UNLV Center for Democratic Culture
Edited by Dmitri N. Shalin

The Social Health of Nevada

Leading Indicators and Quality of Life in the Silver State

Environment and Sustainability in Nevada

Camisha Fagan, Department of Sociology, University of Nevada, Las Vegas
Robert Futrell, Department of Sociology, University of Nevada, Las Vegas

Introduction

When the first Earth Day launched the modern environmental movement over five decades ago, many Americans believed that protecting air, water, land, and other natural resources would be a relatively straightforward task. The logic was simple: identify polluters, pass strong laws, and enforce compliance. In response to growing public concern about environmental degradation, the United States and other industrialized nations adopted sweeping environmental regulations, including the Clean Air Act and Clean Water Act, and created new institutions such as the U.S. Environmental Protection Agency to implement them.

These early successes fueled a belief that environmental harm could be controlled with technical fixes and regulatory oversight. But what once seemed a manageable task, limiting a few key pollutants, evolved into a far more complex challenge. Today's environmental issues are not confined to discrete sources of pollution but are deeply embedded in our economic systems, political institutions, and everyday lifestyles. Scientific evidence continues to mount showing that the health of our local, regional, and global ecosystems is under severe stress, from accelerating climate change and biodiversity loss to the overextraction of

Highlights

- Nearly 60% of the state now experiences minimal to extreme drought, and over 600 acres have burned already this year.
- In July 2021, Reno had some of the worst air quality in the world, and Las Vegas experienced several "unhealthy for sensitive groups" days due to wildfire smoke.
- Valley Fever, caused by inhaling fungal spores from disturbed desert soil, is an emerging concern in southern Nevada, causing severe flu-like symptoms and chronic lung infections.
- Between 2002 and 2017, SNWA reported a 36% reduction in per capita water use, even as the region added more than 660,000 new residents.
- Southern Nevada, which depends on the Colorado River for some 90% of its municipal water supply, has become a national leader in water conservation, recycling, and reuse.

How to Cite this Report

Camisha Fagan and Robert Futrell, "Environment and Sustainability in Nevada." 2025. In *The Social Health of Nevada: Leading Indicators and Quality of Life in the Silver State*, edited by Dmitri N. Shalin. Las Vegas, NV: UNLV Center for Democratic Culture. http://cdclv.unlv.edu

resources and contamination of soils and water. Public concern for the environment remains high, yet achieving durable solutions requires far more than legislation alone. It demands significant changes in collective behavior, infrastructure, and values.

Since the publication of the United Nations' 1987 Brundtland Commission Report, *Our Common Future*, the concept of sustainability has guided efforts to link environmental stewardship with social and economic well-being. The report famously defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition remains widely cited, but the challenges it names have become more urgent and multifaceted in the face of 21st-century conditions, including global warming, extreme weather, environmental injustice, and the degradation of ecosystems that support human and nonhuman life.

Sustainability today entails more than resource efficiency or conservation. It requires systems thinking, intergenerational responsibility, and a just transition toward practices that support ecological health, economic equity, and community resilience. In Nevada, one of the most arid and fastest-growing states in the U.S., the stakes are particularly high. Pressures on water resources, land use, energy consumption, and air quality are intensified by population growth, extractive industries, and climate-induced shifts in precipitation and temperature.

Today's environmental crises involve accelerating climate change, shrinking biodiversity, energy system transformations, and widespread social inequities. In Nevada, where summer nights have warmed up to 17.7°F in Reno and 10°F in Las Vegas between 1970 and 2024, urban heat island effects, public health, and energy demand have come to the fore (Rothberg, 2018; Fitzpatrick, 2025).

Nevada's Climate Trends

- *Record-breaking heat*: Summer 2024 saw the highest temperatures on record in Las Vegas for the third straight year and 52 consecutive days over 90°F in Reno.

- *Intensifying heat waves:* A July 2025 heat wave pushed Las Vegas into the mid-100s (~40 °C), triggering statewide heat advisories (NV Today Contributor, 2025).

- *Drought and wildfire risk:* Nevada remains in extreme–exceptional drought according to the U.S. Drought Monitor. Nearly 60% of the state experiences minimal to extreme drought. Over 600 acres have burned already this year, aided by abundant cheatgrass fuel (Halaly, 2025; Associated Press, 2025).

- *Rising heat risks at night:* Even nighttime lows have climbed, increasing vulnerability and cooling demand.

This report offers an updated overview of key environmental sustainability issues facing Nevada. It focuses on four critical and interrelated areas: air, water, land, and energy. For each, we highlight current trends, emerging challenges, and efforts by communities,

governments, and institutions to protect environmental quality and build a more sustainable future for the Silver State. The report also identifies local resources, organizations, and policies that can help residents engage with sustainability efforts and contribute to Nevada's long-term social and ecological well-being.

Historical Overview

Nevada is a vast and ecologically diverse state whose population is highly concentrated in a handful of urban corridors. This uneven demographic distribution, coupled with sustained in-migration and climate stress, places immense pressure on the state's environmental resources and public health systems. Environmental sustainability in the Silver State is deeply entangled with patterns of rapid population growth, sprawling urban development, and regional climate vulnerability.

Nevada's population has surged from fewer than 100,000 residents in the 1940s to over 3.2 million as of 2024 (U.S. Census Bureau; Nevada State Demographer 2024). While this growth has brought economic development and infrastructure expansion, it has also intensified demands on water, energy, land, and air quality. Consider the following milestones:

- Between 1950 and 1990, Nevada's population increased by about 162%, reflecting rapid growth fueled by postwar military expansion, tourism, and construction (Census Bureau, 2021; Demographia, n.d.).

- During the 1990s, Nevada grew by an additional 50.5%, ranking among the fastest-growing states in the nation (Demographia, n.d.).

- From 2000 to 2020, Clark County added more than 1.5 million residents, a 205% increase (Legislative Counsel Bureau, 2020; U.S. Census Bureau, 2020).

- As of 2024, Clark County's population is about 2.40 million, accounting for roughly 73% of Nevada's 3.27 million residents (Federal Reserve Bank of St. Louis, 2025; Macrotrends, 2025).

- Population forecasts project Nevada reaching about 3.94 million residents by 2043, with most growth concentrated in urban counties such as Clark, Washoe, Lyon, and Douglas (NCHStats, 2025).

This extraordinary growth has reshaped the state's landscape and introduced a host of environmental challenges, particularly in urban and peri-urban regions where infrastructure often lags behind demand. The sprawling development footprint has also fragmented desert ecosystems, strained groundwater and surface water systems, and increased vulnerability to heat, drought, and air pollution.

Regional Contexts and Ecological Stress

Nevada's two major urban regions, Las Vegas in the south and Reno-Tahoe in the north, are ecologically distinct and environmentally sensitive in different ways.

Las Vegas Valley lies within the eastern Mojave Desert, one of the hottest and driest environments in North America. Average summer highs routinely exceed 105°F (40.5°C), and annual precipitation averages less than 4.2 inches. Rapid urbanization has replaced native desert landscapes with impermeable surfaces, intensifying the urban heat island effect, increasing stormwater runoff, and reducing biodiversity. Despite its arid setting, the valley hosts a surprising range of plant and animal life, much of it endemic and fragile. Groundwater pumping and overuse of the Colorado River, on which southern Nevada relies for 90% of its water, have further stressed this desert basin.

The Reno-Sparks-Carson-Tahoe region straddles the transition zone between the Sierra Nevada mountains and the Great Basin. This area features a more temperate climate, higher annual precipitation, and ecologically diverse alpine and subalpine environments. Lake Tahoe, a glacial lake famous for its exceptional clarity, is a centerpiece of the regional ecosystem and economy. But it faces mounting threats from urban runoff, invasive species, wildfires, and warming temperatures, which are altering nutrient cycles and biodiversity in the basin. Wildfire risk in the surrounding Sierra and foothills has intensified sharply in recent years, with longer fire seasons and higher fire intensity attributed to both climate change and forest mismanagement.

Both regions reflect broader dynamics seen across the American West: growing urban populations, overburdened natural systems, and a warming climate that amplifies historical vulnerabilities. These developments have transformed Nevada's environmental challenges from localized pollution and land-use issues into complex, systemic sustainability crises.

Toward a More Sustainable Future

Sustainability in Nevada today demands more than conservation; it requires rethinking how communities grow, use energy and water, move through landscapes, and protect natural systems. While urbanization has concentrated environmental problems in a few geographic areas, it has also created opportunities for regionally tailored innovations in green infrastructure, energy transitions, and adaptive land and water planning.

Recognizing these challenges, recent state-level policies (detailed in the next section) have begun to prioritize long-term environmental health, climate resilience, and environmental justice. Still, the path toward sustainability in Nevada will depend on sustained investment, multi-scalar coordination, and a collective commitment to equity, ecological integrity, and future-oriented planning.

Nevada's Key Environmental Concerns

Four interrelated areas remain central to understanding environmental quality of life and sustainability in Nevada: (a) air, (b) water, (c) land, and (d) energy. This section focuses on air quality, which continues to pose pressing public health, ecological, and regulatory challenges across the state, especially in rapidly urbanizing areas like the Las Vegas Valley and the Reno-Carson region.

Air Quality

Air quality remains a critical public health and environmental concern in Nevada's urban regions, particularly in the Las Vegas Valley, where high temperatures, arid conditions, population growth, vehicular traffic, and construction activity combine to produce elevated levels of air pollution. Like many fast-growing metropolitan areas in the western United States, Clark County faces persistent challenges related to ozone, particulate matter, and episodic wildfire smoke. Although past regulatory efforts have improved conditions for pollutants like carbon monoxide, new standards and environmental changes continue to push counties toward the edge of compliance with federal air quality regulations.

Carbon Monoxide (CO) and Nitrogen Dioxide (NO_2)

Carbon monoxide (CO) pollution has declined significantly since the 1990s due to enhanced vehicle emission standards, fuel reformulations, and regulatory oversight. Once designated as a serious nonattainment area, Clark County has met CO attainment standards for over two decades. As of 2024, CO levels remain within federal thresholds.

