

ECONOMIC OASIS: *Revealing the True Value of the Mojave Desert*





Defenders of Wildlife is a national, nonprofit organization dedicated to the protection of all native wild animals and plants in their natural communities.

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"The deserts are the breathing spaces of the West, and they should be preserved forever."

—John Van Dyke in his 1901 natural history classic, "The Desert"

INTRODUCTION The Mojave Desert: A Valuable Asset

he Mojave Desert offers a blend of splendor and solitude not found anywhere else in the country. The desert's austere beauty and remoteness are its biggest assets, offering real economic value to current and future generations. Camping, hiking, rock climbing, bird-watching and other recreational activities contribute hundreds of millions of dollars to local and regional economies. Homes located near open spaces within the desert enjoy premium real estate values. The military makes use of the desert's wide-open spaces to test new airplanes and to train on-the-ground combat forces. Hollywood takes artistic advantage of the varied landscape to shoot movie scenes. Some of the desert's economic value can be measured in dollars, some of it is hard to quantify, but all of it counts for the people who live there.

Unfortunately, there is often a lack of appreciation of the numerous benefits the Mojave Desert offers and their economic value. Many officials, developers, visitors and residents do not realize that protecting this special place:

Benefits regional economies. Millions of people come to the Mojave each year, contributing greatly to local and regional economies by spending money for lodging, food, gasoline and other goods and services that benefit the local and regional economies.

Keeps property values high. The real estate market has shown that people will pay more money for homes

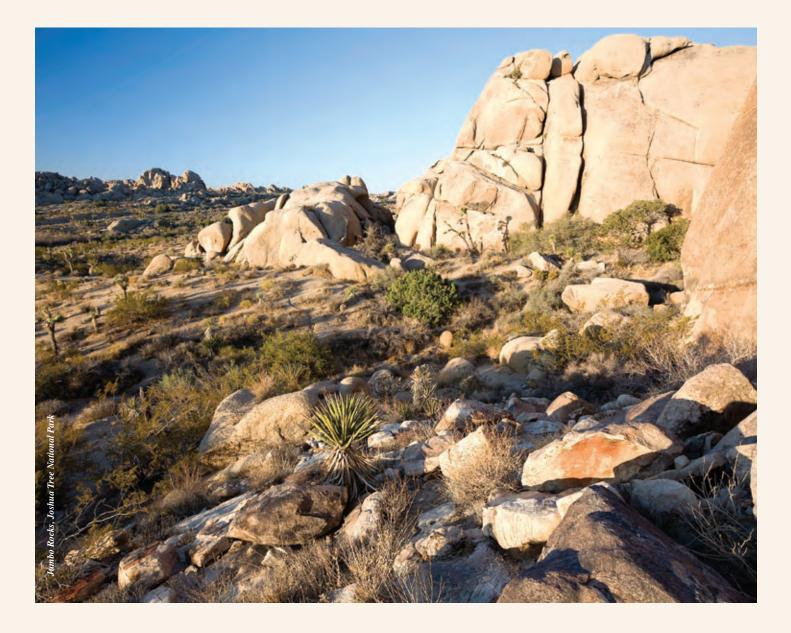
located near permanently protected open spaces.

Contributes to national security. The military uses the desert's wide-open spaces to test new airplanes and train its soldiers. Protection of the desert ensures that development will not compromise the ability of the military to train and protect our country.

Safeguards some of America's most fantastic ecological and cultural treasures. The invaluable lands of the Mojave include Death Valley National Park, the largest national park in the lower 48 states; Mojave National Preserve, the third largest parcel in the national park system after Yellowstone; and Joshua Tree National Park, a popular attraction with 501 archeological and 88 historical sites. The area is truly unique and a source of national pride.

Despite these natural benefits, current decision-making often favors the exploitation of the desert over its conservation. Many think of the Mojave as a tough, rugged and barren place, when it is actually a vital but highly vulnerable ecosystem seriously threatened by urban sprawl and development.

