

# [***CONFERENCE REPORT: COLORADO WATER CONGRESS SUMMER CONFERENCE 2013: LEADING OUR WATER FUTURE***](https://advance.lexis.com/api/document?collection=analytical-materials&id=urn:contentItem:5BV0-BHS0-00SW-509B-00000-00&context=1516831)

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**Reporter**

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Steamboat Springs, ColoradoAugust 21-23, 2013 Agricultural Leadership Forum: So What Exactly does "Saving Ag" Mean? The ***Colorado*** Water Congress is a leading nonpartisan voice in shaping policy and legislation relating to water development, management, and conservation. In addition to working as an advocate for a variety of legislative and regulatory issues, the ***Colorado*** Water Congress provides members with various opportunities for collaboration, networking, and professional development at several events throughout the year. One such event is the Summer Conference. Hosted annually in a beautiful ***Colorado*** resort location, the ***Colorado*** Water Congress Summer Conference offers excellent topical content on water law and policy. At this year's conference in Steamboat Springs, attorneys, citizen groups, engineers, ranchers, legislators, and others gathered to discuss the future of water and agriculture in ***Colorado***.

As part of this year's Summer Conference, Erin Wilson of Wilson Water Group and the ***Colorado*** Water Congress Board of Directors moderated a panel discussion on an important question: "So What Exactly Does "Saving Ag' Mean?" The five panelists shared perspectives on the future of agricultural water rights in the face of growing municipal demands. The panel consisted of John Salazar, Commissioner of the ***Colorado*** Department of Agriculture; Marsha Daughenbaugh of the Community Agriculture Alliance; Doug Robotham of the Nature Conservancy; Terry Fankhauser of the ***Colorado*** Cattlemen's Association; and John McClow of the Upper Gunnison ***River*** Water Conservancy District.

Commissioner Salazar began the panel discussion with a lively presentation on ***Colorado***'s rapidly increasing population and the attendant impacts on the state's land and water resources. Salazar estimated ***Colorado***'s population will increase by 3-4 million by 2040, a rate faster than the United States growth rate. Naturally, an increased population will stress the demand for water. Salazar estimated this growth will require an additional 190,000 to 630,000 acre-feet of water per year. Emphasizing the significance of farm and ranch water rights, the Commissioner declared agriculture a "cornerstone" of ***Colorado***'s economy. In doing so, Salazar argued that agricultural water rights are vital to the growing state economy and that there is a need to ensure the continued production of agricultural goods as municipal needs grow.

Marsha Daughenbaugh, Executive Director of the Community Agriculture Alliance, focused her presentation on one of her organization's strategic anchors: the importance of public education on agriculture. As a third generation **[\*157]** rancher, Daughenbaugh's interests are vested in the partnerships developed between the Yampa Valley's resort, business, and agricultural interests to assure agriculture's longevity throughout the area. The Community Agriculture Alliance seeks to preserve the agricultural heritage of the Yampa Valley by encouraging programs and policies that mutually benefit and connect agricultural producers and consumers. Daughenbaugh and her organization believe in the continuing philosophy that the agricultural environment is a valuable part of the community and ***Colorado*** must act to preserve it. To share this conviction, the Community Agriculture Alliance connects and educates various community groups with agriculture in the Yampa Valley and provides resources for other regions to build a similar connection. Daughenbaugh's public education work is not limited to promoting the benefits of farming and ranching. For example, she highlighted agricultural lands providing abundant open space allowing unique ***Colorado*** ecosystems and wildlife to thrive.

Next, Doug Robotham discussed how The Nature Conservancy decides which lands and habitats to protect. The Nature Conservancy works with communities and businesses to protect and preserve lands and waters vital to the diversity of life on Earth. In ***Colorado***, The Nature Conservancy has helped preserve more than 426,000 acres by establishing thirteen preserves statewide. Robotham pointed to the Nature Conservancy's historic Carpenter Ranch in the Yampa Valley as "a great example of how agriculture and conservation can come together." A new conservation easement project across the Yampa ***River*** from Carpenter Ranch, the Wolf Mountain Ranch, aims to permanently conserve up to 6,300 acres that (i) provide critical habitat for Columbian sharp-tailed grouse and sandhill cranes, (ii) support miles of a globally rare ***river*** forest corridor, (iii) represent historically and economically important ranchlands, and (iv) preserve historic and scenic views important to the local economy.

Terry Fankhauser, Executive Vice President at the ***Colorado*** Cattlemen's Association ("CCA"), encouraged innovation when addressing the issues surrounding agricultural water use. Founded in 1867, CCA is the nation's oldest cattlemen's association. Beef producers voluntarily join CCA and manage it cooperatively, working together to speak on behalf of ***Colorado***'s more than 12,000 beef producers. ?As a representative of cattle ranching interests, Fankhauser observed that risk-aversion and inflexibility will not save agriculture. Instead, farmers and ranchers should be open to creativity where they can gain efficiency. With confidence, Fankhauser stressed that "agriculture does not deserve to be saved, but agriculture does deserve the opportunity to survive."

As the final panelist, John McClow offered a perspective on preserving agriculture in the Upper Gunnison ***River*** Water Conservancy District, which uses easements in the Gunnison County area to conserve agriculture. McClow questioned what would happen to agricultural lands if conservation groups could actually "save" such land. He illustrated two contrasting possibilities amongst others in a spectrum of options: (i) easements protect the lands in perpetuity, or (ii) easements protect the lands only until the farmer wants to retire and sell his water to a municipality (jokingly referred to as the "401(k) plan"). While conservation groups prefer the perpetuity option, increased land values in much of ***Colorado***, especially surrounding resort communities, make **[\*158]** it difficult for conservation groups to incentivize ranchers to preserve agricultural land rather than sell the land to developers. One suggestion posed by McClow involved state funding for a more sustainable water project to match population growth and demand, diverting attention away from ecologically special high-country areas.

The panel concluded with a brief discussion on three relevant and timely topics: The Walton Family Foundation Report, agricultural water conservation, and leasing/fallowing under ***Colorado*** House Bill 1248.

The Walton Family Foundation funded a collaborative effort, working with interested stakeholders, to identify innovative ways to allow water transfers from agriculture to urban use while avoiding or mitigating damages to agricultural economies and environmental values. The report evaluated novel water sharing strategies, and developed actionable recommendations to improve water-sharing opportunities in the ***Colorado*** ***River*** Basin and throughout the West.

Discussion on agricultural water conservation centered first on the issue of how to define such conservation and, second, whether agricultural water conservation can contribute to instream flows or municipal supply. The panel had difficulty answering some of the hard questions on the topic but agreed the problem is still a work in progress.

