



- A. Protect, enhance, and restore natural features and resources of the Mojave Desert.
- B. Improve access and connectivity of open spaces for ecological, social, health, and quality of life benefits.
- C. Prioritize increasing tree canopy across all areas of the City for multiple public health and environmental benefits.





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02. LAND USE + ENVIRONMENT

III.A INTRODUCTION

This section highlights a vision and actionable strategies for the natural environment within the City of Las Vegas. This section includes recommendations for: natural features, urban forestry, parks, connectivity, urban agriculture and environmental justice.

This section focuses on the opportunities, challenges outcomes, objectives and connection with guiding principles for each of the sections. This section is connected to previous, ongoing and future city and regional planning efforts, and specifically linked to a concurrent Parks and Open Space Plan. Specifically, the park goals of this section focuses on the quantitative aspects of park space in Las Vegas in relation to projected growth, infill, redevelopment, and land use changes at city-wide and neighborhood-planning area scales for the next 30 years in the City. It also satisfies various requirements outlined in the Recreation Plan of NRS 278.160. This plan is supported by the concurrent CAPRA-accredited Parks and Open Space Plan that addresses specific park standards, guidelines, objectives, policies and priorities.

Recommendations in this section specifically align with 2050 Master Plan guiding principles, including:

- Protect, enhance, and restore natural features and resources of the Mojave Desert.
- · Improve access and connectivity of open spaces for ecological, social, health, and quality of life benefits.
- Prioritize increasing tree canopy across all areas of the City for multiple public health and environmental benefits.
- Strengthen recreation and cultural opportunities for residents and visitors across the City.

Specific opportunities for the environmental component and embedded in recommendations for each of the subcategory and guiding principles include:

- Preserve and maintain open space as a balance to man-made development.
- Reclaim areas of environmental/ecological deterioration using available resources from the public, guasi-public and private sectors
- Plant 60,000 "Bulletproof" native and adaptive trees on public and private property that are heat, cold, and wind tolerant; water efficient; low maintenance; noninvasive, and pest and disease resistant
- Continue to maintain high-quality park space across the City
- Develop new park spaces to increase the total acreage of park space per resident
- Increase access to park spaces and connectivity between park spaces
- Decrease food deserts and increase community gardens across the City
- Improve air quality and reduce urban heat island ٠ impacts across the City



OPPORTUNITIES

- Environment is one of the factors residents identify a a reason to move to and stay in Las Vegas
- Many gaps in the open space framework current exist, allowing for key connectivity strategies
- Las Vegas is a leader in water conservation and ha proven to have the political will to reduce consumptiv water use (primarily via reductions in outdoor wat use)
- There are good examples of adding tree canopy ar reinforcing water-tolerant and native plant species recent projects in Las Vegas
- Residents identify quality of parks as a key asset continue to build on this perception

EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
Improved environment	Protecting, restoring and	Improved environment,	Las Vegas residents	Proactively addressing
conditions provides	adapting places in the	connectivity and	take pride in the unique	environmental
cleaner air, water and	context of the unique	recreation opportunities	environmental and	opportunities and
health outcomes for	natural resources in	will allow for healthier	parks aspects of the	challenges in the contex
all, especially when	Las Vegas will allow for	choice options including	City. These elements	of extreme climate
prioritized for those with	reduced water use and	physical, mental and	are part of the DNA of	change will require
the most needs	improved environmental	safety	what makes Las Vegas	innovative solutions
	and health		a great place to live	that can become global
A A	outcomes			models



SEE ALSO:

		CHALLENGES
as tly	•	SNPLMA-funded parks and open space improvements will eventually decrease as BLM sales conclude at the periphery of the valley - alternative funding strategy should be developed
as	•	Endangered local species
ve er	•	There is currently not enough open space per capita and open spaces are not always located in best areas
nd	•	Federal encumbrances on SNPLMA land limit the city's ability to regulate and manage open space
in : -	•	The urban heat island effect, coupled with increased frequency and intensity of heat waves and extreme heat may impact residents and visitors to Las Vegas, especially vulnerable populations

III.B NATURAL FEATURES

PROTECT, ENHANCE, AND RESTORE NATURAL FEATURES AND **RESOURCES OF THE MOJAVE DESERT**



The Mojave Desert is a unique region covering more than 50,000 square miles of Southern California, Southern the south. At its eastern edge is the Las Vegas Valley, covering context of a hotter and drier future. six hundred square miles. Surrounded by mountains, to the west are the Spring Mountains that extend north-south and include Red Rock Canyon, the La Madre Mountains, and the range's highest peak, Mount Charleston. At an elevation of 11,916 feet, it contains alpine tundra and thick pine forests. The Mojave Desert region is home to a diverse array of animal and plant species, contains unique topography, hydrology, and geology, and has a wide range of characteristics that require careful attention for its preservation, enhancement, and restoration.

The features of the Mojave Desert interconnect with the city's urban areas in a variety of ways as the city has sprawled outward for decades. The 2050 Master Plan emphasizes an intentional path toward infill, redevelopment and adaptive re-use of currently underutilized spaces as the City grows "up and not out." Las Vegas is also the fastest warming city

in the U.S., causing extreme heat island effects often in the City's core urban neighborhoods. Strategies are required Nevada, Northeastern Arizona, and Southwestern Utah. It to restore natural features and processes to combat is a rain shadow desert created by the Sierra Nevada and negative effects of climate change in Las Vegas. This plan coastal mountain ranges of Southern California, bound by for enhanced natural features that blur the boundaries the Great Basin Desert to the north and Sonoran Desert to between natural and built environments is developed in the





OUTCOMES

- The number of threatened species identified by the Clark County MSHCP is reduced by 2031
- The number of endangered species identified by the Clark County MSHCP is reduced over times
- No net loss of identified habitat areas of threatened or endangered species
- No net loss of identified wetlands or desert areas
- Identified natural areas and arroyos have been restored
- Existing and new identified invasive species have been eradicated or contained to prevent population growth and expansion

EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
mproved natural	Environmental	Access and provision	Protecting and	SNPLMA continues to
eatures that blur	protections for Mojave	of open space areas	enhancing the	be an innovative tool
oundaries provides	plant and animal	allow for additional	Mojave Desert	of protecting open
leaner air, water and	species ensure	opportunities for	helps conserve and	spaces and providing
nealth outcomes for	continued resilience	recreation.	preserve natural	funding for parks and
all, especially when	for the sensitive		amenities for current	recreational facilities.
prioritized for those with	ecosystem.		and new residents.	
he most needs	- (b)			=



SEE ALSO CHAPTER 4:

II. Conservation (Water)

III. Public Facilities

IV. Safety (Hazard Mitigation and Flooding)

KEY ACTIONS



- SNPLMA must continue to be supported as it has proven to be an effective tool for concentrating urban growth, while providing funding for open space.
- Utilize Tule Springs National Monument to its potential as a valuable open space asset for the City.
- Preserve and maintain open space as a balance to man-made development.
- Preserve and protect areas of important environmental/ecological consideration, and incorporate such areas into the park and recreation system.
- Use native and adaptive plants to meet environmental objectives and reduce maintenance requirements.
- Continue to partner with agencies, organizations, and businesses to enhance natural resource access and management.
- Reclaim areas of environmental/ecological deterioration using available resources from the public, quasi-public and private sectors.

NATURAL FEATURES INVENTORY AND ASSESSMENT

The unique natural features of climate, weather and the Mojave Desert within the City of Las Vegas provides unique opportunities for new models of adaptive reuse. In order to achieve successful outcomes, it is important to have a detailed understanding of current and future conditions in Las Vegas.

ECOSYSTEMS

Vegetation. Widely spaced, low-lying shrubs compose most of the Mojave Desert flora. There are 250 ephemeral plants, approximately 90 of which are endemic. Dominant species, some of which are protected under the Endangered Species Act, include Joshua trees, creosote, white bursage blackbrush, and Mojave yucca. The Las Vegas Bearpoppy and Las Vegas buckwheat are protected, yet only grow along the Upper Las Vegas Wash in areas that could potentially be developed.

Wildlife. The area is also home to a wide range of mammals (including bats, bobcats, cougars, coyotes, bighorn sheep, pronghorn, muledeer, jackrabbit, and kit fox), birds (including burrowing owls, hummingbirds, hawks, falcons, eagles, and a number of migratory birds), reptiles (including the threatened desert tortoise, a number of species of rattlesnakes and lizards, Gila monsters, and chuckwallas), fish (chubs and dace), amphibians (such as the Red-spotted toad), and insect and arachnid species. The Mojave Desert Tortoise, Mount Charleston Blue Butterfly, and other species in the Mojave Desert ecosystem each face long-term anthropogenic pressures which may lead to further decline. The desert tortoise in particular was listed by the Federal government as threatened in 1990, however, the yellowbilled cuckoo is listed as threatened and the Southwestern Willow Flycatcher is listed as endangered. Off-road vehicles, urban development, transportation infrastructure, low nutritional nonnative grasses and other diminished food sources, and increased fires have all lead to increased habitat fragmentation and loss for these species.

Invasive Species. As with many areas, the introduction of invasive species, such as invasive grasses like red brome and cheatgrass, can challenge native vegetation and wildlife. Along the Las Vegas Wash and Colorado River, tamarisk is resilient and chokes out other species. The quagga mussel is by far the largest threat to the Colorado River and Southern Nevada' water supply, as well as the aquatic food chain. The bivalve rapidly reproduces, encrusts SNWA's pipes and water intakes, and fouls water quality.





CLIMATE

Precipitation. Prevailing Pacific coastal winds traveling inland are forced upwards by mountain ranges; winds that do make it through have potential to release available precipitation, but only averages four inches of rainfall annually, most falling during winter months. The Mojave Desert also receives summer monsoonal moisture that is pushed into the region from the Gulf of California.

Climate. Temperatures vary from extremes of below freezing in the mountains in the winter to 120 degrees on the valley floor during the summer. They can consistently exceed one hundred degrees for summer highs with mild average winter temperatures averaging sixty degrees.

Potential Impact of Climate Change. The Mojave Desert is threatened by changing climatic conditions, which contribute to extreme heat, wildfire, drought, extreme storm events, and associated plant and animal species loss. The capacity of the ecosystem to be resilient and ecologically stable without rapidly losing native vegetation and wildlife during periods of change can be altered with increased rates or intensity of disturbance. Increased heat and less water from drought will mean less resources available to plant and animal communities. Due to the emergence of invasive grasses that can destroy native desert shrubs and form new fuel, desert wildfires are more likely to occur. After fires occur, nonnative species out-compete the slower-toestablish native vegetation.

III.B NATURAL FEATURES









NATURAL SYSTEMS

Topography. The western part of the city are within or abut the foothills of the Spring Mountains and Red Rock Canyon; to the north are the alluvial fans of Gass Peak that towers over the City at the southern end of the Sheep Range. The valley floor gradually slopes from west to east and from north to south, with an elevation of approximately 2,000 feet near Downtown Las Vegas. While slope stability risks are relatively low and confined, foothill areas and areas containing steep slopes constrain development, runoff and erosion are difficult to control or prevent, and if hillsides are improperly developed, they can become unsightly. To protect them, the City adopted a Hillside Development Overlay; Development standards are designated within the overlay to promote orderly development, protect sensitive lands and habitat, mitigate erosion, and avoid visual blight.

Hydrology. The City is within the Las Vegas Valley Hydrographic Basin. Rain and snow in the Spring Mountains and Sheep Range infiltrates bedrock through faults and fractures and rests in aquifers. Prior to wells tapping the aquifer's groundwater, a number of springs, including those at the Las Vegas Springs Preserve, Lorenzi Park, and Tule Springs, were present. Rainstorms wash sediment from surrounding mountains into enormous alluvial fans and into arroyos that are tributaries of the Las Vegas Wash. The Las Vegas Wash, an ephemeral stream, and its tributaries carrying water and precipitation to the Colorado River at the sole outlet of the valley. As the City grew over time, flows into the wash became permanent as both treated wastewater and stormwater are released; these have created ponds and wetlands that also serve to further clean water before entering Lake Mead. Much of the watershed within the City has been developed through funded projects and facilities of the Clark County Regional Flood Control District. Concrete open flow channels, detention basins, and culverts have helped control stormwater during flooding events, but many of the tributaries are no longer in a natural state that could serve as a quality recreational area, green infrastructure, or open space. There have been notable exceptions, including preserved arroyos within Summerlin North, Summerlin West, and Kyle Canyon.







VEGAS

MINERALS, SOILS, AND GEOLOGY

The mineral composition of the surrounding mountains and hills is a mixture of limestone, shale, sandstone, and dolomite with gypsum and quartzite deposits. Although mining is a major state industry, NDEP's Bureau of Mining Regulation and Reclamation indicates no other active mining operations immediately near the city aside the Lone Mountain Gravel Pit, which contains limestone and dolomite, sand and gravel used for concrete aggregate, construction, and landscaping. Sitting on BLM land between the Lone Mountain and La Madre Foothills planning areas, this mining operation provides a necessary resource for the growth of Las Vegas.

According to soil data from the Natural Resources Conservation Service, the floor of the Las Vegas Valley is covered with silt, loam, and clay left behind from prehistoric waters and runoff from the Spring Mountains. Deposits of sedimentary caliche (a natural cement of calcium carbonate that binds clay, silt, gravel, and sand) are common throughout the valley. Given the condition of soils in some parts of the valley and the groundwater aquifer, subsidence from wells is a concern in certain areas. In some cases, as groundwater is extracted from aquifers, they may collapse as subsidence occurs; in others, expansive soils are present. Local soils contain expansive clays that can cause building foundations to crack and can exert enough force on a building or other structure to cause damage. Similarly, soil fissuring occuring around areas with seismic/ tectonic faulting and horizontal aquifer movement can cause building damage.