- Vehicle exhaust still accounts for the majority of CO and NO_2 emissions, although electric vehicle adoption and improved fuel standards have reduced the overall emission load.

- Wildfires, increasingly common in the western U.S., are now a major episodic source of both CO and NO_2, particularly during summer and early fall.

- While CO exceedances have remained rare, nitrogen dioxide continues to pose public health concerns, especially during high-traffic and wildfire events, and contributes to the formation of ground-level ozone.

Ozone (O_3)

Ground-level ozone is the primary air quality concern in Clark County and increasingly in Washoe County as well. Although ozone forms naturally in the upper atmosphere where it protects against ultraviolet radiation, at ground level it becomes a dangerous pollutant formed through complex chemical reactions involving sunlight, nitrogen oxides (NO_x), and volatile organic compounds (VOCs).

- Ozone levels are highest during the hot, sunny months from May to October, especially during periods of stagnant air and high traffic.

- The EPA's 2015 ozone standard lowered the allowable concentration from 75 to 70 parts per billion (ppb) over an 8-hour average. Clark County has struggled to meet this stricter standard, though it has shown a general downward trend in exceedances.

- As of 2024, Clark County remains in marginal nonattainment status, and local officials anticipate achieving compliance with the 70 ppb standard by 2026, barring major wildfire disruptions.

The urban heat island effect, which increases local temperatures in densely developed areas, is intensifying ozone formation in Las Vegas and Reno, and disproportionately affects lower-income neighborhoods with less tree cover and more impervious surfaces.

Particulate Matter (PM10 and PM2.5)
Particulate matter (PM) remains a major health and visibility concern in Nevada, especially during dust storms, wildfire seasons, and construction booms. Two categories of particulates are tracked:

- PM10: inhalable particles ≤10 microns in diameter, typically associated with dust from construction, unpaved roads, and disturbed desert surfaces.

- PM2.5: finer particles ≤2.5 microns, typically generated by vehicle exhaust, combustion, and wildfire smoke. These can penetrate deep into the lungs and bloodstream, posing greater health risks.

Key trends and concerns:
Clark County was reclassified to attainment for PM10 in 2014, but localized exceedances still occur, especially near major construction sites and on windy days.

PM2.5 levels have worsened in recent years due to longer and more intense wildfire seasons. In July 2021, Reno had some of the worst air quality in the world, and Las Vegas experienced several "unhealthy for sensitive groups" days due to wildfire smoke transported from California and northern Nevada.

PM2.5 pollution has a documented link to increased hospitalizations, cardiovascular disease, and premature death. It also disproportionately affects communities with pre-existing health vulnerabilities.

Health Impacts and Environmental Justice
Air pollution affects all Nevadans, but not equally. Vulnerable groups, including children, the elderly, low-income residents, and communities of color, are more likely to suffer from exposure to elevated pollution levels. Las Vegas and Reno neighborhoods near major highways, industrial zones, and construction corridors experience higher asthma rates and elevated heat and pollution burdens.

According to the CDC's 2023 National Environmental Public Health Tracking Network, approximately 8.1% of adults in Nevada currently have asthma, with higher rates among Black and Latinx residents.

Seven percent of children in Nevada also suffer from asthma, with the highest rates in Clark County's urban core (Kids Count Data Center, 2023).

Nevada is not currently funded under the CDC's National Asthma Control Program, limiting public health capacity for coordinated response and education.

Valley Fever (Coccidioidomycosis)
Valley Fever, caused by inhaling fungal spores (Coccidioides immitis) from disturbed desert soil, is an emerging concern in southern Nevada, especially in arid, construction-heavy, or post-wildfire landscapes. Although most cases are mild, the disease can cause severe flu-like symptoms and chronic lung infections in vulnerable individuals.

The CDC reported that Nevada had one of the highest incidence increases of Valley Fever between 2011 and 2021, with cases now identified in both Clark and Nye counties.

Risk is heightened by drought, land disturbance, and rising temperatures, which contribute to fungal growth and spore dispersal.

Looking Ahead
Meeting Nevada's air quality challenges in the coming decades will require multi-pronged strategies that incorporate not only emissions reduction and land use planning, but also climate adaptation, heat mitigation, and public health outreach. Priorities include:

- Expanding public transit and electric vehicle infrastructure.
- Implementing urban greening and heat-resilient design in low-income neighborhoods.
- Improving air quality monitoring, especially for PM2.5 and wildfire smoke.
- Integrating environmental justice frameworks into state and county planning processes.

Air quality is not just an environmental issue, it is a pressing question of public health equity and climate resilience. Addressing it requires a long-term vision that connects science, policy, and community capacity.

Water
Water scarcity remains the most pressing environmental, economic, political, and social health challenge in Nevada. Southern Nevada and the Reno–Tahoe region both face sustainability limits exacerbated by climate change, legal complexities, and demographic pressures.

- In Southern Nevada, nearly 90% of municipal water comes from the Colorado River, making Las Vegas heavily dependent on allocations determined by the 1922 Colorado River Compact and subsequent agreements known as the "Law of the River."

- Nevada receives the smallest share among the Lower Basin states. Prolonged megadrought conditions since 2000 have pushed Lake Mead to persistently low levels, triggering mandatory cutbacks under evolving federal shortage guidelines.

To ensure supply in this increasingly precarious setting, the Southern Nevada Water Authority (SNWA) has invested in deep intake tunnels, diversified groundwater holdings, and conservation programs to reduce per-capita use from over 300 to roughly 200 gallons per person per day. Despite this, expansion of groundwater extraction plans continues to invite conflict with rural and tribal communities, raising concerns about aquifer depletion, ecological impacts, and social justice.

The Reno-Tahoe region relies primarily on the Truckee River watershed, fed by Sierra Nevada snowpack. Although water-rights trading and prior appropriation limit unchecked development, long-term reliability remains vulnerable due to snow drought cycles and rising demands.

- Lake Tahoe's famed clarity, once exceeding 100 feet of visibility, has steadily declined, with recent measurements near 62 feet.

Sediments, nutrient runoff, warming lake stratification, wildfire ash, and invasive algae now undermine ecological and recreational values. Multi-agency restoration programs have mitigated some sediment inputs, but deeper climate-driven impacts now pose systemic threats to Tahoe's clarity and overall health.

Water Conservation

Water conservation remains one of the most pressing environmental and social challenges facing Nevada, particularly in Southern Nevada where nearly 90% of the region's municipal water supply is sourced from the Colorado River. In the face of long-term drought, increasing population pressures, and climate-driven water scarcity, effective water management has become central to the region's sustainability and resilience. Since the 1990s, the Southern Nevada Water Authority (SNWA) has evolved from a regional coordination body into a nationally recognized leader in conservation planning and implementation. Early water resource plans, such as the 1996 SNWA strategy, achieved modest reductions in water consumption, but these gains were short-lived as population growth outpaced conservation efforts in the early 2000s. In response, SNWA adopted more aggressive measures through its Five-Year Conservation Plan (2004–2009), which combined incentive-based programs, such as turf rebate programs, smart irrigation technologies, and appliance upgrades, with regulatory tools including watering restrictions, drought response ordinances, and municipal development codes.

Public education has also played a critical role in shifting cultural attitudes toward water use in the Mojave Desert. Campaigns promoting a "watersmart" ethos, especially those targeting ornamental landscaping and outdoor irrigation practices, have been instrumental in normalizing desert-appropriate yard design and fostering a sense of civic responsibility around conservation. Given that outdoor water use accounts for between 60% and 90% of residential water consumption in Southern Nevada, efforts to transition from turfgrass to xeriscape landscapes have yielded substantial water savings.

- Between 2002 and 2017, SNWA reported a 36% reduction in per capita water use, even as the region added more than 660,000 new residents.

- By 2024, per capita water consumption had dropped further, reflecting both technological improvements and behavioral shifts among residents.

The SNWA's long-term goal is to reach 199 gallons per capita per day (GPCD) by 2035—a target that once seemed ambitious but now appears attainable. Notably, the rapid reductions in GPCD between 2008 and 2012 were likely accelerated by the economic recession, which slowed new construction and temporarily stabilized population growth. In the post-recession years, however, water use has continued to decline even as economic and demographic growth resumed, suggesting that conservation practices have become more deeply embedded in regional norms and infrastructures. Yet the challenge is far from over. Climate change continues to threaten the Colorado River's reliability, and the growing frequency of extreme heat days increases urban water demands. Going forward, maintaining progress in water conservation will require deeper structural interventions, such as rethinking land-use patterns, incentivizing high-efficiency housing retrofits, and investing in recycled water infrastructure, as well as equitable engagement with tribal, rural, and underserved communities who often remain peripheral in mainstream water governance discourses.

Colorado River

Managing the Colorado River has become one of the most complex and politically sensitive environmental challenges in the western United States.

The river supplies water to over 40 million people, irrigates more than 5 million acres of farmland, and is governed by a tangled web of compacts, court decisions, international treaties, and federal laws collectively known as the "Law of the River."

- The 1922 Colorado River Compact originally allocated 7.5 million acre-feet (MAF) annually to each of the Upper Basin (Colorado, Wyoming, Utah, New Mexico) and Lower Basin (California, Arizona, Nevada) states.

- This agreement was based on data from a uniquely wet period and drastically overestimated long-term flow levels. Today, the average annual flow is closer to 12 MAF, far below the total legally promised to U.S. states, Mexico, and Native tribes.

Climate change has further stressed this over-allocated system, as persistent drought and warming have caused sharp declines in runoff and reservoir levels.

