In 1998, this Draft Wilderness Management Plan was released for public comment with an accompanying environmental assessment. The purpose of the plan was to guide the management of resources and visitor use in the proposed wilderness areas of Grand Canyon National Park. At the time, the Cross-Canyon Corridor and Tuweep area were not included in the scope of the plan.

The release of this plan in 1998 coincided with public scoping for the update to the 1989 Colorado River Management Plan. The Draft Wilderness Management Plan was never approved due to public confusion over the park's wilderness status and relationship to the Colorado River. The Colorado River Management Plan was completed in 2006 as a separate document and addresses visitor use and resource protection along the river corridor.

This document is provided as a reference for the current process to update the park's 1988 Backcountry Management Plan.

Draft
Wilderness Management Plan

April 1998

Grand Canyon National Park

Wilderness Management Plan

April 1998

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CHAPTER One

Introduction

1.1 Purpose and Need

The purpose of this Wilderness Management Plan is to guide the management of resources and visitor use in the wilderness areas of Grand Canyon National Park. The primary need for the plan is to address wilderness and backcountry issues in the context of the Wilderness Act (See Appendix A, Wilderness Act); Grand Canyon's enabling legislation; *National Park Service* (NPS) *Management Policies (*See Appendix B, *NPS Management Policies*); and the 1995 Grand Canyon National Park General Management Plan (GMP).

1.2 Wilderness Responsibilities

The Wilderness Act defines wilderness as "an area where the earth and its community of life are untrammeled [uncontrolled] by man...retaining its primeval character and influence, without permanent improvements...." Wilderness managers are instructed to "administer [wilderness areas] for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment *as wilderness* [emphasis added]."

Wilderness reinforces the purposes of the national parks established by the National Park Service Organic Act (1916) "to provide the enjoyment...in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Organic Act (as amended) allows for activities, including the protection, management, and administration of national parks only if "conducted in light of the high public value and integrity" of such areas, "and shall not be exercised in derogation of the values and purposes for which these areas have been established...." (16 USC 1a-1; *NPS Management Policies*, 1:1)

The Wilderness Act also defines wilderness as an area possessing "outstanding opportunities for solitude or a primitive and unconfined type of recreation." The Act not only strengthens the NPS preservation mandate, but provides for and protects opportunities for a wilderness experience.

1.3 Scope of This Wilderness Management Plan

The Wilderness Management Plan addresses issues and provides guidelines for managing those areas defined as proposed wilderness (See map, Figure 1.1). Over 94% (1.1 million acres) of Grand Canyon National Park is proposed for immediate designation. The proposed wilderness is primarily inner canyon and rim areas and does not include the developed areas nor the Cross-Canyon Corridor. The Cross-Canyon Corridor consists of campgrounds, a tourist lodge, and ranger stations along the North Kaibab, South Kaibab, and Bright Angel Trails. The Colorado River is proposed as "potential wilderness," and issues specific to river management will be addressed in the Colorado River Management Plan. Issues which pertain specifically to the Cross-Canyon Corridor and the Colo-

rado River are not within the purview of this Wilderness Management Plan.

This Plan has incorporated some of the management objectives, standards, and strategies of the 1988 Backcountry Management Plan. Within this framework, this Plan provides direction for management of natural and cultural resources within the context of wilderness management policies, with a primary focus on visitor use and impacts to wilderness values and resources. Changes since the 1988 Plan are noted at the end of the applicable chapter.

1.4 Goals of the Wilderness Management Plan

As stated in the 1995 Grand Canyon General Management Plan

> *The vision statements for the park convey the essence of the park's qualities and desired future conditions... The visions affirm what must be preserved, as well as what types of experiences visitors should be able to expect.*

In terms of Wilderness, the GMP further states that

> *...these areas offer visitors opportunities for solitude and primitive recreation. The management of these areas should preserve wilderness values and character. Non-wilderness undeveloped areas should continue to serve primarily as primitive thresholds to wilderness.*
>
> *Visitors traveling through the Canyon in the backcountry should have the opportunity for a variety of personal outdoor experiences, ranging from solitary to social. Visitors should be able to continue to experience the backcountry with as little influence from the modern world as possible. The backcountry experience should help visitors relate intimately to the majesty of the Canyon.*

Within this context, this Wilderness Management Plan is intended to serve the following goals

1. Provide guidance and describe strategies for meeting legislative and policy mandates on wilderness management while providing recreational opportunities consistent with wilderness, for a broad range of visitor experiences and settings, and preserving and protecting the natural, cultural, and social resources of Grand Canyon National Park.

2. Provide for the continuity of wilderness management throughout changes of park administration and staff.

1.5 Objectives of the Wilderness Management Plan

The management objectives of this Wilderness Management Plan are based on the Park's vision statements articulated in the GMP, and are within

If future generations are to remember us with gratitude rather than contempt, we must leave them more than the miracles of technology. We must leave them a glimpse of the world as it was in the beginning, not just after we got through with it.

President Lyndon B. Johnson on signing the Wilderness Act, 1964

the intent of the enabling legislation and Wilderness Act. The objectives, which are quantifiable and measurable, describe desired conditions to be achieved.

Objective One

Establish and implement a permit system that

- serves the visitor by providing the opportunity to obtain permits for wilderness and nonwilderness areas that yield the type of experience they seek
- serves Park management by providing an effective way to educate the public on low-impact practices, ethics, and safety
- serves Park management by providing data on hiker use levels and distribution in order to make informed decisions regarding the management and protection of backcountry and wilderness resources.

Chapter 5
Backcountry Permit System
Chapter 6
Wilderness Campsite Management
Chapter 12
Monitoring and Research

Objective Two

Establish indicators and standards for desired visitor experiences, and biophysical and cultural resources; monitor regularly the condition of these indicators; and take management action as necessary to meet these standards.

Chapter 3
Wilderness Management Planning Framework
Chapter 6
Wilderness Campsite Management
Chapter 12
Monitoring and Research
Chapter 13
Restoration and Rehabilitation of Recreational Impacts
Chapter 14
Cultural Resource Management

Objective Three

Provide access consistent with wilderness values, including protection of natural and cultural resources. Preserve the character of individual trails, and establish minimal standards for primitive roads.

Chapter 7
Trails Management
Chapter 8
Semi-Primitive Access and Facilities

The chapters and appendices which discuss actions to meet stated objectives are listed after each objective.

Objective Four

Establish a coordinated interpretive/educational program to provide hikers adequate information to plan and execute an enjoyable and safe expedition, whether hiking for a day or for an extended period, and to conduct themselves in a manner which is not damaging to wilderness resources and values.

Chapter 5
Backcountry Permit System
Chapter 9
Safety and Emergency Operations
Chapter 10
Interpretation, Education, and Information

Objective Five

Provide, through partnerships with adjacent land-managing agencies, information on wilderness and nonwilderness recreational opportunities on adjacent lands, including National Forest Service, Bureau of Land Management, State, and Tribal lands.

Chapter 4
Recreational Use of Wilderness
Chapter 5
Backcountry Permit System
Chapter 15
Havasupai Traditional Use Lands
Appendix E
Recreational Opportunities and Permit Information for Adjacent Lands

Objective Six

Provide a reasonable level of public safety, consistent with wilderness areas in accordance with *NPS Management Policies* and Park guidelines.

Chapter 4
Recreational Use of Wilderness
Chapter 9
Safety and Emergency Operations
Chapter 10
Interpretation, Education and Information

Objective Seven

Encourage research which adds to an understanding of the Park and contributes to the body of knowledge required for effective management and protection of wilderness resources and values.

Chapter 11
Ecosystem Management
Chapter 12
Monitoring and Research

Objective Eight

Develop, through partnerships with adjacent land-management agencies, conservation organizations, and institutes of higher learning, an interagency ecosystem-management strategy. The strategy will emphasize restoration and maintenance of natural processes and viable populations of all native species in natural patterns of abundance and distribution.

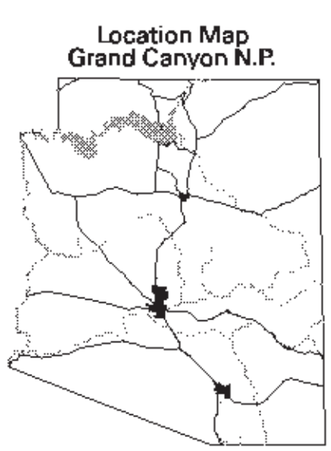
Chapter II
Ecosystem Management

1.6 Wilderness Management Plan Review and Update

The Wilderness Management Plan will be effective for a minimum of five years, and a period not to exceed ten years. Staff with wilderness responsibilities, including the Wilderness Coordinator, Wilderness District Ranger, and Trail Crew Foreman will conduct an annual review. The annual review process will incorporate data from resource monitoring and research projects, visitor use statistics, and status reports on visitor use management in the Park's wilderness areas. The purpose of the annual review will be to evaluate the status and effectiveness of management actions, and to ensure that the management objectives stated in this Plan are being met. Priorities of implementing actions described in the Plan will also be determined, and incorporated into the annual work plans for the appropriate work unit.

The Wilderness Management Plan update will occur within a five-year period depending on the need for major revision and update as determined through the annual review process or as necessitated by change in Grand Canyon National Park management direction and/or NPS policy. The update will incorporate public meetings and comments, research and monitoring data, visitor use information, NPS policy, and legislated wilderness mandates.

Grand Canyon National Park
Proposed Wilderness and other existing Wilderness Areas



Beaver Dam
Cottonwood Point
Lake Powell NRA
Paria Canyon Vermilon Cliffs
Paiute
Kanab Creek
Kaibab National Forest
BLM AZ Strip District
Saddle Mountain
Grand Wash Cliffs
Mt. Trumbull
Mt. Logan
Lake Mead NRA
Lake Mead NRA
Havasupai Indian Reservation
Navajo Indian Reservation
Grand Canyon N.P. Proposed Wilderness
Kaibab National Forest
Hualapai Indian Reservation
Mt. Tipton
Coconino National Forest
Kaibab National Forest
Kendrick Mtn.
Strawberry Crater

Legend

- BLM Wilderness Areas
- NFS Wilderness Areas
- GRCA Proposed Wilderness
- Developed Areas and Roads
- Primary Highway
- Secondary Road
- Road

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CHAPTER 2

Wilderness Management at Grand Canyon National Park

2.1 Grand Canyon National Park Wilderness Recommendation

The Grand Canyon National Park Enlargement Act of January 3, 1975, as amended June 10, 1975, required the National Park Service to prepare a wilderness recommendation for Grand Canyon National Park. In September 1980, the NPS submitted a wilderness recommendation consisting of 980,088 acres proposed for immediate designation, and 131,814 acres proposed for potential wilderness designation. (U.S. Department of the Interior, National Park Service 1980).

Since that time, acquisition of grazing, mineral, and other leases, and completion of land-use studies, necessitated a revision of the recommendation. The 1993 update of the 1980 recommendation (U.S. Department of the Interior, National Park Service 1993) is based on changes in the land status of proposed potential wilderness, the 1969 Field Solicitor's opinion regarding the western boundary of the Navajo Reservation, and refinements in acreage determined by the Geographical Information System (GIS). All changes are consistent with the letter or intent of the 1980 recommendation (Crumbo 1996).

Two units totaling 1,139,077 acres are proposed for wilderness designation in Grand Canyon National Park. These units include about 94% of the Park's total area. Of this total, 1,109,257 acres are proposed for immediate wilderness designation, and 29,820 are proposed for designation as potential wilderness, pending resolution of boundary and motorized riverboat issues (See Appendix C, A History of the Wilderness Recommendation at Grand Canyon National Park). Represented within these units are examples of all the Park's physiographic regions. A map of the Grand Canyon National Park wilderness is included as Figure 1.1.

The 1975 Grand Canyon Enlargement Act dealt directly with the question of occupancy and use of the Havasupai Reservation lands of Grand Canyon National Park. The Act declared a reservation of approximately 185,000 acres to be held in trust for the Havasupai Tribe, and specified conditions on the uses of those trust lands. The Act also provided for an additional 95,300 acres as "Havasupai Use Lands" within Grand Canyon National Park where the Secretary may allow tribal uses "...subject to such reasonable regulations as he may prescribe to protect the scenic, natural, and wildlife values thereof." Congressional intent to include these lands within the wilderness recommendation was explicit.

NPS Management Policies (1988) require that proposed wilderness study areas be managed as designated wilderness, and that no actions be taken that would diminish wilderness suitability until the legislative process for wilderness designation has been completed. The General Management Plan (1995) treats all proposed wilderness areas as designated wilderness, and anticipates the final resolution of wilderness issues.

2.2 Natural and Cultural Aspects of the Wilderness Resource

Natural Resources

Grand Canyon National Park contains some of the world's most spectacular topography. The Canyon is about a mile deep, and varies in width from a minimum of 75 feet at river level in the Middle Granite Gorge to about 18 miles at rim level along the Bright Angel Fault between Grand Canyon Village and the North Rim. Sedimentary rock layers have been carved into buttes, temples, and spires by water, wind, and faults. In addition, the Canyon is comprised of igneous and metamorphic rock, volcanoes and lava flows, waterfalls, springs, and caverns.

The plant communities within the Grand Canyon vary from cool, moist subalpine forests and meadows between 8,000 and 9,000 feet to hot, dry deserts at elevations as low as 1,200 feet. About 1,500 plant species occur within the Park, including one listed endangered species, and several other candidate species. Cryptogamic soil crusts are extensive in portions of the Canyon, but are highly vulnerable to the impacts of recreational use.

