

Appendix A. Mojave Network Park Descriptions

Information contained in Section 4 of this appendix was produced by the following park and network staff.

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1.0 Introduction

The Mojave Network includes 3 National Parks, one National Monument, one National Recreation Area, one National Historic Site, and one National Preserve (Table 1). In 1970, Congress elaborated on the 1916 NPS Organic Act, saying that all these designations have equal legal standing in the National Park System (NPS 1916).

Table 1. Mission Statement for Mojave Network park units.

Park Name	Park Mission Statement ^a
Death Valley National Park	Death Valley National Park dedicates itself to protecting significant desert features that provide world class scenic, scientific, and educational opportunities for visitors and academics to explore and study.
Great Basin National Park	The mission of Great Basin National Park is to preserve for the benefit, inspiration, and enjoyment of present and future generations a representative segment of the Great Basin of the Western United States and to promote an understanding of the natural and cultural heritage of the entire physiographic region.
Joshua Tree National Park	The National Park Service at Joshua Tree National Park preserves and protects a representative area of the Colorado and Mojave deserts and the natural and cultural resources for the benefit and enjoyment of present and future generations. The park includes rich biological and geological diversity, cultural history, recreational resources, and outstanding opportunities for scientific study.
Lake Mead National Recreation Area	We provide diverse inland water recreational opportunities in a spectacular desert setting for present and future generations.
Manzanar National Historic Site	Manzanar National Historic Site dedicates itself to protecting the physical remnants of the internment camp and telling the story of the internment of over 110,000 individuals of Japanese ancestry during World War II in an accurate and balanced way that represents diverse viewpoints and beliefs.
Mojave National Preserve	Mojave National Preserve was established to preserve outstanding natural, cultural, and scenic resources while providing for scientific, educational, and recreational interests.

Park Name	Park Mission Statement ^a
Parashant National Monument	Parashant is a model of land management for the BLM and NPS that conserves its natural, scientific, and historic resources and includes ecological restoration and protection in a broad ecosystem context, while honoring the history and living traditions of the people who came before us: “the place where the west stays wild.”

^a Mission statements obtained from park General Management Plans (NPS 2005a, NPS 2001b, 2000, 1999d, 1996, 1995, 1992a).

2.0 Purpose of Mojave Network Parks

The enabling legislation of an individual park provides insight into the natural and cultural resources and resource values that it was created to preserve. Along with national legislation, policy and guidance, a park’s enabling legislation provides justification and, in some cases, specific guidance for the direction and emphasis of resource management programs, including inventory and monitoring. See Appendix B for a description of the enabling legislation, other related legislation, mission, purpose, and management goals for Mojave Network park units.

One related piece of legislation has significantly affected the entire Mojave Desert region, including 3 network parks, and represents the first comprehensive national statement about the value of the desert. The California Desert Protection Act of 1994 (PL 103-433) was passed due to escalating resource threats and in recognition of the fragility of desert ecosystems. Congress declared that “the public land resources of the California desert now face and are increasingly threatened by adverse pressures which would impair, dilute, and destroy their public and natural values” (PL 103-433). This legislation incorporated the lands of Death Valley National Monument into Death Valley National Park, expanded the park boundary to a total 1.4 million ha (3.37 million acres) and designated approximately 95% of the park as the “Death Valley Wilderness”, a component of the National Wilderness Preservation System. At JOTR, the total park acreage was increased to 321,327 ha (794,000 ac), its status changed from National Monument to National Park, and the total area of land designated wilderness expanded to more than 240,165 ha (593,000 ac) (approximately 80% of park). This act also established MOJA to “preserve unrivaled scenic, geologic, and wildlife values” and “perpetuate in their natural state significant and diverse ecosystems of the California Desert” (PL 103-433) with a legislated park boundary encompassing 648,000 ha (1.6 million ac), including 283,500 ha (700,000 ac) of designated wilderness (approximately 44% of park).

The purpose of designation for MOJN parks varies from the protection of natural resources, to public recreation, benefit, and use, to preservation of cultural resources. MANZ is the only network park established for the primary purpose of preserving cultural resources. A variety of significant resources are identified in MOJN parks (Table 2). The following four categories encompass the network perspective on the purpose of MOJN parks: 1) preservation and protection of the scenic, geologic, and natural resources while perpetuating significant and diverse ecosystems, 2) preserve cultural resources and promote understanding of the cultural heritage of the California Desert and Great Basin physiographic regions, 3) Provide opportunities for scientific research and investigation, and 4) provide compatible public recreation opportunities.

1
2 Table 2. Significance of Resources Identified in Planning Documents^a for Parks^b Within the
3 Mojave Network.
4

Park	Resource ^a	State	Significance Level			Comments
			Region	Nation	Global	
DEVA	Geologic Features				X	Complex, exposed geology and tectonics.
	Fossil Record			X		One of the nation's most diverse and significant fossil records.
	Volcanic History			X		One of the nation's most continuous volcanic histories.
	Dune Systems	X			X	Contains five major dune systems representing all dune types and representing one of the only places on earth where this variety of dune types occur in such close proximity. Eureka Dunes, a designated National Natural Landmark at the park's northern end, are the highest dunes in California and the second highest in North America.
	Scenic Landscape			X		One of the most visually dramatic in the United States.
	Water Resources - Devils Hole			X		Subterranean pool of great ecological significance and home to the Federally Endangered, Devils Hole pupfish (<i>Cyprinodon diabolis</i>).
	Weather			X	X	Temperature and precipitation extremes. Valley floor receives the least amount of precipitation in the nation. Highest recorded temperature for the nation and second highest in the world.
	Topography			X		Lowest point in North America
	Rare Species	X		X		Federal and State-listed T&E.
	Cave Resources	X		X		Lehman Cave is one of the most decorated caves in nation. Park contains the longest cave and highest cave in Nevada.
GRBA	Air Quality			X	Cleanest air quality in nation.	
JOTR	Water Resources		X		Regionally important due to water scarcity.	
	Rare species	X			State-listed T&E species.	
LAME	Rare species	X		X	Federal and State listed T&E species	
	Water Resources		X		Premier inland water recreation in West; Primary source of drinking water for S. Nevada.	
MOJA	Rare species	X		X	Federal and State-listed T&E	
	Kelso Dunes			X	Designated National Natural Landmark; Some of highest dunes in the region.	
	Cinder Cones			X	Designated National Natural Landmark.	
	Cima Dome			X	Joshua tree (<i>Yucca brevifolia</i>) forest on Cima Dome and in Shadow Valley is densest in the world. Internationally known as a place to conduct research.	
MOJA	Scenic Landscape			X	Rich in visual diversity.	
	Rare species	X		X	Federal and State-listed T&E species.	

5 ^a Resources and associated level of significance provided in this table were obtained from General Management
6 Plans for network parks (NPS 2001b, 2000, 1999d, 1996, 1995, 1992a) and enabling legislation for PARA.
7

Table 2. (Con't).

