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What's swimming in my glass? The debate over the Southern Nevada Water Authority's use of the return flow credit policy

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WHAT'S SWIMMING IN MY GLASS? : THE DEBATE OVER THE SOUTHERN
NEVADA WATER AUTHORITY'S USE OF THE RETURN FLOW
CREDIT POLICY

by

Patrick L. Ferguson

Bachelor of Arts
University of Nevada, Las Vegas
1999

A thesis submitted in partial fulfillment
of the requirements for the

**Master of Arts Degree in Ethics and Policy Studies
Department of Political Science
College of Liberal Arts**

**Graduate College
University of Nevada, Las Vegas
December 2003**

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ABSTRACT

What's Swimming in My Glass? : The Debate Over the Southern Nevada Water Authority's Use of the Return Flow Credit Policy.

by

Patrick L. Ferguson

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Currently the Southern Nevada Water Authority uses an existing federal policy of return flow credits to divert water from Lake Mead above the annual allocation authorized by the Colorado River System Water Use Agreement. Credits obtained by the return of treated effluent allow water officials to divert as much Colorado River water as is needed to sustain current growth and development here in southern Nevada. Some in the community believe that this is a prudent use of a valuable resource; others that it is a means to justify the over-consumption of water and is altering the watershed in potentially harmful ways. This thesis will discuss this issue and the concept of 'civic environmentalism.' What I call A-I-D (assess-involve-develop) is offered as a new ethic for creating a more sustainable environmental policy. But equally important, is the need to politically engage this growing community in the policymaking process.

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CHAPTER 1

INTRODUCTION

Background

Access to clean, plentiful water is one of the most important considerations that has motivated where communities have been located for thousands of years. This is especially true of those who choose to live in the arid regions of the world. Water is the provider of life. Without a permanent source of clean drinkable water, cultures cannot survive for long.

In the area of the southwestern United States settlements of indigenous peoples occupied regions that had permanent, easily replenished water sources. Some of these civilizations prospered and built societies that were populated for centuries. Water has been, and continues to be, an essential ingredient for societies to become established and exist.¹

The Colorado River has played a significant role in this region's development. Part of the watershed of the southern Colorado is an area that had meadows and water year round. When the Spanish explored this valley, they called it "Las Vegas," which means "the meadows."² As settlers moved in and stayed they began to develop the valley. The railroad established a water stop for the trains traveling further west. More people moved to the area and established themselves.

This was the start of what was to become a large metropolitan area in Nevada. As of 2002, approximately 1.5 million people lived in Clark County, Nevada.³ That number is expected to continue to grow, as more and more people are again relocating to the west and, in particular, to the new urban areas of Las Vegas. With these increases in population came an increase in the demand for fixed sources of clean water. Local water officials were confronted with a complex task. They had to come up with a strategy to supply water to neighborhoods from increasingly stressed sources. Creative policies were adopted, but water became an increasingly more challenging issue to contend with.

Shaping Water Use

Through the years a series of laws and court cases limited how and where Colorado River water was to be used. For Nevada this would have unforeseeable implications on future growth, for at the time nobody ever conceived that the area would be populated as it is today. Two early examples of laws with future implications are the 1922 Colorado River Compact and the 1928 Boulder Canyon Project Act. These laws determined the apportionment of water given to each of the states, specifying these allotments as consumptive use units (consumptive use defined as diversions minus return flows). Under the Colorado River Compact (Article III paragraph a.) the state of Nevada was allotted 300,000 acre feet⁴ for “exclusive beneficial consumptive use in perpetuity.” At the time this was seen as more than enough since the major water need was for use in the agriculture and mining activities and that was being met with existing and abundant groundwater supplies. This additional water would be seen as an added incentive for further growth and development.

Growth in the western United States increased and by 1948 there came a need to further partition Colorado River water with the implementation of the Upper Basin Compact. The upper Colorado River Basin states needed additional sources of water to continue growth and development, so it became necessary to assign the upper basin region an apportionment of 7.5 million acre-feet of Colorado River water per year. Then in 1964, after considerable bickering over water between neighboring lower basin states, the U.S. Supreme Court (in *Arizona v. California*) verified the lower basin's apportionment of 7.5 million acre-feet per year and reaffirmed that *all* of the states' Colorado River apportionments were designated consumptive use apportionments.⁵ This era marked the beginning of a second large wave of migration into the arid west which would once again question the long held belief that the arid regions of this country could be made fertile given enough irrigation.

Determining Use in Modern Southern Nevada

By the late 1980s-early 1990s new permanent sources of water for southern Nevada were becoming increasingly difficult to obtain and the existing ones were straining under the pressures of the huge increases in population. In an effort to alleviate the anxiety over the water supply, local water officials seized upon the ability under federal law to divert water in quantities greater than the annual allotment and offset that use by water returns to the river (thus the term return flow credits).⁶ Since the original return flow credit policy dealt mostly with returns from irrigation in agricultural operations, and there were not sufficient returns from local irrigation to help the situation, these returns would have to come from another source. This was when they hit upon the idea of returning large

quantities of treated wastewater, quickly, for credit. All that would be necessary to sustain a larger and larger population would be the return of greater and greater amounts of treated urban wastewater to the Colorado River via the Las Vegas Wash and Lake Mead. This policy would allow as much water as was needed to be diverted to maintain the pace of growth and development and the return credits would balance the books as far as the annual water allocation was concerned. It also provides a means to dispose of the urban effluent. The building bonanza soon took off.

This boom was seen by the political power base as good for the economy and for the overall health of southern Nevada. The use of return flow credits to offset diversions fed unrestricted urban development. However, growth was so prodigious that soon even return flows could not keep up with the immense thirst the region had. By 1999 southern Nevada water officials were projecting that Nevada was expected to use the full Colorado River water allocation by 2007. But, by June of 2002 they were estimating that by the end of that year they would use 20,000 acre feet over the authorization. In January 2003 Nevada required 37,171 acre feet above the annual allocation, or enough water for approximately 186,000 people, to meet the basic water needs of the people living in the newly built homes, unceasingly being constructed.⁷ Some in the community began to wonder where all of this was going.

The Deliberation Over Water Use

Water is being used, especially in the desert southwest, as if there was an unlimited supply. The Southern Nevada Water Authority estimates in its 2002 Water Resource Plan, that 68% of the water usage in its jurisdiction is residential. Of that number, 75% is used on outdoor landscaping. This is not limited to southern Nevada. In the western United States construction of new homes continues to skyrocket. It is estimated that freshwater withdrawal in the west accounted for 78 percent of the nation's total consumptive use.⁸ Despite this ever increasing demand and the knowledge that there is only so much water, the office of the Secretary of the Interior consistently has declared a water surplus on the Colorado River every year since 1996⁹ and while new research has indicated that the southwest is in the fourth year of a drought.

Drought cycles of 20 to 30 years are common for this region when looked at through geological time.¹⁰ The major difference now is the population. Past droughts were impacting populations that were minuscule in comparison to the population figures today. Events are now forcing water officials to face the realities of the situation that the west is faced with. This year cuts in available water surpluses have been made by the Bureau of Reclamation and Nevada will no longer be able to depend on automatic allocations of unused water from other states as the supplies get tighter and it becomes more and more difficult to get water to fill the need locally for water. As the time goes on people are starting to pay attention to water policy all through the west.

Here in southern Nevada a debate has been growing over the policy of using return flow credits as one means to allow unlimited and unrestricted growth and development to

take place. On one side are those who advocate a technical rationality¹¹ approach in designing a water policy, finding new resources, and solving water related problems. This side believes that growth and development are needed and necessary for the region. Technology is allowing us to do things that could never be accomplished in the past. They believe that our water system here in southern Nevada is state-of-the-art technology, the best in the world.¹² All of the water returning to the lake is clean, safe to drink, and well within the mandated requirements as prescribed by all environmental laws, rules, and regulations. Using the return policy to fuel this growth is a smart, and efficient use of a limited resource: water.

Opponents to this policy advocate a more green¹³ or environmentally friendly approach and believe that unrestricted and unlimited growth and development is not in our best interest but is shortsighted. In their view, the general public is forced to bear the brunt of the costs in dealing with the downside of all this development: degraded water quality, air pollution, traffic congestion, and a never ending need for funding to pay for infrastructure construction, while the benefits go to a limited few. They fear that we are spoiling the only permanent source of water we have and that we have overextended ourselves in creating more demand for water than we may be able to supply. Using return credits to fuel growth is, in their view, a short-sighted policy, created with no environmental ethic to guide policymakers and with most of the public left out of the process. The current policy is used merely to maintain the status quo and justify the over consumption of water, all the while causing damage to the watershed.¹⁴

Both sides are in agreement that there is a need for a comprehensive policy in dealing

with water issues. Unfortunately, a sizable portion of the populace in southern Nevada is new to the region and is not engaged in the policy making process. These newcomers are ignorant of the unique aspects and peculiarities of western water law and policy and of living in a desert environment. There is also an impression of seemingly endless supplies of water, since it seems to be everywhere in fountains, man-made lakes, and lush resorts.

Because of this and general voter indifference (that is prevalent throughout the United States), citizens have not involved themselves in the policy making process and as a result the debate on which policy approach is better, a “green” one or a “technical rationality” one, has been narrow and very restrained. This has resulted in giving one side (those advocating a technical rationality approach) the ability to shape the debate in their favor, with the same small group of actors consistently getting their voice heard while a large portion of the general public does not.

The Research Focus and Methodology Used

In researching this issue a qualitative research methodology was used. The approach has been threefold: literature review, interviews, and direct observation.

Literature Review and Document Analysis

As the very first step to be taken in this research a thorough and comprehensive literature review was conducted. This review consisted of searching through local newspapers, both past and present. Beginning in the late 19th and early 20th century, a search was conducted for articles that dealt with environmental issues, problems, or debates concerning Clark County, the Las Vegas Valley, Las Vegas Wash and later in the

20th century, Lake Mead, Las Vegas Bay, and the wetlands area. There has been an ongoing public conversation on this issue and research showed that both sides of the debate were well represented. As development and urbanization progressed, public officials faced many obstacles and made both popular and unpopular decisions on water use. This study of history demonstrated that almost from its inception, the Las Vegas region had difficulties with the safe and efficient disposal of urban waste matter, sewage, treated effluent, and the impact that these materials had on the Las Vegas Wash. Time and time again, these issues became problems that grew into crises that required the attention of the community.

The final step, in this part of the research, was a document analysis to look at the different laws, policies, regulations and ordinances at the federal, state, county, and local levels. A review of the history of how these policies were developed and implemented was constructed. What policy was put into place and why that particular one was chosen was of primary interest. This also included looking at web sites, brochures, pamphlets, newsletters, reports and any other pertinent data. In conducting this literature review the resources used were the library at the University of Nevada/Las Vegas (UNLV), additional public libraries, agency libraries, reading rooms, public affairs' offices, government offices, and the Internet. In addition any course materials, bibliographies, professional journals or particular research materials that were available at the different colleges at the University of Nevada/Las Vegas such as the College of Sciences, Greenspun College of Urban Affairs, and the Howard Hughes College of Engineering were used.

Interviews

The interviewing process was conducted with those agencies that directly deal with the policy. These interviews were conducted in an informal manner, taking notes, making tape recordings while the interview was ongoing, or writing it up immediately afterwards. Questions were based on trying to understand how they, as regulators, saw the problem and why the solutions that were implemented were chosen. Also, an attempt was made to discern what pressures were brought to bear from both the politicians and the public, the roles that home building organizations had in the process, and to understand what the process was that led them to the current policy. Contacts and meetings were held with the Clark County Planning Office, wastewater treatment plant supervisors, safety and quality assurance personnel at Lake Mead Marina, and various other mid-level personnel at different agencies. This process continued, with the level of contact continuing upwards in the chain of command, until access to the topmost level was either achieved or denied.

There was however, a reluctance by some senior water officials at the local and county level to speak on this issue. Also, no Clark County Commissioners, or their staffs, were willing to be interviewed for this research. The political establishment, as a whole, was very hesitant to participate. While not all, most of the mid-level people that were willing to talk would only do so with the provision that their names would not be used and that they would not be identified in any way that could be traced back to them or their office. Because of this there are a limited number of people cited as sources in this thesis.

Finally, sit-down interviews were conducted with those individuals and agencies that are opposed to the return of wastewater into the lake. Also, there are some agencies and

groups that were not necessarily always opposed, but did have concerns. All attempts were made to make contact with, and sit down to discuss differing positions on this policy issue.

Direct Observation

The direct observation portion of this study consisted of taking trips to these areas that are being talked about. Most of the areas are accessible to the public. While on these trips informal observations were made of wildlife, fish species, and the geography of the area to see first hand changes that occur from the return of treated waste water, on going construction projects, and natural storm events. Also during these outings, any opportunity to make contact with different individuals and organizations that are involved in activities in this watershed region was acted upon. These trips provided excellent opportunities to conduct informal and casual interviews with people working in the area, to do literature reviews of materials that presented themselves during the course of these chance meetings and to generally take advantage of any situation that presented itself.

The Remaining Chapters

This thesis research has found that the technical rationality approach is scientifically false in places, incomplete in places, and short sighted in places. The “green” position is built on better science and more reasonable rationality. In the past those opposed to unsustainable environmental policies usually developed to aid in unrestrained growth and development had little or no say in what happened, especially the poor and

disenfranchised. Today, in our modern society public participation in policy making makes it possible for all citizens to have more of a say in what happens and how it happens than many did in the past. The modern environmental movement is one example of this.

However, it takes an informed and engaged community who are involved in what is going on and who care about where they live. I believe that both sustainable environmental policies and an engaged public, actively participating in the process, are linked. These are the concepts put forth in William Shutkin's book. That is the reason that both subjects are discussed and that his ideas on the concept of civic environmentalism are put forth for discussion.

In this thesis, a discussion on both the subjects of environmental policy, in this case water, and political science, in this case the public's participation in policy making, is presented. Throughout human history every desert dwelling society, except one,¹⁵ has thrived initially but collapsed eventually, often with devastating consequences for the people involved. The reason for the collapse has always been the same: The crippling of the ability of the ecosystem to restore itself after sustaining nonstop damage from human activities.

In southern Nevada since 1907 the development and business communities, along with the technical community running the infrastructure, have consistently denied the existence of any environmental problems, until a crisis develops. They have instead tried to convince a new and growing community that the state-of-the-art technologies in place are more than adequate to deal with any issues that might arise.

Consequently, growth and development of the region has continued.

Also since 1907, environmental crises in the Las Vegas Wash and later in Las Vegas Bay and Lake Mead have forced the political structure to take action to deal with environmental issues they had steadfastly proclaimed were not necessary, because there was no problem. The existing, state-of-the-art infrastructure, has had to be replaced with a newer one. The community has had to pay for these new systems through higher user fees and taxes. The problem gets solved temporarily but, continued growth and development negates the gains made by the solution implemented, thus allowing the cycle to repeat itself over and over again. The public is left to remain as a paying spectator, not being properly informed on the issues, not genuinely being brought into the process, and at times actually being misled by some as to the real facts of the situation. Historically that has been the pattern.

Chapter Two will review this history. In order to see why we have this particular policy, we must look at how the policy in the southwestern United States was developed. This is by no means intended to be a comprehensive review however, since that is not the focus of this thesis. Instead, an overview of significant events that helped to shape the region's policy will be addressed in order to provide a view of what transpired. This discussion will also consider the growth policy in southern Nevada and how the use of the return flow credit policy and rapid urban development are related.

Next, because of its importance to the Las Vegas Valley, a chronicle of key environmental events pertaining to the region and the Las Vegas Wash in the last 175 years will be presented. The wash is fundamental to the natural water flow out of the

valley and has been for thousands of years. It has also been central to the resulting change that urbanization in the area has had on the Colorado River since the settlement of the region by euroamericans and incorporation of the city of Las Vegas in the late 19th and early 20th century.

As was mentioned above, there has been a vicious cycle repeating itself since 1907. One of the findings of this research has been the discovery of this positive feedback loop. By ignoring these past events successive generations have only succeeded in allowing the cycle's negative consequences to grow in magnitude, proportionally with the increase in population. Ironically, this current debate is no different than those in the past dealing with the same subject, the difference is the magnitude of the potential crisis and the impact it will have on the region.

Chapter Three will discuss just what the current problem is. The chapter starts with a description of the geographic characteristics of the region. It is, I believe, essential that the reader keep in mind the realities of the ecosystem and the true character of this environment while interpreting this current debate over water policy. To live in Las Vegas is to live with the perception that we have plentiful water. We are literally surrounded by water, from the numerous man-made fountains, waterfalls and lakes, to the lush green golf courses and the lavish tropical landscaping of the homes in the countless developments. There is in fact a strong belief in some people that water will be unlimited because of the use of the return flow policy.¹⁶ But this illusion has created a false sense of what is really out there beyond the last row of houses. The Mojave is harsh and can be unforgiving to those who do not respect water and the realities of this desert.

After that, an overview of the current argument is provided. First, the view of those advocating a technical rationality approach to the issue is presented. They, as mentioned above, have consistently denied the existence of any kind of a problem (until a crisis develops). Instead, they have been trying to convince this modern day (new and growing) community that the state-of-the-art technologies in place are more than adequate to deal with any issues that might arise. Consequently, growth and development of the region has continued. The basis of this belief and their argument is outlined.

Next, is the view from the opponents, those who want a more green or environmentally compatible approach to the development and implementation of water policy. Their belief that this policy is shortsighted and damaging to the environment is discussed. They sincerely believe that not enough is known about the long-term effects of wastewater discharges on *this* particular ecosystem to justify, what they see as the shift of emphasis, from the quality of the water discharged into Lake Mead, to the quantity. Their argument is presented.

Finally, the perspective of the policymakers is presented. This discussion is somewhat limited in comparison with the other two groups. This stems from the reluctance to talk on this subject by the majority of officials making policy at the senior levels, and the steadfastly held to “party line” from those willing who did speak. Those willing to be interviewed stated that water should not be used to determine growth, but that land use policy or other planning factors should be. Those interviewed did admit that there is no environmental ethic or vision for the future used in making environmental policy, just adherence to current law. Their argument is presented.

Chapter Four will look at the ethics of this issue. William Shutkin's book "*The Land That Could Be: Environmentalism and Democracy in the Twenty-First Century*" discusses the relationship between how we make public policy and how the condition of the environment drives those decisions in what he calls "civic environmentalism."¹⁷ He believes that "a place worth living in and leaving for future generations requires the investment of time and money, as well as an understanding of the fundamental relation between the quality of the physical environment and society's overall quality of life."¹⁸ This concept is used as a basis for discussion in this chapter along with the theory of fairness and justice in examining how this water policy is used and if it is fair. This idea of civic environmentalism is also introduced as a possible consideration to use the newness of the community and this ethic to build a better place to live and to be a link between environmental problem solving and the goal of building a new community while at the same time using this and the recommendations in Chapter 5 as a means to break the cycle started in 1907.

The last chapter, Chapter Five, will conclude the discussion. Here the conclusions from this research are discussed and the reasons for the thesis conclusions are presented. These points are determinations made as a result of this research and represent a continued discussion of the problems discussed in earlier chapters (for example, the eutrophication of the water in the wash and Las Vegas Bay). They also represent some of the current scientific research on this area, albeit limited. This limitation is discussed in earlier chapters and a recommendation to mitigate this limitation is put forth (see below).

Finally, recommendations are presented and a concept which I call A-I-D (Assess,

Involve, and Develop) is presented. It is my hypothesis that by combining the A-I-D process with the philosophy of civic environmentalism, southern Nevada could ameliorate the water ecosystem, educate the community in how our activities impact our own quality of life through the changes, however slight, we make in the environment, and begin the process of regaining public participation in the creation and administration of a more sustainable environmental policy.

NOTES

CHAPTER 1

1. Glass, Mary E. Water for Nevada: The Reclamation Controversy 1885-1902. University of Nevada Press, Carson City, NV. 1964. p. 18-19.
2. Bell, John. Subsidence in Las Vegas Valley, Bulletin 95. MacKay School of Mines. University of Nevada/Reno, Reno, NV. 1981. p. 17.
3. Center for Business and Economic Research at the University of Nevada-Las Vegas. Clark County Demographics Summary: 2001 to 2035. Las Vegas, N.V.: by the authors. December 29, 2000.
4. One acre foot is defined as 325,851 gallons or the amount of water necessary to sustain a family of five for one year. This definition can be found in several locations: 1. Sax, J. L., Abrams, R.H., Thompson, B. H. Legal Control of Water Resources. West Publishing Co., St. Paul, MN. 1991. p. 971. 2. There is also the same definition on the Southern Nevada Water Authority's website located at www.snwa.com/html/h2o_water_words.html. 3. It is also found in Arizona v. California 1963. United States Supreme Court. 373 U.S. 546 (1963), footnote 22, p. 22 of 46 located on the following website: www.wysiwyg://42//laws.lp.findlaw.com.
5. In addition to the references cited in note 4 above further discussion on consumptive use can be found in United States Code Title 43 Chapter 12A Subchapter 1 Section 617c. (a)(2)(1).
6. Arizona v. California 1963. footnote 23, p. 22 of 46.
7. Casey, Juliet V. "Water Shortage: Officials Look to Reserves." Las Vegas Review-Journal Newspaper. June 23, 2002.
8. Solley, Wayne B. Estimates of Water Use in the Western United States in 1990 and Water Use Trends 1960-1990. Western Water Policy Review Advisory Commission, Albuquerque, NM. August 1997, p.5. Also Solley, W.B. et al, Estimated Use of Water in the United States in 1990. U.S. Geological Survey Circular 1081, Table 2, p.11.
9. Southern Nevada Water Authority. 2002 Water Resource Plan. Southern Nevada Water Authority, Las Vegas NV. 2002. Chapter 3, p. 28.
10. Manning, M. "Scientists Say 10-year or Longer Drought Possible" Las Vegas Sun Newspaper. November 8, 2002.

