

# “Grass” By Any Other Name—Xeriscaping And Sustainability

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## ABSTRACT

*With water conservation and use policy considered to be among the greatest challenges facing contemporary society, this case takes on the enduring issues associated with water and how it impacts urban planning, land use, water conservation, economic development, and sustainability. Conflicted on the uses of natural and artificial turf, Jerard Leon, director of Blue Haven’s Planning Commission recommends that Joseph Teaberry, landscape architect, contact a premier program on xeriscape in the United States –the Southern Nevada Water Authority (SNWA). Teaberry prepares for an in-depth, structured interview with Doug Bennett, conservation manager of SNWA. He reviews the relevant academic and professional literature on the hydrologic cycle, and the economics and geological concerns that affect water use policy, including the meaning of “Water quality,” “Watershed,” and the sundry metrics used to assess water quality under the Clean Water Act, 1972. As the structured interview reveals, Teaberry learns about the history of water policy in the Colorado Basin, the multiple uses and costs associated with water consumption in the SNWA, and the conservation practices and water policy pricing policies and how they impact water utilization. In the final analysis, Teaberry discusses the various strategic management practices employed by SNWA and their attendant efficacies, successes/failures pertaining to water policy education, pricing, inducement, enforcement, and the future water policy concerns. The case has several take-away points associated with xeriscape policy, followed by six poignant questions that stimulate broad discussion on the general areas of water resource policy.*

**Keywords:** Environmental Policy; Water Policy; Sustainability; Xeriscaping; Economic Development; Strategic Management

## INTRODUCTION: AESTHETICS COLLIDE WITH SUSTAINABLE PRACTICES

The dilemma facing the City of Blue Haven is simultaneously a simple one, yet complicated to solve. Would the city come down on the side of water conservation and sustainability or on the side of home and landscape beautification? Jerard Leon directs the city planning commission of Blue Haven, a city tightly nestled in the foothills of southern California, not far removed from a marvelous ocean view, but paradoxically, far removed from a fresh water source. He often commented on the fact that he was surrounded by water—water with a taste of salt.

Blue Haven had recently passed a city ordinance similar that of Garden Grove, California several years ago that reinforced the state’s order to engage in water conservation and at the same time the city required homeowners to maintain “a carpet” of green lawn coverage. To maintain a green lawn is not an easy assignment when living in a near desert climate with light topsoil and on summer days when the thermometer often rises above 110 F, further exacerbated by a population growth that is unforgiving in both volume and rate.

From a public and environmental perspective, the planning commission was presented with several questions. During severe water shortage, should the lawn be watered or left to wilt and dry and display a browning

aesthetic? Or, alternatively, should a land cover be used that would be suitable for a semi-arid climate—a landscape that consisted of green aggregate (rocks, stones, and desert flora); a landscape consistent with a desert climate (think about cactus and natural plants indigenous to the region); and, of course, if it was good enough for use in sports complexes today, why wouldn't artificial turf be an acceptable alternative for the front lawns of thousands of homes in Blue Haven?

These questions were existential and straightforward enough, but in Blue Haven the lawns must be maintained! The city ordinance boiled down to the enforcement slogan that "...green is in and brown grass is out"—meaning that plants and grass require watering or irrigation on a regular basis. So, to walk on the "balance beam" of the city ordinance was difficult. Too much watering would violate the water conservation standards; too little irrigation would result in the "dreadful" browning. For some, it was totally unacceptable to install artificial turf, regardless of its bright fluorescent green color, even if it looked like the "real McCoy"—fresh, lush green grass, trimmed and maintained at the right height, and, of course, never permitted to turn from green to yellow to a dreadful brown. In brief, artificial turf was "off limits"—it was banned in Blue Haven.

As Jerard reflected on the problem, he wondered if the city could possibly reach a compromise between the uses of natural or artificial turf. In researching the pros and cons of synthetic turf he found several opposing views on the websites he visited. Synthetic turf, he learned, is an unnatural, petroleum based product with a sizeable carbon footprint. It is environmentally incompatible and prone to discoloration. Plus, it is expensive to install. He also discovered several other problems with the "fake turf." First, once installed it creates an artificial environment that can hold germs and become unhealthy overtime; it may not be pervious, thereby contributing to excessive storm water runoff; it is not only costly, but as it deteriorates with age, aesthetically, it becomes unattractive though weathering. Also the sun's reflected energy/heat from the artificial turf contributed to the heat island effect in Blue Haven. A major counterpoint, however, was that watering and irrigation costs are eliminated and that alone is an important environmental and financial factor to deliberate upon in reaching a sustainable decision. Further, upon reviewing the empirical research he found that several water districts or conservancy districts had assessed the relative comparative advantages and limitations of the different turf types and found that some districts provided inducements ranging from a .25 to \$1.00 per sq./foot of natural green space converted to artificial turf, plus the obvious savings associated with watering and irrigation.

