APPENDIX 19

LIST OF ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AFFIRMS	Administrative and Forest Fire Information Retrieval System
AML	Appropriate Management Level
AMS	Analysis of the Management Situation
ARPA	Archeological Resource Protection Area
BLM	Bureau of Land Management
CCC	Civilian Conservation Corps
CFS	Cubic Feet Per Second
CFR	Code of Federal Regulations
CR	Creek
CRM	Cultural Resource Management
CRMP	Cultural Resource Management Plan
DEIS	Draft Environmental Impact Statement
DRI	Desert Research Institute
DSN	Desert Side-notched
DUI	Driving Under the Influence (of alcohol)
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Medical Agency
FLPMA	Federal Land Policy and Management Act
FMAP	Fire Management Activity Plan
FMZ	Fire Management Zone
FORRC	Friends Of Red Rock Canyon
FWS	Fish and Wildlife Service
GMP	General Management Plan
GPM	Gallons Per Minute
HMA	Herd Management Area
HMP	Herd Management Plan
IGMP	Interim General Management Plan
LAC	Limits of Acceptable Change
LC	Liaison Council
LWCFA	Land and Water Conservation Fund Act
MEA	Management Emphasis Area
MFP	Management Framework Plan
MSHCP	Multiple Species Habitat Conservation Plan
NAS	National Archaeological Survey
NCA	National Conservation Area
NDOT	Nevada Department of Transportation
NDOW	Nevada Division of Wildlife
NDSP	Nevada Division of State Parks
NEPA	National Environmental Policy Act
NNREC	Nevada Natural Resource Education Council
NRCS	Natural Resource Conservation Service

NRHP	National Register of Historic Places
OHV	Off Highway Vehicle
ORV	Off Road Vehicle
ORWAG	Outdoor Recreation and Wilderness Assessment Group
PCRNA	Pine Creek Resource Natural Area
PFC	Proper Functioning Condition
PLAD	Public Lands Appreciation Day
PM10	Particulate Matter (suspended particles less than 10 microns in size)
PNC	Potential Natural Community
RAC	Resource Advisory Council
RAWS	Remote Automatic Weather Station
RMP	Resource Management Plan
ROS	Recreation Opportunity Spectrum
RRC	Red Rock Canyon
RRCIA	Red Rock Canyon Interpretive Association
RRCNCA	Red Rock Canyon National Conservation Area
RRCRL	Red Rock Canyon Recreation Lands
RS	Revised Statute
SAR	Search and Rescue
SHPO	State Historic Preservation Officer
SMA	Spring Mountains Association
SMNRA	Spring Mountains National Recreation Area
SNRAE	Southern Nevada Rock Art Enthusiasts
SNWA	Southern Nevada Water Authority
SR	State Route
SRA	Stateline Resource Area
SRP	Special Recreation Permit
T&E	Threatened and Endangered
UA	Use Authorization
UNLV	University of Nevada Las Vegas
USDI	United States Department of the Interior
USFS	United States Forest Service
VQO	Visual Quality Objective
WSA	Wilderness Study Area

APPENDIX 20 TRAIL OPTIONS

EXISTING DESIGNATED TRAILS
(same for all alternatives)

TRAILS	Proposed	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Cottonwood Valley (single track)	59.8 miles - 18.1 acres					
Grand Circle Loop	11.0 miles - 3.2 acres (CTF)					
Moenkopi Loop	2.0 miles - .72 acres (CTF)					
Entrance Lot-Calico I	.5 miles - .18 acres					
Cave Canyon	.7 miles - .3 acres					
Escarpment Base	5.2 miles - 1.9 acres					
White Rock Loop	6.1 miles - 1.8 acres (CTF)					
La Madre	1.5 miles - .4 acres (CTF)					
Keystone Thrust	1.0 miles - .3 acres (CTF)					
Lost Creek/Childrens Discovery	.7 miles - .3 acres					
Willow Springs Loop	1.3 miles - .5 acres					
Ice Box Canyon	1.0 miles - .4 acres					
Pine Creek	1.9 miles - .7 acres					
Arnight	1.6 miles - .4 acres (CTF)					
N & S Oak Creek	3.5 miles - 1.3 acres					
First Creek	1.5 miles - .5 acres					
North Peak/Bridge Mountain	2.0 miles - .7 acres					
Brownstone	1.7 miles - .6 acres					
Totals	103.0 miles - 32.27 acres					

CTF - Common Trail Factor - The acres for trail sections in common to more than one trail are counted only once.

EXISTING ROUTES CONSIDERED FOR TRAIL DESIGNATION

TRAILS	PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Old road along E-W ridge just south of Pine Creek 1.5 mi/.6 ac	no	yes	no	no	no	no
Old E-W road just north of Oak Creek Knoll 1.0 mi/.4 ac	no	yes	no	no	no	no
Horse trail spanning from First Creek to Lost Creek 7.0 mi/2.5 ac	yes	yes	no	yes	yes	yes
Section between N & S Oak Creek legs only 1.7 mi/.6 ac	no	no	Yes	no	no	no
Connector horse trails going north & south from Scenic Drive exit lot 1.0 mi/.4 ac	yes	yes	no	yes	yes	yes
Horse loop trail directly north of Red Rock Vista 5.8 mi/2.1 ac	yes	yes	no	yes	yes	yes
Old road running due south from White Rock turn-off 1.3 mi/.5 ac	no	yes	no	no	no	no
Old road between Sandstone Quarry and Willow Spring turn-offs 2.0 mi/.7 ac	no	yes	no	yes	no	yes
Twilight Zone trails 18.1 mi/5.5 ac	yes	yes	no	yes	yes	yes
Blue Diamond to Jean trail (portion within the NCA) 7.0 mi/2.1 ac	yes	yes	no	yes	yes	yes
Totals	38.9mi 12.5ac	44.7mi 14.7ac	1.7mi .6ac	40.9mi 13.2ac	38.9mi 12.5ac	40.9mi 13.2ac

APPENDIX 20

TRAIL OPTIONS

PROPOSED TRAILS REQUIRING NEW CONSTRUCTION

TRAIL	PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
First Creek to Oak Creek 1.3 mi/.5 ac	yes	yes	yes	yes	yes	yes
Kraft Rocks & Gateway Canyon 1.1 mi/.8 ac	yes	yes	yes	yes	yes	yes
Red Valley Equestrian 2.0 mi/.6 ac	yes	yes	no	yes	yes	yes
Totals	4.4mi	4.4 mi	2.4 mi	4.4 mi	4.4 mi	4.4 mi
	1.9ac	1.9 ac	1.3 ac	1.9 ac	1.9 ac	1.9 ac

TRAILS SUMMARY

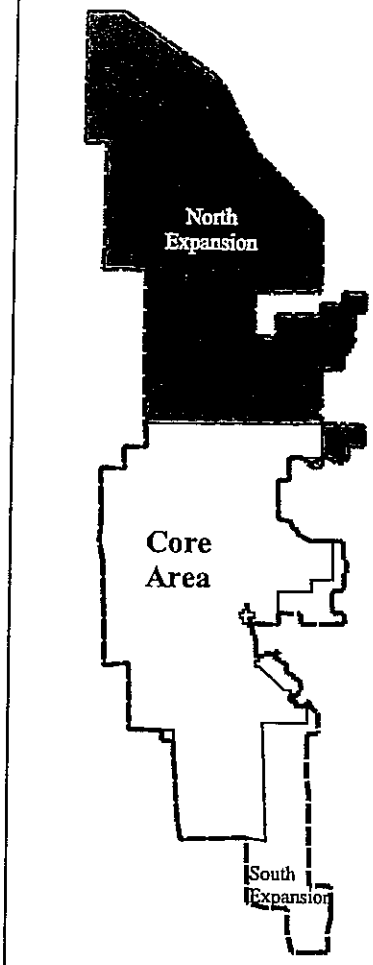
TRAILS	PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Existing designated trails	103.0mi	103.0mi	103.0mi	103.0mi	103.0mi	103.0mi
	32.27ac	32.27ac	32.27ac	32.27ac	32.27ac	32.27ac
Existing Routes (not designated)	38.9mi	44.7mi	1.7mi	40.9mi	38.9mi	40.9mi
	12.5ac	14.7ac	.6ac	13.2ac	12.5ac	13.2ac
Proposed New Construction	4.4mi	4.4mi	2.4mi	4.4mi	4.4mi	4.4mi
	1.9ac	1.9ac	1.3ac	1.9ac	1.9ac	1.9ac
Totals	146.3mi	152.1mi	107.1mi	148.3mi	146.3mi	148.3mi
	46.67ac	48.87ac	34.17ac	47.37ac	46.67ac	47.37ac

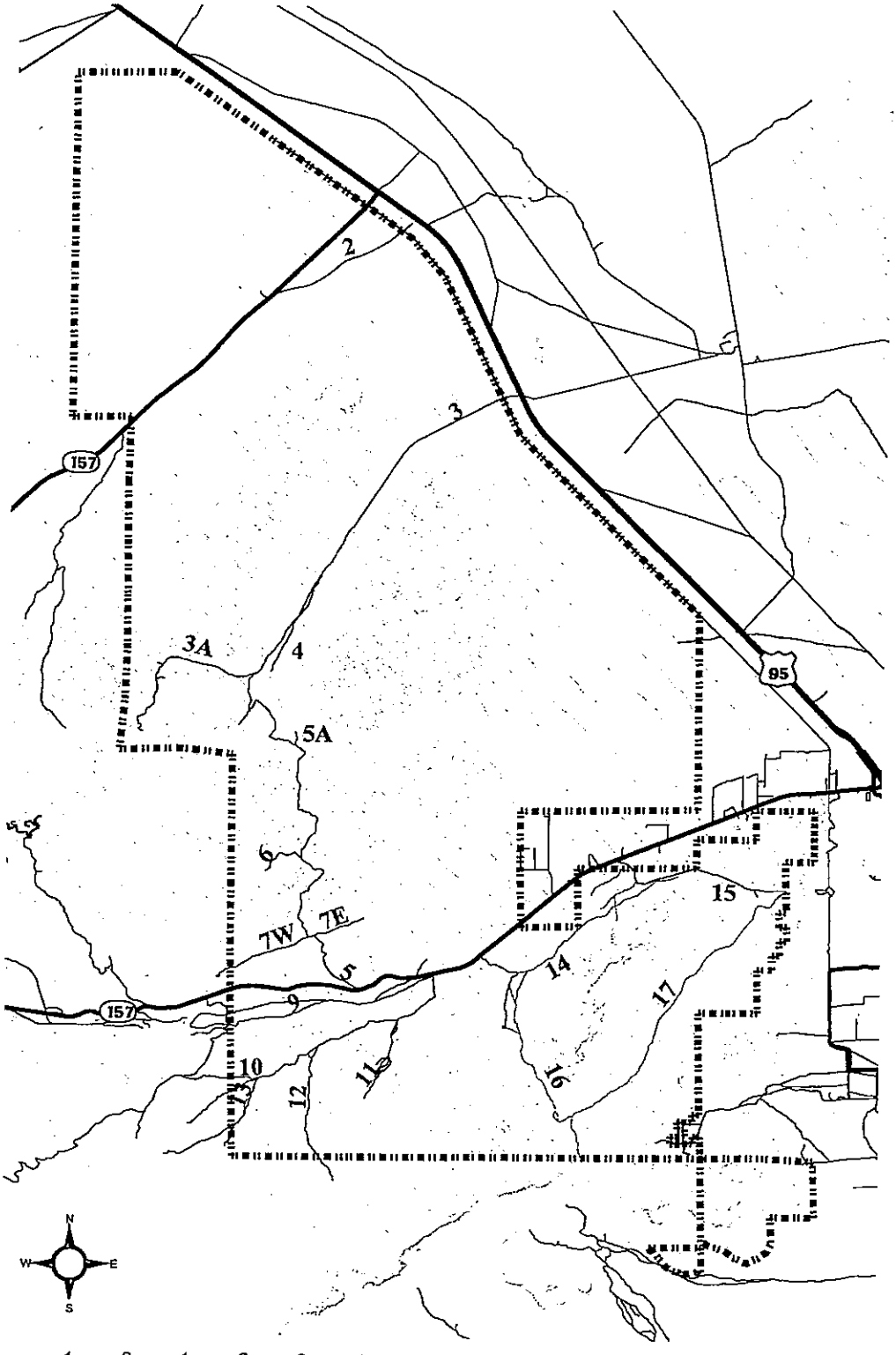
APPENDIX 20 ROAD OPTIONS

DIRT ROADS NORTH OF LA MADRE
(north expansion)

DIRT ROAD		PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
#2 2.8 mi/6.8 ac		close	open	open	close	close	close
#3 8.8 mi/21.3 ac		open	open	open	open	open	open
#3A 3.0 mi/7.3 ac		open	open	open	open	close	open
#4 1.8 mi/4.4 ac		close	open	open	close	close	close
#5 7.4 mi/17.9 ac		open	open	open	open	open	open
#5A .3 mi/.7 ac		close	open	open	close	close	close
#6 .9 mi/2.1 ac		open	open	open	open	close	close
#7E 1.0 mi/2.4 ac		close	open	open	close	close	close
#7W 1.5 mi/3.6 ac		open	open	open	open	close	open
#9 8.2 mi/20.0 ac		close	open	open	close	close	close
#10 4.5 mi/10.8 ac		open	open	open	open	open	open
#11 2.2 mi/5.4 ac		open	open	open	open	open	open
#12 2.7 mi/6.6 ac		close	open	open	close	close	close
#13 1.5 mi/3.7 ac		open	open	open	open	open	open
#14 3.7 mi/8.9 ac		close	open	open	open	open	open
#15 2.9 mi/6.9 ac		close	open	open	open	open	open
#16 7.1 mi/17.2 ac		close	close	close	close	close	close
#17 9.3 mi/22.6 ac		close	close	close	close	close	close
Totals	leave open	29.8mi 72.1ac	53.2 mi 128.8 ac	53.2 mi 128.8 ac	36.4 mi 87.9 ac	31.0 mi 74.9 ac	35.5 mi 85.8 ac
	close	39.8mi 96.5ac	16.4 mi 39.8 ac	16.4 mi 39.8 ac	33.2 mi 80.7 ac	38.6 mi 93.7 ac	34.1 mi 82.8 ac

EXISTING ROAD/WAYS IN THE NORTH EXPANSION AREA





Legend

North expansion area

Roads and ways not shown are to be closed.

Road numbers are for analysis purposes only and are not official designations.

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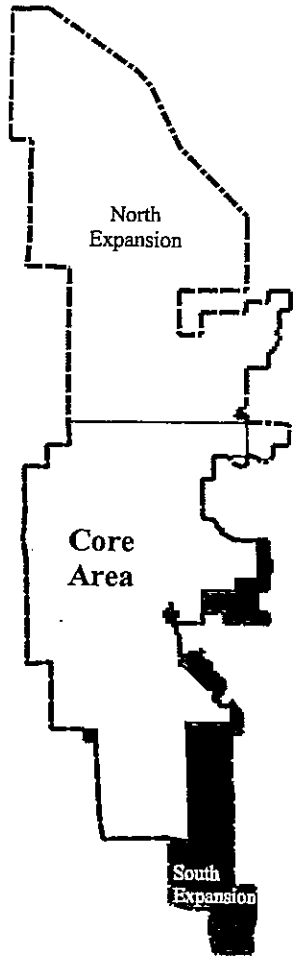
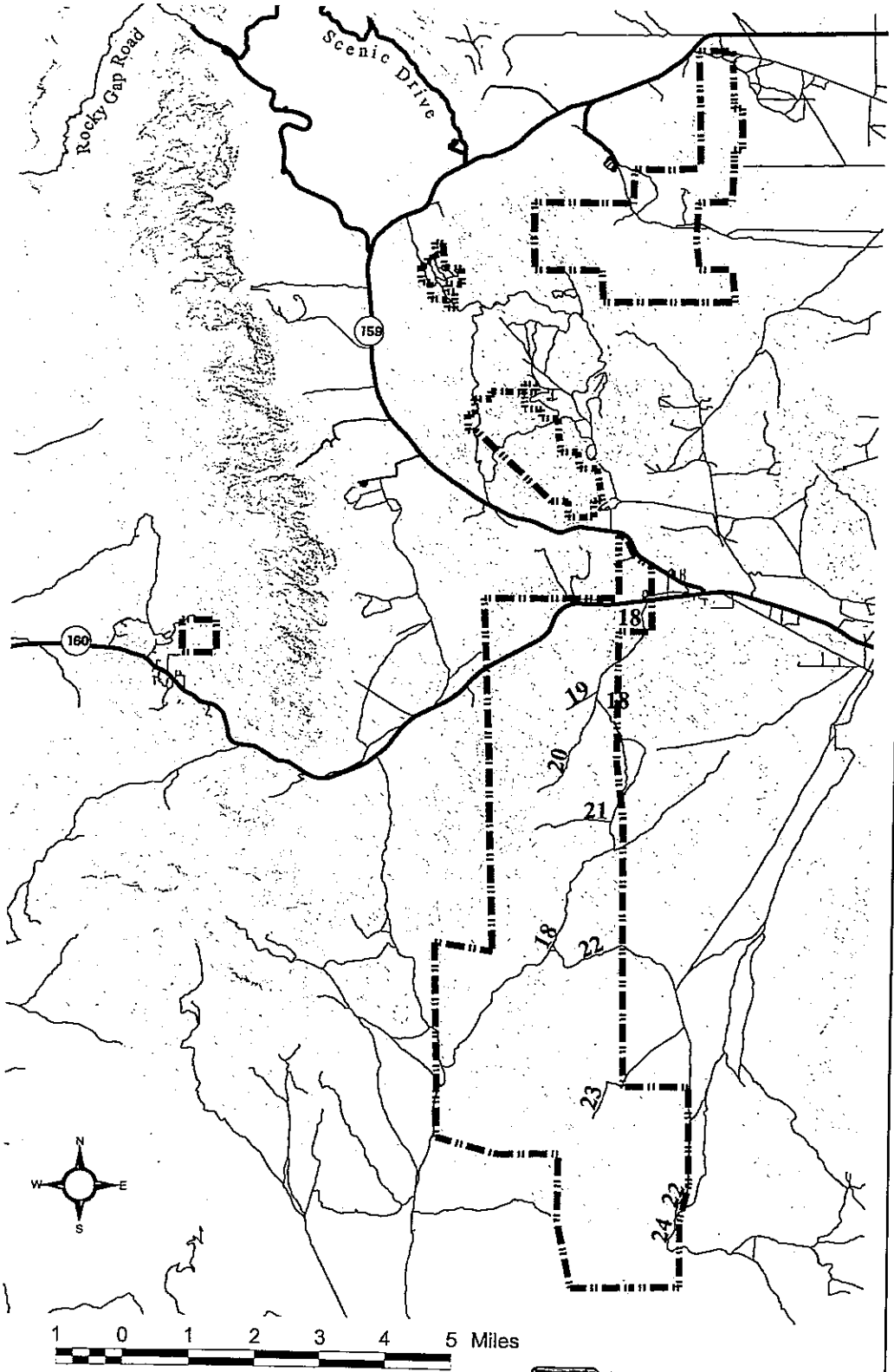
APPENDIX 20 ROAD OPTIONS

DIRT ROADS IN THE SOUTHERN NCA EXPANSION

DIRT ROAD		PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
#18 6.9 mi/16.7 ac		open	open	open	open	open	open
#19 .6 mi/1.4 ac		open	open	open	open	close	close
#20 1.8 mi/4.4 ac		close	open	open	close	close	close
#21 1.2 mi/3.0 ac		open	open	open	open	close	open
#22 1.5 mi/3.5 ac		open	open	open	open	open	open
#23 .9 mi/2.1 ac <u>Partial</u> .4 mi/1.0 ac		partial	open	open	partial	close	partial
#24 2.8 mi/6.7 ac		open	open	open	open	open	open
Totals	leave open	13.5mi 32.3ac	15.7 mi 37.8 ac	15.7 mi 37.8 ac	13.5 mi 32.3 ac	11.2 mi 26.9 ac	12.8 mi 30.9 ac
	close	2.2mi 5.5ac	0.0 mi 0.0 ac	0.0 mi 0.0 ac	2.2 mi 5.5 ac	4.5 mi 10.9 ac	2.9 mi 6.9 ac

EXISTING ROAD/WAYS IN THE SOUTH EXPANSION AREA





Legend

South expansion area

Roads and ways not shown are to be closed.

Road numbers are for analysis purposes only and are not official designations.

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APPENDIX 20

ROAD OPTIONS

DIRT ROADS SUMMARY

DIRT ROADS		PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
North of La Madre	remain open	29.8mi 72.1ac	53.2 mi 128.8 ac	53.2 mi 128.8 ac	36.4 mi 87.9 ac	31.0 mi 74.9 ac	35.5 mi 85.8 ac
	close	39.8mi 96.5ac	16.4 mi 39.8 ac	16.4 mi 39.8 ac	33.2 mi 80.7 ac	38.6 mi 93.7 ac	34.1 mi 82.8 ac
Original NCA	remain open	23.9mi 57.8ac	23.9 mi 57.8 ac	23.9 mi 57.8 ac	23.9 mi 57.8 ac	23.9 mi 57.8 ac	23.9 mi 57.8 ac
	close	49.8mi 72.5ac	49.8 mi 72.5 ac	49.8 mi 72.5 ac	49.8 mi 72.5 ac	49.8 mi 72.5 ac	49.8 mi 72.5 ac
Southern Expansion	remain open	13.5mi 32.3ac	15.7 mi 37.8 ac	15.7 mi 37.8 ac	13.5 mi 32.3 ac	11.2 mi 26.9 ac	12.8 mi 30.9 ac
	close	2.2mi 5.5ac	0.0 mi 0.0 ac	0.0 mi 0.0 ac	2.2 mi 5.5 ac	4.5 mi 10.9 ac	2.9 mi 6.9 ac
Totals	remain open	67.2mi 162ac	92.8 mi 224.4 ac	92.8 mi 224.2 ac	73.8 mi 178.0 ac	66.1 mi 159.6 ac	72.2 mi 174.5 ac
	close	91.8mi 174.5ac	66.2 mi 112.3 ac	66.2 mi 112.3 ac	85.2 mi 158.7 ac	92.9 mi 177.1 ac	86.8 mi 162.2 ac

APPENDIX 20

PAVING PROPOSALS

PAVING	PROP	ALT 1	ALT 2	ALT 3	ALT 4	ALT 5
Existing Roads, Lots & Overlooks						
Red Spring	none	.25 mile plus lot (1 acre)				
White Rock	.55 mile plus lot (1.75 acre)					
Willow bus turn around loop	.1 mile (.24 acre)					
Lost Creek lot	.18 acre					
N Oak Creek	.7 mile plus lot (2 acres)					
New Construction						
Calico III	pave - 1.2 acres					
Return road from Sandstone Quarry	possible option	2.65 mi 5.78 ac	no road	2.65 mi 5.78 ac	no road	2.65 mi 5.78 ac
Sandstone to Willow trail	no trail	2.0 mi .7 ac	no trail	2.0 mi .7 ac	no trail	2.0 mi .7 ac
Sandstone/ Turtlehead	Do not construct	.52 ac	Do not construct			
Red Rock Wash expansion	.5 acre					
Rangers Choice	Do not construct	.47 ac	Do not construct			
Pine Creek expansion	.36 acre					
Totals	1.4mi	6.3 mi	1.6 mi	6.3 mi	1.6 mi	6.3 mi
	6.22ac	14.7 ac	7.2 ac	13.7 ac	7.2 ac	13.7 ac

APPENDIX 21

General Management Plan and

Draft Environmental Impact Statement

for the

Red Rock Canyon National Conservation Area:

Fire Ecology and Management

Mark (Tim) Rash

July 21, 1998

INTRODUCTION

As with most western ecosystems, the physical phenomenon of fire assumes a dual role in the Red Rock Canyon natural environment. Depending on the vegetative community involved (Appendix 4), fire can be either an agent of destructive, far-reaching consequences or a necessary process of ecologic rejuvenation and maintenance. Which affect depends on whether the various communities did or did not evolve in environments in which natural fire occurred with some regularity. Some plant assemblages have developed selective adaptations to periodic fire disturbance, and other communities have not (and with all gradations in between).

Harmful Fire Effects

At one end of this spectrum are vegetative communities which can be characterized as severely *fire-intolerant*, such as Blackbrush (and to a lesser extent, the Creosote bush community). In their native condition, these hot, dry low elevation desert communities hosted perennial bunchgrasses that typically would preclude the occasional lightning fire from spreading much beyond the point of origin, limiting the fire size to literally one or two trees or tall shrubs. Reflecting their harsh habitat, the native Mojave grasses grew in sparse densities and discontinuous arrangements that, barring strong winds or other such extenuating conditions, simply would not allow fire to carry itself from one plant to the next.

Today this situation has been drastically altered by the widespread presence of highly flammable, and fire-prone, species of non-native annual grasses. Chief among these are Red brome (Bromus rubens) and Cheatgrass (Bromus tectorum), which typically form dense, continuous and extensive stands on disturbed sites. In combination with the increased sources of ignition from human activities, the result now is that fire has become a commonplace occurrence within the non-fire adapted desert shrub communities. Especially for the Blackbrush type the biotic consequences are double-edged and fundamental in scope. Not only is fire lethal to individual plants, which lack stump-sprouting ability or other such physiological adaptations to fire disturbance, but in nearly all instances the post-fire site becomes overwhelmingly dominated by one or both of the invasive brome grasses. While not yet conclusively proven, a growing opinion among successional pattern researchers is that this species composition change is permanent. The basic explanation for this perpetual disturbance state (or, *disclimax community*) has to do with the propensity of converted brome sites to subsequently reburn, often in a cycle of relatively high frequency. With each successive fire native plants become eliminated (whether holdover survivors from previous fires or site-recolonizing individuals), creating habitat niche openings which become occupied by the exotic

grasses, due to their many competitive advantages over most native plants.

