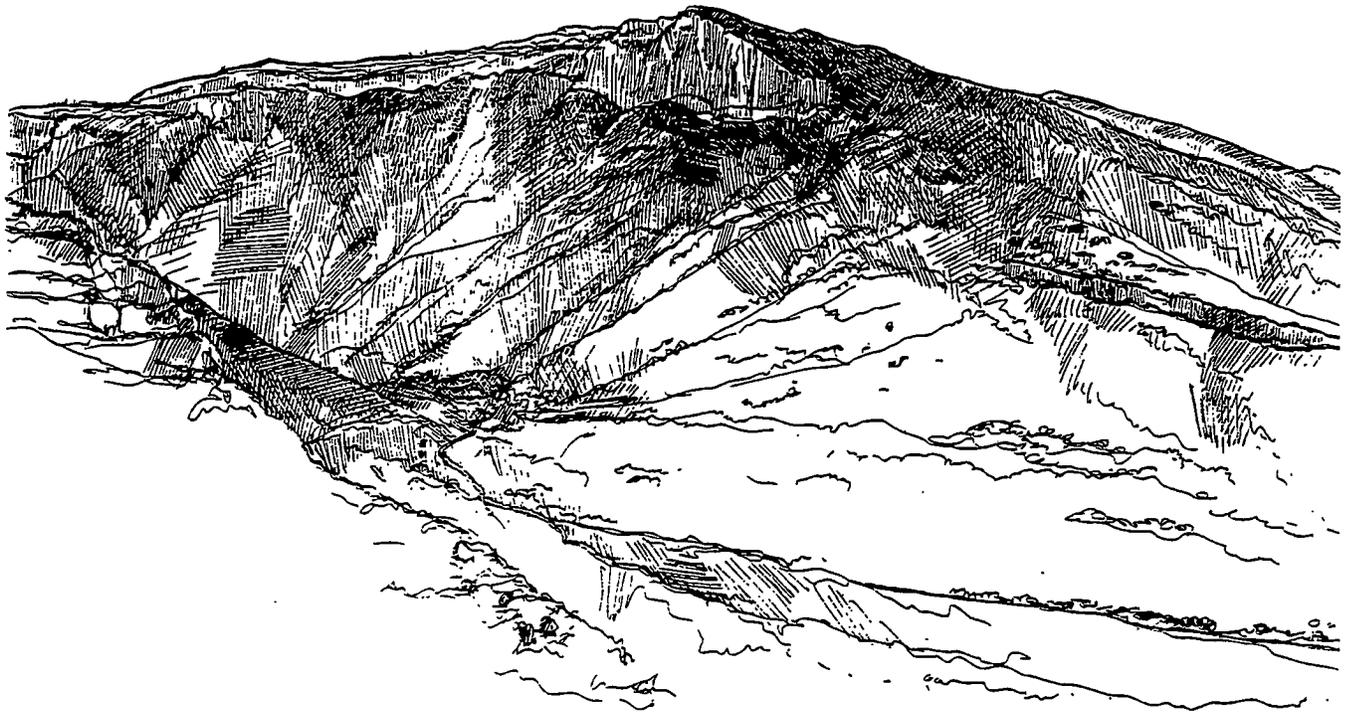


BACKCOUNTRY / WILDERNESS
MANAGEMENT PLAN
and Environmental Assessment



GUADALUPE MOUNTAINS NATIONAL PARK

Texas

166/119396A

**BACKCOUNTRY/WILDERNESS MANAGEMENT PLAN
AND ENVIRONMENTAL ASSESSMENT**

GUADALUPE MOUNTAINS NATIONAL PARK, TEXAS

April, 1995

National Park Service

U.S. Department of the Interior

TECHNICAL INFORMATION CENTER
DENVER SERVICE CENTER
NATIONAL PARK SERVICE

**BACKCOUNTRY/WILDERNESS MANAGEMENT PLAN
AND ENVIRONMENTAL ASSESSMENT**

GUADALUPE MOUNTAINS NATIONAL PARK

Recommended: Jane Henderson Date: April 12, 1995
Superintendent

Approved: [Signature] Date: 5/4/95
Regional Director

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I. INTRODUCTION

A. PURPOSE AND NEED

The challenge of managing the backcountry and wilderness areas of Guadalupe Mountains National Park presents the park manager with the dilemma of providing for the safe public enjoyment of the park while at the same time providing for maximum protection of its diverse natural and cultural resources. To develop a balance between these two equally important mandates, a comprehensive plan is needed which provides readers with an understanding of the biological and administrative constraints of management and provides them with a method for evaluating management alternatives. The Backcountry/Wilderness Management Plan for Guadalupe Mountains National Park is intended to provide the public and the staff with the operating details for managing the park's backcountry resources and, in doing so, insures the standardization and perpetuation of established goals and management policies.

Equally important, the Backcountry/Wilderness Management Plan for Guadalupe Mountains National Park serves as a vehicle by which the public can provide input into management of the park's backcountry and provides a method by which this program can be reviewed, updated, and corrected as needed.

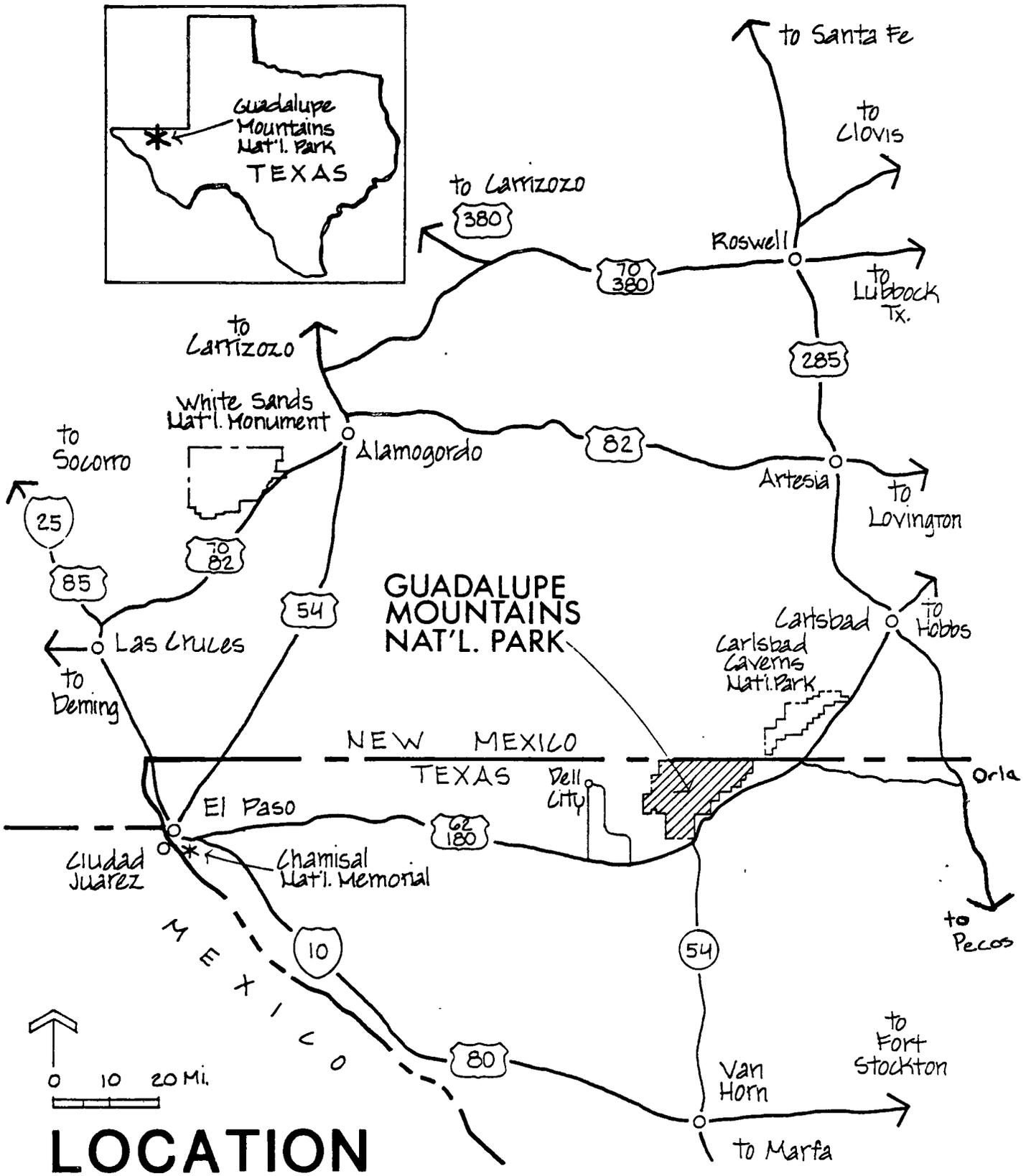
For administrative purposes, the park's backcountry will be defined as all areas of the park away from developed roads, parking areas, information stations, and administrative facilities. While this definition will obviously include the park's 46,850 acre designated wilderness area, the remaining 39,556 acres represents a collage of use zones ranging from those "heavily" used to those "lightly" used. For the purposes of this plan, all areas, except the Pine Springs/Frijole administrative-visitor use area, the Highway 62/180 corridor, the Dog Canyon Ranger Station area, the McKittrick Canyon entrance road-visitor station area, and the Williams Ranch Road corridor will be considered as "backcountry" (see Figure 2).

B. BRIEF DESCRIPTION AND HISTORY OF THE PARK

Guadalupe Mountains National Park was authorized by Congress in 1966 and established in 1972. It is located in a remote, sparsely populated area of the southwest (see Figure 1). The 86,416 acre park lies in Culberson and Hudspeth Counties, Texas, with county populations estimated in 1990 at approximately 3300 and 2700 respectively. Dell City, Texas, a small community of about 500 persons, serves an irrigated agricultural area about 20 miles west of the park.

Although Guadalupe Mountains National Park is surrounded by a variety of private, state and federally administered lands, the land within the boundary of the park is under the administrative protection of the National Park Service, except for approximately 10,000 acres on the West Side which was added in 1988 and is currently being purchased. Legal jurisdiction is concurrent with the state of Texas.

The park preserves a significant portion of the Guadalupe Escarpment, an uplifted Permian Limestone reef forming a huge V-shaped plateau. On both the east and west sides of the plateau, rolling foothills and portions of the desert floor are included in the park. El Capitan, on the southern end of the escarpment is a prominent landmark. Guadalupe Peak, located immediately to the north of El Capitan, is the highest point in Texas at 8749 feet. The escarpment rises above the desert floor some 5000 feet, and the high country contains 8 peaks over 8000 feet. The extensive exposures of the Permian reef are considered by



LOCATION

GUADALUPE MOUNTAINS NATIONAL PARK • TEXAS
 U.S. DEPT. OF THE INTERIOR • NPS

Figure 1

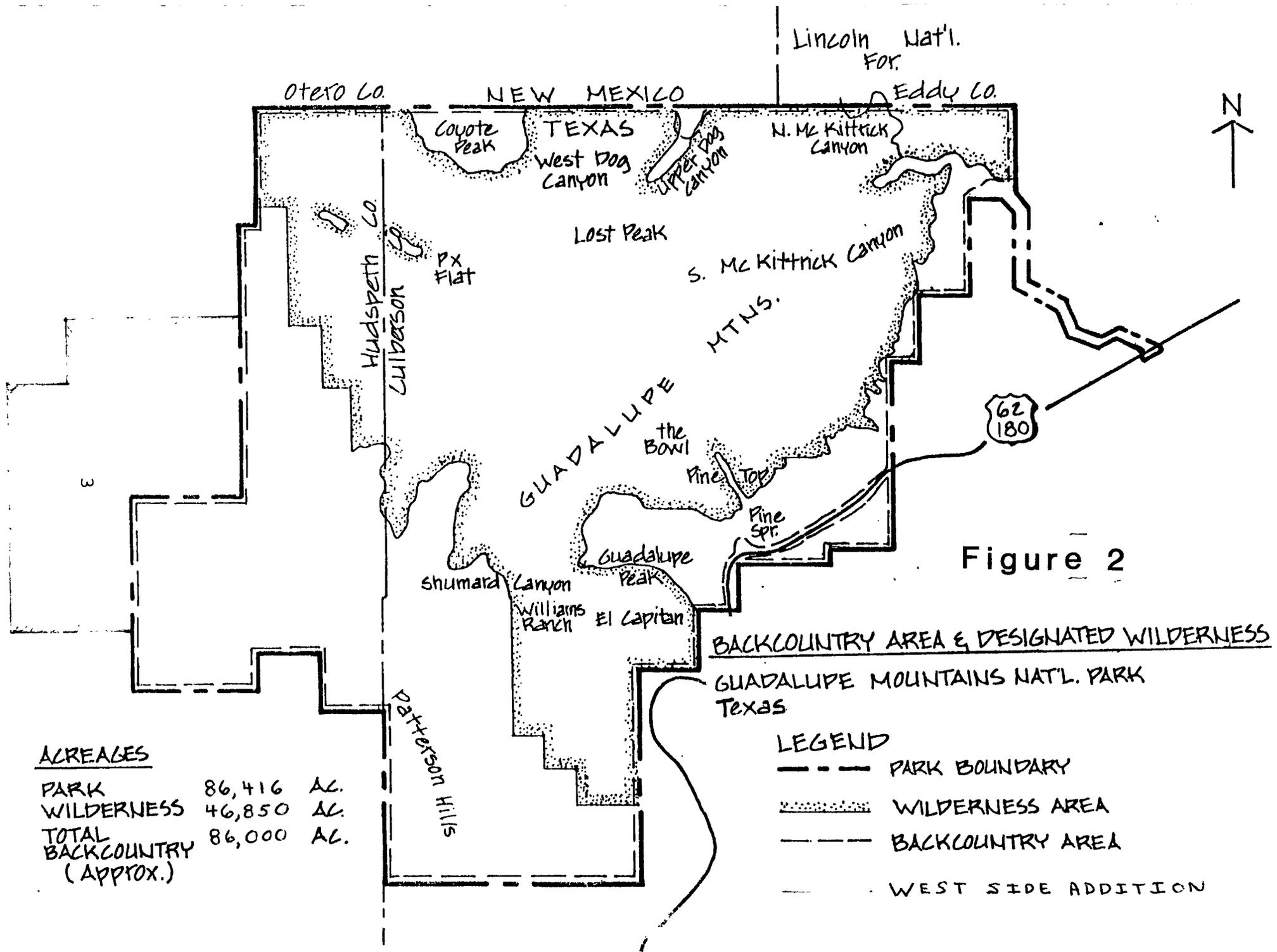


Figure 2

ACREAGES

PARK	86,416	AC.
WILDERNESS	46,850	AC.
TOTAL BACKCOUNTRY (APPROX.)	86,000	AC.

BACKCOUNTRY AREA & DESIGNATED WILDERNESS

GUADALUPE MOUNTAINS NAT'L. PARK
TEXAS

LEGEND

- PARK BOUNDARY
- WILDERNESS AREA
- BACKCOUNTRY AREA
- WEST SIDE ADDITION

geologists and paleontologists throughout the world as an outdoor laboratory of unique importance for tracing the history of the earth and for understanding the origins of certain valuable mineral resources such as petroleum, potash, dolomite, and limestone.

The climate of the park area is typical of the arid southwest. Summers are hot while freezing is common in the winter. However, the frost-free period extends for seven months, from April through October. Annual precipitation averages 21 inches in the high country and on the east side of the escarpment, with most rainfall occurring from May to October. Rainfall on the west side of the escarpment is significantly less. With the exception of McKittrick Canyon, there are no large perennial streams within the park. Otherwise, the escarpment is drained by numerous dry washes which are subject to flash flooding.

Botanically, the park area includes a unique assemblage of flora representing three distinct regions: the Chihuahuan Desert, the Rocky Mountain coniferous forest, and the eastern hardwood woodland. Some plant species are known only from the park area, and three are officially listed on the U.S. Fish and Wildlife Service's List of Endangered and Threatened Plants and Wildlife.

A relict pocket of true coniferous forest exists in the Bowl. This evergreen woodland represents an unusual contrast to the vast expanses of the Chihuahuan Desert scrub plant communities normally found in this region. Douglas fir, southern white pine, and ponderosa pine are dominant trees of the Bowl. The larger trees include Douglas firs with diameters of 39 inches and Ponderosa pines up to 32 inches in diameter. Gamble oak and southwestern chokecherry, two broadleaf deciduous trees, are also found in significant numbers in this high elevation plant community.

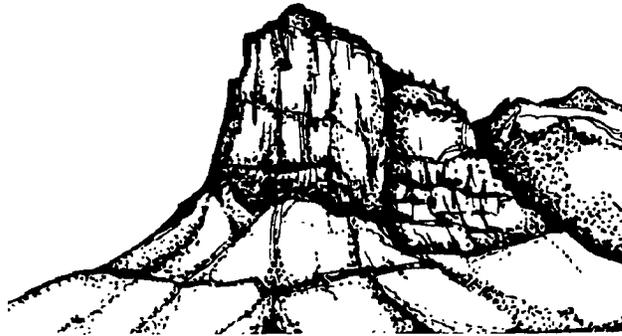
The western edge of the plateau slopes generally lower to the northwest and includes the rugged topography of Lost Peak, Upper Dog and West Dog Canyons, and PX Flat. In these areas, the vegetational composition changes to a pinyon pine-juniper woodland.

The park represents a transition, or overlap, zone with distinct species of mammals, birds, reptiles, and amphibians present but separated from their normal range. If studies indicate suitable habitat is available, Bighorn sheep may be reintroduced and managed to restore the park to its previous prominence as a home for this native species. Any such reintroduction of a species will be evaluated in an environmental assessment prior to decision making. Montezuma quail were introduced in 1984-1985 in Dog Canyon. The reintroduction was initially considered a success, but in recent years sightings have been fewer. Prior to park establishment Rocky Mountain elk (*Cervus canadensis nelsoni*) were introduced and are now estimated at approximately 32 animals. Historically, Merriam's elk (*Cervus canadensis merriami*) inhabited these mountains. A combination of hunting and grazing pressures pushed this animal to extinction by the early 1900's. Other large mammals present in the park include deer, black bear, mountain lion, and coyote. All will require careful monitoring to alert management to population fluctuations which may be harmful to park resources.

The land in and around the national park has a rich cultural heritage. The people of the Paleo-Indian Archeological Period (10,000-6,000 B.C.) were the first known inhabitants of the Guadalupe Mountains region. Archeologists have identified five subsequent cultural sequences including the present "Historic Period" which actually began in the late 1500's. The historic period is further divided into distinct subcultural units characterized as "aboriginal", "military", and

"homestead" periods. Another aspect of the historic period beginning in the 1500's was the Spanish exploration of the area.

In 1858, the "Pinery", a stage station for the Butterfield Overland Mail, was constructed near the mouth of Pine Springs Canyon. By 1876, ranching had become the dominant industry in the area with cattle, goats, and sheep grazing over a vast expanse of territory. During the 1920's and 1930's, ranching activity reached its peak on the Guadalupe Mountains range. This activity continued, at slowly diminishing levels, until 1972 when the Texas portion of the range was acquired by the Federal government and established as Guadalupe Mountains National Park. Ranching still continues on the lands surrounding the park.



II. PLANNING CONSIDERATIONS

A. NATIONAL PARK SERVICE POLICIES AND OBJECTIVES AFFECTING BACKCOUNTRY/WILDERNESS MANAGEMENT

1. Legislation

The following laws pertain to the management of the backcountry resources within Guadalupe Mountains National Park. These laws serve both as constraints in limiting the actions of the National Park Service and as guidelines for what is to be accomplished in the park. These laws include:

The Organic Act of 1916 directs the National Park Service to regulate park use and provide for the enjoyment of park lands in a manner consistent with the conservation of park scenery, natural and historical objects, and wildlife. In order to fulfill these mandates, all resource planning activities must ensure that public-use facilities do not disrupt or damage resources to a degree whereby their ability to benefit future visitors is reduced; that appropriate nondestructive public use and enjoyment of resources is made possible; and that conscious care and protection is provided to conserve natural and cultural park resources.

Public Law 89-667 (1966) provided for the establishment of Guadalupe Mountains National Park "... in order to preserve in public ownership an area...possessing outstanding geological values together with scenic and other natural values of great significance..."

The Wilderness Act of 1964 provided for the establishment of a National Wilderness Preservation System to be composed of federally owned areas designated by Congress as "Wilderness Areas". A wilderness is defined in the act as "...an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain". An area of wilderness is further defined to mean "...an area of undeveloped Federal Land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which: (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value". In November 1978, Congress established 46,850 acres of Guadalupe Mountains National Park as wilderness (see Figure 2). This legislation is provided in Appendix D, with the Wilderness Boundary Description provided in Appendix E.

Executive Order 11593 directs Federal agencies to survey and nominate to the Secretary of the Interior all properties under their administration that might qualify for listing on the National Register of Historic Places and to take measures which would result in the "protection and enhancement of the cultural environment."

The Endangered Species Act of 1973 requires all Federal agencies

to consult with the Secretary of the Interior on all projects and programs having potential impact on endangered flora and fauna. The legislation further requires Federal agencies to take "...such action necessary to ensure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of such endangered species and threatened species or result in the destruction or modification of habitat of such species which is determined...to be critical".

Public Law 100-541, 102 Stat. 2720 1988 Authorized the addition of 10,123 acres on the west side of the park. This additional land will protect both rare plant species and white gypsum and red quartzose dunes.

2. Management Policies

The manual entitled Management Policies for the National Park Service (1988) forms the basis for planning activities and the administration of Guadalupe Mountains National Park. Backcountry and wilderness management planning is also based on management objectives -- a listing of desired conditions or status to be achieved within a park -- which provide the manager a context for the evaluation of preservation and use, and a framework that enables management to satisfy the specific purposes for which a park was established.

National Park Service management policies specifically relating to the backcountry management of Guadalupe Mountains National Park include:

- To maintain, preserve, and perpetuate the aesthetic setting and the natural/cultural resources of park areas.
- To restore conditions conducive to the perpetuation of the natural processes as they functioned before disruption of technological man or competition from non-native plants and animals.
- To restore native plants and animals to their original range.
- To restore to natural appearance the land surfaces disturbed by man, recognizing that the significant cultural values must be preserved.
- To ensure perpetuation of rare and endangered plants and animals and those species endemic to the national park.
- To develop and execute continuing research programs for natural and cultural resources.

Management policies specific to the management of the Guadalupe Mountains National Park Wilderness area include:

- The visitor must accept wilderness largely on its own terms. Modern conveniences are not provided for the comfort of the visitor. The risks of wilderness travel, of possible dangers from accidents, wildlife, and natural phenomena must be accepted as part of the wilderness experience.
- If necessary to preserve the wilderness character, the Service will limit or disperse use through a variety of

means best suited to the particular wilderness concerned.