This discussion lead to the topic of House Bill 1248, which authorizes the ***Colorado*** Water Conservation Board to administer a pilot program consisting of up to 3 pilot projects, each up to 10 years in duration, in the lower Arkansas ***River*** basin. The projects intend to experiment with fallowing agricultural irrigation land and leasing the associated water rights to municipal users in years of shortage.

Overall, the panel spoke positively about the Walton Family Foundation Report, agricultural water conservation, and HB 1248, and viewed each as progressive support for building a creative new approach to Western water management.

Heidi Ruckriegle

CLIMATE CHANGE AND WATER RESOURCES LAW: A LOOMING ADAPTATION CRISIS

Denver, ColoradoAugust 29, 2013 On August 29, 2013, the University of Denver Sturm College of Law was honored to welcome Associate Professor Alex Gardner of the University of Western Australia (UWA). Professor Gardner began his legal career as a solicitor in Melbourne, Australia, before receiving his Master of Laws in natural resources law at the University of British Columbia. Professor Gardner has been on the UWA Faculty of Law since 1988. During this time, he has worked with numerous research centers including the UWA Centre for Mining, Energy and Natural Resources Law, the National Center for Groundwater Research and Training, and the Cooperative Research Center for Water Sensitive Cities. Professor Gardner also holds an Adjunct Professorship at the Australian National University College of Law.

**[\*159]** Following a warm welcome, Professor Gardner introduced his presentation, entitled Climate Change and Water Resources Law: A Looming Adaptation Crisis, with a brief overview of the impacts of climate change on southwest Western Australia, especially declining precipitation and rising temperatures. These impacts will have serious ramifications for water resources management in the state and adaptation will be necessary in order to secure enough water for both human consumption and environmental preservation. According to Professor Gardner, an important part of that adaptation for Western Australia will ineludibly require reformation of its water law, especially the right to take and use water.

Professor Gardner then gave a brief overview of the foundations of Australian water law. Australia is a federation of six states. Its constitution is a marriage of English parliamentary democracy and American federal democracy. The Australian Constitution distributes legislative power and sovereignty over natural resources between the states and the Commonwealth (national) Parliament. The Commonwealth Parliament, like the United States Congress, has limited, enumerated legislative powers. Importantly, those powers do not include the power to legislate with respect to natural resources, while the states retain the "residual" power to make laws regarding anything, including natural resources and water. The Australian Constitution also gives states sovereignty over natural resources, giving them the power to grant rights to take and use water.

Professor Gardner explained that current Australian water rights laws are based on a mixture of the English common law riparian tradition and more modern licensing regimes encompassed by state statutes. Under this system, landowners have the right to take and use water for domestic purposes, including livestock watering, while water use for commercial purposes requires procurement of a state license. According to Professor Gardner, the general goal of water management laws in Australia is ecologically sustainable development, with heavy emphasis on setting aside sufficient water to maintain the environment before determining the amount available for consumptive use.

Professor Gardner next described the current scientific understanding of climate change impacts on southwest Western Australia. Specifically, a recent report by the Australian Climate Commission shows that declining rainfall and increasing average temperatures are beginning to have serious negative impacts on agriculture and urban water supplies in southwest Australia. Even during the recent La Nina event, which caused much of the rest of the country to experience heavy rainfall, the southwest remained dry. Additionally, recent projections for annual rainfall over the next twenty years almost unanimously predict continued drying in southwestern Australia. Professor Gardner pointed out that recent studies by the Indian Ocean Climate Initiative all but confirm that rainfall reductions in southwestern Australia are consistent with human-induced climate change.

Professor Gardner then described the water infrastructure and water needs of the southwest. Southwest Western Australia has a rapidly growing population of roughly two million with an economy historically rooted in agriculture and mining. Traditionally, the southwest relied on surface water but is **[\*160]** now heavily reliant on groundwater in order to make up for declining precipitation.

Total water consumption in the southwest increased steadily during the last decades of the 20th century. However, Professor Gardner highlighted the fact that recent data show total consumption in the region is stabilizing, population increase notwithstanding. This trend reflects the growing recognition of water scarcity and the success of reductions in per-capita consumption. In spite of this, per-capita consumption remains relatively high by both Australian and international standards. In fact, without further adaptation, growing demand coupled with shrinking supply due to climate change will produce a water shortage of 365 gigaliters by 2060.

Professor Gardner then focused specifically on the effects of climate change on the water supply serving Perth, Western Australia's largest city. Traditionally, Perth relied primarily on surface water, especially for its public water supply. As surface water supplies began to dry up in the late 1970s, Perth began to increase its reliance on groundwater resources and finally resorted to desalination in the early 2000s. However, according to Professor Gardner, even with increased use of desalination, these combined sources are proving insufficient in the face of a rapidly drying climate. In the future, water resource managers will need to find other water sources to meet the demands of a rapidly growing population.

Professor Gardner, with input solicited from the audience, then proffered several possible supplementary supplies that Perth could look to in the future. For example, Professor Gardner suggested wastewater recycling, increased conservation, and inter-basin transfers. However, using these supplies presents various obstacles, including ecological concerns and political opposition. Professor Gardner therefore identified "managed aquifer recharge" as one of the more promising solutions.

Professor Gardner next discussed each of Perth's current main water supplies, beginning with the Perth Hills Dams, the major source of surface water for the city. Distressingly, over the past century, average run-off into these dams has fallen by more than fifty percent to an all-time low of thirteen gigaliters in 2010, representing a paltry three percent of the historic average.

Groundwater is another major water source for Perth. Originally seen as a backup to the Perth Hills Dams, use of the major aquifers underlying Perth, called the Gnangara Groundwater System, has steadily increased over the past decade. Now, the Gnangara supplies roughly sixty percent of Perth's water supply. Increased pumping has lead to a steady drop in the aquifer's level to such a degree that the upper, or superficial, aquifer is now at its lowest level on record. This drop has lead to increased drilling into the lower aquifers of the system, the Leederville and Yarragadee aquifers. Though these lower aquifers contain relatively large amounts of water, increased use of the Leederville and Yarragadee has precipitated a drop in the level of the superficial aquifer due to the hydrologic connection between the superficial and Leederville/Yarragadee aquifers.

Professor Gardner highlighted the fact that users are over exploiting Perth's groundwater resources with a newspaper article featuring Loch McNess, a lake in Perth's northern suburbs. As a boy growing up in Perth, **[\*161]** Professor Gardner remembered rowing boats on Loch McNess with his family, an activity that would be impossible now that the lake is essentially dry. Professor Gardner then explained how the state water utility has consistently failed to abide by the legal limits on groundwater drawdown already in place, which is exacerbating the situation. Unfortunately, it is difficult to tell whether climate change or overuse is the primary factor leading to such low aquifer levels. Further complicating matters are the large number of other, non-municipal water rights holders, including agricultural and industrial users, and well as a significant number of unlicensed users.