The 2007 Interim Guidelines and the 2019 Drought Contingency Plans were stopgap agreements meant to prevent a "compact call" – a legal dispute in which Lower Basin users could be forced to curtail use to allow the Upper Basin to meet downstream delivery obligations. These agreements, however, expire in 2026, and renegotiation is underway. One of the key challenges lies in balancing California's historical priority rights with the need for more equitable distribution among all users, including fast-growing Arizona and

Nevada. Meanwhile, Upper Basin states insist they cannot bear disproportionate responsibility for reductions, especially as they have historically used less water than their Lower Basin counterparts. As of 2024, the U.S. Bureau of Reclamation convened input from the Basin States, tribal stakeholders, and other parties to develop new allocation frameworks for the Colorado River that reflect 21st-century hydrology (U.S. Bureau of Reclamation, 2024). This effort has exposed political gridlock and divergent legal interpretations, with competing alternatives emerging from Upper Basin states, Lower Basin states, and Tribal Nations—none yet agreed upon (AP News, 2024). Stakeholders continue to urge formal integration of tribal water rights and climate science into the river's governance, stressing that a long-term solution will require not only legal and regional cooperation but also a shift in water-use culture across the Southwest (Interior Department & Bureau of Reclamation, 2024).

For Nevada, the renegotiation of the Colorado River Compact carries both heightened urgency and a rare opportunity. As the smallest water user among the Lower Basin states,

- Nevada's annual allocation is just 300,000 acre-feet–less than 2% of the total Lower Basin allotment.

- Despite this limited share, Southern Nevada, which depends on the Colorado River for approximately 90% of its municipal water supply, has become a national leader in water conservation, recycling, and reuse.

The Southern Nevada Water Authority (SNWA) has implemented aggressive water-saving measures, including turf removal incentives, indoor reuse systems, and a recently completed low lake level pumping station at Lake Mead that secures access to water even as reservoir levels decline. However, continued population growth and the unpredictability of future water availability mean that Nevada's "do more with less" strategy will be increasingly difficult to sustain. As multi-state negotiations proceed, Nevada must navigate a delicate balance: advocating for a fairer and more resilient allocation formula while protecting its reputation as a cooperative, conservation-oriented actor in the Colorado River Basin. The outcomes of these negotiations will directly shape Nevada's long-term environmental sustainability, economic development, and the security of its urban water future.

Tribal Water Rights & Indigenous Governance

For tribal nations in Nevada, like the Pyramid Lake Paiute Tribe, Shoshone-Paiute tribes of Duck Valley, and Southern Paiute communities, water is foundational to sovereignty, culture, and ecosystem health. Under *Winters v. United States* (1908), federally reserved rights predate and often supersede other allocations, but many remain either unquantified or unfulfilled.

The Pyramid Lake Paiute Tribe, for example, has long enforced rights established under the 1990 Truckee-Carson–Pyramid Lake Settlement. Yet from 2002 to 2019, federal agencies diverted "excess" water away from the Truckee River inflows critical to Pyramid Lake and its culturally significant fish populations–Lahontan cutthroat trout and cui-ui. In July 2023, the Tribe filed a federal lawsuit, asserting that the Interior Department

violated the Settlement Act and failed tribal trust obligations by reallocating tribal water to benefit the Stillwater Wildlife Refuge instead of Pyramid Lake (Solis, 2023). Meanwhile, in 2025, the Nevada's Governor Lombardo approved Senate Bill 276, endorsed by the Pyramid Lake Paiute Tribe, requiring municipalities to notify tribes of upstream water-quality incidents, affirming tribal sovereignty and ensuring participatory governance in environmental decision-making.

At the basin level, more than two dozen Native American tribes, including the Navajo, Hopi, and San Juan Southern Paiute, have negotiated a proposed settlement to secure priority water rights and infrastructure support, including the development of a pipeline from Lake Powell to deliver water to remote communities. This agreement, still pending Congressional approval, would represent one of the most significant water settlements in U.S. history, restoring tribal access and addressing decades of exclusion from Colorado River negotiations (Bryan, 2024).

Nevada tribes have also begun leveraging federal infrastructure funding under the Inflation Reduction Act and the Bipartisan Infrastructure Law. In 2024–2025, millions were allocated to upgrade tribal water systems, including the Duck Valley and Fallon Paiute-Shoshone Reservations, addressing decades of safe drinking water violations and inadequate sewage treatment infrastructure (Halaly, 2025).

Social Health Implications

These developments emphasize that water management is inseparable from social justice and tribal sovereignty. Quantifying and honoring tribal water rights is essential not only for public health and cultural preservation but also for enhancing regional water system resilience. Indigenous knowledge, grounded in stewardship, reciprocity, and ecosystem health, offers critical insight for long-term adaptive governance.

Collaborative governance that includes tribal representation is becoming essential as federal Colorado River agreements approach their August 2026 renewal deadline. Tribes are demanding permanent seats at the negotiation table to ensure that future allocation frameworks reflect their rights and ecological responsibility, not just state-level interests (Ritter, 2024; Hager, 2025).

Nevada's water future now depends on interwoven strategies: supporting equitable tribal settlements, enforcing trust obligations, reducing urban and agricultural demand, restoring watershed ecosystems, and expanding funding for infrastructure in underserved communities. Such holistic governance can better secure water access, ecosystem health, and social well-being for all Nevadans.

Reno–Sparks–Tahoe: Water, Climate Variability, Institutional Adaptation

The Reno–Sparks–Tahoe region continues to confront mounting climate-related risks to its water supply, despite medium-term forecasts suggesting adequacy through at least 2036. According to the Truckee Meadows Water Authority (TMWA) and the Regional Water Planning Commission,

- water supply is projected to remain sufficient until the metropolitan population reaches approximately 550,000. This projection relies heavily on the reliability of Sierra Nevada snowpack, which feeds the Truckee River watershed.

- However, recent decades have produced extreme swings, from record snow in 2010-2011 to the lowest snowpack in over 500 years in 2015.

These "snow droughts" are increasingly understood as consequences of warming temperatures shifting precipitation patterns and creating earlier melt cycles. The shifts undermine the steady streamflow on which TMWA and local communities depend (TMWA, 2009).

Unlike Southern Nevada, where urban growth is decoupled from local water rights, the Reno-Tahoe region regulates new development through a unique system of water rights trading. Prospective developers must first acquire rights before construction can occur, and those rights are permanently transferred to TMWA. This ensures growth is tied to actual water availability, but also places upward pressure on water rights prices, limits expansion, and may potentially lock out lower-income housing developers as available rights dwindle (TMWA, 2025). As climate variability intensifies, existing rights allocations may need reevaluation or supplemental supply sources, such as planned off-river reuse or groundwater banking initiatives like the American Flat project (TMWA, 2023).

Lake Tahoe Clarity: A Plateau, Not Progress

Lake Tahoe's iconic clarity, once exceeding 100 feet of visibility, is no longer improving. According to the 2024 annual clarity report from UC Davis' Tahoe Environmental Research Center, mean clarity stabilized at 62.3 feet, slightly down from 68.2 feet in 2023, but statistically unchanged from long-term averages (Hampton, 2025). This plateau follows decades of steady improvement after severe mid-century clarity loss, suggesting that current restoration programs—such as those under the Lake Tahoe Environmental Improvement Program funded at over $3.1 billion—are now confronting new climate-driven barriers to progress (Davis, 2025).

- Early studies identified sediment runoff as the primary contributor to clarity loss, and efforts to capture over 500,000 pounds of fine sediment annually have significantly slowed that degradation.

But contemporary degradation appears tied to emerging factors such as warming lake temperatures, increased phytoplankton, microrganisms like picoplankton, wildfire ash deposition, and shifts in the zooplankton food web, highlighted by the resurgence of Daphnia and Bosmina in 2022, temporarily boosting clarity (Kerlin, 2023). These complexities underscore the need for renewed research and policy recalibration, as past strategies may no longer address all clarity-reducing mechanisms.

Implications for Regional Sustainability and Social Health

The Reno–Tahoe region exemplifies the challenge of managing water under conditions of hydrological uncertainty, growth pressure, and ecological vulnerability. Institutional

frameworks like rights-based allocation and metered rates have helped moderate per-capita use, but systemic resilience now depends on additional structural shifts. These include expanding drought-resilient supply sources, rethinking land-use planning to align with changing water regimes, and integrating climate-adaptive ecosystem recovery strategies, especially concerning lake clarity.

From a socio-environmental perspective, preserving Lake Tahoe's clarity and securing water for urban growth and recreation is not only an ecological task, it is fundamental to regional identity, tourism economies, and social well-being. As climate stress intensifies, equitable governance that connects water supply, public infrastructure, and ecosystem restoration will be essential to protect both community resilience and the region's natural heritage.

Groundwater Contamination

Groundwater serves as a vital drinking-water source across Nevada, particularly for rural communities and suburban developments that rely on private or community wells. In recent decades, urban expansion and decentralized septic systems have heightened concerns around contamination. Nitrate, an odorless and colorless compound often resulting from fertilizer, animal waste, or failing septic systems, poses a particular risk.

- In Clark County, shallow wells in residential areas have occasionally exhibited nitrate concentrations above the federal and Nevada drinking-water standard of 10 mg/L, raising serious health concerns for infants under six months of age and prompting local authorities to recommend annual testing for private wells (SNHD, 2019).

Northern and rural parts of the state have also shown elevated nitrate levels, especially where new housing developments employ dense clusters of septic tanks near local aquifers. Because wetlands and low-lying groundwater zones may recharge via seepage from these systems, nitrate concentrations in nearby domestic wells may rise over time. Regulation in Nevada requires annual testing only for public water systems—not private wells—so many residents remain unaware of contamination risks unless proactive testing is undertaken.

Nevada's legacy of nuclear testing at the Nevada National Security Site (NNSS) presents long-term challenges to groundwater integrity.

- Between 1951 and 1992, a total of 828 underground nuclear detonations occurred, vaporizing rock and releasing radionuclides, particularly tritium, strontium, plutonium, and uranium, into subsurface layers.

