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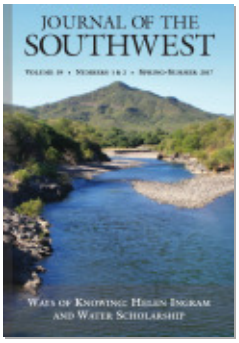

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Introduction

The western United States continues to be the fastest-growing and fastest-urbanizing region of the country, while also being the most arid (Mackun and Wilson, 2011). As population and cities continue to grow in water-scarce environments, people are forced to confront value tradeoffs in trying to balance efficiency, equity, and effectiveness of water allocation practices (Ingram, Scaff, and Silko, 1986; National Research Council, 1992; Howe and Ingram, 2002; Ingram, Whiteley, and Perry, 2008). In the U.S. West, these water allocation challenges are made even more difficult as people try to increase the flexibility of an established water system deeply entrenched in American political and institutional history (Ingram, 1990; Wilkinson, 1992; Reisner, 1993; Ingram and Brown, 1998; Lach, Rayner, and Ingram 2005; Lach, Ingram, and Rayner, 2006).

In this article, we examine the water conflict between the Las Vegas metropolitan area and rural communities in east-central Nevada (figure 1). The main source of Las Vegas's current water supply is the Colorado River, which flows south from Lake Powell at the Arizona-Utah border through the Grand Canyon and into Lake Mead. Nearly 40 million people in seven states, including major U.S. cities and agricultural systems, depend on Colorado River water. Over-allocation of the Colorado River, multiple competing needs, prolonged drought, rapid regional population

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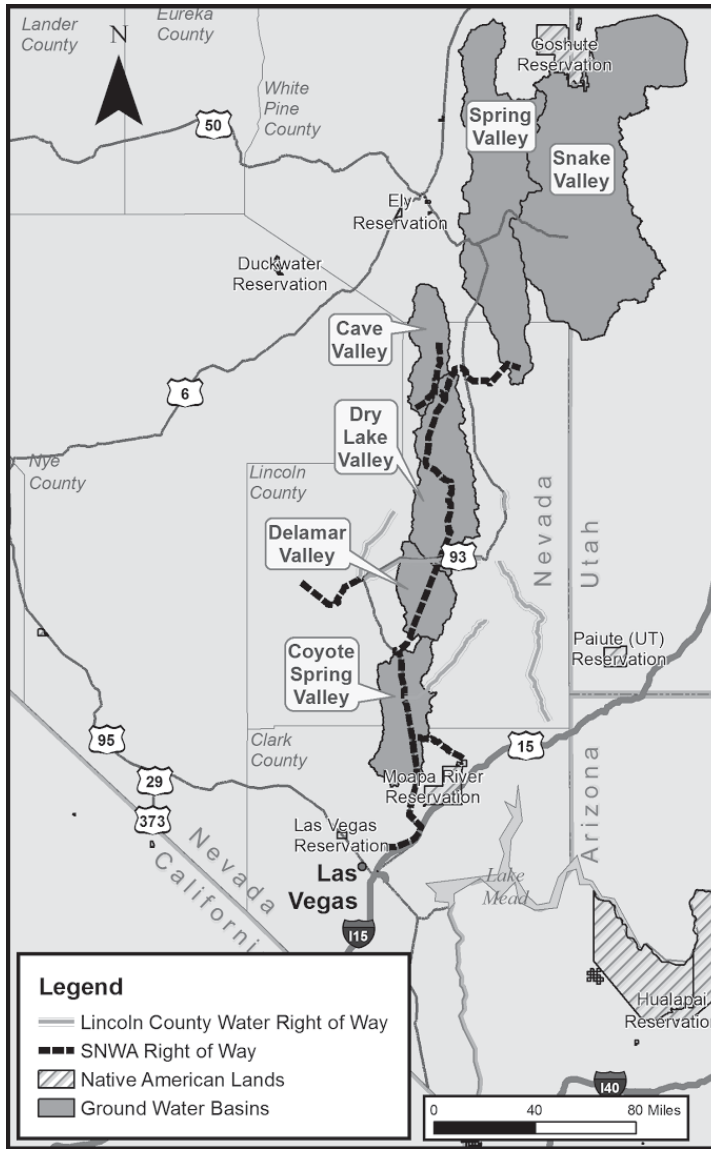

Figure 1. Map of eastern Nevada showing the five groundwater basins (Snake Valley, Spring Valley, Cave Valley, Dry Lake Valley, and Delamar Valley) targeted in SNWA's water right application for its proposed Groundwater Development Project. The Lincoln County, Conservation, Recreation, and Development Act (LCCRDA) establishes corridors in Lincoln County for water conveyance structures and shows the general location of the proposed groundwater pipeline. Credit: Adrian Welsh.

growth, and climate change have stressed this watershed, and current water policies may not contain the tools to equitably resolve emerging water conflicts (Adler, 2007; Hundley, 2009). Water managers have been investigating other solutions to survive in this new reality (U.S. Department of the Interior, 2012).

In 1989, the Las Vegas Valley Water District, now part of the Southern Nevada Water Authority (SNWA), applied for water right permits to transport groundwater from rural east-central Nevada 300 miles south to Las Vegas and the surrounding metropolitan area via its proposed Groundwater Development Project (figure 1). The project would "likely be the largest interbasin transfer of water in U.S. history" (White Pine County et al. v. King, 2013). We use this case study to examine the water policy controversies involved in a rapidly growing desert metropolis seeking water from distant rural sources. Our analysis relies heavily on contributions from Helen Ingram's work on the importance of context, the significance of social constructions in policy design, the role of equity in water management, and the need to recognize multiple ways of knowing and valuing water. We follow her social construction and policy design framework (Schneider and Ingram, 1997) to explain how policy debates over the SNWA pipeline project have been framed. This case study focuses on foundational principles of water allocation that need to be reexamined as people attempt to better balance multiple needs in water-scarce environments.

Framework for Understanding the Debates

Ingram and Schneider (1990) argue that the content of policy has not received adequate attention within the policy sciences. While policy processes that lead to policy designs may be chaotic and changes in policy abrupt (Sabatier, 2007), the actual content of various policies is purposefully crafted to "serve particular values, purposes, and interests" (Schneider and Ingram, 1997, 3). Understanding the context in which policy designs emerge is also very important, because policies are created in response to particular situations (Schneider and Ingram, 1997; Honadle, 1999). Although contexts may change and evolve, policy designs generally endure, because the underlying foundations of policy designs are known for continuity, not for fundamental shifts (Pierson, 2004; Ingram and Fraser, 2006; Schlager and Blomquist, 2008). Policy designs socially construct target populations in positive and negative

terms, distribute burdens and benefits that reflect and perpetuate these constructions, and encourage (or not) citizen engagement in the democratic process (Schneider and Ingram, 1993; Ingram and Schneider, 1993). Over time, policy designs based on these social constructions affect the distribution of resources within society. Therefore, it is essential that the values underlying these policies and the messages they send to different segments of society are analyzed and understood in order to design policies that promote democracy (Schneider and Ingram, 1997).