- The Service may designate campsites where the protection of resources dictates the need. Campsite facilities are to be the minimum necessary for the health and safety of the wilderness traveler and for the protection of the resources. Facilities may include an identifying site marker, tent sites, and sanitation facilities.
- The Service, recognizing the scientific value of wilderness areas as natural outdoor laboratories, will permit those kinds of research and data gathering which require such areas for their accomplishment, or which will not adversely modify either the physical or biological resources and processes of the ecosystem, nor intrude upon or otherwise degrade the aesthetic values and recreational enjoyment of wilderness environments. All activities must be in accord with wilderness management policies.
- Refuse may not be disposed of within the wilderness. The "carry out" concept will be implemented by the park.
- In the management of wilderness resources and of wilderness use, the Service will use the "minimum tool" necessary to successfully, safely, and economically accomplish its management objectives. The specifics of wilderness management for the park will be included in the park's Backcountry/Wilderness Management Plan.
- Administrative use of motorized equipment or mechanical transport is permitted only in emergency cases involving the health and safety of wilderness users or the protection of wilderness values and as necessary to meet the minimum needs of management to achieve the purpose of the area.
- Narrow, natural surface foot and horse trails are permissible. Trails intended for foot traffic only will be maintained, generally, to a width sufficient for persons to walk single file. Trails intended for combined foot and horse travel, or for horse travel only, will be maintained to a width sufficient for horses and their riders or pack saddles to travel single file.
- Action will be taken to manage wildfire in a manner which protects natural and cultural features and minimizes the lasting impacts of the fire itself.

3. Inter-relationships With Other Plans and Proposals

- a. National Park Service. The Backcountry/Wilderness Management Plan for Guadalupe Mountains National Park has been developed in co-ordination with other plans and programs implemented at the park and adjoining Federal areas. These documents and their relationships to the Backcountry/Wilderness Management Plan include:

The Guadalupe Mountains National Park Master Plan (FES 76-21) (1976) proposed that 46,850 acres of the park be established as wilderness. It also mandated that the subsequent trail system would follow the 55 miles of preexisting trail routes except for minor

relocations. This document projected that only horse and foot travel would be permitted in the park's backcountry and established that backcountry facilities would be limited to trail improvement, directional signs, and signs or markers designating campsites.

The Guadalupe Mountains National Park Master Plan Supplement (1980) sets forth a series of alternatives for park expansion, wilderness area expansion, and west side development. The study addresses three inter-related elements: (1) possible boundary revisions, (2) the westside development concept, and (3) possible wilderness additions. No final recommendations have been made on any of these elements.

The Backcountry/Wilderness Management Plan is also closely related to the park's Statement for Management, which provides a current summary of the state of the park, its significant resources and influences on management. The Statement for Management is updated annually to reflect more timely and specific guidance than the format of the Master Plan allows. Specific management objectives form the heart of the Statement For Management and establish a framework for achieving the park's legislated purpose.

Guadalupe Mountains National Park Wilderness Recommendation (FES 73-45) delineates the extent of designated wilderness in the park (46,850 acres) and explains the additions and deletions to the park's preliminary wilderness proposal (39,000 acres). The crux of this document is a resolution of which areas of the park are included in the wilderness and, equally important, which are excluded. This proposal was approved by Congress in 1978.

The Natural and Cultural Resources Management Plan (1992) for Guadalupe Mountains National Park identifies and prioritizes a 5-year program for managing the park's natural and cultural resources. The problems associated with backcountry use, backcountry restoration and the special needs of wilderness management were identified as important issues in this document. The revision of the Backcountry/Wilderness Management Plan was further identified as the first step in correcting backcountry resource problems.

The Guadalupe Mountains National Park Trails Development Plan (September, 1979) identified a series of trail development alternatives. This document basically outlined trail options and subsequent environmental impacts of National Park Service administration. This document, and subsequent related documents, describe planned trail actions.

The Cave Management Plan (1991) and the Fire Management Plan (1985-under revision) for Guadalupe Mountains National Park are specific documents describing goals and objectives for the management of

these individual resource elements and are included as addenda to the Natural and Cultural Resources Management Plan. Their specific relationship to the Backcountry/Wilderness Management Plan is explained in separate sections of this document.

- b. U.S. Forest Service. The U.S. Forest Service's Roadless Area Review and Evaluation (RARE II Plan) outlines the land use practices proposed on USFS lands adjoining the national park. This document describes the USFS Wilderness Study Areas tentatively proposed for inclusion under the Wilderness Act of 1964. Since the basic management philosophy presented in this document is the preservation of these adjoining lands in a pristine condition, there does not now appear to be a likelihood of conflict with National Park Service management programs if these proposals are finalized. The final designation of USFS lands adjoining the park as wilderness is currently in abeyance and must await congressional approval.

A separate Forest Management Plan for the Lincoln National Forest was developed and was released to the public in 1986.

- c. Bureau of Land Management. The Bureau of Land Management manages the lands adjoining the national park in the vicinity of the Brokeoff Mountains. This area is a part of the BLM's Wilderness Study Areas in the state of New Mexico. The basic management philosophy for this Wilderness Study Area at the present time does not conflict with National Park Service management programs. The National Park Service will continue to work with BLM in coordinating land management practices on these adjoining lands.

B. CURRENT BACKCOUNTRY USE AND DEVELOPMENTS

1. Current Backcountry Use Data and the Present Permit System.
The overall pattern of visitor use at Guadalupe Mountains National Park over the years has generally been of increasing numbers of people visiting the park. Overnight backcountry visitation has followed this overall pattern, but has leveled off somewhat. There are no figures on backcountry day use. Backcountry overnight use shows that approximately 1% of park visitors are overnight backpackers in the backcountry. Table I and Graphs I and II summarize and display park visitation over the last eighteen years.

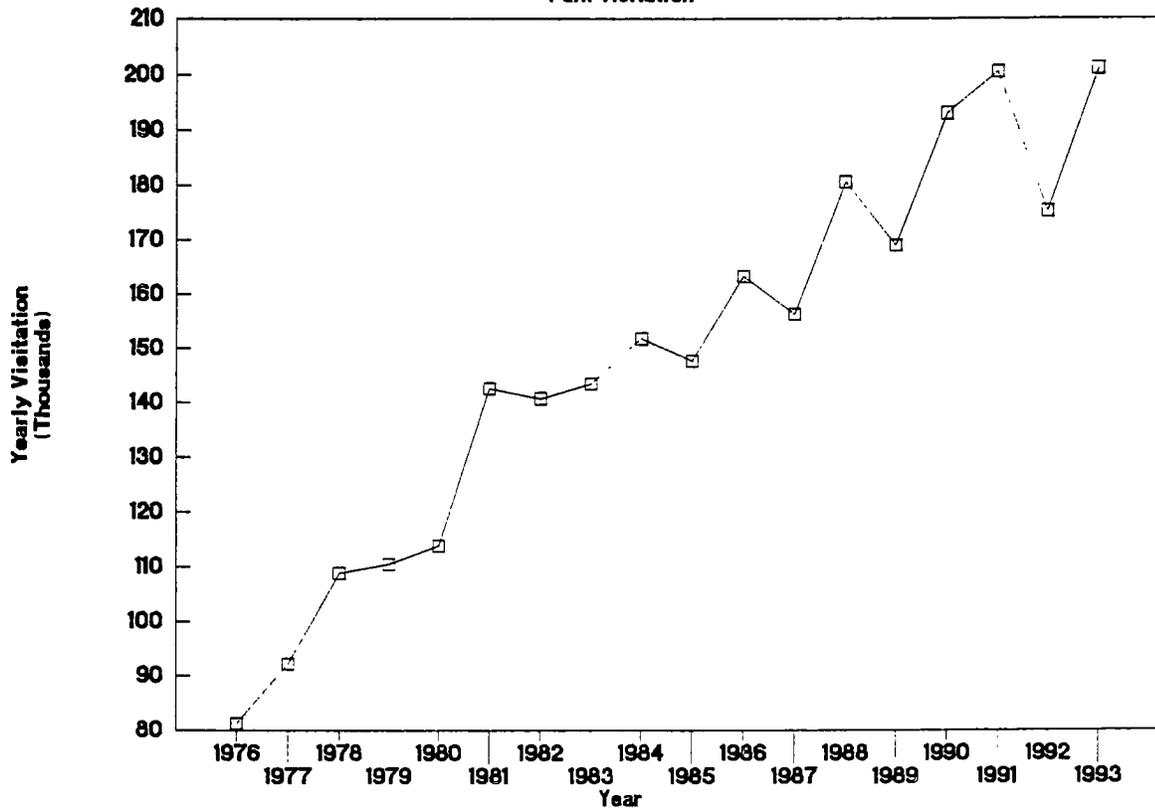
Table 1

**Summary of Visitor Use
1976 - 1993
Guadalupe Mountains National Park**

<u>Year</u>	<u>Total Park Visitation</u>	<u>Number of Backpackers</u>	<u>Backcountry User Nights</u>
1993	201,054	3,171	3,885
1992	175,125	2,377	2,880
1991	200,398	2,631	3,069
1990	192,891	2,151	2,475
1989	168,872	1,976	2,788
1988	180,542	1,667	2,692
1987	156,344	1,624	2,630
1986	163,313	1,750	2,700
1985	147,758	1,816	2,920
1984	151,862	1,678	2,706
1983	143,500	1,948	3,083
1982	140,800	2,042	3,325
1981	142,641	1,976	3,020
1980	113,800	1,689	2,802
1979	110,500	2,231	2,920
1978	108,800	2,268	3,399
1977	92,200	1,845	2,894
1976	81,300	1,679	2,667

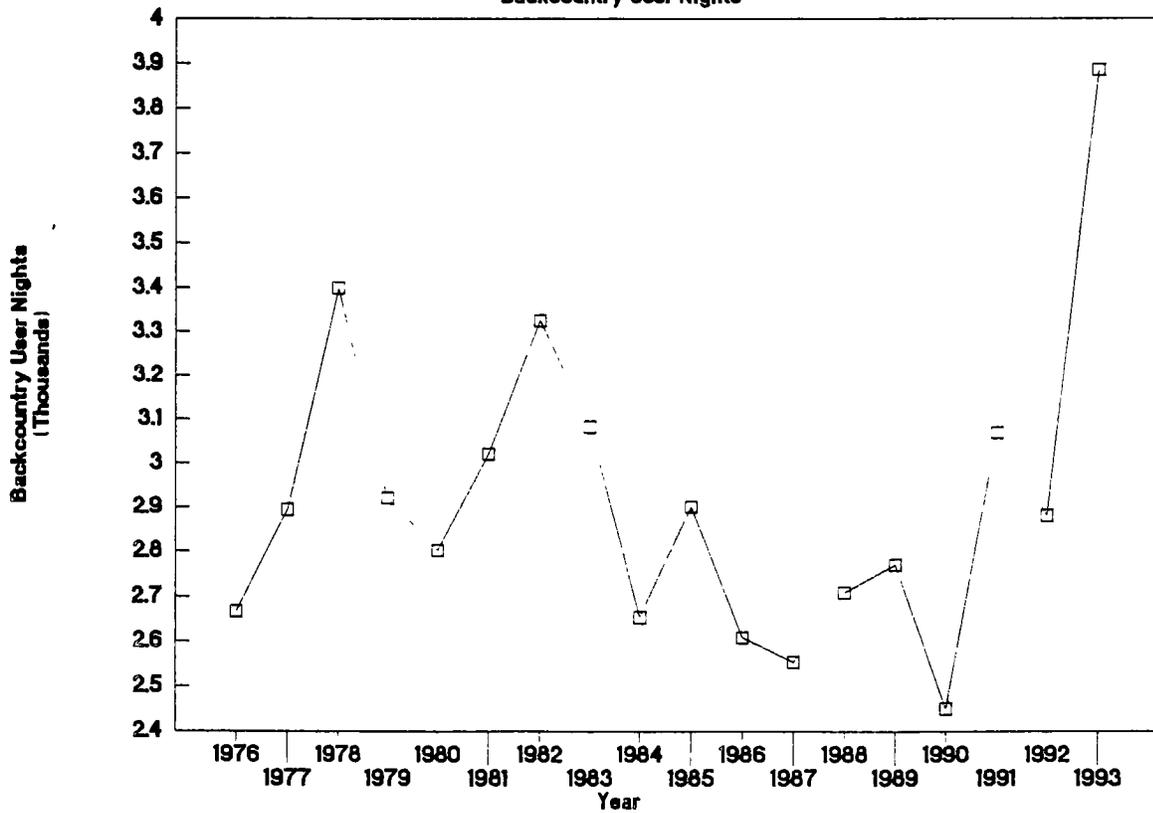
GRAPH 1

Park Visitation



GRAPH 2

Backcountry User Nights



A permit is currently required for all overnight and horse use in the backcountry of the park. The permit system is intended to provide a means of monitoring and controlling backcountry use and to generate the information needed to govern future management of the park. It is also intended as a safety measure for backcountry users. Horse use has been minimal with the number of horse users each year averaging less than 100 per year.

The Standard National Park Service Permit Tag (Form 10-404, Rev. 11-76) is issued to backpackers at the park Visitor Center, the McKittrick Canyon Information Station and the Dog Canyon Ranger Station. Campgrounds are assigned on the permit tag but the choice of a specific campsite is currently left for the individual to select upon his arrival. Permits are issued free on a first-come, first-served basis, with no advance telephone or mail reservations accepted.

The park staff anticipates that visitation will probably continue to grow as more and more people "discover" the park and it becomes further established in the National Park System. This trend is evidenced by the growth that has occurred since the construction of the park's new visitor center.

The park currently has ten designated backcountry campgrounds containing approximately 50 campsites. Visitor use patterns established over the past twelve years have shown (Table 2) that most backcountry camping use occurs at the Pine Top, Tejas, Mescalero, McKittrick Ridge, and Guadalupe Peak campgrounds. These five campgrounds accommodate nearly 80% of the total backcountry campground use.

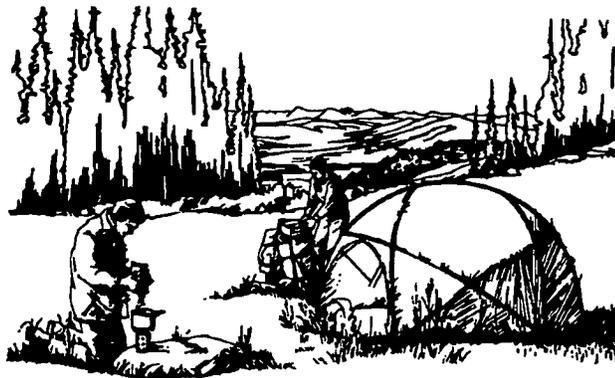


Table 2

Backcountry User Nights* 1982-1993

Backcountry Campground:	'82	'83	'84	'85	'86	'87	'88	'89	'90	'91	'92	'93
Pinetop	1217	1013	986	874	747	702	640	777	587	814	794	908
Bush Mt.	316	328	251	283	161	133	170	146	170	208	183	252
Blue Ridge	213	178	145	149	133	134	127	126	143	184	162	180
Mescalero	524	283	234	322	307	328	349	360	346	297	319	544
McK. Ridge	284	224	237	344	440	472	449	411	359	431	415	526
Guad. Peak	498	335	298	383	290	312	383	424	439	510	459	668
Tejas	New	285	27	266	358	348	378	397	318	432	353	496
Marcus	67	73	56	57	42	29	63	61	46	63	64	115
Shumard	10	79	176	76	26	26	48	27	9	13	41	28
Wild. Ridge	70	151	72	147	103	68	101	51	40	117	87	93
Total	3199	2949	2653	2901	2607	2552	2708	2770	2457	3069	2877	3810

*Expressed in terms of User Nights" - Total number of campers multiplied by the number of nights each camper stayed.

Beyond the problem of trying to accommodate the numbers of people wishing to use these campgrounds, the sites themselves demonstrate the telltale signs of heavy use including soil and vegetation trampling, the presence of human waste, and the continuing spread of the camping area into the surrounding vegetation. While these instances can not as yet be considered critical, they do indicate the presence of environmental problems and serve as warnings to National Park Service managers.

2. Current Backcountry Developments

- a. Present Trail System. Figure 3 illustrates the existing trail and campground system in Guadalupe Mountains National Park. The present trail system is actually the end result of a combination of old game trails, Indian trails, stock trails, roads developed by ranchers and miners, the initial National Park Service building program (Phases I, II, and III) implemented in 1981, and recent minor changes and additions. Together, this system offers the backcountry visitor over 80 miles of trails and ten designated campgrounds for their recreational use. Trail conditions currently vary from those considered to be of excellent quality to those of poor quality.

There are five major trailhead locations in the park: Pine Springs, McKittrick Canyon, Dog Canyon, Frijole Ranch and

Williams Ranch. Overnight parking for overnight backcountry users, however, is permitted only at Pine Springs, McKittrick Canyon and Dog Canyon. A list of the current trails and their mileages is shown in Table 3. A listing of some of the hiking distances on the trail system is contained in Appendix A.

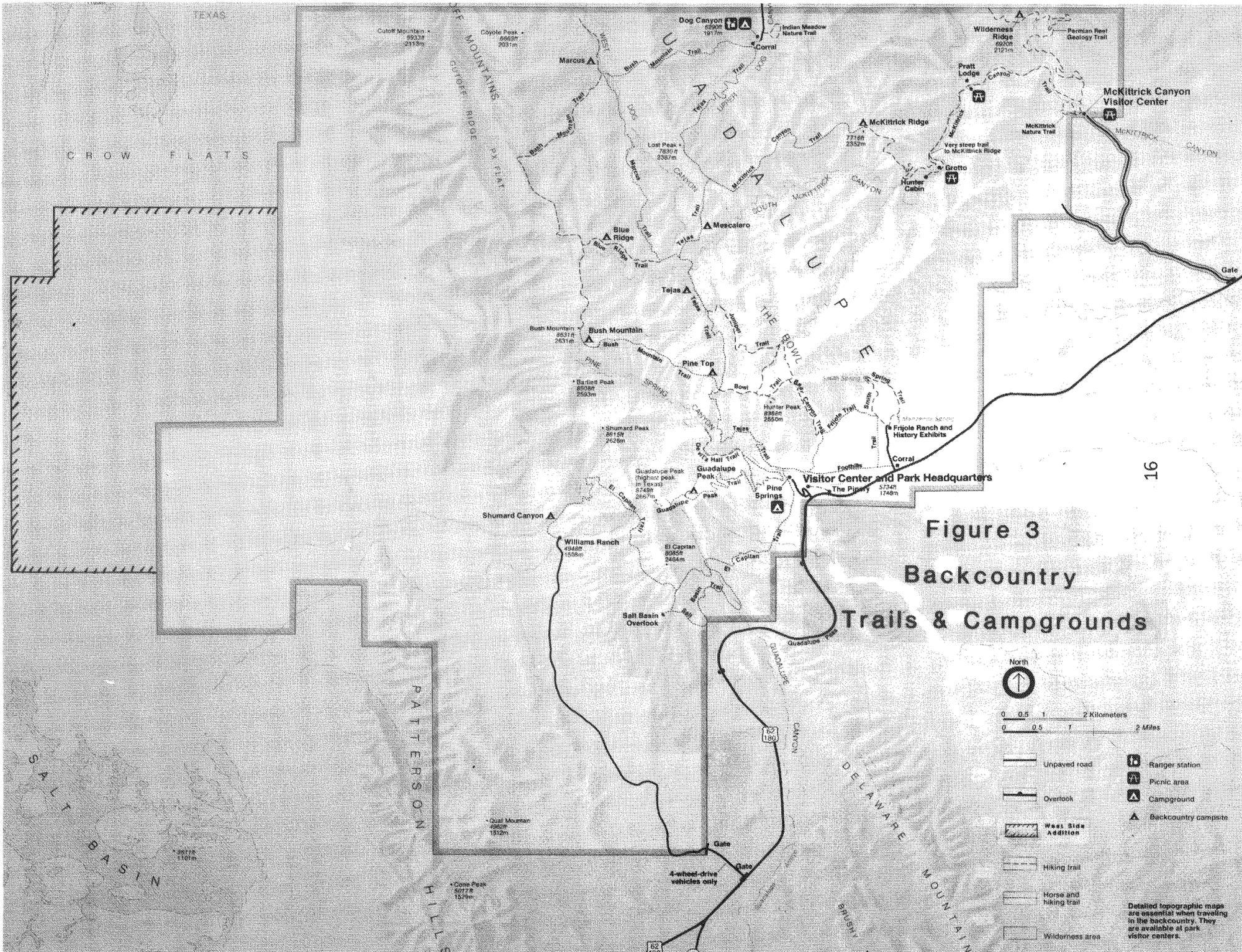


Figure 3
 Backcountry
 Trails & Campgrounds

North

0 0.5 1 2 Kilometers
 0 0.5 1 2 Miles

Detailed topographic maps are essential when traveling in the backcountry. They are available at park visitor centers.

Table 3

Designated Trails By Name and Mileages

McKittrick Canyon Trail	11.09
Tejas Trail	12.01
Salt Basin Overlook Trail	3.56
Bear Canyon Trail	1.80
Frijole Trail	2.70
Guadalupe Peak Horse/Hiker Trail	5.04
Hiker Only Segment	0.71
Permian Reef Trail	4.76
Permian Reef Geology Loop Trail	0.44
El Capitan Trail	9.46
Devil's Hall Trail	1.26
Bowl Trail	3.10
Bush Mountain Trail	11.84
Blue Ridge Trail	2.04
Juniper Trail	2.00
Marcus Trail	5.02
McKittrick Nature Trail	0.97
Indian Meadow Trail	0.90
Smith Springs Trail	2.30
Foothills Trail	2.18
Pinery Trail	0.59
Grotto Trail	0.14
Hunter Peak Trail	0.10
 Total Trail Mileage	 84.01

b. Present Backcountry Campground System. Figure 3 illustrates the locations of the existing backcountry campgrounds in Guadalupe Mountains National Park. The campground system was originally proposed in conjunction with the proposed trail construction. However, only a few of the backcountry campgrounds were ever fully constructed. There are currently ten designated backcountry campgrounds for recreational use and one open camping zone, as indicated on Figure 4. The open camping zone has no improvements. Each of the backcountry campgrounds has designated sites. Some of these sites are hardened and others are just indicated with markers, as site improvements have not been made at all campgrounds. A hardened site is a site where a hardened tent pad has been constructed. Table 4 lists these ten campsites and the current number of sites at each.