Some soils can also contribute to contamination of groundwater and permit leeching of potentially hazardous chemicals. As a result, brownfields around Downtown Las Vegas are present and have require remediation. Finally, due to less than ideal soil conditions and composition, farming and agricultural activity have been somewhat limited, although it has been possible to grow crops, orchards, and feed grasses.







III.B NATURAL FEATURES

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NATURAL FEATURES COLLABORATION

Protecting, enhancing, and restoring the Mojave Desert environment within and around the Las Vegas Valley requires substantial collaboration between Federal, State, and local agencies, especially for public lands that have helped contain urban growth:

- Most of these lands are managed by the Bureau of Land Management (BLM) and also include designated wilderness areas, national conservation areas (NCA), and Areas of Critical Environmental Concern (ACEC). BLM's Southern Nevada District's Las Vegas Field Office oversee the resources and protection of public lands, conduct Resource Management Plans, and implement the Southern Nevada Public Lands Management Act (SNPLMA). BLM oversees and permits ranching and grazing, outdoor recreation, off-highway vehicle usage, and hunting.
- Fish and Wildlife Services. This includes the Desert National Wildlife Refuge, located directly north of the City, covering Corn Creek, Gass Peak and the Sheep Mountains this de-facto wilderness area helps protect a wide range of animal species, including desert bighorn sheep.
- National Forest Service and wilderness areas, including the Spring Mountain National Recreation Area to the west of the city. As a part of Humboldt-Toiyabe National Forest, the Spring Mountains contain Mount Charleston, Kyle Canyon, and Lee Canyon, and offer outdoor recreation opportunities.
- National Park Service. Tule Springs National Monument, spanning 15 miles of the Upper Las Vegas Wash between Corn Creek and the 215 Northern Beltway in North Las Vegas and through city territory, is among the newest national parks; also nearby is Lake Mead National Recreation Area - the first and largest recreation area, as well as one of the busiest, averaging more than 8 million visitors annually.
- Tribal territory. The Las Vegas Paiute Tribe occupied the reservation around the Nu Wav Kaiv planning area, in addition to a colony located north of Downtown Las Vegas. This reservation contains a major golf resort and smoke shop.

- Military installations. Nellis Air Force Base and Creech Air Force Base are among the largest fighter and training bases in the country. North of the City is the Nevada Test and Training Range, a 4,700 square mile complex for which the air force conducts combat training with live ordnance, aircraft testing, and exercises. Creech Air Force Base, near Indian Springs, which has undergone significant investment and expansion conducts military drone testing and global drone operations. Developing the northern part of the Las Vegas Valley has met some resistance, in part to ensure the protection of the military installations and their respective operations.
- Because the Federal government owns so much of Nevada's public lands, the State of Nevada does not have significantly large land holdings around the City of Las Vegas. Several state departments do have jurisdiction over areas that help protect the desert environment.
- Nevada Department of Conservation and Natural -Resources (DCNR) oversees the protection of Nevada's environment, including environmental cleanups and remediation. It includes protection of water resources, state lands and state parks, forestry, historic preservation, conservation districts, and off-highway vehicles programs.
- Nevada Department of Wildlife (NDOW) ensures conservation and oversight of wildlife diversity and conservation, and permits hunting, fishing, and boating activities
- Nevada Department of Agriculture (NDA) operates a noxious weed program and regulates the use of fertilizers and pesticides.
- Clark County's Department of Environment and Sustainability is the region's air pollution control agency, implements the Desert Conservation Program, and administers the Multiple Species Habitat Conservation Plan.

The City's Planning Department and Office of Sustainability play a lead role in land use planning and environmental protection. NRS 278.250 prescribes that zoning regulations be in accordance with this master plan and be designed to preserve air and water quality, conserve and protect open space and natural resources, provide for recreational needs. By setting land use controls and zoning through

the LVMC Title 19 Unified Development Code, the City can further protect, enhance, and restore the Mojave Desert

THE SOUTHERN NEVADA PUBLIC LANDS **MANAGEMENT ACT (SNPLMA) IS A VALUABLE TOOL FOR FUNDING PARKS AND OPEN SPACE**

Adopted in 1998, SNPLMA allows the BLM to sell public land within a specific boundary around Las Vegas, Nevada. The revenue from auctioned land sales, totaling \$4.1 billion as of 2019, is split between the State Education Fund (5%), the Southern Nevada Water Authority (10%), and an account for specified purposes, including:

- Development of parks, trails, natural areas, and other recreational and public purposes in cooperation with local governments or regional entities
- Capital Improvements at Federal facilities or on Federal lands
- Conservation Initiatives on Federal lands
- Multi-Species Habitat Conservation Plan (MSHCP)
- **Environmentally Sensitive Land Acquisitions**
- Hazardous Fuels Reduction and Wildfire Prevention
- Eastern Nevada Landscape Restoration Projects
- Lake Tahoe Restoration Projects

Other provisions in the SNPLMA direct certain land sale and acquisition procedures and provide for the sale of land for affordable housing and public purposes, such as municipal facilities and schools. Of the 68,000 acres within the SNPLMA boundary, 38,700 acres have been sold at auction, leased, exchanged, or reserved for public purposes, with approximately 29,000 acres remaining for disposal; much of the City's BLM parcels are within the northwestern planning areas. The City has previously been able to leverage SNPLMA for a wide range of parks and trails projects and renovations. Congressional approval is required to amend SNPLMA and expand the boundary, several recent proposals have been made to increase SNPLMA's territory as a part of public lands bill package.

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III.B NATURAL FEATURES



NEW MAP

Southern Nevada Public Land Management Act Disposal Boundary



TULE SPRINGS NATIONAL MONUMENT IS A VALUABLE OPEN SPACE ASSET TO THE CITY

Established in 2014 by an act of Congress, the Tule Springs Fossil Beds National Monument spans 22,650 acres of the Upper Las Vegas Wash and protects key paleontological and archaeological resources. Fossils of mammoths, camels, and American lions, dating between 10,000 to 250,000 years in age have been found within the wash's arroyos, as have traces of the "Nuwu," the ancestors of the Southern Paiute. Encroachment had been taking place over the last thirty years; some areas of the Wash have been developed or contain housing developments immediately against the Monument's boundaries. The Monument is now protected and contains approximately 5,350 acres within the Nu Wav Kaiv planning area. Because Tule Springs is so new, it lacks basic boundary protections, has no major facilities or visitor's center, and still faces threats of encroachment, as well as vandalism, misuse, and degradation. The City, in partnership with the NPS, must work together to ensure the Monument is secured, buffered, and protected.

HABITAT AND ENDANGERED SPECIES

The Clark County Desert Conservation Program (DCP) manages Endangered Species Act compliance on behalf of Clark County (the agency lead and implementing entity), NDOT, and local municipalities through implementation of the Clark County Multiple Species Habitat Conservation Plan (MSHCP) and an associated incidental take permit due to concerns over habitat loss and mortality of the desert tortoise. Formed thirty years ago and approved for nearly 80 reptile, amphibian, mammal, insect, crustacean, and plant species in 2001 covering 145,000 disturbed acres, the MSHCP allows landowners to develop land without the need for an Endangered Species Act review or environmental study. In addition to funding and implementing conservation measures for the desert tortoise, the plan made funding available to research other species of concern.

The MSHCP directs measures to proactively conserve species and ecosystems. Doing so reduces the likelihood that future species will become endangered and protects the region against further requirements if current species become threatened or endangered in the future.

The MSHCP:

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Helps increase populations of covered species.

- Works to balance conservation with recovery of habitats and ecosystems for native plants and wildlife.
- Protects a broad range of activities under the permit, including development.
- Reduces economic burdens on individual landowners and all levels of government.
- Reduces uncoordinated decision making, which can result in incremental habitat loss.

The MSHCP reserves Federal public land areas defined by their kinds and levels of management as it affects the covered species:

- Intensively Managed Areas (IMAs): Includes the DNWR and areas north of the city
- Less Intensively Managed Areas (LIMAs): Areas immediately surrounding the Spring Mountains and its foothills
- Multiple Use Managed Areas (MUMAs): Areas in the northwestern and western planning areas of the City
- Unmanaged Areas (UMAs): Much of the Las Vegas Valley

IMA and LIMA areas are part of the "reserve system." No net unmitigated loss or fragmentation of habitat is intended within these areas, or within MUMA areas where a substantial proportion of the species habitat exists. Prior to development on private property anywhere within the City or County, the developer must obtain a grading or building permit and pay a one-time \$550 per acre disturbance fee for each non-municipal acre (up to 130,000 acres). These fees are collected by the City and other permittees, and collectively administered by the County to implement the MSHCP.



NEW MAP



III.B NATURAL FEATURES

IMPLEMENTATION STRATEGIES

- SNPLMA must continue be supported as it has proven to be an effective tool for concentrating urban growth, while providing funding for open space
 - Develop a long-term, citywide SNPLMA parcel and property nomination plan, consistent with SNPLMA's Strategic Plan, for future land development purchases, parks, trails and recreation projects, and reserving locations for additional public facilities
 - Carefully collaborate with other jurisdictions and Nevada's Congressional delegation on changes or amendments to SNPLMA or other public lands bills to ensure the intent and purpose of this plan is not undermined
- Utilize Tule Springs National Monument to its potential as a valuable open space asset for the City
 - Utilize SNPLMA or City funding, partner with the NPS to construct a Visitor's Center and other facilities and amenities at the Tule Springs National Monument
 - Provide or require connections and accessibility along boundaries with the Tule Springs National Monument and red Rock Canyon NCA
- Preserve and maintain open space as a balance to man-made development.
 - Protect adjacent lands from urban encroachment through zoning buffers along boundaries with the Tule Springs National Monument and Red Rock Canyon NCA
- Preserve and protect areas of important environmental/ ecological consideration, and incorporate such areas into the park and recreation system.
 - Within the Summerlin West, Lone Mountain, La Madre Foothills, Tule Springs, Centennial Hills, Kyle Canyon, and Nu Wav Kaiv planning areas (especially those within identified LIMA and MUMA areas pursuant to the MSHCP), assess each area to identify plant and wildlife species and habitat areas (including those that are threatened or endangered), connections between habitats, and invasive species

- Adopt additional resource conservation and preservation measures as may be needed or required
- Fund targeted habitat restoration efforts
- Preserve slopes and hillsides, as defined under the Hillside Overlay ordinance, especially for identified sensitive slopes and ridgelines
- Adopt a policy to further enable the use of conservation easements and the transfer of development rights program pursuant to NRS 111 for open space and sensitive lands that warrant protection
- Use native and adaptive plants to meet environmental objectives and reduce maintenance requirements.
- Enact additional policies to identify, contain, and eradicate invasive species, noxious weeds, diseased or infected trees, insects, rodents, pursuant to the Las Vegas City Charter, LVMC Title
 9, and Title 13.48, utilizing best-management practices
- Coordinate with Clark County on additional measures or policies that implement the MSHCP
- Update design standards for municipal buildings and the LVMC Title 19 Unified Development Code to ensure native and adaptive plants are utilized and non-invasive species are prohibited
- Continue to partner with agencies, organizations, and businesses to enhance natural resource access and management.
- Work with Clark County Regional Flood Control District to selectively restore and enhance the Las Vegas Wash and its tributaries
- Work with Clark County Regional Flood Control District to identify, conserve, and protect other arroyos and washes as recreational amenities, while ensuring the ability to protect the public and property from flash flooding
- Develop public education campaigns and coordinate with volunteer organizations to inform residents about endangered, threatened, and invasive species



III.B NATURAL FEATURES

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02. LAND USE + ENVIRONMENT

URBAN FORESTRY NRS 278,160,1(b)(1)

PRIORITIZE INCREASING TREE CANOPY ACROSS ALL AREAS OF THE CITY FOR MULTIPLE PUBLIC HEALTH AND ENVIRONMENTAL **BENEFITS**



As one of the fastest warming cities in the country, extreme heat, including heat waves of greater intensity, frequency, and duration is one of three current and long-term hazard vulnerabilities to the city that must be mitigated. Among the top methods to reduce the urban heat island effect, mitigate extreme heat, and reduce overall temperatures is through the City's urban forest and other forms of green infrastructure. Trees help cool cities by providing shade, lowering the need to cool buildings, decreasing the amount of heat absorbed by asphalt areas like streets or parking lots, and creating overall cooler environment through which people can walk and bike. Urban forests, the collection of urban trees throughout the urban environment, should be considered a capital asset, much like a public building. Trees and urban forests also have the benefit of providing the City with a wide range of physiologic, economic, sociologic, and aesthetic benefits, including:

- Help treat stormwater runoff
- Provide shade that help cool and mitigate the urban heat island
- Help reduce air pollution and sequester greenhouse gas emissions by providing health benefits and environmental justice to urban neighborhoods
- Provide wildlife habitat
- Increase property values and property marketability.

KEY ACTIONS

- In keeping with Tree City USA and urban forestry commitments, plant 60,000 "Bulletproof" native and adaptive trees on public and private property that are tolerant heat, cold, and wind tolerant; water efficient; low maintenance; non-invasive, and pest and disease resistant.
- To further reduce extreme heat and the urban heat island effect, support and accent trees with heat and water efficient native and adaptive plants, including shrubs, groundcover, vines, agaves, cacti, succulents, yuccas, ornamental grasses, and perennials.
- Strengthen landscaping requirements within LVMC Title 19 to ensure trees and landscaping are not lost due to exceptions or waivers of codified standards.
- Institute resilient best management urban design practices to ensure high quality landscape architecture for public facilities and private developments.

