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Stephen Grace, Dam Nation

are all practices federal policy does not work to mitigate. By reallocating renewable energy subsidies and providing a financial incentive to use recycled water, the federal government can encourage efficient water use. Conserving water, the authors point out, saves energy, which in turn saves more water. If energy companies recognize these benefits, they can conserve water and save on production costs all at once.

Chapter Ten discusses an issue relatively new to water policy: climate change. Climate change will have a tremendous effect on water use and water quality, because it fundamentally alters the hydrological cycle. This affects recharge rates of groundwater, shifts growing seasons for farmers, and threatens ecosystems and animals like salmon that can only survive in specific water temperatures. To better understand and tackle these issues, the authors support appropriations for the National Climate Service that President Obama ordered in 2010 as an extension of the National Oceanic and Atmospheric Administration. Through the efforts of NOAA, as well as other departments like Interior and EPA, data collection can improve allowing every sector to adapt to the threats of climate change. Many of these changes are “no-regret” options and will benefit users whether they are undertaken in response to climate change or otherwise.

Chapter Eleven evaluates the United States’ role in international water issues, both in relation to shared water resources with Mexico and Canada, and to water poverty and development efforts across the globe. Gleick predicts that increased water scarcity will be a common flashpoint in future diplomatic conflicts. Thus, in light of the United Nations’ declaration of a “human right to water,” he argues the United States government should work to encourage water compacts around the globe creating a framework for dispute resolution on shared water resources. Funding for development programs, especially through USAID and the recently passed “Senator Paul Simon Water For the Poor Act,” can improve the effectiveness of American investment and prevent water from becoming a weapon of war.

A Twenty-First Century U.S. Water Policy is a truly comprehensive survey of current national water policy. Persistent throughout the book is a critique of the country’s capacity for data collection. The authors used what quantitative data is currently available to craft their “soft path” recommendations, but are clear that improving water monitoring is the cornerstone to informed policy-making. Notwithstanding the quantitative approach, including a number of graphs and statistical tables, the book serves as an accessible source for non-technical readers interested in the many challenges to United States water policy.

Davis Wert

Stephen Grace, *Dam Nation*, Globe Pequot Press, Guilford (2012); 333 pp; \$24.95; ISBN 9780762770656; hardcover.

[D]ams rise like monuments in the deserts of the West. They are America’s cathedrals, its castles, its pyramids. The immensity and gorgeous symmetry of these monoliths will stun future worlds looking back on ours. We

were worshippers of wetness in a dry land, penitents before the meager flow of water in a world of sun-blasted stone and drifting dunes of sand.

Stephen Grace's *Dam Nation* traces the historic development of water use in the American West and examines its legacy in light of the West's modern framework. Written as a richly descriptive narrative, the book follows the unique trajectory of Western water law and the philosophies and political movements which underpin it. From the days of the earliest European explorers, through the construction of colossal dams, to the ever-scarcer water resources of the modern world, Grace weaves an intricate tale of competing interests fighting over an essential resource—water.

Grace organizes *Dam Nation* into twelve chapters; the first six chapters lay out the history of Western water use and the final six chapters contemplate modern issues, organized by theme. Through a series of illustrative stories and events, *Dam Nation* provides a broad look at overall trends woven through the history of the West. Grace intends to engage his audience in the realities and rationales of the West's intricate, and often seemingly illogical, water law system.

Early chapters of *Dam Nation* explore the storied history of early water use in the West. Grace defines the arid West as beginning west of the 100th meridian. This area of the country receives less than twenty inches of rain per year. Grace relays stories of the very first European explorations of the West, including the expeditions of de Escalante and Dominguez in 1776, Lewis and Clark in 1803, and Zebulon Pike in 1806. Early explorers of the West brought back stories of their hardships in the "Great American Desert" to those in the East. However, this mindset did not last; it instead transitioned into a great migration to settle the West. The federal government and promoters promised riches and land, using the allure of Manifest Destiny to attract growing numbers of pioneers ready to move west.

Gold miners flocked to the West using water intensive mining process that helped lead to the appropriation system of water use, a system in which "first in time, first in right" reigns supreme. Furthermore, through the Homestead Act of 1862, the federal government promised families 160 acres for farming and that "rain follows the plow." Grace points out the shortsightedness of the federal government at this time. The federal government did not give land away based on geographical realities, but rather used a two-dimensional grid system developed in Eastern states. This method caused farms and towns to locate in areas far away from water sources, and led to the constant need for irrigation projects.

