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# Environment and the Quality of Life in Nevada

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# Environment and the Quality of Life in Nevada\*

## Introduction

When the first environmental decade was launched in the U.S. more than thirty years ago with the inaugural Earth Day, protecting our air, water, land and other natural resources seemed a relatively simple task. Environmental polluters and exploiters would be brought to heel by tough laws. The U.S. and other industrialized nations responded to quality of life concerns associated with the degradation of the natural environment by adopting dozens of major environmental and resource policies and creating new institutions such as the **U.S. Environmental Protection Agency** to manage environmental programs. With a sense of urgency Congress passed the **Clean Air Act in 1970** with scarcely a dissenting voice. This was followed by passage of policies on water pollution, land use, and other resources. However, environmental protection has turned out to be a moving target. What appeared to be a relatively straightforward job of controlling a few key pollutants and other development trends, has become a far larger and more difficult task involving major changes in human behavior.

Following these national developments, states and local communities began systematic efforts to address environmental problems. Public opinion favoring greater environmental protection has also continued to grow as social values change and mounting scientific evidence reveals threats to our local, regional, and global life support systems. People perceive the environment as more endangered now than it was 30 years ago. Yet, despite some successes, comprehensive solutions have not been easy to find.

This report will offer an overview of the environmental issues we face in Nevada, identify urgent steps we need to take to improve the situation, and list the community resources available to those interested in helping with the environmental concerns of the Silver State.

## Historical Overview

Environmental health and safety are central to the quality of life in Nevada – an enormous state whose inhabitants are mainly clustered in just a few urban areas. Environmental problems facing Nevadans are closely linked to the extraordinary population growth and urban development in the Silver State. Consider the following statistics:

- Since World War II, Nevada's population has climbed from less than 100,000 to 2.44 million.
- During the past four decades, Nevada has been the country's fastest-growing state, with its population climbing 66% during the 1990s alone.
- According to the U.S. Census Bureau's first post-2000 population count, the state continued to outpace the nation by growing at a rate five times the national average.
- Almost 2 million Nevada citizens are clustered in Clark County's Las Vegas metropolitan area, while just under 400,000 live in the Reno-Sparks-Tahoe area.
- In Clark County alone, population has grown by more than 120% since 1990 – an increase of more than 800,000 people.
- It is estimated that Nevada's current population will nearly double to 4.3 million by 2030, with most immigrants to the state settling in a few major population centers.

Not surprisingly, the most prominent environmental issues facing the state are also centered in these areas and are directly related to the rapid population growth and urban development.

Both Las Vegas and the Reno-Sparks-Tahoe area are home to unique geographic and climatological conditions. The Las Vegas metropolitan area is located in a valley with one of the world's harshest climates. Summer temperatures average well over 100 degrees Fahrenheit and the valley's average annual rainfall barely tops 4 inches. The

Las Vegas Valley is situated within the eastern Mojave Desert, an extremely rich area in terms of biological diversity. The Reno/Tahoe region, located on the interface of the eastern Sierra Nevada and western Great Basin, enjoys a more temperate climate, and it hosts one the world's most unique natural ecosystems, notably in the Lake Tahoe area, as well as sensitive mountainous and meadowland

regions. The glacially-formed lake area is famous for its astonishingly clear waters, and the unique plant, and microbotic and animal species inhabiting the Tahoe basin. The serious ecological stresses plaguing these areas can be traced to the human causes that undermine Nevadans' quality of life.

## **Nevada's Key Environmental Concerns**

Three areas are central to understanding environmental quality of life issues in Nevada: (a) air, (b) water, and (c) land.

### **Air Quality**

Air quality is perhaps the most acute problem in the Las Vegas Valley. Stemming from motor vehicles, incessant construction, and commercial and industrial enterprises, air pollution grows in severity in proportion to the population and economic growth in the valley. The rapid influx of people and businesses into Southern Nevada during the last decade has exacerbated already severe air quality problems. Like many urban areas throughout the U.S., Las Vegas faces air quality problems from several pollutants:

- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO<sub>2</sub>)
- Ozone (O<sub>3</sub>)
- Particulate matter (PM)
- and Sulfur Dioxide (SO<sub>2</sub>)

### **Carbon Monoxide and Nitrogen Dioxide**

The major source of both carbon monoxide and nitrogen oxides is auto emissions producing pollutants that aggravate asthmatic conditions and, after interacting with the oxygen, release ozone in the air.

- According to the **Clark County Department of Air Quality Management**, vehicle exhaust accounts for 85% of carbon monoxide air pollution in Clark County.
- In the late 1990s, the Las Vegas Valley failed to meet federal standards for carbon monoxide levels and, in November 1997,

was designated by the **Environmental Protection Agency** (EPA) as a major nonattainment area.

