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WATER USE AND NATURAL LIMITS IN THE LAS VEGAS VALLEY: A HISTORY OF THE SOUTHERN NEVADA WATER AUTHORITY

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A thesis submitted in partial fulfillment
of the requirements for the

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ABSTRACT

Water Use and Natural Limits in the Las Vegas Valley: A History of the Southern Nevada Water Authority

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This thesis examines the history of the Southern Nevada Water Authority (SNWA) and how it has helped transform various aspects of southern Nevada's economy and environment. Prior to the establishment of the SNWA in 1991 the Las Vegas Metropolitan Area (LVMA) possessed several competing water providers whose opposition to one another adversely affected the management of water in the region. These water providers recognized this problem, came together, and negotiated the creation of a regional water agency, the SNWA. This organization, comprised of representatives from each of the LVMA's water providers has the power to institute policy across municipal boundaries. The SNWA has proven to be a remarkably potent political organization, one whose success has generated significant controversy. This study speaks to these local historical developments, while contextualizing the SNWA and water use in Southern Nevada within a larger historical context of water use in the southwestern United States and, more broadly, in desert environments worldwide.

TABLE OF CONTENTS

ABSTRACT……...iii

LIST OF ABBREVIATIONS……..v

CHAPTER 1 DE-EXCEPTIONALIZING THE DEMON……....1

CHAPTER 2 LAS VEGAS AND THE AMERICAN WEST…….10

CHAPTER 3 PARADIGM SHIFT: THE EARLY HISTORY OF THE SNWA……42

CHAPTER 4 PARTNERSHIP AND REGIONAL WATER ACQUISITION…..……58

CHAPTER 5 INFRASTRUCTURE AND LOCAL WATER USE……..……80

CHAPTER 6 BLUEPRINT FOR THE FUTURE?……...…….107

CHAPTER 7 LEARNING FROM THE ANASAZI: LAS VEGAS AND THE RISE OF AN ENVIRONMENTAL ETHOS……..…..…..……..121

BIBLIOGRAPHY……126

VITA……133

ABBREVIATIONS

AFY	acre-feet per year
Authority	Southern Nevada Water Authority
BMI	Basic Magnesium, Incorporated
BMP	Bureau of Reclamation best management practices
CAP	Central Arizona Project
CIP	Capital Improvements Project
GDP	Clark, Lincoln, and White Pine Counties Groundwater Development Project
CRC	Colorado River Commission
District	Las Vegas Valley Water District
Engineer	Nevada State Water Engineer
IRPAC	Integrated Resource Planning Advisory Committee
LADWP	Los Angeles Department of Water and Power
LVL&W	Las Vegas Land and Water Company
LVMA	Las Vegas Metropolitan Area
LVVWD	Las Vegas Valley Water District
LVWCC	Las Vegas Wash Coordination Committee
MAF	million acre-feet
MET	Metropolitan Water District of Southern California
MWD	Metropolitan Water District of Southern California
NPS	National Park Service
PSWP	Pacific Southwest Water Plan
RMWTF	River Mountains Water Treatment Facility
SNWA	Southern Nevada Water Authority
SNWS	Southern Nevada Water System
SPLA&SL	San Pedro, Los Angeles, and Salt Lake Railroad
SSA	Seven States Agreement of 2007
UNFCCC	United Nations Framework Convention on Climate Change
USBR	United States Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
Valley	Municipalities within the Las Vegas Valley
Wash	Las Vegas Wash
WRMI	Water Resources Management, Incorporated
WSLRP	Water Smart Landscape Rebate Program
WUCA	Water Utility Climate Alliance

CHAPTER 1

DEXCEPTIONALIZING THE DEMON

The history of early Las Vegas reads like that of countless other western American towns. Las Vegas, or rather, the group of cities, unincorporated townships, and master-planned communities that comprise the Las Vegas Metropolitan Area (LVMA), has an international reputation for glamour and exoticism that belies the fact that this modern metropolis is solidly grounded within the larger historical context of the American West.[1] The sequence of human settlement from Indian to European is a common theme throughout the region—a trait shared by almost every urban settlement in the West—as are the economic drivers of ranching, mining, and railroading. Like scores of other western settlements, local geography provided some characteristics that favored human habitation. In the Las Vegas Valley it was the abundance of springs and aquifers that provided a year round supply of water.

It is important to realize that there are dozens of major cities throughout the world located in extremely harsh desert regions. Examples include Mecca, Baghdad, Cairo, Jeddah, Johannesburg, and Tripoli. The size of these cities stands, ostensibly at least, in stark contrast to their surroundings; Cairo, Egypt has a population of over 10 million people, a figure comparable to present day Los Angeles County; Baghdad, Iraq (prior to the current war and accompanying exodus of refugees): 3.4 million; Alexandria, Egypt:

[1] The Las Vegas Metropolitan Area is comprised of the cities of Henderson, Las Vegas, and North Las Vegas, as well as the unincorporated communities of Winchester, Paradise, Enterprise, and Spring Valley. Some representations also include the neighboring communities of Boulder City and Blue Diamond.

2.9 million; and Jeddah, Saudi Arabia: 1.2 million. Countless elementary students throughout the country are taught that western civilization, for better or worse, began in Mesopotamia, a desert land also known as the Fertile Crescent. Grade-schoolers are also able to describe the ancient wonders of Egypt, and know through pictures of the pyramids that it is a desert civilization. Furthermore, of the world's five largest religions, three (Judaism, Christianity, and Islam) began in the desert. It is hard to overstate the cultural influence of these religions and their effect on world history. The environmental theme that ties all of these settlements together, and makes their subsequent cultural development possible, is their proximity to a year-round water source.[2]

Like their global counterparts, almost all western American desert cities adhere to similar geographic principles. They are found near sources of water, which can appear at the base of mountains (Reno, Salt Lake City), along rivers (El Paso, Albuquerque), and overlying aquifers or springs (Palm Springs, Tucson). American desert cities also possess significant populations; the Phoenix metropolitan area has almost four million residents, and Tucson has almost one million; El Paso, Texas: two million; and Albuquerque, New Mexico over 700,000.[3] Las Vegas currently has all three of these environmental conditions (proximity to mountains, river, and springs), and it, too, has a large population. Deserts throughout history often possessed resources of one kind or another that have spurred economic demand. The ancient cities of North Africa and the Middle East were strategically located along trade routes or in agricultural regions, such as the Nile River Valley. These entrepôts attracted capital and often substantial populations. In the twentieth-century, cities in Saudi Arabia and Iraq, to name a few,

[2] Michael A Mares, *Encyclopedia of Deserts* (Norman: University of Oklahoma Press, 1999), 118-119.
[3] United States Census Bureau, available from www.usgs.gov.

grew as a result of the world's demand for oil. In Las Vegas's case, the city's decades-long monopoly on gambling produced profound levels of growth, a development indicative of the shifting political geography of the West that determined the gambling industry's legality on one side of an invisible state boundary-line but not the other.

Presently there are approximately two million people living in the Las Vegas metropolitan area. But while this broader global and national desert heritage is clearly evident, one would never know it from reading contemporary critiques of LVMA water use. Las Vegas, or the metropolitan area people perceive as Las Vegas, has long been the object of literary scorn. Early criticism focused on the city's moral depredation, a result of legalized gambling, prostitution, and easy divorce. Increasingly, criticism is aimed at Las Vegas' supposedly cavalier attitude toward the environment. Many recent books and articles reveal a deep bias against the place. Two examples are *Lasso the Wind*, by Timothy Egan, and *Dead Cities*, by Mike Davis. Each book's premise is that no one should live in Las Vegas, that the environment here is too harsh for human habitation. Each book delivers a scathing critique of Las Vegas, its citizens, and local values governing water use. Interestingly though, each author based his conclusions on selective data that precluded an accurate assessment of the place. Revealingly, neither author lives in southern Nevada, and each based his work on a short visit to town. Their biased treatment of Las Vegas reveals a preconceived notion of the place that stands in stark contrast to southern Nevada's environmental reality. Given their bias, it is doubtful whether Egan, a resident of the Pacific Northwest, and Davis, a resident of Southern California, really needed to visit Las Vegas at all.[4]

[4] Timothy Egan, *Lasso The Wind: Away to the New West* (New York: Alfred A. Knopf, 1998); Mike Davis, *Dead Cities* (New York: New Press, 2002).

Despite the fact that environmental history took a "cultural turn" in the 1990s, a historiographic direction that gave as much attention to how people have conceptualized nature as to nature itself, many authors continue to take a declensionist tack when writing about Las Vegas. "Declensionism" refers to a state of moral decline, and writers who adopt this trope see only the negative side of human actions. Works of this genre view Las Vegas as a veritable Sodom and Gomorrah rolled into one, and predict the city's (Las Vegas's) imminent demise, portending the moment when the misplaced metropolis finally steps past environmental limitations and begins the downward spiral toward oblivion. Unfortunately, neither Egan nor Davis extends the discussion on water issues in the Las Vegas Valley and the larger American Southwest. They merely echo the negativity of numerous earlier works that emphasized the seamier side of Las Vegas. To be sure, modern Las Vegas has a significant impact on the local environment, and this study is not an advocation for unrestricted growth; but argues instead that Las Vegas be placed alongside other regional centers and judged on similar terms. The southwestern United States has a long history of human habitation and is facing the challenges of increased population and an overtaxed water supply. However, preaching doom and gloom to shock readers does little to further solutions to these pressing issues, nor do these accounts present an accurate description of the region or its people.

During the nineteenth century, the themes of small urban population and successive waves of settlement and displacement defined the history of most cities throughout the American West. (Notable exceptions were Los Angeles and San Francisco whose meteoric rises in population were without precedent). At the time of Las Vegas' creation Reno, Carson City and Virginia City were the only notable towns in Nevada. Las Vegas'

development followed normal growth patterns in the West until roughly the time that the Hoover Dam was built. At that point southern Nevada received enormous federal funding, which allowed it to explore atypical economic ventures, most notably gaming, which then set it apart from its regional neighbors; but even this, had its roots in western cultural history. Gambling existed in almost every western town during the nineteenth century; especially the rough and tumble mining camps that helped jumpstart the region. As cities became "respectable," however, gaming became less prevalent, so much so that when Nevada re-legalized the activity in 1931 mainstream America viewed it as a rogue industry.

Up until the signing of the Colorado River Compact in 1922, Las Vegas' history resembled that of most western American towns. The deviations did not occur until after the signing of the Compact and the construction of Hoover Dam, at which point a new economic resource was available for exploitation. As the waters of Lake Mead rose behind the dam, so too did the level of government expenditure in southern Nevada. The government wages that dam workers earned found their way into local banks and businesses, and myriad housing developments, as well as the government town of Boulder City, which sprouted from the desert and helped ignite the local economy. This initial federal project led to others: the creation of the United States Army Aerial Gunnery Range (later renamed Nellis Air Force Base) in 1941, and the Nevada Test Site in 1950, where the Department of Energy tested nuclear weapons until the 1992 worldwide moratorium. Basic Magnesium, Incorporated (BMI) was an important defense contractor that built its processing plant in 1940-41 in what later became Henderson. These projects helped create what had long eluded southern Nevada—

economic stability.[5] It was then that urban economic and geographic expansion became feasible in the minds of southern Nevadans. For better or worse, the Hoover Dam drastically changed the face of the Las Vegas Valley.

As the LVMA's urban population gradually expanded it consumed larger amounts of water, but unlike other cities in the region Las Vegas has run up against its legal allotment. This development, perhaps unfairly conveys the message that Las Vegas cannot live within its means. This perception is based on a faulty premise, since it fails to account for Nevada's comparatively small allocation under the Compact. Other cities in the region use greater amounts of water, but have remained within their more generous allotments. This is not to say that urban development and growth in the Las Vegas Valley has not had an enormous environmental impact. The metropolis has displaced numerous species of plants and animals and can be wasteful with some of its resources. But this is something that is common to all urban areas, not just Las Vegas. Despite the city's reputation for waste, it has actually taken significant steps to reduce its water consumption since 1991.

The use of artesian water and recycled water has gone a long way toward meeting the valley's water needs. However, given the unrelenting growth, urban planners are now considering options such as water importation via pipeline from northeastern Nevada and purchasing agricultural water rights. This action has gained wide public attention, but is a trend that has several precedents throughout the American West. Other cities in the region employ water delivery systems far larger than that proposed between Las Vegas and northern Nevada. For example, the Bureau of Reclamation (USBR) currently pipes millions of acre-feet of Colorado River Water through a tunnel thirteen miles in length

[5] Eugene Moehring, *Resort City in the Sunbelt* (Reno: University of Nevada Press, 2000), 13-40.

that goes *underneath* Rocky Mountain National Park, taking water from the western slope and sending it to the city of Denver.[6] Los Angeles and Phoenix both receive Colorado River water via 250-mile long aqueducts. And this type of water engineering is not unique to the American West. Boston, New York, and Atlanta have constructed extensive pipelines siphoning water to their urban areas from distant sources, often several hundred miles away. To single Las Vegas out for following a common course is illogical and ignores the inequitable nature of the Compact.

Contrary to alarmist pronouncements from the criers of doom, the metropolitan area is not on the edge of environmental catastrophe, and is in fact coming up with some interesting and progressive ways of addressing its water shortage. Not least of which is the creation of the Southern Nevada Water Authority in 1991, a regionally focused water provider whose main mission is to provide water to the LVMA, and has implemented a comprehensive water management plan that has greatly reduced water consumption rates from prior levels.

If the Colorado River Compact were rewritten today there would be little chance that a metropolis like Las Vegas would receive such a small allotment. In 1922, California had far more political power and population than any other state in the West and was in the position to heavily influence the manner in which the Colorado River resource was distributed. California's political leaders' sole interest was to solidify their state's future growth. They accomplished this task, but did so at the expense of other Colorado River Basin states, especially Nevada. The Colorado River Compact is based on an early twentieth century reality, a time when Los Angeles was the only western city with over 1

[6] United States Bureau of Reclamation. Colorado-Big Thompson Project. Available from http://www.usbr.gov/dataweb/html/cbt.html#general

million residents. The population of the American West has grown enormously since 1922, but the water allotments have remained the same. The following figures reflect the 2006 population estimate for the Colorado River basin states: Arizona currently has 6.2 million residents; California—36.5 million; Colorado—4.75 million; Nevada—2.5 million; New Mexico—2 million; Utah—2.5 million; and Wyoming—515,000.[7] Clearly, the situation has changed drastically with respect to population, yet the Colorado River Compact continues to reflect a 1920s reality and is proving inadequate in dealing with the social and environmental pressures of the twenty-first century.

Given the modern day image of Las Vegas as a leading world destination, and the media attention to its current water shortage and spectacular growth rates, it is easy to forget that the city began just like many others across the American West. Las Vegas and Southern Nevada witnessed a similar sequence of historical characters as that seen in places throughout the region: first the Indians, then mountain men, followed by federal explorers, Mormons, ranchers, and two railroads. Water in southern Nevada supported limited agriculture as it did in places such as Phoenix, Denver, and Boise. And the railroad chose the Las Vegas Valley as a way station, because of its water supply, placing it alongside other railroad towns such as Cheyenne and Laramie, Wyoming, and Reno and Battle Mountain, Nevada. There is simply nothing exceptional about Las Vegas and its use of water prior to the creation of the SNWA in 1991. After that point, however, it is exceptional, but not for the reasons so often cited by visiting writers. Rather, the Las Vegas Metropolitan Area has created a singular entity that incorporates the needs of each of southern Nevada's communities. As a result water has been utilized with a greater degree of efficiency throughout the region, and formerly competing water purveyors have

[7] United States Census Bureau, 2006 population estimate, available from www.census.gov.

come together to create a politically powerful organization capable of affecting water policy throughout the Colorado River Basin.

CHAPTER 2

LAS VEGAS AND THE AMERICAN WEST

While modern Las Vegas appears to sprout as if from nowhere, its existence is actually deeply rooted in the local geography. A well-known historian once proclaimed that Las Vegas "owes nothing to its surroundings."[8] This is a difficult statement to maintain when faced with the fact that for over nine millennia humans have called the Las Vegas Valley home, a trend only possible because the region contains the necessary preconditions to attract and sustain human life.[9] On the surface the Las Vegas Valley appears harsh and forbidding, but a closer examination reveals an area of surprising biodiversity, something made possible by the numerous water sources located throughout the valley.

Las Vegas is located within the Basin and Range province, which extends east from the Sierra Nevada to the Wasatch Front and south into Mexico. It is largely defined by interior drainage, with the notable exception of the Colorado River. The Sonora Desert of Arizona and Northern Mexico and the Great Basin Desert of Nevada and Utah intersect and create the Mojave Desert. The Mojave averages ten inches of precipitation annually—for the Las Vegas Valley, the rainfall is even lower at four inches. This precipitation is split evenly between summer and winter, making the Mojave the hottest

[8] Hal Rothman, *Neon Metropolis: How Las Vegas Started the Twenty-First Century.* (London: Routledge, 2002), xi.
[9] Elizabeth Von Til Warren, *The Las Vegas Springs: A Disappeared Resource.* (Doctoral Dissertation, Washington State University, 2001).

desert in America with the record temperature set in 1913 in Death Valley at 134° Fahrenheit.[10]. Although harsh, biodiversity abounds in the Mojave, including the creosote bush, a plant that constantly replicates itself through cloning, with some specimens as old as 11,000 years.[11] This is the physical setting of which Las Vegas is a part.

The desert interior is the result of a rain shadow caused by the Sierra Nevada, a range of mountains over four hundred miles in length that stretches from just south of Mt. Lassen in northern California to Tehachapi Pass north of Los Angeles. Many of its peaks reach over 14,000 feet in elevation and block moisture from reaching further eastward. As moisture-laden air from the Pacific Ocean moves up and over the mountain range, the temperature decreases, a principle known as orographic lift. As the temperature goes down, the air loses its ability to retain moisture and deposits most of it in the form of snow on the western slope of the Sierra. This de-humidified air then travels over Death Valley and the Panamint mountain range and finally to the Spring Mountains, which form the western border of the Las Vegas Valley. These mountains rise to an elevation of 11,912 feet, two full miles above the Las Vegas Valley floor and further compound the rain shadow effect. Even though they tend to block snow and rain from falling directly on the Las Vegas Valley, precipitation still percolates down into underlying aquifers. This water erupts in three main springs along the bluff west of present day downtown Las Vegas and has nourished a wide range of plant and animal life since prehistoric times. Along with these main springs there exist several more scattered throughout the Valley in

[10] United States Geologic Survey, *Geology of Death Valley*. Available from http://wrgis.wr.usgs.gov/parks/deva/weather.html; http://www.nps.gov/deva/naturescience/weather-and-climate.htm.
[11] http://www.nps.gov/jotr/naturescience/creosote.htm.

at least five other areas.[12] The frequency and reliability of the springs illustrates a location that favors human habitation, something supported by the archaeological record. An assessment of the Las Vegas Springs conducted by the railroad in 1906 revealed a flow of 6,400 acre-feet. Using today's standards of water use, that output is enough to support 25,600 people (1 acre-foot per family of four per year). This total is more than enough for groups of hunter/gatherer Indians.[13] Indeed, it was enough to support the Valley's population well into the twentieth century.

The Valley's inhabitants relied on the Las Vegas springs until the 1950s, which may seem odd considering the proximity of the Colorado River, which lies only twenty miles east of Las Vegas. Whereas the river currently serves as southern Nevada's prime water-source, it only became accessible during the 1930s when the impounded water behind Hoover Dam rose to a point at which it could be siphoned off and sent to the Valley's residents. Prior to the dam's construction, however, the inhabitants of the Las Vegas Valley could make little use of the river. The rugged terrain and dramatic geographic relief between the Las Vegas Valley and the river made it impossible to utilize its waters except along its riverbanks. Joseph Ives, an army officer who explored the lower Colorado River, was quite intimidated by the perpendicular walls of the canyons just east of the Las Vegas Valley, stating that they were likely over a thousand feet high. Ives wanted to lead his expedition out of the canyon and into the surrounding region, but finding this impossible, had to float back down the river thirty miles to a point at which they could leave the river's course and explore the region on land.[14] The Colorado

[12] Joseph Tingley, Becky Purkey, Ernest Duebendorfer, Eugene Smith, Jonathan Price, and Stephen Castor, *Geologic Tours in the Las Vegas Area* (Reno: Nevada Bureau of Mines and Geology, 2001), 123.
[13] John F. Cahlan, *Water: A History of Las Vegas, v.1.* (Las Vegas: Las Vegas Valley Water District, 1975).
[14] United States, *Report Upon the Colorado River of the West* (New York: Da Capo Press, 1969).

River's importance for human habitation has steadily increased, and has become the main fuel source for the growth explosion that occurred in the postwar American Southwest, but this is the result of twentieth century technological improvements. Prior to Hoover Dam the sole source of water in the Las Vegas Valley was the artesian springs that discharged the ancient snowmelt of the Spring Mountains.

Early Las Vegas history follows the same path as that of most other Intermountain western cities. These settlements were early sites of Indian habitation that were later taken over by Euro-Americans. The archaeological record indicates that both Pueblo and Paiutes utilized the Las Vegas Valley's plentiful water sources for centuries. During the nineteenth and twentieth centuries the Indians were moved off the land when Euro-Americans, in this case Mormons, moved in. While there is significant evidence that the Anasazi Indians practiced farming in the Las Vegas Valley, the Mormon settlers initiated a system of agriculture that appropriated local water supplies more intensively than any previous group of humans. This had the effect of displacing many of the Paiute Indians who inhabited the valley as Mormons settled there, and who had previously relied on the springs to support their hunting and gathering circuits throughout the region. The Mormon settlers began limited ranching and farming in the Las Vegas Valley, a trend that lasted well into the twentieth century. Mining, which established hundreds of western cities, also played a role in Las Vegas history. While there was no mining in the Las Vegas Valley itself, the town served as a trading post first for the 49ers on their way to California, and later for gold and silver strikes in Goldfield, Tonopah, Eldorado Canyon, and Searchlight, all located in Nevada.

Lastly, like scores of other towns throughout the region, Las Vegas felt the influence of the railroad. While the Las Vegas Valley was inhabited prior to the railroad's arrival, it was not an official town, but rather, a scattered collection of ranches. At the turn of the twentieth century the railroad chose to make Las Vegas a stopover point on its line from Los Angeles to Salt Lake City, and its choice had everything to do with the water available in the Valley. The railroad purchased land near the course of the Las Vegas Creek, located in present day downtown, and then sold it at auction, thus creating the City of Las Vegas. This followed a trend of railroads establishing towns throughout the West, in places such as Battle Mountain, Winnemucca, Elko, Lovelock, Laramie, and Cheyenne.