Grand Canyon National Park is a valuable wildlife refugia due to the immense primitive areas, the topographic character, and the relatively unfragmented habitat. There are 315 bird species, 88 mammal species, 50 reptile and eight amphibian species, 21 fish species (including five native species), and thousands of different aquatic and terrestrial invertebrates. Seven animals are officially listed as endangered, one as threatened, and a dozen are listed as sensitive or candidate species. The Kaibab squirrel, for example, is a unique subspecies that has coevolved with natural processes, such as fire, on the Kaibab Plateau. The California condor, recently reintroduced immediately outside the Park, will become an uncommon but appreciated inhabitant.

The largest carnivore, the mountain lion, roams much of the Grand Canyon, although little is known about their populations. Mammals common to the inner canyon include mule deer and desert bighorn sheep. Other wildlife, sometimes considered threats to personal comfort or safety, include ground squirrels, ringtail cats, striped skunks, rattlesnakes, and scorpions. Regulations pertaining to proper camping distance from creeks and springs are primarily for the protection of water resources, habitat, and prevention of wildlife disturbance. The proper storage of food, and low-impact meal preparation practices help avoid unwanted encounters with rodents and insects at wilderness campsites.

Water resources originating as springs and seeps in the inner canyon provide important water sources for wildlife and humans. At least 70 major springs and streams are supported by groundwater draining from plateaus outside the Park boundary. The major water source for many backcountry users is

> Every great landscape carries in its beauty the seeds of its own destruction. Primitive wilderness characteristics give the national parks their real prestige and will increasingly add to their distinction as these qualities disappear elsewhere. But these qualities are readily destroyed; they are fragile things. How preserve them? The answer may well depend upon how clearly we define our aims.
>
> Newton B. Drury
> Director,
> National Park
> Service,
> 1940-1951

the Colorado River which bisects the Park, flowing a distance of 277 miles between the reservoirs of Lake Powell and Lake Mead. While major tributaries and the Colorado River provide perennial water, seeps and springs in many side canyons may be unreliable sources at different times of the year.

Grand Canyon enjoys some of the nation's cleanest air. Under the Clean Air Act, the Park is a Class I area which affords the highest level of protection from increased pollution. Air quality is influenced by humidity, precipitation, and temperature inversions, as well as long-distance, regional, and local pollution sources. Under the most pristine conditions, visitors may enjoy a visual of range of more than 240 miles.

Natural sounds and natural quiet have long been regarded as Park resources. They are among the conditions and resources the National Park Service is mandated to protect and preserve. Just as natural quiet is important to visitor experience and Park appreciation, it is also critically important to other protected Park resources. "Non-natural sounds" (i.e., introduced, human-caused, or mechanically produced sounds) may, depending on location, volume, and timing, produce direct and indirect negative physiological and behavioral responses in wildlife.

Nonnatural sounds may also negatively impact cultural resources, specifically, ceremonial, sacred, or traditional-use sites. The presence of aerial overflights, motorized rafts, and power tools can threaten wilderness values.

Cultural Resources

Grand Canyon National Park contains a rich assortment of cultural resources spanning 10,000 years of human occupation. Four cultural resource categories are present in the wilderness areas of Grand Canyon National Park: archeological, ethnographic, historic, and objects.

At present, six historic districts, two prehistoric sites and one individual structure are listed on the National Register of Historic Places. One prehistoric site and one historic district are located in the wilderness; the Little Jug site is located on the Uinkaret Plateau, near Tuweep, while the Last Chance Mine Historic District is located at the base of the Grandview Trail on Horseshoe Mesa.

In 1980 the entire Park was determined eligible by the State Historic Preservation Officer as a multiple resource archeological district. Formal listing has yet to be completed. Historic properties listed on the National Register of Historic Places, as well as those that are pending nomination and those that are eligible for nomination, are subject to the same protections under the National Historic Preservation Act and NPS policies. Determinations of eligibility for the National Register have been received for ten trails within the Canyon.

Archeological Resources

Nearly 3,700 prehistoric and historic sites have been documented in Grand

Canyon National Park to date, and it is estimated that approximately 50,000 sites are present. The existing inventory is based on intensive survey of only two percent of the Park. The archaeological resources of Grand Canyon encompass a wide variety of cultural remains indicating human use of the Canyon over the past 10,000 years.

In addition to the prehistoric and historic American Indian archaeological legacy, physical remains of Euro-American endeavors from the time of first contact in 1540 through development of the national park are represented in the archaeological record. The historic archaeological record includes evidence of early exploration by John Wesley Powell and Robert Brewster Stanton, mineral exploitation by Ralph Cameron, Pete Berry, William Wallace Bass, Louis Boucher, and John Hance among others, and the remains of early tourist enterprises.

Historic Resources

Historic resources are cultural resources which have been determined significant in a historic context or theme, on Park lands. Significance has been achieved during the historic, as opposed to the prehistoric, time period. Historic resources include districts, sites, landscapes, structures, archival materials, and objects. Significance is determined primarily through archival research.

The historic period is best summarized by the history of exploration, exploitation, pioneer settlement, railroad development, and Federal administration.

Ethnographic Resources

An ethnographic resource is defined as any natural or cultural resource linked to traditional practices, values, beliefs, history, and/or ethnic identity of a cultural group or groups.

Grand Canyon has been home to various peoples for thousands of years. These people, both American Indians and Euro-Americans, have used the Canyon as both a home and a place linked to traditional practices, values, and beliefs. To the Hopi and Zuni, the Grand Canyon represents their place of origin into this world. For Hopi, it also represents the place where their spirits come to rest after death. For the Pueblo people (Hopi and Zuni), archaeological remains in the Canyon provide evidence for their migration from their place of origin to their present homes. For the Pai people (Hualapai and Havasupai), the Canyon and the River are lands for which they have been entrusted to care. For the Southern Paiute, the Canyon represents a place given to them by the Creator to protect and manage, including its water and natural resources. To the Navajo people, the Colorado River in Grand Canyon forms a protective boundary on the western border of Navajo land, and some Navajo clans trace their ancestry to specific Canyon locations.

Euro-Americans recognized the Canyon's spiritual values in the establishment of Grand Canyon National Park in 1919. World Heritage designation informed the world that the Grand

Canyon had value beyond just the American people. The 1975 Grand Canyon Enlargement Act specified natural quiet and scenic views as important, yet intangible, qualities that must be protected. These, too, are ethnographic resources.

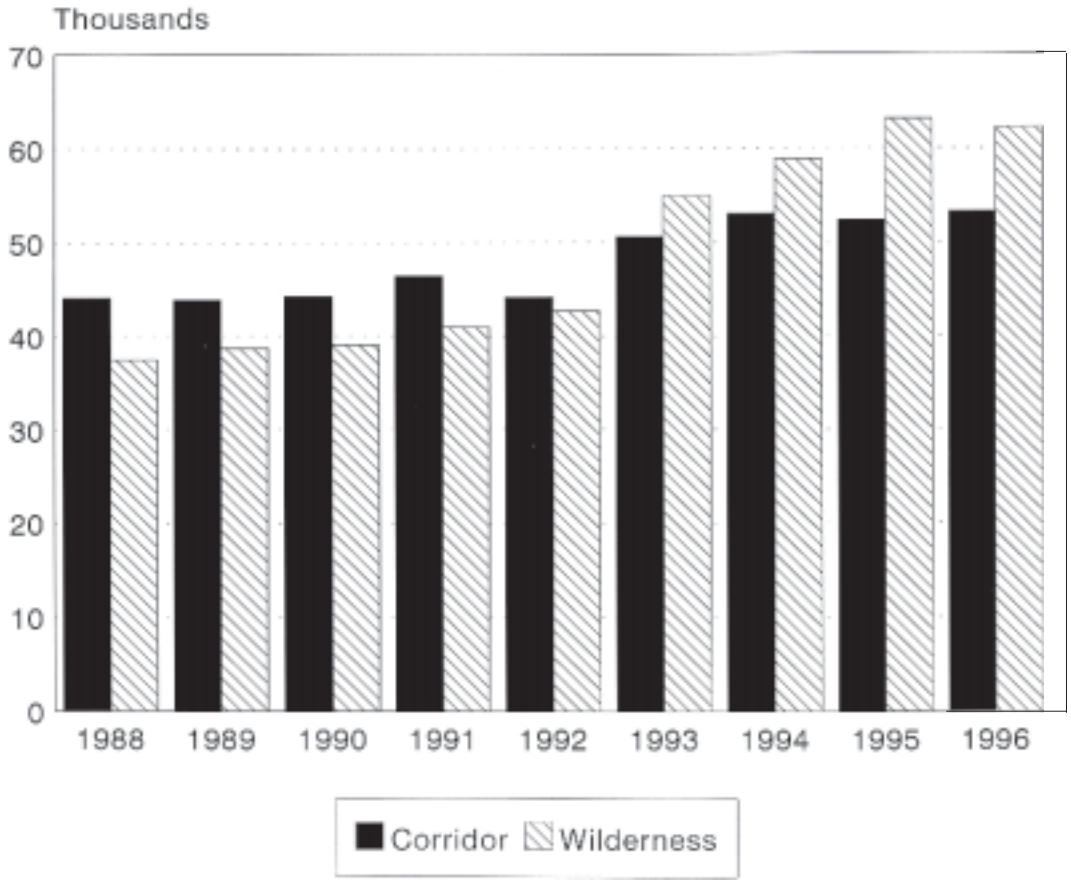
2.3 Description of Wilderness Visitor Use

Permits are required for backcountry use. Over 15,000 backcountry permits are issued annually. Although more permits are issued for the Cross-Canyon Corridor, total use is highest in wilderness areas. Overall backcountry and wilderness use is measured in "user nights," which is defined as one person per night. Wilderness use statistics indicate a significant increase in use from 1988 to 1996. (See Figure 2.1, Wilderness and Cross-Canyon Corridor Use).

Since 1993, user night totals have exceeded 100,000 annually. Permit operations changed in that year when the Park began issuing permits four months in advance by mail. Prior to this time, backcountry users were required to pick up permits at the Park just prior to their hike. The change in the permit system allowed operations to issue

Figure 2.1

Wilderness and Cross-Canyon Corridor Use



permits more efficiently, but at the same time sacrificed accountability of actual use versus cancellations and changes in trip plans, including the number of people in each party. Statistically, visitor use peaks in the wilderness areas in the months of April and October, which is typically when conditions are most amenable for wilderness travel. (See Figure 2.2, Annual Use Patterns by Month, 1991-1995.)

Sociological research and studies on backcountry users at Grand Canyon reveal that, demographically, the population of users appears to conform with national trends for wilderness use (Hendee, et al. 1990). Studies showed that the highest proportion of users were between the ages of 23 and 35, lived in cities of 75,000 or more, had an annual income of at least $50,000, and that over two-thirds had completed at least four years of college (Underhill, et al. 1986; and Jalbert 1992).

Although it is difficult to determine the overall experience level of hikers in the Grand Canyon wilderness Use Areas, it is known that the more experienced hikers tend to use more remote areas. Research conducted by Underhill and others in 1986 evaluated the hiking experience of overnight users; the

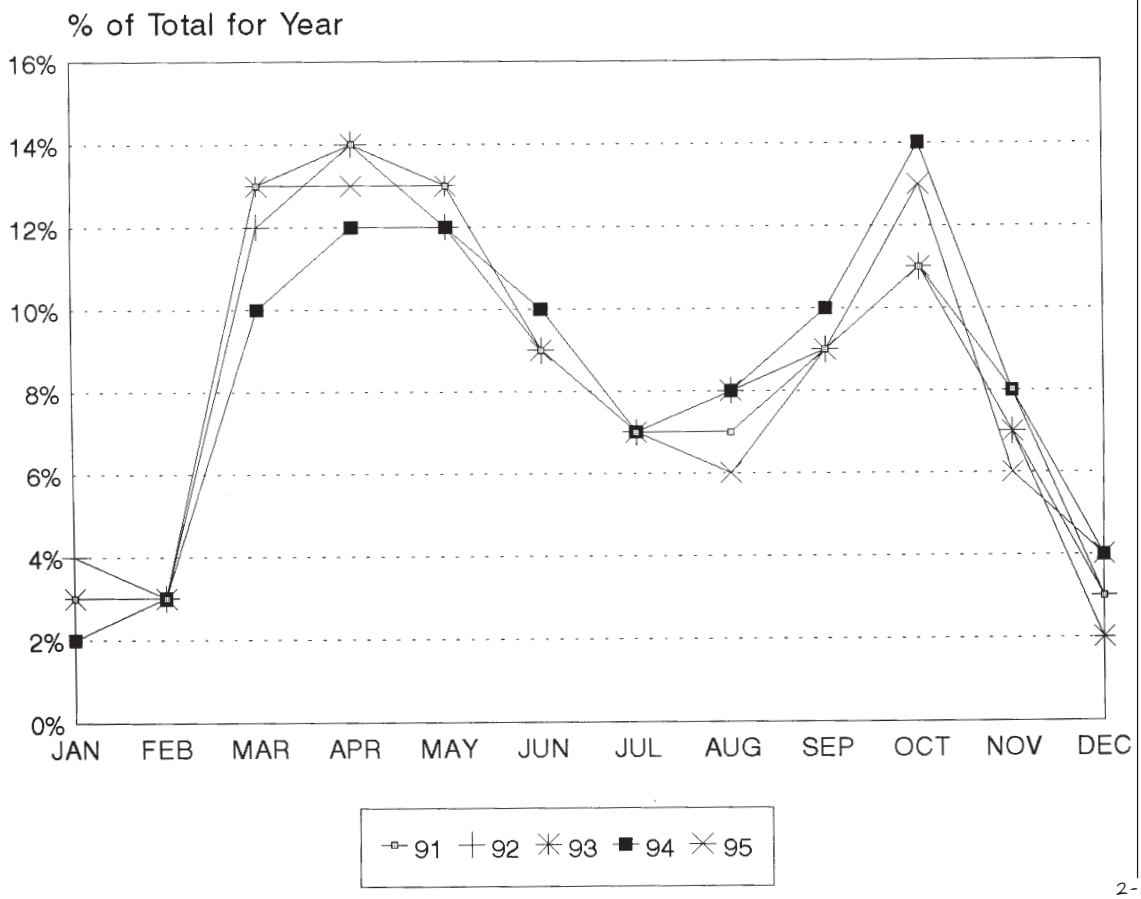


Figure 2.2

Annual Use Patterns by Month, 1991-1995

results showed seasonal differences among users. Summer hikers were the least experienced group at Grand Canyon, winter hikers most experienced, with spring and fall hikers in between.