11. In the context of this discussion, the expression technical rationality is defined as “a way of thinking and living that emphasizes technical solutions to social and political problems.” See Fischer, Frank. Evaluating Public Policy. Nelson-Hall Publishers, Chicago IL. 1995, Chapter 1, p.1-24 and Adams, G.B. & Balfour, D.L. Unmasking Administrative Evil. SAGE Publications Inc., Thousand Oaks, CA. 1998. Chapter 2, p. 29-52.

12. Quote by Douglas Karafa, interviewed by author on July 21, 2000. Douglas Karafa was the Superintendent of Plant Operations at the Clark County Water Treatment Plant located at 5857 E. Flamingo Road, Las Vegas Nevada. The interview was part of a sit-down discussion, facilities tour, and several sampling trips that occurred in July-August of 2000 involving myself and several research scientists from the Environmental Protection Agency (EPA) ‘s National Exposure Research Laboratory, Environmental Chemistry Branch that is located at 744 E. Harmon Ave., Las Vegas Nevada. The tour showed the complete operation of the plant from waste intake, to the process of treatment, and ended at the discharge point where the water flows into the Las Vegas Wash on its way back to Lake Mead.

13. A more comprehensive definition of “green” can be found in Fischer, Frank. Evaluating Public Policy. Chapter 1, p.1-24 and in Adams, G.B. & Balfour, D.L. Unmasking Administrative Evil. Chapter 2, p. 29-52.

14. Jane Feldman, interview by author, January 28, 2002. Jane Feldman is the co-chairperson for the Conservation Committee of the Southern Nevada Chapter of the Sierra Club. This same view was expressed by Carrie White during a telephone interview with the author on February 5, 2002. Carrie White is a Senior Environmental Planner for Clark County, Nevada.

15. The one exception is the Egyptian civilization, although many now argue that since the building of the Aswan Dam the natural cycle of the Nile River has been completely changed, leading to the same problems of soil salinity that plagued many of the other major desert civilizations such as Assyria, Carthage, Mesopotamia, the Inca, the Aztec, and the Hohokam. An excellent reference on this topic is Clive Ponting’s book A Green History of the World: The Environment and the Collapse of Great Civilizations. Penguin Books, 1991.

16. Many people that were interviewed (technical rationality advocates) did not see water as a problem at all. Their argument is that if we can return more than 180,000 acre feet of water with current population levels (which is approximately 60% of the state’s total annual water allotment) increasing the population will also increase the return flow amounts. “We can divert all we want because in the end the return flows will balance the books.” We have, in their view, no limit to water under this policy. Besides, technology will always be available to solve whatever “bumps in the road” that are encountered along

the way. When asked about potential pollution problems with returning all of that chemically treated effluent, the answer was remarkably always the same: “all returned effluent complies with federal and state guidelines, in fact the effluent is cleaner than the water normally found in the wash” For another example of this view see note 29 Chapter 3.

17. Shutkin, William. The Land That Could Be: Environmentalism and Democracy in the Twenty-First Century. MIT Press, Cambridge MA. 2000. p. xv.

18. Ibid.

CHAPTER 2

HISTORY OF WATER POLICY IN SOUTHERN NEVADA

The history of water and water usage in this region is unique and, for the most part, has driven policy making. Because of the arid conditions in some areas and the wealth of water in others, irrigation has been the tool by which settlement was made possible. These limitations have restricted the options that people have had in dealing with water problems. In the past the emphasis was on mining and agriculture. Large metropolises of more than one million people each were hardly envisioned by the first settlers to the region. But, as is evident today, that is what is happening in the west. To understand the policy dilemma that water officials find themselves in, it would be wise to first look at why the water laws, rules, and regulations are constructed the way they are.

The Idea of Prior Appropriation

Throughout the early founding of the eastern United States new settlements used water policies that were based on those that existed in England. Under English law, water rights were predicated upon ownership of the land that bordered a river, stream, or lake. If you owned the land, you also owned the water rights. As settlers progressed westward, they quickly discovered that water was sparse west of the Rocky Mountains. Because of this, water rights in the west are dictated by a canon understood as the

principle of prior appropriation.¹ Emerging from 19th century mining practices in which miners diverted water to separate the valuable ores from all of the other material they were contained in,² this doctrine dominates water allocation and use in the west.

The idea of prior appropriation contends that the first person to divert water from a river or stream, and use that water in a beneficial way, is entitled to continue to use that water without encroachment. Any requests to use the water are secondary to those rights of the first appropriators. This is where the expression: “first in time, first in right” comes from. It is based on use of the water, rather than on ownership of the land.³ Appropriation was viewed as a beneficial use of water and was a common practice of the era.

Those with the first usage claims are called “senior appropriators” and they hold what is termed “senior rights.” Individuals that first settled into an area ended up with complete rights to the water they acquired for their own usage. The rule gave large vested land owners unconditional supremacy over available water. For example, during a period of drought the senior rights holder could continue to use their full allocation of water, while the junior or secondary users received little or no water at all.⁴ In addition, these water rights are permanent as long as the water is put to beneficial use. This policy allowed these senior appropriators to become very influential, both economically and politically.

This influence would become a major factor in the politics involved in the development of the region in the decades to come. As more and more people migrated westward, water became more and more of an issue. During these migration periods

farsighted entrepreneurs, with an eye on future development, began to see possibilities. These original political actors began to crusade for their own agendas and take advantage of the maturing political scene.

Development of a Regional Water Policy

In the second half of the 19th century investors interested in California's Imperial Valley formulated plans to divert water from the mainstream Colorado River. At the time the most feasible route was through Mexico. Because of this in 1896 the California Development Company was created and a canal was dug partly in Mexico and partly in the United States. The idea was to bring water to the Imperial Valley, located just north of the Mexican border. Complications emerged almost right away. Since this new canal was accountable to the sovereignty of both countries, confusion and arguments developed over water usage rights, who was entitled to water and when, and how the management of the overall program was to be administered.

The canal concept, as it existed, was not functioning as well as it was first visualized. Regional coalitions in the United States began looking for a way to gain more control over the canal and the water. In August of 1905 the Colorado River itself provided the event that they were waiting for. The river broke through the canal's intake in Mexico and the entire Colorado flowed into the Imperial Valley, filling the ancient Salton Sea lake bed, before it was finally stopped. To prevent further disasters such as this, it was now argued, the construction of a canal located exclusively in the United States should be undertaken as soon as possible. In this way, proponents of the canal project argued, a

permanent headgate that could not be washed away by the river could be constructed along with a canal that could be maintained in a more professional manner.

This new canal idea started to be referred to as the all-American Canal, a label that was chosen for its emotional reasons, as well as economic and political ones. While the new canal idea was being debated locally, project backers used the extra time to build a consensus and establish the coalitions necessary to get visibility for the idea on the national scene.⁵ The first step in achieving this was realized by a document on the all-American Canal that was written by the all-American Canal Board of the U.S. Department of Interior. In this report the Interior Department recognized there was a problem and that the local entities were not capable of rectifying it because of the costs and scale of the project required. The report helped to frame the emerging concern as one not merely regional, but federal in scope.

On May 18, 1920, Congress passed a bill offered by Congressman Kincaid of Nebraska. This bill, entitled the Kincaid Act, directed the Secretary of the Interior to undertake a study and document any diversions that could be made from the Colorado River to be used for irrigation in California's Imperial Valley. The alliances lobbying for this project had been successful in their efforts. The issue now had been placed into the national political dialogue.

In 1922, in compliance with the Kincaid Act, the Fall-Davis Report was introduced to the 67th Congress (67th Congress, 2d Session, 1922). The report found that management of the floods and the development of the Colorado resources are pecuniarily national problems (because they involved more than a single state), citing the following

reasons: 1. the Colorado River is international, 2. the river and many of its tributaries are intrastate, 3. it is a navigable river, 4. its waters may be made to serve large areas of public lands naturally desert in character, and 5. its problems are of such magnitude as to be beyond the reach of other than a national solution.(67th Congress, 2d Session, 1922).

The Policy Implementation and the Issues That Developed

For the proponents lobbying for this venture to be developed as a national project, this was welcome news. But to the people situated in the northern river basin states, this planned policy brought great anxiety. They saw the surplus waters obtained by the storage and canal projects being consumed by the much faster prospering southern basin states, in particular California and the Imperial Valley. The biggest worry was that the Imperial Project would establish prior appropriated water rights.⁶ Any possible policy window that was open for them would be slammed shut in their face before they could push attention to their special problems. They feared they would be left with nothing. Any water benefits would be claimed by California using the law of first use. This was a bona fide concern.

Only four months after the Fall-Davis Report was published, the United States Supreme Court ruled in *Wyoming v. Colorado* (259 U.S. 419) that the doctrine of prior appropriation applied to issues of water between individual states. This decision only deepened the fears that the northern basin states had. Watching the rapid development in the southern basin, they became convinced they were going to lose out to California and not get their fair share of the water. Moreover, with the Supreme Court's recent

decision, they would have no legal recourse in trying to claim some water for themselves.

These concerns were not confined just to the states located in the northern basin area. Nevada, Utah, and especially Arizona were all apprehensive that California's rapid acquisition of these water rights would deprive them of their own fair share of the water that was going to be available after construction of the newly proposed projects. Because of this, it appeared as though there would be no possible way any kind of agreement could be reached when it came to water.⁷

In an attempt to avoid conflicts and expensive litigation, the basin states successfully persuaded Congress to pass an act on August 19, 1921 that gave states consent to negotiate and enter into a compact for the "equitable division and apportionment . . . of the water supply of the Colorado river." (42 Statute 171, 1921) Under this new authority granted by Congress, the seven states in the Colorado basin each appointed a Water Commissioner. These individuals assembled in Santa Fe, New Mexico and over the course of the next year consummated an understanding. On November 24, 1922, this arrangement, known as the Colorado River Compact (70th Congressional Record 324, 1928), was made public.

It failed however to fulfill the hope that Congress had, that the states would settle on what each state's share of the water would be. The most that these commissioners were able to do was to adopt a compromise suggestion made by the Secretary of Commerce, Herbert Hoover. This compromise separated the region into two parts, the Upper and Lower Basins. The separation point was located in northern Arizona. Water allocations were then made to both basin regions and to future Mexican water rights, which were

recognized by the United States government in an international agreement. While these allocations quieted the rivalries between the Upper and Lower Basins, there were still major disagreements between the states in the Lower Basin.⁸ The failure of the compact to determine each state's parcel of water left Nevada and Arizona with the fear that California was going to end up with the lions' share of the water.

Arizona, in particular, intensely resented the Compact's inclusion of the Colorado's tributaries water amounts in its allocation scheme, and was bitterly opposed to having its instate tributary water totals contribute to Mexico's water allocation. Primarily for these reasons, Arizona refused to ratify the Compact. They were the only state to do so.⁹

Looking for a means to get all seven states to ratify the compact, the governors of each state met in Denver, Colorado in 1925 and again in 1927. As a consequence of these meetings the governors of the Upper Basin states made what they felt was a balanced apportionment of water among the Lower Basin states. However, this proposal failed because California held out for more and Arizona demanded the exclusion of its tributary totals from any part of the Mexican allocation. Arizona also objected to the provisions put forth that dealt with electrical power.

On December 21, 1928, 45 Statute 1057 was passed establishing the Boulder Canyon Project. The project was similar to those provided for in the early bills that were defeated, but there were striking differences. Preceding bills had offered no method of water allocation among the states in the Lower Basin. This final act did. The method chosen was regarded as a complete statutory apportionment intended to put an end to the disputes over the water. After construction of Boulder Dam in 1936 the Secretary of the Interior

made contracts with various water users in California for 4,400,000 acre-feet, in Nevada for 300,000 acre-feet, and Arizona for 2,800,000 acre-feet, from the new water stored in Lake Mead.¹⁰

More Trouble

In 1952 the state of Arizona filed suit in the United States Supreme Court against the state of California and seven of its public agencies. Later Nevada, New Mexico, Utah, and the United States were added as parties either voluntary, or on motion. (373 U.S. 546, 551) The fundamental dispute in the case was again over how much water each state has a legal right to use out of the Colorado River and its tributaries.

In the majority opinion, Justice Black stated that the Special Master appointed by the court found that the Colorado River Compact, the law of prior appropriation, and the doctrine of equitable apportionment were not the issues in this case. Since the lower Basin States had failed to allocate the waters among themselves, the allocations made by the Secretary of Interior would stand as prescribed. In the Court's view, Congress had put the Secretary of the Interior in charge of a whole network of projects constructed by the federal government. It entrusted him with sufficient principal contract power to direct, manage, and coordinate their operation. This power must be construed to permit him to allocate and distribute the waters of the Colorado River within the boundaries set down by the act (Pp 588-590, 373 U.S. 546, 547).

California had asserted that the water in the tributaries to the Colorado should count toward the states' individual allocations. This would then allow them (California)

entitlement to claim half of the excess water that this procedure would produce. In addition, they believed that the court should divide the waters according to the laws of equitable apportionment and the law of prior appropriation, either of which would result in protecting California's prior usage. This reasoning failed, resulting in a ruling that California had not wanted. Their problems were just beginning as far as usage of Colorado River water was concerned. Soon they would have to contend with another rival for water, one that nobody envisioned would become one.

Southern Nevada's Development

Development would transform the southern Nevada landscape in unimaginable ways. Nowhere more than in Las Vegas would be this transformation become evident. In the matter of a few decades it would become a regional metropolis with a population more than one million people, and growing. Resources were stretched to the limits. Water became more and more vital as huge swaths of the desert were transformed, seemingly overnight, into lush neighborhoods, golf courses and mega resorts. With ever growing populations came the need for more permanent sources of water. Without water, life in the deserts of this region is not possible.

Pre- Euroamerican Las Vegas

In the beginning, water was not an issue for Las Vegas. The valley has historically been the site of abundant water in comparison to the surrounding desert area. This also appears to be true for prehistoric times. The large springs that used to flow at numerous locations in the valley were probably first used by primitive stone-age humans.

Archeological remains indicate that there was widespread use of these water sources prior to the use by the Paiute and Shoshone Indians.

The valley in which Las Vegas is located is a natural drainage basin. Any flows out of the valley run into the Las Vegas Wash and then to the Colorado River. It is the natural path for drainage and has been used as that, both by nature and later by man.¹¹ Several tributaries feed into this wash, receiving cyclic flows from smaller feeder creeks. The wash was not a perennial stream. Flood water flows through this system from regional storms and, since settlement in the early 20th century, from runoff due to human activities. The Las Vegas Wash travels in a northwest-southeast direction and runs the length of the valley

Life in the Valley 1830-1912

The Spanish used these springs as watering stops on the old Spanish Trail. It is believed that the first group of Europeans to enter into the valley was a group traveling through the area on January 7, 1830. A scout for the group, named Rivera, is believed to have entered into the Las Vegas Wash area looking for a possible route through the region.¹² From 1830-1848 travelers through this part of the southwest used the waters here while journeying along the Old Spanish Trail. The United States acquired the valley, along with other lands in the southwest through the Treaty of Guadalupe Hidalgo in 1848 upon conclusion of the war with Mexico.¹³

In 1855 Brigham Young established a missionary colony at the Las Vegas Spring, and this colony prospered until 1857, after which time the Stewart and Kyle Ranches became the dominant water users. In an early description of the valley it was noted that

“east of the Mormon Fort there was a vast mesquite forest extending from the fort down to the Las Vegas Wash, to the base of Sunrise and Frenchman Mountains and then spreading out toward the Colorado River.”¹⁴ After days struggling through the surrounding desert, it must have felt to individuals of the day that they had entered the Garden of Eden. The air was cool and moist in the forest. There were green meadows. The soil in some places was black, rich, and looked like that found back east. When compared to the miles and miles of surrounding desert the vegetation in this oasis appeared lush and extensive, the wash and forest seemed to have abundant small game species and birds and there were thousands of mesquite trees concentrated in one large area.

The mesquite was considered an extremely valuable and useful tree, especially in the desert. Growing to an average height of 15-20 feet or more, they were much sought after because of their numerous uses, especially as firewood for cooking and heating. The wood burns slowly, with intense heat and when available was preferred to all other combustibles. The fruit of the tree is an edible pod that “could be eaten out of hand, boiled, stored in the ground, or even fermented to make an alcoholic drink.”¹⁵ The root system had evolved to capture and hold even the smallest quantity of moisture in place. The presence of these trees in an area was viewed by individuals at the time as a sign of good fortune and the Las Vegas Valley had them in large numbers.

The resultant attitude of these first settlers was that living here, while demanding, could be profitable if you were willing to exert yourself for it. One such initial pioneer, Octavius Gass, encouraged others to this possibility. In 1868, when advertising his

homestead for sale, he described the soil in the upper Las Vegas Wash as “a black, rich loam that would produce vegetables or grains in abundance.” A 1871 report filed by the Nevada State Mineralogist seemed to confirm this statement by Gass. “This area had a very productive tract of land,” said the report, “on what is called the Las Vegas Ranch.” It went on to describe an area encompassing several hundred acres of very rich land, with only a portion of it being used. “Already on this small portion developed there were abundant orange, lemon, peach, apple, pear, apricot, fig, pomegranate, and mesquite trees along with grapes being grown. The area is the most productive and valuable tract of land in the Las Vegas Valley.”¹⁶

In reality, only a small part of the valley had the rich soils and only where the groundwater aquifer was close to, or actually broke through, the surface. The remaining Las Vegas Valley was a parched desert that would require enormous amounts of irrigation to produce anything at all. This exaggeration was used to sell homesteads in the valley; cheap land located in an oasis in the desert, where anything was possible. Here we see the beginning of what would become a characteristic of Las Vegas: manufactured reality for sale.

In 1881 Gass sold the ranch to Archibald Stewart. Then in 1902 Stewart’s widow sold “most of the ranch and the water rights to the San Pedro Los Angeles and Salt Lake Railroad who then built a railroad across the valley and upper end of the Las Vegas Wash during the winter of 1904-05.”¹⁷ The fertile area was a big draw for a region that was mostly a harsh desert and it was exploited. On May 15, 1905, surveyed plots of land were auctioned off and the town-site of Las Vegas was established.¹⁸

By December 1907 growth and development in Las Vegas had exploded, resulting in the first of many environmental crises. Growth had exceeded the ability of the community to properly dispose of its waste. A set of city ordinances was proposed that dealt with the growing problem of sanitation.¹⁹ There was now a need for laws governing personal behavior and business practices in the city. One section of this new ordinance was known as the nuisance section. It dealt with keeping the streets clear of paper, rubbish, slops, swill, ashes and cans of other refuse. Officials were trying to cope with numerous manure piles, hog pens, mounds of decaying meat, fruits, vegetables, numerous cesspools, privies, water closets, and a growing number of dead animals that were overflowing, fouled, or abandoned and left to rot. This was attracting vermin of all types, not to mention the constant odors.

To make matters worse, when flash floods occurred during storm events, the resulting flood waters picked up this material and a mud-like slurry mix (made up of a concoction of all the refuse) collected in the basements of buildings, the streets, yards, ditches, drains, creeks, and in the wash. Most of this mess originated from the business district of downtown and was of great concern to the general public. Large fines and jail time were proposed for those who refused to comply with the proposed new policy.

The new nuisance ordinance was met with opposition from those businesses that felt that these laws were directed at them in particular. Some even felt that the city was too young to have nuisance ordinances and wanted the whole section on nuisances taken out.²⁰ The ordinances eventually passed, including the nuisance section, but only after intense and heated debate between the monied business elite who wanted to maintain the

status quo and those seeking to improve the conditions (a trend that continues to today and will be discussed in Chapter 3). The policy worked. Businesses and the city in general started cleaning up after themselves. Refuse was taken to a dump outside city limits or drained into the creeks in the area that fed into the Las Vegas Wash, eventually flowing to the Colorado River. Conditions began to improve.

However, by the fall of 1909 continued growth and development had rendered this system of waste management obsolete and a new approach was needed.²¹ An election was called for on November 8, 1909 to raise thirty-thousand dollars in municipal bonds to pay for a new, state-of-the-art, sewer system for the entire city. A local newspaper announced that “the necessity for a sewer system in Las Vegas is pressing now and serious damage to the good name as well as great financial loss, sickness, and suffering will certainly be our share in the future if we do not now succeed in building a complete sewer system for the city.”²² Las Vegas was again having difficulty keeping surface, and now near surface water, out of the basements of buildings in the business section. Owners were pumping the water out of these basements, allowing it to drain along the natural path of ditches, creeks and tributaries that fed into the Las Vegas Wash. The city had to act because a sewer system “was the most essential means to eliminate dangerous sanitary conditions where basement pools, now stagnant, are breeding mosquitoes and menacing public health.”²³ There was also concern over the amount of this putrid water that was now increasingly flowing in open ditches and creeks in and around the city.

This also marks the introduction of a more technical (technical rationality) approach to solving problems. The pro-growth part of the community promised that all future

development in the Las Vegas Valley would be accomplished using the most advanced technology and scientific methods available, no matter what the cost. This new state-of-the-art sewer system was to consist of pipes laid in the city's alleys which would (lessening the impact to the public) carry the sewage out of the city to a point midway between the city's northeast boundary and the Las Vegas Wash. The waste would then be treated by a state-of-the-art treatment plant that consisted of a series of 10 treatment (septic) tanks with the ability to add more later. The "cleansed" water would then flow out of the last tank into the creek (the upper wash area) which was located on railroad property and then eventually flow into the Las Vegas Wash.

There was however, substantial protest raised on this idea because "the cleansed water could be a valuable asset to the city and it should not be surrendered to the railroad without adequate compensation."²⁴ Many in the community felt that the railroad should not be given access to this free source of water. A constant series of debates, arguments, delays and difficulties with contractors ensued. By the end of 1910 people realized that the sewer system was not going to happen as fast as they had been led to believe.

In the summer of 1912 water samples were being taken in the creek area close to town. Some people were convinced that something was wrong with the water and demanded that officials look into it. While not trained themselves in the engineering and sciences of the day, ordinary people on the street of Las Vegas could clearly see for themselves that something was not right with the water flowing around them. On August 10, 1912, the Las Vegas Health Officer announced that "analysis of water samples finds that they are not indicative of a very foul condition. The water is however, a possible

culture medium for typhoid germs, but no cases have yet developed, therefore, it is perfectly safe to allow present conditions to continue.”²⁵ Local officials decided that the issue required more study before taking any action.