Humans have used the Las Vegas Valley as a trade route throughout the archeological and historical record. The reason for this consistent use comes in the form of the springs that dot the Valley. The Pueblo Indians, whose history stretches over 1,500 years, left undeniable evidence that they used the Las Vegas Springs.[15] This branch, referred to as the Virgin Anasazi, represents the western most extension of a culture that stretched from the Virgin River east into central Colorado and south into northern Arizona and New Mexico. The main settlement for the Virgin Anasazi was along the Muddy and Virgin rivers northeast of present day Las Vegas, a location in which extensive irrigated agriculture was practiced. Since evidence of irrigated agriculture in the Las Vegas Valley has yet to be discovered, archaeologists think the springs represented a forward hunting base for the Puebloans. For over fifteen hundred years, they were able to thrive in this hot corner of Nevada through careful management of water and through community cooperation. While the Anasazi are best known for their ornate pueblo dwellings, the

[15] Warren, *The Las Vegas Springs: A Disappeared Resource*.

communal network of canals and irrigation trenches they built was equally as impressive. These artificial waterways, which radiated from riverbeds, provided the Indians with a reliable water supply for farmland and for domestic use in their multi-storied adobe structures. The best-known example of Anasazi architecture in Nevada is the *Pueblo Grande*, or Big House, which was located near the present town of Overton, Nevada. *Pueblo Grande* stood as one of the largest pre-Columbian structures in North America until the waters of Lake Mead engulfed it in the 1930s.[16] This eighty-four-room adobe building was a testament to the success of the Anasazi's water management system and its ability to support a rather large population even in harsh desert conditions. By manipulating the local water supplies through above ground irrigation systems and by developing cooperative distribution systems, the Anasazi thrived for over a millennium. Sometime during the twelfth century, Anasazi culture in the American Southwest totally collapsed. According to archeologists, their disappearance coincided with a massive and prolonged drought, which probably caused their demise. The severe and sudden environmental changes may have been too much for their water management system.

The Paiute Indians arrived in the region about four hundred years before the Anasazi's departure and developed a different land ethic and system of water usage. Unlike the Anasazi, the Paiutes were hunters and gatherers. Rather than producing most of their food, they chose a more nomadic lifestyle, following game and collecting various plants throughout the year. They depended on an intimate knowledge of local springs, streams, and *Tinajas*—water basins carved into stone. Cooperation was central to Paiute survival in the desert. The Paiute Indians organized themselves into small bands of twelve to fifteen individuals. These bands were very loosely connected, but they respected each

[16] James W. Hulse, *The Silver State,* (Reno: University of Nevada Press, 1998), 22-23.

other's hunting grounds. None of these groups sought to exercise control over local water sources either. The limited supply and geographic distance between springs inspired teamwork among them. One band shared its water supply with a neighboring group in need, with the expectation that the favor would be reciprocated when there was a reversal of fortune. [17]

Even though there are few visible remnants of their historic settlements today, the Paiute Indians offer a remarkable example of how to manage scarce natural resources in the Mojave Desert. The key to their success was close cooperation among different constituencies for the desert's finite supply of water and a keen knowledge of its environmental conditions and limits. The arrival of Euro-Americans in southern Nevada during the nineteenth century radically altered the desert environment and the Paiutes' way of life.

The Mormons were the first non-native settlers to the Las Vegas Valley, and they represented a radical departure from previous land/water use precedents. They were the first people to pursue enact a sedentary lifestyle in the Las Vegas Valley, a prospect made possible, in part, by irrigated agriculture. The close knit and homogenous Mormons also relied on a system of communal ownership of water and carefully planned collective effort. This method of administering water originated farther north in the Salt Lake Valley of Utah, the heart of the Mormon culture region. As a result of frequent religious persecution, the Saints developed a close-knit social system that dominated all aspects of Mormon life. Water policy fell within that ethos.

[17] Martha Knack, *Boundaries Between: The Southern Paiutes, 1775-1995* (Lincoln: University of Nebraska Press, 2004), 10-29.

As a result of religious oppression, Brigham Young led the Saints westward out of Iowa to The Salt Lake Valley in present-day Utah. They immediately set about solidifying their claim over their geographic surroundings. Brigham Young chose the Salt Lake Valley because of its remote location. The Saints had been displaced numerous times in the more populated East, and this western location afforded them enough distance from prejudice to build their culture. Young realized that a geographic buffer built on distance and rugged topography was a beneficial attribute given the level of intolerance he and his followers had previously experienced. He also realized that in order to create a successful empire, brisk trade and commerce were essential. The Saints, not content to merely control their local surroundings in northern Utah, began expanding their network to the north, west, and south. Their reasons were both defensive and economic.

The Mormons expanded their empire by building successive bases (towns) radiating outward from Salt Lake City. Mormons used these towns as supply points to expand to the next site, a leapfrog approach. This proved to be a vital tactic in the overall Mormon strategy. Utah, unlike its coastal neighbors California and Oregon, was deeply embroiled in Indian warfare in the second half of the nineteenth century, and Mormon villages faced the very real possibility of attack. Many of the Mormon settlements resembled ancient European forts, complete with city walls and breastworks to repel attack. This network of towns was an essential tool in Mormon control of the eastern Great Basin.[18]

One natural avenue of expansion was to the southwest along the front of mountain ranges that trended in that direction. Young wanted to increase trade, leading ultimately

[18] Eugene P. Moehring, *Urbanism and Empire in the Far West, 1840-1890* (Reno: University of Nevada Press, 2004), 83-120.

to the prospering California markets. He finally realized this goal when a group of missionaries purchased land and created a mission in San Bernardino in 1851.[19] Crucial to this southwestern expansion were the series of supply points that provided logistical support along the route between Utah and the Pacific coast. One of the most vital points along the passage was the Las Vegas Valley, site of lush meadows and perennial springs, attributes that gave rise to its name (Las Vegas translates to "the meadows" in Spanish). The contrast between the harsh Mojave Desert and the reliable and substantial springs and the towns geographic isolation hundreds of miles distant from additional settlements and water sources gave Las Vegas an importance far greater than its size would suggest.

In 1855 Young sent thirty missionaries to the Las Vegas Valley to build a settlement. The Mormons constructed an adobe fort three miles east of the springs, along the watercourse of the Las Vegas Creek. They laid out plots of land and began farming. The communitarian ethic that had proved successful further north in Utah was employed at the new mission. John Steele, president of the Las Vegas Mission, describes how "all hands [were] busy making water ditches, roads, plowing, and planting."[20] Corn, tomatoes, melons, squash, oats, and beans were but a few of the crops the Mormons raised at the Mission.[21] The Saints traded with migrants moving through the Valley and interacted with, sometimes even baptizing, the local Paiutes. While their mission was ostensibly one of peace, it did have an unintended dark side.

The Mormons initiated a policy of intensive use of the Valley's water supply, radically altering the land use ethic that had prevailed to that point. The Mormons viewed their utilization of water for irrigated agriculture as benign; but their actions displaced

[19] *Ibid,*106.
[20] John Steele. *Diary of John Steele* (Provo: s.n.1959).
[21] Maria Burston Wheeler, *My History*. 1938. UNLV Special Collections.

much of the indigenous flora and fauna, which eliminated a primary source of sustenance for the Paiutes. Early explorers noted the abundant water supply of the Las Vegas Springs observing that it "was forty-five feet in diameter" and that it "contain[ed] the clearest and purest water." These sources go on to describe the spring's upwelling as being so strong that "It is positively impossible for a man to sink over his head in it."[22] Despite these favorable accounts describing a seemingly inexhaustible water supply, agricultural use appropriated most of the spring's flow. The Indians then began to raid agricultural fields for crops and cattle, and were unfairly characterized as thieves by the Mormons who failed to realize the impact of their land use practices. The Indians' occasional use of the springs guarded against overexploitation of local resources. When the Mormons built the fort it upset this balance, although not as much as the practices of later settlers in the valley. The Mormons only represented the first stage of a new water policy that would increasingly dominate the Las Vegas Valley in the coming decades.

The Mormons left the Las Vegas Valley after only two years of habitation. Originally envisioned as a supply depot along the Salt Lake City/San Bernardino route, the settlement's mission expanded to include lead mining in the Spring Mountains. For several months missionaries mined for lead on Mt. Potosi, southwest of the Las Vegas Valley. For a while the mission had enough surplus food and resources gained through trade and local agriculture to support mining operations in the mountains above town. There were several springs between the fort and the mine, which made travel back and forth possible. However, the added task of mineral extraction soon proved too much responsibility for the fledgling mission, dividing loyalties between William Bringhurst,

[22] Solomon Carvalho, *Travel and Adventure in the Far Wet: Col. Fremont's Last Expedition* (New York: Derby & Jackson, 1859), 229-231.

the president of the Mission, and Nathaniel Jones, the leader of the mining operation, so, with Brigham Young's consent, it was abandoned in 1858.[23] The environmental margin of error is very small in the Mojave Desert. The Mormons may have been able to persist and continue the settlement, but the division among the settlers over their mission and potential warfare with the federal government over anti-polygamy laws made LDS presence in the valley a costly proposition. Mormon leaders weighed the costs and realized that it would simply take too many resources to continue maintaining the fort; thus, the Mormon Church hierarchy ordered it closed.

Ranching in the Valley continued after the Mormons' departure and was practiced on a limited basis until the 20th century. Early settlers like Octavius Gass, Helen Stewart, and Conrad Kiel used the water that flowed from the Las Vegas Springs to raise cattle and crops and traded with travelers crossing the valley on their way to California. The valley's ranchers continued the Mormon practice of using the water that passed though their property to irrigate crops and provide for livestock. Employing water in this fashion slowly became institutionalized legally as the riparian doctrine. This doctrine evolved in the wetter climates of France, England, and the eastern United States. It holds that water belongs to those individuals whose land abuts a waterway and requires that the water be restored to its original course after it is used.[24] Helen Stewart, one of the first ranch-owners in the Valley, utilized water from the Las Vegas creek in this fashion.

While the Mormons and Stewart both used water more intensively than their Indian predecessors, a new chapter of truly intensive water use was about to emerge, one that relied on water engineering and the total appropriation of local water supplies.

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[23] Hulse, *The Silver State,* 62-65.
[24] David H. Getches, *Water Law In a Nutshell* (St. Paul: West Publishing Co., 1990), 14-21.

In 1901 Senator William Clark of Montana began building the San Pedro, Los Angeles, and Salt Lake Railroad (SPLA&SL). The railroad chose Las Vegas as a way station for the same reason that the Indians, Mormons, and ranchers did; the ready source of water. The steam-powered locomotives of the era were in constant need of being replenished with water. Places with a naturally occurring source of water were logical sites for railroad way stations. In places where there was no water, it was simply brought in by train.

Senator Clark's selection of Las Vegas as a stopover point for the railroad initiated the most profound change in water use locally to that point. Immediately upon entering Las Vegas the railroad set about buying water rights from the scattered ranches in the valley. In 1902 Senator Clark purchased 1,864 acres of land and water rights from Helen Stewart, who operated a ranch and way station at the Las Vegas Springs. While the Indians and Mormons functioned under a communal system, the railroad instituted a system of private ownership of water and jealously guarded its water supply, utilizing it to the fullest degree. The railroad exercised ownership and control over the Las Vegas Springs until 1948, when local citizens voted to buy out the railroad and created a publicly owned water utility.[25]

The creation of Las Vegas followed a trend that played out scores of times throughout the West. The railroad auctioned off its surplus land and created a town. For Las Vegas this occurred in 1905. Water for the new town was supplied by the railroad's subsidiary company, the Las Vegas Land and Water Company (LVL&W). The influx of people and capital, both the result of the railroad, spawned the city of Las Vegas and later inspired

[25] Eugene Moehring and Michael S. Green, *Las Vegas: a Centennial History* (Reno: University of Nevada Press, 2005), 161.

the creation of Clark County. Las Vegas had been a part of Lincoln County until 1909, when the legislation created Clark County to better serve the growing local population. Pioche had been the county seat in the 1870s, but it was prone to boom and bust economic cycles typical of mining communities. In the early twentieth century, Pioche was losing population as its mines played out. Las Vegas' star was rising, however, and this opened the door for its eventual selection as the Clark County seat.

It is important to recognize the importance of mining to the economic and legal development of the American West, and Nevada in particular. Mining drew hundreds of thousands of migrants to the region, and was the basis for granting statehood to several western territories, including Nevada, in 1864. Additionally, mining had a profound impact on water law, beginning in the streams and rivers that flow down the western slope of the Sierra Nevada.

In the January of 1848, James Marshall unwittingly shaped the course of Western American history when he discovered gold in California. Staring down into the American River, Marshall noticed flecks of a bright yellow metal by his feet. These turned out to be the first small fragments of one of the largest gold deposits ever before discovered in the world. The discovery of gold at Sutter's Mill in central California was not only the death knell for many American Indian communities, it also dramatically altered land use practices, including especially how people thought about, used, and negotiated for water in the region.

Spurred on by Marshall's example, people scrambled across the continent by foot, wagon, and boat in search of instant wealth hidden in the waterways and mountains of California. Because there were no existing laws to regulate gold mining, miners created

an informal legal system, or honor code, based on the premise of "first in time, first in right." The code provided some semblance of order and helped protect claims from theft. This code evolved to include water rights, because one of the main prerequisites of gold mining was access to water. In the practice of placer mining, miners used river water to sift through gravel with their pans to expose precious metals. With hydraulic mining, they used hoses connected to nearby water sources to literally wash away mountains in order to expose the ore embedded in the earth. Miners often prospected in areas not immediately adjacent to water sources, and they soon began constructing conveyance systems, such as flumes, to power their rockers and sifters. This de facto recognition of water rights was later codified and designated the Doctrine of Prior Appropriation.

Under the Doctrine of Prior Appropriation, the first person to divert water from a natural source for "beneficial use" had the right to its use in the future over any other competing interests. Initially "beneficial use" referred only to mining but later expanded to include ranching, farming and domestic use. The Doctrine was predicated on the philosophy of "use it or lose it," which historically discouraged cooperation and encouraged wasteful practices as holders of water rights sought to maintain their claims, whether they continued to need all of the water allocated to them or not. Nevertheless, the Right of Prior Appropriation became the recognized water allocation system and the legal foundation for water law in eleven western states, including Nevada.[26]

As the mines of northern California played out, prospectors began searching elsewhere for precious metals. Word of new discoveries in nearby northern Nevada sparked a rush to Washoe (as the region was then known) in the 1860s. The mines of the Comstock Lode in Virginia City and Gold Hill proved exceptionally rich, and, as in

[26] Getches, *Water Law in a Nutshell* , 14-21.

California, water was essential to their development. The infrastructure of these mines was built with logs that were floated down flumes from the Lake Tahoe basin to collection points just north and south of Carson City, at which point horse-teams, and later rail, took them to Virginia City. Mining engineers also erected a pipeline that transported water from Marlette Lake, an augmented reservoir situated above Lake Tahoe in the Carson Range, across Washoe Valley to Virginia City (a distance of over twenty-five miles) in order to support mining operations and other businesses and settlements that developed alongside them. As a result of the influx of population, Nevada was able to secure statehood in October of 1864. Mining was a factor in several western state's creations; Colorado in 1876, Montana in 1889, and Idaho in 1890. The second great wave of mining occurred in Tonopah and Goldfield in 1905, the same year that Las Vegas was created. These new mining settlements soon began producing enormous amounts of gold and silver that triggered a population boom which may have saved Nevada from losing its statehood. The population had sunk to 47,355 by 1890, and the continued decline of the state's mining industry threatened to bankrupt the state economy. Prior to the Goldfield/Tonopah mineral strikes there was Congressional discussion over the possibility of revoking Nevada's statehood and reverting it back to territorial status.[27] While thousands streamed into the central part of the state, Las Vegas enjoyed the benefit of being a supply point for Bullfrog Mining District and other areas. Interestingly, the Goldfield and Tonopah gold strikes occurred during the automobile era. While these mining towns were reminiscent of the earlier Comstock Lode of legend, migrants, like future governor Tasker Oddie were now able to rent automobiles, departing

[27] Hulse, *The Silver State,* 152.

from Las Vegas, in order to travel to the diggings.[28] Oddie later pushed the Oddie-Colton Highway Act of 1927 through Congress which authorized the federal government to pay one hundred percent of the cost of highways crossing federal land and Indian reservations—a reform crucial to Nevada's development.[29] The mining region also spurred the growth of a rail connection between the two locations, further augmenting trade and commerce and increasing Las Vegas' importance as a trade-hub.

The mining boom petered out fairly quickly in southern Nevada compared to the North, yet there were some notable mining operations in the region. The most significant mines in southern Nevada were located in El Dorado Canyon, thirty-five miles southeast of Las Vegas. The neighboring towns of Searchlight, Death Valley Junction, Pioche, and Beatty were all founded on mining at the turn of the twentieth century. At that time, Las Vegas served as only a minor trading post helping to supply the relatively small number of miners and businesses associated with these gold mining operations. While most of the mining towns were deserted within a few years of their establishment, Las Vegas began an expansion, the magnitude of which a century later, no one would have predicted at the time.

As Las Vegas grew slowly it was drawn into the aegis of a second empire, that of Los Angeles. At the time of the Las Vegas land auction in 1905, Los Angeles was a city of more than 170,000 people and was just beginning to realize its imperial potential.[30] While Mormon territorial and economic expansion had proven untenable, that of Los Angeles proved far more enduring, influencing Las Vegas to the present day.

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[28] "Autos Invade Gold Camps," *Los Angeles Times*, March 4, 1905; Russell R. Elliott and William D. Rowley, *History of Nevada* (Lincoln: University of Nebraska Press, 1987), 210-11.
[29] Elliott and Rowley, *History of Nevada*, 275.
[30] Walter Nugent, *Into the West: The Story of its People* (New York: Alfred A. Knopf, 1999), 219.

Real estate and expansionism were the two main factors driving growth in Los Angeles at the turn of the twentieth century. The Los Angeles Chamber of Commerce was constantly extolling the benefits of growth locally and nationally. One of the chief selling points was the thriving agricultural market. The Los Angeles Basin is environmentally well suited to support the cultivation of many high-value crops, and this made farming there a potentially lucrative endeavor. Citrus farmers, owning only a fraction of the land acreage possessed by their eastern wheat-growing counterparts, were bringing money in hand over fist. Stories of instant wealth were the chamber of commerce's main export. The railroad, which helped launch the city's success in 1876 was an indispensable ally of the L.A. Chamber of Commerce and aided it by exporting high value crops and stories of instant farming wealth, and by importing the people who wanted to partake in the fabulous lifestyle available in Southern California. The wintertime arrival of citrus fruits to frigid eastern states contributed significantly to the Los Angeles image of sunshine and plenty. Southern California was now turning Brigham Young's earlier drive for markets on its head; now, California was exploiting the vast interior of the American West, staking claim to its new hinterland. And once again, Las Vegas found itself in the middle.

Water acquisition in Los Angeles was vital to the city's continued economic success. Los Angeles, while semi-arid, benefited from substantial local water supplies. The mountains that create the Los Angeles basin rise to over 11,000 feet in elevation, thereby capturing and conveying significant amounts of water to the city. Both the Santa Ana and Los Angeles Rivers coursed through the basin, and artesian water underlay the entire area. Enormous growth rapidly overwhelmed these supplies however, and local business

leaders began to look beyond the immediate vicinity for additional water sources that could fuel future growth.

Rampant boosterism aided Los Angeles in its quest for more water. In 1905 Los Angeles was well on its way toward acquiring additional water from the Owens Valley and later the Colorado River. The city's booster mentality extended to Las Vegas since California business leaders owned the railroad and its land; Senator William Clark and his company applied the real estate boom strategy that had driven the southern California economy for years to Las Vegas. The *Los Angeles Times* advertised the Las Vegas land auction and announced free railroad fares for those individuals purchasing lots.[31] Present throughout the advertisements were assurances of a convenient and plentiful water supply. As land was auctioned off in Las Vegas, Los Angeles acted on its designs for the Owens River. Even though these events were unrelated, their coincidence represents the increased power and growth of western cities and their need for resources. Even before completing the aqueduct conveying the Owens River to Los Angeles in 1913, the Los Angeles Department of Water and Power (LADWP) had its eyes on the Colorado River as a potential future source of water. Los Angeles' growth mentality fed more growth, and boosters always had their eyes on the future.

At the turn of the twentieth century, California cities were displaying their first signs of maturation, long before their counterparts in the Intermountain West. This took the form of urban imperialism. Los Angeles and San Francisco had outgrown their local water supplies and were looking to distant locations to import water. Neither Los Angeles nor San Francisco actually had a shortage of water when they initiated their

[31] C.O. Whittemore "Information as to Sale of Lots in Clark's Las Vegas Townsite, Las Vegas, Nev." *Los Angeles Times*, May 11, 1905.

actions; rather, they were solidifying control over water for future growth. This illustrates the influence that growth exerts over the local population, since both cities had support from a majority of their residents who saw their future affected by their city's ability to expand. (The voters of Los Angeles and San Francisco repeatedly supported bond measures funding water projects). Growth meant prosperity, and coupled with the Progressive Era ethos of "the greatest good for the greatest number," the process of acquiring distant sources of water, while detrimental for a few, would be beneficial to a much larger population. Los Angeles was the first of the two cities to look beyond its immediate hinterland for additional water. Engineers from the LADWP located an ideal source in the Owens River Valley north of Los Angeles. Officials considered it ideal because, despite the mountains north of Los Angeles, the entire watercourse flowed downhill. At no point along the line would water have to be lifted. This proved doubly enticing since the water could be used to generate electric energy as it descended toward Los Angeles. After eight years of legal maneuvering and construction, the aqueduct began delivering water in 1913.[32] While growth provided the incentive for Los Angeles' forays into the Owens Valley, a geologic catastrophe provided the impetus for San Francisco's hydraulic ambitions.

The San Francisco Earthquake of 1906 resulted in widespread fires that incinerated a significant portion of the city. Almost immediately following the disaster city leaders began calling for a more reliable water source in case of future emergencies. Officials located an ideal site in the Hetch Hetchy Valley of the Sierra Nevada Mountains. It was

[32] For excellent coverage of Los Angeles' actions in the Owens Valley see Norris Hundley's *The Great Thirst* (Berkeley: University of California Press, 2001), William Kahrl's *Water and Power* (Berekeley: University of California Press, 1982), and Gary Libecap's *Owens Valley Revisited* (Stanford: Stanford University Press, 2007).

perfectly situated east of San Francisco and at a sufficient elevation (3,772 feet above sea level) that no costly pumping would be necessary. In spite of these advantages, one geographical fact threatened to interfere with San Francisco's ambitions: the valley is located entirely within Yosemite National Park. After a monumental struggle that involved the Sierra Club, and San Francisco's business and political leadership, a fight that extended all the way to the president of the United States, the city procured the site, flooded the valley, and began delivering water to constituents in the Bay Area. By the time Los Angeles and San Francisco began receiving water from their hinterlands, Las Vegas was still a small western town that had an ample local water supply.[33]

While cities throughout the West were busy pursuing agendas for economic and social expansion, the Federal government was simultaneously engaged in the same process. The effect of the national government on western settlement cannot be overstated. Numerous federal laws and support, including the Homestead and Morrill Land Grant Acts (1862), Desert Lands Act (1877), Dawes Severalty Act (1887), Reclamation Act (1902), and the Enlarged Homestead Act (1909) did much to populate the West. The Reclamation Act was especially anticipated in many western areas since it represented federal assistance in combating the region's overriding aridity by creating the necessary infrastructure for a viable economic venture through agriculture. The Act reflected Progressive Era politics, which emphasized technology as a solution to society's problems. Congressman Francis G. Newlands of Nevada sponsored the bill, and was supported by President Roosevelt who signed it into law in 1902. While the first of the nation's reclamation projects was slated for Nevada, the newly created Bureau of

[33] For excellent coverage of the Hetch Hetchy dispute, see Robert W. Righter *The Battle Over Hetch Hetchy: America's Most Controversial Dam and the Birth of Modern Environmentalism* (New York: Oxford University Press, 2005).

Reclamation located the first project in northern Nevada east of Reno and Carson City along the Truckee and Carson Rivers and had no impact in the south. Reclamation later benefited southern Nevada, but not until the construction of Hoover Dam in the 1930s.

