

1-1-2015

Desert Water: The Future of Utah's Water Resources

Kobi Webb

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Kobi Webb, Book Note, Desert Water: The Future of Utah's Water Resources, 18 U. Denv. Water L. Rev. 410 (2015).

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Desert Water: The Future of Utah's Water Resources, Univ. of Utah Press (Hal Crimmel ed., 2014); 240 pp; ISBN 978-1607813750.

Hal Crimmel is a Brady Presidential Distinguished Professor of English at Weber State University and founding co-chair of its Environmental Issues Committee. He is the editor of and contributor to *Desert Water: The Future of Utah's Water Resources*, a collection of essays by professors, social scientists, and policy makers studying current and future water resources in Utah. Crimmel aims in his book to increase public awareness of the importance of water and water-related issues in Utah. Through the perspective of each contributor, the book assesses the historical and current state of Utah's water resources, identifies current and future threats, critiques certain consumption policies and practices, and proposes solutions for managing the unrelenting demand on the state's waters. While *Desert Water* primarily focuses on water resources in Utah, decisions made within the state's borders are likely to impact surrounding states. Accordingly, many of the problems and solutions discussed in the book are relevant to water resources in similarly arid western states.

In the first chapter, "The Coming Challenge: Population Growth and Water Decline," Eric Ewert, a professor of geography at Weber State University, explores the inverse relationship between Utah's declining fresh water resources and its rapid population growth. These two trends, Ewert suggests, are set to combine with each other in what he refers to as the "water-population collision." Drawing on 2012 predictions, Ewert points out that due to a high birth rate and an influx of immigrants, the population in Utah is expected to double by 2060. At the same time, trends in the state show a continuous decline in its water supply and reservoir capacity. This is due, in part, to less runoff, earlier snow melts, evaporation, sedimentation in the reservoirs, and Utahans enjoying the second highest per-capita water use rate in the country. While Utah does not presently have a water shortage problem, Ewert contends, consumption will naturally grow alongside the population. So unless changes are made now, Utah's unsustainable water use rates will lead to a shortage crisis in the future. In his analysis, Ewert rejects some of the state's supply-focused policies and practices, such as building more dams and diversions. He instead recommends that Utah adopt more demand-focused policies, such as climate-appropriate landscaping, water education, and rate incentives.

In Chapter 2, Stephen Trimble, an award-winning author and teacher of writing at the University of Utah Honors College, authors "The Miracle at the End of the Line." The chapter is a personal story that considers the sources of water in the rural town of Torrey. In arid southern Utah, Torrey only receives an average rainfall of seven and a half inches per year. The rain and running water from Thousand Lake Mountain currently delivers fresh clean water to a population of one hundred and eighty people, a local agriculture system, and a few surrounding communities. Trimble describes how Mormons first pioneered the town in the 1870s and settled it through the cooperative construction of ditches and canals. As water storage and control continued to drive growth in the area, disputes inevitably arose over water allocation,

giving rise to discussions of equity and water politics. Trimble uses the rest of the chapter to illustrate how history and priorities continue to make our relationship with water complex and sometimes contentious. Using specific examples from the town, he ponders how much growth will come to Torrey, how much growth the town really wants, and how much it can reasonably sustain. In the larger context, Trimble's story of accessible water in Torrey symbolizes how growth and economic development in small towns across the arid west depend on infrastructure and access to affordable, clean water.

Craig Denton, author and professor of communication at the University of Utah, examines the nature and use of the Bear River in Chapter 3, "Bear River: Learning from a River That Closes Our Circle." Bear River is a lesser-known watercourse that begins and ends in northern Utah. Although it provides nearly sixty percent of the water to the Great Salt Lake, by the time it reaches residential areas the river is opaque, slow moving, and uninspiring. Denton contends that rivers that are revered, like the Colorado and Green Rivers, receive more protection than less celebrated rivers, such as the Bear River. Therefore, Denton's goal in this collection is to raise awareness and protection for the Bear River. He accomplishes this in two ways. First, Denton examines the river's regional importance to avian ecosystems, aquatic life, water rights holders, and the local population. Second, he discusses some of the river's most pressing threats, including additional proposed diversions, irrigation runoff, diminished biodiversity, and lower quantities of water due to climate change. Denton adds to these concerns by critiquing western water laws. He criticizes western water law's emphasis on prior appropriation. Specifically, Denton argues that the courts should see conservation as a beneficial use, especially since the Great Salt Lake lacks its own water rights. Denton ends the chapter by applauding the protection efforts of various governments and environmental groups. He also proposes several steps that Utahans can take to protect the river, including conservation awareness and increasing residential water rates.