URBAN HEAT ISLAND CONTEXT

Average annual high and low temperatures have continually increased over time. Between 2006 and 2019, temperatures increased in Las Vegas nearly three to four degrees. July monthly daytime average temperatures have exceeded 105° in ten of the past 14 years. The Las Vegas office of the National Weather Service determines extreme heat events; heat advisories are issued when daytimes highs are expected to be 100° or higher for at least two days and nighttime temperatures do not drop below 75°. An excessive heat warning is similarly issued when temperatures reach above 105°. Over the next 30 years, barring no major reversal of global climatic temperature trends, it is anticipated that the average annual number of days when temperatures exceed 100° will increase to 70°. Extreme heat is further exacerbated by the urban heat island effect, the phenomenon of urban areas being hotter than rural areas, which can be mitigated by reducing asphalt and concrete surfaces while weaving in green infrastructure and shade. The urban heat island effect can cause the following: Health issues, especially for heat-susceptible

- populations like children, the elderly, homeless individuals, and low-income and minority populations.
- Delays, business risks, and heath concerns for employees that work outside, especially at the City's resorts, construction and development labor.
- Increased energy and water demand for air conditioning and cooling, as well as increased building operational • 85% of the City's population lives within a 1/3 mile costs, employee needs, and goods requiring from green infrastructure features that provide refrigeration. localized cooling through park space, tree canopy Poorer air quality through the greater incidences of cover, or vegetative surfaces.
- inversion layers

EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
Tree canopy coverage	Utilizing water-	Trees help reduce	Parks, trees, and	Designing structures
must be distributed	efficient, drought	the urban heat	green infrastructure	and architectural
throughout the City to	tolerant native and	island effect and	enhance the sense	features that provide
ensure all residents,	adaptive tree and	overall temperatures,	of place in the	shade as well as
as well as members	plant species help the	improve the quality	community and	green space
of vulnerable	City further mitigate	of stormwater and	provide areas that	
populations, have	and adapt against	air, and provide	are enjoyable to walk,	
access to the benefits	the hazard of extreme	visual aesthetics that	bike, and recreate by	
of trees	heat.	improve personal	all.	
ě]ě		wellness.	<u><u>e</u></u>	



OUTCOMES

- Plant and maintain Plant 60,000 "Bulletproof" native and adaptive trees on public and private property by 2050
- The City's tree canopy increases to 20% by 2035 and 25% by 2050 utilizing native and adaptive drought tolerant tree species.





THE MULTIPLE BENEFITS OF TREES Opportunities for further exploration may include the development of joint tree and landscaping programs that incentivizes the replacement of sick, dying, non-native, or A healthy urban forest provides an opportunity to reverse the effects of the urban heat island effect and improve non-adaptive tree and plant species with xeriscaping, water efficient, drought tolerant species that provide community air and stormwater quality. Effective urban forests make benefits and increase the City's tree canopy. neighborhoods livable and promotes a positive aesthetic impact in addition to the benefits of mitigating urban heat **URBAN FORESTS HISTORY IN LAS VEGAS** islands. Not only are trees used to help provide green space for residents, they are commonly used to provide an Urban forests and urban trees are performance landscape aesthetic buffer between uses. Done well, planted trees can elements that have long been proven to provide green help mitigate some of the unwanted or undesirable views of infrastructure serving as a valuable physical capital certain types of uses.

Ultimately, through public and private tree planting efforts and the provision of green space, the overwhelming majority of the City's population should live within a short walk from a concentration of green infrastructure features that provide localized cooling, including park space, tree canopy cover, or vegetative surfaces.

Green infrastructure efforts must be balanced with the ambitious water reduction and conservation targets identified in this plan. Trees for buffering and green space provision are necessary, and species that offer shade, biodiversity, and other benefits considered "bulletproof" should be prioritized for public and private use. These will help ensure a diverse plant pallet that is not only heat tolerant and water efficient, but also meets a range of other criteria, including:

- A large diameter tree canopy; the average for the recommended species is approximately 355 square The City of Las Vegas maintains approximately 40,000 trees feet in public rights-of-way and at public facilities and parks. Not Water consumption only do these trees help provide benefits to public property, A range of tree sizes, heights, and widths help improve air and stormwater quality, they also help Growth rate mitigate local greenhouse gas emissions.

- Maintenance and aesthetic concerns
- Resistance to pests and disease
- Appropriateness for planting within property perimeters as buffers, along the street as shade trees, and within parking areas.

Las Vegas has the most intense urban heat islands of any city in the country, measurably higher daytime and nighttime temperatures and intensities in the urban core than in SNWA's Water Smart landscaping incentive program has suburban areas and in the peripheral desert areas. In terms helped reinforce appropriate tree and species selection of urban heat island intensity, the City is approximately 20while reducing turf and cool season grasses, non-functional 25 degrees hotter than in surrounding desert areas. turf, and application at sports and recreational fields at City parks. Codifying the recommended pallet will send a Using remote sensing imagery, daytime and nighttime clear message that appropriate species selection is vital.

III.C URBAN FORESTRY

asset for the City. The City has been a long-time supporter of urban forestry; the first Arbor Day activities were carried out by the women of the Mesquite Club in 1912 who planted 2,000 trees. Ever since, the City:

- Has been recognized as a Tree City USA by the Arbor Day Foundation since 1989.
- Has supported urban forestry through its sustainability efforts. The City adopted an urban forestry resolution (R-26-2008) that committed the city to double the City's urban tree canopy to 20% by 2035.
- Regulates the planting of trees and shrubs pursuant to LVMC Title 13.48 and LVMC Title 19; the City's Urban Forester and Operations and Maintenance Department are responsible for the City's urban forest, while the Planning Department establishes landscaping standards for residential and commercial development.

EQUITY, URBAN HEAT ISLAND AND URBAN FORESTS

land surface temperatures were mapped across Southern

Nevada using LANDSAT and Census data. Green infrastructure and the proximity of resident population were analyzed, including the amount of the population near protected vegetated surfaces performing localized cooling, including the tree canopy cover, artificially created water features and other permeable surfaces, and recreational areas including parks, golf courses, and greenways. Several extreme heat factors were assessed including:

- The normalized difference vegetation index, which assesses the abundance of vegetation that help mitigate the urban heat island effect through evapotranspiration by releasing absorbed heat easily, which keeps nighttime temperatures down.
- Impervious surfaces that retain heat and raise urban temperatures, especially at night.
- Vulnerability factors within each planning area. Among the key indicators are:
 - The age of the population, particularly of the elderly and children who are more susceptible to extreme heat and the associated health affects
 - Health data, including how many residents are disabled or have chronic diseases
 - Income data as a measure of the ability to afford utilities
 - Access to cooling infrastructure and other information on the building stock

These factors contribute to a community's overall vulnerability to extreme heat caused by the urban heat island. The results reveal:

- Vegetated surfaces only account for 30% of the City's total area, while the tree canopy accounts for approximately 13%, much of it coming from trees in residential areas.
- Tree canopy coverage is typically highest in suburban planning areas like Summerlin and Centennial Hills. Conversely, canopy coverage is lowest in the inner ring suburbs around Downtown Las Vegas. Some notable exceptions include the neighborhoods immediately around the Springs Preserve, golf courses, Lorenzi Park, and Freedom Park. Much of East Las Vegas, the Historic Westside, and Downtown have older tree canopies with large trees that are slowly being lost to disease, replacement, or stress

- In all parts of the City, areas with large concentrations of impervious surfaces, especially parking lots, have higher temperatures and lower amounts of tree canopy.
- The hottest areas are located in the desert areas around the City. Soils and rock heat faster than concrete and asphalt that cool off faster at night. Because concrete holds heat in and releases it slowly, the city doesn't cool down as fast at night
- Other forms of urban cooling and providing shade are not in wide practice in Southern Nevada. The abundance of low albedo surfaces leads to greater heat absorption. Low albedo locations with low sunlight reflectivity are found throughout all planning areas, especially as a result of the abundance of asphalt parking lots. While green infrastructure provides the highest amount of benefits, other efforts, including the proper utilization of building materials, use of shade structures, active and passive shading, and green roofs must be further incorporated into community design.
- The impacts of extreme heat are felt disproportionately across the City. Vulnerable planning areas include those that have higher rates of poverty or homelessness, the elderly and young, and those who have preexisting medical conditions. The impacts of extreme heat are concentrated in areas with lower incomes and have higher rates of African American and Latino neighborhoods, especially those located within West Las Vegas, Charleston, and East Las Vegas. These areas are underserved by green infrastructure and community centers and facilities that serve as cooling stations that serve as a respite from extreme heat.

THE CITY MUST REVERSE THE TREND **OF WAIVING TREE AND LANDSCAPING** REQUIREMENTS

The City must evaluate other proactive measures including a regulatory approach to reduce the amount of impervious surfaces and parking lots. Designing places to mitigate extreme heat impacts will require more innovative approaches.

Based on Planning Department data beginning in 2002, a significant amount of development projects have requested waivers, and exceptions from LVMC Title 19 tree and landscaping standards. During the site development review process, requests may be necessitated for a specific

project. While a single project may eliminate a handful of required trees, the cumulative sum of all trees has led to a substantial loss of the urban forest; between 2006-2015, more than 2400 waivers and exceptions were requested leading to the loss of 6,750 trees and more than 27,000 shrubs. During this period, both Planning Commission and City Council approved these requests to deviate from standards at a rate of more than 74% of the time despite staff recommendation of denial.

The difference between urban and suburban community design and green space availability is age, for which newer standards may apply; Parking areas are especially prevalent in suburban planning areas of Las Vegas, LVMC Title 19 provides requirements for shading that are intended to provide both a perimeter buffer as well as aesthetic enhancement. Some areas, including Downtown Las Vegas, have higher rates of impervious surfaces that serve as a heat sink that raises ambient air temperatures. Likewise, suburban planning areas also tend to have higher, albeit less concentrated heat sinks, with asphalt and dark rooftops concentrations as high as 70% of total area. Addressing heat islands must also recognize that asphalt parking lots are "placeholders" for future mixed-use infill development. Eliminating these existing asphalt and concrete areas, by retrofitting commercial corridors will begin to change the mix of surfaces. New tree canopy and landscaping associated with each mixed-use infill site coupled with changes to landscaping, paving, and building shade standards will also ensure a reversal in the trend of lost landscaping. The loss of trees and landscaping as a result of waiver requests can be addressed in the following ways:

- Applicant education on the importance of trees and their necessity in every project as a means of reducing the urban heat island effect
- Staff education to identify vegetation, building • materials, and other methods to increase shade
- · City Council and Planning Commission education to ensure high quality projects meeting standards are approved and those that are not are better scrutinized.
- An evaluation of standards for exceptions and waivers, including the development of policies to ensure that if landscaping is not planted as a part of a project. landscaping will be contributed to another portion of the planning area.

III.C URBAN FORESTRY





MOJAVE NATIVE AND ADAPTIVE SPECIES

The following list, adapted from previous versions of SNWA's and Southern Nevada Regional Planning Coalition's Regional Plant Lists of Mojave desert native and adaptive species by common name, is rated on environmental and temperature tolerance, water efficiency, canopy coverage, diversity, maintenance needs, and disease resistance. These are appropriate for public and private street trees and landscaping. The Planning Department shall maintain a complete list of approved tree, shrubs, groundcover, grasses, and perennials.

Trees

- Mulga Acacia
- White Thorn Acacia
- Sweet Acacia
- Cat Claw Acacia
- Twisted Acacia
- **Shoestring Acacia**
- Netleaf hackberry
- **Desert Willow**
- Texas Olive
- Texas Ebony
- Coolibah tree
- Kidneywood
- Littleleaf ash
- Raywood ash
- Arizona ash
- Modesto Ash
- Fan-Tex/Rio Grande Ash
- Honey Locust
- Goldenrain
- **Bay Laurel**
- Wilson Olive
- Blue Palo Verde
- Foothills Palo Verde
- Desert Museum Palo Verde
- Sonoran Emerald Palo Verde
- **Chinese Pistache**
- Chilean Mesquite
- **Thornless Chilean Mesquite**
- Western Honey Mesquite
- Screwbean Mesquite
- **Velvet Mesquite** Escarpment Oak
- Holley Oak
- Valley Oak
- Cork Oak
- Southern Live Oak
- Blue Elderberry
- Japanese Pagoda
- Texas Mountain Laurel

- Lacebark Elm
- Chaste Tree
- Xylosma
- Sawleaf Zelkova
- Chinese Date
- Pomegranate
- Shrubs, Groundcover and Vines
- Apache plume
- Arizona mescal bean •
- Arizona rosewood
- Baja fairy duster
- Big sage brush
- Black Dalea •
- Blackbrush
- Bladdersage
- Cimarron Ranger
- . Quail Bush
- Brittlebush
- Buckwheat
- Chuparosa
- Chaparral sage
- Chihuahuan sage
- Cliff goldenbush
- Cliff rose
- Compact jojoba
- Compact Texas Ranger •
- Cooper's wolfberry
- **Creeping Acacia** •
- Creosote
- Damianta
- Desert Almond .
- Desert Milkweed Desert Olive
- Desert Ruellia .
- Desert Saltbrush •
- Emu bush
- Evergreen sumac
- Feathery senna
- Four wing saltbush

- Fremont's Barberry
- Green cloud Texas Ranger
- Greythorn
- Indigo bush Jojoba
- Las Vegas Valley Buckwheat
- Little Leaf Ash
- Little Leaf Cordia
- Littleleaf Sumac
- Lynn's Legacy Texas Ranger
- Mexican Bird of Paradise
- Mexican Blue Sage •
- Mexican Cliffrose •
- Mexican Elderberry
- Mexican Honeysuckle •
- Mojave sage
- Mormon tea
- Narrowleaf rosewood
- Nevada Mormon Tea
- Nevada Smokbush •