The planning commission in consultation with the city's department of urban planning and design of Blue Haven argued the merits and limitations associated with various choices it had before them. Most importantly, with the scientific predictions of reduced water from the snow pack of the Sierra Nevadas, they all agreed that the city should implement those practices that reduced water consumption and the corollary need to expand their water distribution operations, while producing a healthy, sustainable, and aesthetically attractive cityscape. However, they also knew there would be some push back from residents who wanted to maintain their blue grass lawn at any cost. How could they have both landscapes that people would love and simultaneously reduce the total water consumption of their city?

To facilitate their deliberations, it was recommended that the staff of Blue Haven contact one of the premier xeriscape programs in the United States—the Southern Nevada Water Authority (SNWA)—and ascertain their approach to water conservation and the accompanying issues of sustainability. Joseph Teaberry, the senior landscape architect and longtime employee in the Department of Urban Planning and Design was asked to travel to Las Vegas, Nevada and meet with representatives of SNWA.

#### **TEABERRY'S PREPARATION FOR THE INTERVIEW: PERSONAL OBSERVATIONS AND REFLECTIONS**

Teaberry understood some the paradoxes and contradictions associated with water resource policy and how, culturally, people receive cues from their communities about customary landscape styles, home design, front and back of residence uses, and even acceptable water use. In Blue Haven and Las Vegas, he thought, the dominant message sent from real estate and development companies, even from the tourist bureaus and recreational interests, is the dominant message of living in an oasis-like urbanscape surrounded by the abundance of water—a kind of "make believe" Elysian of excessiveness! Yet, he knew that most people didn't understand either the geology or geography, the flora or fauna of location related to natural resources, especially water.

Imbedded in his consciousness, he struggled mentally with his own perceptions about water availability, the history of water use in Blue Haven, the ethics and economics of water source ownership, and the practicalities of what life would look like in a culture of water conservation that valued the use of less water in their life activities. He thought about how his own habits associated with lawn irrigation, car washing, installation of efficient plumbing fixtures, hot water recirculating delivery systems, repairing leaking faucets and toilet flappers, voluntarily complying with seasonally-mandatory watering restrictions, etc., would change. As an environmentally-sensitive person, he challenged himself to see the “big picture” and understand the interconnectivity between water supply and uses, the geography of the area, and the many political and economic interests (stakeholders), coupled with the ethical and moral issues affiliated with water conservation and environmental sustainability.

As Teaberry prepared for the interview in Las Vegas, he refreshed his own understanding of the hydrologic cycle, and the fact that every molecule of water ever created, beginning with the dawn of the planet, still exists in one form or another and that human interaction with this valuable resource has been constant, whether in wasteful or conservative uses. He also reflected on the issues he faced in Blue Haven and wondered if there would be similarities with those water issues SNWA had encountered in Las Vegas. For example, he felt that both organizations were primarily in the extraction, filtration, and distribution of potable water for urban uses; each have thousands of miles of ever-aging, infrastructure (pipes, valves, pumps, etc.) that require maintenance and replacement; water pricing policies that are difficult to adjust due to political and economic constraints; and both organizations are concerned with providing a safe, reliable water supply for human consumption, fire suppression, economic development, quality of life, and the general welfare of their citizens.

Teaberry’s research also revealed a major similarity between SNWA and Blue Haven: They both obtain the bulk of their water from surface sources and, therefore, manage complex treatment plants to turn raw lake water into potable drinking water. And, geologically, he realized both organizations experienced water quality concerns stemming from land uses associated with upstream agricultural and mining activities and their corresponding run-off problems. He was certain he would find common ground with the SNWA representative on the “preciousness” and increasing scarcity of water worldwide, and its necessity as the most essential commodity - the very lifeblood - of a community.