This report highlights the substantial economic and other benefits of protecting the Mojave, reinforcing why it merits protection. It concludes with recommendations on what we must do to adequately protect and preserve this special place–now and into the future. "Despite these natural benefits, current decision-making often favors the exploitation of the desert over its conservation."



he Mojave is part of the American Semi desert and Desert Province, which covers almost 20 million acres from southeastern California into southwestern Arizona and southern Nevada. Federal agencies—Bureau of Land Management, National Park Service and Department of Defense—own approximately 79 percent of the land. The desert covers seven different counties. However, this report focuses on the California portion of the desert in San Bernardino, Inyo, Riverside, and Kern counties and the Lancaster-Palmdale area of Los Angeles County.

The Mojave is a land of granite formations, snowcovered mountains, mesas, sand dunes, endless open vistas, star-filled skies and stunning sunsets. Its many striking features, stark beauty, vast expanses and solitude set the Mojave Desert apart from any other place in the United States.

Plants and Animals

The Mojave is also home to a variety of miraculously adaptive plants and animals. This desert habitat supports a fragile ecosystem of plants and animals that have existed in the desert environment for millions of years. It includes most of the 1,800 vascular plants found in the California deserts and approximately 300 species of animals, including bighorn sheep, mule deer, mountain lions, kit foxes, Mohave ground squirrels and desert tortoises.

Because of the delicate balance of life in the desert, this ecosystem is easily disrupted—and almost impossible

to restore once the damage has been done. "Most of the plants and animals in the Mojave have lived in the desert for millions of years," explains local biologist Ed LaRue. "If you destroy their habitat, you can't just plant another Joshua tree to make up for it. It is too fragile a balance."

People

The human population of all seven counties encompassing the Mojave was almost 15 million in mid-2003. Of that 15 million, 650,000 people actually live in the desert and approximately 40 percent of these desert inhabitants live in the Lancaster-Palmdale area. Another 800,000 people live within a half-hour drive of the desert in Fontana, San Bernardino, Redlands, Rialto and Riverside. These desert communities have experienced fairly rapid population growth in the past 20 years. From 2000 to 2003, the area experienced a population growth of 3 percent per year, which is a higher rate than the state of California as a whole. In addition, the Bureau of Land Management projects that the desert's population will double by 2020.

POPULATION GROWTH IN MOJAVE COMMUNITIES FROM 2000 to 2003

Joshua Tree	60%
California City	
Victorville	17%
Apple Valley	11%
Adelanto	10%
Barstow	9%

Its many striking features, stark beauty, vast expanses and solitude set the Mojave Desert apart from any other place in the United States.



Spotlight on Wildlife: Desert Bighorn Sheep The first time you see a male bighorn sheep, you instantly see how the this animal got its name. The large curved horns are hard to miss. Bighorn sheep are also legendary for their ability to climb steep rocky slopes and are well adapted to the desert environment. These desert denizens can go for extended periods without drinking water. But should its habitat continue to be fragmented at such a dizzying pace, even the rugged bighorn sheep may not be tough enough to survive.





A Land of Plenty: Economic Uses, Benefits and Values

he lands of the Mojave Desert—in their natural state—provide significant economic benefits for the communities around the desert. Some of the different economic drivers that rely on the desert's resources include outdoor recreation, tourism, military operations, movie-making and real estate.

Mojave lands are currently being developed at a dizzying speed and without adequate planning, enforcement of current environmental regulations or consideration of the effects this haphazard growth might have on the desert itself. This development is bringing unsightly sprawl, increased traffic, polluted air and other problems to the area. It is also threatening some of the existing economic benefits directly tied to the continued existence of the desert's special natural state. Indeed, as the desert changes, the economic benefits described on the following pages may be reduced or disappear altogether.