Table 4

Designated Backcountry Campgrounds By Name & Number of Sites

Campground Name	Number of Sites		
	Hardened Sites in 1994	Unhardened Sites in 1994	Existing Sites in 1983*
Blue Ridge		Open (1)	5
Bush Mountain		Open (2)	5
Guadalupe Peak		Open (3)	5
Marcus		Open (5)	5
McKittrick Ridge	8		8
Mescalero	8		8
Pine Top	6		12
Shumard Canyon	4		2
Tejas	4		4
Wilderness Ridge formerly called "Blue Jay"		Open (2)	5
Backcountry Campgrounds Total Sites:	30	13 = 43	59

*Existing Sites as Identified in the 1983 Backcountry Management Plan. Not all sites were well defined and some have disappeared through lack of use, while volunteer sites have appeared in places.

c. Present Visitor and Administrative Facilities. Beyond the trailheads and information stations, the park currently has ten established campgrounds scattered throughout its backcountry area and provides 9 hitching post sites at strategic locations. A small cabin located near Pine Top serves National Park Service personnel for administrative and emergency purposes.

d. Park Staffing and Administration. Current (1994) staffing for the park totals 29 permanent and from 6 to 18 temporary employees. The park is managed by a Park Superintendent. For administrative purposes, the park is divided into three management areas, the Frijole District, the Dog Canyon District and the Dunes District. Each of these areas is supervised by a District Ranger who reports to a Chief Ranger who, in turn, reports to the Superintendent. The Dog Canyon District Ranger is supported by one permanent and one or two seasonal employees. The Frijole District Ranger supervises four permanent Park Rangers and from one to five seasonal rangers. In addition, a Resource Management Specialist, supervised by the Chief Ranger, provides the park with staff support on resource management issues.

The ranger staff is responsible for a variety of frontcountry and backcountry duties, including trail patrol (foot and horse back), visitor contact, managing campgrounds and trail activity, law enforcement, resource protection, conducting resource monitoring and other resource management projects as assigned. The Frijole District ranger staff base their operations at Pine Springs. A small cabin, located at Pine Top on the Tejas trail, serves as a backcountry station during routine and emergency operations. This cabin is considered a critical administrative facility for managing the park's backcountry.

The Interpretative staff, supervised by a Chief of Interpretation and Visitor Services, operates the visitor contact points where most backcountry information is provided to backcountry users and where most backcountry permits are issued. This is a critical service for providing backcountry users with information needed to enjoy their backcountry experience.

Trail maintenance is the responsibility of the park's roads and trails crew supervised by an "R&T" foreman. This crew consists of two permanent employees and one to four seasonal crew members. The trail crew is employed to do routine maintenance work on the backcountry trails. The Buildings and Utilities staff, supervised by a "B&U foreman", provide facilities support. Both of these operations are supervised by a Facility Manager, who in turn reports to the Park Superintendent.

III. **PROPOSED ACTIONS: 1994 GUADALUPE MOUNTAINS NATIONAL PARK
BACKCOUNTRY/WILDERNESS MANAGEMENT PLAN**

A. BACKCOUNTRY/WILDERNESS MANAGEMENT PLAN OBJECTIVES

Management objectives for the Guadalupe Mountains National Park Backcountry/Wilderness Management Plan have been developed after consideration of established laws and policies regulating the national park system and the park staff's recommendations for the best methods of protecting the resources and providing for recreational use of the national park. The objectives of the plan are to:

Natural and Cultural Resources Objectives

- Preserve and protect the natural and cultural resources of the park.
- Preserve and protect the wilderness values of the park.
- Restore man-impacted areas of the backcountry to as natural a condition as practical in keeping with existing policies.
- Maintain the natural abundance, behavior, diversity, and ecological integrity of native animals, including insects and natural diseases, as part of the park's ecology.
- Perpetuate the natural distribution and abundance of threatened and endangered species and the ecosystems on which they depend.
- Perpetuate the natural distribution and abundance of the special populations of endemic species found in the park and the ecosystems on which they depend.
- Implement a fire management program which will return fire to its natural role in the ecology of the park.
- Protect the natural quality of the airshed and water resources of the park.

Visitor Use Objectives

- Provide opportunities for solitude and an unconfined experience.
- Perpetuate the wilderness nature of the park and the visitor's experience.
- Provide minimum facilities for visitor safety and resource protection.
- Provide ways for visitors to understand and appreciate the unique nature of the park and its resources.
- Provide for a diversity of backcountry experiences in the park.
- Regulate and balance visitor use to prevent resource damage.
- Develop a system of accounting for visitor use and monitoring resource impacts.

- Provide for the practical and cost effective administration of the area.
- Acquire accurate trail counter statistics.

B. MANAGEMENT OF MCKITTRICK CANYON

McKittrick Canyon is the most heavily visited portion of Guadalupe Mountains National Park. Because of the fragile nature of this special riparian environment and the number of visitors using the area, more definite management direction is needed for McKittrick Canyon, to prevent degradation of its unique resources. A separate McKittrick Canyon Management Plan is currently under development. This plan will identify management, research and monitoring needs for the canyon; and will also address Levels of Acceptable Change (Cole and Stankey, see bibliography) and possible visitor use limits in the canyon. A comprehensive Environmental Assessment of impacts will accompany the plan. Overall management will be in accordance with the following guidelines.

1. South McKittrick Canyon

Although the lower portion of McKittrick Canyon is a heavily used day-use area, it is included as "backcountry" in keeping with its unique aquatic resources and the spectacular natural beauty it possesses. In keeping with the backcountry designation, Pratt Lodge, located at the confluence of South and North McKittrick Canyons, will not serve as a permanent residence for the park staff. The power lines serving this facility will be removed when solar or alternative power is available. The building will continue to serve as an interpretive site, emergency equipment cache, seasonal housing, and administration site for the park staff and researchers. Restroom facilities at Pratt Cabin will continue to be maintained for park visitors to insure resource protection.

2. North McKittrick Canyon

North McKittrick Canyon drains southward from the Lincoln National Forest into the national park. The lower 1.75 miles of this canyon lies within, and is administered by, Guadalupe Mountains National Park. To insure the preservation of unique flora and fauna contained in the canyon, and to preserve the pristine quality of this area, the National Park Service and the U.S. Forest Service entered into an agreement (Memorandum of Understanding) to provide for cooperation in the management of the canyon. This agreement has expired and is being negotiated for renewal. The revised agreement will be similar to the expired agreement and will contain no condition which might contradict the Backcountry/Wilderness Management Plan for Guadalupe Mountains National Park.

It is the intention of the National Park Service to manage North McKittrick Canyon as a special resource and to continue such management in cooperation and close concert with the U.S. Forest Service under a cooperative agreement, to maximize protection of this fragile area.

3. Visitor Use

McKittrick Canyon is a narrow riparian corridor with the only

perennial stream found in the park. Several endangered and threatened species, including the Peregrine Falcon and Spotted Owl, are found in this fragile riparian environment. In addition, the canyon contains a number of plants and animals which are candidate species for listing by the USF&WS as Endangered and Threatened species (see Appendix C). Visitor use in McKittrick Canyon will be managed to limit impacts to the resource in this heavily visited narrow riparian corridor and to prevent degradation of the unique resources found there.

Visitor use is restricted to "day use" only within the canyon, including North McKittrick Canyon. Overnight parking for backcountry overnight users is allowed, by permit only, at the trailhead parking lot, but no overnight camping is permitted within the canyon. All visitor use from the McKittrick Canyon Visitor Center to the Pratt Lodge is restricted to the trail to prevent the development of social trails and trampling of vegetation in this heavily used corridor. Visitors may not enter the water anywhere in the canyon, to protect the riparian environment.

C. TRAILS

1. Trail Standards for Maintenance and Construction

Both visitor use and the natural forces of erosion act to degrade the quality of trails in the park. It is a park goal to develop a balanced trail system which provides for a diversity of backcountry experiences and maintains the pristine aspects of the national park.

The park trail system will be maintained at standards which: (1) provide for continuous use at established levels; (2) protect the backcountry resources of the park; (3) recognize the park as a designated unit of the National Wilderness Preservation System; and (4) prevent undue expenditures of man-power and money beyond that needed to provide a safe access to the backcountry for park visitors.

Backcountry trails in the Guadalupe Mountains National Park will be constructed and maintained as narrow, unpaved routes of sufficient width for persons to walk single file. Trails intended for combined foot and horse travel will be maintained at a width and vegetation trimmed at a height sufficient for horses to safely travel single file with rider and pack saddle.

Park trails will be maintained at standards in proportion to the amount of use they receive. Main entrances and access trails, such as the Tejas Trail, the Guadalupe Peak Trail, and the McKittrick Canyon Trail will be maintained at the highest priority level to insure durability and safety. All newly constructed trails will be maintained at levels in keeping with their new condition to insure durability and eliminate the need for extensive rehabilitation work.

Trails designated as "primitive" will receive, at the least, an annual inspection and the repair of established rock cairns. Old trails, roads and other paths that visitors might use will receive no designation or only be designated as routes or paths and will not be maintained. They will not be routinely inspected and will be considered the same as cross-country travel.

All maintained trails will receive a designation for Level of Maintenance and Care as described in the National Park Service Trails Manual. Specific standards of maintenance will then be further described in a Trails Maintenance Manual for the park based on the trail construction and maintenance standards and techniques identified in the NPS manual and following the guidelines set forth in the various management documents for the park including the General Management Plan and the Natural and Cultural Resources Management Plan.

Because of erosion and the degradation of trails through use, maintenance needs include some building up of trails to natural grades. This requires, in some places, the addition of base course as fill to properly maintain the trails. The park will keep the use of borrow pits in the backcountry to a minimum and instead transport into the backcountry the base course to be used as fill on trails. It is estimated that up to 196 cubic yards, or 300 tons, of base course could be needed per mile of trail. It is proposed that a helicopter would be used to transport this material into the backcountry, using a sling load only and not landing in the wilderness. No more than 10 days of helicopter air time would be utilized per year to support trail maintenance. Other materials would be supplied by horse and mule stock.

2. Phase IV Trail Construction Projects and Revised Trail Plan

The Phase IV Trail Construction Projects represented the final phase of the park's backcountry trail development program. Under Phase IV Trail Construction the park was to complete modification of the present trail system through rerouting of some existing trails and deletion of some trails.

This trail development program is now over 10 years old and needs to be reassessed before Phase IV construction is conducted. A more complete database on park resources now exists as well as a more defined understanding of visitor use and visitor use patterns. The priority portions of the Phase IV construction have either already been completed, in some instances are no longer needed, or may be inappropriate with new resource information.

The Phase IV trail projects were to address several problems:

- a. Trails impacting sensitive natural and cultural resources.
- b. Trails that had degraded to conditions beyond which normal repair and maintenance can be made.
- c. Duplication of trails.
- d. Trails no longer needed due to NPS administrative changes.

While each of these issues still remain important, the state of existing trails has changed, a reevaluation of visitor use patterns has been done, and the knowledge of the resource database has improved. This necessitates an overall reevaluation of these proposals.

As a result, no more new construction of trails will be conducted until a new trail plan can be completed. Minor reroutes of trails will be accomplished where necessary to protect cultural or

natural resources that are being impacted.

D. BACKCOUNTRY OVERNIGHT CAMPING USE

1. Use Limits

To avoid congestion, reduce environmental impacts, provide for maximum enjoyment of the aesthetic backcountry qualities, and to enhance the wilderness experience, the park manages the backcountry permit system to match proposals for backcountry campgrounds and limits for each site. All backcountry campground use limits are based on a standard of no more than four persons or one tent to occupy a designated campsite. In a few instances, a larger site may accommodate two tents. These few sites will be so noted in the Visitor Center, but users with a permit for more than one tent must use the larger designated sites. The standard will normally be one tent per site and a permit will be issued for each site.

No group larger than ten persons will be permitted in any backcountry campground, and no groups larger than can be accommodated at a specific backcountry campground (i.e. 1 tent/site or 4 persons without tents/site) will be allowed. Groups will be distributed over the necessary number of sites to accommodate the group size. Again, however, a permit will be issued for each site assigned the group.

Two group sites will be established in the future, one at Pine Top and one at McKittrick Ridge to accommodate groups. These sites will be reserved for groups only, will be limited to a group size of 20 and will be available upon a reservation basis. Once these group sites are established, groups will not be permitted to camp in the regular campground at these two sites.

Exactly how much visitor use causes irreversible damage to park resources is undocumented at this time. The park has little research by which resource damage can be evaluated. Research studies are proposed to help establish upper limits of visitor use. A system of trail and campground monitoring has been established to help identify the onset of unacceptable resource impacts. In addition, the park will develop a comprehensive monitoring program following the Levels of Acceptable Change protocols established by Cole and Stankey. The National Park Service reserves the right to change use limits as more resource data becomes available.

Recommended campground use limits are based upon:

- a. Available space.
- b. The natural and cultural resources near the campground.
- c. The need for quiet and solitude.
- d. Past use patterns and an estimate of future use.

Table 5 summarizes the use limits recommended in the 1994 Backcountry/Wilderness Management Plan.

Table 5

**Proposed Backcountry Campground System, Open Camping and Use Limits
Guadalupe Mountains National Park +**

Backcountry Campground	<u>Current</u>	<u>Proposed</u>	<u>Maximum</u>
	<u># Sites</u>	<u># Sites</u>	<u>Total Use Limit</u> (Based on Proposed Site Numbers)
1. Blue Ridge	Open (1)	5	20
2. Bush Mountain	Open (2)	5	20
3. Guadalupe Peak	Open (3)	5	20
4. Marcus	Open (5)	5	20
5. McKittrick Ridge	8	8	32
6. Mescalero	8	8	32
7. Pine Top	6	8	32
8. Shumard Canyon	4	4	16
9. Tejas	4	6	24
10. Wilderness Ridge	Open (2)	5	20
Total Backcountry Campground Sites	43	57	228
11. Highcountry Open Zone	N/A	One permit (max. 2 tents)	4 people
12. Pure Well Camping Site	N/A	One permit (max. 2 tents)	4 people
13. PX Well Camping Site	N/A	One permit (max. 2 tents)	4 people
Total Overnight Use on Any Given Night:			232 people

+ Proposed campsite and use limits reflect upper limits of use to be established under the present Backcountry/Wilderness Management Plan. Future Studies may allow the expansion of these campgrounds to accommodate more people, or reduce use limits.

The length of stay in the backcountry is limited to two (2) consecutive nights at the same campground, with permits issued for a maximum of seven (7) nights per visit. In addition, a total of fourteen (14) days is the maximum limit in each six month period. The length of stay at any camping site in the open zone or in the West Side Camping Sites will be a maximum of two consecutive nights.

2. Backcountry Campground Permit System and Designated Campsites

Backcountry camping will be permitted only at designated campgrounds, within the defined "open" camping zone located in the highcountry, or at the two West Side Camping Sites identified in this plan. Figures 3, 4 & 5 illustrate the locations of the open camping zone, the two west side camping sites and the ten designated backcountry campgrounds in the park. The open zone and the West Side camping sites are further defined and clarified on a topographic map maintained at the park Visitor Center and in the Chief Ranger's Office. Specific information on these areas must be obtained in addition to a permit, before they are used.

A backcountry use permit is required for all overnight use in the park. Backcountry use permits are issued (in person) at the Headquarters Visitor Center, at Dog Canyon, and at the McKittrick Canyon Information Station (when manned), on a first-come-first-served basis and are written a maximum of one day in advance. No permits are mailed or issued over the phone. In the future, if increased use causes many of the backcountry campgrounds to fill on a regular basis, an advance reservation system will be considered.

Currently, many of the backcountry campgrounds have definite, distinct, hardened tent pads upon which tents must be pitched. The hardened sites are approximately 14' x 14'. Eventually all designated sites will have hardened tent pads. Accordingly, use limits for backcountry campground sites are based on 1 tent per site or four persons per site without tents.

All backcountry campground sites will be numbered and marked to facilitate campground management. The park reserves the right to assign individual campsites when, and if, the present open selection method proves unsatisfactory. Until then, campers will be issued permits based upon the number of established campsites at each backcountry campground, with one permit issued for each site to be occupied (i.e. one tent=one site=one permit). The issuance of permits will cease once the sites are occupied.

When the park does adopt a system of assigning campsites, the permittee will be assigned a specific numbered campsite and will be expected to use only that site under the terms of the backcountry permit.

3. Highcountry Open Camping Zone

Currently, one area of the park is designated a "open camping zone". This open camping zone is located in the high country. In this "open camping zone" (see Figure 4 for general location) campers are free to choose their campsite anywhere inside the zone, within certain limitations. Camping locations in the open zone are restricted to the following conditions: (1) visitors must camp at least 200 feet from any water source, (2) camping in caves or shelters is prohibited, (3) camping is not permitted on archeological sites, and (4) minimum impact camping techniques are required.

Maps indicating the exact location of this "highcountry open camping zone" are maintained at the Headquarters Visitor Center and in the Chief Ranger Office. Specific information on the location of this zone must be clarified when a permit is given for its use.

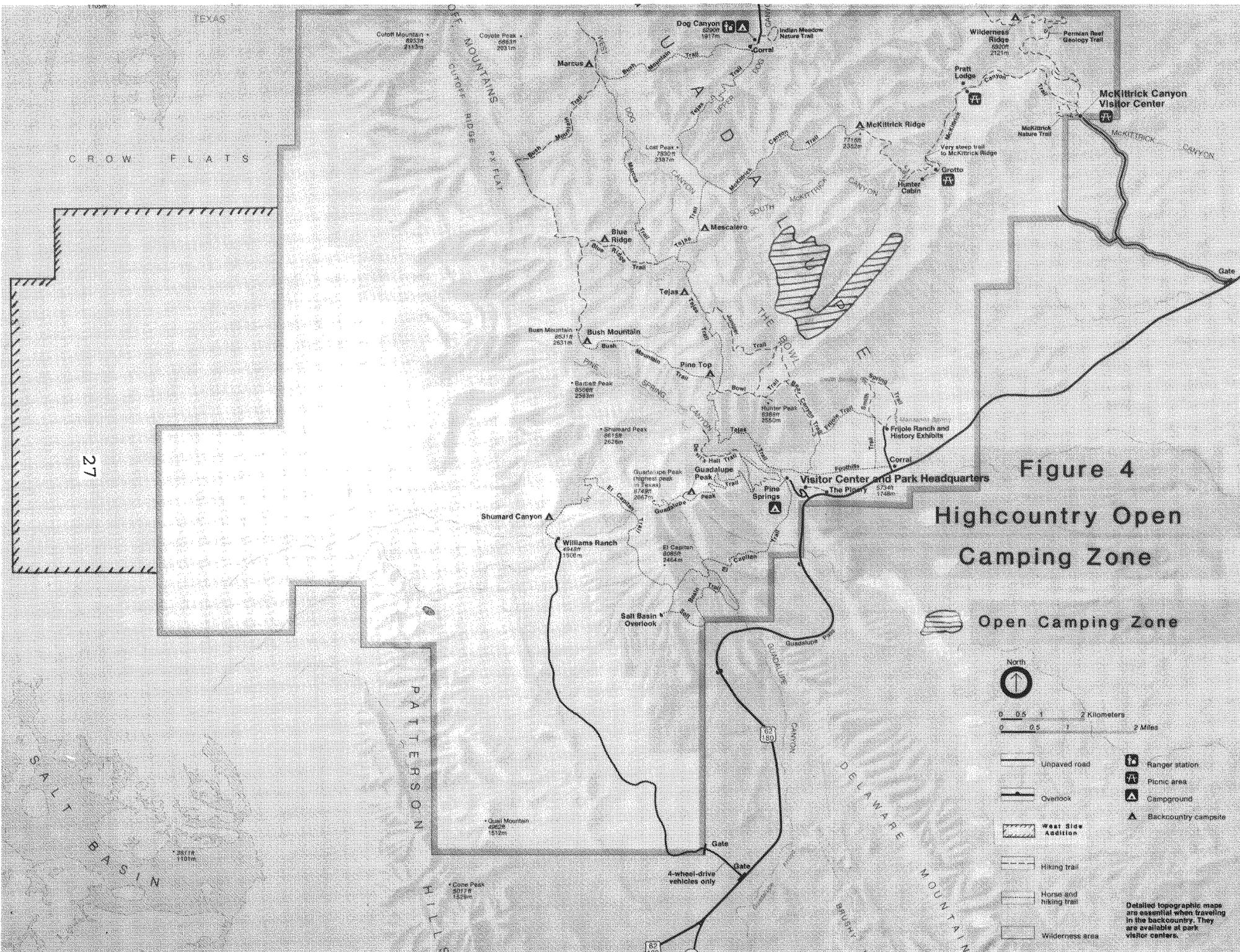
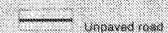
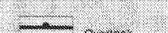
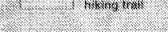


Figure 4
Highcountry Open
Camping Zone

 **Open Camping Zone**



0 0.5 1 2 Kilometers
 0 0.5 1 2 Miles

-  Unpaved road
-  Overlook
-  West Side Addition
-  Hiking trail
-  Horse and hiking trail
-  Wilderness area
-  Ranger station
-  Picnic area
-  Campground
-  Backcountry campsite

Detailed topographic maps are essential when traveling in the backcountry. They are available at park visitor centers.

Only one permit will be issued for the open zone at a time. Party size is limited to four persons and no more than two tents. Maximum length of stay will be seven days, however, camping is limited to a stay of no more than two consecutive nights at any campsite within the zone and the maximum length of stay is a total of fourteen (14) days per each six month period. This requirement is designed to reduce impact. A backcountry use permit is required and all other rules and regulations pertaining to backcountry use are in effect.

Monitoring of the open camping zone will be conducted routinely based on camper use, to insure that resource degradation does not occur. The Park Service reserves the right to close the designated open camping zone to camping in order to protect the resources of the park.

4. West Side Camping Sites

Two camping site locations have been identified on the West Side of the park to enhance the opportunity for a wilderness experience in the Chihuahuan Desert ecosystem. This area has no designated trails and few or no water sources. Access to these sites will be by cross-country travel (i.e. cross-country or over abandoned roads and trails) and will require the use of a map and navigational skills.

The two sites are located as follows: (1) The Pure Well campsite is located in the vicinity of the Pure Oil Well historic site. (2) The second site is located in the vicinity of the PX Well and thus will be called the PX Well Camping Site. The general locations of both sites are indicated in Figure 5. Maps showing the exact locations of these sites are maintained at the park Visitor Center and in the Chief Ranger's Office. Specific information regarding the location of these sites must be clarified when obtaining a permit for their use. Camping at these sites will be anywhere within the designated area, an area approximately 1/4 mile square. Camping restrictions within the camping sites are as follows: (1) visitors must camp at least 200 feet from any water source, (2) must camp at least 200 feet from historical resources, (3) minimum ground disturbance is required, (4) camping is not permitted on archeological sites, (5) camping in caves or shelters is prohibited and (6) minimum impact camping techniques are required.

Party size is limited to four persons and no more than two tents for each of the two sites. Maximum length of stay will be seven days, with a limit of two consecutive days at either camping site. In addition, this maximum length of stay will be a maximum length of fourteen (14) total days per each six month period. This requirement is designed to reduce impact. A backcountry use permit is required and all other rules and regulations pertaining to backcountry use are in effect.

Monitoring of these two camping sites will be conducted routinely based on camper use, to insure that resource degradation does not occur. The Park Service reserves the right to close these camping sites to camping in order to protect the resources of the park.