Then the crisis came. What was characterized in the local newspaper as an epidemic of infantile paralysis developed. Small children had been “wading one day in the putrid water being pumped from the basement of a local business” and become afflicted with the disease.²⁶ Infantile paralysis or anterior poliomyelitis, a highly contagious polio virus found in areas without adequate sewage treatment, was a disease familiar to everyone at the time. They knew that it came from water contaminated with heavy fecal pollution, and that when a person comes in contact with it the virus quickly takes hold. Everyone understood polio and more importantly, what it could do to a community.²⁷

Luckily, the disease did not spread, remaining confined only to a small few. Work on the sewer system took on a new importance. On December 14, 1912, it was announced by the *Clark County Review Newspaper* that the new, long awaited, sewer system was completed. The new system had a capacity for 12,000 people. With a population just over 1500 it seemed as though it was clear sailing for the next several decades.

1913-1950

The National Reclamation Act of 1902 was designed, in part, to provide water for irrigation for farms in the vast arid portions of the west. It was fervently believed that with the application of enough water, the desert could be made to bloom. With the Colorado River nearby, and the seemingly endless supply of water in the valley, Las Vegas could easily be turned into a lush, vibrant agricultural center, or so it was thought.

By 1913 the effects of growth and development in the area were once again being discussed. Local papers began to voice concern over the rapid spending on things like roads and infrastructure to support the population.²⁸ Discussions began on the possibilities of tax increases to pay for all of this. In addition, criticisms of the way that water was being used began to appear. In the April 1913 issue of *Dry Farming and Rural Homes* F. L. Peterson, an Irrigation Engineer with the Agricultural Experiment Station at the Nevada University, argued that current irrigation practices “are using water in wasteful quantities” and that Nevada could “achieve a 50% increase in the cultivated area of the state with improved water application.”²⁹ This idea and similar others were ignored. The agenda had been set, growth and development were perceived as good for the region, water was seen as being in abundance and not a limit to the planned growth, and any environmental problems that arose could be solved with the proper application of technology. There was no reason to listen to those opposing growth and development it was argued by the pro-growth community, because they were wrong. The status quo prevailed.

Additionally in 1913, local agriculture was having mixed results. The Clark County Land Company Ranch had experienced very disappointing results, even with considerable irrigation. However, the Kyle, Stewart, and Las Vegas Ranches, all located on that limited original portion of fertile land, had promising returns for their efforts. Water it was believed, if applied in the proper volume, could resolve these issues. All that was needed was access to more.

In 1915 a groundwater study³⁰ was conducted by the U.S. Department of Interior to

assess the water situation in southern Nevada. By this time, 125 wells had been sunk in the Las Vegas Valley. There were three pumping plants for irrigation, which had been in operation for a year. It was determined that the groundwater, while considered hard water, was of good quality for use.³¹ With the water additions from the sinking of more wells, the number of homesteads of ranches and small farms would flourish ³²

A soil survey study of the Las Vegas Area was conducted by the Department of Agriculture in 1926. It described a Las Vegas with “electric lights, good waterworks, stores, hotels, and banks. The Pacific Fruit Express Company also maintains a large ice plant here along with the railroad facilities. The city’s population is 2,304.”³³ The report also made mention of the fact that water was again collecting in local drainage and finding its way into the Las Vegas Wash. While the wash is dry during the greater part of the year, “in places a small perennial flow is maintained by waste water from flowing wells.”³⁴

Las Vegas’s agricultural industry along with the railroad’s service center remained the dominant activity until 1931, when gambling was legalized. This combined with the construction of the Hoover Dam, caused another spurt of growth and development.³⁵ In February 1936 a report was published by the Bureau of Reclamation on the Las Vegas Pumping Project. This project was to provide water for “15,000 acres of irrigated desert for agriculture with additional provisions to supply domestic water for Las Vegas from the Boulder Reservoir (Lake Mead). The acreage for irrigation is to be located along the drainage of the Las Vegas Wash.” There were also other provisions in the plan such as developing small irrigation tracts for settlement by the unemployed.³⁶ The report also

made note of the fact that in the valley “drainage conditions are such that water seepage may be expected to develop rather quickly.”³⁷ Without proper precautions in the construction of irrigation ditches or holding ponds water could be expected to drain off quickly, following the natural path already described. This one point in the report was critical and could have prevented other environmental crises, had it not been ignored.

After the construction of the dam in 1936, the Secretary of the Interior made contracts with all existing water users in the southwestern United States. These contracts gave states using lower Colorado River water an allocation of the water stored in the newly created Lake Mead. Water allocations were determined by combining historical usage rates of Colorado River water with an estimate of what future requirements might be.³⁸ Nevada officials believed at the time that they had sufficient permanent sources of groundwater to satisfy the state’s needs, consequently the surrounding states received a greater portion of the new water.³⁹

For a short period it appeared as though the region would have more water than it could ever consume. However, only two years later in 1938 a study was started, subsequently resulting in a published report in 1941, that was in response to “a request by citizens of Las Vegas who thought that underground leaks were causing the decrease in water pressure that had been taking place.”⁴⁰ By this time there were 200-300 wells in the Las Vegas Valley, many privately owned. With no water meters installed in the water works, the best estimate available was that the population of approximately 8,000 people (a fourfold increase in 12 years) was using at least 5,000,000 gallons of water per day.⁴¹ One finding of the report aptly described the community’s water habits: “much of the

artesian water is wasted or put to low use. For the most part, if water from a well has not caused any local inconvenience the well has been allowed to flow full force, year after year. Flow from some wells irrigates only a few cottonwood trees surrounding abandoned homes. The people in Las Vegas should understand that the groundwater supply is not unlimited and that conservation of the supply is necessary.”⁴² This fell on deaf ears.

Three years after the publishing of the 1941 report on underground leakage, another groundwater study began in July 1944. This study was driven by “a cooperative arrangement between the Director of the Geological Survey and the State Engineer of Nevada.”⁴³ There was concern over the Basic Magnesium Project, located in nearby Henderson, Nevada. The report stated that “most of the wastewater from the plant and the towns (Las Vegas and Henderson) flowed back into Lake Mead via the Las Vegas Wash. Concern has arisen that part of this wastewater was percolating into the groundwater, which is the only source of water for most of the Las Vegas Valley.” The report also notes that many of the area’s residents, along with state and now federal officials, have long been interested in the groundwater “problems.”⁴⁴

The study was completed and a report published in 1947. Also in 1947, the Nevada state legislature created the Las Vegas Water District to address water usage issues and develop policies. Shortly afterwards water meters began to be used. The newly generated revenues would be used for water resource development and to be available for future expansion of the system.⁴⁵ In the time frame between the 1941 report and 1950 the area’s population grew from 8,000 to almost 50,000.⁴⁶

1951-1986

Starting in 1950 there was what is described as a “tremendous movement of people into the western United States.”⁴⁷ Las Vegas also saw an increase in its population during this decade. In the valley it can be characterized as a period steady of growth, increased groundwater pumpage, declining water levels, and increased subsidence (as the water level is depleted, the ground above it collapses).⁴⁸

Continued urbanization and development of the region caused the water officials in Southern Nevada to realize there was a possibility of overusing the permanent sources of water available to sustain the rate of growth that was now desired by some members of the community. New strategies needed to be developed and explored.⁴⁹ One of these was to use treated sewage effluent instead of valuable groundwater for some applications, instead of just letting it flow down the Las Vegas Wash and into Lake Mead.⁵⁰

In 1955 it was estimated that “the total area being irrigated by groundwater in the valley had amounted to some 2,000 acres over the preceding 50-75 years.”⁵¹ By 1961, 1500 acres in the southeast valley were being irrigated using sewage effluent as a means to relieve the stress on groundwater supplies. Eventually, water reclaimed from sewage “represented a significant portion of the total supply of water being used for other than household use in the valley. This water is being used for power plant cooling, gravel washing, and irrigating both golf courses and some crops.”⁵² It was believed that this new policy would be the solution to this new crisis, and was sold to the public as a smart efficient use of a valuable resource.

However, either unseen or ignored by the policy makers at the time, was another

pending environmental crisis. The cycle that had started back in 1907 (unchecked growth and development negating the gains made by technology) was about to circle back with consequences for the community equal in proportion to the magnitude of the environmental degradation that was occurring. By 1960 the permanent population in the area was 127,016.⁵³

The concerns with the Basic Magnesium Project (also referred to as the Henderson Industrial Complex) discussed in the water report published in 1947 returned. A 1961 report written by Leeds, Hill and Jewett Inc. discussed the Las Vegas Wash area and the now poor water quality that was very evident. There was, as stated in the report, “the desire to take reasonable precautions to protect the quality of water in this zone.”⁵⁴ At issue was a slow flow of untreated wastewater, estimated to be 42,920 acre feet from 1956-1960,⁵⁵ coming from the industrial complex. There was also a growing concern that this wastewater would eventually flow into the underground aquifer “through flows of pollutant laden water into the near-surface reservoir which was the supply for nearly all domestic wells at the time.”⁵⁶ Officials at the complex denied that there was a problem. It was then decided by local water officials and political leaders that this issue required more study before any action could be taken.

In January 1967 a report was published by the Federal Water Pollution Control Administration (FWPCA), in cooperation with the Colorado River Basin Water Quality Control Project, and the Technical Advisory and Investigations Activity of the FWPCA to “ascertain the effects of wastewater discharges on the Las Vegas Wash, Las Vegas Bay, and the Boulder Beach area of Lake Mead.”⁵⁷ In regards to the issue raised in the 1947

and 1961 reports on leaking wastes from the holding ponds used by Basic Management Incorporated (formerly the Basic Magnesium Project) to hold the discharged wastewater. the report's findings were restricted to one sentence on page 8 which stated "the question of whether wastes from these ponds seep into the Las Vegas Wash through the ground water cannot be categorically answered from the data gathered in this survey."

However, the rest of the report was able to answer questions of pollution in the wash. During the period of the survey, the reports states, "the principal sources of waste in the study area are the effluents from the sewage treatment plants. The flow in Las Vegas Wash is comprised principally of this discharge. Lesser flows originate from nearby power plants."⁵⁸ The sewage plants were employing state of the art technology (for the time) and also used what was described as a small holding pond filled with treated effluent to be used for irrigation. The effluent discharges into the wash were estimated to be approximately 15.6 million gallons per day.⁵⁹

The report describes the effect of these discharges to the Las Vegas Wash, Las Vegas Bay, and Lake Mead as follows:

1. "Isolation of salmonella bacteria in the wash and in some effluent samples from the treatment plants, along with excessive coliform densities indicates that the operation of the chlorination facilities can be improved to provide greater efficiencies."⁶⁰
2. "For the past several years, Las Vegas Bay has experienced a buildup in concentrations of nitrogen and phosphorus. This has resulted in increasing algal concentrations to the point where the water in the bay is a distinctive green color. The algae concentrations result primarily from the discharge of phosphorus in the effluent

from the treatment plants which represents 98.1 % of the phosphorus discharged through the Las Vegas Wash. If this continues, it is possible that large algae blooms will destroy the Bay's usefulness as a recreation area."⁶¹

3. "The Las Vegas Wash is supporting a population of organisms that are often associated with organic wastes such as, snails, mosquito larvae, sludge worms, midges, along with sewage-associated bacterium covering sticks and rocks in and along the wash."⁶²

Since the issues raised seemed confined to the Bay and the Wash areas, it did not generate the concern it would have if there had been a problem found in the Boulder Beach area or elsewhere in the lake. Local officials decided that more study of the area was necessary before determining a course of action. In September of 1968 an Interagency Task Force on Water Pollution Controls was established by Clark County to study various means of cleaning up pollution.⁶³

Also in 1968, a major player in Las Vegas, Howard Hughes, became convinced that a perception problem could develop over the return of large amounts of chemically treated wastewater back into Lake Mead. He was worried that people would start to see all the water as nothing but processed sewer water, and that this would call into question the quality of the water being used in Las Vegas.⁶⁴ Hughes also feared that the area's drinking water could become mixed with the treated sewage being discharged back into Lake Mead. Since the water system intake is located downstream from the wastewater discharges, he realized that this was a real possibility. He was so concerned he tried to persuade the governor that this water policy was a bad idea. He was ignored.⁶⁵

By 1969 concerns about growth and development were again being vocalized by the public. Issues such as insufficient numbers of parks and green spaces, traffic-congested streets, the spreading of commercial areas into residential neighborhoods and the fact that the Master Development Plan was not being followed was considered wrong by many in the community, some of whom were becoming very vocal with their disgust in the entire process. There was also an objection voiced, by local environmental groups, about water rates that favored industry, "It is inconceivable that Nevada, the driest state in the union, is selling its precious water resources at such ridiculously low prices so vested industries can damage Nevada's recreational areas."⁶⁶ As happened so often in the past, these critics of the growth policy were ignored.

In 1970 Clark County had a permanent population of 273,288 of which 268,065 were living in the Las Vegas Valley.⁶⁷ By this time tourism and recreation, in the form of gambling casinos and resort hotels on the Las Vegas Strip, and the attraction of crowds to Lake Mead and Hoover Dam made up the lion's share of revenue for the region. In addition, other important areas that generated economic input were the chemical and metal industries located near the town of Henderson, the Nevada Test Site north of Las Vegas, and Nellis Air Force Base just outside of town, also to the north.⁶⁸

Growth and economic development had now evolved from the original concept of an agricultural center to something quite different. In doing so, a series of unforeseen problems developed, from 1907 onward, which needed to be dealt with in a serious long term way. However, as illustrated above, a cycle of behavior⁶⁹ developed in handling these recurring environmental crises, that effectively prevented the region from actually

dealing with them in a meaningful long term manner. In never facing the fact that continued, unchecked growth negated any gains made by the employment of new technologies, policy makers created a situation where the cycle was allowed to continue on and on.

In December 1971 the newly formed Environmental Protection Agency (EPA) published the first of two major reports to be issued in that decade on the health of the environment of the region. The report's opening statements best describes the situation the EPA found. "Various technical investigations conducted during the period from 1966 to 1977 have demonstrated that direct and indirect discharges of municipal and industrial wastes to the Las Vegas Wash from sources in the Las Vegas Valley are causing interstate pollution of Lake Mead and the lower Colorado River which is deleterious to the health or welfare of persons living in Arizona, California, and Nevada. This pollution also causes violations of Federal-State water quality standards applicable to Lake Mead and the Colorado River. To date, no positive steps have been taken toward construction of needed region-wide pollution control facilities. As a result of the continuing delays the Regional Administrator, Region IX, Environmental Protection Agency notified municipalities and industries discharging wastes into Las Vegas Valley that such discharges were in violation of established State-Federal water quality standards."⁷⁰ The fourteen official findings of the report are summarized below:

1. "The majority of the perennial streamflow in the Las Vegas Wash consists of treated municipal and industrial waste discharges. This water is characterized by high dissolved solids concentrations and excessive levels of nitrogen and phosphorus, nutrients

that stimulate algal growth. Nevada has established water quality standards applicable to the wash which take effect in 1973, with more stringent requirements to apply in 1980.

Present water will not meet the 1973 standards.”⁷¹

2. “Excessive algal growths have occurred, producing a distinct green color in the Bay, along with odors and nuisance conditions. Studies have shown that Lake Mead downstream from Las Vegas Bay and the Colorado River below Hoover Dam have a higher algal growth potential than Lake Mead upstream from Las Vegas Bay.”⁷²

3. “Water quality conditions in Las Vegas Bay are in violation of Nevada standards.”⁷³

4. “To provide maximum assurance that algal growths in the Bay are not stimulated by waste discharges from Las Vegas Valley it will require that essentially all waste charges be eventually removed from Las Vegas Bay [sic].”⁷⁴

5. “About 21 million gallons per day of treated municipal wastes are discharged through a short outfall ditch to the Las Vegas Wash by the City of Las Vegas’s secondary treatment plant. This effluent is a major source of dissolved solids and algal nutrients to the wash. The effluent provides about half of the total flow to the wash. Existing treatment processes cannot produce an effluent that will meet the 1973 Nevada water quality standards for the wash.”⁷⁵

6. “The Clark County Sanitation District’s secondary treatment plant’s present waste intake exceeds design capacity, resulting in reduced treatment efficiency. As is the case of the Las Vegas plant, it also is a major source of dissolved solids, and algal nutrients and will not meet Nevada’s 1973 water quality standards.”⁷⁶

7. "Effluents from both of Nevada Power's power generating stations will not meet Nevada's 1973 water quality standards. No changes in treatment and/or disposal are planned during the next few years."⁷⁷

8. "The existing quality of the effluent discharge from Nevada Rock and Sand Company will not meet the 1973 Nevada standards."⁷⁸

9. "Basic Management Incorporated (BMI) operates a waste disposal system that includes a sewage treatment plant for the city of Henderson and a large complex of waste disposal ponds covering an area of more than 1300 acres. Since the disposal ponds are unlined⁷⁹ wastes are percolating into the near-surface aquifer underlying the ponds and are entering the Las Vegas Wash as groundwater seepage. This seepage currently averages more than five million gallons per day with a pH range from 2 to 13.⁸⁰ The minimal treatment and/or disposal improvements presently planned by the waste sources discharging to the disposal ponds will be inadequate to abate pollution attributable to these sources."⁸¹

10. "Long-term seepage of industrial wastes from BMI has resulted in the development of an artificially elevated groundwater mound in the near-surface aquifer. This groundwater is highly contaminated with industrial wastes. Seepage would continue several years after all artificial recharge of this aquifer was stopped."⁸²

11. "Disposal of all highly mineralized industrial wastes in disposal ponds should be done in lined ponds with no discharge into the Las Vegas Wash"⁸³

12. "Waste technology is currently available that will reduce nitrogen and phosphorus in municipal effluent to levels necessary to meet 1973 Water Quality

Standards for the Las Vegas Wash. Available technology would not produce an effluent that would meet 1980 water quality standards.”⁸⁴

13. “The Las Vegas Valley Water District has been designated by the Nevada legislature as the agency responsible for the elimination of the pollution problems in Las Vegas Wash and Lake Mead. The District is empowered to conduct feasibility studies, and to construct, operate, and maintain pollution control facilities.”⁸⁵

14. “Total dissolved solids and sulfate concentrations in Lake Mead and the lower Colorado River presently exceed the recommended limits specified by the Public Health Service Drinking Water Standards. The average annual dissolved solids load of 150,000 tons discharged from the Las Vegas Wash into Lake Mead is estimated to produce a detrimental economic impact on downstream water users of \$670,000 per year, which is equivalent to a present (1971) worth of \$13 million. This increase in total dissolved solids in the Colorado River is due to waste discharges from the Las Vegas Wash, and the economic damage sustained therefrom constitute interstate pollution to persons living in Arizona and California and therefore is subject to abatement under the provisions of Section 10 of the Federal Water Pollution Act.”⁸⁶

The report went on to recommend that a regional waste treatment system be established so that the existing water quality standards could be met, that “this regional municipal waste treatment system shall be implemented and administered by the Las Vegas Valley Water District according to an engineering plan developed by July 1, 1972 and approved by the Environmental Protection Agency and the State of Nevada.”⁸⁷ Local officials determined that more study of the area was necessary.

In August of 1972 another study of the Las Vegas Wash was published.⁸⁸ In order to finally put to rest the argument on the BMI Disposal Ponds and to determine the impacts these ponds were having on the water quality in the wash, the Desert Research Institute and the University of Nevada carried out an extensive research effort for the EPA. The study is described in the report as “an aerial remote sensing program, requested by EPA Region IX, over the Las Vegas Wash Basin.”⁸⁹

This second study concluded that the seepage into the wash was in fact occurring. The actual discharge locations were identified and assessed as to their individual impact to the overall problem. In the report the scientists conducting the study stated that “the groundwater behavior patterns in the BMI pond area have been established and confirmed by the Desert Research Institute and the University of Nevada. It can be concluded that as long as the Henderson sewage treatment plant continues to discharge into the BMI lower ponds, sewage carrying away the deposited metals, minerals, nutrients, etc. will continue from the ponds to the wash indefinitely. Also, the BMI ponds will continue to seep wastes as long as waste water is present in them or the ponds are lined properly to prevent seepage.”⁹⁰ They also identified two other areas of concern that needed to be dealt with along with the ponds.

Most important however, were the recommendations put forth in this report. The first was that the Las Vegas Wash continue to be surveyed, by air once every six months, to “document the behavior” of the BMI ponds and of the “other municipal/industrial waste discharges.”⁹¹ The second recommendation was that the guidance in the December 1971 report, specifically Section III which called for the establishment of a regional waste

treatment system, be “implemented at an early date.”⁹² Local officials, under intense lobbying pressure from the business interests identified as causing the problem, once again determined that more study of the area was necessary before deciding upon a course of action to take.

On October 21, 1973, the draft environmental impact statement (DEIS) dealing with the pollution problem and the abatement program for the Las Vegas Wash area was made available to the appropriate agencies in Clark County and also to the general public. For three days starting on December 5, 1974 public hearings were held in Las Vegas on this DEIS with the record being left open for additional comment for ten days after that. Any and all comments were gathered, from industry, government, and members of the general public.

Finally, on May 29, 1975 the final Environmental Impact Statement (EIS) was issued.⁹³ The stated objective of the plan was to “abate pollution contributions from municipal and industrial sources in the Las Vegas Bay/Wash drainage area.”⁹⁴ The EPA had considered its report in 1971 “a 180-day enforcement notice to clean up all discrete discharges to the Wash in order to avoid violation of established State-Federal water quality standards for the Colorado River.”⁹⁵ In December of 1972 the Nevada State Legislature had accepted a plan of action from the Las Vegas Valley Water District. The plan proposed a resolution to this issue along with eight alternative solutions. However, after accepting this plan, additional legislation by the state directed Clark County to come up with an additional proposal, which resulted in ten being proposed in the draft EIS.⁹⁶ Tired of endless local debates and studies, the federal government decided that it was

time to implement the necessary actions to correct the situation and they were going to apply whatever pressure was necessary to ensure that it happened.