Throughout the west this *type conversion* fire effect is becoming recognized as an ecological problem of the first order. In the Mojave Desert and other regions of the Southwest fire conversion of native shrublands to Bromus sp. dominance affects the population status of the Desert tortoise (Gopherus agassazii). This problem affects the Red Rock Canyon NCA, as does the threat posed by fire to the entire known global population of the Blue Diamond cholla (Opuntia whipplei var. multigeniculata). This special status plant (Appendix 1) occupies the southern end of Blue Diamond Hill, which burned extensively over its northern portion during the early 1980's and continues to experience fires up to the present. One of these, a 40-acre fire in 1993, started less than three miles from occupied Blue Diamond cholla habitat. Another RRCNCA concern relative to fire-induced brome conversions is the loss of native biodiversity, both at the species and community level.

By somewhat fortunate coincidence, the majority of all property inholdings, visitor facilities and other improvements are located within the Blackbrush and Creosote bush vegetative communities. The BLM wildland firefighting mandate is to protect human life, property and natural resources, in that order. Wildfires occurring in this zone, whether lightning or human-caused, will be fought immediately and forcefully; the primary goal being to minimize burned acreages. Operational tactics will utilize the best available equipment, personnel, and technology consistent with Bureau wildfire policy (ie, suppression costs must be commensurate with the value of the resources protected, unless human life or property are at risk).

Beneficial Fire Effects

At the other end of the fire tolerance spectrum are those plants and communities that require periodic fires for their continued ecological health. Ponderosa pine (Pinus ponderosa) reproduces solely by seed, and then only under favorable seedbed conditions. Along with precipitation and soil moisture, the most critical of these requirements is a seedbed free of competing live vegetation and composed of a thin layer of organic litter (mineral soil needs to be exposed). Historically, fire disturbance has been the primary agent responsible for achieving such seedbed conditions, which is evidenced by the array of fire-survival adaptations found in this species (extremely thick bark, for example). Ecologically sound management principles, in light of the ecosystem focus on the Spring Mountains as a whole, dictate a much more flexible approach to fire management in Ponderosa pine habitats. The occupied range of this species in Red Rock Canyon essentially corresponds to the Sandstone Escarpment, including

the rimrock plateau and most of the deep, east-facing canyons. The predominant vegetation found in these canyons is the Chaparral community, which also requires periodic physical disturbance for its ecological maintenance and health. Together with rockslides and wet season flash floods, wildfire has served as one such disturbance source. Since this portion of the NCA is entirely free of private property and developments, the logical result is to treat the Escarpment rimrock and canyons as a second fire management zone. In this zone the primary fire suppression consideration is ecological appropriateness (ie, not suppressing beneficial fires) and firefighter safety.

Red Rock Canyon NCA consists of a third wildland fire management zone as well, one comprised of species and communities that can best be described as *fire neutral*. This intermediate zone coincides with the occupied range of its most representative species, the Juniper-Pinyon community. Even though neutral in the strict sense of their species-level fire ecology, fires occurring in dense, closed canopy Juniper-Pinyon woodlands do provide tangible benefits to many wildlife species, particularly Mule deer (Odocoileus hemionus). Whereas undisturbed Juniper-Pinyon communities tend to form monotypic, relatively sterile stands, canopy openings created by fires often are recolonized by a variety of shrubs, forbs and grasses. Many of these shrubfield species are important as wildlife browse sources, including Bitterbrush (Purshia sp.), Gambel oak (Quercus gambelii) and Mountain-mahogany (Cercocarpus sp.).

The primary suppression objective in this fire zone is flexible and variable. On a case by case basis, the full range of firefighting strategies and tactics will be employed on wildfires within this upland portion of Red Rock Canyon, from all-out suppression to vigilant monitoring of those fires deemed to be beneficial to the natural resources and posing minimal threat to human life or property. Under current RRCNCA conditions, the exception to this scaled-response policy concerns the Mountain Springs vicinity. Any and all fires occurring within proximity of the township will be fought aggressively, forcefully and without delay.

Prescribed Fire

The two biological roles fire plays in the Red Rock Canyon natural environment translates into two management types of wildland fire as well. The first is the collective group of unplanned wildfires that result from lightning downstrikes and various human actions. The second type of management fires, those that transpire under strictly controlled conditions, are planned for in advance and are expected to yield specific beneficial ecological effects. These *prescribed* wildland fires are broken down further into natural ignition fires (lightning)

and management ignitions (various torches and incendiary tools and devices).

The intensity, rate of spread, size and behavior of any wildland fire is dictated by a complex array of physical parameters that are unique for each given site. The term *prescribed fire* relates to the fact that these localized conditions can be measured and then assigned a range of magnitude under which a fire could be anticipated to display a behavior and intensity that would stay within the burn project prescription; thus achieving the predicted resource benefits while avoiding any undesirable control problems or safety risks.

The crucial site conditions used as burn prescription parameters are: 1) Weather variables (wind speed and direction, humidity and temperature, airmass stability, storm activity), 2) Topographical constants (slope, aspect, elevation, canyon effect ("chimneys")) and 3) Vegetative (ie, fire fuel) characteristics (plant moisture content, spatial arrangement and continuity of the available fuel plants, surface area to volume ratio of individual plants, ratio of dead to live vegetation, flammability (due to volatile oils or resins, or extreme curing (ie, drying)). In conformance with BLM Policy Manual 9200 (Fire Management), for any prescribed fire to take place, an approved burn plan must be on file, which identifies the acceptable range of numerical values for these prescription elements. The burn plan also documents the management objectives being sought, the operational methods and procedures to be used, and health and safety contingencies for both fire personnel and the public at large.

If the fire moves out of the target area or if burning conditions change in excess of the acceptable range, the project is terminated and the operation is treated as a wildfire and is suppressed. Fires that stay in prescription are allowed to burn until the objectives are attained or the fire either burns itself out. If and when such time as prescribed fire management actions are authorized for the Red Rock Canyon NCA, their application will be restricted to the two upland elevation fire zones. No prescribed fires will occur in the Blackbrush and Creosote bush portions of RRCNCA.

Prescribed burns are formulated to address two broad categories of resource management objectives, *hazard (fuels) reduction* and *vegetative manipulation*. Hazard reduction projects utilize fire as an efficient, cost-effective means of eliminating or reducing unsafe accumulations of combustion prone vegetation, especially in locales where human safety and/or property values are at risk. Burn projects of this type are not foreseen for Red Rock Canyon, based on the lack of need and given the Conservation Area mandate to preserve the area's biological conditions in the least altered form possible. Yet at the same time, this same mandate calls for

restoring natural fire to those areas of Red Rock Canyon in which periodic fire disturbance is an essential component of ecological balance and plant community maintenance.

For several decades now a policy of aggressive fire suppression has eliminated or greatly reduced this fundamental process from the Spring Range ecosystem. In turn this has created the need to conduct prescribed fires of the *vegetative manipulation* category, the purpose of which is to specifically alter (manipulate) plant characteristics such as community composition, species occurrence and density, vigor (age class proportions) and vertical structure (seral stage; species composition). Such prescribed burns are employed to mimic the desirable post-fire effects that would otherwise accrue to lightning fires if simply allowed to burn. A few of the more important of these benefits include revitalizing sites that have become dominated by over mature vegetation, setting back shrub community habitats that have become encroached by woody species, maintaining disturbance-dependent plant species and/or communities, and reducing the threat of catastrophic fires by curtailing the unnatural accumulation of vegetative fuelbeds (due to suppression actions over time).

The vast majority of all RRCNCA prescribed burn projects are anticipated to take place in the Chaparral and Ponderosa pine communities of the escarpment canyons and rimrock, and in the upland Juniper-Pinyon woodlands of both the Spring Range and the La Madre Mountains. Depending on the site, these fire applications can be designed to restore ecological balance, trigger the competitive release of shaded-out plant species, yield seedbed conditions favorable to fire-adapted species and increase the quality of wildlife habitat (forage and cover). More fundamental though, is the management objective to simply return fire to its rightful place in the natural scheme and functioning of the Spring Mountains ecosystem.

Fire Planning & Mitigation

Fire management actions fall under the direction of the Las Vegas District Fire Management Activity Plan (FMAP), in conformance with policy guidance provided under Bureau Manual 9211. The basic thrust of this direction is that BLM fire management program actions are planned and executed in harmony with fire management objectives that have been designed to achieve resource management objectives. These are described in land use plans such as the Red Rock Canyon NCA General Management Plan and the Las Vegas Resource Management Plan.

The integration of fire and resource purpose is accomplished in two ways. At the planning stage, resource specialists have input into the FMAP process during the initial FMAP planning cycle and at all subsequent annual review & revision periods. At the

implementation stage of prescribed fire projects on-the-ground natural resource considerations and effects are the responsibility of the Burn Manager (typically the same specialist who designed the project). Similarly, during the implementation stage of wildfire suppression operations resource management concerns and mitigation issues are addressed through the use of a Resource Advisor position.

Mitigation factors are not limited to the potentially destructive effects of the fire. Particularly in an area with the number of sensitive species and habitats as has Red Rock Canyon fire suppression operations can also create environmental impacts, including some of greater magnitude than would be caused by the fire itself. Overall, this suppression mitigation concern predominately applies to the following types of RRCNCA resources.

1) Desert floor; Creosote/Blackbrush communities:

Low soil moisture, scant precipitation, extreme temperature and other hostile growing conditions means that vegetation and soils are exceedingly slow to recover from any surface disturbance, including the scraping of fire control lines or operating fire vehicles off-road (which can also contribute to subsequent unauthorized public off-road usage as well).

2) T&E Species and habitat (Desert tortoise):

The mitigation emphasis is on minimizing burn acreages, due to the tendency for post-fire invasion of Creosote-bursage sites with exotic annual Brome grasses. This consideration must be balanced against the surface disturbance factors (1 above) on a case-by-case incident basis, however.

3) Wilderness Study Areas (Pine Creek WSA; La Madre Mtn WSA):

Though both WSA's are dominated by fire-adapted or tolerant species and communities all suppression actions must still be tailored to preserve wilderness suitable conditions, as per federal Interim Management Policy. These non-impairment standards are known as "light on the land" methods, tactics and strategies, due to the avoidance of surface disturbing activities (vehicle travel, handtool or dozer fireline, and even chainsaw use in some situations) in favor of hand crews and aerial forces such as helicopters and retardant planes.

4) Designated Natural Areas (Pine Creek, North Fork):

Absent of fire stipulations in the (1952) NA legislation, mitigation is covered under Interim Management Policy (Pine Creek WSA) and the RRCNCA establishment legislation.

5) Priority Management Areas (Blue Diamond Hill; Bridge Mtn):

Fire mitigation focus and effort will be redoubled for these particular locations due to the elevated sensitivity of the vegetative resources at risk, including the complete known global occurrence of two RRCNCA endemic plant species.

6) Riparian areas:

Aside from the factor that riparian areas disproportionately account for the total biodiversity of RRCNCA (endemic and/or special status species included), a unique mitigation issue concerns the chemical composition of aerial fire retardants, many of which function as fertilizers once introduced into biotic systems. Because this can lead to algae "blooms" and other aquatic ecosystem disruptions the use of retardants is prohibited within a 300' lateral buffer zone of any springs or springbrooks. In addition, only retardants of the fugitive type (biodegrading in 14-days or less) should be employed in RRCNCA firefighting operations.

7) Cultural resources; Air quality; Sensitive Species/Habitats:

The full range of resource protection and mitigation issues will be adequately addressed by the on-site presence of one or more Resource Advisors during all Red Rock Canyon fires. In this manner, the trade-off between minimal burn acreages and suppression-caused impacts can be weighed and mitigated on an incident by incident basis. Only under circumstances in which human life or property is threatened will dozer-constructed fireline be considered for use within the boundaries of the RRCNCA.

Fire Information & Public Education

An integral task in the long-term goal of restoring fire into the natural scheme of Red Rock Canyon and the Spring Range ecosystem will be to effectively offset the "fire is bad" message portrayed during five decades of Smokey The Bear fire prevention campaigns.

The challenge is further complicated by the circumstance that Red Rock Canyon lies adjacent to a major urban population, and by the related condition that the Las Vegas Valley already represents an air quality standard Non-attainment Airshed, as classified by the federal Environmental Protection Agency (EPA). Life and property concerns of the residents in Red Rock's various private in-holdings, such as Bonnie Springs, Calico Basin and Mountain Springs must be considered. For these reasons it will be imperative that all fire-related press releases, interviews, visitor brochure texts and interpretive displays and signs present a consistent, ecologically accurate and balanced

depiction of fire's dual role in the Red Rock Canyon environment (ie, destructive incident versus essential ecological process).

Interagency Cooperation (Ecosystem Management)

Due to the agency ownership pattern in the Spring Mountain range and to the inherent circumstance that natural phenomena (such as fire) are completely unaffected by administrative designations or boundary lines, in order to accomplish the objective of restoring fire on a landscape ecosystem scale, it will be imperative to maximize interagency cooperation and consultation during both the planning and implementation stage of all Red Rock Canyon NCA fire management program actions. This unified approach is required of such efforts as determining fire suppression acreage standards (FMAP zones), implementing of prescribed natural fire policies, parameters and allowable burn sizes, and in negotiating annual smoke emission threshold levels.

Fire History

Standard BLM fire incident reports from the years 1980-1997 were used to compile the Red Rock Canyon fire history and statistical summary presented in Appendix 16. Part A tabularizes the annual wildfire occurrence in terms of fire numbers (or *frequency*) and acres burned, as analyzed relative to the broad vegetative types affected (shrubland versus woodland) and their categorical source of origin (natural, lightning fires versus human-caused fires). The TOTAL and MEAN (average) figures presented in this table show the assertion that wildfire does in fact play a natural role in the Red Rock Canyon/Spring Range ecosystem. Over the eighteen year period, 294 total wildfires occurred in Red Rock Canyon. 37% (108) were lightning-originated fires, but accounted for only 06% of the total acres burned during this same span of years. This wildfire occurrence pattern is typical of the Fir-Pine and Juniper-Pinyon community types in most areas of the western U.S. Fires in this vegetative type primarily are confined to the aerial canopy and seldom generate enough heat and intensity to carry themselves through the sparse ground fuels that are typical of the Juniper-Pinyon community in particular. This expected fire occurrence pattern is further supported by the breakdown of NCA shrubland fires (225) versus woodland fires (69) reported during 1980-1997, corresponding to 77% versus 23% of the total fire occurrence. The conclusion of Appendix 16, Part A, is that the great majority of Red Rock Canyon fires over the past eighteen years have affected shrubland vegetative types and have been human-caused in origin.

This human-caused shrubland fire occurrence pattern is clearly shown in Appendix 16, Part B, which is a list of all individual wildfires greater than 10-acres in size. All but two of these larger fires were human-caused, and only one of them did not take

place in shrubland vegetation. Even more revealing is four of these fires (01% of 294 total) account for 86% of all the acres burned in Red Rock Canyon from 1980 to 1997 (2,249 out of 2,605 acres, total). Besides posing a hugely disproportionate ratio of fire occurrence to cumulative acres burned this single statistic illustrates two fundamental conditions affecting the Red Rock Canyon environment in general, and the area's fire ecology in particular. First, the comparatively large size of these four wildfires is symptomatic of the overall presence, and isolated site dominance, of the invasive, non-native grasses Bromus rubens (Red brome) and Bromus tectorum (Cheatgrass). Second, these larger fires point out the increased risk of wildfire in the lower elevations of Red Rock Canyon, lands corresponding both to shrub-dominated vegetative cover and the location of the highest volume of human recreational use and visitation.

As Appendix 16, Part C shows, not all of this increase in human-caused fires is due to sources necessarily associated with either outdoor recreation or routine visitor activities. Vehicle fires (including many due to theft), fireworks, trash dump fires, children playing with fire, arson, and other miscellaneous causes (vehicle exhaust, firearms, powerline, equipment use, blasting, plane crash and structure fire) accounted for 56%, over one-half, of all wildland fires in Red Rock Canyon from 1980 through 1997. The true percentage of fire occurrence from these sources may be as much as 71%, depending on the actual origin of those fires reported as *human-caused, source unknown*. Urban proximity itself is thus a significant wildfire risk factor affecting the RRCNCA.

APPENDIX 22

ARCHAEOLOGY IN RED ROCK CANYON OF SOUTHERN NEVADA A CLASS I CULTURAL RESOURCES OVERVIEW

Cultural Resources Report 5-1991

by

Keith Myhrer
Archaeologist

September 1990
Revised February, 1991

Bureau of Land Management
Stateline Resource Area
Las Vegas District, Nevada

ABSTRACT

The unique setting of Red Rock Canyon as an oasis within a desert environment facilitated aboriginal exploitation and continues to foster recreational uses. This Class I Inventory reviews and evaluates the previous cultural resources investigations in Red Rock Canyon Recreation Lands. Archaeological research is classified within four separate phases: 1) initial exploration and identification of significant sites from the 1930s to 1960s, 2) BLM-contracted surveys from 1968 to 1977 for anticipated recreational development, 3) compliance inventories for Federal actions from 1975 to the present, and 4) three proactive research projects in the late 1980s. Red Rock was divided into three subzones for comparative purposes. Red Rock Summit consists of several large rockshelter/roasting pit districts. North Red Rock Escarpment has a predominance of rockshelter/rock art locales. South Red Rock possesses a distribution of lithic scatters, rock art and some rockshelters. I propose a strategy to test, evaluate, complete data recovery, and then manage for public uses at sites that are within high intensive recreational use areas. Sites within less intensive use areas should be managed for conservation. I also propose a research strategy for a graduate student for the roasting pit/rockshelter districts in Red Rock Summit subzone.

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ACKNOWLEDGMENTS

A complete Class 1 inventory of Red Rock Canyon Recreation Lands is not possible without field visits to its archaeological sites. I wish to thank the Red Rock staff members who provided me with intimate details concerning the environment, the history of Red Rock recreational uses, and initial inspections of the sites. My first field tours were given by Chris Miller, Chief Interpreter. After assuming position as Park Manager, Joel Mur guided me on a reconnaissance tour in which we discussed long-term management objectives. The following staff members also provided me with tours of cultural resource sites, Ralph Robinson, Chuck Ward and Pat Grediagin at the Lost Creek trail and site; Dave Phillips and Peggy Ahrens at Red Spring; and Joel, Chris, Peggy, Dave and Ralph at both Sandstone Quarry and Willow Spring. Also, Richard Stockton, Red Rock Volunteer and archaeologist accompanied us and provided advice on resources evaluations. Previous Park Manager Dave Hunsaker facilitated my work in Red Rock by allowing me to utilize the knowledge from his staff and giving me free reign to evaluate and work on sites in Red Rock. Finally, I appreciate the time that both Joel and Chris contributed to review the draft of this document.

INTRODUCTION TO RED ROCK CANYON

Red Rock Canyon was a desert oasis for humans during both prehistoric and historic times. It is also used by contemporary people as a center for recreation, solitude, and inspiration. The numerous springs and streams that flow within its natural boundaries provide for a variety of life. Because elevations in the canyon are 2000 feet higher than the surrounding valleys, allowing for extra moisture, a diverse assortment of edible plant resources such as agave and faunal resources like bighorn sheep is present. In addition, the contrasting colors of the sandstone and limestone formations and the various micro-environments of each canyon are aesthetically appealing.

The identification and study of artifacts, hearths, remains of occupied rockshelters, and a variety of rock art indicates that humans have utilized the Red Rock area for at least 2000 years. Principle use was concentrated near springs and other water sources, on terraces overlooking major washes, and along eroded bluffs and escarpments that allowed for physical shelter.

Recent use of Red Rock Canyon Recreation Lands (RRCRL) is primarily recreational in nature. The scenic Red Rock loop road was constructed in two phases between 1972 and 1978 and the Visitor Center was opened in 1982. Since that time, visitor use of RRCRL has massively increased, maintenance activities have continued, and trails and picnicking areas constructed. To meet the increasing demands of the growing urban population of Las Vegas Valley, some new trails and use areas have been proposed.

Red Rock is located about 10 miles west of the present edge of urban development of Las Vegas, Clark County, Nevada. Proposed commercial and residential development within the next decade is expected to meet the east boundary of the park lands. Population of the area is presently 750,000, but is expected to increase to more than a million in a few years. The recreation park presently consists of 63,110 acres and is managed by the Bureau of Land Management (BLM), Stateline Resource Area (SRA), Las Vegas District, Nevada. An additional 5,000 acres will be added to RRCRL as part of the Summa/Red Rock Land Exchange. Figure 1 is a map of southern Nevada in which SRA and RRCRL are located.

This document has two objectives. First, the previous archaeological work in the area is synthesized and evaluated in terms of the present Cultural Resource Management (CRM) requirements. Second, research strategies are proposed that provide appropriate cultural resources management for sites within heavily-used recreational areas, and for sites in the more isolated areas in Red Rock.

The remaining part of this section delineates the methodology for

this Class I inventory and describes the environment in RRCRL The prehistory and history of the area are summarized in the following section, followed by a review of the documents that describe archaeological work in the area. Next is a discussion of the archaeological sites recorded in Red Rock and their locational distribution. Finally I make recommendations for the future CRM of the recreation lands.

Class I Inventory Methodology

An initial reason to conduct a Class I inventory for RRCRL was to offer a general plan for probing, testing, and evaluating site complexes within intensively used recreational areas. Few sites in RRCRL have been formally evaluated for eligibility for nomination to the National Register of Historic Places (NRHP) and are considered eligible pending further evaluation. Site complexes within heavily used recreational areas, such as Red Spring, Lost Creek, Willow Spring, and Sandstone Quarry, have interpretive potential but have presumably suffered impacts from 25 years of recreational uses. A strategy to evaluate the sites prior to implementation of an aggressive interpretive scheme is necessary. Another reason for the inventory was to identify sites or districts that need management for scientific research or conservation purposes.

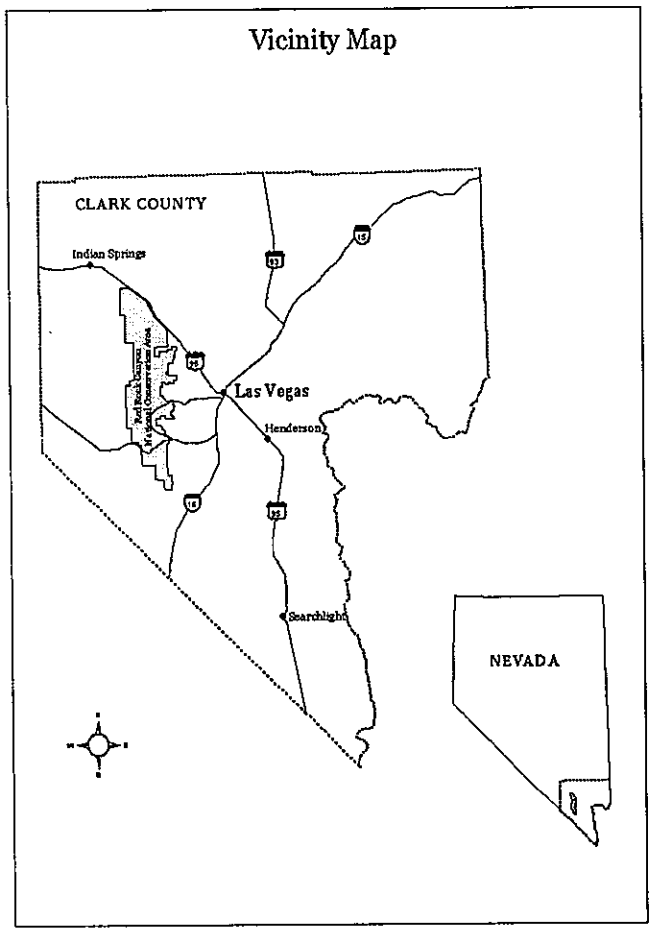

Figure 1 Location of Red Rock Canyon

Rather than evaluating each site complex as an independent project, I felt that questions on significance and impacts should be treated for all sites in RRCRL within a holistic planning concept. Proposed treatment of each site would then be consistent with long-term objectives. I began this

project in 1989. At the point that I had completed a general outline, the Washington office of BLM determined that a Resource Management Plan (RMP) was needed on an accelerated time frame for SRA of Las Vegas District, which includes RRCRL I was assigned to write the cultural resources section of the RMP. The first step was a data inventory for the entire resource area. The results of the inventory are presented in an independent document that summarizes the kind of archaeological work conducted in the resource area, the number and types of sites recorded, the amount of acres surveyed, and presents a management philosophy for future CRM in southern Nevada (Myhrer 1990). Although the RMP work postponed the Class 1 inventory for RRCRL, the summary document allows for a regional view of the archaeology of Red Rock Canyon within the region and establishes a CRM philosophy to treat individual sites within a larger conceptual framework.