As more people settled the West, the federal government, through the Bureau of Reclamation, began to take an important role in developing the intricate water supply system. Grace suggests Reclamation's ambitious water projects reflected a belief that Americans had the capacity and imperative to control nature through technological achievement. The great dams of this era held back amounts of water so heavy that the weight actually sped the Earth's rotation and shifted the planet's axis. Grace describes the flurry of politicians clambering to bring federal water projects to their districts, often rushing into projects without adequate investigation of their long-term economic and environmental impacts.

For example, the Hoover Dam, built during the Great Depression, provided jobs and a point of national pride during a time of crisis. However, Reclamation built the Hoover Dam and many other projects based on the premise that they would increase the overall economic productivity of the West. Reclamation's projects often went over-budget; a 1955 report cited ninety projects costing twice their original estimates. Indeed, Reclamation spent four times more than expected on the Missouri Basin Project and the Colorado-Big Thompson Project. Reclamation's Director, Floyd Dominy, later lamented the financial burdens, "half our projects were insolvent." Furthermore, dams usually benefited only a few large agricultural or industrial companies and provided cities with water to expand in areas far away from natural water sources.

In one of the most memorable stories of *Dam Nation*, Grace delves into the history of the Glen Canyon Dam on the Colorado River. The mid-century construction of this dam illustrates Reclamation's aggressiveness in building new dams and highlights an increasingly active Sierra Club. Glen Canyon was a remote, but stunningly beautiful canyon that contained vast archeological value in the stone ruins of the Anasazi, also called Ancestral Puebloans. Floyd Dominy, the larger-than-life Reclamation Commissioner, pushed hard for authorization to build the Glen Canyon Dam as part of his continuing quest to build engineering marvels that could control nature. During the preparations to build Glen Canyon Dam, Sierra Club Director, David Brower, fought and won a battle to stop Reclamation from building a dam at Echo Park that, if built, would have flooded Dinosaur National Monument. In return, the Sierra Club agreed not to oppose the Glen Canyon Dam, which the public knew very little about. Brower later publically regretted this decision when the huge dam submerged important archeological sites, as well as the natural beauty of the canyon, under the newly formed Lake Powell.

Dominy succeeded in building one of the last big dams in the West, holding eight trillion gallons of water behind its enormous girth. The Sierra Club, under Brower's leadership, published *The Place No One Knew*, showing the public photographs of a Glen Canyon now submerged. Reclamation responded with its own publication, *The Jewel of the Colorado*, to honor the engineering triumph of man over nature. In the end, Grace argues the Glen Canyon Dam resulted in little economic benefit, because it is too far from population centers to use for water supply and the area's high elevation restricts the growing season. Furthermore, Lake Powell does not efficiently store water for the Colorado River because of large losses of water due to evaporation. The Glen Canyon Dam signaled an end to public acceptance of large water projects.

Dam Nation also examines problems inherent in the current Western water system that pollute Western water supplies. Dams prevent rivers, like the Colorado River, from rushing at a speed strong enough to carry silt out to the oceans. Instead, silt now piles behind dams, trapping chemicals, such as mercury and selenium, in the water supply. In addition, water runoff and seepage from mining, agriculture, and industrial plants poison rivers and aquifers with numerous chemicals. Such toxins are difficult to remove and often remain undetected.

Along with the many other examples of water pollution, Grace discusses the effects of mining at Montana's Spirit Mountain to illustrate the negative

impact of mining methods. Local Native American tribes, the Assiniboine and Gros Ventre, regard Spirit Mountain as a sacred site, but the federal government took the land through a treaty. The Pegasus Gold Company used open-pit cyanide-leach mining methods that dismantled the mountain to remove gold. The chemical-laden runoff from Spirit Mountain killed aquatic life and contaminated the drinking water of the Fort Belknap Reservation with cyanide and sulfuric acid. The Environmental Protection Agency, the State of Montana, and the tribes sued the Pegasus Gold Company for violating the Clean Water Act and won a large settlement. The company, however, provided only five million dollars of the settlement before declaring bankruptcy. Polluted water from Spirit Mountain continues to flow into local communities' water supplies, leaving Montana to clean up the pollution in perpetuity. In 1998, Montana banned new gold mines from using cyanide-leaching techniques.