Although contamination is largely confined within the site boundaries, DOE's Environmental Management program continues to drill monitoring wells (the most recent in May 2025 at Pahute Mesa) and model contaminant migration to ensure it does not threaten public water supplies or nearby communities (DOE EM-Nevada Program, 2025)

Recent groundwater sampling by Nye County's Tritium Sampling and Monitoring Program (TSaMP) confirmed ten consecutive years of non-detectable tritium in wells downgradient of NNSS, an important early-warning indicator for more hazardous radionuclides, and helped support extension of funding for monitoring through at least 2026 (Pahrump Valley Times, 2025; DOE EM, 2020). Meanwhile, USGS and DOE-sponsored hydrologic modeling continues to confirm that subsurface flow from the NNSS does not reach municipal water systems in communities such as Las Vegas, Amargosa Valley, and Beatty (USGS DOE Cooperative Studies, 2025)

Land and Its Inhabitants

Nevada has the highest percentage of federally owned land, more than 80 percent, making it a uniquely public-land-dominated state (Halaly, 2024). These lands, which include those managed by the Bureau of Land Management (BLM), U.S. Forest Service, Fish and Wildlife Service, and National Park Service, combined with protected areas such as Desert National Wildlife Refuge and Great Basin National Park, support a wide spectrum of recreational activities while also shaping the state's environmental governance and rural economic landscape Nevada Association of Counties, n.d.).

Nevada's varied terrain supports one of the richest biological diversities in the continental United States. Across its basin-and-range landscape, home to minor deserts, alpine zones, and riparian wetlands,

- Nevada hosts approximately 3,800 plant and animal species. Among these, at least 300 are endemic, found nowhere else in the world, and around 67 are aquatic species restricted to isolated springs or lakes, remnants of ancient Pleistocene water bodies (The Nature Conservancy, 2022).

This biodiversity is distributed across four major ecoregions (Columbia Plateau, Great Basin, Sierra Nevada, and Mojave Desert), each supporting distinct ecological communities shaped by geographic isolation and varying climates. These isolated mountain ranges, known as "sky islands," serve as hotspots for species evolution and habitat specialization. Because food and water are often concentrated in few locations such as springs or riparian zones, wildlife is not evenly distributed but instead occurs in relatively low densities across most of the state.

While public lands offer broad protections and recreation opportunities, they also intersect with key conservation challenges. Wildlife faces ecological stressors intensified by an arid climate, including extended droughts, habitat fragmentation, and hydrological changes caused by groundwater pumping and river diversion. Human land uses such as urban expansion, agriculture, and mining further contribute to species threats. For example, intensive off-road vehicle use can lead to soil compaction, vegetation loss, and wildlife disturbance in sensitive desert ecosystems.

In recent years, political disputes have intensified over proposals to sell portions of federal land to support housing and development.

- A recently introduced legislative rider would transfer approximately 400,000 to 500,000 acres in Nevada and Utah to state or local control.

Critics argue this may harm habitat, tribal interests, and the ecological integrity of sensitive areas. Supporters counter that some land should be returned to states for local control, particularly to address housing shortages (Daly and Brown, 2025).

Looking ahead, conservation in Nevada depends on refining land-use planning that balances recreation, traditional land uses, resource development, and ecological preservation. This includes partnerships across federal, state, tribal, and local governance structures, alongside investments in science-driven restoration and climate adaptation interventions. Managing Nevada's land and wildlife requires integrating public access with mechanisms that protect isolated habitats, endemic species, and the resilience of landscapes shaped by extreme aridity and climate vulnerability.

Wildlife Habitats and Conservation

Nevada's ecological richness stems from its location at the intersection of four major ecoregions, each supporting distinct plant and animal communities. These ecoregions are defined by the Nevada Department of Wildlife as geographically distinct areas shaped by shared climate, soil, topography, and species assemblages. The Columbia Plateau encompasses broad volcanic plains and high desert valleys in north-central Nevada. The Great Basin, the largest of the four, stretches from the Sierra Nevada's eastern slope across most of Nevada into Utah. It includes sagebrush steppe, salt flats, conifer forests, and alpine areas that provide key habitats for species like the sage-grouse and Bonneville cutthroat trout. The Sierra Nevada ecoregion, located along Nevada's western edge, features mixed conifer forests, sagebrush, and subalpine ecosystems. Finally, the Mojave Desert in southern Nevada includes creosote bush scrublands, Joshua tree woodlands, and rare spring-fed wetland habitats that support species like the desert tortoise and Amargosa toad (Nevada Department of Wildlife, 2022).

The biodiversity across these ecoregions is shaped by Nevada's complex topography and arid climate. Its numerous mountain ranges, separated by broad, dry basins, form what biologists refer to as "sky islands," elevated habitats that are isolated from one another. These sky islands create conditions for speciation by limiting gene flow between populations, allowing unique subspecies of flora and fauna to evolve. Because water and food resources are sparse and unevenly distributed, wildlife density is generally low across the state. Many species are concentrated near springs, riparian zones, and isolated wetlands, making these areas critical for conservation.

Nevada is especially notable for its endemic aquatic biodiversity. More than 65 aquatic species are found nowhere else in the world, including the Devils Hole pupfish (*Cyprinodon diabolis*) and the White River springfish (*Crenichthys baileyi*) (US Fish & Wildlife Service, 1967). These species are evolutionary holdovers from the Pleistocene epoch, when large prehistoric lakes covered much of the Great Basin. As the climate warmed and the lakes receded, aquatic populations became isolated in desert springs and marshes, where they continued to evolve under unique ecological pressures. They are now among the species most vulnerable to groundwater depletion and climate change.

Conservation efforts face multiple stressors, both environmental and human-driven. The state's aridity renders its ecosystems especially vulnerable to prolonged drought, wildfire, and extreme heat, all of which are becoming more frequent due to climate change. Human activities that alter or fragment habitats pose additional risks. Among the most significant are urban sprawl, excessive groundwater pumping, river diversions, and open-pit mining operations. Off-road vehicle recreation, while popular, has led to erosion, noise pollution, and the degradation of sensitive habitats, especially in desert ecosystems. Invasive species, such as tamarisk (salt cedar) and quagga mussels, further disrupt native ecological balances, outcompeting endemic plants and animals for limited water and nutrients (Brooks et al., 2020).

Wildlife conservation in Nevada requires adaptive strategies that balance ecological preservation with ongoing development pressures. Recent efforts have included habitat restoration programs, species monitoring initiatives, and policy tools like conservation easements and land-use planning frameworks. Cross-jurisdictional coordination is especially critical, as many of Nevada's ecosystems span federal, state, tribal, and private lands. Looking ahead, effective stewardship will depend on integrating ecological science, public participation, and climate adaptation strategies into land and water governance across the state.

Urban Development and Sprawl

Nevada continues to undergo profound transformation driven by rapid population growth and urban expansion. Since the 1990s, the state has remained one of the fastest growing in the nation. As of 2024, Nevada's population exceeds 3.2 million, with most residents concentrated in the Las Vegas metropolitan area and the Reno-Tahoe corridor (U.S. Census Bureau, 2023). While rural areas remain sparsely populated, urban development has sprawled outward in low-density, auto-dependent patterns that create complex environmental and planning challenges.

Urban sprawl is a form of dispersed development that extends beyond city boundaries, often with limited coordination among local jurisdictions. In Nevada, this pattern is driven by speculative housing markets, land availability, and infrastructure subsidies that enable leapfrog development. Sprawl leads to the inefficient consumption of land, contributes to habitat fragmentation, increases reliance on cars, and raises the cost of extending municipal services such as water, sewer, fire protection, and schools (Ewing & Hamidi 2015).

While open space preservation has gained some policy traction, especially in fast-growing areas like Clark and Washoe counties, conservation measures often remain fragmented or secondary to economic growth imperatives. In many cases, natural areas, such as floodplains, riparian zones, and wildlife corridors, are developed piecemeal. This undermines broader ecological connectivity and reduces resilience to climate-related disturbances such as drought, wildfire, and flooding.

The environmental consequences of sprawl are increasingly visible. Land disturbance from residential and commercial development promotes soil erosion, spreads invasive

species, and degrades air and water quality. Individual septic systems used in exurban subdivisions often fail to meet the needs of dense clusters of homes, contributing to groundwater contamination in places like Pahrump, Moapa Valley, and Spanish Springs (Nevada Division of Environmental Protection, 2022). Additionally, vehicle miles traveled (VMT) have steadily increased with sprawl, contributing to higher greenhouse gas emissions and worsening air quality, especially during ozone season in Clark County (Regional Transportation Commission of Southern Nevada, 2023).

In Las Vegas, the historical depletion of groundwater illustrates how urban growth reconfigures hydrological systems. Prior to large-scale development, the valley was sustained by artesian springs fed by deep aquifers. These springs supported Indigenous communities and ecosystems long before Euro-American settlement.

- Over-pumping in the mid-20th century far exceeded the aquifer's natural recharge rate of approximately 25,000 to 35,000 acre-feet per year.

- By the late 1960s, withdrawals had reached 88,000 acre-feet annually, leading to significant land subsidence (Bartlett 2002; SNWA 2023).

Today, the aquifer is recharged artificially using Colorado River water piped in from Lake Mead, but questions remain about the sustainability of this practice amid regional water scarcity and long-term drought.

In response to these mounting challenges, regional conservation efforts have emerged. In Southern Nevada, residents and local governments have pushed for expanded access to parks, trails, and protected open space. Community coalitions have advocated for the protection of stream corridors, desert tortoise habitat, and culturally significant landscapes. In Washoe County, similar initiatives are underway, with growing public interest in land trusts, greenbelts, and open space bonds (Truckee Meadows Regional Planning Agency, 2023).

A major policy milestone was the passage of the Southern Nevada Public Land Management Act (SNPLMA) in 1998, which allowed the Bureau of Land Management (BLM) to auction off federally managed land within designated disposal boundaries in Clark County. Proceeds fund public parks, habitat restoration, and conservation planning. The law also supports the Clark County Multiple Species Habitat Conservation Plan (MSHCP), a collaborative effort to mitigate the impacts of development on threatened species like the desert tortoise. The SNPLMA helped establish a development boundary—or "ring"—around the Las Vegas Valley. Land inside the ring may be sold and developed, while land outside is managed for conservation.

However, tensions persist between conservation goals and development pressures.

- In 2018, the Clark County Commission endorsed a resolution urging Congress to expand the development boundary by opening 44,000 acres of additional public land, while designating more than 300,000 acres for conservation.

Critics argue that expanding the ring undermines the original intent of the SNPLMA and threatens to erode the ecological integrity of surrounding desert landscapes (Southern Nevada Building Resilience Report, 2023).