In the public meetings conducted by Teaberry and his staff, it became apparent that those who participated in the sessions had differing perspectives on at least three major dimensions of water resources and water quality. First, Blue Haven citizens thought the term “water quality” referred to having an ample supply of fresh, potable, or drinkable water; or water that was safe and healthy to drink; or water (springs, streams, rivers, lakes, aquifers, etc.) suitable for fishing, swimming, boating, and other recreation; or water that one could use safely for agricultural, commercial, residential, and industrial uses; or water that would provide a safe environment on which to have lodges, homes, and public accommodations. In short, the myriad of definitions of what constituted water quality was similar in that it could be used safely for the multitudinous types of regular—if not daily--human interaction people have with this commodity; and, most of all, viewed in simple terms.

Secondly, the notion of what constituted a watershed that served as the supply source for the water used in Blue Haven was not completely understood. Some viewed it quite narrowly as constituting the major streams, rivers and lakes within a reasonably short distance from their locale; others saw it more broadly as encompassing huge swaths of geography that drained water from vastly different and complex geological and environmental sensitive ecosystems (forested area, agricultural, row cropping lands; estuaries, backwaters, marshes, and swamps, etc.), into a maze of tributaries, some small and other that were quite large, all with a “funneling effect” that led to major rivers, lakes, and even ocean; that is an area of land that drains to a final point. This was a salient point for Teaberry, since if one cannot adequately define their area watershed, how can they possibly develop and implement policy for its protection. As a senior staff of the department of natural resources stated, “The watershed is the body and the water is the blood. If you desire to fix the blood quality you need to heal the body.”

Thirdly, as the open meetings discussion revealed, the metrics (measurements) used by the state, Blue Haven and the U.S. Environmental Protection Agency to assess water quality were not agreed upon. Some people wished to use precise quantitative indicators and other spoke of normative concerns that were difficult to measure empirically, such as impact on Mother Nature and environmental aesthetics. Most citizens had little understanding

of how the Clean Water Act of 1972 affected water quality and their own watershed—especially how it’s administrative and regulatory authority was currently being exercised. Furthermore, the conversation about water quality and its uses were further debated by the many special interest groups who had their own constituency to represent: The Sierra Club; Ducks Unlimited, corporate agriculture; commercial and industrial concerns; energy producers; tourism interests, neighboring communities, as well as the state, had their own concerns about water distribution and regional priorities for its utilization. In brief, Teaberry realized that several factors would be on the agenda in his upcoming interview with the Conservation Manager for the Southern Nevada Water Authority: Water used for drinking, irrigation, sustaining biological diversity and the ecosystem (terrestrial and aquatic life), and how it is monitored (ambient to targeted measures).

### **A STRUCTURED INTERVIEW WITH THE CONSERVATION MANAGER, SOUTHERN NEVADA WATER AUTHORITY (SNWA)**

Joseph Teaberry conducted a structured interview with SNWA Conservation Manager Doug Bennett in June 2011 and again in September 2013. Bennett operates one of the largest conservation programs in the United States, with a strong emphasis on reducing landscape water demands. He provided Teaberry an overview of how water-efficient, xeric landscape proliferated in his service area as water resources became more limited as the result of drought.

With just over four inches of annual rainfall, Las Vegas is an inherently water-challenged environment. In the early 1900s the tiny railroad town relied entirely upon groundwater that flowed freely from an artesian spring. By mid-century, dozens of wells dotted the valley, pumping water to the fast growing and thirsty resort community. With the completion of a federally-constructed water treatment plant on the banks of nearby Lake Mead in 1971, the burgeoning community was finally able to capitalize upon Nevada’s share of Colorado River water. As Teaberry and Bennett spoke, river water comprised about 90 percent of the region’s supply, with groundwater comprising the small remainder.

An extreme drought on the Colorado River had a profound impact in 2002, requiring the community to reduce its annual demand on the river by at least 25,000 acre feet – more than 8 billion gallons. Despite dry conditions in the upper reaches of the watershed, users downstream continued to draw their share from the gigantic Lake Mead reservoir. As a result, the enormous 250 square mile lake began to decline as much as 20 feet per year. By the time of Teaberry’s first visit, the dark, volcanic rock ringing Mead was marked with a chalky “bathtub ring” more than 100 feet high from mineral deposits exposed by the receding water level.

As shocking as the lake appeared, Bennett revealed that having residents be able to see first-hand the impacts of the drought was beneficial. He said that this acknowledgement by the citizens of Las Vegas area that their water supply was becoming precarious as Lake Mead’s water level dropped was key to prime the community to accept more sustainable landscapes. In fact, one of the concerns was that one of Las Vegas’ two water intakes could lose function as the lake level continued to decline. Bennett said a powerful and relevant image is worth a thousand words.