Schneider and Ingram (1997) describe social constructions of target populations along a spectrum of two dimensions: one that characterizes the value placed on the social group from deserving to undeserving, and the other that characterizes the political influence of the group from weak to strong (figure 2). From these two dimensions, Schneider and Ingram (1997) identify and label four types of target populations. "Advantaged" groups are politically powerful and are positively constructed as deserving of benefits that enhance their positions and are distributed through policy designs. "Contenders" are also politically powerful, but these groups are viewed negatively as undeserving of policy benefits and are more likely to receive policy burdens. "Dependents" hold little political influence but are positively constructed as groups that need assistance or policy benefits. "Deviants" are politically weak but also negatively constructed and are the groups most likely to have policy burdens that constrain or punish their behavior directed at them. Schneider and Ingram (1997) further explain that a group's position as a policy target population is not fixed but can change depending on the perspective of who is viewing the group. Often target populations are identified and then policy-related burdens or benefits are applied to those populations, depending on whether or not those actions provide political risks or opportunities to public officials (figure 3; Schneider and Ingram, 1997).

Applied to water policy, Schneider and Ingram's (1997) social construction framework helps to explain how some groups are better able to receive benefits that they would not be entitled to in otherwise strictly applied water allocation processes. For example, municipalities are often considered to be deserving of water allocation preferences since municipal water use is perceived to be for household purposes such as drinking and bathing, while farmers' use of water is often viewed negatively because of perceived inefficiencies in its application. As a result, municipalities are generally powerful in water politics and can influence the policy process in their favor. The ability of Los Angeles to take water

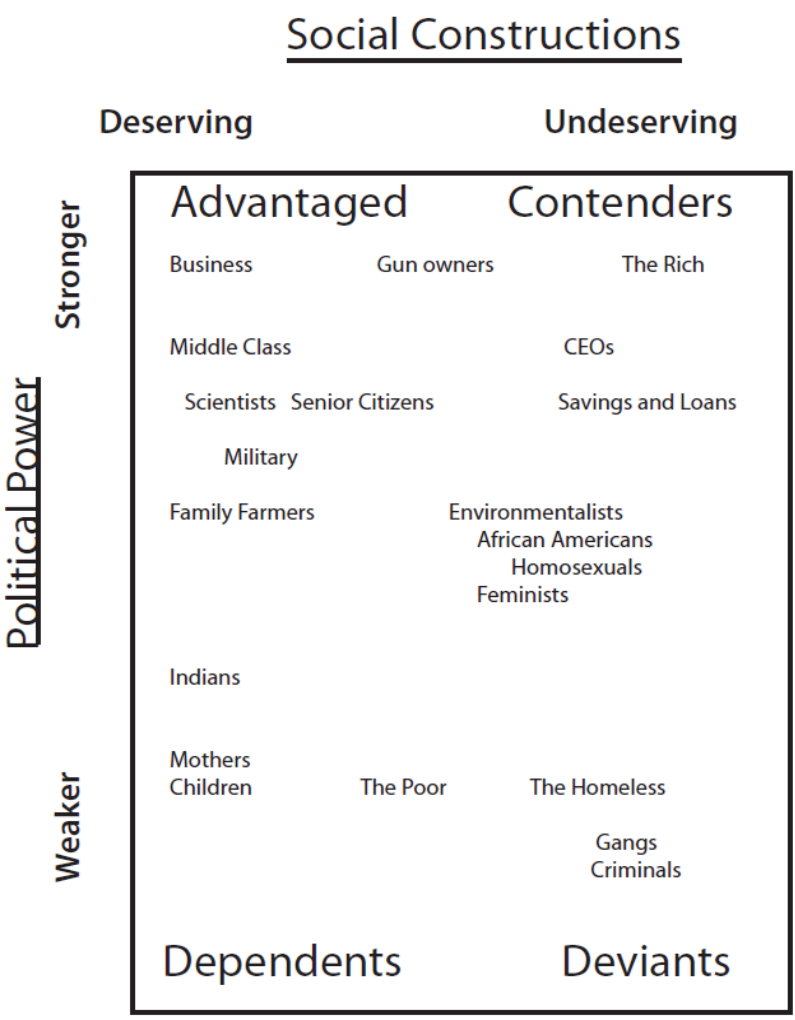

Figure 2. Social constructions and political power of target populations. Schneider and Ingram (1997) give examples of where certain target populations could fall on the diagram, depending on who is viewing the target population. Adapted from Schneider and Ingram (1997, p. 109).

from the Owens Valley in 1913 was partly due to the advantaged social construction of Los Angeles as deserving of water because of its growing population and industrial economy and the disadvantaged perception of the Owens Valley as small, rural, and agrarian (Kahrl, 1982; Reisner, 1993).

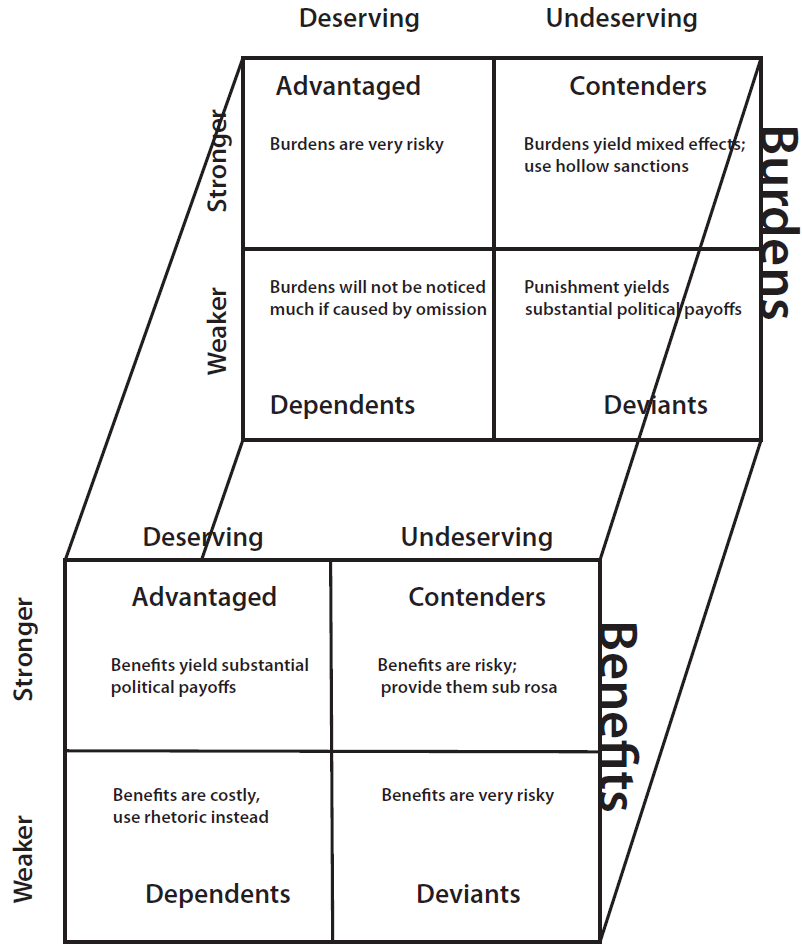

Figure 3. Benefits and burdens assigned to target populations. Schneider and Ingram (1997) show which target populations policy makers tend to assign benefits and burdens to, depending on whether or not the action would provide political opportunities or political risks. Adapted from Schneider and Ingram (1997, p. 113).