The general aim of this literature review is to describe and synthesize the present amount of archaeological data and to identify several subzones of sensitivity in RRCRL. This project, as are most in Federal land management agencies such as BLM, was constrained by conceptual boundaries determined by funding ceilings and in effect time limits. A question identified prior to data collection concerned the amount of research that could be invested until efficiency was lost. For example, if 95 percent of the inventory was accomplished within one month, and another two weeks would be required to procure four or five additional percent, then application of the Law of Diminishing Returns would conclude the gathering of the final five percent as inefficient. This is especially meaningful when the researcher discovers that most of the sites identified in RRCRL were recorded prior to the mid-1970s when the number of site and environmental requirements were considerably lower than that of today. Consequently, searching for a few records that in actuality may not have even been written seemed an inefficient use of energy. The standards and quality of the data inventory for this project, described below, were considered the most useful and realistic for achieving an holistic view of the archaeology of Red Rock. The sources for the solicitation of data for the Class I Red Rock inventory were the records and base maps from Las Vegas District BLM, the Southern Nevada Site Repository.

The data collection consisted of two phases. The first step was entirely accomplished by William White, presently Preservation Planner with Nevada State Historic Preservation Office (SHPO) and in 1989 graduate intern under my direction. As one of several assignments, White reviewed the documents describing the projects conducted in RRCRL between 1969 and 1977. His comments and analysis are incorporated into the section on previous research in Red Rock. In addition, White complied the draft data base maps of RRCRL using records and maps from the Southern Nevada Repository of Site Records and BLM.

The second phase involved my review of White's analysis along with the review of all compliance based projects after 1975. In conjunction with White's draft maps I examined the recordation forms and classified sites by components and types. During this process some sites were identified that had been recorded by two different archaeologists and assigned separate site numbers. For example, survey reports prior to 1975 discussed the problem of numerous sites having been recorded twice and assigned separate numbers. Although I used the information available in the reports, I did not complete the recordations for sites not formally recorded. Based on White's draft maps, several sites had been assigned Smithsonian numbers without BLM designations. Most of the number questions were resolved after additional record searches. About 20 were determined duplicates while several had never been recorded on appropriate forms.

In addition, there are certain features such as rock art panels that local avocationalists and professionals will feel were missed in this review. Some rock art sites are so "well-known" that no one has ever recorded the site. Others may have been "lumped" into a recording form as a small part of a larger site without the recorder actually noting the presence of the panel. Consequently, one of the results of this review will be identification by reviewers of "obvious" sites that have never been recorded. A contrasting problem is the method in which features such as roasting pits were recorded as individual sites rather than contributing parts to a larger complex or district. The section on proactive management in the latter portion of this document recommends treatment of site clusters as districts, a strategy that would supercede the necessity of conducting individual recordations for these unrecorded sites during resurvey projects.

Environment In Red Rock Canyon

Red Rock Canyon Recreation Lands is located on the east side of the Red Rock escarpment. The climate and resources make this locale an oasis in an arid, desert environment. Figure 2 is a map of the recreation lands.

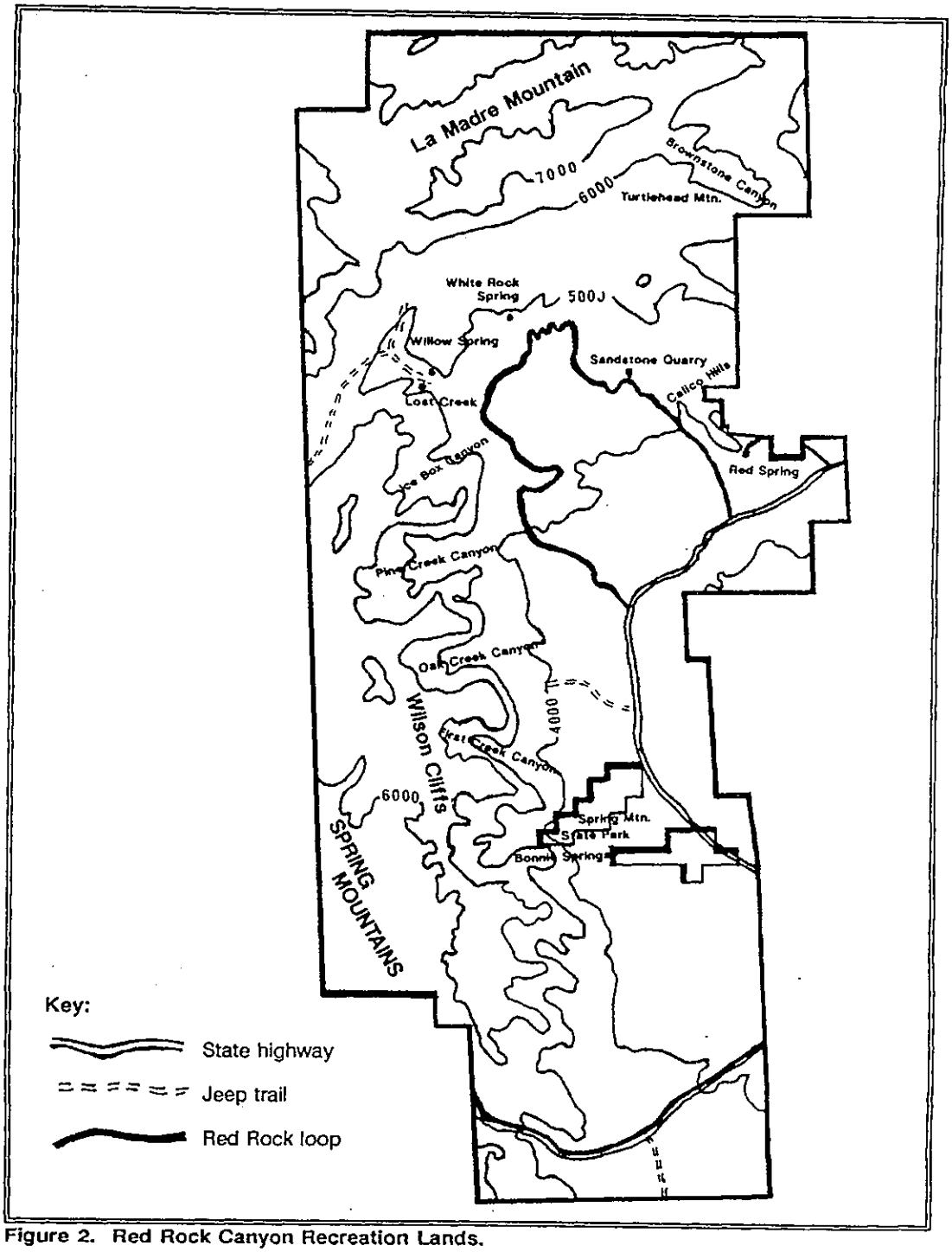

Figure 2. Red Rock Canyon Recreation Lands.

Geology. The Red Rock escarpment rises more than 5000 feet (1525 meters) above Las Vegas Valley. Although the valley is nearly flat in its interior, rugged mountain ranges frame the exterior. The McCullough Range lines the south, Frenchman and Sunrise Mountains the east, and the Spring Mountains, edging the Red Rock escarpment on the west, stretch in a northwest-southeast direction along the west side of the valley. Blue Diamond Hill is a prominent feature that borders the east portion of Red Rock Canyon, creating a valley that is two to four miles wide and 12 miles long. Elevation within RRCRL ranges from 4000 feet (1280 meters) to 7000 feet (2130 meters).

The Red Rock escarpment, also known as the Sandstone Bluffs, is composed of Aztec Sandstone. To the west of the bluffs "...an overlying thrust plate of carbonate rocks forms a continuous cliffy slope (the Wilson Cliffs) more than 2,000 feet high and about 12 miles long" (Longwell et al. 1965:63). Soils in the canyons are composed of colluvial and alluvial limestones and sandstones. Canyon washes are strewn with large boulders.

Vegetation. Vegetation is characterized by a spring-canyon riparian complex. Common plants are blackbrush, sagebrush, Spanish bayonet, prickly pear cactus, desert almond, and some pinyon pine and juniper stands. A major source of food to the people occupying this area was agave. This plant is commonly found in the limestone substrate, but stalks also grow on sandstone and limestone terraces within some washes.

Climate. Summers in southern Nevada are long, hot and arid, and winters are mild. The average temperature in Las Vegas Valley is 46 to 47 degrees F in winter and 87 degrees F in summer. Average relative humidity is about 20 percent. Normal annual precipitation is four inches and often occurs in cloudbursts that cause flash flooding in ephemeral washes (USDA 1980:5; USDA 1985:3). Due to the 3000 foot difference in elevation at Red Rock Canyon in comparison to the valley, temperatures are about 5 to 10 degrees cooler. The individual canyons in Red Rock usually receive winter snows.

Legal Description of Red Rock Canyon Recreation Lands

The legal description of RRCRL is within T.20S., R.58E., T.21 S., R.58E., T.22S., R.58E., and T.21 S., R59E. The 7.5 minute United State Geological Survey maps on which RRCRL is located are Blue Diamond, 1972, La Madre Mountain, 1972, La Madre Spring, 1984, and Mountain Springs, 1984. State Route 159 loops through the east-central portion of RRCRL and State Route 160 cuts through the south part of the park.

GENERALIZED PREHISTORY AND HISTORY OF RED ROCK CANYON

Southern Nevada is a unique region because it is situated at the interface of three distinct geographical zones: the Colorado Plateau, Mojave Desert and Great Basin. Each zone retains evidence of several cultural groups who adapted to the natural resources of the area. References that discuss established cultural associations and chronology include Lyneis (1982a) and Rafferty (1985).

Prehistory of Red Rock Canyon and Southern Nevada

All prehistoric native Americans employed hunting and gathering for some portion of their resource base. Collected foods include seeds and pods from cacti, yuccas, various grasses, mesquite from marsh-like areas, and pinion nuts from the higher altitudes. Hunted animals include rabbits, coyotes and rodents from lower elevations, and bighorn sheep and deer from surrounding ranges such as the Virgin and Spring Mountains. The atlatl was used as a hunting tool to throw spear points attached to shafts.

Unique to this region is the large number of roasting or mescal pits. These are circular features primarily used to roast bulbs from the agave plant. Roasting pits are defined and discussed in the section on archaeological sites types. Hunter-gatherers lived in open camps, brush structures and caves. Based on ethnohistoric sources, they moved throughout a territory in an extended family group exploiting maturing plant resources and animals on a seasonal basis (Steward 1970).

Early hunter-gatherer occupation in southern Nevada dates to about 11,000 B.C. at Tule Springs site in northwest Las Vegas Valley (Shutler 1967). Heaviest use of the region by the Archaic and Paiute peoples occurred within the last 5000 years. Gypsum Cave, located in the Sunrise/Frenchman Mountains on the northeast edge of Las Vegas Valley, yielded evidence of continual use from about 3000 B.C. into historic times. Due to the variety of resources, availability of water, and the accessibility of shelter caves, Red Rock Canyon as a resource zone was the locus of intensive use for at least the Past 2000 years.

Two other cultural groups that utilized the area were the Virgin Anasazi and the Lower Colorado (Patayan or Yuman) peoples. Lower Colorado groups such as the Mojave conducted floodwater farming along the Colorado River about 70 miles south of Red Rock Canyon. They also exploited resources in surrounding ranges and valleys.

The Virgin Anasazi were concentrated along the Muddy and Virgin Rivers in the Moapa Valley. Population increased after A.D. 500 which coincides with the beginning of farming and introduction of

the bow and arrow. The Virgin Anasazi lived in pit rooms dug into the earth or in pueblo surface structures constructed of brush and adobe. Although they supplemented their diet with hunted animals and seeds gathered from the region, much of their food came from corn, beans and squash grown in the floodplains of the rivers. The Virgin Anasazi left the region around A.D.1150. Reasons for the abandonment include an increased population size, a lengthy drought during crucial times, and a heavy dependence on farming.

Eileen Green's work (1987) on the ecological associations of rock art in the region describes petroglyph and pictograph elements in the Red Rock area. Rock art in the region is considered culturally mixed, in the sense that certain elements are attributed to the Paiute-Shoshone, others to the Patayan or Yuman, and some to the Virgin Anasazi. Green considers the red "handprints" panel at Willow Spring as extremely rare, only one of three in Clark County (Personal Communication, 1989). She considers all three panels as visually the same. Green considers the "handprints" at Willow Spring to be possibly of Virgin Anasazi origin. Patayan and Paiute rock art influences are also found at Brownstone Canyon in RRCRL, Keyhole Canyon in the Eldorado Mountains, and sites in the Newberry Mountains.

Based on the review of recorded features and artifacts, use of the Red Rock zone is considered to date to as early as 3000 B.C. This early date in Red Rock Canyon is attributed to the report of "Gypsum Cave like" points recovered by K.K. Miller at Red Spring (Brooks 1969). Late Archaic use of the area as early as 3000 B.C. has not been abundantly demonstrated, but it is accepted that prehistoric peoples used Red Rock within the past 2,000 years.

There is contention whether the earliest users of Red Rock were the generic Archaic hunter/gatherers or more explicitly the Paiute. Lamb (1958) postulated that the Numic speakers, which include the Paiutes, spread across the Great Basin about a 1000 years ago. Lyneis (1982a) argues for an in situ development of the Numic languages. Rafferty and Blair (1984) and Rafferty (1989) contend that the late Archaic peoples in this region were actually the ancestors of the Paiute. Because a cultural change in the archaeological record that would indicate the Paiute initially entered the region between 1,000 and 2,000 B.P. has not been adequately demonstrated, I consider the contemporary Paiutes the descendants of the indigenous hunter-gatherers.

The Numic-speaking Paiute remained in the area through the historic settling of the region. The presence of Paiute and Virgin Anasazi pottery indicates that both cultural groups occupied the area, possibly in a symbiotic relationship (Rafferty and Blair 1984). It is probable the Patayan also visited Red Rock. Table 1 lists the chronology and referenced aboriginal

cultural groups that are considered to have used Red Rock Canyon.

Table 1. Chronology and cultural users ot Red Rock Canyon.

Time Frames	Cultural Groups	Source
Prehistoric		
?3000 B.C.	Archaic hunter/gatherer	Brooks 1969
A.D. 1	Paiute	Brooks *et al.* 1974,1975,1976a/b
A.D. 1000-1100	Virgin Anasazi	(same as above)
A.D. 1000	Patayan (in Las Vegas Valley)	(same as above)(this report)
		(see Rafferty 1985)
Historic		
1826-1831	*Old Spanish Trail* Smith, Armillo,	Hafen and Hafen 1954
1844	Wolshill/Yount	Hafen and Hafen 1954
	Mormon Road, Fremont	Waren 1974
		Meyher *et al.* 1990
1855		Hauck *et al.* 1979
1880	Mormon Settling of Las Vegas	Paher 1971
	Settling of Wilson Ranch in RRC	

Historic Uses in the Area

Historic use of southern Nevada began in 1826 with blazing of the Old Spanish Trail by American and Mexican explorers. Fremont revised the route of the Old Spanish Trail through southern Nevada in 1844, for the first time cutting through the lower portion of what would become RRCRL By 1848 this trail was abandoned for better routes north and south, but the path was used for another half century for immigration and trade from Salt Lake City to San Bernardino, and was called the Mormon Road. Recent field inspection and analysis of the remaining trail and artifacts indicates heaviest use of the Mormon Road occurred between the 1860s and the first decade of the 20th century. Archaeology of the trail is described in Myhrer et al. (1990).

Colonizing efforts by the Mormon Church initiated the settling in 1855 of a mission and ranch site near what is now downtown Las Vegas (Paher 1971; Hauck et al. 1979). This first attempt at settlement by non-Indians in the region was abandoned in 1857, but the site was later re-occupied by ranchers in 1865. The first settlement in the Red Rock lands was the Wilson Ranch, now Spring Mountain State Park, in 1880 (Paher 1971).

PREVIOUS ARCHAEOLOGICAL WORK IN RED ROCK CANYON

The Red Rock Canyon area has seen recreational use by non-Indian settlers of Las Vegas Valley and visitors to the region for about a century. Brooks et al. (1976:2) note that Helen Stewart, owner of the Mormon Fort from 1881-1903, "...inscribed her name in a cave on the lower slopes of the Spring Mountain Ranch in 1890."

The earliest archaeological work in Red Rock occurred in the 1930s. Mark Harrington, director of the Civilian Conservation Corps excavations for Boulder Dam, recorded the Willow Spring complex in 1939. Sometime prior to 1962 Karma Miller, an avocational archaeologist, "...received permission from the Las Vegas District BLM to carry out limited archaeological investigations at the Willow Spring complex under the auspices of the Red Rock Archaeological Association" (now ArchaeoNevada Society) (Brooks et al. 1976:2-3). Miller is listed as having partially excavated the site complex. No maps or provenience records are referenced or found at the BLM District Office. Consequently, the extent of the digging at the site complex is unknown.

In 1962, Richard and Mary Shutler conducted a reconnaissance survey in Red Rock Canyon. Eighteen petroglyph, mescal pit and open campsites were recorded. Based on the kinds of observed cultural materials, the Shutlers determined that the Lost City Virgin Anasazi, the Lowland Patayan (Lower Colorado) and the Southern Paiute had used the area for at least 1500 years. "The lack of architectural features, the shallow deposit of the campsites and their scarcity indicate that this occupation was sporadic and temporary" (Shutler and Shutler 1962:24). Based on the high numbers of observed rock art sites, they also guessed that the Red Rock area had been a ceremonial locale.

A series of small archaeological surveys were contracted by BLM to Dr. Richard Brooks and the Nevada Archaeological Survey (NAS) of Desert Research Institute from 1967 to 1969. NAS later became Archaeological Research Center (ARC) of the University of Nevada, Las Vegas (UNLV). Areas with cultural debris at the base of the cliffs above Red Spring (26CK22 and 458/BLM 532338 and 2380) were tested by Brooks in 1969. This was the locale from which the Shutlers collected four artifacts in 1962 (Shutler and Shutler 1962:20-21).

> "Contrary to expectation, the midden is found only adjacent to the cliff and spring area and not over the whole meadow. In addition the depth of midden was not more than 30 cm, at the greatest extent tested. A total of eleven test pits were excavated during the fall in an arbitrary line along the base of the cliff area, none of which showed any depth developing. Small amounts of brown ware pottery and several

late type projectile points were found near the surface" (Brooks 1969).

Brooks (1969:4) also states in the report that K.K. Miller partially dug two Calico Basin area cave sites (26CK453 and 26CK454), that are located on private lands more than a mile north of Red Spring, with "Gypsum Cave like points" found in the latter shelter. Brooks also describes preparations for forthcoming test excavations at the Sandstone Quarry prehistoric site area (26CK300). These investigations were conducted following this 1969 report, and the excavation notes are present in the Las Vegas District BLM cultural resources files.

A series of more intensive surveys for the recreational development of RRCRL was again contracted by BLM to Brooks of ARC/UNLV (Brooks et al. 1974, 1976, 1977a, and 1977b). Conclusions of the reports were generally limited to listing of sites determined as critical based on potential of research data and imminent danger from casual collectors. Table 2 lists the archaeological projects in RRCRL conducted for BLM.

Table 2. Summary of cultural resource projects completed in RRC.

Report#5	Locality	Invent. Lvl.	Acres	Sites
NAS Surveys (Overlaps in Acres and Numbers of Sites)				
89	General	III N	3200	100E
89	Red Rock Summit	?	?	?
89	Red Rock Summit	III N	100E	155
231	Visitor Center, La Madre Canyon, Willow Spring	III N	1530E	18
255	Nine Areas	III N	3840	4+ 7*
367	General	III N	1820	2+ 4*
728	General	III N	600E	14
Small Compliance-based Projects After 1975				
108	General	III L	15	0
202	Calico	III L	40	2
222	Blue Diamond	III N	160	0
253	Loop Road	III L	150	1
324	Blue Diamond Hill	III N	10	0
612	Blue Diamond Hill	III N	1	0
880	Highway	III L	160	0
883	Highway	III L	80	1
1175	Blue Diamond	III N	90	0
1355	Calico	III L	13	0
1361	Calico	III L	10	0
1383	Highway	III L	100	5
1400	Blue Diamond Hill	III N	1	0
Proactive CRM Projects				
1726	*Stripper's Cabin*	III N	5	1
1950	*Old Spanish Trail/Mormon Trail*	III L	100	1
1952	*Willow Spring*	EXC	1	1
Key: E=Estimated, III=Class III Survey, N=Non-linear, L=Linear, EXC=Excavation,?=unknown information, +-New site, *=Previously recorded site				

The next phase of work in RRCRL consisted of 13 surveys to comply with Section 106 of the *National Historic Preservation Act of 1966*. Finally, three proactive CRM projects in the 1980s included treatment of individual sites and areas within the park. The archaeological projects completed within RRCRL lands are discussed below in three sections: 1) those conducted by NAS that were primarily contracted by BLM for evaluative purposes, 2) small projects for compliance reasons, and 3) recent proactive CRM research. The projects are described according to the level of inventory described in Nevada BLM Guidelines (USDI 1989a), the number of acres surveyed, a brief summary of sites identified, results, and a short critique of the report. Estimations concerning level of inventory and acreages are given for reports that are not considered clear in terms of providing data or information to answer these questions.

Nevada Archaeological Survey Projects in Red Rock Canyon

Five large inventory projects from 1969 to 1977 were contracted by BLM to NAS/UNLV under the direction of Dr. Richard Brooks. The prime purpose of the surveys was the identification and evaluation of significant sites that could be affected by increased visitor use to the park. Although the number of acres surveyed and the total number of sites are not always specifically stated in the reports, an estimation is made that about 10,000 acres were inventoried and more than 100 sites initially recorded. Many of those sites were duplicate recorded, some during the following NAS surveys. It is interesting to note in the reports the chronological development of CRM methodology and increasing levels of direction from BLM.

NAS 1969 1970 Surveys. Three reports, somewhat similar in nature and all filed under i as Vegas District Cultural Resources Report Number 5-89 were written as a result of work carried out over a three-year period from 1967 to 1969, and included ground survey and some test excavations. They represent the initial inventory of archaeological sites within and adjacent to the proposed Red Rock Recreational Area. The methodology by which the surveys were conducted was not always clearly stated in the documents. Levels of inventory had not been established by BLM at that time, and it is estimated that the surveys were conducted at a Class Ill level of 30 meter or less transect spacing. Some artifacts were presumably collected and some sites "tested", although records of these specific actions are not present in the BLM files.

The first of the three reports was completed in Spring, 1969 (Brooks 1969). Based on the locations of sites recorded, it appears that intensive surveys were conducted in areas that were expected to receive high degrees of visitor uses, such as Red Spring, Sandstone Quarry, Willow Spring, and Brownstone Canyon.

Although the number of acres surveyed is not stated in the document, the report map shows a minimum number of 3200 acres inventoried. More than 100 sites were identified. Several sites in areas of Snyder Quarry, Brownstone Canyon, Lost Creek Canyon, and Sandstone Quarry were listed as being critically in need of salvage or protection management due to recreational impacts. Sites were concentrated around springs, dry washes, stream beds, and sandstone outcrops. The document is a progress and recommendation report rather than a detailed analysis of archaeological data recovered from ground survey and limited test excavations.

The second CR5-89 report (Rodriguez 1969) is a two-and-a-half page summary of a survey for a foot trail from Red Rock Summit to Mountain Springs along the Red Rock escarpment. The number of acres surveyed, number of sites located, and their descriptions were not given. No map is present. Site records were completed according to standards acceptable at the time. The report, though, does not offer any useful information in terms of CRM. Although the author notes that evidence of aboriginal use was not found on the trail itself, he states that numerous archaeological sites such as roasting pits, rockshelters and open camps were located near the trail alignment. A standard recommendation for salvage and protection of important sites is given.

The purpose of the final CR5-89 inventory report (Brooks 1969) was to assess the scientific value of sites, and determine their vulnerability from trail construction or increased visitor use impacts. This report is the best of the three. It describes a methodology that recorded resources one mile on either side of the trail right-of-way, and is probably a final on the Rodriguez (1969) document. Yet, maps showing locations of sites, site numbers, or areas surveyed are not present. Of the 155 sites that were stated to have been recorded, 21 were recommended for preservation or salvage actions. The report also makes some tentative observations concerning cultural chronology and affiliation of Red Rock Canyon users.

NAS 1974 Evaluation Survey. The purpose of this inventory was to identify and evaluate sites in the Pine Creek and Spring Mountain Ranch areas (Brooks et al. 1974, CR5-728). Although five sites were recommended for additional field research. The historic ranch foundation in Pine Creek was not noted, likely because it was not older than 50 years. The document establishes an initial temporal sequence for Red Rock based on diagnostic artifacts and assessment of site types.

NAS Phase 1 Evaluation Survey. The purpose of this inventory (Brooks et al. 1976, CR5-231) was to survey the proposed Visitor's Center location, La Madre Canyon, and the Willow Spring/Lost Creek locale. This document marks some changes

occurring in contract archaeology. A BLM memorandum specified collection of only sites with 20 or fewer artifacts. The report hints at a loose research design that notes a correlation between biotic communities and the presence of limestone that posts a high probability for roasting pit sites. A data review was also conducted, with a determination that existing site records were less than accurate. A decision was made to reevaluate old sites as encountered.