Outdoor Recreation

The Mojave Desert is one of the top outdoor recreation locations in the continental United States. The region boasts several superlative natural attractions. At 3.3 million acres, Death Valley National Park is the largest national park in the lower 48 states. Mojave National Preserve ranks third, behind Yellowstone, with 1.6 million acres, and is a showcase of geologic formations, animal and plant diversity and military, railroad and mining history. Joshua Tree National Park's 800,000 acres just east of the Palm Springs area protect 501 archeological and 88 historical sites. Enormous tracts of public lands in the desert—Barstow, Needles and Ridgecrest—are under Bureau of Land Management (BLM) control and open to the public. California parks such as Pipes Canyon Preserve and Red Rock Canyon State Park offer further respite from urban and suburban life.





Spotlight on Wildlife: Desert Tortoise

One of the most famous occupants of the Mojave Desert is the desert tortoise. Desert tortoises live in burrows, often located in the shade of bushes on the open sandy flats or in the banks of dry washes. They can store up to a year's supply of water in their canteen-like bladders. Unfortunately, tortoise burrows are vulnerable to trampling by off-road vehicles. Educating the people who use these vehicles to keep an eye out for desert tortoises will help to ensure that this flagship species of the desert is able to keep a solid footing in the future. The Mojave Desert is one of the top outdoor recreation locations in the continental United States.



NUMBER OF VISITS (VISITOR DAYS) TO MOJAVE BLM LANDS BY ACTIVITY (2004)*

Camping	1,167,007
Hiking/Walking/Running	117,195
Backpacking	81,505
Viewing wildlife, scenery, etc.	64,765
Horseback riding	23,551
Rockhounding/mineral collection	18,599
Nature study	15,736
Photography	14,202

AVERAGE TRIP EXPENDITURES PER PERSON PER DAY BY WILDERNESS VISITORS (2003)

Gasoline	\$8.37
Groceries	\$8.39
Restaurants	\$6.90
Lodging/campground	\$6.58
Car rental	\$1.58
License fees/admission/permits	\$1.16
Recreation equipment/outfitter/guide	\$1.62
Other retail purchases	\$5.58

TOTAL:.....\$40.17

TOTAL ESTIMATED VISITOR EXPENDITURES FOR MOJAVE NATIONAL PARKS (2003)

Death Valley National Park	\$70 million
Joshua Tree National Park	\$47.5 million
Mojave National Preserve	\$27.4 million



Millions of people come to use these lands each year and spend money for lodging, food, gasoline and other goods and services that benefit the local and regional economies. In addition, many of the visitors—hikers, rock climbers, campers, photographers—need and pay for equipment and guides.

In 2003, outdoor recreationists spent more than \$230 million while visiting the Mojave region. Of that amount, an estimated \$66 million was spent by people participating in wilderness-compatible recreation activities such as hiking, camping and rock-climbing on BLM lands alone. Another \$145 million was spent on trips to the three National Parks—Death Valley, Mojave and Joshua Tree—and almost \$8 million was spent while visiting Red Rock Canyon and other state parks and private preserves such as Pipes Canyon.

These recreational visitors enjoy the desert for what it is—largely undeveloped land with breathtakingly scenic views and vast, remote areas of solitude. These unique desert characteristics translate into economic benefits for the outdoor recreation and tourism industries in the communities around the desert. "Tourists coming to our hotels, restaurants and shops help our businesses thrive," say Paul and Jane Smith, owners of 29 Palms Inn, "but they don't come here to shop. What these visitors seek, above all else, is to experience the 'wild' of our western deserts."

With the desert at risk of being swallowed by unchecked sprawl, these special lands may lose their appeal for many recreational users. If these visitors are forced to recreate in other locations, they will take their outdoor recreation and tourism dollars with them. Protecting the special lands of the Mojave is crucial to retaining the economic benefits the area's tourism and outdoor recreation industries bring to local communities. In 2003, outdoor recreationists spent more than \$230 million while visiting the Mojave region.





THE OHV DILEMMA: Balancing Financial and Environmental Impact

Many people use Mojave lands for motorized recreation, including riding off-highway vehicles (OHVs). There are more than a million OHVs registered in the state of California and 57 percent of them are registered in counties within 75 miles of the Mojave. The sport provides hundreds of millions of dollars for the Mojave region.

