#### **NLCS Urban Growth Case Study:**

# Greater Las Vegas

The Greater Las Vegas region includes the fourth-largest megapolitan areas in the Intermountain West. Defining the region as Clark and Nye Counties, Nevada, and Mojave County, Arizona, it ...

This report alters that definition slightly to also include Washington County, Utah, and omit Nye County, Nevada.

This area includes three NLCS areas: Sloan Canyon National Conservation Area, Red Rocks Canyon National Conservation Area, and Grand Canyon-Parashant National Monument.

The two NCAs lie directly east of Las Vegas and south of Henderson, and are thus subject to the full brunt of the region's rapid population growth, much of which is occurring along the NCA boundaries.

The third NLCS area, Grand Canyon-Parashant National Monument, is one of the largest and most remote areas of the National Landscape Conservation System. However, regional

growth pressures from Las Vegas but also Washington County, Utah and Mojave County, Arizona are having indirect impacts that are likely to become more evident in the future.

The Greater Las Vegas region's NLCS areas benefit nearby communities and the American public in many ways:

- They protect natural landscapes and cultural resources
- Provide habitat for threatened and endangered species
- Supply invaluable ecosystem services such as flood mitigation, water filtration, and carbon sequestration
- Create recreational opportunities for the region's growing population
- Enhance and preserve the quality of life that attracts many new residents and businesses.



#### The National Landscape Conservation System (NLCS)

features the some of the best of America's public lands. Created in 2000 and administered by the Bureau of Land Management, its 26 million acres include national monuments, wilderness areas, scenic rivers, trails, and historic sites. NLCS areas allow access to wild landscapes and a range of ways to enjoy them, including hunting, fishing, hiking, wildlife watching, and more.

### NLCS Urban Growth Case Study: Greater Las Vegas





The maps above illustrate urban growth projections by decade in Greater Las Vegas. NLCS areas are shown in yellow, while urban growth is red. Tribal lands ae shown in pink, private lands in beige, and other public lands in tan. The maps are based on 2000 Census data<sup>3</sup>.

### **Population Growth in Greater Las Vegas**



Includes Cochise, Maricopa, Pima, Pinal, Santa Cruz, and Yavapai Counties. 1970-1990: U.S. Census Bureau Decadal Estimates 2000: Census Bureau Annual Estimates for Arizona Counties

2010-2040: Arizona Dept. of Commerce 2006-2055 Population Projections

### NLCS Urban Growth Case Study: Greater Las Vegas



### **Current and Future Urbanization**



# Urban Growth Challenges

The Greater Las Vegas area is challenged by two types of growth and development: that which occurs adjacent to or very near NLCS areas, and growth in the region as a whole. This section explores them both.

#### Growth on the Edges

Land on the edges of NLCS areas is a particularly attractive place for homeowners, given the stunning views, peace and quiet, and ready access to recreational opportunities that it provides — and attractive to developers as well, given the higher premiums that lot sales can bring. Lots that border natural areas have been shown to sell for thousands of dollars more than similar lots without open space access<sup>7</sup>. The Sun Corridor is also primed for large-scale solar energy development, which may occur near NLCS areas.

Development near NLCS areas creates a set of challenges for BLM land managers:

#### Loss of habitat;

•Disruption to wildlife corridors as roads, walls or fences block wildlife movements;

•More human-wildlife conflicts;

•Overuse and degradation resulting from easy access to natural areas, including cutting of dense networks of "social trails" from backyards into protected areas for hiking, bikng, horseback riding, or motorized use;

•Spread of invasive species, such as fountain grass and bufflegrass.

Planning and development practices can minimize the impacts of nearby development on protected areas, preserve functional ecosystems, and minimize visual impacts. Many of these goals can be achieved through effective local ordinances and improved collaboration between developers, public land managers, and city and county planners and officials.



Two different models for urban expansion: The development in the photo above maximizes access to open space for many of the homes, which can lead to a proliferation of trails directly from residences, "spider webbing" of trails, and resource degradation. On the other hand, wildlife retain access to washes and other migratory corridors, which may be beneficial but can also lead to more human-wildlife conflicts.