As an ever-increasing number of urban areas ranged farther afield for resources, water management became a regional rather than a local issue in the American Southwest during the early twentieth century, beginning with the Roosevelt Dam east of Phoenix, Arizona. The linchpin for the region was the Colorado River, "the most litigated, contested, and divided waterway in the world," and that is where California focused its lobbying efforts in congress. [34] In an effort to divert river water for its own use, California planned to build a dam on the Colorado River. California's economy had matured far earlier than those of other western states, and agribusiness in the Imperial Valley pressured government officials for irrigation water and protection against flooding. In 1922 Phil Swing, a congressman from the Imperial Valley, and Senator Hiram Johnson, the progressive senator and former governor of California, introduced legislation calling for the construction of a high dam in or around Boulder Canyon on the Colorado River. For several years the upper basin states of Colorado, Utah, Wyoming, New Mexico, as well as lower basin Arizona, were able to block the bill's passage; however, in 1922 the Supreme Court ruled that the doctrine of prior appropriation applied to states, as well as individuals. As a result of its precocious development, California was definitely the "first in time," which meant it was "first in right." The Court's ruling spurred the upstream states into action. Fearing that their water rights were in jeopardy, the upriver states agreed to stop stonewalling California's attempts to get a high dam built

[34] Marc Reisner, *Cadillac Desert, The American West and its Disappearing Water*. (New York: Penguin Books, 1993), 120.

on the Colorado River, if California would agree to a distribution of the river among the states. The agreement came to be known as the Colorado River Compact of 1922.[35]

During the negotiations, representatives agreed to divide the Colorado River Basin into an upper and lower basin. The Upper Basin included the states of Wyoming, Colorado, Utah, and New Mexico, and the Lower Basin the states of Nevada, Arizona, and California. Each basin was permitted to develop up to 7.5 million acre-feet (MAF) of river water annually. The 1920 population of the Colorado River basin states followed by their allotment of Colorado River water are as follows: Arizona-334,162/2.8 million acre feat (MAF); California-3,426, 861/4.4 MAF; Colorado-939,000/3.88 MAF; Nevada-77,407/300,000 acre-feet; New Mexico-360,350/843,750 acre-feet; Utah-449,396/1.7 MAF; and Wyoming-194,402/1.05 MAF.[36] The Compact secured the upper basin's portion of the river to use it in the future when the region had the population and economic maturity to do so, and allowed for the lower basin's immediate development of it. California still received the lion's share of the river water at 4.4 million acre-feet, a portion approaching a third of the entire river's flow. Nevada received only 300,000 acre-feet.[37]

Nevada was not a major player during the negotiations. It had neither the population nor the potential for agriculture that the other six Basin States possessed. This is one of the main reasons why Nevada received so little water compared to the other states, and why the delegation did not protest the amount allotted. However, Nevada was not a

[35] Norris Hundley, *The Great Thirst*: *California and Water, a History* (Berkeley: University of California Press, 2001), 225-223.
[36] United States Census Bureau, 1920 Census Data. Available from http://www.census.gov/prod/www/abs/decennial/1920.htm; U.S. Department of the Interior, Bureau of Reclamation, *Reclamation: Managing Water in the West: Hoover Dam* (Bureau of Reclamation, 2006).
[37] Hundley, *The Great Thirst*, 221.

completely disinterested party. In 1920, Nevada Governor Emmet Boyle appointed a commission, later to become the Colorado River Commission, to pursue Nevada's interests on the Colorado River. Later during Compact talks the delegation was willing to forgo larger amounts of water because it saw potential in hydroelectric power for local industrial purposes, and the fact that the dam site, located in Nevada, would bring significant capital to the state. While the Nevada delegation's failure to secure more water may seem shortsighted to the twenty-first century observer, it is important to bear in mind that in 1922, when the Compact was ratified, the Las Vegas Valley was home to less than 3,000 people, and the modest agricultural operations were still amply supplied with either surface water from the Las Vegas springs, or groundwater.

The Colorado River Compact of 1922 marks a pivotal turning point in Las Vegas history, because the town transitioned from a small ranching and railroad community to a bustling center of trade and tourism, forever changed by the government's decision to build the nation's largest multi-purpose dam to that point. The development of federal public works projects and the legalization of gambling coincided to create what is now a world-famous desert metropolis. The most substantial and long-lasting government works project in southern Nevada was the construction of the Hoover Dam from 1931 to 1935. Workers, who came from across the nation, scaled the cliffs of Black Canyon thirty miles east of Las Vegas. They blasted and drilled the red rock, poured millions of tons of concrete, and ultimately produced a dam of monumental proportions. After the dam's completion, the Nevada Legislature increased the Colorado River Commission's influence by increasing its membership from four to five, giving it greater funding, and by requiring commissioners to be more highly qualified. This made the Commission

more effective in pursuing its state-mandated goal to acquire and develop southern Nevada's share of water and hydropower. Over time, the CRC would work in tandem with other water management organizations in the region to manage water and power resources.

As the waters of Lake Mead rose behind Hoover Dam in 1935-36, so too did the level of Federal expenditure in southern Nevada. Government wages found their way into local banks and businesses, financed community development, such as Boulder City, and greatly stimulating the southern Nevada economy. Hoover Dam's construction led to additional government projects in the state, including: the Basic Magnesium Plant and the United States Army Aerial Gunnery Range (later renamed Nellis Air Force Base) in 1940-1941, and the Nevada Test Site in the 1950s, where the U.S. Department of Defense, and (after 1978) Energy tested nuclear weapons until the 1992 moratorium. And while technically a private company, Basic Magnesium, Incorporated (BMI), a company responsible for making magnesium ingots for airplane and bomb manufacturers in southern California, benefited greatly from the federal government's Defense Plant Corporation building its factory in the surrounding Basic Townsite (later Henderson), to house its workforce. These projects combined to create something that had long eluded southern Nevada—economic diversification and a stable foundation for future growth.

During the Depression, thousands of people nationwide were unemployed and, despite the dam construction boom around Las Vega, Nevada was no exception. In a desperate attempt to revive the state's economy, Phil Tobin, a first-year assemblyman from Humboldt County, introduced a bill in 1931 to re-legalize gaming.[38] The state legislature

[38] Hulse, *The Silver State,* 264.

quickly passed the bill and signed it into law. Initially, gaming had little impact on the state economy, and even less on water policy; but, Tobin's bill catalyzed a building frenzy in Las Vegas that continued until 2008-09.

California entrepreneur Thomas Hull was among the first to capitalize on the new gaming law and built a sprawling hotel resort and casino, which he named the El Rancho, Vegas in 1941. He located the resort on the outskirts of Las Vegas, just over the municipal boundary, to avoid paying city taxes.[39] The success of this resort spurred the construction of others along the Los Angeles Highway, giving rise to what became the Las Vegas Strip. In addition to live entertainment, fine dining and luxurious hotel rooms, Hull made water the centerpiece of his hotel. An expansive swimming pool, lush gardens, and an outdoor waterfall combined to create the illusion of an oasis in the desert. Las Vegas entrepreneurs have since continued to imitate Hull's example, as evidenced by the lagoons, waterfalls, and fountains that are now prominent features of the Strip. Hull's El Rancho buoyed the southern Nevada economy, but it also set in motion a building boom that would consume more and more water from a region that had little to spare.

From the turn of the century until the early 1940s when Hull built the El Rancho, the Las Vegas Land & Water Company administered the water needs of the Las Vegas Valley. During the first two decades of the twentieth century the LVL&W relied on surface-water with which to provide the people of Las Vegas. However, in 1923 the company was forced to drill a well into the aquifer underlying the Las Vegas Valley in order to keep up with increasing population demands. Local residents also drilled private wells. These practices worked reasonably well while Las Vegas was still a small town.

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[39] Moehring and Green, *Las Vegas: a Centennial History*, 109-10.

But the Second World War changed everything. As federal jobs and the tourist industry began to attract people to the area in ever-increasing numbers, the LVL&W could not keep pace with the growth. In addition to growth pressure, lack of popular knowledge about the scarcity of local water resources also contributed to water waste, which served to further decrease supply and increase demand. The LVL&W's reliance on local groundwater limited its ability to expand water services, a fact that forced the company to oppose further expansion of the local water infrastructure. The LVL&W claimed that it was reluctant to expand its services, or make internal improvements, because it was a Union Pacific entity and not a recognized public utility. The truth of the matter was that the LVL&W simply could not develop further water sources for the community. This action compelled many southern Nevadans to publicly call for a new approach to water management, creation of a special service district—a reform enacted in Los Angeles and other metropolitan areas. Still, local opinion makers like the *Review Journal* editor Al Cahlan (an outspoken member of the Colorado River Commission), accused the company of intentionally stifling growth and economic development in southern Nevada and raised the possibility of future water supplies from Lake Mead.[40] Before this could happen, however, control of water management needed to be taken from the LVL&W.

In response to local water administrative and supply problems, the state government created the Las Vegas Valley Water District (LVVWD) in 1947. After decades of feeling neglected by the LVL&W and frustrated by their lack of control over local water supplies, citizens, under the leadership of local activists, had demanded a publicly owned water service from the state legislature. Lawmakers established the district as a not-for-

[40] Cahlan and Jones, *Water: A History of Las Vegas*, *v. I*, ix.

profit organization governed by a Board of Directors composed of the publicly elected Clark County Commissioners. Its original mission—to administer the water needs of the Las Vegas Valley—continues to this day. The District's board worked with the LVL&W for seven years to transition from private to public ownership. The District took full control in 1954. It immediately signed an agreement with BMI of Henderson that allowed it to use the company's pumping station and pipeline that had drawn water from Lake Mead since 1941. The District then built a pipeline from Las Vegas southeast along the Boulder Highway to the plant in Henderson, and in September, 1955, Colorado River water from Lake Mead finally began to flow into Las Vegas, more than two decades after the completion of Hoover Dam.[41]

Simultaneously, the District was busy expanding water mains and connecting the Valley's homes to the city's water supply. The District also began installing meters at all new construction sites in order to monitor water usage. The Nevada Division of Water Resources, the state agency that manages surface, ground and well water in the state, also began to issue temporary water permits, which, unlike historic water rights, could be revoked. This permit system would have important consequences in the 1990s.

Most of these measures proved to be short-lived solutions to the region's increasing water demands. More water was needed to keep pace with the growing influx or residents and visitors to the Las Vegas Valley. Yet the county could not afford to build the utility infrastructure to keep up with growth. Working through the Colorado River Commission, southern Nevada's leaders turned to a partner who had come to their aid before—the federal government.

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[41] Moehring and Green, *Las Vegas: a Centennial History*, 161-162; Jones, *Water*, v.2, 33.

The construction of the Hoover Dam during the Great Depression had shown southern Nevadans how much assistance the federal government could provide to the area. The federal government had been involved in western water issues since the late 1880s when Nevada Senator William Stewart pushed for federal reclamation subsidies in the arid region. He founded the national irrigation congress in 1891 and was able to persuade future Nevada Senator Francis G. Newlands to support the measure in congress, an effort that led to the creation of the Reclamation Act of 1902.[42] The Reclamation Act created the Reclamation Bureau (later changed to the Bureau of Reclamation), which sold public land to fund "the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands" in the West.[43] Congress created the Bureau to help farmers "reclaim" land from the desert, and to turn it into productive farmland. Unlike the individual states, the federal government had the financial and organizational resources necessary to build and maintain large-scale systems to redistribute water from the deep canyons of the West to the high plateaus and desert areas where people lived.

Over the course of the twentieth century, the Bureau of Reclamation (USBR) increasingly supported urban as well as rural areas. This was especially true during the post World War II era when urban populations throughout the West exploded. However, this growth exerted a new pressure on the Bureau. In addition to water, the organization was now scrambled to provide electricity as well. The USBR found itself in the impossible position of trying please all people. In the early 1960s, Interior Secretary

[42] Russell Elliott, *History of Nevada*, 174-5.
[43] Quoted from the Reclamation Act/Newlands Act of 1902, Fifty-Seventh Congress, Sess. I, June 17, 1902 [Public, No. 161], chapter 1093, as cited at www.ccrh.org/comm/umatilla/primary/newlands.htm, on August 16, 2007.

Stewart Udall proposed a comprehensive development plan, which came to be known as the Colorado River Basin Plan, a project that called for a number of new dams along the Colorado River, to include a pair on either side of Grand Canyon National Park. It also included funding for the Central Arizona Project (CAP), a water system that would deliver water from the Colorado River at Lake Havasu to the Phoenix Metropolitan area and Tucson.

Senator Alan Bible of Nevada had been trying since at least 1960 to provide Las Vegas with water from Lake Mead, and Udall agreed to include a pipeline project for Las Vegas within the Pacific Southwest Water Plan (PSWP). However, this was not necessarily a good thing in the eyes of Senator Bible.[44] He was apprehensive about the Nevada project being included in the PSWP for several reasons. First, California was threatening to derail the entire process since it was unhappy with the Supreme Court's recent decision in Arizona v. California (1963), that reaffirmed Arizona's right to 2.8 million acre-feet per year from the Colorado. California had grown accustomed to using the surplus water that flowed down the river, and the CAP threatened to diminish the amount they were using. The last thing Bible wanted was for his small part of the overall plan to disappear because of a legislative fight between California and Arizona, one that threatened to derail the entire project. Bible also felt that Udall's plan, especially the dams in the Grand Canyon, were vulnerable to attacks from environmentalists, which in fact later occurred. Bible had been a member of the Senate during the Echo Park Dam controversy (1956) during which environmentalists effectively blocked the construction of a dam within Dinosaur National Monument. For these reasons, Bible sought approval

[44] Gary E. Elliott, *Senator Alan Bible and The Politics of the New West* (Reno: University of Nevada Press, 1994), 152.

from Udall to introduce a separate bill for the Nevada project. After lobbying congress and President Lyndon Johnson, Bible finally received the blessings of Udall and the Arizona and California congressional delegations and introduced Senate Bill 32 on May 20, 1965, which called for the construction of a water delivery system capable of conveying Nevada's entire allotment of 300,000 acre-feet per year from Lake Mead. Five months later, Johnson signed the bill funding the Southern Nevada Water System (SNWS). The project, the first phase of which was completed in 1971, included construction of six pumping plants, a regulatory reservoir, a four mile tunnel, and 31.4 miles of pipeline from Lake Mead to various points throughout the LVMA. The SNWS represented a significant expansion and improvement upon Las Vegas' existing water system, to include the augmentation of the BMI pipeline. The construction of the SNWS was a major turning point in the history of Las Vegas and its importance cannot be overstated. Thanks to Bible's efforts, Las Vegas now had the capacity to support a metropolitan population of more than 2 million—far beyond the 30,000 residents and visitors of the 1940s.

Despite Senator Bible's valiant efforts, however, by the early 1990s Clark County's water needs began to tax the SNWS's capabilities. The mass migration of retirees, a booming gaming and tourist economy, along with a vibrant housing market attracted so many people that the Las Vegas Metro Area consistently ranked as one of the fastest growing regions in the United States from the 1970s to the mid 2000s. The entire state of Nevada claimed only 180,083 inhabitants in 1950; by 1980, Clark County alone possessed 582,000 residents, not including the thousands of visiting tourists.[45] While the

[45] Demographic sources for the year 1950 from www.factfinder.census.gov, accessed August 2007, and www.city-data.com/us-cities/The-West/Las-Vegas-Population-Profile.html, accessed August 2007.

SNWS provided adequate water to the Valley, local municipalities increasingly battled each other for a share of the river. The Colorado River Commission's policy of allotting water based on a municipality's previous year's usage led to some highly wasteful practices. During the 1980s, instead of conserving water, each urban area sought to maximize its usage in order to receive the same amount of water the next year. Boulder City's water managers even went so far as to uncap the town's fire hydrants to guarantee it would continue to receive the same annual allocation.[46]

Open competition and obvious hording and wasting of water inspired local water managers and residents to pursue a better approach to regional water management. Throughout the 1980s, and with increased urgency toward the end of the decade, public forums, such as newspapers, community meetings, radio talk shows, and private meetings between government officials from the Water District, North Las Vegas, Henderson, and Boulder City wrestled with how to best distribute and conserve this precious natural resource. The end result of this widespread community discussion was the creation of the Southern Nevada Water Authority (SNWA) in 1991.

The SNWA ushered in a new type of water management in the LVMA by making cooperation instead of competition its governing principle. The SNWA brought all the metropolitan area's water purveyors to the same table and gave them each an equal stake in the proceedings. Representatives of Boulder City, Henderson, Las Vegas, North Las Vegas, Clark County, Big Bend Water District, and the Clark County Water Reclamation District comprised the SNWA. All of them ceded their water rights to the new organization in the interests of economic, ecological, and political efficiency. By

[46] California Colloquium on Water, UC Berkeley, Pat Mulroy: *Overcoming the Traditions that Divide Us: Tomorrows Reliable Water Supply Dependent Upon Partnerships*, May 1, 2007.

bringing all the water utilities in Clark County together, SNWA took a bold step away from the predominant "use it or lose it" ethos that had hamstrung cooperation and conservation since the days of the Forty-Niners.

To see how this new cooperative model came into being, the next chapter will take an in-depth look at the specific people, events, and issues that led to SNWA's formation. The process was anything but smooth and the results anything but predetermined. Perhaps it is fitting and logical that Las Vegas would be the place to re-imagine western water law and practices. After all, it was the ancestral home of the Anasazi and Paiutes whose historic water management systems embodied the ethics of cooperation and teamwork. With these precedents and ideas to guide it, the SNWA has sought to re-invent how the West governs water. It has striven to give every stakeholder a voice and to make necessity and efficiency rather than waste and competition its managing principles.

CHAPTER 3

PARADIGM SHIFT: THE EARLY HISTORY OF THE SNWA[47]

There had to be a better way. Competition for water had become fierce. In the history of the western United States there have been dozens of instances when conflict and litigation were the preferred methods of resolving water allocation disputes. In 1933, Governor Benjamin Moeur of Arizona called on the National Guard to protect his state's Colorado River interests against California's maneuvers to build another dam across this major waterway.[48] Within California, Owens Valley farmers have battled Los Angeles for water ever since the city's aqueduct began draining the valley in 1913. And closer to home, in the 1970-80s, the Las Vegas Valley was the site of some of the worst infighting among municipalities vying for limited water resources. Competition in the Valley had intensified as growth rates drove demand for water to unprecedented levels. Clearly, westerners needed to radically change their way of thinking about water and how they managed it.

The SNWA helped to spearhead a philosophical shift; the shift from competition to accommodation; from the pursuit of individual interests to the creation of partnerships; from wasteful water practices to the institutionalization of conservation policies. The

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[47] Some might argue that the formation of the SNWA in 1991 fails to represent a paradigm shift in the Kuhnian sense, that other cities in the West had formed prominent water administration super-agencies before the early nineties, most notably the Metropolitan Water District of California. Despite this, the formation of the SNWA can be considered a paradigm shift in the truest sense of the word because it represented a radical departure from earlier water management policy in southern Nevada, if not the region.

[48] Norris Hundley, *The Great Thirst: Californians and Water: a History* (Berkeley: University of California Press, 1992), 231.

year 1991 marks the creation of the SNWA and a radically new way of managing water in the West. Why was Las Vegas at the forefront of innovation? Who developed the SNWA? What factors led to its creation? To answer these questions, this chapter will revisit that moment in time when a diverse group of water administrators, scientists, and policy makers came together to initiate an unprecedented water policy that made the SNWA a model water management organization worldwide.

Since the construction of Hoover Dam and the Strip put Las Vegas on the map in the 1930-40s, growth has often outpaced regional planners' population predictions, thereby exacerbating already contentious water issues. In 1960 the Water District had estimated that there would be 600,000 residents in the Valley by 2000; instead, that mark was reached by 1970.[49] But slow growth in the recession filled 1970s convinced many local water planners that existing water supplies and infrastructure were adequate to support the Valley into the next century. This perception quickly eroded during the next decade. As David Donnelly, former Deputy Executive Director of the SNWA, explained in the early 1980s, "the system was able to move 400 million gallons a day from the Colorado River. And everybody thought that was enough water for as long as anybody will ever be around."[50] Then, as SNWA General Manager Pat Mulroy observed, "The balloon popped."[51]

The opening of The Mirage casino in November 1989 ushered in the mega-resort era of Las Vegas, an event that sparked a renaissance on the Strip and launched an unprecedented period of growth, which quickly strained the Valley's water resources.

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[49] Eugene P. Moehring and Mike Green, *Las Vegas: A Centennial History* (Reno: University of Nevada Press, 2005), 193.
[50] Hal Rothman interview with David Donnelly, May 24, 2005, author's files.
[51] Michael Weissenstein, "The Water Empress of Vegas," *High Country News*, April 3, 2001.

Annual water consumption rapidly increased from five to twenty-two percent and, by 1990, Clark County's population had passed 740,000.[52] "We saw that if we kept going [at the same rate of growth]," explained Mulroy, "we were all going to run out of water at the beginning of the 1990s."[53]

This explosive growth confronted the Valley's water planners with an enormous challenge, one that was only compounded by the politically fragmented nature of the valley. With three cities and the county, all competing to expand their tax base at each other's expense, regional planning was almost impossible. This decentralized system of organization was highly inefficient and nowhere more so than in the area of water management and distribution.

According to the Colorado River Compact and the Law of the River, the Bureau of Reclamation (USBR) was responsible for distributing water to the Colorado River Commission of Nevada (CRC), which then allocated a specific amount to each local municipality in the valley. As noted earlier, to maintain its yearly allotment, each city felt compelled to use the amount it had previously received, regardless of need, or run the risk of losing some of its allotment. Since the allotment process was based on use, it unwittingly promoted waste and drained the region's water supply at an ever-increasing rate. Each purveyor felt it needed to vigorously defend its water allotment against the other municipalities of the valley. "We were at war as water agencies," stated Mulroy.[54]

Tensions among the Valley's municipalities and the county often spilled over during meetings with the CRC. Officials often shouted at each other, creating a sense of unease and distrust among participants. Donnelly recalled that they "had a lot of fun being nasty

[52] *Ibid*.
[53] Rothman interview with Patricia Mulroy, April 26, 2005, author's files.
[54] *Ibid*.

to each other."[55] As SNWA's Public Service Director Julie Wilcox noted, "Each city wanted to protect its ability to grow."[56] This desire contributed to conflict that worked against finding a productive solution to the Valley's water problems.

One of the first acts to transform the ineffectual and sometimes ruthless culture of regional water management was to re-orient the District from an engineering-led operation to a more provincial and administrative one. In 1984, Pat Pine, a former budget director for the State of Nevada, replaced Don Path, who became the last engineer to lead the District. Pine brought in county administrator Patricia Mulroy to assist him. Mulroy subsequently replaced Pine in 1989 and brought with her an approach to management that fostered consensus building. "With this new style," explained Tom Minwegan, who has been an engineer with the county since 1981, "you break down barriers and work more effectively together."[57]

One of Pine's most significant contributions was to recommend that the District call in Water Resources Management, Incorporated (WRMI), a consulting firm based in Columbia, Maryland, whose 1991 study would become the blueprint for the SNWA. The company specialized in developing computer models to forecast population rates, assessing water management systems, and creating workable solutions to problems of inefficiency and waste. Local water managers hoped WRMI could help the Valley redesign its disorganized distribution systems and provide more accurate forecasts of its population growth. Improvement on both fronts was essential to staying on top of the region's water shortages. Furthermore, the USBR no longer wanted to be in the position of allocating water to metropolitan agencies – much less arbitrating disputes among them

[55] Rothman interview with David Donnelly, May 24, 2005, author's files.
[56] Author's interview with Julie Wilcox, October 4, 2007, author's files.
[57] Rothman interview with Tom Minwegen, April 26, 2005, author's files.