There is little variation in the seasonal distribution of overnight use in the Threshold Use Areas; whereas, the more remote Primitive and Wild Use Areas have higher use in the spring and fall (Jalbert 1992). For a discussion of Use Areas see Chapter Six, Wilderness Campsite Management.

The maximum allowed group size is 11 people. Park statistics show that the average size of an overnight hiking party is 3.3 persons, and the average trip length is three days (Backcountry Office, 1988-95). The studies showed that groups of two made up the highest proportion of users, followed by groups of three or more, and solo hikers (Underhill, et al. 1986; Jalbert 1992). Of the groups with two or more people, over 50% were friends hiking together, less than 30% were families, and less than 10% were organized groups (Underhill, et al. 1986 and Jalbert 1992).

Wilderness hikers often encounter other user groups including stock users and day hikers on popular Corridor trails, and river users at beaches and attraction sites along the Colorado River. Currently, private and commercial stock use in the inner canyon is limited to 40 miles of trail, primarily within the Cross-Canyon Corridor. Several miles of primitive roads and trails on the rims are also open to stock use. Designated stock camps are also located near the developed Corridor campgrounds. Frequent encounters with day hikers are most common on the Corridor trails, and are increasing on trails accessible from popular rim overlooks. Encounters with river users along the Colorado River vary seasonally. During the summer months when river use is highest, hikers who camp at popular beaches may encounter groups of up to 36 people travelling on large motorized rafts. A small hiking group could potentially encounter a large river trip at popular attraction sites within large tributaries of the Colorado River.

2.4 Mandates Guiding Park Actions

Congressional legislation, National Park Service policies, and Park policies provide guidelines for administering each national park. The guidelines tend to become more specific as one moves from Congressional acts to local policies. While the mandates authorize the establishment and delegate management of Federal lands, the purpose and significance, goals, and management objectives are further defined in national and local park policies.

National Park Service Legislation

The National Park Service Organic Act of 1916 (39 Stat. 535, 16 USC 1) established the NPS and provided the agency with its fundamental direction by defining its purpose, which is to:

...promote and regulate the use of the Federal areas known as National Parks...by such means and measures as conform to the fundamental purpose of the said Parks... which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

These areas derive increased national dignity and recognition of their environmental quality....The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public values and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established.

The Redwood Act Amendments in 1978 (16 U.S.C. §1a-1) further expanded the Organic Act to state:

The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

Congress intended park visitation to be contingent upon the ability of the NPS to preserve park environments in an unimpaired condition. What constitutes an "impaired" resource is ultimately a management determination. It is in this context that the vision, goals, and objectives for wilderness management at Grand Canyon were developed and are being implemented.

Grand Canyon National Park Legislation

On January 11, 1908, President Theodore Roosevelt, under the authority of the Antiquities Act of 1906, reserved land as the Grand Canyon National Monument. In Proclamation No. 794 (35 Stat. 2175), Roosevelt stated that the Grand Canyon is:

...an object of unusual scientific interest, being the greatest eroded canyon within the United States, and it appears that the public interests would be promoted by reserving it as a National Monument with such other land as is necessary for its proper protection.

The Grand Canyon National Park Establishment Act of 1919 (40 Stat 1175) dedicated and set apart Grand Canyon National Park as a "public park for the benefit and enjoyment of the people." In the Grand Canyon National Park Enlargement Act of

1975 (16 U.S.C. §228a et seq.) Congress stated that its object was to:

> *...provide for the recognition by Congress that the entire Grand Canyon, from the mouth of the Paria River to the Grand Wash Cliffs, including the tributary side canyons and surrounding plateaus, is a natural feature of national and international significance. Congress therefore recognizes the need for the further protection and interpretation of the Grand Canyon in accordance with its true significance.*

On June 10, 1975, The Grand Canyon National Park Enlargement Act was amended (P.L. 94-31), and provided the Secretary of the Interior two years to make a recommendation as to the suitability or nonsuitability of any portion of the Park as wilderness.

World Heritage Site Designation

In October 1979, Grand Canyon National Park was designated as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO). As a World Heritage Site, the Grand Canyon was given the greatest protection for a natural area. The protection of the area's outstanding geological, biological and cultural features and processes is assured for all people for all time. The Grand Canyon is unique in meeting both natural and cultural resource criteria for World Heritage Site designation.

The Wilderness Act of 1964

The Wilderness Act of 1964 (P.L. 88-577) guides the form of most administrative decisions affecting the Park's wilderness. The purpose of Wilderness, as stated in the Act, is:

> *To establish a National Wilderness Preservation System for the permanent good of the whole people...to secure for the American people of current and future generations the benefits of an enduring resource of wilderness (Section 1 (a)).*
>
> *The National Wilderness Preservation System, therefore, is for people and its components are to be administered in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness (Section 2(c)).*

The Act implicitly distinguishes between an area's public purposes and the administrative actions necessary to realize those purposes. The Wilderness Act does not contradict a superintendent's discretionary authority to administer a park. As the Act states:

> *...except as necessary to meet minimum requirements for the administration of the area for the*

purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motor boats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area (Section 4(c)).

The Act makes clear that mechanized or motorized equipment is inappropriate for public purposes like recreation, education, or scientific study that is not serving administrative purposes. Such equipment, however, is occasionally appropriate for administration of a wilderness area, provided that the result meets the Act's requirements for such an effort. More specifically, efforts necessitating the equipment must protect or rehabilitate the area's character and contents as wilderness for enjoyment or study by future generations.

The Americans With Disabilities Act (ADA)

The Americans With Disabilities Act addresses the issue of accessibility in the National Wilderness Preservation System:

...Congress reaffirms that nothing in the Wilderness Act is to be construed as prohibiting the use of wheelchairs by an individual whose disability requires use of a wheelchair, and consistent with the Wilderness Act, no agency is required to provide any form of special treatment or accommodation, or to contract any facilities or modify any conditions of lands within a wilderness area to facilitate such use.

Additionally, the ADA defines the term wheelchair as "a device designed solely for use by a mobility-impaired person for locomotion, that is suitable for use in an indoor pedestrian area." (See Appendix F, Wilderness Use By Persons with Disabilities; U.S. Department of Agriculture. National Forest Service 1996).

The National Environmental Policy Act (NEPA)

The National Environmental Policy Act of 1969 (P.L. 91-190; 31 Stat. 852) declared a Federal policy to "preserve important historic, cultural, and natural aspects of our national heritage." It required Federal agencies to "utilize systematic, interdisciplinary approaches which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment."

With the passage of NEPA, Federal agencies were required to use a specific environmental planning process where any Federal action being considered would, if implemented, have an impact on the human environment. These actions may include, but are not limited to, adoption of policy, plans, programs, and approving projects and permits. NEPA sets

environmental policy goals; imposes analysis of potential environmental, social, and economic impacts; and requires a public review process.

The National Historic Preservation Act (NHPA)

The National Historic Preservation Act of 1966 (P.L. 89-665, 80 Stat. 915), as amended in 1992 (P.L. 102-575), declared a national policy of historic preservation, including encouragement of preservation on the State and private levels. It authorized the Secretary of the Interior to expand and maintain the National Register of Historic Places. It established the Advisory Council on Historic Preservation and designated State Historic Preservation Officers. It required Federal agencies to consider the effects of their undertakings on properties listed or eligible for listing on the National Register.

By incorporating Executive Order 11593, it instructed all Federal agencies to support the preservation of cultural properties and directed them to identify and nominate to the National Register properties under their jurisdiction which may be eligible. The 1992 amendments redefined "Federal undertaking" and emphasized the interests of American Indians, Native Hawaiians, and Native Alaskans. It also introduced the concept of Traditional Cultural Properties as National Register eligible properties, and included additional provisions for location confidentiality.

2.5 National Park Service Policies

Authority for implementing Congressional laws is delegated to agencies which identify and interpret all relevant laws, and formulate management policies to guide their implementation. For the NPS, these policies are set forth in a document titled *NPS Management Policies*, revised in 1988.

These policies provide direction for management decisions; adherence is "mandatory unless waived or modified by an appropriate authority." Recommended procedures for implementing servicewide policy are described in the NPS guideline series, and are also mandatory where the language so indicates.

Wilderness Management

National Park Service wilderness management policies are based on provisions of the Organic Act and the Wilderness Act, as well as the establishing legislation of individual parks within the national system. *NPS Management Policies* (6:8) treats all categories of wilderness in the same manner:

> *...the term wilderness includes the categories of designated wilderness, potential wilderness, and recommended/study wilderness, and these policies apply regardless of category...*

> *The Park Service will take no action that would diminish the wilderness suitability of an area recommended for wilderness study or for wilderness designation until the legislative process has been completed. Until that process has been completed, management decisions pertaining to recommended wilderness and wilderness study areas will be made in expectation of eventual wilderness designation.*

NPS Management Policies also addresses the management of public use of wilderness, and states that the NPS will "encourage and facilitate those uses of wilderness that require the wilderness environment and do not degrade wilderness resources and character." As stated in the Wilderness Act, these areas are for public purposes of recreational, scenic, scientific, educational, conservation, and historical uses.

Regarding public use, *NPS Management Policies* (6:8) states:

> *Park visitors must accept wilderness largely on its own terms, without modern facilities provided for their comfort or convenience. Users must also accept certain risks, including possible dangers arising from wildlife, weather conditions, physical features, and other natural phenomena, that are inherent in the various elements and conditions that comprise a wilderness experience and primitive methods of travel. The National Park Service will not eliminate or unreasonably control risks that are normally associated with wilderness, but it will strive to provide users with general information concerning possible risks, recommended precautions, minimum-impact use ethics, and applicable restrictions and regulations.*

Minimum Requirement Policy

In protecting wilderness character and resources, and in managing wilderness use in accordance with the Wilderness Act, Grand Canyon National Park will adhere to the "minimum requirement concept" within all proposed wilderness, including the river corridor. All decisions pertaining to administrative practices and use of equipment in wilderness will be based on this concept. The guiding principle of the minimum requirement concept is: "that only the minimum regimentation necessary to achieve established wilderness management objectives is justified...apply only the minimum tools, equipment, device, force, regulation, or practice that will bring the desired result" (Hendee, et al. 1990).

NPS Management Policies (6:4) requires the selection of *"the minimum tool or administrative practice* necessary to successfully and safely accomplish the management objective with the least adverse impact on wilderness character and resources [emphasis added]." By indicating that managers are to examine all administrative practices and equipment use, the NPS applies the minimum require-

ment analysis to the full breadth of the wilderness management tasks in protecting wilderness resources. This includes "outstanding opportunities for solitude or a primitive and unconfined type of recreation." This principle provides an encompassing framework for management decisions at several levels (See Appendix D, Minimum Requirement Decision Process).

2.6 Grand Canyon National Park Policies

General Management Plan (GMP)

The Grand Canyon National Park General Management Plan (U.S. Department of the Interior. National Park Service 1995) provides the overall direction for the protection of resources and visitor experiences. The GMP states that the Park's purpose is based on the enabling legislation, and that as a place of national and global importance, Grand Canyon Nation Park is to be managed to:

1) preserve and protect its natural and cultural resources and ecological processes, as well as its scenic, aesthetic, and scientific values

2) provide opportunities for visitors to experience and understand the environmental interrelationships, resources, and values of the Grand Canyon without impairing the resources.

The GMP specifies management objectives which are based on the Park's purpose and significance, and which set the direction for management. Several management objectives define the desired conditions for management of wilderness values, including the preservation of visitor experience and protection of natural and cultural resources.

The GMP also directs the preparation of separate action plans to implement overall Park management. This includes the development of this document, i.e., a plan for managing visitor use and protecting resources in the Park's backcountry and wilderness areas. The GMP specifies that, in accordance with *NPS Management Policies*, the proposed wilderness must be managed as designated wilderness, and "anticipates the final resolution of wilderness issues, and the preparation of a wilderness management plan as future actions."

Resource Management Plan (RMP)

The Park's 1997 Resource Management Plan (U.S. Department of the Interior. National Park Service 1997a) provides a comprehensive overview of the Park's natural and cultural resources, and identifies actions that will enable the NPS to fulfill its legislative mandate to protect Grand Canyon in keeping with its true significance.

The RMP defines specific, nonroutine actions for resource protection, and provides justification for allocating

funds to various resource management projects. The RMP contains a priority listing of projects determined by managers to address primary issues. Pertinent to the scope of the Wilderness Management Plan, several project statements address wilderness resources and values. Included in the projects statements are:

1) updating visitor use management action plans (such as the Wilderness and Colorado River Management Plans)
2) monitoring visitor use and impacts to social and biophysical resources, and

3) mitigating wilderness resource impacts.

Fire Management Plan

The goal of the Park's Fire Management Program as defined in the 1992 Fire Management Plan is to effectively manage wildland fire and provide for the protection of life, property, and cultural resources, while ensuring the perpetuation of ecosystems and natural resources. The Fire Management Plan also specifically addresses the restoration of the natural fire regime in wilderness areas, using practices consistent with management policies and other planning documents, including the Resource Management Plan and Wilderness Management Plan.

The current Fire Management Plan addresses the proper minimum-impact suppression techniques, but lacks clear direction for implementing a Minimum Requirement Process. The updated plan will be consistent with the Wilderness Management Plan and management policies regarding administrative use of roads, road closures, landing facilities, and use of aircraft in wilderness.