Unfortunately, OHV use can ruin sensitive desert ecosystems. Riding on and off trails can kill plants and animals, cause erosion and landslides and degrade water quality in streams and rivers. Noise and other disturbances from OHVs can cause animals such as the desert tortoise to abandon their precious habitat.

OHV use must be managed properly to balance its financial and environmental impacts. Important elements for achieving this balance include designating appropriate places for OHV use, enforcing current OHV laws and regulations and closing and restoring illegally created routes and other lands damaged by OHV use. "Tourists coming to our hotels, restaurants and shops help our businesses thrive. But they don't come here to shop. What these visitors seek, above all else, is to experience the 'wild' of our western deserts."

-Paul and Jane Smith, 29 Palms Inn





Military Testing and Training

Military installations located in the Mojave Desert have a significant economic impact on the surrounding communities. For example, the R-2508 Special Use Airspace Complex, the largest dedicated airspace in the United States, is located in the central Mojave. Military and civilian aircraft are tested, student pilots are trained, and air combat maneuvers are flown in the desert's restricted airspaces.

The Mojave is also home to a number of major military bases, including the Twentynine Palms Marine Corps Air Ground Combat Center, the Marine Corps Logistics Base, Edwards Air Force Base and China Lake Naval Air Weapons Station. More than 50,000 military personnel and their families, civilian employees and on-site contractors are connected to these bases for their livelihood. The Twentynine Palms base produced \$533 million in salaries, services and construction and maintenance contracts in 2004. An estimated \$363 million of that money stayed in the Mojave region.

The other bases do not publish economic impact reports, but an internal assessment at Edwards Air Force Base estimated its total economic impact at \$1.5 billion per year, with most contracts—and money—staying in California. In addition, the bases contribute to the local school district and generate local tax and fee revenues. These military facilities are located in the remote setting of the Mojave to take advantage of the large, unbroken open spaces and low population densities that are necessary to run these military operations. While not all military operations are compatible with protecting the natural state of desert lands, many of them especially the ones that use vast desert lands as controlled airspace—provide economic benefits for the area without hurting the fragile desert ecosystem.

Many of these military operations are actually threatened by encroaching development, which may eventually lead to restricted use. Edwards Air Force Base, for example, manages more than 470 square miles of desert lands, most of which have never been grazed or farmed and support relatively healthy, undisturbed plant and animal communities. These lands have been set aside to protect the airspace needed to test new aircraft, rocket engines and weapon systems, a process that requires the use of only a small percentage of the land surface. "Regrettably," says Robert W. Wood, the chief of the While not all military operations are compatible with protecting the natural state of desert lands, many of them—especially the ones that use vast desert lands as controlled airspace—provide economic benefits for the area without hurting the fragile desert ecosystem.



Edwards base's Environmental Management Division, "unplanned urbanization of the desert lands near the base has the potential to encourage invasive species, which can displace the native plant and animal populations. Elimination of vast areas of desert habitat to support the anticipated urbanization will mean that many native plant and animal communities will only exist on Department of Defense lands, making it more difficult and costly to accomplish the base missions. Degradation of the air quality will reduce the 100-mile visibility that has been essential for safe and effective testing of advanced civilian and defense aerospace systems."

Beyond military and airspace activities, the Mojave Desert provides an ideal location for civilian aerospace industry and, most recently, the private space industry. The Mojave airport has evolved into a flight research and civilian aerospace test center and is home to the first federally licensed spaceport.

To protect the economic impact of the military and aerospace industry in the region, it is crucial to protect the desert's wide-open spaces from uncontrolled sprawl. The military has an active program working with land trusts and conservation agencies to establish buffer zones around the perimeters of their boundaries. A large number of the contractors operating on these military bases are located in the Mojave or in neighboring counties, which means the dollars stay in the region as well.