Access to the West Side is currently limited to existing trailheads, with overnight parking allowed only at Pine Springs, Dog Canyon and McKittrick Canyon. Automotive access to the Williams Ranch Trailhead will be permitted for "drop-off" purposes only. Future access points will be considered as future west side

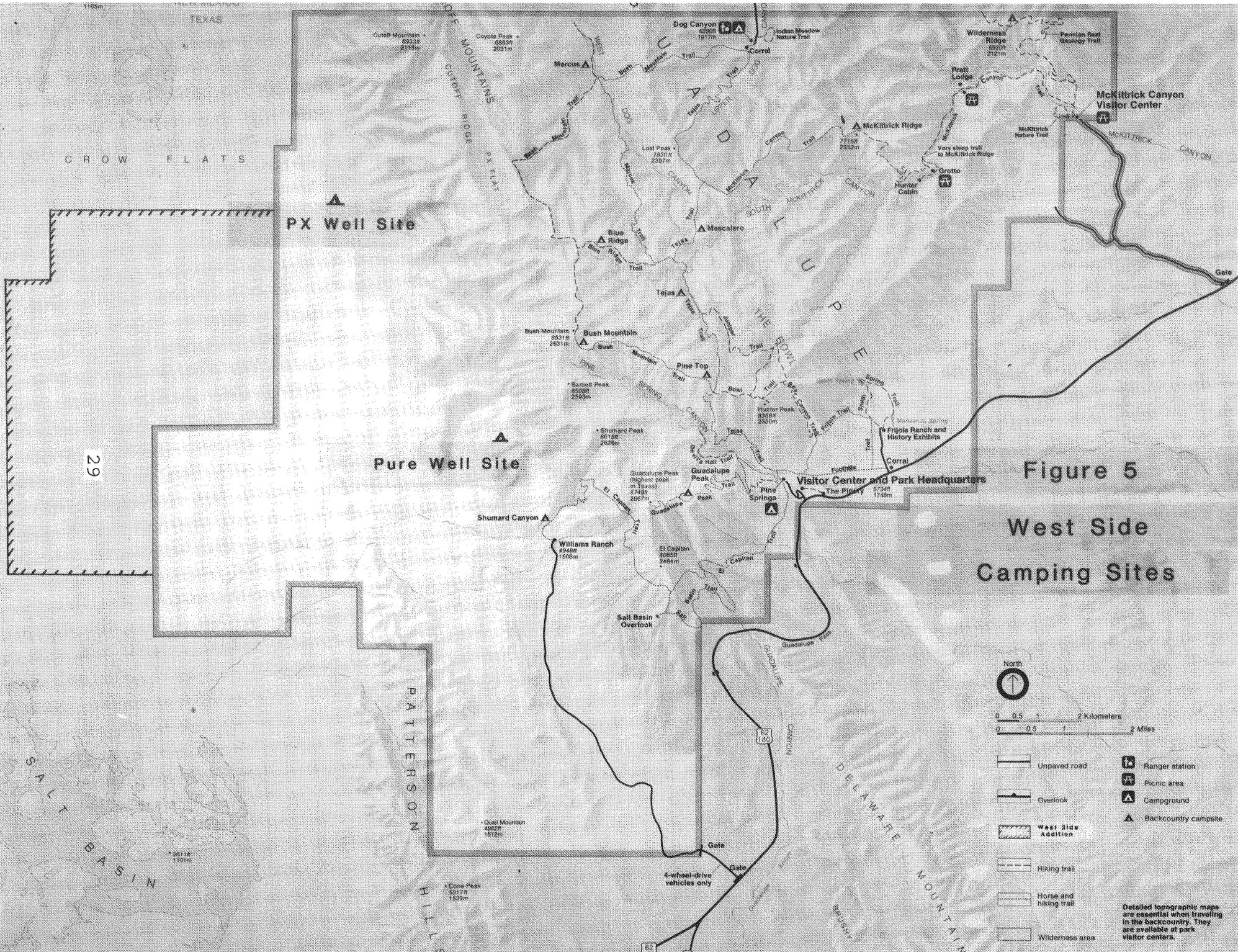


Figure 5
West Side
Camping Sites



0 0.5 1 2 Kilometers
 0 0.5 1 2 Miles

- Unpaved road
- Overlook
- West Side Addition
- Hiking trail
- Horse and hiking trail
- Wilderness area
- Ranger station
- Picnic area
- Campground
- Backcountry campsite

Detailed topographic maps are essential when traveling in the backcountry. They are available at park visitor centers.

planning occurs.

5. Backcountry Campground Maintenance and Construction Standards

Backcountry campgrounds, and individual campsites, will be maintained in keeping with the wilderness ethic of the National Park Service. Campgrounds will be placed at strategic locations throughout the park to provide hikers with an opportunity to experience a variety of areas spaced roughly 1/2-day hike from main entrance points. Campground locations are also intended to provide the National Park Service with a means of regulating and monitoring the quantity of visitors using these facilities and the resultant impact on natural resources.

The park will maintain a total of ten designated campgrounds within the backcountry area. The physical locations of these campgrounds have been selected after considering aspects of physical geography, resource protection, and aesthetic considerations. All campgrounds are located a short distance off established trails.

The number of campsites to be established at individual campgrounds is shown in Table 5. Campgrounds will be constructed and maintained in a manner which insures minimal disturbance of vegetation and soil resources while providing a permanent hardened camping area. It is the intent of the park to keep all backcountry campgrounds simple, with no physical amenities except the designated campsite and, possibly, sanitation facilities.

Site hardening of individual campsites within a campground will consist of leveling and delineating the specific locations which campers are to use. Eventually, as funding and staffing permit, all of the sites at the ten designated backcountry campgrounds, will be hardened. This delineation will consist of a simple outlining of timbers or rock, or trenching, and the installation of an identifying marker at the site. Sites will vary in size depending on topography but will be no larger than the space needed to contain one large backpacking tent or two smaller tents (approx. 14 x 14).

Sanitation facilities may be needed at heavily used campgrounds. Investigation is currently underway to determine which type of facility would best meet this need and will be installed as determined necessary.

E. BACKCOUNTRY ADMINISTRATIVE FACILITIES

The park will maintain its present inventory (indicated below) of backcountry administrative facilities and will not expand this system with the exception of adding additional repeater sites for safety reasons. The present facilities may be modified to provide park personnel with better methods of meeting administrative and emergency needs. The backcountry facility inventory recommended includes:

1. The maintenance, relocation or removal of small caches of fire tools when it is determined that this equipment is necessary for emergency operations.
2. The maintenance of the park's radio repeater facilities on Bush Mountain and the maintenance of the clearing at this

location used as a helispot during emergencies, and the possible maintenance of no more than two additional repeater sites for safety reasons.

3. The placement of inconspicuous water caches at locations needed to meet administrative and emergency situations.
4. The maintenance of Remote Automated Weather Stations (RAWS) for monitoring of fire weather.
5. The maintenance of a cabin at Pine Top for administrative and emergency purposes.

F. WILDERNESS MANAGEMENT

In 1978, Congress designated 46,850 acres of the park as "wilderness" as defined by the 1964 Wilderness Act. This designation recognized the pristine qualities of much of the backcountry area of the park (approximately 60%) and imposed stipulations on park managers to administer the park's wilderness to provide "outstanding opportunities for solitude or a primitive and unconfined type of recreation".

In keeping with the wilderness designation, the following policies will be established in managing the backcountry of Guadalupe Mountains National Park:

- Motorized equipment, including trail maintenance machines, will be restricted to non-wilderness areas of the backcountry except when needed for public health and safety, and as needed for new trail construction. Approval for such use will be by the Superintendent on a case by case basis.
- Administrative use of aircraft, including helicopters, will be restricted to those operations necessary to meet minimum requirements for the administration of the park and emergency situations involving public health and safety and fire management.
- The park will permit private day-use horse trips and may permit off-site stable operations offering guided trips, in the designated wilderness, as long as this practice assists visitors in realizing the recreational value of the park and enjoying its aesthetic qualities.
- The Pine Top cabin will be maintained as a park administration site for use in routine visitor protection and maintenance patrols, resources management, and emergency operations.
- The Bush Mountain radio repeater station will be maintained in the wilderness as a part of the park's general administration and protection operation.

All decisions regarding the management of the wilderness at Guadalupe Mountains National Park will be formulated using the "Wilderness Decision Tree". (Appendix B) This decision tree will be used to help make decisions that are in keeping with the wilderness philosophy and to insure consistency in decision making.

G. FIRE MANAGEMENT

1. Wildland Fire Prevention

To minimize the possibility of human-caused wildfires, the park has developed a Wildland Fire Prevention Plan, as a component of the Fire Management Plan for the park. This plan identifies the need to restrict open fires in the park (as described below) and to place cautions and additional restrictions on any use of fire, including smoking, during periods of extreme fire danger. Any such restrictions are posted throughout the park when in force.

2. Cooking and Warming Fires

To prevent the possibility of escape fires and to maintain "minimal impact" use of the backcountry, no open fires are permitted in any backcountry area of the Guadalupe Mountains National Park. Hikers and campers must restrict cooking and lighting to the use of devices using containerized man-made fuels. Charcoal fires are prohibited. All fire rings will be scattered and persons violating fire regulations will be cited. Information on the rationale for a "no fires" policy will continue to be integrated into the park's informational literature and other interpretive presentations.

3. Wildfire Management

It is the goal of the National Park Service to reintroduce fire into its natural ecological role in all backcountry areas of Guadalupe Mountains National Park. Methods and techniques for accomplishing this goal have been generally identified in the park's Natural and Cultural Resources Management Plan and are more specifically described in the park's Fire Management Plan, an addendum to the Resources Management Plan. The Fire Management Plan outlines the strategy for managing wildfires in the park and is updated annually.

Under the present Fire Management Plan (approved, 1986 -- under revision), the park will extinguish all wildfires until a revision provides for managing natural-caused fires to minimize resource impacts, and administrative costs. Once revised, natural caused fires will be permitted under the auspices prescribed by the Fire Management Plan.

A separate Environmental Assessment will be prepared to address the environmental impacts of the proposed actions identified in that Fire Management Plan.

H. WILDLIFE MANAGEMENT

The wildlife of Guadalupe Mountains National Park will be managed in accordance with the National Park Service policy of managing entire ecosystems rather than favoring individual species. This policy is intended to insure the welfare of all native wildlife species through the protection and management of natural habitat. The policy infers a concern for the ecological stability of total park ecosystems rather than a preoccupation with specific numbers of wildlife. It also precludes the maintenance of any artificial facility (stock tanks, wells, feeding stations) for the benefit of specific wildlife types.

In adopting this policy, park management recognizes the dynamic nature

of park ecosystems and the natural fluctuations individual populations will undergo in adjusting to environmental changes. This policy infers less concern for actual numbers of wildlife than that park ecosystems remain free of man's influences. A goal of this policy is to protect natural ecosystems, when and where they are found to exist in a natural or near-natural condition, and, equally important, to restore, where practical, those ecosystems known to be impacted by the influences of man.

Exceptions to the above policy will be instances where: (1) individual wildlife species have declined to the point that they are officially listed on the U.S. Fish and Wildlife Service's List of Endangered Wildlife and Plants, and (2) where a species is clearly exotic to the ecosystem. In these cases, the park will make every effort to either protect the species if it is endangered, or remove the species if it is clearly exotic.

I. SENSITIVE NATURAL AND CULTURAL RESOURCES

1. Endangered and Threatened Species

The park currently contains six species listed on the U.S. Fish and Wildlife Service (USF&WS) List of Endangered and Threatened Wildlife and Plants. These species include the Peregrine falcon (*Falco peregrinus anatum*), Sneed's pincushion cactus (*Coryphantha sneedii* var. *sneedii*), Lloyd's hedgehog cactus (*Echinocereus lloydii*), the Mexican Spotted Owl (*Strix occidentalis lucida*), Lee's pincushion cactus (*Coryphantha sneedii* var. *leei*), and the American Black Bear (*Ursus Americanus*) under the similarity of appearance clause for protection of the threatened Louisiana Black Bear. As required by the Endangered Species Act of 1973, the park has initiated consultation with the USF&WS to inventory and assess the status of these species in the park and establish a close communication link by which all activities which might threaten these species can be evaluated. The park has one species, McKittrick pennyroyal (*Hedeoma apiculatum*), which was listed as threatened and has been removed from listing because of apparent abundance. This species will need continued monitoring to confirm this conclusion. In addition, the park also contains numerous species listed as Category 2 (those potentially eligible for listing as a Threatened or Endangered Species). Most notable among these is the Guadalupe Violet (*Viola guadalupensis*). This violet is a recent discovery, new to science, which is endemic to a small portion of the Guadalupe Mountains National Park. A complete listing of these species is shown in Appendix C.

Accordingly, the first three phases of the backcountry trail construction program were coordinated through the USF&WS Office of Endangered Species. The result of this effort has been the creation of a series of management recommendations intended to mitigate the impacts of construction activity and provide long-term protection for listed species. These recommendations include:

Peregrine Falcons -- Monitoring of peregrine falcons to be conducted by park personnel starting in early spring and through the summer at the historic eryie to determine number of young produced yearly.

- Explore "cross fostering" or "hacking" possibilities with the USF&WS to stimulate population numbers.

McKittrick Pennyroyal- Provide on-site inspection and clearance in areas where new trail construction might impact individual plants.

- Maintain a monitoring program to measure changes in the numbers of individual plants.

The park will continue to monitor and promote populations of listed and proposed listed species as part of the overall management of park resources. Monitoring of potential impacts on these species will be a part of the backcountry/wilderness comprehensive monitoring program to insure the conservation of these species.

2. Cultural Resources

The park contains over 300 recorded sites representing archeological and historical events. The majority of these sites are prehistoric in nature and include midden rings, ceramic scatters, rock shelters, lithic scatters, and pictographs and petroglyphs. The remaining sites represent historic periods of occupation and consist of such resources as military campsites, stagecoach routes, mines, oil wells, ranchhouses and ranch facilities, and the homes of Wallace Pratt. The 1994 Backcountry Management Plan will have little or no impact on most cultural resources in Guadalupe Mountains National Park. All impacts which might occur, through trail and campground construction, are being evaluated, prior to construction, as required by Section 106 of the Historic Preservation Act. Initial "clearance" work indicates there will be no damage to any cultural resource by the trail program and, in fact, these resources will be better protected by trail rerouting and the improved regulation of backcountry use.

Fifteen (15) historic structures are currently included on the List of Classified Structures for the park and two of these same sites are included on the National Register of Historic Places. Several of these sites are located within the park's backcountry as described in this document and a few are located within the designated wilderness area. Some of the more significant sites are addressed specifically below.

The park also contains a number of line camps, water tanks, drift fences, old wells, etc. remaining from the late ranching period. These remnants are scattered throughout the frontcountry and backcountry area of the national park. Depending upon one's aesthetic evaluation of these remains, they represent a wide spectrum of resource values ranging from an outright intrusion into the natural environment to exciting historic objects which might play an important role in fully understanding the national park. The management of these sites is discussed in the newly revised Resource Management Plan for the park.

In developing management recommendations for these backcountry resources, each will be evaluated on an individual basis for historic preservation needs. Management actions will be implemented accordingly. Careful evaluation of these resources and compliance to the 106 process will be completed prior to any management actions. Those resources that are determined to be important historic resources will be preserved. Those cultural resources, such as some interior fencing, which are not determined to be of historic importance will be removed as funding allows, to restore the natural scene.

The following actions will be taken to insure the preservation of specific cultural resources in the park.

- a. All archeological sites and all historic sites listed on the National Register of Historic Places and the Park Services's List of Classified Structures will be administered in full compliance of the laws and policies preserving these resources.
- b. The large water tank at the head of Bear Canyon, the pipeline along the trail in Bear Canyon, and the small tank and pump bed at the base of Bear Canyon will be left intact. This represents the best preserved and most significant portion of the historic livestock watering system as well as being the most logical examples for the interpretation of this activity.
- c. The earthen tank in the Bowl will be left intact. While obviously the result of ranchers, this historic stock tank contains no other material evident of this activity other than connecting pipes. The tank is slowly filling with sediment and actually holds very little water. No attempt will be made to repair or preserve the tank, and natural deterioration will be allowed to occur unimpaired.
- d. All tanks, pipes, structures and historic fences connected with Williams Ranch House will be left intact until a site-specific interpretive plan and historic structure report is produced for this site. While west side visitor and administrative developments are being considered as a future option by the National Park Service, it is anticipated that these developments will not occur in the near future. This fact, combined with present low level of visitor use of the Williams Ranch/Bone Spring Area, warrants a relatively low priority for a "cleanup" program in this area.
- e. Retain the cabin in the Bowl, the Marcus Cabin and associated pens, and the Cox Tank cabin and associated lambing pens since these structures remain relatively intact and have been recommended for preservation in the historic survey. Equally important is the fact that removing these cabins would appear to serve no useful purpose in protecting the backcountry ethic of the national park.
- f. Clean up the debris at the Pure Well site and retain the drilling equipment as a discovery site.
- g. Leave intact the remaining tanks, at Tejas Campground, the Tejas/Juniper Trail junction, along the El Capitan Trail, and on the West Side; and the Windmills on the West Side until an evaluation can be conducted for determination of their status and final decision made on any additional "cleanup" needed.

It is felt that the above cultural resources represent the historical period of ranching in the park. The other tanks, pipes, wells, and related structures scattered throughout the park

will need further study and individual documentation before decisions can be made on any management actions. Prior to removing any structure or making any decisions impacting these resources the park will complete an inventory of the high country water system, documenting the location and physical characteristics of structures. Then, some of these items may be removed. All work will be coordinated with the Southwest Region Cultural Resources Center - Division of History.

There are many other historic objects found throughout the park that have no known historic or interpretive value. These objects are slated for potential removal from the backcountry with appropriate obliteration and/or revegetation actions to be conducted as needed, pending an inventory and the concurrence of the Regional Office, Division of History. These actions include:

- h. Remove a number of old fence lines throughout the park. These include: 3.5 miles in the southern end of the park; 2.5 miles on the west side; 2.5 miles on the east side; 22 miles in the highcountry; approximately 1/2 mile in McKittrick Canyon, and other miscellaneous lines totalling nearly 90 miles of fence.
- i. Remove the collapsed tanks at the head of Bear Canyon Trail and in the canyon drainage.
- j. Remove the Lost Peak cabin and rehabilitate this site since the cabin has collapsed and is in a deteriorated condition that presents a safety hazard.
- k. Remove debris near Cox Tank and rehabilitate this site.
- l. Allow the earthen tank adjacent to the Cork Canyon road southeast of Coyote Peak to fill-in naturally.

The above structures present resource problems or are along major hiking trails, or visible from them, and should receive first priority in scheduling "cleanup" of the backcountry. There are a number of other sites scattered throughout the park, representing this same period but of even less significance than the above. Most "artifacts" are in an advanced state of disrepair and cannot be tied to the known history of the park. Although of a lower priority, these objects will be systematically removed as opportunities arise, and the historic review process permits. Included in this category are:

- m. Pipes connecting tanks throughout the park, particularly in the Bowl area.
- n. A number of minor tanks, pipes, and well structures along the west escarpment and lower flats.

3. Butterfield Trail

The Historic Butterfield Trail passes through the park for a distance of approximately 7 miles. The route ran from the Pinery, a National Register Property, along or near the same path as the present Hwy. 62/180, and then across the West Side of the park north of the present day town of Dell City. Currently research is underway to more accurately locate the exact route and any

historical remnants of the trail and this previous use. Once a complete assessment of the condition of the trail is made, management recommendations will be made as to the type and amount of use which would be appropriate along and on the trail. Until this evaluation is made, horse use on the trail will be prohibited and the trail will not be marked or otherwise delineated.

Once a complete survey and evaluation is conducted, the trail will be considered for nomination to the National Register of Historic Places and all cultural compliance will be completed before any management actions are undertaken.

4. Natural Water Resources

The National Park Service recognizes the scarcity of natural water in Guadalupe Mountains National Park and the critical role this resource has in its ecology. Water resources will be protected from human impact by restricting wading and bathing and prohibiting camping in proximity to springs and seeps. Interpretive messages will relay the sensitive nature of water resources and backcountry literature will identify special precautions campers must be aware of in dealing with these resources.

5. Research Natural Areas

Guadalupe Mountains National Park has three areas of unique natural science interest and has nominated these areas for designation as Research Natural Areas. These three areas are: 1) Upper South McKittrick Canyon (above Hunter Line Cabin), (2) Devil's Den Canyon, and 3) the Middle Fork of North McKittrick Canyon. The approximate locations of these three areas are shown in Figure 6 and are further defined and clarified on a topographic map maintained at the park Visitor Center and in the Chief Ranger's Office. These areas are closed to all visitor use, to incur minimum human impact and influence and to protect them as natural outdoor laboratories. Entry to these areas is strictly limited and is approved only by special permit from the Superintendent for scientific research, or special administrative needs, such as emergencies.

J. RIDING STOCK AND PACK STOCK

It is the intention of the National Park Service to provide for livestock use in the Guadalupe Mountains National Park and limit this use where these animals are determined to be impractical or environmentally unsuitable. For the purposes of this plan, livestock is defined as only those domestic animals normally used for riding and/or packing, i.e. horses, mules, donkeys and llamas. The park provides wooden hitching posts at strategic high-country locations and posts appropriate signs indicating areas closed to livestock.