The debate highlights ongoing trade-offs between housing affordability, economic growth, and environmental sustainability.

Looking ahead, the challenge is not simply to limit growth but to shape it in ways that reflect social, ecological, and cultural values. Emerging frameworks such as smart growth, climate adaptation planning, and green infrastructure provide tools for managing urban development more equitably and sustainably. Integrating these approaches into local and regional governance is essential to addressing the interlinked pressures of sprawl, water scarcity, biodiversity loss, and climate change in Nevada's fast-urbanizing landscapes.

Urban Green Space and Environmental Amenities

Urban green spaces play a vital role in promoting ecological health and social well-being in Nevada's fast-growing cities. These spaces, including public parks, greenways, landscaped corridors, and community gardens, offer significant benefits to residents by supporting recreation, mental health, and social cohesion, while also providing critical ecological services. In cities like Las Vegas and Reno, green spaces help mitigate urban stressors such as air pollution, noise, and extreme heat, and they offer refuge for both people and wildlife in increasingly dense and paved environments.

One of the most pressing concerns related to green space in Nevada's urban cores is the urban heat island (UHI) effect. This phenomenon occurs when built environments composed of materials like concrete, asphalt, and brick absorb and re-emit solar radiation, raising local temperatures well above those in surrounding rural areas. In Las Vegas, UHI is especially severe.

- According to a 2021 study by *Climate Central*, Las Vegas has one of the most intense UHI effects in the United States, with summer temperatures averaging 7.3°F higher in urbanized areas than in surrounding rural zones (Climate Central, 2021).

- This disparity contributes to elevated risks of heat-related illness and mortality, particularly for vulnerable populations such as low-income residents, outdoor workers, and unhoused individuals.

Green infrastructure is a key strategy in reducing urban heat and improving livability. Increasing tree canopy coverage, expanding park access, and installing vegetated buffers can significantly cool ambient air temperatures through shading and evapotranspiration.

- Research from the U.S. Forest Service suggests that well-placed trees can reduce local air temperatures by up to 9°F and lower building energy use for cooling by 20–40% (Nowak et al., 2014).

Despite these benefits, tree canopy distribution in Nevada cities remains uneven. A 2023 urban forestry assessment by the Nevada Division of Forestry found that lower-income neighborhoods in Las Vegas have significantly less green coverage than wealthier districts, perpetuating environmental inequality (US Forest Service, 2025).

An important recent development in Southern Nevada's green infrastructure planning is the Las Vegas Urban Forestry Initiative, launched in collaboration with UNLV's Office of Community Partnerships and Engagement, the School of Public Health, and the UNLV Urban Sustainability Initiative. This effort aims to plant 60,000 drought-resilient trees by 2050 to address both environmental and public health challenges associated with extreme urban heat. Supported by funding from the Southern Nevada Health District and the federal Inflation Reduction Act, the initiative prioritizes neighborhoods most impacted by the urban heat island effect and environmental inequities, often those with the least existing tree canopy and highest social vulnerability indexes. UNLV researchers are contributing to the initiative through community-based climate resilience research, mapping tree canopy disparities, and evaluating the public health impacts of urban greening. The program integrates workforce development components as well, training local residents in tree planting and maintenance, with the dual goals of heat mitigation and job creation. As part of this broader strategy, the initiative reflects a shift toward more holistic, justice-centered environmental governance in Nevada's urban sustainability planning (City of Las Vegas, 2024; UNLV Urban Sustainability Initiative, 2024).

Rooftop greening is another promising strategy for mitigating UHI effects, though its feasibility in arid regions remains a topic of study.

- Green roofs–rooftops planted with drought-tolerant vegetation–can reduce surface temperatures by as much as 50°F and significantly lower indoor cooling needs.

While cities like Phoenix and Tucson have made progress in adapting green roofs to desert climates, Las Vegas has yet to fully scale such solutions. Recent pilot projects by the Desert Research Institute and the University of Nevada, Las Vegas are exploring the effectiveness of green roof materials and plant types suited to Southern Nevada's heat and water constraints.

In addition to vegetative solutions, reflective and solar-integrated surfaces are gaining attention. The widespread installation of rooftop solar panels in Nevada not only helps offset greenhouse gas emissions but also mitigates the UHI effect by absorbing solar radiation and reducing heat accumulation.

- Nevada ranked 6th in the nation for solar energy generation in 2023, with over 4,900 MW installed statewide (Solar Energy Industries Association, 2024).

Efforts to expand green space and mitigate urban heat have also gained traction in local planning. The Southern Nevada Regional Planning Coalition and the Southern Nevada Strong initiative are working to increase equitable access to green infrastructure in underserved neighborhoods. Similarly, Reno's ReLEAF urban forestry initiative,

launched in 2021, is planting thousands of drought-tolerant trees to shade pedestrian areas, schoolyards, and public transit stops (City of Reno, 2024).

As climate projections show increasing frequency and intensity of extreme heat events across the Southwest, urban green infrastructure will remain an essential strategy for enhancing environmental health and sustainability in Nevada cities. Investments in green spaces must be equitably distributed and climate-adapted to ensure that all residents benefit from their cooling, aesthetic, and recreational potential.

Resident Health and Community Well-Being

Green spaces in urban communities continue to serve essential functions for both individual well-being and social cohesion. In fast-growing metropolitan areas like Las Vegas, where much of daily life unfolds in densely built environments with limited natural landscapes, the presence of accessible green space can significantly reduce the psychological stressors associated with urban living. Scholars have long observed that urban residents experience a distinct desire for contact with nature, a phenomenon often referred to as "nature deficit" (Louv, 2008). This desire is linked to a growing body of evidence showing that contact with nature improves mental health, reduces anxiety, and promotes cognitive restoration (van den Berg, Hartig, & Staats, 2007; Bratman et al., 2019). Research suggests that residents with access to parks, gardens, and tree-lined streets report higher life satisfaction and lower rates of depression and cardiovascular disease (Twohig-Bennett & Jones, 2018). Green spaces offer a sense of respite or "being away" from daily routines, while also encouraging active behaviors such as walking, play, and outdoor socializing that benefit physical and emotional well-being.

In Las Vegas, where more than 70 percent of Nevada's population resides, equitable access to urban green space is a growing concern. Rapid urbanization in the Las Vegas Valley has meant a steady loss of natural vegetation over the last several decades.

- Between 1985 and 2014, urban greenspace declined by approximately 2.5 percent, a notable change in an already arid region with limited tree canopy (McLean et al., 2016).

As housing development has expanded outward, newer suburbs often include more parks and landscaped areas, while older, inner-city neighborhoods tend to lack sufficient green infrastructure. This uneven development exacerbates environmental inequality, as disadvantaged communities, often communities of color, are more likely to experience higher temperatures, greater exposure to pollutants, and fewer environmental amenities. These disparities are compounded by limited access to safe, walkable green spaces that can foster community interaction and neighborhood identity.

To address these concerns, the City of Las Vegas Planning and Development Department has outlined goals to improve environmental equity by using a needs-based approach. This strategy prioritizes tree planting, shade infrastructure, and green investments in lower-income and high-vulnerability neighborhoods. These efforts align with recent federal support, including funding from the Inflation Reduction Act, to advance urban greening projects that support climate resilience and environmental justice (U.S.

Department of Agriculture, 2023). Complementary initiatives such as the Las Vegas Urban Forestry Initiative, in partnership with UNLV, further exemplify a growing regional commitment to reimagining green infrastructure as a tool for public health, community revitalization, and environmental sustainability.

Military Lands

Nevada's expansive high desert landscape is often misunderstood and mischaracterized as barren or lifeless, contributing to long-standing justifications for its use in military operations, nuclear testing, and waste storage. This "wasteland" narrative has served to rationalize decisions such as the establishment of the Nevada National Security Site (formerly the Nevada Test Site) and the selection of Yucca Mountain as the proposed national repository for spent nuclear fuel and high-level radioactive waste. In reality, Nevada's desert ecosystems are rich in biodiversity, cultural heritage, and ecological value. Framing them as expendable has enabled decades of environmental degradation that disproportionately affects both the land and the people who live near or depend on these areas.

The environmental legacy of military and nuclear activities in Nevada is profound and ongoing.

- The Nevada National Security Site (NNSS), which hosted more than 900 nuclear detonations between 1951 and 1992, remains one of the most contaminated locations in the United States.

- According to the U.S. Department of Energy, underground nuclear testing has resulted in plumes of radioactive groundwater contamination beneath the site, with state officials estimating that over 300 square miles of groundwater have been affected (DOE, 2023).

- Surface soils in parts of the NNSS are also contaminated with long-lived radionuclides such as plutonium and cesium-137. More than 30,000 acres of the site are permanently restricted from public access due to persistent contamination (GAO, 2021).

Although above-ground nuclear testing ended in 1962, the long half-life of many radioactive elements means that these lands will remain hazardous for generations.

Other federal military facilities in Nevada, including Nellis Air Force Base, the Hawthorne Army Depot, and Naval Air Station Fallon, have also contributed to environmental degradation. At these sites, contamination includes industrial solvents, aviation fuel, and heavy metals that have leached into soil and shallow aquifers. Some of these locations are designated Superfund sites due to their toxic legacy. Live munitions testing at bombing ranges introduces additional contaminants, including unexploded ordnance and heavy metals, which pose persistent safety risks and make large-scale remediation cost-prohibitive. Despite cleanup efforts funded by the Department of Defense's Environmental Restoration Program, progress is often slow and uneven, especially at

active installations where mission readiness takes precedence over environmental rehabilitation (DoD, 2022).

Of particular concern is the mobility of radionuclides in the groundwater beneath the NNSS. Tritium, a radioactive isotope of hydrogen, remains especially worrisome due to its ability to travel with groundwater and its relatively long half-life of over 12 years. While most radioactive contaminants remain trapped in subsurface detonation cavities, some, like iodine-129 and technetium-99, may migrate over time and pose future risks to water sources beyond the site's boundaries. Scientific monitoring continues, but public trust remains fragile, especially among communities historically excluded from decision-making about land use and environmental risk. Indigenous nations, particularly the Western Shoshone, have long asserted that these military activities violate treaties and sacred land stewardship responsibilities (Dunbar-Ortiz, 2014).