Park	Resource ^a	Significance Level				Comments
		State	Region	Nation	Global	
PARA	Cave resources	X	X			Approximately 20 natural caves, 4 major sinkholes, and numerous other small sinkholes that may potentially contain significant cave features are located on the monument.
	Geologic Features			X	X	Geologic treasure offering a clear view of the geologic history of the Colorado Plateau.
	Fossil Record		X			Significant fossil resources, particularly invertebrates and sponges.
	Volcanic History		X			Plateau capped by 9 million to 1000 year old volcanic cinder cones and basalt flows.
	Scenic Landscape				X	Impressive landscapes. Remote areas of open, undeveloped spaces and engaging scenery located on the edge of one of the most beautiful places on Earth – the Grand Canyon.
	Rare Species	X			X	Federal and State-listed T&E species.

^a Resources and associated level of significance provided in this table were obtained from General Management Plans for network parks (NPS 2001b, 2000, 1999d, 1996, 1995, 1992a) and enabling legislation for PARA.

3.0 Regional Context

Mojave Network parks are surrounded by a significant amount of public land. Approximately 93% of the Great Basin National Park boundary abuts other federal lands (78% USFS and 15% BLM) and the park is almost completely surrounded by Humboldt National Forest. BLM lands surround the park at lower elevations in the Spring and Snake Valleys. Parashant National Monument also is almost completely surrounded by federal lands (NPS and BLM) with only 24 km of the park boundary abutting private lands. Across the California portion of the Mojave Desert (including all parks except GRBA and LAME), a total of 77% of land is federally owned and the main federal land administrators are the BLM (34%), NPS (28%), and Department of Defense (14%)(Table 3). Lands in private ownership exist in a checkerboard pattern across the network, “a pattern established in the 19th century as a result of federal policy of land allocation during the homesteading and railroad development period” (Davis et al. 1998).

The California Desert Protection Act of 1994 (CDPA) significantly altered not only the size and designation of individual park units within the Mojave Network but the administrative composition of federal land across the region. During the California Gap Analysis project lands across the Mojave Desert region were categorized by management level with status 1 lands being afforded the highest level of protection (e.g. designated wilderness, units of the National Park Service, preserves, ecological reserves, etc.). The CDPA increased the proportion of status 1 lands across the Mojave Desert by approximately 150% (Davis et. al. 1998). Additional information on land management in the Mojave Desert region can be found on-line at: http://www.biogeog.ucsb.edu/projects/gap/gap_rep.html (Accessed 30 August 2005).

A significant portion of the Mojave and Great Basin Deserts are publicly owned and managed provides hope for future preservation of park resources in the face of many resource threats and affords unique opportunities for collaboration and partnership and management of resources at

1 multiple scales (Table 3 and Figure 1). These opportunities have been recognized not only
 2 through the passage of legislation but in the formation of bodies such as the California Desert
 3 Managers Group (DMG). This group was established as a forum for land managers (federal and
 4 state) across the Mojave Desert to discuss issues of common concern. The mission of the DMG
 5 is compatible with and compliments the goals of the MOJN Vital Signs Monitoring Program
 6 including coordinating and integrating efforts to conserve and restore desert resources and
 7 development of integrated databases and scientific studies needed for effective resource
 8 management (Desert Managers Group 2005)

9
 10 Table 3. Land Ownership in the California portions of the Mojave Desert (Mojave Desert
 11 Alternative Futures Project 2005).
 12

Land Owner	Hectares	Percent Total
U.S. Fish and Wildlife Service	1,379	0.02%
Native American	1,584	0.02%
County/City/Regional	2,637	0.04%
USDA Forest Service	18,917	0.26%
State Land	165,890	2.24%
Designated Wilderness	742,617	10.04%
Military	1,066,317	14.42%
Private	1,542,337	20.86%
Bureau of Land Management	1,804,198	24.40%
National Park Service	2,047,635	27.70%
Total	7,393,717	100.00%
Percentage in Federal Ownership		76.84%

13
 14 The quality of the landscape matrix in which national park units are embedded is vital to the
 15 long-term integrity of the units themselves. Attributes of the surrounding landscapes contribute
 16 to both abiotic and biotic dynamics of remnant areas (Saunders et. al. 1991, Meffe and Carroll
 17 1997) and are major determinants of both short-term and long-term protection effectiveness
 18 (Schonewald-Cox 1988). It is essential for national park units to work with adjacent landowners
 19 The National Academy of Sciences Advisory Committee recommended that specific attention
 20 should be given to assessing changes in land use, resource use, and economic activities on areas
 21 adjacent to national parks that likely affect those parks (Robbins et. al. 1963). In 1993, the
 22 National Park System Advisory Board recommended that “resource management should be
 23 addressed in broader context” and specifically recognized the impact of activities outside park
 24 boundaries (NPS 1993). Threats or stresses originating from outside park boundaries are
 25 significantly modifying biodiversity and other valued components of park ecosystems (National
 26 Parks and Conservation Association 1979, Garratt 1984, Machlis and Tichnell 1985, Sinclair
 27 1998). Greater than 50% of threats reported across the National Park Service system were from
 28 external sources, with development on adjacent lands, air pollution, urban encroachment, roads,
 29 and railroads most frequently cited (NPS 1980). Hansen and others (2001) suggests that only
 30 protected areas with adequate expanses of surrounding habitat and linkages to other protected
 31 areas will be able to support current levels of biodiversity into the future.
 32

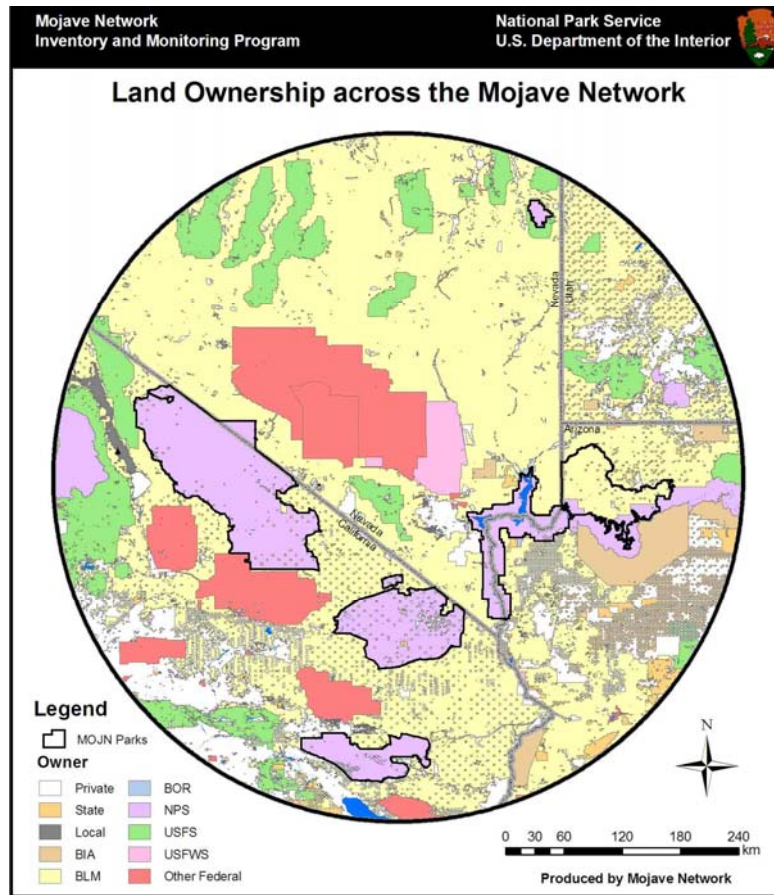


Figure 1. Land ownership across the Mojave Network

4.0 Park Descriptions

4.1 Death Valley National Park

Death Valley National Park (DEVA) lies in the extreme western portion of the Basin and Range physiographic province. Two principal mountain ranges embrace Death Valley NP – the Panamint Range on the west and the Amargosa Range on the east. Other northwest-southeast trending ranges include the Saline, Last Chance, Cottonwood, Grapevine, Funeral, Greenwater, Black, and Owlshead Mountains and part of the Inyo Range on the northwest boundary. The intervening valleys include Death Valley, Greenwater Valley, Amargosa Valley, Saline Valley, Eureka Valley, and part of the Panamint Valley. Relief is dramatic, from the highest point at Telescope Peak (3,368 meters above sea level) to the lowest point at Badwater (-86 meters below sea level). DEVA is located in a hot desert environment and winter temperatures within the park rarely drop below freezing while daytime summer temperatures routinely reach 43-49 °C (110-120 °F). Annual precipitation is approximately 5.08 cm (2 in) and there have been years with no recorded rainfall. The valley floor at DEVA receives the least precipitation in the United States