Analyzing Military Land Use Compatibility

The importance of the desert's large, undeveloped open spaces to the military prompted the California Legislature to pass Senate Bill 1462, signed into law by the governor in September 2004. The law established the California Military Land Use Compatibility Analyst (CMLUCA), This is a Web-based program that determines if projects or land uses proposed by developers or local agencies will affect military installations, special-use airspace or low-level flight paths. If impacts are noted, the program produces a report with a map that is sent to the appropriate military branch by the local planning agency.



To protect the economic impact of the military and aerospace industry in the region, it is crucial to protect the desert's wide-open spaces from uncontrolled sprawl.



Film Industry

The California desert has been called "Hollywood's Largest Back Lot." Its unusual and varied scenery and remoteness make it an ideal location for shooting feature films, commercials, print ads, still photography (Ansel Adams once lived in the Mojave), music videos and television shows. What makes the region so attractive is that its 27,000 square miles provide background locations that can stand in for the Pacific Ocean (Salton Sea), New England towns, northwestern forests, western towns, midwestern farms, the sand dunes of the Middle East, French vineyards and other planets.

According to the Motion Picture Association of America, film-related payroll in the Antelope Valley alone was \$96 million in 2000 with an additional \$4 million spent on local vendor services. The Antelope Valley Film Office tracked more than 220 productions from 2002 to 2003



and estimated that the total local economic impact was \$3.3 million. Filming movies in the Mojave generates local revenues for hotels, restaurants and other businesses as well as income for production-related businesses in the area. "There's such a huge creative energy," says business owner and musician J. C. Hafley. "A lot of people say it's like being on the moon. But there's a sense of community in this big, huge space. It's unlike any other place I've ever been."

What makes the Mojave unique is its seemingly boundless vistas, its remoteness and its varied topography. These are essential qualities that uncontrolled development would ruin. If it is not protected from unchecked sprawl, the desert will lose the considerable economic benefits that movie-making brings to the area.

Movies Filmed in the Mojave Desert

Kill Bill Vol. 2 (filmed near Barstow, Lancaster and Victorville) *Hulk* (filmed near China Dry Lake and Victorville)

Jarhead (filmed at Southern California Logistics Airport)

Deep Impact (filmed at Edwards AFB)

Armageddon (filmed at Edwards AFB) Filming movies in the Mojave generates local revenues for hotels, restaurants and other businesses as well as income for production-related businesses in the area.





Premium Real Estate

Many people enjoy living in the country, mountains or other areas removed from urban—and even suburban life. Real estate market figures reveal that people are willing to pay more for homes located near permanently protected open spaces. Fifty percent of the respondents to a 2001 National Association of Realtors survey said they would pay 10 percent more for such a prime location.

The real estate market in the Mojave provides an excellent example of the premium value that protected open space provides for homes. A 2004 study of private properties located near wilderness in the Mojave estimated the total value of this proximity to be 13 percent of the median house value, or more than \$450 million for San Bernardino and Inyo Counties alone. These numbers do not include open-space premiums in the portions of other counties that lie in the Mojave, nor do they take into account open-space premiums received by properties close to protected nonwilderness lands in the Mojave.

These premium real estate values are particularly evident in the vicinity of Joshua Tree National Park, where the median price for a home increased by 72 percent between 2003 and 2005. A 2005 survey of lots in Joshua Tree found that the average price per acre was about onethird higher for lots close to the park boundary than for lots farther from the park.

The value of these houses is tied to the beauty, vistas and tranquility the desert offers. Nonetheless, development in most of the communities in the Mojave region is galloping out of designated boundaries. The increasing economic premiums that wild desert lands provide for properties in this area will be put at risk if this uncontrolled development is allowed to continue without incorporating common-sense planning that minimizes its long-term impacts.

Renewable Energy

The Mojave's blazing sun and Santa Ana winds make it an impressive source of renewable energy. The region hosts facilities for the production of electricity from solar, geothermal and wind sources that directly and indirectly employ over 1,100 area residents. In 2003, these facilities produced almost 4.5 million megawatthours of electricity with an estimated value of more than \$520 million. That is enough to supply electricity for 375,000 households for one year at 1,000 kilowatthours (or one megawatthour) per month.