The development in this photo is more dense and has "harder" edges, which may minimize the cutting of multiple trails and protect open space from over-use. Denser development may also confine growth so that more open space is available. However, the walls around the development prohibit wildlife from utilizing migratory corridors and may cut off their access to resources.

# In Greater Las Vegas

### **Growth Throughout the Region**

Even when population growth and development occur far from the borders of NLCS areas, they may still have impacts that require careful management – particularly when these trends are occurring as rapidly as they are in the delicate environment of Greater Las Vegas. Some of the key management challenges are summarized below.

**Greater pressure on resources:** As open space is filled in with development in Greater Las Vegas, places to enjoy natural open space become scarcer. With fewer options to choose from, more people choose to recreate in NLCS areas. This puts more pressure on these areas and increases their risk of damage and degradation. In the arid environment of Greater Las Vegas, longterm drought conditions make it more difficult for damage from overuse to heal, and single incidences of off-road travel can leave permanent scars on the landscape.

**Conflicts between users:** As more recreationists of various types flock to NLCS areas to share limited numbers of trails and prime recreation areas, conflicts are bound to increase. Conflicts between recreationists who enjoy ATVs and motorbikes and those who prefer non-motorized activities such as hiking, wildlife watching, horseback riding, and mountain biking are increasing in both numbers and severity. Although traditionally roads in most NLCS areas have been open for all types of recreation, the BLM is responding in some high-conflict locations by designating areas for specific types of recreation.



This map of the West illustrates NLCS areas (in green, including wilderness and wilderness study areas) and the fastest-growing counties in the region. It shows that four of the six Sun Corridor counties (Yavapai, Maricopa, Pinal, and Pima) will each grow by more than 50,000 people between 2000 and 2011.

**Air pollution:** Particulate pollution, or dust, is of particular concern in Greater Las Vegas The region's arid environment, combined with heat and long-term drought, can create high dust in and around urban areas. NLCS areas can be sources of dust when it is stirred up by off-road travel; and more users may translate to more dust.

**Energy Development:** Parts of Greater Las Vegas rank as some of the nation's areas of highest solar potential. Arizona BLM offices have been deluged with applications for utility-scale solar development, and are currently creating a programmatic Environmental Impact Statement to better handle the issue. Some of these solar facilities are likely to be near NLCS areas.

Invasive species: Their spread is assisted by an increased number of roads and trails in protected areas.

Note: Removed illegal immigration from this version; otherwise these two pages are the same as Sun Corridor.

# Urban Growth Challenges

#### The Changing Economy of Greater Las Vegas

In addition to being Nevada's population center, the Greater Las Vegas area is also the state's economic powerhouse; it is the source of over 90 percent of the state's gross product<sup>8</sup>.

The Sun Corridor has been recognized as one of the megapolitan areas with the greatest natural capital — that is, natural resources that are important to its economy and future. Its NLCS areas are an important aspect of maintaining this vital aspect of building a sustainable economy — one where economic growth and wealth generation are matched by continually enhanced natural and social capital<sup>9</sup>.

The economy of the Sun Corridor is changing in ways that highlight the value of open space protection and outdoor recreation. The graph on the right shows trends in personal income in the Sun Corridor for 1970-2005. As it illustrates, by far the most rapidly growing source of income is Services and Professional. This category includes occupations that range from low-wage occupations in retail and tourism to higherskilled jobs in technology, medicine, and professional services such as law, design, etc. Income from government and construction jobs has increased along with the population.

An important aspect of many Services and Professional jobs is that they are mobile; they are not tied to particular resources, factories, or locations. As such, entrepreneurs and workers in these professions have a choice about where to live and conduct business. Many of them choose locations that offer a high quality of life. The Sun Corridor's natural beauty and abundant recreational opportunities, found in the region's NLCS areas, are important factors in the region's high quality of life.

#### **Demographic Change**

The population of the Sun Corridor in 2040 will not only be larger it will also be significantly older. As the figure below illustrates, in 2006 only 13% of the region's population was over age 65, but by 2040 the proportion will rise to 21%.

The aging of the Sun corridor's population will have impacts on the type of recreational activities most in demand, and may create additional challenges for public land managers.