Bennett reiterated the historical background associated with the “taming” of the Colorado River and the subsequent growth of Las Vegas. The history of the Boulder Dam, the vast system of dams, canals, reservoirs, etc., connected with the distribution of the precious water and energy resources throughout the Colorado River Basin exemplified the leadership and administrative acumen of Herbert Hoover — arguably one of the most brilliant and accomplished public administrators in American history. He accomplished what was considered to be an unfathomable task — to reach water resource agreements with the many western states and their highly differentiated and competitive water and energy needs.

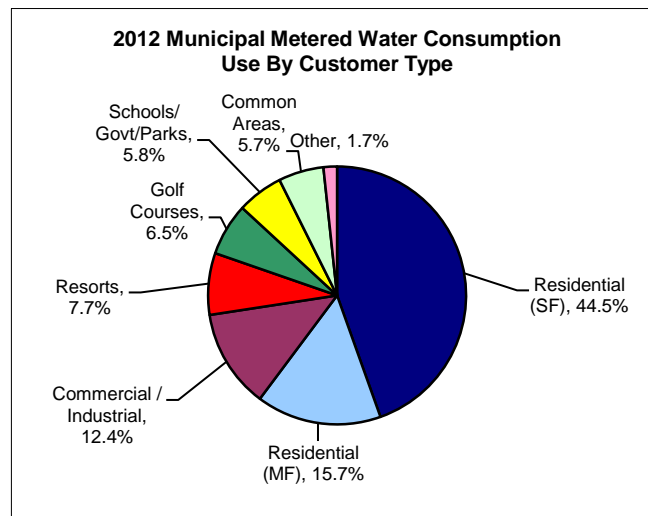
As Bennett’s history lesson unfolded, it became clear to Teaberry that the issue of water, water rights, and water conservation in a semi-arid geography had deep political, economic, and ideological roots and that over the years, these roots became intertwined locally and regionally as the different competing interests struggled to get their “fair share” of a limited supply, all the time mindful that water would eventually become a scarce, critical resource.

With the passage of the 1928 Boulder Canyon Act, Bennett further explained, Nevada was allocated 300,000 acre feet (AF) per year, or about 1.8 percent of the 16.5 million acre feet (MAF) currently appropriated among seven states and Mexico (Mexico’s 1.5 MAF was later appropriated through a 1944 international treaty). An acre foot of water is approximately 326,000 gallons, so the Las Vegas region was allowed to deplete about 98 billion gallons of water from the river each year.

River managers now know the division of the Colorado’s water in 1922 was based upon less than two decades of flow data collected during a period of wetter-than-normal years. Over subsequent decades, it became clear the river’s reliable flow was 20 percent lower than the amount of water apportioned. In essence, more commitments for water had been issued than the river could consistently support. Despite the over-allocation, the series of agreements governing the Colorado’s water use (known collectively as the Law of the River) functioned effectively for decades, primarily for two reasons: First, the river had been plumbed with a series of substantial reservoirs capable of harvesting and storing as much as 60 million acre feet of water. Secondly, few states on the river were actually utilizing their full, legal allotment.

Early on, many viewed water as a free good. This attitude was reinforced by the generous federal subsidization of water infrastructure throughout the West such as dams, canals, pump stations, and elaborate systems of irrigation canals. As an attendant consequence, water itself seemed inexpensive and abundant, leading often to wanton use. But when communities find these historic supplies fully obligated, adding “new” water to the system often comes at great expense. Bennett said these new supplies often are attained through transfers of existing rights for which the original user is paid. In addition, many water agencies, including the SNWA, are considering more distant supplies, which may require extraordinary infrastructure to convey water for hundreds of miles. When these projects are undertaken, the agency typically borrows the money through bonds and repayment of the project is typically embedded into water bills or system fees over the course of the next 20 to 30 years.

By mid-2002, the community had well-accepted that the drought posed real consequences, but the question was how to address water use in the community? Bennett said there was a widespread perception among citizens that resorts and golf courses were using most of the water supply in the region. However, when the SNWA audited each of the major water suppliers in the region, it was clear that residential uses dominated the demand, with nearly two-thirds of all water delivered to homes and apartments. This information is displayed in Figure 1, SNWA Municipal Metered Water Use, 2012.