- In August 2000, the Clark County Department of Air Quality and Environmental Management submitted a plan to the EPA to control carbon monoxide.
- Southern Nevada has not violated national carbon monoxide standards since 1999, but it remains a risk given the growth of automobile traffic in the valley.

State and county officials have taken several measures to limit CO, including (a) smog testing, (b) the state-wide smog hotline, (c) seasonal oxygenated and cleaner-burning gas programs, and (d) increased mass transit options.

## **Ozone**

Ozone is a gas that occurs naturally in the Earth's upper atmosphere and provides protection from the sun's harmful ultraviolet rays. However, ground-level ozone is a pollutant which, inhaled by a human, irritates the lungs and causes coughing, burning sensations, and shortness of breath. Ozone is of particular concern to the elderly, children, and people with heart and respiratory problems like asthma and bronchitis.

Ground-level ozone is a component of smog generated largely by motor vehicle emissions and industrial operations. It forms during hot, summer days from a chemical reaction between sunlight, heat, and nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs) produced from the burning of fossil fuels, gasoline vapors, dry cleaning products, chemical solvents, and other products. Seasonal weather and traffic congestions during the hottest months of the year (May to October in Clark County) are principle factors in ground-level ozone concentration.

- In April 2004, the EPA designated Clark County as a nonattainment area for failing to meet the new federal eight hour federal standards which designate levels (85 parts per billion of ground-level ozone) that cannot be exceeded over an eight hour period.

This development has prompted the **Clark County Department of Air Quality**, and Environmental Management to develop plans for reducing emissions that cause ground-level ozone.

## **Particulate Matter**

Particulate matter (PM) is a complex mixture of very tiny solid or liquid particles, composed of chemicals, soot, and dust. PM is caused when tiny particles of dust or matter become airborne. This dust is not a natural phenomenon of desert living. Native desert soils around Las Vegas are crusted by years of wind, sun, and rain. Sustained winds of 25 mph are required to disturb this soil. Dust is raised when the soil's crust is broken and the winds fan it throughout the valley. Under those conditions, the airborne dust contributes to valley's particulate matter pollution.

Particulate matter is typically grouped into two sizes:

- PM10 refers to particulate matter measuring 10 microns or less – thinner than the width of a human hair.
- PM2.5 refers to particulates smaller than 2.5 micrometers. These particles can stay airborne several days and make up as much as half the haze visible around the Las Vegas Valley.

Research suggests that PM2.5 particles may be more hazardous to human health than PM10 particles because they can travel deeper into your lungs.

- Clark County's Department of Air Quality Management has collected data on PM2.5 since 1996, and it shows that the valley meets the federal standards with the PM2.5 national air pollution mark set by the U.S. Environmental Protection Agency (EPA).
- Though less hazardous, PM10 is of the immediate concern in the Las Vegas Valley, which was designated by the EPA as a serious nonattainment area for PM10 on Jan. 8, 1993.
- Since then, air quality officials in Nevada have been working to reduce PM10 levels by creating awareness about the health problems associated with dust in the valley, better regulating

construction activities, and limiting other sources of PM10 (e.g., off-highway driving).

- The Clark County officials expect to achieve the EPA's 24-hour standard for PM10 by 2006.

Air pollution affects everyone's health. Symptoms include watery eyes, coughing, and wheezing. Small children breathe at a faster rate than do adults, and their developing lungs make them more susceptible to pollutants. People with emphysema or asthma – a sizable population group in the area – are facing the greatest risks.

- Recent research conducted by the **Center for Disease Control and Prevention** (CDC) shows that 13.4% of Nevada residents are suffering from asthma.

## **Water**

Water – or lack thereof – is a vital feature of desert living. The booming Las Vegas Valley and the Reno-Sparks-Tahoe area are bursting at the seams as new homes rapidly spill out into dry desert valleys. But cities cannot grow without water. Combined with reckless water use and outright abuse, growth poses a threat to our water supplies and the quality of those supplies in both Southern Nevada and the Reno-Sparks-Tahoe area.

Southern Nevada, along with four other lower basin states (Arizona, California, New Mexico, and Utah), rely on the Colorado River and its human-made reservoirs to sustain growing populations. The river serves about 25 million people in seven western states and Mexico. Although the river is replenished to some extent each year through rain and snowfall in the watershed of the Colorado Rockies, it is subject to great variations in flow due to unpredictable precipitation patterns. Since 2000, the lower basin states have been facing the effects of the worst drought on record. Changing precipitation patterns along the river have raised concerns about the current use levels and underscored the need for conservation.