1 and the park can also claim the nation's highest, and world's second highest recorded
2 temperature (NPS 2001).

3
4 On a global scale, DEVA is renowned for its exposed, complex and diverse geology and
5 tectonics, including one of only two active rift faults known in the world. Additionally, the park
6 contains five major dune systems representing all dune types and representing one of the only
7 places on earth where this variety of dune types occur in such close proximity. DEVA contains
8 the lowest point in North America and the valley floor receives the least precipitation in the
9 United States. DEVA also can claim the nation's highest and world's second highest recorded
10 temperature. The landscape at DEVA is one of the most visually dramatic in the United States
11 and contains one of the nation's most diverse and significant fossil records and most continuous
12 volcanic histories (NPS 2001).

13
14 The park's major plant communities are characterized by bristlecone pine (*Pinus longaeva*)
15 forests, limber pine (*Pinus flexilis*) forests, and pinyon pine (*Pinus monophylla*)/juniper
16 (*Juniperus osteosperma*) woodlands at the higher elevations while scrubland habitats are
17 common at middle and lower elevations. Nearly 1,000 native plant species have been
18 documented within park boundaries. Many areas with harsh environmental conditions do not
19 support any vegetation at all. Various wetland habitats associated with springs and drainages are
20 found throughout the park. Native plants common to some or all of these wetlands are willows
21 (*Salix* spp.), cottonwoods (*Populus fremontii*), mesquites (*Prosopis* spp.), cattails (*Typha*
22 *domingensis*), tules (*Scirpus americanus*) and arrowweed (*Pluchea sericea*). Salt pans and sand
23 dunes comprise much of the valley floor. The Death Valley playa, at more than 51,800 hectares
24 (128,000 acres), is one of the world's largest salt pans. The Eureka Dunes, a designated National
25 Natural Landmark at the park's northern end, are the highest dunes in California and the second
26 highest in North America. Approximately 12% of the native plants at DEVA are considered
27 special status species, including the federally listed endangered Eureka Valley dune grass
28 (*Swallenia alexandrae*) and Eureka Dunes evening primrose (*Oenothera californica* ssp.
29 *eurekensis*). Twelve plants are endemic to the park including plants such as the Panamint daisy
30 (*Enceliopsis covillei*), rock lady (*Maurandya petrophila*), Death Valley monkeyflower (*Mimulus*
31 *bigelovii* var. *panamintensis*) and Telescope Peak bedstraw (*Galium hypotrichium* ssp.
32 *tomentellum*).

33
34 Over 500 vertebrate species have been documented within the boundaries of DEVA. Large
35 native mammals include desert bighorn sheep (*Ovis canadensis nelsoni*), coyote (*Canis latrans*),
36 bobcat (*Lynx rufus*), mountain lion (*Puma concolor*) and mule deer (*Odocoileus hemionus*).
37 The desert tortoise (*Gopherus agassizi*), a federally threatened species, is known from sporadic
38 sightings in the southern and eastern portions of the park. Devils Hole pupfish (*Cyprinodon*
39 *diaboli*), a federally endangered species, occur in Nevada at a disjunct administrative unit of
40 DEVA that is part of a larger system known as Ash Meadows. Numerous species of aquatic
41 mollusks (snails) and amphipods are known to be endemic to park waters. The park's various
42 habitats are also home to a plethora of unique and endemic insects such as butterflies, bees,
43 weevils, and flies (NPS 1999a).

44
45 The natural resources of DEVA are threatened by a variety of internal and external threats.

1 Internal threats are a result of mining activities, introduction of non-native plants and animals
2 and visitor use activities. Currently, 118 patented mining claims remain in DEVA, principally in
3 support of borate deposits. An examination of the status of national and international minerals
4 production indicates that the borate deposits of DEVA will receive increased attention during the
5 next two decades (NPS 1999a). The impacts from non-native plants and animals at DEVA
6 include displacement of native species and alteration of native habitat or community structures
7 and functions. Key species of concern are saltcedar (*Tamarix ramosissima*), palm trees (*Phoenix*
8 *dactylifera* and *Washingtonia filifera*), Russian thistle (*Salsola tragus*), mosquitofish (*Gambusia*
9 *affinis*), wild horses (*Equus* spp.) and burros (*Equus asinus*). Threats from visitors include
10 development of local springs and ground water to supply visitor use needs, unregulated use of pit
11 toilets in the backcountry, off road vehicle use, creation of social trails and camps, vandalism,
12 etc. External threats to resources include air pollution, depletion of the regional ground water
13 basin, and potential development of a nuclear waste depository at Yucca Mountain and
14 introduction of non-native plants from adjacent lands. The full extent of impacts associated with
15 these activities is poorly understood due to the lack of baseline data on park resources. It is
16 expected that the rapidly growing human population and subsequent urban sprawl in southern
17 California and Nevada will make it increasingly difficult to protect/maintain park resources.
18

19 **4.2 Great Basin National Park**

20
21 Great Basin National Park is the only National Park wholly within the Great Basin physiographic
22 region. The 'Great Basin' consists of 90 wide valley basins separated by 160 long, parallel
23 mountain ranges and is defined by the fact that its few waterways drain not into the sea but into
24 the desert flats. Great Basin National Park lies in the South Snake Range in east-central Nevada,
25 encompasses 31,194 hectares (77,082 acres), and is essentially a mountain park overlooking
26 Spring Valley (west) and Snake Valley (east), but including only 32 ha (80 acres) of the basin
27 environment. Currently, 93% of the park boundary is adjacent to federally owned lands (NPS
28 1992).

29
30 Elevation in the park ranges from 1,615 meters to 3,981 m above sea level (5,300 to 13,063 feet)
31 at the top of Wheeler Peak, one of the tallest peaks in Nevada. The park is located in a cold
32 desert climate with January temperatures at Lehman Caves (2081 m /6,825 ft) varying from
33 -23 to 4.4 °C (-10 °F to 40+ °F). Average high temperatures during the summer range from 29 to
34 35 °C (85-95 °F) in the valleys to 25-28 °C (78-83 °F) at mid-elevations and 13-18 °C (55-65 °F)
35 on the mountain ridges. The corresponding precipitation ranges from an average annual rainfall
36 of 15 cm (6 in) in the valleys to 228+ cm (90+ in) on the mountain ridges (NPS 1992).
37 Precipitation occurs primarily in the form of winter snows and summer thunderstorms.