Although not stated in the report, examination of the map indicates about 1530 acres were surveyed at an estimated Class Ill level. The most frequently encountered archaeological site type was the roasting pit. Several roasting pit/rock art/rockshelter complexes were recorded. The surveyors noted that rock art sites and habitation locales such as the Willow Spring complex were being destroyed by recreation uses. Excellent site maps were drafted for Willow Spring and Lost Creek complexes. The recommendation was to test each site in order to obtain definitive and chronological data. There are no records in the BLM files that indicate any sites were tested.

NAS Phase 2 Evaluation Survey. Nine specific areas that were surveyed for evaluative purposes are First Creek, Oak Creek, Pine Creek, Ice Box Canyon, Willow Spring, White Rock Spring, Sandstone Quarry, Red Spring, and Brownstone Canyon (Brooks et al. 1977a, CR5-255). There is substantial overlap from earlier surveys. An existing data review was again conducted, and prescribed guidelines by BLM concerning collection and methodology were followed. Four new sites were recorded and 17 reevaluated. Recommendations were made to consider La Madre Canyon, Willow Spring, White Rock Spring, Sandstone Quarry, Red Spring, and Brownstone Canyon as archaeological National Register Districts. Yet, this survey and report provided little new information. Its purpose was likely linked to determinations that previous surveys and site recordation had been insufficient for changing needs. The only NRHP nomination following this report was that done for Brownstone Canyon (Rafferty and Rolf 1981).

NAS Phase 3 Evaluation Survey. This report (Brooks et al. 1977b, CR5-367) is of fair quality but unlike the Phase 1 and 2 surveys lacks in detailed site descriptions. Two new sites were recorded but no interpretations are given. The report mainly offers very general resource management recommendations that include midden testing and additional intensive survey for sites at Pine Creek and Willow Springs area. There is no record of any testing following this recommendation.

Small Projects in Red Rock Canyon

Numerous small compliance-based projects for mineral actions,

land projects, and recreation applications have been conducted in Red Rock Canyon and associated lands. Nine linear inventories covered 568 acres and recorded 10 new sites. A total of 262 acres were walked in five non-linear surveys with the recordation of no new sites. Table 2 also lists these projects.

Three Recent Proactive CRM Research Projects

From 1987 to 1989, three proactive CRM projects were completed within RRCRL One was an evaluation and analysis of a unique trash site east of White Rock Spring, another a linear survey of an historic trail that crosses the south end of RRCRL, and the last was data recovery of a component of a shelter site for a preservation project.

Cleanup at Stripper's Cabin. In 1987 the Red Rock Park Manager requested I submit a recommendation to the Area Manager concerning archaeological significance of a unique trash site east of White Rock Spring. If the site was not considered eligible for nomination to the NRHP, the locale would become recipient of the annual Red Rock clean-up in April, 1988. The trash site was composed of four automobile hulks, the remnants of a poorly-made sandstone two-room structure, remnants of a makeshift stove and icebox, and approximately two hundred artifacts consisting of nails, ceramics, metal, and auto parts. The site was initially recorded by Kevin Rafferty in 1981 as 26CK3487/BLM 53-3461. Due to the isolated nature of the area and the potential for solitude, Rafferty named it "Hermit's Cabin".

Members of the Veteran Motor Car Club of America investigated the autos and some of the associated auto parts in 1982. I examined a sample of the remainder of the objects in 1987. The combination of the results of the two analyses provided a cultural interpretation of the site (Myhrer 1987). I concluded that at some time during the 1950s the fault canyon wash east of White Rock Hills was chosen as the locus of an auto stripping operation. The secluded nature of the canyon would have provided a natural cover for the operation, after which the auto hulks were abandoned on site. The paucity of domestic artifacts and the presence of a very poorly-made structure indicated use of the site was very short, perhaps only months. The autos were likely transported from Las Vegas, stripped at the site, and the parts taken back to Vegas or other areas to sell. I felt the name "Hermit's Cabin" was no longer appropriate in view of the new interpretation and I renamed the site "Stripper's Cabin".

An agency determination that Stripper's Cabin site did not qualify for nomination to the NRHP under 36 CFR 60.4 was reviewed by the Nevada State Historic Preservation Office (SHPO). A

clean-up in April, 1988 resulted in the removal of the loose trash. The auto hulks and the remains of the sandstone structure were left in place.

Inventory of the Old Spanish Trail/Mormon Road. As a result of a compliance-based inventory in 1987 of lands north of RRCRL, 1.5 miles of the Old Spanish Trail/Mormon Road were walked by BLM archaeologist Stanton Rolf and me. At this point we formulated a plan to walk the remaining trail from Las Vegas to the California border on a recordation and evaluation project. This CRM undertaking took two years to complete. A two-mile portion in the south part of RRCRL, which is part of a larger five-mile segment of the route in Cottonwood Valley, was determined to have retained integrity and is considered eligible for nomination to the NRHP under 36 CFR 60.4 (a). Artifacts collected from this section of trail were incorporated into an heritage display and the document describing the survey was published by the BLM Nevada State Office (Myhrer et al. 1 990).

Excavation at Willow Spring. In 1987, Red Rock Rangers noted that a pictograph panel composed of five red hand prints was being defaced by recreational climbers. The pictograph panel is located above a shelter midden in the Willow Spring archaeological complex (26CK370/BLM 53486). As a method to deter people from climbing on this panicular rockface, rangers suggested planting a cactus beneath the panel. This plan was adopted and a treatment plan (Myhrer 1988) that included excavation of the midden beneath the shelter/panel was written and submitted to SHPO and the Advisory Council on Historic Preservation. Concurrence on the plan was received from both agencies. The treatment plan was designed to obtain data on chronology and the cultural associations of prehistoric users of Red Rock.

In May, 1989, Stanton Rolf and I excavated a unit measuring 0.5 X 1.5 meters to bedrock at 75 centimeters below datum. Las Vegas District Cultural Resources Report 5-1950 (Myhrer 1989) describes the work and results. From this relatively small excavation exercise, 23 ceramic shards, five projectile points (whole and incomplete), two grinding implements, four lithic tools, and 247 flakes were recovered. Three research questions were addressed in this investigation. First, concerning cultural tradition, the presence of 21 Paiute shards of 23 total implies most use at this site complex was by Numic-speakers. The remaining two shards are Virgin Anasazi. Second, concerning chronology, three of the points are Desert Side-notched (DSN) and the remaining two are either DSN or Rose Spring. The diagnostic analyses of the both the points and the shards fit with established time frames for occupation by both the Virgin Anasazi during and after A.D. 1000 and the Paiute after A.D.1000. Third, the presence of obsidian flakes and mica material presumably used for tempering Paiute pottery indicates that the aborigines were carrying

materials for distances up to 40 miles, probably on their routes of seasonal rounds.

Using the information gained from the excavation exercise at Willow Spring in combination with the field descriptions from the test pits by Brooks at Red Spring (1969), I ranked in this excavation report (Myhrer 1989) three research questions by priority for future work at Red Rock Canyon. Because it appears that most use of Red Rock may have occurred within the last 1000 years, a priority research question yet remains to identify earliest use of Red Rock Canyon. Was there indeed use of the zone as far back as 3000 B.C.? Second, was exploitation of the Canyon confined to the Paiute and Virgin Anasazi? If so, were the Paiutes the principal users? Although we know the Virgin Anasazi were in the Canyon around A.D.1000, the Paiutes seem to have most intensively exploited the area over the past 2,000 years. Recent mitigation work on BLM lands in north Las Vegas Valley indicates the mesquite dune environment on the Eglington Escarpment may have been primarily used by the Virgin Anasazi (White et al. 1990). Perhaps the Paiute stayed closely to seasonal rounds that in this specific area used major water sources such as Big Springs, Duck Creek, Las Vegas Wash in Las Vegas Valley and the Red Rock environment. These two questions can be studied both in surface and subsurface work. The third research question concentrates on ceramic manufacture in Red Rock. Were the Paiute obtaining local or non-local tempering minerals and clays and firing their wares on-site? Recovery of unfired ceramics and other tempering minerals to explore this question would likely be limited to excavations.

Summary of Archaeological Research in Red Rock Canyon

There have been sixty years of archaeological research in the area defined as RRCRL It is estimated that in Red Rock 10,800 acres were inventoried at Class Ill level standards. This is based on an estimation that about 10,000 acres were inventoried during the NAS surveys, and another 820 acres covered in small, compliance-based projects after 1975. Of the total 63,110 acres in RRCRL, 17 percent were surveyed for cultural resources.

The purposes and direction for archaeological work have changed through the past 25 years due to the maturity of CRM and as a response to the dramatically increasing use of the area for recreation needs. Harrington's 1930 recordation of Willow Spring and the Shutlers' (1962) documentation of sites served to tantalize professional and avocational archaeologists into further exploration of the rich cultural heritage in the canyon. The late 1960s surveys by NAS attempted to continue the previous interest-oriented desires of their forerunners. The later 1970s NAS reports show that the perceived needs had changed, and that

the initial direction of CRM as we know it today was beginning to influence archaeological research. Recordation of sites for informative purposes had taken second place to evaluation of cultural resources in terms of preservation and protection from recreational impacts.

The decade of the 1980s was directed by CRM for compliance purposes. Construction of an interpretive Visitor's Center required a surface survey and evaluation. Horse endurance rides and the paving of the loop road required linear inventories. Proposed trails needed survey by qualified archaeologists prior to surface disturbance.

The evaluation for clean-up of Stripper's Cabin, the walking inventory of the Old Spanish Trail/Mormon Road, and excavation at Willow Spring by BLM archaeologists in 1989 indicates there is a new trend for the 1990s. This direction is one of detailed evaluation, testing, data recovery, and proactive management for preservation. Although a minimal number of new surface-disturbing actions should be required for management of RRCRL, evaluation and preservation activities should be increased.

The management direction prescribed for RRCRL is the same as that for SRA as described in the data review document of 1990 (Myhrer 1990). BLM Manual 8111.21 provides direction for assigning uses of cultural resources for management direction. Significant sites in isolated areas that are not presently in danger of impacts will be managed for conservation. Districts or sites that may be adversely impacted from Federal actions and are not likely to qualify as representative samples will be managed for information uses such as data recovery efforts. Sites that are in areas of high recreational impacts, have interpretive potential, but lack integrity or have been subjected to data recovery exercises, will be managed for public uses such as interpretive exhibits-in-place. Some sites may qualify for more than one purpose, but in such cases a leading use will be assigned.

The following section discusses in a general sense the number and kinds of sites recorded in RRCRL This information was obtained from a thorough data review of BLM archaeological base maps and site records.

RECORDED ARCHAEOLOGICAL SITES IN RED ROCK CANYON RECREATION LANDS

A total of 153 recorded sites were identified in Red Rock Canyon Recreation Lands from a review of base maps and records filed in SRA of Las Vegas District BLM. The sites were categorized by type and their locations plotted on surface management maps at a scale of 1:100,000. The maps and the list of categorized sites are in the cultural resources files of SRA. A description of subzoning for locational distribution, site type ranking, and site type definition is presented below.

Subzoning and Locales

The concept of site patterning is used in archaeology to aid in predicting areas of sensitivity. Delineation of a region into smaller areas based on geographic variables provides a basis for comparison. SRA was divided into 19 "zones", of which RRCRL was one, in the summary of the SRA data review (Myhrer 1990). As a means of comparison for this document, RRCRL is subdivided into three "subzones", consisting of Red Rock Summit, North Red Rock Escarpment/La Madre Mountain, and South Red Rock Escarpment/Cottonwood Valley. Red Rock Summit includes the top of the Red Rock escarpment and the land on its west side. North Red Rock Escarpment/La Madre Mountain and South Red Rock Escarpment/Cottonwood Valley zones are on the east side of the escarpment and divided north/south by Oak Creek Canyon. These subzones are further divided into 18 "locales". Figure 3 illustrates these divisions in RRCRL.

Site Types

The recorded sites in RRCRL were categorized under seven major types: 1) Roasting Pits/Complexes, 2) Rockshelters, 3) Rock Art, 4) Camp sites, 5) Prehistoric Structures, 6) Historic Structures or trash scatters, and 7) Rock Features such as a rock rings or alignments. Many sites possess more than one feature, for example, roasting pits are often found in association with rockshelters. A few sites have features of all categories. The information from the recording forms was used to place each site into only one category based on a ranking, described below, that primarily selected for the best management potential.

Because a rockshelter is considered to have the most potential for management uses, its presence at a site dominates the ranking of all other types. Roasting pit sites are ranked second, primarily due to the unexplored potential, especially considering the plethora of roasting pits in RRCRL. Due to its high potential

for public uses, rock art is third ranked. Rock art that is associated with a rockshelter site is also highly ranked. A pit structure is fourth ranked. An open site with artifacts or hearths is called a camp site and is ranked fifth. Historic remnants are placed into the sixth type. Finally, a rock feature is ranked seventh. Table 3 lists the distribution of sites by type, subzones, and locales.

Roasting Pits. Sixty-five sites possess one or more features that reflect distinctive cooking activities, called roasting pits. These circular pits, constructed mainly of limestone rocks, were primarily used to roast bulbs from the agave plant. A hole was dug into the ground, the food placed within, a fire started above the edibles, and limestone rocks placed on top. Limestone is ideal for retaining heat but once used turns white and will no longer function as an efficient heat-conductor. Consequently, each time new foods were roasted fresh limestone had to be gathered and the pile of rocks that comprised the roasting pits grew through time.

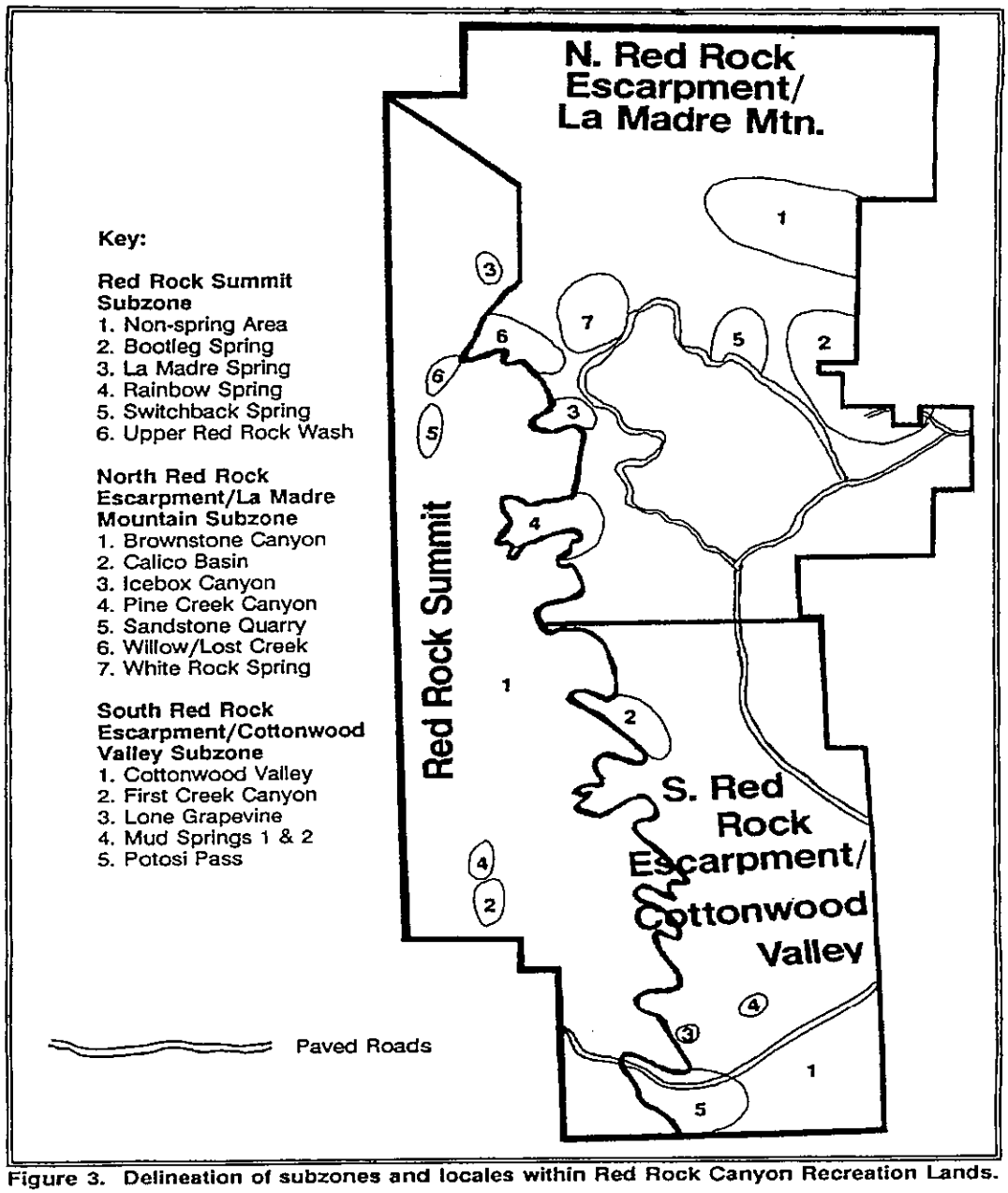

Figure 3. Delineation of subzones and locales within Red Rock Canyon Recreation Lands.

Table 3. Distribution of site types by subzones and locales in RRC zone.

Subzones/Locales*	Site Types								
	RP	RS	RA*	RA	CP	ST	HT	RR	TOTAL
RED ROCK SUMMIT SUBZONE									
1. Non-Spring Area	25	4			17				46
2. Bootleg Spring	1	1			4				6
3. La Madre Spring						1			1
4. Rainbow Spring	10	1			4				15
5. Switchback Spring	1								1
6. Upper RR Wash	3	2	2						7
Number in Subzone	40	8	2		25	1			76
% in Subzone	53%	11%	3%		33%	1%			
% in Site Type	62%	31%	20%		78%	17%			
% of Total Red Rock Sites								50%	
NORTH RED ROCK ESCARPMENT/LA MADRE MOUNTAIN subzone									
1. Brownstone Canyon	7	3		2					12
2. Calico Basin			2	3	1			1	7
3. Icebox Canyon		1			1	5			7
4. Pine Creek Canyon	1				1				2
5. Sandstone Quarry	4	2	4	2			2		14
6. Willow/Lost Creek	2	4			2				8
7. White Rock Spring	3	1					1		5
Number in Subzone	17	11	6	7	5	5	3	1	55
% in Subzone	31%	20%	11%	13%	9%	9%	6%	2%	
% in Site Type	26%	42%	60%	78%	16%	83%	75%	100%	
% of Total Red Rock Sites								36%	
SOUTH RED ROCK ESCARPMENT/COTTONWOOD VALLEY SUBZONE									
1.Cottonwood Valley	5	5		1			1		
2.First Creek Canyon					1				
3. Lone Grapevine			1		1				
Subzones/Locales*	Site Types								

	RP	RS	RA*	RA	CP	ST	HT	RR	TOTAL
4. Mud Springs 1&2		2	1	1					
5. Potosi Pass	3								
Number in Subzone	8	7	2	2	2		1		22
% of Subzone	36%	32%	9%	9%			5%		
% of Site Type	12%	27%	20%	22%	6%		25%		
% of Total Red Rock Sites								14%	
ALL OF RED ROCK TOTALS									
Total Quantity	**65**	**26**	**10**	**9**	**32**	**6**	**4**	**1**	**153**
Total %	**42%**	**17%**	**7%**	**6%**	**21%**	**4%**	**3%**	**1%**	

Key: *=Locales within subzones are numbered to correspond with divisions shown in Figure 3; RP=Roasting Pit, RS=Rockshelter, RA*= Rock Art, CP=Campsite, ST= Structure, HT=Historic, RR=Rock Feature.

Blair (1986) notes that in California Wash, an area presently lacking agave, other plant resources and animals were cooked in roasting pits. Milling or food processing equipment, lithic materials and ceramics are often associated with these features. Excavations conducted on roasting pits in Hidden Valley west of Valley of Fire and in the Virgin Mountains yielded numerous artifacts but the pits generally lacked internal structure (Ellis et al. 1981, 1982). This is considered a problem for stratigraphic recordation. Because charcoal was mixed by the aborigines during repetitive cooking episodes, radiocarbon analysis can yield questionable single-use dates. Other methods of providing chronological data must be used, such as ceramic correlation studies, possible dendrochronological analysis, or alternate ways of using the mixed charcoal dates. Roasting pits have best potential for yielding scientific data on subsistence practices and chronology and will be managed for information uses until such studies are completed.

Rockshelters. A total of 26 rockshelter sites are present in RRCRL. A rockshelter is a cave-like opening in rock that has resulted from erosional or faulting processes. Aborigines commonly used caves for shelter from the natural elements. Evidence of their fires can be found in the blackened staining on the walls and ceilings of the caves. Many cave openings are partially blocked by walls constructed of brush and boulders. Intensively occupied caves contain midden deposition within the floor and in the apron surrounding the entrance consisting of carbon-blackened soil filled with artifacts and bones. An undisturbed midden has excellent potential for yielding significant information on the prehistory of the region. Potential for stratigraphic interpretation and the yielding of charcoal for radiocarbon dates is high. The remnants of cooking, food processing,

and toolmaking activities are found in the forms of ceramic shards, seeds, remnants of corn, grinding implements, and lithic stone materials such as flakes and formed bifaces. Pieces of basketry and rope have also been recovered from shelters.

Rock Art. Nine rock art sites were recorded in RRCRL There are some unrecorded sites that are presently being investigated by members of Archaeo-Nevada Society, in particular Grace Burkholder and LaRae Bringhurst. Rock art panels are common in certain areas, usually associated with water sources such as springs or catchments. Rock art is one of the earliest types documented in this region. Shutler and Shutler (1962) illustrate several petroglyph sites in RRCRL. Cunningham (1978) conducted research work at Lone Grapevine Spring in the south portion of RRCRL Green (1986) discusses rock art at Willow Spring and other Red Rock complexes. Rock art is defined as the modification of a rock wall or face by pecking or painting figures or designs. Sandstone with a patinated surface is perhaps the best vehicle for illustrating this type of aboriginal visual creativity, but limestone and basalt were also commonly used. Some rock art panels are associated with rockshelters, roasting pits, artifacts, or other features. Although rock art designs have been attributed on a general level to all groups over a long period of time, there is at present no positive method of dating individual sites. Rockshelter sites with associated rock art are placed into a Rockshelter/Rock Art site type. Ten sites are classified as Rockshelter/Rock Art.

Camp Sites. There are 32 sites classified as Camp Sites in Red Rock. Camp site locales possess lithic material such as flakes or formed bifaces, ceramics, faunal bone, or milling equipment, and are often associated with stained soil from years of repeated habitation. These often reflect relatively temporary stops on a path from spring to spring,-resource to resource. Potential for yielding important data varies from low to high depending on the presence or absence of diagnostic artifacts and subsurface deposition. The Paiute, Virgin Anasazi, and Lower Colorado aborigines all manufactured distinctive kinds of pottery within the past 1500 years. Camp sites and lithic scatters are found in all areas but are most prevalent on terraces overlooking major washes and surrounding springs.

Prehistoric Structures. Six unverified Structure sites were recorded in this area. Structures were presumably dug or constructed by the Anasazi but it is possible they could have also been built and occupied by hunter-gatherers. Rooms for storage or cooking and sleeping that were dug wholly or partially into the ground are called pit structures. Stratigraphy is excellent in undisturbed pit rooms. Rooms constructed with the floor on the surface are referred to as pueblos. Potential for obtaining significant information is high at such sites. Analysis of data from buried strata on floors of pueblos has yielded significant information on room size, artifacts, and plant remains at sites in the Lost City region of southern Nevada (Shutler

1961; Myhrer and Lyneis 1985; Lyneis et al. 1989). All six unverified structure sites were recorded by one archaeologist as "pithouses" in Icebox Canyon.

Rock Features. One recorded site is composed of undefined stone features, a site type that may have potential for scientific uses. Ferraro (1982:42) refers to these rock features as fragile pattern sites. Because rock rings are usually found near locales of resource concentrations including the terraces above Meadow Valley and Las Vegas Washes, and artifacts such as milling equipment and flaked lithic materials are sometimes found in association, it seems plausible to suggest they may have been used for caching plant resources. Determinations have been made in some circumstances that such undefined sites be preserved for times when better scientific techniques are present to retrieve data. Although there is a paucity of such sites in RRCRL, a massive complex of more than 50 rock rings (26CK3373/BLM 53-5369) was recorded by Nevada Department of Transportation archaeologists about one mile east of the southeast RRCRL boundary. It is likely that the habitants of Red Rock Canyon were making base camps at the shelters in the canyons and conducting collection activities along the major washes east of the escarpment.

Historic. Four Historic sites are present in Red Rock. Historic rock foundations from a mining site at Sandstone Quarry and the remains of a ranch in Pine Creek Canyon are present. What appears as an old dirt road in the south portion of the park is actually the remnant of the Old Spanish Trail/Mormon Road. The remaining site is an historic isolate. Potential is often high for the yielding of important data on chronology, subsistence and other cultural processes.

Distribution of Site Types in Red Rock

Inspection of Table 3 reveals some interesting points concerning distribution of site types within Red Rock as a whole. Of the 153 recorded sites, 42 percent are composed of one or more roasting pits, classified as roasting pit sites. Rockshelter sites comprise 17 percent of the total. Rock art sites without rockshelters account for six percent, while rock art/rockshelter sites constitute seven percent of the total number of sites. Camp sites comprise 21 percent of the total. Four percent are unverified structure housepits. Only one site is composed of rock features. Finally, three percent of the sites are historic. None of the recorded sites are isolate artifacts.