In the face of this water shortage, Perth has increasingly turned to desalination. Though approximately half of the city's water now comes from desalination, according to Professor Gardner, the climate is drying faster than the city can build desalination capabilities, requiring increased reliance on other sources such as wastewater recycling.

Professor Gardner then discussed the current state of Western Australia's water law. The current licensing scheme in Western Australia includes a landholder eligibility requirement, a fixed term generally ten years in length, as well as the right to renew the license after the term has expired. Each license specifies the land upon which the user can apply the water, up to an annual maximum. However, the licensed maximum is subject to scarcity reductions at the direction of the state water minister. Though there are limits in place to protect the environment, according to Professor Gardner, limited metering and poor enforcement have severely limited their efficacy.

Though climate change has hit Western Australia particularly hard, the other states of the Commonwealth have experienced similar problems. This led the Commonwealth government to develop a National Water Policy to help deal with the adaptation crisis. As Professor Gardner explained, the key principles of the National Water Policy include transitioning to tradable water rights removed from landholder requirements, improving metering and reporting, national oversight of state water markets, proportional sharing of scarcity, and a comprehensive water planning system. Though Western Australia initially resisted, it has recently accepted the National Water Policy and is moving toward implementation of a planned water property rights regime based on a system of proportional sharing of scarcity among licensees.

In closing, Professor Gardner compared the changing nature of Australian water law with ***Colorado*** water law. Western Australia is moving towards a property rights regime like that in ***Colorado***. However, unlike in ***Colorado***, the new Australian scheme will incorporate a system of central planning that is bound to first provide adequate water for environmental flows. Another major difference between the ***Colorado*** system and the emerging Western Australian system is the formula for sharing scarcity. Instead of a hierarchy founded on historical priority, the new system in Western Australia will require proportional sharing of scarcity.

Nathanial Brown **[\*162]**

[*24TH*](https://advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8T9R-T2H2-8T6X-7316-00000-00&context=1516831) ANNUAL SOUTH PLATTE FORUM: THE INS AND OUTS OF THE SOUTH PLATTE BASIN

Longmont, ColoradoOctober 23-24, 2013 Swimming In As part of its twenty-fourth annual proceedings, the South Platte Forum hosted a discussion on fish in the South Platte Basin. Titled "Swimming In," the three-part discussion focused on the heritage of ***Colorado***'s state fish, fish management by flow management, and improvement of urban streams for native warmwater fishes.

Dr. Kevin Rogers, a fisheries scientist and member of the Aquatic Research Group for ***Colorado*** Parks and Wildlife ("CPW"), spoke about the greenback cutthroat trout (the "greenback"), ***Colorado***'s state fish since 1994. Often referred to as the "blackspotted trout" and once believed to be extinct, in 1973 the government designated the greenback as one of the first species listed as endangered under the Endangered Species Act ("ESA"). Downlisted from endangered to threatened in 1978 and currently poised for delisting entirely, Dr. Rogers noted the greenback is one of the "shining stars" of the ESA due to the success of multiple conservation efforts.

Dr. Rogers described recent historical research and scientific analyses of the greenback's DNA that revealed much about the greenback's lineage. For example, in the mid-1850s, William A. Hammond, a Civil War surgeon and eventual Surgeon General of the United States Army, served as medical officer on an expedition from Fort Riley, Kansas that attempted to find a pass to the Oregon Trail. Dr. Rogers obtained copies of notes Hammond made and sent to the National Archives at Philadelphia after his expedition. In these notes, Hammond mentioned the blackspotted trout. Dr. Rogers plotted Hammond's notes on a timeline and determined that Hammond made his notes regarding the blackspotted trout in what is now ***Colorado***. Hammond also managed to collect and send trout specimens to the National Archives. Dr. Rogers reported that scientists analyzed DNA taken from these preserved specimens and confirmed that the fish that eventually became ***Colorado***'s state fish derived from around sixty populations of ***Colorado*** ***River*** cutthroat trout on the Western Slope.

Dr. Rogers stated that ***Colorado*** has been home to six distinct lineages of greenbacks, but a fire near Pagosa Springs in the summer of 2013 wiped out one of these populations. Another of these six lineages, which Dr. Rogers considers "the true greenback cutthroat trout" due to its lack of hybridization, is native to the South Platte Basin on Bear Creek near ***Colorado*** Springs. In mid-September 2013, historic rains increased the flow on this creek from a normal flow rate of five cubic feet per second ("cfs") to an estimated 169 cfs. According to Dr. Rogers, the September 2013 flood might actually improve these fishes' habitat on Bear Creak, "assuming they are still there."

In a discussion entitled "Managing Fish by Managing Flows: A Wild Rainbow Story in Elevenmile Canyon," Ken Kehmeier, Senior Aquatic Biologist in the Platte Basin for CPW, discussed recent successes in wild rainbow trout **[\*163]** ("rainbow") management. Elevenmile Canyon lies southwest of Lake George in Park County, ***Colorado***. CPW manages the upper section of the canyon as a self-sustaining wild rainbow trout fishery, which means no stocking is required.

Since 2003, the rainbow population in this area has consistently declined. In light of this realization, Mr. Kehmeier and his associates began studying the factors that might have contributed to the decline. According to Mr. Kehmeier, rainbows in this area tend to spawn in mid-to late-April depending on the temperature of the water, which warm-water releases from the Elevenmile Canyon Dam can alter. After studying years of data, Mr. Kehmeier's team determined that in years with sustained populations of rainbows, flow rates downstream of Elevenmile reservoir and Spinney Mountain reservoir remained stable. However, in recent years with demonstrated low population growth, overlapping data suggested that flows created by "untimely" releases from these reservoirs were responsible for the rainbow population decline. Mr. Kehmeier said releases from the reservoir in April and June simply "washed out" trout eggs and fry, thus depleting the populations.

As a result of his team's findings, CPW met with officials from Denver Water and Aurora Water in March 2011 and February 2012 to discuss possible changes to releases and flow rates downstream of Elevenmile Canyon to attempt to increase the wild rainbow trout population. According to Mr. Kehmeier, the existing population of rainbows in the upper section of the canyon increased by only seventy fry in 2010. As the result of collaboration with the pertinent water authorities, the existing population in the upper canyon section grew by a total of 672 fry in 2011 and 2012. In 2013, demands on Denver Water prevented it from instituting the improvements from the previous two years. As a result, the population of trout fry declined once again, thus proving the relationship between flow rates and wild rainbow trout populations in the upper section of Elevenmile Canyon and the need for continued collaboration between water managers and fisheries managers. Mr. Kehmeier stated that even with losses in 2013, "if the wild rainbow trout population can increase two to three years out of every five, the overall population will tend to improve."