38
39 Due in part to its distance from urban centers, GRBA contains many relatively pristine natural
40 resources. Biological diversity is perhaps the most notable attribute of GRBA due to the
41 elevation, temperature, and moisture gradients in the South Snake Range. Ten perennial stream
42 systems and 5 alpine lakes within the park support significantly greater biological productivity
43 than surrounding, more arid areas and have great local and regional ecological significance due
44 to the scarcity of water in the South Snake Range. The park contains more than 7,000 acres
45 above 10,000 feet in elevation. The geologic history of the Great Basin and the isolation of

1 alpine/subalpine areas from other high elevation mountain areas have combined to produce
2 endemic plant species, subspecies, and varieties that occur nowhere else. The park contains
3 several ancient bristlecone pine stands (3,000-5,000 years old) that represent the most
4 exceptional examples of these species in the NPS. GRBA contains over 30,000+ acres of karst
5 geology with a high potential for harboring cave resources and has numerous limestone outcrops,
6 many of which contain natural caverns. Lehman Cave is only one of 42 known and numerous
7 unknown caverns in the park. Glacial formations in the park include cirques, tarns, a remnant
8 glacier, and several rock glaciers. Few other mountain ranges within the Great Basin
9 physiographic region contain glacial features as well defined. Air quality at GRBA exceeds the
10 highest standards in the United States. Visibility from the park is often greater than 120 miles
11 (193 km) providing spectacular views of the broad basins to the east and west and surrounding
12 mountain ranges (NPS 1992).

13
14 Plant communities at GRBA include sagebrush grasslands, pinyon-juniper woodlands, mixed
15 aspen-conifer forests, mixed conifer forests, and unique subalpine and alpine communities. Over
16 700 plant species have been documented within park boundaries. Unlike other parks in the
17 network, plant communities at GRBA are representative of montane and alpine areas. Common
18 shrub and tree species include big sagebrush (*Artemisia tridentata*), green rabbitbrush
19 (*Chrysothamnus vicidiflorus*), serviceberry (*Amelanchier alnifolia*), oregon grape (*Berberis*
20 *repens*), pinyon pine, juniper, mountain mahogany (*Cercocarpus ledifolius*), aspen (*Populus*
21 *tremuloides*), white fir (*Abies concolor*), englemann spruce (*Picea engelmannii*), Douglas fir
22 (*Pseudotsuga menziesii*), limber pine (*Pinus flexilis*), and bristlecone pine (*Pinus longaeva*).
23 Alpine tundra communities are dominated by small low-growing perennial herbs, cushion plants
24 (ie. mosses, sedums), grasses, sedges, and dwarf wildflowers. Alpine vegetation generally covers
25 less than 35 percent of the broken rock scree, talus slopes, and fellfields (NPS 1999b).
26 The South Snake Range supports a wide variety of wildlife not found in the basins to the east and
27 west due to being essentially a temperate ecological island in the middle of a cold desert. Over
28 160 vertebrates (birds, mammals, fish and reptiles) have been documented within the park. Large
29 vertebrate species include elk (*Cervus canadensis*), mule deer, Rocky Mountain bighorn sheep
30 (*Ovis canadensis canadensis*), mountain lion, bobcat, ring-tailed cat (*Bassariscus astutus*),
31 coyote (*Canis latrans*), fox (*Vulpes* spp.), badger (*Taxidea taxus*), porcupine (*Erethizon*
32 *epixanthum*), and jackrabbit (*Lepus* spp.). Numerous smaller mammals are also present such as
33 squirrels, mice, and bats. Migratory and breeding and seasonal resident bird species also are
34 abundant within GRBA. Common species include the Clark's nutcracker (*Nucifraga*
35 *columbiana*), Stellar's jay (*Cyanocitta stelleri*), scrub jay (*Aphelocoma coerulescens*), horned
36 lark (*Eremophila alpestris*), etc. Due to the large number of caves, bats species are of particular
37 concern at GRBA. Many caves are known to be day roosts or hibernacula for sensitive bat
38 species, such as the Townsend's big-eared bat (*Corynorhinus townsendii*) and the spotted bat
39 *Euderma maculatum*). There are several other species in the park that are considered sensitive
40 and represent unique management opportunities. Examples include Bonneville cutthroat trout
41 (*Oncorhynchus clarki utah*), inyo shrew (*Sorex tenellus*), and the peregrine falcon (*Falco*
42 *peregrinus*) (NPS 1999b).

43
44 Threats to natural resources at GRBA include a lack of baseline information related to natural
45 resources, introduction of non-native plant/animal species, loss of natural fire regime, and water
46 diversion. There are approximately 43 species of non-native plants that occur within park

1 boundaries. Highly aggressive species include musk thistle (*Carduus nutans*), spotted knapweed
2 (*Centaurea maculosa*), bull thistle (*Cirsium arvense*), and Field bindweed (*Convolvulus*
3 *arvensis*). Fire history and range condition studies have revealed that natural patterns of fire size
4 and frequency at GRBA have been disrupted by fire suppression, grazing, and lack of human
5 (i.e. Native American ignitions). This change has resulted in landscape-level changes in plant
6 successional patterns. Water diversions (spring improvements, pipelines, etc.) are present
7 throughout the park and cause loss of riparian habitat, interruption of groundwater recharge, and
8 increased erosion (NPS 1999b).

10 **4.3 Joshua Tree National Park**

11
12 Joshua Tree National Park lies at the eastern terminus of the Transverse Ranges physiographic
13 province along the east-west transverse ranges of the Little San Bernardino Mountains. The
14 southern park boundary follows the base of these mountains along the northern perimeter of the
15 Coachella Valley and the northern park boundary is defined by the Morongo Basin. The
16 elevation gradient at JOTR reaches from close to sea level in the Pinto Basin to 1,772 meters
17 above sea level at Quail Mountain. JOTR is located in a hot desert climate and winter
18 temperatures are mild, ranging from 4.4-18 °C (40-65 °F). Summer temperatures range from 20-
19 41 °C (68-106 °F). Precipitation occurs primarily in the form of rainfall, averaging 10 cm (4.06
20 in) per year, although this average varies widely throughout the park. The Pinto Basin average is
21 0-5 cm (0-2 in) of rain per year while higher elevations areas may receive 15-20 cm (6-8 in) of
22 rain per year (NPS 1995).

23
24 An incredibly unique diversity of desert flora is represented within JOTR as a consequence of a
25 compressed transition zone between the Mojave and Sonoran Deserts. The Mojave Desert
26 ecosystem contains sensitive plants including the Joshua tree (*Yucca brevifolia*) and the
27 Pleistocene relic blackbrush. The Sonoran Desert ecosystem is noted for the ocotillo (*Fouquieria*
28 *splendens*), ironwood (*Olneya tesota*), and native fan palms. Over 700 plant species have been
29 documented within JOTR. The original impetus for the creation of JOTR was the wholesale
30 uprooting of native desert vegetation that occurred in the 1920's. Mature palm trees were being
31 removed from native oases and entire cactus communities were removed to meet consumer
32 demands associated with southern California's urban sprawl. Furthermore, setting fire to Joshua
33 trees had become a favorite sport of the first auto adventurers into the desert. The highlands of
34 JOTR form a peninsula that sustains many floral and faunal elements of the southern California
35 mountain ranges. The relative isolation of this peninsula is such that several coastal California
36 species have evolved endemic characteristics that reflect the selective pressures of desert
37 conditions (NPS 1995).