– so the Valley needed to take greater control of managing its resources. The Valley's city and county managers agreed to retain WRMI to help them do just that.

Water Resources Management, Inc., working with the Center for Business and Economic Research at the University of Nevada, Las Vegas and Management Consultants Limited of Carbondale, Illinois, submitted an evaluative report in early 1991. Their research results were alarming. They concluded that the Valley would exhaust its supply of both ground and Colorado River water by the mid-1990s, although it could extend supplies until 2007 by immediately implementing conservation measures. The WRMI report stunned the Las Vegas community. "At the end of that exercise, we all realized that we were going to run out of water in 1992-1993," Mulroy recalled, "and it was just a matter or months before one of us [meaning one of the municipalities] was going to go off the cliff first, second, or third."[58]

The WRMI report was a wakeup call for urban planners throughout the region. It made clear that there was not enough water to sustain the metropolitan area's spiraling growth. Rather than questioning the feasibility of continuing the development boom in the desert, which some environmentalists suggested would be a wiser policy, the water managers believed their task was to fulfill the wishes of local municipalities who supported growth, though the most sustainable way possible. The WRMI report included recommendations for developing a cooperative framework for solving regional water issues and reversing the dire predictions of water shortages. The plan urged Valley water purveyors to create policies that crossed rather than defined political jurisdictions. Recognizing the disparities in municipalities' size and population densities, it suggested that they establish formulas for allocating capital and operational costs more equitably.

[58] Rothman interview with Patricia Mulroy, April 26, 2005, author's files.

In contrast to the competitive water use ethic of the past, the plan encouraged the joint sharing of water during supply shortages.

Perhaps the most significant conservation measure the WRMI plan suggested was a system of return-flow credits for municipalities that treated and then returned effluent water to Lake Mead. This system of return flow credits could significantly boost southern Nevada's water supply, because it would allow purveyors to withdraw more water than the state's original Colorado River allotment as long as they treated and returned it to the river. The return-flow credit system was actually a feature of the 1922 Compact; southern Nevada had just never exploited it. The WRMI now urged it to do so.

Transforming the WRMI plan into a workable reality would require water purveyors of southern Nevada to completely restructure how they did business. George Forbes, Boulder City manager, offered several suggestions for managing the metropolitan area's water. One scheme was for the CRC to increase its role and become a regional water-planning agency. This option was problematic because the governor appointed the members of the CRC from throughout the state and the purveyors wanted to ensure local control of the Valley's water supply. Another approach was for the District to assume responsibility for the Valley. While it already had the power and infrastructure to step into the role, this system flew in the face of the collective strategy that everyone was working toward. There was also the "do nothing" option. Since this tactic would result in the exhaustion of water supplies within a few years, purveyors never really considered it.

One night, while meeting over dinner in Mesquite soon after WRMI had delivered its proposal, several key figures in local water management, including representatives from

the District and from the towns of Henderson and North Las Vegas, struck on the idea of creating a "super-agency" to implement WRMI's plan. They agreed to pitch this idea to their superiors when they got back to the Valley.

Once the idea was approved, an important first step towards the creation of this super-agency, which would become the SNWA, was bringing together all the various organizations that had a stake in the region's water. Those involved were a veritable "who's who" of water organizations in southern Nevada. They included federal agencies, such as the USBR and Nellis Air Force Base; state organizations, such as the CRC and the Nevada Department of Conservation and Natural Resources; county agencies, such as the District, Big Bend Water District**,** Clark County Sanitation District, Clark County Water Reclamation District, and Clark County Department of Comprehensive Planning; and all of the municipalities, including the cities of Boulder City, Henderson, Las Vegas, and North Las Vegas.

To figure out how to allot water equitably amongst once adversarial groups, the Valley's water planners decided that each municipality should present a proposal to the others. In the spirit of openness and cooperation, they insisted that the water officials themselves conduct the meeting, not their legal counsels. As Donnelly recalls, "We had this table, and we all had attorneys. We had our Colorado River attorneys. Henderson had theirs. North Las Vegas had theirs. We made the attorneys sit on the outside of the table [and] they could not talk….They could be in the room but they could not say anything….It was a stressful and volatile process, but through it all everyone's main focus was the creation of the SNWA."[59]

[59] Rothman interview with Donnelly, May 24, 2005, author's files.

One pivotal meeting among the various stakeholders was a showdown reminiscent of the nineteenth-century West. As Donnelly remembers it, "We all came to the table [with our proposals], and everyone looked around afraid to start what all thought would be a long, drawn-out, and unpleasant round of negotiations…. [We each thought,] 'Who is going to go first? Who is going to be the first to turn up their cards?'"[60] Then, the District General Manager Patricia Mulroy took the lead. "She said: 'I will turn mine'," Donnelly continued, "and she turned over her plan and said 'this is how I think we should do it.' At that point, Henderson City Manager Phil Speight took his plan off the table and put it into his brief case. Then the others followed suit. They were all happy with Mulroy's proposal."[61] Some sources credit the power of Mulroy's personality for bringing so many disparate and historically antagonistic interests together for the common good. Speight contends, "She was able to develop trust with all of the administrators as well as the political leaders of each of the entities through her work ethic."[62]

Before solidifying this new cooperative agreement, the district attorney encouraged the Valley's water purveyors to assess the amount of water already committed to development. So at the height of negotiations, the District called a temporary moratorium on "will-serve" letters, which were commitments for water service the agency provided to builders. To receive bank financing, developers had to show that the District would supply water to the project. In the past, the District had indiscriminately fulfilled the developers' requests because there was so much local support for growth,

[60] *Ibid.*
[61] *Ibid.*
[62] Weissenstein, "The Water Empress of Vegas".

and because prior to 1991 there was less concern over water shortages. As a result, the District did not keep a close accounting of the promised water commitments. Mulroy recalls, "We had no clue how many will-serve letters were out there."[63]

The District ceased issuing will-serve letters to developers on February 14, 1991, a move that became known as the "St. Valentine's Day Massacre."[64] Because so much of southern Nevada's economy rested on construction and growth, the withholding of will-serve letters sent shock waves throughout the community.[65] The District planned to lift the suspension once it had determined existing water commitments and the Valley had a new water management system in place.

Meanwhile, the Valley's water purveyors continued to work on transforming the WRMI's proposal into a fully integrated and cooperative program. There were two central issues at stake: how the water was to be divided among the purveyors and how each purveyor would be represented within the larger organization. Although the system would change radically after the creation of SNWA, the purveyors initially followed WRMI's advice and agreed to allocate water based on economic formulas of growth predictions. Each purveyor would thus receive a set percentage of water based on these forecasts.

The group also established safeguards to protect the individual interests of purveyors who were in essence giving up control of their destiny by partnering with the others. The purveyors adopted a flexible collaborative agreement that protected the rights of the smaller municipalities. Officials decided that each of the five water purveyors, which included the LVVWD and the cities of Henderson, Boulder City, Las Vegas, and North

[63] Rothman interview with Patricia Mulroy, April 26, 2005, author's files.
[64] *Las Vegas Review Journal*, February 15,1991.
[65] Mary Hynes, "Report: Valley Running Out of Water," *Las Vegas Review Journal*, February 8, 1991.

Las Vegas, would have veto power over any proposed policy direction, though the two wastewater agencies, including the Big Bend Water District and the Clark County Water Reclamation District, would not. The Reclamation District was involved because water treatment was a central component of local water management. Under the new system, each city or district shared water supplies, while maintaining their individual autonomy to allocate water and shape policy. Each ran its own utilities, but infrastructure, conservation and planning issues would be implemented on a regional scale and were the responsibility of the new umbrella organization – the Southern Nevada Water Authority.

Nevada Governor Bob Miller lobbied the state legislature in support of the SNWA. From his position in Carson City, he could see how a regional water authority would help the state's economy as a whole. In July 1991, Nevada Attorney General Frankie Sue Del Papa signed the law to establish the SNWA.[66] The state granted member agencies the authority to create a cooperative organization under the powers of Nevada Revised Statute (NRS) 277, a law the legislature created during the 1950s to allow local governments to enter into cooperative agreements. Mulroy acknowledged that "[t]he whole concept that we would throw away our water rights, that nobody had a priority over anybody else and that we were going to be in this together," was revolutionary for water policy in the West.[67] "This is a very monumental occasion," *The Las Vegas Review Journal* quoted Donnelly at the time, "What we accomplished here a number of Western town and cities have tried and not been able to do."[68]

Within a year of its founding, there was a major shake-up of SNWA's staff. Mulroy, the District general manager, replaced the SNWA's first general manager Walter Fite,

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[66] Sean Whaley, "Attorney General OKs New Water District," *Las Vegas Review Journal*, July 26, 1991.
[67] Rothman interview with Patricia Mulroy, April 26, 2005, author's files.
[68] John Gallant, "Historic Area Water Pact on Tap," *Las Vegas Review Journal*, June 29, 1991.

who had been recruited from the USBR. The SNWA member agencies had lost confidence in Fite who approached water politics with a divide and conquer attitude. He was "playing the purveyors against each other" noted David Donnelly, and "this ran counter to the spirit of the SNWA."[69] Julie Wilcox, SNWA Head of Government Services, ran the recruitment effort to replace Fite. Wilcox recalled, "that the quality of the people who applied for the position never exceeded that of Mulroy."[70] Despite some reluctance on the part of the member agencies, they eventually recognized the merit of Mulroy's qualifications and collectively appointed her SNWA District Manager in January 1993.[71] The newly formed SNWA hired additional staff including a deputy general manager, chief engineer, and an office manager to handle clerical duties. Another critical change was the decision among the member agencies to allow the LVVWD to manage the SNWA's operations. Despite some initial misgivings, the member agencies conceded that since the district covered seventy-five percent of the SNWA's operating expenses and was the largest provider, it was in the best position to assume a lead role in the SNWA.[72] To ensure the SNWA member agencies satisfaction with LVVWD leadership, they (the member agencies) would annually vote whether to reaffirm the contract granting the District authority. Eventually the member agencies stipulated that the contract granting Mulroy and the District leadership authority could be cancelled if she left, a provision that expressed increased confidence in her leadership.[73]

One of Mulroy's first actions as head of the SNWA was to sign a contract with the USBR to acquire more Colorado River water and to administratively streamline the

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[69] Author's interview with David Donnelly, September 24, 2007, author's files.
[70] Author's interview with Julie Wilcox, October 4, 2007, author's files.
[71] Mary Hynes, "Water District to Lead Board," *Las Vegas Review Journal*, January 15, 1993.
[72] *Ibid.*
[73] Author's interview with Julie Wilcox, October 4, 2007, author's files.

process of water delivery to the region. The USBR began to distribute water to one entity—the SNWA—instead of dividing it among all of the LVMA's various municipalities. Simply put, the SNWA began to serve as an efficient medium though which the USBR provided water to southern Nevada.

The agreement with the USBR also allowed the SNWA to access the remaining 58,000 of Nevada's original 300,000 acre-feet per year allotment and to begin using return-flow credits. To put SNWA's request for additional water in perspective, in the same year, California sought a temporary increase of its annual allotment from 4.4 MAF to 5.2 MAF.[74] Nevada did not need its full allotment until the late twentieth century, when Las Vegas's growth, coupled with a drought, made it necessary to come up with alternate means of supplying the state with water. A few Nevada citizens groups feared that the SNWA's request was part of an effort by Las Vegas to seize more water from rural areas of the state.[75] So while the creation of the SNWA eased certain tensions and facilitated more environmentally responsible practices, it did not alleviate all conflicts over water.

The return-flow system provided a much-needed inflow of water to the region. As previously noted, the return-flow system allows basin states to take more water than their allotment, as long as they treat and return to the river any amount that exceeds their legal allotment. For example, if Nevada withdrew 400,000 acre-feet of water from Lake Mead and returned 100,000 acre-feet of treated water, then it remained at its 300,000 annual limit. To obtain the additional annual supply of water, the SNWA had to build a new intake pipe, or second "straw," into Lake Mead. This new intake pipe was built alongside

[74] Keith Rogers, "Colorado River Basin States' Officials Mull Water Allotment," *Las Vegas Review Journal*, November 5, 1991.
[75] Ralston, "Miller's Phone Calls."

the existing one, but it extended to a greater depth. The pipeline took eight years to complete at a cost of $80.9 million.[76] At the same time, the SNWA also instituted public education programs to encourage wise-use practices and discourage waste, as chapter four will fully discuss.

The immediate effect of the 1992 USBR contract was the lifting of the yearlong construction moratorium that had kept development in the Las Vegas Valley at a standstill since the "St. Valentine's Day Massacre" of 1991. The infusion of water and plans for a pipeline allowed the District to resume granting water rights to contractors, providing an immediate boost to the local economy. As the *Las Vegas Review-Journal* noted, it "created jobs, [and] put people back to work."[77]

Ironically, the additional water helped fuel a drive towards organizational and water use efficiency. After the moratorium, the District kept much tighter reins on developers' use of water than in the past. The District wanted to stop the water speculations that were so prevalent under the previous will-service practice. Up until the 1990s, the county simply handed over water rights to developers, whether or not they had any plans or money in place to support their construction projects. Under the new plan, developers had to demonstrate a significant financial commitment to their building projects before receiving water rights. Dick Wimmer, SNWA Deputy General Manager, remembers that "we ended up with a new process where [water] was not committed out in advance…Developers had to understand that you do not get water until you have bonded for everything, you have paid your connection fees [and] you are past the point of no

[76] *Ibid*.
[77] Mary Hynes, "Fed Agency Gives Valley River Water," *Las Vegas Review Journal*, February 27, 1992.

return financially."[78] By providing much stronger safeguards against developers making empty water commitments, the SNWA kept better track of its water supply and, therefore, better managed its water resources.

A dramatic example of this change in policy occurred when Steve Wynn built Treasure Island next to the Mirage in the 1990s. One of the premier developers in Las Vegas during the mega-resort era, Wynn has been legendary for his attention to detail and for the demands he placed upon his contractors and public officials. As he was about to begin his new resort project, Wynn sought a water commitment. Wimmer remembers that "we told him no, that is not how it works."[79] Despite the more stringent water policy, Wynn proceeded with construction. Wimmer went on to say "he actually came out of the ground without a water commitment," which was testimony to both Wynn's investment in the community and the changing nature of water management in the Valley.

Forecasting development and trying to allocate water equitably throughout the Valley proved to be more problematic than anticipated. The city was growing at unexpected rates and in areas not predicted by the WRMI planners. Despite formal commitments to cooperate, individual water purveyors were still coveted their allocations. Some were short on water, while others had more than enough. The SNWA soon recognized that the current water distribution system was woefully inadequate. The SNWA wanted something different for the Valley, something more flexible and dynamic.

In an unprecedented move, the SNWA decided to completely dismantle its distribution system. It stopped administering water based on set percentages for each

[78] Rothman interview with David Donnelly, May 24, 2005, author's files.
[79] Rothman interview with Dick Wimmer, June 15, 2005, author's files.

purveyor, and began sending water to where it was needed most. The purveyors abandoned the concept of separate and individual water rights, and replaced it with the idea of a single pot to be shared among them. Water allocation was no longer driven by formulas. Instead, the SNWA delivered water based on need through a water budget process that was annually revised. As Donnelly recalls, "[purveyor members basically felt] let's just forget that [meaning the WRMI allotments], and let the capacity go where it's needed."[80] The SNWA had renegotiated the cooperative agreement and thereby produced a paradigm shift in western water management.

"The reason it is so profound," explained Donnelly, "is because the seven members of the SNWA—Henderson, N. Las Vegas, Las Vegas, Clark County Water Reclamation District, Big Bend, Boulder City, and LVVWD—relinquished control of their water rights to an overarching super-agency and allowed it to distribute water to areas not necessarily their own. This is unheard of in the West, to surrender, in essence, one's water rights for the good of the whole." In the words of Julie Wilcox, SNWA Public Services Director, "This type of thing just doesn't happen."[81]

Wilcox's statement partly reflects the historic legacy of water conflict in the West. The region's history is rife with examples of bitter disputes over water within and between states, and between the United States and adjacent nations. For example, citizens of northern and southern California have a longstanding animosity over each others' claims to the state's water supplies, the states of Colorado and Wyoming have taken their grievances over water rights all the way to the Supreme Court, and Mexico has threatened to denounce the US in the United Nations and demand a hearing because

[80] Rothman interview with David Donnelly, May 24, 2005, author's files.
[81] Author's interview with Julie Wilcox, October 4, 2007, author's files.

of its pollution of the Colorado River.[82] Considering this history, the formation of the SNWA stands as a truly significant event – a profound shift in water management.

Extraordinary growth, limited water resources, and innovative minds all contributed to the creation of the SNWA in 1991. By bringing together all the water utilities in the LVMA and pooling their water supplies, SNWA began a new chapter in the history of western water use. Instead of pitting different interests against each other and wasting water in the process, the SNWA built a united cooperative, which facilitated conservation and wise-use practices at the same time that it supported local development. The SNWA's flexibility and dynamism during the early years of its tenure empowered it to meet the changing demands of the region.

[82] Norris Hundley, *Water in the West: The Colorado River Compact and the Politics of Water in the American West* (Berkeley: University of California Press, 1975).

CHAPTER 4

PARTNERSHIP AND REGIONAL WATER ACQUISITION

Like mountains everywhere, the Spring Mountains that border Las Vegas' western edge are water makers. The streams and snow packs at the top of the peaks seep down over ten thousand feet into the gravel and clay beds that underlie the Las Vegas Valley. Some of this water finds its way into the homes of the Valley's residents, then into the Las Vegas Wash and eventually into the Colorado River. Rising high above Las Vegas, Mt. Charleston affords a panoramic view of how water interconnects the region's natural ecosystems and cultural institutions.

Looking north from the peak past the Nevada Test Site, one sees into the heart of the Great Basin and the expanse of mountain ranges that send scarce water into the areas below. To the east, Hoover Dam impounds the Colorado River fresh from its descent through the spectacular Grand Canyon of Arizona into Lake Mead, the largest reservoir in America. Following its brief pause in the lake, the river continues through the dam and turns southward flowing to California and finally Mexico. To the south, the Mojave Desert stretches uninterrupted until it reaches the 11,000-foot escarpment of the San Bernardino and San Gabriel mountains, on the other side of which lies the Los Angeles Basin with its milder and wetter coastal climate. Westward, the rugged spine of the Sierra Nevada forms a barrier blocking the coastal moisture from the Pacific, to produce an arid Death Valley – the driest and lowest spot in North America.

The territory encompassed by the Mount Charleston vantage point is as physically vast as it is geographically, culturally, and economically diverse. Yet, it is utterly interconnected by water – both as a feature of the natural ecology and as a facet of its regional politics. While conflict over water has been common throughout the region's history, the SNWA has instead embraced a cooperative model of water management and its initiatives have been predicated on the ecological and political interconnectedness of the region's water supplies. The SNWA has worked to create an integrated system, with the understanding that use in one area would invariably affect use elsewhere, and that conflict among water users only serves to divide communities and decrease the available water supply. This new cooperative ethos has not only helped guide the SNWA in regional and local matters, but has also made it a model among water agencies worldwide. It is important to recognize, however, that the SNWA has not acted alone. This chapter will examine the partnerships that the SNWA has forged in order to increase the region's water supply and to develop more integrated and sustainable water management systems.

After the SNWA negotiated with the federal government to gain greater authority over regional water management and to access Nevada's full 300,000 acre-foot allotment of the Colorado River through the 1992 Bureau of Reclamation (USBR) contract, it sought to re-configure the Colorado River Commission (CRC) of Nevada.[83] The SNWA wanted the CRC to better reflect the interests of the southern part of the state, where most of the water was being used. As noted in chapter one, the state legislature established the Commission in 1935 to protect Nevada's Colorado River interests, including the

[83] Michael Weissenstein, "The Water Empress of Vegas," *High Country News*, April 9, 2001.

allotment of water and hydroelectric power. The CRC was comprised of seven gubernatorial appointees chosen from locations throughout the state. The problem with this arrangement was that representatives from the northern part of the state, which did not have access to the Colorado River, had proprietary rights to a resource that was beyond their reach. This occurred because in the years before court-mandated reapportionment, each county (most were in the north) had one state senator; it was not yet based on population.

One of the SNWA's first priorities was to transform the CRC board so that it more fully represented southern Nevadans. In 1993, Patricia Mulroy petitioned then governor of Nevada Bob Miller (of Las Vegas) and the state legislature (reapportioned in 1965 to give Clark County control of both legislative houses), to allow the SNWA to appoint three out of the seven seats on the Commission. Under the new arrangement, the governor would appoint the remaining four positions, including the chair. When the measure passed in 1993, this administrative re-organization shifted power to the region that would be most directly impacted by the CRC's decisions. As Mulroy described it, "We were paying 100 percent of the bill for the Commission and had no voice…This allowed Nevada to speak as one voice."[84]

Although Governor Miller and U.S. Senator Harry Reid backed the CRC's re-configuration, a few state lawmakers feared that greater integration of the SNWA and the Commission would create a governmental organization with potentially too much power. Nevada State Assemblyman Hal Smith (R-Henderson) called the partnership a "power grab," and Assemblywoman Marcia De Bragga (D-Fallon) argued that at least one representative from northern Nevada should be on the Commission. She felt that it was a

[84] *Ibid*.

conflict of interest to give the SNWA representation on the CRC, since the SNWA had plans to acquire northern Nevada water.[85] After considering these opposing viewpoints, the Nevada legislature still decided in favor of the plan and granted the SNWA the power to appoint three of the seven members to the CRC.

An important intermediary in the SNWA's negotiations with the federal government and neighboring states was Interior Secretary (1993-2001) Bruce Babbitt. A former governor of Arizona, attorney for northern Nevada's White Pine County ranchers, and a close affiliate of Mulroy's during his tenure as Secretary of Interior, Babbitt was quite familiar with the challenges facing the Southwest. During the 1990s, he was instrumental in fostering cooperation and compromise among the Colorado River Basin states, and helped make the Compact more malleable and elastic, so that it could meet the states' changing demographics and needs.

With the CRC's support and Secretary Babbitt's assistance, the SNWA and its neighboring lower basin states pursued stronger partnerships. Indeed, the Interim Surplus Criteria Agreement of 2001 demonstrated a major breakthrough in inter-state cooperation, showing how different states could work within the parameters of the Colorado River Compact, while still accommodating each other's needs. The Agreement gave the Secretary of Interior the authority to declare a "surplus" of water on the Colorado River to be allotted to the states on a temporary basis. As noted, the upper basin states had historically been unable to use their entire water allotments, which then flowed downstream. Ever since 1922, California had exploited this situation by taking and withdrawing all of this unclaimed water. The state routinely exceeded its 4.4 MAFY

[85] Ed Vogel, "Colorado River Commission Targeted," *Las Vegas Review Journal*, June 4, 1993.

allotment, sometimes by as much as 800,000 acre-feet.[86] California's actions caused serious concern among the upper basin states, especially since they were beginning to face their own growth issues. In short, they feared that California's elevated water withdrawal levels would become institutionalized policy.

The Interim Surplus Criteria Agreement is a two-part plan that addressed both the upper basin's fears and California's needs. In the first part of the plan, the upper river basin states of Colorado, New Mexico, Wyoming, and Utah joined together with the lower basin states of Arizona and Nevada and agreed to designate the unclaimed portions of river water that states did not use as "surplus," which they then permitted California to draw on for up to ten years. The Interim Agreement, therefore, gave California a grace period in which to lower its intake rather than demanding that it immediately reduce the amount of water it withdrew from Lake Mead.