**Figure 1**

The information presented in Figure 1 was a key piece of information in changing the minds of people about considering sustainable landscapes. In fact, earlier studies showed residents thought their single greatest use of water was showering. In reality, research showed homeowners used more than twice as much water on their



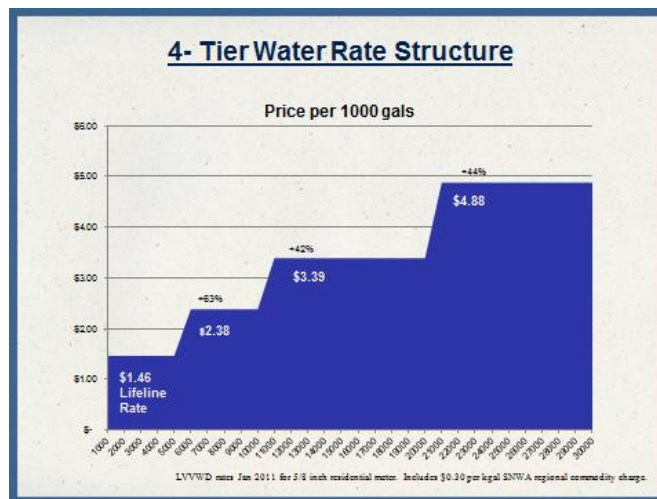
landscapes as they did for all uses inside the home. Old perceptions of water use were shattered and new factual information was then used to determine water conservation strategies. Since the residential sector accounts for the majority of Las Vegas’ water use and the majority of that use is attributable to landscape irrigation, Bennett considered the introduction of water efficient landscape critical to reducing demand.

He knew people’s residential landscapes hold deep and complex meanings for them. Many Las Vegas residents came from locales where lush lawns were common and they brought their landscape concepts into a region where sparse rainfall would not begin to support an eastern landscape ethos. Substantial irrigation was the only way to keep them alive in the Mojave Desert environment. How could he convince people to change to more sustainable landscapes?

**CONSERVATION AND WATER PRICING POLICY**

As the interview unfolded, Bennett peeled the many layers of the regional onion. He spoke about the political and legal barriers that influenced prospective strategies, such as water rates. As a public agency, the SNWA is prohibited from profiting on water sales. As a result, water pricing must be set to produce only enough revenue to pay the expenses of the system. In the private economy, a business firm would normally maximize its profitability, whereas the SNWA is caught in a zero-sum game. To promote conservation through rates while operating within the constraints of the law, SNWA utility members price water using a tiered rate structure (Figure 2). In this rate design, the first increments of monthly water use are actually provided at a subsidized rate. Heavy water users eventually breach the higher priced tiers. Known as a 4-tier increasing block rate, this structure encourages conservation through pricing, without creating unnecessary revenue.

Bennett cautioned, however, that complex rate structures also make it difficult to consistently predict revenue, particularly in the midst of an aggressive conservation campaign. If customers conserve more than the utility projects, revenue can fall short of the utility’s needs. In response to the revenue shortfall, the utility may implement a rate increase, taking special care to anticipate the effect the new rate will have upon further reducing water use. If the community again exceeds expectations in their conservation response, yet another rate change may occur. This circular process can lead to what Bennett referred to as a “conservation/rate increase death spiral.” He said the real threat in such circumstances is not just financial; it is losing the confidence of the customer base at a time when the utility needs to provide credible leadership.



**Figure 2**

**Teaberry:** In view of the limitations on the water pricing mechanism, how is SNWA dealing with water use regulations and policy?

**Bennett:** Several strategic policies have been initiated to address both new development and existing properties. Although numerous tactics were deployed, those pertaining to landscaping have had the most impact:

