  
Energy and Environmental Analyst  
National Renewable Energy Laboratory

Gerald Knapp  
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Kristin Maharg  
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Colorado Foundation for Water Education

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Rampart Realty, Inc.

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Western Water Program Manager  
National Wildlife Federation

David LaFrance  
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American Water Works Association

Zach Margolis  
Utility Manager  
Town of Silverthorne

Paul Lander  
Instructor  
CU-Boulder/ASLA/AWE

Danyelle McCannon  
Chief Financial Officer  
Central Colorado Water Conservancy District

Linda Lilienfeld  
Project Director  
Let’s Talk About Water

Bart Miller  
Water Program Director  
Western Resource Advocates

David Little  
Director of Planning  
Denver Water
<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Rebecca Mitchell</td>
<td>Water Policy and Issues Coordinator, Colorado Department of Natural Resources</td>
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<tr>
<td>Matt Rice</td>
<td>Director, Colorado Conservation, American Rivers</td>
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<tr>
<td>Ken Moraff</td>
<td>Deputy Director, Office of Ecosystem Protection, U.S. EPA Region 1</td>
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<tr>
<td>Russell Sands</td>
<td>Water Conservation Program Manager, City of Boulder</td>
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<tr>
<td>Susan Morea</td>
<td>Senior Vice President, CDM Smith</td>
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<tr>
<td>Christopher Schall</td>
<td>Conservation Research Specialist, Central Colorado Water Conservancy District</td>
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<tr>
<td>Peter Nichols</td>
<td>Partner, Trout, Raley, Montaño, Witwer, &amp; Freeman, P.C.</td>
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<tr>
<td>Patrick O'Toole</td>
<td>President, Family Farm Alliance</td>
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<tr>
<td>Edward Osann</td>
<td>Senior Policy Analyst, Natural Resources Defense Council</td>
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<tr>
<td>Tien Shiao</td>
<td>Associate, World Resources Institute</td>
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<tr>
<td>Jill Ozarski</td>
<td>Natural Resources Policy Advisor, Office of U.S. Senator Mark Udall</td>
</tr>
<tr>
<td>Faith Sternlieb</td>
<td>Research Associate, Colorado Water Institute</td>
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<tr>
<td>John Stulp</td>
<td>Special Advisor to the Governor for Water, Colorado Water Conservation Board</td>
</tr>
<tr>
<td>Stacy Tellinghuisen</td>
<td>Senior Energy/Water Policy Analyst, Western Resource Advocates</td>
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<tr>
<td>Kenan Ozekin</td>
<td>Senior Research Manager, Water Research Foundation</td>
</tr>
<tr>
<td>Phyllis Thomas</td>
<td>President, Phyllis Thomas Consulting</td>
</tr>
<tr>
<td>Randy Rhodes</td>
<td>Senior Water Resources Analyst, Production Resources, Xcel Energy</td>
</tr>
<tr>
<td>Richard Vidmar</td>
<td>Senior Water Resources Engineer, Aurora Water</td>
</tr>
<tr>
<td>Marc Waage</td>
<td>Manager of Water Resources Planning, Denver Water</td>
</tr>
</tbody>
</table>
Reagan Waskom  
Director  
Colorado Water Institute

Brad Wind  
Deputy Manager  
Northern Water

Steve Zelenak  
President  
Forston Labs

Charting New Waters Team

Lynn Broaddus  
Director, Environment Program  
The Johnson Foundation at Wingspread

Wendy Butler  
Special Initiatives Coordinator  
The Johnson Foundation at Wingspread

Holly Dobson  
Senior Project Coordinator  
Meridian Institute

John Ehrmann  
Senior and Managing Partner  
Meridian Institute

Laura Maker  
Principal  
Blackbird Consulting LLC

David Marks  
Vice President  
Outreach Strategies

Molly Mayo  
Partner  
Meridian Institute

Tad Segal  
President  
Outreach Strategies

Susie Seidelman  
Environment Program Associate  
The Johnson Foundation at Wingspread

Brad Spangler  
Mediator and Program Manager  
Meridian Institute
1) As a Colorado water leader, what do you see as the most promising strategies being developed in the state to ensure adequate long-term water supply for agricultural, municipal and industrial (M&I), and environmental water needs?

2) What do you see as the most promising strategies Colorado stakeholders are developing to stimulate water conservation and efficiency in the municipal sector?

   In the industrial sector?

   In the agricultural sector?

3) What new ideas did the Forum discussion spark about how to amplify the role of water conservation and efficiency in closing the looming M&I water-supply gap in Colorado?

4) What do you see as the most promising strategies Colorado stakeholders are devising or implementing to proactively address freshwater challenges at the water/energy nexus?
5) How did the Charting New Waters Colorado Regional Freshwater Forum add value to ongoing efforts to solve Colorado’s freshwater challenges? What novel or innovative ideas did you hear that you think will advance solutions to the challenges discussed during the Forum?

6) In your view, what are the most important lessons or messages from Colorado’s experience confronting freshwater challenges that Charting New Waters should carry forward to other regions of the nation? To federal decision makers in Washington, D.C.?

7) If you were to request one legislative, regulatory, or policy change of federal decision makers to facilitate solving Colorado’s freshwater challenges, what would it be?

8) Additional comments, reflections, or feedback.

About The Johnson Foundation at Wingspread
The Johnson Foundation at Wingspread, based in Racine, Wisconsin, is dedicated to serving as a catalyst for change by bringing together leading thinkers and inspiring new solutions on major environmental and regional issues. Over the course of 50 years, The Johnson Foundation at Wingspread has inspired consensus and action on a range of public policy issues. Several organizations have roots at Wingspread, including the National Endowment for the Arts, National Public Radio, the International Criminal Court and the Presidential Climate Action Plan. Building on this legacy, The Johnson Foundation at Wingspread has set a new, strategic mission designed to achieve greater, more sustained impact on critical environmental issues. Launched as part of this new direction is Charting New Waters, an alliance of leading organizations calling for action to avert the looming U.S. freshwater crisis.