The other states were amenable to this approach because California promised to initiate a conservation program and cut its water use by 800,000 AFY by the year 2016. This second component of the Interim Surplus Agreement is known as the Colorado River Water Use Plan. California water managers hoped to conserve an initial 459,000 AFY by lining canals with impermeable materials to plug leaks, storing water underground in aquifers, forcing urban and rural communities within the state to share aqueducts, and leaving agricultural fields fallow.[87] The two plans (Interim Surplus Criteria Agreement and Colorado River Conservation Plan) worked in tandem, since the former allowed California to gradually reduce the amount of water it withdrew from Lake Mead, while the latter provided them with the tools to enable them to do just that.

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[86] Ed Marston, "Quenching the Big Thirst," *High Country News*, May 21, 2001.
[87] *Ibid*.

Because of a prolonged drought that began in 2002, California could not reduce its intake of Colorado River water and therefore implement the Interim Surplus Agreement and the Colorado River Conservation Plan. As an alternative, the SNWA helped devise other collective solutions to maximize efficient use of the Colorado River among the Compact states. The SNWA and other purveyors diversified available water assets by developing a greater number and variety of methods for acquiring and managing water. One of these methods was the water banking system.

Babbitt initiated the banking system when he facilitated a groundwater storage program as governor of Arizona in the 1970s and 1980s. The Arizona Banking Agreement of 2004 between Nevada and Arizona was the first example of an interstate storage system.[88] The banking system involves storing or "banking" unused annual water allotment from the Colorado River in underground storage units (such as aquifers) instead of letting the unused water flow downstream. Prior to this agreement, Colorado River basin water purveyors could not store water for future use, because tributaries along the river counted as part of the overall flow and so they could not store waters from these sources either. With the agreement, however, lower basin states were permitted to store water in "off-stream" sites. In other words, they could not store it in Colorado River reservoirs, such as Lake Mead, but they could use other storage alternatives, such as aquifers and off-stream reservoirs.

The SNWA and the state of Arizona had begun negotiating what became the Arizona Water Banking Agreement in 2001. Southern Nevada was looking for other ways to meet its water demands, and Arizona had more water than it needed. Arizona was also motivated by the desire to protect and maintain its original CRC water allotment.

[88] 2008 SNWA Water Resources Plan, 41-3.

Arizona water managers feared that California or another state would ask them to forfeit a portion of their allotment because of under utilization. Under the agreement, Arizona contracted to sell Nevada 1.25 MAF (more than 400 billion gallons of water) of its unused allotment for $330 million. Nevada could not withdraw Arizona's unused allotment all at once, but would have to withdraw a portion annually beginning with 20,000 AFY in 2007 and rising to as high as 40,000 AFY by 2011.[89] Nevada paid to store the water in Arizona's aquifer, since it was for Nevada's future use. If, however, Arizona had to use its entire allotment during any given year, Nevada had to defer to those needs. The banking system provided great benefits to both parties. Nevada was able to secure additional water for the future while Arizona was able to make a profit while at the same time maintaining a claim on its allotment of the Colorado River.

The Arizona Banking Agreement had strong support among the lower basin states because the states worked out a mutually beneficial compromise rather than getting mired in conflict. According to Herb Guenther, Director of the Arizona Department of Water Resources, "We will continue to have some water in excess of what we would be able to put to beneficial use. As long as we have that water and it can be put to beneficial use by another state in the basin, we have the right to store that water on their behalf in exchange for compensation."[90] Rather than engaging in a legal battle over Arizona's unused water, the SNWA and Arizona instead worked together to develop an innovative water sharing system. By building this alliance, they not only strengthened the ties among western water users, but also protected their own water interests. As the Arizona Water Resource

[89] SNWA Water Resources Plan, p. 28, www.snwa.com/html/wr_resource_plan.html, accessed May 14, 2008.
[90] "Arizona Board Ok's Nevada Water Deal," *Las Vegas Sun*, December 10, 2004.

newsletter reported, many celebrated the banking agreement as a "big breakthrough" in western water management.[91]

The Arizona Water Banking Agreement of 2004 established a precedent for future banking deals. Shortly after it was completed, the SNWA negotiated a similar deal with the Metropolitan Water District of Southern California (MET), in which Nevada would bank its unused water allotment in Los Angeles basin aquifers and reservoirs. As a result of numerous conservation measures, between 2003 and 2007, Nevada used less water than its annual allotment of 300,000 acre-feet. In keeping with the rules established under the Arizona Banking Agreement, it was free to store or sell any unused portion of its yearly allotment.

The California Banking Agreement was another mutually beneficial arrangement. For Nevada, it provided a future source of water that it could use to support southern Nevada's growth. For California, it provided a small amount of water to help alleviate immediate water shortages in the southern part of the state. It is important to note that the SNWA could have pumped this unused water into the Southern Nevada Water Bank, an aquifer underlying the Las Vegas Valley. Yet, in the spirit of cooperation the SNWA, the MET, and the USBR worked together to create a deal that benefited both states. In the words of Mulroy, the California Water Bank "helps establish the spirit of cooperation that we're going to so desperately need on the Colorado as the drought continues."[92]

Besides working towards more sustainable water consumption methods and more efficient and cooperative management systems, the SNWA also joined with others to improve the region's environmental. Environmental advocates first brought news of the

[91]John Gelt, Arizona, Nevada Are Partners in Major Water Banking Deal," Arizona Water Resource 13, no. 3 (Nov-Dec 2004) at ag.arizona.edu/azwater/awr/novdec04/feature1.html, accessed April 20, 2008.
[92] Henry Brean, "Board Approves Plan to 'Bank' Water," *Las Vegas Review Journal*, October 22, 2004.

Colorado's ecological destruction during the 1950s, but it was only in 2001 that the Colorado River Basin states created a regional conservation program. That year, the endangerment of three species of tiny fish—the razorback sucker, the bonytail chub, and the Colorado squawfish—and subsequent pressure from environmental advocacy groups like the Defenders of Wildlife and the Southwest Biological Center for Biodiversity, spurred the SNWA, California, Arizona, the federal government, to create a plan to save them.[93]

The banks along the lower Colorado River have long supported a vast array of wildlife. Hundreds of bird species, including the Western Least Bittern, the California Black Rail, the Yellow Billed Cuckoo, and even the occasional bald eagle have depended on the lower Colorado River habitat. The delta that forms where the Colorado River empties into the Gulf of California was at one time one of the most ecologically diverse environments in North America, and home to the Yuma Clapper Rail (a long beaked marsh bird), the Vaquita Porpoise, and the Totaoaba fish. The USBR's construction of dams along the Colorado during the twentieth century adversely affected this ecosystem. The dams provided water and electricity to the region's expanding populations and industries, but they also endangered the animals and plants living in the Colorado River watershed.

Americans initially celebrated these dams as signs of progress, and enthusiastically greeted each new project. But attitudes began to change in the 1960s and 1970s as many concerned citizens developed a new environmental awareness and questioned this wholehearted faith in the benefits of progress. Widespread concerns about pollution,

[93] "States, Feds Launch United Effort to Save River," *Las Vegas Sun*, May 6, 1996.

endangered wildlife populations, and diminished open spaces spurred people to action. As a part of a larger effort to improve the health of America's rivers, numerous citizens and conservation groups like the Sierra Club and Wilderness Society sought to rehabilitate the Colorado River ecosystem.

Arguably the most famous example of environmental activism to protect a river occurred during the 1950s when the USBR announced plans to build a dam on the Green River that would flood portions of Dinosaur National Monument, a unit of the National Park System that straddles the Utah/Colorado border. The Green River is a part of the Colorado River System and converges with the mainstream in central Utah approximately two hundred miles south of the monument. The Sierra Club under David Brower as well as the Wilderness Society led the attack against the Echo Park Dam, recruiting thousands of private citizens to the cause. These individuals lobbied their senators and representatives to such a degree that Congress eventually abandoned support for the USBR plan. But this success came at a cost. Advocates had limited legal and financial resources with which to oppose the USBR and were unable to mount a similar undertaking against a second dam planned for Glen Canyon in Southern Utah/Northern Arizona. Although this dam would not affect any national parks, Brower, nevertheless, came to regret his decision to essentially sacrifice Glen Canyon to preserve Echo Park. His motivation and the subsequent public lament for the loss of Glen Canyon, coupled with the burgeoning environmental movement of the 1960s, created an environmental constituency that has helped prevent the construction of any dams on the Colorado River since 1963. The initial effort to protect Echo Park helped establish a legacy of

environmental activism within the Colorado River Basin that persists into the twenty-first century.[94]

This legacy, in part, influenced the United States Fish and Wildlife Service (USFWS) in 1994 to list large portions of the Colorado River, including Lake Powell, Lake Mead, Lake Mohave, and Lake Havasu, as vital habitat for the three species of endangered fish. In addition, the following year, Nevada, Arizona, and California and the U.S. Department of the Interior signed the Lower Colorado River Multi-Species Conservation Program, a 50-year wildlife protection plan. The program had to balance the competing desires of urban, recreational, environmental, and agricultural interests, not to mention the needs of the animals themselves. The program's goals were the rehabilitation and conservation of riparian habitat, the recovery and protection of threatened native species, and compliance with federal and California endangered species laws. At the same time, it sought to maintain water diversions for agriculture and urban users and the hydroelectric power generated by the river's numerous dams.

Critics argued that the Multi-Species program, along with the Interim Surplus Guidelines and the banking systems, did not reserve enough water for ecosystems along the river and its delta.[95] Despite these shortcomings, it was nonetheless a major political accomplishment in terms of bringing together diverse constituencies for the cause of environmental protection. In the words of SNWA spokesperson Kay Brothers, " the fact that the agencies from three states and the federal government can agree on the

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[94] Jared Farmer, *Glen Canyon Dammed* (Tucson: University of Arizona Press, 1999), 137-46; Reisner, *Cadillac Desert*, 284-5; Ted Steinberg, *Down to Earth: America's Role in American History* (New York: Oxford University Press, 2009), 243-6.

[95] "Colorado River Delta Needs More Water Stakeholders From U.S. and Mexico Release Principles to Guide Restoration," Environmental Defense Fund press release, posted: 12-Sep-2001; Updated: 15-Dec-2001 at www.edf.org/pressrelease.cfm?contentID=58, accessed April 19, 2008.

environmental programs was significant…this is something that is a huge example of what you can do when you cooperate. It's really a huge success for the lower basin entities that did this."[96]

At the same time that the SNWA was developing stronger partnerships with its neighbors, it also pursued them within the state. Besides creating regional acquisition programs through the California and Arizona water banks, the SNWA also looked within Nevada for additional water sources to diversify its water stores. One advantage of using in-state sources was that it significantly decreased the chances of federal and interstate opposition. The SNWA sought water in ever-expanding concentric circles from local rivers near the Las Vegas Valley to underground aquifers in the state's northeastern regions.

The Virgin River northeast of Las Vegas was the first regional source the SNWA added to its Colorado River supplies. Even though the Virgin River heads in Southeastern Utah near Zion National Park, it can be considered a Nevada resource since the state has a prior claim to the river that predates the 1922 Colorado River Compact. Despite its small size, the river created Zion Canyon, a chasm several thousand feet deep. The river then descends from Utah's plateaus to the lower Mojave Desert, traveling through the northwestern tip of Arizona and finally into Nevada and Lake Mead. Despite its modest size, during the early 1990s the SNWA aggressively sought to add this waterway to its collection of water reserves.

The Nevada State Water Engineer (State Engineer) granted the SNWA rights to the Virgin River in 1994. The State Engineer works for the Division of Water Resources, which was established by two legislative acts, in 1913 and 1939. Through the Division

[96] "Program Targets Health of River Species," *Las Vegas Sun*, March 14, 2005.

of Water Resources, the State Engineer has the ultimate authority over all water in the Nevada. The State Engineer granted the SNWA rights to the Virgin River based on the state's rights to the river that predated the Colorado River Compact of 1922 and the Boulder Canyon Project Act of 1928.[97] Even though the State Engineer gave his official sanction to use the river, the SNWA's plan to allow the river to flow into Lake Mead and withdraw a corresponding amount downstream drew the attention of the federal officials and other basin states.

Following a practice known as "water-wheeling," the SNWA planned to let the Virgin River flow its usual course into Lake Mead and then withdraw a corresponding amount of water downstream at the Saddle Island intake point. This required support from the other basin states, since it was technically illegal under the Colorado River Compact. Under the agreement, all water that reaches the main stem of the Colorado River becomes common property of the basin states. Its tributaries, with the exception of the Salt and Gila Rivers of Arizona, are considered part and parcel of the main waterway and are not available for unilateral exploitation, as earlier noted. Consequently, according to existing law, the SNWA would not be able to claim the Virgin River contributions as its own after that stream joined the Colorado River.

As an alternative to accessing the Virgin River waters from Lake Mead, the Authority considered constructing a dam and pipeline from the mouth of the Virgin River directly to the LVMA. This method had two major drawbacks. In the first place, a dam would flood riparian habitat that was vital to several species of fish and waterfowl. Secondly, the monetary cost would be enormous, with some estimates for the system running as

[97] SNWA Water Resources Plan, p. 27, www.snwa.com/html/wr_resource_plan.html, accessed May 14, 2008.

high as $500 million.[98] The SNWA was able to avoid the environmentally and monetarily costly pipeline when, in 2006, the USBR and the other basin states permitted the Authority to obtain Virgin River waters via the water wheeling system. It would only be allowed to withdraw ninety-seven percent of the river flow, however, because three percent would have to be withheld to account for water lost due to evaporation. Even though it had official sanction, the SNWA did not develop its Virgin River rights. As a result of the drought with the Colorado River Basin, the SNWA agreed to forgo utilizing the Virgin River in the short-term in order to maintain the water flow into Lake Mead and prevent further decline of its water levels. The SNWA entered this agreement with the understanding that it would develop the Virgin River at some point in the future if and when more favorable environmental conditions return to the Colorado River Basin. As part of the agreement the SNWA decided to instead pursue its other instate water sources.

The Muddy River was the next water resource that the SNWA sought to develop. The Muddy River emanates from springs deep within the Arrow Mountains fifty miles northeast of Las Vegas. Local residents had primarily used the river for agricultural purposes since the time of the Anasazi Indians over twelve hundred years ago. In 1997, the State Engineer set a new precedent when he granted the SNWA permission to use it for urban, rather than for agricultural, development. Once the SNWA had secured the rights to use the Muddy River waters, it then had to create a feasible means of bringing the water to Las Vegas, something that would surely initiate conflict between local residents and the SNWA. Instead of fighting for the water in court, as has been the historically common approach, the SNWA purchased water rights from the farmers who owned them. When the SNWA purchased water rights directly from farmers it saved

[98] Mary Hynes, "Water Deal OK'd," *Las Vegas Review Journal*, November 11, 1994.

both time and money, and arguably avoided the provocation of rural animosity toward Las Vegas and the SNWA.

The SNWA board voted unanimously to authorize the purchase of water rights for 5,200 AFY of Muddy River water at a cost of $10.9 million in 1999.[99] The SNWA was ultimately able to access 7,000 AFY from the Muddy River by purchasing additional shares from the Muddy Valley Irrigation Company between 1997 and 2005.[100] Because of the Muddy River's proximity to the Virgin River, the SNWA simply consolidated this additional water into the existing water-wheeling plan. While the SNWA has begun to use water from the Muddy River, it has yet to access water from the Virgin River.

The SNWA's plans for the Virgin and Muddy rivers prompted several groups, including the National Park Service, Moapa Band of Paiutes, residents of rural Nevada communities, and the incorporated towns of Mesquite and Bunkerville (located fifty miles northeast of Las Vegas) to lodge complaints with the State Engineer. Their protests primarily resulted from a concern over the pipeline's potential negative environmental impact. Once the SNWA received permission to let tributary waters flow into its intake pump-station on the Colorado River it abandoned the pipeline plan, at which point the opposition dissolved and few protesters appeared at the public hearings.[101]

In perhaps the most controversial move of SNWA's existence, the agency sought the right to pump groundwater from three rural and distant Nevada counties. A vast network of aquifers lies northeast of Las Vegas in upper Clark County, Nye, Lincoln, and White Pine Counties. The porous limestone underlying the region has produced hollowed-out

[99] Michael Weissenstein, "Muddy River Rights Bought," *Las Vegas Review Journal*, November 19, 1999.
[100] SNWA Water Resources Plan, p. 27, www.snwa.com/html/wr_resource_plan.html, accessed May 14, 2008.
[101] Mary Hynes, "Few Rivals Protest Plan to Dam River," *Las Vegas Review Journal*, January 11, 1994.

pits that store enormous amounts of water that has seeped down from the surrounding mountain ranges. The state of Nevada has been aware of this store of subterranean water as a potential source for the LVMA since at least the 1960s. When the Department of Defense began exploring the possibility of locating MX nuclear-missile silos in the mountain valleys of northern Nevada in the 1970s and 1980s, the underground reservoirs gained attention again. While the Defense Department abandoned its plans, the District and the SNWA campaigned to acquire this vast resource, a venture known as the In-State Groundwater Project (ISGP).

A decision by the basin states helped compel southern Nevada's water managers to pursue rights to the northern aquifers. In 1989, as head of the District, Mulroy proposed to the upper basin states that Nevada buy a portion of their agricultural rights to the Colorado River. The state managers quickly rebuffed her request. They told her that Nevada had to develop its own in-state water resources before they would consider any changes to the Colorado River allotments. As a result, the District turned to the northern aquifers.

The Groundwater Project began in 1989 when the District applied for 147 permits to develop well water in White Pine, Lincoln, and northern Clark counties. The sheer number of applications from the Las Vegas purveyor sent shock waves through much of rural northern Nevada, and protesters filed over 3,600 complaints with the State Engineer.[102] Because of this immediate and vocal opposition, the District decided to put the Project on hold for several years. But in 2004, under pressure from a severe drought, the SNWA, once again pursued the Project albeit in a more restrained manner. This time

[102] Henry Brean, "Pipeline Plans, Water Rights to be Argued," *Las Vegas Review Journal*, March 22, 2004.

it filed only seven groundwater withdrawal applications with the State Engineer, instead of 147. The seven sites the SNWA applied for were located in six valleys north of Las Vegas: Coyote Springs, Delamar, Dry Lake, Cave, Spring, and Snake Valleys. These areas are sparsely populated and are primarily used for ranchland.

SNWA officials knew that tapping into these northern Nevada underground reservoirs would greatly reduce Las Vegas's reliance on the Colorado River, which currently supplies around ninety percent of the local water needs.[103] The SNWA position is that it considers the northeastern Nevada groundwater as a sustainable long-term source of water and not a temporary stopgap measure. According to J.C. Davis, Senior Public Information Coordinator of the SNWA, "The rights for which the SNWA has applied are considered a permanent renewable resource."[104] The SNWA will deliver the 125,000 to 200,000 acre-feet of water per year that it plans to withdraw from northern Nevada to Las Vegas through a pipeline. The scope of this project is ambitious, requiring the construction of more than 450 miles of pipeline (all below ground), 200 miles of power lines, and four pumping stations for a combined estimated cost of over two billion dollars.

The State Engineer ruled first on the Spring Valley intake site in 2008, when it granted the SNWA permission to withdraw up to 60,000 acre-feet annually from the aquifer. The SNWA received rights to immediately withdraw 40,000 acre-feet per year of water from the Spring Valley well, with permission for the remaining 20,000 acre-feet per year pending a comprehensive study of the possible environmental impacts. In addition, the State Engineer also granted SNWA rights to 18,755 acre-feet of water from

[103] "Rural Critics Heat Up Water Planning Meeting," *Las Vegas Sun*, March 16, 2005.
[104] JC Davis in discussion with the author, March 2008, author's files.

Cave, Delamar, and Dry Lake Valleys.[105] While these rulings alarmed many residents of the northern counties, as well as southern Nevada environmentalists, the SNWA attempted to reassure the public that it was following every safeguard to ensure the environmental health of the region. As SNWA spokesperson J.C. Davis announced, "For the Environmental Impact Study, we are studying everything you can possibly imagine...Not just hydrology, but baseline studies of species within the proposed pumping area, vegetation densities and composition, air quality, etc. When I say fine-tooth comb, I mean it. They are inventorying every bug, bunny and bristlecone in the region."[106] Despite these assurances, many ranchers in northeastern Nevada as well as individuals within the Las Vegas metropolitan expressed reservations about the logic supporting Las Vegas' ambition.

Considering the magnitude of the ISGP, it is not surprising that it has inspired some opposition in northern Nevada communities. Spring Valley ranchers have expressed serious concerns about the effects that draining the aquifer will have on their agricultural enterprises. They worry that pumping the aquifer will draw down the water table to the point where they will not be able to access it for their livestock.[107] Because the Nevada-Utah state line bisects the valley, Utah state officials and ranchers are also concerned about the pipeline's depletion of local water supplies, especially because of the growing population along the Wasatch Front. Rancher Cecil Garland of Callao, Utah expressed misgivings about the SNWA plan to pump water from the region, and described it as a contest between "crops vs. craps." For Garland it is a moral issue as he argues that he is earning an honest living off the land and it is wrong for a distant city like Las Vegas to

[105] http://www.snwa.com/html/system_gdp.html, accessed April 22, 2009.
[106] JC Davis email message to author, April 29, 2008, author's files.
[107] JC Davis in discussion with the author, March 2008, author's files.

invade his valley and potentially destroy his livelihood. Notes Garland, "Gluttony, glitter, girls, and gambling are what [Las Vegas] is all about…What it's all about here is children, cattle, country and church."[108] The fear amongst politicians and ranchers is that the aquifers cannot withstand pumping and supply sufficient water to sustain the natural environment and the local economy at the same time.

One of the main criticisms of the ISGP is that Las Vegas is reaching beyond its watershed for resources. Critics fear the SNWA is going to repeat the now infamous Los Angeles Owens Valley water grab of 1913, an event in which the Los Angeles Department of Water and Power (LADWP) drained rural Owens Valley of water with devastating effects on the region. To be sure, there are several similarities between the two situations. Like Los Angeles, Las Vegas is a large urban center seeking water in rural areas outside its borders. Both are boomtowns. Until early 2009, growth in southern Nevada was as rampant as it was in southern California during the early twentieth century. From 1900 to 1930, when Los Angeles began to seek outside water sources, the population soared from 170,000 to over 2.2 million, a figure only slightly greater than the LVMA's growth at the close of the twentieth century.[109]

There are significant contrasts between the two cities, however. The LADWP showed little or no concern for the environmental fate of the Owens Valley. In what was proved an environmentally destructive move, Los Angeles tapped the entire flow of the Owens River and diverted it into concrete aqueducts to convey water to Los Angeles. Even though city leaders worked with state and federal officials, no one ever set limits on the amount of water the LADWP could withdraw. After the water diversion to Los Angeles,

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[108] Howard Berkes, "Struggling Over Water: Las Vegas Water Battle: 'Crops vs. Craps,'" *NPR*, July 30, 2007, http://www.npr.org/teplates/story/story.hp?storyld=10953190.
[109] Walter Nugent, *Into the West: The Story of Its People* (New York: Knopf, 1999), 219.

Owens Valley's once rich farmland was incapable of supporting agriculture. Publicly acknowledging the mistakes of the past, the SNWA has declared it would take a different approach in northern Nevada.