The EIS was very clear in stating what the consequences of ignoring the enforcement action would be, “ignoring the enforcement action may precipitate court action by the U.S. Attorney General. A court order to cease polluting Lake Mead might be issued. The violators, including the City of Las Vegas and the Clark County Sanitation District, could be found guilty of contempt of court if present discharges continue. Fines and prison sentences could result. An injunction to prevent further connections to sewer systems in Las Vegas Valley could also be sought.”⁹⁷ In the end the EPA approved the plan for the construction of the facilities required to correct the situation and the state of Nevada was informed that “when Nevada realizes full utilization of all in-valley water resources, then the treated return flow of water, through the Las Vegas Wash, may be credited for additional fresh water withdrawals from the Southern Nevada Water Project.”⁹⁸

Once again technology was applied to an environmental crisis. Once again, as had been the case historically in the region, it was successful. However, once again nothing was done about growth and once again the gains achieved, with the application of state-of-the-art technologies to mitigate the crisis, were negated by allowing unchecked growth and development to continue. The cycle remained unbroken.

By 1977 concerns were again raised about what was happening in the Las Vegas Wash. Continued growth and development were again producing problems. The difficulties that had come to officials’ attention now were:

1. The destruction of the marsh areas by stream channel erosion. Because of ever

increasing water flows in the wash, the stream was head-cutting itself by several hundred feet per year. Head-cutting is the process in which erosion of the area beneath small waterfalls undercuts the wall of the fall, resulting in its collapse. This causes the stream bed to channelize and erode further and further back upstream.

2. There was an ongoing loss of the vegetation in the wetlands caused by ever increasing water flows.

3. Storm runoff and urban flows were exceeding water quality standards. Storm water and urban flows use a separate drainage system from the sewer system. Water in this system flows directly into the Las Vegas Wash, untreated. All storm runoff is drained into the Las Vegas Wash to minimize flooding in the urban areas during the limited, but intense major rain events common to this area. These flows are often large and violent, resulting in flood damage.

Urban flows are those flows that are present year round. This water contains a mix of toxins such as used motor oil, antifreeze, pesticides, fertilizers, sewage overflows, pet droppings, body wastes, and anything that is spilled, poured, dropped or otherwise discarded onto the ground in the urban areas of the valley. Originating from natural springs, people washing vehicles, driveways and sidewalks, broken or leaking water pipes, and lawn sprinklers this water flows onto the streets and drains into the catch basins, transporting these pollutants directly to Lake Mead, again completely untreated.

According to local policy “no treatment is done because of the sheer volume of water involved during storms. The cost of treating it would exceed available resources.” Water officials, aware that the urban flow water goes straight into the Las Vegas Wash,

considered this an “unfortunate” result of the storm drain system⁹⁹ (this will be discussed further in Chapter Three). Since water from storm flows goes back untreated into the lake, the levels of phosphorus, organic material and fecal coliform from body waste were increasing.

These issues needed to be addressed not only because of the impact that they were having in the wash, but because eventually the problems would spread further into Lake Mead. It became evident to water officials that these problems needed to be addressed in a regional management plan of some kind. In particular, there were four objectives which needed to be met, immediately. These were:

1. Insure that anticipated growth does not destroy/reduce existing plant and animal habitats and does not reduce water quality to levels less than established standards.
2. Minimize adverse effects of storm water run off and erosion.
3. Protect and maintain archaeological and historic sites.
4. Provide convenient public access to the wash

For the next ten years as urban boundaries started to expand and development progressed in what had previously been an undeveloped desert, the environmental abuses of the past once again became pollution problems of the day. Dump sites, created by residents who discarded unwanted household items, old vehicles, large appliances, and yard and construction waste into what was “just the desert” had to be dealt with. Urban runoff and flooding during storm events were beginning to have an impact on the wash.

1987-2003

Unfortunately, while a management plan was written nothing was really done to address these issues and things continued the way they were. Water officials seemed to be reacting to problems instead of being proactive in their policy approach, except with the 1987 artificial recharge program. This was initiated because land subsidence was now becoming a bigger and bigger problem. The plan called for the injection of treated Colorado river water into the groundwater system to prevent further collapses throughout the valley. But unlike previous plans, this one had been given some deliberation in its formation. It also provided water officials with the added benefit of being a means to recharge underground aquifers to store water for future use.¹⁰⁰

By the late 1980s there also was an increase in the practice of reusing treated wastewater effluent in the now familiar areas of agriculture, urban irrigation (golf courses), and cooling water in thermal power production. More and more of this water was being mandated to be used in this way.¹⁰¹ By this time southern Nevada water officials formally recognized that the 300,000 acre-feet allotment of Colorado River water was not going to go much further, and that something more dramatic needed to be done.¹⁰² In an effort to help in water procurement more dependance was placed on return flow credits (the system by which credit is received for water that is returned back into the Colorado system) as a means to obtain water. Since Nevada's 300,000 acre feet were designated consumptive use apportionments¹⁰³ and consumptive use was defined as diversions minus return flows, Nevada would be able to divert more than its 300,000 acre feet per year, as long as the net use was no more than 300,000. This meant that

water officials were able to divert more water than the allotted amount as long as water was returned to the river, in an amount that balanced out to a usage of 300,000 acre feet per year.¹⁰⁴

Over the course of the next few years anxiety over the water supply here in the valley continued to swell as it became more and more clear that Nevada's share of water from the Colorado River would limit growth. Almost all of Nevada's apportionment, as well as the existing groundwater supply in Southern Nevada, was committed to new home builders by water officials for use in the tract homes they were building. The pinch came in February 1991 when development was halted in Las Vegas because the water district stopped promising water. During this time frame, municipal suppliers in the valley banded together to form the Southern Nevada Water Authority (SNWA). This action enabled the newly formed SNWA to present a powerful united front, and allowed them to secure some additional water contracts from other users within the state. It also allowed the process of running the water system in southern Nevada to fall under a more efficient and productive management system. Shortly afterwards the year-long moratorium on development in Las Vegas ended.¹⁰⁵

To further relieve growing agitation over water, the decision was made by water officials to build a second intake system from Lake Mead. This would provide a secondary system to allow increased delivery flows and provide a backup in the event of a failure of the existing one. All that was necessary was to complete the construction of this new intake pipeline, also referred to as the second straw, at an estimated cost of two billion dollars.¹⁰⁶

Although most of the water supply was, on paper committed, some still believed there was “room to grow” in the system. The water authority predicted that it would not use it all until 2008. This was based on the theory that it would take years for a master planned community, which was promised water, to be completely built. Also, because many developments fail to get started, some of the outstanding commitments made by the water district would never get put to use.¹⁰⁷

But, once again as water supplies dwindled and the rate of growth showed no signs of slowing, bureaucrats and politicians had to rethink their policy. This time, the change in policy was that it was all right for the community to grow, despite some uncertainty about where the water supply to support additional growth was going to come from. Officials began stating that they viewed the odds of securing more Colorado River water as extremely good. Nevada water agencies were working together rather than competing with each other, and the other states in the southwest were cooperating in dealing with the region’s water shortage problems. By cooperating with each other, surpluses could be given to those in need.

However, this plan too had problems. Water was simply being promised, without really knowing where it was going to come from. In the view of those pushing this agenda it did not matter how much water was promised, because it’s there. They knew that “somehow” there would be water when it is needed. Water officials had adopted a religious-like faith in this plan. “We will never be denied the slim amount of water necessary. The Federal government will never let Nevada go dry,” Janet Rogers, Chairwoman of Nevada’s Colorado River Commission, told the *Las Vegas Review*

Journal in an interview on October 13, 1996. The political community whole-heartedly embraced this philosophy, while at the same time water officials continued to search for new sources of water. This involved attempts to obtain unused water supplies.

First, a strategy was conceived that would try to obtain unused Colorado River water from outside the state. At the very end of 1997 Secretary of the Interior Bruce Babbitt (a former Arizona Governor) approved a plan between Nevada and Arizona allowing Nevada to bank up to 1.2 million acre feet of water underground in Arizona. Basically, this proposal would allow Nevada to help pay to store Arizona's unused allocation of the Colorado water, enabling the state to withdraw equal amounts of water from Lake Mead.

Next, attempts were made to obtain water from the northern part of the state. In April of 1998 the Southern Nevada Water Authority approved a \$25 million deal to buy the water rights from a well located on the very northern border of Clark County.¹⁰⁸ This was not perceived well in the rest of the state and was characterized as: "an effort to grab unclaimed ground water north of Clark County and pump it all to Las Vegas."¹⁰⁹ The problem with this approach was that growth rates, once again, far exceeded any amount of water that was going unused. There just was not unused water in amounts that could be economically included into the overall water system. However, by the end of the decade an increase in the sales tax in Clark County provided funding to enable water officials to "deliver twice as much water to the valley and almost double the treated waste going to Lake Mead."¹¹⁰ So they pressed on.

In January of 2000 the opening of a new \$80 million underground water facility raised aspirations of water officials. Once more, a new state- of-the-art solution was

designed to help relieve potential future problems. The new intake pipe provided by this facility was installed 50 feet lower than the original one still in place. The reason for putting it deeper was the realization that a drought could lower water levels and increase the possibility of polluted surface water being drawn into the system's intake.¹¹¹ Concern over water levels in Lake Mead was on everyone's mind because the region was in the midst of a severe drought, and there was no relief in sight.

Also in January Pat Mulroy, General Manager of the Southern Nevada Water Authority, said that "populations throughout the west face incredible legal, technical, environmental, and supply challenges as populations continue to grow. Meeting those challenges requires that all seven states along the Colorado River cooperate."¹¹² Growth and development continued, unchecked.

By 2003 the drought, which so concerned water officials all over the southwest, was worsening. Climate models showed temperatures over the next 100 years increasing by 3 to 11 degrees Fahrenheit.¹¹³ Reactions to this announcement by water officials were the same all over the west and were characterized by some as "a head in the sand approach to drought." Critics said that "the government keeps saying that lake water levels will get better, while in reality the levels keep going lower and lower."¹¹⁴

In Las Vegas, there was talk once again by water officials about getting serious with water usage. These officials, proclaiming a desperate need for more water supplies, are forced to try to reconcile a wasteful image portrayed by water attractions at big resorts on the Las Vegas Strip to an increasingly skeptical outside world. By January 2004 Las Vegas is expected to move into a "drought alert" status.¹¹⁵

Remarkably, as if to reenforce the perception of wasting water, some local communities are not going to do anything until forced to do so. Don Barsky, executive director of The Sun-City Community Association and president of the Nevada Golf Course Owners Association was quoted in the *Las Vegas Sun* as saying that they will not shut down any ornamental fountains until “enforcement rules are enacted by Las Vegas.”¹¹⁶ They feel that its not fair that they have to and the casinos do not.

Conclusion

On May 3, 2003, the *Las Vegas Review Journal* reported that the federal government issued a warning to southern Nevada that if serious conservation and development plans were not implemented the area would “likely run low on water by 2025.”¹¹⁷ As has been the case since the start of the cycle in 1907, technology solves an impending environmental crisis only to have the potential gains to the community negated by allowing unlimited, unchecked growth and development to continue.

Water officials are betting that developing a series of water usage plans designed to relieve the short term water supply shortages as they occur combined with new technologies to improve efficiency, will be the solution. Demands could be met, they believe, to meet needs until the year 2030 or at the worst 2020 by implementing stricter conservation rules and a more efficient use of ground water assets, unused portions of the Colorado River and credits received from reclaimed water.¹¹⁸ Growth and development however, will continue.

NOTES

CHAPTER 2

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71. 1971 EPA Pollution Report, Section II, p. 2

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75. Ibid. p. 4

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77. Ibid.

78. Ibid.

79. The soil survey study conducted in 1936 clearly stated that “drainage conditions are such that seepage may be expected to develop rather quickly.” This study either was not consulted during the construction of these ponds in the early 1940's or ignored. Had they been lined properly seepage could not have occurred. See Kerr, John, N. Report on Plans and Cost Estimates of Las Vegas Pumping Project From Boulder Reservoir Nevada. U.S. Department of Interior, Bureau of Reclamation. U.S. Government Printing Office Washington, D.C. February 1936. p. 28

80. To help visualize what this seepage is like, pure water has a pH of 7 which is considered neutral. Battery acid and stomach acids have a pH of 0 and 1 respectively while aqueous ammonia and bleach have a pH of 11 and 12. See Joesten, M.D. & Wood, J. L. World of Chemistry, 2nd Edition Saunders College Publishing, Orlando FL. 1996. Figure 9.5 p 266.

81. U.S. Environmental Protection Agency, Report on Pollution Affecting Las Vegas Wash, Lake Mead & The Lower Colorado River. 1971. p. 6

82. Ibid. p. 7

83. Ibid.

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92. Ibid.

93. U.S. Environmental Protection Agency, Region IX, Final Environmental Impact Statement: Las Vegas Wash/Bay Pollution Abatement Project. By the authors. San Francisco, CA. May 1975.

94. Ibid. p. II

95. Ibid.

96. Ibid. p. VI

97. Ibid. p. 207-208

98. Ibid. p. VIII

99. In 2002 this system would consist of 66,000 drains and encompass an area of 1600 square miles. Information on the storm water system can be found at www.lvstormwater.com/whatis. This is the website for The Stormwater Quality Management Committee which falls under the authority of the Clark County Regional Flood Control District. This quote is found in the answer to question #3 asked on this web page, third paragraph.

100. See Manning, M. "Protection of Well Water Major Valley Concern" Las Vegas Sun Newspaper May 16, 1997.

101. The purpose statement of the 1997 amendment to the Las Vegas Valley 208 Water Management Plan describes reclaimed water planning as being one part of the overall plan to mitigate the effects of "sustained regional growth and development." Clark County Board of Commissioners. Clark County 208 Water Quality Management Plan. Clark County Department of Comprehensive Planning, Las Vegas, NV. 1997.

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116. Rake, Launce, "Sun City-Summerlin Vows to Keep Fountains Running" Las Vegas Sun Newspaper April 30, 2003.

117. Young, Samantha, "Feds Warn of Tapping Out Supply" Las Vegas Review-Journal Newspaper May 3, 2003.

118. Projection forecasts were outlined in the Southern Nevada Water Authority's 1999 Water Resource Plan, however growth rates made the projections figures pointless within a couple of years.

CHAPTER 3

THE CURRENT PROBLEM

Background

The biggest problem facing water officials in southern Nevada is the same problem that faces all water officials in the southwestern United States, the desert. People choose to live in a very harsh and unforgiving environment. Often in our modern society that fact gets lost, especially here. The glitter of the lights, the golf courses, lush landscaping, and artificial waterfalls and lakes, gives the impression that we actually live in a Shangri-la. Water is everywhere around us and the perception is that it is bountiful. To truly understand the situation that we are in, we first must see the desert here for what it really is and not for what we want it to be.

The Las Vegas Desert Region

The deserts of North America lie in the area between two major mountain masses. To the east are the Rocky Mountains and to the west, the Sierra Nevada Mountains. Southern Nevada is in what is called the Basin and Range Province. This desert region covers approximately 300,000 square miles or about 8% of the total land mass of the United States.¹

Las Vegas is in the southern Mojave Desert area between the Great Basin Desert to the north and the Sonoran Desert to the south.² The Mojave Desert extends over two

separate sections of the Basin and Range Province and has warmer temperatures than those found in other areas of the Great Basin. There are freezing days but not many. The number of frost-free days generally exceeds 200 per year.³ Rainfall in the Mojave Desert is less than six inches per year. Rainfall in Las Vegas is approximately 4.23 inches per year. Sixty-five to 98% of the rain occurs in the winter months. Warm temperatures and high winds are common resulting in low humidity and very dry conditions.

Environmental conditions in summer are distinguished by low rainfall and low humidity. The days are cloudless and hot with daily temperatures of more than 100 degrees Fahrenheit. During the winter months temperatures drop below freezing about twelve days per year, with average daily temperatures of 46 degrees Fahrenheit. Spring and Autumn are mild with average daily temperatures around 80 degrees Fahrenheit.⁴

The growing season is ordinarily 304 days with the first frost occurring in late November, the last in early March. Due to the Sierra Nevada Range and the Spring Mountains to the west, rain that comes from Pacific storms rarely reaches the valley. The rain that we do get comes from moist tropical air from the southeast in mid to late summer. Thunderstorms and flash flooding occur during this period.

Water in the Las Vegas valley drains to the Colorado River by means of three large washes and several smaller ones. The three largest, the Flamingo Wash, Las Vegas Wash, and Duck Creek have water in them year round. The smaller ones normally do not. The Las Vegas Wash is the one that empties directly into Lake Mead and there is a wetland area located at the end of the valley where this wash enters the lake.⁵

The valley is bordered on all sides by mountains. To the west, as previously

mentioned, are the Spring Mountains. This range contains the third highest peak in the state of Nevada, Mount Charleston, which has an elevation of 11,918 feet. To the north are the Desert, Sheep, and Las Vegas Mountain Ranges. East of the valley are the Frenchman and Sunrise Mountains. Finally to the south are the River Mountains and the McCullough Ranges. Most of the city is built in the center of the basin that is formed by these mountains just described. It is an old flat basin which has an elevation of approximately 2,000 feet above sea level.⁶

The geologic history of the valley is similar to that of the Basin and Range region; periods of deposition of material from erosion of the surrounding mountains, uplifts from earthquakes, and considerable volcanic activity. Most of the near-surface soil (upper 100 feet) is sandy silt and sands comprised mostly of gypsum and calcium carbonates. Much of this material in the basin contains caliche. Caliche is a soil layer made up of gravel, sand, or other desert debris cemented by porous calcium carbonate.⁷ It can be up to one meter thick, concrete-like in composition, and extremely hard and impermeable. There are also thick layers of marine sedimentary materials, deposited during the Paleozoic and Mesozoic time periods.⁸ A study conducted in 1967 came to the conclusion that these sediments were from what was called Lake Las Vegas. This ancient lake existed from about 15,000-30,000 years ago. It is believed that it covered most of the valley.⁹

This is a harsh and hard place to live. Technology has taken the edge off of this harshness, but it remains there just beneath the asphalt and beyond the edge of the urban lights. Continued existence depends on one single factor: water. Without water, life here could not go on.

An Overview of the Argument

After the groundwater supplies became insufficient to provide permanent water for a growing population, water officials were forced to come up with a means of being able to allow the growth and development to continue and stay within the restrictions of the annual allocation of Colorado River water mandated by Federal law. These officials decided to rely on the existing federal return flow credit policy to fuel the growth in southern Nevada and started returning more treated wastewater to Lake Mead. The quantities increased annually as the demand for water increased. Currently, more than 160 million gallons (491 acre feet) of treated wastewater flows through the Las Vegas Wash and into Lake Mead per day (more than 180,000 acre-feet per year). Of that amount, southern Nevada receives credit for 92-95% of it through the return flow policy (remaining 5-8 % is lost to evaporation, ground absorption, or leakage).¹⁰ This was exactly the answer that local water officials were looking for. Growth could be continued and, in their view, the ever-growing population sustained through the rapid treatment and return of wastewater for credit. Nevada's 300,000 acre feet per year allotment was no longer viewed as an impediment to the growth and development that political leaders sought for southern Nevada.

However, while ensuring that water was available for a new and ever growing population, the quantity and rate at which it was being returned caused a growing concern among a portion of the public. This group, made up of environmental activists, scientists, academics, and long time residents of the valley was not comfortable with the changes in water conditions in the Las Vegas Wash and Lake Mead. In their view, a

conscious political decision had been made regarding the issue of quantity versus quality. The emphasis was now to be on the *quantity* being returned with the *quality* of the returns being a secondary consideration. The only reason for this new emphasis, as they saw it, was that in order for the growth and development rates to be maintained, credits from returns had to be quickly earned to offset the ever increasing amounts of water being diverted for more and more new homes. The water was still going to meet all guidelines for treatment under current law, but at the minimum standards required.

This group believed that the emphasis should be on achieving the highest level of water quality as possible, with the quantity being returned the secondary consideration. This belief is based on the idea that the treated water, while meeting the minimum standards under the Clean Water Act, still contains the chemical compounds associated with a large urban area such as pesticides, oils, and fertilizers. Even those identified as hazardous to human life are contained in the discharge water, albeit in amounts below the levels established by the U.S. Environmental Protection Agency. These compounds do not simply disappear once they flow down the wash but remain, collecting in the water, soil, sediments, plants, and wildlife of the watershed's environment. Their impact to the health of the ecosystem is not entirely understood, but enough is known to realize that there are consequences, some of them negative.

As people became more aware of the details of the water supply system more and more of them began to see it as nothing but a system using processed urban waste water of questionable quality. Then a series of accidents, incidents, and discoveries involving the Las Vegas Wash, Las Vegas Bay, and Lake Mead itself further reinforced the notion

that something was wrong, and that there were serious contamination problems that public officials seemed to be dismissing as normal.

Over time this debate began to be characterized as a difference in world views between those who advocate a technical rationality approach in solving the environmental problems of the area and those advocating a green approach. As was stated in the introduction, in the context of this discussion, the expression “technical rationality” is defined as “a way of thinking and living that emphasizes technical solutions to social and political problems.”¹¹ The term “green” as it is used here is defined as: “the idea or a pattern of thought prescribing that the natural world provides a model for human society and that we must learn to live with rather than against the natural world.”¹²

To further compound the issue here in southern Nevada, the majority of residents are new to the area. This “newness” has meant that they are not acquainted with return flow credits in water policy or the underlying principles in western water law. By taking advantage of this newness, it has been much easier for those who wish to sustain high growth rates to form the discussion in their favor. Whenever concerns are raised about sufficient water supplies to sustain the growth in the region, the answer from water officials is always that there are plenty of sources readily available to us. The efficiency of the return flow credit policy is used as one example of those sources.