Likewise, drought has been affecting water supplies in the Reno-Sparks-Tahoe area. The Truckee River system which flows out of the Sierra Nevada in California, provides most of the water for

Reno-Sparks-Tahoe residents. The Truckee River system is sensitive to the precipitation patterns and snow pack thawing in the surrounding mountains. Drought has beset the area, which in conjunction with rising water consumption produced by development along the complex **Truckee River System**, makes for less dependable water supply. The problem is further exacerbated by the inadequate management of the Lake Tahoe basin that has plagued the area since about 1960 and that has led to a significant loss of water clarity. More than one quarter of a mile deep, the lake is world-renowned for its blue color and transparent waters. Yet, the lake's clarity has been decreasing at an alarming rate of nearly one foot per year.

Several factors have contributed to the fact that Lake Tahoe's waters have become more opaque in recent years: (a) storm water runoff, (b) urban development, (c) air quality, and (d) erosion. Such adverse developments have put on the political agenda the feasibility of limiting growth. The same trends have underscored the importance of enforcing present laws and passing new pollution regulations.

## **Southern Nevada**

The water situation in Southern Nevada is complicated by the lack of diversity in its supply sources.

- Southern Nevada currently receives nearly 90% of its water from the Colorado River, with the other 10% being drawn from groundwater pumped out through wells in Clark County.

Water allotments from the river are governed by the **1922 Colorado River Compact** and a series of subsequent compacts, laws, and court-mandated ordinances collectively known as the Law of the River. When Nevada received its allotment of 300,000 acre feet in 1922, it seemed like a lot of water. In fact, the Las Vegas Valley did not begin using its allocation until 1955. As population grew, this allotment has had to be supplemented with large groundwater draws. Now the **Southern Nevada Water Authority** is looking toward three in-state water resources – **Three Lakes Valley Groundwater Development, Virgin and Muddy**

**Rivers Surface Water Development, and Clark, Lincoln and White Pine Counties Groundwater Development** – to supplement the Colorado River supply.

While development of in-state water resources would supplement southern Nevada 's municipal water supplies, and reduce its dependence upon the Colorado River , there are many environmental and socio-political concerns associated with these projects. An unlikely alliance of environmentalists, ranchers, and other rural citizens has recently formed to consider the potential large scale impacts to surface water resources in southern and eastern Nevada that may result from both surface flow diversions and groundwater pumping and exportation of these resources through pipelines to Las Vegas Valley. These water resources, including the Virgin, Muddy river systems in Clark County, the Amargosa River system in Nye County, and the Pahranaagat and White river systems in Lincoln and White Pine counties, are critical sources for rural domestic water supply, agriculture, wildlife, riparian and wetland habitats, and endangered species.

What is clear in this push to increase access to water resources is that we may be stretching the limits of water availability. Water is a limited natural resource in Southern Nevada . While renewable, it is also finite. Since the water cycle makes available only so much each year in any given location, supplies per person drop as population grows. Sooner or later water demand approaches the natural limits of the water supply, and when it hits those limits, signs of trouble begin to multiply – falling water tables, dried up rivers, shrinking lakes and wetlands. Some of those signs are already visible in Southern Nevada. Thus, the area's artesian wells have long overextended groundwater supplies found in the large aquifer beneath Las Vegas. This has led to increased draws on the Colorado, which threatens to turn it into what hydrologists call a "deficit river" where more water is allotted for its users and is used each year than is annually replenished through the natural cycle. If climate experts are right, the scarcity limits may be reached in the near future.

Much water use planning for the Southwest is based on past trends, but such an approach assumes a static average and continuing Colorado River flow. Global warming may alter the scenario significantly by transforming a fairly reliable flow into one of diminishing returns. Most climatological change models agree that the Earth's temperature will rise in the coming decades, and as it does, the hydrological cycle will intensify. Rainfall and snowfall patterns will shift, with some areas getting more and some less. Instances where climate change brings less precipitation, areas already at or near water limits, may experience long periods of shortages.

This problem is exacerbated for regions depending on water from snowmelt, such as the Desert Southwest. Mountain snowpack acts like a reservoir, storing water in the winter and releasing it during the spring and summer as the snow melts. The water infrastructure in the region is designed and operated on the assumption that the current pattern of river runoff will continue. But such shifting patterns may strain the system with spring floods and summer shortages. As more winter precipitation comes down in the form of rain, snowmelts are bound to start earlier in the year, reducing flows during the summer when they are most needed. Not much warming is required under the circumstances for a significant environmental change.

- A temperature increase averaging 2 degrees Celsius could reduce the average annual runoff 4% to 12%. An increase of 4 degrees Celsius will reduce runoff by 10-20%.

Consequently, the capacity of the existing water supply system to offset the worst effects is limited. Under conditions of long-term flow reductions and current operating rules for reservoirs, the human-engineered water storage facilities could be drawn almost dry. This, in turn, would put major strain on hydroelectricity production and increase salinity in the Colorado River to levels exceeding legal standards. Since the Colorado River is so intensively used, it is very sensitive to climate changes. The scenario makes long-term planning precarious and casts a shadow over future growth.