All livestock use is restricted to designated trails only, except when specifically approved on a case by case basis for administration of the park. In addition, the William's Ranch Road and the old roads on the west side are designated for horse use. No off trail/road riding is permitted anywhere in the park. The Bowl area is specifically closed to all livestock use except that specifically approved for administration of the park. Riders will utilize corral and hitching rack facilities where they are provided. The "loose herding" of any livestock is prohibited. Mares with nursing foals are also prohibited on park

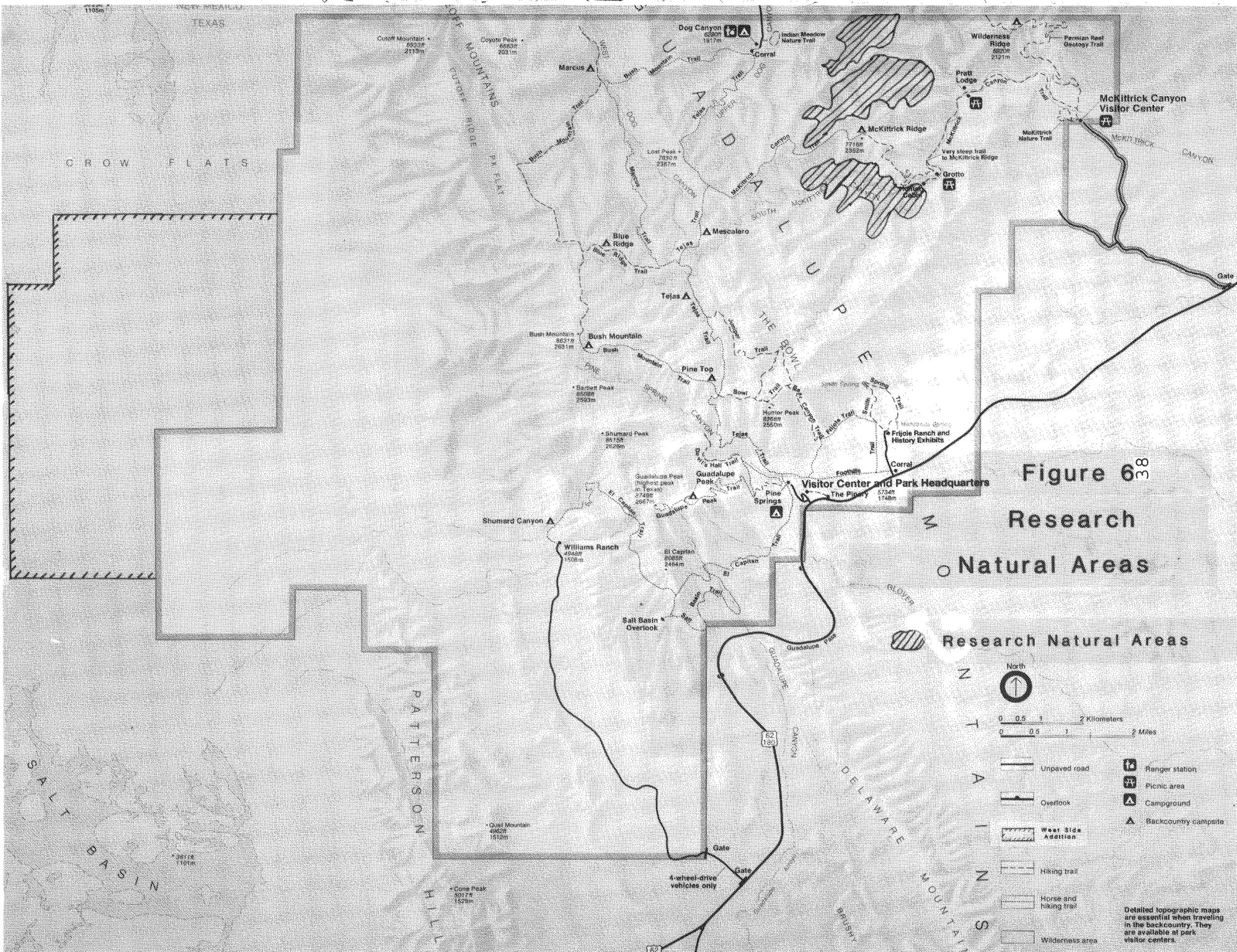
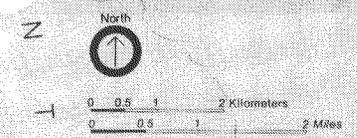


Figure 6^m

Research Natural Areas

Research Natural Areas



- Ranger station
- Picnic area
- Campground
- Backcountry campsite

- Unpaved road
- Overlook
- West side Addition
- Hiking trail
- Horse and hiking trail
- Wilderness area

Detailed topographic maps are essential when traveling in the backcountry. They are available at park visitor centers.

trails. The following trails are designated as open to livestock use: 1) Foothills Trail, 2) Guadalupe Peak Horse Trail to the hitching post below the summit of Guadalupe Peak, 3) Tejas Trail, 4) Frijole Trail, 5) El Capitan Trail, 6) Salt Basin Overlook Trail, 7) McKittrick Trail from Tejas junction to McKittrick Ridge Campground, 8) Bush Mountain Trail from Tejas junction to Bush Mountain, 9) Blue Ridge Trail from Tejas junction to Marcus Trail junction, and 10) the Marcus Trail. In addition, the William's Ranch Road from Hwy 62/180 to the William's Ranch, the connection with the El Capitan Trail, and the old roads on the west side are designated for Horse Use. All other trails are closed to livestock use.

Currently 9 hitching posts are provided for livestock users. One additional hitching post, as shown in Figure 7, is planned for the Bush Mountain Overlook. Figure 7 illustrates those trails where livestock use will be allowed and the locations of hitching posts.

Saddle and pack stock use in the entire park is restricted to "day use" only. This limit is based upon the relatively small size of the park and those impacts inherent with overnight stock use, i.e. needed corral facilities, trampling, vegetation damage, and livestock urine and feces.

To minimize trail erosion and deflation, and to maximize safety, parties using livestock are limited to 10 animals per group and to one group per trail at any point in time. If more than 10 riders arrive on any given day, they must separate into groups of 10 and ride on different trails to different locations. Party size is limited to prevent hiker/horse use conflicts caused by long strings of horses/pack animals. Trails do not provide for parties of horses meeting each other and cannot accommodate more than one party at a time.

All persons using livestock must obtain Backcountry Use Permits at the Headquarters Visitor Center or the Dog Canyon Ranger Station prior to entering the park. This permit indicates the trail route for the livestock users and ensures that all livestock users are aware of rules and regulations pertaining to livestock use, resource concerns and visitor safety concerns. Commercial operators conducting riding parties must also obtain a Special Use Permit from the Park Superintendent.

Livestock use will be restricted when the trails are too wet to accommodate these animals without trail damage. Closures will remain in effect until the trails are suitably dry. This closure will be made by the Park Superintendent.

K. CAVE USE

The Guadalupe escarpment is noted for its diverse and spectacular cave resources. There are presently 27 known caves in Guadalupe Mountains National Park. These caves, although characteristically dry, are sparsely decorated with a wide variety of nonrenewable speleothems. Historically, these caves have received little attention due to their remote locations, difficult access and proximity to larger and better known caves in the area.

In recent years, the caving community and general public have become more aware of the park's cave resources. It is also likely that, with increased backcountry use, the potential for new cave discoveries and associated public interest will increase. All entry into caves is prohibited except by permit.

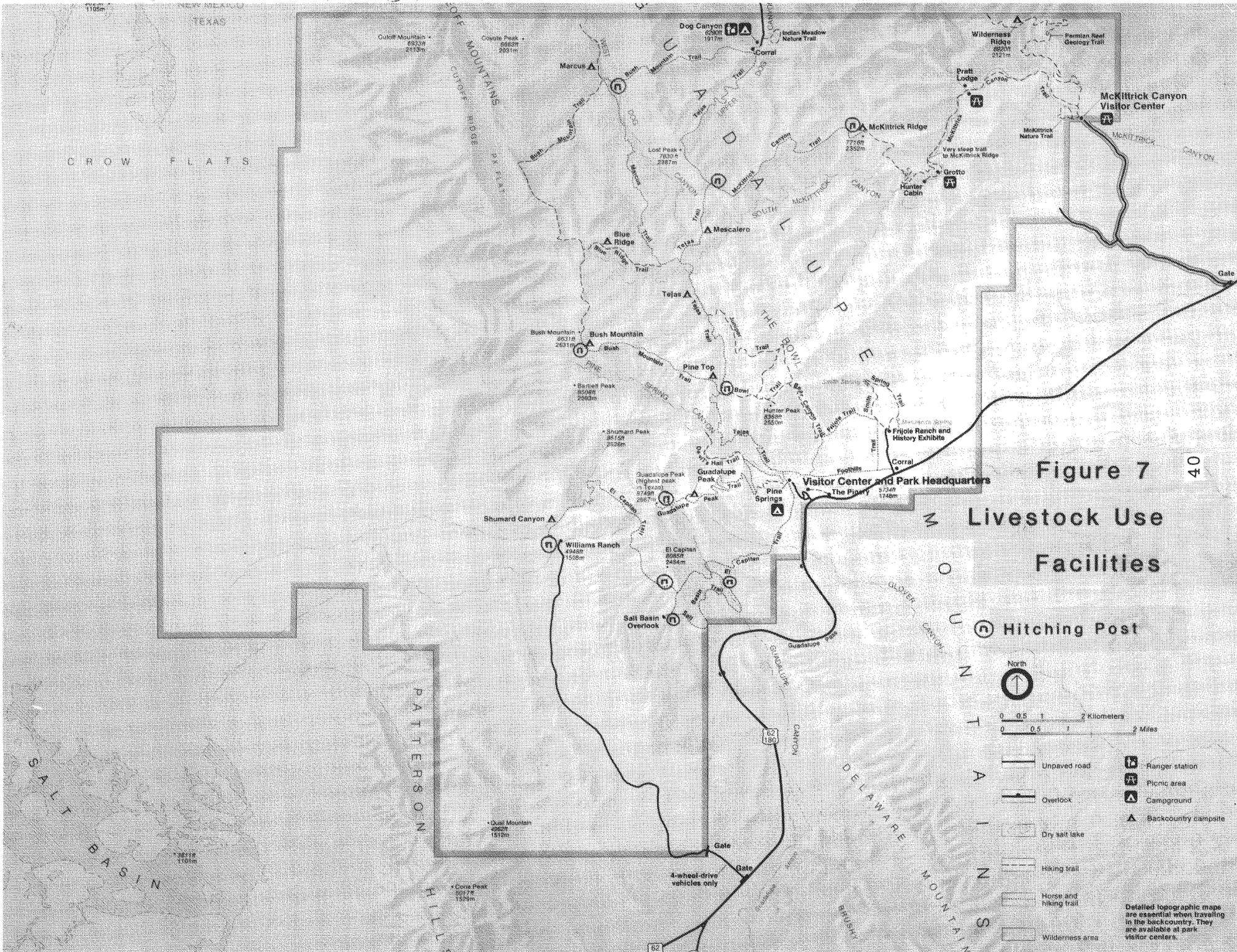


Figure 7 40

Livestock Use Facilities

Hitching Post



0 0.5 1 2 Kilometers
0 0.5 1 2 Miles

- Unpaved road
- Overlook
- Dry salt lake
- Hiking trail
- Horse and hiking trail
- Wilderness area
- Ranger station
- Picnic area
- Campground
- Backcountry campsite

Detailed topographic maps are essential when traveling in the backcountry. They are available at park visitor centers.

To assure a comprehensive management program for all caves in the park, a separate Cave Management Plan has been developed for Guadalupe Mountains National Park. This document, an addendum to the Natural and Cultural Resources Management Plan for Guadalupe Mountains National Park, identifies specific management recommendations for individual caves within the park. The Cave Management Plan has established the following management objectives concerning the caves of Guadalupe Mountains National Park:

1. Protect and perpetuate natural cave systems.
2. Provide educational and recreational opportunities for a broad spectrum of park visitors (from the casually curious to the avid caver) to discover, study, respect, and enjoy the park's caves at their individual levels of interest and technical competence.
3. Provide opportunities for scientific study of cave resources and systems.
4. Classify and manage caves (in management categories) based on their resources and hazard characteristics.
5. Establish regulations, guidelines, and permit stipulations that insure maximum safety for the cave visitor and preservation of park resources.

L. SIGNING

It is the goal of the park to limit signs in the backcountry to only those needed for directions, public safety and resource protection. In compliance with the Wilderness Act, interpretative signs will not be utilized within the Wilderness Area of the park. Directional signs will be of a standard design and quality as identified in the approved Sign Plan for Guadalupe Mountains National Park. All trail destination and mileage signs will be constructed of anodized aluminum plates mounted on metal posts and routed with standardized letters.

A Backcountry sign inventory will be made in keeping with the park's Sign Plan and will include recommendations for changes, additions or deletions, and replacements. Signs suffering from weathering, poor maintenance, inaccuracy or vandalism will be removed as soon as suitable replacements become available.

Trail Wayside Exhibits are maintained at all trailheads leading into the backcountry. Minimal information displayed includes a topographic map (with trails, campsites, and mileages marked), a registration sheet for hikers, and appropriate seasonal information.

These exhibits will be constructed of weatherproof material and well-maintained.

Map boxes, bulletin boards, and registration boxes in backcountry areas of the park are inappropriate and unnecessary. The only exception is a small registration book kept at the top of Guadalupe Peak. This practice will be continued in keeping with the tradition of recording the names of those who have climbed to the highest point in Texas.

Interpretive signs in the backcountry/wilderness will be kept to an absolute minimum. Frontcountry signs interpreting backcountry resources will be of an appropriate format using design techniques approved by the

National Park Service Design Center at Harpers Ferry. It will be the intention of the park to carefully appraise the need for interpretive devices in the backcountry and install only those which maintain the pristine qualities of the park.

Wilderness Wayside Exhibits have been placed on major trails to designate entrance into the Wilderness Area.

M. SOLID WASTE DISPOSAL

1. Trash

In keeping with the wilderness ethic, all visitors are expected to pack out any trash they carry into the park. No trash will be buried or burned.

2. Human Waste

Human waste will be disposed of in a manner which protects the park environment, public safety, and preserves the aesthetic qualities one expects in a national park. Backcountry visitors will bury waste well away from trails and campsites.

At high use campgrounds and at the Pine Top Patrol Cabin, inconspicuous sanitation facilities may be established. They will consist of some type of self composting or perhaps solar device. The exact type of facility will be based on current available technology to meet the need. A sign in the campground will identify the toilet location.

Where sanitation facilities are not provided, visitors are expected to move 100 feet from established trails, and 150 feet from campsites and water sources, to dispose of their waste. Information on proper human waste disposal techniques will be printed in suitable backcountry literature and conveyed in other programs at hiker check-in points.

N. PETS

Except for authorized riding or pack animals and seeing-eye dogs, no pets of any kind will be allowed in the backcountry of Guadalupe Mountains National Park or away from developed front country areas.

O. MOTORIZED VEHICLES OR BICYCLES

In accordance with the Wilderness Act, no motorized vehicles, human powered wheeled conveyances, except a manual wheelchair, or wheeled vehicles of any type will be allowed on trails or in the backcountry. This includes motorcycles, mountain bicycles, bicycles and strollers.

P. RESEARCH AND MONITORING

The park staff will conduct or authorize research into various aspects of the backcountry management and conduct monitoring to assess the impacts of visitor use.

Research will be conducted in keeping with the park's established research and collecting permit policy. Work will be funded by the park

or promoted through cooperation with established institutions. Collecting permits for the removal of backcountry resources will be issued only when it is established that the collection will directly benefit the park.

Research affecting endangered and threatened species and cultural resources will be coordinated through appropriate National Park Service Offices and other Federal agencies.

The National Park Service will continue its own research and monitoring efforts concerning the reintroduction of fire into the park's ecosystems. The program will follow procedures and prescriptions identified in the approved Fire Management Plan and will consist of a variety of practices including allowing some natural-caused fires to continue burning and the actual ignition of park vegetation to reduce forest fuels.

The park will develop a comprehensive monitoring program for the backcountry and wilderness areas in the park. This monitoring program will be designed to monitor public use, develop statistics on use, monitor environmental impacts and detect Levels of Acceptable Change. The Limits of Acceptable Change system and other monitoring protocols developed by Stankey and Cole will be utilized to develop this monitoring program.

As determined by funding and manpower limitations, the park will conduct a series of resource monitoring projects including wildlife populations, water quality, air quality, visitor use impacts, and vegetation recovery. All research and monitoring activities will be conducted to insure minimal impact on the resource, including visual and aesthetic values.

Q. COOPERATION WITH ADJACENT AGENCIES AND PARK NEIGHBORS

The park staff will maintain communication with Federal and State agencies bordering the park. This communication will take the form of personal communication with representatives of these agencies and through following the established procedures of the National Park Service in coordinating proposed management actions.

The park will conduct annual meetings with neighboring agencies concerning its management programs and participate in other meetings as needed in order to keep these agencies informed of park activities. Significant management plans, including the Backcountry Management Plan, will be distributed to local, State, and Federal agencies as well as the public for review and comment.

The park staff will also maintain an active communication with park neighbors to insure that major actions proposed by park neighbors are fully considered in relation to their possible impacts on the park's backcountry resources.

R. RESPONSIBILITIES FOR IMPLEMENTING AND UPDATING THE BACKCOUNTRY/WILDERNESS MANAGEMENT PLAN

The Park Superintendent has the ultimate responsibility for development and implementation of the Backcountry Management Plan for Guadalupe Mountains National Park. He/she will be assisted in these duties by the park staff. Responsibility for the implementation of specific aspects of the plan have subsequently been delegated to members of the park

staff using the established organizational chain-of-command. The Park Superintendent has the overall responsibility for implementing the plan. The resources management and visitor protection functions are the responsibility of the Chief Ranger and the interpretive elements of the plan are assigned to the Chief Interpreter. Maintenance functions, including trail maintenance, are the responsibility of the park's Facility Manager.

The park will conduct an in-house annual review for minor corrections and update, as necessary, the Backcountry Management Plan by January 1st of each year. Unless there are significant changes to the document or significant needed additions or deletions, the plan will undergo formal public review every five years.



IV. ENVIRONMENTAL IMPACTS OF THE PROPOSAL AND THE ALTERNATIVES

The following assessment is intended to outline the environmental impacts of the implementation of the 1994 Backcountry/Wilderness Management Plan proposals and the alternatives considered to these proposals.

A. SUMMARY OF PROPOSED MANAGEMENT ACTIONS

Implementation of the proposed Backcountry/Wilderness Management Plan would consist of the following proposed actions (summarized here):

- 1) Continue to manage McKittrick Canyon as a Special Use Area
- 2) Establish Backcountry Campgrounds with Designated Sites
- 3) Establish Backcountry Campground Use Limits
- 4) Establish Riding and Pack Stock Use Limits
- 5) Install Pit Toilets at Various Locations in the Backcountry
- 6) Implement Endangered and Threatened Species and Wildlife Management Plans
- 7) Remove Unneeded Historical Resources
- 8) Implement Fire Management Plan
- 9) Implement a Backcountry/Wilderness Monitoring Plan
- 10) Maintain Existing Open Camping Zone in Park's High Country
- 11) Establish two Additional Camping Sites on the Park's West Side
- 12) Continue Trail Maintenance on Existing Trails to Maintain Trails at Standard
- 13) Utilize Helicopter to Support Trail Maintenance Operations by Flying In Base Course Material
- 14) Re-evaluate Phase IV Trail Construction Projects and Develop a New Trail Plan
- 15) Continue to Maintain a Management Agreement with the U.S. Forest Service for North McKittrick Canyon

B. SUMMARY OF ALTERNATIVES CONSIDERED

The alternatives considered in development of this plan are summarized below:

1. Allow Unrestricted Visitation in Backcountry
2. Allow Unrestricted Visitation in McKittrick Canyon
3. Open All Park Trails to Horse Access
4. Close Entire Backcountry to Open Zone Camping
5. Open Entire Backcountry to Open Zone Camping

6. Add Additional Open Camping Zones in the Park
7. Use Only Horses to Support Trail Maintenance Operations
8. Complete Phase IV Trail Construction Projects
9. Add Additional Trails and Campgrounds on the West Side to Provide for Visitor Use in This Area
10. No Action

C. ENVIRONMENTAL IMPACTS OF PROPOSED MANAGEMENT ACTIONS

1. Continue to Manage McKittrick Canyon as a Special Use Area:

- a. Vegetation. Management of visitor use and resource impact will lead to the reduction of vegetation losses caused by trampling and trailing.
- b. Wildlife. Management of visitor use lessens impact to wildlife by limiting visitation during the nighttime hours. Use restrictions and on-trail use requirements also lessen impact to wildlife.
- c. Endangered or Threatened Species. Peregrine falcons and Spotted Owls will be afforded protection from human interference during critical nesting periods. The McKittrick pennyroyal population will be afforded better protection through the presence of park staff.
- d. Cultural. Known sites will be afforded better protection by park staff temporarily assigned visitor contact duties during peak visitor use periods.
- e. Air Quality. No impact.
- f. Water Quality. Resource monitoring effort and ranger patrols will lessen human caused contamination of stream.
- g. Soils. Streamside embankments will be protected from trampling, protected vegetation will stabilize existing soil communities.
- h. Socio-Economic. Persons visiting the protected canyon will impact and/or benefit the surrounding communities in keeping with present use levels.
- i. Aesthetic Values. Persons enjoying the unique resources of McKittrick Canyon will be pleased with NPS efforts at protection. Those people feeling present use levels are adversely impacting the resources of McKittrick Canyon will oppose the proposal.

*A comprehensive Environmental Assessment will accompany the McKittrick Canyon Management Plan and address impacts of proposed actions in more detail.

2. Establish Backcountry Campgrounds with Designated Sites:

- a. Vegetation. Approximately one acre of vegetation will be disturbed by the addition of new sites and the continued

hardening of sites in the backcountry of the park. The presence of hardened sites will encourage use of these sites for camping and limit trampling of vegetation caused by lack of designated sites.

- b. Wildlife. Minor and temporary disturbances to reptiles and small mammals will result from campground relocations, and site hardening.
- c. Endangered or Threatened Species. Designation of campsites and hardening of sites will lessen impact on threatened & endangered species through better control of visitor activities.
- d. Cultural. Designation of campsites, relocating some and hardening of the sites will lessen impact on cultural resources through better control of visitor activities.
- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. Approximately one acre of soil will be impacted by designation of sites, relocation of sites, and site hardening. This will limit development of social trails and reduce soil impact.
- h. Socio-Economic. No impact.
- i. Aesthetic Values. Visitor enjoyment of the park will be enhanced by limiting the visual intrusion created by unrestricted camping. Those persons insisting that they should be allowed to camp at locations of their choice will probably be displeased. Those who appreciate hardened sites to camp on will enjoy the designated sites with hardened tent pads. Some possible displeasure may result from persons being denied specific campgrounds if they become full. Due to the relatively low level of use, the conflict will be minimal.

3. Establish Backcountry Campground Use Limits:

- a. Vegetation. Approximately one acre of vegetation will be disturbed by the addition of new sites and hardening of existing sites in the backcountry of the park. Limiting numbers of users will reduce trampling of vegetation.
- b. Wildlife. Minor and temporary disturbances to reptiles and small mammals will result from campground relocations and hardening. Adverse disturbances to wildlife will be minimized by limiting the number of backcountry campground occupants.
- c. Endangered or Threatened Species. The setting of use limits will, along with designating campsite locations, limit the impact on endangered and threatened species through limiting the uncontrolled spread of campgrounds, limit trampling of vegetation and control the locations of camping to avoid sensitive habitat of endangered and threatened species. Peregrine falcons will be unaffected by the proposal.
- d. Cultural. Established use limits and designation of

specific campgrounds and campsites will lessen impact on cultural resources through better control of visitor activities.

- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. Approximately one acre of soil will be impacted during campground relocation and site hardening. Limits on the numbers of users will reduce trampling of soils.
- h. Socio-Economic. Visitor enjoyment of the park will be enhanced by adopting use limits which avoid campground congestion and distributes use over a wider area of the park.
- i. Aesthetic Values. More persons will be permitted to camp at any given time. Low levels of use is not expected to significantly impact the enjoyment of park visitors. Those persons insisting that the present system is satisfactory will object to development of campgrounds and implementation of a permit system. Some possible displeasure may result from persons being denied specific campgrounds if these areas become full and the NPS prohibits further use. Due to the relatively low level of use, this conflict is expected to be minimal.