Unlike the LADWP, the SNWA will fulfill several legal requirements before pumping any water from northern Nevada. First, it must apply to the State Engineer for a permit to develop groundwater. (This is what it succeeded in doing at Spring Valley in 2008.) Before granting any water rights, the State Engineer must consider existing claims, proof of beneficial use, and whether or not use of the water is detrimental to the public good. The State Engineer grants water rights according to Nevada state water law, which is predicated upon the key principles of prior appropriation and beneficial use. Prior appropriation, also known as "first in time, first in right," as previously stated, gives priority to the party that has used the water source the longest. "Beneficial use" means that the party that owns the right to the water must use it productively; examples of it are wide ranging and include recreation, industry, municipal services, mining, and agriculture.[110] The State Engineer takes into account several factors from many constituencies across the state before ruling on a case.

The SNWA asserts that there are other significant differences between the two historical events. To begin with, the SNWA has stated that it applied for only a portion of the water available in the aquifers, whereas Los Angeles appropriated the entire Owens River. And, unlike the LADWP, the SNWA prides itself on its history of developing programs since its inception to decrease consumption throughout the Las Vegas metropolitan area. Some could also point out the media attention has been far more scrutinizing of the SNWA plan than that of the LADWP's in the early twentieth century

[110] David H. Getches, *Water Law in a Nutshell* (St. Paul: West Publishing Co., 1990), 74-77, 98-101.

and that the latter enjoyed a cozy relationship with local newspapers like the *Los Angeles Times* to rally support for the Owens Valley Aqueduct and to downplay opposition. It can be pointed out, however, that the SNWA has also had a rather positive relationship with the pro-growth *Las Vegas Review Journal*. To be fair, the SNWA has been comparatively open about its plans for northern Nevada water and has held numerous public meetings with pipeline opponents. Many Owens Valley residents perceived the LADWP as having essentially blocked interested parties from attending policy meetings while at the same time that it actively courted the southern California public to support its cause. The *Los Angeles Times*, a staunch supporter of the LADWP plans in the Owens Valley, railed against those who opposed the Los Angeles aqueduct. In contrast, the SNWA has provided a forum for the public to voice its opinions. Citizens have the right to attend SNWA board meetings during which it can express various concerns. Indeed, one of the pipeline's leading opponents, Dean Baker, a White Pine County rancher, has attended numerous meetings to voice his opposition to the SNWA's plan.[111]

Despite the Authority's insistence that the two historical events are not analogous, that has not convinced White Pine Rancher Dean Baker. When asked what his thoughts were in the matter he responded:

> Owens Valley is a very good parallel to this. Southern Nevada Water Authority hates that to be brought up, but you've got to realize that Owens Valley is on the east side of the range that collects most of the moisture that comes off of the Pacific. It is one of the best water sources there is in the West and by the time it gets here to Snake Valley it has gone across a half a dozen or dozen other ranges that rain more water out and drop it down. The history of Owens Valley was that they didn't start in initially to dry the ranches up. They were only going to take a little water and they weren't going to harm it, but as it became clear that there was such a conflict, they just simply had no choice but to dry it up and suck

[111] Southern Nevada Water Authority Board of Directors Meeting, November 17, 2005, http://www.snwa.com/cfml/agenda/minutes.cfml?doc_id=5581&reason=detail_search_results&agenda_org_id=1, accessed April 22, 2009.

it dry. They say the laws won't let them do that now, but I question that.[112]

Critics like Baker have repeatedly pointed out the potential environmental impact of the SNWA pipeline, again comparing it to the Los Angeles Aqueduct's effect in the Owens Valley. While a common concern, it fails to adequately recognize the radically different ethos governing environmental policy in the twenty-first century from when the L.A. aqueduct was completed in 1913. There are significantly more environmental safeguards now in place, including the National Environmental Protection Act of 1969, The Clean Air Act of 1970, the Endangered Species Act of 1973, and the Clean Water Act of 1977. The SNWA has repeatedly claimed to have openly and thoroughly adhered to these environmental regulations, a statement that seems to withstand scrutiny in light of the organization's exhaustive environmental impact study of the proposed pipeline route.[113]

The SNWA turned to northern counties and local tributaries for water in order to diversify its water resources so that it would not have to depend so heavily on the Colorado River. While the SNWA's actions have met with controversy, to be fair the organization has attempted to work closely with ranchers in the rural counties of northern Nevada to ensure that pumping water to Las Vegas will not adversely affect those making their living off the land. The SNWA has spent significant funds on scientific research to determine the potential environmental impacts of their actions. The SNWA's position is that it is attempting to mitigate environmental damage in northeastern Nevada in order to preserve rural ways of life and biodiversity. It is the Authority's intention to serve as a model for sustainable water management in the American West by preserving both environmental and cultural resources.

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[112] *Desert Wars: Water and the West*, http://www.kued.org/productions/desertwars/baker_dean.php.
[113] http://www.snwa.com/html/system_gdp_bio_studies.html, accessed April 22, 2009.

CHAPTER 5

INFRASTRUCTURE AND LOCAL WATER USE

The Las Vegas metropolitan area has changed drastically over the past two decades. Not only is the city twice as large as it was in 1990, but the casinos have grown to more colossal heights, the suburbs have expanded into the foothills surrounding the valley, and the freeways and roads have created an ever more complicated network of transportation corridors. This rapid expansion of modern Las Vegas, both upward and outward, overshadows a more subtle change to the metropolitan area's makeup: throughout the Valley water intensive lawns have largely been downsized or eliminated, giving way to desert adapted plants and trees; decorative fountains now utilize recycled water, and the ubiquitous swimming pool, summer refuge for young and old alike, is increasingly veiled with plastic covers to decrease rates of evaporation. These changes have brought dramatic results; to date, southern Nevadans have removed enough grass from their yards to save the community almost six billion gallons of water a year, enough to form an eighteen inch-wide strip of turf that stretches from Las Vegas to Australia.[114] The fountains that adorn businesses throughout the Valley are actually a symbol of compromise that represents an enormous savings of water. The SNWA specifically targeted fountains in its efforts to reduce consumption, but rather than mandating their elimination, it allowed business owners to keep them if they reduced water consumption in other areas, such as grass removal—and, the SNWA added, the water savings must

[114] SNWA conservation brochure, author's files.

equal fifty times that used by the fountains. The fountains stayed, and the grass was removed. Lastly, simply by placing a plastic cover over their pools, residents saved southern Nevada over forty-seven million gallons in one year alone.[115] While these measures save the LVMA an enormous amount of water annually, they only represent a mere fraction of the overall SNWA conservation program, a campaign that affects every level of southern Nevada life, from the frenetic social and economic activity of the Las Vegas Strip to the quiet suburbs surrounding it.

While chapter three tells a regional story, in this section the emphasis is local and outlines how southern Nevadans receive, use, and dispose of water within the Las Vegas Valley. As the SNWA searched the region for additional water sources, it simultaneously launched a plan to improve the infrastructure within the LVMA and initiated a conservation campaign to decrease consumption. The Las Vegas metropolitan area's water system is a complex and highly integrated organization of pipes and pumping stations, which in many ways resembles the circulatory system of the human body. In southern Nevada this system takes water from Lake Mead, brings it to drinking standards with two treatment plants, then sends it all around the Las Vegas Valley through a grid of pipes, into homes and businesses where it is used and consumed, before delivering it back to the Colorado River via sewage plants and the Las Vegas Wash. During its journey, the water flows into myriad locations: from pools and parks, to homes and casinos; from schools and government buildings, to apartments and car washes.

This system is comprised of three vital components: the water delivery infrastructure of pipes and treatment plants, greatly expanded and modernized with the Capital Improvements Program of 1995; the SNWA Water Smart Campaign, an institutionalized

[115] *Ibid*.

set of guidelines for water conservation covered within the SNWA Conservation Plan; and the Las Vegas Wash, a system of marshes and wetlands which help purify and dispose of the Valley's water after it has been used. This chapter will outline each of these subjects and expand upon how this urban water "circulatory system" works and how nature, citizens, and the SNWA collaborate to efficiently and effectively execute its operation.

Throughout southern Nevada's history, the Las Vegas Valley's water purveyors have struggled to build an adequate infrastructure capable of delivering enough water to an ever-expanding population. Growth has always outpaced the designer's best efforts to build an effective water delivery system. In 1954 planners for the Las Vegas Valley Water District thought it had solved the shortage problems when the organization acquired rights to the Las Vegas Springs and a small pipeline from Lake Mead, only to find out that yet more was needed, leading to the construction of the Southern Nevada Water System in 1971-84. The SNWS, a joint venture between the federal government and the state of Nevada, expanded southern Nevada's water conveyance capabilities and consisted of an intake pipe from Lake Mead, as well as a water treatment plant. Engineers expected this system to provide water for southern Nevada well into the twenty-first century, but by the late 1980s it too proved unable to keep up with growth. The SNWA assumed responsibility for the issue of adequate infrastructure following its creation in 1991. In 1994 the SNWA created an advisory committee, the Integrated Resource Planning Advisory Committee (IRPAC), comprised of twenty-five members of the southern Nevada community, whose purpose was to plan for the expansion of water services in southern Nevada. These individuals, representing a wide range of socio-

economic groups, including the Bank of America, AFL-CIO, Sierra Club, and the Clark County School District, drafted a list of recommendations that became guideposts for the construction of an enlarged urban water system, one that came to be known as the Capital Improvements Program (CIP).[116] The most pressing issue for the IRPAC was how to finance the CIP. Water hookup fees had paid for water expansion construction until the mid 1990s, but the IRPAC realized that the CIP would be a much larger expansion than had occurred in southern Nevada previously, and that it would require additional sources of money. After debating many options, the SNWA advisory committee recommended an increased sales tax as a way to augment the regional hookup fees as a way to pay for the CIP.

At first glance it may seem like the board chose a regressive method of funding. Sales taxes have often been criticized as disproportionately impacting the poor, but there is a logic to it that makes sense in southern Nevada. Many social scientists recommend more progressive types of taxation, like those on income and property, however, in southern Nevada the normal rules do not always apply. Supporters of the sales tax pointed out that property and income taxes would only affect Nevadans, but that locals and tourists alike would share a sales tax.[117] Therefore, the reasoning went, in a city that hosted forty million visitors a year, a sales tax was actually a progressive tax that spreads the burden between tourists and residents. However, the sales tax only provided twenty eight percent of the CIP's overall cost. As a result, the SNWA had to rely on additional sources of revenue, such as a regional connection charge (fifty seven percent), a

[116] SNWA Agenda Item #22, November 21, 1996.
[117] Larry Henry, "Proposed Tax Hike Had a Storied History," *Las Vegas Sun*, November 19, 1997.

reliability surcharge (five percent), and water rates (ten percent) to fully fund the CIP.[118]

The SNWA decided to implement the IRPAC sales tax recommendation and brought the proposal to the Clark County Commission, a body that had the power to implement it. Always a political hot-potato, and one year before the elections, the Commission decided to place the issue before the voters themselves, a politically savvy move that enabled them to sidestep the thorny issue of taxation—and perhaps not unwisely for the plan encountered immediate community resistance. Opponents argued that the sales tax would only benefit a choice few and that growth should be funded by developers, not taxpayers. Chuck Muth of the Republican Liberty Party praised the Commission's decision to place the issue before the voters, noting that "the special interests still may prevail on the tax hike, but they're going to have to go to the voters instead of behind closed doors." Ken Mahal of the Nevada Seniors Coalition echoed this sentiment when he stated "placing the issue on the ballot was a 'fantastic loss' for special interests.[119] Even some state legislators expressed reservations, if not downright opposition, to the plan. Assemblyman Harry Mortensen (D-Henderson) contended that growth provided enough money through water rates and connection fees to cover the $2 billion price tag for the construction of treatment plans and pipelines. However, Mortensen's reasoning, shared by many who opposed the plan, only "accounts for the revenue side of the equation, not the on-going cost"; something columnist Jon Ralston of the *Las Vegas Review Journal* pointed out.[120] Mortensen only looked at what was needed to build new infrastructure and failed to account for the continuing maintenance costs of an urban

[118] http://www.snwa.com/html/system_cip_funding.html, accessed April 22, 2009.
[119] Jeff German and Larry Henry, "Decision by Commission Political Loss For Casinos," *Las Vegas Sun*, November 19, 1997.
[120] Jon Ralston, First Schools, Then Water," *Las Vegas Review-Journal*, April 15, 1997.

water system.

The resort and homebuilding industries were the most supportive of the sales tax initiative, because they had most to gain financially from the measure. Homebuilders could defray the cost of water hookups, which in turn helped keep the local housing market strong. This helped promote the local economy, a factor beneficial to southern Nevada casino owners since it improved Las Vegas' overall image to tourists. The southern Nevada homebuilders, resort industry, and the SNWA were all unhappy with the Commission's decision to place the tax initiative before voters.[121] Bill Vasiliadis, who represented the Nevada Resort Association, pressed the SNWA board and Clark County Commission to pass the tax without the public's vote. People like Vasiliadis felt it highly unlikely that the voters of Southern Nevada would support a tax initiative—not an unreasonable fear given the state's historic antipathy towards taxes of all kinds.

Despite great uncertainty, the measure passed by a large margin of victory. The final tally revealed that 71.6 percent of Clark County voters supported the initiative. However, even though the bond passed comfortably, in the weeks leading up to the vote, proponents felt that victory was anything by assured. Polls taken prior to the vote indicated that three-quarters of southern Nevadans opposed the sales tax increase. Said one pollster, "If I were a proponent of that tax, I'd throw in the towel."[122] Pat Mulroy herself was not sure of the outcome either. Shortly after the measure passed she said "she wasn't sure until it was done how the ballot question would go…the polls were all over

[121] "Water Authority Urges Commission to OK Sales Tax Hike," *Las Vegas Sun*, November 18, 1997.
[122] Jane Ann Morrison, "Poll Reveals Voter Opposition to Sales, Gaming Tax Increases," *Las Vegas Review-Journal*, February 25, 1998.

the place…we never knew where they would end up."[123]

The SNWA's massive media blitz can be partially credited for the initiative's passage. The Authority waged a non-stop publicity campaign that explained the need for the expanded water infrastructure and the logic behind the sales tax measure. While the Authority's efforts were effective, ultimate credit must be given to Clark County voters. Mulroy said as much when she stated that the "people looked at it logically—do you want it in [increased] water rates, or do you want to share the pain."[124]

The public's endorsement is especially significant when one considers that metropolitan residents were fully aware of the enormous cost of the project ($2 billion), yet chose to fund it anyway. Assessing the events since the tax recommendation, Dick Wimmer expressed satisfaction that the community supported the measure. He commented on the need for the Civil Works Project and the public's acknowledgement of the difficulties in planning for the explosive growth in southern Nevada:

> The bottom line is that the plan is flexible…no one is smart enough to predict growth thirty years out. When you're predicting growth a year out, you're doing a good job. Five years out you're doing a good job if you're in the ballpark. Ten, twenty, thirty years out is guesswork…in defense of people who underestimate our growth; they didn't do a bad job until ten to fifteen years ago. No one estimated this degree of expansion for this period of time.[125]

The CIP's initial tasks were to improve the Valley's intake systems at Lake Mead, modernize the existing water treatment plant and construct an entirely new one, lay over sixty miles of water transmission pipes, and build reservoirs and pumping stations. The plan covered a thirty-year period, with the first three devoted to planning and design and improving existing structures. Perhaps the most interesting piece of the CIP puzzle was

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[123] Adrienne Packer, "Quarter-Cent Tax Hike Passes with Little Fanfare," *Las Vegas Sun*, December 16, 1998.
[124] *Ibid*.
[125] "More Water is on its Way," *Las Vegas Sun*, February 21, 1999.

the River Mountains Water Treatment Facility (RMWTF). Completed in 2002, it was an engineering and architectural wonder. The facility had the capacity to treat 300 million gallons per day, but could be expanded to 600 million in the future. It used state of the art water treatment methods, to include ozonation, a process that infuses ozone, a gas produced by subjecting oxygen molecules to high electrical voltage, to water. This process has proven effective in killing various forms of contaminants including bacteria and other organisms.[126] The RMWTF is also aesthetically pleasing, with pools, overlooks, and interpretive displays adorning its grounds. At one point the SNWA intended for the public to see this beautiful water structure, however, the events of 9/11 caused them to reconsider. The public may still visit, but a tour guide must accompany them.

The SNWA enjoyed great success at acquiring numerous regional water sources for use in the LVMA; however, this success came at an enormous political, economic, and environmental cost. Therefore, given this multi-faceted expenditure, it was absolutely essential for the SNWA to initiate a rigorous conservation campaign in order to use these water resources in the most efficient way possible. The Authority's most publicized and publicly recognized attribute, conservation's effect on SNWA policy, cannot be understated. By conserving water, a precious commodity in the Mojave Desert, the SNWA demonstrated to its regional, state, and local neighbors its commitment to wise use of water, thereby giving the organization credibility as a political entity. This regional credibility was also vital locally. The SNWA has had to demonstrate its commitment to conservation as an organization in order to receive the support of southern Nevadans. The medium through which the SNWA sought to express that

[126] http://www.snwa.com/html/wq_treatment_facilities.html, accessed April 22, 2009.

commitment was the Water Smart campaign, which offered various incentives for consumers who agreed to conserve water.

Environmental reality will compel the SNWA to continue its conservations efforts throughout the region well into the future; there is simply no other way the Authority will be able to maintain its support for various growth organizations unless it continues to aggressively push the local community to decrease water consumption. And although Las Vegas is situated next to a pair of reliable water sources—the groundwater underlying the metro area and the Colorado River—neither of these sources is large enough to provide the city with enough water to guarantee an existence free from worry. As the Valley's population increases, so too does the potential for shortages. The SNWA recognizes this reality and emphasized conservation since its inception in 1991. The following section describes several methodologies the Authority employed in order to decrease water consumption in the Las Vegas community and some of the organizations plans for the future.

Comprised of three components—education, incentives, and regulation—the SNWA's conservation program met with widespread success, which saved the Valley billions of gallons of water to date. This three-pronged conservation program was specially designed to give the public a sense of ownership over the destiny of water conservation. The education and incentives components have utilized positive motivation techniques by issuing instruction on desert conservation methodologies and providing cash incentives for citizens to remove water intensive lawns and plants from their yards, all for the purpose of influencing residents to use less water. These two components have been generally well received by the Las Vegas community, but the SNWA still relies on

enforcement as a third method of decreasing consumption. The SNWA fields regulators who patrol the Valley and can issue citations if they catch a person wasting water.

One advantage the SNWA held over its predecessors was the ability to institute a valley-wide water policy, a comprehensive approach that greatly improved water conservation efforts. The pace at which the SNWA initiated conservation measures began slowly, but quickly increased during the 1990s. In the first few years of the SNWA's existence the organization was attempting to define a direction and to marshal its forces in order to forge an effective conservation program.

The SNWA conservation policy follows the parameters stipulated in the SNWA Conservation and Drought Plans. These plans work in tandem and essentially address the same issue: namely, how to conserve water in a desert environment and differ only in details. The Drought Plan is a tactical guide that provides guidance on the day-to-day methodology for conservation, and the Conservation Plan is a strategic plan that identifies the SNWA's long-range conservation goals. Adopted in 2001, these plans institutionalized and codified what had prior been a wide-ranging and unfocused series of conservation measures. These plans constitute SNWA's conservation campaign and they too incorporate the previously mentioned themes of education, incentives, and regulation.

While there were some isolated instances of water conservations measures that occurred during the previous decades, the move toward an institutionalized, regional conservation plan really gained steam in 1995 when the SNWA decided to adopt and implement the USBR's Best Management Practices (BMPs).[127] These practices were a collection of USBR water conservation tactics and strategies that helped define the SNWA Conservation and Drought Plans, and included such measures as turf removal

[127] http://www.snwa.com/html/cons_wsl_xeriscape.html, accessed April 22, 2009.

incentives, later known as the Cash for Grass program, incentive pricing that penalizes the heaviest users, and information and education programs.

One of the first acts under this program was a 1995 joint-sponsored xeriscape study between the SNWA and the USBR.[128] Xeriscape is a landscape style especially well suited to arid environments since it uses far less water than traditional yards. A typical xeriscaped yard had little grass and featured drought tolerant plant species such as cactus, pine trees, or oleanders, and uses efficient watering techniques such as drip irrigation, which directs a stream of water directly on the plant instead of spraying it over a larger area. The SNWA and USBR identified outdoor water use as the single area with the largest potential for water savings, so in 1995 the two organizations signed a cooperative agreement to fund a study analyzing the benefits and feasibility of large-scale xeriscaping. The initial study determined that the average family could save over 96,000 gallons a year on outdoor use by converting to a xeriscaped yard. Typical grass yards consume around seventy-three gallons per square foot annually, compared with only 17.2 gallons for xeriscape. This represents a savings of over seventy-five percent for outdoor use, and thirty percent for overall per capita use (a figure that includes indoor water usage for activities like clothes/dish washing, bathing, etc.). While the study demonstrated the savings potential, there was still the question of how to compel southern Nevadans to remove the grass from their yards and replace it with plants that required little water. The answer came from one of the other USBR BMPs: offer customers cash incentives to remove their grass. The SNWA adopted this measure and it formed the basis for the Water Smart Landscape Rebate Program (WSLRP).[129]

[128] http://www.snwa.com/html/cons_wsl_xeriscape.html, accessed April 22, 2009.
[129] http://www.snwa.com/html/cons_index.html, accessed April 22, 2009.

The promising results of the SNWA xeriscape study spurred the Authority to initiate the Water Smart Program in 1999. The SNWA designed this program to positively motivate southern Nevadans, through cash incentives, to decrease water consumption. During the first year of the WSLRP the SNWA offered customers forty cents for every square foot of turf they removed. This, though, had relatively little initial impact as consumption rates actually increased during the next few years, which prompted the SNWA to raise the rebate amount to $1.00 per square foot in 2003, and then to $2.00 in 2006.[130] These rate increases had the desired effect, as water consumption rates dropped drastically and the SNWA settled on a $1.50 per square foot rebate in 2008. The WSLRP has unequivocally been the SNWA's largest success. To date it has saved the Las Vegas community over eighteen billion gallons of water and has helped decrease regional consumption by more than fourteen percent.

The SNWA has refined the process to make it as easier for consumers to remove the grass from their yards. The procedure begins by checking in with the SNWA, who then sends out a technician to do a pre-conversion site inspection. The next step is removing the grass, often done by a professional. Many people who give up their grass attend free landscaping classes at the Springs Preserve. In these classes local botanists and biologists offer instruction on what plants are best suited for local environmental conditions, and help customers create yards conducive to wildlife, such as numerous species of birds and bats. Doug Bennett, SNWA Conservation Director notes that "It is not just about saving water, but also about creating a more livable environment in the LVMA."[131] While before, there was a broad expanse of monochromatic grass, following conversion there is

[130] Henry Brean, "Rebates Doubled For Lawn Removal," *Las Vegas Review – Journal,* Dec 8, 2006. Southern Nevada Water Authority Fiscal Year 2007 Operating and Capital Budget, 4-13.
[131] Author's interview with Doug Bennett, July 2008, author's files.

a wide array of cactus and flowering plant species that greatly diversify the visual makeup of a yard. After customers undergo conversion from grass to "water-smart" landscaping, the SNWA then sends the individual a rebate check in the amount of $1.50 for each foot of turf removed.