38
39 Wildlife resources at JOTR, especially reptiles, represent a diverse and unique assemblage of
40 species with over 250 documented vertebrate species within park boundaries. Due to monetary
41 and personnel constraints management of wildlife has focused on individual species of concern.
42 Species that are currently managed actively include the desert tortoise (*Gopherus agassizii*)
43 (Federally threatened), desert bighorn sheep (*Ovis Canadensis nelsoni*), fringe-toed lizard (*Uma*
44 *scoparia*) and sensitive bat species. JOTR represents the largest protected area containing
45 tortoise habitat and thus its management at this location is significant (NPS 1995).

1
2 There are many new threats facing this relatively pristine desert area. In 1993, park managers at
3 JOTR suggested that the “acceleration of impacts to resources due to urbanization and increased
4 visitation may be eliminating or damaging resources before [they] have a chance to conduct
5 inventories” and repeatedly referred to lack of baseline resource data as the greatest threat to
6 natural resources (NPS 1993). Air pollution that enters the park from Los Angeles is among the
7 highest in any National Park unit. Visibility has decreased to the point that only a few days
8 represent the best examples of what used to be seasons of clear air. In 2000, six new natural gas
9 and coal power plants were proposed for fast-track construction, all located within seven miles
10 upwind of the park boundary. Increasing urbanization across the northern edge of the park has
11 resulted in housing developments being located directly adjacent to park lands. Urbanization has
12 further increased problems associated with the introduction of domestic animals, non-native
13 plants, hydrology, and off-road vehicle use. Exotic grasses have spread throughout the high
14 valleys of the park providing fuel for wildfires in an ecosystem formerly supporting fire only
15 once per century. In 1999, nearly 14,000 acres burned including many large Joshua Tree stands.
16 Due to proximity of the park to large cities to the west and their burgeoning population, yearly
17 visitation has grown to an average of 1.4 million individuals. Over time recreational activities
18 have resulted in severe impacts to prominent rock formations and delicate aquatic communities.
19 Finally, there is the threat of a major landfill that will be receiving 20,000 tons of trash per day
20 and is surrounded on three sides by NPS wilderness. Burning methane (natural gas) is expected
21 to significantly increase the rate of nitrogen deposition in and around JOTR and may have
22 considerable impact on native plants that are adapted to low nitrogen content in the soil. Simply
23 stated, burning natural gas produces carbon dioxide and hydrogen gas that are released to the
24 atmosphere. In the atmosphere, hydrogen gas and nitrogen gas react to form ammonia (NH₃) that
25 is then returned to earth and acts as a nitrogen fertilizer.
26

27 **4.4 Lake Mead National Recreation Area**

28
29 Lake Mead National Recreation Area (LAME) is located within the Basin and Range
30 physiographic province. In the north part of the Nevada portion, are the Black Mountain and the
31 Muddy Mountains. To the south, the Colorado River and Lake Mohave are east of the Eldorado
32 and Newberry Mountains. Elevation in the park ranges from 152 meters to 1,719 m (500 to 5,639
33 feet) above sea level. LAME is located in a hot desert climate and winter temperatures are mild,
34 averaging 12-19 °C (53-66 °F). Summer temperatures average 32-43 °C (90-110 °F).
35 Precipitation occurs primarily in the form of rainfall, averaging 11 cm (4.5 in) annually.
36

37 Lake Mead National Recreation Area covers 229 kilometers (142 miles) of the Colorado River in
38 northwestern Arizona and southern Nevada. The park has approximately 185,000 acres of
39 designated wilderness, with thousands of additional acres proposed as such. The recreation area
40 is centered on two artificial lakes: Lake Mead and Lake Mohave. Lake Mead, created by Hoover
41 Dam, is 122 km (76 miles) long, has 62,000 ha (153,200 ac) of surface water, and over 1,118 km
42 (695 miles) of shoreline. Lake Mohave lies behind Davis Dam and is 108 km (67 mi) long, has
43 11,260 ha (27,800 ac) of surface water, and over 414 km (257 mi) of shoreline. However,
44 approximately 87 percent of LAME consists of terrestrial habitat representing elements of the
45 Mojave, Sonoran, and Great Basin deserts (NPS 2000a).

1
2 Many regionally and nationally significant resource components are present in the biologically
3 and geologically diverse land and water environments at LAME. The geologic diversity and
4 convergence of three desert ecosystems within the park provides habitat for a diversity of plants
5 and animals. Significant populations of species of special concern and species at the end of their
6 range occur within the park. There are six plant species, which are state listed in California as
7 critically endangered. The Nature Conservancy considers the recreation area the best refuge for
8 four of these species: the Las Vegas bearpoppy (*Arctomecon californica*), sticky buckwheat
9 (*Eriogonum viscidulum*), three-cornered milk vetch (*Astragalus geyeri* var. *triquetrus*), and the
10 Grand Canyon rose (*Rosa stellata* spp. *abyssa*). The paloverde tree (*Cercidium microphyllum*)
11 reaches its northernmost range in North America in the Fire Mountain vicinity and the smoke
12 tree (*Psoralea argophylla*) reaches its end of range extension in the Newberry Mountains. The
13 recreation area contains globally significant herds of desert bighorn sheep, with some of the
14 highest population densities found anywhere. LAME also contains significant populations of the
15 federally threatened desert tortoise. The area supports a rich herpetofauna, including the Gila
16 monster (*Heloderma suspectum*) and the relict leopard frog (*Rana onca*), previously believed
17 extinct. Over 340 species of birds have been recorded in the area including resident peregrine
18 falcons, over-wintering bald eagles (*Haliaeetus leucocephalus*), and the southwestern willow
19 flycatcher (*Empidonax traillii extimus*). Potential habitat exists for the Mexican spotted owl
20 (*Strix occidentalis lucida*) and the Yuma clapper rail (*Rallus longirostris*). Lake Mohave is
21 Critical Habitat for the bonytail chub (*Gila elegans*) and both Lakes Mead and Mohave contain
22 critical habitat for the razorback sucker (*Xyrauchen texanus*). Lake Mohave contains the largest
23 existing population of the razorback sucker. The 229 km of the Colorado River's former channel,
24 with and associated 1,118 km of lake shoreline, and the park's 40 desert springs provide
25 preservation opportunities for one of the Southwest's most threatened habitats – the desert
26 riparian community. Finally, LAME also contains soil associations, such as gypsum soils and
27 cryptogamic crust associations, which are threatened regionally (NPS 2000a).

28
29 The majority of LAME contains vegetation characteristic of the Mojave Desert. The Sonoran
30 Desert is represented at the southern tip of the park. The diversity of the vegetation at LAME is
31 reflected in its classification into 16 plant communities in 5 different vegetation types and 2
32 different biotic provinces (NPS 2000a). Over 900 plant species have been documented within
33 park boundaries. The predominant vegetative feature of the landscape at LAME is the presence
34 of shrubs. Shrub communities present include creosotebush (*Larrea tridentata*), sagebrush
35 (*Artemisia* spp.), blackbrush (*Coleogyne ramosissima*), and saltbush (*Atriplex* spp). Shrub
36 dominated hot desert communities are found within pinyon-juniper woodlands at higher
37 elevations and cottonwood and willow stands along the Colorado River. Unique plant
38 communities include the gypsophilous, riparian, cliff, desert marsh, ocotillo, and other stem
39 succulent communities.