1. In response to drought, land use regulations were changed in 2003 to aggressively limit use of lawn grass in new residential development and completely prohibit the use of lawn grass in all non-residential development. For homes, the regulation essentially prohibited front yard lawns and restricted backyard lawns to not more than 50 percent of the planting area. The rationale for this measure was based upon a 5-year research project that determined lawn grass used four times as much water as xeric landscapes comprised of trees, shrubs, and groundcovers that included mulch and drip irrigation. The study showed that irrigation water demand decreased from 73 gallons per square foot per year for lawns to just 17 gallons per square foot per year for water-efficient landscape. This change produced profound water conservation results and is largely responsible for curbing and reversing the trend of increasing demand associated with population growth. Further, since SNWA is a regional authority, all jurisdictions in the region implemented the same regulations. By assuring the regulation was the same in all of the region’s jurisdictions, the playing field was leveled among competing developers and also among neighboring jurisdictions. This approach is surprisingly uncommon in metropolitan areas. No one city could create an economic advantage by attracting more development through less stringent regulation. Furthermore, this approach allowed unity in messaging and also provided residents in all jurisdictions with a sense of equity. Bennett emphasized that this was another key factor that created the acceptance of sustainable landscapes into residential neighborhoods. Although these regulations were adopted in response to drought, they have since been made permanent.
2. With development regulations assuring water efficient landscapes for new buildings, the Authority amplified inducement programs to convert lawns on existing properties. In 2003, the SNWA provided an inducement of \$1.00 for each square foot of lawn grass converted to what the Authority calls “Water Smart Landscape.” In 2007, the inducement was doubled to \$2.00 per square foot as a special promotion, then dropped to \$1.50 per square foot in 2008. The rebate is tiered, with a \$1.50 rebate for the first 5,000 square feet and \$1.00 for each additional square foot. Properties are limited to a maximum rebate of \$300,000 per property per year. By accommodating large-scale properties, the SNWA was able to work with golf courses, schools, parks, and homeowners’ associations. SNWA studies showed the average residential conversion involved about 1,200 square feet and received a rebate of approximately \$1,500. Depending on the elaborateness of the xeriscape design and whether a home owner or licensed contractor performs the work), project costs typically ranged between \$3.00 to \$5.00 per square foot. This “cost-sharing” approach is consistent with the SNWA’s philosophy that if clients are invested in the project, it is more likely to achieve long-term success. Figure 3 displays a “before” and “after picture of a traditional lawn conversion to xeriscape.



**Figure 3: Conversion of a Typical Residential Property From Traditional Lawn to Xeriscape (Before)**  
Southern Nevada Water Authority (2)



**Figure 3: Conversion of a Typical Residential Property From Traditional Lawn to Xeriscape (After)**

The Las Vegas homeowner got a rebate for replacing 2,200 square feet of lawn with water-efficient plants. The flora and aggregate used are adapted to the Mojave Desert climate and require less water and custodial care than lawn grass. Photos courtesy of Southern Nevada Water Authority

Then, Bennett made a final point about the acceptance of water smart landscape. The Authority found as fresh, new development projects appeared with water efficient landscape, community acceptance for the aesthetic began to increase. Citizens began to affiliate xeric landscapes with modern facilities and lawns with older, more dated developments. This phenomenon was welcomed, but certainly unexpected.

**Teaberry:** What are some of the successes you have experienced with these four strategies you have presented: education, pricing, inducement and enforcement?

**Bennett:** To date, nearly 40,000 properties have completed projects and received an incentive. To assure the program provides permanent water demand reductions, participating property owners must grant a conservation easement that prevents the water efficient landscape areas from being converted back to grass or water features. This easement is in perpetuity, meaning that no matter who owns the property in the future, they must abide by the restriction.

The SNWA estimates that its landscape conversion program served 10 times as many customers as all other similar programs in the United States combined. To accommodate the high volume, the SNWA has adopted increasingly sophisticated technologies to administer the program. In addition to sending employees equipped with cameras and measuring wheels to properties, the Authority utilizes sophisticated aerial photography and geographic information systems (GIS). Using the GIS systems combined with field measurements, Authority staff members are able to accurately measure large and irregularly-shaped landscape areas. The Authority has also implemented use of multispectral aerial imagery to identify and characterize vegetation in the urban area. This imagery can assist the agency to assess macro-scale changes in urban landscape, but it can also be used to create targeted marketing lists of properties with large lawn areas. Although the images are collected from an aircraft, the imaging techniques are similar to the remote imaging done by the Landsat satellite project managed by the United States Geological Survey. An assessment conducted in 2007 estimated 15,000 acres of lawn grass within the metropolitan area. The challenge, Bennett said, is distinguishing functional turf areas, such as parks, playgrounds, and golf courses, from non-functional turf areas, such as decorative medians, storefronts, front yards, and street parkways. Additionally, this imagery can be used to assess whether the urban forest is growing or shrinking in Las Vegas. The magnitude and pervasiveness of the tree canopy is important since it produces shade, reducing heat island effect on both buildings and landscaped areas.



Many communities have policies that prohibit the waste of water, but not all take enforcement seriously. In the early 2000s Bennett helped SNWA's water agencies move away from writing citations to a process embedded within the utilities' service rules. Instead of enforcing through the justice system, compliance with the policy is a contractual matter between the customer and their water agency. When warranted, fees are assessed directly to water bills. A violation occurs when watering is done at a prohibited time, or on a prohibited day; when water sprays or flows off of the property. Inspectors only issue a notice when credible evidence exists that a violation has taken place.