• Pink Fairy Duster

Purple Sage

Red Justicia

Saltbush

Sand Sage

Scrub Live Oak

Shadscale

Silver Dalea

Spiny Senna

Skunk bush

Sugar Bush

Sweet Bush

Snakeweed

Quailbush

Pink Indigo Bush

Raincloud Texas Ranger

Red Bird of Paradise

Rio Bravo Texas Ranger

Sierra Bouget Texas Ranger

Silver Cloud Texas Ranger

• Pale Wolfberry

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III.C URBAN FORESTRY

MOJAVE NATIVE AND ADAPTIVE SPECIES



Agave, Cacti, Succulents, Yucca

 Banana Yucca Beaked Yucca

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Bear Grass

Blue Nolina

Blue Yucca

Bunny ears

Claret Cup

Cow's Tongue

Desert Spoon

Joshua tree

Mojave yucca

Texas Ranger

Turpentine Broom

Turpentine Bush

Utah Butterfly Bush

Virgin River Brittlebush

White Cloud Texas Ranger

Velvet Leaf Senna

White Bursage

Wild Buckwheat

Wooly Bursage

Yerba Santa

Four O'Clock

Indigo Bush

Spurge

DRAFT: 09/13/20

Wooly Butterfly Bush

Yellow Rabbit Brush

Yellow Snapdragon

Desert Sand Verbena

Dwarf Coyote Brush

Goodding Verbena

Goosefoot Mallow

Sierra Gold Dalea

California grape

Rogers red grape

Western Virgin's bower

Canyon grape

Desert Carpet Creeping Acacia

Winterfat

Wolf Berry

Thundercloud Texas Ranger

Beavertail cactus Beehive cactus Bigelow's Nolina Black Spine Prickly Pear

 Bristly Prickly Pear Buckhorn cholla

> **Common Pincushion** Compass Barrel Cactus Cottontop cactus

Diamond Cholla Englemann's Prickly Pear Fishook Barrell cactus Giant Sword Flower Green Desert Spoon Harriman's yucca

Indian fig cactus

Mojave Prickly Pear

Nevada agave





USE LAND

MOJAVE NATIVE AND ADAPTIVE SPECIES

- Agave, Cacti, Succulents, Yucca Grasses (continued)
- Night bloom yucca
- Ocotillo
- Old Man Prickly Pear
- Orange Tuna Cactus
- Our Lord's Candle
- Palm Yucca
- Pancake Prickly Pear
- Pencil Cholla
- Pincushion
- Pine Cone Prickly Pear
- Queen Victoria Agave
- Red Yucca
- Silver Cholla
- Silver Dollar Cactus
- Soaptree Yucca
- Staghorn Cholla
- Stick Palm
- Strawberry Hedgehog
- Teddy Bear Cholla
- **Texas Bear Grass**
- Treebear Grass
- **Twisted Yucca**
- Yellow Yucca

- Alkali Sacaton Grass Autumn Glow
- **Big Galleta Grass** •
- Blue Grama Grass
- Blue Oat Grass
- Bull Grass
 - Deer Grass
 - Desert Needlegrass
 - Dwarf Pampas Grass
 - Feather Reed Grass
 - Indian Ricegrass
 - Nashville
 - Pampas Grass
 - Purple Threeawn
 - Regal Mist Muhly Grass
 - Side Oats Grama

Perennials

- Angel Wing
- Angelita Daisy
 - Canyon Penstemon
 - **Chocolate Flower**
 - Dahlberg Daisy
 - Desert Alyssium



- Desert Marigold
- Desert Prince's Plume
- Desert Zinnia
- Firecracker Penstemon
- Globe Mallow
- Golden Dogbane
- Goldeneye
- Mojave Aster
- Native Fleabane
- Paper Flower
- Parry's Penstemon
- Pinto Beardtongue
- Powis Castle Wormwood
- Prairie Sage
- Preuss' Milkvetch
- Rosy Two-Tone Beardtongue
- Russian Sage
- Scarlet Gaura •
- Scented Penstemon
- Silver King Artemisia •
- Silverleaf Sunray
- Skyrocket
- Wooly Paper Flower



• Within each planning area, especially those with vulnerable populations, and when temperatures exceed 100 degrees, prepare an adequate extreme

heat response.

- Should a variance, exception, or waiver be requested Ensure cooling centers are prepared to open at within a development application to the City, or each City of Las Vegas senior center and community require approval by the Planning Commission or cooling center, especially those in vulnerable City Council, the City should develop a fee-in-lieu of communities requirement to fund the planting of new trees
- Leverage social media resources to communicate Work with SNWA to create a tree and landscaping extreme heat conditions to outdoor workers, program that incentivizes the replacement of sick, seniors, children, and cooling center locations dying, non-native, or non-adaptive tree and plant Budget additional resources toward extreme heat species with xeriscaping, water efficient, drought response tolerant species that provide community benefits and increase the City's tree canopy
- Institute resilient best management urban design practices to ensure high quality landscape architecture Ensure the City's urban forester has access to and energy efficiency for public facilities and private resources in order to spend a minimum of \$2 developments. per capita on the City's trees and urban forests, plant new trees and remove unsafe, damaged or In keeping with Tree City USA and urban forestry diseased trees, and maintain and contract public commitments, plant 60,000 "Bulletproof" native
 - trees. and adaptive trees on public and private property Increase outreach and education on trees and that are tolerant heat, cold, and wind tolerant; landscaping water efficient: low maintenance: non-invasive, and pest and disease resistant
 - Ensure that developers and applicants meet To further reduce extreme heat and the urban heat city landscaping efforts and require substantial island effect, support and accent trees with heat evidence that landscaping plans or lack of and water efficient native and adaptive plants, landscaping will not compromise City objectives. including shrubs, groundcover, vines, agaves, Require planning staff to properly evaluate trees cacti, succulents, yuccas, ornamental grasses, and and landscaping plans during site development perennials reviews and properly administer standards Amend relevant Chapters of LVMC, including Title contained within the zoning ordinances.
 - 19, to increase the amount of shade and vegetative Adopt a tree protection ordinance that requires or surfaces to provide urban cooling incentivizes protection of trees on private land
 - Re-evaluate standards for exceptions and waivers Annually celebrate Arbor Day by issuing official to landscaping requirements, especially for proclamations each Arbor Day, planting new trees residential and commercial perimeter buffer areas at city parks, facilities, and CCSD schools within and parking lot landscaping the public right of way
 - Amend requirements for building surfaces and Educate members of the public about the materials to reflect sunlight and absorb heat importance of trees and their necessity as a means Allow and incentivize green roofs, especially to of reducing the urban heat island effect
 - meet open space requirements and for infill and mixed-use developments
 - Install physical shade structures at parks, along heavily traveled complete streets, or at key mobility hubs.

III.C URBAN FORESTRY

IMPLEMENTATION STRATEGIES

Strengthen landscaping requirements within LVMC Title 19 to ensure trees and landscaping are not lost due to exceptions or waivers of codified standards

STRENGTHEN RECREATION AND CULTURAL OPPORTUNITIES FOR **RESIDENTS AND VISITORS ACROSS THE CITY**

Parks and recreation assets are one of the greatest contributers to environment and quality of life in the City of Las Vegas. As part of the The Las Vegas 2050 Master Plan, residents ranked parks and recreation as the most affordable and highest quality amenity across all wards. The Las Vegas Parks and Recreation Department provides access to facilities, connections to nature and preservation of the Mojave Desert while offering beautiful parks, sports fields, reservable areas, pools, sports leagues, classes and activities for all ages and skill levels for the benefit of the city's residents. Key to the department's mission and success are:

- Maintaining and programming over 100 parks and facilities within the City limits, offering amenities for all individual and all levels
- Programming classes, sports, activities, campus, aquatics, events and rental facilities
- Providing pop-up parks to connect underserved areas with free activities, crafts, games, sports and fun

The use of these resources is reinforced by the statistically significant ward-based resident survey where 67% of residents find parks above average quality, 73% of residents feel at least moderately safe in City parks, and over 60% of residents use amenities like open spaces and walking trails at parks.

73% of residents also noted that there are park amenities that are missing or could be improved, thus, embedded in the Master Plan recommendations is a desire to increase the quantity of parks and access to parks in the City as growth continues. This plan sets targets and strategies to increase the quantity of open spaces and recreation elements in the city to 7 acres per 1,000 residents within a ¹/₄ mile walk. This represents a significant increase over the current quantity of parks per resident. This element emphasizes constant updating and measuring success as decisions are made,

> **SEE ALSO SECTIONS E:** Connectivity



visualizing city-wide and neighborhood planning-area scale opportunities for as low as 5 acres per 1,000 residents and up to 10 acres per 1,000 residents. The Master Plan allows for flexibility in future planning and design of specific elements that meet the unique demographic demands of each community in conjunction with infill and redevelopment opportunities. The 2050 Master Plan generally emphasizes infill and adaptive re-use as the City grows "up and not out". The Parks and recreation component similarly focuses on infill strategies as part of the best practices and tools. This section is specifically supplemented by a more indepth CAPRA-accredited study. Specific recommendations regarding open space programming and character shall be included in future studies.

- Mini-park/ Pocket park
- Urban plaza / Pocket plaza
- Square
- Neighborhood park/Urban park
- School park
- Community park
- Special use

OUTCOMES

- The City will provide 7 acres of parkland / 1,000 (by 2050)
- Attain CAPRA certification

INFILL PARK STRATEGIES

- · Leverage SNPLMA funds to build infill and adaptive re-use park spaces in key locations (i.e. new downtown infill park at Washington, Lamb and the Las Vegas Wash)
- Utilize left over and underutilized right-of-way spaces for mini parks, urban plazas and/or linear parks (i.e. 3rd and Coolidge in downtown Las Vegas)
- Utilize roof spaces for plazas and mini-parks
- Utilize space above parking lots and parking structures for park spaces
 - Emphasize placemaking through arts and culture
 - Prioritize adaptive reuse

PARKS AND RECREATION BEST PRACTICES

- Connect to nature and unique local environment characteristics
- Meet the community where they are and engage a variety of age groups via design, elements, access and programming
- Utilize performance landscapes that not only meet the needs ٠ of the community but also meet environmental targets, goals and metrics
- Measure outcomes and adjust accordingly to achieve objectives
- Create a culture of innovation to improve quality and functionality in the parks and recreation system
- Emphasize a park management system and culture that • emphasizes community and employee engagement and accountability
- Ensure use of native plant materials and low water use •
- Prioritize shade creation through structures and plant materials
- Minimize use of lawn spaces
- Prioritize safety through Crime Prevention Through Environmental Design Principles (CPTED)
- Minimize use of fencing •
- Prioritize multi-modal connectivity between parks spaces and • between living, working and other active spaces in the City
- Program amenities and furnishings with input from the community and in the context of demographics and the large park system



III.D PARKS

NRS 278,160,1(f)



THE CITY PROVIDES NEW, HIGH QUALITY PARKS AND RECREATIONAL FACILITIES, YET MORE WILL BE NEEDED AS THE CITY GROWS

As described for each Area of the City in Chapter 2, the City of Las Vegas owns and operates 1,700 acres of park space. Given the City's population of approximtely 675,000, this yields a service level of approximately 4.4 acres per 1,000 persons, which falls short of national benchmarks of 5.0 to 10.0 acres per 1,000 residents.

Overall, the City has been steadily increasing its service level over the course of the last Master Plan, largely due to SNPLMA funding. Although standards and service levels are intended to measure the city's progress in serving the recreational needs of its citizens, in order to create a complete picture of the city's park system, other types of park space that add to and complement the city's system should also be addressed, including linear parks (trails and greenways) and quasi-public open spaces like public golf courses

Throughout public outreach, residents ranked parks and recreation as the most affordable and highest quality amenity. Most that visit use them for exercise activities or places to take children with walking trails, open spaces, and picnic areas being the most commonly used amenity. Use of other amenities varied depending on location and availability; aside from use of sport fields, residents also make use of dog parks, playgrounds and splash pads; use of sport courts vary by demographics - basketball courts and skate parks have higher rates of use in urban areas of the City by younder residents, while tennis, volleyball, horseshoe, bocce, and shuffleboard are used more in suburban areas,

often by families and seniors. Approximately three quarters of residents also reported that the quality of parks were excellent or good. About one-third of residents felt amenities were missing from parks, while forty percent believed parks could be generally improved with bathrooms, improved cleanliness, shade, and playgrounds. While most residents reported feeling safe while visiting parks, they also desired more security.

Beyond city-focused and recreation efforts, other federal (F), state (S), and local (L) efforts have contributed to conserving, creating, and maintaining local area parks that should influence City parks and recreation strategies, despite not all facilities being located within City limits.

- (F) The Red Rock Canyon National Conservation Area Establishment Act and Red Rock Canyon National Conservation Area Resource Plan ensure the provision of unique recreational opportunities to residents and visitors and greatly enhances the portfolio of parks and leisure facilities provided by the city.
- (F) The Southern Nevada Public Lands Management Act (SNPLMA) allows the Bureau of Land Management (BLM) to dispose of public land, with a portion of land sales proceeds that may be used for conservation and the development of parks, trails and natural areas by local and federal agencies. The City accesses these funds through a competitive application process.
- (S) The Nevada Division of State Parks (NDSP) serves as a liaison to the National Parks Service and is responsible for creating a Statewide Comprehensive Outdoor Recreation Plan (SCORP).