Southern Nevada's future water supply can be extended by aggressive conservation efforts and the development of additional water resources. The Southern Nevada Water Authority is vigorously pursuing plans to tap groundwater supplies in Clark, Lincoln, and White Pine Counties and surface water from the Virgin and Muddy rivers. However, a number of political obstacles and environmental considerations may slow these plans. Meanwhile, fast paced economic and population growth continues, all reliant on a secure water supply that, over the long term, is questionable.

Water quality in Lake Mead and the valley's groundwater is also critically important. Potential sources of contamination include urban chemicals such as fertilizers, pesticides, and industry. Presently, the Southern Nevada Water System is in compliance with federal safe drinking water standards. Health standards are monitored and maintained in the Lake Mead area, but the quality of the recreational setting, such as water clarity and water odor, is rapidly diminishing. These negative factors are likely to multiply in the future as lake use continues to increase.

### **Reno-Sparks-Tahoe**

The Reno-Sparks-Tahoe region is suffering from the same drought as Southern Nevada and facing many of the same environmental concerns related to short-term and long term water supplies. Regional water plans predict that sufficient water supplies exist to serve the nearly half a million people projected to live in the area in two decades.

- According to the **Regional Water Planning Commission**, a surplus of water will continue until 2025 when the population of the Reno-Sparks metropolitan area is expected to reach about 497,800.

Some environmental experts contest this forecast, finding this projection of water supply overly optimistic, particularly if growth and development continues at its current rate.

- An alternative assessment holds that water will remain in the surplus column only until 2015. Additional water supplies,

possibly imported from points north of the region, will likely be tapped.

The Truckee Meadows Water Authority (TMWA) doesn't foresee water shortage problems as a result of growth in the *near* future. In the greater Reno-Sparks area, water rights are allocated differently than in Southern Nevada because developers in the Reno-Sparks region must purchase water rights before they can build. The water rights are similar to real property and are sold on the open market. Historically, a set number of water rights were dedicated to the Truckee River – a number that can't change. The result is that when housing developers buy the rights, they turn them over to TMWA once the houses are sold. Since there are a finite number of water rights, they can't be resold. So, if ten people are to cut their water use in half, their rights cannot be sold to develop five new homes. The time is coming when water rights will be sold on the open market, and then a new supply will have to be found.

## **Lake Tahoe**

A major study known as **Lake Tahoe Watershed Assessment** was carried out in 2000 by a consortium of universities and federal agencies. Researchers identified several factors that spurred the adverse environmental changes in the Lake area: (a) urbanization, (b) habitat loss, (c) air pollution, and (d) soil erosion.

- It is estimated that Lake Tahoe will lose about 30 feet of water clarity by 2030 at current rates of change. Lake color would transform from cobalt blue to green because of estimated algae growth of 5% a year.

This projected rate of change is based on phosphorous and nitrogen runoff which, along with other pollutants, contribute to algae blooms. Unless the trend is stopped in time, the damage may become irreversible. This would be a hard blow for Reno-Tahoe residents and their tourism trade.

The problems defy easy solutions, as the loss of water clarity is traceable to an array of sources:

- Water that runs off the roads each spring carry road salt and other fine materials into streams that empty into the lake.
- Building in the Tahoe watershed goes on, disturbing soils and adding to the natural runoff of clay.
- Fire suppression prevents natural small-scale fires from clearing brush and downed timber, which ignites more damaging catastrophic fires and breeds sick forests.

Several multiagency plans are in place to stem the tide of environmental pressures on Lake Tahoe's waters. Still, there are fears that the efforts will not be enough and that the lake waters will succumb to human intrusion.

## **Water Conservation**

The main challenge facing the Silver State is how to manage effectively water conservation efforts to support existing and future water supply needs. A water resource plan was created for Southern Nevada in 1996 by the **Southern Nevada Water Authority** (SNWA).

- The SNWA plan identified several successful preliminary management strategies that gradually reduced water consumption by more than 5% between 1996 and 2000.
- But between 2000 and 2003, consumption rates grew and conservation measures began to falter.

The plan was updated in 2002, and once again, in 2004, when the SNWA released a **Five-Year Conservation Plan: 2004-2009** which established a number of rebate incentive programs that focus on watersmart landscapes, irrigation clocks, and water efficient technologies. Regulatory programs like water use ordinances, development codes, and drought watering policies aimed at curbing water misuse were also put forward, as were several public education and outreach programs designed to teach the public the virtues of watersmart desert culture. Some of these approaches have been used to good effect as the severe drought became apparent. The key to conservation is reducing demand.