With respect to the September 2013 flood, Mr. Kehmeier said ***river*** fish populations experienced virtually no changes. In fact, from a fisheries standpoint, Mr. Kehmeier said the flood was "almost an ecological reset on a lot of our ***rivers***," essentially a cleaning of the ***rivers***. Mr. Kehmeier acknowledged that the September flood was devastating, but he noted "the fish survived the flood way better than we as people did."

In the final discussion of "Swimming In," Ashley Ficke discussed how to improve urban streams for native warmwater fishes. Ms. Ficke, a doctoral candidate in fisheries biology at the University of ***Colorado*** at Boulder, described the South Platte as an "urban stream," a transition zone between the mountains and the plains. According to Ficke, "transition zone streams" in ***Colorado*** are highly modified because of their spatial relation to urban areas, differing greatly from mountain and plains streams in terms of geomorphology, physicochemical characteristics, and hydrology.

**[\*164]** Ms. Ficke described urban streams as home to a unique combination of species that tend to have a large diversity of body size, lifespan, and reproductive strategy. Accordingly, urban stream species have "impressive physiological tolerances" to large temperature ranges, dissolved oxygen levels, and salinity levels. As illustrations of their ability to adapt to changing needs, urban species tend to be omnivorous and can make wide changes in habitats if compelled to do so by flooding or seasonal changes.

Despite a high tolerance to urban environments, Ms. Ficke stated that assemblages of fishes in urban streams are declining. These declines are due to "extensive human modifications" in and around the streams such as alterations of flow rates, sedimentation, changes to water quality, fragmentation, channelization, and introduction of nonnative species. According to Ms. Ficke, dams and diversions cause changes in flow patterns that can adversely affect opportunities for foraging, spawning and refuge. Changes in sediment regimes can suffocate incubating eggs and increase competition for food and predation amongst existing populations. "More water is not always beneficial," according to Ms. Ficke: higher flow rates can lead to limited refuge during spates and floods and limited habitats for spawning and rearing. Hence, urban fish have "nowhere to hide" in channelized systems. Ms. Ficke concluded by stating that the persistent introduction and growth of nonnative species in urban streams will continue to pose significant challenges to existing and future populations of urban fish species as fish fight for habitat and food.

"Swimming In" proved to be a useful mix of history, biology and the current reality. From tracing the roots of ***Colorado***'s state fish, to fisheries scientists collaborating with water managers to spur trout populations while maintaining domestic needs, to the challenges faced by fish that prefer the city to the country, these speakers fascinated and educated the attendees of the twenty-fourth annual proceedings of the South Platte Forum.

J. Keith Tart

Digging In

As part of its two-day conference, the South Platte Forum hosted a panel that discussed ***Colorado*** agriculture and the effects of the September 2013 floods on livestock and crops in the South Platte Basin.

The first speaker, David Petrocco, a local vegetable farmer in Adams and Weld Counties, discussed the basics of local agriculture, including methods of applying water to crops, water conservation, and the beneficial uses of water. As Petrocco explained, timely irrigation is every farmer's main concern. A lack of adequate water stresses certain crops and affects their marketable quality. Irrigation wells were useful resources for timely irrigation prior to 2006. However, due to severe drought in 2006 the State of ***Colorado*** shut down many irrigation wells, which impacted the production of crops.

Most importantly, Petrocco discussed the challenges of water conservation. Noting the significance of agriculture, Petrocco suggested that, along with improving irrigation efficiency, water conservation efforts should focus on cities and municipalities decreasing the watering of golf courses, parks, and road frontages in order to provide more water to agriculture. Petrocco also discussed **[\*165]** the problems of pondweeds, aggressive vegetation that grow on the bottom of ***rivers*** that raise water levels, restrict the water's flow, and ultimately consume a great amount of the water in which they grow. Even though the South Platte ***River***'s quality has improved greatly, Petrocco argued these pondweeds were a growing concern deserving immediate attention.

Next, Adrian Card and Keith Maxey discussed the on-the-ground impact of the September 2013 flood on the ***Colorado*** farming community. Card serves as Boulder County's Agricultural and Natural Resources Extension Agent with ***Colorado*** State University in Boulder County. Maxey is the Weld County Director and Livestock Extension Agent with ***Colorado*** State University. Their presentation started with a video showing aerial footage of the flooding and its subsequent destruction in Longmont and other areas of ***Colorado***.

Card and Maxey spoke about how the flooding greatly affected mountain communities by destroying roads and restricting access. In Weld County, the flood closed over one hundred roads. Even a month after the flooding, crossing over the Platte ***River*** was cumbersome for children trying to get to school and for farmers making product deliveries.

Card and Maxey then discussed floodwater contamination of local crops. Concerned with floodwater mixing with various contaminants like raw sewage, oil and gas spills, and pesticides from agricultural fields, the United States Food and Drug Administration (FDA) declared that any crop touched by floodwater was adulterated and thus unmarketable. This had a dramatic and expensive toll on the affected ***Colorado*** farmers. In the South Platte Basin, crop loss from floodwaters estimated between $ 3.5 million and $ 5.5 million.

The final speaker, Sean Cronin, discussed what water providers focused upon in the aftermath of the flood. Cronin is the executive director for the St. Vrain and Left Hand Water Conservancy District. Cronin reported that in District Five of the Conservancy District the flood damaged 101 ditches and reservoirs, amounting to almost $ 10 million of estimated damage. Cronin mentioned, however, that this number might decrease as water levels subside and infrastructure shows less damage than previously feared.

Cronin then discussed flood recovery. First, Cronin mentioned the availability of Federal Emergency Management Agency (FEMA) Public Assistance available to those who apply. Second, Cronin discussed ***Colorado*** Water Conservation Board ("CWCB") loans and grants, which apply to individuals who experienced approximately $ 1-2 million in damages. The loan carries no interest and no payments for three years. Third, Cronin mentioned partnerships forming between many different agencies interested in helping support the affected water users. Lastly, Cronin described local "stream teams," which consist of local volunteers, engineers, and water experts. The CWCB headed the state "stream team," which provided technical assistance to local groups by coordinating and aiding them with financial assistance and permits. However, aiding water users without creating conflicts and obstacles proved challenging. Justifiably, water users want to make long-term repairs immediately even though it might be more beneficial and financially prudent to make incremental short-term repairs.

Cronin commended the emergency response teams and acknowledged the heroism, human kindness, and leadership during the devastating floods. **[\*166]** However, he also stressed that ***Colorado*** lacked any kind of emergency flood plan and argued ***Colorado*** needed to address and plan for future floods.

Overall, the panel extensively addressed the concerns of the September flooding, the effects of the flooding, and what ***Colorado*** could do better in the future.