Efforts to reimagine these lands for future generations, such as proposals for renewable energy development on decommissioned military lands, face legal, ecological, and ethical hurdles. A sustainable and just environmental future in Nevada requires ongoing transparency, investment in long-term monitoring, meaningful tribal consultation, and a reckoning with the historical sacrifices imposed on both people and land.

Energy

Nevada's economy remains relatively energy-light compared with other states; per-capita energy consumption ranks in the bottom fifth nationally (EIA 2025).

- Despite this, the state imports approximately 88 percent of its total energy due to limited fossil fuel resources and low in-state production (Governor's Office of Energy, 2023).

- As of 2022, natural gas continued to be the dominant electricity source, accounting for about 53 percent of in-state generation, the smallest share in nearly two decades, illustrating growing adoption of renewable energy (U.S. Energy Information Administration, 2025).

- Nevada has made significant progress toward renewable energy goals. As of 2022, approximately 37 percent of Nevada's electricity came from renewables, placing the state on track to meet its target of 50 percent by 2030.

- Solar generation made up 23 percent, geothermal 9 percent, hydro 4 percent, and wind 0.7 percent (U.S. Energy Information Administration, 2025).

- In 2024 NV Energy reported serving nearly 47 percent of its customers from renewable sources, including large-scale solar and battery storage projects like Gemini and Dry Lake Solar (Riley, 2025).

Geothermal and Solar

Nevada is a national leader in geothermal energy, producing roughly 26 percent of all U.S. utility-scale geothermal electricity as of late 2023—second only to California (U.S. Energy Information Administration, 2025).

- The U.S. Geological Survey estimates that geothermal capacity in the Great Basin region, including Nevada, could reach 135 gigawatts—enough for about 10 percent of national electricity needs—if new technologies unlock deep geothermal resources (Reuters, 2025).

Solar energy continues to grow rapidly. Nevada generates more solar electricity per capita than any other state and ranks fourth nationally in total solar generation, including residential rooftop systems (U.S. Energy Information Administration, 2025; America's Health Rankings, 2023).

- By 2024, utility-scale solar accounted for nearly a quarter of state generation, with about 2 GW of rooftop solar added over recent years (Governor's Office of Energy, 2023).

- Major projects in development include the Eagle Shadow Mountain Solar Farm (300 MW AC) on the Moapa River Indian Reservation and the Libra, Gemini, and Sierra Solar projects, each paired with battery storage, to support grid reliability and decarbonization goals.

Wind and Hydropower

Nevada's wind energy sector is modest.

- The Spring Valley Wind Farm, the state's first utility-scale wind installation, has a capacity of 152 MW and generates around 310 GWh annually.

- Although Nevada has wind potential exceeding 7 GW, additional development has been slow due to limited federal land permits and environmental or cultural concerns (Lewis, 2023).

- A second large wind project, Stagecoach Wind, is under environmental review and expected to produce 600 MW when completed by 2026, potentially marking a major expansion in state wind capacity (Lewis, 2023).

- Hydropower, primarily from Hoover Dam and Davis Dam, accounts for about 4 percent of Nevada's electricity supply. Hoover Dam alone provides approximately 4 billion kWh annually, with 24 percent of that allocated to Nevada (Governor's Office of Energy, 2023).

Policy and Infrastructure Trends

Nevada's Energy Portfolio Standard mandates that 50 percent of electricity sales come from renewable resources by 2030. The State Energy Program and Bipartisan

Infrastructure Law funds support renewable development, EV infrastructure, and weatherization efforts across the state (Governor's Office of Energy, 2024).

- NV Energy's 2024 Integrated Resource Plan outlines expansions including over 1,000 MW of solar capacity with co-located battery storage and hydrogen-capable natural gas turbines to balance reliability and decarbonization aims (Governor's Office of Energy, 2024).

- In September 2024, the federal government approved the Greenlink West transmission project—a 472-mile line linking northern and southern Nevada—that can transmit up to 4 GW of electricity, enhancing the ability to deliver renewable energy to California and other markets (Reuters, 2024).

Energy on Tribal Lands

Though tribal lands cover just two percent of Nevada's land area, they play an outsized role in the state's renewable energy landscape due to their abundant solar and geothermal potential (U.S. Energy Information Administration, 2025).

- Nevada is home to thirty-two tribal communities, including nineteen federally recognized tribes. The Moapa Southern Paiute Solar Project, commissioned in 2017 on the Moapa River Indian Reservation, is the first utility-scale solar plant built on tribal land in the continental United States.

- This 250 MW photovoltaic (PV) facility generates roughly 617 GWh annually, accounting for roughly 28 percent capacity factor, and replaces an estimated 341,000 metric tons of CO_2 emissions per year, enough to power approximately 111,000 homes, with its electricity sold under a 25-year PPA to the Los Angeles Department of Water and Power (Center for Innovative Finance Support, 2012).

- Since then, the Moapa tribe has expanded its energy portfolio with two additional large-scale projects: the 300 MW Eagle Shadow Mountain Solar Farm, completed in 2023, and the 200 MW Arrow Canyon Solar Project, both located on reservation lands.

These projects are also paired with battery storage to improve grid reliability and revenue stability. The Moapa Band leases approximately two thousand acres of its reservation to develop these initiatives, receiving lease revenues, workforce training opportunities, and long-term economic benefits (US Department of the Interior Indian Affairs, 2021).

Other tribal communities in Nevada are undertaking renewable energy development as both climate mitigation and sovereignty strategies. In northwest Nevada, the Pyramid Lake Paiute Tribe partnered with Black Rock Solar and NV Energy to install a community solar system in Nixon, which supplies power to tribal facilities including a high school, clinic, police station, museum, and fish hatchery; their solar installations rank Nixon among the communities with the highest per capita solar capacity nationwide (U.S. Energy Information Administration, 2025). The Washoe Tribe has installed multiple ground-mounted solar arrays across its reservation communities in Dresslerville, Carson,

and Stewart, with the goal of meeting all community energy needs from renewables by 2025. These developments received over half a million dollars in DOE grant funding and technical assistance through the Washoe Environmental Protection Department (DoE, 2015).

Federal support for tribal energy development has grown under recent legislation. In 2024, the Biden administration allocated $366 million toward clean energy projects for Native American tribes and rural areas, including solar, wind, battery storage, and micro-hydro installations, marking the largest such investment in U.S. history (Austin, 2024). Tribal communities like those in Nevada have leveraged these funds, alongside private funding partnerships with corporate philanthropies such as the Bezos Earth Fund and Wells Fargo, to build renewable infrastructure that supports economic resilience, job creation, and energy sovereignty (Goodluck, 2022). Together, these tribal-led energy initiatives reflect a broader shift toward Indigenous-directed renewable development that is economically, environmentally, and culturally significant. They offer a model for how tribal sovereignty, environmental justice, and climate mitigation can intersect to foster sustainable futures in Nevada and beyond.

Conclusion

Nevada's energy transition is well underway. The decline in natural gas dependence, rapid growth of solar and geothermal power, and expansion of grid infrastructure, reflect a strategic shift toward renewable energy. Though wind remains nascent, large-scale projects in the pipeline signal potential growth. Continued investment, technological innovation, and partnership, particularly tribal collaboration, are needed to support a resilient, equitable energy future in Nevada.

Prospects for the Future and Work Ahead

As Nevada continues its post-recession transformation into a rapidly diversifying economy, the environmental stakes have only grown more urgent. The state's expanding population, intensifying climate stress, and shifting land use patterns place increased pressure on its fragile ecosystems, scarce water supplies, and air quality. The ongoing impacts of climate change—seen in record-setting droughts, extreme heat events, and declining snowpack—demand a strategic and justice-oriented approach to environmental policy and planning (Nevada Climate Initiative 2023; NOAA 2024).

Raising public awareness remains foundational to addressing these challenges. Nevada's residents need accessible and actionable information about the environmental consequences of overconsumption, water overuse, and carbon-intensive lifestyles. This includes sustained educational campaigns on climate adaptation, groundwater sustainability, and the value of biodiversity in desert ecosystems. Water conservation, in particular, must be reframed not only as an individual responsibility but as a collective obligation linked to regional water justice and tribal water sovereignty (Hundley 2021; U.S. Water Alliance 2023).

In parallel, public officials, environmental planners, and media leaders must expand their roles as communicators and advocates. Support for grassroots environmental coalitions, tribal environmental offices, and youth-led climate organizations can strengthen the

broader civic infrastructure needed to build environmental resilience. Local and regional planning agencies should center environmental justice and community participation in decision-making processes, especially in historically underserved areas (Clark County Office of Sustainability 2024).

At the policy level, Nevada legislators must pursue federal and state funding streams, such as the Inflation Reduction Act, Bipartisan Infrastructure Law, and EPA Justice40 initiatives, to support infrastructure upgrades, air quality monitoring, ecosystem restoration, and wildfire risk reduction. These investments are particularly critical for rural and tribal communities often overlooked in statewide sustainability planning. Recent federal allocations through the Bureau of Reclamation and Department of Energy have already begun to support large-scale water recycling projects and tribal renewable energy systems across Nevada (DOE 2024; Reclamation 2023).

Nevada's renewable energy potential remains one of the state's most promising tools for climate mitigation and economic development. Solar, geothermal, and wind development on tribal, public, and brownfield lands can generate significant employment and revenue while reducing dependence on fossil fuels. Notably, the Moapa Band of Paiutes, the Walker River Paiute Tribe, and the Washoe Tribe have all launched successful solar and energy efficiency initiatives, demonstrating how energy sovereignty and sustainability goals can be aligned (DOE Office of Indian Energy 2024).

Finally, a critical need remains for independent, interdisciplinary research that examines how economic growth and land development intersect with ecological decline and social vulnerability. Collaborative research efforts led by Nevada universities, especially those that include Indigenous science, urban sustainability, and community-based participatory approaches, are essential for shaping a livable and equitable environmental future.