Each year, tens of thousands of field inspections are made in the Las Vegas region resulting in issuance of about 1,000 violation notices. Noncompliance can become very expensive for property owners with recurring violations. For instance, if a home already received a courtesy warning and water is subsequently wasted, a fee of \$80.00 will be assessed to the water bill; the second violation escalates to \$160.00; and then it continues to double for each additional violation to \$320 and on to \$640. The fee structure is scaled by meter size, so larger properties with larger water services also experience larger fees; up to \$5,000 in some instances. As much as \$400,000 in fees have been assessed through the enforcement program in a single year. The progressive fine structure is designed to change customer behavior, thereby contributing to water use conservation. Bennett said enforcement can also be a factor to encourage people to change ornamental lawns (the most common cause of violations), to drip-irrigated landscapes that typically produce no runoff.

**Teaberry:** You mentioned earlier in the interview about the culture of excessive water use colliding with the values of conservation. Please elaborate.

**Bennett:** In the Las Vegas region, it's easy for people to be confused about our values relative to water. As an international tourist destination, we've created something of an adult Disneyland with a marketing image suggesting excess and abundance. On the Las Vegas Strip, you'll find one of the world's largest fountains, a bay with full-scale pirate ships, a world-class ocean aquarium, and a mock-up of New York's harbor replete with a spouting fireboat. Off the Strip, however, Las Vegas is much like other southwestern cities. With nearly 70 percent of the Las Vegas economy connected with gaming and tourism, it can be difficult for residents to separate the messages and develop a culture that embraces water conservation.

Culture, of course, can be modified or changed when the economy and lifestyle are faced with imminent dangers of drought. In addition to the severe drought, the SNWA expects that the Colorado River will experience a five to 15 percent reduction in long-term flows as a result of a drying western climate. We walk a fine line between warning our community about water scarcity while simultaneously reassuring them that the water supply is adequate and stable if prudently managed.

Another challenge is the unique perspectives, experiences, and biases of critical stakeholders. Solutions may be more difficult when key stakeholders have seemingly incompatible perspectives (North vs. South, urban vs. rural, and pro-development versus anti-growth).

**Teaberry:** In Blue Haven, we often hear in our public meetings that water resource availability could be mitigated by more intensive use of water recycling processes. How do you see this recycling opportunity paying out in your region?

**Bennett:** Reusing water is a major supply strategy for many water utilities. In Las Vegas, all treated wastewater effluent is directly or indirectly reused. Direct reuse (sometimes called "recycled" water) means treating wastewater to a quality suitable for landscape irrigation. Many of the region's golf courses receive recycled water. Indirect reuse typically involves returning the treated water to a watershed or aquifer so it may be diverted at a later time, often at a different location. Southern Nevada returns highly-treated water to Lake Mead, where it is further diluted by Colorado River water. Through an accounting process, the water deposited may later be withdrawn through an intake several miles away.

Direct reuse is not as simple as many people think. Recycled water is more saline, so irrigation must be carefully managed to avoid damaging plants. The higher the salinity, the greater the quantity of water required to

avoid building up salt toxicity in the plant root zone. Laypeople also think it is rational to provide recycled water to homes for landscape irrigation without realizing the cost and complexity of building and maintaining dual water distribution systems and the challenge of sustaining plant health.

Lastly, it's important that communities continue to designate recycled water for meaningful uses. It's not uncommon to see recycled water under-valued and used for marginal purposes or applied through inefficient systems. In some cases it may require more energy and infrastructure to create and deliver recycled water than potable water.

**Teaberry:** In Blue Haven there is considerable interest in how water policy will impact future economic development and how the city should proceed in developing a culture of "less is best water use." Generally, how do you size up the demand for economic development, the quality of life questions associated with reducing water demand, and the use of regulations on water?

**Bennett:** Water is perhaps the single most important resource for economic development. Before investors put their money into play, they examine the overall investment climate of a community, including the long-term stability of the water supply. Consider a mega-resort hotel, for example. Many of the properties on the Las Vegas Strip borrowed several billion dollars in construction capital from investors. That money will be repaid over a period of 25 to 30 years or more. If investors thought Las Vegas was going to experience an extreme water crisis at any time in that 30-year horizon, it would significantly discourage investment. In this sense, lower water demand can become an asset to a community's ability to create jobs and maintain or improve quality of life for current and future residents. In the Las Vegas region between 2003 and 2008, per capita water demand decreased by about one-third, but the economy continued to grow at unprecedented rates. The key is eliminating waste and pursuing higher efficiency.