Greater personal mobility challenges may mean that the older population will demand greater accessibility to natural spaces like NLCS areas, preferring motorized recreation to non-motorized activities. Managing motorized recreation and conflicts between different types of users is already a significant challenge for NLCS staff, and one that is likely to increase in the future. On the positive side, retirees have made valuable contributions to NLCS areas through volunteering and other activities.



#### Percent of Sun Corridor Population Under 20 and Over 65 Years of Age



# In Greater Las Vegas

#### **BLM Trends and Management Challenges**

The BLM is clearly aware of the mounting effects of population growth and urbanization on the lands it manages. The agency's 2007 Performance and Accountability Report notes that 40 percent of BLM-managed lands in the West are now located within a day's drive of the region's 16 major urban centers<sup>10</sup>. The agency's 2008 budget justifications<sup>11</sup> add that:

- An estimated 22 million people reside within 25 miles of BLM lands.
- An estimated 58 million annual visitors, combined with an increase in use of all-terrain and off-highway-vehicles, visit BLM lands every year.
- 4,100 nearby communities rely on critical watersheds that include BLM lands.

The five NLCS areas in Greater Las Vegas are a prime example of these West-wide trends of increasing numbers of people seeking to live near and recreate in public lands. The public lands within the Phoenix District, which includes the Agua Fria and Sonoran Desert National Monuments, are the BLM's most intensely urbanized and home to 77 percent of Arizona's residents, according to the 2007 Agua Fria manager's report.<sup>12</sup> The report notes further that many of these residents and Arizona's 12.0 million annual tourist visitors regularly use BLMadministered public lands, including the NLCS areas.

## Monitoring Current and Projecting Future Visitation and Recreation

Monitoring visitor use and planning for future recreation needs have presented challenges to the BLM. Comprehensive data for many NLCS areas only started being compiled on an annual basis in 2006, through the monument managers' reports. The agency is currently piloting a version of the National Visitor Use Monitoring (NVUM) methodology, which has been widely used by the Forest Service.<sup>14</sup>

Until more complete visitor and recreational use monitoring systems are in place, such data will remain non-uniform and of varying degrees of quality across various BLM management units. Each of the NLCS areas featured in this report includes visitor data from the 2007 monument managers' reports, many of which provide comparisons to 2006 data.

Without more complete baseline data, accurately predicting future visitor numbers and demand for specific types of recrea-

Visitation to BLM lands appears to be growing more rapidly than the budgets or staffing needed to manage it. The graphs below show that both Congressional appropriations and agency employment have decreased over the past five years.

A 2007 General Accounting Office report estimates that current unfunded repair and maintenance needs for BLM facilities and infrastructure are \$190 million to \$330 million.<sup>13</sup>

It is difficult to determine funding and employment figures for individual BLM or NLCS areas over time, although the 2007 information contained in the monument managers' reports is included in the case studies.



tion is challenging. Methodologies used by other agencies such as the National Park Service may not accurately reflect the degree of local visitation, since NLCS areas typically receive more use by local residents compared to visitors who travel long distances to visit well-known, iconic locations such as Yellowstone or Yosemite national parks.

Visitation patterns affect the types of recreation most in demand. For example, some of the NLCS areas included in this publication report more use by local residents as populations expand and urbanization increases.

"As a result of such growth, once-remote lands managed by the BLM are now virtual backyards and playgrounds of major metropolitan areas in the West."

-BLM 2007 Performance and Accounting Report, p. 2

2000

#### **Distant Growth is Still Significant**

Agua Fria National Monument lies 40 miles north of Phoenix in Yavapai County, along Interstate 17 at the northern end of the Sun Corridor. While there is development at a few adjacent points along its northwestern corner and southern tip, much of the Monument is bounded by the Coconino National Forest. However, the Monument is likely to experience the impacts of increased visitation tied to regional population growth, particularly from the Prescott area to the northwest and growth extending from Phoenix's northern edge.

The Prescott/Prescott Valley area (1 in the maps above) is expected to nearly double in population from 2006 to 2030, from 78,743 to 140,868.<sup>15</sup> Along with expansion of the lowdensity urbanized area, this area is expected to grow more dense by 2030, indicated by areas that change from pink in the 2000 map to red in the 2030 map.