While the SNWA's turf removal program has received much public attention, there are two additional programs of note that also contributed to decreased water consumption rates across the Valley. The first is the Pool Cover Rebate, a program the SNWA started in 2005. The SNWA estimated that the average family pool lost around 12,000 gallons a year to evaporation, the bulk of which occurs during the summer months when pool levels fall by two to three inches per day. Given that there are roughly 80,000 pools in family homes throughout the Valley, the Pool Cover Program's water savings potential is quite apparent. As a result, the SNWA began targeting pool owners in their conservation efforts by offering incentive coupons that gave customers either $50 toward, or fifty percent off, the purchase of a plastic pool cover, and $200 toward the purchase of a mechanical pool cover. To date the SNWA has issued approximately 12,000 rebate coupons and paid $704,138 in incentives, which has helped save the LVMA over 452 million gallons of water.[132]

The second program is the Irrigation Clock Rebate. Irrigation clocks ensure that water is used at the correct time each day and for the exact time necessary to provide a healthy yard. It is common for customers to either water for too long, simply because they forget how long the sprinklers have been on, or during the hotter hours of the day. Automated clocks largely eliminate these possibilities and typically decrease the average

[132] 2008 SNWA Pool Cover Rebate Informational Pamphlet; http://www.snwa.com/html/cons_pools.html, accessed April 22, 2008.

family's water consumption by ten to thirty percent, which saves over 12,000 gallons annually per household. The SNWA agreed to rebate up to fifty percent of the cost for an irrigation clock, but only those with the ability to sense rainfall. Although rare, rainstorms do occur in southern Nevada and can dump more than 300,000 acre-feet of water across the expanse of the Las Vegas Valley.[133] By preventing customers from watering their lawns during only a few of these rare rain events, the Valley can save the equivalent of its entire annual Colorado River allotment. To date the SNWA has paid out over $160,000 in incentives for this program, a figure that represents a savings of over 130 million gallons of water.[134]

The SNWA incentive programs demonstrate that money is often an effective motivating force. The SNWA has also found that increasing the price of water also has an effect of water usage. Water rates in southern Nevada have historically been among the lowest in the Southwest, so in 1995 the SNWA sponsored an elasticity study to analyze the potential effect pricing had on water consumption. Elasticity in this sense is an economic term that refers to the amount people are willing to pay for a good. If demand for a good remains the same regardless of price, then it is inelastic; if demand increases or decreases based on price, the good is elastic. The SNWA study determined that some water use was elastic and would go down following price increases. As a result, the SNWA recommended basic water use, such as that for drinking and bathing, be modestly priced. Uses in addition to these, however, would see an exponential increase in price. Based on these recommendations, the member agencies implemented a tiered water pricing structure, which had an immediate effect on consumption. The vast majority of

[133] "Solutions Sought For Water Quality, Quantity Problems," *Las Vegas Sun*, March 20, 1997.
[134] SNWA Conservation Pamphlet 2008, author's files.

money the SNWA collects through the tiered rate structure goes to fund the rebate incentive programs mentioned previously.

The tiered pricing structure goes hand in hand with the SNWA's public education efforts. In an effort to give the public agency and involve common citizens in conservation efforts, the SNWA has established partnerships with various organizations throughout the Valley. Two of these partnerships address the public and private sector. The first is the Water Conservation Coalition, a partnership between the SNWA and various southern Nevada businesses that have agreed to increase water efficient business practices, such as removing grass for the SNWA Water Smart Landscape Rebate, and that also challenge other businesses in the Las Vegas community to do the same. Despite the fact that businesses only account for ten percent of the total landscape removal projects in the Valley, their conversion to water smart landscaping has accounted for sixty percent of the total area of grass removed, clearly a huge savings in water.

The resort industry too has cooperated with the SNWA conservation efforts. Casinos along the Las Vegas Strip, often perceived as the worst water wasters, in fact, have labored to reduce their water use. Despite the highly visible display of fountains and erupting volcanoes along the Las Vegas Strip, the entire resort industry only accounts for three-percent of all water consumed in southern Nevada.[135] Casinos have drastically reduced consumption by recycling water and using a combination of turf and plant removal. The second partnership, the H_2O University, between the Authority, the Springs Preserve, and Clark County School District, takes teachers and students from the community and helps educate them about water conservation. Through this partnership

[135] SNWA Water Resource Plan, http://www.snwa.com/html/wr_resource_plan.html, accessed April 22, 2009.

the SNWA helps teachers earn professional development credits, and students receive instruction into a whole host disciplines, including local history, geography, politics, and economics.

The SNWA conservation campaign and Water Smart programs are the bedrock of the Authority's political effectiveness. The Water Smart Program has proven beneficial regionally and locally, as well as politically, economically, and environmentally. Regionally, the SNWA's Water Smart program has given the Authority political capital with other states, which has helped forge important interstate water sharing agreements. Conservation has also given the Authority credibility for residents who have enjoyed significant financial benefits through incentives and reduced water bills following conversions from grass to xeriscape. Economically, conservation has meant less infrastructural needs throughout the LVMA—fewer pumps and pipes needed for decreased water use—and, until 2008, helped maintain the local housing market by allowing growth to continue. Lastly, SNWA conservation efforts helped to improve the environment by aiding in the creation of yards that support local, Mojave Desert-specific biodiversity, something that ultimately helped keep greater amounts of water in Lake Mead by decreasing demand in the Valley. As the twenty-first century unfolds, the drought will continue to exert pressure on political institutions, local and regional economies, and the environment. Therefore, the SNWA's conservation efforts will remain an important policy-shaping element long into the future.

The Las Vegas Wash is of vital importance to southern Nevada geologically and politically. It is a natural channel that begins in the extreme northwestern part of the Las Vegas Valley and runs to the southeast, passing between Frenchman's Mountain and the

River Mountains east of the metropolitan area, and eventually to the Colorado River. It is the sole drainage channel for the entire Las Vegas Valley, an area consisting of 1,600 square miles. Prior to the twentieth century, water flows into the Wash were ephemeral, that is, they ran intermittently, primarily during floods. However, as the Valley's population increased, this in turn brought about a corresponding increase in outflows to the Wash, at first helping to create a large wetland and marsh. But, as growth continued, so too did the volume of outflow, which created a canyon where the marshes once stood. This environmental degradation had political implications since the degradation of the wetlands allowed more sediment to reach Lake Mead. Besides Nevada, two additional states rely on Lake Mead for their water supply and clean water is essential in maintaining amiable interstate relationships. While the Las Vegas Wash is one of the smallest waterways in the West, contributing only two percent of the total water inflow to Lake Mead, its importance is inversely proportional to its size.[136]

Water quality has long been a concern of southern Nevadans, beginning in the early twentieth century when local citizens protested that the local water company, a subsidiary of the railroad, was not doing enough to protect the Las Vegas Springs and distribution system from contamination. Further concerns arose later in the century when southern Nevada prepared to draw Lake Mead water through the Southern Nevada Water System in 1971. Howard Hughes wrote then Governor Paul Laxalt that he felt returning Las Vegas' treated wastewater to Lake Mead was unsanitary and could hurt the city's image as a tourist destination. Hughes' concerns arose because the Valley's drinking intakes were downstream from the wash's discharge point.[137] This economic concern was echoed

[136] SNWA Lower Colorado River Basin Tour Brochure, April 2008, author's files.
[137] "Hughes Foresaw Water Quality Problem," *Las Vegas Sun*, February 3, 1997.

in 1998 when Patricia Mulroy asserted, "the whole economy of Southern Nevada hinges on the Las Vegas Wash [and that] it's an issue we can no longer take for granted."[138] Since Nevada uses return flow credits, the quality of water the SNWA returns to Lake Mead has regional ramifications. Several downstream political governments and Indian reservations rely on the Colorado River including California, Arizona, Mexico, and the Mojave and Chemehuevi Indian tribes.

At one point the wetlands along the wash were merely seen as an impediment to return flow credits, since the plants would consume some of the water. This way of thinking began to change during the 1990s following the SNWA's ascension. As Rick Holmes, the SNWA environmental resources director acknowledged, "the wetlands once were considered a place where cattails and other plants drank too much water returning to the lake."[139] It was readily apparent that this type of thinking was becoming obsolete as Lake Mead's environmental quality continued to deteriorate.

Clean water helps southern Nevada in its efforts to secure more water from the Colorado River. As a result of the drought, declining lake levels have increased the concentration of pollutants, which in turns makes it that much more important to return clean water to lake. As the drought continues, the potential to draw down the lake increases. Ensuring the return of clean water to the lake not only makes sense for the local drinking supply, but also ensures that a spirit of cooperation continues among the Colorado River Basin states. In 1998 one SNWA official conceded that, "We—Clark County—are considered the worst polluters among the seven Colorado River states."[140] This was clearly an image the SNWA did not want to present to its Colorado River Basin

[138] "LV Wash Seen as Key to Future of Valley," *Las Vegas Sun*, June 15, 1998.
[139] "Valley Debates Restoration of Diminishing Wetlands," *Las Vegas Sun*, February 4, 1997.
[140] "Water-pollution Control Plan Pursued," *Las Vegas Sun*, June 19, 1998.

brethren, and the organization has worked hard to be an exemplary environmental steward. The key to all of this was the health of the Las Vegas Wash, for it would help ensure clean water for southern Nevada's regional neighbors.

The significant amount of current public attention being paid to environmental issues of the Las Vegas Wash obscures the fact that for thousands of years humans have been drawn to the wash for its natural bounty. Early hunter/gathers undoubtedly stopped there to collect plants and hunt game. There is actual archaeological evidence in the Wash indicative of several Native American groups including the ancient Desert Archaic Peoples, the Anasazi, Patayan, and Paiutes.[141] It was widely believed in the scientific community that the Las Vegas Valley was home to various bands of hunter/gatherers until European settlement in the eighteenth century. During this period the wash remained an intermittent stream. This began to change during the twentieth century, however, as thousands of people began to settle in the Las Vegas Valley.

Since the Las Vegas Wash is the only drainage for the entire Valley it inevitably became the wastewater conveyance system for the new town of Las Vegas. Growth continued throughout the first half of the twentieth century necessitating the construction of a new sewage treatment plant in 1957. The first, built shortly after the turn of the twentieth century was outdated and unable to handle the increased effluent. The new plant was located in the wash and began discharging treated effluent, which created a continual stream of water. At this point the Las Vegas wash underwent a transformation from desert scrub to perennial wetlands. These wetlands were without precedent in the Las Vegas Valley and directly affected the environment. The wetlands began cleaning and slowing the Valley's runoff water as it flowed toward Lake Mead, and also provided

[141] Las Vegas Wash Comprehensive Management Plan, 153.

an enlarged refuge for wildlife. However, they began to deteriorate during the late 1960s as a result of increased population.[142]

The post-World War II era witnessed a growth explosion across the entire western United States, especially in southern Nevada. This growth contributed to greater outflows in the Las Vegas Wash large enough to continue supporting the wetlands. However, in 1970 the volume of water became too much and began exerting a devastating effect. Significant downcutting occurred along the wash, starting first near Lake Mead, and gradually progressing up the streambed well into the Las Vegas Valley. Downcutting is when water cuts a vertical stream bank, often the result of fast flows and little vegetation to hold stream banks together. It is commonly seen in areas of overgrazing where cattle strip away the natural ground cover binding the soil. Downcutting negatively impacts the environment because it destroys the riparian zone—level areas next to streams, areas that contain most of the vegetation needed by animal species. It also lowers the water table, which affects well users throughout the region, and increases sedimentation—the increase in suspended solids, usually dirt particles. As water flows through the downcut channel it increases speed and, because there is no vegetation to hold the ground together, picks up added dirt and debris and deposits them downstream, in this case, into Lake Mead.

The destruction of wetlands left the Wash and Lake Mead especially vulnerable to storms, since four inches of rainwater across the Valley equals to 350,000 acre-feet, more than Nevada's entire allotment from the Colorado River. These torrents course down the wash, gouge ever-deepening channels, and deposit up to 1,600 tons of sediment into Lake

[142] *Las Vegas Wash Comprehensive Management Plan,* Las Vegas Wash Project Coordination Team, January 20, 2000, 25-28.

Mead.[143] In the words of former SNWA official David Donnelly, this is the same as one-hundred dump truck loads of dirt.[144] Furthermore, storms pick up all kinds of pollutants, including motor oil, pesticides, bacteria, and other chemicals. By the 1990s the Wash had long since lost its ability to filter these pollutants; its wetlands were but a memory.

Interest in the wash dates at least to the 1970s when a group of concerned citizens created the Las Vegas Wash Development Advisory Committee to address wetland degradation issues. For the rest of the 1970-80s there were periodic attempts to improve the wash's condition, but the real push came in 1997 when the Nevada Department of Environmental Protection, in response to concerns over the health of Lake Mead, initiated the Lake Mead Water Quality Forum.[145] As an attendee of the forum, and given its central role in southern Nevada water policy, the SNWA formed a twenty-one member citizens committee—the Water Quality Citizens Advisory Committee—which developed recommendations on how best to manage the wash. Following deliberation, the Committee recommended that the SNWA coordinate the effort. The SNWA then created the Las Vegas Wash Coordination Committee (LVWCC), an agency that produced a list of forty-four action items that govern Wash policy. Despite the fact that the SNWA was tasked to manage Wash restoration efforts, it is important to note that dozens of agencies came together for the effort. Federal, state, and local governmental organizations coordinated, along with local citizens and business owners, to contribute resources, expertise, and time to improve the Wash's wetlands.

In the late 1990s the health of the Wash was a particularly pressing concern. Pollution had been increasing in Lake Mead and may have even contributed to a 1994

[143] "Solutions Sought For Water Quality, Quantity Problems," *Las Vegas Sun*, March 20, 1997.
[144] "Wetlands Woes: LV Wash in Bad Shape," *Las Vegas Sun*, March 30, 1999.
[145] Las Vegas Wash Comprehensive Adaptive Management Plan, January 20, 2000, 3-5.

outbreak of cryptosporidiosis, an illness associated with the single celled pathogen cryptosporidium, sometimes found in water tainted with untreated effluent. This outbreak contributed to thirty-two deaths in the LVMA among HIV patients, individuals who were already weakened by disease. Moreover, inspectors found ammonium perchlorate, a rocket fuel ingredient produced at the BMI complex in Henderson, leaking into the wash, and from there into Lake Mead.[146] The SNWA's initial priority of forming a committee to oversee the management and restoration of the wash had already been fulfilled. It was then up to the committee to form a list of its own priorities, the first of which was the stabilization of the wash.

The Committee correctly identified the downcut stream banks as the most important problem to address. Their first step was to install a series of erosion control measures that consisted of weirs and riprap. Weirs are structures underlying a stream designed to slow water and spread it around over a wide plane, and riprap is heavy, mostly concrete rubble deposited along or in the streambed, also to slow water, as well as to convey it in certain directions. The riprap used in the Las Vegas Wash often came from local demolished hotel casinos.[147] Some of the oldest landmarks along the Las Vegas Strip are now helping improve southern Nevada's water supply.

The LVWCC's next priority was to establish off-stream wetlands. These wetlands, composed largely of cattails, a type of wetland plant species, naturally filtered out contaminants by absorbing the pollutants into the plants themselves. The use of wetlands for filtering purposes had a well-established history. During the early 1990s, Secretary of Interior Bruce Babbitt oversaw the creation of wetlands in the Florida Everglades

[146] Michael Weissentstein, "The Water Empress of Vegas," *High Country News*, April 9, 2001.
[147] Las Vegas Wash Coordination Committee Year End Report, 2006, 6-7.

National Park to help filter out fertilizers used by nearby sugar plantations. The fertilizers were discharging into the National Park, disrupting its natural biodiversity. The Secretary oversaw the installation of wetlands using cattails, which formed a biological belt between the sugar plantations and national park, a move that greatly reduced the amount of contaminants reaching the Everglades.[148]

Funding for the Las Vegas Wash recovery effort came in part from the previously mentioned SNPLMA funds, as well as from contributions from the SNWA and various governmental agencies like the Army Corps of Engineers, National Park Service, and Fish and Wildlife Service. Addressing a crowd of onlookers along the Las Vegas Wash, Secretary Babbitt announced in 2000 that the government would provide $28 million to southern Nevada for environmental protection purposes.[149] Of this amount, $3.7 million of this was directed to Clark County to purchase sensitive areas in the Wash. Both Nevada Senators voiced their approval of the situation. Democratic Senators Harry Reid and Richard Bryan have well-earned reputations for their commitment to environmental issues, such as opposition to the Yucca Mountain Nuclear Waste Repository, a mere ninety miles north of Las Vegas, and other measures to protect Nevada's public lands as wilderness or national conservation areas. Senator Reid noted that, "The Vegas Wash and Lake Mead are both the victims of Southern Nevada's rapid growth…Restoring wetlands in the area will help stop erosion and will act as a natural filter to stop harmful pollutants from entering the lake, which supplies the Valley's drinking water needs." Bryan followed this by declaring that the purchase of land near the wash could set a national

[148] Bruce Babbitt, *Cities in the Wilderness: A New Vision of Land Use in America* (Washington: Island Press, 2005), 13-54.
[149] "Nevada Gets Money for Environment," *Las Vegas Sun*, July 5, 2000.

example for effectively saving threatened areas due to urban expansion.[150] While Bryan left office in 2001, Reid eventually went on to become Senate Majority Leader and has continued to support Nevada's environmental initiatives. As by Keiba Crear, SNWA Environmental Quality Monitoring Manager, observed, "Senator Reid's involvement has been very helpful for wash restoration."[151] His interest in the wash is testament to the profound importance this little waterway has to the region.

The Las Vegas Wash, as envisioned by the LVWCC, is a network of water purification mechanisms. The riprap and weirs mentioned before are "bio-armored," or, lined with natural vegetation to further enhance the barrier's slowing effects. These structures also serve to convey water to settling basins and slow-moving side channels, where various types of plants absorb the pollutants suspended in the water. These organic "water-scrubbers" consist of local bulrush, grown in the Pahranagat National Wildlife Refuge fifty miles north of Las Vegas.[152] This species of wetland vegetation is especially well suited to purifying water, but can only do so for a specific amount of time—they eventually reach their absorbing capacity and then have to be harvested and replaced.

Since restoration efforts began in 1997, the wash's condition has greatly improved, a major accomplishment for the LVWCC and SNWA. In 2002 a Harvard University Poll declared the wash one of five best wetlands restoration projects in the world.[153] It has since become a major recreation area for the local residents, as well as establishing itself as a successful wildlife refuge. The wash supports a dizzying array of animal and plant

[150] *Ibid*
[151] Author's interview with Keiba Crear, March 2008, author's files.
[152] *Ibid*.
[153] "County's Wetlands Project Ranks Among Best in the World," *Las Vegas Sun*, March 8, 2002.

species—everything from owls and woodpeckers, to minnows and catfish, to large mammals like coyotes and bighorn sheep. Plant species include elm and mesquite trees, cholla cactus, and even the endangered Las Vegas bear poppy.[154]

Despite this expansion of biological life, the wash faces several challenges, one of the largest being the infiltration of invasive species. The Las Vegas Valley is home to thousands of invasive species. Many of these have found their way to the Wash and are crowding out the native plants and animals. Perhaps the best-known invasive species in the American Southwest is the Tamarisk, a water intensive, extremely aggressive bush that has taken over many riverbanks throughout the region. The LVWCC is trying to combat this plant, but progress is slow. Tamarisk grows in very dense groups, which makes clearing them difficult. Furthermore, their root system is quite tenacious. Controlled burns have helped rid the Las Vegas Wash of some, but not all tamarisk.[155]

Funding and land procurement also continue to challenge the LVWCC and SNWA. The Authority's goal is to reach 176 acres of wetlands, but funding for this land is difficult given the current economic turmoil locally and nationally. Despite the widespread success in transforming the Las Vegas wash from environmental liability to asset, there has been opposition to the SNWA's efforts. Larry Paulson, retired biology professor from UNLV sees the efforts to improve the wash as merely a ploy for the SNWA to withdraw more water, using return flow credits, from Lake Mead.[156] Paulson commends the action taken to improve the Las Vegas Wash, but insists that increased outflows only serve to hurt the environment and discourage conservation. Despite these concerns, there are those who feel the wash is a perfect blending of the urban and natural

[154] Las Vegas Wash Coordination Committee 2007 Bioassessment.
[155] Las Vegas Wash Coordination Committee, *Year End Report 2003-2007*, 50-51.
[156] "Biologist Immersed in LV Wash Debate," *Las Vegas Sun*, January 30, 2000.

world, another aspect of southern Nevada's organic machine. Interior Secretary Babbitt supported this notion in 1999 when he called the Las Vegas Wash and wetland park a "model for Western states."[157] The Las Vegas Wash is an example of accommodating growth, while mitigating environmental damage—a key aspect of the SNWA's philosophy.

All too often, critics have described Las Vegas as a place that almost deliberately squanders resources. Yet, as this chapter clearly demonstrates, this has not been the case. The people of the Las Vegas metropolitan area plainly displayed their community pride when they overwhelmingly voted to support funding for the CIP. The SNWA's conservation efforts also seem to contradict the notion that Las Vegas is brazenly wasteful. The partnership between residents and the SNWA has drastically reduced individual water consumption rates for the past two decades. Water waste is becoming increasingly less socially acceptable, as evidenced by consumer support for grass removal programs and tiered incentive pricing. Further confounding the pundits is the presence of the Las Vegas Wash, a 162-acre wetland located in the middle of the Las Vegas Valley, a geographic feature that contradicts many people's preconceived image of Las Vegas. More important, however, are the efforts behind the "creation" of the Las Vegas Wash. The SNWA, along with thousands of local citizens helped bring about improvements to the Wash, further demonstrating a local commitment to environmental issues. Through it all, collaboration has helped bring about these positive changes to the LVMA. Teamwork between the SNWA, the Valley's citizens, business community, and political organizations has proven vital to success. The SNWA's policy of working with such a

[157] Angie Wagner, "Babbitt Calls Wetlands Park Proposal a Model for Western States," *Las Vegas Sun*, March 30, 1999.

diverse group of constituencies will undoubtedly continue to define its strategy into the foreseeable future.

CHAPTER 6

BLUEPRINT FOR THE FUTURE?

In the summer of 2008 the Brookings Institute, a think tank devoted to public policy analysis, issued a report titled *Mountain Megas: America's Newest Metropolitan Places, and a Federal Partnership to Help Them Prosper.*[158] The report reviewed the challenges facing the American Southwest in the early twenty first century and recommended establishing partnerships between multiple levels of government to address problems on a comprehensive, regional scale. The authors of the study stated that given the enormity of the potential environmental and social challenges, a regional approach to solving the Southwest's infrastructural problems was the only effective course of action. In southern Nevada, the Institute's recommendation was welcome news to many planners and politicians; however, this was not the first instance of calls for collaboration among various political bodies. Upon its founding in 1991, the Southern Nevada Water Authority began using a collaborative model, thus anticipating the Institute's recommendation by seventeen years.

The SNWA has successfully met dozens of challenges to date, in part because of its collaborative approach to water management. This model has given the SNWA a tactically and strategically advantageous position from which to meet future challenges, since many of the problems southern Nevada faces in the coming century are merely

[158] The Brookings Institute, *Mountain Megas: America's Newest Metropolitan Places and a Federal Partnership to Help Them Prosper*, 2008.

larger versions of those it has already encountered: population growth, water shortages, and drought.

Following the Second World War, southern Nevada's urban planners predicted that the population of Las Vegas' metropolitan area would surpass 400,000 residents by the turn of the twenty-first century (The actual figure turned out to be slightly over 1.8 million). Predictions such as these failed to adequately prepare subsequent city planners for the onslaught of growth that southern Nevada experienced during the second half of the twentieth century, a trend that continued without pause until 2008. The SNWA is working to ensure that southern Nevada has the resources necessary to bolster the local economy and provide water well into the distant future. While the Authority has already its effectiveness on this front, the myriad challenges it faces require that it continue to work with other state and federal agencies, cities and counties, and common citizens throughout the region. What the SNWA realized in 1991, and the Brookings Institute recommended in 2008, is that in order for people to live successfully in the American Southwest, they need to work together and seek common ground.