40
41 Over 500 vertebrate species have been documented within the boundaries of LAME. Due to the
42 presence of a large number of special protection species, park staff has focused management
43 activities on this group. The majority of activity has centered on desert bighorn sheep, desert
44 tortoise, razorback sucker, bonytail chub and two other federally listed native Colorado River
45 fish. Sport fishing is a major activity within the recreation area. These fisheries consist chiefly of
46 exotic game species stocked within the reservoirs. On Lake Mead, principal species are striped

1 bass (*Mylopharodon conocephalus*), largemouth bass (*Micropterus salmoides*), channel catfish
2 (*Ictalurus punctatus*), crappie (*Pomixis* spp.), and bluegill (*Lepomis macrochirus*). Lake Mohave
3 still supports a trout fishery, although its long-term viability is in doubt due to trout predation by
4 striped bass (NPS 2000a). In 1990, the park entered into a multi-agency and interest group
5 planning effort to develop a long term Habitat Conservation Plan for the desert tortoise in Clark
6 County, Nevada. That plan has now been expanded into a multi-species conservation plan, which
7 will provide long term protection for approximately 100 species of concern.

8
9 Major metropolitan areas of Las Vegas, Nevada, Phoenix, Arizona, and highly urbanized
10 southern California are located less than a day's travel from LAME (NPS 2000a). The rapid
11 urbanization and development of the communities adjacent to LAME pose many threats to the
12 integrity of park resources. The recreation area, while still maintaining wilderness characteristics,
13 is now virtually surrounded by urban centers. Threats related to surrounding
14 urbanization include a long list not limited to the introduction of non-native plant and animal
15 species, groundwater withdrawal for the exploding Las Vegas population, water quality threats
16 from surrounding rivers and discharges, current and past soil surface disturbances from illegal
17 off-road driving, burros, and livestock grazing and disruptions of desert springs and riparian
18 areas.

20 4.5 Manzanar National Historic Site

21
22 MANZ is located in the Owens Valley of southern California and encompasses 329 ha (814
23 acres) at an elevation of approximately 1,159 m (3800 feet) above sea level. The Owens Valley
24 is well protected from ocean air masses by the Sierra crest and thus experiences a predominantly
25 high desert type climate. Winter temperatures are often cold dropping below freezing for more
26 than 100 days per year. Winter highs range generally range from the 0-10 °C (30-50 °F).
27 Summer high temperatures often exceed 37 °C (100 °F), followed by evenings ranging from 18-
28 24 °C (65-75 °F). Most precipitation falls as a mix of rain and snow during the months from
29 December through March. A limited amount of precipitation falls from thunderstorms in July
30 and August. Average precipitation totals about 10 cm (5 in) per year (NPS 1996).

31
32 Natural resource diversity is highest along the primary natural watercourse, Bairs Creek, flowing
33 west to east through the camp toward the Owens River. This stream is intermittent, carrying
34 substantial flows during periods of spring and summer runoff, but tapering off to minimal or no
35 flow during fall and winter months. Soils are composed of alluvial materials deposited by
36 erosion of the Sierra Nevada Mountains. Materials are coarse and well-drained.

37
38 Natural vegetation at MANZ is primarily Great Basin sagebrush scrub, characterized by low
39 shrubs such as sagebrush, saltbush (*Atriplex polycarpa*), and rabbitbrush (*Chrysothamnus*
40 *nauseosus*), and a variety of forbs, cacti, and grasses. A portion of the park also is covered by a
41 large cottonwood grove that exists in a unique hydrologic area where groundwater remains
42 relatively near the surface. Finally, a small riparian zone is present along Bairs Creek. While
43 natural vegetation patterns are reasserting themselves over much of the camp, the twentieth
44 century agricultural and residential uses have significantly affected the vegetation on site.
45 Numerous non-native species were planted by early settlers and by Japanese American internees

1 as landscaping, and remain today throughout the camp. The park General Management Plan
2 (1996) authorizes selective thinning of natural vegetation as needed to reveal the historic
3 landscape and designates the area around Bairs Creek as a natural area.

4
5 Wildlife species occurring at MANZ are those characteristic of the Great Basin region,
6 including a range of mammals, especially rodents and predators such as foxes (*Vulpes* spp.)
7 coyotes (*Canis latrans*), reptiles including rattlesnakes (*Crotalus* spp.) and many bird species.
8 Park staff also report the presence of black bears (*Ursus americanus*) and elk that are causing
9 damage to cultural landscape features such as orchards. A substantial quail population in the area
10 generates significant hunting activity in season.

11
12 No threatened or endangered species have been documented within MANZ however, the U.S.
13 Fish and Wildlife Service has identified special protection species that could potentially be
14 present including the Owens Tui Chub (*Gila bicolor snyderi*), Owens pupfish (*Cyprinodon*
15 *radiosus*) and Least Bell's Vireo (*Vireo bellii pusillus*)(USFWS 1993). The California
16 Department of Fish and Game's Natural Diversity Database lists Owens Valley checkerbloom
17 (*Sidalcea covillei*), Nevada oryctes (*Oryctes nevadensis*) and Inyo County star-tulip
18 (*Calochortus excavatus*) as special status plants that occur in or near MANZ.

19
20 Existing threats to natural resources at MANZ include a lack of baseline data, non-native plants
21 such as black locust (*Robinia pseudoacacia*) and tamarisk (*Tamarix ramosissima*), groundwater
22 withdrawal to the City of Los Angeles, soil loss through erosion due to Los Angeles Department
23 of Water and Power upstream water-spreading activities, visitor use activities and development
24 of park facilities (roads, trails, etc.) (F. Hays, *personal communication*).

26 4.6 Mojave National Preserve

27
28 Mojave National Preserve (MOJA) is characterized by isolated mountain ranges and ridges
29 separated by alluvium-filled, irregular large valleys. Dividing MOJA in half is the northeast
30 trending Providence-Mid Hills-New York Mountain ranges. The principle valleys within the
31 Preserve include Ivanpah Valley, Kelso/Cedar Wash, Lanfair Valley, Devils Playground, Piute
32 Valley, and the northern area of Fenner Valley. Both Lanfair and Piute Valleys drain into the
33 Colorado River. The remaining valleys have self-contained drainage systems as represented by
34 playa lakes such as Soda and Ivanpah. Elevation at MOJA ranges from 275 meters (900 feet)
35 above sea level to 2,439 m (8,000 ft) above sea level. MOJA is located in a hot desert climate
36 and winter temperatures are mild, ranging from 1 to 16 °C (34-61 °F) and summer temperatures
37 range from 25 to 43 °C (77-109 °F). Precipitation occurs primarily in the form of rainfall,
38 averaging 21.8 cm (8.6 in) per year (NPS 2000b).