While renewable energy is a valuable resource, the facilities and installations that produce this energy must be properly designed to minimize their impact on the desert ecosystem, especially on its migratory birds and bats and scenic ridgelines. "The Mojave's climate and open spaces make it an ideal location for producing renewable energy. However, it takes careful planning to make sure that the renewable energy facilities cause as little damage to desert lands as possible," says V. John White, executive director of the Center for Energy Efficiency and Renewable Technologies.



The increasing economic premiums that wild desert lands provide for properties in this area will be put at risk if this uncontrolled development is allowed to continue without incorporating common-sense planning that minimizes its long-term impacts.





Other Irreplaceable Benefits

In addition to economic uses, the lands of the Mojave provide other valuable benefits that would be incredibly expensive—if not impossible—to replace if they are diminished or lost altogether. These additional benefits include:

Clean Air

In their natural state, Mojave lands play an important role in soil conservation and erosion control that in turn reduces particulate emissions for people who live around the desert. By reducing particles in the air, protected lands in the Mojave are estimated to help San Bernardino, Riverside and Inyo counties avoid more than \$20 million in health care costs per year.

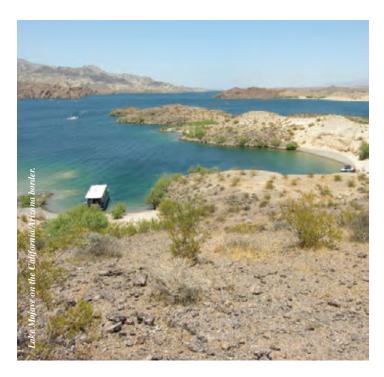
Spotlight on Wildlife: Mohave Ground Squirrel

Just nine inches from nose to tip of tail, Mohave ground squirrels are found only in the western Mojave Desert. They are active only in the spring and summer, when they feed on the leaves and seeds of native shrubs and plants. To cope with scarce food supplies in times of drought, Mohave ground squirrels don't reproduce if rainfall is less than three inches. These squirrels are difficult to study, and with development threatening their last refuge, we risk losing them before we fully put together all the pieces of the puzzle.



In addition to economic uses, the lands of the Mojave provide other valuable benefits that would be incredibly expensive—if not impossible—to replace if they are diminished or lost altogether.





Option Value

Measuring the economic value people place on the preservation of natural resources for potential future use is difficult, but it is a legitimate value. Economists refer to it as the "option value," which in simple terms means the value people put on the fact that they retain the possibility of visiting a certain piece of land in the future even if they are not planning on visiting at present. Maintaining the natural state of the Mojave gives people the valuable option of experiencing the desert's scenery and attractions in the future.

Water

The Mojave's rivers and underground aquifers provide water for domestic and agricultural use. This water has an estimated annual value of between \$90 million and \$110 million.

Research

The unique desert ecosystem provides a sought-after location for researchers and universities from California and around the world.

Artistic Inspiration

A large number of artists live and work in the Twentynine Palms area because they find inspiration in its vast and varied landscapes. If this desert "muse" is tarnished by runaway growth and sprawl, this vibrant arts community could move elsewhere, taking its economic and cultural benefits with it.

For example, most Americans value the fact that Yosemite, Glacier, Yellowstone and Grand Canyon national parks are there to visit should they, their children and grandchildren ever want to visit. Even those who have not visited the Mojave can be assumed to place value on desert land being preserved so they retain the option of one day visiting this desert and its three popular national parks, which in 2003 attracted more than 450,000 U.S. visitors from outside California and more than 700,000 foreign visitors.

Maintaining the natural state of the Mojave gives people the valuable option of experiencing the desert's scenery and attractions in the future.



As this report highlight, the undeveloped lands of the Mojave Desert provide economic benefits for the communities in and around the desert. We hope that local civic leaders, policy-makers and citizens will embrace the information in these pages and make a long-term commitment to protecting this valuable land for the benefit of current and future residents and visitors.