4. Establish Riding and Pack Stock Use Limits:

- a. Vegetation. Some cropping of trailside vegetation will result from horse use. Impacts are lessened by limiting horse use to certain trails and by restricting horse use to trails. Some introduction of exotic plant species may occur as a result of horse use. Impacts are mitigated by limiting horse use to certain trails and by prohibiting overnight use of horses.
- b. Wildlife. Impacts to wildlife are lessened by the limiting of horses to day use only.
- c. Endangered or Threatened Species. Impacts to threatened or endangered species are reduced by restricting horse use to trails and by limiting horse use to certain trails.
- d. Cultural. Impacts to cultural resources are significantly reduced or eliminated by restricting horse use to trails.
- e. Air Quality. No impact.
- f. Water Quality. Impacts to water quality are reduced or eliminated by prohibiting horse use within McKittrick Canyon.
- g. Soils. Accelerated trail erosion will result from horse trail use in the park. Trail maintenance efforts will need to be increased in areas experiencing heavy horse use. Trail erosion will be somewhat reduced by limiting horse use to certain trails and maintaining them to horse standards.
- h. Socio-Economic. No. impact.

- i. Aesthetic. Persons objecting to horses in Guadalupe Mountains National Park will object to hitching posts installed in the backcountry for these animals. They will also object to seeing and smelling horse manure and urine on trails. Those persons enjoying the sights and experiences associated with horseback riding in the park will be pleased with the opportunity to ride in the park.
5. Install Pit Toilets at Various Locations in the Backcountry:
- a. Vegetation. Estimate 4 sq. ft. of park vegetation will be destroyed by facility installation.
 - b. Wildlife. Could serve as an attractant to wildlife if users improperly dispose of food wastes in toilets.
 - c. Endangered or Threatened Species. No impact.
 - d. Cultural. No impact.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Minor disturbances of soil (est. 5 cu. ft.) will result from installation.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. Persons objecting to using pit toilets in the park's backcountry will probably not use these facilities. Those people objecting to the proliferation of human feces and toilet paper around the heavier used campgrounds will be pleased with the installation of central toilet facilities.
6. Implement Endangered and Threatened Species and Wildlife Management Plans:
- a. Vegetation. All T&E plants and endemic species will benefit by the protection provided in these plans.
 - b. Wildlife. The ability of the peregrine falcon to pair and nest in the park will, hopefully, be enhanced by the closure of upper South McKittrick Canyon during their nesting period. Trail closure will be expanded or modified according to its observed influence of these wildlife species. Monitoring and other actions accomplished in these plans will benefit wildlife by adding to the park information database and providing management with information to make informed decisions.
 - c. Endangered or Threatened Species. These species will be protected by the actions taken in these plans. Monitoring of these species will have no direct impact them. Information obtained from monitoring efforts will enable the NPS to better manage and protect individual species. No collecting will be done without full consultation with the USF&WS and a thorough assessment of environmental impacts.
 - d. Cultural. No impact.

- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. No impact.
- h. Socio-Economic. No impact.
- i. Aesthetic Values. Those persons concerned about and pleased with the existence of endangered and threatened species in the park will be pleased with the attempts of the NPS to protect those species. Those persons concerned about the wildlife populations will be pleased to see Bighorn sheep introduced and other wildlife populations managed to maintain biodiversity. Otherwise, the proposal will not significantly impact a visitor's enjoyment of the park.

7. Remove Unneeded Historical Resources:

- a. Vegetation. Some minor trampling of localized vegetation would occur during removal process.
- b. Wildlife. Removal of some unneeded historical resources such as old interior fencing will benefit wildlife in that these fences will no longer impede wildlife movement. Since the other historical resources such as tanks and water troughs are not maintained and contain no water, their removal or not will have no impact on wildlife.
- c. Endangered or Threatened Species. No impact.
- d. Cultural. Some non-significant historic "objects" will be removed from the park. These items will range from historic trash dumps, to water distribution lines, to interior fencing. No object listed on the National Register of Historic Places or the park's List of Classified Structures will be impacted. All objects removed will be removed only after full cultural compliance review and completion of the "Triple X" cultural resources compliance process.
- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. No impact.
- h. Socio-Economic. No impact.
- i. Aesthetic. Persons feeling the historic material to be removed by this proposal are integral parts of the national park will object to NPS efforts at removing it. Other people, who view this same material only as "junk", will be pleased by its removal.

8. Implement Fire Management Plan:

- a. Vegetation. Eventually all areas of the park will be affected by this proposal. The present inventory of plant species and their frequency will eventually be returned to that of a forest having a natural fire ecology.
- b. Wildlife. Wildlife species which developed in relation to

natural forest fire regimes will respond to the vegetational changes resulting from the proposal. Some species will increase their numbers while others, which have responded to the present vegetational community, will decrease.

- c. Endangered or Threatened Species. Endangered and threatened species are expected to increase their populations in keeping with their ecological relationship with a "natural" environment.
- d. Cultural. Since the forest has historically burned, (approximately once every 17 years), the impact of research and prescription fires on cultural resources is not expected to be significant.
- e. Air Quality. Approximately 5 to 10 tons of smoke and fire related emittance will be thrown into the air with each management fire. These emittances will include carbon dioxide, carbon monoxide, phosphates and nitrates. These emissions will add to man-made pollutants but are not expected to significantly diminish air quality standards within the region.
- f. Water Quality. Temporary disturbance to water communities will result from management fires. These impacts will be of a temporary nature. Long-term effects of the proposal will be the return of the natural ecology of these systems.
- g. Soils. Temporary disturbance to soils will result from management fires. These impacts will be of a temporary nature. Long-term effects of the proposal will be the return of the natural ecology of these systems.
- h. Socio-Economic. No impact.
- i. Aesthetic Values. Those people concerned with returning the park to a totally natural ecological regime will be pleased by the proposal. Those people not understanding the ecological role fire has in the environment, or objecting to any use of fire, for any reason, will object to the proposal. Temporary removal of vegetation and a general blackened appearance of the forest will temporarily lessen the enjoyment of the park. These scenes will gradually fade as new growth generates and natural levels of diversity and abundance are restored.

*A comprehensive Environmental Assessment will accompany the Fire Management Plan and will address the impacts of this plan in more detail.

9. Implement a Backcountry/Wilderness Monitoring Plan:

- a. Vegetation. Additional information gained from monitoring will increase the database for vegetative resources and impacts to these resources. This will assist park managers in making informed management decisions.
- b. Wildlife. Additional information gained from monitoring will increase the database on the park's wildlife and impacts to these resources. This will assist park management in making informed management decisions.

- c. Endangered or Threatened Species. Monitoring of these species will be conducted, in cooperation with the USF&WS. Information obtained through monitoring provides data on the status of these species and assists in making informed management decisions. No collecting of specimens is planned under this monitoring program. If species were required to be collected, it would be accomplished only after full Section 7 consultation with the USF&WS and obtaining necessary permits.
 - d. Cultural. Additional information gained from monitoring will increase the database on the park's cultural resources and impacts to these resources. This will assist park management in making informed management decisions.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact. Water samples collected will be used to provide management with information to detect impacts or changes in the baseline over time and overall quality of water resources within the park.
 - g. Soils. No impact.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. No impact.
10. Maintain Existing Open Camping Zone in Park's High Country:
- a. Vegetation. Potential exists for significant disturbance to vegetation from persons pitching tents in pristine areas. Visitor use limits and close monitoring of this use will mitigate impact.
 - b. Wildlife. Campers will temporarily disturb wildlife as they use this zone. Visitor use limits will mitigate this impact.
 - c. Endangered or Threatened Species. No impact. This zone is located so as not to coincide with prime habitat for endangered or threatened species.
 - d. Cultural. Some minor disturbance of cultural resources will result from campers exploring sites in this area. This disturbance is not expected to be significant.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Some minor compaction of soils will result from camper use. Area use will be widespread and minimize compaction.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. Persons enjoying the experience inherent in hiking and camping in pristine areas of the national park will be pleased by the designation of a section of Guadalupe Mountains National Park as an "open camping" zone. Those wishing this unique type of wilderness experience will

appreciate this opportunity. Those not wishing this type of wilderness experience will not object to this opportunity. Those persons objecting to increased use of the park's backcountry will object to this proposal.

11. Establish Two Additional Camping Sites on the Park's West Side.

- a. Vegetation. Some vegetation within the 1/4 square mile camping zones will be disturbed by campers using these two sites. Camp site use limits will lessen the impact. The anticipated low visitation will minimize this impact. Monitoring will be conducted to measure impacts.
- b. Wildlife. Minor and temporary disturbances to reptiles and small mammals will occur when the camp sites are being used. The anticipated low visitation will minimize this impact.
- c. Endangered or Threatened Species. Sites are established to avoid habitat of endangered or threatened species. If this later proves incorrect, the sites will be relocated.
- d. Cultural. Sites are located in areas free of surface cultural resources. Visitor use limits will lessen impact on cultural resources generally through better control of visitor activities.
- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. Some compaction of soil will occur where campsites are located. Visitor use limits will lessen the impact. Potential trampling will be distributed over a wider area and will lessen compaction.
- h. Socio-Economic. Visitor enjoyment of the park will be enhanced by adopting use limits which distribute use over a wider area of the park.
- i. Aesthetic Values. More persons will be permitted to camp in the park at any given time. The relatively low level of use is not expected to significantly impact the enjoyment of visitors. Those persons enjoying the experience inherent in cross-country hiking and camping and wishing a more solitary experience will be pleased with this opportunity. Those persons wishing to experience the Chihuahuan Desert will be pleased to have this opportunity. Those persons objecting to any increased use of the park's backcountry will object to this proposal.

12. Continue Trail Maintenance on Existing Trails to Maintain Trails at Standard:

- a. Vegetation. Some vegetation adjacent to trails will be impacted by routine annual trimming and brushing of trails.
- b. Wildlife. No impact.
- c. Endangered or Threatened Species. No impact.
- d. Cultural. No impact.

- e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Some erosion occurs because of the presence of trails and use by visitors. Erosion is managed by trail maintenance and the construction of waterbars, both of which minimize the impact from erosion.
 - h. Socio-Economic. Access offered by well maintained trails may have the effect of attracting more visitors to the park backcountry.
 - i. Aesthetic Values. Persons enjoying the ability to hike on well maintained trails in remote sections of the park will be pleased with the maintenance efforts. Safety of park visitors is enhanced by maintaining designated trails to a standard. Some diminution of a wilderness experience will occur for those seeking a purely wilderness experience.
13. Utilize Helicopter to Support Trail Maintenance Operations by Flying in Base Course Material:
- a. Vegetation. Impacts to the park's vegetation will include the minor disturbance of grasses and shrubs caused by the placement of cargo nets loaded with base course. Impacts to vegetation will also include the trampling of grasses and forbs in the vicinity of loading and unloading operations. Impact will be minimized by using the trail itself where possible or other open non-vegetated areas. Natural recovery of the disturbed area is expected to occur, in a short period of time, as the base course is relocated.
 - b. Wildlife. Noise from the helicopter will temporarily disturb raptors, and ungulates in the vicinity of trails where helicopter operations would be occurring. This disturbance will be of a short duration and these animals will return to their normal patterns of activity within a day or two after the helicopter operation.
 - c. Endangered or Threatened Species. Unloading sites would be chosen to avoid areas where threatened, endangered or rare or fragile plant species are located. Noise from the helicopter might temporarily disturb the peregrine falcons or spotted owls. This disturbance will be of a short duration and these animals will return to their normal patterns of activity within a day or two after the helicopter is gone. Helicopter operations will avoid known eyrie sites. Section 7 consultation with the USF&WS would be completed before this action was taken.
 - d. Cultural. No impact.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Some minor impact to soils will occur at loading and unloading sites. Natural recovery should occur rapidly and impacts are anticipated to be of a short duration. Soils brought in by helicopter rather than by the use of borrow pits will significantly preserve park soils as considerable

material, up to 195 cubic yards per mile, is needed to maintain trails. By not using borrow pits in the backcountry, this soil is protected and less erosion should occur.

- h. Socio-Economic. The use of a helicopter will support commercial operations of this nature and be a cost effective method of providing base material to trail maintenance operations.
 - i. Aesthetic Values. The use of a helicopter within the designated wilderness areas will temporarily broach the natural quiet and solitude found in the park and temporarily compromise the designation of this area as a unit of the National Wilderness Preservation System. Persons hiking into the area (over an up to 10 day period per year) may be subjected to noise from the helicopter and may question the use of a helicopter in a wilderness area. Those persons wishing the park to be cost-effective in operations will not object to this temporary disturbance. Persons who view the advantages (efficiency and convenience) of helicopter use as acceptable under the minimum requirement identified in the wilderness act will support this proposal.
14. Re-evaluate Phase IV Trail Construction Projects and Develop a New Trail Plan:
- a. Vegetation. An estimated 3.5 acres of vegetation would have been destroyed by phase IV trail construction. An additional estimated 2.0 acres of old trails and roads that would be obliterated or abandoned would leave scars on the landscape for years in the desert environment. A new trail plan would reevaluate these needs and impacts.
 - b. Wildlife. Some temporary disturbance of reptiles and small animals would result from trail construction. No long term impacts would result. A new trail plan would have no adverse impacts.
 - c. Endangered or Threatened Species. A new trail plan will evaluate all known locations of threatened or endangered species, or category 2 plants, assessing the increased information in the park's database and plan for rerouting of trails where necessary and location of any new trails to avoid impact on these species. Section 7 consultation with USF&WS would be included as part of this plan.
 - d. Cultural. A new trail plan will evaluate all known locations of cultural resources, assessing all new database information, and plan for rerouting of trails, where necessary, and the location of any trails to avoid impact on cultural resources.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. The phase IV construction would disturb approximately 3.5 acres of soil during new trail construction activities. A new trail plan will reevaluate this need.

- h. Socio-Economic. Access offered by more trails, as identified in the phase IV trail projects, may have the effect of attracting more visitors to the park's backcountry.
 - i. Aesthetic Values. Persons enjoying the ability to hike on additional improved trails in remote sections of the park will be unhappy that the phase IV projects are being reevaluated. Those believing the park presently has a satisfactory trail system will be pleased that the phase IV trail construction projects are being reevaluated.
15. Continue to Maintain a Management Agreement with the U.S. Forest Service for Management of North McKittrick Canyon:
- a. Vegetation. No impact. By working together any potential impacts to vegetation by management of either agency would be minimized.
 - b. Wildlife. No impact. By working together any potential impacts to wildlife by management of either agency would be minimized.
 - c. Endangered or Threatened Species. No impact. By working together any potential impacts to threatened and endangered species would be minimized and efforts would be coordinated.
 - d. Cultural. No impact. By working together any potential impacts to cultural resources would be minimized and protection of these resources would be enhanced.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. No impact.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. Mutual cooperation and planning is expected to enhance the natural environment and promote the visitors ability to use and enjoy the area. By both agencies working together to manage the North McKittrick Canyon area, the visitors entering this area will have a better understanding of what use limits, if any, exist.
- D. ENVIRONMENTAL IMPACTS OF PLAN ALTERNATIVES
1. Allow Unrestricted Visitation in Backcountry:
- a. Vegetation. No significant change from current vegetation impacts would occur if visitation levels remain at current numbers. Increased visitation would result in accelerated damage to native vegetation caused by the unregulated expansion of campgrounds and hiking trail networks. In McKittrick Canyon this would lead to the proliferation of social trails and the resulting trampling of vegetation from off-trail use in the narrow canyon corridor.
 - b. Wildlife. Wildlife populations will respond to habitat damage caused by uncontrolled visitor use. Animals will be temporarily disturbed by persons moving through the park

during cross-country camping trips.

- c. Endangered or Threatened Species. Peregrine falcons will continue to be afforded protection by the nature of their habitat, but may be impacted by visitors getting close enough to interfere with the critical space they need for nesting. The McKittrick Pennyroyal and other plants will be threatened by visitors using the present network of trails in their habitat. Further impact will result if unrestricted trail use creates situations wherein visitors and/or horses wander indiscriminately through pennyroyal habitat. This action would require Section 7 consultation with the USF&WS.
 - d. Cultural. The rate of deterioration of archeological sites known to lie near trails and campgrounds would increase or decrease dependent upon the level of visitation the park experiences. Damage would be irreversible. Areas previously impacted would receive impact by persons hiking off established trails and camping on archeological sites.
 - e. Air Quality. Some periodic degradation of air quality will result from occasional wildfires occurring in built up forest fuel loads. An estimated 100 tons of pollutants will be emitted over the course of a year. Man-caused fires would be a significant contributor to these wildfires.
 - f. Water Quality. Some periodic increase of fecal coliforms and fecal streptococci may occur in the canyon drainages immediately after rainshowers. This impact will result from accumulations of human feces being washed into drainages. Overall this pollution, compared with the heavy loads of other organic material washed into the drainages during downpours, is expected to be insignificant. McKittrick Canyon would continue to receive periodic impacts from human waste.
 - g. Soils. Soil impacts will increase in direct proportion to increases of visitor use. New soil impacts will result from the uncontrolled use of new campsites and the development of new trails as dictated by visitor whims.
 - h. Socio-Economic. Increased visitor use levels of the national park would result in a proportional increase in whatever benefits this activity currently brings to surrounding communities. However, projected visitation is not expected to reach even established use limits identified in the proposal.
 - i. Aesthetic Values. Any significant increases from the present use levels would result in increased conflicts between persons and groups wishing to use preferred camping spaces; and conflicts between those preferring to ride horses with those objecting to horse use in the relatively small area of the park. Unrestricted use will invariably impact natural resources and reduce the pristine quality of the national park.
2. Allow Unrestricted Visitation in McKittrick Canyon:
- a. Vegetation. Significant impact to vegetation would occur with unregulated use resulting in social trails and

trampling of vegetation. Increased visitation would result in accelerated damage to native vegetation caused by trampling and social trails. Streamside vegetation would be impacted by trampling and erosion caused by social trails.

- b. Wildlife. Wildlife populations will respond to habitat damage caused by uncontrolled visitor use. Vegetation changes along the stream and in the riparian zone would affect wildlife habitat. Animals will be temporarily disturbed by persons moving through the riparian zone.
- c. Endangered or Threatened Species. Peregrine falcons would be potentially impacted by visitors using the canyon during the critical nesting period. McKittrick Pennyroyal and other special populations would be impacted by trampling when visitors wander indiscriminately through habitat for these species. Section 7 consultation with the USF&WS would be required to complete this action.
- d. Cultural. The rate of deterioration of archeological sites found in the canyon would increase or decrease dependent upon the level of visitation. Damage would be irreversible.
- e. Air Quality. No impact.
- f. Water Quality. Some periodic increases of fecal coliforms and fecal streptococci may occur in the canyon because of increased and uncontrolled visitation. Visitors who entered the stream in McKittrick could considerably upset the delicate ecological balance found there. Some rare and endemic aquatic invertebrates would be impacted. Delicate geological depositions found in the stream would be disturbed and probably broken.
- g. Soils. Soil impacts will increase in direct proportion to increases of visitor use. New soil impacts would result from uncontrolled use and development of new social trails as dictated by visitor whims.
- h. Socio-Economic. Increases in visitor use levels would result in a proportional increase in whatever benefits this activity currently brings to surrounding communities. Theoretically, more visitors would mean more benefits, through sales of supplies and services, for the local communities.
- i. Aesthetic Values. Any significant increases in visitation would result in increased conflicts between persons using the canyon. Increased use or uncontrolled use in the narrow canyon corridor would impact natural resources and reduce the pristine quality and wilderness experience of the canyon visit.

3. Open All Park Trails to Horse Access:

- a. Vegetation. Some increased damage to native vegetation would result from horses being allowed into areas closed to their use. This damage would result from normal cropping of trail-side plants as the animals moved through the park and from the increased width of the trail tread required for horse trails. Fragile habitats would be impacted by this use on certain trails, proposed for closure. At current

use levels, the impact is not expected to be significant on trails open to use.

- b. Wildlife. No significant impact. Some minor disturbance of wildlife will result from riders passing through the home ranges of these wildlife species.
- c. Endangered or Threatened Species. Horse use in and around populations of the McKittrick Pennyroyal and other special plant species would threaten these species through grazing and trampling. This impact would probably be significant. This action would require Section 7 consultation with the USF&WS.
- d. Cultural. Horses using trails previously restricted would impact archeological resources wherever established trails crossed these sites. At least 10 mesal rings would be impacted through trampling and accelerated erosion brought about by increased horse traffic.
- e. Air Quality. No impact.
- f. Water Quality. Increased use of riding and pack stock in the park will result in increased levels of urine and manure being deposited in the park. This material will eventually be washed into water sources during rainstorms. The net effect of this material will be a slight decrease of water quality. However, runoff from rainstorms is so charged with organic material, the effect of horse waste is expected to be negligible.
- g. Soils. Soil deflation and compaction will increase wherever horse use is permitted in addition to hiker use. Soil tread of horse/hiker trails will erode at a rate faster than similar material on hiker-only trails.
- h. Socio-Economic. Increasing horse access to all areas of the park could conceivably attract more people to the park. The net socio-economic impact, however, is not expected to be significant. There would be an increased cost of maintaining all trails at horse standards.
- i. Aesthetic Values. Those persons wishing total use of the Guadalupe Mountains National Park for riding purposes will find this alternative highly attractive. Incidents of safety related problems will increase as riders use trails previously closed to stock use because of trail deterioration. Incidents of unfriendly hiker/rider interactions will increase.

4. Close Entire Backcountry to Open Zone Camping:

- a. Vegetation. Impacts on vegetation would be minimized by this proposed action. Current low levels of use, however, indicate that impacts on vegetation would not be significantly reduced.
- b. Wildlife. Campers only temporarily disturb wildlife in the open camping zone. Levels of use are low and no significant lessening of impacts on wildlife would be anticipated, above those already incurred from day hikers.

- c. Endangered or Threatened Species. Endangered and threatened species would be protected from impacts of campers using the open zone.
 - d. Cultural. Prohibiting camping would protect archeological sites from potential disturbance by overnight users.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Soil compaction resulting from overnight camping would be reduced.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. Those persons wishing a solitaire and pristine wilderness experience would be deprived of that opportunity. Those persons objecting to increased use of the park's backcountry will support this proposal.
5. Open Entire Backcountry to Open Zone Camping:
- a. Vegetation. Significant impact to vegetation would occur through indiscriminate selection of camping sites throughout the backcountry. Impact would not be lessened by reuse of established sites, but would be increased by the spreading out of campers over large areas. Trampling and social trails would proliferate causing increased vegetative loss.
 - b. Wildlife. Some impact to animals would occur as these species respond to habitat damage caused by the radiating impact of unrestricted camping.
 - c. Endangered or Threatened Species. Significant impact to threatened and endangered species would occur as the most fragile areas of prime habitat for many of these species occurs on rugged outcrops and other areas desirable by some for camping. Uncontrolled camping would open these sites to this impact. This action would require Section 7 consultation with the USF&WS.
 - d. Cultural. The rate of deterioration of archeological and other cultural sites would increase through indiscriminate camping. Damage would be irreversible. Sites would be impacted by persons camping on archeological sites.
 - e. Air Quality. No impact.
 - f. Water Quality. No impact.
 - g. Soils. Soil impacts will increase in direct proportion to increases in visitor use. New soil impacts will result from the uncontrolled use of new campsites.
 - h. Socio-Economic. No impact.
 - i. Aesthetic Values. Those persons who like to camp at sites of their own choosing will prefer this proposal. Unrestricted use will impact the natural resources and reduce the pristine quality of the park's backcountry. The desert environment will be slow to recover from adverse

impacts of indiscriminate use. The park would be managed more in keeping with the intent of the Wilderness Act. Impacts would be mitigated through increased restrictions on camping permits.