This current debate, I believe, is merely the newest issue in a positive feedback loop (or a vicious cycle) that has been ongoing since 1907. First, there is rapid unlimited growth and development that creates degraded environmental conditions. This necessitates sooner-than-planned-for improvements in the waste and wastewater

management infrastructure because of an impending environmental crisis. The development and business community, along with the technical community running the infrastructure, dispute that there is a problem, trying instead to convince a new and growing community that the state-of-the-art technologies in place are more than adequate to deal with the problem. Growth and development continue unchecked. The crisis comes, forcing the political structure to take action. The existing state-of-the-art infrastructure must be replaced with a newer one. The public pays for the newest system through higher user fees and taxes. The system is replaced or upgraded with the new technology. The problem is temporarily solved. After a time however, continued, rapid, unlimited growth and development negates any gains made by the solution/technology implemented and the cycle repeats itself.

In this present debate one side (technical rationality) advocates that, through the best available modern technology, our society can take advantage of a well used federal policy to solve our water problems. The other side (greens) views this action as ill-advised because it has not been thought through thoroughly in regards to the impact it will have on the environment in the long term. Additionally, they see this action as being done solely for the purpose of maintaining growth and development. Below is a discussion of the basic arguments used by each side in this current debate.

The Technical Rationality Position

Growth is certainly not expected to stop any time soon in the region. The December 2000 Clark County Demographics Summary forecast the population to reach 2,796,596 people by the year 2035.¹³ This is in addition to the approximately 30 to 35 million

visitors per year that come to southern Nevada.¹⁴ The region is exploding with new homes and businesses.

It is being predicted that growth in this area will continue, nonstop, for the foreseeable future.¹⁵ The political climate here in southern Nevada is very pro-growth. It is seen as a means to improve the economy and that it is good for southern Nevada.¹⁶ Southern Nevada politicians have shown little or no interest in any plan to restrict the rates of development in the region.

One example of this is that in his January 17, 2002 “State of the City” address, North Las Vegas Mayor Michael Montandon said that only 28 percent of the available land in North Las Vegas has been developed, “but that is rapidly changing.” He went on to add that there would be sharp increases in growth and development which in the long run will only make the city better off than it is today.¹⁷ As confirmation of this, there currently is a new 1,095 acre master planned community in the works.

To those who advocate growth and urban development in Southern Nevada, return flow credits allow the development community the breathing room necessary to continue building essentially unlimited numbers of new housing tracts, without being restrained by Nevada’s limited Colorado River water allocation. Water officials agree, publically stating that there is plenty of water for us to grow and that “there was no need to consider any alternative. Public policy and land use management should be the tools of restricting any growth in southern Nevada, not water.”¹⁸ The current policy, in the view of water officials, is a smart, effective method of water usage. This determination is premised on some core beliefs from which the water authority works.¹⁹

The first of these core beliefs deals with the main water source that is available to this area. The water authority's contention is that 97% of the water in Lake Mead begins as snow melt from the Rocky Mountains. This melted mountain snow flows down to create the Colorado River. Hoover Dam in turn created Lake Mead, which is nothing but an accumulation of this pure snow melt water. This makes Lake Mead one of the largest and cleanest sources of water in this part of the country. The very size of the lake, as they see it, is sufficient to dilute any impurities that might somehow make it to the lake. As far as any concerns over discharging treated effluent into the lake, all treated water returning to the lake will meet the drinking water guidelines for purity as dictated by federal and state law; consequently, there will be no impact to the overall water quality. Additionally, all water extracted from the lake undergoes intensive purification treatment before being delivered for use. Therefore, there are no pitfalls to be concerned with.²⁰

Second, the authority publicly states that they are taking a "proactive" approach to addressing all environmental fears. They comply with the Endangered Species Act, the National Environmental Policy Act of 1969, and with section 404 of the Clean Water Act. The Authority conducts surveys of plant and wildlife species that live near their water projects and is one of twenty-six members that make up a regional environmental action group working to protect and manage the Las Vegas Wash. The plan of action that has developed from this collaboration has led to programs like channel stabilization, the development of a wetland park, stream restoration and habitat creation. Overall, the belief is that this policy of return credits is contributing in a positive way.²¹

Third, in an effort to ensure that this local water cycle is used to the fullest potential, Southern Nevada will spend several billion dollars in the coming decades, part of this coming from the federal government, to keep the supporting infrastructure for water delivery, wastewater treatment, and erosion control projects from being overwhelmed by increasing rates of urban development. By installing these new systems and improving existing ones, the authority will be able to utilize all water that is available efficiently, with minimum loss.²² This investment demonstrates that the water authority is being part of the solution and not part of the problem.

Finally, a flood control system is being constructed that will capture water from major storm events, through a series of strategically placed retention and detention basins. The former is designed to retain or hold the water there and allow it to evaporate while the latter are designed to detain the water and slow it down, thus reducing the water's velocity and making it less destructive. Past floods were extremely destructive to the Las Vegas Valley and to the Las Vegas Wash. Storm water is not counted as returned water or even utilized as a source of drinking water since the water is not drawn from the Colorado River and the costs for facilities and infrastructure for transport and treatment would deplete available resources.²³ However, officials still believe that effectively managing the water runoff from urban areas and storm events allows better utilization of this resource, while at the same time gaining control of what happens in the wash.²⁴

In conclusion, water officials believe that the current usage of the return credit policy contributes to the water cycle in a positive way and is an efficient, smart, and effective use of a scarce resource. The proper application of state of the art technologies in water

management will overcome projected deficiencies in obtaining water for years to come. As was stated previously above, any concern or question about water and growth is always answered in the same way: “There is plenty of water for us to grow. There was no need to consider any alternative. Public policy and land use management should be the tools of restricting any growth in southern Nevada, not water.”²⁵

The Green Perspective

For those who oppose this approach of using return credits to fuel growth and development in southern Nevada, the strategy is seen as damaging to the environment. They believe it is shortsighted and feeding an endless cycle of harm. More wastewater returned allows additional water to be diverted and thus made available for growth. This then assures that water is available for new homes. More homes means more wastewater that needs treatment. This then means more treated wastewater gets discharged back into the lake faster because more water is needed to be diverted to satisfy increasing demand.

The green argument has several points. First, critics ²⁶ believe that pumping the water back into the wash as fast as possible leaves open the possibility of mistakes or accidents. They argue that in the hurry to return water for credits there is the possibility that management may be tempted to cut corners, resulting in returning water which is not as clean as it should be. With the water intake located just a few miles downstream from the water discharge point, allowing unclean effluent to flow in or around the intake is a disaster waiting to happen. As an example, they cite the 1994 event where high bacteria levels in the valley’s drinking water are believed to have played a role in the deaths of 43 people and the infection of another 134. It is speculated that returned wastewater

containing cryptosporidium made its way back into the drinking water, and that this was responsible for the deaths and illness. (The Southern Nevada Water Authority maintained that this was not due to substandard water quality from the treatment plants, but that the problem originated from the homeless population that resided in the Las Vegas Wash area. They were the ones responsible for the high bacteria counts in the water, because they were using the wash to dispose of their body wastes).²⁷

Moreover, the greens see this incident as one in a long list of problems that continue to plague the wash. It also adds credibility to the assertion, in their view, that the local environment is becoming sensitive to the introduction of this treated waste water and that pumping millions of gallons per day of it into the lake is having a negative effect on the ecosystems located there. For example, in 1997 the entire Las Vegas Wash was posted with signs by the state of Nevada warning of danger from high bacteria levels in the water. The Nevada Environmental Protection Division (NEPD) was compelled to list the Las Vegas Wash as a no contact stream for recreational use because of high fecal bacteria levels.

The state's position was that in the interest of public safety it was best to err on the side of caution. Since the bacteria levels fluctuate in the wash and the year round flow of urban runoff (discussed in detail below) from Las Vegas is so heavily polluted, the wash was and still is posted as a no-contact stream. The signs are there as a precaution to prevent people from swimming, bathing, and drinking the water from the wash. The contamination, in the view of the state of Nevada, is not caused by the discharge of effluent but from the discarding of dead animals, trash, bird droppings from the birds in

the wetland area, seepage from old septic tanks, the homeless population in the wash area, and the year round urban flow.²⁸

Even today when asked why the signs are there, State of Nevada Environmental Protection Division officials insist, “the signs are there only as a precaution because the bacteria levels, while fine, do fluctuate. They (the signs) are there to protect the public.” When asked about the urban flow: “urban flow is not a big concern with us because the effluent discharges actually improve the quality of the water in the wash since the water is treated to the standard defined in the Clean Water Act. The high quality of the effluent discharge is such that it renders the urban flow water safe.”²⁹ He was however, unclear and vague when pressed on how exactly it renders the urban flow safe other than saying that the sheer volume of the effluent discharges drove the process and insisted once more that the signs were only there as a precaution against high bacteria levels.

The critics say that in the past the wetlands area located in the wash had been able to soak up much of the wastewater discharge and acted as a bacterium buffer of sorts, cleansing the water adequately. However, with increasing amounts of treated water returning at ever increasing rates this natural ability was overwhelmed and the ability to filter out the bacteria was diminished. The increased flow and subsequent erosion also caused a channelization of the wash, which increased the speed of the water. Large portions of the wetlands were then ripped away by these rapid water flows, especially during major storm events. All of this resulted in increased bacteria levels which rendered the water unsuitable for human contact of any kind, a fact that greens point out is in violation of the Clean Water Act. The water flowing into the wash is full of

pollutants and merely diluting it with chemically treated waste water does not make them go away. This is why, in the green view, the signs had to be posted. They believe that the state and the county do not have adequate funding to properly address the situation and are simply doing the minimum required to get by and hoping that nothing bad happens.

The second argument made by the greens is the inconsistency in the message that comes from water officials when responding to incidents dealing with water. One example of this was seen while conducting this research. During a tour of the Alfred Merritt Smith Wastewater Treatment Facility on July 21, 2000 a water treatment plant supervisor repeatedly made the comment that the water is clean enough to drink when it comes out of this plant. "I could go over to the discharge point in the wash and drink the water right there, it's that clean."³⁰ While these comments were being made, signs stating the water was unfit for human contact were visible just across the wash.

Additionally, comments such as those made during the tour are not an accurate representation of the quality of the effluent, in the opinion of the greens. Before anything else it must be understood, they argue, that all discharges of treated wastewater into the wash and in turn Lake Mead contain a myriad of different compounds. Each day as hundreds of millions of gallons of effluent flow through the wash and into Lake Mead, the water carries chemical compounds whose discharge *is* regulated, along with thousands of others (such as medicines and chemicals used in personal care products like perfumes, soaps, and body lotions) that are *not*.³¹

Levels of known, harmful pollutants are set by a permitting process under the National Pollutant Discharge Elimination System (NPDES), established by the federal

government under the Clean Water Act. Treated effluent contains what the plan calls wasteload allocations and pollutant limits, allowed under the NPDES permit in specified regulated amounts. ³² Table 1 below shows some of these pollutants.

Table 1. Examples of Some Regulated Pollutants ³³

oil and grease	chromium
hydrocarbon fuels	lead
phenols	nickle
nitrates	nitrogen
mercury	zinc
ammonia	arsenic
phosphate	cyanide
phosphorus	boron
cadmium	selenium
copper	salmonella

These compounds have established limits that control the amounts that are allowably discharged into waterways. Restriction levels are set at amounts that have been determined by the U.S. Environmental Protection Agency (EPA) to provide the least amount of risk to the least amount of exposed individuals.

More than one hundred ³⁴ permanent sampling stations are set up in various locations in the treatment plants, the wash, and locations around Lake Mead. As a part of the permit process, samples are obtained on a predetermined written schedule, analyzed, and

the finds are made public as a matter of the public record (for example on the SNWA's website www.snwa.com). The U.S. Environmental Protection Agency (EPA) monitors the State of Nevada's compliance, the state monitors Clark County, and they in turn monitor the jurisdictions under them. All findings are again, made public through reports available through the agency or on their websites. Table 2 below shows a sampling of some unregulated compounds that currently flow into the system through both treated effluent discharges and untreated urban flows. While the regulated compounds have been individually tested for toxicity, little is known about what happens when both regulated and unregulated chemicals mix together in the environment or what the "long-term effects are on human beings who ingest very low, subtherapeutic doses of numerous pharmaceuticals multiple times a day for many decades, especially infants and fetuses."³⁵ All of these compounds are collecting in the tissues of the fish and wildlife living there, accumulating in sediments, and are being absorbed by the plant life. Some remain intact for years or even decades.

Table 2. Examples of Some Non-Regulated Compounds³⁶

antibiotics	testosterone
growth hormones	estrogen
antiseptics	beta-blockers
blood- thinning medications	cholesterol-lowering drugs
x-ray contrast media	cardiac drugs
sunscreen agents	synthetic musks
illegal drugs	steroids
antidepressants	lipid regulators
tranquilizers	analgesics
prescription and non-prescription drugs	veterinary drugs

The big danger here, the greens feel, is that so little is known and that the environment is so sensitive to the introduction of the wastewater containing these compounds, that it is easily overwhelmed and cannot safely handle them. This is not a failure of monitoring, but that the volume of what is being discharged is beginning to overwhelm the “carrying capacity” of the system, or the lake’s natural ability to safely absorb, dilute, or neutralize any pollutants it receives.

There are limited scientific studies available considering toxicity of multiple mixed compounds, such as those found in urban effluent, but this research is relatively new and the regulatory process does not call for testing of mixed chemical compounds for toxicity, only individual chemicals. There may be toxicity issues of which we are totally unaware.

Next there is the issue of what was briefly touched upon earlier, the subject of urban runoff. This is the water that runs from the urban areas and flows year round into the Las Vegas Wash from the secondary washes, streams, and other flows that are located throughout the Las Vegas valley. Urban area water flows originate from the over watering of lawns, leaks, spills, and natural underground springs. This water flows at rates ranging from 25 cubic feet per second in dry weather conditions to a high of 4500 cubic feet per second during wet conditions.³⁷ It is heavily contaminated with every imaginable pollutant as it flows into the wash and in turn Lake Mead. As previously mentioned, there is no process in place to capture this flow and treat it prior to it flowing into the lake.

Water officials do not treat this water for several reasons: 1. it is collected and transported in a separate drainage system, 2. it would be cost prohibitive,³⁸ and 3. as was noted earlier, it is their position that effluent discharges improve the water quality in the wash, thus taking care of the problem. Again the greens disagree with this policy position. They feel that continued growth only increases the amount of urban flow, potentially damaging a sensitive ecosystem.

Finally, there is the marshland area located in the Las Vegas Wash through which all of this water flows. Besides being a valuable wetland area, it is argued, it is also home to more than 270 species of wildlife and approximately 37 species of plants.³⁹ This makes the area vital to their well-being. Any degradation of the quality of the water will have an impact on these species which may be harmful and in the case of species that are endangered already, is a violation of federal law.

Critics of the current policy state that while the quantity of treated waste water has been increasing, no extensive, independent scientific review⁴⁰ of the impact which growth in southern Nevada has had on the ecosystems of Lake Mead and the Colorado River watershed has been published since 1990. There have been individual studies conducted in specific sites or subject areas but nothing to assess the overall picture of what has been going on. The only regular monitoring that is being accomplished is that which is required by the discharge permit to ensure compliance in regards to the wasteload allocations and pollutant limits allowed under the permit levels.

What the greens believe gives credibility to their arguments is that the individual research that has been done reveals that something is going on in the environment there and that it may not support the position of those that advocate that everything is fine. For example, in 1996 a study was published by the U.S. Geological Survey that found organic chemicals, pesticides, and industrial compounds in the water, bottom sediment, and fish from Las Vegas Wash and the Las Vegas Bay. The results indicated that the fish suffered from physiological changes that are consistent with the effects of long term sub-chronic exposure to toxic materials.⁴¹

This is why, the critics say, we need to look at what this policy is doing to the wash and to the lake. In a letter to the editor of the *Las Vegas Sun* Newspaper, Jessica Hodge, Urban Issues Coordinator for Citizen Alert, said that “our drinking water, the lifeblood of our valley, is continually threatened by sewage spills, dangerous levels of bacteria, contaminated storm water, landfill runoff, and industrial pollution. This is why the policy needs to change.”⁴²

How the Policy-Makers See It

As discussed above, the use of the existing federal program of return flow credits has been wholeheartedly embraced to allow growth to continue without water being a limited factor. This policy is one of several components of the overall water strategy in southern Nevada for permanent water sourcing. As has been pointed out, water officials believe that public policy and land use management should be the tools of growth restriction, not water. There will be, in their view, no problems with water as it relates to population growth.⁴³

Those involved in policy making locally claim that the developers do not drive what the policy is going to be. While it is true that the political establishment here in Southern Nevada is very pro-growth, water officials say, “we always make valiant efforts to include the public in what’s going on. In developing any policy, we always seek to involve the public by setting up workshops, seminars, town meetings and public hearings. The times and locations are announced on television, in the newspapers and on the respective agencies’ websites. These events are scheduled in the morning, afternoon, and evenings in an attempt to reach everyone.”⁴³

The main problem, people involved in this process say, is that the general public is just not interested. For example, they say that when the Clark County 208 water Quality Plan went out for public review and comment, only 10 comments were received from the public. One Clark County official interviewed during this research stated that “the public is very disinterested in participating in environmental policy making. It is always the same small number of actors involved. Time and time again we put the information out

there and nobody replies; the public does not show, they do not comment, and once we even had to call the Sierra Club three times before they got back to us. But, there is one group that is always involved in the process and that is the development community. We do not have to force or entice them, they are already at the table when we start. Getting the public to participate is on the other hand is something completely different.”⁴⁴

In what they themselves characterize as forcing the public to participate, the Las Vegas Valley Water District uses a system they call the Public Participation Program. This program’s goal is to get a cross section of the community involved in focus groups, allowing water officials to receive some input from citizens. Participants in this program are randomly chosen from billing lists, volunteers are accepted, or names are given to them from the Clark County Commissioners. People then agree to commit themselves until the end of the life of the focus group, generally several months. The Water District says that they provide meals, flexible scheduling, and any other means necessary to make the process as appealing as possible. This program illustrates, they assert, the lengths to which they have to go to get any participation from the public.⁴⁵

Since, as they see it, there is so little involvement from the public, some officials freely admit that when there is little or no public participation on a particular issue, whatever they (the officials) perceive to be in the public’s interest, gets incorporated into the policy being considered. Besides, in the words of a senior environmental planner for Clark County, “the corporate community is very fair and aware of those issues involving the environment that concern Americans. They would never push for policies that go against those concerns. It is not in their best interests to be seen doing otherwise.”⁴⁶

NOTES

CHAPTER 3

1. MacMahon, James A. Deserts. Chanticleer Press Inc. New York, NY. 1997. p. 24.
2. Ibid. p. 34 & 42.
3. Ibid. p. 48.
4. Ibid.
5. See www.lvwash.org/thewash/tributaries.
6. Jones, Florence L., and Cahlan, John F. Water: A History of Las Vegas, vol. 1. Las Vegas Valley Water District, Las Vegas, NV. 1975. p. 1.
7. Bates, R. L. and Jackson, J. A., Dictionary of Geological Terms. Anchor Books Doubleday, New York, NY. 1984. p. 71.
8. Haynes, C.V. Quaternary Geology of the Tule Springs Area, Clark County, Nevada: Pleistocene Studies in Southern Nevada. Nevada State Museum Anthropological Papers, no. 13. 1967. p. 94-106. and also see p. 120-129.
9. Ibid. p. 122-123.
10. Kay Brothers, interview with author, February 15, 2002. Kay Brothers is the Director of Resources, Southern Nevada Water Authority, Las Vegas Nevada. The interview was conducted at her office. Also, information on water loss can be found in: Southern Nevada Water Authority. 2002 Water Resource Plan. Southern Nevada Water Authority, Las Vegas NV. 2002.
11. Fischer. Evaluating Public Policy. p. 1-24. Also, Adams & Balfour, Unmasking Administrative Evil. p. 29-52.
12. Fischer. Evaluating Public Policy. Box 9.5, p.193. In fact, Chapter 9 p 175-203 provides comprehensive background information.
13. Center for Business and Economic Research at the University of Nevada-Las Vegas, Clark County Demographics Summary: 2001 to 2035. Las Vegas, N.V.: by the authors. December 29, 2000.

14. Las Vegas Convention and Visitor Authority. Visitor Statistics: 1970 to Present. Las Vegas, NV; by the authors. 2000.
15. Carrie White, telephone interview by author, Las Vegas, NV on February 5, 2002.
16. Ibid.
17. Harris, Jason. "Mayor Expecting Explosive Growth," The Northern View Newspaper. January 30, 2001. The Northern View is a weekly publication focusing editorially on neighborhood news, including politics, personalities, zoning, entertainment, business growth, education and sports. It is published by the Las Vegas Review-Journal and Las Vegas Sun Newspapers, Las Vegas, NV.
18. Kay Brothers, interview with author, February 15, 2002.
19. Southern Nevada Water Authority. 1999 Water Resource Plan. Southern Nevada Water Authority, Las Vegas NV. 1999. Also in: Southern Nevada Water Authority. 2002 Water Resource Plan. Southern Nevada Water Authority, Las Vegas NV. 2002.
20. www.snwa.com/html/wr. Accessed April 20, 2001.
21. Ibid.
22. Ibid.
23. 2002 Water Resource Plan, Chapter 1, p. 13 and www.lvstormwater.com/whatis.
24. Ibid.
25. Kay Brothers, interview with author, February 15, 2002.
26. Critics to this policy are made up of several organizations, both large and small, and individuals who are long time residents who believe that the region has grown too much, too fast, taking a position similar to that voiced by Howard Hughes decades earlier. Historically, there have been "green" opposition groups going back to the 1907 debate over the establishment of the nuisance ordinances implemented to remediate the pollution caused by the business establishment in the downtown area (who denied the necessity of them). The largest of the modern groups is the local chapter of the Sierra Club. Earlier in this chapter "newness" was discussed as a concept that has been seized upon by advocates of growth and development. This newness has created a situation where the proponents of a more "green" approach to environmental policy are forced to play catchup with the more organized and much better funded growth advocates. An excellent example of this can be seen in the expansion of the Sierra Club's ability to devote personnel to various

issues. During an interview conducted on January 28, 2002 Jane Feldman, Conservation Committee Chairperson, stated that the club really did not have “anybody devoted full time to water issues because of a lack of manpower.” By September of 2003 they had people devoted to traffic issues, air quality, water, and public transportation. With more people moving into the region membership in the Sierra Club is increasing, providing the necessary manpower. In addition to the Sierra Club, each of the major newspapers now have reporters devoted to environmental issues, writing regularly on the environmental news of the region. Also, in the early 1990s the University of Nevada Las Vegas introduced an undergraduate degree program in Environmental Studies and several years later a graduate level program bringing even more attention to the environment in the region. There are also numerous individuals, some of whom are retired scientists (such as Dr. Larry Paulson), who are very vocal in their opposition to current policy and are active politically. Recently, these groups and individuals, led primarily by the Sierra Club, have banded together on some issues and are now forcing policy makers to rethink previously held positions. One example of this “green” political activism is the defeat of the proposed zoning change to allow a high density housing development adjacent to the Red Rock Canyon National Conservation Area, 17 miles west of the Las Vegas Strip, something that would have not been possible thirty years ago. The term “critics,” as used in this thesis, will mean these groups and individuals.