Colorado River Management Plan

Wilderness management issues and strategies that overlap with river management pertain primarily to the linkage of the two user groups (overnight hikers and river runners), and the application of minimum requirement policies. While Park policy on group size differs for either user group, the Wilderness and Colorado River Management Plans each describe standards for the types of experience on a spatial and temporal basis. The Wilderness Plan emphasizes the difference in experience opportunities through the zoning or spatial concept, while the Colorado River Plan defines opportunities on a seasonal or temporal basis. Each plan will integrate the overarching issues pertaining to each user group.

Park policy on administrative use of wilderness, or "minimum requirement," will be consistent in the Wilderness and Colorado River Management Plans. This policy includes use of the appropriate conveyance, tools, and visitor contact techniques to meet the objectives of resource protection and visitor experience management in wilderness.

Cross-Canyon Corridor Management Plan

Management of the Cross-Canyon Corridor will continue under the 1988 Backcountry Management Plan until a specific visitor use management plan for the Cross-Canyon Corridor is developed. Management standards for campsite condition and visitor experience will be consistent with the goals and objectives of the 1995 General Management Plan. Regulations regarding backcountry permitting operations and overnight camping are consistent with the Wilderness Management Plan.

Cave and Karst Management Plan

Of an estimated 1,000 caves in the Park's wilderness, 335 have been recorded. The 1997 Cave and Karst Management Plan provides for a systematic inventory, assessment, and classification of Park cave resources. Recreational and scientific use of caves is also directed by the plan, which addresses management responsibilities for resources management, safety, education, and restoration of impacted cave resources.

Other Plans

The following undeveloped but anticipated plans may affect wilderness qualities and management of resources in wilderness areas:

- Aircraft Management Plan
- Water Resource Management Plan
- Vegetation Management Plan
- Habitat Restoration Plan
- Wildlife Management Plan.

As stated in the GMP, as implementation plans are developed and updated, they will be consistent with NPS wilderness policy requirements.

Other Authorities

One method to limit or eliminate potential resource damage is through selective temporary or permanent closures to all or certain types of public use. The general authority for such closures is 36 CFR §1.5(a), which states

> *Consistent with applicable legislation and Federal administrative policies, and based on a determination that such action is necessary for the maintenance of public health, safety, protection of environmental or scenic values, protection of natural or cultural resources, aid to scientific research, implementation of management responsibilities, equitable allocation and use of facilities, or the avoidance of conflict among visitor use activities, the superintendent may:*
>
> *(1) Establish, for all or a portion of a park area, a reasonable schedule of visiting hours, impose public use limits, or close all or a portion of a park area to all public use or to a specific use or activity.*

(2) Designate areas for a specific use or activity, or impose conditions or restrictions on a use or activity.

Decisions made under the authority of this section will be based on written determinations justifying the actions, and signed by the superintendent.

2.7 Grand Canyon Wilderness Management Staff

Grand Canyon staff responsible for wilderness management include wilderness rangers; backcountry office visitor-use assistants; a variable trail-crew staff; and a wilderness coordinator.

Wilderness Rangers

Wilderness rangers are assigned geographic areas of responsibility about which they are expected to be highly knowledgable. They conduct extended trips into wilderness on foot, monitoring resources, contacting hikers, providing information and education, and working on resource projects. Wilderness rangers are also responsible for visitor protection and emergency operations. Wilderness rangers spend approximately 80 to 85% of their time to wilderness protection. Backcountry office staff spend approximately 50% of their time on wilderness management through permit processing, education, and information exchange.

Wilderness Trail Crew

Trail-crew numbers vary with the availability of supplemental funding. Currently, (1998) there are no full-time wilderness trail staff, although part-time or seasonal crews assigned to wilderness have numbered up to ten workers. On the average, approximately 200 person-days are devoted to river and backcountry trail restoration. Major restoration efforts on the Hermit and Grandview Trails were conducted in the 1997 season, involving crews of eight over a period of approximately three months. At present, there are no base-funded, full-time trail staff devoted to wilderness trails. Additional work will depend on available supplemental funding.

Wilderness Coordinator

Grand Canyon funds a full-time wilderness coordinator in the Science Center. Duties include providing guidance in implementing NPS wilderness preservation and management policies; developing and writing wilderness-related plans; assisting in the development of restoration projects; NEPA compliance; and coordinating wilderness training.

Wilderness Steering Committee

In 1994, the Director of the National Park Service, in response to the recommendations of the 1993 Wilderness Task Force, outlined the responsibilities of park superintendents regarding wilderness management

(U.S. Department of the Interior. National Park Service 1994b). One of the Task Force's recommendations included the establishment of a national and park-level "Wilderness Steering Committee" (U.S. Department of the Interior. National Park Service 1994d:2). The purpose of the committee is to "provide strong wilderness leadership... [and] facilitate and promote interagency cooperation...." The report emphasized the need for wilderness training, research and ecosystem management (U.S. Department of the Interior. National Park Service 1994d:2). The Park's immediate response was to develop a Wilderness Resource Management Team (U.S. Department of the Interior. National Park Service 1994c). Composition of this group was modified in 1995 to comprise the Park's current Wilderness Steering Committee (U.S. Department of the Interior. National Park Service 1995c).

The role and function of the Grand Canyon National Park Wilderness Steering Committee (WSC) is twofold:

- To provide leadership for the field implementation of NPS wilderness policy at the Park; and

- To make recommendations to management regarding minimum-requirement operational decisions. The WSC is made up of senior-level managers who share responsibility for field implementation of the Wilderness Management Program.

2.8 Summary of Changes and Actions

- Implement wilderness management policies for areas of proposed wilderness in Grand Canyon National Park in accordance with *NPS Management Policies*, the Grand Canyon General Management Plan, and the Wilderness Act

- Implement minimum requirement strategy for public and administrative use in Grand Canyon National Park

- Prepare other Park management plans consistent with the Wilderness Management Plan as directed in the General Management Plan and consistent with *NPS Management Policies*, including the
    - •Fire Management Plan
    - •Colorado River Management Plan
    - •Cave and Karst Management Plan

- Establish and maintain Park staffing levels to ensure wilderness management responsibilities are met as directed by NPS Wilderness Management Guidelines:
    - •Wilderness Steering Committee
    - •Wilderness Coordinator
    - •Wilderness Rangers
    - •Wilderness Trail Crew

Chapter 3

WILDERNESS MANAGEMENT PLANNING FRAMEWORK

3.1 Background of Backcountry and Wilderness Planning at Grand Canyon National Park

A wilderness study process preceded the development of the first Backcountry Management Plan. In 1970, the Park released its Preliminary Wilderness Study for Grand Canyon National Park, Marble Canyon National Monument, and Grand Canyon National Monument (U.S. Department of the Interior. National Park Service 1970). The total recommendation was 569,000 acres or approximately 63% of the 900,000-acre Park. Then in 1971, the Park issued a Wilderness Recommendation (U.S. Department of the Interior. National Park Service 1971) of 508,000 acres, not including the river corridor or North Rim. By 1973, the Park released its Final Environmental Statement for the Proposed Wilderness Classification (U.S. Department of the Interior. National Park Service 1973) which consisted of 512,870 acres and included North Rim.

The first visitor-use management plan for the backcountry areas of Grand Canyon was approved in 1974. This document, the Backcountry Use and Operations Plan (U.S. Department of the Interior. National Park Service 1974), established use limits for trailheads outside the corridor (use limits for the corridor had been established in 1971), and set a maximum group size of 16 individuals. Permits were issued at the South Rim Visitor Center.

In 1975, the Grand Canyon National Park Enlargement Act incorporated Marble Canyon National Monument, Grand Canyon National Monument, portions of Lake Mead National Recreation Area, Kaibab National Forest and some Bureau of Land Management lands into Grand Canyon National Park. The Act, as amended in August 1975 (P.L. 94-31), required the submission of a wilderness recommendation reflecting an enlarged Grand Canyon National Park within two years.

During 1975, a Backcountry Reservations Office (BRO) was established. Backcountry reservations were made up to one year in advance. A lottery was conducted for persons requesting permits during the busy Easter holiday period. In 1976, a new management system was implemented based on heavy use in Hermit Creek. Campgrounds and nightly capacities were established for the area west of the Bright Angel Trail to Hermit Creek.

In 1977, the Final Wilderness Recommendation (U.S. Department of the Interior. National Park Service 1977) recommended 1,004,066 acres for immediate designation, and an additional 108,945 acres as potential wilderness. The action was suspended until completion of the Colorado River Management Plan. Then in 1980, the Wilderness Recommendation was revised to eliminate the Cross-Canyon Corridor from wilderness consideration. During this same period, the reservation system was changed from accepting reservations one year in advance to three months in advance. The change was

intended to spread the BRO workload over the year, and reduce the number of no-shows, which were estimated at 50% in 1977 and 35% in 1980.

A new Backcountry Use Plan was drafted in 1981, and by 1983, the new Backcountry Management Plan was adopted (U.S. Department of the Interior. National Park Service 1983a). Major changes included establishment of four Management Zones and 72 Use Areas with prescribed use limits, replacing a trailhead quota system. Another major action was the initiation of sociological and ecological research and monitoring programs. A North Rim Backcountry Reservation Office was established in 1983.

Between 1983 and 1986 extensive sociological research was conducted, resulting in recommendations on use distribution and backcountry operations. Ecological research focused on campsite condition and distribution. A public review process was initiated in 1987, and by September 1988, a revised Backcountry Management Plan was approved incorporating information from these studies (U.S. Department of the Interior. National Park Service 1988a) . Major changes included opening more corridor and rim trails to private stock use, inclusion of a commercial use policy, reallocation and distribution of use based on the research, and adaptation of management objectives for specific management strategies.

In the four-year period between 1988 and 1992, overnight use increased by 12%. In 1993, a new permitting system was implemented whereby mail-in permits were accepted four months in advance, and a pre-trip check-in was no longer required. Statistics showed a 32% increase in overnight use from 1992 to 1995.

In 1993, the Wilderness Recommendation was updated to include 1,139,007 acres proposed for designation. Of this total, 1,109,257 acres were recommended for immediate designation, and 29,820 acres were recommended for designation as potential wilderness pending resolution of boundary and motorized river use.

Public Scoping began for a new Backcountry Management Plan in June 1995. The General Management Plan was also approved, replacing a 1976 Master Plan. The General Management Plan provided guidance for wilderness management, and called for the development of a Wilderness Management Plan. As a result, efforts to update the Backcountry Management Plan were redirected to complete a Wilderness Management Plan for the 1.1 million acres of proposed wilderness in Grand Canyon National Park.

In God's wilderness lies the hope of the world--the great fresh unblighted, unredeemed wilderness. The galling harness of civilization drops off, and the wounds heal ere we are aware.

John Muir
July 1890
From
John of the Mountains

3.2 NPS Planning Guidance

Planning guidance for resource management and visitor use plans is provided at the national and park levels. *NPS Management Policies* (6:4) specifically requires and guides the development of planning documents which address backcountry and wilderness management:

The superintendent of each park containing wilderness will develop and maintain a wilderness management plan to guide the preservation, management, and use of that wilderness. This plan may be developed as a separate document or as a action component of another appropriate management plan, such as the general management plan or backcountry management plan...The plan will be developed with public involvement and will contain specific, measurable management objectives that address the preservation of wilderness-dependent cultural and natural resources and values in order to achieve the public purposes specified by the Wilderness Act and other appropriate legislation.

Backcountry use will be managed to avoid unacceptable impacts on park resources or adverse effects on visitor enjoyment of appropriate recreational experiences. The National Park Service will identify acceptable limits of impacts, monitor backcountry use levels and resource conditions, and take prompt corrective action when unacceptable impacts occur. Management strategies designed to guide the preservation, management, and use of the backcountry and to achieve the park's management objectives will be integrated into the park's backcountry management plan. (NPS Management Policies, 8:3)

NPS-77, *Natural Resources Management Guidelines (*U.S. Department of the Interior. National Park Service 1991), provides comprehensive guidelines on natural resource management which assure that activities planned and initiated at the park level comply with Federal laws and regulations and NPS and Departmental policies. Specific guidance is provided for Backcountry Recreational Use Planning and Special Park Designations Uses, which include wilderness areas.

The 1993 Wilderness Task Force evaluated wilderness management in the National Park Service. The report, *Wilderness Task Force Report on Improving Wilderness Management in the National Park Service* (U.S. Department of the Interior. National Park Service 1994), identified several areas where management practices were not consistent with Federal laws and national policies. The report identified the weakness or lack of NPS guidance for wilderness planning. Actions recommended for improving wilderness planning included the development of wilderness planning and management guidelines, and the development of a wilderness resource team concept to facilitate the wilderness planning process. The National Wilderness Steering Committee was formed in response to the report, and has drafted guidelines which include wilderness planning requirements (U.S. Department of the Interior, National Park Service 1997b).

In February 1995, a special directive regarding wilderness management in National Parks was issued from the Director's Office. Special Directive 95-2, *Management and Planning Policy for Suitable, Proposed, Recommended, and Potential Wilderness Areas* (U.S. Department of the Interior. National Park Service 1995a), states that in addition to managing classified areas for the preservation of their wilderness values, "planning for these areas must be oriented toward ensuring the preservation of their wilderness character until such time as Congress determines their eventual designation." It further states that wilderness policy must be reflected in general management planning and in all types of activity plans for wilderness areas.

Grand Canyon National Park's General Management Plan directs the preparation of visitor-use management plans for all areas of the Park. The GMP specifies that, in accordance with *NPS Management Policies*, the proposed wilderness be managed the same as designated wilderness, and "anticipates the final resolution of wilderness issues, and the preparation of a wilderness management plans as future actions." As a specific project statement, the 1997 Resource Management Plan (U.S. Department of the Interior. National Park Service 1997a) directs that the 1988 Backcountry Management Plan be revised to be consistent with NPS wilderness policy requirements.