However, contexts and circumstances can change and, with them, social construction of a group can also shift. Even after the Los Angeles Aqueduct's 100-year anniversary in November 2013, long-lasting consequences of that project are still being felt. Perhaps the most notable consequence is the drying up of Owens Lake and the resulting air pollution problems in Owens Valley. The Los Angeles Department of

Water and Power is still trying to mitigate the environmental and social effects that its pumping had on Owens Lake and the surrounding valley. As Los Angeles continued to divert water from Owens Valley and dealt individually with ranchers and other irrigators in ways that divided them, many people began to view Los Angeles as a "contender," very powerful but undeserving of Owens Valley water (Kahrl, 1982; Hundley, 2001). The Owens Valley story emerged as a powerful symbolic narrative in western water politics that has united networks of opponents against other rural water grabs (Lejano, Ingram, and Ingram, 2013). People increasingly recognize that water to fuel urban growth and development is not the only legitimate meaning of water (Ingram and Oggins, 1992; Blatter, Ingram, and Doughman, 2001; Whiteley, Ingram, and Perry, 2008). As other meanings of water become more accepted and social constructions change concerning what uses and users deserve water, water policies are often modified to accommodate these new social constructions.

In all water allocations, but particularly in cases such as Los Angeles diverting Owens Valley water, value judgments about fairness in distributing scarce resources are embedded in the decisions made. Pradhan and Meinzen-Dick (2010) explain that in order to gain access to limited resources such as water, people have to legitimate their claims with a rationale that is socially accepted. Sometimes claims have to be negotiated when people hold different values. Over time, certain values become the norm, and rules in the form of laws often develop to grant people legal rights based on those values. The concept of water rights actually refers to bundles of rights and responsibilities that vary according to the context in which they were formed and that condition a system's primary water allocation principle (Endter-Wada, Welsh, and Ingram, 2012). These conditions are necessary if a policy is going to serve multiple goals (Schneider and Ingram, 1997). The water policy context in the western United States is currently in transition. As water becomes increasingly scarce in the face of climate uncertainties and multiple needs and wants for that water, rights to its use are being renegotiated and reallocated. The policy debates surrounding SNWA's water right applications in rural Nevada reveal different rationales people hold for legitimizing their claims under these conditions of climatic and societal transition.

Methods

This article uses a qualitative, case study methodological approach appropriate for conducting policy analysis. The case study approach

provided us the opportunity to examine the uniqueness of this specific case while also finding attributes that are common to many water allocation debates (Ragin, 1987). Many rules have been used to allocate water, and the specific rules that particular locations choose depend partly on precedents that can be generalized but partly on unique and specific circumstances (Honadle, 1999; Pierson, 2004). We used a variety of data-gathering and data-analysis strategies, primarily relying on key-informant interviews and secondary document analysis (Box-Steffensmeier, Brady, and Collier, 2008; Cresswell, 2009; Johnson and Reynolds, 2011).

We conducted sixteen in-depth key-informant interviews using an IRB-approved protocol; the interviews were taped and professionally transcribed. Interviewees included people with different perspectives on the SNWA Groundwater Development Project: SNWA water managers, Las Vegas citizens, board members of the Great Basin Water Network (an organization devoted to keeping water in rural Nevada), and rural Nevada landowners and business owners. Interviewees were chosen based on their expertise and involvement in the issue, and all of them gave permission for their names to be used. We used primary, archival documents to reconstruct the policy process in the SNWA case study by analyzing information produced by the legislative process, including the procedural history of the SNWA Groundwater Development Project and the official certified transcripts from the 2011 water right hearings. We also examined secondary, contemporary public records from newspaper and other media accounts of the case as it unfolded over time. Integrating data from interviews, hearings, and news sources, we used content analysis to identify the main arguments and rationales about how rural groundwater should be allocated (Krippendorf, 2004). We also used the process-tracing method to trace the historical events and decisions that led to arguments and outcomes over the SNWA water applications (George and Bennett, 2005; Pierson, 2004).

Case Study Background

The Southern Nevada Water Authority (SNWA) was created in 1991 by joining the seven agencies responsible for water resources in southern Nevada: Big Bend Water District, Boulder City, Clark County Water Reclamation, City of Henderson, City of Las Vegas, Las Vegas Valley Water District, and North Las Vegas. SNWA's mission is to manage southern Nevada's water resources and provide for residents' and

businesses' present and future water needs (SNWA, 2012; DWR Applications 53987 through 53992 Vol. 1, 2011). The water right applications to groundwater in rural Nevada date back to 1989 when the Las Vegas Valley Water District made an unprecedented filing on 800,000 acre-feet of water from 30 groundwater basins across four counties. This filing was for half of all unallocated water in Nevada (Green, 2008). In our 2011 interview, J. C. Davis, spokesman for the SNWA, explained that the Las Vegas Valley Water District applied for these water rights to protect against water speculation and to reserve water for future southern Nevada municipal uses. SNWA took over the applications shortly after it was formed. More than 4,000 legal protests were submitted when the applications were filed in 1989 (Jenkins, 2009). Hearings for the water right applications were not held at that time, and SNWA dropped the project in order to pursue other water acquisition strategies, such as negotiating with other Colorado River Basin states to allow SNWA use of their allocations of Virgin River water after it had already flowed to Lake Mead and become part of the Colorado River system (Christensen, 1994).

However, in 2002, the Colorado River was in the midst of a major drought that altered perceptions of water security in southern Nevada. As Davis explained, "We realized that this lake [Lake Mead] that everybody thought was drought-proof might in fact be susceptible to drought" (J. C. Davis, personal communication, May 4, 2011). In 2004, SNWA requested that the Nevada state engineer rule on its 1989 water right applications for five of the rural groundwater basins: Spring Valley, Delamar Valley, Dry Lake Valley, Cave Valley, and Snake Valley (figure 1). In 2006, water right hearings were held for four basins: Spring Valley, Delamar Valley, Dry Lake Valley, and Cave Valley. Snake Valley, which straddles the Nevada-Utah border, was not included pending an agreement between those two states. Rights to use 79,000 acre-feet of water a year were granted to SNWA by the state engineer. However, the Nevada Supreme Court overturned the state engineer's ruling, because the state engineer had violated his duty to act on the applications within one year of their original filing, denying "protestants" (so named in the hearing documents) due process. In 2010, the Nevada Supreme Court ruled that the only equitable remedy would be to renotice the applications and reopen the protest period. The applications were renoticed and new water right hearings took place in fall 2011. The state engineer published his ruling in March 2012, granting SNWA the majority of the water rights for which it applied. A networked coalition of protestants appealed

the state engineer's ruling in a two-day hearing in June 2013. In December 2013, 7th Judicial District Judge Robert Estes released his decision, remanding the water rights back to the state engineer to correct the deficiencies Judge Estes found in the initial ruling.

Nevada Water Law

Water transfers in the U.S. West have a reputation for being contentious. However, Jason King, Nevada's state engineer, explained that in making difficult water right decisions, "We [the State Engineer's Office] do what the State tells us to do, what the law tells us to do" (personal communication, March 24, 2011). Nevada water law follows the doctrine of prior appropriation, which allows water users to divert water for use on nonriparian lands. Water allocated under a water right is limited to the amount needed to fulfill a particular beneficial use, as stated in the law under Nevada Revised Statute 533.035: "Beneficial use shall be the basis, the measure, and the limit of the right to the use of water." Determinations of the specific amounts needed to fulfill different beneficial uses are based upon historic use, court rulings, and administrative procedures to quantify agricultural duties of water for different river basins. Each water right is assigned a priority date, based on the concept of "first in time, first in right." Nonuse of a water right can result in forfeiture, a concept known by the phrase "use it or lose it" (Thompson, Leshy, and Abrams, 2012; Getches, Zellmer, and Amos, 2015). Nevada water law states conditions under which the state engineer shall approve water right applications: if beneficial use is proven, if proposed use does not conflict with existing rights, and if applicants prove reasonable diligence and have financial ability and reasonable expectation to construct the diversion work and apply water to the intended beneficial use (Nevada Revised Statute 533.370).