Devon Bell

ENVIRONMENTAL ENTREPRENEURS (E2) ECOSALON

Denver, COOctober 29, 2013 Water Wise: Meeting ***Colorado***'s Water Challenges Environmental Entrepreneurs ("E2") is an independent non-partisan organization uniting business and environmental leaders to shape state and national policy. E2 is an affiliate of the Natural Resource Defense Council ("NRDC"). Donations supporting E2 go through the NRDC and the two organizations share staff. Due to the close affiliation between the two non-profits, the NRDC and E2 both value environmental advocacy and sustainability. However, E2's mission expressly seeks engagement of business leaders to achieve the shared goals of the affiliated organizations. E2's mission is "to create a platform for independent business leaders to promote environmentally sustainable economic growth."

On October 29, 2013, at Deloitte Consulting's office in downtown Denver, E2 hosted a panel to discuss the topic "Water Wise: Meeting ***Colorado***'s Water Challenges." Panelists included Will Sarni, Director of Enterprise Water Strategy at Deloitte; Jerry Tinianow, Chief Sustainability Officer of the City of Denver; Greg Fisher, Chief Planner for the Denver Board of Water Commissioners ("Denver Water"); and James Eklund, Director of the ***Colorado*** Water Conservation Board ("CWCB"). In light of E2's recently released report titled "***Colorado*** Water Supply and Climate Change: A Business Perspective," each speaker addressed questions relating to water conservation and efficiency in ***Colorado***.

Will Sarni discussed three categories of value that he contemplates when consulting with a wide variety of companies to strategize their water management. Sarni asserts that the three risk categories for business value are physical risks, regulatory risks, and reputational risks. Physical risks, for instance, could be the temporary unavailability of water. Regulatory risks range from the reallocation of water away from business production to meet more urgent needs during times of drought to the suspension or withdrawal of the supplier's license or permit. Reputational risks refer to the potential for negative exposure or public outcry against a business for its water-use practices. Among other things, when Sarni consults with businesses about the location of manufacturing plants he asks whether the business will have access to water in twenty years at that location and from where the water to support growth projections will come. Will Sarni's role at Deloitte Consulting led him to encourage business leaders to incorporate water stewardship into their corporate risk management plans.

**[\*167]** Denver's Chief Sustainability Officer, Jerry Tinianow, discussed the city government's sustainability agenda. Denver's plan encompasses twelve areas: air quality, climate change, energy, food, health, housing, land use, materials, mobility, workforce, water quantity, and water quality. For each of the twelve resources, Tinianow has specific goals for the government with a separate, but complementary, set of community goals. Tinianow expressed the city government's water quantity goal to reduce use of potable water for irrigation of parks and golf courses by 22 percent to an eighteen gallon per square foot average, and to reduce use of potable water in city buildings by 15 percent over a 2011 baseline. Tinianow stressed that half of the water used in Denver currently goes toward watering golf courses and parks, though he seemed optimistic about meeting Denver's conservation goals by 2020.

Greg Fisher, the Chief Planner for Denver Water, outlined how the Board supplies the Denver area with sufficient clean water and how it plans to do so in the future. As Fisher explained, Denver Water serves 25 percent of ***Colorado***'s population while only using 2 percent of the state's water. Fisher claimed there are still conservation opportunities, but acknowledged Denver Water's successes thus far. Fisher asserted that Denver Water serves 30 to 40 percent more people than it did in 1980, yet it uses the same amount of water as it did in 1980. One contributing factor for this conservation success was the dramatic reduction in household use that occurred when Denver Water installed meters on all homes in 1990.

In terms of future conservation, Denver Water's current goals involve a push for innovation of WaterSense-labeled indoor fixtures and higher water efficiency levels for households. Since multifamily homes use half as much water per household on average as single-family homes, Fisher encouraged thoughtful land use planning as a tool to achieve higher efficiency. Denver Water will continue employing their four-tiered rate scale in the future, which incentivizes conservation. The affordable first tier rate ($ 2.59 per 11,000 gallons per month) accounts for most households' entire water use. But the cost of water increases sharply above that tier because using more than 11,000 gallons per month indicates outdoor watering. Fisher argued that this tiered scale is a practical and equitable solution because it allows everyone to have cheap access to the amount of water they need to live and it discourages uses Denver Water views as inefficient, such as watering grass. Under Greg Fisher's guidance, Denver Water seems poised and ready for ***Colorado***'s water future in the short term. That said, Fisher predicted that the solutions might need to be more extreme if the state's population doubles from five million people to ten million by 2050, as many people expect.

Finally, James Eklund, Director of the CWCB, discussed the context of ***Colorado***'s water situation and the creation of a comprehensive water plan. He asserted that in certain settings - education, healthcare, and transportation, for example - we fear the unknown, but with water issues we fear the known because there are so many studies and statistics displaying a tense, dry future for the American West. Eklund encouraged the audience to trust the state demographers' accuracy in their projections of an additional two million people in ***Colorado*** by 2030. Eklund stressed how critical it is for ***Colorado***'s interstate situation that the state has its intrastate house in order due to ***Colorado***'s **[\*168]** status as a headwater state with many binding compacts. Arizona, ***Colorado***, and Washington are the only states in the West without comprehensive water plans. Through an executive order in May 2013 Governor John Hickenlooper directed the CWCB to commence work on the ***Colorado*** Water Plan, which Eklund is currently working on.

The CWCB's comprehensive water plan will be a dynamic document amended every two to five years. Eklund stated that the CWCB's goals include addressing the gap between supply and demand, incentivizing quicker regulatory processes for businesses wanting to establish in ***Colorado***, and devising a statewide comprehensive water plan. Eklund also called for the need to formulate alternatives to "buy and dry," which refers to users (typically municipalities) in one location buying water rights from other users (typically farmers) and drying up vast swaths of land completely. Eklund concluded by reminding the audience that Mother Nature and hydrology require that we move quickly.

The E2 conference served as a platform to begin an informed conversation between entities that value a strong economy built on responsible water use and conservation. A predictable and secure water future for the West is in the best interest of the community and the economy, so E2's effort to engage a wide array of participants in the discussion is a step in the right direction.

Emily Dowd

***COLORADO*** BAR ASSOCIATION AND CONTINUING LEGAL EDUCATION IN ***COLORADO*** INC. PRESENTS: GROUND WATER REGULATION - HISTORY AND FOCUS ON DIVISION 1, 2, AND 3

Denver, ColoradoOctober 30, 2013 History of Ground Water Regulation from a Technical Perspective James Slattery, a professional engineer who serves as Water Engineer for the Republican ***River*** Water Conservation District, presented on the topic of the changing ways engineers and hydrologists evaluate the effect of ground water withdrawals on nearby surface streams. Slattery has provided expert testimony for the State of ***Colorado*** in two arbitration hearings and is also an engineering representative on a team that is designing a $ 21 million pipeline system to collect and deliver well field water to the North Fork of the Republican ***River***.