27. Associated Press (Washington, D.C.), contribution by Mary Manning, “Feds Shift Attention to Deadly Water-borne Bacteria” Las Vegas Sun Newspaper. July 11, 1996.

28. Manning, Mary. “Birds Blamed for Bacteria in Las Vegas Wash,” The Las Vegas Sun Newspaper. April 12, 2002.

29. Telephone interview with Nadir Sous, Supervisor Water Pollution Division, Department of Environmental Protection for the State of Nevada, conducted by author on November 19, 2002. Their view is that the vast volume of treated wastewater discharges dilute the urban runoff, thus resolving the problem. It is important for the reader to realize however, that the pollutants are still there in the water since dilution only attenuates the concentration of these pollutants below the detection limit. The detection limit is defined as “a statistically based value defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero,” see Domagalski, J. “Results of a Prototype Surface Water Network Design for Pesticides Developed for The San Joaquin River Basin, California” Journal of Hydrology 192 (1997) 33-50 p. 39. It will also be helpful to remember that the detection of pollutants is restricted only to those levels that current technology allows. They are still there.

30. Douglas Karafa, interview by author, July 21, 2000. Douglas Karafa is the Superintendent of Plant Operations, Clark County Water Treatment Plant located at 5857 E. Flamingo Road, Las Vegas Nevada. The interview was part of a tour that I

participated in along with several research scientists from the U.S. Environmental Protection Agency (EPA), National Exposure Research Laboratory, Environmental Chemistry Branch that is located at 744 E. Harmon Ave., Las Vegas Nevada. We were given a tour of the complete operation of the plant from wastewater intakes, through the entire process of treatment, ending at the discharge point where the water flows into the Las Vegas Wash on its way back to Lake Mead.

31. Daughton, C.G. & Thomas A. Ternes, "Pharmaceuticals and Personal Care Products in the Environment: Agents of Subtle Change?", Environmental Health Perspectives, Vol. 107, Supplement 6, December 1999 p. 907-937. and Osenwengie, L.I., & S. Steinberg. , On-Site Solid Phase Extraction and Laboratory Analysis of Ultra-Trace Synthetic Musks in Municipal Sewage Effluent Using Gas Chromatography- Mass Spectrometry in the Full Scan Mode. Journal of Chromatography A, 932 (2001) p.107-118. 2001.

32. Information on this is found at www.lvstormwater.com/npdes.html and also in the Clark County 208 Water Quality Management Plan.

33. Ibid.

34. Information on water sampling and testing can be found at the Las Vegas Valley Water District's website: www.lvvwd.com/html/wq_testing.html Accessed on September 19, 2003.

35. Daughton & Ternes, Environmental Health Perspectives, p. 913-921.

36. Ibid. p. 923.

37. The figures used are the high end flow numbers for both the dry and wet weather conditions. Dry figures are from 1995-1996 and the wet weather figures are from a storm event on February 21, 2000 at 12:00pm to 2:00pm. Greens argue that these higher end numbers do not take into account the constant growth, which increases the amount of developed urban area. Areas such as streets, parking lots, neighborhoods, etc. discharge water into the storm drains from lawn sprinklers, washing cars or any other activity that results in water running into the gutter. Increasing the surface area, or the amount of new developed urban area, increases the amount of pollutants collected. 1999-2000 Annual Report, Las Vegas Valley NPDES Municipal Stormwater Discharge Permit. Las Vegas Stormwater Quality Management Committee, August 2000.

38. <http://www.lvstormwater.com>

39. This information was obtained from the website that belongs to the Las Vegas Wash Coordination Committee. This is an advisory committee formed by the Southern Nevada Water Authority in 1998. This committee was established to ensure that the interests of all the Las Vegas Wash's stakeholders were represented. It is made up of local, state, and federal agencies along with environmental groups, business people and members of the public. More information can be found at:
<http://www.lvwash.org/thewash/birdlist/animallist/plantlist.html>; Internet accessed 3 March 2001.
40. An example of this would be a study along the lines as the one recommended in Chapter 5 of this thesis.
41. Bevans, Hugh E. et al. Synthetic Organic Compounds and Carp Endocrinology and Histology in Las Vegas Wash and Las Vegas and Callville Bays of Lake Mead, Nevada, 1992 and 1995. Water-Resources Investigations Report 96-4266, U.S. Geological Survey.
42. Hodge, Jessica. "Letter: Threats to Water Danger Overlooked," Las Vegas Sun. October 5, 1998.
43. Kay Brothers, interview with author, February 15, 2002.
44. Carrie White, telephone interview by author, Las Vegas, NV. on February 5, 2002.
45. Ibid.
46. Kay Brothers, interview by author, Las Vegas NV. February 15, 2002.
47. Carrie White, telephone interview by author, Las Vegas, NV. on February 5, 2002.

CHAPTER 4

THE ETHIC OF CIVIL ENVIRONMENTALISM

Introduction

Southern Nevada water officials are depending on the use of an existing federal policy that permits the return of enormous amounts of chemically treated urban waste water back into Lake Mead, in order to obtain credits. These credits are a necessary part of an overall policy, used by local water officials, to continue the pace of growth and development. Water officials and political leaders who want the growth to continue are also relying on the fact that the majority of citizens are new to the region and are not familiar with the issue. This ignorance of western water law and policy can be used to shape the discussion in their favor and to silence critics by labeling them as alarmists, elitist environmentalists, or newcomers who are uneducated in how water is managed in the west.

A Just Society

Are local leaders acting in the best interests of the society or in the interests of a few? In creating the government of the United States the original framers used the philosophy of John Locke to guide them during the formation of a new approach to self government. Members of this new society would come together and form a “civil society where men

have come together and agree upon what the society will be.”¹ This agreement is made among the members of this society to form a community where all can share in a common wealth, and enjoy the benefits of comfort, safety, and peace that this union will bring.²

In coming together for the common good the members consent to form a community or government where elected representatives of the people have a right to act for the rest.³ All the members agree to this and realize that in doing so, they give up some of their “natural rights” of independence and freedom in order to achieve the greater good. In this kind of society the members enjoy the benefits derived from the cooperation of the other members of that society. Wealth is shared, theoretically, in the way that will benefit all in the society better than what could be achieved by individual members trying to live on their own.

However, in order for this to work, all members of the community must be active participants in the process of governance. This involves being active in the process of electing representatives who will take part in the decision making, staying informed on the issues of the day, and remaining knowledgeable on the subjects that are necessary for the community to function.⁴ Social cooperation is essential for the process to work properly.

A Question of Fairness

As John Rawls explains, This idea of social cooperation is made up of three basic characteristics: ⁵

1. Behavior is guided by publicly recognized rules and procedures.
2. Established rules and procedures for the distribution of goods are understood

as being fair and are accepted by all members. It is perceived that all who comply are to benefit for complying.

3. This cooperation includes the idea of what each individual sees as good for the society. The society has developed a way of coming together and attaining a shared agreement, after being allowed to discuss differing views of what constitute the common good. In the end enough common ground is found in order to form a consensus on what the rules will be.

Social cooperation relies on these three characteristics to ensure that all members of the community see the actions of the majority as in their best interest. By being guided by recognized rules and procedures, decisions that are made in the name of the greater good are acceptable to the group. This is because the group has collectively decided upon these rules and procedures as the means to be used in achieving the desired end. The group being actively involved in the process accepts these rules as their own and is satisfied with them and their results. In addition, the process allows for change and reconsideration.

Each individual agrees to what the terms are that define what is fair to the group, by seeing them as fair individually. Each individual accepts them because he or she believes that in complying with them each individual stands to benefit from this action. In participating in the defining of what is fair each participant also ensures that he or she will benefit in any aspect of the common wealth that is to be shared by the society.

By defining what is good for the community in all of those aspects of what needs to be done for the community, the individual can see that the common good is what all agree

upon. If it turns out that the individual disagrees in what is seen as the common good that he or she was seeking, there is at least an opportunity not only to be heard, but to possibly convince others to change their point of view and that of the community over time. In achieving this idea of what the common good will be, the individual feels comfortable with the means that will be used to achieve the chosen end.⁶

Social Cooperation in Southern Nevada Water Policy

Because of the idea that society is a fair system of cooperation between free and equal persons,⁷ it would be useful to contrast the three basic tenets of social cooperation with what is happening here in southern Nevada with respect to the use of the return flow credit policy. It could be argued that the community is new, making it difficult to participate since we are still trying to grow into a society and are still trying to develop “a fair system of cooperation.”⁸ In other words we are still growing as a society. But most of us grew up in the United States, and studied the basic ideas of how our society works while in high school, so these concepts should be widely understood.

Publically Recognized Procedures

The population in Southern Nevada grew from approximately 550,000 in the mid 1980's to more than 1.5 million today.⁹ Because of this we are experiencing “growing pains” as we develop the societal norms that will become the framework for future environmental decisions. Ideology is a mixture of social beliefs and political interests.¹⁰ If, however, that mixture is in flux, in that there is a constant input of new social beliefs and interests, then time has to go by in order for this “mixture” to settle down.

People have moved here from all over the world, bringing with them their own societal values from where they came. The idea, for example, of what defines “clean water” would have one meaning for a person from Mexico City and another for someone from northern New England. The fundamental social and political values that are “believed to be the most legitimate and desirable”¹¹ differ from individual to individual. So when you speak to someone of what constitutes clean water, you may get different definitions.

This was one complication the greens had in keeping their message focused. With a population continuously growing they were continually trying to get everyone to see there was a problem. “Everyone” today is not the same as “everyone” a decade ago. With populations exploding and large tracts of homes now existing where a few years ago there was nothing but an open desert, opponents to this policy never could develop a consensus in goals and beliefs. There has not been sufficient time to for this to happen.

Developing what will become a social framework or ideology for environmental issues here in Southern Nevada faces the same difficulties. Time will be necessary for us to evolve. We need this time to develop the mixture of Southern Nevada beliefs and political interests necessary for us as a society to assign meaning to all the competing values. This however does not mean that we as citizens can abdicate our responsibilities as citizens.

In this light it might be argued that the public needs to begin to take part and begin the process of educating themselves in what is being done with regards to this policy. The process cannot be considered fair if the public is not involved. Without the

community members participating, the political players and the corporate interests of the developers are free to behave in the manner that most benefits their own personal, political, and corporate agendas. Non-participation on the part of the citizenry is seen as permission to maintain the status quo.

Fairness

Since all members do not receive benefits from complying, the process could be called unfair. The established terms of what is fair are those which increase only corporate profits or further a political ambition or goal or, both. The benefits of profit are granted to those corporate entities that are guided by the established rules and procedures. The benefits of increased political authority, reelection, and campaign funding are granted to those within the system that make the rules and enforce those regulations dealing with water issues. The rest of the society is left paying for this development through increasing taxes, degraded ecosystems, and pollution cleanup costs, as well as paying for health problems and the social costs of those health problems.

There is no guarantee that any consideration is being given to the benefit of those others in the community who are not part of the political-plus-corporate base. As it stands currently, those others in the community are often not even aware of what the rules and procedures are, what the terms of fairness are described as requiring, and how to comply to achieve any benefit from involvement in the current system.

Returning hundreds of millions of gallons of treated wastewater per day back into Lake Mead has consequences on the other components of our natural community, and inevitably on ourselves. Everything that we do has an impact on the other interdependent

parts that comprise the whole. Unfortunately this fact is being ignored. The mistake that is being made is that we have lost the ideal that the watershed in the valley, Lake Mead, and the Colorado River is a part of our community. They are not properly the exclusive property of the politicians, casino owners, developers, or industry to be used for their exclusive advancement. They are part and parcel of the natural community here and are to be used and cared for by those who live here, for the common wealth.

Shared Public Good

Using the public's lack of knowledge to further political agendas or for profit, without making a real attempt to ensure that they are brought along, is corrupt. By not establishing the terms of fairness, the community is robbed of its resources, its "common wealth." If the good, the fairness, and the rules and procedures to achieve these goals are established by a small minority that intentionally keeps them in the dark, or purposely encourages their ignorance, then that is unethical.

Water is always a limiting factor in the desert. The decision to grow and develop southern Nevada always had the restriction of a limited water supply to contend with. During the interviews conducted during the research for this thesis, when asked "what ethic is used in developing water policy in southern Nevada?", both sides of the argument acknowledged that there was no specific ethic used in the decision making process.¹² A comprehensive description was always given of the process used to advise decision makers in formulating a certain policy or the procedure used to ensure compliance with applicable rules, regulations and laws, but in the end all who were interviewed, with the exception of the Howard Hughes Corporation,¹³ stated there is no single guiding ethic.

Civic Environmentalism

People must engage civic issues when it comes to devising solutions to environmental problems. “Contaminated urban land, suburban sprawl, polluted water, and drained wetlands are some of the physical effects of development that ultimately are a reflection of the civic health of a community.”¹⁴ What is needed is for us as a community to take a new approach in improving our civic health; what is needed is civic environmentalism.

Water nourishes the ecosystems here, ecosystems of which we are part, and on which we depend for our very existence. But water is viewed as a resource to be exploited, to be used by man to increase the profitability of the region, for man (in actuality only some). We seem to forget that “humans remain residents in an ecosystem, that an ecology always lies in the background of culture.”¹⁵

The development community and their political allies have seized on the fact that a majority of the public is new to the region and not aware of all the complexities of water management in the desert southwest. This enables them to push for policies that will benefit themselves, even if the long term results are not necessarily what is wise, such as feeding development through the policy of return credits.

There can be a relationship between building civic health through participation and maintaining the quality of the environment. “No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions.”¹⁶ Communities that enjoy a good, clean, healthy

environments also have members of their community who are involved, and care about their surroundings and their neighborhoods. Citizens are politically active.

This is where we can make our newness work for the betterment of the society here and to help create a sense of place that we can grow in as a community. The answer to doing this lies in the adoption of the core concepts of an idea known as *civic environmentalism* because “what ultimately defines and distinguishes it from other forms of social action is the explicit link between environmental problem solving and the goal of community building. It is about ensuring the quality and sustainability of our communities economically, socially, and environmentally.”¹⁷ “A place worth living in and leaving to future generations requires the investment of time and money, as well as an understanding of the fundamental relation between the quality of the physical environment and society’s overall quality of life.”¹⁸ We are now building what may be considered a place that is worth leaving to the future generations who will follow us.

We need to develop the habits of being involved citizens and insure that policy officials and government bodies are compelled to hold substantive public meetings when deciding on a policy action that impacts the citizenry, such as water policy. This participation can insure that sustainable economic development, to the greatest extent possible, does not occur at the expense of future generations or natural resources, by reminding elected decision makers that they will be held accountable by involved voters, not merely watched by nonparticipating spectators. The current situation has instilled an arrogance in some public officials where they feel no hesitation to tell critics of their policy that they cannot speak or to sit down and shut-up.¹⁹

In order to begin to think this way we need to first examine each of the six core concepts that define civic environmentalism.²⁰ This will give us a starting point in developing those ideals that can enable us to make both a healthy community and society and a healthy environment. Each is essential in developing this objective of making this community a desirable place to live.

These core concepts are defined in the following way: 1. *Participation*: “at the root of civic environmentalism is meaningful, informed participation in the decision making procedures that affect the quality of peoples’ lives.” 2. *Community and regional planning*: “communities want to ensure that future generations will inherit a healthy and vital place to live. Participation and planning are mutually dependent practices that help develop a strong sense of community and common purpose.” 3. *Environmental education*: “a central component that helps enforce the notion that environmental and social conditions are mutually reinforcing and local communities possess the power to change their circumstances. A precursor to #2 that informs both the producers and consumers about environmental and social costs.” 4. *Industrial ecology*: “a conceptual and practical model for integrating environmental protection measures with economic and community development initiatives. It is a life cycle approach to industrial production that has the industrial process functioning roughly in the same way that ecosystems do, in that it is clean and sustainable.” 5. *Environmental justice*: “holds that democracy works best when everyone lives, works, and plays in a safe and healthy environment. It asks the question: are ordinary people, especially the disenfranchised participating in the decision-making procedures of the institutions that fundamentally regulate their lives?”

6. *Place*: "Civic environmentalism strives to develop and reinforce a sense and experience of place to help ground citizens to their communities and bolster their sense of a shared destiny."²¹

How Southern Nevada Currently Measures Up

Having now discussed what this concept of civic environmentalism is, it will be beneficial to look at how southern Nevada measures up to the core concepts of this ethic.

Participation

At the root of the idea of civic environmentalism is participation-- meaningful -- informed -- intelligent -- participation -- of those whom the implementation of policy will impact the most. An uninformed public can neither participate nor even understand the scope of the issues and how these problems will impact them directly through quality of life issues such as drinkable water, or indirectly in taxes that are imposed to pay for water treatment facilities necessary to get water from ground to tap.

There is not a great deal of public participation in the development of environmental policy in southern Nevada. As was previously discussed, with the population in a constant state of growth, maintaining momentum is difficult at best for groups committed to political actions of any kind. This in particular has been a shortcoming of the greens. Elected public officials advocating growth and those groups that are profiting from it have been able to seize the opportunities presented to them in a much more effective manner than their opponents. This was due to several factors but largely it was because they were better funded and organized initially. The greens have been forced to try and play catch up ever since.

This one-sidedness has resulted in safeguarding the development community's interests against the implementation of environmental policies that may impact their business plans.

Community and Regional Planning

This concept starts with the understanding that we as a society need think not only of ourselves in the here and now, but also of our children's children. Future generations will need to have a healthy Lake Mead with an equally healthy watershed system in the lower Colorado River. Participation and planning are essential elements that must be used together. In planning all actions that will involve the environment, it is necessary to adopt a naturalistic culture in planning our communities.

A 'naturalistic' culture is a way of living that imitates nature or its natural surroundings and is imparted to future generations. In a society that has a naturalistic culture, decisions are based on the impact that they will have on the ecosystem in which the society lives. For example, a decision to double, or triple, the amount of treated wastewater discharged for return credits should be based on this action's impact, not only on the potential for growth in southern Nevada, but also on the consequences that will result from that much chemically treated wastewater being introduced into the biosphere of the watershed. To counter the effects of this increase in discharge, using this naturalistic view, you would equally double or triple the size of the current wetland area, using a wetlands natural filtering ability to further filter and cleanse the water.

In reviewing regional plans dealing with development in southern Nevada, it appears that the only voice that gets heard is that of the developers and their advocates. There is

the appearance that corporate interests are the overriding factor in water policy. While growth and development are important in the economic health of a region, there are other considerations such as developing the supporting social infrastructure to sustain the new populations to be considered (police, fire, public schools). Growing beyond the ability to sustain the population with basics such as clean water is, in the end, self-destructive. If these issues are not carefully thought out, we will run out of water or it will become so expensive to make potable that we will see an emigration of people instead of the growth we have experienced. There is great potential to overextend ourselves and end up in a real crisis from natural events such as a low mountain snowfall in those regions that feed the Colorado River.

Environmental Education

This is another vital portion to this concept of creating a naturalistic culture. It helps to “support the notion that environmental and social conditions are mutually reinforcing and that local communities possess the power to change their circumstances.”²²

However, this ability for communities to change has been slow in coming in southern Nevada. For example, the Sierra Club has traditionally led the way in educating the public in environmental issues and how it relates to an individual’s day-to-day life.

While they have seen a steady rise in membership in the region, the pace of growth and the resulting environmental problems that are associated with that growth, have far exceeded their ability to keep up. They have gone from working environmental issues in what could be characterized as a medium sized desert community with medium sized issues to a large metropolis with large scale problems with air, water, and other urban

pollution in a very short time. The Sierra Club and other like-minded groups are trying, but funding is always an issue and these organizations are continually laboring to catch up. They are forced to make do or find themselves in situations where the complexities of the issues are beyond the abilities of those attempting to deal with them.

Another area where environmental education has traditionally fostered and grown has been the public school system. The Southern Nevada Water Authority has a comprehensive education program aimed at providing teachers and students with water information. They publish a newsletter grouped by grade and age group of the intended audience. These are provided in both English and Spanish and are published several times a year. It is a very good program. Unfortunately, as with most all of the components of this exploding society, they too are just trying to keep up. Within the school system there is an annual struggle just to find enough teachers to fill shortfalls created by the numerous new schools that open every year. District wide cutbacks, due to lack of funding, are being implemented and all school programs are potentially on the budget chopping block. Before they can focus on teaching new generations about the importance of the environment, the public school systems are forced into working within increasingly shrinking budgets and are looking at severe cuts in fundamental requirements.

We are, whether we realize it or not, causing a change in the natural environment. Evolution is adaptable over time, but sudden changes to the evolved processes in place have an impact on the system, and in turn affect the societies that depend on those ecosystems to sustain them.