Examination of Table 3 also yields a view of site types by subzones. The greatest percentage of roasting pit sites (61 percent) are in the Red Rock Summit subzone. Rockshelter sites are somewhat evenly divided among the three subzones, with a slightly larger percentage in the North Red Rock Escarpment subzone. The highest percentage (68 percent) of both rock art/rockshelter and rock art site types are present in

the North Red Rock Escarpment subzone. Most camp sites were recorded in the Red Rock Summit. And as could be expected, most historic sites are in the North Red Rock subzone surrounding Sandstone Quarry.

A general summary is that roasting pit sites are most prevalent in the Red Rock Summit subzone, rockshelter and rock art sites in the North Red Rocks, and a variety of sites are found in the South Red Rocks subzone. All subzones show a tendency for users to favor water sources, but other factors must be linked to the differential placements of roasting pit and rock art/rockshelter sites. The most obvious explanation is attributed to specific geologic areas. The presence of a high number of roasting pits in Red Rock Summit is linked to a limestone alluvium, an abundance of agave, the presence of several springs, and an elevation above 5000 feet. The sandstone cliffs with their shallow caves and patinated faces on the east side of the escarpment likely facilitated the occupation of rockshelters and the creation of rock art. I interpret the data on the distribution of site types in RRCRL as an indication that future CRM should place priority on the research of roasting pits and rockshelter/rock art sites in these two subzones.

RECOMMENDATIONS FOR CULTURAL RESOURCES MANAGEMENT IN RED ROCK CANYON RECREATION LANDS

There are three questions to be encountered before planning for the future CRM in RRCRL. First, does the 17 percent total area surveyed in Red Rock represent a biased or non-biased sample? For example, can we expect to multiply by six the number and kinds of recorded sites to assume a projected total for Red Rock, or does the sample represent an intuitive bias on the part of the surveyors and an assumption that most sites have been found and recorded? Second, how well were the sites recorded? Recordation standards and styles have changed immensely since the late 1960s and inspection of the site records for this data review indicates certain environmental and site descriptive information is missing. Can present workers use those site records to address questions on National Register nomination eligibility? Third, how much has recreational use of Red Rock changed or impacted archaeological sites?

Sampling Accuracy and Value

What kind of sample inventory was taken of RRCRL? An estimated 10,000 acres were inventoried during the 1969 to 1977 NAS/ARC surveys, and another 820 acres sampled for compliance-based surveys after 1975, for a total of 17 percent inventoried.

The NAS/DRI reports indicate those projects had objectives to record and evaluate sites in areas proposed for increasing recreational uses. They are considered intuitive in the sense that archaeologists chose areas for inspection that had potential for visitor use, but areas that also were selected for prehistoric occupation. The assumption is accepted that the kinds of attributes that make certain locales appealing for recreationalists today are the same traits that attracted prehistoric hunter-gatherers in the past. These attributes include the abundance of floral and-faunal resources, water sources, relatively cooler temperatures in summer, and aesthetic beauty. Consequently, I consider the Pre-1975 surveys to have been intuitively biased, but with positive results.

The post-1975 compliance surveys in RRCRL were also biased, but in a different fashion. Areas that required inventory were those proposed for surface disturbance. For the most part, these areas are not ideal for contemporary visitors and results of the surveys indicate they were also not chosen for prehistoric uses. The areas include locales of alluvial deposits for sand and gravel pits, an area in Red Rock Wash for a detention basin, and segments of land for roads and off-highway trails. Two factors facilitated the selection of these areas for recent construction projects. First, the designation of Red Rock Canyon as a park and recreation area prohibited most surface-disturbing projects in user-friendly areas. Second, the design

of roads, gravel pits, and detention basins generally require flat, low-lying areas that are easily accessible by machines, areas that are not ideal for recreationalists or aboriginal users.
I conclude that the sample inventoried in Red Rock reflects a bias, but one that has been checked and balanced through time. The pre-1975 intuitive surveys were designed to record the bulk of sites in the most sensitive areas in Red Rock Canyon. The post-1975 surveys were directed by Federal actions that were restricted to areas determined as non-sensitive through preliminary RRCRL planning designations. The latter inventories validated the accuracy of the intuitive surveys because only 4 of the 153 recorded sites in RRCRL were found during these actions. In a general sense, the inventories that covered 16 percent of the land in RRCRL are considered valid in terms of having identified most, not all, of the sensitive locales.

The question that follows concerns quality and accuracy of the surveys on a locale-specific scale. For instance, the clustering of several roasting pits and complexes around springs in the Red Rock Summit zone implies that these features may be better analyzed in terms of archaeological districts.

Additional recordation of the sizes of individual roasting pits and distances between individual features in conjunction with data on present numbers of agave plants may provide information for analysis on the length of use of sites and districts.

I conclude that on a broad scale the Red Rock zone has been adequately sampled to identify most areas of sensitivity. But within these areas, or subzones, there is a need for consistency and accuracy in recordation.

Site Recordation: Quality Control

How well were the sites in Red Rock Canyon recorded? During the first twelve years of inventory in Red Rock sites were poorly recorded, at least in terms of contemporary standards. Emphasis at the time was centered on noting the locations of sites on maps, not on obtaining accurate measurements of features. Inspection of the site recording forms from the Red Rock Summit surveys shows a lack of consistency in recorded data. Evidence of a shift in emphasis on recordation techniques occurred around 1982 when Sandstone Quarry received intensive documentation, and a CRMP and a NRHP nomination for Brownstone Canyon were prepared under the initiative of Kevin Rafferty, Area Archaeologist at the time. Because few additional sites have been discovered in Red Rock since the early 1980s, and agency funding for proactive work to update files has been severely limited, recording forms from 20 years ago remain the principal records for most sites in Red Rock.

How useful are the recording forms for most sites in Red Rock? Beyond

providing relative locational information, they only identify site types. Also, the records are not worthwhile in terms of research nor do they address questions helpful for evaluating for eligibility for nomination to the NRHP.

Recreation Management and Impacts to Archaeological Sites

How has recreational use of Red Rock changed or impacted archaeological sites? The initial management actions for RRCRL incorporated recreational use patterns that had been established prior to the implementation of a CRM program in 1975 and before the development of the Red Rock Master Plan in 1978. Established trails and roads were designated and maintenance programs developed without the benefits of review by cultural resources specialists. In particular, two existing trails and two recreational areas that cut across and wind through complex archaeological sites were accepted and improved. The sites in which these trails and picnic/parking areas are located are described below.

Lost Creek (26CK1394/BLM 53 371). This prehistoric archaeological complex recorded in 1976 during the Red Rock Archaeological Inventory (Brooks et al. 1976) consists of two roasting pits, one shelter with red pictograph staining, and a midden in the apron of the shelter. Figure 4 is a map of the site initially created by the survey archaeologists (Brooks et al. 1976). I redefined the map in 1990 based on present trail uses. The trail winds around the roasting pits and through the midden-deposited apron of the shelter, and back into the wash of the canyon. The site was "built" by aborigines onto the sloping colluvial Willow Canyon wall escarpment. Roasting pits erode naturally in this kind of environment. Maintenance of the trail has actually shored up one of the pits and in a manner aided in preservation. In contrast, placement of the trail through the midden in the apron in front of the shelter has likely impacted the top layers of deposits. The midden locus has not been explored and its depths are unknown.

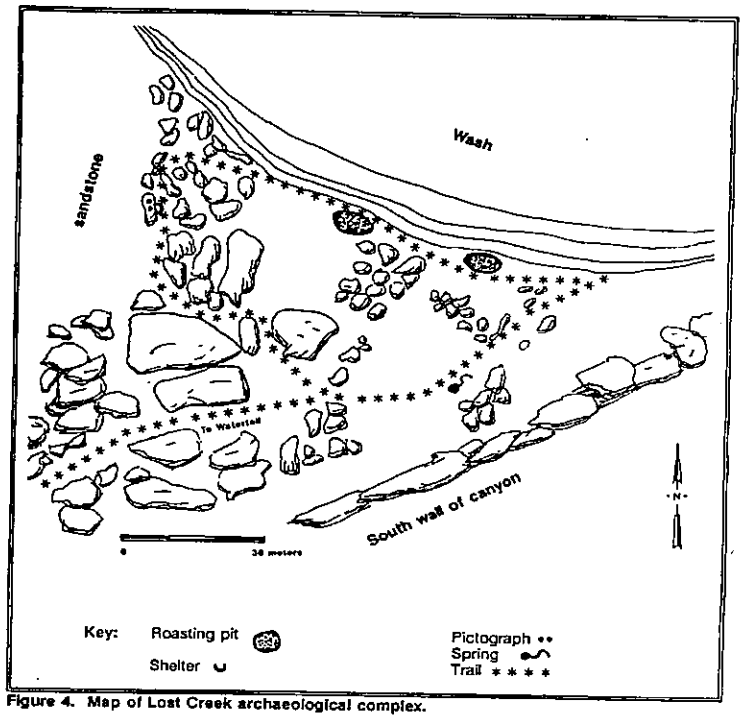

Figure 4. Map of Lost Creek archaeological complex.

Willow Spring (26CK486/BLM 53 370). This site is composed of six roasting pits, a shelter with five red-stained aboriginal handprints, and a midden, and is situated at the base of the north escarpment wall of Willow Spring Canyon. Figure 5 is a site map initially drafted in 1976 (Brooks et al. 1976), updated by Archaeo-Nevada volunteers in 1988 under my direction, and revised after my reevaluation of the site in September, 1990.

According to Brooks et al. (1976:2-3), an avocational archaeologist partially excavated the site complex in the 1960s. Later in the decade the site was incorporated into a picnic area. Two roasting pits at the west end were leveled for picnic tables and an outdoor toilet was placed into the subsurface of another large roasting pit. There have been attempts to proactively manage the intensive recreational use at Willow Spring site complex in terms of turning the site into an interpretive exhibit-in-place. The last endeavor in 1985 was the placement of numbered posts that corresponded to information on a handout. The bulletin was not professionally written and the posts placed into the ground were destroyed by visitors.

As a result of noted defacement of the shelter hand prints from

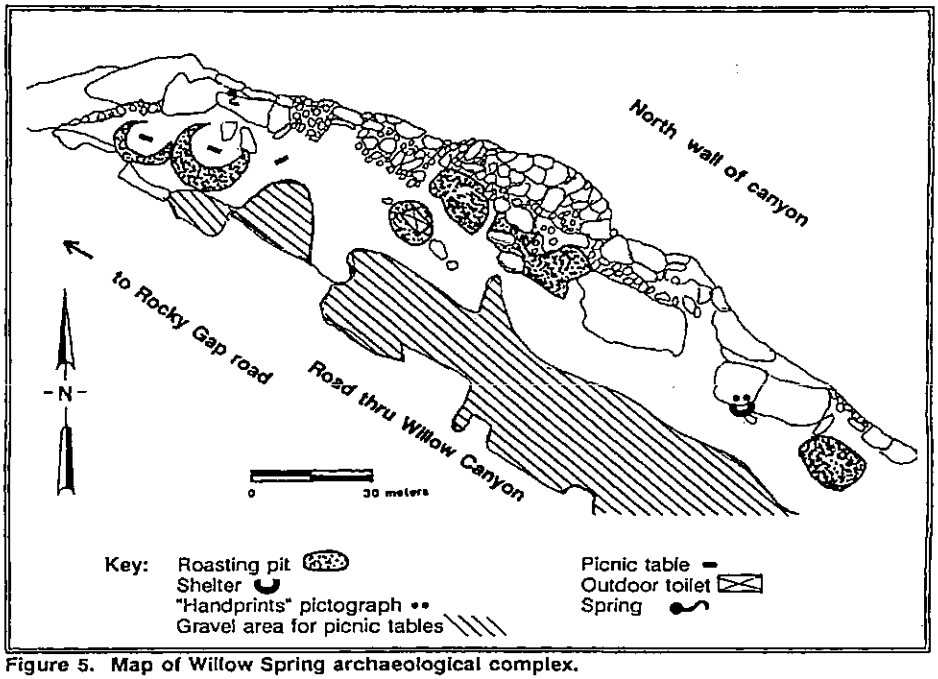

Figure 5. Map of Willow Spring archaeological complex.

recreational climbing, RRCRL staff members proposed planting cactus at the base of the pictograph panel to discourage this kinds of activity on this rock. Because the cactus was proposed to be planted in a midden, I wrote a research design for data recovery, conducted consultation, excavated the midden, and documented the results (Myhrer 1989). The cactus was planted in 1990 and the defacement from rock climbing stopped.

Red Spring (26CK458/BLM 53-2380). Red Spring prehistoric complex is composed of small shelters, a possible midden area, a rock ring feature, a meadow that might have been used for ceremonial purposes, and numerous petroglyphs. Shutler and Shutler (1962) collected two manos, a chopper, and a hammerstone from the complex, and designated the artifact locus as 26CK224/BLM 53-2338. The site was tested in 1969 with 11 pits excavated along the base of the escarpment (Brooks 1969), but the notes are not in the files. Other shelters and rock art loci around the spring were given Smithsonian numbers of 26CK449452. Three to four circular rock features (BLM 53-377) were recorded during a powerline inspection in 1976. This locale is intensively used for recreational purposes. Figure 6 is a map of the site created from a composite of topographic maps, my sketch maps, an aerial photo, and an on-site revision by Susan Murphy of ArchaeoNevada Society working under my direct supervision.

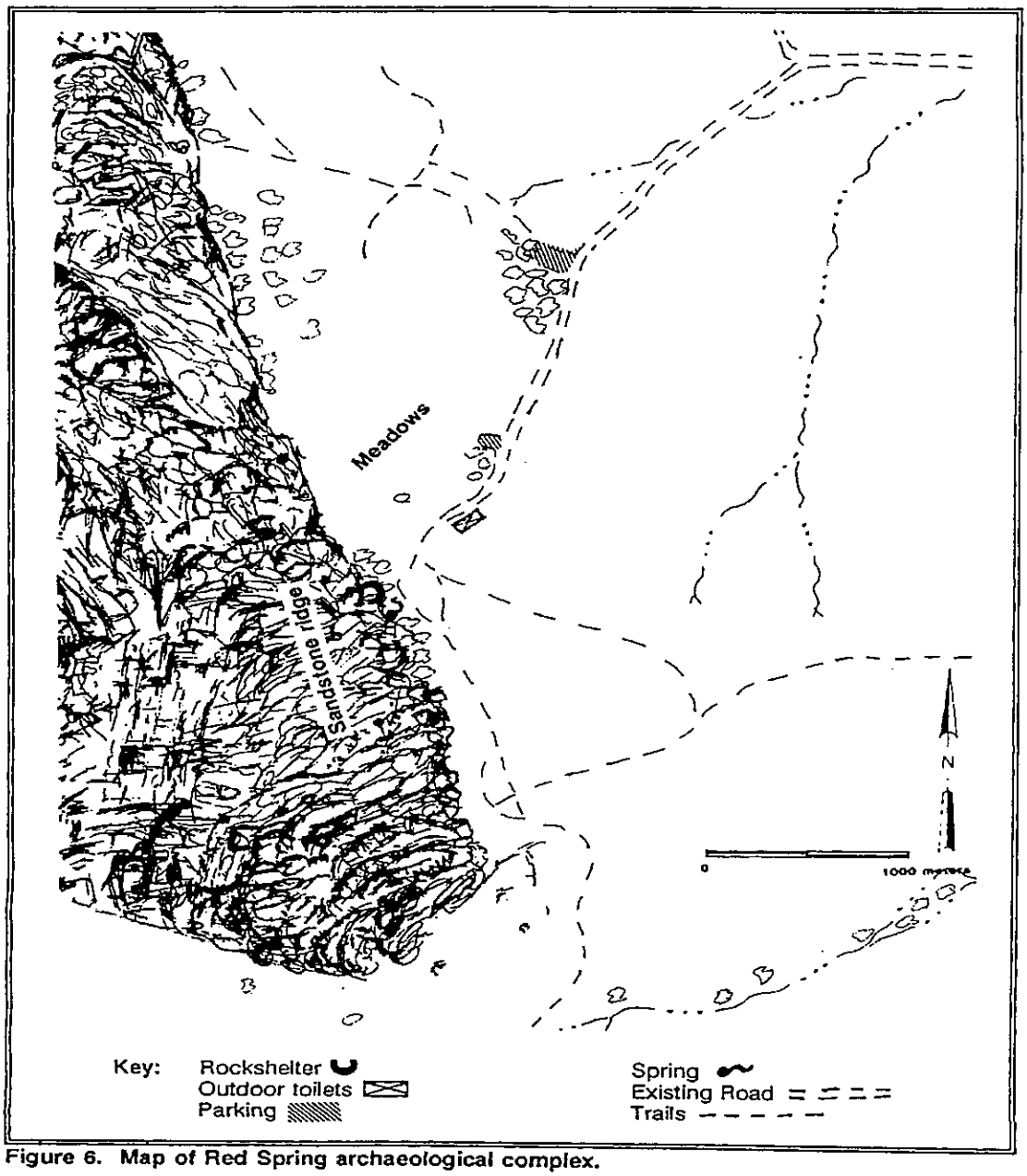

Figure 6. Map of Red Spring archaeological complex.

Picnic tables have been placed into the meadows, two small parking areas cut and graveled, outdoor toilets installed on the east edge of the site, and thousands of visitors every year climb the west rock wall that exhibits numerous petroglyph panels. In August,1990, I conducted eight trowel probes into the site to determine exact locations for further probing/testing activities. In September, 1990 I spoke with Richard Brooks concerning his 1969 test pits. He noted that although the pits were sterile at about 30 centimeters below datum, there is the possibility that deeper test units could reveal evidence of earlier occupational episodes buried beneath years of spring riparian soil deposition.

Sandstone Quarry (26CK1427/BLM 53-455). Sandstone Quarry was an historic sandstone-block mine that operated from 1905 to 1912, and was recorded by Rafferty in 1982. A short road leading to a parking area with an outdoor toilet cuts through the site. The road is the widened trail used in 1905. Edges of two structural foundations, originally along the historic road are presently flush with the wider, contemporary road cut. Although it has not been documented, it is likely that deterioration to the foundations along the road cut is occurring. Another historic trailS a quarry, and the foundations of three additional structures are situated on the east side of the access road. The remnant of another structure is located north of the others. Several of the structural foundations have been dug by unauthorized people. Figure 7 is a composite map of the site created from topographic maps, my notes and sketches, a sketch map by Rafferty, and an aerial photo.

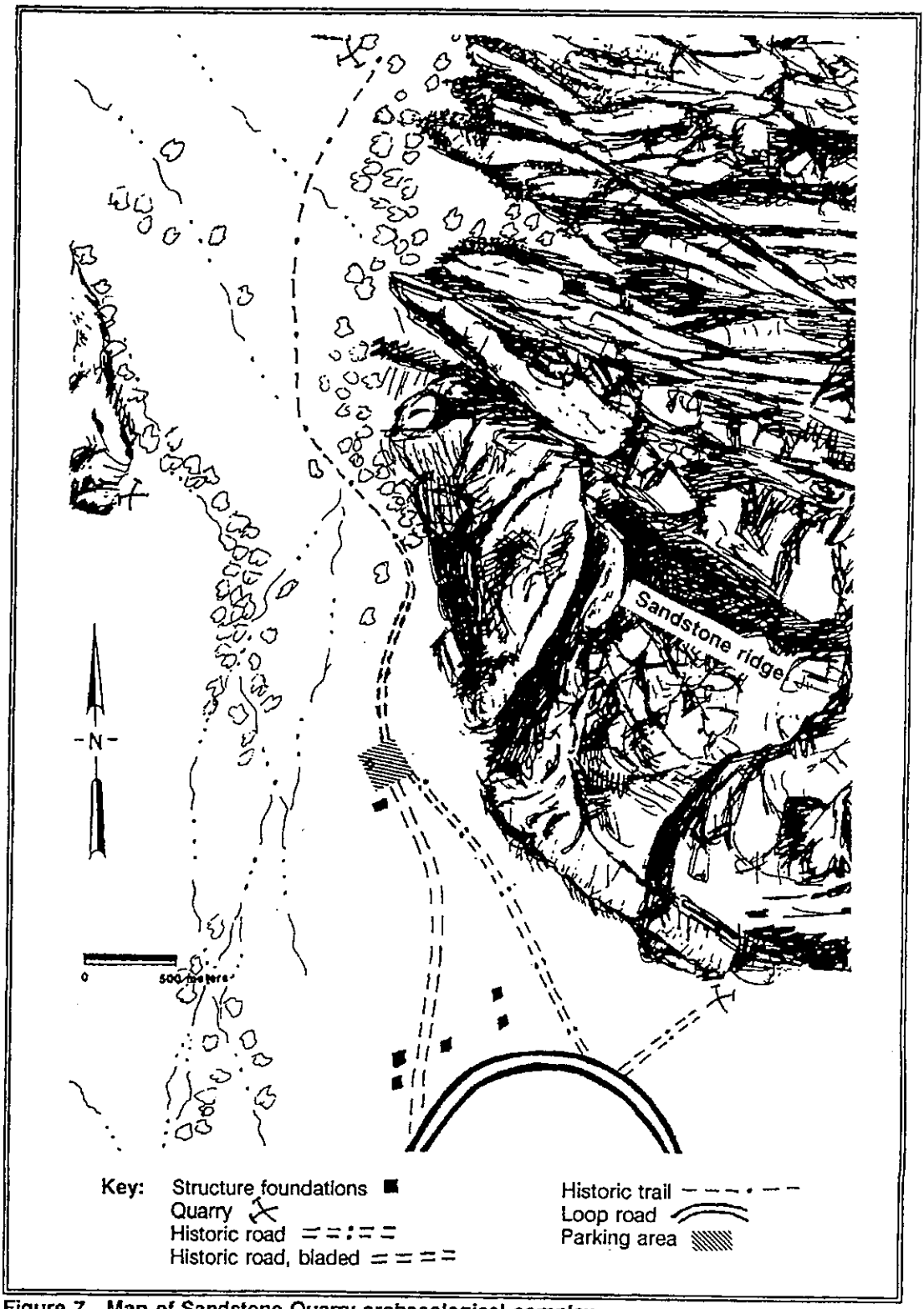

Figure 7. Map of Sandstone Quarry archaeological complex.

Other Recreational Impacts. Visitor use of RRCRL has tremendously increased in the past ten years, with projected increases for the next decade. In addition to the designated roads and trails within site complexes, described above, impacts have occurred from other recreational uses such as hiking. Although consequences of this activity have not been investigated, it is likely that minor impacts to isolated roasting pits, lithic scatters and other features have occurred in subzones such as the Red Rock Summit. The historic house foundation and associated trash scatter in Pine Creek is another resource that may have suffered impacts. Yet, due to the fact that vehicles are not permitted on most of the trails it is actually possible that only a small degree of impact has occurred.

Recommendations for Proactive Management

The answers to the questions directed above indicate that the sample inventories have located most areas or locales of sensitivity in RRCRL Although the recording forms are not adequate for most sites, they have value in the sense they provide baseline information on locations and site types. Recreational uses of two trails and two activity areas have impacted in varying degrees certain cultural complexes in Red Rock, but the nature of these impacts cannot be ascertained without knowing more about the subsurface depositions of each site. In the absence of studies on impacts to cultural resources in RRCRL from general recreational use, I estimate that cultural resources outside of the designated trails discussed above have suffered relatively little.

A Management Strategy for Lost Creek, Willow Spring, Red Spring, and Sandstone Quarry. There are two immediate management alternatives for the trails and recreational areas at the associated archaeological sites. One choice is to close the trails both administratively and physically due to the acceptance that impacts have and will continue to occur to the sites. This alternative is unacceptable. These are widely-known, established trails that attract thousands of people every year. The agency does not have the resources to effectively close popular trails of this kind. Also, there is high potential that disgruntled visitors would walk the trails in trespass and vandalize the sites out of a sense of irritation or revenge.

The four sites have not been formally evaluated by BLM. Until the consultation process has been completed, the sites are considered eligible for nomination to the National Register of Historic Places under criteria in 36 CFR 60.4. Lost Creek, Willow Spring, and Red Spring complexes are eligible under criterion (d), the potential to yield information important in the prehistory of the region. Sandstone Quarry is eligible under (a), associated with a unique regional mine, and is also eligible under (d). Further investigation at each site is necessary to complete a formal determination on significance. Whatever the determinations become, these sites additionally qualify for

management for public values described in BLM Manual 8111.

Due to the present degree of high intensive public uses, the sites should be treated under Section 106 consultation as if adverse effects are occurring. The management strategy should consist of the following steps: 1) test for eligibility, 2) consult on initial determinations, 3) conduct a data recovery program if needed, 4) complete consultations on final determinations, and 5) develop project plans to manage for public uses. Project plan could be relatively simple and similar for each site.

In order to make determinations on eligibility, three of the sites require further probing and testing, and one should be determined not eligible without any further work. Based on the lack of remaining stratigraphic deposition documented during excavation of a midden unit (Myhrer 1989), and the fact that the site has been severely impacted from recreational uses including installation in the 1960s of an outdoor toilet in a roasting pit, and leveling of two other pit features for picnic tables, the Willow Spring complex is considered to lack integrity and should be formally determined as not eligible for nomination to the NRHP. If SHPO concurrence on this determination is received, the site should then be managed for public uses.