Urbanization on Phoenix's northern edge is expected to increase in density rather than expand, as shown in the shift from pink to red in areas 2 and 3 above.



But the impacts of population growth on protected areas go far beyond those that occur on their borders. Agua Fria National Monument was established in part to protect a particularly wellpreserved system of prehistoric communities that were inhabited between A.D. 1250 and A.D. 1450. It contains a wealth of cultural resources that are vulnerable to purposeful looting and incidental, recreation-related damage — both of which may increase with population growth.



## Red Rocks Canyon

# National Monument

#### **Growth-Related Management Challenges**

According to the 2007 Monument manager's report, the overall trend in the quality of Agua Fria's natural resources is improving, due largely to decreased grazing, and cultural resources are holding steady.<sup>16</sup>

Agua Fria received 34,830 visitors in 2007, and had a total budget of \$609,429, according to the Monument manager's 2007 report. The Monument had a total staff of four in 2007, including one ranger, although it was planning to hire an archeologist to fill a vacant position. It does not have a dedicated recreation planner due to lack of funds.

Like many Arizona NLCS areas, the Monument is experiencing increasing levels of off-highway vehicle use. OHV activity increased five-fold between 2000 and 2004, from 1,500 to 8,000 vehicles annually. In addition, the area has recently had a dramatic increase in target shooting activities, after the Bureau of Reclamation and Maricopa County Parks closed the northern area of the nearby Lake Pleasant County Park to motorized vehicles to limit ongoing environmental damage.

Water is an issue for Agua Fria National Monument. Its designation included a reserved water right, although it has not yet been entirely quantified and reserved through the state's water adjudication process. Population growth around and upstream of the Monument increases water demand, which increases

Established in 1990 196,890 acres acres per ranger budget per acre managed:

#### **Key Features:**

- Perennial water supply supports over 100 bird species and 45 species of mammals
- Herd of wild, free-roaming burros originally introduced by Spanish
- Petrified sand dunes, huge cliffs, deep ravines
- Endangered desert tortoise and desert bighorn sheep
- Cultural resources including petroglyphs and petrographs

groundwater pumping — potentially decreasing streamflow in the Agua Fria River.

Agua Fria National Monument's incredible archeological resources are increasingly being recognized, valued, and studied. Whether these resources will remain intact for future generations to discover will depend on whether the Monument's staff and funding for management can keep pace with the Sun Corridor's rapid population growth.





#### **Urbanization Around the Monument**

When the Sonoran Desert National Monument was designated in 2001, the approximately 30 miles separating it from downtown Phoenix made it seem far removed from the city's sprawling urban areas. Since then, in addition to growth in much of the Phoenix metropolitan area, "boomburbs" such as Buckeye and Goodyear have filled in acre after acre of desert with homes, schools, and stores — and as the maps above and the graph at right illustrate, there is much more to come.

Area I above centers on the town of Buckeye, which in 2005 had a population of 32,735. By 2030, this community is expected to increase exponentially, to 419,146. The 9,470 housing units it included in 2005 will grow to 163,523.<sup>17</sup>

Area 2 above identifies Goodyear, another rapidly growing boomburb. The city's 141,441 population in 2005 is projected to swell to 299,397 by 2030. This municipality will have to find space for 118,418 houses, compared to the 16,517 it contained in 2005.<sup>18</sup>



**Sloan** Сануон

Growth is also approaching the Monument from the western side as the community of Gila Bend (area 3 above) expands, although not on the same scale as Buckeye or Goodyear. Its 2005 population of 2,118 is expected to grow to 9,074 by 2030.<sup>19</sup> This area is also the planned home of a major utility-scale solar electricity installation known as Solana. It is planned to be built directly to the west of the Monument, and will form a buffer between urbanized and protected areas.



# National Monument

Although it will remain less densely populated for the foreseeable future, the Casa Grande/Coolidge/Eloy area (shown as 4 on the map) is expected to nearly quadruple in population from 47,987 residents in 2006 to 192,793 by 2030.<sup>20</sup>

While much of the land within the city limits of these communities is currently natural open space, this will not be the case within a few decades. Residents in search of outdoor recreation will instead seek out protected areas, such as the Sonoran Desert National Monument.