- In 2003, the community achieved an almost 7% increase in water conservation.
- The SNWA's goal is to achieve a community-wide water conservation goal of 25% by 2010 (calculated from a baseline of zero in 1990).
- With outdoor water use related to landscaping accounting for 60-90% of water used in the valley, the Authority focuses on conserving water outdoors. Xeriscape conversions of lawns are critical to this approach as are more efficient uses of water in construction projects.

The **Truckee Meadows Water Authority** and **Tahoe Carson Irrigation District**, which oversee water management for the Reno-Tahoe area, also have water conservation plans in place. However they appear much less comprehensive than those of the SNWA. Many water users are not metered, which encourages irresponsible water use. Measuring water use and controlling sound water allocation are complicated by the non-metered water consumption (non-metered users are generally charged a flat rate). Enforceable ordinances covering water misuse are fewer in number, and rebate programs for converting high-intensity water use landscapes are nonexistent. The area does have a tiered conservation plan based on flows of the Truckee River during drought periods. Similar to Southern Nevada, water use is managed by a system that designates various levels of drought conditions, starting with "no drought," moving to "drought watch," and as the situation worsens, to "drought alert" and "drought emergency." Each step introduces water restrictions for residents to follow. It should be noted, though, that enforcement mechanisms remain unclear.

### **Groundwater Contamination**

Many Nevadans draw water from artesian wells that tap underground aquifers. The urban development boom has created contamination problems for some groundwater sources. A substantial number of wells in urban areas contain low levels of nitrates and volatile organic compounds. Some urban shallow wells show nitrate levels exceeding the safe drinking water standard.

The incidence of elevated nitrate levels in aquifers underlying suburban and rural subdivisions has increased. New homes and businesses built outside urban areas often use individual septic systems, which at the time of construction appear to be a cost effective alternative to community wastewater treatment systems. In some valleys, septic systems have become concentrated, especially where piecemeal housing development is allowed.

Of special concern are housing developments using septic systems that use local groundwater sources for domestic or community drinking water supply. Septic system seepage appears to be a major source of groundwater recharge and contributes to elevated nitrate levels.

## **Data Sources and Suggested Readings**

### **Land and its Inhabitants**

Nevada is not only the fastest growing state in the nation, it also has the driest climate, the most mountains, and the largest percentage of federal public lands.

- Eighty-six percent of Nevada land is federally-owned

Part of Nevada's draw is the immense recreational opportunities found on the state's public and private lands. These include: hiking, camping, climbing, biking, motorized off-road vehicle use, skiing, golf, boating, and hunting. These activities are enhanced by and must coexist with Nevada's unique natural environment.

From the standpoint of biological diversity (the number and type of species occurring in a given area), the State of Nevada, with 3,800 plant and animal species, ranks fourth in the nation, after California, Florida, and Hawaii. Nevada state is also home to a large number of species (309) found nowhere else in the world. The considerable species diversity in Nevada is attributable to the large variety of habitat types, ranging from arid shrublands to riparian and wetland communities, from low elevation desert playas to alpine habitats at the highest elevations in the many mountain ranges of this basin and range-dominated landscape.

## **Wildlife Habitats and Conservation**

These habitats are found across 4 distinct eco-regions. According to the Nevada Department of Wildlife's "Action Plan," ecoregions are "relatively large areas of land and water that contain geographically distinct assemblages of natural communities." Nevada's ecoregions include:

- The Columbia Plateau consisting of broad volcanic plains and valleys of the Intermountain West which comprises north central Nevada .
- The Great Basin, a semidesert area extending from the east slope of the Sierra Nevada range across much of Nevada to the Wasatch range in central Utah. It consists of salt desert scrub and sagebrush, conifer forests, and alpine areas near the mountains with isolated aquatic habitats in each area.
- The Sierra Nevada ecoregion is located on the western edge of the Great Basin and is characterized by conifer forests mixed with sagebrush, pinion-juniper stands and alpine areas at high elevations.
- The Mojave Desert eco-region is located in Southern Nevada and is inhabited by creosote scrub, succulents, and yucca-blackbrush species. There are also upper elevation habitats atypical for desert ecoregions.

Nevada's tremendous wildlife diversity derives from its varied geography and climatological conditions. For instance, the numerous mountain ranges are relatively isolated from one another by the arid, treeless basins that divide them. As the Nevada Department of Wildlife explains, this has created isolated islands of habitat, called sky islands. These isolated islands have produced the evolution of new species and subspecies of flora and fauna.