3.3 The Limits of Acceptable Change

The Wilderness Management Plan uses the concepts outlined in *The Limits of Acceptable Change (LAC) System for Wilderness Planning* (Stankey, et al. 1985). The LAC emphasizes a framework for establishing acceptable, appropriate, and measurable resource and social conditions in wilderness. The LAC process focuses on desired conditions, defines what is, and is not, acceptable, and develops a strategy to prevent unacceptable conditions.

The premises of the Limits of Acceptable Change process are:

- some change in conditions is inevitable
- the focus is on human-induced change
- the effects of human activities are important
- a diversity of settings is important to maintain
- determining what is acceptable is value-based.

Planning models such as LAC are designed to facilitate the balancing of visitor use with the protection of park resources and impacts to other visitor and park uses. The LAC model was adopted for the 1988 Backcountry Management Plan, and the 1989 Colorado River Management Plan, and provided clear guidance for monitoring and implementing management actions to reduce impacts to resources from recreational use.

NPS Management Policies and the *Natural Resources Management Guidelines* (NPS-77), recognize the Limits of Acceptable Change model as a planning framework for recreation management planning. *NPS Management Policies* states that such plans "will establish indicators, standards, conditions, and thresholds above which management actions will be taken to reduce impacts" (6:5). Standards are developed using the best available knowledge of Grand Canyon wilderness management, including ecological limitations, visitor use patterns, and existing environmental conditions, as well as current literature on wilderness management and national trends. Indicators are those measurable variables which determine resource condition, and measure the standard.

The emphasis of the LAC framework is to outline management objectives through the use of indicators and standards for various resource and social conditions and values. These methods are applied to help managers structure management direction. This information is included in a description of indicators, standards and monitoring programs in Chapter 12.

3.4 Management Zoning

In accord with legislative intent and specific objectives to manage for a "diverse range of visitor experiences compatible with the protection of resources and values" (GMP 1995), "zoning" of Park areas provides a framework for management based on different Park settings. *NPS Management Policies* (2:7) requires general management plans to define Management Zones "where strategies for management and use will best fulfill management objectives and achieve the purpose of the park."

The wilderness areas of Grand Canyon National Park are within the Natural Zone, "managed to conserve natural resources and ecological processes and to provide for their use and enjoyment by the public in ways that do not adversely affect these resources and processes" (*NPS Management Policies,* 2:7). To further represent the diversity of wilderness settings and opportunities, the Park has defined four recreational Opportunity Classes.

Recreational Opportunity Classes

The term "Opportunity Class" replaces "Management Zone" described in the 1983 and 1988 Backcountry Management Plans. The concept has not changed, simply the terminology. As in the GMP, "zone" implies a physical management area, whereas the term "opportunity class" describes a range of conditions or settings for which the Park manages.

Grand Canyon backcountry and wilderness areas are comprised of five Opportunity Classes: Corridor, Threshold, Semi-Primitive Mechanized, Primitive, and Wild. This Plan establishes the Semi-Primitive Mechanized Opportunity Class which identifies access to nonwilderness corridors within the Grand Canyon Wilderness. Each Opportunity

Class is described in terms of the desired resource, social, and managerial conditions for that particular use area (See Figure 3.1).

The Opportunity Classes are based upon the following criteria:

- type and amount of use
- opportunity for solitude
- current resource conditions
- management uses.

The following narrative descriptions outline the general characteristics associated with each Opportunity Class. A listing of standards and criteria is detailed in Figure 3.2.

Corridor

The Cross-Canyon Corridor is a developed inner-canyon area with campgrounds and facilities. The Corridor is not included in the proposed wilderness. The Bright Angel, South Kaibab, and North Kaibab Trails provide access to developed areas, and act as thresholds to the wilderness use areas. The Corridor, which is not specifically covered by this Plan, is referenced to the extent that it represents the spectrum of opportunities and provides a comparison for management strategies in the wilderness areas.

Threshold

This Opportunity Class applies to 24% of the wilderness use areas. Threshold Use Areas are managed for moderate to high levels of use relative to wilderness. Camping can be in designated sites or at-large, depending on the use area. Composting toilets exist at most areas, or may be installed if required to deal with unacceptable concentrations of human waste. The smallest Threshold Use Area limit for total number of overnight campers is six; the largest is 40.

Semi-Primitive Mechanized

This Opportunity Class applies to the 58 miles of primitive roads in 300-foot wide nonwilderness corridors which access wilderness trailheads and overlooks. These nonwilderness corridors were identified in the public review process (leading to the 1980 Wilderness Recommendation). Use Areas in this Opportunity Class overlap with adjacent Threshold and Primitive Opportunity Classes, and include designated and at-large camping. Mechanized (motorized and bicycle) access is permitted on primitive roads only.

Primitive

This Opportunity Class applies to 50% of the use areas. Primitive areas provide a more isolated and remote experience, and are managed for low to moderate use. Camping is at-large except in very rare cases where campsites may be temporarily designated for resource protection. Toilets are not common and are installed only as a last resort to correct human waste problems. Other structures are generally not permitted except temporary structures that are not visible and do not leave permanent impacts. The

maximum number of overnight users permitted per use area is 29.

Wild

This Opportunity Class applies to 26% of the use areas. Wild areas are mostly remote and provide the greatest opportunities for solitude. No structures of any kind, including toilets, are permitted. The maximum number of overnight users permitted per Wild Use Area is 12.

3.5 Summary of Changes and Actions

- Adopt recreation management concept of Opportunity Classes, replacing former "management zone" concept first adopted in 1983

- Establish Semi-Primitive Mechanized Opportunity Class to describe conditions and standards for nonwilderness primitive road corridors, in addition to the existing Corridor, Threshold, Primitive and Wild Opportunity Classes

Figure 3.1 Wilderness and Backcountry Opportunity Classes

	CORRIDOR	THRESHOLD	SEMI-PRIMITIVE MECHANIZED	PRIMITIVE	WILD
Resource Setting	A modified natural, nonwilderness environment with high impact levels from heavy recreational use. Three developed campgrounds with water, toilets, and shade structures. Campsites are moderate to high density.	A natural environment with moderate to high impacts from recreational use. Some areas with designated campsites and toilets. These areas have moderate to high density with frequent use.	A modified natural, nonwilderness environment with moderate to high impacts from recreational use. Access to trailheads with designated campsites, and day-use overlook areas.	A natural environment with low to moderate impacts from recreational use. Dispersed, at-large camping with frequent and concentrated use at creeks and attraction sites.	A natural environment with minimal impacts from recreational use. Dispersed camping in remote areas.
Social Setting	Corridor trails are heavily used by day hikers and backpackers. Commercial stock use is frequent and private stock use is infrequent. High numbers of trail encounters with hikers and mule riders. High probability of camping within sight and sound of other groups in campgrounds. Opportunities for solitude are unlikely.	Access trails to use areas also used frequently by day hikers. High probability of frequent encounters with backpackers and river users. High probability of camping within sight or sound of others during primary use periods. Opportunities for solitude often exist during non-peak periods.	Infrequent encounters with other users including motorists and bicyclists. High probability of encounters with others at popular day-use destinations. Opportunities for solitude increase during non-peak use periods.	Frequent encounters on threshold trails, becoming more infrequent with remoteness. Infrequent contacts with hikers and river users except at popular beaches. Increased opportunities for solitude exist year-round especially during non-peak use periods.	Infrequent to no contacts with others except near trailheads or along river. Route finding and cross-country travel likely. Outstanding opportunities for solitude exist.
Managerial Setting	Trails maintained for heavy hiker and stock use. Informational, warning, and mileage signs are frequent. Ranger stations are located near campgrounds, and routine patrols are conducted.	Trails maintained infrequently based on resource protection. Trail mileage, directional, resource protection, regulatory, and boundary signs placed as needed. Interpretive signs in historic areas and at trailheads. Toilets at designated campsites. Temporary ranger stations possible, and frequent patrols based on use and resource monitoring.	Roads maintained infrequently and kept in an unpaved condition. Improvements made to reduce resource impacts only. Temporary closure of roads for resource protection. Frequent ranger patrols based on use and resource monitoring.	Trails maintained infrequently based on resource protection. Trail signs at trailhead, park boundary and for resource protection. No facilities; toilets placed as last resort for health and safety. Frequent ranger patrols based on use and resource monitoring.	Trails maintained very infrequently except for resource protection. Signs at trailheads and boundaries only. No facilities or structures. Infrequent ranger patrols based on resource monitoring.

Figure 3.2 Summary of Management Standards by Opportunity Class

Factor	CORRIDOR	THRESHOLD	SEMI-PRIMITIVE MECHANIZED	PRIMITIVE	WILD
Stock use: Commercial and Private. Equine only.	Permitted only on the Bright Angel, Plateau Point, South Kaibab, Tonto between Bright Angel and South Kaibab, River, and North Kaibab trails.	Permitted only on the Whitmore Trail and on designated rim trails.	Permitted on primitive roads and trails on rim areas.	Permitted only on the Ken Patrick Trail to the Uncle Jim Trail on to Uncle Jim Point, and on designated rim trails.	Not Permitted.
Roads within the backcountry and wilderness	No roads present.	Roads in wilderness areas will be closed to mechanized travel.	Designated unpaved roads within a 300-foot-wide non-wilderness corridor. Maintenance will be the minimum necessary for resource protection.	Roads in wilderness areas will be closed to mechanized travel.	No roads present.
Camping restrictions	Camping in designated sites within developed campgrounds only.	Camping in designated campsites or at-large camping depending on specific use area.	Camping in designated campsites or at-large camping depending on specific use area.	At-large camping. Designated campsites or areas may be required for resource protection on a temporary basis in localized areas.	At-large camping.
Variety of recreational uses	Day hiking, backpacking, horse or mule riding, fishing, river running.	**Inner canyon:** day hiking, backpacking, horse or mule riding, fishing, river running. **Rim areas:** day hiking, backpacking, horse and mule riding.	Motorized and bicycle use on roads only within non-wilderness corridor. Access to day-use overlooks and designated campsites. Horse and mule riding.	**Inner canyon:** day hiking, backpacking, fishing, river running. **Rim areas:** day hiking, backpacking, horse and mule riding.	Day hiking, backpacking and river running.
Use area limits for recreational use	Up to 180 people or 59 small groups and four large groups permitted within three designated campgrounds.	Up to three small groups and two large groups for a possible maximum of 40 people. One exception is the Monument use area where eight small groups and two large groups are permitted for a possible maximum of 70 people.	Applicable limits based on adjacent Threshold and Primitive use areas.	Up to three small groups and one large group may be permitted for a possible maximum of 29 people.	Up to two small groups or one large group may be permitted for a possible maximum of 12 people.

Factor	CORRIDOR	THRESHOLD	SEMI-PRIMITIVE MECHANIZED	PRIMITIVE	WILD
Structures (other than cultural resources)	Ranger stations, bridges, scientific facilities, campground facilities including pack bars, toilets, shade structures and picnic tables, concession facilities and utilities including telephone, electricity, water and sewage treatment plants.	Primitive facilities at designated campsite clusters (toilets and pack bars). Temporary scientific and administrative structures, and emergency communication facilities may be permitted if they are determined to be the minimum requirement.	Scientific and administrative structures, and emergency communication facilities may be permitted if they are not normally visible from wilderness areas. The Kanabownits Cabin and Fire Tower, and Pasture Wash cabin currently exist. The continued need for these facilities will be evaluated under the requirements of *NPS Management Policies*.	Primitive toilets may be placed as a last resort to deal with localized human waste problems. Temporary scientific and administrative structures, and emergency communication facilities may be permitted if they are determined to be the minimum requirement.	No structures are permitted except in extreme situations approved by the Superintendent.
Signs: Types permitted	Trail mileage, trailhead, interpretive, directional, regulatory, and resource protection.	Trail mileage, trailhead, regulatory, directional, resource protection and park boundary designations. Interpretive signs only in historic areas of Hermit and Horseshoe Mesa use areas.	Road and trail mileage, trailhead, regulatory, directional, resource protection, park boundary, and road designations.	Trailhead and park boundary. Small signs indicating road site closures. Special signs only by approval of Superintendent.	Park boundary. Special signs under exceptions circumstances only by approval of Superintendent.
Sign materials	Etched metal, reflective, adhesive lettered, and routed wood.	Routed wood except at trailheads and park boundary. Etched metal interpretive signs in historic areas only by Superintendent approval. Small metal or wood signs for road closures.	Etched metal, reflective, adhesive lettered, and routed wood.	Routed wood except at trailheads and park boundary. Small wood or metal signs for road closures.	Routed wood except at park boundary.
Ranger and resource specialist presence	Rangers stationed year-round at Indian Garden and Bright Angel campgrounds and seasonally at Cottonwood. Frequent patrols and contacts with visitors. Patrols based on intensity of use and resource monitoring.	Temporary stationing of rangers and resource specialists is possible. Frequent patrols based on intensity of use and resource monitoring.	Frequent patrols based on intensity of use and resource monitoring.	Frequent patrols based on intensity of use and resource monitoring.	Infrequent patrols based on intensity of use and resource monitoring.
Interpretive and educational contacts	Scheduled formal programs, interpretive signs, bulletin boards, and informal contacts.	Informal contacts. Bulletin boards and interpretive signs at trailheads. Special interpretive signs in Hermit and Horseshoe Mesa use areas.	Informal contacts. Interpretive signs only in historic areas, or for resource protection.	Informal contacts.	Informal contacts.

CHAPTER 4

RECREATIONAL USE OF WILDERNESS

One of the goals of the Wilderness Management Plan is to guide management of wilderness resources while providing recreational opportunities for a broad range of visitor experiences and settings. Within the context of the wilderness mandate, Grand Canyon National Park offers the opportunity for a variety of recreational activities and uses in popular destinations as well as remote areas.