What Nevada Citizens Can Do

Nevada residents play a vital role in shaping the state's environmental trajectory. While structural change is necessary, meaningful improvements can also be driven by individual and community-level action. Improving air quality, for example, requires attention to both regulatory enforcement and behavioral change. Residents can help reduce ozone formation and fine particulate matter by refueling vehicles after sunset, maintaining vehicles for efficient combustion, limiting solvent use, and switching to electric lawn equipment. Local air quality initiatives, such as those promoted by the Clark County Department of Environment and Sustainability, recommend using real-time air monitoring tools to adjust activities on high pollution days (CCDES, 2024).

Water conservation remains an urgent priority as the Colorado River Basin faces long-term drought and renegotiations of interstate water agreements. Households can significantly reduce water use by converting turfgrass to xeriscaping, upgrading irrigation systems, and repairing indoor leaks. The Southern Nevada Water Authority's Water Smart Landscapes program has helped convert over 200 million square feet of turf, saving billions of gallons of water annually. Residents are also encouraged to use commercial car washes that recycle water, and to cover pools to reduce evaporation (SNWA, 2024).

Climate-conscious transportation choices—such as purchasing electric vehicles, biking, using public transit, or participating in ride-sharing—can collectively reduce urban emissions. NV Energy and state agencies now offer rebates and infrastructure support to accelerate the transition to electric vehicles, especially in underserved communities (NV Energy, 2024).

In terms of land use, citizens can advocate for policies that preserve open space, protect habitat corridors, and reduce urban sprawl. Local governments need public input to designate lands for recreation, conservation, or restricted motorized use. The creation and maintenance of urban green spaces—particularly in historically disinvested neighborhoods—has also been linked to improved public health, urban cooling, and biodiversity benefits (Nevada Department of Conservation and Natural Resources, 2024).

Civic engagement is essential. Residents can attend public hearings on environmental permits, comment on land use plans, and support or volunteer with organizations working on conservation, climate, and energy justice. Nevada-based groups such as the Nevada Environmental Justice Coalition, the Clean Energy Project, and Friends of Nevada Wilderness provide avenues for direct action. Importantly, partnerships with tribal environmental departments—such as those at Pyramid Lake, Duck Valley, and Ely Shoshone, offer opportunities to support Indigenous watershed governance and land stewardship rooted in traditional ecological knowledge (Cozzetto et al. 2013; PLPT 2024). By combining personal action with structural engagement, Nevada citizens can help shift the state toward a more just, sustainable, and climate-resilient future.

Nevada's environmental future depends on our collective capacity to balance economic development with ecological stewardship. While the state's urban centers, Las Vegas and the Reno–Sparks–Tahoe corridor, continue to attract residents and businesses, the environmental impacts of this growth are becoming increasingly pronounced. Rapid urbanization, coupled with rising temperatures, diminishing water availability, and habitat fragmentation, calls for a more intentional and equity-oriented approach to sustainability. Environmental challenges in Nevada are not only biophysical but also deeply social, shaped by decisions about land use, energy policy, infrastructure investment, and public health. As climate variability intensifies across the Southwest, long-term environmental planning must address both mitigation and adaptation. Equally important is ensuring that environmental benefits and burdens are distributed fairly across communities, particularly among historically underserved populations. Public participation, transparent policymaking, and inclusive planning are essential to advancing environmental justice in the state. A sustainable Nevada requires robust civic engagement, interdisciplinary research, and collaboration between government agencies, universities, industry, and community organizations. These efforts should prioritize ecosystem resilience, clean energy development, and the protection of natural resources for future generations.

Data Sources and Suggested Readings

America's Health Rankings. (2023). *Renewable Energy in United States*.

AP News. (2024). States in Colorado River basin pitch new ways to absorb shortages but clash on the approach. Associated Press. https://apnews.com/article/08cdce814c0f04f06f771d4232a61632

AP News. (2024). Feds outline 'necessary steps' for Colorado River agreement by 2026 but no recommendation yet. Associated Press. https://apnews.com/article/fce423f8fa12ccd3b1a83acead2d1145

Austin, S. (2024). Biden administration taps $366M to fund clean energy for Native American tribes and rural areas. *AP News*.

Bartlett, R. (2002). *Saving the Springs: A History of Las Vegas Water*. University of Nevada Press.

Bratman, G. N., Anderson, C. B., Berman, M. G., Cochran, B., de Vries, S., Flanders, J., ... & Daily, G. C. (2019). Nature and mental health: An ecosystem service perspective. *Science Advances, 5*(7), eaax0903. https://doi.org/10.1126/sciadv.aax0903

Bryan, M. S. (2024). Native American tribes give unanimous approval to proposal securing Colorado River water. *AP News*.

Census Bureau. (2021). Population change and distribution: 1950 to 2010. U.S. Department of Commerce. https://www.census.gov/data/tables/time-series/dec/popchange-data-text.html

City of Las Vegas. (2024). *City of Las Vegas 2050 Master Plan Annual Report*. Retrieved from https://files.lasvegasnevada.gov/planning/2050-Master-Plan/2024_2050_Master_Plan_Annual_Report.pdf

City of Reno. (2024). ReLEAF Reno. Retrieved from https://www.reno.gov/releafreno

CENTER FOR INNOVATIVE FINANCE SUPPORT. (2012). *Project Profile: Moapa Southern Paiute Solar Project, Clark County, Nevada*. U.S. Department of Transportation.

Clark County Department of Environment and Sustainability. (2024). *Air Quality Initiatives and Resources*. Retrieved from https://www.clarkcountynv.gov/government/departments/environment_and_sustainability/public_communications/air_quality_initiatives_resources

Climate Central. (2021). *Growing public climate concern in 2021*. Climate Matters. Climate Central. Retrieved August 26, 2025, from

https://www.climatecentral.org/climate-matters/growing-public-climate-concern-in-2021

Cozzetto, K., Chief, K., Dittmer, K., et al. (2013). Climate change impacts on the water resources of American Indians and Alaska Natives in the U.S. *Climatic Change, 120*, 569–584.

Daly, M., & Brown, M. (2025). House Republicans push to sell hundreds of thousands of acres of public lands in the West. *AP News*.

Davis, B. J. (2025). Tahoe's clarity is not improving. Scientists are racing for answers. *SF Gate*.

Demographia. (n.d.). State population percent change: 1950–2020. Demographia. https://demographia.com/db-statepc50.htm

DoE. (2015). *Washoe Tribe of Nevada and California 2015 Project*. U.S. Department of Energy.

Dunbar-Ortiz, R. (2014). *An Indigenous Peoples' History of the United States*. Beacon Press.

Ewing, R., & Hamidi, S. (2015). Compactness versus sprawl: A review of recent evidence from the United States. *Journal of Planning Literature, 30*(4), 413–432.

Federal Reserve Bank of St. Louis. (2025). Clark County, NV population (NVCLAR3POP). FRED. https://fred.stlouisfed.org/series/NVCLAR3POP

Goodluck, K. (2022). In search of funding, tribal communities are turning to corporate investment to embrace solar power. *Time*.

Government Accountability Office (GAO). (2021). *Nuclear Waste Cleanup: DOE Should Address Funding and Other Challenges in Long-Term Cleanup Plans*. GAO-21-585. https://www.gao.gov/products/gao-21-585

Governor's Office of Energy. (2023). *Status of Energy Report 2023*. Energy.NV.Gov.

Governor's Office of Energy. (2024). *2024 Status of Energy Report*. Energy.NV.Gov.

Hager, A. (2025). A deadline looms for a new Colorado River plan. What happens if there isn't one? *KUNC*.

Halaly, A. (2024). How much of Nevada's land is owned by the feds? More than you might think. *Review Journal*.

Halaly, A. (2025). Nevada tribes awarded $5 million to enhance water security. *Review Journal*.

Hampton, S. (2025). *Tahoe State of the Lake Report 2025*. UC Davis.

Kerlin, K. (2023). Lake Tahoe's clarity the best it's been since 1980s. *UC Davis*.

Legislative Counsel Bureau. (2020). Population of counties in Nevada: 2020 census. Nevada Legislature. https://www.leg.state.nv.us/Division/Research/Documents/PopulationofCountiesInNevada2020.pdf

Lewis, M. (2023). Nevada's largest – and only second – wind farm just got 70k acres from BLM. *Electrek*.

Louv, R. (2008). *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Algonquin Books.

Macrotrends. (2025). Nevada population 1900–2025. https://www.macrotrends.net/states/nevada/population

McLean, D. D., Jensen, R. R., & Barrie, E. (2016). Changes in vegetation in Las Vegas metropolitan area from 1985 to 2014. *Geographical Bulletin, 57*(2), 113–125.

NCHStats. (2025). Nevada population projections. Nevada County Health Statistics. https://nchstats.com/nevada-population/

Nevada Association of Counties. (n.d.). *Natural Resources & Public Lands: How they Affect Nevada*.

Nevada Department of Conservation and Natural Resources. (2024). *$3.6 million awarded by Conserve Nevada to protect Nevada's resources*. Retrieved from https://dcnr.nv.gov/blogs/3.6-million-awarded-by-conserve-nevada-to-protect-nevadas-resources

Nevada Division of Environmental Protection. (2022). *Onsite Sewage Disposal Program Overview*.

Nowak, D. J., Hirabayashi, S., Bodine, A., & Greenfield, E. (2014). *Tree and forest effects on air quality and human health in the United States. Environmental pollution* (Barking, Essex : 1987), 193, 119–129. https://doi.org/10.1016/j.envpol.2014.05.028

NV Energy. (n.d.). *Clean Energy*.

Nitrate and Ground Water. (2019). *Southern Nevada Health District*.

Office of Environmental Management. (2025). EM Nevada well drilling underway for groundwater analysis at NNSS. *Energy.gov*.

Pahrump Valley Times. (2025). No movement of radioactivity in local waters. *PV Times*.