Groundwater law in the United States has always operated differently from surface-water law, mostly because groundwater is hidden and knowledge of exactly how groundwater flows through a region is limited (Blomquist and Ingram, 2003; Getches, Zellmer, and Amos, 2015). In most states, including Nevada, domestic wells are not monitored and do not require a permit through the state engineer. Nevada has been more proactive than other U.S. states by requiring that the groundwater rights issued in a basin should be less than or equal to the perennial yield. The perennial yield is the amount of water that can be withdrawn without

exceeding recharge of the groundwater basin. However, in 45 out of 256 groundwater basins in Nevada, water is over-appropriated. Some groundwater basins became over-appropriated when new data revealed the perennial yield of a basin to be lower than what it was thought to be at the time water was allocated (Nevada Department of Conservation and Natural Resources, 2013). The State Engineer's Office has enacted a variety of policies to help bring groundwater basins back into hydrologic balance. These policies include recharge projects, declaration of critical management areas, calls for proofs of beneficial use, and water exchanges (Nevada Department of Conservation and Natural Resources, 2013). Because many states do not have sufficient data to adequately characterize and quantify water in groundwater basins, allocating groundwater can be difficult.

Nevada State Engineer Jason King explained that interbasin transfers of water are particularly controversial with lengthy hearing processes (personal communication, March 24, 2011). Nevada Revised Statute 533-370(3) is specific to interbasin transfers. It specifies that in ruling on an application for interbasin transfer of groundwater, the state engineer shall consider:

> (a) Whether the applicant has justified the need to import the water from another basin; (b) If the State Engineer determines that a plan for conservation of water is advisable for the basin into which the water is to be imported, whether the applicant has demonstrated that such a plan has been adopted and is being effectively carried out; (c) Whether the proposed action is environmentally sound as it relates to the basin from which the water is exported; (d) Whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported; and (e) Any other factor the State Engineer determines to be relevant. (Nevada Revised Statute 533-370[3])

King feels that this statute is "arguably the most important section of [Nevada's] water law, because it tells [the State Engineer's Office] how [it] should look at these applications" (personal communication, March 24, 2011). He admits that there are gray areas in the law and, in those cases, it is up to both applicants and protestants to provide as much evidence as they can to support their positions. One example of the law's obscurities is the criterion of "environmentally sound," which is not defined in the law. Applicants and protestants must "put [their] best foot

forward and help [the state engineer] help [their] case" and "put whatever experts [they] have…on the stand and get them to tell [the state engineer] why or why not this is environmentally sound" (J. King, personal communication, March 24, 2011). The water right hearings provide an important forum for applicants and protestants to state their arguments and question their opponents' reasoning. While the state engineer's decision is guided by water law, decisions about allocating scarce water are also based on the supporting rationales and values presented in public hearings.

Water Policy Debates

The water right hearings took place over a six-week period, starting in late September 2011. SNWA was the applicant for the water rights. Protestants (so named in the hearing documents) consisted of individuals, citizen groups, environmental organizations, rural businesses, and other entities located in or adjacent to one of the four targeted basins. Protestants included the Great Basin Water Network, the Confederated Tribes of the Goshute Reservation, Duckwater Shoshone Tribe, Ely Shoshone Tribe, EskDale Center, Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-Day Saints, the Long Now Foundation, and various counties in Utah and Nevada. SNWA and protestants presented numerous witnesses to make their respective cases. Witnesses included physical scientists, policy makers, social scientists, rural residents, and citizens from both states.

SNWA Rationales

SNWA presented witnesses to confirm that SNWA "absolutely needs" the water from Nevada's groundwater basins and has a "good-faith intent and reasonable expectation to construct the groundwater project and put this water to beneficial use" (DWR Applications 53987 through 53992 Vol. 1, 2011, 238). The 2010 U.S. Census shows that southern Nevada is among the regions with the highest population density in the interior western United States (Mackun and Wilson, 2011). Southern Nevada's economy is dominated by the gaming and tourism industries, and southern Nevada's population and employment growth rates are above the national average (Center for Business and Economic Research,

2014). SNWA's foundational rationale for the project is the "need to secure additional water supplies" and the "need to diversify [its water] portfolio" (J. Entsminger, personal communication, May 5, 2011). Witnesses for SNWA outlined the history of water management in southern Nevada that eventually led to the Groundwater Development Project. In his testimony, John Entsminger, then senior deputy manager of SNWA (later appointed SNWA general manager in February 2014), described the politics behind southern Nevada's water supply. Because Nevada receives only 300,000 acre-feet of water per year from the Colorado River, SNWA has had to be strategic in meeting growing water demands.

While the initial 1989 water right applications were filed in response to exponential growth in southern Nevada, SNWA felt comfortable with its water portfolio and the temporary water supplies it had secured, because Lake Mead was close to full at that time. However, in 2002, the Colorado River experienced its lowest runoff since 1906, when records for the river first started to be kept. Shortages in the Colorado River system acted as a political trigger event for SNWA. They were a "wake up call in Southern Nevada, how quickly the lake went down" (DWR Applications 53987 through 53992 Vol. 1, 2011, 232). The Groundwater Development Project, initially created to provide additional water supplies to meet future growth, became essential for diversifying SNWA's water supply to reduce near-term dependence on the Colorado River. Entsminger explained, "As a water manager with two million people to supply water to every day [and] with a peak demand of 900 million gallons a day for seven out of every ten Nevadans, we know that we can't rely upon the Colorado River" (DWR Applications 53987 through 53992 Vol. 2, 2011, 304). Entsminger noted that other technologies, such as desalination, may become more developed and useful in the future. However, desalination is not a feasible source of water for Las Vegas without the ability to exchange desalinized water from the California or Mexico coast with California's or Mexico's Colorado River water that moves through Lake Mead, requiring available water in Lake Mead (personal communication, May 5, 2011). Patricia Mulroy, then SNWA general manager, also pointed out that other states, particularly in the Upper Basin, have not fully developed their Colorado River allocations, enabling Lake Mead to sit at a higher elevation (DWR Applications 53987 through 53992 Vol. 1, 2011). Mulroy further explained, "We will not be able to meet the needs of that community [southern Nevada] if there is no ability to bring water in from outside the Colorado River watershed that is not dependent on Colorado River

supplies" (DWR Applications 53987 through 53992 Vol. 1, 2011, 88). When asked if the project was still necessary if no further growth occurred in southern Nevada, Mulroy responded, "If not one more person moves to southern Nevada, if there is no more development in southern Nevada, this project is still critically important to the residents of southern Nevada" (DWR Applications 53987 through 53992 Vol. 1, 2011, 92). Entsminger also pointed out that other signatory states to the Colorado River Compact have "conditioned their cooperation [to help provide SNWA with temporary supplies] on the fact that we will have permanent supplies to replace those temporary supplies" (DWR Applications 53987 through 53992 Vol. 2, 2011, 252).