4.1 Issues and Public Concerns

Comments related to wilderness recreational use were received during the Public Scoping Process in 1995. In particular, people were asked to comment on day use in the Cross-Canyon Corridor, private stock use, impacts to natural and cultural resources from users, and conflicts between different use groups.

While many respondents indicated a preference for hiking in wilderness areas, many mentioned that they often access wilderness trails through the Cross-Canyon Corridor. Those who provided information on their day-hiking experience said they often avoid the Corridor trails due to crowding and stock use. It appears that most user conflicts are related to high use levels of these trails, and on occasion, at popular river beaches and attraction sites where hikers encounter large river parties.

Many respondents commented on the Park's efforts to preserve natural conditions and protect cultural resources in wilderness areas. Some suggested that use levels be decreased in popular camp areas such as Hermit Creek and Horseshoe Mesa in order to decrease the impacts from visitor use. Many suggested that the best way to address problems related to visitor use is through public education.

4.2 The Regional Recreation Opportunity Spectrum

The recreational activities offered within Grand Canyon National Park are compatible with the Park's significance and its wilderness resources. Opportunities for other activities such as motorboating, hunting, mountain biking, and snowmobiling are available on neighboring public and Tribal lands. Specific information on use of public and Tribal lands adjacent to the Park is found elsewhere in this Plan (See Chapter Five, Backcountry Permit System, and Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands).

4.3 Accessibility

In compliance with the Americans with Disabilities Act of 1990, the NPS will allow, as appropriate, the use of wheelchairs in Grand Canyon wilderness areas. Visitors with sight or other impairments requiring the use of guide animals in the backcountry and wilderness areas, should make specific inquiries at the

Backcountry Office. All visitors must be aware of the unique, and challenging characteristics of the Grand Canyon wilderness, including steep terrain, potential interactions with wildlife, mules and horses, and diverse weather patterns (See Appendix F, Wilderness Use by Persons with Disabilities).

4.4 Day Use

National trends indicate increasing day use of wilderness areas. The actual amount of day-use hiking on trails at Grand Canyon National Park is unknown. High concentrations of day use occur on the corridor trails, where hikers may also encounter several mule strings. Day hiking is also common on North Rim wilderness rim trails, and is increasing on inner canyon trails accessible from the South Rim road system, especially the Hermit and Grandview Trails. The proposed transportation system (General Management Plan 1995) will also have an effect on the dispersal of day hikers.

A day-use research project at Grand Canyon National Park began in June, 1997. The purpose of the study is to learn more about day-use of the wilderness and nonwilderness backcountry areas. Information from this study may be incorporated into future visitor-use plans, and will provide a basis for informed decision-making about issuing permits for guided day hikes, visitor education, and safety programs.

Presently, noncommercial day-use hiking is unrestricted. However, for the health and safety of Park visitors, temporary restrictions on inner canyon trails can be imposed as a result of extreme environmental conditions. These restrictions have resulted from floods, rockfalls, and for periods of extremely high temperatures. Overnight users and guided trips are also subject to these restrictions.

4.5 Overnight Use

All overnight use of the wilderness and backcountry areas of Grand Canyon National Park requires a backcountry use permit. Demand for overnight use of popular Grand Canyon wilderness areas far exceeds availability. The maximum group size for overnight use of the wilderness (and Corridor) is 11 people. The National Park Service strives to maintain a fair and equitable permit system to balance the demands of visitor use with mandates for protection and preservation. Chapter Five discusses the permit system; the Backcountry Reservation and Permit System is included as Appendix G.

4.6 Private Stock Use

Private stock use (equine only) in the wilderness is permitted on existing primitive roads and trails on the North and South Rims (See Appendix H, Wilderness Stock Use Guidelines). A permit is required for overnight use.

President Clinton and I believe that preserving America's special places isn't just good public policy, it is a moral obligation... The parks and forests and wilderness preserves can never be replicated.... Our responsibility to this land is one of the most profound and sacred we have.

Vice President Al Gore
September 2, 1997

This Plan establishes the overnight group-size limit for wilderness areas as a maximum of six people and a maximum of six stock animals (with a limit of five stock to one mounted packer). The total numbers in wilderness for day use will not exceed 12 people and 12 stock animals.

4.7 Fishing

Recreational fishing is permitted in Grand Canyon's wilderness areas. All fishing activities must meet Arizona Game and Fish Department regulations, and any special regulations established by the National Park Service. Fishing in the Colorado River is prohibited within one-half mile of the confluence with the Little Colorado River, and in that portion of the Little Colorado River in the Park.

4.8 Rock Climbing

Presently, there is no permit required for technical rock climbing. Many technical climbing areas are remote, and only accessible by overnight hiking that requires a Backcountry Use Permit. Most of the rock formations at Grand Canyon are extremely unstable, resulting in hazardous climbing conditions. Climbers are required to employ minimum-impact climbing techniques. The use of power tools to install bolts or other hardware is prohibited. All hardware must be removed upon finishing the route.

4.9 Nordic Skiing and Snowshoeing

Nordic skiing and snowshoeing in the Park is unregulated. These activities occur primarily on the rims, often on unmarked trails or roads. Due to the Park's remote areas and hazardous winter conditions, winter travelers must be prepared for storms and delays. Skiers or snowshoers camping overnight in the Park must have a backcountry permit. Any delay or change in itinerary due to conditions should be reported as soon as possible to the first available ranger so that the permit can be adjusted.

Once Highway 67 and the North Entrance Road close for the winter, all overnight travel on the North Rim requires a backcountry permit. Snow machines are prohibited in the Park (except for administrative use). Backcountry users may camp at-large north of the intersection of the North Entrance Road and Fuller Canyon Road. South of this point, and continuing along the entrance road to the North Rim Lodge developed area, campers must use the winter campground facility at the group sites behind the closed Camper Store. At-large camping must be out of view of the North Entrance Road. All trash must be carried out, and human waste cannot be buried over roads, parking lots, trails, near buildings or other areas that will be in view of summer users.

Commercial ski trips must comply with regulations identified in an Incidental (IBP) Business Permit or a Special Use Permit (SUP).

4.10 Bicycling

Bicycling is allowed on all Park roads accessible and open to private vehicles. In addition, the Arizona Trail on both rims is open to mountain biking, and bicycling opportunities are available on adjacent Forest Service lands. All bicycles are prohibited in wilderness areas. Commercially guided bicycle tours must comply with regulations identified in an IBP or SUP. (See Appendix I, Commercial Use Policy.)

4.11 Commercial Use of Wilderness

Commercially guided overnight and day trips are considered an appropriate use of the Grand Canyon wilderness, and must comply with the regulations identified in an Incidental Business Permit. The Commercial Use Policy for wilderness and backcountry areas is included as Appendix I. Commercially guided day-hiking trips are currently permitted in Grand Canyon National Park pursuant to an IBP or SUP.

4.12 Cave Entry

Cave entry and management is guided by the Grand Canyon National Park Draft Cave and Karst Management Plan (1997c). All caving activity (day use or overnight), except for access to Class I caves, must be approved in advance through the Grand Canyon National Park Science Center. A permit will be issued to applicants under the provisions defined in the Cave and Karst Management Plan. A Backcountry Use Permit is required for overnight stays. Special campsites may be designated on the Cave Entry Permit as provided in the Cave and Karst Management Plan. Cave Entry permits are not automatically issued.

Approvals for cave entry depend on the cave's classification and whether or not it has been classified using the criteria put forth in the Cave and Karst Management Plan, the experience of the person requesting the approval, and the availability of a backcountry permit. A Cave Entry Permit application is included as Appendix J.

4.13 Semi-Primitive Mechanized Access in Nonwilderness Corridors

Nonwilderness road corridors adjacent to the wilderness areas on the North and South Rims provide access to various rim overlooks and designated camping sites. The primitive roads which are open to motor vehicles and bicycles are subject to temporary closures based on fire conditions, weather, and potential hazards. High-clearance vehicles are recommended. Sections of the Arizona Trail on the Kaibab Plateau within the Park allow bicycle use. Mechanized access in nonwilderness corridors is further addressed in Chapter 8.

4.14 Area Limitations and Closures

The fragility of Grand Canyon's lands and resources necessitates use limits in some cases, and, in other cases, temporary or permanent closures (U.S. Department of the Interior, National Park Service 1993c). These limits and closures are authorized by 35 Code of Federal Regulations (CFR) section 1.5:

1. Camping is not permitted in the Transept, Manzanita, Uncle Jim Point, Long Jim, and Tusayan Use Areas. These are day use areas only. The basis for the closures is that each is adjacent to the Cross-Canyon Corridor Use Area or the rim camping areas, each has a limited physical carrying capacity, and each has special ecological sensitivities.

2. Also closed to camping but open to day use are the following:

- Dripping Spring
- Page Spring
- Portions of Phantom Creek (below 3600-foot contour)
- Thunder River drainage (from its origin to its confluence with Tapeats Creek)
- Havasu Creek within the Park (from the confluence at the Colorado River to Beaver Falls)
- Matkatamiba Canyon below the Redwall Limestone (i.e., below the major side canyon on the east)
- Grandview Mining District (designated camping is located just outside the historic district boundary)
- Deer Creek (north side of the Colorado River within ¼ mile upstream or downstream at confluence, and to the upper end of the narrows)
- Elves Chasm (within ¼ mile of Royal Arch Creek's confluence with the Colorado River, or within the chasm)
- The area on the east side of the Colorado River (within one-half mile of the confluence of the Little Colorado and Colorado Rivers)
- Redwall Cavern

3. The following are closed to all visitor use

- Hance Mine (in Asbestos Canyon south of Hance Rapid)
- Bass Mine (in Hakatai Canyon and the area immediately surrounding the mine tailings and waste rock areas)
- Furnace Flats from mile 71.0 to mile 71.3 on the north side of the Colorado River
- Anasazi Bridge

4. The Hopi Salt Mines along the Colorado River within the Park are closed to all visitation except by permission from the superintendent. The closure extends from river mile 62 to river mile 62.5 on the southeast side of the Colorado River. If permission is obtained, a backcountry permit is also required.

5. Havasupai Use Lands are closed to all visitation except to access areas authorized on a Havasupai Tribe or Grand Canyon backcountry permit (includes the Olo and Fossil Use Areas).

4.15 Applicable Regulations

The National Park Service advocates Leave No Trace camping principles (See Chapter 10, Interpretation, Education, and Information). The following regulations have been established to support these principles, to promote protection of the Canyon's fragile environment, and provide an equitable system for permitting use.

It is the responsibility of all trip participants to know and obey the following regulations while in the wilderness and backcountry areas of Grand Canyon National Park. These regulations are considered the terms and conditions of a backcountry permit under 36 CFR 1.6:

1. A Backcountry Use Permit is required for all overnight use, and must be in possession while in the wilderness. Overnight users must have a Backcountry Use Permit displayed on the outside of their pack, tent, or other camping equipment once camp has been established (36 CFR 1.6).

2. Wood or charcoal fires are prohibited. However, the use of "Sterno" or backpack stove is permitted (36 CFR 2.13).

3. Trash must be packed (carried) out. Burning or burying of trash or toilet paper is prohibited (36 CFR 2.14).

4. Possession of firearms, and/or bows and arrows is prohibited (36 CFR 2.4).

5. Pets are not allowed in Grand Canyon National Park wilderness areas or within the inner canyon. In rim developed areas, pets can be taken on trails, roads, and other outdoor areas as long as they are under physical restraint, and there are no posted closures. Where pets are allowed, they must be under physical restraint at all times.

Exception: Use of guide animals is allowed; specific information can be obtained from the Backcountry Office. (See Appendix F, Wilderness Use by Persons with Disabilities).

6. Leaving a trail or walkway to shortcut between portions of the same trail or walkway, or to shortcut to an adjacent trail or walkway, is prohibited (36 CFR 2.1).

7. Throwing or rolling rocks or other items inside caves or caverns, into valleys, or canyons, down hillsides or mountainsides, is prohibited (36 CFR 2.1).

8. Feeding, touching, teasing, frightening, or intentionally disturbing wildlife is prohibited (36 CFR 2.2). Unattended food must be stored properly to prevent access by wildlife. Improper food storage is prohibited (consult the Backcountry Office for information on proper food storage).

9. Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state any plants, rocks, animals, or mineral, cultural, or archeological resources is prohibited. Walking on, entering, traversing or climbing an archeological resource is prohibited (36 CFR 2.1).

10. The use of motorized or wheeled vehicles, such as motorcycles, bicycles, baby buggies/ strollers, and similar vehicles, on trails below the rim is prohibited (36 CFR 4.10 and 4.30).

Exception: The use of wheelchairs for mobility-impaired persons is allowed (See Appendix F, Wilderness Use by People with Disabilities).

11. Writing, scratching, or otherwise defacing signs, buildings, or other property is prohibited (36 CFR 2.31).

12. More than one party/group from the same organization camping in the same designated campground or noncorridor use area per night is prohibited. Violating a closure, designation, use, or activity restriction or condition, schedule of visiting hours, or use limit is prohibited (36 CFR 1.5 and 1.6).

13. Use of soap in any side stream or within 100 yards of any side stream junction with the Colorado River is prohibited (36 CFR 2.10).

Exception: Use of soap is allowed in the mainstream of the Colorado River only.

14. Commercial use of the backcountry must be authorized by a permit from Grand Canyon National Park (See Appendix I, Commercial Use Policy).

15. All trails within the Grand Canyon are closed to use for competitive travel, including "rim-to-rim" and other races or timed events.

16. Disposing of human waste within 100 feet of a water source, high-water mark of a body of water, or a campsite, or within sight of a trail is prohibited (36 CFR 2.14a9). However, hikers camped along the Colorado River must urinate directly into the Colorado River. Fecal waste must still be disposed beyond 100 feet as described above. This exception for urine applies to the Colorado River only, and does not include any sidestream or other water course.