PARK TYPE Community

Neighborhood

Pocket park

Special use

Regional

Plaza

KEY ACTIONS

- Adopt a Parks System Master Plan
- Increase the amount of park and open space acreage and develop innovative park typologies as part of redevelopment
- Continue to integrate education, arts, and culture into community centers
- Ensure safe, accessible park design



NUMBER	ACREAGE
16	249.07
42	197.39
2	1.05
3	0.47
11	1,120.49
6	133.44

2-199

Building upon the parks classifications established as part of the previous Master Plan, this section aligns park typologies with current zoning transects and includes character descriptions, size, amenities, use and place type applicability for all park types. The classification system utilized by the city of Las Vegas is based on the guidelines established by the National Recreation and Park Association (NRPA) and local factors and will be expanded upon as part of subsequent studies. Park typologies for the 2050 Master Plan include:

MINI-PARK/POCKET PARK

DESCRIPTION/	A compact green space for a wide range of informal or formal activities in close proximity to
CHARACTER	neighborhood residences, featuring trees and vegetation.
SIZE	Max. 0.50 acres
AMENITIES/USES	Passive/active (unstructured) open space, civic uses, including picnic shelters, casual seating, trails
	and paths, community gardens and public art.
APPLICABLE	Regional Center, Mixed-Use Center, Neighborhood Center Mixed-Use, Mixed Residential, Traditional
PLACE TYPES	Neighborhood, New Subdivision, Subdivision Retrofit

URBAN PLAZA/POCKET PLAZA			
DESCRIPTION/	A formal space for commercial and civic activities, surrounded on three sides by buildings, located at		
CHARACTER	the intersection important streets. While primarily hardscape, urban plazas and pocket plazas feature		
	trees, vegetation, and greenery that contrast with the surrounding built environment.		
SIZE	0.25-2 acres (pocket plazas are smaller)		
AMENITIES/USES	Seating, play equipment, sport courts, passive/active (unstructured) open space, civic uses, including		
	outdoor pavilions, open-air shelters, outdoor assembly, outdoor seating, public restrooms, commercial		
	uses, including a farmer's market and outdoor dining, playgrounds, public art.		
APPLICABLE	Regional Center, Mixed-Use Center, Neighborhood Center Mixed-Use		
PLACE TYPES			

SQUARE	
DESCRIPTION/	A formal space for unstructured recreation and civic purposes, spatially defined by buildings, tree-
CHARACTER	lined streets, walkways and planting at all edges. Squares are frequently located at the intersection
	of important thoroughfares, featuring abundant seating opportunities in the midst of hardscape or
	landscaped surroundings.
SIZE	0.50 -5 acres
AMENITIES/USES	Passive (unstructured) recreation, no organized sports, civic uses including outdoor pavilions, open-air
	shelters, community gathering, outdoor seating, commercial uses, including the farmer's market and
	outdoor dining, paths, community gardens, playgrounds, public art/creative space.
APPLICABLE	Regional Center, Mixed-Use Center, Neighborhood Center Mixed-Use
PLACE TYPES	

SEE ALSO CHAPTER 4, SECTION III: Public Facilities and Services



URBAN PARK/NEIGHBORHOOD PARK

DESCRIPTION/	A formal and/or natural park that s
CHARACTER	serves those residents within one-
	trees are present, occasionally aro
SIZE	Min. 0.50 acres
AMENITIES/USES	Passive/active (unstructured) oper
	community gathering, outdoor sea
	community gardens, playgrounds,
APPLICABLE	Regional Center, Mixed-Use Center
PLACE TYPES	Residential, Traditional Neighborho

COMMUNITY PARK		
DESCRIPTION/ CHARACTER	A park that serves a broader purpo miles.	
SIZE	10-50 acres	
AMENITIES/USES	The same uses as neighborhood p	
APPLICABLE	Subdivision Retrofit, New Subdivisi	
PLACE TYPES		

SCHOOL PARK	
DESCRIPTION/	A school playground and sports fie
CHARACTER	is closed. For purposes of this plan
	Neighborhood Parks, or one-half m
SIZE	Varies based on the type of school
AMENITIES/USES	Play equipment, sport courts, spor
APPLICABLE	Mixed-Use Center, Neighborhood C
PLACE TYPES	Subdivision, Subdivision Retrofit

SPECIAL USE

A park or facility with a very specific use which is generally oriented for a specific purpose. Examples include, but are not limited to: equestrian parks, extreme sports parks, dog parks, motocross tracks, and competitive tennis facilities. The standard amenities vary depending upon the specific type of park/facility. Recreation trends identified by ongoing public needs assessments may also indicate demand for new special use parks/facilities. These facilities serve the entire community and do not have size or service area requirements of their own.

GREENWAY

Greenways are linear parks most applicable along corridors and through neighborhoods. Read more about these connectors in section E.

serves as the recreational and social focus of a neighborhood and half mile. Paths, lawns, planted walkways, and formally arranged ound a civic element located at a prominent location.

en space, civic uses, including outdoor pavilions, open-air shelters, ating and public restrooms. Trails for bicycles and pedestrians, and public art.

r, Neighborhood Center Mixed-Use, Corridor Mixed-Use, Mixed ood, New Subdivision, Subdivision Retrofit

ose than neighborhood parks and serves those residents within three

parks, as well as sports fields, sports courts, skateboarding areas

sion, Rural Preservation

eld that may be open for public use during times that the school n, the service area for School Parks will be the same as that for nile. Requires CCSD joint use of facilities agreements

I; ES: 3-4 acres; MS: 5-6 acres; HS: 10-15 acres

rt fields

Center Mixed-Use, Mixed Residential, Traditional Neighborhood, New



COMMUNITY AND SENIOR CENTERS CAN BE LEVERAGED TO BE ANCHORS FOR NEIGHBORHOODS AND AREAS OF THE CITY

The City's community and senior centers are the flagship locations for the public to gather for recreation, group and leisure activities, social support, public information, and other purposes.. As described in Section II of this Chapter, the City has relatively few of these facilities, which serve a wider population. Still, less than half of the City's residents are within a two-mile drive of a community center, and even fewer are within a short walk or bike ride. The lack of these places indicates a need for more of them, especially because they are publicly facing and provide the opportunity for residents to directly interact with the City.

Large community centers and other regional facilities are designed to serve a broad cross-section of the community. Each offer a wide variety of recreational, social, performing

and visual arts and educational needs for adults, seniors, and youth. These centers are typically co-located or are adjacent to a community park, and feature indoor or outdoor swimming pools, gyms and athletic rooms, classrooms, and game rooms. Two of these facilities, Durango Hills and Centennial Hills Community Centers, are operated through a public-private partnership with the YMCA.

Smaller neighborhood community and senior centers offer smaller scale programming space that can be used for a variety of general recreational, social, performing and visual arts activities. Because there are fewer of these types of facilities, such as Cimarron Rose Community Center, these would be an ideal model to add more facility space that not only increases community accessibility to a center, but also helps expand the City's recreational programming it already offers.

Given that these locations are important places for residents to interact and serve as anchors for neighborhoods and entire areas of the City, they should be thought of and leveraged in different ways. While many of these community centers already offer a wide range of recreational and leisure programming, these places should be thought of in the context of other goals in this plan, specifically for education and workforce development, as discussed in Chapter 3. Offering these spaces for rent, for specific special purpose classes, continuing education, or for partnerships with UNLV, CSN, or other workforce development programs. Such multi-use, multi-purpose community centers are not a new concept; specific centers could be piloted for this type of use to determine how they would work beyond just a place for the community to recreate.

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EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
Increase the overall	Utilize drought tolerant,	Provide aesthetically	Provide high quality,	Develop unique
quantity and	water efficient parks and	pleasing, comfortable,	enjoyable recreation	greenways, right-of-way
connectivity of parks	open space landscapes	and safe opportunities	and leisure spaces of all	spaces, rooftops, and
and open space	that address other	for residents of all ages	types that emphasize	spaces above parking
throughout the City to	environmental outcomes	to connect with nature.	placemaking space,	structures for plazas,
ensure all residents	while also meeting the		arts, and culture.	mini-parks, or park
have access to parks	needs of the community.			spaces if a traditional
nearby their homes				park cannot be built.
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PARKS AND RECREATION OFFERS A WIDE **RANGE OF PROGRAMMING AND LEISURE ACTIVITIES**

Finally, the City should set itself apart in the region by constructing additional facilities or developing special In addition to the facilities it provides, the Parks and Recreation Department offers a wide range of programming programming that is unique to Las Vegas and may not be found in great supply anywhere else in the region. The City and classes. City staff organize and provide a number of has previously constructed and expanded unique leisure classes for community participation, enrichment, and amenities, such as bocce, pickleball, and roller hockey; recreation at its parks and community centers, including: offering other unique, one-of-a kinda facilities such as Active adult classes a velodrome, a model railroad park, fields for rugby, field Adaptive and therapeutic recreation hockey, lacrosse, or cricket. The city should also consider Swmming and aquatics making an investment in an open-air or partially enclosed Gym and fitness classes outdoor amphitheater venue for year-round large-scale Arts, crafts, cooking, and performing arts ticketed performing arts events.

- Sport leagues and an annual Corporate Challenge

These activities are a hallmark of any world-class parks and recreation department's programming. Continued funding

IMPLEMENTA

- Adopt a Parks System Master Plan
 - Quantify and inventory park amenities
 - Determine community needs and preferences for different park types and amenities
- Increase the amount of park and open space acreaged and develop innovative park typologies as part of redevelopment
 - Prioritize use of SNPLMA funding for new targete parks, trails, and community centers, or for th upgrade, maintenance, or renovation of existin ones
 - Develop a large scale, regional open-air or partial enclosed outdoor amphitheater
 - When new City parks cannot be built in areas of th City lacking sufficient space, require open space provisions for private development
- Continue to integrate education, arts, and culture integrate education. community centers
 - Offer a variety of new classes and uses for community centers.
 - Pilot different multi-use, multi-purpose activities a community centers to make them

and expansion of these options for residents will further improve the livability and health of City residents.

TION	I STI	RATEGIES
	-	Develop additional smaller, neighborhood oriented community and senior centers for each area of the City
or •	En	sure safe, accessible park design
ge of	-	Construct new parks and facilities that offer unique and specialized designs and amenities not typically found in the region
ed ne ng ly ne ce		 » Velodrome » A children's "exploration park" » Demonstration or botanical gardens » Miniature railroad park » Mini golf or pitch-and-putt » Mazes » Archery range » Fields for rugby, field hockey, and lacrosse » Cricket oval
to	-	Design parks with CPTED principles
or	-	Provide sports fields that use both natural and artificial turf as a means to save and conserve water
at	-	Provide shade and trees, while also limiting non-functional turf and using drought tolerant

landscaping

IMPROVE ACCESS AND CONNECTIVITY OF OPEN SPACES FOR ECOLOGICAL, SOCIAL, HEALTH, AND QUALITY OF LIFE BENEFITS

Access to parks and open space was repeatedly identified as a top priority throughout the 2050 Master Plan planning process. Residents highlighted the region's natural features and recreation opportunities as key amenities. As the City of Las Vegas has grown rapidly, some parts of the city lack sufficient walkable and bikable access to parks and open space. As the City prioritizes locations for new parks, safe, convenient access to those parks is paramount to help motivate residents to choose a healthier alternative to driving. Walkable and bikeable access is especially important in areas where personal automobile ownership is lower.

While the Transportation section (Chapter 4) and the City's Layered Complete Street Network addresses non-motorized connections more explicitly, this section recommends design improvements to consider these connectors as an extension of the park system. Improving access to parks and open space meets the guiding principles to improve equitable neighborhood vitality and health.



OUTCOMES

- 85% of housing units are within ¹/₂ mile of public parks by 2050
- 90% of housing units are within 3 miles of trail by 2050

SEE ALSO CHAPTER 4:

Connect and enhance accessible bike and pedestrian facilities as part of a safe, efficient road network that supports all transportation modes throughout the City.

KEY ACTIONS

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- Work with appropriate agencies and stakeholders to implement the region's non-motorized loop.
- Continue to improve bicycle and pedestrian access along major roads and increase safety of alternative transportation.
- Revise residential zoning to require a greenway along corridors and limit the use of walls.
- Explore public-private partnerships to formalize public access to privately-held open spaces

NEIGHBORHOODS NEED BETTER CONNECTIONS AND MORE BUFFERS

To improve walkable access between sites and the street network, buffers such as walls and fences should be deemphasized as the buffer treatment of choice. More permeable buffer solutions involving vegetation and more frequent access points will help contribute to walkable access. Traditional subdivision design has limited points of vehicular entry that typically dissuades pedestrians and bicyclists from accessing nearby amenities. As the bird flies, access to open space or neighborhood commercial may be walkable but the perimeter wall typical of subdivisions makes the walk out of reach.

Future subdivisions should be planned with friendlier buffers along corridors to make it more appealing for pedestrians and bicyclists to utilize greenway and trail amenities.

One of residents' primary concerns was the lack of public access to private open space amenities. In areas lacking public parks, these private open spaces should be prioritized for public-private partnerships to encourage walks from neighbors.



DRAFT: 09/13/20

BARRIERS TO SAFE, CONVENIENT ACCESS:

- Insufficient separation between the bike/pedestrian facility and vehicular traffic
- Physical barriers between neighborhoods and corridors
- Uninviting, hot, long expanses lacking sufficient shade

BENEFITS OF GREENWAYS AND TRAILS

As a tool for improving mobility and the environment, greenways and urban trails can provide a wide range of benefits - particularly when designed for all ages and abilities. Benefits include:

- Increased mobility and transportation options. Connects residents to jobs, commercial areas, institutions, and other destinations.
- Improved community health through active living. Creates attractive, safe and accessible places to walk, bicycle, hike, run, and more.
- Generates economic activity. Adds to property value, attract, businesses and residents, and contributes to tourism.
- Provides environmental benefits. Manages stormwater, protects and restores habitat, and improves air and water quality.
- Enhanced cultural awareness and community identity. Connects to local heritage, interpretive opportunities, and community recreation.