In many ways, SNWA has been innovative in supplying water for high demand with a small allocation from the Colorado River. In the hearing, SNWA illustrates how it has stretched limited water supplies through its conservation work (DWR Applications 53987 through 53992 Vol. 2, 2011; DWR Applications 53987 through 53992 Vol. 4, 2011). SNWA considers conservation as one of its main permanent supplies and strives to continually decrease southern Nevadans' water use (DWR Applications 53987 through 53992 Vol. 2, 2011). When Lake Mead's elevation declined in the early 2000s, SNWA enacted extraordinary water conservation measures. Davis explained, "We were able to adopt, arguably, the most stringent and comprehensive set of conservation measures in the United States" (personal communication, May 4, 2011). SNWA is well known for its Water Smart Landscapes Program, where it pays people to remove lawn or grass and replace it with water-efficient landscaping. However, SNWA explained that while it continues to make forward strides in conservation efforts, conservation cannot negate the need for the Groundwater Development Project, because it still would not sufficiently diversify its water portfolio. "You can't conserve your way out of the droughts that we've seen in the hydrologic record of the Colorado River…putting all your eggs in one basket and hoping for the best is not how we engage in water management" (J. Entsminger, personal communication, May 5, 2011).

When justifying its need for the groundwater rights, SNWA ultimately presents the project as essential to its mission of supplying "a safe and reliable water supply for two million people" and, consequently, to all of Nevada, since southern Nevada provides the majority of revenue for the entire state (J. Entsminger, personal communication, May 5, 2011). SNWA claims that the Groundwater Development Project is vital to Nevada's economy because all investments in Las Vegas depend on water

availability. Patricia Mulroy explained, "What investor is going to lend money…and/or enter into any economic activity in Southern Nevada if their investment is at risk from a major drought?" (DWR Applications 53987 through 53992 Vol. 1, 2011, 94). When asked about the possibility that the Groundwater Development Project could harm future economic growth in the basins of origin, Richard Holmes, SNWA's deputy general manager for engineering, stated, "In my opinion, the public interest would be best served by providing that water to the Southern Nevada Water Authority for economic development and uses in Southern Nevada which could benefit the state, I believe, in a far greater way than would be the case of additional agriculture in the basins of origin" (DWR Applications 53987 through 53992 Vol. 15, 2011, 3472). Knowing how important water is to southern Nevada's livelihood also plays into SNWA's financial analysis of the project. SNWA's analyses show that the Groundwater Development Project can be funded, because SNWA provides an essential service and is an attractive, low-risk investment for project investors.

SNWA also used the hearings to present many scientific witnesses who explained that pumping will be done in a responsible manner in order to reduce any impacts to senior water users and the environment. SNWA stated that it has collected more data in the groundwater basins than any other entity. It also pointed out that the project will be highly scrutinized by several federal agencies and the Nevada state engineer to provide the basins with further protections. SNWA entered into stipulated agreements over the project with the Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (USFWS), and the National Park Service (NPS). As part of those agreements, it developed monitoring and mitigation protocols that are supervised by technical panels from members of each agency. In the 2012 WaterSmart Innovations Conference, Mulroy said, "We have forged enough of a partnership with U.S. Fish and Wildlife, we have managed habitat, we are protecting the species, and we have proven that groundwater can safely be developed and not jeopardize and kill off old, prehistoric species—it can be done" (Circle of Blue, 2012).

Protestant Rationales

The four basins of the proposed Groundwater Development Project are rural, with the majority of the active groundwater rights in the basins

allocated for irrigation and stock watering (Bureau of Land Management, 2012). The economy of these rural basins is dominated by farming alfalfa and other pasture grass crops and raising animals, such as cattle and sheep (Bureau of Land Management, 2012). James Garza, the director of community and economic development for White Pine County, believes that the economy in these rural areas can grow through the development of new ranch properties and expansion of existing mining operations in the area (DWR Applications 53987 through 53992 Vol. 21, 2011). The Goshute, Ely Shoshone, and Duck Valley Indian Reservations are to the north and west of the proposed pumping area. While the tribal reservations are not within the proposed pumping area, the tribes do have traditional ties to the area that many tribal members feel would be endangered from the Groundwater Development Project. In addition, many tribal members believe the impacts from the project could have impacts outside the project area and impact the reservations (Bureau of Land Management, 2012).

In making their case against the SNWA applications, the protestants presented witnesses who testified that the Groundwater Development Project does not comply with Nevada's water law, particularly Nevada Revised Statute 533-370(3), the statute specific to interbasin transfers. Addressing the first point of the statute, the protestants do not agree that SNWA has "justified the need to import water from another basin" (Nevada Revised Statute 533-370[3]). The protestants argue that more stringent conservation measures with increased water rates will be enough to cover shortages that would result from a severe drought along the Colorado River, using water delivery reductions that would be applied according to the 2007 Colorado River Interim Guidelines (Great Basin Water Network, 2011). The protestants also presented several experts in economics and infrastructure investment to refute SNWA's claim that it has the financial ability to construct the project and put the water to beneficial use. Sharlene Leurig, an expert in water project financing, testified that SNWA's ability to finance project construction is "tenuous," partly because SNWA's revenue is directly related to water demand (DWR Applications 53987 through 53992 Vol. 22, 2011, 4891). Leurig explained that "further increasing rates could have the effect of further decreasing demand, and that creates very significant difficulties in their ability to assure a given revenue stream over time" (DWR Applications 53987 through 53992 Vol. 22, 2011, 4851).

The protestants also pointed out that although SNWA now explains that its water right applications are primarily intended for drought protection against Colorado River shortages, initially the applications

were filed to support growth in southern Nevada, and growth is still a factor in SNWA's justification for the project. However, the protestants do not think that SNWA's growth projections are reasonable, because they are based on data and calculations before the 2007 economic downturn. Some protestants go even further and argue that growth should not be a planning goal in southern Nevada. Rick Spilsbury, a Western Shoshone Indian living in the rural basins, explained, "They don't really need the water at this point….If they grow by taking what's out here in rural Nevada, at some point the water will run out and then they will be desperately in need of [more] water" (personal communication, March 17, 2011).

Protestants reject the notion that needing water for the increased growth of Las Vegas should trump the well-being of their rural communities. Protestants disagree with SNWA's belief that Nevada's public interest would be better served by allocating the water for development in southern Nevada. James Garza explained, "The vitality of rural America is critical to ensuring the strength of our economy. The affordability of our food, the independence of our energy supply, and the vibrancy of small communities" (DWR Applications 53987 through 53992 Vol. 21, 2011, 4704). One protestant asked, "Why is it okay to destroy one community to save another?" (DWR Applications 53987 through 53992 Vol. 10, 2011, 2132). Gary Perea, White Pine County commissioner, said, "It's hard for me to imagine us being able to stay here in business and be able to live here with that kind of volume of water leaving the valley" (personal communication, May 27, 2011).

The Bureau of Land Management (BLM) prepared an Environmental Impact Statement (EIS) in response to SNWA's right-of-way application to construct and operate water conveyance facilities for the Groundwater Development Project. The EIS acknowledges that groundwater drawdowns of less than 5% flow reduction could potentially cause declines in the diversity and abundance of wildlife resources and vegetation. The EIS also provides a framework for the development of a Construction, Operation, Maintenance, Monitoring, Management, and Mitigation Plan (COM Plan) to be completed by the BLM after the approval of SNWA's final plan of development (Bureau of Land Management, 2012). However, the protestants explained that while monitoring and mitigation plans could help ensure that the project does not impact existing users, the framework of the COM Plan and of other plans as currently written does not provide that protection. The plans do not contain any quantified goals or thresholds to trigger mitigation measures. James Deacon, an

expert in desert ecology, explained that Monitoring, Mitigation, and Management Plans (MMM Plans) often do not work in practice. He stated, "I believe all of the several that I've been involved with have, in spite of the best efforts of really competent people, over time resulted in decline or disappearance of some of the species or some of the habitats that [they] were attempting to prevent damage to" (DWR Applications 53987 through 53992 Vol. 19, 2011, 4203). Rob Mrowka, ecologist with the Center for Biological Diversity, explained that the massive pumping SNWA proposes has the potential to affect the entire ecosystem of the basins, leading to loss of game and other wildlife species (personal communication, May 6, 2011).