"Working together with the other government and private land owners and conservation organizations," says Edwards Air Force Base environmental chief Robert W. Wood, "we can ensure that the values that make the Mojave Desert such a treasure will endure forever." With that goal in mind, we offer the seven recommendations below. We consider each one vital to the kind of analysis that will bring a more complete view of desert ecosystem management and sustainable development to regional land-use planning and descision-making.

1. Adopt a new paradigm of thinking about the desert. The perception of the desert as a vast and barren environment fails to appreciate the diversity of this natural system with its varied landscapes and plant and animal resources. To move desert conservation in a more positive direction, the true value and vibrancy of the Mojave must be promoted and perceived.

2. Understand and address the myriad problems development brings. Developments across the desert bring sprawl, increased traffic, polluted air and other problems to this sensitive area. Land-use decisions must include solutions to avoid and address these impacts to the desert ecosystem.

3. Recognize the fragility of the desert ecosystem and make decisions to reduce impacts. The delicate balance of life in the arid desert is easily disrupted and almost impossible to restore once the damage is done. Scientists predict the Mojave and desert Southwest are likely to be one of the areas of the country to show early and acute effects of climate change.

4. Address the rapid growth of desert communities. Desert communities have experienced fairly rapid population growth in the past 20 years. From 2000 to 2003, the Mojave area experienced a population growth of 3 percent per year, which is a higher rate than the state of California as a whole. If the desert is going to keep its unique values, we must work to direct growth away from the most sensitive and unique parts of the desert.

5. Engage and involve the public. Enormous tracts of public lands in the desert, such as Barstow, Needles and Ridgecrest, are under BLM control and open to the public. Successful desert conservation is contingent on solid management of recreation and other human interactions on these and other desert lands. With a variety of stakeholders becoming increasingly engaged in desert land-use issues, conflict resolution and clear and transparent dialogue between user groups becomes even more important to conservation. The public must be educated to foster respect for wilderness and wildlife values and to understand that they have a vested interest in protecting the desert. The public must also be encouraged to advocate for these values through the community planning process to ensure that future land-use decisions safeguard the Mojave Desert and its many natural assets.

6. Adopt a unified vision through long-term regional conservation planning. Careful planning is needed to balance the pressures of development with the protection of key desert lands and wildlife. Without a comprehensive and holistic management plan that looks at the Mojave desert as a whole, development has the potential to erode habitat connectivity and large-scale landscape integrity. As we have learned with our oceans, expansive environments are not immune to over-exploitation.

7. Include accurate economic assessments of natural assets in land-use decision-making. Evaluating the economic benefits of natural landscapes or the value lost when land is developed is not as easy as calculating the dollar value of a new housing subdivision or shopping mall.

"Our communities in the Death Valley region have historically been based on a mining economy, but that is now gone. People come to our region now specifically to see untrammeled desert, trackless expanses, and, per chance, wildlife. We are a tourism economy, and a healthy, wild desert is what we have to offer. Without that, we could literally dry up and blow away."

-Brian Brown, China Ranch Date Farm



Evaluation requires a much more comprehensive economic analysis that cannot be overlooked or underestimated. Land-use decisions must reflect an accurate assessment of all that is at stake.

Adopting these recommendations will require widespread understanding and appreciation of the true value of the Mojave Desert. Many residents like Brian Brown, owner of Death Valley's China Ranch Date Farm, already understand. "People come to our region now specifically to see untrammeled desert, trackless expanses and, per chance, wildlife. We are a tourism economy, and a healthy, wild desert is what we have to offer," says Brown. Without that, we could literally dry up and blow away."

Residents, user-groups and decision-makers must come to share this vision of the Mojave Desert as an economic oasis and recognize that protecting it is a wise investment in nature and the future. Antelope Valley Film Office. 2003. *Antelope Valley Film Office Annual Report 2002-03*. Lancaster, CA. 5 pp.

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