Education will show us in southern Nevada how to understand what those changes are and how they are going to affect the ability to live here.

Industrial Ecology

This idea looks at using a model for industry that integrates environmental protective measures with economic and community development initiatives. In other words, the actions necessary to safeguard the environment are made a part of the business model from start to finish. We adopt the belief that in protecting the environment we are protecting ourselves. Part of this is using a life cycle approach to industrial production.²³

The concepts of reduce, reuse and recycle are incorporated into production. A naturalistic culture is developed and nurtured. We become less wasteful and more aware of the actions that we take and how they impact the society, for under this philosophy the impact to the environment, whether positive or negative, is also an impact to the society that lives in that environment. Each is a part of the other. Both depend on each other for their well-being. A wasteful, inefficient, dirty society will create a dirty, wasteful, and depleted environment through its excesses and abuses. In southern Nevada we pay only token attention to this concept. The overriding factor in water policy is to get it back as quickly as possible, for credit.

Environmental Justice

This concept holds that democracy works best when everyone lives, works, and plays in a safe, healthy environment. It also asks the question, “are ordinary people, especially the poor participating in the decision making process of the institutions that fundamentally regulate their lives?”²⁴ By providing the means for the underprivileged to

participate in the process of making policy they become involved and are shown that they are as much of a part of the society as anyone else, that someone cares what they think and what they have to say. It can also empower people and can renew in them a sense that they have some control over their own destiny. They can have a say in what happens in their neighborhoods and in the environment that they live in. It helps foster a sense of place (to be discussed below), that this is my home.

The capacity to sustain a population in the desert is determined by many factors. One of the most important is a permanent water supply that is clean and in sufficient quantity to sustain the population year round. Currently in southern Nevada ordinary people do not have a real voice in the decision making process. They are currently excluded by ignorance of the facts brought on by a system that wants them to remain unaware, presented with meetings where public input is limited to five minutes at the end, or subjected to public hearings where they are told by elected officials to sit down and shut up when they voice an opinion that is not what officials want to hear.

This is by no means a sign that we have a healthy system of environmental justice here. It is one area in which great improvement is needed. Southern Nevada continues to develop the desert and feeds this growth by using a policy that cannot be sustained indefinitely. The status quo has taken advantage of the situation to form the debate in such a way as to ensure their view is always heard, while disagreement is ignored. The participants who stand to profit from this development insist that growth is good, there is no shortage of water, and the quality of the water returning to Lake Mead is fine. But the perception is there that Howard Hughes warned of decades earlier, and with good reason:

we have a system designed for a population that was present decades ago. It has become harder and harder for opponents to policies (like those to returning water for credit) to be heard, or to be taken seriously when public officials view the water is there to do with as they see fit

Place

Civic environmentalism strives to develop and reinforce a sense and experience of place to help ground citizens to their communities and bolster their sense of a shared destiny.²⁵ In order to care about the environment you have to have a sense of belonging to a place or to being a part of the environment. Without this feeling of belonging you do not have the sense of being a part of it. Without roots to a place you have no sense of caring for it. When there is no compassion for the environment then it can be viewed merely as a commodity or a thing to be used and exploited for personal gain.

Attachment means caring. This leads to the idea that a place is more than just a city or just a lake, but that it is much more. It is a place where I live, that I enjoy, that I am attached to. It becomes personal because it is part of you, part of your life. All of us can remember a place that as a child we would go when we had to think, to make a decision, or to just to get away from it all. This was much more than just some place, it became part of our lives. We grew within it and in doing so it became part of us. A sense is developed that I am part of it, and it is part of me. Memories are made there. It becomes something to pass on to future generations, to our children and theirs.

Southern Nevada needs to develop this sense of being a place, and of its people belonging to it. (In Chapter Five a recommendation for assisting in developing this sense

of place will be discussed). Members of the society need to grow a sense of community and to realize our shared destiny. As is the case when any group of people are initially brought together, time is necessary for bonds to develop among the members: time for a sense of belonging to this group and that each member is a part of the greater whole; time to build experiences together to forge that sense of shared destiny and to begin to see this region as a place, and a place that belongs to all members of the society, so that whatever ends that are chosen to strive for, the means to get there are shared and developed by all members of the group.

Currently that is lacking in this new community we are building, but that is natural and expected. The sooner we decide to come together in the way we view ourselves and this community in the desert the sooner the sense of shared destiny will develop. It may very well be that growth should stop now, and the focus put on improving the quality of life instead of the quantity.

Conclusion

As was said in the beginning of this chapter, “a place worth living in and leaving to future generations requires the investment of time.”²⁶ Southern Nevada can be such a place if, collectively, we deal with our growth and development. The dilemma facing this community is that this expansion has been extensive and achieved in a very brief period of time. We need time to let things settle down and focus on our situation.

Currently, there is no shared public good in the policy structure as it is managed. By complying with established rules and procedures the benefits of growth, growth made

possible only by the adoption of this current policy, go to the developers and their political allies who are receiving the lion's share of the benefits. The positive side of this growth- increased revenues from a broader base- is not shared with the rest of society who are bearing the brunt of the negative side of this growth. Increased taxes and rates to pay for an ever-growing water delivery system that never seems to be quite enough, the cleanup of damage caused by poorly designed systems, and remediation costs to mitigate damage from pollution, are borne by society as a whole. So there is a great disproportion between benefits and burdens - the classic definition of a great injustice.

By taking advantage of the newness of the society and their unfamiliarity with the issue it has been easy for the established power base to maintain the status quo. Participation by those paying for this policy can ensure that, at the very least, the system that is put in place is one that makes sense, the main water intake is not located directly downstream from the effluent discharge, and elected officials know they are facing an engaged public that will hold them accountable for the policies put in place.

What is needed is an ethic on which decisions on water policy and environmental policy in general are based. The use of the idea of civic environmentalism as a basis from which this ethic can grow is worth exploring. By capitalizing on the fact that we are new as a community, we can take advantage of a great opportunity to not make the past mistakes that older communities have made when dealing with waste water disposal and the other associated water issues that inevitably arise with large human populations. A system can be designed and implemented that fits the needs of the region. A means to this end is suggested in the next chapter.

As will be discussed in the next chapter, the policy of diverting greater amounts of water to feed greater amounts of development and then balancing the books with return flow credits, can no longer sustain the projected population increases that are currently being proposed. Recent events have resulted in the admission of this fact by public officials, driven partially by the realities of what is happening to Lake Mead (as predicted by the greens' argument, and now being acknowledged by some on the technical rationality side of the debate) and the reality that there is just no more water to be had.

NOTES

CHAPTER 4

1. Locke, John. Second Treatise of Government. Chapter VIII Sections 95-98. , Hackett Publishing Company, Indianapolis, IN. 1690.
2. Ibid., Chapter X, sections 132 and 133.
3. Ibid., Chapter VII, sections 87 and 88.
4. Rawls, John. Justice as Fairness: A Restatement. Harvard University Press, Cambridge MA. 2001. p. 5.
5. Ibid. p. 5-7.
6. Ibid. p. 140-145.
7. Ibid.
8. Ibid.
9. Center for Business and Economic Research at the University of Nevada/Las Vegas. Clark County Demographics Summary: 2001 to 2035. Las Vegas, N.V.: by the authors. December 29, 2000.
10. Fischer, Frank. Evaluating Public Policy. p. 157.
11. Ibid. p. 157-158.
12. This question was asked of these three following individuals, who each in their own way, speak for the group which they represent. This gave an excellent indication for the feelings that are out there on what ethical standard is used in making environmental policy. (When the same question was asked of ordinary citizens, the answer was remarkably similar.) The three individuals are: Jane Feldman, interview by author, January 28, 2002. Jane Feldman is the co-chairperson for the Conservation Committee of the Southern Nevada Chapter of the Sierra Club. Carrie White, telephone interview by author, Las Vegas, NV. February 5, 2002. Carrie White is a Senior Environmental Planner for Clark County, Nevada. Kay Brothers, interview with author, February 15, 2002. Kay Brothers is the Director of Resources, Southern Nevada Water Authority, Las Vegas, Nevada.

13. In any construction decision that this corporation makes they consider the effect on the ecosystem involved and how this impact can be minimized. All designs incorporate landscaping that will use the least amount of water and use only native plant species. This is a model that is used in all new home construction by the Howard Hughes Corporation and was described in great detail during an interview with Tom Warden, on February 28, 2002. Tom Warden is the Vice-President of Public Relations and the interview was held in the corporate conference room, in their Las Vegas NV office. Out of most developers that are involved in the region, they actually have a “green” outlook from which all decisions are based. The interview was set up in part from a recommendation from the southern Nevada Chapter of the Sierra Club.

14. Shutkin, William. The Land That Could Be: Environmentalism and Democracy in the Twenty-First Century. MIT Press, Cambridge MA. 2000. p. 46.

15. Rolston, Holmes. Environmental Ethics: Duties to and Values in The Natural World. Temple University Press, Philadelphia, PA. 1988. p. 3.

16. Leopold, Aldo. “The Land Ethic” A Sand County Almanac. Oxford University Press. New York, NY. 1949. p. 209-210.

17. Shutkin, W. The Land That Could Be. p. 128.

18. Ibid.

19. Two examples of this are: 1. County Commissioner Yvonne Atkinson Gates told Dr. Jeffrey Arenswald to “shut-up” during the public comment portion of the July 31, 2002 Clark County Commission Hearing on new enforcement laws dealing with strip clubs. She later apologized for her comment. 2. On December 4, 2001 North Las Vegas Mayor Michael Montandon stopped accepting public comment for most items that came before the city council meetings. Prior to that he had limited public comment, but then decided to stop it entirely. He felt that “some in the audience have started to abuse the extremely liberal way I have handled public comments.” When criticized the mayor stated that residents had other ways to be heard “every couple of years you vote.” Remarkably there was no backing off from this position and as of February 2003 the matter was still pending at the Nevada Supreme Court. 1. Wagner, A., “Dancers, Others Upset Over County Move to Limit Vegas Lap Dancing,” Las Vegas Sun. July 31, 2002. 2. Winkler, M. “Mayor Limits Public Comment at Meetings,” Las Vegas Sun. December 7, 2001 and Harris, Jason, “North Las Vegas: The Year in Review,” Northern View, February 12, 2003.

20. Shutkin, William. The Land That Could Be. p. 128-141.

21. Ibid.

22. Ibid.
23. Ibid.
24. Ibid.
25. Ibid.
26. Ibid., p. 128.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The decision was made by the southern Nevada political and business establishment in the mid-to late 1980's that unlimited, virtually unplanned growth and development was going to be good for the economy in southern Nevada. Obtaining a permanent water supply however, was a major obstacle in implementing this plan, because the State of Nevada was only allowed 300,000 acre-feet per year of Colorado River water. With this limitation, and the reality that other permanent sources were not abundantly accessible, water officials and the political leadership decided to use the existing federal policies governing water use on the Colorado River to their advantage. Since existing policy allowed for diversions and credits for returns, they would use it to feed unrestricted growth and development in southern Nevada. The plan was simple: divert as much as was needed and return for credit the amount necessary to balance out the total so it remained within the state's apportionment.

In the past the return policy had generally dealt with credit for return or seepage flows, generally from agriculture activities, in quantities much smaller than those being returned by the Southern Nevada Water Authority. Even the definition of "return flow" had its origins in agriculture: "a return flow is any flow which returns after an irrigation

diversion, to a stream channel, surface stream, or groundwater aquifer, which is not consumed in evaporation or transpiration.”¹

Nevada’s usage of this policy was going to turn out to be quite different. Since wastewater flow meters, installed in Las Vegas Wash, cannot tell how much of the return flows originated in the Colorado River, in 1984 the Colorado River Commission agreed to a methodology that is unique to the state of Nevada.² This was how the Southern Nevada Water Authority was able to overcome the water obstacle.

What Does This Mean?

As was addressed in Chapter Three the majority of residents are new to the area. This “newness” has meant that they are not acquainted with return flow credits in water policy or the underlying principles in western water law. By taking advantage of this newness, it has been much easier for those who wish to sustain high growth rates to form the discussion in their favor. This has resulted in a political environment where it has been easy for those with their own agenda to “spin” any argument put forth by the minority of involved citizens who voiced objections, as simply the difference between a technical rationality approach to the issue versus an environmental or green one. They have been successful.

Substantiation of the extent of this detachment by the public can be found by reviewing the voting records. According to the year 2000 census,³ in Clark County there were 1,023,995 people 18 or older. Of this number, 641,989 were registered to vote. In the 2000 election however, only 555,722 were active voters,⁴ 69.24% voting in the general election and 21.75% voting in the primary election. Voter turnout was high this

year. In the preceding year, 1999, 23.58% voted in the general election and 22.77% in the primary. In the year following the presidential election, 2001, only 14.11% voted in the general election and 12.36% in the primary.⁵

This is not unique to southern Nevada. There has been a steady decline in the social health of the United States. A study conducted by the Fordham University Institute for Innovation in Social Policy found that “of the eight worst years depicting public involvement in the political process since 1970, six were in the 1990's.”⁶ Also, research conducted by Robert Putman corroborates the Fordham study: “the number of Americans who reported that in the past year they attended a public meeting on municipal or school affairs dropped from 23% in 1973 to 13% in 1993. By almost every measure Americans’ direct engagement in politics and government has fallen steadily and sharply over the last generation.”⁷

One theory as to why this is so is the influence of money in the political process and its impact on decision making. Elections are expensive and campaigns are financed through contributions. “For the most part, these contributions come from large blocks of private wealth. People without money, those from lower income and working- class backgrounds, are effectively denied the opportunity to affect the political programs and positions of candidates in the race. Citizens without money to give are totally excluded from participating. Therefore, money in politics has had the effect of turning voters off to the process and consequently seeing them walk away from being able to influence the decision making that has a profound impact on their daily lives.”⁸

What does this have to do with the return flow credit policy? Remembering the concepts of civic environmentalism will answer this. People who are involved with the political process also care about where they live. They have a strong sense of place. They want to ensure that future generations inherit a healthy place to live. Without public involvement in developing policy those seeking to further their own business or political agendas are free to do as they please, seeing public silence as an acceptance of their actions and policies.

Where We Are Today

In answering whether we are knowingly forsaking water quality to ensure nonstop growth, or if there are unintended destructive effects to Lake Mead from the return of millions of gallons of treated effluent per day, it is not difficult to separate spin and propaganda from the facts. Several of the premises on which the advocates for this policy base their argument, do not hold up to scrutiny. They are discussed below.

First, located on the Southern Nevada Water Authority web site,⁹ which is used to inform the general public on a variety of regional water topics, is information that describes Lake Mead as “an excellent source of high-quality water because it comes from the Colorado River.” This statement may be misleading. While it is true that Colorado River water does originate as snow melt it is not pollutant free, and can hardly be characterized as high-quality water. By the time the water has reached Lake Mead it has been used extensively in Wyoming, Utah, Colorado, and Arizona and is considered to be some of the most drawn upon water in the western United States. It has the warmest water, the most damaging salinity problems, and carries more silt than any other river in

the United States.¹⁰ In addition, the river receives runoff, seepage, spills, and flows laden with all of the pesticides and herbicides associated with agriculture and ranching activities that take place along the river in these states. This water must go through a rigorous and expensive treatment process before it is safe to drink.

Next, there are the billions of taxpayer dollars that are going to be spent, now and in the upcoming decades, to ensure that infrastructure, wastewater treatment upgrades and new facilities are in place to continuously meet an ever growing demand. There was little choice in the expenditure of these dollars if growth was to continue. Facilities quickly become obsolete. Water officials play a continuous game of “keep-up” in order to provide for the thousands of new residents arriving annually. In addition, there is the annual cost¹¹ to Clark County to maintain and repair the damage done to the Las Vegas Wash due to the high flow rates and resulting channelization, all paid for with local taxes, rate increases, or state and federal funds.

This channelization has lead to large amounts of sediments being deposited into the Las Vegas Bay, located at the mouth of where the wash enters the lake. The U.S. Park Service has estimated that the erosion over the past 30 years has deposited 4.5 million cubic yards of material into the delta located in the bay.¹² Because of this, the Las Vegas Bay Marina owned and operated in Las Vegas Bay for more than 45 years was forced to move to a new location approximately 14 miles south of its original location in Lake Mead.¹³ The damage was inflicted by the rapid return of effluent, the green opponents argue, and the repairs necessary to regain the ability to effectively manage the issue will cost millions.

In addition to the sediment deposition, other changes are occurring in Lake Mead. It may first help to understand the life cycle of any lake (natural or man-made). There are three naturally occurring stages in this life cycle.¹⁴ The first stage is called the oligotrophic stage which is characterized by the rapid growth of a variety and number of different species. The second stage is called the mesotrophic stage in which there is a progressive stability of species in the lake. The third and final stage is the eutrophic stage during which “less complex organisms take over and the lake appears to become gradually choked with weeds.” Eventually over time this process, combined with sedimentation build-ups, results in a lake becoming overgrown with plant life. Eutrophication is a continually occurring natural process in the life cycle of *all lakes* and is sustained by the input of energy.

This energy comes from sunlight and nutrients such as Nitrogen (N), Phosphorus (P), and Carbon (C) which are fed into the lake through the natural life cycles that occur in nature. As organisms die and are absorbed back into the environment, these compounds are released and cycle back into the water, air and soil. Sunlight acts as the catalyst or the means that increases the rate of these chemical reactions. In nature the input of N, P, and C occurs at steady rates depending on the type of ecosystem that the lake is located in. For example, a lake in a temperate environment has evolved to receive these compounds at a given input rate. This has led to the rest of the system (fish, plants, mammals, etc.) to evolve their individual rates of development according to this input. But this cycle, one that may take thousands of years to transpire naturally, can be greatly accelerated if nutrients are introduced into the lake as a result of human activity.¹⁵

Urban effluent is rich in the nutrients Nitrogen (N), Phosphorus (P), and Carbon (C). Some of the human sources of these compounds are excrement, synthetic detergents, and fertilizers. The unlimited introduction of these compounds results in an uncontrolled growth of algae, which upsets the natural cycle of events in a lake.¹⁶ Discharging millions of gallons of effluent a day provides enormous amounts of the nutrients needed for this accelerated growth of algae to take place. The more effluent returned the more N, P, and C stored in the system. This results in an overabundance of algae growth because the water is now so nutrient rich. Huge, teeming carpets of algae grow virtually unchecked because of the around-the-clock input of nutrients into the system.

When those algae carpets eventually die they drop to the lake bottom and become a source of food for bacteria. These bacteria attack the algae and begin to decompose it. During the process of decomposition the bacteria use all of the available oxygen in the water. As more and more algae is produced and falls to the lake bottom, more and more oxygen in the water is consumed. Eventually the normal biological activity found in the lake is restricted to the upper few feet. All this causes the water to become opaque, decreasing light penetration, which then results in algae production being restricted to this top portion of the water. Finally, the water becomes so depleted of oxygen that all aquatic life begins to die.¹⁷

The Las Vegas Bay “experiences frequent eutrophication due to nutrient loading from the Las Vegas Wash.”¹⁸ As discussed in Chapter Two this has resulted in significant problems in the past. In September 1977 the U.S. EPA published a report on Lake Mead which was part of the National Eutrophication Survey that was initiated in

1972 in “response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs” in the United States.¹⁹ This report found that Lake Mead was “borderline between mesotrophic and oligotrophic with the exception of the inner Las Vegas Bay and the Las Vegas Wash area. These last two areas are meso-eutrophic and eutrophic respectively. The remainder of the lake appears to be in excellent condition. The lake appears to be acting as an effective nutrient trap, with more than 90% of the phosphorus loading being retained by the lake. This loading can be expected to lead toward eutrophic conditions if substantial reductions of phosphorus loading from the Las Vegas Wash is not achieved.”²⁰

Another study on the effect that effluent discharges were having on the eutrophication process in Las Vegas Bay and Lake Mead was published in 1986.²¹ This study concluded that Las Vegas Bay was the most eutrophic section of Lake Mead found during the study and that “this classification has remained unchanged since the results of a 1970 survey of water quality within Lake Mead, conducted by the U.S. Department of the Interior, were published.”²²

In May of 2001 algae growth in Las Vegas Bay was once again a cause for concern and consternation among the public and water officials. This bloom which started to build in February was soon being described as “the largest green algae growth in the lake’s 66-year history.”²³ Incredibly, water officials stumbled around with explanations to the public. In the April 25, 2001 edition of the *Las Vegas Sun* Jim LaBounty, an aquatic biologist and consultant to the Southern Nevada Water Authority, was quoted as saying that the bloom could be attributed to “winter rains washing nitrogen into the lake.”

The very next month it was being characterized as the largest ever, as discussed above. By July Nevada officials were planning to ask the Federal government to provide funds to find out what was causing the algae growths. Tim Porta, Director of the State Bureau of Water Quality Planning was quoted as saying that when the task force responsible for looking into this problem sought out scientific papers on the particular algae species they only found one. "We had to have it translated because it was written in German. This algae is so common that no one studies it. Most of the time it floats in Lake Mead's water and is invisible to the naked eye."²⁴

Water officials began debating what the possible causes for this continuing bloom might be. The reasons debated were the high levels of nutrients from effluent discharges or mild winter temperatures, lower water levels in the lake, or even higher nutrient loads in the bottom sediments.²⁵ The available information (easily found for this thesis) on this topic, dating back almost thirty-five years, was apparently not known to or ignored by these officials. These local officials, unable to come to a decision, finally determined the issue required more study before deciding upon a course of action to be taken. Shortly thereafter the algae blooms broke up, the algae sank to the lake bottom, and the problem went away (for the time being). Bacteria began consuming the algae and removing oxygen at depth. Officials moved onto other issues.