In Chapter 4, George Handley authors "The Restoration of All Things: The Case of the Provo River Delta." Handley is a professor of interdisciplinary humanities at Brigham Young University. In this piece, Handley ponders why so many Utahans are apathetic towards the health of their local water ecosystems and addresses what he sees as personal roadblocks to conservation. In one sense, Handley articulates, modern populations do not appreciate rivers because people are not aware of the journeys rivers take, their histories, or of our relationship to rivers. In another sense, he explains how different doctrines held by members of the Church of Jesus Christ of Latter-day Saints, are used to support attitudes that both encourage and reject environmental conservation. For instance, many Mormons believe that the end is near. This can either motivate a believer's stewardship or it can encourage her to dismiss long-term environmental concerns altogether. Handley breaks the church's theology into twelve different pro-environmental and anti-environmental attitudes. He then expresses his hope for Mormonism to embrace stronger environmental ethics. In the case of the Provo River Delta, eighty percent of the population is Mormon. Therefore, Handley points out, any meaningful restoration in the area may have to include a shift in doctrinal beliefs. Handley ends the chapter by arguing that pro-environmental beliefs

are still consistent, if not more aligned, with the church's theology.

Desert Water takes a turn to Utah's most famous body of water in Chapter 5, "Climate Change and the Future of Great Salt Lake." Geographer Daniel Bedford expands on Denton's discussions in Chapter 3 by examining the large but mysterious Great Salt Lake. The Great Salt Lake is a terminal lake, meaning that water flows into but not out of it. Consequently, Bedford explains, the Great Salt Lake is susceptible to human and natural influences of which readers should be aware. Natural influences on the lake include, among other things, a warming global climate system, lake-effect precipitation, river inflows, and a shallow depth that contributes to greater evaporation and drastic water level changes. Direct human influences, such as irrigation and residential consumption, have a much smaller effect on the health and level of the lake. However, as the population in Utah is estimated to double in the next forty years, more water will be required to support its residents. Ultimately, Bedford argues, the health of the Great Salt Lake will depend on how much humans care for it. Aside from its iconic image and economically valuable minerals, many locals do not care for the lake and do not see it as a unique resource that should be protected. Bedford contends that this apathy may come at a great cost, not just to humans but to birds, fish, and other wildlife that depend on it for their survival.

Zachary Frankle, founder and executive director of the Utah Rivers Council, interrupts the book's serious tone in Chapter 6 with "Chicken Little's New Career: How Utah's Water Development Industry Shows False Fears and Misinformation." In this chapter, Frankle argues against developments similar to the Lake Powell Pipeline project, which is expected to carry water from Lake Powell to southwest Utah. The project will cost Utah's taxpayers over one billion dollars. Frankle insists that Utah has all the money and water it needs to solve its water problems without the project. Utah's lack of water, he argues, is nothing more than a myth perpetuated by a large and elusive water development industry and repeated by an under-informed media. Frankle examines the tax and fee structures behind projects like the Lake Powell pipeline and Price River dam proposal, which proposes to dam the headwaters of the Price River. In doing so, he describes how taxpayers are being asked to spend millions of dollars on projects when simple modernization efforts, such as phasing out water waste, could solve the same problem and impact fewer ecosystems. In addition, and in unison with other authors in this collection, Frankle believes raising water rates is one of the more simple and effective solutions available for reducing consumption. Property taxes and federal subsidies currently subsidize the water rates in Utah. As a result, residents pay just a fraction of the real cost of the water that they use and are, not surprisingly, more wasteful. Frankle concludes with a reminder that not all conservation projects are actually good for conservation and that some should be considered with great skepticism.

The Great Salt Lake receives even greater attention in Chapter 7, "Time to Rethink Policy: Ideas for Improving the Health of Great Salt Lake." In this chapter, attorney Rob Dubuc examines characteristics of the lake, identifies differing perceptions of its value, and discusses threats to the lake's long-term condition. With a focus on economic considerations, Dubuc weighs the economic value of the lake against its inherent value and general health. For ex-

ample, operations that extract salt and other minerals out of the Great Salt Lake yield approximately \$1.13 billion dollars in economic output annually and create approximately 5,300 jobs in the area. With an eye toward proposals to expand these operations, Dubuc ponders the consequence of such widespread projects, especially in combination with other local threats, including industrial discharge, nutrient loading, diking, and a lack of water rights for the lake. Dubuc concludes by asking the open question of whether state law should protect a minimum lake level.

In Chapter 8, "The Colorado: Archetypal River," writer and former river guide Brooke Williams describes the personal and philosophical appreciation she has for the Colorado River. Writing from the perspective of the Colorado River's banks, Williams portrays the Colorado as an archetype river. It supports the life of thirty million people and ecosystems across seven states, and to some it represents a collective unconscious that contains universal symbols of the evolutionary history of our species. Intertwined with facts and anecdotal stories, Williams's chapter attempts to develop for the reader a deeper appreciation of the natural and spiritual importance of the Colorado River. Experiences and connections that some people take for granted, she argues, may forever be lost due to misuse of the water. For instance, the Colorado was listed as America's Most Endangered River in 2013. Ultimately, Williams's essay aims at inspiring a sense of urgency to protect these western water resources. Many readers will appreciate her philosophical approach.