The midden outside the apron of the shelter at Lost Creek should be probed and tested for subsurface deposition under Nevada BLM guidelines (USDI BLM 1989). If stratigraphic deposition is found and integrity is present, then a data recovery plan should be written and implemented for the entire site. Although Red Spring was tested in 1969, there are no detailed results present in the BLM files, consequently, the site should be probed. An evaluation that may include testing is also needed at Sandstone Quarry. If analysis indicates that intact structural foundations are present at the site, a determination of eligibility should be written. At that point a decision should be made to determine whether additional protection measures are necessary or possible, or if data recovery or even reconstruction of the foundations is the most manageable alternative.

Until probing, testing and evaluation procedures are implemented, and formal determinations are submitted for SHPO review, educational interpretation should be continued. I propose that an existing draft interpretive brochure that describes cultural resources and associated Federal laws be finalized for distribution at the Visitor's Center. A great deal of recreational climbing is also conducted in the park and the first stages of an interpretive program for the organized climbing group members was initiated in 1990 by Red Rock Rangers. This program should be continued and expanded.

A Research Strategy for the Red Rock Summit Subzone. Based on analysis of the site recording forms written during the 1970s surveys for RRCRL, a large district or several smaller prehistoric districts are present in this canyon. The Rocky Gap/Potato Ridge road follows the

canyon west of Willow Spring with numerous roasting pits, camp sites, and a few rockshelters located along its sides. The road is presently impassable for motorized vehicles. I propose that the Rocky Gap road be managed as a primitive hiking trail without any future maintenance. Another canyon runs north from Mountain Springs and contains numerous rockshelter/roasting pit complexes associated with Rainbow and Bootleg Springs.

The archaeological resources of the Red Rock Summit subzone are in many ways archaeologically similar to those in the South Virgin Peak Ridge in the Virgin Mountains, a canyon that holds several prehistoric roasting pit and rockshelter complexes. Both settings provide an excellent research potential to compare and contrast roasting pit complexes in different mountain ranges. Based on the results from the present amount of archaeological work in the RRCRL zone, I propose that most occupation in the Red Rock zone was by the Paiute with only limited use by the Virgin Anasazi and Lower Colorado groups. Occupation in the Virgin Mountains area was presumably dominated through time by the Paiutes, with intensive uses by the Virgin Anasazi from about A.D. 700 to 1150. The locus of the Anasazi occupation was the lower Moapa Valley, located about 25 miles west of the South Virgin Peak Ridge. A research topic that focuses on interrelationships among the Paiute, Virgin Anasazi and the Patayan in both Red Rocks and the Virgin Mountains can be studied by a graduate student for a master's thesis. Fieldwork would consist of resurvey and recordation of sites identified during previous surveys in each of those areas. The sites should be analyzed in conceptual terms of archaeological districts. Roasting pits could be subjected to a variety of investigations using some examples of methods that are discussed in the section on archaeological site types in this document.

Following the distribution of the draft of this document in September, 1990, UNLV graduate intern Connie VonSleichter conducted a reconnaissance survey of the Rainbow/Bootleg Springs locales in the Red Rock Summit subzone. The results of her survey (VonSleichter 1990), in which sites were relocated and recorded as an archaeological district on an IMACS form, indicate that there has been only moderate impacts, as a result of recreational activities, to archaeological sites near Rainbow and Bootleg Springs.

Uses for Brownstone Canyon National Register District. Brownstone Canyon (26CK462 through 470/BLM 53-476 through 485) is already listed on the National Register of Historic Places. I propose two management uses for this district. First, those features that are highly visible by the public, such as the roasting pits, Civilian Conservation Corps (CCC) dams, and the pictograph panel should be managed for public uses. This includes signing and interpreting the importance of the dams, the roasting pits, and the rock art panel. Second, the shelter and midden site located on the north edge of the east-west trending canyon should be probed or tested to determine depth and information potential. If testing indicates that integrity has been lost, or if

the deposition has limited information potential, then the shelter should be managed for public interpretive uses. If the midden shows potential to yield significant scientHic information, then the site should be managed for conservation and monitored on a weekly basis. If monitoring indicates the shelter is being impacted, then additional protection measures or evaluation for a data recovery plan should be implemented.

Summary of Recommendations

Red Rock Canyon Recreation Lands have been intensively used for recreational purposes for at least 25 years. Inventories for cultural resources have been conducted within the past 20 years. Although those surveys have located most areas of sensitivity, present uses for the site records are limited to locational and site typing information.

Management of the area as a park setting has fostered certain kinds of use by recreationalists. Existing trails run through sites that are significant for public uses, and possibly for information potential. The trails will not be abandoned, consequently, I recommend probing, testing, and evaluation of each site, and for those sites determined eligible, implementation of data recovery programs. Finally, those sites should be managed for public uses under BLM Manual 8111. With the exception of new recreational proposal projects, all presently sanctioned activities in RRCRL are non-destructive in nature. Continuing education for cultural resources preservation should be adequate to inhibit impacts to archaeological sites from recreational activities such as climbing and hiking.

I propose a research strategy that compares and contrasts the roasting pit/rockshelter sites in the canyons of Red Rock Summit with those in South Virgin Peak Ridge. The canyons are similar in terms of the kinds of sites present, but were presumably used by a slightly different mix of cultural groups. This project is ideal for a thesis project by a graduate student.

Brownstone Canyon National Register District should be managed in two parts. The rock art panel, roasting pits, and CCC dams should be signed for interpretation. The shelter should be tested and H there is potential for scientific research the feature should be managed for conservation.

Red Rock Canyon Recreation Lands is a unique geologic and biologic inset into the juxtaposition of the Mojave Desert and Great Basin. The environment was and is rich in resources including those cultural or human-caused in nature. RRCRL is one of only two designated geographic zones in SRA that are highly significant for cultural resources and that have also received an adequate amount of inventory to determine most areas of sensitivity. Although the recordation of most of the sites in the park was accomplished in the early 1970s and with methods

that no longer meet most needs of CRM, the documents do provide baseline data sufficient for making general strategic management recommendations. I recommend that sites that are in heavily utilized areas in RRCRL be tested, evaluated, and subjected to data recovery procedures, then managed for public uses. Sites or features in less utilized areas that have potential for information uses should be managed for conservation.

Review by Interested Parties

Copies of the draft version of this document were submitted for review in November, 1990 to interested parties that included local professional archaeologists and the Moapa Band of Paiutes. The designated representatives of the Moapa Paiutes, the Cultural Committee, agreed that the intent of the document was a positive and constructive approach to preservation of representative samples. Although no written responses were received from local professionals, there were several positive oral responses. There were no negative responses.

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APPENDIX 23

LAW ENFORCEMENT RESOURCE PROTECTION ANALYSIS

GENERAL: The current trend is that more people are using the NCA in more ways as different populations discover aspects of the area that meet their recreational and commercial needs. In 1998 more than 1 million persons traveled the Scenic Drive. This puts increasing pressure on finite and fragile arid lands resources, and creates conflicts with existing user groups. Rapidly growing populations in Las Vegas metropolitan area are also increasing pressure on the NCA as activities traditionally occurring on private property to the east are forced into the NCA by development. Improved access on upgraded roads, and new freeways increases use by reducing travel times from distant portions of the valley. The rapid growth of the Pahrump Valley is creating a daily commuter traffic pattern on State Routes 159 and 160 in the southern portion of the NCA.

In addition to the rapid growth of local population and user numbers, the RRCNCA has been expanded from the previous size of 83,000 acres to almost 200,000 acres. There has been no corresponding increase in the authorized number of Rangers to patrol the additional areas. The five Rangers authorized to cover the smaller area can no longer provide sufficient patrol coverage of the expansion areas while providing the customary coverage of the heavily used core area of the Scenic Drive. The result is an increase in vandalism, resource damage, commercial use violations, traffic accidents, and delays in answering service calls. Estimated personnel needs for adequate patrols, prosecution follow-up, training, leave and other down-time is a minimum of twelve (12) Rangers by the year 2005.

The objective of the Law Enforcement Resource Protection Program within the Red Rock Canyon National Conservation area is to minimize activities that damage resources and threaten users, and to reduce conflicts between different user groups through education and enforcement of federal regulations. State and local regulations will be enforced as need, opportunity and jurisdiction dictate. The primary areas of concern are discussed below.

TRAFFIC ENFORCEMENT: The greatest single threat to public safety in the NCA is from motor vehicle accidents due to speeding, reckless driving, and driving under-the-influence of drugs or alcohol. The growth of commuter traffic traversing the area, and the use by some motorcyclists for speed contests is incompatible with the primary use of the area by sightseeing drivers and non-motorized recreationists. Single vehicle accidents due to excessive speed occur more than once-

a-month on the four State Routes that cross or enter the NCA. The majority of serious accidents occur on state highways crossing RRCNCA. In 1994-1995 there were ten fatalities on S.R. 159 alone, including two double fatal rollovers, and a double fatal collision. Collisions between vehicles and burros standing in, or crossing the road, are a serious problem with up to 20 burro kills occurring in some years. Enforcement of speed limits, no-passing zones, and other traffic control devices, as well as the apprehension of drunk drivers is necessary to protect legitimate users from the dangerous and illegal behavior of some motorists. State Route 160 is patrolled by Nevada Highway Patrol. There is no routine patrol of State Routes 156, 157, or 159 in the NCA. The Las Vegas Metropolitan Police Department is responsible for law enforcement on the roads, but has inadequate manpower to perform routine patrols, or to respond to any but the most serious accidents, and frequently calls upon BLM Rangers for assistance when there will be an extended response time from the southern or western portions of the county. The enforcement of traffic regulations will generally be by traffic stops of violators observed during normal patrols of the area. If circumstances warrant, special patrols will be instituted to target specific areas or problems, including DUI checkpoints, and stationary radar speed enforcement.

AREA CLOSURE AND CLOSURE VIOLATIONS: The Scenic Drive and Red Spring Picnic Area in Calico Basin are part of a core area that is designated for day use only. The purpose of the day use restriction is to limit incidental damage to resources that results from overnight use of fragile arid lands resources, and to exclude criminals committing illegal acts under cover of darkness. Principal closure violations are committed by persons who enter the area during the day, but fail to leave at the posted closure hour. Others violations are committed by people who enter the area during the late night or early morning hours to commit acts of vandalism, and drug, or alcohol violations. The enforcement of the Area Closure will be by regular patrols at the end of the day to clear all unauthorized persons and vehicles from the Scenic Drive and Red Spring, and by special patrols to deal with late night violators.

COMMERCIAL OPERATIONS: There is a growing number of entrepreneurs engaged in commercial operations to satisfy the recreational needs of different user groups, including guided equestrian rides, off-highway vehicle sightseeing trips, all-terrain bicycling and road bicycling, aircraft overflight tours, motor coach tours, guided technical climbing, and guided trail hiking. The spectacular scenery attracts still and motion picture photography for Hollywood films, vehicle and other product commercials, fashion catalogues, professional portfolios, magazines, and local advertisement backgrounds. All commercial photography requires permit authorization, and enforcement

activities consist of ensuring compliance with this requirement, as well as ensuring that permittees do not interfere with other users or cause unacceptable damage to resources. Some permits require little more than spot checks, while other require constant monitoring and control of crew activities, and provision of traffic control for filming of vehicle sequences. Such high intensity monitoring takes Rangers out of regular patrol duties, and should utilize overtime assignments funded by proffer accounts from permit fees to allow normal operations to continue.

VISITOR SERVICES: The heavy use of the area creates a demand for assistance to visitors in terms of medical emergencies, search and rescue, vehicle mechanical assistance, delivery of emergency messages and attempts to locate. The implementation of fee collection creates a higher expectation of service in the minds of the visiting public. Response to these requests for non-emergency services in usually incorporated into regular patrol activities.

SEARCH AND RESCUES: The steep cliffs and remote canyons in the RRCNCA attract hundreds of thousands of hikers and climbers to the area each year. There are on average over 75 search and rescue (SAR) incidents per year that range from simple stranding on steep rock faces to falls resulting in serious injury or death. While legal responsibility for SAR lies with the Las Vegas Metropolitan Police Department, Rangers have historically provided a first response and size-up of incidents. If a major response is required LVMPD is called, assumes command of the incident and Rangers provide necessary support and assistance. As aspect of SAR not commonly considered by some is swift water rescue operations. There are numerous low-water crossings of major washes along both state highways and the Scenic Drive. In 1984 five persons drowned in two swift water incidents in the RCNCA when attempting to drive across flooded roadways. Subsequent incidents have resulted in personal injury and property damage. Rangers will be trained in swift water rescue operations to provide a first response for rescues, as well as to competently evaluate dynamic flow conditions that would require the temporary closure of roads to public use.

PUBLIC EVENTS/SRP'S: RRCNCA is attractive as an area for bicycle races, charity walk-a-thons, fun runs, off-road vehicle caravans on back country roads, and other similar events ranging in size from less than 50 to more than 500 participants. Similar events held outside of RRCNCA also impact the area when participants attempt to camp in the NCA. Event organizers usually are required to hire extra security in the form of LVMPD officers. Work month costs are included in proffer accounts where applicable.

GANG ACTIVITY: There are over 100 active criminal gangs in the Las

Vegas Metropolitan area within a 20 minute drive of the RRCNCA. Past activity has included illegal shooting, and spray paint vandalism of resources and facilities as well as drug and alcohol violations. Levels of activity are directly correlated to levels of Ranger patrols and enforcement of all regulations. Aggressive patrol and enforcement causes the gang members to seek less policed areas for criminal activity.

The RRCNCA is broken down into patrol sectors based on geographic area, and types of use. As opposed to other BLM areas these are relatively small and do not equate to 8-hour patrol units.

1. TARGET PATROL AREA: Calico Basin/Red Spring.

RESOURCE PROTECTION ISSUES: The Calico Basin/Red Spring area is a heavily used area that contains a developed picnic area designated for day use only, a separate popular boulder climbing area known as Kraft Rocks, a day camp operated by the Girl Scouts of America near Calico Spring, and a significant number of small tract private parcels of developed and undeveloped land.

The interface of heavily used recreational areas and private residences creates frequent conflicts between users and residents, and subsequent complaints to the Bureau. Such complaints frequently involve use of the recreational areas after hours by persons violating the area closure. Such violations usually include under-age drinking, public intoxication, illegal ground fires, possession, distribution and use of controlled substances, illegal fire arms discharge adjacent to residences, and violent assaults among violators and against local residents. Search and rescue operations are often initiated to remove violators stranded or injured while climbing on the steep cliffs.

Other issues in the Calico Basin area are derived from the public/private land interface and include various types of trespass, dumping, animal violations, and attempts by local residents to exercise "proprietary" control over public lands resources because they are "theirs" by reason of proximity.

Special resources of note in the Calico Basin area include significant cultural resources in the form of numerous rock art sites, middens, and rock shelters, and natural resources including a rare desert meadow environment, and several important springs with rare and fragile plant communities. The recently acquired Calico Spring area contains at least two plant species listed as threatened or endangered in the state of Nevada.

Natural and cultural resources are threatened by heavy public use,

uses that are not compatible with the resources, as well as by vandalism and theft. The area is also a favorite destination for truants from local high schools. Such persons have frequently been involved in search and rescue incidents, traffic accidents, and alcohol violations.

2. TARGET PATROL AREA: Scenic Drive/Visitor Center.

PROTECTION ISSUES:

GENERAL: The Scenic Drive and the Visitor Center represent the core of recreational development and the primary objective of most users of the area. On a recent weekend, over 2000 persons per day utilized the Visitor Center, and an estimated 10,000 persons used the Scenic Drive. These levels of use are unprecedented and will only increase.

3. TARGET PATROL AREA: FOOT TRAIL SYSTEM

GENERAL: The foot trail system currently consists of ten separate maintained trails: Calico I, Calico II, Sandstone Quarry, Keystone Thrust, White Rock Spring to Willow Spring/White Rock Spring spur, Lost Creek, Willow Spring Complex, Icebox Canyon, Pine Creek, and First Creek. Other unmaintained trails exist in the La Madre Spring, Red Rock Summit, Red Spring, Oak Creek, and Velvet Canyon areas. These trails provide access to climbing areas, recreational hiking opportunities, and environmental education facilities.
Some areas are more attractive to visitors due to the presence of seasonal streams and waterfalls, large rock shelters, or expansive areas of slickrock. Short easy trails with heavy brush or rock shelters are attractive to those who wish to engage in illegal activities while avoiding enforcement personnel.

4. TARGET PATROL AREA: OAK CREEK CAMPGROUND.

PROTECTION ISSUES: The Oak Creek Campground was never officially planned or constructed. The facility is chronically overcrowded with serious resource damage resulting from trampling, illegal ground fires, collection of wood, littering, off-road travel, cutting of green vegetation, and improper disposal of human wastes.

The area has a history of long-term occupancy violations, vehicle burglaries, larcenies of campground equipment, assaults, illegal firearms discharge, under-age drinking, disorderly conduct, fugitives from justice.

The facility is due to be relocated which should reduce some resource violations. Property and violent crimes can be expected to occur in any campground.

5. TARGET PATROL AREA: WEST CHARLESTON, S.R. 159, DEDICATION SITE, CAVE PARKING AREA, FIRST CREEK TRAILHEAD, .

PROTECTION ISSUES: The primary focus of this sector is the relationship between traffic violations on the highway that exert a direct threat to resources and visitor safety. The primary violations include exceeding safe speed limits, and traffic congestion associated with visitor contact with wild burros.
The primary objective of enforcement in this zone will be to encourage compliance with speed limits to reduce the number of serious accidents that occur, and to reduce the amount of traffic congestion associated with visitor contact with burros. Violations observed incidental to these major activities will be handled as need, resources and jurisdiction permit.

6. TARGET PATROL AREA: PAHRUMP HIGHWAY, S.R. 160

PROTECTION ISSUES: Primary jurisdiction for traffic enforcement lies with the Nevada Highway Patrol. Excess speed on the highway is responsible for the deaths of +/- 10 wild burros and +/- 5 wild horses per year. Driving behavior that represents a threat to visitor safety or resources will be dealt with on a case by case basis. It will not be the policy to engage in frequent stationary radar patrols, or other high profile traffic enforcement activities. There is a powerline access road just east of the USFS boundary near mile 20. This road leads back up onto the sandstone escarpment from the two-pole wooden powerline.

7. TARGET PATROL AREA: BACK COUNTRY ROAD PATROL (ROCKY GAP, ETC)

PROTECTION ISSUES: The primary concerns in this area are off-road travel in the two wilderness study areas designated along the road. In the past there has been significant damage to vegetation from violators operating ORV's off-road, creating new roads, and turning foot trails into roads. As camping pressure increases in this area there will be increasing problems with litter, illegal ground fires, collection of wood, and cutting of green vegetation.

8. TARGET PATROL AREA: VELVET CANYON/COTTONWOOD VALLEY NORTH

PROTECTION ISSUES: The Velvet Canyon Campground absorbs most of the overflow from Oak Creek and receives heavy camper pressure in spring and fall. The area also contains significant cultural resources in the form of numerous rock art sites. The area contains several developed springs that are crucial for the wild horse herd that lives in the area. Some littering and household/construction waste dumping has occurred adjacent to S.R. 160.

9. TARGET PATROL AREA: COTTONWOOD VALLEY SOUTH

PROTECTION ISSUES: The primary resources at stake in the area is wild horse herd. The area has been extensively burned and is mostly exotic grasses and Russian thistle. Common problems include target shooting, dumping, and occasional incidents involving the shooting of wild horses.

10. TARGET PATROL AREA: LOVELL CANYON/MOUNTAIN SPRINGS

PROTECTION ISSUES: There are several roads up into the RRCNCA from the Lovell Canyon road including the road to Bootleg and Rainbow Spring. Seasonal concerns include cutting of fuel wood in the burned area, cutting of Christmas trees, dumping, cultivation of marijuana near the springs, protection of cultural resources in the form of roasting pits, control of OHV's's driving into the NCA from Mountain Springs, fireworks patrols in late June and early July, wildlife violations, and theft of sand and gravel.

11. TARGET PATROL AREA: ADJACENT PUBLIC LANDS:

PROTECTION ISSUES: RED ROCK WASH DETENTION BASIN
BLUE DIAMOND NDOT PIT
BLUE DIAMOND ROAD Mile 0.0 to 10.0.

The Red Rock Wash Detention Basin located at Mile 15 on S.R. 159 is the frequent site of illegal shooting, and has been the location for dumping and burning several stolen vehicles. The outlet tunnel is the favored site for local hate groups such as the SKINHEADS to hang out at night. The land ownership pattern is irregular so close attention must be paid to exact location in the basin to with respect to jurisdiction involved.

The NDOT pit on S.R. 159 at mile 1.0 has two entrances, one off of HICKEY ROAD, and the other off of Mile 1.5. Both areas are susceptible to dumping, and theft of mineral materials as well as illegal shooting.

12. TARGET PATROL AREA: BROWNSTONE CANYON

PROTECTION ISSUES: Brownstone Canyon contains significant cultural resources in the form of numerous rock art panels, roasting pits, rock shelters, and historic water development dams built by the Civilian Conservation Corps. In addition there are several wildlife water developments in the upper portions of the canyon above the CCC impoundments. The area is an alternate trailhead for Turtlehead Peak. Violations commonly encountered are violations of vehicle closure, vandalism to gates, fences, and cultural resources, illegal shooting, illegal ground fires, under age drinking, possession and use of

controlled substances, off-road travel. Stolen vehicles are occasionally dumped and burned on the road. On at least two occasions in the 1980's victims of homicides were also dumped on the road. The primary emphasis of patrols will be to enforce the vehicle closure which will prevent most of the other types of violations in the area.

13. TARGET PATROL AREA: LITTLE RED ROCKS.

PROTECTION ISSUES: The Little Red Rocks area is the first obvious outcrop of red sandstone visible from West Charleston Blvd. The area was added to the NCA with the enabling legislation. Prior to that it was undifferentiated public lands with few restrictions on use. All access is across private property owned by the Summa Corp. The area is severely impacted with numerous off-road vehicle trails resulting in major damage to vegetation, and soil erosion. The primary goals for this area will be to mark the boundary, establish one or two viable vehicle routes, close superfluous roads, control firearms discharge, littering, off-road travel, and other general public lands abuses.

14. TARGET PATROL AREA: EASTERN URBAN INTERFACE

PROTECTIONS ISSUES: The Eastern Urban Interface includes that area from south of the Red Rock Country Club and the Desert Sportsman's Rifle and Pistol Club, north along the RRCNCA boundary past Lone Mountain and up to the Kyle Canyon Road. Urban development is already present adjacent to the boundary in some areas, and will become monolithic during the life of this plan. Public pressure to provide recreational opportunities will increasingly conflict with stated RRCNCA resource protection mandates, and public use will intensify the already "non-traditional" role of the BLM law enforcement in this area. The influence of this area will extend south on S.R. 159 from the Red Rock Wash Detention Basin to Spring Mountain Ranch State Park. Current problems include dumping of construction and landscaping debris from urban development, wire burns, illegal shooting, off-road travel, dumping of stolen and burned vehicles, gang activities, homicides, theft of plant and mineral resources, occupancy trespass, and large parties of youths engaged in alcohol and drug parties. As increased urban development occupies open space at lower elevations previously favored by violators, these activities are increasingly moving up slope into the RRCNCA. Resource protection strategies include aggressive closure of illegal or superfluous roads and points of entry as well as installation of signs, and boundary fences where appropriate, and regular patrols, especially at night and on weekends to detect and prosecute violators.

15. TARGET PATROL AREA: BIRD SPRING RANGE:

PROTECTIONS ISSUES: This area includes the eastern foothills of the

Bird Spring Range from Bird Spring, north to State Route 160. The area contains the Wilson Tank/Tunnel Spring wildlife water development, an important and extensive joshua tree forest, the Cottontail petroglyph archeological area, and the largest share of wild horses in the RRCNCA. The area is used by mountain bikers and off-highway vehicles, upland game hunters, and regularly scheduled OHV tours. Violations recorded in the past include off-road travel, illegal shooting and dumping, and theft of archeological resources. Public use of this area is rapidly increasing due to the rapid growth of urban development in the southwest Las Vegas Valley. Increasing resource damage from illegal dumping, litter associated with illegal shooting, and creation of new illegal roads are the chief problems anticipated in this area.

16. TARGET PATROL AREA: KYLE CANYON:

PROTECTIONS ISSUES: This area extends from approximately Mile 15 on State Route 157 to the border of the Spring Mountains National Recreation Area near the Harris Spring Road. Primary problems have been illegal dumping of construction and household trash by local residents, litter associated with illegal shooting, and creation of illegal roads and other routes of travel. The southern portion of the area includes the Deer Pasture drainage, site of a destructive fire started in 1997 by illegal shooting, and the lower Harris Spring canyon, site of the White Beauty Mine gypsum patents. The northern portion includes the Grapevine Spring area. Significant development of mountain biking trails is occurring the northern portion. In spite of several major clean-ups in the area, dumping continues in the area. Closure of traditional shooting areas closer to Las Vegas is increasing illegal shooting in this area.

17. TARGET PATROL AREA: LUCKY STRIKE CANYON

PROTECTIONS ISSUES: The lower portions of the canyon contain several traditional target shooting sites that contained significant amounts of litter. Illegal shooting continues to be a serious problem at Mile 100 on US 95, as well as near and west of the electrical power substation located at the mouth of Lucky Strike canyon. Installation of traffic barriers and boundary fences and signs followed up with increased patrols to enforce regulations are needed in this area.