Food and water to sustain wildlife occur in abundance in only a relatively few places. Across much of Nevada, these resources are widely scattered at relatively low density. The distribution of wildlife closely reflects this pattern of resource distribution and, so, wildlife is generally not found in high densities across Nevada's ranges. The pattern of isolation and divergence has been even more extreme for Nevada's aquatic species. The state is home to 67 aquatic species

found nowhere else in the world. Many of these species are traceable to the Pleistocene period with large lakes covered much of the state. As the climate changed, the lakes dried up, leaving isolated pockets of wetlands and springs. Many organisms that thrived in the lakes, now persist in these isolated areas, evolving and adapting to ongoing ecological change. Today, Nevada has more endangered fish than any other state in the U.S.

Wildlife conservation on Nevada lands is a unique challenge. The generally arid climate, geography, and water scarcity means that wildlife is easily subject to ecological stressors such as droughts. Also, human factors such as ecologically damaging land uses that alter or destroy habitats are critical. Some of the most influential include:

- Urban Sprawl (discussed below)
- Agricultural impacts leading to water and soil pollution, soil erosion, and chemical buildup of pesticides and herbicides
- Hydrologic changes produced by damming waterways or excessive groundwater pumping
- Mining operations, particularly open-pit techniques
- Characteristics and extent of recreational activities, particularly motorized forms such as off-road vehicles, snowmobiles, watercraft, and other devices that produce noise pollution, erosion, habitat fragmentation, wildlife displacement, vegetation loss, and soil compaction.
- Invasive plant and animal species

## **Urban Development and Sprawl**

Population growth and urban development is transforming Nevada lands. While urban and rural population centers remain widely distributed despite a doubling of the state's population in last 15 years, the exuberant pace of urban development in the Las Vegas and Reno-Tahoe areas has raised the awareness of resource issues associated with urban sprawl.

Sprawl is a development cycle that begins with housing developments outside urban boundaries and ends up with a blanket of residential and commercial buildings. Conserving open space for

important ecological functions, aesthetic considerations, and socioeconomic values may be only an afterthought for planners in rapidly growing areas. While floodplain, wildlife habitat, and forest areas are sometimes retained as parks or other recreation areas, piecemeal land management does not bode well for maximizing the natural appeal of open environmental spaces. Sprawl is also an inefficient consumption of land that raises costs of municipal and utility services. Sprawling development is known to leave in its wake a host of problems. In particular, it

- Extends road and utility corridor construction
- Expands disturbance in native plant communities and fragments wildlife habitat
- Spurs soil disturbance and erosion
- Compromises water quality
- Increases noxious weed invasions

Subdivisions built outside urban boundaries often resort to using individual septic systems that diminish groundwater quality, as seen presently in several areas throughout the state with high densities of septic systems.

Uncontrolled sprawl development increases pressures on state and local governments to tackle problems with air and water quality, deterioration of plant and animal habitat, over development of floodplains, and loss of public land. Regional air quality deterioration is due, in part, to increasing amounts of pollution produced by the growth in vehicle miles traveled and traffic congestion that accompanies sprawl.

In the 1990's, local residents responded to sprawling development with calls for the conservation of open space for both human and wildlife use. In Southern Nevada, community efforts are focused on protecting natural stream courses, floodplains and wetlands, improving access to outdoor recreation resources, sensitive species habitats, agricultural greenbelts, cultural sites, scenic views, and wildfire prone forest and shrub lands. In the Reno-Sparks-Tahoe area, communities are assessing open space conservation programs and weighing the merits of bond and tax initiatives for the purchase and conservation of open space.

In October 1998, the **Southern Nevada Public Land Management Act** was passed. The purpose of the act is to direct the BLM to auction approximately 27,000 acres of federally-owned land in Clark County, mostly principally in and around the Las Vegas valley, which in turn provides funding for projects in Southern Nevada that enhance outdoor recreation opportunities and contribute to development of the Clark County **Multiple Species Habitat Conservation Plan**. This plan permits urban development of Las Vegas Valley that currently provide habitat for the desert tortoise, a species listed as threatened under the Endangered Species Act, as well as other sensitive species of plants and wildlife, in return for funding of mitigation measures that conserve these species and their habitats on public lands elsewhere in Clark County.

Because the federal government owns nearly 87% of the lands in Clark County, the Act effectively drew a tight ring around the Las Vegas valley. While the BLM lands inside the ring will be sold to private parties, the land outside the ring will remain under Federal management, limiting the extent to which development can spread.

### **Military Lands**

Nevada is sometimes called a “wasteland” because of its stark high desert landscape that seems so inhospitable to life. This common misperception is used to rationalize the use of Nevada lands for military operations and nuclear research. It has also helped to justify the location of Yucca Mountain, the nation’s proposed repository for spent nuclear fuel and high-level radioactive waste.

The large federal facilities in Nevada have caused significant environmental degradation. A large portion of the Nevada Test Site will remain restricted “in perpetuity” due to radiological and toxic contamination stemming from 40 years of above and below ground nuclear tests. Underground testing has contaminated groundwater over vast areas.