"I love being able to take a morning walk from my house through the desert areas near my neighborhood"

- Participant at Cetennial Hills Community Center 2-205

CONNECTOR/TRAIL TYPES

Chapter 4's Layered Complete Streets Network

- **Greenways.** Greenways, as either Regional or Shared Use Trails effectively connect park system components together to form a continuous park environment. Long, linear, dedicated open spaces that include a mixture of natural land areas, open spaces and typically include trails. Trails can take a number of forms, from paved shared-use or all-purpose trails for use by pedestrians and cyclists, to dirt trails or bridle trails. Typically, greenways are separated from streets and other public rights-of-way.
- **Park Trail.** Multi-purpose trails located within greenways, parks and natural resource areas. Focus is on recreational value and harmony with natural environment.

Type I: Separate/single-purpose hard-surfaced trails for pedestrians or bicyclists/in-line skaters. Type II: Multipurpose hard-surfaced trails for pedestrians and bicyclists/in-line skaters. Type III: nature trails for pedestrians. May be hard- or soft-surfaced.

• Shared Use Paths. Multipurpose trails, as Shared Use Trails that emphasize safe travel for pedestrians to and from parks and around the community. Focus is as much on transportation as it is on recreation. Connector Trails are typically paved, all-purpose trails situated within more built up and developed areas and may have less greenspace or natural area associated with the trail. Connector Trails can take on several forms, from off street paths (i.e. wide sidewalks next to roadways) to separated and/or protected bicycle lanes,

or to off-street pathways that connect through public or private property.

Type I: Separate/single-purpose hard-surfaced trails for pedestrians or bicyclists/in-line skaters located in independent row (i.e., old railroad right-of way). Type II: Separate/single-purpose hard-surfaced trails for pedestrians or bicyclists/in-line skaters located in road right-of-way.

While the preference is always for separated trails and offstreet greenways, where there is not sufficient right-of-way space or property access more conventional "Bike Streets" may be required in a limited context to provide important network connections:

- Separated Bike Lanes and Cycletracks. Paved segments of roadways that serve as a means to safely separate bicyclists from vehicular traffic.
- Buffered Bike Lanes: Designated portions of the roadway for the preferential or exclusive use of bicyclists.
- **Bike Lane:** Shared portions of the roadways that provide separation between motor vehicles and bicyclists, such as paved shoulders.

Different greenway and trail types are appropriate for different locations throughout the city. Increasing the safety and usability of greenways will encourage more users who are less comfortable with riding or walking in close proximity to vehicles.







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III.E PARK CONNECTIVITY

2-207

02. LAND USE + ENVIRONMENT

III.F FOOD + URBAN AGRICULTURE 🗸 NRS 278.160.1(i)

ENSURE ACCESS TO FRESH, HEALTHY FOOD

Food is an important system for the health and wellbeing of the City's residents, whether from agricultural production, distribution, accessibility, to waste. Historically, farm and ranch based agriculture have been limited by water availability, soil, and the size of Southern Nevada's small towns – only a handful of agricultural operations have been successful in Southern Nevada's modern history. Today, there are approximately fifty certified food producers in the region. The majority of these producers use traditional growing techniques and are either small scale or familyowned operations, such as Gilcrease Orchard in the Tule Springs planning area, community gardens, or community supported agriculture (CSA). A number of stakeholders help oversee the food system:

- The Nevada Department of Agriculture, which regulates all aspects of agricultural production, livestock, consumer equity, and food systems
- The State Division of Welfare and Social Services, which oversees SNAP and food assistance programs
- · The City regulates animals and agricultural land use activities pursuant to LVMC Title 7 and LVMC

Title 19. The City has taken a measured approach as a community stakeholder to food access and agricultural production, but will take a more active role in implementing this plan.

- The Southern Nevada Food Council convenes stakeholders within Southern Nevada's food system to promote sustainable food production and consumption. It emphasizes
- As a part of the University of Nevada's land grant mission, the University of Nevada Cooperative Extension provides outreach and extended education to Las Vegas residents, specifically as it relates to food safety, healthy living, horticulture, and urban agriculture. The Cooperative Extension also works closely with the Conservation District of Southern Nevada to promote and develop community gardens and urban agriculture





KEY	Ι Α	CT	0	NS

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- Decrease food deserts and reduce food swamps in low-income, food insecure planning areas, further incentivize the establishment of grocery stores and healthy food retail outlets.
- Provide at least one accessible community garden for urban agriculture activity in each planning area.
- Work closely with the Southern Nevada Food Council, CCSD, the University of Nevada Cooperation Extension, Three Square Food Bank, and other stakeholders to address food insecurity, hunger, and access issues for city residents.
- Further expand allowable agricultural uses and activities within the community.

OUTCOMES

- At least one City-owned, operated, or leased community garden or urban agricultural site within each planning area by 2030.
- No food deserts exist in the City by 2050.
- The percentage of residents within 1/4 mile of a food hub, healthy food retail outlet, or grocery store increases over time
- The percentage of residents that are food insecure and utilizing SNAP decreases over time
- The percentage of children, seniors, and other identified vulnerable population that are food insecure decreases over time

EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
Food access and	A number of adaptable	Ensuring food access	Accessible healthy food	Repurposing and
food desert reduction	plants can be grown in	and security by	outlets, community	diverting food from
must be prioritized to	home and community	eliminating food deserts	gardens, and farmers	the hospitality industry
reduce hunger and food	gardens, providing a	and food swamps	markets are necessary	has reduced the total
security issues.	supplemental source of		and desirable amenities	volume of food waste
	food		for City residents	

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FOOD IMPORTATION PRESENTS A SUPPLY-CHAIN DEPENDENCY CHALLENGE AND POTENTIAL VULNERABILITY

According to the Bureau of Economic Analysis, 92 percent of all the food in Las Vegas is shipped by truck and eight percent of the foods purchased in grocery stores and markets are grown locally or within the region. This high rate of both domestic and global food importation by way of truck leaves Southern Nevada potentially vulnerable to disturbances in the transportation system. Shipping and supply chain disruptions across the country or the world. the closure of Interstate 15, or spikes in fuel prices have the potential to impact the Southern Nevada food system for residents, businesses, and visitors in the following ways:

- As the distance between producers and consumers increases, an increase in energy prices could have a ripple effect on food costs.
- Many types of food loses a bulk of their nutrients after four days. While, canning, drying and freezing can minimize the loss of nutrients, food trip length can create challenges for healthy food to be in supply and affordable
- 21st Century food production is energy and water intensive to feed millions of Americans and meet demand for products.

FOOD SYSTEMS MAY FUNDAMENTALLY BE **ALTERED IN THE FUTURE**

Climate change may result in further drought, altered precipitation patterns, and increased water stress in key farming regions, both domestically and abroad. Because plants are sensitive to high temperatures during the flowering and seed development stages, changing climatic conditions may reduce yields, and therefore impact food quality and cost. Temperature increases and drought may have an impact on food production, especially in prime agricultural areas, which not only affects Las Vegas, but the rest of the country:

• California, one of the world's largest and most diverse agricultural economies of the world, and Southern Nevada's most important market for food, is already showing impacts from the overuse of its water supply, as well as the impact of wildlifes.

- Increased temperatures in the Great Plains, where wheat and corn are among the most important crops and are staples for breads and starches, could stress overall plant growth and production.
- The southeast, home to fruit and nut orchards are also projected to pass the threshold of ninety-four degrees that impacts plant photosynthesis.
- Drought conditions and disease have reduced output of the citrus crop in Florida, corn and soybean crops in the Midwest and the vegetable and dairy production in California.

Should climate change increase temperatures to these levels, prices could increase for major staple crops used in a variety of products, including wheat, rice, and corn by 2050. Higher temperatures and less easily available water have resulted in a three percent price increase in most fruits and vegetables. Due to lower corn production, animal feed costs have also been rising; this is reflected back in the prices consumers pay.

FOOD ACCESS CAN BE ASSESSED FOR EACH **AREA OF THE CITY**

Urban food deserts refer to low-income, low-food access areas. They have high concentrations of poverty at or below 80 percent AMI, in which either 500 or one-third of the population live more than one mile from a grocery store or healthy food retail outlet that contains all major food departments. Food swamps represent areas with a high abundance of fast-food and takeout restaurants in low-income areas. Within the City of Las Vegas, both food deserts and swamps exist around the Downtown Las Vegas and West Las Vegas planning areas. Approximately 12,000 residents live within these areas.

Food access considers location of food from one of the City's grocery stores or healthy food outlets and its overall affordability. In terms of transportation accessibility, access is determined by vehicle ownership or public transportation access. Economic and land use forces, including land value, lease rates, and population density determine grocery store location decisions. Even if transportation is adequate in some areas, grocery stores may not be close enough to neighborhoods. These factors, alone and in tandem, can mean major grocery stores will have difficulty being profitable in low-income neighborhoods. Within the City's food deserts, residents are at a higher risk of hunger, poor nutrition, and poor health.

The average American household spends approximately 15 percent of its budget on groceries. Nationally, food costs, have been rising for many basic staples. This can affect disposable income as well as create challenges for people to pay for other necessities, ultimately leading to hunger and poor nutrition as people choose less nutritious options for their meals.

FOOD INSECURITY AND HUNGER ARE **DISCRETE ISSUES THAT MUST BE** ADDRESSED TO ENSURE RESIDENTS ARE HEALTHY

Hunger is a term to describe the acute condition of food insecurity resulting from an individual's or family's insufficient supply of food needed to lead healthy and active lives. The Supplemental Nutrition Assistance Program (SNAP), provides nutrition assistance to people with low incomes, allowing families to purchase healthy foods and can be a benchmark measure for community health and wellbeing. More than 106,000 households, equal to one out of every ten people in Southern Nevada, receive an average SNAP benefit of \$260/month. For many households, this is most, if not all, the monthly food budget. Nearly 50 percent of these SNAP recipients are children 18 years of age and younger. Approximately 180,000 students enrolled at CCSD schools are a part of the Free and Reduced Lunch Program,



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III.F URBAN AGRICULTURE

A DAY IN THE LIFE

SPACE FOR CONNECTING

Carla Delisle, Former Las Vegas Historic Preservation Commission Member

In a city of big roads, high speed limits, and limited transportation alternatives. Carla depends her car more than she'd prefer. She tends to avoid using public transportation because the travel times are too long and bus routes to the busier parts of town are rarely straightforward. For sure, Carla loves her downtown historic neighborhood. She just wishes it included more walking and biking options. She wishes the entire city did.

When she considers the city as a whole, Carla sees vast amounts of open space that feel underused. She'd love to see more areas designated for adult recreation, dog parks, BBQs and picnics, and sports. Even simple public benches would be welcome. Considering Las Vegas's sometimes harsh, high-desert climate, she'd also welcome more shade.

Carla's grocery shopping options are limited to a few large chain stores. She'd love for a few smaller, more health-conscious markets to open up nearby. "Maybe the city could offer temporary public uses, or pop-ups, as experiments to see what people will do when they have more lifestyle options," she considers.

"And if we had one or two more expressways together with more direct routes to the main areas of town, people would go and stay outside more," she says. "This would encourage more connectivity among residents."

which is approximately 60% of all students and significantly higher than the national rate of 40%.

Other means of distributing food include:

- Three Square, Southern Nevada's only major food bank, whose mission is to help reduce hunger in Southern Nevada. Three Square combines food banking (warehousing donated canned and boxed goods), food rescue (obtaining surplus or unused meats, bread, dairy and produce from hospitality and grocery outlets), and pre-cooked meals. Three Square served more than 41 million meals across Southern Nevada in 2019.
- Food pantries distribute non-perishable grocery products to families struggling with hunger. Some within the City are aligned with the Three Square food bank.
- The Summer Food Service Program (SFSP), funded by the USDA and administered by the Nevada Department of Agriculture, provides meals to children 18 years of age and younger in low-income areas during the summer. The program ensures that children have access to nutritious meals during their school breaks when free and reduced meals are not available to them.
- Community meal sites provide hot meals to the homeless and those in need.
- Food hubs are businesses or organization that actively manages the aggregation, distribution and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand. A food hub can expand capacity for urban agriculture and regional growing and often have teaching and meal-prep facilities where consumers can learn where their food comes from and how to grow food in their own communities. While Southern Nevada does not currently have a food hub, introduction of one may help expand and sustain local capacity for urban agriculture.

INNOVATIVE EFFORTS IN SOUTHERN NEVADA REDUCE FOOD WASTE

A relatively small amount of the region's waste is organic. Thanks to the efforts by resorts on the Las Vegas Strip and Downtown Las Vegas, which generate a large share of organic material, and the Three Square Food Bank, increased attention has been paid to diverting food from the landfill, thus decreasing food waste. Efforts have also

been made to repurpose and compost food waste; for many decades, RC Farms, a local pig farm, has successfully diverted food waste and has utilized it for animal feed.

DESERT URBAN AGRICULTURE CAN SUPPLEMENT FOOD SUPPLIES

Despite limited rainfall, aridity, and extreme temperatures, a wide variety of food can be produced and livestock raised within Las Vegas. The University of Nevada Cooperative Extension has demonstrated a wide range of crops, appropriate for Las Vegas's climatic conditions, can be produced for urban agriculture application at its Clark County Lifelong Learning Center gardens and Master Gardener Orchard near the Tule Springs planning area. However, Las Vegas clearly cannot invest in agricultural development at levels that will sustain the City's current and future population; strategies and methods that can make urban agriculture a community amenity should continue to be pursued, such as:

- Rural preservation areas within the City permit crop production and animal husbandry.
- The City has previously enacted ordinances that permit community gardens in all zoning districts with limited conditions. Not only are community gardens an amenity that allow residents to grow, new placetypes will encourage the incorporation of such gardens as an allowable use. After successfully permitting poultry ("backyard chickens") in residential zoning districts, the allowable uses at each type should also be further researched and increased, including allowing apiaries and additional small-animal husbandry.
- A limiting factor to urban agriculture, however, may be water and its costs; all urban agricultural activities would be required to use metered water from the Las Vegas Valley Water District (LVVWD), which is progressively more expensive based on consumption and meter size.
- Farmers markets are excellent amenities that allow Due to the lack of major agricultural production in Southern Nevada, most farmers markets are small, specialized, typically do not offer a fixed stock of supplies, and are not typically used by the average consumer for food staples. Most farmers markets import food from growing regions in California, Northern Nevada, or Utah; because most are small, their presence does

not necessarily mitigate food deserts; however, their presence provides supplemental food access.