The current techniques for determining the relationship between the amount of pumped water from underground aquifers and the decrease in surface water is the result of more than a century of evolving ground water measuring techniques. In 1856, Henry Darcy, when experimenting with water flow as it traveled through porous mediums, discovered a rule to predict groundwater flow in any situation, later becoming "Darcy's Law." This rule was rudimentary in its practicality because it did not include any unit of time, which made it unruly in application. However, Darcy's Law laid the foundation for future inventions that sought to predict with greater precision the measurement **[\*169]** of ground water flow and the effects groundwater pumping would have on surface sources. Darcy's Law was the prevailing measuring technique during the implementation of the majority of ***Colorado***'s wells.

Nearly a century later, after analyzing the similarities between water traveling through a porous medium and heat's dispersal through metal, Robert Glover, from ***Colorado*** State University, predicted the magnitude of depletion pumping a well had on a nearby ***river***. The test, later known as the Glover Equation, became the standard measuring unit for groundwater extraction on surface water in ***Colorado*** and across the U.S. This test proved more applicable than its predecessors despite the need to rely on certain assumptions during any study. These assumptions included: the tapped aquifer is isotropic and homogeneous, the surface stream having no meanders, water table is flat, and the well pumping is consistent.

Upon its creation in 1976, Stream Depletion Factor ("SDF"), an alternative to the Glover Equation, quickly became the industry standard. The approach relies on the premise that, from the time a well is pumping continuously, the affected stream's volume decreases by twenty-eight percent of the pumped volume. However, the SDF technique had many of the same assumptions implicit in the Glover Equation, and it was not until hydrologists recalibrated the equation in 1974, naming it the "Jenkins and Taylor SDF Approach," that a truly reliable technique existed to address recharge and depletion values on streams from ground water pumping. The Jenkins and Taylor SDF Approach incorporated irregular aquifer boundaries and stream meanders into the formula, enabling assessors to realize that drawing ground water has a lagging effect on the surface stream. Steadily pumping a well for a month will create a depletion in the surface water that month, and, if the surface water is not recharged, for many months into the future.

After more than a century of evolving techniques, surveying groundwater has now become digital, in the form of the U.S. Geological Survey MODFLOW code. The 3-dimensional, public-domain software solves the groundwater equation in a finite-difference framework. Hydrologists are able to simulate coupled groundwater and surface water systems with the assurance of peer review processes. There is still debate in the water law community and among hydrologists as to just how accurate and reliable MODFLOW is, given the varied situations to which it is applied. However, with the current technology available, it is impossible to determine with certainty the exact impact on surface waters by ground water wells.

MODFLOW has proven itself to be extremely valuable. With the aid of MODFLOW, hydrologists and engineers working on water rights issues in ***Colorado***, specifically in Districts 1, 2, and 3, are addressing water systems with levels of certainty that would have been impossible before. In District 1, the 2002 droughts forced many senior claimants to seek redress from those with groundwater rights. MODFLOW played an integral role in the subsequent replacement plans in the South Platte ***River*** Basin, which also required the cessation of hundreds of wells. In District 2, the court in the landmark case Kansas v. ***Colorado*** relied heavily on various MODFLOW models to determine that ***Colorado***'s groundwater wells were depriving Kansas of state-line flow of the Arkansas ***River*** required by compact. In District 3, the Rio Grande **[\*170]** Decision Support System is using MODFLOW along with additional geohydrological data to improve regional knowledge of groundwater impacts on surface water.

Matt Freemann Legal History of Ground Water Regulation Veronica A. Sperling, Esq. of Buchanan and Sperling, P.C. gave a presentation on the Legal History of Ground Water Regulation in ***Colorado***. Although her presentation covered all ground water regulation, Veronica primarily focused on the type of wells that generated most of the legal history-high capacity irrigation wells that pump tributary ground water.

Most high capacity irrigation wells were drilled between 1930 and 1970, when there were few ground water regulations. The irrigation wells pumped large quantities of tributary ground water that would have otherwise ended up in a stream, thus affecting the amount of surface water available to surface water right holders. Conflict between surface water users and groundwater users began as early as the 1950's. Ground water regulation's most pressing legal issue was how to belatedly integrate ground water users with the surface water prior appropriation system.

The first instances of a legislative attempt to reconcile ground water and surface water uses were the 1953 Act and the 1957 Act. The 1953 Act required well drillers to obtain a license, give notice before drilling, and submit well logs after drilling. The 1957 Act repealed the 1953 Act and required the State Engineer to issue permits to drill water wells. The 1957 Act expressly stated that the well permit did not confer a water right, and the legislature obligated the State Engineer to issue all permits, provided all the fees were paid.

Ground water regulation's next evolution came in 1965 with House Bill 1066 and the ***Colorado*** Ground Water Management Act. HB 1066 defined the State Engineer's duty to administer tributary ground water within the surface water prior appropriation system. The Ground Water Management Act allowed the State Engineer to deny a ground water well permit for the first time.

The 1965 Act was challenged in Fellhaur v. People. The State Engineer tried to curtail ground water use in the Lower Arkansas Valley. The ***Colorado*** Supreme Court ruled that the State Engineer violated the ***Colorado*** Constitution's due process and equal protection clauses. Furthermore, any ground water curtailment must be supported by reasonable written rules and regulations, reasonably lessen a material injury to a senior surface water rights, and allow wells to operate as long as senior water users were protected. The court also opined the need for "maximum utilization" of ***Colorado***'s water resources. Maximum utilization is now integrated into statute and called "optimum utilization." Optimum utilization does not advocate using every available drop of water, as maximum utilization did.

In 1967, partially in response to Fellhaur v. People, ***Colorado*** passed Senate Bill 407. SB407, among other things, called for ground water studies. The 407 studies concluded that pumping ground water had infringed senior surface water rights. These results, coupled with increasingly depleted surface **[\*171]** flows, compelled the state to administratively integrate ground and surface water uses in the 1969 Act. The 1969 Act encouraged ground water users to adjudicate their water rights through water courts and integrated ground water wells into the surface water priority system by using augmentation plans.

***Colorado***'s Water Division One, the South Platte ***River*** basin, stayed closest to the 1969 Act by using augmentation plans to regulate ground water. The State Engineer promulgated rules governing ground water use for the South Platte in 1974, which resulted in the State Engineer approving Central GMS and GASP annual operating plans as temporary substitute supply plans even though the State Engineer's approval was not authorized by statute. The State Engineer's power to approve the temporary substitute supply plans was successfully challenged first in 2002 by Empire Lodge Homeowners' Association v. Moyer and in 2003 by Simpson v. Bijou.