- State officials now estimate that an area more than 300 square miles is contaminated beneath the site.

- Surface soils at NTS are also contaminated with various radionuclides. At least 30,000 acres will remain permanently restricted for all uses at the site.

Environmental damage at the Hawthorne Army Depot, Nellis Air Force Base, and Fallon Naval Air Station stems from industrial contamination, such as solvents and aviation fuels in shallow aquifers. It is unlikely that contamination of bombing and testing ranges will ever be remediated, the chief reason being the high costs of cleanup. Contamination in such areas resulting from live ordnance use is a significant safety hazard and potential long-term environmental risk.

The U.S. government has funded studies of groundwater and surface contamination at some of the military facilities, but such programs are inevitably limited, for the facilities remain in active use. At military bases, federal funds are allocated each year to address site-specific cleanup and closure active. Groundwater contamination at the Nevada Test Site is perhaps the most troublesome because certain contaminants remain mobile in water (e.g., tritium). Radionuclides also pose a tangible threat, as they have decay periods measured in thousands of years.

### **Prospects for the Future and Work Ahead**

Ongoing development patterns suggest that the pressures on Nevada environment will continue to grow in years to come. Water supplies will remain strained in both Southern and Northern Nevada. Southern Nevada is certain to pursue aggressively new water resources to meet rising demands of the growing Las Vegas metropolitan area. Limitations on growth have not so far received serious attention in the Nevada legislature beyond concerns that slow growth policies would lead to *economic* devastation. Likewise, rapid growth in the Reno-Sparks-Tahoe region runs the risk of overusing existing supplies. County officials there have only recently agreed to address growth issues, including crucial issues of water management. Currently, there are few state legislative initiatives or executive order actions that address environmental issues. Most of the responsibility for the issues addressed in this report is handled at the city and county levels.

Several broad measures must be taken to address the environmental issues facing Nevada.

- We need to raise the awareness among Nevada citizens about the causes and consequences of environmental damage and the urgently needed conservation measures.
- There should be increased advocacy from public officials at state and local levels, community leaders, planning and environmental management professionals, and the media to support ongoing efforts of concerned citizens groups and community organizations in this task.
- Sustained effort should be made by Nevada legislators at federal and state levels to secure federal and state government funding to tackle ongoing issues, such as air quality, water resource management, and remediation of the environmental damages.
- Sorely needed for effective short- and long-term planning is independent research that explores the effects of Nevada's rapid economic and urban development on the local environment.

### **What Nevada Citizens Can Do**

Air Quality can be addressed through strict programs targeting emission sources such as motor vehicles, gasoline stations, and industrial operations. According to the Clark County Department of Environmental Air Quality, the following are the most effective measures for controlling emissions:

- Refuel motor vehicles after sunset to prevent gasoline fumes from interacting with sunlight.
- Keep vehicle engines finely tuned.
- Limit the use of solvents and aerosol sprays for painting and dry cleaning.
- Use electric-powered lawn equipment instead of mowers with gasoline motors.
- Enhance programs to boost ridership on mass transit and increase ride-sharing in private cars and trucks.

Citizens can increase water conservation efforts in the following way:

- Convert grass lawns and other heavy water use landscaping to water efficient xeriscapes. Also install and use an efficient irrigation clock for both sprinkler and drip systems.
- Use commercial car washes that recycle water on-site or send it to a water treatment facility, where it is cleaned and returned to the water cycle.
- Inspect and repairing leaking plumbing and install low-flow shower heads and faucet aerators.
- Cover and maintain swimming pools

Citizens should encourage land use planners in Southern and Northern Nevada to focus on:

- Conserving areas for their value as open spaces
- Withdrawing designated areas from development where land use conflicts may arise
- Retaining or acquiring public recreation access to public lands
- Designating areas closed or open to off-highway vehicle use
- Identifying and protecting environmentally sensitive areas
- Controlling urban sprawl

Citizens can also get involved in local, state, and national environmental organizations such as:

- Sierra Club
- The Nature Conservancy
- Friends of Nevada Wilderness
- Lahontan Audubon Society (Reno)
- Red Rock Audubon Society (Las Vegas)
- Nevada Wildlife Federation
- Nevada Wilderness Project

There are also opportunities to participate in public hearings and evaluation programs organized by local, state, and federal environmental and natural resource management agencies.

## **Conclusion**

A safe and healthy environment is crucial to safe and healthy living for Nevadans. The problems identified in this report are tied primarily to population growth and urbanization. Nevada's two main urban areas – Las Vegas and Reno-Sparks-Tahoe – are powerful growth engines attracting people and business at unprecedented rates during the last decade. The fact that growth has been relatively unregulated has contributed to the environmental woes confronting the regions. In the coming years, Nevadans will be forced to take a hard look at the ecological stresses in the key areas of the region and make hard decisions about the environmental policies affecting the quality of life in the Silver State.