Ultimately, the scarcity of any resource - be it water, land, or energy - has the effect of driving available supplies toward the highest and best uses, but it may not be appropriate or efficient to let it find its own path. For example, steering limited water toward a project that creates 100 jobs sounds enticing, unless there's the potential that the same water might be capable of supporting 1,000 jobs. Our Water Smart Landscape rebate program is a good example; was it appropriate to spend hundreds of millions of dollars changing existing landscapes, or should we have had more foresight and regulated landscape design much sooner?

**Teabury:** As take-away points, what do you consider to be the three main results of the xeriscape policy that have been put into practice by SNWA?

**Bennett:** There are three main results of the xeriscape policy initiative in Las Vegas. Remember, these results must be placed within the historical, political, and legal context that was presented earlier on in the interview. With this in mind, three results are palpable:

1. Over 160 million square feet of lawns have been converted to xeriscape.
2. More than \$180 million has been provided as inducements to property owners to offset the costs of landscape conversion.
3. More than 78 billion gallons of fresh water has been conserved and banked for future use.

#### **QUESTIONS AND INSTRUCTIONS:**

1. How does your own lifestyle involve a personal connection and interaction with water and how do you see yourself adapting to a "less is best" cultural sensitivity? Please be specific.
2. Water is increasingly considered to be one of our most valuable resources not only in the United States, but worldwide. It now rivals the importance of energy in the world economy. In what ways does your own city encourage water conservation and water waste reduction? Please elaborate.
3. Please consult your own water department (whether public or privately operated) and report the water usage rates. Determine the volume of potable water usage and indicate whether the trend is increasing, remaining static, or decreasing per population. In your view, does the water utility rate in your own city affect water use behavior either positively or negatively? Please explain.

4. The story of xeriscape in Blue Haven is not an uncommon one in many urban and semi-arid regions of the United States today. If you were Joseph Teaberry, the senior landscape architect, what did you learn from your interview with Doug Bennett, SNWA Conservation Manager, that would be directly applicable to water use policies being formulated in Blue Haven? Please be specific. Would you have asked additional questions of Bennett, or did Teaberry cover the most essential ones pertaining to water use conservation and sustainability. If not, what questions should have been asked? Please elaborate.
5. Learning as much as possible from Bennett, what recommendation would you make to SNWA to enable it to deal more effectively with the twin dilemmas it faces: A) Water rate structure and increased water use due to growth; B) infrastructure costs and economies of scale related to “old” and “new” water resources. Please be specific.
6. Generally, why do you think it is so difficult for residents to embrace conservation practices that would reduce water consumption levels? Please elaborate on the cultural and water preconceptions and other barriers that might affect people constructed reality from the actual reality of the place where they live.

#### **AUTHOR INFORMATION**

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<b>“Grass” by any Other Name – Xeriscaping and Sustainability</b>
<b>Name:</b> _____

**Case Log and Administrative Journal Entry**

*This case analysis and learning assessment may be submitted for either instructor or peer assessment*

**Case Analysis:**

Major case concepts and theories identified:

1. What is the relevance of the concepts, theories, ideas, and techniques presented in the case to that of public or private management?
2. Facts — what do we know *for sure* about the case? Please list.
3. Who is involved in the case (people, departments, agencies, units, etc.)? Were the problems of an “intra/interagency” nature? Be specific.
4. Are there any rules, laws, regulations or standard operating procedures identified in the case study that might limit decision-making? If so, what are they?
5. Are there any clues presented in the case as to the major actor’s interests, needs, motivations and personalities? If so, please list them.

**Learning Assessment:**

1. What do the administrative theories presented in this case mean to you as an administrator or manager?
2. How can this learning be put to use outside the classroom? Are there any problems you envision during the implementation phase?



3. Several possible courses of action were identified during the class discussion. Which action was considered to be most practical by the group? Which was deemed most feasible? Based on your personal experience, did the group reach a conclusion that was desirable, feasible, and practical? Please explain why or why not.
  
4. Did the group reach a decision that would solve the problem on a short-term or long-term basis? Please explain.
  
5. What could you have done to receive more learning value from this case?