Like SNWA, the protestants presented many scientific experts. These scientific witnesses emphasized the large degree of uncertainty about details of the groundwater system in these rural basins. Scientists disagree on the perennial yield, the amount of recharge in the basins, and the amount of interbasin flow that occurs throughout the system. Scientists pointed out that effects of a project of the magnitude of the SNWA Groundwater Development Project often take a long time to unfold. John Bredehoeft, expert in geology, hydrology, and groundwater monitoring, explained, "This idea that you can sit there and allow the system to recover and then we'll start pumping again, if you really look at that, it doesn't work" (DWR Applications 53987 through 53992 Vol. 24, 2011, 5402). Ranchers and other irrigators in the basins have firsthand experience with how pumping affects local springs, and they recognize that groundwater levels have decreased from their own, much-smaller-scaled actions. Rancher Dean Baker said, "We dried up springs around our land. We've killed plants and things. So, yes. We know it [his ranch's pumping] is drawing it down" (DWR Applications 53987 through 53992 Vol. 24, 2011, 5611). The protestants stated it is clear "that there is great uncertainty about the amount of flow and that the system is not well understood. In such a situation, the only responsible and rational approach to take is a conservative one that errs on the side of protecting the long-term viability of the resource" (Great Basin Water Network, 2011, 17).

The protestants also presented compelling testimony from witnesses who live in the rural basins of origin. These witnesses emphasized that groundwater in the rural basins supports their livelihood, and they do not have other options for securing water. Steve Carter, rancher and president of the Preston Irrigation Company in Nevada, explained, "Our limiting resource is water. Any removal of this water will limit our ability to make a living on the land. If you take any of this water away from

Eastern Nevada, you'll be taking it from our family and our communities. There is no excess water" (DWR Applications 53987 through 53992 Vol. 21, 2011, 4773). The Confederated Tribes of the Goshute Reservation, the Duckwater Shoshone Tribe, and the Ely Shoshone Tribe testified that water is essential to their tribal cultures. Witnesses representing the Tribes explained that if the hydrological models SNWA is relying on are incorrect, then they will lose their reservation and their way of life. The protestants believe the stakes of the project are much higher for the rural communities. For SNWA, the Groundwater Development Project is part of a much larger water strategy for southern Nevada to supplement and diversify sources of water, such as Colorado River water, water gained from conservation measures, and temporary and permanent water exchanges with other states, in times of water shortages and in the face of future population growth. When asked what SNWA would do if the groundwater project was not approved or could not be implemented, Holmes stated, "I'm thoroughly convinced that we will see increase in the demands in the future and we will need additional resources to meet those demands. Your question is hypothetically if the water is not there what will we do? We will find water for Southern Nevada" (DWR Applications 53987 through 53992 Vol. 2, 2011, 374).

Unlike SNWA, people and ecosystems in these rural basins do not have other sources of water nor do they have the political and economic resources to find other sources of water. Many people living in these rural basins are fourth- and fifth-generation residents. One protestant explained that the area is his "lifelong home" (DWR Applications 53987 through 53992 Vol. 21, 2011, 4759). Diane Murphy from the Confederated Tribes of the Goshute Reservation explained the stakes for people living on the reservation: "People that live on the reservation, that's all we have….[Other] people can move wherever they want. We can't. We have to live within our means, and if we don't have that, then we cease to exist" (DWR Applications 53987 through 53992 Vol. 10, 2011, 2315).

The Ruling

Nevada State Engineer Jason King released his ruling on SNWA's water right applications on March 22, 2012, four months after the six-week-long water hearings ended. Of the 104,856 acre-feet annually that

SNWA requested, King granted 83,988 acre-feet annually from the four northeastern Nevada groundwater basins: 5,235 acre-feet in Cave Valley, 11,584 acre-feet in Dry Lake Valley, 6,042 acre-feet in Delamar Valley, and 61,127 acre-feet in Spring Valley. The total amount permitted in Spring Valley is dependent on staged pumping. Stage one allows pumping 38,000 acre-feet for the first eight years. Then depending on biological and hydrological data, an additional 12,000 acre-feet for another eight years could be granted for stage two. Following monitoring for stage two, SNWA may be allowed to develop the entire 61,127 acre-feet in Spring Valley granted by the state engineer. All SNWA water right applications are subject to existing rights, a minimum of two years of biological and hydrological data collection prior to exportation, and a monitoring, mitigation, and management program.

In his ruling, State Engineer King explained that his decision is made within the current Nevada water law and that the law recognizes the importance of "protecting existing water rights, supporting water conservation, and acknowledging the role of water planning" (Office of Nevada State Engineer, 2012, 28). First, the state engineer ruled that SNWA's water applications would be put to beneficial use and that "Southern Nevada needs a water resource that is independent of the Colorado River and that it would not be advisable for the Applicant to continue to rely upon the Colorado River for 90% of Southern Nevada's water" (Office of Nevada State Engineer 2012, 37). The state engineer also ruled that SNWA has a "good faith intention" and the financial ability to "construct the works necessary to put this water to beneficial use" (Office of Nevada State Engineer, 2012, 45).

In the ruling, the state engineer had to determine how much unappropriated water was available and if the Groundwater Development Project could be done in a responsible manner. The law encourages the state engineer to use the "best available science" when making decisions. Because there is much uncertainty about how groundwater flows through and between the basins and exactly how much water is available, the state engineer "consider[ed] and weigh[ed] the science submitted by all parties" (Office of Nevada State Engineer, 2012, 162). After determining existing water rights and estimated perennial yield of the basins, the state engineer also reserved an additional 4,150 acre-feet of water for future growth and development in the basins of origin, collectively. This amount was guided by testimony that predicted the nature of possible future growth in the rural areas overlying the groundwater basins.

SNWA submitted a Monitoring, Management, and Mitigation Plan (MMM Plan) to the State Engineer's Office prior to the water rights hearing. The state engineer ruled that the plan is comprehensive and "scientifically sound" (Office of Nevada State Engineer, 2012, 119). Even though the protestants argued that the mitigation plans do not include specific, objective standards that will force mitigation activities, "the State Engineer finds that it is premature to attempt to set quantitative standards or triggers for mitigation actions in the Management Plan at this time" (Office of Nevada State Engineer, 2012, 118). In the end, the state engineer concluded that with the MMM Plans in place and by reserving water for the basins of origin "there is no reason to reject the Applications under NRS 533.370(2)," the Nevada statute that stipulates when water applications must be denied.

The Appeal

The protestants appealed the ruling to Nevada's 7th Judicial District Court, where two days of testimony in June 2013 were heard by Judge Robert Estes. Judge Estes listened to arguments to determine whether the state engineer's groundwater rulings met Nevada's water law criteria authorizing interbasin transfers of water. In particular, the protestants' objections stated that the state engineer's rulings were "neither environmentally sound nor in the public interest" (White Pine County et al. v. King, 2013, 7).