The same day the Simpson decision was handed down, the ***Colorado*** Governor signed Senate Bill 03-73 into law. SB 03-73 named December 31, 2005 as the date to curtail pumping in all ground water wells in District One unless the well had a water court approved augmentation plan, a pending application for an augmentation plan, or a well could operate under its own priority without need for an augmentation plan. Division One has approximately three thousand wells with approved augmentation plans with hundreds more augmentation plans pending approval.

In 1973 the State Engineer also promulgated rules for Water Division Two, the Arkansas ***River*** basin, which allowed the State Engineer to curtail ground water pumping up to four days per week to prevent injury to senior surface water rights. In 1974 the State Engineer tried to promulgate rules that would further curtail ground water wells, but the Supreme Court in Kuiper v. Atchison, Topeka & Santa Fe Railway ***Co***. that there was insufficient operating experience under the 1973 rules to justify decreased ground water pumping.

In 1985 Kansas claimed that ***Colorado*** violated the 1949 Arkansas ***River*** Compact because ground water wells drilled after the Compact were depleting the usable flows at the state line. Kansas sued ***Colorado***. In 1994 the United States Supreme Court held that ground water pumping in ***Colorado*** had violated the Compact. In 1996 new well pumping rules were promulgated, replacing the 1973 rules. The 1996 rules imposed an augmentation requirement for all wells in the Arkansas ***River*** basin.

Veronica stated that ground water regulation in Water Division Three, the Rio Grande ***River*** basin, lagged behind Water Divisions One and Two. In 1966 Texas and New Mexico sued ***Colorado*** for violations of the 1938 Rio Grande ***River*** Compact. ***Colorado*** agreed to meet the conditions of the 1938 Compact and the State Engineer began to substantially curtail surface water uses. In 1975 the State Engineer proposed new rules that would limit ground water pumping over a five year period unless a well had a court approved augmentation plan. The rules were protested and after a lengthy appeal process the District Three water users adopted the "60/40 Agreement" in 1985. The 60/40 Agreement provided protection only for 1985 use levels and only for then-existing wells. In 1998 ***Colorado*** addressed post-1985 ground water uses by passing HB 98-1011, which contained criteria to guide the State Engineer in promulgating new ground water use rules. The new rules went into **[\*172]** effect in 2006. Additionally, ***Colorado*** passed Senate Bill 04-222, which prohibited the State Engineer from curtailing ground water withdrawals in Division Three wells that are part of a ground water management sub-district. The ***Colorado*** Supreme Court characterized SB 04-222 as an alternative to court approved augmentation plans. So far the water court has only approved one sub-district, Special Improvement District One, although five other sub-districts are planned for Water Division Three. Currently, approximately three thousand wells located outside Sub-district One are depleting stream flows in Division Three. The depletions are not being replaced and the State Engineer is not curtailing the wells.

Gabriel Kester

[*THIRD*](https://advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8T9R-T372-8T6X-731R-00000-00&context=1516831) ANNUAL CARVER COLLOQUIUM

Denver, ColoradoNovember 12, 2013 The ***Colorado*** ***River*** Compact: Effective or Obsolete? Lawyers, students, scientists, and the general public gathered to watch the 3rd annual Carvel Colloquium, an Oxford-style debate about the future of the ***Colorado*** ***River*** Compact ("Compact"). The event followed two years of stellar debates on timely topics - namely the push to build transmission lines for renewable energy sources and the question of who has primacy when it comes to regulating hydraulic fracturing of oil and gas wells. Professor Jan Laitos, holder of the John A. Carver Jr. Chair, hosted the debate and served as a moderator. Speaker-debaters included CEO and Manager of Denver Water, Jim Lochhead, and Assistant Provost of IE Research and Curriculum Initiatives for the University of Denver Sturm College of Law, Tom I. Romero.

Mr. Lochhead is recognized as one of the nation's foremost water rights and natural resources attorneys. He is the former executive director of the ***Colorado*** Department of Natural Resources and past shareholder at Brownstein Hyatt Farber Schreck, where he worked on issues relating to water rights, interstate water matters, the Endangered Species Act, public lands and natural resources, zoning, land use, and real estate development. Professor Romero teaches and researches in the areas of the legal history of the American West, land use, water law, urban development, and local government, and has published extensively on these topics in prestigious law reviews.

Introducing the issue to the crowd, Professor Laitos discussed the value of ***Colorado*** ***River*** water in the past, today, and moving into the future. The ***river*** is an incredibly important source for water needs in ***Colorado*** and beyond. As the lifeblood of the West, especially the Southwest, the ***Colorado*** ***River*** serves seven states and two countries. Past intelligent management of the ***river*** allowed for economic growth in the arid west.

The Compact, signed in 1922 at the Bishops Lodge in Santa Fe, brought all seven ***Colorado*** ***River*** Basin states into agreement as to the allotment of ***Colorado*** ***River*** water. It has served as the foundation for the "law of the ***river***" ever since, but has many noted shortcomings. It famously overestimated the amount of water available from the ***Colorado*** ***River*** and failed to anticipate **[\*173]** certain demographic and climatic trends within the ***Colorado*** ***River*** Basin. While the agreement has served a noble purpose over the years, many have questioned the Compact's continued viability. To start the debate Professor Laitos asked the question: "Is the Compact still relevant; or should we throw it away and start over?"

Format for Oxford debates allots each speaker twenty minutes to make their case; afterward, each speaker has the opportunity for a five-minute rebuttal before the speakers accept questions from the audience. Professor Romero opened with the argument that the Compact signatories need to replace the Compact with a new system. To follow, Mr. Lochhead took the position that the agreement maintains viability in today's world.

Professor Romero highlighted the crisis; no other water body has been the source of more controversy. The ***Colorado*** ***River*** provides water to over 40 million people, 5.5 million acres of land, Native American tribes, national parks, wildlife refuge areas and more. The Compact was the first negotiation of its kind to agree upon water distribution. In the words of Professor Romero, it is "thus far the most ambitious illustration of interstate agreement."

Professor Romero explained that compacts, like contracts, can change by mutual consent or judicial decree and are not as resistant to change as constitutions. Although the Compact's format implicitly allows some change, barriers to such changes exist. Comparing the challenge of amending the Compact to the Constitution, Professor Romero noted that Congress has amended the Constitution significantly in the past ninety-one years and could likewise amend the Compact. In fact, Professor Romero explained that the expectation that future generations would amend the Compact is evident in the words of Compact signatory and Secretary of Commerce Herbert Hoover who, noting that the Compact had ample provision for readjustment at a later date, stated:

It seems to me almost fantastical to be fighting in the shadows of what may happen ...in seventy-five years hence....If we can provide for equity for the next 40 to 75 years, we can trust the generation after the next to be as intelligent as we are today. They will settle it in the light of the forces of their day.