6. Add Additional Open Camping Zones in Park:

- a. Vegetation. Potential exists for significant disturbance to vegetation from persons pitching tents in pristine areas. Close monitoring of this would mitigate impact.
- b. Wildlife. Campers will temporarily disturb wildlife as they use these zones.
- c. Endangered or Threatened Species. Potential would exist for significant impact on threatened and endangered species habitat as persons would pitch tents in pristine areas. Impact would be lessened by careful selection of open camping zones to avoid threatened and endangered species habitat. This action would require Section 7 consultation with the USF&WS.
- d. Cultural. Some disturbance of cultural resources would result if campers chose archeological sites for camping.
- e. Air Quality. No impact.
- f. Water Quality. No impact.
- g. Soils. Some compaction of soils would occur as a result of more widely dispersed camping.
- h. Socio-Economic. No impact.
- i. Aesthetic Values. Those persons enjoying the experience inherent in hiking and camping in pristine areas and camping in solitude away from developments will be pleased to have additional open camping zones. Those persons objecting to increased use of the park's backcountry will object to this proposal.

7. Use Only Horses to Support Trail Maintenance Operations:

- a. Vegetation. The use of livestock only to transport base course materials for trail maintenance would cause a significant amount of vegetation damage along trails as livestock use would be significantly increased. It would take 16 trips by horseback over 16 days to duplicate the material flown in by helicopter in one 8-hour day.
- b. Wildlife. The additional use of livestock would cause temporary disturbance to wildlife on each day that livestock is used. This disturbance would be temporary in nature and of a short duration each day.
- c. Endangered or Threatened Species. Since the horses use only trails, no impact should occur to threatened or endangered species.
- d. Cultural. No impact.
- e. Air Quality. No impact.

- f. Water Quality. No impact.
 - g. Soils. The additional use of livestock to support a program of livestock only transportation of base material would increase the amount of soil and trail erosion by the significant increase in livestock use. It is estimated that it would take a trip with 6 animals on each trip for 16 days to duplicate the material that could be flown in by helicopter in one day.
 - h. Socio-Economic. The longer duration required to transport the needed base materials by horse would be expensive and not cost effective.
 - i. Aesthetic Values. Some people will feel that the use of livestock within the wilderness is in keeping with the spirit and intent of the Wilderness Act. Persons concerned with any use of motorized equipment within the wilderness will support this proposal. Those objecting to the increased presence of livestock, and the presence of feces, urine and other impacts that accompany this use, necessary to support transportation of base material will object to this proposal. Those persons who view the advantages of helicopter use (efficiency and convenience) as acceptable under the minimum requirement of the wilderness act will not feel this proposal necessary.
8. Complete Phase IV Trail Construction Projects:
- a. Vegetation. An estimated 3.5 acres of vegetation would be destroyed by trail construction. Native vegetation would eventually return to the estimated 2.0 acres of old trails that would be obliterated or left to rehabilitate themselves. However, in the desert environment, the scars left behind would take 30+ years to recover.
 - b. Wildlife. Some temporary disturbance of reptiles and small mammals would result from trail construction. No long term impacts would result.
 - c. Endangered or Threatened Species. Trail construction would be routed around known locations of endangered or threatened plants. The McKittrick Pennyroyal would probably benefit some from the consolidation of numerous trails which presently impact individual plants. This action would require Section 7 consultation with the USF&WS.
 - d. Cultural. All trail routes would receive archeological clearance prior to construction. No archeological or historic resource would be impacted by the construction program.
 - e. Air Quality. Some minor disturbance to air quality would result from dust particles being blown into the air during rock blasting operations.
 - f. Water Quality. No impact.
 - g. Soils. Approximately 3.5 acres of soil would be disturbed by new trail construction activities. Some soil is expected to erode with initial summer rains.

- h. Socio-Economic. Access offered by more, and better trails may have the effect of attracting more visitors to the park backcountry.
 - i. Aesthetic Values. Persons enjoying the ability to hike on improved trails in remote section of the park will be pleased by the Phase IV project. Those believing the park presently has a satisfactory trail system will object to the addition of new trails or the improvement of old trails. Those objecting to the scars left behind when previously existing trails are abandoned will object to this proposal.
9. Add Additional Trails and Campgrounds on the West Side to Provide for Visitor Use in This Area:
- a. Vegetation. Additional trails and campgrounds on the West Side would add to the impact on this fragile desert environment. Vegetation would be lost, trampling would occur and impacts to currently uninventoried species might occur.
 - b. Wildlife. Temporary disturbance to wildlife would occur with the development of additional trails and campgrounds on the west side. No long term impacts would be anticipated.
 - c. Endangered or Threatened Species. Trails and campgrounds would be routed around known locations of endangered or threatened species. Additional inventory would be necessary to adequately obtain information on these species on the west side. This action would require Section 7 consultation with the USF&WS.
 - d. Cultural. Trails and campgrounds would be located so as to avoid archeological resources. All construction would receive archeological clearance prior to work.
 - e. Air Quality. Some minor disturbance would occur as a result of dust particles being created by trail construction activities and vegetation loss.
 - f. Water Quality. Water is scarce on the west side. The few water sources located there could be impacted by heavy visitor use.
 - g. Soils. Soil would be disturbed where trail and campground construction activities occur. Soil erosion would occur due to sparse vegetation and poor soils causing significant runoff.
 - h. Socio-Economic. Access offered by more and better trails may have the effect of attracting more visitors to the west side.
 - i. Aesthetic Values. Persons enjoying the ability to hike on improved trails in remote sections of the park will be pleased with this proposal. Visitation would still probably be minimal due to safety concerns and lack of water. Those wishing to experience this portion of the park in its pristine condition would object to this proposal.

10. No Action:

The No Action proposal would be a combination of the above proposals, each of which have been addressed separately in detail above.

E. CONSULTATION AND COORDINATION

This draft Backcountry/Wilderness Management Plan will be distributed for a 45-day public review period. Informational copies of the document will be sent to:

- Federal agencies including the BLM, USFS, and USF&WS
- State Historic Preservation Officer
- Texas Department of Parks and Wildlife
- the Chambers of Commerce for the Cities of Carlsbad, New Mexico, and Van Horn and Dell City, Texas
- the County Commissions of Culberson and Hudspeth counties, Texas
- local and state environmental groups
- any person requesting a copy of the document

A news release announcing the availability of the document and inviting public comment will be distributed to newspapers, TV and radio stations in El Paso, Van Horn, Dell City, Carlsbad, Roswell, Albuquerque, Dallas, Austin, Midland/Odessa, and Houston. This release will detail the specific dates for the 45-day public review period and the process for finalizing the draft plan.

At the conclusion of the public review period, the National Park Service will evaluate the comments received and modify the Backcountry/Wilderness Management Plan accordingly. If major issues and problems are identified in the plan, a revised draft of the document or a full environmental impact statement may be prepared.

If minor changes or no changes are needed in the document, the National Park Service will select final management alternatives and present these recommendations in a final Backcountry/Wilderness Management Plan along with a "Finding of No Significant Impact" (FONSI) statement. These documents will be mailed to all individuals and all groups and organizations expressing an interest in the issue. The plan will then be implemented.

V. REFERENCES

The following references were used to assess impacts and develop management recommendations for the Backcountry Management Plan.

Barton, Howard, Wayne G. McCully, Howard M. Taylor, and James E. Box, Jr. 1966. Influence of soil compaction on emergence and first-year growth of seeded grasses. *J. Range Management* 19:118-121

Bratton, Susan Power, Matthew G. Hickler, and James H. Graves. 1978. Visitor impact on backcountry campsites in the Great Smoky Mountains. *Environ. Management* 2:431-442

Brown, J.H. Jr., S. P. Kalisz, and W. R. Wright. 1977. Effects of recreational use on forested sites. *Environ. Geol.* 1:425-431.

Campbell, S. E., and G. W. Scotter. 1975. Subalpine revegetation and disturbance studies, Mt. Revelstoke National Park. *Canadian Wildl. Serv. Rep.*, Edmonton Alta. 99 p.

Cole, David Naylor. 1977. Man's impact on wilderness vegetation: an example from Eagle Cap Wilderness, northeastern Oregon. Ph. D. diss. Univ. Oregon, Eugene. 307 p.

Cole, David N. 1978. Estimating the susceptibility of wildland vegetation to trailside alteration. *J. App. Ecol.* 15:281-286.

Cole, David N. 1979. Reducing the impact of hikers on vegetation: an application of analytical research methods. In *Recreational impact on wildlands: conference proceedings*, p 71-78. R. Ittner and others, eds. USDA USFS Pacific Northwest Region, R-6-001-1979.

Cole, David N. 1981b. Managing ecological impacts at wilderness campsites: an evaluation of techniques. *J. For.* 79:86-89.

Cole, David N. 1982. Wilderness campsite impact: effect of amount of use. USDA INT. Research Report INT-284.

Cole, David N. 1989. Wilderness Campsite Monitoring Methods: A Sourcebook. USDA, USFS. Intermountain Research Station, General Technical Report INT-259. 57 p.

Cole, David N. 1989. Area of Vegetation Loss: A New Index of Campsite Impact. USDA, USFS. Intermountain Research Station, Research Note INT-389. 5 p.

Cole, David N. 1989. Low-Impact Recreational Practices for Wilderness and Backcountry. USDA, USFS. Intermountain Research Station, General Technical Report, INT-265. 131 p.

Coombs, Elizabeth A.K. 1976. The impact of camping on vegetation in the Bighorn Crags, Idaho Primitive Area. M.S. thesis, Univ. Idaho, Moscow. 63 p.

Cordell, Harold K. and George A. James. 1972. Visitors preferences for certain physical characteristics of developed campsites. USDA USFS Research Paper SE-100, 21 p. Southeast For. Exp. Stn., Asheville, N.C.

Dale, D. and T. Weaver. 1974. Trampling effects on vegetation of the trail corridors of north Rocky Mountain forests. *J. Applied Ecol.* 11:767-772.

Dawson, J.O., D. W. Countryman, and R. R. Fittin. 1978. Soil and vegetative patterns in northeastern Iowa campgrounds. *J. Soil and Conserv.*

33:39-41.

Dotzenko, A. D., N.T. Papamichos, and D. S. Romine. 1967. Effects of recreational use on soil and moisture conditions in Rocky Mountain National Park. *J. Soil and Water Conserv.* 22:196-197.

Fazio, James R. 1974. A mandatory permit system and interpretation for backcountry user control in Rocky Mountain National Park: an evaluation study.

Fox, Douglas G., J. Christopher Bernabo, and Betsy Hood. 1987. Guidelines for Measuring the Physical, Chemical and Biological Condition of Wilderness Ecosystems. USDA, USFS. Rocky Mountains Forest and Range Experiment Station, General Technical Report, RM-146. 48 p.

Freilich, Helen R., compiler. 1989. Wilderness Benchmark 1988: Proceedings of the National Wilderness Colloquium; 1988 January 13-14; Tampa, FL. USDA, USFS. Southeastern Forest Experiment Station, General Technical Report, SE-51. 228 p.

Frissel, Signey S. 1978. Judging recreation impacts on wilderness campsites. *J. For.* 76:481-483.

Hancock, "H" K. 1973. Recreation preferences: its relation to user behavior. *J. For.* 71:336-337.

Harper, J. L., J. T. Williams, and G. R. Sagar. 1965. The behavior of seeds in soil. 1. The heterogeneity of soil surfaces and its role in determining the establishment of plants from seed. *J. Ecol.* 53:273-286.

Hartley, Ernest Albert. 1976. Man's effects on the stability on alpine and subalpine vegetation in Glacier National Park, Montana. Ph. D. diss. Duke Univ., Durham, N. C. 258 p.

Hendee, John C., George H. Stankey and Robert C. Lucas. 1990. Wilderness Management. Golden, CO.: North American Press.

Holmes, Daniel O. and Heidi E. M. Dobson. 1976. Ecological carrying capacity research: Yosemite National Park. Part 1. The effects of human trampling and urine on subalpine vegetation, a survey of past and present backcountry use, and the ecological carrying capacity of wilderness. U.S. Dep. Commerce. Natl Tech Inf. Center PB-270 995. 247 p.

Ittner, Ruth, et al. 1979. Recreational impacts on wildlands. Conf. proc., October 27-29, 1978. USFS Pacific Northwest Region, R-6.

LaPage, Wilbur F. 1967. Some observations on campground trampling and ground cover response. USDA USFS Res. Paper NE-68, 11 p. Northeast Forest Exp. Station, Broomall, Pa.

Lucas, Robert C. 1980. Use patterns and visitor characteristics, attitudes, and preferences in nine wilderness and other roadless areas. USDA, For. Serv. Res. Pap. INT-253, Intermountain For. and Range Exp. Stn., USDA USFS.

Lucas, Robert C., compiler. 1987. Proceedings -- National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions; 1985 July 23-26. USDA, USFS. Intermountain Research Station, General Technical Report, INT-220. 369 p.

Magill, Arthur W., and Eamor C. Nord. 1963. An evaluation of campground conditions and needs for research. USDA For. Serv. Res. Note PSW-4, 8 p. Pacific Southwest Forest and Range Exp. Station, Berkeley, CA.

Marion, Jeffrey L. 1991. Developing a Natural Resource Inventory and Monitoring Program for Visitor Impacts on Recreation Sites: A Procedural Manual. Natural Resources Report NPS/NRVT/NRR-91/06. U.S. Dept. of the Interior, National Park Service. 59 p.

Minore, Don, Clark E. Smith, and Robert F. Woolard, 1969. Effects of high soil density on seedling root growth of seven northwestern tree species. USDA For. Serv. Res. Note PNW-112, 6 p. Pacific Northwest Forest and Range Exp. Station, Portland, OR.

Moir, William H., and William M. Lukens. 1974. Resource monitoring system, Chiricahua National Monument, AZ.

Monti, P., and E. E. Mackintosh. 1979. Effect of camping on surface soil properties in the boreal forest region of northwestern Ontario. Soil Sci. Soc. Am. J. 43:1024-1029.

Moorhead, Bruce B., and Edward S. Schreiner. 1979. Management studies of human impact at backcountry campsites in Olympic National Park, Washington. In Proc. Conf. on scientific research in the National Parks. p. 1273-1278. R. M. Linn, ed. U.S. Dept. Interior, Natl Park Serv. Trans. Proc. Ser. 5. Washington, D. C.

Nagy, J. S. S., and G. W. Scotter. 1974. A quantitative assessment of the effects of human and horse trampling on natural areas, Waterton Lakes National Park. Can. Wildl. Serv. Rep., Edmonton, Alta. 145 p.

Peet, Robert K. 1974. The measurement of species diversity. Annual Rev. Ecol. and Syst. 5:285-308.

Schreiner, Edward George. 1974. Vegetation dynamics and human trampling in three subalpine communities of Olympic National Park, Washington. M.S. thesis. Univ. Wash., Seattle. 150 p.

Schreiner, E. S., and B. B. Moorehead. 1976. Human impact studies in Olympic National Park. In Proc. symp. on terrestrial and aquatic ecological studies of the Northwest. p. 59-66. Eastern Washington State College, Cheney.

Siegel, Sidney. 1956. Nonparametric statistics for the behavioral sciences. 312 p. McGraw-Hill, NY.

Speight, M. C. D. 1973. Outdoor recreation and its ecological effects. From discussion paper in conservation, Univ. Col., London.

Stankey, G. H. 1972. "A strategy for the definition and management of wilderness quality", natural environments: studies in theoretical and applied analysis, John V. Krutilla, ed. Baltimore: The Johns Hopkins Univ. Press. p. 88-114.

Stankey, George H., Stephen F. McCool, and Gerald L. Stokes. 1984. Limits of Acceptable Change: A New Framework for Managing the Bob Marshall Wilderness Complex. Western Wildlands 10(3):33-37.

Stankey, George H., David N. Cole, Robert C. Lucas, Margaret E. Petersen, and Sidney S. Frissell. 1985. The Limits of Acceptable Change (LAC) System for Wilderness Planning. USDA, USFS. Intermountain Forest and Range Experiment Station, General Technical Report, INT-176. 37 p.

Thornburgh, Dale Alden. 1962. An ecological study of the effects of M.S. thesis, Univ. Calif. Berkeley. 50 p.

USDA, Forest Service, et al. 1978. Cooperative trails training session

handbook. Developed in conjunction with NPS and Appalachian Mountain Club. 350 p.

USDI, National Park Service. NPS Trails Management Handbook. Denver Service Center.

USDI, National Park Service. 1982. Trail Plan. Rocky Mountains National Park, Colorado.

Van Wagtendonk, J. W. A conceptual backcountry carrying capacity model. NPS, Yosemite National Park.

Weaver, Tad, Donn Dale, and E. Hartley. 1979. The relationship of trail condition to use, vegetation, user, slope, season, and time. In Recreation impact on wildlands, conference proceeding. p. 94-101. R. Ittner and others, eds. USDA USFS Pacific Northwest Reg., R-6-00101979.

Weaver, T., and F. Forcella. 1979. Seasonal variation in soil nutrients under six Rocky Mountain vegetation types. Soil Sci. Soc. Am. J. 43:589-593.

References specific to the backcountry resources of Guadalupe Mountains National Park:

Ahlstrand, Gary M. 1974. Ecology of fire, Carlsbad Caverns and Guadalupe Mountains National Parks. P. 43-45 in transactions of Southwest Regional National Science Conf., NPS, Santa Fe, NM.

Baker, Robert J., Hugh H. Genoways, Robert L. Packard, John E. Cornely, Margaret S. O'Connell, James W. Cottrell, and Dallas E. Wilhelm, Jr. 1974. Survey of mammals of Guadalupe Mountains National Park, Texas. P. 7-11 in Transactions of Southwest Regional Nat. Sci. Conf., NPS, Santa Fe, NM.

Bednarz, James C. 1981. Peregrine falcon habitat evaluation and proposed management plan for the Guadalupe Mountains, New Mexico and Texas. Final report submitted to USFS and NPS. 32 p.

Burgess, Tony. 1979. Summary of investigation of trail construction sites for threatened or endangered plant species for biological assessment - Guadalupe Mountains National Park. Report to Superintendent, Carlsbad Caverns and Guadalupe Mountains National Parks. 44 p. 27 July.

Chihuahuan Desert Research Institute. 1977. Nesting peregrine falcons in Texas, 1977. CDRI Contrib. No. 37. Prepared for Texas Parks and Wildl. Dept. 57 pp.

Findley, James S. and William Claire. 1977. The status of mammals in the northern region of the Chihuahuan Desert. p. 127-139 in Transactions of the symposium on the biological resources of the Chihuahuan Desert region, United States and Mexico (Roland H. Wauer and David H. Riskind, eds.) NPS Trans. Proc. Ser. 3.

Fish, Ernest B., V. B. Ackerson, and P.A. Fuller. 1977. Watershed inventory and land classification studies in Guadalupe Mountains National Park, Texas. Unpublished report to NPS, Southwest Region, Santa Fe, NM.

Fish, Ernest B., Roger B. Lewis, and Gene L. Brothers. 1981b. Erosional impact of trails in Guadalupe Mountains National Park, TX. Unpublished draft. 16 p.

Fish, Ernest B. and Gene L. Brothers. 1981b. Erosion impacts of trails in the Guadalupe Mountains National Park, Texas. In Landscape Planning 8:387-398. Elsevier Sci. Publ. Co., Amsterdam

Gehlbach, Frederick R. 1979. Biomes of the Guadalupe escarpment: vegetation, lizards, and human impact. P. 427-439 in biological investigations in the Guadalupe Mountains National Park, Texas (H. H. Genoways and R. J. Baker, eds.) NPS Trans. Proc. Ser. 4.

Gibbons, S. T. 1980b. Air quality related values inventory - Guadalupe Mountains National Park. Rep. to NPS, Southwest Region, Santa Fe, NM. 26 p. 3 July.

Grace, Jim W. 1980. The herpetofauna of Guadalupe Mountains National Park. Rep. to NPS, Southwest Region, Santa Fe, NM. 174 pp. March.

Guadalupe Mountains National Park. 1984. Backcountry Campground Monitoring Program. Unpublished Report. 28 p.

Hayes, P. T. 1964. Geology of the Guadalupe Mountains, New Mexico. U. S. Geol. Survey Prof. Paper 446. 69 p.

Katz, Paul R. (appendix by Susanna R. Katz). 1978. An inventory and assessment of archeological sites in the high country of Guadalupe Mountains National Park, Texas. Univ. Texas/San Antonio, Archeol. Serv. Report No. 36. 91 p.

Kitchen, James W. and William C. Griggs. 1973. A survey of historic structures, Guadalupe Mountains National Park, Texas. Unpublished Report, Texas Tech Univ., Lubbock.

Kittams, Walter H. 1972. Effects of fire on vegetation of the Chihuahuan Desert region. Proc. Annual Tall Timbers Fire Ecology Conf. 12:427-444.

Krysl, Leslie J. and C. David Simpson. 1980. Food habits of mule deer and elk and their impact on vegetation in Guadalupe Mountains National Park. Final Rep. to CPSU, NPS, Southwest Region, Santa Fe, NM. 132 p. January.

Levy, Benjamin. 1971. Guadalupe Mountains National Park historic resource study. NPS pert., Div. Hist. Office of Archeol. and Hist. Preservation, Washington, D. C. 148 p.

Lind, Owen T. 1969. Limnological analysis of McKittrick Creek, Guadalupe Mountains National Park. Unpublished Report to NPS. 16 p.

Lind, Owen T. 1971. A limnological analysis of McKittrick Creek and springs, Guadalupe Mountains National Park, Texas. A second (unpublished) project report. 17 p.

Marlett, Robert and James Mertes. 1979. Visitor use survey, Guadalupe Mountains National Park, Texas. Unpublished Report for NPS, Southwest Regional Office, Santa fe, NM. 68 p.

Netherdton, W. N., B. S. Johnson, and W. G. Hunt. 1978. An evaluation of essential habitat of nesting peregrine falcons in...Guadalupe Mountains National Park, Texas. A portfolio prepared for the NPS by the Chihuahuan Desert Research Institute, Alpine, TX.

Northington, David K. 1974. Annual Report on surveys of the vascular plants - Guadalupe Mountains National Park, Texas. P. 13-24 in Annual report on Guadalupe Mountains Studies. Texas Tech Univ., Lubbock.

Potter, Loren D. and James L. Robinson. 1968. Final report of effects of development and use on the relict forest and woodland of the southern Guadalupe Mountains. Unpublished Report to NPS. Univ. New Mexico,

Albuquerque. 60 p.