In Chapter 9, "Going with the Flow: Navigating to Stream Access Consensus," Sara Dant considers the balance of fairness between the rights of private landowners and the public's right to access Utah's rivers and streams. With an emphasis on the Weber River, Dant explores these issues through a historical examination of Utah's water use and policy. Historically, the Weber River was widely used for timber floating, irrigation, and sports fishing. These uses were often guaranteed by the courts, but were challenged in 2010 when the Utah State Legislature passed House Bill 141, the Public Water Access Act. This stream access bill essentially prohibits and even criminalizes all public recreational use of rivers and streams that cross private property, except for floating and incidental touching. In her chapter, Dant proposes that legislators respect the rights of private property owners, but at the same time recognize that people should have the right to access and enjoy public waters, especially in arid climates where water is scarce. While some areas of the law remain undecided, such as owner liability, fencing issues, and the extent of riverbeds, Dant urges courts and policymakers to draw inspiration from Utah's water history and not to forget their roles as trustees for the public.

Lake Powell is the focus of Chapter 10, "The Return of Glen Canyon: The Beginning of a More Sustainable Future for the Colorado," by senior journalism lecturer and Southwest Editor for Backpacker Magazine, Annette McGivney. The Glen Canyon Dam was built in southwest Utah to provide hydroelectricity and to create Lake Powell, a reservoir and storage buffer between the Upper and Lower Colorado River Basins. One of six dams built along the Colorado River, the Glen Canyon Dam ensures that the Lower Basin gets the water to which it is legally entitled under the 1922 Colorado River Compact. McGivney argues, however, that holding water in six dams across the arid region may not be the best solution. The reservoir is currently over-

allocated and rising temperatures in the region lead to greater evaporation and lower input levels. In 2005, for example, Lake Powell was only at thirty percent capacity. To better manage scarce water reserves in the state, McGivney suggests decreasing consumption rates and removing the dam, thus lowering the water in Glen Canyon to its original level. McGivney argues that doing so will recover lost ecosystems and archeological sites. Although Lake Powell attracts millions of visitors every year, thereby boosting the local economy, McGivney argues that the beauty of the canyon will attract new visitors and support a more sustainable life cycle.

Chapter 11, "Land of 20,000 Wells: Impacts on Water from Oil and Gas Development in Eastern Utah" by editor Hal Crimmel, explores natural resource drilling in the Uinta Basin and Green River watershed. Current research shows that Utah has four hundred billion barrels of oil shale and its tar sands deposits contain another twelve to nineteen billion barrels. In the process of extracting these resources, companies use and dispose of vast amounts of water in an already arid region. Crimmel recognizes the relative permanence of natural resource drilling in today's economy, so he suggests certain policies and regulations to better manage threats posed to the state's water resources. Equating certain oil and gas rhetoric with that of the tobacco industry, he argues that even with precautions, there are no guarantees of safety from water supply contamination throughout all phases of the extraction process. While the region examined in this chapter is somewhat remote, natural resource drilling continues to take place across the West, even in highly populated areas. Especially because water crosses state lines, Crimmel argues that oil and gas development should not be treated as a local issue.

In Chapter 12, "Moving Water," author Jana Richman takes on a proposal by Pat Mulroy, General Manager for Southern Nevada Water Authority, to pump water out of Snake Valley in western Utah and carry it to Las Vegas through a three-hundred-mile pipeline. Proponents of the pipeline claim that the water can be pumped and transported with minimal to no impact in the area. Richman, however, argues that no one can be certain of the extent of devastation the pipeline may cause. She examines the failure of similar groundwater pumping projects, predominately out of Owens Valley in California, and examines whether or not this project will have similar results. The Owens Valley pumping project resulted in consequences such as the drying up of Owens Lake, disappearance of native flora and fauna, local farm and orchard crop failures, and massive traveling dust storms. Richman argues that even with the proposed monitoring precautions in place, it could take centuries after the pumps are shut off to slow and stop the damage that has been done, not to mention the inherent damage of digging 300 miles of pipeline. Richman does not offer specific alternatives for a Las Vegas water shortage problem but contends that there are better solutions than the proposed pipeline.

In the final chapter, "A New Water Ethic," Daniel McCool, professor and director of the Environmental and Sustainability Program at the University of Utah, challenges the anthropocentric framework with which we currently think about water use in the West. Water, he posits, is irregular and unpredictable, but also essential to every organism. Going forward, we need to have a coherent vision and framework in which to develop western water law and policy.

McCool devotes his essay to discussing why we need change and what the new western water ethic should look like. Broadly, he encourages evolution to a more bio-centric concept of ethics.

For anyone interested in learning more about the condition of water resources in Utah, *Desert Water* is an overall valuable resource. It offers a variety of well-cited works by various authorities in the state. The book does not advocate for a particular method or even offer a conclusion about the optimal use and regulation of water in the state. Instead, it offers a fair evaluation of pressing issues and conservation motivations from a multitude of perspectives. Additionally, the short collection of essays allows the reader to delve directly into the particular topics most interesting to them. For those who choose to read the book in its entirety, the chapters compliment each other with minimal overlap.

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