An occurrence that demonstrates how thoroughly this paradigm of cooperation has permeated the American Southwest is the Seven States Agreement (SSA) of 2007 that defines how the Colorado River Basin States will share the Colorado River in the coming decades. Aspects of the SSA range from protocol for using available surpluses of water within the river system to coordinating water management efforts between the upper and lower Colorado River basin that rely on methodologies more sensitive to environmental conditions. The Agreement demonstrates a wide-ranging, intensive effort on the part of seven western American states and the federal government to come together to more

effectively manage the region's most vital resource, the Colorado River. Collaboration in the case of the Seven States Agreement has helped the Basin States jointly bargain for water rather than litigate, a choice that has saved untold millions of dollars in legal fees. As Patricia Mulroy noted in 2007, "The signing of this accord is proof this region can work cooperatively on complex water issues and reach agreements that mutually benefit the communities we serve…this accord provides Nevada with much additional security in our Colorado River water supply."[159]

The issues the SNWA faces in the coming years are many of those highlighted in the *Mountain Megas* report: continued growth, corresponding water shortages, climate change, and drought. While growth and water shortage are comparatively "easy" to plan for, climate change inserts an entirely unpredictable element into the equation. Also called global warming, climate change, as defined by the United Nations Framework Convention on Climate Change (UNFCCC), refers to "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."[160] While these issues present daunting challenges, the SNWA is confident that it can meet them by staying focused on its collaborative methodology. Notes Dick Wimmer, SNWA Deputy General Manager, it "all comes back foundation of SNWA….Teamwork."[161]

Throughout most of its history, the SNWA has primarily focused on establishing local and regional partnerships. Beginning in 2007, however, the Authority geographically expanded its focus significantly when it and seven of the nation's largest

[159] 2007 SNWA Annual Report.
[160] "United Nations Framework Convention on Climate Change," United Nations, 1992.
[161] Author's interview with Dick Wimmer, June 13, 2008, author's files.

water providers established a partnership to provide leadership and collaboration on climate change issues. The coalition, labeled the WUCA (Water Utility Climate Alliance) is comprised of Denver Water, Metropolitan Water District of Southern California, New York City Department of Environmental protection, Portland Water Bureau, San Diego County Water Authority, The San Francisco Public Utilities Commission, Seattle Public Utilities and the SNWA. These organizations provide drinking water to more than thirty-six million people throughout the United States.[162] Southern Nevada and the SNWA have a real interest in the effects of climate change given the region's extreme temperature fluctuations. The WUCA, along with the SNWA issued the following recommendations with regard to climate change mitigation efforts: reduce the uncertainty of scientific projections, enhance the collection, maintain and enhance the accessibility of information, improve access to consistent climate data, and coordinate international research efforts.[163] Patricia Mulroy described the import of the alliance when she stated

> [w]ater agencies throughout the nation will invest hundreds of billions of dollars in infrastructure over the next fifteen years alone, and those investments must be informed by climate projections that are as accurate as possible…Open, ongoing dialogue and active cooperation must be at the center of our efforts to confront the possible burdens presented by climate change. Voices from research and scientific communities, the public, government and environmental organizations all should be heard.[164]

The SNWA has continuously sought to meet environmental challenges on a regional, rather than a local level. The organization cites several reasons for this strategy, perhaps the most prominent revolves around equity. The SNWA has fully absorbed the value or

[162] http://www.snwa.com/html/news_wuca.html.
[163] *Ibid*.
[164] SNWA 2007 Annual Report, 30.

mutual back scratching and asserts that challenges rarely affect only one or two entities, but rather all the parties concerned. Mulroy points out that "if you…try to off-load your share of a shortage onto someone else the burden becomes impossible for those taking the double hit."[165] In the case of water in the American Southwest, every state, county, and city will be affected in times of drought. This makes it impossible, not to mention immoral, to compel a minority of communities to shoulder the entire burden of regional water shortage. A collective approach helps everyone through times of hardship, and the establishment of WUCA represents an expansion of this collaborative model to a national level, one that unites southern Nevada with cities across the country in an effort to reduce the potential impacts of climate change. To effectively combat climate change the SNWA recognizes that it must focus on proper resource management and that to be successful it must address several challenges in southern Nevada.

The SNWA has been an active participant in partnerships that have led to more effective and efficient resource management. A major development in this regard is the management of Lake Powell and Lake Mead as a singular unit, rather than separate entities. Under the previously mentioned SSA Congress granted the Bureau of Reclamation a higher degree of flexibility in releasing water from Lake Powell to Lake Mead. The Colorado River Basin states agreed that environmental factors can and should be taken into account when administering the Colorado River. Prior to the Seven States Agreement, in accordance with the Law of the River, the USBR was required to release 8.23 million acre-feet annually to the lower basin regardless of environmental conditions. Under the SSA the Bureau of Reclamation can release or withhold water if it is environmentally beneficial to do so. While the Seven States Agreement helps illustrate

[165] Mulroy email message to author, June 16, 2007, author's files.

the SNWA's willingness to help manage natural sources of water, the Authority is also seeking artificial means of providing additional water through a technology known as desalination, to southern Nevada.

Desalination, or the process of removing salt from water, is currently seen as a panacea for ending much of the world's drinking water shortage. Current desalination technology consists primarily of two methods. The first is called reverse osmosis and is a process that forces salty or brackish water through a membrane that removes impurities. The second method is called fractional distillation, which is a process of boiling water to create steam. The steam rises, leaving impurities behind and is collected to become a source of high quality drinking water. Although expensive, desalination became increasingly viable at the beginning of the twenty first century as much of the world's fresh water drinking supply dwindled and was already in large-scale use in parts of the Middle East, Africa, and Australia.

In the American Southwest desalination has become a potential source for water given the technological breakthroughs and the added pressure of the region's increased population. Many people within the Colorado River Basin have called for the serious consideration of desalination as a way to augment water supplies. In anticipation of this eventuality, the Bureau of Reclamation in 2007 reopened a desalination plant in Yuma, Arizona, which had lain dormant for several decades, in order to conduct tests.[166] The plant, originally constructed to purify water entering Mexico, is capable of purifying eighty million gallons of water a day. The reopening of the Yuma plant indicates the growing momentum toward desalination.

[166] SNWA 2007 Annual Report, 34.

In spite of desalination's promising potential, it still does not solve southern Nevada's water needs. If the SNWA should partner with other states for desalination efforts, any water southern Nevada receives would be in the form of exchanges for an increased share of the Colorado River and not from any water piped from desalination plants. The arrangement would most likely take the form of California, Arizona, or Mexico building a desalination plant with SNWA funds on the Pacific coast. Several coastal communities could then draw upon a reserve of desalinated ocean water, which would subsequently allow the SNWA to withdraw a corresponding amount from Lake Mead. Mulroy explains, "I mean, if we had coastal property, we would be building our own desalter. But we don't have coastal property. So the only way we can do it is by building facilities in other areas, and by using the river as an exchange tool."[167] While there is much potential in this plan, it is not the cure-all for southern Nevada's water needs. These plants create water for coastal communities, but the prohibitive costs of pumping water to Nevada will force Las Vegas' continued reliance upon Lake Mead. This fact has compelled the SNWA to proceed with the northern Nevada pipeline project mentioned in chapter three.

The threat of climate change and drought along the Colorado River requires the SNWA to continue diversifying southern Nevada's water supplies. Since responsible water planning cannot rely upon one source alone, the SNWA has proceeded with its plan to tap subterranean water in White Pine and Lincoln counties. According to the SNWA the "project would utilize unused, naturally replenished, available water" and would not overdraw the aquifers, an action that could negatively impact the area's ranching community. Despite the controversial nature of the plan, the Authority has managed

[167] Ted Robbins, "Struggling over Water: Stakes High for Las Vegas Water Czar," *NPR*, June 11, 2007.

attract some significant allies in its effort to build the pipeline. It has partnered with several organizations including the Bureau of Indian Affairs, National Park Service, Bureau of Land Management, United States Fish and Wildlife Service, and many members of northeastern Nevada's ranching community. The SNWA expects that the pipeline will be finished sometime in 2015, with deliveries to come shortly thereafter.

Perhaps the most significant criticism of the SNWA pipeline plan is that it is going to have an adverse effect on northeastern Nevada's ecology. While the SNWA is determined to secure a reliable supply of high-quality drinking water for southern Nevada, the organization points to several examples it hopes will dispel concerns. The SNWA is quick to point out that it has conducted numerous environmental impact studies throughout the northern counties and that it has purchased ranches in order to free up water and preserve cultural sites. On the other hand, critics could point out that it was the SNWA that funded these environmental studies, and that it is only purchasing ranches so as to minimize local opposition. While the controversy will undoubtedly continue well into the future, the SNWA is working to position itself in the public consciousness as an environmental steward and trying to set a positive example for the southern Nevada community.

In an effort to reduce its carbon footprint and become more environmentally sustainable, the SNWA is evaluating the potential for wind, solar, and geothermal energy to fuel various infrastructural needs. The SNWA voluntarily committed to meet twenty percent of its energy needs through renewable resources by the year 2015. The SNWA has also implemented several hydroelectric generators throughout the Las Vegas Valley. All of the water withdrawn from Lake Mead has to eventually be returned to the lake.

Following its use by the Valley's residents this water is used to generate electricity. As the water flows downhill it passes through a series of hydro-generators that create power. This allows the SNWA to recoup some of the energy that it expended to originally pump that water out of Lake Mead and into the southern Nevada community. The SNWA also receives a significant amount of energy through the use of solar power generators located on various sites throughout the Valley. This too helps power the pumps that deliver water from Lake Mead.

The SNWA's has worked to establish a public image as a community leader, one that leads by example. Perhaps the most obvious manifestation of this came with the construction of the Molasky building, completed in 2008. The building is located in downtown Las Vegas on what was formerly a rail yard for the Union Pacific Railroad. Part of the downtown redevelopment effort, the building provides office-space for several large firms and is the SNWA headquarters. It is filled with numerous environmentally sustainable innovations including underfloor air distribution system (a design feature that decreases the amount of piping needed and improves air circulation), recycled wall insulation, water recycling system, low flow plumbing, a recycling center, and a partnership with 24 Hour Fitness, which shares the building with the SNWA, to allow employees access to showers, thus helping promote bicycle commuting.[168] The SNWA's deputy director Dick Wimmer summarized the Molasky building's mission when he said "it is vital that we continue efforts on every front to reduce our carbon footprint and live sustainably in our desert environment. The Molasky Corporate Center is a testament to corporate sustainability."[169] The SNWA's construction of environmentally sustainable

[168] http://www.snwa.com/html/about_sustainability_projects.html, accessed April 22, 2009.
[169] SNWA 2007 Annual Report.

buildings and infrastructure is the organization's attempt to instill a conservation ethos that will help ensure the long-term viability of the southern Nevada economy and environment.

While the SNWA is making progress in constructing environmentally sustainable infrastructure, there looms an additional challenge to the environmental health of the Las Vegas Valley, and it takes the form of invasive species. Invasive species pose a considerable threat to southern Nevada's ecological health, as well as to the entire American West. The SNWA recognized the significant threat of invasive species and in the 1990s partnered with other local, state, and federal agencies to seek ways of increasing native biodiversity and reducing the negative effects of introduced plants and animals. Perhaps the most prolific of all invasives in the West is a plant known alternately as the saltcedar or the tamarisk bush. This plant is especially destructive for Las Vegas since it consumes tons of water from the Colorado River through evopotranspiration. The tamarisk is found locally in the Las Vegas Wash, but its range extends throughout the Colorado River Basin. Many communities are experimenting with various methods to eradicate the plant, with mixed success. Burning and biological warfare through the use of beetles that feed off the plant's bark have proven the most successful means to date.[170] In the upper Colorado River Basin the tamarisk bark beetle has successfully reduced the number of plants along various river shores. The beetle is not evolved to deal with the higher temperatures along the lower Colorado River however, and it has not yet been employed in the Las Vegas Valley. Despite the beetle's promise in the Upper Basin, the range of the tamarisk is vast and much more intensive and comprehensive efforts will be needed in order to eradicate the bush. The SNWA

[170] Michelle Nijhuis, "Beetle Warfare," *High Country News*, November 26, 2007.

continues to study this possibility, as well as rates of evopotranspiration, in an effort to mitigate the tamarisk's effects in southern Nevada.

Plants are not the only species to have an adverse effect on southern Nevada's water supply. The quagga mussel, a type of bivalve similar to the barnacles found on sea going vessels was discovered in Lake Mead in January 2007.[171] The mussel, a transplant from the Great Lakes, is enormously destructive to the Southwestern environment in a number of ways. First, it out-competes the native fish populations by consuming the food supply. The mussel can also reproduce at alarming rates, thus rapidly expanding and displacing local aquatic species. The quagga mussel also damages water infrastructure by clogging pipes and intake valves, and has cost southwestern water agencies millions of dollars to date in upkeep. The SNWA met the quagga mussel challenge by establishing a monitoring program to examine the specie's effect on biodiversity and infrastructure. Furthermore, the SNWA's water treatment regimen destroys all mussels before they reach the drinking water system. The SNWA is working with other water management agencies across the West to coordinate prevention programs, helping establish protocols for the cleaning of boats and education programs to increase public awareness regarding the matter.

While the threat of invasive species is significant, the SNWA is also concerned about the overall health of southern Nevada's waterways and has implemented a number of additional measures to protect them. In 2007 the SNWA began funding seven biological research projects examining the various aspects of the Virgin River ecosystem. The studies include invasive plant species water consumption rates, riparian area studies, assessments examining the endangered southwestern willow fly catcher, Virgin River

[171] http://www.snwa.com/html/env_quagga_mussel.html, accessed January 8, 2009.

chub and woundfin, small mammal studies such as bat monitoring, and vegetation and plant studies.[172] The SNWA is also working to ensure the health of the Warm Springs Natural Area, which is a collection of springs that form the headwaters of the Muddy River. The SNWA acquired the area to protect the endangered Moapa dace (a type of fish), restore and manage the area as an ecological preserve, create opportunities for low impact recreation, develop public environmental education opportunities, provide a national scientific research program on aquatic and terrestrial systems, and to serve as a water bank for future water delivery systems. To more effectively manage the area, the SNWA partnered with the United States Fish and Wildlife Service, the Nature Conservancy, Nevada Department of Wildlife, and the other Colorado River Basin States.

While these initiatives all speak to a growing environmental consciousness, they are also born of necessity and work to help naturally purify Southern Nevada's drinking water. The SNWA's work to improve the health of the various regional river systems has done a great deal to improve the quality of Las Vegas' drinking water supply. The SNWA continues to place heavy emphasis on its water quality lab located at the River Mountain water treatment facility. This lab houses an entire research division, which is constantly seeking improved methods for ensuring the removal of biological and chemical contaminants from southern Nevada's water supply. However, the SNWA must still further purify the water it withdraws from Lake Mead; the SNWA continually seeks more efficient and effective means of doing so. To this end, the SNWA is going forward with construction of a third intake valve into Lake Mead that will reach farther from the shore and to a greater depth. This intake will guarantee Las Vegas has access to

[172] http://www.snwa.com/html/env_virginrvr_studies.html, accessed December 19, 2007.

water should lake levels drop to the point that intake number one, the first and oldest water intake valve, should become inoperable.

Perhaps the most visible example of the SNWA's conservation education efforts came in 2008 when the Authority, in partnership with the EPA, hosted the Water Smart Innovation Conference, an event attended by over 1,200 participants from 177 foreign nations.[173] Memorable speakers included Prince Fiesal Ibn Al-Hussein of Jordan. Jordan's representation at the conference helps illustrate the SNWA's leading role in conservation efforts since Jordan is one of the most water starved countries on the planet and is simultaneously experiencing rapid population growth. Senate Majority Leader Harry Reid of Nevada also lent his considerable stature to the conference by speaking at length on the need to conserve and protect the desert Southwest's vital water resources. The SNWA will continue to use highly public events such as the Water Smart Innovations Conference to educate the regional public about conservation issues in the Southwest, but will also focus locally through its educational outreach programs.

The SNWA has long recognized that its success hinges upon successful collaboration with the broader community, and set about creating education programs that informed the public about a broad array of environmental conservation methods. The SNWA's main initiative in education is to instill within the public a philosophy that recognizes the need for sustainability; the public has responded positively to the SNWA's leadership in these issues and willingly decreased its water usage dramatically. In 2007, pleased with developments in the LVMA, Patricia Mulroy stated that "[o]ur community is becoming more aware of its environmental footprint and water is central to sustainability."[174]

[173] http://www.snwa.com/html/news_wsi.html, accessed December 22, 2008.
[174] SNWA 2007 Annual Report, 11.

The key element of the SNWA's success has been its policy of collaboration. This policy of working with, instead of against, various water users has contributed to the success of infrastructural improvements, environmental initiatives, regional and inter-state agreements, and water acquisition efforts. The SNWA began as an inward looking organization focused almost solely on the LVMA's water needs. While this component of the Authority's mission remains, the agency has become a major political power in the American Southwest. The SNWA now takes a leadership role in regional water politics and its collaborative framework is now a model for other water agencies throughout the West.

CHAPTER 7

LEARNING FROM THE ANASAZI: LAS VEGAS AND THE RISE OF AN ENVIRONMENTAL ETHOS

The American West has always been a dynamic and changing place, a fact that is especially true for the Las Vegas Valley. The region has been home to dozens of ethnic groups, from paleo-Indians, to ranchers and Mormons. It has been the site of an ancient civilization, one based on agriculture and whose culture created brilliant works of architecture and art. This culture, known to us as the Anasazi, offers modern day Las Vegas a two-part lesson: it demonstrates how quickly economies and the environment can change, and how humans can negatively impact their environment. For several centuries the Anasazi experimented with different types of economies, gradually moving from hunter-gatherers to permanent settlements based on agriculture. Their villages and culture flourished, giving rise to multi-story buildings, road networks, and a regional proliferation of art and pottery. Their kivas—places of worship and gathering—were dug into the ground and richly adorned with bird feathers and murals. Their petroglyphs can still be seen throughout the region and represent a beautiful and skillful display of art; however, underlying this beauty are indicators of how their civilization collapsed.

The Anasazi culture was a study in overconfidence, building a precarious existence upon a vulnerable environmental region. They deforested vast areas of their homeland in

order to build grand pueblos and kivas.[175] Irrigation was over used and salinized the ground, thus rendering it useless from an agricultural standpoint.[176] Anasazi use of these environmental practices placed their society in a precarious position, and when the climate changed during the fourteenth century it had dire consequences for most of their settlements in the desert Southwest. Their example provides a valuable lesson for modern society on desert living.

Today, a similar pattern of human settlement has emerged in the American Southwest. Like the Anasazi, modern-day southern Nevadans have experimented with several types of economies, beginning with Mormon agriculture, then transportation (railroad), followed by defense and public works, and finally gaming. While gaming is still proving a generally effective economic choice, the collapse of Anasazi culture throughout the Southwest exposes the potential dangers in the Las Vegas area's primary reliance upon a single-industry in an environmentally severe region.

Returning to the theme of de-exceptionalization, the Anasazi example demonstrates a significantly longer span of human habitation in southern Nevada, a fact that runs counter to the public perception of Las Vegas as an instant city and one without a pre-twentieth century history. It also helps us understand Las Vegas in a broader, older, and more typical American western context. Nevertheless, sensational stories persist. Authors frequently examine exceptional aspects of southern Nevada's history, to include the

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[175] Jared M. Diamond, *Collapse: How Societies Choose to Fail or Succeed* (New York: Viking, 2005), 136-156; Timothy A. Kohler and Meredith H. Matthews, "Long-Term Anasazi Land Use and Forest Reduction: A Case Study from Southwest Colorado," *American Antiquity*, Vol. 53, No. 3 (Jul., 1988), 537-564.

[176] Daniel O. Larson and Joel Michaelsen, "Impacts of Climatic Variability and Population Growth on Virgin Branch Anasazi Cultural Developments," *American Antiquity*, Vol. 55, No. 2 (Apr., 1990), 227-249; Shepard Krech III also addresses the issue of southwestern Indian agricultural salinization in *The Ecological Indian: Myth and History* (New York: W.W. Norton & Company, Inc., 1999) in which he describes the Anasazi's southern neighbors, the Hohokam and their experiences with agricultural salinization.

community's imminent environmental demise, tales of mob violence, or the hedonism for which the town is known. This, however, is the wrong kind of exceptionalism, for the truly exceptional development in southern Nevada has been the methodical and consistent development of a regional conservation ethos in a metropolitan area that thrives on its image of excess. While many people find tales of the LVMA's precarious relationship with the environment and mob violence entertaining, these phenomena are not unique to Las Vegas. Many cities throughout the country, and the world for that matter, are situated in unforgiving regions, and the presence of the mob can be found in dozens of cities stretching from the West Coast of the United States all the way to Italy. What is unique to the LVMA is a situation in which several communities agreed to come together to share water rather than to fight over it.

When the LVMA's water providers gathered in 1991 to create the SNWA, they established a flexible system well suited to address future challenges. They recognized the importance of putting an end to conflict—that the entire community would suffer if they could not come to a solution for amenably distributing water.

The SNWA brought a new approach to water management in southern Nevada, one that dynamically integrated people, economics, and resources. It allowed for a drastic increase in conservation, cutting water consumption throughout the region, as well as helping to increase the resources available to the growing metropolis. The SNWA helped Nevada present a united front to its regional neighbors and the federal government, which has helped immensely in acquiring water from the Colorado River for the Las Vegas community. Moreover, the SNWA's success has inspired numerous agencies to come to southern Nevada, from as far away as Australia, in order to learn the reasons for the

Authority's success.[177] Some cities, like Reno, Nevada, have even sought guidance in how to create a similarly structured organization.[178] The Colorado River Basin states have begun to work more closely with one another in part, as a result of the SNWA's leadership. With the increased severity of climate change, collaboration is the only way the region's population will be able to thrive. Climate change, coupled with the region's reliance on a diminishing Colorado River, mandates teamwork, examples of which are already evident in the California and Arizona Water Banking Agreements between those states and Nevada. However, to date most teamwork has occurred between states within the Upper and Lower Colorado River Basins. In the future, planning will need to take an even higher degree of integration in which both basins work in concert. Progress has already been made on this front—witness the 2007 Seven States Agreement. A vital part of that agreement outlines how Lakes Mead and Powell will be managed as an integrated unit, rather than as coveted prizes, jealously guarded by the Upper and Lower Basin states.

The region's dryness caused the early city leaders to realize the need for unity. And while many feared the creation of the SNWA in 1991—worrying aloud that it would be highly centralized, unresponsive to the public, and vested with too much power—few now can envision ever going back. The regional focus and drive to include others in an integrated system gives the SNWA and the larger Southwest the power and ability to survive in a harsh desert environment. A decent appreciation of history—coupled with local and regional partnerships—has prepared the SNWA to continue providing water for Southern Nevada. The SNWA has become an integral part of the LVMA's community,

[177] Doug Bennett email message to author July 2008, author's files.
[178] Truckee Meadows Water Authority Minutes, February 3, 2006, Meeting of Board of Directors, www.tmh2o.com/about_us/board/pdfs/Minutes20060203.pdf, accessed April 22, 2009.

establishing it as a major fixture in Southern Nevada for as long as the region is in need of humanity's most vital resource—water.

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