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## **Community Resources**

## Federal Resources

U.S. Environmental Protection Agency develops and enforces federal environmental regulations and performs environmental research, <http://www.epa.gov/>.

U.S. Fish and Wildlife Service conserves, protects and enhances fish, wildlife, and plants and their habitats through management of National Wildlife Refuges and regulation of the Endangered Species Act, the Migratory Bird Treaty Act, and other federal laws and regulations, <http://www.fws.gov/>.

U.S. Bureau of Reclamation – Lower Colorado Region manages the last 688 miles of the Colorado River within the United States which includes overseeing water and power delivery, protecting endangered species and native habitat, accounting for water use, and maintaining the river channel and protective levees, <http://www.usbr.gov/lc/>.

Bureau of Land Management – In Nevada, the BLM manages approximately 47.5 million acres of public lands for multiple uses including wildlife habitat, grazing, mining, and recreation, <http://blm.gov>.

U.S. Forest Service – The Humboldt-Toiyabe National Forest in Nevada and a small portion of eastern California, at 6.3 million acres, is the largest National Forest in the lower 48 states. The Humboldt-Toiyabe National Forest includes 10 ranger districts primarily in the higher elevation mountain ranges scattered throughout the state, <http://www.fs.fed.us/r4/htnf/>.

## State of Nevada Resources

**State of Nevada Department of Conservation & Natural Resources** (DCNR) is responsible for the establishment and administration of goals, objectives and priorities for the preservation of the State's natural resources, <http://dcur.nv.gov/>.

**State of Nevada Department of Wildlife** (NDOW) is the state agency responsible for the restoration and management of fish and wildlife resources, <http://ndow.org/>.

## **Las Vegas/Clark County Resources**

**Southern Nevada Water Authority** is regional agency that manages the Las Vegas Valley's water supply and other water resources, <http://www.snwa.com/html/index.html>.

**Clark County Department of Air Quality and Environmental Management** is responsible for monitoring air, developing proper control measures, and educating the citizens of Clark County, Nevada.

**Clark County Water Reclamation District** is responsible for treating, disinfecting, and reclaiming wastewater before returning to the environment, <http://www.cleanwaterteam.com/home.html>.

**City of Las Vegas Department of Planning and Development** oversees zoning and land use in the city, <http://www.lasvegasnevada.gov/Government/departments.asp#>.

## **Reno-Sparks-Tahoe Resources**

**City of Reno Department of Community Development** oversees land use through planning and zoning mechanisms. <http://www.cityofreno.com/res/comdev/>

City of Sparks Department of Community Development is responsible for land use planning, [http://www.ci.sparks.nv.us/business/planning\\_dev/](http://www.ci.sparks.nv.us/business/planning_dev/).

**Truckee Meadows Water Authority** is a collaborative unit of the Cities of Reno and Sparks and Washoe County that manages water resources for the region, <http://www.tmh2o.com/>.

**USDA Forest Service – Lake Tahoe Basin Management Unit** protects Lake Tahoe and its water quality by managing a diverse range of resources, particularly the complex watershed

systems that form the basin surrounding the lake, <http://www.fs.fed.us/r5/lbmu/>.

## **Environmental and Conservation Organizations**

**The Nature Conservancy** (Nevada Chapter) is a leading international, nonprofit environmental conservation organization. Their mission in Nevada is to preserve the plants, animals and natural communities in Nevada by protecting the lands and waters they need to survive, <http://nature.org/wherewework/northamerica/states/nevada/>.

**Sierra Club of Nevada** is a chapter of the national organization dedicated to wilderness preservation, <http://nevada.sierraclub.org/>.

**The Wilderness Society** is a national conservation group with the goal of protecting America's Wilderness through the combination of science, advocacy and education, <http://www.wilderness.org/WhereWeWork/Nevada/index.cfm>.

**Citizen Alert** is a Nevada-based grassroots environmental group providing education, advocacy, and empowerment to citizens on matters of environmental policy and environmental justice, <http://www.citizenalert.org/>.

**Friends of Nevada Wilderness** is a wilderness education and advocacy group that strives to keep Nevada's wild places wild, <http://www.nevadawilderness.org/>.

**Lahontan Audubon Society** is a Reno-based group dedicated preserving wildlife habitat in Northern Nevada, <http://www.nevadaaudubon.org/>.

**Red Rock Audubon Society** educates the public and protects and restores delicate Southern Nevada ecosystems.

**Nevada Wildlife Federation** is state's oldest nonprofit, conservation organization, <http://www.nvwf.org/>.

Nevada Wilderness Project seeks to protect public lands through grassroots education and activism, <http://www.wildnevada.org/>.

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