39
40 MOJA consists of a vast expanse of desert lands representing a combination of Great Basin,
41 Sonoran, and Mojave Desert ecosystems within a landscape of mountain ranges, sand dunes,
42 great mesas and extinct volcanoes (NPS 2000b). Numerous natural resources at MOJA have
43 regional, national, or global significance and serve as the basis for management. An extensive
44 variety of habitats, species and landforms unique to the Mojave Desert are present within MOJA
45 and provide unique opportunities for visitors and scientists. Mojave National Preserve contains

1 outstanding scenic resources, rich in visual diversity containing a varied landscape of sand
2 dunes, mountain ranges, dry lake beds, lava flows, cinder cones, Joshua tree forests and far-
3 reaching vistas. The Joshua tree forest of Cima Dome and Shadow Valley is the largest and
4 densest population of Joshua trees in the world. Internationally, MOJA is known as a place to
5 conduct desert research and its lands are known for their geological features such as Cima Dome,
6 the Cinder Cones and the Kelso Dunes. Additionally, approximately half the lands within the
7 preserve have been designated Critical Habitat for the desert tortoise (NPS 2000b).

8
9 The vegetative resources of Mojave National Preserve reflect the mingling of three major North
10 American Deserts: the Great Basin, Mojave and Sonoran and is considered a unique floristic
11 area. Vegetative attributes of the Preserve primarily represent the Mojave Desert but contain
12 floral species of the Great Basin, Sonoran and some elements of the California Coastal Zone.
13 Over 830 plant species have been documented within park boundaries. Many plants are
14 distributed throughout Preserve boundaries; while other areas such as the New York Mountains
15 contain species of manzanita (*Arctostaphylos* spp.) and California lilac (*Ceanothus thyrsiflorus*)
16 normally associated with coastal California. The Mid Hills have significant stands of Great Basin
17 sagebrush and Utah juniper. The strongest association however, is with the Sonoran desert whose
18 northernmost range is often recognized to intermingle with the southern border of the preserve.
19 Sonoran plant species such as teddy bear cholla (*Cylindropuntia bigelovii*) and smoke tree
20 (*Psoralea arguta*) extend many miles into the southeast portion of the preserve. Common
21 elsewhere in the Preserve are the playas, saltbush, creosote-covered flats, alluvial fans and
22 Joshua tree forests. The Preserve is unusual in the complexity and density of the Joshua tree,
23 Mojave yucca (*Yucca schottlandii*) and Spanish bayonet communities. Higher elevations support
24 grassland, sagebrush, blackbrush and pinyon-juniper woodlands. Many unique plant assemblages
25 occur at MOJA in canyons within the New York Mountains. For example, Caruthers, Keystone
26 and Live Oak canyons contain pinyon-oak-juniper woodlands or interior chaparral communities.
27 Piute Creek is a perennial stream, bordered by riparian vegetation. Cottonwoods, willows, and
28 sedges dominate this fragile and limited plant community (NPS 2000b).

29
30 The intermingling of three desert environments has produced approximately 35 wildlife habitat
31 types and these habitats support over 250 vertebrate species, including many special protection
32 species. Some of the most notable wildlife species are the Gila monster, desert tortoise, Mojave
33 tui chub (*Gila bicolor mohavensis*), Mojave fringe-toed lizard, regal ring-necked snake
34 (*Diadophis punctatus regalis*), and desert striped whipsnake (*Masticophis taeniatus*). Significant
35 avifauna include the prairie falcon (*Falco mexicanus*), Bendire's thrasher (*Toxostoma bendirei*),
36 California thrasher (*Toxostoma redivivum*), gray vireo (*Vireo vicinior*), golden eagle (*Aquila*
37 *chrysaetos*), Lucy's warbler (*Vermivora luciae*), and Gambel's quail (*Callipepla gambelii*).
38 MOJA also has one of the more significant bat faunas of the California desert. Other wildlife
39 include rock squirrels in pinyon-juniper woodland, a relict population of dusky-footed woodrats
40 (*Neotoma fuscipes*), mule deer, porcupines, mountain lions and desert bighorn sheep (NPS
41 2000b).

42
43 Significant threats to MOJA natural resources exist and are in part related to exceptions in land
44 use made by Congress. The enabling legislation of MOJA specifically allows the continuation of
45 the following land uses that may threaten biological integrity in some areas of the park: mining,
46 grazing, hunting, trapping, and utility rights of way (pipelines, major transmission lines,

1 telephone relay stations, antennas, billboards, etc.). Other threats to park resources include
2 introduction of non-native plant and animal species (i.e. burros, tamarisk), air pollution,
3 hazardous materials related to mining activities, military overflights, light pollution, off-road
4 vehicle use, loss of critical habitat due to grazing and recreational activities and increased
5 vehicular traffic along the Los Angeles to Las Vegas corridor.
6

7 **4.7 Parashant National Monument**

8
9 The Parashant National Monument (PARA) was created by presidential proclamation on January
10 11, 2000. The unit encompasses approximately 1,014,000 acres of land that will be jointly
11 managed by the NPS and Bureau of Land Management (BLM). The NPS will retain primary
12 authority over approximately 87,414 hectares (216,000 acres) of land that are currently within
13 the boundary of Lake Mead National Recreation Area (LAME) and generally referred to as the
14 Shivwits Plateau. Because of its recent establishment, PARA is still in the process of developing
15 baseline summary and guidance documents, developing management goals, etc. Most of the
16 descriptive information provided below is from Stevens (2001).
17

18 The NPS retains primary management authority over approximately 84,358 ha (208,453 ac) that
19 are still formally within the boundary of Lake Mead National Recreation Area. In September
20 2002, the network Board of Directors decided to treat PARA as a separate park unit in the MOJN
21 I&M program for the purposes of funding, field efforts and data management. PARA represents
22 the only area of land within the Mojave Network located on the Colorado Plateau. Management
23 documents and basic inventory data are still being developed for PARA and information for this
24 NPS unit has been included where available. As additional information becomes available it will
25 be included in subsequent reports and planning efforts.
26

27 The monument is the junction of two physiographic ecoregions: the Mojave Desert and the
28 Colorado Plateau. The western margin of the Shivwits Plateau marks the boundary between the
29 Sonoran/Mojave/Great Basin floristic provinces to the west and south, and the Colorado Plateau
30 province to the northeast. The intersection of these biomes is a distinctive feature of this park
31 (Stevens 2001). Geologically, the monument is referred to as a “treasure”, offering a clear view
32 to understanding the geologic history of the Colorado Plateau. The Plateau is bounded on the
33 west by the Grand Wash Cliffs and on the east by Hurricane Cliffs. These cliffs represent a major
34 barrier to travel across the region. The Grand Wash Cliffs form a spectacular boundary between
35 the Basin and Range and Colorado Plateau geologic provinces. Elevation within the monument
36 ranges from 366 m to 2,447 m above sea level (1,200 to 8,029 ft) Average summer temperatures
37 in nearby St. George, Utah range from 15-39 °C (59-102 °F) and average winter temperatures
38 range from -3.3-16 °C (26-60 °F). Average total precipitation in St. George is 21 cm (8.3 in)
39 primarily in the form of winter snow and summer rain. Temperatures at higher elevations may be
40 significantly lower compared to temperatures in St. George and precipitation (snow) significantly
41 higher.
42

43 In FY 2004 the Mojave Network funded a baseline inventory of vertebrates and vascular plants
44 geared toward the identification of existing voucher specimens and published (and grey)
45 literature and development of species lists based on this review. To date, cooperators at Northern