This is consistent with the Colorado River trip regulations.

17. Violating a term or condition of a backcountry permit is prohibited. This includes all aspects of the permit process as outlined in the Wilderness Management Plan (36 CFR 1.6g2).

4.16 Summary of Changes and Actions

- Provide information on recreational opportunities outside the Park (See Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands).

- Support day hiking research project. Incorporate findings into future visitor use plans.

- Implement group-size limits for stock overnight and day use in wilderness areas.

CHAPTER 5

BACKCOUNTRY PERMIT SYSTEM

One of the management objectives of the Wilderness Management Plan as stated in Chapter One, specifies desired outcomes for the permitting system and operations:

- *serve the visitor by providing users the opportunity to obtain permits for wilderness and nonwilderness backcountry areas that offer the type of experience they seek*
- *serve Park management by providing an effective way to educate the public on low-impact practices, ethics, and safety*
- *provide information on use levels and patterns that enable management to make informed decisions regarding the protection of wilderness values and resources.*

This chapter discusses issues, initiatives, and strategies to achieve the management objectives. (See Appendix G, Backcountry Reservation and Permit System).

5.1 Issues and Public Concerns

During the Public Scoping Process for the Wilderness Management Plan conducted in 1995, people were asked to comment on issues related to the Park's backcountry permitting operations, including a proposed cost-recovery program.

A high percentage of respondents seemed to favor a cost-recovery system, and stated that the revenues collected should be used to support backcountry-related programs and operations. These operations and services include direct contact with knowledgeable staff by phone or in person, extended office hours, more rangers in the field, trail maintenance, education, and resource management programs.

While many commented that the current system is satisfactory, a majority of comments suggested that certain aspects of the permit system should be improved. Of greatest concern was the inability of users to obtain information from the Backcountry Office. The telephone system did not provide an adequate level of service. Of those who indicated they were "experienced" Grand Canyon hikers, the mail-out system was the preferred way of obtaining permits.

Of those who did not favor a cost-recovery system for backcountry permits, many believed that current Park entrance fees should cover this service. Others felt that the system should be simplified to avoid charging for permits, and many felt strongly that access to public lands should be free.

Neighboring Tribal governments raised issues about access. While permits are required for recreational use on the Navajo, Havasupai, and Hualapai Tribal lands, visitors accessing the Park through Tribal lands often do not obtain the required permits from the Tribes. Visitors mentioned that getting tribal permits can be difficult and confusing.

5.2 System and Administration

To meet the tremendous demand for Backcountry Use Permits in a fair and timely manner, an automated backcountry reservation and permit system was established in 1983. A Backcountry Use Permit is required for all overnight wilderness and backcountry use, including overnight hiking, overnight cross-country ski trips, off-river overnight hikes by river-trip members, Colorado River beach camping by backpackers, overnight equine backcountry use, and all overnight backcountry caving activity. (A Cave Entry Permit is required to enter caves. See Appendix J, Cave Entry Permit). The Backcountry Use Permit is valid only for the trip leader, itinerary, and dates specified on the permit. Overnight stays in the dormitories or cabins at Phantom Ranch do not require backcountry permits.

The permit system is designed to regulate, facilitate, distribute, and measure use in wilderness and backcountry areas. Use regulation is essential for protecting Park resources and insuring a variety of backcountry experiences. The permit system also provides information about the extent and intensity of wilderness use, including identification of problem areas. Use statistics generated from the automated system are compared to resource conditions evaluated through the campsite monitoring program (See Chapter 12, Monitoring and Research). This provides a basis for determining actions to prevent further resource impacts from recreational use. Park ranger patrols monitor use at a level that encourages compliance with the permit system. Wilderness use statistics will be distributed by the Backcountry Office quarterly to the Wilderness Subdistrict, Trail Crew, Interpretation Staff, and the Science Center to facilitate wilderness management.

The permit system is administered by the Backcountry Office. The main office (South Rim), is open year-round. The North Rim office is open from May to October. These offices handle permit applications by mail, FAX, or in person. Permits may also be obtained in-person at a number of remote locations. Specific guidelines and procedures for obtaining a backcountry permit are included as Appendix G, Backcountry Reservation and Permit System.

5.3 Recreation Fee Demonstration Program

In 1996, Congress mandated the Secretary of the Interior to implement a three-year Recreation Fee Demonstration Program in up to 100 National Park Service areas. Grand Canyon National Park is participating in the Recreation Fee Demonstration Program, implementing an increased entrance fee and a backcountry permit and impact fee. This program directs parks to increase current fees and establish new fees for recreational uses, and retains a large portion of the resulting revenues at the collecting park for new services and facilities. The program mandates collection of fees for three years, and allows for expendi-

In those days there was no road, the park was all a blessed wilderness, and I have often thought since what a wonderful people we would have been if we had wanted to keep it that way.

Adolph Murie

tures from fees for up to six years. After this three year period, the Park may continue collection of use fees under a cost recovery program. Currently, all fees are collected under the Fee Demonstration Program. A cost recovery program would allow fees to be collected to cover actual costs, and would have to be approved by Congress.

In general, the benefits realized at Grand Canyon include additional service to the public, increased protection of Park resources, and construction of needed facilities according to the Park's General Management Plan.

The direct benefits of the Recreation Fee Demonstration Program to wilderness users include improved access to the Backcountry Office by FAX or phone, longer office hours, and additional staff to disseminate information and process permits. In 1997, and educational hiking video was written and produced by the Grand Canyon Association in cooperation with the Park. Fees collected through the demonstration program will support additional copies and distribution of the video to permittees and visitor contact stations. In addition, impact fees will support wilderness resource monitoring programs, trail maintenance, and visitor education. Several projects have been identified and are included in Chapter Sixteen, Implementation Schedule.

5.4 Access Through Adjacent Lands

Access to wilderness in Grand Canyon National Park is sometimes gained by crossing other Federal or Tribal lands. On some North and South Rim areas, primitive roads through National Forest Service lands access remote trailheads. In western Park areas, access is through lands administered by the Bureau of Land Management. These Federal agencies do not currently require permits; however, fees and permits may be required in the future under the Recreation Fee Demonstration Program. Visitors to Federal lands are required to comply with applicable regulations for each agency.

Permits are required for use of, or access across, Tribal lands adjacent to Grand Canyon National Park. Navajo, Havasupai, and Hualapai Tribal lands share boundaries with Grand Canyon National Park. Access permits must be obtained from each Tribal government. Through the government-to-government consultation process, the Tribes requested that the park work with them to establish a system that ensures visitors have both Park and Tribal permits. This Plan establishes a cooperative recreational use permitting strategy with the Navajo, Havasupai, and Hualapai Tribes. (See Chapter 16, Implementation Schedule). Specific information on permit requirements for Tribal lands are outlined in Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands.

5.5 Administrative Use

Park staff conducting work related to resource protection, visitor contact, or other administrative duties are not required to obtain a permit for overnight use. These activities include natural, cultural and recreational monitoring such as monitoring water quality, wildlife, caves, campsites, and archeological sites; routine ranger patrols; and trail maintenance. Park group-size limits depend on the project's scope, and will be determined through the Minimum Requirement Decision Process (See Appendix D). Park staff must provide the Backcountry Office with dates and location of scheduled work. When appropriate, this information will be conveyed to visitors.

Scientific Studies

Individuals or groups conducting scientific studies in the Park must first obtain a research and/or collecting permit; applications are due at least 90 days in advance of planned field activities. See Chapter 12 for information on the research permit process.

Projects requiring access to restricted locations or popular backcountry use areas may require more than 90 days to review and process. Non-park researchers must obtain a permit for overnight use, and should submit a backcountry permit application through the reseach office at the same time the research and/or collecting permit is submitted. The Research Office and Backcountry Office will coordinate the review and approval of backcountry permits for scientific studies. Group-size limits depend on project scope, and will be determined through the Minimum Requirement Decision Process (See Appendix D.)

Organized Groups

An organized group is any number of persons united for some purpose, whether commercial or noncommercial. See Appendices G, Backcountry Reservation and Permit System, and I, Commercial Use Policy, for permit information.

5.6 Summary of Changes and Actions

- Upgrade automated reservations system, and improve customer service by increased staffing, communications, and hours of operation
- Distribute quarterly wilderness-use statistics to Wilderness District, Trail Crew, Interpretive Staff and Science Center to facilitate wilderness management
- Show educational video in Backcountry Office and Visitor Centers, and distribute to permit holders
- In cooperation with the Navajo, Havasupai, and Hualapai Tribes, establish a cooperative permitting system for use on Tribal and Park lands.

CHAPTER 6

WILDERNESS CAMPSITE MANAGEMENT

6.1 Issues and Public Concerns

The primary issues of wilderness campsite management are related to the amount and type of impacts to natural and cultural resources, and the distribution of campsites and subsequent effects on visitor experience. Long-term monitoring programs have documented campsite and trail conditions and impacts to archeological sites.

Two issues identified in the June 1995 Public Scoping process specifically addressed concerns related to campsite management, 1) use-area boundaries, and 2) group-size limits.

Several suggestions for addressing concerns related to visitor impacts at popular campsites were made. Those most often mentioned were to reduce the number of permits (and use), and to provide more information and education on wilderness camping practices.

Those who expressed support for changes in use-area boundaries focused on greater opportunities for solitude, and supported dispersal of use. Several suggestions were made on how to divide use-area boundaries, recommending adjustments based on terrain and geologic formations. Rather than adjusting use-area boundaries, some suggested evaluating the management zoning and camping classifications (designated versus at-large).

The vast majority of respondents did not support increased group-size limits. Many supported a smaller group size (a limit of six was most often mentioned). Several individuals expressed dissatisfaction with encounters made with larger groups; and some inferred that a smaller group size is more closely related to a wilderness experience.

6.2 Use-Area Allocation

The wilderness of Grand Canyon National Park is divided into 88 overnight use areas. Each use area describes a specific land area, and has an established camping capacity. To the extent possible, use-area boundaries have been defined according to identifiable topographic features such as ridge tops and drainages, and vary in size from several hundred to several thousand acres. Each use area has an overnight camping capacity based on the area's size, the number of suitable and available camping sites, management zoning or Opportunity Class, and its use history.

The strategy for allocating by use areas was adopted in the 1983 Backcountry Management Plan. Prior to this, permits were issued for the wilderness areas by trailhead entry. Each major trailhead had a daily quota which allowed a defined number of groups. In some cases, one trailhead provided access to several use areas but visitors typically congregated in a specific area such as Hermit Camp. As a result, irreversible impacts to natural features and cultural sites occurred, and the high number of people at camps did not provide the desired wilderness experience. The use-area

strategy serves as a management tool for dispersing use for resource protection and preservation of wilderness values such as opportunities for solitude.

As described in Chapter Three, the Opportunity Classes define management objectives for resource, social, and managerial settings of each management zone. Each use area by definition falls into an Opportunity Class, and overall management of the use area is based on specific management objectives and standards.

The wilderness-use allocation system is based on the number and size of overnight groups. In use areas with designated camping, the number of groups allowed is determined by the number of campsites that are, in turn, based on the levels of impacts a particular area can tolerate. Management objectives for providing a range of opportunities and experiences including solitude, warrant lower use allocations. In addition, the Park's vast, remote use areas defined by geologic complexity, lend themselves well to use dispersal, and, as defined in the Wilderness Act, "outstanding opportunities for solitude or a primitive and unconfined type of recreation."

A complete listing of use areas with an explanation of the system for assigning codes is included as Appendix K, Use Area Classification and Limits.

6.3 Campsite Classification

Three types of camping exist within the backcountry and wilderness areas of Grand Canyon National Park. Camping within the nonwilderness Cross-Canyon Corridor is restricted to developed campgrounds at three locations: Cottonwood, Bright Angel, and Indian Garden. Primitive designated campsites are located in the wilderness areas which receive high use levels and are typically concentrated near water sources. Unrestricted, at-large camping is available in over 90% of the wilderness use areas. Table 6.1 shows the proportion of campsite types by Opportunity Class.

The long fight to save wild beauty represents democracy at its best. It requires citizens to practice the hardest of all virtures--self-restraint.

Edwin Way Teale

Designated-Site Camping

Camping at designated locations is required when necessary to limit further resource degradation and to restrict intensive use of previously disturbed areas. There are use areas in the Threshold Opportunity Class with campsites that have been designated because of archeological, resource protection, aesthetic, and sociological considerations. Where designated campsites exist, backcountry users may not select other campsites. In some use areas within the Primitive Opportunity Class, camping areas have been defined to direct hikers to more resistant areas, and to prevent impacts to fragile and sensitive areas.

Figure 6.1 Proportion of Wilderness Campsite Types by Opportunity Class

	Threshold	Primitive	Wild
Total Use Areas	26	40	22
Designated Sites	62%	2%	0%
At-Large Camping	38%	98%	100%

At-large Camping

Camping in the backcountry at sites other than designated campsites is considered "at-large" camping. In use areas without designated campsites within the Threshold Opportunity Class, as well as those within the Primitive and Wild Opportunity Classes, individuals or groups can camp anywhere in the use area in accordance with minimum-impact camping techniques (See Chapter 10, Interpretation, Education, and Information).

River Beach Camping

Camping on Colorado River beaches is permitted for backcountry hikers, or for those on commercial or private Colorado River trips. Commercial and private river users are required to comply with the specific conditions of their river trip permits. Backcountry users should recognize that differences exist between backcountry and river-use regulations. River-use regulations, for example allow group sizes up to 36 on commercial trips, and require the carry-out of human waste in approved portable toilets. River users are also required to camp on the resistant post-dam sandbar areas, and not in the fragile desert zones (Colorado River Management Plan 1989). Backpackers may experience frequent contacts with river trips when camping on Colorado River beaches.