The southern sides of the Monument are not facing as much pressure directly from population growth, since they border the Barry M. Goldwater Air Force Range and the Tohono O'odham Indian Reservation.

### **Growth-Related Management Challenges**

The Sonoran Desert National Monument's natural resources have been under increased stress in recent years, according to the 2007 Monument manager's report.<sup>21</sup> While growing populations in the area are the cause of some of these negative effects, long-term drought and illegal immigrant-related activities such as cutting new roads and dumping trash are also causes.

Approximately 35,000 people visited the Monument in 2007, a substantial increase in recreational use, particularly over the past three years. The increased visitation is believed to be largely due to increased urbanization in the Phoenix area growing closer to the Monument's boundaries. Recreational use patterns have also changed over the past several years, with fewer weekend campers and more week day use by people who live near the area.

A rapid increase in motorized recreation, combined with longterm drought, challenge Monument staff. Despite improved signage and other efforts to control off-road driving, resource damage forced the agency to close about 55,000 acres, or about 89 miles of vehicle routes, to all vehicle use in June 2008.

For the next two to three years, the area will only be open to hikers and equestrians as the agency works to rehabilitate damaged areas<sup>22</sup>.

The agency has stepped up efforts to monitor recreation impacts on the Monument, including investigating how far the "urban effect" of development extends in the Monument as urbanized areas draw closer to its boundaries. Air pollution changes related to urbanization are also being studied.

While visitation to the Monument has increased in recent years, the budget has not; it has stayed in the \$400,000-500,000 range.

Nor has staffing increased significantly, although in 2007 a ranger who had left in 2004 was replaced, bringing the total number of rangers charged with patrolling the nearly half-million acre Monument to two, and the total staff to eight. The Monument continues to rely on a single recreation planner.

Increasing the management budget and staff to keep pace with increasing management challenges is essential to ensuring that the Sonoran Desert National Monument continues to be a functioning ecosystem in an ocean of urban growth.



Established in 2002 48,438 acres acres per ranger 2007 budget per acre managed:

#### **Key Features:**

- Native American sacred sites ranging from Archaic to historic eras
- Petroglyphs and rock art up to 2,000 years old
- Endangered species including desert bighorn sheep and desert tortoise
- Elevations from dry lake beds to 5,000-foot volcanic peaks

Grand Canyon-Parashant



#### **Growth on the Monument Borders**

Ironwood Forest National Monument lies between Arizona's two largest cities, Phoenix and Tucson, and receives visitors from both urban areas. However, a substantial portion of the growth pressure it is receiving is from two cities that were barely on the map 20 years ago: Casa Grande and Marana.

The Monument can expect increasing growth pressures from these urbanizing areas, to the north and east of the Monument.

To the north, in Pinal County, the Casa Grande/Coolidge/Eloy area (shown as 1 on the map) is projected to increase in population from 47,987 residents in 2006 to 192,793 by 2030. While most of the growth in this area is somewhat removed from the Monument, it is likely to become a more sought-after recreation destination as other natural areas become unavailable.<sup>23</sup>

Of potentially greater impact is the growth of Marana, in Pima County, along the Monument's eastern border (2 on the map above). Marana has been one of the fastest-growing cities in Arizona in recent years, and its population is expected to more than triple in the coming decades, from 29,802 in 2006 to 89,761 by 2030.<sup>24</sup>



# National Monument

### Growth-Related Management Challenges

A significant portion of the new houses and commercial space required to house the growing population will be built along the Monument's eastern boundary: 2,000 houses are projected to be built adjoining the Monument in 2008, and 5,000 homes in the next few years, according to the 2007 Monument Manager's report. In addition, the Monument contains large inholdings that may be very attractive for development.<sup>25</sup>

Although its southern and eastern borders are protected from urban growth by the Tohono O'odham Indian Reservation, illegal immigrant smuggling activity from these areas is a serious concern. As in the Sonoran Desert National Monument, smugglers cut roads across the Monument, opening new routes to recreational drivers. Illegal activity also creates a potentially unsafe environment for visitors, increasing the need for more patrol staff. Three immigrants were murdered and two injured in an attack on Monument lands in 2007, and many die each year from heatrelated illnesses. The 2007 monument manager's report notes that illegal immigrant issues require much of the staff's time and effort, and that volunteer efforts are of great assistance in cleaning up trash and remediating damage.