1 Arizona University have assembled specimen information on more than 10,246 plant specimens
2 that may have been collected in NPS portion of Grand Canyon-Parashant National Monument,
3 involving more than 990 plant species (L. Stevens, *personal communication*). Grand Wash, the
4 Sanup Plateau and the Grand Wash Cliffs form one of the nation's most distinctive ecotones, an
5 ecological transition from the Mojave Desert to boreal coniferous forests. The contemporary
6 vegetation of the Shivwits region consists of several distinct assemblages: 1) desert creosote
7 bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) in Grand Wash; 2) desert
8 riparian Fremont cottonwood (*Populus fremontii*), Goodding willow (*Salix gooddingii*), and
9 mesquite (*Prosopis glandulosa*) at springs; 3) a regionally unusual assemblage of Joshua tree
10 (*Yucca brevifolia*), blackbrush (*Coleogyne ramosissima*), Utah juniper (*Juniperus osteosperma*)
11 and cacti on the middle elevation Sanup Plateau; chaparral-oak shrub and woodland on south-
12 facing slopes; 4) widespread stands of pinyon pine (*Pinus monophylla* and *P. edulis*) and Utah
13 juniper in vast woodlands on the plateau; 5) remnant short-grass prairie to the north and east; 6)
14 stands of bigtooth sagebrush (*Artemisia tridentata*) and snakeweed (*Gutierrezia sarothrae*) in
15 natural and altered meadows, particularly on grazing-disturbed uplands; 7) ponderosa pine (*Pinus*
16 *ponderosa*) stands with patches of quaking aspen (*Populus tremuloides*) at higher elevations; and
17 8) upland riparian vegetation around Plateau springs (Stevens 2001). Federal Species of Concern
18 and Arizona State Sensitive plant species occurring on PARA include the Grand Canyon rose
19 (*Rosa stellata* spp. *abyssa*), blackrock daisy (*Townsendia smithii*), and Mount Trumbell
20 beardtongue (*Penstemon distans*). Despite the probable alteration of plant species composition
21 due to 150 years of grazing and other post-settlement land manipulations, new plant species are
22 still being discovered, at an approximate rate of one species every two years, on the Arizona
23 Strip/PARA.

24
25 Inventory cooperators have also gathered data from the literature as well as specimen
26 information indicating that at least 58 mammal, 119 bird, 29 fish and 16 herpetofaunal species
27 have been documented in the PARA region (L. Stevens, *personal communication*). The extent of
28 migratory and upland species using the Shivwits Plateau and its western periphery as winter
29 range is presently unknown. The northwestern portion of the Shivwits is managed as desert
30 tortoise habitat. Game populations include wild turkey (*Meleagris gallopavo*), desert mule deer
31 (*Odocoileus hemionus*), desert bighorn sheep, and pronghorn in this region. Winter waterbird
32 populations (including bald eagle, [*Haliaeetus leucocephalus*]) on upper Lake Mead and its
33 shorelines are substantial, but are poorly documented.

34
35 There is no natural perennial surface water in the Monument other than that discharging from
36 springs and occurring in association with spring ponds and other catchments. The only perennial
37 surface water in the Monument occurs in association with spring ponds and catchments.
38 Parashant Wash and other washes will run briefly after heavy precipitation. Water for livestock
39 and wildlife is captured from precipitation in catchments or from surface runoff in earth tanks
40 and reservoirs. Many natural springs exist that represent regionally important biological hot spots
41 that protect endemic species. A study of 100 Arizona Strip springs and seeps (Grand Canyon
42 Wildlands Council, 2001) included 5 springs from the NPS area of the Monument and 30 springs
43 from the BLM portion. Tassi Spring in the NPS area had the greatest diversity of mammal
44 species, herptofauna, and plant species of all the 100 springs surveyed and also is home to the
45 endemic Grand Wash spring snail (*Pyrgulopsis bacchus*). Burro spring had the highest field
46 electrical conductivity of all the springs. The primary use of the springs is for wildlife in the NPS

1 portion and livestock in the BLM portion of the Monument. Restoration efforts are currently
2 ongoing at important spring sites including the Pakoon spring complex (Grand Canyon
3 Wildlands Council 2001). A basic inventory of springs within the monument is scheduled to
4 begin in FY2006 and is being funded through the Mojave Network.

5
6 Restoration ecology is being explored and implemented in the Shivwits region through several
7 different projects: 1) The Mt. Trumbull Resource Conservation Area (RCA) is a ponderosa pine
8 forest in which fire suppression, grazing and logging have altered forest structure and
9 composition. The pre-settlement fire frequency was 3-5 yr, but fire suppression has allowed fuel
10 loads to accumulate, threatening this ecosystem with potentially devastating fires. The Mt.
11 Trumbull RCA is being used to scientifically test forest restoration options in an interagency
12 effort spearheaded by W.W. Covington and his associates at Northern Arizona University;
13 2) Eighteen young endangered California condors (*Gymnogyps californianus*) have been released
14 from a site on the Hurricane Cliffs 36 miles south of St. George, UT as part of the on-going
15 California condor re-introduction program, and additional releases are planned; 3) Pronghorn
16 populations declined on the northern half of the Shivwits Plateau until the populations were
17 augmented in the 1960's by the Arizona Game Fish Department. Pronghorn numbered 150-200
18 head in 1998, and the success of the pronghorn program has allowed the AGFD to issue hunting
19 permits since 1977. The desert bighorn sheep population is increasing as well, as on-going
20 collaboration between BLM and AGFD has initiated population augmentation in the northern
21 Shivwits region; 4) Non-native tamarisk, an invasive woody tree, has been removed from several
22 desert springs along Grand Wash, a remarkably successful program lead by the National Park
23 Service at Lake Mead National Recreation Area and underway by the BLM at several of its low
24 elevation springs; 5) The desert tortoise is a focal species for habitat management along the
25 western edge of the Shivwits Plateau. Several habitat conservation areas have been established
26 and are being monitored by the BLM in St. George, Utah and the northern Sanup Plateau area
27 may provide excellent habitat for desert tortoise, and is being managed for that species by the
28 BLM; 6) The USGS has conducted extensive research on the effects of fire on Mojave Desert
29 plant communities and the role that rodents and insects play in seed predation, seed distribution,
30 and re-establishment of native plant species. Overall, these population and ecosystem
31 management activities demonstrate that the Shivwits region is an extraordinary natural
32 laboratory in which to test and apply the principles of conservation and restoration ecology
33 (Stevens 2001).

34
35 Threats to natural resources in the Monument are primarily related to current and potential future
36 growth in the nearby communities of Saint George, UT and Mesquite and Las Vegas, NV.
37 Threats related to surrounding urbanization include a long list not limited to the introduction and
38 spread of invasive plant and animal species, groundwater withdrawal for the exploding Las
39 Vegas population, water quality threats, disruption of spring systems, and soil alteration resulting
40 from surrounding discharges, grazing (livestock and burros), and off-highway vehicle use, and
41 air quality degradation. Current resource issues for the monument identified by park managers
42 are: 1) damage and/or disruption of natural processes, productivity, natural and cultural resources
43 and biodiversity has occurred in the past in most areas of the park; 2) mule deer populations are
44 at lower than desired levels; 3) development of new, and maintenance of existing, rangeland
45 improvements has been sporadic and incomplete with no long-term planning, monitoring or

1 evaluation; and 4) lack of complete resource inventory data may hinder management decision-
2 making.

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