Scott, Jane. 1978. Guadalupe Mountains National Park overview of historical research: annotated bibliography and recommendation for future studies. Unpublished Report for NPS, Santa Fe, NM. 24 p.

Simpson, C. Davic and Tim J. Leftwich. 1976. Desert bighorn sheep: a feasibility study on their re-introduction to the Guadalupe Mountains. Report submitted to NPS. 30 p.

Warnock, Barton H. No date. Plant communities of the Guadalupe Mountains in Texas and nearby Carlsbad Caverns National Park. 15 p.

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APPENDIX A

LIST OF SOME HIKING DISTANCES ON THE TRAIL SYSTEM

FROM PINE SPRINGS TRAILHEAD TO:

GUADALUPE PEAK CAMPGROUND	
VIA HIKERS TRAIL.....	3.16 MILES
VIA HORSE/HIKERS TRAIL.....	4.00 MILES
GUADALUPE PEAK SUMMIT	
VIA HIKERS TRAIL.....	4.20 MILES
VIA HORSE/HIKERS TRAIL.....	5.04 MILES
FRIJOLE HISTORIC SITE.....	3.17 MILES
SMITH SPRINGS.....	3.77 MILES
SHUMARD CANYON CAMPGROUND	9.09 MILES
WILLIAMS RANCH	
VIA NORTH ROUTE.....	9.52 MILES
VIA SOUTH ROUTE.. (SALT BASIN OVERLOOK).....	12.15 MILES
DEVILS HALL.....	2.16 MILES
PINE TOP CAMPGROUND.....	3.91 MILES
BUSH MOUNTAIN CAMPGROUND.....	6.16 MILES
TEJAS CAMPGROUND.....	5.55 MILES
MESCALERO CAMPGROUND.....	7.07 MILES
MCKITTRICK RIDGE CAMPGROUND.....	11.43 MILES
DOG CANYON CAMPGROUND VIA TEJAS TRAIL	12.01 MILES
MCKITTRICK INFORMATION STATION.....	18.99 MILES
SUMMIT OF BEAR CANYON	
VIA BEAR CANYON TRAIL.....	3.47 MILES
VIA TEJAS AND BOWL TRAIL.....	5.10 MILES
SUMMIT OF HUNTER PEAK	
VIA TEJAS, BOWL, AND HUNTER PEAK TRAILS.....	4.70 MILES
VIA BEAR CANYON, BOWL, AND HUNTER PEAK TRAILS..	4.07 MILES

FROM THE DOG CANYON TRAILHEAD TO:

MARCUS CAMPGROUND.....	3.76 MILES
MESCALERO CAMPGROUND.....	4.94 MILES
MCKITTRICK RIDGE CAMPGROUND.....	7.64 MILES
TEJAS CAMPGROUND.....	6.46 MILES
PINE TOP CAMPGROUND.....	8.52 MILES
MCKITTRICK INFORMATION STATION.....	15.20 MILES
PINE SPRINGS CAMPGROUND VIA TEJAS TRAIL.....	12.01 MILES
PINE SPRINGS CAMPGROUND VIA BUSH MOUNTAIN TRAIL	15.80 MILES

FROM THE MCKITTRICK INFORMATION CENTER TO:

THE FIRST WATER CROSSING.....	1.10 MILES
THE SECOND WATER CROSSING.....	1.50 MILES
PRATT PICNIC AREA.....	2.36 MILES
PRATT CABIN	2.43 MILES
GROTTO.....	3.50 MILES
J.C. HUNTER LODGE.....	3.60 MILES
MCKITTRICK RIDGE CAMPGROUND	7.56 MILES
DOG CANYON CAMPGROUND.....	15.20 MILES
PINE SPRINGS CAMPGROUND.....	18.99 MILES
WILDERNESS RIDGE CAMPGROUND.....	4.17 MILES
TEXAS-NEW MEXICO STATE LINE	
ATOP WILDERNESS RIDGE.....	4.76 MILES
IN NORTH MCKITTRICK CANYON.....	6.30 MILES
MCKITTRICK NATURE TRAIL LOOP.....	1.03 MILES

FROM FRIJOLE HISTORIC SITE TO:

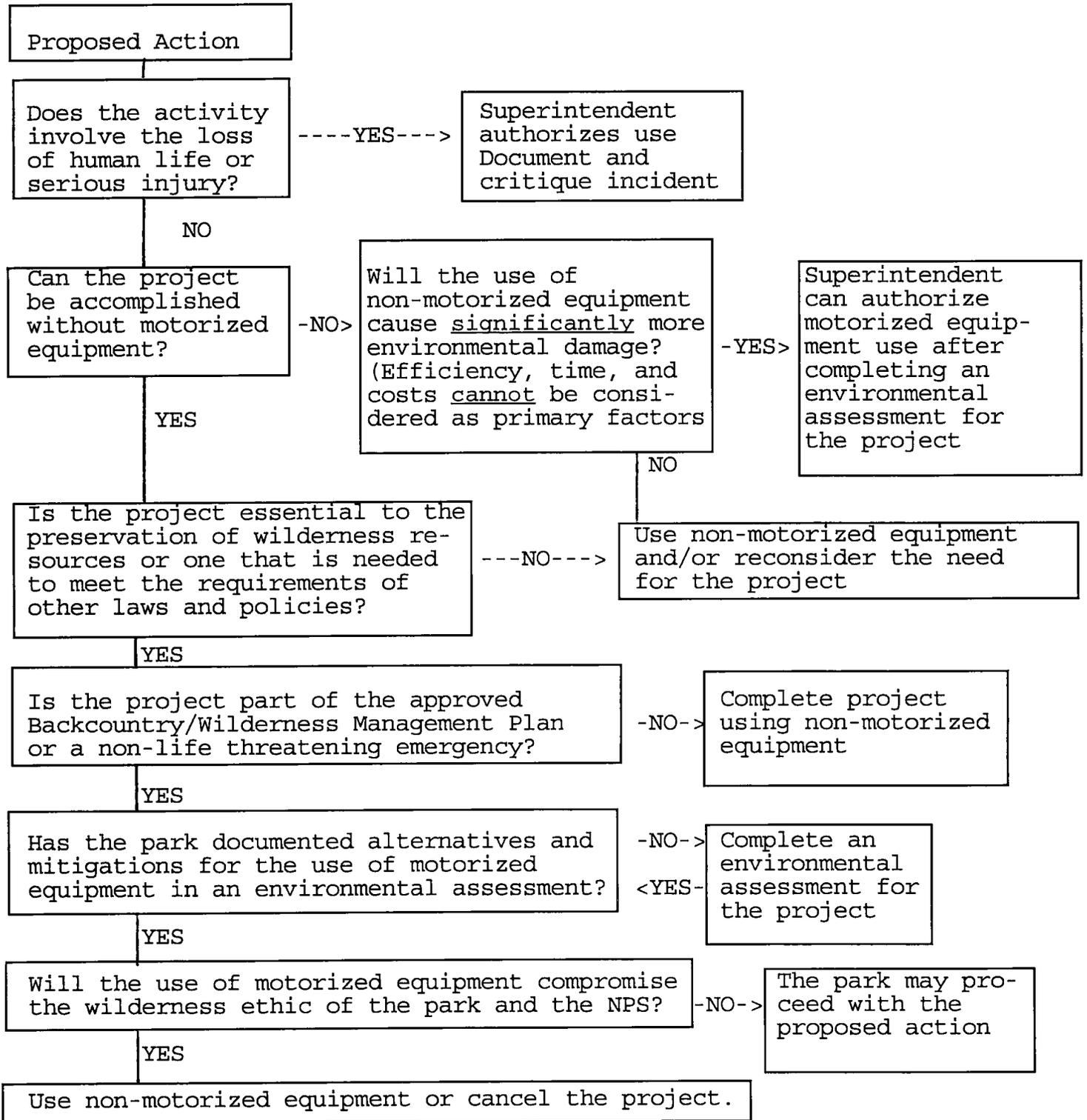
SMITH' SPRING.....	1.20 MILES
MANZANITA SPRING.....	0.20 MILES
SMITH SPRING LOOP	2.30 MILES
PINE SPRINGS CAMPGROUND	
VIA FRIJOLE TRAIL.....	3.17 MILES
VIA FOOTHILLS TRAIL.....	2.63 MILES

FROM FRIJOLE VISITOR CORRALS TO:

FRIJOLE RANCH.....	0.76 MILES
TEJAS TRAIL JUNCTION	
VIA FRIJOLE TRAIL.....	3.74 MILES
VIA FOOTHILLS TRAIL.....	1.90 MILES

APPENDIX B

MINIMUM TOOL DECISION TREE
WILDERNESS MANAGEMENT



Endangered, Threatened, Category 1, Category 2, and Endemic Species of Guadalupe Mountains National Park

ANIMALS

Federally Listed Endangered Species:

Falco peregrinus anatum Peregrine Falcon
Haliaeetus leucocephalis Bald Eagle (Accidental winter migrant)

Federally Listed Threatened Species:

Strix occidentalis lucida Mexican Spotted Owl
Ursus americanus American Black Bear [Protected in Texas under similarity of appearance clause with respect to the Louisiana Black Bear (*Ursus americanus luteolus*)]

Category 2 Species:

Buteo regalis Ferruginous Hawk
Cincindela nevadica olmosa Los Olmos Tiger Beetle
 * *Cincindela politula barbarannae* Barbara Ann's Tiger Beetle
 * *Cincindela politula petrophila* Guadalupe Mountains Tiger Beetle
Euderma maculatum Spotted Bat (+State threatened)
Lanius ludovicianus Loggerhead Shrike
Limnebius texanus Texas Minute Moss Beetle
Phrynosoma cornutum Texas Horned Lizard (+State threatened)
 * *Thomomys bottae guadalupensis* Guadalupe Southern Pocket Gopher
Vulpes velox Swift Fox

PLANTS

Federally Listed Endangered Species:

Coryphantha sneedii var. *sneedii* Sneed's Pincushion Cactus
Echinocereus lloydii Lloyd's Hedgehog Cactus

Federally Listed Threatened Species:

Coryphantha sneedii var. *leei* Lee's Pincushion Cactus

Category 1 Species

* *Festuca ligulata* Guadalupe Fescue (Past occurrence, no recent records)

Category 2 Species

- Agave glomeruliflora* Chisos Agave
- * *Aster laevis* var. *guadalupensis* Guadalupe Mountains Aster
- * *Chaetopappa hersheyi* Mat Leastdaisy
- * *Chrysothamnus nauseosus* ssp. *texensis* Guadalupe Mountains Rabbitbrush
- * *Escobaria guadalupensis* Guadalupe Mountains Pincushion Cactus
- Hexalectris revoluta* Curly Coral-root
- Lepidospartum burgesii* Gypsum Scalebroom
- * *Scutellaria laevis* Smooth-stem Skullcap
- Streptanthus sparsiflorus* Few-flowered Jewelflower
- * *Symphoricarpos guadalupensis* McKittrick Snowberry
- * *Viola guadalupensis* Guadalupe Violet

Species endemic to the Guadalupe Mountains without special status

<i>Aquilegia chrysantha</i> var. <i>chaplinei</i>	Guadalupe Mountains Columbine	GSI
<i>Berlandiera lyrata</i> var. <i>macrophylla</i>	Large-leaf Greeneyes	
<i>Cryptantha paysonii</i>	Payson's Hiddenflower	SI
<i>Hedeoma apiculatum</i>	McKittrick Pennyroyal	GSI
<i>Hymenopappus biennis</i>	Biennial Woollywhite	
<i>Lesquerella valida</i>	Scaly Bladderpod	GSI
<i>Nama xylopodum</i>	Cliff Nama	
<i>Penstemon cardinalis</i> ssp. <i>regalis</i>	Royal Red Penstemon	GSI
<i>Perityle quinqueflora</i>	Fiveflower Rockdaisy	
<i>Pinaropappus parvus</i>	Dwarf Rock Lettuce	
<i>Polygala rimulicola</i> var. <i>rimulicola</i>	Rock Crevice Milkwort	GSI
<i>Rosa stellata</i> ssp. <i>mirifica</i> var. <i>erlansoniae</i>	Erlanson's Desert Rose	GSI
<i>Salvia summa</i>	Mountain Sage	GSI
<i>Senecio warnockii</i>	Warnock's Groundsel	
<i>Sophora gypsophila guadalupensis</i>	Guadalupe Mountains Mescal Bean	GSI
<i>Streptanthus carniatus</i>	Lyreleaf Twistflower	
<i>Stipa curvifolia</i>	Guadalupe Needlegrass	
<i>Valeriana texana</i>	Guadalupe Mountains Valerian	GSI

Historically Present Species With No Recent Records

- * *Allium perdulce* var. *sperryi* Sperry's Wild Onion (endemic)
- Anulocaulis leiosolenis* var. *lasianthus* Chihuahua Ringstem (SI)
- Astragalus gypsodes* Gyp Milkvetch (GSI)
- Chamaesyce chaetocalyx triligulata* Three-Tongued Spurge (Category 2)
- Hexalectris nitida* Glass Mountains Coral-root (Category 2)
- Nolina arenicola* Sand Sacahuista (Category 2)
- Suaeda duripes* Hardtoe Seepweed (Category 2)

Species Habitat Present But Occurrence Unknown

Cereus greggii var. *greggii* Desert Night-blooming Cereus (Category 2)
Chamaesyce geyeri var. *wheeleriana* Wheeler's Spurge (SI)
Coryphantha dasyacantha var. *dasyacantha* Dense Cory Cactus (Category 2)
Lycium texanum Texas Wolf-berry (Category 2)
Opuntia imbricata argentea Silver Cholla (Category 2)
Pediocactus papyracanthus Paper-spined Cactus (Category 2)
Sedum robertsonianum Robert's Stonecrop (Category 2)

Species Receiving State Protected Status

ANIMALS: State Threatened

Buteo albonotatus Zone-Tailed Hawk
Buteogallus anthracinus Common Black Hawk
* *Phrynosoma douglasi hernandezii* Mountain Short-Horned Lizard
Trimorphodon biscutatus wilkinsoni Texas Lyre Snake

Key to Symbols

* Indicates species endemic to the Guadalupe Mountains region

SI = State Imperiled

GSI = Globally and State Imperiled

Endangered A species which is in danger of extinction throughout all or a significant portion of its range.

Threatened A species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Category 1 Sufficient information on biological vulnerability and threats exist on file with the USFWS to support proposals to list these species as endangered or threatened.

Category 2 Sufficient data on biological vulnerability and threat is not currently available to the USFWS, however, proposing to list these species as threatened or endangered is possibly appropriate.

Endemic Native or confined to a given region.

GUADALUPE MOUNTAINS NATIONAL PARK WILDERNESS LEGISLATION

* * * * *

TITLE IV - WILDERNESS

Sec.401. The following lands are hereby designated as wilderness in accordance with section 3(c) Wilderness Act (78 Stat. 890; 16 U.S.C. 1132(c)), and shall be administered by the Secretary in accordance with applicable provisions of the Wilderness Act:

* * * * *

(4) Guadalupe Mountains National Park, Texas, wilderness comprising approximately forty-six thousand eight hundred and fifty acres, depicted on a map entitled "Wilderness Plan, Guadalupe Mountains National Park, Texas", numbered 166-20,006-B and dated July 1972, to be known as the Guadalupe Mountains Wilderness.

Sec. 402. A map and description of the boundaries of the areas designated in this title shall be on file and available for public inspection in the office of the Director of the National Park Service, Department of the Interior, and in the Office of the Superintendent of each area designated in this title. As soon as practicable after this Act takes effect, maps of the wilderness areas and descriptions of their boundaries shall be filed with the Committee on Interior and Insular Affairs of the House of Representatives and the Committee on Energy and Natural Resources of the United States Senate, and such maps and descriptions shall have the same force and effect as if included in this Act: *Provided*, That correction of clerical and typographical errors in such maps and descriptions may be made.

Sec. 403. Any lands which represent potential wilderness additions in this title, upon publication in the Federal Register of a notice by the Secretary that all uses thereon prohibited by the Wilderness Act have ceased, shall thereby be designated wilderness. Lands designated as potential wilderness additions shall be managed by the Secretary insofar as practicable as wilderness until such time as said lands are designated as wilderness.

Sec. 404. The areas designated by this Act as wilderness shall be administered by the Secretary of the Interior in accordance with the applicable provisions of the Wilderness Act governing areas designated by that Act as wilderness, except that any reference in such provisions to the effective date of the Wilderness Act shall be deemed to be a reference to the effective date of this Act, and, where appropriate, any reference to the Secretary of Agriculture shall be deemed to be a reference to the Secretary of the Interior.

* * * * *

Approved November 10, 1978

APPENDIX E

DESCRIPTION OF WILDERNESS BOUNDARY, GUADALUPE MOUNTAINS NATIONAL PARK

GUADALUPE MOUNTAINS WILDERNESS

As designated by Public Law 95-625

The wilderness area is depicted on that map titled "Guadalupe Mountains Wilderness, Guadalupe Mountains National Park, Texas," No. 166-20,006-B, sheet 2 of 2, January 1980 and is described as follows:

Beginning at the northeast corner of Guadalupe Mountains National Park being the northeast corner of Section 1 of Texas and Pacific Railroad Block 65, Township 1 on the state line of Eddy County, New Mexico and Culberson County, Texas;

thence, south on the park boundary line to the hydrographic divide at about 5,130 feet elevation lying southerly and adjacent to the intermittent stream near the southeast corner of said Section 1;

leaving the park boundary, westerly on the hydrographic divide to the 5,300 foot contour line;

westerly on the 5,300 foot contour to a point 400 feet easterly of McKittrick Canyon road at the mouth of McKittrick Canyon;

northwesterly into McKittrick Canyon on a parallel line 400 feet from the road to a point 400 feet distant from Pratt Lodge development area near the confluence of North and South McKittrick Canyons;

counterclockwise maintaining a distance of 400 feet from the Pratt Lodge development area perimeter to a point 200 feet southerly from the McKittrick Canyon road;

easterly on a parallel line 200 feet from McKittrick Canyon road to the northerly-southerly hydrographic divide at about 5,150 feet elevation lying westerly and near the east line of Section 2 of Texas and Pacific Railroad Block 65, Township 1;

southerly uphill on the hydrographic divide to the 5,750 foot contour line;

southerly on the 5,750 foot contour to the east-west centerline of Section 33 of Texas and Pacific Railroad Block 65, Township 1;

west on section centerline to the 6,250 foot contour line;

southwesterly on the 6,250 foot contour to a point 200 feet northeasterly of the high-standard trail leading from the vicinity of Pine Spring to the escarpment rim;

northwesterly uphill on a parallel line 200 feet from the high-standard trail to the top of the escarpment;

southwesterly on the escarpment rim about 400 feet to a point;

southeasterly downhill on a parallel line 200 feet from the high-standard trail to the 6,250 foot contour line;

southerly on the 6,250 foot contour to the east-west centerline of Section 41 of Texas and Pacific Railroad Block 65, Township 1;

west on section centerlines to the drainage centerline of Pine Spring Canyon at about 6,300 feet elevation;

northerly upstream on the drainage centerline of Pine Spring Canyon passing Devils Hall to the confluence with the drainage centerline of an unnamed canyon at about 6,570 feet elevation;

westerly upstream on the drainage centerline of the unnamed canyon to the confluence of the drainage centerlines of the two major unnamed canyons on the north face of Guadalupe Peak at about 7,290 feet elevation;

southerly to the left upstream in the major drainage centerline of the unnamed canyon to its point of origin atop Guadalupe Peak, excluding that portion of Guadalupe Peak above 8,650 feet for the pylon commemorating airmail service;

easterly downward along the main eastern hydrographic divide leading from Guadalupe Peak to the point of origin of the drainage centerline on the south escarpment at about 7,600 feet elevation near the west edge of the terrace;

southeasterly downhill on the drainage centerline to the east line of Section 43 of Texas and Pacific Railroad Block 65, Township 1;
south on section line to the corner of Guadalupe Mountains National Park on the southeast corner of said Section 43;
south, west and south on the park boundary line to the east 1/4 corner of Section 24 of Public School Land Block 121;
leaving the park boundary, west on section centerline to the west 1/4 corner or said Section 24;
north on section lines to the east 1/4 corner of Section 14 of Public School Land Block 121;
west on section centerline to the center of said Section 14;
north on section centerline to the north 1/4 corner of said Section 14;
west on section line to the northwest corner of said Section 14;
north on section lines to the west 1/4 corner of Section 2 of Public School Land Block 121;
east on section centerline to the prolongation of the common section line of Sections 46 and 47 of Texas and Pacific Railroad Block 66, Township 1;
north in a straight line to the common south corner of said Sections 46 and 47 and the general base of the western escarpment at about 5,000 feet elevation;
northwesterly following the toe of the slope of the prominent escarpment, passing Shumard Canyon, Shirttail Canyon and the mile wide unnamed open canyon, to the drainage centerline of the intermittent stream supplied by Bush Mountain and Bartlett Peak at about 4,500 feet elevation near the east-west centerline of Section 33 of Texas and Pacific Railroad Block 66, Township 1;
westerly downstream on the drainage centerline to the north-south centerline of Section 32 of Texas and Pacific Railroad Block 66, Township 1;
north on section centerlines to the center of Section 29 of Texas and Pacific Railroad Block 66, Township 1;
west on section centerline to the west 1/4 corner of said section 29;
north on section lines to the east 1/4 corner of Section 19 of Texas and Pacific Railroad Block 66, Township 1;
west on section centerline to the center of said Section 19;
north on section centerlines to the center of Section 7 of Texas and Pacific Railroad Block 66, Township 1;
west on section centerline to the boundary line of Guadalupe Mountains National Park on the west 1/4 corner of said Section 7;
north on the park boundary line to the northwest corner of Guadalupe Mountains National Park on the state line of New Mexico and Texas;
east on the park boundary line to the drainage centerline in Cork Canyon;
southeasterly upstream on the drainage centerline in Cork Canyon to the source of the nearest hydrographic divide at about 6,170 feet elevation lying southerly of the road adjacent to Coyote Peak;
easterly on the nearest major hydrographic divide lying southerly of the road to its terminus in the drainage centerline at about 6,190 feet elevation;
northeasterly downstream on the drainage centerline to Humphrey Canyon and to the north boundary line of Guadalupe Mountains National Park on the state line of New Mexico and Texas;
east on the park boundary line to a point 300 feet westerly of Upper Dog Canyon road;
southerly into Upper Dog Canyon on a parallel line 300 feet from the road to the drainage centerline that meets Upper Dog Canyon at about 6,600 feet elevation;
easterly crossing Upper Dog Canyon about 600 feet to a point;
northerly on a parallel line 300 feet from Upper Dog Canyon road to the boundary line of Guadalupe Mountains National Park on the state line of New Mexico and Texas, and
east on the park boundary line to the beginning corner.

The wilderness area described herein contains 46,850 acres, more or less.