18. TARGET PATROL AREA: LEE CANYON

PROTECTIONS ISSUES: The old Desert View Natural Area incorporated into the NCA contains an extensive Joshua tree forest. There are some illegal shooting sites, and this area will receive more illegal shooting pressure in the future due to restrictions closer to Las Vegas. Clean-ups, signs and barriers will be necessary to close old shooting sites, followed up with increased patrols.

APPENDIX 24

INTERPRETIVE PLAN

"Interpretation is a communication process designed to reveal meanings and relationships of our cultural and natural heritage, to visitors, through first hand involvement with an object, artifact, landscape or site." - Interpretation Canada

Purpose & Significance:

The unique geologic features, plants and animals of Red Rock Canyon represent some of the best examples of the Mojave Desert ecosystem. In 1967, the area was designated as Red Rock Canyon Recreation Lands to be managed by the Bureau of Land Management for the enjoyment of the public. In 1990, special legislation supported by the Nevada congressional delegation, changed the status of recreation lands to a National Conservation Area (NCA), the seventh to be designated nationally.

Red Rock Canyon currently comprises over 196,000 acres of diverse and rugged terrain in southern Nevada.

As stated in its enabling legislation, *"In order to conserve, protect and enhance for the benefit and enjoyment of present and future generations the area in southern Nevada containing and surrounding the Red Rock Canyon and the unique and nationally important geologic, archeological, ecological, cultural, scenic, scientific, wildlife, riparian, wilderness, endangered species and recreation resources of the public lands therein contained, there is established the Red Rock Canyon National Conservation Area."*

Themes:

- Red Rock Canyon is an area of the Mojave Desert with outstanding biotic diversity.
- Unique and dynamic geologic forces have helped create the most significant scenic features of the park.
- Human beings have utilized the resources of Red Rock for at least 2,000 years and continue to do so.
- The diversity of the area encourages a wide variety of recreational uses.

Goals:

- Enhance and diversify visitor experience to Red Rock Canyon through interpretive and educational programs, exhibits, and activities.
- Promote protection and preservation of the resource.
- Expand natural resource education programs in the Clark County School District.
- Strengthen ties with and support from continuing volunteer and other agency partnerships.
- Promote the Bureau's identity and management goals to the public.

Visitor Experience Statement:

Through interpretive/educational programs, exhibits, activities and other recreational uses, the visitor to Red Rock Canyon NCA will gain greater knowledge and appreciation of the Mojave Desert and its unique and fragile ecosystems, geologic dynamics, and recreational diversity. These programs and opportunities will further enhance the visitor experience and create an understanding of the importance of preservation and a sensible land-use ethic which will help protect desert environments for the enjoyment of future generations.

Visitor Profiles

Based on a "customer" survey completed in 1992 by the Outdoor Recreation and Wilderness Assessment Group (ORWAG), a research unit of the USDA Forest Service, the following information was compiled about the " average" visitor to Red Rock Canyon. Assessments were made through on site interviews at RRC and written surveys distributed by mail.

60% of park visitors are well-educated with some college education. Most are white Anglo, with majority in the 25-44 year age group. Half of Red Rock's visitors come from outside Nevada, and a little more than half are male.

Observation by staff indicates that many park visitors are casual tourists who come to Las Vegas primarily for its gaming\entertainment amenities and/or for business related activities, and drive out to Red Rock for a "desert" experience and to enjoy the scenic drive. Many local residents visit on a regular basis to enjoy the many recreational aspects of the area such as hiking, biking, and rock

climbing. These people generally fall within the majority age-group mentioned above but can be much younger or much older.

The area also receives heavy use from local school classes who usually make advance reservations for ranger-led interpretive talks and walks.

Interpretive programs should be directed at the casual visitor as well as the experienced and dedicated desert afficionado, and for both the short term and the long term visitor. All interpretive statements should be simple and direct in message and presentation. The Visitor Center shall remain the focal point for information, natural resource education and interpretation. Programs in the forms of guided walks or self-guided walks can be presented at nearly every pull-off and trail. Priority for interpretive media should be given to those areas most heavily used or impacted by visitors. This focus allows for more of an interpretive profile by the Bureau, a greater effectiveness of the message to a greater number of people, and a greater identity with the park mission and goals. Topics covering cultural resources, geologic and ecosystem concepts, water conservation, and human impacts will be expressed in a variety of media to reach the casual visitor. Where appropriate, other languages besides English will be used to express information and interpretive concepts.

The greatest challenges facing interpretive programs and planning at Red Rock Canyon will consist of how to manage ever-increasing numbers of visitors with a limited number of facilities, natural resources and personnel available, and project funding. Some improvement in facilities can be expected through the fee demonstration program but limitations on expansion will continue to be dictated by the sensitivity and vulnerability of the resource. Some of these challenges can be met with a flexible plan allowing for changes in visitor use and interests that occur over time. The current use of volunteer and hosted worker assistance must continue and increase. Natural resource education projects such as the Junior Ranger and Children's Discovery Trail brochures, workshops, guided public activities, and volunteer resource protection projects would continue to assist Bureau staff with management of resources and visitor use.

Natural and Cultural History of Red Rock Canyon NCA

The majority of the 600 million year history of what is now Red Rock Canyon NCA was spent at the bottom of a deep ocean basin. A rich variety of marine life flourished in these waters and left behind deposits of shells and skeletons more than 9,000 feet thick which were eventually compressed into limestone and similar carbonate rocks that now comprise the La Madre and Spring Mountains. Beginning approximately 225 million years ago, crustal movements caused the seabed to slowly rise and evaporate. The arid land became covered by

giant sand dunes more than a half mile deep in places. These shifting sands were buried by other sediments, and eventually cemented into sandstone by iron oxide with some calcium carbonates. This formation is known locally as Aztec Sandstone and makes up the Calico Hills and Escarpment of Red Rock Canyon NCA. The most significant geologic feature of Red Rock Canyon is the Keystone Thrust Fault. This fault and other smaller local faults created the dramatic landscape that attracts today's visitors.

The unique geologic features of Red Rock Canyon allowed for the abundant plant and wildlife development of NCA. An area that supports vegetation and has one of more dominant species is identified as a vegetation type. Red Rock Canyon has nine different plant communities that support a variety of flora and fauna species. This abundance of life and water attracted early man into the area. The resources of Red Rock Canyon were utilized by various indigenous groups of Native Americans as early as 5,500 years before present. Evidence of their occupation can be found in the many cultural resources consisting of pictographs, petroglyphs, agave roasting pits and handmade tools found in the NCA.

The first visitors of European ancestry that passed through Red Rock Canyon were explorers, traders, and trappers in the early 1800s. The Spanish Trail was active between 1824 and 1849, and the first permanent settlement was the Sandstone Ranch, presently known as Spring Mountain Ranch State Park, established in 1867.

Las Vegas citizens early on knew of the recreational importance of Red Rock Canyon. In 1967 they helped the Bureau of Land Management acquire special land status for Red Rock Canyon in the formation of Red Rock Canyon Recreation Lands. On November 16, 1990, Red Rock Canyon National Conservation Area was designated, creating an even larger are of resources and recreational opportunities for the nation.

Existing Interpretive Facilities and Media Condition

The current RRC Visitor Center is a 7,600 square foot facility offering information and interpretation about recreation opportunities, wildlife, wild horses and burros, vegetation, geology, cultural and natural resources and more. Most exhibits were constructed in the early 80s and consist of static displays with the exception of a portable wand tour which needs text revision. Many of the exhibits show wear and tear, are thematically inconsistent, and are in need of major rehab work or total replacement. Patterns of visitor movement are undefined and confusing.

The lobby currently houses the information desk, bookstore\gift shop, interpretive area entry and hand-held wand unit distribution box.

With the current visitor load, this causes overcrowding problems and hinders circulation, as does the lack of appropriate signage.

The bookstore/gift shop is operated by the Red Rock Canyon Interpretive Association, a non-profit organizations whose mission "is to aid in the understanding of the values of the areas in and around Red Rock Canyon National Conservation Area" and in researching and sharing interpretive information about RRC and assisting the BLM financially with endeavors related to interpretation.

Recently, an additional "Friends" room was constructed for multi-purpose use by educational groups, and for special functions and events.

With annual visitor center use approaching half a million people, the current building can no longer fully accommodate the needs of visitors and staff. Inadequate storage space is also a major problem. The original reception area was previously altered to create a makeshift office/library with storage space for video production equipment.

In the same location as the Visitor Center is the "Homer Morgan Pavilion" which offers a rest stop destination/location, with water and a rest room, for bicycle enthusiasts. It also includes benches and picnic table providing opportunities for day use picnicking and group gatherings.

A *Visitor Center Masterplan and Conceptual Design* report (July, 1996) addresses some of these concerns and considers alternatives for future expansion of these facilities.

Interpretive Development of Themes by Site Location

Visitor Center

The Visitor Center is the focal point for visitor orientation. Located at the entrance of the Scenic Drive adjacent to Charleston Boulevard, visitors can receive educational, informational and interpretive materials, partake in scheduled public activities, and view the overall Conservation Area. The interior exhibits will continue to be upgraded to support increased use and changing information. Major cooperative agreements with non-profit organizations providing interpretive services for both the Bureau and public at Red Rock Canyon will continue to center their activities at the Visitor Center.

Moenkopi Trail

The Moenkopi limestone formation is the best example of the ancient

seabed which covered the NCA. Fossilized mud, marine life and sand dunes would be interpreted along this trail. The Moenkopi Trail with its adjacent access to the Visitor Center, can become an additional environmental education trail. Promoting the Moenkopi Trail for educational purposes would reduce the resource damage and use restrictions occurring on the Children's Discovery Trail.

Calico I, II and III

The geology of the Calico Hills presents a variety of topics. This petrified Aztec sandstone formation is a fine example of cross-bedding, mineral leaching, faulting, and erosional actions. Interpretive signs explaining different geological processes should be located both at Calico I and II.

Sandstone Quarry

Interpretation at Sandstone Quarry would focus on cultural resources and wash ecosystems. The early mining history would be the major historic theme with prehistoric Native American use a sub-theme. The geologic processes that affect a wash environment would also be explained by self-guided tours or interpretive signs.

White Rock

The entire ecosystem of Red Rock Canyon can be interpreted here. Sub-themes on geology, springs, flora, fauna and cultural resources can be explained at different White Rock sites. The expansive view from the White Rock pull-off is the best place in the NCA to talk about the famous Keystone Thrust. All the faulting and thrusting action that gives the unique escarpment its importance can be seen from this spot. Other geologic sub-themes could be included at White Rock Spring explaining how springs form at the base of sandstone outcrops. In addition, the cultural resources associated near spring development and the unique flora and fauna associated with riparian sites are also possible themes.

Willow Spring

The largest concentration of resources of historic and prehistoric use occurs here. Interpretive activities should be concentrated here as this is the most heavily visited picnic site in the NCA. Trails and signs will interpret the various periods of Native American occupation, and the early ranching and transportation developments in the canyon. The existing interpretive trail requires frequent maintenance due to heavy use. New signing needs to be installed. And bilingual signs, in Spanish, should be strongly considered.

Red Rock Summit Road (Rocky Gap/Old Potato Road)

The major theme here will be the importance of transportation through this pass for the Las Vegas and Pahrump Valleys. Historic Civilian Conservation Corps road work and the importance of early transportation of goods would be highlighted. Additional interpretation should acknowledge this road as the portal for hiking to the top of the escarpment, adjacent proposed wilderness areas and entrance into Spring Mountain National Recreation Area.

La Madre Spring

This is a great place to promote the "Watchable Wildlife" program. The spring brings in a variety of wildlife which can be viewed a short distance away from the small dam.

Lost Creek

The unique flora and its biotic relationship with water will be the main theme here. The concept of a riparian environment will be the main topic.

Children's Discovery Trail

Current use for school and youth groups will continue to be the major focus here. All major ecosystem themes are incorporated at this site and an additional on-site brochure for the public has been developed for the Children's Discovery Trail.

Ice Box Canyon

The theme of plant succession due to past and recent fires at the mouth of the canyon should be the major interpretive thrust here. A sign at the parking area would reach all visitors to Ice Box Canyon.

Pine Creek

Riparian habitat, rare plant species and the natural succession of plant communities should be the major topics of interpretation at this site. Interpretive signs at the parking lot would reach both the casual visitor and the climbing/hiking visitors to Pine Creek. Sub-themes on historic homesteading and Native American use of this area should be interpreted at the meadow site. The fire ecology trail off the main Pine Creek trail should be more clearly delineated.

First Creek

Interpreting the wild burros in Red Rock Canyon NCA near the trail

entrance would serve a practical purposed in educating the public about burro behavior.

Oak Creek

Interpreting the different geologic strata should be the main theme at Oak Creek. The Chinle formation is best observed at Oak Creek and other wash and Moenkopi formations can be interpreted here.

Highway 160/Spanish Trail

The Spanish Trail opened the Las Vegas Valley to the east and the west. The importance of this trail to early Mexican commerce throughout the southwest and the later migrations of Mormon pioneers into southern California should be the main theme. Other interpretive activities can focus on the cultural resources, wild horse herds and the climbing, equestrian and mountain biking opportunities in the area.

Bootleg and Rainbow Springs

The southwestern end of Red Rock Canyon is a surprise of springs and cultural resources. Signing shall be installed as necessary to protect cultural resources, otherwise the area would be left undeveloped. No attempt would be made to provide on-site interpretation.

Bridge Mountain/Escarpment

Increased usage by hikers and backpackers atop the escarpment shows the need to install a trail system that interprets the unique geology and fragile ecosystem found here. Low impact interpretation in the forms of signing and information acquired at the Visitor Center, plus the occasional guided activity should continue the solitude and wilderness experience most visitors desire when hiking to Bridge Mountain and surrounding peaks.

Scenic Drive

The Scenic Drive will continue to be the primary recreational activity for the majority of visitors to Red Rock Canyon. Vista pull offs along the 13-mile drive can be used to interpret every ecosystem found at the NCA, cultural resources, and impact of human use. Installing a radio tour along the Scenic Drive would further increase the interpretive outreach media available. The biggest challenge for interpretation around the Scenic Drive is attracting the attention of visitors at given sites and communicating the desired message during their visit.

Brownstone Canyon

The prehistoric cultural resources of Brownstone Canyon would be the focal point of interpretation, with sub-themes on geology and wildlife. A cooperative agreement with local Native Americans and continuation of current volunteer activities would increase accuracy of site interpretation, enhance protection of special world-class features and increase guided activities. In order to protect resources within the basin, interpretation will be low key and limited. Former access through private land has been limited.

The Cave

The "Cave" adjacent to west Charleston is the most accessible cave in Red Rock Canyon. Due to years of resource degradation at the site, concerns for local bat populations, and safety hazards inherent in cave sites, interpretation of this site should be limited to the abundant fossil resources of the Kaibab formation, rather than any emphasis on the cave itself whose significant formations have all but been destroyed.

Blue Diamond Hill

A cooperative agreement with the James Hardy Gypsum Plant would allow for interpretation of the geologic features that allow for mining in the area and the formation of the town of Blue Diamond. A brochure on the above material for a self guided tour along Highway 159 would interpret the importance of mining in southern Nevada.

Red Spring

This sensitive area of natural and cultural resources includes threatened and endangered plant and animal species, natural springs, and significant archeological resources. The geologic and cultural resources found in the area can be tied together with a water theme. A site plan needs to be developed as area resources are currently very vulnerable to vandalism and other human-caused damage. The site plan will focus on restoring Red Spring to a more natural condition and reducing the vehicle access and picnic aspect of the area by limiting it to the lower vicinity near the entrance. Interpretive potential is high.

Red Rock Overlook (Dedication Site)

Interpretive signs explaining who the Bureau of Land Management is and the basic concepts of the Red Rock Canyon National Conservation Area should be added. Due to heavy use by local Hispanic groups, bi-

lingual signing should be considered. This area is a major short-term pull off for a variety of users.

Personal Services

Personal interpretive services at Red Rock Canyon National Conservation Area currently consist of guided walks, talks and hikes; formal and informal "patio" talks; outreach education programs; teacher workshops; special events; and staffing of the visitor center desk. As of January, 2000 BLM interpretive staff numbers five permanent employees and two ECO positions.

In addition, interpretive programs and services are also provided by Red Rock Canyon Interpretive Association employees as well as members of the Friends of Red Rock Canyon. In 1998 RRCIA employees presented 187 formal programs and 144 informal talks, reaching an audience of 5,455 people, a 28% increase over the previous year.

Public support and demand for interpretive programs is high with increasing local use by educational and other groups, as well as enthusiastic participation from casual visitors. An aggressive program of teacher workshops and environmental education programs is in place, but there can be very little outreach into the community with the current limited resources.

Non Personal Services

Non-personal interpretive services at Red Rock Canyon currently consist of a number of media including publications, exhibits, video programs, wayside exhibits, and an audio "wand" tour. The visitor center is the primary location for many of these media including the "wand" tour which is currently available in four different languages. Most exhibits within the visitor center were designed and fabricated in the early 1980s and are in need of repair or replacement. Interpretive messages are dated and space is poorly utilized.

In the absence of an exhibit plan, displays and exhibits have been "piece-mealed" over the years with no coherent theme or message. Meanwhile, visitation to the facility has skyrocketed creating crowded and often uncomfortable conditions. A total redesign of the current visitor center, with proper and professional exhibit planning, should be considered a top priority.

Visitors have access to numerous free publications outlining various aspects of Red Rock Canyon. By and large, these publications are well-designed and accurate. With the expansion of the trail system, a hiking/trail guide needs to be developed as well as a color brochure of the park itself. An annual park newspaper, which would be

distributed free, would be an excellent way to inform visitors of BLM resource management issues as well as advertising current interpretive programs.

Wayside exhibits are well distributed at trailheads and significant cultural sites and appear to be holding up well. But, again, an overall wayside exhibit plan needs to be addressed as different interpretive sites and themes are established.

Consideration should be given to establishing a room or auditorium where a professionally developed illustrated slide program, laser disc and/or video can be screened to the public at regular intervals. Interactive computer programs will also be an asset to the education of park visitors as well as establishment of a web site on the Internet.

Partnerships

At the present time, partnerships play a crucial and significant role in the interpretive program for Red Rock Canyon. Red Rock Canyon Interpretive Association and the Friends of Red Rock Canyon play a key role in supporting and sustaining interpretive activities on site through interpretive and education programs, and regularly scheduled staffing of the information desk. Furthermore, both organizations provide financial support for critically needed supplies and materials (refer to section on Cooperating Associations and Friends Groups).

Library and Collection Needs

At present, Red Rock Canyon maintains a small resource library at the park visitor center as well as a collection of video taped programs and lectures. Expansion and relocation of the library should be an integral part of any plan to redesign the current visitor center. Some "master" video and audio tapes need to be in a protected, climate-controlled environment to ensure that no deterioration occurs.

Slides are currently housed in an Abodia slide cabinet and are well organized and protected. Slide storage will need to expand as the collection expands.

Staffing Needs and Costs

In spite of continued support from our partner organizations, BLM still needs to be a viable and visible entity on site to provide credibility, expertise and agency identification to the visiting public. Some staff increases will be necessary to provide better coverage and expanded hours at the park visitor center. Staffing increases due to fee collections (temporary Rangers) allowed the

Visitor Center operating hours to be expanded to 8 AM to 5 PM in early 1999, but staffing is not sufficient to extend hours to 6 PM in the summer..

Furthermore, in order to implement an effective outreach/education program within the community, dedicated staff must be available to develop and deliver these programs. An aggressive outreach program is an effective tool for resource protection and support, and is essential as the rapidly growing metropolis of Las Vegas moves closer and closer to the boundaries of the Conservation Area.

An addition of four permanent interpretive personnel (4 FTE) at full-performance level would allow Red Rock to achieve the goal of expanded visitor center hours, dedicated outreach programs, and additional on-site presentations while still maintaining full-time coverage inclusive of annual leave, sick leave, and other unscheduled emergencies. Projected cost for these additions would be about $240,000 annually.

Summation

Red Rock Canyon National Conservation Area protects and preserves some of the finest Mojave Desert scenery and habitat of any federally-managed area in the west. It's close proximity to one of the largest and rapidly-growing cities in the southwest makes education for preservation and protection an imperative action. Visitation will continue to grow and will bring increased impacts to this fragile resource.

Facilities and services must keep pace with this anticipated growth, and must employ the most effective and "cutting edge" techniques to capture the interest and imagination of park visitors from all walks of life.

Understanding and support of this area by the visiting public will promote its protection and will promote the efforts of the Bureau of Land Management in its missions and goals. Effective interpretation and education is the best way to foster this support and, in turn, provide an awareness of the vulnerability of all of our desert lands. With its high-visibility in southern Nevada, the Red Rock Canyon National Conservation Area has the opportunity to make a real difference in the perception and protection of these public lands for future generations.

APPENDIX 25

PUBLIC REVIEW/COMMENT AND BLM RESPONSES

The Draft Plan was published and distributed to the public on July 1, 1999. Coinciding with the delivery date, the 90-day public comment period began on July 1 and continued through the end of September. Due to requests received from some of the reviewing interest groups, the comment period was extended through October 31, 1999. Comments were received at several public meetings and field trips held during the comment period (for more information, see Chapter 5 - Coordination and Consultation), as well as a public hearing in which all testimony was recorded. BLM received 159 comment letters during the comment period, some of which were repeat letters from the same source. Letters and the public hearing transcript are on file, and available for review, at the BLM's Las Vegas Field Office. The following includes comments received (in italics) and BLM responses.

CULTURAL RESOURCES

Implement recommendations in Appendix 22 (Cultural Resource Report by Keith Myhrer).
Many of the recommendations proposed have been completed. Most sites have been evaluated and Willow Spring, Sandstone Quarry and Red Spring have already been submitted for eligibility. Red Spring is slated for a new site plan emphasizing the restoration of much of the area and focusing on interpretation of the resources. As recommended, BLM at one time proposed closure of the Rocky Gap Road to motor vehicles, but because of the RS-2477 status the proposal was dropped. A cultural resource analysis is prerequisite to implementation of any projects with potential resource impacts. An interpretive plan for Red Rock Canyon is included as Appendix 24.

Protect Spanish Trail from mountain bikes.
The Plan allows for adjustments to be made to the Cottonwood Valley Mountain Bike/Equestrian Trails Network as needed to prevent resource impacts. Review of the trails is currently taking place. BLM has held several meetings with trail users to determine needed adjustments to the trails network. Along with adjustments and improved trail designation on the ground, BLM is working with the trails community to increase education and awareness to help prevent unauthorized trail creation and protect the resources.

Consider impacts to cultural resources on all proposed recreation proposals.
This is prerequisite to implementation of any proposed ground-disturbing activity as stated in the Standard Operating Procedures in Chapter 2.

A more complete cultural resource inventory needs to be done in RRC.
Inventories of the known historic and prehistoric sites acquired in the 1994 expansion of RRCNCA will be conducted as stated in Chapter 2 under Cultural Resources.

Use public education to protect cultural resources.
Efforts are currently taking place through brochures and displays at the Visitor Center, interpretive hikes and presentations offered, and books and literature available at the Visitor Center Bookstore. Protection through education programs, exhibits and activities is also listed as a goal in the Interpretive Plan included in Appendix 24.

Set up Native American council for guidance.
Several actions propose requesting assistance and input in related BLM programs and inviting Native Americans to present cultural/educational activities for BLM volunteers and the general public (see Cultural Resources and Native American Concerns in Chapter 2).

Protect cultural sites.
Cultural sites will be managed and protected as described under Cultural Resources and Native American Concerns in Chapter 2.

Reduced entrance fee or no fee for Native American cultural use of RRC.
Native American concerns can be reviewed in the Cultural Resources section of the Standard Operating Procedures in Chapter 2.

COMMERCIAL INTERESTS/PERMITS

Allow competitive bike events on the Scenic Drive.
When events occur on the Scenic Drive, the public is still allowed access. The speed limit on the Scenic Drive is 35 mph and bikes can easily exceed this limit at several locations. Due to safety concerns, events that exceed the posted speed limit will not be permitted on the Scenic Drive.

Do not allow exclusive rights to permittees.
Permittees are not granted exclusive rights. All trails and roads are available for designated casual use. Commercial events are allowed no more than ½ of any specific permitted overlook. A standard stipulation stating that the permittee does not have exclusive rights accompanies each authorized permit.

In favor of commercial operations that abide by regulations.
So are we.

Include more information on horse riding concessions.
Commercial operations are discussed in the expanded issues in Chapter 1, planned actions in Chapter 2 and existing situation in Chapter 3. For more detailed information or information on specific commercial opportunities, feel free to call the Las Vegas Field Office or make an appointment for a personal visit.

Be more restrictive with Cowboy Trail Rides.
The Cowboy Trail Rides file has been closely reviewed for allowances that were too liberally granted. The new managers at the Las Vegas Field Office have several concerns. Preliminary discussions have been held with the Cowboy Trail Rides organization and they have shown a willingness to work with the BLM to resolve concerns.

Do not allow downhill mountain bike events.
Proposed mountain bike events will be reviewed on a case-by-case basis before a permit is issued. Past downhill events have not shown impacts significantly higher than other permitted mountain bike events.