The 2007 monument manager's report also notes that annual maintenance work on the Monument is not adequate, due in part to a lack of funding and staff. The Monument received an estimated 12,000-15,000 visitors in 2007, few of whom are likely to have direct contact with Monument staff since the nearest BLM office is a one-hour, 45-minute drive and there is little ranger coverage.

User-caused negative impacts to its resources over the past five years include target shooting, illegal immigration, theft of prehistoric petroglyph boulders, and vandalism of 1,500 year-old Hohokam sites.



#### Established in 2000 1,014,000 acres acres per ranger 2007 budget per acre managed:

#### **Key Features:**

- Over 5,000 feet elevation change creates range of habitats and extreme biodiversity
- More than 200 plant species, 115 bird species, and 49 mammal species
- Endangered species include California condor and desert tortoise
- Prehistoric quarries, campsites, watchtowers and burial sites
- Historic ranch structures left by early settlers



- I. NLCS Permanence: Passing the currently pending National Landscape Conservation System Act would make the Conservation System a permanent feature of America's array of public lands. Without permanent protection, the System suffers from neglect, and could even be dissolved. Congress should endorse the importance of these places by recognizing the System as a permanent part of our nation's legacy.
- 2. Staff and Resources: Because several of the monuments and conservation areas explored in this report are falling behind on even routine maintenance due to shortages of staff and funding, management resources should first be made sufficient to handle current needs. But if the Greater Las Vegas NLCS areas are to continue to be functioning ecosystems that provide outdoor recreational opportunities, enhance quality of life, and supply invaluable ecosystem services to this rapidly urbanizing region, it is essential that management staff and funding are increased to keep pace with population growth and more complex management challenges.
- **3. Greater Budgeting Transparency:** It is currently difficult to track funding trends for the Conservation System over time. While the budgetary sections of the monument managers' reports are helpful, information that breaks down how funding is allocated among individual NLCS units by program or activity is not accessible. This information should be easily available to the public.
- 4. Protection for Adjacent Lands: As this report demonstrates, much of the land around existing NLCS areas that is currently open space will be filled with new development in the coming decades, and large-scale ecosystem functions may be compromised as a result. To prevent this, more adjacent BLM land should be formally protected from development, starting with those included in the Omnibus Public Land Management Act of 2008, which is currently being considered by the U.S. Senate.
- 5. Improved Land Use Planning: Currently BLM planning does not adequately consider the likely impacts of projected population growth and local land use and transportation plans. More sophisticated growth modeling and review of local plans should be employed during the planning, implementation, and monitoring phases of public lands management.
- 6. Development Design: There are ways to improve development design on the boundaries between public lands and urbanized areas in order to provide buffers to open space and preserves wildlife corridors. NLCS managers should work with local governments and others to develop design guidelines that will minimize the impact of urbanization.
- 7. Effective Partnerships: Many of the growth-related challenges to NLCS areas originate outside the protected areas. As the challenges posed to public land managers by population growth and urbanization become more complex, effective partnerships with other agencies, non-profit organizations, Friends groups, and municipalities will become critical. The time and resources that the BLM devotes to fostering these relationships should be recognized and rewarded.
- 8. Improved Monitoring: Stepping up efforts to monitor resource conditions and visitor use and impacts on NLCS areas will help the BLM to avoid seemingly minor management issues becoming major problems.



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### ABOUT THE SONORAN INSTITUTE

The Sonoran Institute promotes community decisions that respect the land and people of the West. Working with communities since 1990, we believe people make the best decisions about their future when they look at the big picture, work collaboratively and create practical, local solutions.

The Institute encourages public participation, civil dialogue and practical solutions that benefit each community as a whole. We believe that informed and engaged citizens boost the resilience of a community's economic and natural systems.

Supplying accurate information, technical support, small grants and training, the Sonoran Institute provides people with resources to make sound decisions about using land and resources wisely for the benefit of people today, and for future generations.

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Promoting community decisions that respect the land and people of the West.

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