Another area of concern is that water from the Las Vegas wash is warmer, has greater conductivity, turbidity, suspended and dissolved solids and a greater density than the main-body water in Lake Mead. This results in an underflow (that extends until equilibrium is met) that can cause an inter-flow or overflow above the hypolimnion in the

main body of Lake Mead (the hypolimnion is the lower, cooler, non-circulating water in a thermally layered lake in summer). “At certain times of the year the intrusion of the Las Vegas Wash can be detected at various depths to Hoover Dam, which is approximately 16 kilometers downstream.”²⁶

If the zone between the warm surface waters and cooler, deeper water is below the depth at which photosynthesis produces oxygen, then the dissolved oxygen supply of the lake depletes gradually and re-oxygenation is possible only when the thermal layers break up in autumn.²⁷ The overflow from Las Vegas Wash forces this layer further down accelerating the depletion of the dissolved oxygen. This combined with the decay of algae in the Las Vegas Bay has the potential to initiate large fish die-offs in the lake due to oxygen depletion in the water.

In 1996 fish from the Las Vegas Wash and Las Vegas Bay were reported to “have significantly different plasma sex steroid and vitellogenin (sex hormones) levels than fish collected from a reference site in Callville Bay.”²⁸ They were found to have endocrine disruptive effects that are associated with estrogenic compounds found in waste water effluents.²⁹ These compounds are part of a class of compounds known as endocrine disrupting compounds. They are synthetic chemical compounds that can disrupt hormonal systems and cause low sperm counts or abnormal sexual development in males, and experiments have shown that “even small shifts in hormones before birth can matter a great deal and have consequences that lasts a lifetime.”³⁰

In addition to this work, a 2002 study found that fish from the Las Vegas Wash and Las Vegas Bay were found to contain significant levels of synthetic musk compounds,

including some compounds that were banned in the 1970's because of their toxicity.³¹

Also the concentrations of some commonly used synthetic organic chemicals were found to be “greater in water sediment, and fish tissues from the Las Vegas Wash and Las Vegas Bay when compared with similar samples from Callville Bay.”³²

Analysis of water samples taken from sites in the Boulder Basin of Lake Mead³³ contained many chemicals found in several classes of estrogenic degradation products along with those chemicals used in the pharmaceuticals and personal care products (PPCPs) shown in Table 3. Furthermore, the water in the Las Vegas Wash and Las Vegas Bay was found to be very “estrogenic” (heavy in endocrine disrupting compounds).³⁴

Table 3. Examples of Some PPCPs Detected in the Las Vegas Bay of Lake Mead.

<u>Compounds</u>	<u>Usage</u>
Dilantin, Myidone, Luminal	seizure treatment
Codeine, Hydrocodone,	pain medication
Tricosan	antibacterial
Robotusin	expectorant
Oxybenzone	sunscreen
Trental	blood thinner
Meprobamate	anti-anxiety
Carisprodol, Methocarbamol	muscle spasm
DEET	insect repellent
Acridine, p-Chloroaniline	dyes

Finally, but perhaps most damaging to the technical rationality argument, is the basic design of the system itself. When the population of southern Nevada could be measured in the hundreds of thousands, having the intake directly downstream from the discharge point was not a big concern. A larger portion of those smaller, slower flowing daily returns were absorbed by the existing wetlands area or became diluted in the area where the wash enters Las Vegas Bay.

Today with current flows at 160 million gallons a day and plans to increase these amounts, the discharge is given less time to dilute with existing lake water, or to slowly flow through the wetlands area. Effluent discharges are returning as fast as possible, for the credits needed to divert larger and larger amounts of Colorado River water. With such large, fast-moving discharge flows the water is forced to travel a narrow loop; the recently discharged water being sucked up by the intake almost as soon as it flows back into the lake.

Instead of designing and constructing a new system, the new one was just added onto the old one. This strategy of adding onto the existing system merely exacerbated the situation. Water officials found themselves spending millions of dollars in what amounted to a patchwork design for a water structure. No sooner was one project completed than the need to add to or update another became evident. In the meantime more and more treated effluent, along with rocket fuel, bacteria, pesticides, herbicides, and all the other chemical compounds that are known to flow from large cities, continue to make their way toward the intake at Saddle Island.

Summary

This thesis research has found that the technical rationality approach is scientifically false in places, incomplete in places, and short sighted in places. The “green” position is built on better science and more reasonable rationality. There are several reasons for this conclusion:

1. The technical rationality approach focuses on short-range solutions with existing technologies and ignores the history of the region. The cycle starting in 1907, described in earlier chapters, continues today. Implementation of these short term fixes have accomplish nothing in the long term. Ignoring past problems or merely mimicking past actions only ensures that the cycle will continue. No real progress can be made in breaking this cycle until a long term solution is found, preferably one that is environmentally sustainable. Substantial effort must be undertaken to break this cycle. Returning treated wastewater to maximize the quantity of credits to further development is neither sustainable or wise. The emphasis should be on the quality of the water returned, not the quantity. Doing so will help in eliminating the constant reappearance of serious environmental emergencies. Cleansing the water above the minimum required standards will also have the benefit of being be economical in the long term thereby, reducing the need for vast expenditures of resources in solving yet another environmental crisis. By spending the money on the front end of the process, you reduce the potential for spending greater sums in cleanup costs later on because the water was of only minimumly acceptable quality to begin with.

2. The silence of the local political establishment who would not be interviewed for this research could be characterized as evidence that there is a flaw in this current policy approach. While the local political leaders in southern Nevada say they favor growth, they are keenly aware that they must be careful in saying anything at all on this topic. It could be argued that they are aware of the potential pitfalls of this policy and are merely hoping that “nothing happens on their watch” or that better technology will always be just over the horizon. Or it could be argued that they are in way over their heads and are merely stumbling around in the dark, trying to get by on the hope that the public does not catch on to their incompetency. In any event it seems as though the current strategy is to remain silent.

This silence may also explain why the public is given no real role in the technical rationality solutions and consequently are not made stake-holders in the process. This policy was never really explained to the community as it was being developed nor were they educated in a meaningful way on any negative consequences of its implementation and use. Potential problems were discounted, underplayed or ignored until an environmental crises came (such as the discovery of rocket fuel in the water) and they were then forced to act, as has been the case since 1907.

3. There are not sufficient permanent clean water supplies available to southern Nevada to sustain a population in the numbers (millions) being projected. The total legal allocation of Colorado River water, in the United States, is 17.5 million acre feet per year. The average flow of the river is 13-15 million acre feet per year, depending on snowfall in the mountains. During the normal drought cycles the average river flow is less.³⁵ Water

in the Colorado River is allocated and used by so many people that it no longer flows into the Gulf of California, as it did for thousands of years in the past. All that remains just across the United States-Mexico border is the dry river bed of what once was the Colorado River.³⁶

4. Southern Nevada water officials claim that by juggling existing allocations or making deals to use water not used by other states, they can meet these new demands. The problem is that this is only a temporary fix. The other states in the region have growth and development needs that they need to support, not to mention water quality problems of their own. For example, Southern California is currently struggling with primary water right holders to obtain water for its urban areas. After decades of California overdrawing its allotment of Colorado River water, it is being forced by the federal government to live within its allocation of 4.4 million acre feet per year. The problem is that 70 percent of California's entire allotment belongs to the Imperial Valley agriculture interests and they are not giving up their water rights freely without what they feel is just financial compensation, beginning with payments of \$2 billion over the next 75 years.³⁷ Again, if all of the water is already allocated to someone, depending on the goodwill of neighbors or on surpluses that may or may not be there, can only take you so far. We are depending on getting water that may or may not be there and none of this allows for normal drought cycles which will further complicate an already complicated situation.

5. The adoption of using return credits to fuel growth seemed to satisfy the need for water and the ability to grow, and allowed water officials the ability to work around the limited amount of Colorado River water they could use. However, as time has gone

on and growth continued, it is beginning to appear that we are reaching the limit to what this environment can withstand and remain healthy. While the ecosystems of the Las Vegas Wash, Lake Mead and the Colorado River were able to initially absorb the discharge of treated effluent without complications, the continued increase of these discharges will eventually exceed the natural ability of the environment to absorb, neutralize, or otherwise filter the water, as was seen in the case of the bacteria levels discussed earlier.

6. We are now at the point where this policy may no longer be a sustainable one. This fact also appears to be evident to those elected and appointed officials responsible for water development. Circumstances have begun to change the tone of this debate. Pat Mulroy, the general manager of the Southern Nevada Water Authority, has recently been stressing the importance of all users to cooperate to keep this resource clean. Uneasiness has been increasing that the water being returned into the Colorado River system is not as clean as it should be. She was stressing the point that development of one region should not come at the expense of others in the west. While speaking to about 1,000 people during a conference of the American Water Works Association she called for interstate cooperation in ensuring that the Colorado River water is kept clean. It was reported that she told them: "We're poisoning ourselves, it's the largest form of suicide I've ever seen. It's not just fish-versus-people. We are part of that ecosystem."³⁷

7. In an announcement that could transform the entire discussion, the *Las Vegas Sun* newspaper reported in the April 19, 2002 edition that elected officials now say that a \$1 billion dollar pipeline might be required in order for southern Nevada water officials

to ensure that the drinking water in the region remains safe. The news article quotes Doug Shelby, the Las Vegas Deputy City Manager as saying that “it’s what we consider the solution the valley has needed for years.”³⁸ The plan is for the pipeline to transport the treated wastewater to a point downstream from the intakes at Saddle Island. While the exact location for the discharge point has not yet been decided, one idea being discussed is below Hoover Dam, directly into the Colorado River. One potential drawback is that of the perception that might develop from the downstream users of Colorado River water! There is a concern that they may question the quality of the water.

Recommendations

The central theme in water policy in southern Nevada should be that there is a clean source of water for generations to come. It is incumbent on the citizenry to become involved in the process of water policy since their quality of life is directly impacted by the condition of the water available for use. One way to accomplish this is to become involved in the process and help find solutions together with our elected and appointed officials. A way has to be developed to encourage the public that they do need to be involved, they can make a difference and that it is possible for ordinary people to be heard. The political process to do this already exists. It is a matter of instilling confidence in people to show them that they can make a difference.

To realize this goal I recommend that all members of the society demand that public officials, both elected and appointed, change their approach to the issue of water policy here in southern Nevada. This is to be accomplished by adopting the principle of what I

call A-I-D or Assess, Involve, and Develop. In this process programs, policies and regulations are looked at with a more long term view, with the emphasis on what impacts there will be on the quality of the environment after these policies are put in place. Also, there will be a much greater emphasis on developing a public forum where the citizenry is made a more active partner. We need, as southern Nevadans, to adopt civic environmentalism into our collective view on the environment and civil society, and then combine it with each of the parts of A-I-D described below.

Assess

In order to truly understand where we need to go with water policy in southern Nevada, we need to understand where we are and to understand what is really happening to the watershed and secondary ecosystems under the current policy. What, scientifically, is the effect of our pumping millions of gallons of treated wastewater back into these ecosystems?

This can be achieved with the implementation of a multi-disciplined scientific study similar to the Central Arizona-Phoenix Long Term Ecological Research Project (CAPLTER) that is funded by the National Science Foundation (NSF). This project is studying the long term ecological change in Phoenix, Arizona, focusing on the effect of urban development on the ecosystem of the Sonoran Desert. It is being conducted by Arizona State University (ASU). The research's stated goals, as described on their website (<http://www.asu.edu/ces/CAPLTER.htm>), say that this research will:

1. Monitor and interpret the long range impact on the environment of the city and the surrounding urban areas.

2. Enhance the understanding of the ecology of these areas.
3. Identify the relationships between ecological and socioeconomic factors.
4. Engage students at all levels, especially K-12 students, in the enterprise of scientific discovery.

Therefore, it is recommended that a similar study designed to fit the uniqueness of southern Nevada be established at the University of Nevada/Las Vegas, in conjunction with the Desert Research Institute (DRI), with funding from the National Science Foundation or, if the federal government goes ahead and establishes Yucca Mountain as the National High-Level Nuclear Waste Repository, funding could possibly come from there. In any event, the establishment of a Southern Nevada- Las Vegas Long-Term Ecological Research Program would be essential in answering what is happening to the Las Vegas Wash, Lake Mead, and the supporting watershed.

While studies have been and are currently being conducted into what is going on, this would be a large multi-disciplined study designed to look at the southern Nevada as a whole, not fragmented pieces of a problem but a step back to look at the region's issues and how they relate to the entire southern Colorado River system as a whole. With the expansion of the capabilities of the University of Nevada/Las Vegas and the regional development being so dramatic, a very unique setting for this type of research now exists.

Assessment is the essential first step in the A-I-D process. In order to rate our environmental health we need to see what kind of shape it is in. This can be accomplished by examining scientifically the conditions of the ecosystem along with "some of the social, political, and economic factors that inhibit or enable the achievement

of a civic democracy and, in turn, a healthy sustainable environment. It is important to remember that the factors driving environmental change are those civic conditions that enable and influence development, production, and consumption practices to occur in the first place.”³⁹ In order for the members of the society to be capable of meaningful, informed participation, it is necessary to have the facts. A comprehensive study that produces conclusions and assessments based on current science and not on political spin or hidden agendas is essential for that process to develop and to have it flourish.

Involve

To have a just society and to implement the civic environmentalism concept of environmental justice, ordinary people - especially the disenfranchised - must be allowed, encouraged, and even helped in the processes of making policy within the society. If we ascribe to truly “practice what we preach” to the rest of the world, then it is essential that government makes as a central goal the idea that all are provided real opportunity to participate.

There are, as was pointed out in the course of this research, two deep problems in involvement: 1. our publically appointed and elected officials do not seem to know any mechanisms or processes they could use which would really open public policy formation to the public, and 2. our citizenry is not actively using time and energy to be citizens.

Official Involvement

A measure of this point is in the number of people that are actively involved in public participation in the policy process. The first thing that public officials need to ask

themselves is why the public chooses not to participate. Participation, used as a measurement of the ability of public officials to engage the public, should indicate to those officials that in some way they are failing in communicating to the public the necessity of them being active participants. If the reason is due to apathy, then it is incumbent upon the government and scholars to find the reason for that apathy. If it is because the public feels that they will not make a difference, then it needs to be demonstrated that they do (the 2000 presidential election is stark testimony to this).

If the public is disgusted with the political process or is angry at the perceived elitism of government officials, then it is the responsibility of those who govern to demonstrate, in a meaningful way, that they are indeed the servants of the people. This can be demonstrated by the actions of officials, in the way that the officials handle themselves while performing their duties. Elected leaders need to govern by example. An example would be a political community leader who is not concerned in how to find loopholes in campaign finance reforms, but by following the spirit and intent of those reforms. They need to learn to develop those skills necessary to give the perception that they are indeed looking out for the interests of all members of the community, and not just the wealthy and powerful.

This will involve a new approach or a new way of thinking on the part of public officials, policy makers, and administrators at all levels. Officials charged with making public policy need to remember that they have a duty to create real public meetings with real input allowed from all that show up. This means scheduling time for public comment, not at the end of the meeting, but rather as a major portion of it. These

officials need to perceive these meetings as a larger portion of their responsibility, not as something that the law requires them to do. Another possibility would be to devote more meetings specifically for public input with all members of the commission, board, etc., present.

If this requires public officials receiving training in how to facilitate debate, then so be it. These meetings must be conducted in a manner that fosters and promotes the free exchange of ideas and discussion. Too often the perception that is developed by members of the public is that the decision has already been made, nobody is interested in what I have to say, or officials are simply going through the motions because the laws say that they have to. Public officials need to learn that this is a major part of the job for which they are elected or appointed, namely, to provide a forum where these perceptions will not develop but instead, that all who want will be allowed to speak and will be listened to, and that stages of policy development will embody public input.

This idea will require a new way of thinking on the part of officials. They need to remember that “decisions made after highly visible consultation with the public can carry greater weight and legitimacy, both in legislative circles and in terms of the agency’s public perception.”⁴⁰ The focus here is that the time for open participation needs to be the most important part of time management and planning when it comes to developing public policy on water issues in southern Nevada. “Public officials need to acquire the skills to have effectual public meetings where people can learn, hear, be heard, propose, argue, and counter argue, and then end up seeing the real fruits of that meeting embodied in policy.”⁴¹

Finally, a better way needs to be developed to educate the public. Terminology often times is used to turn off the public or to intimidate. It is not possible for a public to get engaged and become better informed if they can not get past the basic technical language used. A real, sincere effort needs to be made to explain the technical aspects this to non-technical people. One model that might be considered is the one used by the military to explain what it is that they do or are in the process of doing. Military briefings to non-military people are loaded with technical jargon, but in recent decades the military has been very successful in getting their message across to the general public. It has worked because the military has taken the time to make sure that the message is understood by the audience receiving it. There is no reason that this same attitude could not be utilized here with the same success. All that is required is a sincere effort.

We all live in the same desert and depend on the same water for our continued existence. There needs to develop a greater sense that we are all in this together, that these policies are our policies, and that we collectively want to make this a better place to live, and to live a healthy and vibrant ecosystem for future generations. This requires real leadership from visionary people and participation from the public as well.

Citizen Involvement

This brings us to the second problem of involvement which is that the citizenry is not actively using their time and energy to be involved citizens. Much could be speculated as to why the public is uninvolved in the political process. Part of the reason may be due to events in the last 40 years, which continue to reinforce the negative stereotype of the political system in the minds of the voters. Scandals like Watergate, where national

figures spoke to the American public with contempt and disrespect, leave people angry and resentful. Locally, the steady parade of public officials having questionable ethical dealings in the performance of their duties, also presents a picture of government that is not favorable.

This cynicism is somewhat valid, or at the very least, understandable. The perception developed is that the process is not equal or fair, and that the wealthy and politically powerful have the advantage. However, what the public needs to remember is that the wealthy and politically powerful will have an advantage only as long as the public remains disengaged. Once engaged, an informed, united, and deliberate citizenry will be heard, for to ignore the voters only invites retribution through the power of the ballot-box.

The question that now remains is how to re-engage the members of the society. This can be accomplished by first using the six core concepts of civic environmentalism as a philosophical and ethical base to work from. The ideas of a well-informed, participating community striving for these ideals of understanding that the environment and social conditions are mutually reinforcing, and that we want to leave a better place for generations to come, are the ethical goals we should all work toward.

By embracing civic environmentalism and developing a sense of place we will develop those mores that are characteristic of a just society. The community must first become active: vote, go to meetings, listen, organize, speak, form action groups, ask questions of public officials, hold those officials accountable, and always stay informed. The mechanism by which this can be done is A-I-D. We can do this by uniting and demanding that we accurately assess the situation, involve all members of the community

and, as will be discussed below, develop policies that incorporate the idea of becoming a naturalistic culture.

Develop

Under this step of the A-I-D process we as a society need to develop those ideals that will enable us to live in this ecosystem in the best possible way. If development is going to happen it needs to be done in a more environmentally conscious way. An approach in urban planning needs to be adopted that is less intrusive to the ecosystems where the development is taking place, than is currently being done. An example of this would be:

1. No more than 25% of the landscaping is turf.
2. Turf is not installed next to streetscapes to eliminate water overspray.
3. Drought tolerant landscaping is utilized.
4. Landscaping is designed to fit in with the surrounding natural ecosystems.
5. More than one-third of the communities' total acreage is designated as community space; passive and active open areas, recreational facilities, parks, and golf courses.
6. The use of drip irrigation on all shrubs/groundcover to save water.

This model⁴² demonstrates that building homes while still minimizing the impact to the environment is achievable if the environment is considered in the initial planning. It does not solve all the problems with urbanization, but most of the issues that we as a society are forced to deal with are due to not thinking "green." If all development was done, using this model, perhaps part of the negative side of urban development could be mitigated. As it is only one developer even considers the environment in planning.

Another example of “thinking like nature” would be to greatly expand the current wetlands area, and discharge the treated wastewater into it. This expanded area could be used as a fourth level of wastewater treatment. By allowing the water to slowly meander through these wetlands, water released from the current treatment plants could be cleaned further by the process known as phytoremediation. This is the process by which chemicals, extra nutrients, and other organic compounds are absorbed by the plant material that would thrive in the wetlands area. In incorporating this natural fourth level, fewer chemicals would be needed to achieve clean water discharge standards and it would eliminate the risk of having organic pollutants accumulating in Lake Mead at the current rates. In the long-term, the society would benefit in that pollution levels in the water would be reduced, revenue currently being spent on chemical treatment could be made available for use elsewhere, and we would be on the road to a more sustainable, cleaner environment which, in turn, increases our social capital. The major obstacle here is in acquiring the land to do this.

By living in the best way it is meant that: we develop policies dealing with the environment that view the natural world as it really is, that we learn to live with the ebb and tide of natural rhythms, and that we will move our economy toward the goal of developing the six core concepts in civic environmentalism of industrial ecology.

Going back to what was said in the previous section, central in this step of development is the ideal that we develop a new way of conducting the business of policy making. Public officials, elected or appointed, at all levels of government, need to look on the public as partners in this process. They need to develop methods and procedures

to conduct public meetings far enough in advance to have real discussion on the issues.

Conversely, the members of this society need to demand nothing less than this type of a process. Citizens need to demand that elected and appointed public officials look out for the interest of the society as a whole, not just selected portions of it. To accomplish this citizens need to insure that officials use A-I-D in the everyday business of governing. Reluctant officials who see this as a waste of their valuable time, need to go. The public needs to voice their concerns in these public forums, designed for open and two way discussion. If this does not happen then it is the duty of the citizenry to voice their concerns in the voting booth.

Final Thought

We in southern Nevada are a brand-new society and have the opportunity to grow a community whose focus is on the quality of what we currently have. Further growth and development cannot be sustained much longer. The environment is reaching its limit in being able to support this society. All of us, citizens, elected and appointed public officials, and business leaders, need to come to the realization that we may have grown as big as we can without causing irreparable harm to the environment and in the end to ourselves. Continuing down this same path will only lead to continued environmental problems and in the end we will create an unhealthy, unhappy life here in the desert. We are as much a part of the environment as the plants, birds, and animals around us. We need to remember that.

NOTES

CHAPTER 5

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interview was held in the corporate conference room, in their Las Vegas NV office. Out of most developers that are involved in the region, they actually have somewhat of a “green” outlook from which all decisions are based. The interview was set up in part from a recommendation from the southern Nevada chapter of the Sierra Club.

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