In December 2013, Judge Estes published his decision and remanded SNWA's approved water rights back to the state engineer for further action. Judge Estes ordered the state engineer to recalculate the amounts of SNWA's water right awards because, as the cumulative water rights stand, the aquifer may not reach equilibrium even after 200 years, leading to groundwater mining. Losing this water from the aquifer is "unfair to following generations of Nevadans and is not in the public interest," stated Judge Estes (White Pine County et al. v. King, 2013, 13). He also disagreed with the state engineer's ruling that it is acceptable to award water rights if impacts to existing users do not occur within hundreds of years. According to Judge Estes, water applications need to be rejected if there will ever be impacts to other water rights holders, because it is irresponsible to "defer serious water problems and conflict to later generations" (White Pine County et al. v. King, 2013, 20).

Judge Estes agreed with protestants that the MMM Plans are useless without "objective standards to determine when mitigation will be required and implemented" (White Pine County et al. v. King, 2013, 15). He ruled that without these standards, the state engineer's ruling is "arbitrary and capricious" and "cede[s] the monitoring responsibilities to SNWA" (White Pine County et al. v. King, 2013, 18). If the state engineer does not have enough scientific data to establish triggers and thresholds in the MMM Plans, then "it is premature to grant water rights," reasoned Judge Estes (White Pine County et al. v. King, 2013, 23). Judge Estes ordered the state engineer to establish objective standards for mitigation and to include the adjacent Snake Valley, Utah, in the MMM Plans.

Discussion

Three main lessons can be drawn from this case study that illustrate current water policy challenges in the U.S. West.

First, SNWA's proposed Groundwater Development Project illustrates how public institutions have tried to manage water in changing societal and climatic contexts without deviating from their original mission of providing a reliable and safe water supply to meet current and future demands of their constituents. Because institutions, such as SNWA, focus on managing water to serve the specific needs of municipal use, they tend to ignore impacts to the users and uses related to other values of water (Lach, Rayner, and Ingram, 2005). In addition, many water managers frame water management as an engineering endeavor (Huitema and Meijerink, 2010). However, with more recent recognition of environmental needs and the importance of water to sense of place and community sustainability, competing uses and values of water have increasingly been at odds with water managers' mission and vision of water as a product or commodity that they deliver (Brown and Ingram, 1987; Blatter, Ingram, and Doughman, 2001; Whiteley, Ingram, and Perry, 2008).

Second, this case study also shows that in current debates over water allocation decisions, people are focused on what happens to the water after it is allocated. While prior appropriation requires applicants to specify for what purpose they will use water, generally after a water right has been granted, it is considered as personal property of the applicant

(J. King, personal communication, March 24, 2011). Traditionally, little attention had been focused on how water was actually used after it was granted unless disputes arose (Tarlock, 1991). However, now that the amount of unallocated water is increasingly scarce, people are more interested in understanding how water will be used and are making value judgments on whether they consider particular uses as beneficial from a societal perspective.

In their social construction framework, Schneider and Ingram (1997) explain there are two arenas that have clear political opportunities: providing policy-related benefits to "advantaged" groups and burdens to "deviant" groups. All other policy actions are risky for politicians, including providing benefits to "contenders" and burdens to "dependents" (Schneider and Ingram, 1997). Protestants of SNWA's Groundwater Development Project view SNWA as a "contender," an entity that is powerful but undeserving of the benefits they seek. They have very little trust in SNWA and recognize the large power imbalance between them. Launce Rake, communications director of the Progressive Leadership Alliance of Nevada, explained, "They've [SNWA] got the money and the power and they're just going to do it" (personal communication, May 5, 2011). In presenting its case, SNWA tries to shift people's perspectives in ways that would situate SNWA in the "advantaged" category, i.e., as a group not only powerful but seen as deserving of water rights benefits. SNWA's arguments that it provides water for 70% of Nevada's population and is the economic engine of the state are aimed at influencing this reframing. As attorneys for SNWA explained in their summary and closing arguments, "If these applications are granted, 7 out of 10 people in the State of Nevada will directly rely upon this water and the other 3 out of 10 will benefit either directly or indirectly" (SNWA, 2011, 19). Furthermore, SNWA tries to show that burdens of the project will not fall on "dependent," less powerful rural interests. SNWA highlights its MMM Plans and insists that Nevada state law and federal law will protect the basins of origin. In her testimony, Patricia Mulroy explained, "What I can say is that Nevada law protects existing users. Federal law protects the environment. The State Engineer, the State Department of Natural Resources will be absolutely involved in protecting the existing users" (DWR Applications 53987 through 53992 Vol. 1, 2011, 127).

In the water right hearings, SNWA also tried to divert focus away from value judgments on its intended beneficial use of the rural

groundwater. During cross-examination of witnesses who live and own businesses in the rural basins, SNWA attorneys continually asked them if they believe that no new water rights should be developed within any of the four basins. The majority of witnesses admitted they do not protest other water right applications where the beneficial use would remain local. Rocky Hatch, a rancher, explained, "I think the water should be developed as far as for cows and for wildlife, stuff like that. I don't know about developing it to take it to Las Vegas, no" (DWR Applications 53987 through 53992 Vol. 22, 2011, 4921). Steve Carter further clarified his position by saying he did not protest SNWA water right applications for water use on ranches it had bought in the basins. "It was just the ones that left the valley" (DWR Applications 53987 through 53992 Vol. 21, 2011, 4783). SNWA believes protestants are opposed to its water right applications based on the fundamental idea of exporting water to Las Vegas, a city whose economy depends on casinos and the gambling industry. In his opening statement for SNWA, attorney Paul Taggart said, "The opposers and their experts are blinded by personal prejudice against SNWA and this project." SNWA further argued that water allocation decisions cannot rely on value judgments of beneficial use. Taggart explained, "Here's why the law supports SNWA: We filed for the water first, and Nevada's water law is still founded on prior appropriation. Nevada water law prohibits SNWA from impacting existing water rights" (DWR Applications 53987 through 53992 Vol. 1, 2011, 23). SNWA's position is that as long as it fulfills Nevada's water law that guides interbasin transfers, including minimizing impacts, there is no legal reason why their applications should be denied.

However, Nevada water law is known to be one of the most comprehensive formulations of prior appropriation in the West, and it contains provisions that allow the state engineer to apply value judgments to beneficial uses. For example, the state engineer has the ability to issue orders declaring preferred uses in designated basins in the interest of public welfare. In addition, Nevada Revised Statute 533.370(2) says the state engineer will reject water right applications that "prove detrimental to the public interest." However, the law does not specifically define criteria to establish what actions would be "detrimental to the public interest." Great Basin Water Network found that in the past the state engineer had to use discretion in interpreting the law (Great Basin Water Network, 2011). In a 1982 ruling, then state engineer Peter G. Morros wrote, "It is not unusual that more than one public interest is determined

or defined. Some interests may ultimately outweigh others….The State Engineer in many cases is simply faced with weighing one public interest against another in reaching a decision especially when competitive beneficial uses are at issue" (Great Basin Water Network, 2011, 1).

In his ruling on the SNWA water right applications, State Engineer King explained that his analysis of the public interest is guided by the Nevada State Legislature, because the concept of public interest "is a dynamic concept changing over time" (Office of Nevada State Engineer, 2012, 163). Current Nevada policy has established the "important role of water resource planning and that such planning must be based upon identifying current and future needs for water" (Office of Nevada State Engineer, 2012, 28). With that guidance, the state engineer ruled that SNWA's water right applications fulfill a beneficial use and, furthermore, that "it would not be advisable for the Applicant to continue to rely upon the Colorado River for 90% of Southern Nevada's water" (Office of Nevada State Engineer, 2012, 37). In Judge Estes's ruling on the appeal, he agreed with the state engineer's findings of SNWA's need for and financial ability to develop the groundwater. However, Judge Estes ruled that the amount of water the state engineer granted to SNWA was excessive and did not meet the public's interest. While he agreed that SNWA's filings do meet a beneficial use of rural Nevada groundwater, he made a greater attempt to balance multiple beneficial uses and interpreted the "public interest" statute of Nevada water law to include future generations and the future sustainability of rural Nevada. Accordingly, Judge Estes ruled that the state engineer must recalculate the water granted to SNWA to incorporate a longer and more comprehensive view of the consequences of SNWA's Groundwater Development Project.