Professor Romero argued that the forces of our day clearly indicate it is time to make a change. We need a new compact sufficiently nimble, adaptive, and responsive to changing times.

Professor Romero based his argument on three factors. First, the Compact is based on inadequate understanding of hydrology and an inadequate historical record. Compact participants relied on 1899-1920 records when precipitation and flows were unusually high/wet. They estimated the ***Colorado*** ***River***'s flow to be 16 million acre-feet annually. However, the reality is that severe drought has plagued the ***river*** since 1999, with annual flows averaging barely12 million acre-feet. Worse, lower average flows are predicted in the future. At the time of the Compact, none of the signatories could foresee the effects of climate change - less snow, decreased groundwater, and increased rates of evaporation - which over time may be potentially catastrophic. Professor Romero noted that the National Academy of Sciences has predicted that by 2060 water sources will experience a thirty percent decline. Under current **[\*174]** Compact parameters, the upper basin will bear the brunt of these impending shortages.

[*Second*](https://advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8T9R-T352-D6RV-H379-00000-00&context=1516831), Professor Romero argued the economic and social context of the ***Colorado*** ***River*** Basin was unsettled at the time of Compact formation. Although some locations of growth were predictable, for example southern California, the signatories could not have easily anticipated urban booms in Nevada and Arizona. Furthermore, in general the basin has experienced a shift from agricultural to urban needs. In asimilar but distinct way, user valuation has changed; people now appreciate the canyons, ***river*** and water for what they are and not their water consumption.

[*Third*](https://advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8T9R-T372-8T6X-731R-00000-00&context=1516831), and finally, Professor Romero argued the Compact failed to include important sovereign interests - namely, Native Americans and Mexico. Despite the notion of equity, fairness, and commitment governing the use of ***Colorado*** ***River*** system, neither Mexico nor American tribes had a seat at the original negotiation table. Compact commissioners felt no legal obligations to their riparian neighbor to the south. It was not until 22 years later, in 1944, that the United States and Mexico entered into a contract guaranteeing 1.5 million acre-feet per year (forty percent of the 3.6 million acre-feet Mexico sought), a contract that left no room for future growth. Unfortunately, U.S. tribes received even less acknowledgement. From a purely structural perspective, American tribes arguably deserved similar status as states. In fact, fifteen years before the signing of the Compact, the Supreme Court case Winters v. United States determined that the federal government impliedly reserved water for needs of native communities at the establishment date of the reservation.

Professor Romero left the audience with the argument that, ultimately, the basin states need the courage to re-think the Compact, whose shelf-life has expired, and, at a minimum, the agreement warrants amendments in the face of significant economic, environmental, and political shifts.

From the other prospective, Jim Lochhead fully supported the ***Colorado*** ***River*** Compact as it stands. He pointed out that Denver Water serves over 1.3 million customers, and half of the water comes from the ***Colorado*** ***River***. Much of what drives both the ***Colorado*** and U.S. economy is at stake with the Compact. Mr. Lochhead explained that the basic Compact obligation of Upper Basin states is not to deplete flows to the Lower Basin below 75 million acre-feet over a ten-year average.

In his argument, Mr. Lochhead made four main points. First, if we were to follow Professor Romero's suggestion and re-negotiate the Compact, the Upper Basin states could potentially end up with a reduced Compact allocation. As it stands, the Upper Basin has the right to use 7.5 million acre-feet in a given year, but currently fails to put that entire amount to beneficial use. This is especially true in drought years, when the water simply isn't physically available. The Compact also allocates 7.5 million acre-feet to the Lower Basin, plus an additional 1 million acre-feet for tributary inflow. Unlike the Upper Basin, the Lower Basin regularly uses its entire Compact allocation. This raises the question - if we were to renegotiate the Compact based on the historic consumptive use of the Upper and Lower basins, how would allocations differ? Mr. Lochhead believes that the odds are likely that Lower Basin economies **[\*175]** would demand a larger share of the allocation and the Upper Basin would be left with less water to develop in the future.

Next, Mr. Lochhead argued the political process required to amend the Compact makes continued innovation within the current framework a logical choice. Within the Compact, it explicitly states that Congress needs to give its consent to any amendment, and then it becomes federal law. Such amendment would also require the approval of seven states legislatures. Noting Congress' recent performance, Mr. Lochhead believes that amending the Compact is an unlikely outcome. Given the potential for gridlock, Mr. Lochhead argued we frankly do not have time for this political process to unfold. The last fourteen years are the driest in history. For example, Lake Powell, the main storage facility for the upper basin - yet, is approaching the minimum power pool of the reservoir. If drought continues and the water falls below the power generation level, then low water levels will compromise operational integrity and the Glen Canyon Dam will not be able to physically move the required 7.5 million acre feet of water owed to the lower basin states.

[*Third*](https://advance.lexis.com/api/document?collection=statutes-legislation&id=urn:contentItem:8T9R-T372-8T6X-731R-00000-00&context=1516831), alterations in the Compact would undermine nearly 100 years of law that has come to be known as the "law of the ***river***". States have developed statutory frameworks and organized agencies around the Compact. Significant case law at the state and federal level interprets Compact obligations. In short, a lot is dependent on the Compact. Amending the Compact would be a complex, time consuming and overwhelming exercise.

Lastly, Mr. Lochhead argued that "if it aint broke don't fix it." Mr. Lochhead believes that the Compact is not as rigid an agreement as detractors often proclaim. Instead, he believes it is simple and places minimal constraints on the Department of Interior. Because the document's provisions are clearly articulated and set forth, it gives states the ability to adapt and be nimble. For example, states and Department of Interior have implemented important environmental programs in the areas surrounding the ***Colorado*** ***River*** (e.g. the Grand Canyon Protection Act protects fish, beaches, and other conservation goals). Another example of flexibility is the fact that in 2007, basin states negotiated a coordinated operation allowing amazing flexibility through water banking and importation agreements. Mexico is now included in water quality and quantity agreements. As a highlight, Minute 319, signed by the U.S. State Department and Mexico last year, negotiated water quantity and quality rights amongst basin states, NGOs, and the Mexican government. The agreement provides Mexico access to U.S. reservoirs for pulse and base flows, joint projects, desalination, and other projects. Such cooperation allows stakeholders to provide for environmental, agricultural, and municipal needs in United States and Mexico. While the world faces enormous challenges ahead, this document is one of the best examples of effective management.

After the rebuttal, Professor Laitos opened the debate for questions. With overwhelming participation, Professor Laitos asked each debater six questions at the close of rebuttal. The ***Colorado*** ***River*** Compact: Effective or Obsolete? proved to be yet another successful event for the Carver Colloquium.

Heidi Ruckriegle

University of Denver Water Law Review

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