Some alternative farming operations have been established in Southern Nevada, including hydroponic and aquaponic systems and are permitted in commercial and industrial areas. While both systems are water-based, both use five to ten percent of the water used in traditional farming and a fraction of the land. As a result, while these systems may have high initial costs, they can be operated in a climate controlled settings and provide an efficient alternative to traditional farming.

- Decrease food deserts and reduce food swamps low-income, food insecure planning areas, furthe incentivize the establishment of grocery stores an healthy food retail outlets.
 - Further permit and incentivize food hubs, health food retail outlets, or grocery stores
 - Utilize City funding, redevelopment tools, Ne Market Tax Credits and other forms of innovativ financing to attract businesses
- Provide at least one accessible community garden for urban agriculture activity in each planning area.
 - Conduct regular inventories of vacant land owne by the city to determine whether these lands a suitable for urban farming and gardening.
 - Ensure access for urban agricultural activities to acquiring, leasing or purchasing vacant land for use as community gardens
 - Reserve space at City parks and communicenters for community gardens
- Work closely with the Southern Nevada Food Council CCSD, the University of Nevada Cooperation Extension Three Square Food Bank, and other stakeholders

III.F URBAN AGRICULTURE



IMPLEMENTATION STRATEGIES

in er	address food insecurity, hunger, and access issues f city residents.	or
nd	Consider making food access requirements as pa of development within TOD place types	rt
лу	Explore reducing food swamps with fast-food distance separation requirements	bd
W	Incentivize and develop food hubs	
/e	Develop educational programs for City residents	
or	Develop community gardens	
ed	 Discuss and take action on food issues, acces and security and food waste for the benefit residents, business, and visitors 	s, of
• •	Further expand allowable agricultural uses ar activities within the community.	nd
or	Require community gardens as part of zonin regulations and requirements	١g
ty	Amend LVMC Title 7 and LVMC Title 19 to expan allowable agricultural uses and activities, and the zoning districts they are allowed in, especially	nd ne in
n, to	rural preservation areas, including crop productio apiaries, and small-animal husbandry.	n,

III.G ENVIRONMENTAL JUSTICE

NRS 278.160.1(a)(1))

REDUCE LEVELS OF POLLUTION THAT IMPACT AIR, LAND AND WATER, AND AFFECT SENSITIVE POPULATIONS

Environmental justice is the concept that all people have equal right to a clean and healthy environment with respect to spatial relationships to environmental concerns, equal protection from negative environmental impacts and equal access to decisions made by the Planning Commission or City Council. No population bears a disproportionate share of negative environmental consequences resulting from industrial, municipal, and commercial operations or from laws, regulations, or policies. Meaningful involvement requires effective access to decision makers for all, and the ability in all communities to make informed decisions and take positive actions to produce environmental justice for themselves.

Today, pollution from stationary and mobile sources can impact the City's water, ground, and air that can affect the health, especially sensitive populations like children and the elderly, as well as disproportionately affected low income and minority populations. Because pollution is a regional issue, the 2050 Master Plan takes a regional approach to mitigate land, water, and air pollution concerns in the context of the environmental element.

Because this plan emphasizes infill development and redevelopment, especially on sites and locations that may be considered brownfields or have forms of soil contamination, Not only does infill and redevelopment help reduce commute times for drivers and minimize air pollution, it also helps conserve land by alleviating development pressure, and clean up existing brownfields, it also helps support economic development by increasing property values through new development, promoting affordable housing, returning tax value to greyfield sites, and reducing blight. Two key sources of water pollution are from stormwater and wastewater treatment discharge. Wherever the source of contamination, ultimately, pollutants make their way back to Lake Mead through the Las Vegas Wash. The National Pollutant Discharge Elimination System (NPDES) permit program regulates water pollution from sources that discharge for both stormwater and nonstormwater discharges and requires the implementation



- Hire a staff member within the City that has experience with environmental justice.
- Implement the actions from the Land Use Chapter that reduce or eliminate brownfield and greyfield locations.
- Implement projects and actions from other parts of this plan that improve air and water quality:
- Incorporate environmental justice criteria and priorities into LVMC and continue to enforce environmental regulations and permitting to ensure clean air and water.

OUTCOMES

- · Achieve attainment or maintenance status for all measured criteria pollutant
- For any non-attainment pollutants, a decrease in the annual concentration
- By 2050, no brownfields are found within the City.
- The annual number of days in which the Air Quality Index (AQI) exceeds 100 decreases over time
- For each identified planning area, priority environmental justice conditions, risks, and exposure are reduced



of best management practices to reduce pollutants to the and that low-income people and minority groups have maximum extent practicable. Furthermore, given possible equitable access to the City's services and facilities without experiencing disproportionate health, environmental, or future drought conditions, water must be withdrawn from lower elevations, which may require increased treatment of economic impacts. the drinking water supply given the higher load of pollutants A number of other regionally-based functions are delegated entering the lake.

Air pollution primary comes from two sources: mobile pollution: sources, primarily from combustion from single-occupant The Clark County Department Environment and automobiles, and stationary sources, including those Sustainability (DES, fromerly known as the Department from power generation. Additionally, the Valley's natural of Air Quality) is the region's designated air pollution topography and desert environment contributes to control board that implements and enforces air pollution unhealthy air by trapping pollution and creating haze. control and operates pursuant to NRS 445B.500. It is The region's lack of rain and increasing temperatures also responsible for: can contribute to higher levels of pollutants. Exposure to air pollutants causes a range of respiratory ailments and Air quality permitting. cardiovascular risks. Health impacts cause thousands of Regulation and enforcement of air pollutants. hospitalizations annually and increase the financial burden of chronic diseases. Outdoor air guality is related to many Preparation of studies and plans to comply Federal other goal areas and outcomes in this plan. air quality standards.

The 2050 Master Plan works to ensure City planning areas and neighborhoods are not overburdened by pollution

EQUITABLE	RESILIENT	HEALTHY	LIVABLE	INNOVATIVE
Environmental justice	A resilient environment	Avoiding and mitigating	Developing TOD and	Transportation
ensures specific groups	adapts to pollution while	air quality concerns,	implementing this plan's	electrification and
are not overburdened by	mitigating efforts help	improving water	infill and redevelopment	renewable energy play
the effects of air, land,	prevent it and its effects	quality, and eliminating	strategy at brownfield	an important role in
and water pollution.	on the population	brownfield sites ensure	locations ensures the	reducing stationary and
		healthy outcomes	creation of a livable	mobile emissions.
			community.	
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to different organizations to control the various forms of

- Monitoring air quality conditions and informing the public about current air conditions.

- NV Energy, a private, investor owned utility that generates both renewable and non-renewable electricity, generates some emissions from power generation.
- Several City of Las Vegas departments oversee different aspects of pollution prevention:
 - The City's Department of Public Works oversees capital project and infrastructure planning and project development. Its Environmental Division is responsible for the City's wastewater treatment plant, as well as stormwater and wastewater treatment discharges pursuant to the NPEDs and MS4 permits.
 - The Planning Department oversees the entitlement of land and implementation of the City's zoning ordinances to protect the health, safety, and general welfare of City residents. The City's Code Enforcement division also ensures property upkeep and ensure noise policies are not violated.
 - The Economic and Urban Development Department and the City's Redevelopment Agency, which works to eliminate blighting conditions and remediate brownfields, most notably, the former Union Pacific Railroad brownfield now known as Symphony Park in Downtown Las Vegas.
- With respect to air quality from mobile sources, the Regional Transportation Commission of Southern Nevada (RTC), is responsible for the administration of:
 - Streets and Highways funding, engineering, and capital project construction, for which air quality impacts are closely modeled and monitored. Federal funding from transportation projects could be lost if the region fails to comply
 - RTC public transportation and paratransit services, which is further covered under TI-5
 - Transportation Demand Management Programs and incentives through "Club Ride."

Ultimately, a variety of Federal and state laws help control pollution, but the implementation of those laws take place at the State, county, and city level.

• The City, County, LVVWD, RTC are required to report to the U.S. Environmental Protection Agency or the

Nevada Division of Environmental Protection (NDEP) on a number of laws and programs, including:

- Safe Drinking Water Act
- Clean Air Act -
- Clean Water Act
- Underground Storage Tanks

Noise is a similar form of pollution; at sustained high levels, ambient noise can be harmful to people's health. Ambient noise varies widely throughout the City, whether for residential areas that ensure noise levels are safe for people to live in or for vibrant and active commercial areas. The City does play a role in determining where and how noise is mitigated.

Not only do both the public and private sector entities play important roles in regulating and ensuring the control of pollution, it can be prevented by individuals.

Southern Nevada's desert environment, topography, and pollution from stationary and mobile sources pose a challenge for being in attainment with Federal air quality standards. The annual maximum tolerable level of air pollution is an Air Quality Index less than 100.

Southern Nevada's air quality is monitored and measured within the boundary of Nevada Hydrographic Area 212, covering the Las Vegas Valley. Through the Clean Air Act, the EPA established National Ambient Air Quality Standards (NAAQS) for six regulated criteria air pollutants as well as baseline "healthy" levels air:

- Carbon monoxide (CO): In attainment
 - During winter months, CO levels tend to rise. CO can block oxygen from the brain, heart, and vital organs, with fetuses, babies, and people with chronic illnesses being especially susceptible to its effects. Long-term exposure to low levels may lead to increased respiratory illness and heart conditions. Individuals already having respiratory ailments or heart problems are at the greatest risk for further negative health impacts from breathing high concentrations of carbon monoxide. The Las Vegas Valley was designated as a 'serious' nonattainment area in 1993. Conditions improved after implementing and maintaining a State Implementation Plan. The Las Vegas Valley has maintained attainment levels for carbon monoxide (CO) since 1999, due to regulations on gasoline

that help to control CO emitted into the atmosphere. Programs targeted to the repair of gross emitting and smoking vehicles also had a positive impact on air quality due to the large proportion of air pollution coming from older vehicles.

Nitrogen dioxide (NOx): In attainment

- NOx may cause lung irritation and potentially make people more prone to respiratory infections such as pneumonia and influenza. According to EPA data, it is responsible for 80 percent of the total NOx emissions in Clark County. Since the closure of the coal-fired Reid Gardner Generating Station in Moapa NOx emissions in Clark County have significantly decreased.
- Ozone (O3): EPA designated Clark County as an 03 nonattainment area in 2014
 - Ozone is the only pollutant not directly emitted: matter in Southern Nevada is dominated by dust. it forms through the reaction of nitrogen oxides Secondary particles come from atmospheric (NOx), volatile organic compounds (VOCs), chemical reactions emitted from power plants and and sunlight. The EPA and the American Lung automobiles. Soils, including those with high silt Association determined that long term exposure content in the western and northwestern planning to ozone may cause harm to the central nervous areas of the City that are disturbed through system and cause damage to the reproductive recreational uses or construction, can become system. Ozone can also cause developmental airborne during strong wind events. As a result of harm in young children. DAQ issues advisories not being in attainment during the 1990's, dust when ozone and particulate matter levels become unhealthy and recommends those with sensitive control permitting was a required management practice; as a result, levels of PM10 have shown respiratory systems stay indoors. Concentrations of a continued decline since the early 2000s despite ozone are not uniform and vary from day to day and rapid growth in the Valley. from place to place. Other environmental impacts from long term ozone pollution include damage to Sulfur dioxide (SOx): In attainment ecosystems and landscaping and the degradation Burning sulfur-containing fuels (such as coal), of building materials. As part of the nonattainment distillation of sulfur from fuels can cause airborne designation, DES established a transportation sulfur dioxide. rule with motor vehicle emission budgets to show progress consistent with adopted control measures Lead (Pb): In attainment and projected emissions.
- Particulate matter (PM): In attainment
 - Measured at 2.5 and 10 parts per million, PM is the mixture of airborne solid particles and liquid droplets. PM can settle in the lower portion of the lungs and can cause asthma and respiratory issues. Fine particulates also create haze and reduced visibility. It can come directly from construction

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sites, unpaved roads, and fires. Airborne particulate

Lead monitoring is not continuous, so no real time measurements can be made. Once taken exposed, lead makes its way though the bloodstream and is accumulated in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidneys, the immune system, and the cardiovascular system. Lead exposure also affects the oxygen levels within blood. Aside from burning of fuel, no major sources of lead are present in the City of Las Vegas.

Because prevailing wind flows from California's converge in the Mojave Desert, poor air, dust, and PM are typically transported pollutants into Nevada. More than three quarters of air pollution generated within Las Vegas comes from engine or machine exhaust, transportation generated emissions, and construction. Topography and local weather serve to trap pollution in parts of the Las Vegas Valley; surrounding mountains reduce the wind speeds that would carry pollution away, increasing pollutant concentrations in the valley itself. During cold weather, thermal inversions can develop. If winds are calm, the eastern part of the Valley has higher pollutant levels, usually for CO, due to its lower elevation. Ten official air pollution monitoring stations record meteorological data and measure pollutants in real time.