State Engineer King also applied burdens to SNWA through the staged pumping and MMM protocol. However, Judge Estes ruled that the MMM Plans are not really a burden to SNWA, because these plans would be under SNWA's direction and "there are no objective standards to determine when mitigation will be required and implemented" (White Pine County et al. v. King, 2013, 15). Schneider and Ingram (1997) explain that it can be difficult to assign burdens to contender groups, because contender groups have the power to inflict political damage. Therefore, many burdens assigned to contender groups tend to be "hollow and unenforceable" (Schneider and Ingram, 1997, 119). In this case study, many protestants believed the state engineer "want[s] to

make a good decision" (G. Perea, personal communication, May 27, 2011) but they recognize the broader political implications of SNWA's project. Rob Mrowka explained, "The bottom line is that Southern Nevada Water Authority enjoys the support of developers and casino owners, who then influence heavily, with campaign donations, politicians who are supposed to be the watchdogs over SNWA, but are held at abeyance because of the money" (personal communication, May 6, 2011).

Finally, the third lesson of this case study is that as water becomes scarcer with increasing droughts and over-allocated river systems, it has become ever more important to carefully deliberate water policy designs that allocate water to meet a variety of competing needs. Schneider and Ingram (2007) explain that ways of knowing are narratives that allow people to make sense of a policy space. Society can use different ways of knowing to allocate water. For example, SNWA highlights economic reasoning and technological knowledge, while protestants emphasize ecological knowledge and moral ways of knowing as appropriate knowledge systems on which to base water allocation rationales. The policy debates over SNWA's water right applications reveal that the central argument is over different ways of knowing and understanding beneficial uses of that water. Endter-Wada, Welsh, and Ingram (2012) explain that a foundational element of water law is determining fair ways to allocate water among *users.* In his ruling, State Engineer King used the testimony provided to determine how much water was unappropriated in the basins and granted SNWA that amount, minus a small amount reserved for the basins of origin. However, Endter-Wada, Welsh, and Ingram (2012) emphasize that less attention is paid to fair ways to allocate water among beneficial *uses.* The state engineer was careful to point out that it is not his job to evaluate the "political and economic decisions made by local government and there is nothing in Nevada water law instructing the State Engineer to control or distribute population or perform an alternative analysis" (Office of Nevada State Engineer, 2012, 158).

Even so, Judge Estes ruled that the state engineer does have a responsibility to carefully consider how an assigned use will affect the collective, existing uses of that water in rural Nevada, including ecological uses. In addition, Judge Estes's ruling showed that allocating water should require more thought than simply assigning the available water to existing users and water rights applicants. Instead, allocating water necessitates a holistic view of the hydrologic system and a true understanding of how

water uses interact within the system. Judge Estes's ruling demonstrates that water allocation decision makers can and should take the time needed to clearly understand and evaluate the long-term impacts of a project, particularly one involving water rights granted in perpetuity.

Schneider and Ingram (1997) have shown that focusing on target populations, like water *users*, can send messages about which users are more deserving of water and can perpetuate or reinforce existing water allocation decisions. This case study illustrates the need to focus on the actual *uses* of water so that society can begin to differentiate between water needs and water wants when allocating scarce resources. The "public interest" statute that is found in many states' water laws is a step in the right direction to encourage decision makers to wrestle with these concepts. However, its use can be limited depending on how a decision maker chooses to interpret the statute, which often depends on how comfortable the decision maker is with assigning benefits and burdens to particular applicants.

The state engineer and SNWA appealed Judge Estes's decision. In February 2015, the Nevada Supreme Court dismissed the appeals, because Judge Estes sent the case back to the state engineer to "resolve a substantive issue" and was not a final, appealable judgment (Southern Nev. Water Authority vs. Dist CT, 2015). The Nevada Supreme Court's decision encourages SNWA and the state engineer to abide by Judge Estes's decision and gather the data and conduct the analyses that Judge Estes deemed necessary. Members of the Great Basin Water Network consider the Nevada Supreme Court's ruling a victory and hope that the ruling will cause SNWA to reconsider the project (Great Basin Water Network, 2015). However, SNWA water officials have indicated that they will continue working to develop the project that they believe is "for the benefit of two million Nevada citizens" (Brean, 2015). The state engineer held a status conference in September 2016 to decide how to comply with Judge Estes's order. The state engineer directed a new hearing to occur in fall 2017 to focus on SNWA's MMM Plans for the four rural Nevada basins. The state engineer will use the new hearing to reconsider how much water SNWA should be granted from the four basins (Chereb, 2016). Taking another hard look at how SNWA will remain responsible to the rural basins when exporting their water could lead to a thoughtful solution involving contingency plans that could benefit SNWA without harming the rural basins.

Conclusions

Battles over water can be long-standing and arduous. This case study of rural Nevada's groundwater is no exception; SNWA has maintained water rights applications for future development while protestants have been fighting these plans for over 25 years. Simeon Herskovits, attorney for the Great Basin Water Network, explained the significance of Judge Estes's ruling: "It could fundamentally change the way regulators review [SNWA's] controversial pipeline" (Brean, 2013). While Judge Estes's decision validated many of the arguments that protestants made against SNWA's project, the protestants are aware that Nevada water law is vague when it comes to recognizing environmental uses of water. Susan Lynn, then coordinator of the Great Basin Water Network, explained, "We want him, [the state engineer], to further define environmental soundness because he gives it lip service, but he has nothing in which to base his decision. There are no criteria for environmental soundness" (personal communication, April 14, 2011). Rob Mrowka calls for "better foundational laws in place that provide for environmental protection" before large-scale water exportation projects are approved (personal communication, May 6, 2011).

Helen Ingram's work has shown that there are no universal solutions to water management problems. Politics cannot be separated from water management questions, because people value water differently in varying contexts (Brown and Ingram, 1987; Blatter, Ingram, and Doughman, 2001; Ingram, 2011; Whiteley, Ingram, and Perry, 2008). As different values of water gain momentum and importance in political debates, it becomes increasingly necessary to design and implement water policies that reflect these changing interests (Ingram and Schneider, 1990; Schneider and Ingram, 1997). Policy designs that engage multiple ways of knowing may be different from what groups with one way of knowing would create; however, these complex policies that encompass many conflicting goals often can reduce conflict and encourage open discourse among multiple ways of knowing (Schneider and Ingram, 2007). The defining thread through all of Helen Ingram's work is her emphasis on the importance of designing policies that enhance democracy and equity. When it comes to democratic and equitable water policies, decisions need to engage and involve not just politically powerful entities, but also the people and communities that are affected by those decisions (Ingram, 2001). If society can carefully deliberate why we allocate water the way

we do and which beneficial uses it considers legitimate uses of scarce water in different contexts, then we will more likely be able to balance the multiple water needs of cities, various rural communities, and the environment. As Helen Ingram explains, "Equity and fairness have powerful generative force in water politics, and water reforms that do not appear just and fair are likely to be politically infeasible" (2011, 258). ✣

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