The government no longer builds large monolithic dams. Grace attributes the country shying away from large dams to the following factors: (i) growth of the conservation movement; (ii) publicity of many Reclamation projects' economic inefficiency; and (iii) a lack of remaining suitable dam sites. At the same time, the struggle to provide enough water to thirsty cities, farms, and industrial uses continues in the midst of dwindling water supplies. Grace argues that a belief in technological capacity to solve Western water problems remains present in the public conscience today.

Grace closes *Dam Nation* by suggesting a number of policies to sustain water supplies and quench the thirst of the West. While Grace writes of dwindling water supplies, he argues that inept management forms the real water crisis. He advocates the "soft path" of Peter Gleick: "an integrated, sustainable approach that emphasizes conservation and efficiency and learning to live within the limits of the land rather than trying to replumb it on a grand scale." Grace maintains that there is enough available water to maintain the current cities by keeping growth rates stable, pricing water to reflect its scarcity, and abandoning cost-ineffective agriculture projects.

Furthermore, Grace commends the success of vigorous conservation efforts, like those seen in Los Angeles and Las Vegas. Las Vegas's conservation program concentrates on lowering outdoor water use through strict limits on use and other requirements such as using reclaimed water for fountains. The city charges fines for noncompliance with the regulations and rewards homeowners for replacing their lawns with drought-resistant landscaping. Using this incentive system, Los Vegas lowered its water consumption while still experiencing population growth.

Grace also recognizes the success of modern water projects that take into account geographical realities and use sophisticated and efficient techniques. Over the past ten years, the City of Aurora, Colorado established its own self-funded water project, Prairie Waters. Prairie Waters uses a renewable water loop that draws water from the nearby South Platte River. The city dumps treated wastewater into the river and thirty-four miles downstream Prairie Waters wells draws up water through gravel for further purification. Prairie Waters then pumps water through basins of sand and gravel and transports the water to Aurora's reservoir for a final treatment at a high-tech plant that uses chemicals and ultra-violet light. Grace applauds Prairie Waters as an example of

efficient and sustainable use of local water that careful planning and scientific advances promoted. Grace argues that with continued conservation efforts and more responsible water projects, the West may be able to sustain its most important resource, water.

Grace covers an ambitious amount of material, yet manages to draw in the reader with colorful and engaging stories that reveal a deep connection with the subject. Due to its fast pace, the scope of the book can be jarring at times. Nevertheless, the book provides glimpses into important historical events and fosters a deeper understanding of how and why the West developed the water law system it continues to struggle with today. *Dam Nation* is an excellent choice for both a reader first exploring the subject of Western water use and a more knowledgeable reader looking for a solid general background on the subject presented in a highly engaging format.

Jenna Anderson

K. Hare, *Buckled in the Denver Basin*, Bluestack Consulting, Inc., Falcon (2012); 310 pp; ISBN 0985892110; paperback.

The best kind of fiction teaches us things we could never have known about ourselves, and about the world around us. The worst kind teaches nothing at all. In *Buckled*, author K. Hare uses a murder mystery to inform the audience about real issues concerning Colorado water; namely, that groundwater in the Denver Basin is a non-renewable resource that is drying up more quickly than many realtors and politicians are ready to admit. While *Buckled* might not be an academically impressive novel, it does have something to say about water law in Colorado. The book presents secretive issues in local law and politics, which could provide insight for those unfamiliar with the intricate shortcomings of water politics in Colorado.

The novel takes place in the fictitious town of Breeze, Colorado, located somewhere on the hot, dry eastern plains. The town, like many others in the area, pumps its water directly from the Denver Basin. Since the town's inception, greedy land developers and corrupt politicians worked together on a lucrative campaign of bribery, blackmail, and public misinformation. In doing so, they convince most of the public that suburban properties will retain their value despite further development because, as the public has been falsely informed, Breeze "doesn't have a water problem." But the truth is Breeze itself was built on "lies of endless water," and, as the novel opens, Breeze and its citizens are in serious trouble. The book begins with the protagonist, writer, and activist, Aggie Boyle, stumbling across the remains of developer Randolph "Bluster" Brown lying next to the town water pump, facedown and dead in the mud, with his own belt buckle jammed between his eyes.

As the novel progresses, the relationship between the characters and the intricacies of the conspiracy are untangled, until finally, Hare presents a clear message: that the Denver Water Basin's groundwater is, in fact, a non-renewable resource, and that failing to confront that fact head-on will only lead to dire consequences, especially for small communities on Colorado's eastern plains. But that is not the book's only lesson. Throughout the narrative, Hare