The EPA uses the Air Quality Index (AQI) to rate air quality based on the National Ambient Air Quality Standards (NAAQS). The scale includes categories of good, moderate, unhealthy for sensitive groups, unhealthy, and hazardous. Over the past three years, the AOI has generally improved, but must continuously be monitored:

Cities that violate the NAAQS for one or more of the criteria pollutants are in nonattainment of the standard based severity. After the Clean Air Act was amended in 1990, the region was classified as a "moderate" non-attainment area for both PM10 and CO, requiring the submission of a state implementation plan containing local regulations and plans to be in attainment of standards. Long-term plan were put in place to demonstrate how the region will meet and continue to maintain compliance with standards. They address:

- Mobile sources The greatest source of the City's (and the Southern Nevada region's) pollution is transportation related emissions. Non-compliance with Federal air quality standards can also affect transportation funding.
- **Stationary sources** site-specific locations that generate emissions. Permits are issued to facilities that emit pollution to ensure they control emissions and do not harm public health or degrade regional air quality. Permits may include limits on both construction and operation activities and are required before activity or pollution emissions begin. New sources must also

AS VEGAS MAST

be reviewed and permitted to ensure pollution is controlled. Stationary sources are regulated as major, minor, or exempt sources, based on the tons of any regulated pollutant, and each have different permitting requirements.

To mitigate air pollution from mobile and stationary sources, a combination of actions can be taken from a number of other goals that will ultimately decrease the number of poor air quality days, improve the annual AQI to levels less than 100, and ensure attainment of NAAQS:

- The transition to cleaner energy sources through energy efficiency and renewable energy projects will yield numerous benefits, including cleaner air and reduced emissions.
- Ensure balance between economic development goals while scrutinizing development applications through the LVMC Title 19 Special Use Permit process for any major industrial-oriented emitters and for environmental justice concerns.
- Decreasing overall VMT and increasing transit use through implementation of RTC's On Board Mobility Plan and the infill and redevelopment strategy detailed in the Land Use and Environment Chapter.
- Transportation electrification will ultimately reduce mobile emissions and demand for fuel.
- Planting trees to increase the overall tree canopy and decrease the urban heat island effect, which will also help reduce air pollution.

THE CITY MUST ASSESS, MITIGATE, AND **REDUCE THE NUMBER OF BROWNFIELDS** AND GREYFIELDS THROUGH THE CITY'S TOD. INFILL AND REDEVELOPMENT STRATEGY

The presence of hazardous materials in brownfields with contaminated soil and groundwater, can increase the risk of adverse health effects to exposed populations. Short term dangers include acute health effects such as poisoning and injuries, while long-term effects include poisoning, cancers, birth defects, and other chronic non-carcinogenic effects. Pollution can negatively impact minority and low-income communities, as well as sensitive sub-populations like children, pregnant women, and the elderly, all of whom can be disproportionately affected.

The City of Las Vegas is fortunate to have few brownfield Both brownfield and greyfield property cleanup and locations requiring major long-term hazardous material environmental remediation can reduce liabilities associated clean-up or environmental remediation, and no properties with reusing contaminated sites, converting vacant, subject to the Comprehensive Environmental Response, underutilized land into productive resources that reduce Compensation and Liability Act (CERCLA). The City does, blight, improve aesthetics, and improve community health however, have legacy locations, especially within Downtown and well-being. Within each planning area, these must be Las Vegas, Downtown South, East Las Vegas, West Las assessed in close coordination with this plan's Economic Vegas, Charleston, and Twin Lakes planning areas. Other Development and Land Use goals for TOD. locations and areas of concern may also exist throughout **CONTINUE ENSURING HIGH STANDARDS** the community, including current and former gas stations, FOR WASTEWATER TREATMENT AND dry cleaners, medical facilities, and buildings that may **STORMWATER POLLUTION PREVENTION** contain toxic materials like lead or asbestos.

Pollution could threaten Southern Nevada's groundwater, Far more prevalent within the same planning areas are greyfield locations, containing abandoned, idle, underutilized soils, and drainage through the Las Vegas Wash to Lake Mead through both natural contamination and spills, leaking pipes or vacant buildings and property. Empty and unused asphalt and underground storage tanks, urban runoff, industrial typifies these locations. While brownfields have actual operations, and forms of agriculture. Water percolating contamination that requires cleanup, many greyfields may through soil picks up naturally-occurring minerals, salts and remain neglected due to the real or perceived complication and expense of redevelopment. These locations commonly organic compounds causing mineralization. If levels are high enough, groundwater can no longer can be used in the include strip malls and neighborhood shopping centers. water supply without higher levels of treatment.

AIR QUALITY INDEX (AQI) REPORT-LAS VEGAS	2019	2018	2017
Days "Good" (AQI 0-50)	154	122	136
Days "Moderate" (AQI 51-100)	206	194	200
Days "Unhealthy for Sensitive Groups" (AQI 101- 150)	5	48	28
Days "Unhealthy" (AQI 151-200)	0	1	1
	0	0	0
AQI Max	122	154	154
AQI Median	54	61	58
Days of CO	1	0	0
Days of NO2	18	45	37
Days of O3	252	227	234
Days of Sox	0	0	0
Days of PM 2.5	86	79	84
Days of PM 10	8	14	10

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- Non-point source water pollution occurs when stormwater and irrigation water flows over developed or disturbed land, carrying contaminants and entering waterways directly through storm drains or percolating into groundwater. It is much more difficult to control than point-source discharge from wastewater treatment plants.
- Point-source water pollution threatens water quality from specific permitted and non-permitted sites. Wellmanaged groundwater basins are monitored to detect leaks so that any harmful intrusions can be addressed quickly by local agencies. Dry cleaners and gas station with underground storage tanks have been prominent polluters in the past with most soil and groundwater contamination occurring from these leaking or spilling sources

Keeping contaminated sites from further polluting soils, aquifers, and watersheds has been a major City focus. Runoff from construction activities can similarly have an impact on water quality. NDEP's Stormwater Program requires developers and contractors of construction sites to obtain a permit prior to discharging water. All construction sites over one acre must develop a Stormwater Pollution Prevention Plan to keep sediment, turbidity, and other pollutants from impacting water quality.

The National Pollutant Discharge Elimination System (NPDES) permit program regulates water pollution from point sources that discharge pollutants. In accordance with the Clean Water Act and NRS Chapter 445A, the Regional Flood Control District is part of the NPDES stormwater discharge permit that authorizes both stormwater and non-stormwater discharges from the municipal separate storm sewer system (MS4) to the Las Vegas Wash. In return, the permit specifies monitoring requirements, best management practices (BMPs), and conditions designed to promote the reduction of pollutants in both stormwater and permitted discharges to the "maximum extent practicable." The City's Public Works Department - Environmental Division, discharges treated wastewater into the Las Vegas Wash and monitors groundwater discharge permits pursuant to LVMC Title 14; it must continue to responsibly abide by regulations to comply with Federal environmental laws.

The City also participates on the Stormwater Quality Management Committee with the Regional Flood Control

District, which informs the general public of measures necessary to protect water quality and other NPDES compliance activities. The RFCD monitors stormwater quality and promotes the construction of facilities that will help reduce the concentration of pollutants in stormwater runoff.

THE CITY MUST BE AWARE OF ENVIRONMENTAL JUSTICE AND WORK WITH COMMUNITY GROUPS

Different parts of the City may have different risks with respect to the impact of environmental pollution on the community. Conditions may be site-specific, such as brownfields in West Las Vegas or Downtown Las Vegas, or may be broader such as the construction of the Downtown Access Project that will replace the I-515/Future I-11 viaduct through Downtown and East Las Vegas. While necessary for transporting people and goods, such a facility may also contribute to respiratory health concerns for the residents that live nearby.

Environmental justice includes not only the impacts of pollution, but also the impacts to the neighborhoods people live and work in. The City's low-income or minority population must be experiencing a disproportionate health or environmental effect, such as increased illnesses or death, direct pollution; disruption of the availability of public and private facilities and services; displacement of people and businesses, and/or the isolation, exclusion, or separation of people within a given community or from the broader community.

The initial city-wide assessment includes consideration of the following factors:

- Proximity to roadways for noise and pollution.
- Exposure to lead based on age of home construction.
- Proximity to air and water point source polluters, such as industrial emitters of noxious odors.
- Proximity to commercially or industrially zoned land

Additional aspects focused on accessibility to certain community assets, such as the presence of food deserts, parks, transit availability, and proximity of City facilities.

Priority planning areas include those with neighborhoods containing high populations of low-income residents, racial and ethnic groups, combined with higher concentrations of environmental risks and pollution using EPA's EJSCREEN



PLANNING AREA/ LOCATION	DESCRIPTION
Downtown Las Vegas	Soil
(Symphony Park)	contamination
	from diesel
	spills
Downtown Las Vegas	Other
(Symphony Park)	contamination
	from parking lot
	surface staining
Downtown Las Vegas	CLV ownership-
(Historic Westside)	asbestos
Downtown Las Vegas	CLV ownership-
(Historic Westside)	asbestos
Downtown Las Vegas	CLV ownership
(Historic Westside)	asbestos
	PLANNING AREA/ LOCATION Downtown Las Vegas (Symphony Park) Downtown Las Vegas (Symphony Park) Downtown Las Vegas (Historic Westside) Downtown Las Vegas (Historic Westside) Downtown Las Vegas (Historic Westside)

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RECENT SUCCESS

The City's most successful brownfield cleanup and remediation is Symphony Park in Downtown Las Vegas. Since the founding of Las Vegas, the 61-acre site was contaminated by petroleum spills, solvents, and metals from railroad operations. During the 1990's, Union Pacific Railroad began the process of cleaning up the brownfield and moving railyard operations through a soil remediation and groundwater management program approved by NDEP. As part of its redevelopment efforts, the City purchased "Union Park" in 2000 to develop for a mixeduse development. In 2010, NDEP awarded additional funds for continued implementation of the Soil and Groundwater Management Plan (SMP) through the Nevada Brownfield Program. Since then, the area was renamed "Symphony Park" after the Smith Center for the Performing Arts was constructed, the Discovery Museum and Lou Ruvo building housing the Cleveland Clinic opened, and parking facilities were completed. In 2020 and 2021, two mixed-use housing developments will open with further redevelopment planned in the future.

tool. It reveals that the urban planning areas immediately around Downtown Las Vegas have the higher levels of risk and vulnerability.

Over the next thirty years, the City must begin taking steps to make measurable reductions in risk and vulnerability. Conditions can be changed to reduce the threat or occurrence of the impact itself, for example, through site remediation efforts or brownfield cleanups. Relocating impacted populations can similarly reduce the risk associated with the condition. However, when vulnerable populations do not have resources to relocate, the City must work to find way to ensure even greater disproportionate impacts never occur.

To reduce environmental justice risks, specific stationary and mobile sources of pollution must either be eliminated, the vulnerability must be significantly reduced, and/or health indicators dramatically improve. The City can also address environmental justice through policy making and specific amendments to LVMC made by the Planning Commission or City Council. Reducing the impact of environmental justice burdens will require a series of significant, coordinated investments and projects that demonstrate a reduction in vulnerability that is being systematically monitored over time.



OZONE



ENVIRONMENTAL JUSTICE RISK	AREA/LOCATION	DESCRIPTION
Ozone	East Las Vegas, West Las Vegas	High concentrations of ozone in low income Latino and black neighborhoods
Traffic	East Las Vegas, Downtown Las Vegas, Charleston, West Las Vegas, Twin Lakes	Widespread noise, air pollution, and emissions concerns for neighborhoods along US 95, I-15, and I-515
Lead Paint	East Las Vegas, Downtown Las Vegas, Downtown South, West Las Vegas, Twin Lakes	Older homes containing lead- based paints
Brownfields	Downtown Las Vegas	Concentration of several brownfields in Downtown's Historic Westside district

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AIR TOXINS LEADING TO RESPIRATORY DISEASE



TRAFFIC



LEAD PAINT



IMPLEMENTATION STRATEGIES

- Hire a staff member within the City that has experience vacant lot cleanup to improve chances of site with environmental justice and assign to an appropriate redevelopment and to deter crime department.
- Make local infrastructure improvements identified in the CIP, including street, water, sewer, storm • Implement projects and actions from other parts of this drain, and energy, to revitalize redevelopment or plan that improve air and water quality, including from: blighted areas and catalyze private reinvestment
 - Urban Forestry
 - Complete Streets and Highways
 - Transit
 - Energy
 - Waste
 - **GHG** Emissions
- Implement the actions from the Land Use Chapter that Continue enforcement of dust control permits from reduce or eliminate brownfield and greyfield locations: construction activity
 - Incorporate environmental justice criteria and Implement recommended RC, TOD, TOC, and priorities into LVMC Title 19 zoning, and site NMXU placetypes development reviews of new projects
 - Develop an inventory of infill, brownfield, and Create an interdepartmental working committee greyfield sites of greatest priority and potential for to discuss environmental justice concerns and development or redevelopment mitigation strategies
 - Collaborate with NDEP to advance current or any Monitor and enforce environmental regulations future brownfields cleanup, should they develop and permits pursuant to LVMC Title 14
 - Establish a program to provide information and Implement projects to reduce pollution exposure assistance to owners, potential buyers, and in prioritized planning areas with environmental development regarding brownfield assessments, justice risks and vulnerabilities cleanups, redevelopment strategies, and available resources
 - Strengthen the City's noise ordinance based upon results from a local assessment of commercial and Support temporary, creative neighborhood uses for residential areas vacant properties and greyfields
 - Ensure the Planning Department's Code Enforcement division enforces greyfield and

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- Incorporate environmental justice criteria and priorities into LVMC and continue to enforce environmental regulations and permitting to ensure clean air and water.
- Create and enforce anti-idling regulations -