Pyramid Lake/Truckee-Carson Water Rights Settlement — Title II of P.L. 101-618, Fallon Paiute Shoshone Tribal Settlement Act (Nov. 9, 1990). TheCRE.com. Retrieved August 26, 2025, from https://www.thecre.com/fedlaw/legal22x/pyramid.htm

Regional Transportation Commission of Southern Nevada. (2023). *Mobility and Sustainability Plan*.

Riley, K. (2025). NV Energy reports serving almost half of customers with renewable energy sources in 2024. *Daily Energy Insider*.

Ritter, K. (2024). Colorado River agreement by 2026 but no recommendation yet. *AP News*.

Rogers, J. (2014). Toxic legacy: The Nevada Test Site and nuclear colonialism. In B. Hevly & J. M. Findlay (Eds.), *The Atomic West*. University of Washington Press.

Reuters. (2024). *US approves major transmission project in Nevada*. Reuters.

Reuters. (2025). *US agency says geothermal energy in Nevada's Great Basin could play larger role*. Reuters.

SNWA. (2024). *What we're doing to conserve*. SNWA.

SNWA (Southern Nevada Water Authority). (2023). *Las Vegas Valley Groundwater Management Program*.

Southern Nevada Water Authority. (2024). *2025 Water Resource Plan: Protecting the Environment*. Retrieved from https://www.snwa.com/assets/pdf/water-resource-plan-2025.pdf

Solar Energy Industries Association. (2024). *Nevada Solar State Report*. Retrieved from https://seia.org/wp-content/uploads/2024/08/Nevada-1.pdf

Solis, Jennifer. (2023). *NV tribe sues feds over water rights, failure to protect endangered fish*. Nevada Current.

Southern Nevada Building Resilience Report. (2023). *Balancing Growth, Equity, and the Environment in the Las Vegas Valley*.

Steinmann, F., & Strong, N. (2024). A strategic plan for the Pyramid Lake Paiute Tribe and for the Pyramid Lake Paiute Reservation, 2024 through 2029. *PLPT*.

The Nature Conservancy. (2022). *Resilient Lands*. Nature.org.

TMWA. (2009). *Water Resource Plan*. TMWA.

TMWA. (2023). *Advanced Purified Water Facility at American Flat Project*. USBR.gov.

TMWA. (2025). *2020-2040 Water Resource Plan – Q & As*. Truckee Meadows Water Authority.

Truckee Meadows Regional Planning Agency. (2023). *Open Space and Natural Resource Assessment*.

Twohig-Bennett, C., & Jones, A. (2018). The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes. *Environmental Research, 166*, 628–637. https://doi.org/10.1016/j.envres.2018.06.030

UNLV. (2024). *$5 Million Urban Forestry Initiative*. Retrieved from https://www.unlv.edu/about/highlights/5-million-urban-forestry-initiative.

U.S. Bureau of Reclamation. (2024). Alternatives development – Post-2026 Colorado River. U.S. Department of the Interior. https://www.usbr.gov/ColoradoRiverBasin/post2026/alternatives/index.html

U.S. Census Bureau. (2020). Clark County, Nevada: Profile data. https://data.census.gov/profile/Clark_County%2C_Nevada?g=050XX00US32003

U.S. Census Bureau. (2023). *Population Estimates and Demographic Profiles*.

U.S. Department of Agriculture. (2023). *Urban and Community Forestry Program Fact Sheet*. https://www.fs.usda.gov/managing-land/urban-forests/ucf

U.S. Department of Defense (DoD). (2022). *Defense Environmental Restoration Program Annual Report to Congress for FY 2021*. https://www.denix.osd.mil/derp/home/

U.S. Department of Energy (DOE). (2023). *Nevada National Security Site Environmental Report*. https://www.nnss.gov/docs/Fact_Sheets/DOE_NV/ER/

U.S. Department of the Interior, & U.S. Bureau of Reclamation. (2024). Biden-Harris Administration puts Colorado River on path to success. U.S. Department of the Interior. https://www.doi.gov/pressreleases/biden-harris-administration-puts-colorado-river-path-success

U.S. Department of the Interior Indian Affairs. (2021). *BIA issues final EIS for Moapa Band's proposed Southern Bighorn Solar Project*. The Bureau of Indian Affairs.

U.S. Energy Information Administration. (2025). *Nevada Profile Overview*. EIA.gov.

U.S. Energy Information Administration, Short-Term Energy Outlook (STEO). (2025, August).

US Fish & Wildlife Service. (1967). *Devils Hole pupfish*. Environmental Conservation Online System.

U.S. Forest Service. (2025). Nevada State and Private Forestry Fact Sheet 2025 [PDF]. USDA Forest Service. Retrieved August 27, 2025, from the USDA Forest Service NICPortal

USGS DOE Cooperative Studies. (2025). *Cooperative Studies and Groundwater Monitoring in Nevada*. USGS.

Van den Berg, A. E., Hartig, T., & Staats, H. (2007). *Preference for Nature in Urbanized Societies: Stress, Restoration, and the Pursuit of Sustainability*. Journal of Social Issues, 63(1), 79–96.

Winters v. United States, 207 U.S. 564 (1908).

Community Resources

Nevada's environmental and sustainability efforts are supported by a diverse network of federal, state, regional, and nonprofit organizations. These agencies and groups play crucial roles in managing natural resources, advancing clean energy, protecting public health, and promoting community engagement across the state. Below, key resources are organized by thematic areas to enhance clarity and accessibility.

Water and Land Management
Federal Agencies

- **U.S. Bureau of Reclamation – Lower Colorado Region**
  Manages the last 688 miles of the Colorado River within the United States, overseeing water and power delivery, endangered species protection, habitat conservation, and river channel maintenance. The agency now plays a critical role in drought contingency planning and interstate water agreements.

- **Bureau of Land Management (BLM) – Nevada**
  Oversees approximately 47.5 million acres of public lands for multiple uses including wildlife habitat preservation, grazing, mining, recreation, and increasingly wildfire risk reduction. The BLM's stewardship efforts incorporate climate resilience and landscape-scale conservation initiatives.

- **U.S. Forest Service – Humboldt-Toiyabe National Forest**
  The largest national forest in the lower 48 states, covering 6.3 million acres, with active programs in forest restoration, wildfire management, watershed protection, and recreation management.

- **U.S. Fish and Wildlife Service – Nevada Office**
  Conserves and protects fish, wildlife, plants, and habitats through management of refuges and enforcement of federal conservation laws. The agency has expanded its focus to address climate impacts on species and habitats in Nevada.

State and Regional Agencies

- **Nevada Division of Environmental Protection (NDEP)**
  Oversees environmental quality, including air and water quality management, hazardous waste control, and remediation programs. NDEP now integrates climate adaptation into regulatory frameworks.

- **Nevada Department of Conservation and Natural Resources (DCNR)**
  Coordinates statewide conservation planning, wildfire prevention, drought resilience programs, and natural resource management to promote sustainability and public safety.

- **Colorado River Commission of Nevada**
  Responsible for managing Nevada's share of Colorado River water and

hydropower resources, particularly critical as Lake Mead levels fluctuate under ongoing drought conditions.

- **Southern Nevada Water Authority (SNWA)**
  Manages water supply for the Las Vegas Valley, promoting conservation, infrastructure adaptation, and public education in response to severe and prolonged drought.

- **Truckee Meadows Water Authority (TMWA)**
  Oversees water resource management for Reno, Sparks, and Washoe County, focusing on sustainable supply, quality protection, and climate resilience.

- **Northern Nevada Water Planning Commission**
  Develops integrated water plans and promotes efficient water use to protect quality of life and support growth.

Climate, Energy, and Sustainability

- **Nevada State Office of Energy**
  Leads the state's clean energy transition by promoting renewable energy development, energy efficiency, and climate action planning. The office supports incentives, technical assistance, and programs aligned with Nevada's 2050 net-zero goals.

- **NV Energy**
  Nevada's major electric utility company providing electricity services and incentives for renewable energy adoption and energy conservation, including programs to support solar, wind, and battery storage projects.

- **City of Las Vegas Sustainability Office**
  Coordinates local sustainability and resilience efforts, focusing on urban heat mitigation, equitable green infrastructure, and climate action strategies.

- **Southern Nevada Strong**
  A regional planning initiative integrating transportation, housing, economic, environmental, and health goals, with an increased focus on climate equity and resilience.

- **Nevada Climate Initiative**
  A statewide collaboration launched in 2020 that provides climate data, public engagement, and cross-sector planning resources to prepare communities for climate impacts.

Public Health and Environmental Quality

- **Clark County Department of Air Quality and Environmental Management**

Monitors and regulates air pollution sources, promotes air quality improvement, and addresses environmental health issues related to urban growth and traffic.

- **Nevada Division of Public and Behavioral Health**
  Protects public health with increasing attention to environmental health challenges such as heat vulnerability, air pollution, and vector-borne diseases in the context of climate change.

Conservation and Civic Engagement Organizations

- **The Nature Conservancy – Nevada Chapter**
  Works on land and water conservation, ecosystem restoration, and climate adaptation strategies across Nevada's landscapes.

- **Sierra Club – Nevada Chapter**
  Advocates for wilderness preservation, renewable energy development, and climate justice within the state.
- **Friends of Nevada Wilderness**
  Focuses on protecting Nevada's wild places through education, advocacy, and public engagement.

- **Clean Energy Project**
  A nonprofit promoting renewable energy through education and collaboration with policymakers, businesses, and communities.

- **Lahontan Audubon Society** (Northern Nevada) and **Red Rock Audubon Society** (Southern Nevada)
  Dedicated to bird conservation, habitat restoration, and environmental education.

- **Nevada Wildlife Federation**
  The state's oldest conservation organization, working on wildlife habitat protection and public engagement.

- **Indigenous-led Environmental Initiatives**
  Emerging Indigenous stewardship projects, such as the Moapa Band of Paiute's solar energy developments and land restoration efforts, highlight the growing role of tribal leadership in Nevada's sustainability future.

Nevada's environmental resource network continues to evolve, addressing urgent challenges such as climate change, water scarcity, wildfire risk, and environmental justice. Effective collaboration among these federal, state, local, and nonprofit entities remains essential to securing a resilient, equitable, and sustainable future for all Nevadans.