A number of comments received called for a limit or reduction in the number of commercial permits issued, a few calling for the elimination of all commercial operations.
Commercial permits will not be completely eliminated, as BLM has the responsibility of providing opportunities to the public. Commercial guided tours offer the permittee a business opportunity at their desired trade and the public the opportunity for an enhanced experience that generally includes interpretation along with experiencing Red Rock Canyon in their desired fashion. Limits were set for the various commercial operations in the Draft Plan. After review of the comments received, further reductions have been made in the Proposed Plan. Pertinent information can be viewed under "Commercial Use" in Chapter 2 and under "Changes from Draft to Proposed Plan" in Chapter 2.

BIODIVERSITY

Limit recreation in sensitive habitat areas. / Fewer actions leading to fragmentation.
The Proposed Plan offers a number of actions and management strategies to enhance biodiversity. Few proposed actions actually involve new ground disturbance, but in all cases the proposals will go through a more focused environmental review at the project plan level. Dirt road closures are proposed in many areas. In sensitive areas where effects from recreation become unacceptable, BLM maintains the flexibility to mitigate impacts by rerouting trails, road closures or other means as necessary.

Work in harmony with other agencies regarding conservation agreements/plans.
BLM is working with the U.S. Fish and Wildlife Service and James-Hardie Gypsum to conserve the Blue Diamond Cholla habitat. BLM is also working as a partner to implement the Clark County Multi Species Habitat Conservation Plan.

No camping within 100 yards of water sources.
The only camping allowed on the valley floor within the NCA, as designated in the 1990 legislation, is in the 13-Mile Campground. The Proposed Plan states that camping will not be allowed within 1/4 mile of springs and riparian areas.

Several comments were made in regards to spring developments, such as having fewer, protecting the

first 50 meters of springbrooks, not developing springs with less than 1 gpm flow, and not developing springs at the source.
No spring developments are planned in the NCA, other than those related to wild horse and burro use. The Plan calls for improvements to existing facilities and allows that other options are being explored. The specific mitigations to managing wild horses and burros will be determined in the Herd Management Plan (HMP), which is being developed currently in a separate planning effort. To express concerns relating to spring developments, interested parties should keep apprized of the HMP planning process.

GENERAL/MISCELLANEOUS

Address OHV/4x4 community
OHV is discussed in Chapter 3 under "Recreation" and in Chapter 2 under "Roads".

State property in Pine Creek should be identified and discussed. / Do a land trade for the State property in Pine Creek .
The State property in Pine Creek is mentioned under "Land Status" in Chapter 3 and identified on maps showing non-BLM ownership. The BLM is very interested in acquiring this property and will discuss the possibility with the State.

Agreement with Draft Plan alternatives.
Several comments stated they generally agreed with either Alternative 3, 4 or 5. Most were in agreement with Alternative 3.

Include section on cumulative impacts.
Included in Chapter 4.

What actions are to be taken if water standards and vegetation objectives are not met?
If monitoring shows the health of the resources declining to substandard levels or that improvement is not occurring where levels were already determined to be in a substandard state,
mitigation will be implemented to reverse the trend. Mitigation could be a downward adjustment in the AMLs for wild horses and burros or a reduction in human visitation, depending on what the impacting factors are determined to be.

Need more staff for law enforcement.
There has been a consistent continual need for additional law enforcement since the passage of the NCA legislation in 1990. There are two factors which prevent the increase in staffing. The first factor is the amount of budget allocated to the Las Vegas Field Office to pay salaries, and the second is a ceiling set for each field office in Nevada that limits the number of employees allowed.

Support hunting policy.
The hunting policy is determined in cooperation with the Nevada Division of Wildlife.

Allow target shooting at proposed Lucky Strike location.
The overwhelming public response to target shooting is to not allow it in the NCA.

No closures in Cottonwood Valley due to hunting season.
The annual hunting closure includes only the first 10 days (including the first 2 weekends) of the upland game bird season. The closure is in regards to public safety and does not include the trails on the north side of SR 160. Field interviews with trails enthusiasts during the closure have proven to be supportive of the temporary closure.

No target shooting.
There has not been and it has been determined that there will not be legal target shooting in the NCA.

Several comments wanted to concentrate more on conservation and have less emphasis on development (keep RRC pristine).
There are actually very few proposals for new development. Only 2 trails would require new construction and many of the existing dirt roads are slated for closure. The proposal to construct a paved trail has been dropped and the paved return road has been put on hold. However, the reality is that the local population is growing rapidly and community development is occurring directly adjacent to the eastern NCA boundary north and south of Charleston Boulevard. There may be additional facilities development needed in order to protect resources, such as a mass-transit system along with a parking facility for the Scenic Drive.

ROCK CLIMBING

Do not list CLC mission in the Plan, but refer to the MOU to be developed.
The Climber's Liaison Council is an existing organization that has been meeting and developing for the last 18 months. Reference to the CLC and the BLM-CLC Cooperative Agreement can be viewed under Recreation in Chapter 2. For specific information, contact the CLC or the BLM's Climbing Ranger.

Opposed to having the CLC .
Perhaps a better understanding of the CLC would negate opposition to the organization. The CLC is the local climbing community working to educate climbers toward participating in their activity in a manner respectful of the natural resources. They sponsor an annual cleanup of RRC climbing sites and have been working on resolution of other climbing issues.

Allow bolting in the WSAs. / With BLM approval.
At this time, the Las Vegas Field Office does not have the choice to allow bolting in the WSAs. The

"Interim Management Policy for Lands Under Wilderness Review" directs the BLM in this matter (see Technical Rock Climbing under Recreation in Chapter 3).

Allow camping at the base of climbs.
Due to riparian and other resource concerns, the BLM does not allow camping at the base of climbs. Camping at the base of climbs is not consistent with the general camping policy as discussed under Recreation in Chapter 2. To allow so would be offering an opportunity to one user group that is not available to other visitors.

Allow more early access to the Scenic Drive. / Allow open early access to Scenic Drive.
Although the current direction is to allow a maximum of 2 early access parties per morning, this issue is still under review and other options are being explored.

No rock climbing in Pine Creek. / Limit rock climbing to one area. / No climbing.
Red Rock Canyon is one of the top 5 climbing areas in the country, and climbing is one of the top 3 activities in Red Rock Canyon. It is not practical to consider a ban on climbing or limiting access to one area. Different areas offer totally different climbing experiences (sport, traditional, bouldering, etc.). Routes already exist in Pine Creek and climbers have proven a willingness to participate in proposals to mitigate impacts which might be attributed to their activity.

Allow access to Potosi climbing site.
BLM has been working with representatives from the climbing community to design environmentally sound access to this site.

There should be a range of climbing alternatives. / Provide more analysis on the effects of rock climbing on the natural resources. / Develop a more in depth climbing plan separate from the Final GMP.
After the completion of the General Management Plan (GMP), a separate climbing plan will be completed that will tier from the GMP (see Recreation section of Chapter 2).

Several comments were in favor of allowing the issuance of more commercial climbing permits; some want no limit to the number issued.
This is contrary to a number of comments responded to earlier in this appendix under "Commercial Interests/Permits", which called for fewer permits issued or the elimination of commercial interests. The completion of a separate climbing plan, as addressed in the previous paragraph, will allow for additional comment and consideration of this issue.

Guest permit guides should be certified. / Limit party size to 8 with a 3:1 client-guide ratio. / Authorize AMGA to administer guest permit program.
Although certification would be viewed as preferable, the expense of completing certification limits the opportunities for many competent guides. The BLM has worked with and had the included climbing policy reviewed by many climbing entities and individuals who agree with a party size of 10. The BLM does not direct guiding outfits as to how they operate (guide-client ratio), however we may request

information from AMGA as to whether a particular guiding operation is accredited and deny a permit accordingly. BLM will continue to administer the guest permit program. The opportunity to reevaluate and reconsider these ideas will be available within the planning process in the development of a climbing plan for RRCNCA.

FEES

No fees should be charged in Red Rock Canyon except for developed facilities such as the campground.
The entrance fee collected at the Scenic Drive is part of the Pilot Fee Demonstration Program passed by Congress in 1996, which allows Federal land managing agencies to test fee collection methods and use the revenues generated to correct backlogged maintenance needs and improve visitor services. The money collected stays onsite. This program is still a test program and has not been made permanent to date, so comments addressing the program can still be directed to your local Congressional representation.

Do not implement the fee for mountain bikes in Cottonwood Valley.
The Draft Plan's proposed action to implement a fee collection program in the Cottonwood Valley vicinity has been dropped in the Proposed Plan.

FACILITIES

Limit facilities.
The Plan does not call for a lot of new facilities development. Most of the proposed facilities occur in the Scenic Drive area which is assigned a "Management Emphasis Area" (MEA) designation of "Roaded Developed". Another possibility would be the Oliver Ranch location which has an MEA designation of "Developed." A separate site plan will be completed for Oliver Ranch with the goal of providing an environmental education facility. (see Management Emphasis Areas in Chapter 2)

No new Visitor Center structures. / Keep the "Homer Morgan" bicycle pavilion.
The specific proposed actions to keep the Visitor Center functional are not addressed in this document. A separate plan was completed for the Visitor Center. The Visitor Center Plan is on file at the Las Vegas Field Office and the NCA Manager can be contacted for information on implementation.

Support Calico III proposal. / No Calico III or Rangers' Choice.
Calico III is a planned action which is included in the Interim GMP and is necessary to facilitate activities occurring in the Calico Hills. Construction will allow the touring public, RRCs number one user group, an improved opportunity to stop at Calico I, Calico II and Sandstone Quarry. During the spring and fall seasons, these sites fill up with long term parking and the touring public has no place to

park at these locations. The Rangers' Choice Overlook has been dropped from the Proposed Plan.

No dormitory at Oliver Ranch.
A dormitory at Oliver Ranch is not proposed in this document. A specific site plan will be completed for the Oliver Ranch location which will strongly consider the development of an environmental education facility and may or may not consider a dorm type facility in conjunction.

Develop a Science Center/Environmental Education facility.
A specific site plan will be completed for Oliver Ranch (see Additional Management Considerations in Chapter 2). The final decision on proposed actions will be determined with the completion of the site plan, although this document emphasizes that the development of an environmental education center will be a primary consideration for analysis.

Activate a feasibility study for a shuttle/mass transit system for the Scenic Drive. / Implement a shuttle/mass transit system for the Scenic Drive.
Before this action can be implemented, a feasibility and project plan must be completed. The Proposed Plan calls for a feasibility analysis to be conducted by a qualified contractor (see Additional Management Considerations in Chapter 2).

CAMPING

13 Mile Campground is a great facility.
Thank you for the positive comment!

Permit camping at Cottonwood Valley for events only.
To permit camping in the Cottonwood Valley vicinity for events only would be contrary to the camping policy set for Red Rock Canyon and would offer a special consideration not extended to the casual public. Permitted events that would require overnight camping are beyond the scope of activity to be authorized in Cottonwood Valley under a Special Recreation Permit.

Allow primitive camping in the Black Velvet area.
The BLM developed the 13 Mile Campground to consolidate camping to one location which allows reasonable proximity to most of the central NCA vicinity. The objectives were to allow better control of the camping situation and to allow recovery of previously used sites. The Plan does not propose reopening closed sites since the objectives have not changed.

Develop a campground for equestrian use. / Develop equestrian facilities and camping at 13 Mile Campground. / Develop an equestrian campground at the old overflow site across from James-Hardie Gypsum Plant.
A regular campground combined with an equestrian campground is normally not an agreeable mix. The

consideration of the location across from the James-Hardie Gypsum Plant for a campground in the recent past met with severe resistance and was dropped from consideration.

TRAILS

Several comments were in support of Alternative 4 which is the most restrictive of the alternatives and designates fewest number of existing routes as trails.

Promote trail connectivity with non-BLM systems.
On several occasions BLM has had preliminary discussions with different trails entities resulting in little fruition. At this time, the goal is to determine the trails systems for the NCA. This does not preclude consideration of connectivity with other trails in the future. The addition of a trail or the modification of existing trails is possible as long as it is located in a Management Emphasis Area consistent with the proposed action (see Management Emphasis Areas in Chapter 2).

Include more trails and toilets (use washes for trails)
The Proposed Plan offers a multitude of trail opportunities. It will be possible to propose new trails not listed in this plan, as is discussed in the previous comment, but each proposal would need to be analyzed regarding resource concerns and made available for public review prior to a final decision. The addition of toilets would also require planning ahead.

Trails should be multiple use whenever possible.
Many of the trails are multiple use, although in some areas the combined use is not compatible. Different combinations of trail use were presented in the Draft Plan and discussed at public meetings to arrive at the trail designations in the Proposed Plan.

Provide a bike lane along Scenic Drive.
This particular trails proposal has been presented in past planning considerations as either a separate trail constructed adjacent to the Scenic Drive or as a designated lane striped on the Scenic Drive. Both ideas met with disapproval. It was felt that the trail would create an unacceptable amount of new disturbance and would be very difficult to construct at certain locations. The consensus of the biking community that utilizes the Scenic Drive was that they did not want to be limited to a lane and needed more of the road to negotiate turns.

Do not allow trail use right after rainstorms.
This is a good idea and is probably best addressed through educational efforts from both the BLM and the trails user groups.

Construct the Sandstone-Willow paved trail. / Construct Sandstone-Willow trail, but do not pave it. / Do not construct Sandstone-Willow paved trail.

The primary intent of the paved trail was to provide a more user friendly route for bicycle riders and prevent the unsafe practice of returning against traffic on the one-way road. Some comments support the trail as proposed, but the overwhelming attitude is that the impact of the new construction and pavement is not worth the opportunity the trail offers. The proposal is not included in the Proposed Plan.

Several comments were received requesting various equestrian staging locations. Individual comments requested different combinations of sites, but the list of sites requested includes the old Oak Creek Campground, the Cottonwood kiosk lot south of SR 160, the lower White Rock lot, the Scenic Drive exit lot, and the old overflow campground across from the gypsum plant.
The 3 areas that will be designated for equestrian staging include the old Oak Creek Campground location, the Scenic Drive exit lot, and the 12 mile location along the Kyle Canyon Road. These sites offer excellent access to surrounding trails. The overflow site is closed to vehicular access and is not available. The designation of the selected sites does not preclude use by other visitors and the non-designation of the kiosk location and the lower White Rock lot does not mean horse trailers cannot be parked there.

Do not allow equestrian staging at the old Oak Creek Campground site.
The Oak Creek site is a good location for equestrian staging due to its location in proximity to the surrounding equestrian trail opportunities.

Include a new equestrian trail following the east RRC boundary.
This proposal did not surface during the planning process for the GMP and was not included in any of the alternatives in the Draft Plan. It cannot be included in the Proposed Plan, but it can be considered as a future proposal and would require a specific environmental analysis (EA) and public review.

Allow equestrian use on the La Madre trail.
The Nevada Division of Wildlife has a strong concern that equestrian use of the area and watering horses on site would be a deterrent for bighorn sheep that utilize the site. To accommodate equestrians using the White Rock Loop trail, a trough is proposed in the vicinity of the junction with the La Madre trail.

Construct a second Red Valley trail for equestrian use.
This proposal is included in the Proposed Plan.

Include equestrian use on Twilight Zone trails.
This proposal is included in the Proposed Plan.

Limit equestrian use in RRC. / Limit equestrians to designated trails.
The Proposed Plan limits all equestrian use to existing designated trails within the area south of La Madre Mountain to the south end of Cottonwood Valley (basically the original NCA boundary). Dispersed casual use is not a concern at this time within the remainder of the NCA (this does not include commercial use).

Do not allow equestrian use on escarpment base trails. / Do not allow equestrian use on the proposed Kraft Rocks trail.
The southern most sections of the escarpment base trails include equestrian use. Many of the trails on the west side of the Scenic Drive where the heaviest hiking use occurs are limited to hiking only. Many of the residents of the Calico Basin community own horses, so it is appropriate to allow equestrian access on the
proposed Kraft Rocks trail.

A number of comments requested additional mountain bike trails and the added designation of mountain bikes to equestrian and hiking trails.
The mountain bike trails that have been designated along with the additional proposed trails north of Kyle Canyon and from Blue Diamond to Jean offer an abundance of opportunity. Getting a handle on the Cottonwood trails and controlling the proliferation of unauthorized new trails has proven to be a constant challenge. BLM and members of the mountain bike community have been working to resolve some of the ongoing problems and start a campaign to educate the trail users. Until there is control over this situation, it is unlikely that new trails will be designated.

Provide trails for mountain bike novices.
Beginners may ride on any of the designated dirt roads to become familiar with the operation of their mountain bikes. At that point there are various trails available to graduate into single track ventures. BLM is presently working with the mountain bike community to better organize the trail system and offer loop rides at a range of challenge levels. The new system will be accompanied with a more user-friendly trails map.

A number of comments stated that all bikes should be limited to roads only, mountain bikes should not be allowed on trails in the Scenic Drive vicinity, the number of mountain bike trails should be reduced, or mountain bikes should not be allowed in Red Rock Canyon.
Mountain biking is one of the highest use activities that occurs in the NCA, which demonstrates the demand for trail opportunities. The communication between the mountain bike community and BLM has improved vastly over the last several months, and a partnership is developing with the goals of educating the users of the Cottonwood trails and resolving problem situations. The BLM will be looking at areas outside of the NCA to enhance local mountain bike opportunities and lighten the load on Cottonwood Valley.

ROADS

Check with Clark County before closing roads that may be RS-2477.
The Proposed Plan states that the BLM will confer with Clark County on this matter before any actual road closure takes place.

Allow access to the Oak Creek trailhead without driving the entire Scenic Drive.
At the present time this would be inconsistent with the logistics of the one-way drive orientation and the ability of BLM to monitor for day use. It is an issue that can continue to be considered in conjunction with some of the potential changes, such as the implementation of a shuttle system or the quest to devise an improved early/late access plan.

Create openings in the speed bumps on the 13 Mile Campground road for bikes.
The intent of the speed bumps is to slow traffic (including bicycles) to a safe speed, therefore new openings will not be created.

Do not reopen old roads for trail use.
Most of the road-to-trail conversions proposed in the different alternatives of the Draft Plan have not been carried forward in the Proposed Plan. Any additions to the trails proposed in the Proposed Plan will require the completion of a separate environmental analysis and opportunity for public comment.

Do not close minor dirt roads without checking validity.
The Proposed Plan states that dirt roads slated for closure can be reconsidered if there is a valid reason. It also states that the BLM will confer with Clark County regarding RS-2477 status.

There were a few comments requesting that roads 16 and 17 (see the road maps in Chapter 2) in the La Madre Wilderness Study Area remain open to motor vehicles. There were a number of comments that called for the closure of all roads within the Wilderness Study Areas that were not cherry stemmed.
In following the direction set forth in the "Interim Management Policy For Lands Under Wilderness Review", roads/ways 16 and 17 will be closed. When Congress makes a wilderness decision regarding the La Madre WSA, the roads will be reconsidered depending on wilderness designation/nondesignation.

Comments regarding the return road from Sandstone Quarry to the Visitor Center were distributed evenly into 3 general groups:

1. *Those not in favor of constructing the return road*
2. *Those in favor of constructing the return road*
3. *Those that would support the return road, but only in conjunction with a comprehensive transportation plan for the Scenic Drive.*

Whereas the Draft Plan considered the return road a primary proposed action, the Proposed Plan will list it as an option for future consideration and not a primary proposed action.

WILD HORSE & BURRO

Defer horse and burro actions and AML determination to the HMA planning team.
Many of the actions are being considered at present in separate planning processes leading to an AML, plus the completion of a Herd Management Plan (HMP) for the Las Vegas Field Office. The Proposed

GMP will set the general parameters for the Red Rock HMA, AML will be set in a separate interdisciplinary planning process and the HMP will deal with long term specifics of herd management.

Mention wild horses and burros in description of the planning area.
Mention of wild horses and burros has been added to the description of the planning area.

More interpretation (public education) of horses and burros.
The Visitor Center is presently developing a new interpretive plan for the facility. Wild horse and burro interpretation has been discussed in the preliminary scoping and will receive strong consideration as to what extent it will be presented.

No vehicle parking should be allowed near the underpasses.
There are 3 sets of underpasses, all of which allow access back and forth for horses. Parking at the eastern most set of underpasses is being reviewed. The parking at the underpass itself can be signed for "no parking", but an alternate parking site needs to be located for the trailhead lot just north of the underpass.

Stipulations are needed to prevent disease transmission from domestic horses.
BLM will develop a stipulation to be included in Special Recreation Permits that allow commercial use involving domestic horses.

The area south of SR 160 should be closed to permit events during the foaling season.
The foaling season falls within the months of March, April and May, which is also the prime time of year for trails enthusiasts. There will not be a blanket closure of the trails south of SR 160 for permitted events during this time frame, but proposed events will be reviewed carefully and mitigation needs will be met before an event will be permitted (see Wild Horses and Burros under Biodiversity in Chapter 2).

Stop horse and burro adoptions.
Adoptions are an integral part of the management of wild horses and burros. When the herd sizes grow beyond what the natural resources can support, the herds are thinned and the collected horses and burros are put up for adoption to qualified homes. The alternative would be that a number of animals would die from lack of water or starvation.

Exclosures are needed to monitor the effects of non-native species. The BLM's AML team (mentioned in the first horse and burro comment) has already added additional exclosures for future monitoring.

Manage for the recovery of vegetation north of SR 160.
The direction in the Proposed Plan is to leave a reduced herd of 6-10 horses in the area of concern and allow the burros to remain in the area (burro herd may be thinned). The vegetation will be monitored to see if improvement occurs. Additional exclosures have been added to enhance monitoring capabilities. If improvement does not occur, AMLs will be reduced until monitoring shows a balance has been achieved.

Do not disturb burros south of SR 160 in the HMA outside of RRC.
The Proposed plan does not specify the relocation of animals to the south of SR 160. Disturbance of burros south of SR 160 is not anticipated from the GMP.

Do not change name of Red Rock HMA.
The name will not be changed.

Don't diminish wild horse and burro range. / Do not reduce the HMA boundary. / Do not modify the HMA boundary, use AML to limit herd size.
The HMA boundary will remain intact as shown in the Las Vegas Resource Management Plan with the exception of 2 minor adjustments south of SR 160 (see Wild Horses and Burros under Biodiversity in Chapter 2 for a description of adjustments along with accompanying map).

Do not fence the east side of SR 159. / Remove restrictive fences. / Utilize fragmenting fences for pasture rotation.
The Proposed Plan does not call for fencing the east side of SR 159, but it does allow for fencing as needed. The determination of specific actions taken to manage wild horses and burros will be determined in a separate planning process for the development of a Herd Management Plan.

Improve Mud Spring trough.
This has been done.

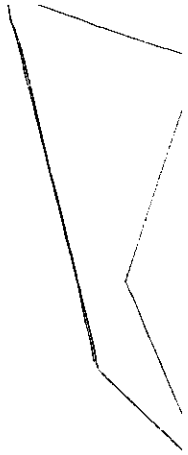
Support existing water sources with wells. / Favor water developments in Alternative 1.
The determination of specific actions taken to manage wild horses and burros will be determined in separate planning actions and/or in a Herd Management Plan. In either case, the actions will be subject to NEPA review.

Develop water sources before relocating horses and burros.
The Proposed Plan does not propose to relocate horses and burros.

Limit the amount of horse and burro water allocated from any water source to 25%.
The Proposed Plan calls for the restoration of riparian areas to proper functioning condition and specifies that wildlife needs must be provided for where waters are developed, but there are no specific water allocation percentages set.

There were a large number of letters stating the following concerns: Do not move horses. / Do not remove horses from Red Rock Canyon. / Do not relocate wild horses and burros. / Do not remove wild horses and burros from Red Rock Canyon.
The Proposed Plan does not call for the removal of wild horses and burros from Red Rock Canyon. The only specific proposed action is to reduce the herd size north of SR 160 to 6-10 horses. The specific AMLs and actions involving management of the wild horses and burros will be determined in a separate planning effort for all HMAs on the Las Vegas District.

Prefer Alternative 1 for wild horses and burros. / Do not relocate or split herds. / Do not move or destroy wild horses and burros.
See previous response.

Don't kill horses.
It is not BLM policy to kill horses and at no time in the GMP planning process has the possibility been considered.

A number of comments in favor of reducing animal numbers are included under the following: Allow a small herd (5-7 horses) north of SR 160. / Adopt horses of age north of SR 160 and leave remaining small herd. / Keep herd size at a manageable level. / Support horse and burro actions as proposed in Alternative 3. / Use castration to control herd size. / Restrict horses to south of SR 160. / Relocate the burros that are north of SR 160. / Remove burros north of SR 160, except those on Blue Diamond Hill. / Move burros to east of SR 159. / Move burros to east of SR 159
and develop burro viewing areas. / Remove burros that are north of SR 160. / Move horses and burros to south of SR 160, neuter and phase out. / Permanently remove horses and burros north of SR 160. / Remove horses and burros.
The Proposed Plan proposes managing a reduced herd of 6-10 horses in the area of concern north of SR 160. All other specific actions involving management of the wild horses and burros will be determined in a separate AML planning effort and in Herd Management Plans for all HMAs on the Las Vegas District. To stay current on the determinations of this planning effort, send a letter to the Horse and Burro Management Specialist at the Las Vegas Field Office and request to be included on the mailing list. Letters may also be addressed to the Assistant Field Manager of Renewable Resources at the same location.