6.4 Group Size and Use Limits

In 1993, the group-size limit was reduced from 16 to 11. The determination was based on the recommendations of ecological and sociological wilderness research (Cole 1985; Underhill, et al. 1986; and Hendee, et al. 1990) and National Park Service monitoring programs (Jalbert 1992 and 1993).

The unit of measure for allocating use in use areas is by groups. These are categorized as "small group" consisting of 1-6 persons, and "large group" consisting of 7-11) persons. The upper limit on total number of groups (small and large combined) per night is five in the Horseshoe Mesa Use Area. Other use areas within the Threshold Opportunity Class allocate a maximum of four groups per night. Tanner Use Area is the only inner canyon use area within the Primitive Opportunity Class that allows up to

four groups each night. The maximum is three in all other Primitive Use Areas. All but two use areas in the Wild Opportunity Class have a use limit of two small *or* one large group per night. Fossil and Vishnu Use Areas are limited to one small group *or* one large group. These limits for the Fossil and Vishnu Use Areas assure the opportunity for an experience without contact with another party or group. In the Cross-Canyon Corridor campgrounds, use limits are based on the total number of campers as well as on the number of groups.

All use areas which have at-large camping have an overnight stay limit of seven nights/use area/trip. The superintendent may approve an extended stay due to a research or resource-monitoring project. The overall trip length, both in number of days and miles, is not limited. In use areas having designated campsites or campgrounds, overnight stays in any one designated campsite or campground are limited to two nights per trip.

6.5 Special Management of Use Areas

A variety of factors necessitates diligent management efforts to maintain the ecologic integrity and cultural significance of heavily visited fragile wilderness areas. Intensive recreational use of popular areas has resulted in deterioration of natural and cultural resources. Additionally, the effects of concentrated use has implications on the quality of experience a visitor may have. For each Opportunity Class, management objectives for campsite condition and distribution have been described (See Chapter 12, Monitoring and Research). When standards are not being met, specific treatments are needed to address resource problems. These treatments may involve a range of actions including rehabilitation, campsite designation, use dispersal to other areas, use reduction, and sensitive area closure. Following is a list of Use Areas which require special management.

Hermit and Monument Use Areas

The high demand for the Hermit and Monument Use Areas is primarily due to their accessibility and the presence of water. The designated sites for camping in the Hermit and Monument Use Areas are Hermit Creek, Hermit Rapid, Monument Creek, Granite Rapid, Cedar Spring, Salt Creek, and Horn Creek.

At both Hermit Creek and Monument Creek, campsites are located in a cluster of four campsites in close proximity. Toilets are provided at the cluster areas as well as designated sites along the Tonto Trail east of Monument Creek. An administrative site is located near the campsite cluster at Hermit Creek.

Specific problems at both use areas are associated with the presence of archeological sites, impacts to water sources, presence of rodents, and, in the social context, the proximity of campsites to one another.

Maintenance of the backcountry toilets is conducted by mule and by resource river patrol trips (See Appendix D, Minimum Requirement Decision Process). Rehabilitation and restoration work has also been done at each site. These treatments have not been completely successful. A range of alternatives including reduction in use, data recovery at archeological sites, and campsite relocation are being considered in action plans for the Monument Creek and Hermit Creek Use Areas. These management actions are identified in Chapter 16, Implementation Plan and Schedule.

Horseshoe Mesa Use Area

The Horseshoe Mesa Use Area has relatively easy access and high levels of overnight and day use. Designated campsites are located in two clusters for small and large groups. Toilets are within each cluster.

The actual and potential impacts to fragile cultural resources necessitates the reevaluation of campsite management in this area. The historic remains on Horseshoe Mesa are officially listed on the National Register of Historic Places as the Last Chance Mine Historic District. As a National Register site, the NPS is mandated to manage the area to protect the District's long-term integrity and historic values. Limiting factors in this area are adequate human waste disposal and the protection of cultural resources. Camping is restricted to designated sites, some of which are currently located near cultural resources. Alternatives to mitigate the impacts to cultural resources will be developed through a separate action plan (See Chapter 16, Implementation Schedule). The range of alternatives will include reduction in overnight use, increased visitor education through staff contacts, printed material and signing, and closure of campsites within the Last Chance Mine Historic District. See Chapter 16, Implementation Plan and Schedule.

Tanner Use Area

The Tanner Use Area has high use levels on the delta area near the Colorado River. Impacts to concentrations of archeological sites and vegetation in the dunes have resulted in the closure of the sand dune area immediately downstream of Tanner Creek. Campsites and trails have been defined in the sand and cobble areas adjacent to the Colorado River. A composting toilet has been placed experimentally to address human waste and trailing problems. This Plan expands the Tanner Use Area boundaries at the River to allow for greater dispersal of use into resistant areas adjacent to the Colorado River.

Deer Creek Use Area

One of the most popular destinations is the Deer Creek Use Area. During the summer months, as many as 200 river users visit Deer Creek Falls and the Narrows in a single day (Jalbert 1990 and 1991). The preferred campsites in the Deer Creek valley are within sight of the trail, and archeological sites are located near the high-use area. Human-

caused wildfires (two in the past seven years) have destroyed vegetation and damaged archeological features in this area.

This Plan separates the Deer Creek Use Area from the expansive, rim to river, Indian Hollow Use Area. The new Deer Creek Use Area is managed by the standards described in the Threshold Opportunity Class. A composting toilet has been placed, and the overnight camper limit set at one small and one large group per night in two designated campsites.

Tapeats Use Area

Although the Tapeats Use Area is remote and access from the rim is difficult, this area is visited frequently by river trips, especially during the summer season. Camping is restricted to two designated areas, Upper Tapeats and Lower Tapeats. Three designated campsites and a toilet are provided at the Upper Tapeats site. The Lower Tapeats Use Area is at the confluence of Tapeats Creek and the Colorado River, and is also a popular camp for river trips.

Clear Creek Use Area

The Clear Creek Use Area includes the Clear Creek drainage as well as the area on the Tonto Plateau to Sumner Wash (two miles east of the North Kaibab Trail). In the Clear Creek drainage, camping is restricted to areas above the first major side canyon north of the River that enters from the east. Camping on the Colorado River beach just to the east of the confluence of Clear Creek and the Colorado River is also allowed.

Phantom Creek Use Area

The Phantom Creek Use Area includes Utah Flats and the Phantom Creek drainage two miles above its confluence with Bright Angel Creek. The Phantom Creek drainage is only open to camping above the major waterfall near the 3600 foot contour line on United States Geological Survey (USGS) maps.

Cape Final Use Area

This Plan separates the Cape Final Use Area on the North Rim from the Walhalla Use Area. This use area also offers an increasingly popular day hike with views of the Canyon from the rim. Overnight camping is limited to two nights for small groups only at the designated campsite. At-large camping is available in the adjacent Walhalla Use Area.

Other Considerations

For the Walhalla Plateau, Thompson Canyon, and Robbers Roost Use Areas, access is from the North Rim Entrance and Point Imperial/Cape Royal Roads. Camping is at-large, and campsites must not be visible from paved access roads.

G.G Nonwilderness Use Areas with Semi-Primitive Mechanized Access

These areas are characterized by a predominately natural setting where use is relatively low, but evident. Use dispersal is achieved by designated-site camping. Motorized use is permitted. (Manning 1986; U.S. Department of Agriculture, Forest Service 1982) Within the wilderness, a 300-foot wide nonwilderness road corridor will be retained in a primitive state to provide mechanized access. The following use areas are accessible by primitive roads within the Semi-Primitive Mechanized Opportunity Class.

Point Sublime Use Area

The Point Sublime Use Area on the North Rim is a popular day use and overnight destination. This area is reached by the Point Sublime Road, and is excluded from wilderness for the purpose of providing an overlook site. Two designated sites for one small and one large group are located away from the popular rim viewpoint. Overnight camping is limited to two nights.

Swamp Ridge Complex

Within the Swamp Ridge Cluster, two designated campsites and at-large camping are accessible by primitive roads. Overnight use is limited to two nights at the designated campsites.

Fire Point is a popular rim viewpoint and camping area within wilderness, and is reached by travelling Forest Service roads to the Park boundary. Users of the Fire Point designated site must park near the boundary fence and hike approximately one mile into the campsite. One designated campsite accommodates one large or one small group per night.

Swamp Point is popular rim viewpoint, campsite, and trailhead to the North Bass Trail and Powell Plateau. Two designated campsites are located here: one at the trailhead, and the other adjacent to the road within the nonwilderness corridor. The campsite at the trailhead is intended for use by those doing an inner canyon trip. The limit is two large or two small groups per night.

Swamp Ridge Use Area is open to at-large camping, and is accessible by primitive roads.

Pasture Wash Complex

The Pasture Wash Use Areas are accessible by high-clearance vehicles during most of the year; heavy rains and snow may make the roads impassable requiring temporary closures for re-

source protection. Use areas within the cluster are managed as designated and at-large camping. Overnight use is limited to two nights at designated campsites.

Signal Hill and Ruby Point each location has one designated campsite located on the Boundary Road toward Havasupai Point. Camping is limited to one small group at each site with a maximum of two vehicles per group. Havasupai Point is designated for day-use only, camping is not allowed.

South Bass Trailhead has two designated campsites. Groups planning hikes into the South Bass Use Area must also have a permit for the trailhead designated campsites if they plan to camp on the rim prior to their hike. Two designated campsites accommodate one large or two small groups.

Pasture Wash At-large campsites to the southwest of the Pasture Wash Ranger Station must not be visible from access roads. Designated campsites are located at the South Bass Trailhead and along the Havasupai Point Road. Camping is not allowed near the historic Pasture Wash Ranger Station or at the Havasupai point overlook area.

Eremita Mesa Use Area

Access to the new Eremita Mesa Use Area is by the Boundary Road. Road conditions may limit access as described for the Pasture Wash Use Area. At-large camping is limited to one large and one small group per night.

6.7 Resource Protection and Stewardship

The primary dimensions of recreation management in wilderness (to provide visitors the opportunity for quality wilderness experiences and to limit the resource site impacts caused by visitor use), are not separate or distinct concepts (Hendee, et al. 1990). The interrelationship between these two aspects of managing visitor use in wilderness presents a challenge for managers. Many resource impacts (such as litter and vandalism) affect visitor experience, and reducing impacts improves experience. However, some management actions taken to control impacts may restrict visitors in ways that adversely affect their experience (e.g., signs, closures, and designated campsites).

Management of resource impacts to campsites, trails, and associated activities requires an understanding of visitor behaviors as well as the affects of treating these problems. This involves an interdisciplinary strategy to achieve management objectives. To that end, Park staff play various roles in campsite management.

Figure 6.2 describes the general staff responsibilities associated with wilderness campsite management.

6.8 Summary of Use Area Changes

Changes in use patterns, resource conditions, and increased demand have required a reevaluation of use-area classification and allocations. As previously stated, the primary purpose of allocating use is to maintain the standards described for natural, cultural, and experiential wilderness values. The use area changes allow for a slight increase overall in wilderness use levels. In many of the popular areas visitor use is concentrated, and by separating these sites from the larger use area, a broader range of opportunities is provided. Many of the changes also provide for a more appropriate level of management.

Other use area changes not included in the previous sections reflect use-area boundary changes. Use-area changes are summarized in Figure 6.3, and are included in Appendix K, Use Area Classification and Limits.

Upon approval of this Plan, the National Park Service will produce a map which will include these use-area boundary and classification changes, wilderness boundaries and primitive roads.

Figure 6.2 Responsibilities Associated with Campsite Management

	Inventory	Monitoring	Visitor Education	Resource Protection
Wilderness Ranger				
Natural Resource Specialist				
Recreation Researcher				
Archaeologist				
Interpretive Specialist				

Use Area Name and Code		Nature of Change
Badger	(AA9)	Extend boundary to include Nine-Mile Canyon
Soap Creek	(AB0)	New. Formerly within Rider Use Area. Primitive Use Area with at-large camping
Rider	(AB9)	Extend boundary to include 19 Mile Canyon
Walhalla Plateau	(NA0)	Redefine boundaries, decrease total area. Create NA8 and NC9 (See below)
Cape Final	(NA1)	New. Formerly within Walhalla. Manage as separate Threshold Use Area with designated campsites
Ken Patrick	(NC9)	New. Formerly within Walhalla. Manage as separate Primitive Use Area with at-large camping
Thompson Canyon	(NB9)	Change to Wild classification
Robbers Roost	(ND9)	Boundary change. Extend boundary to include a portion of the Basin north of access road, and toward Point Sublime
Outlet	(NG9)	Boundary change. Includes a portion of the Basin south of access road.
Point Sublime	(NH1)	Reduction of total area (See ND9). Manage as Threshold Use Area with mechanized access and designated campsites.
Swamp Point	(NJ2)	Separate from Swamp Ridge. Manage as Primitive Use Area with mechanized access and designated camp areas.
Fire Point	(NJ1)	Separate from Swamp Ridge. Manage as Primitive Use Area with mechanized access to Park boundary and designated campsite
Indian Hollow	(AN9)	Formerly called Deer Creek. Does not include high-use area in Deer Creek Valley
Deer Creek	(AX7)	Separate Deer Creek valley from expansive area. Threshold Use Area with designated campsites
Tanner	(BB9)	Extend boundaries at river to drainage at Basalt Rapids
Eremita Mesa	(SC9)	Separate from SE9. Manage as Primitive Use Area with mechanized access and at-large camping
Pasture Wash (SE1, SE2, SE3, SE0)		Reduction in total area (See SC9). Designate campsites at South Bass Trailhead and along Havasupai Point Road

Figure 6.3 Summary of Use Area Changes

Chapter 7

Trails Management

Grand Canyon National Park has over 400 miles of established trails, of which 375 miles lie outside the routinely maintained Cross-Canyon Corridor. Eighteen of these wilderness trails (approximately 260 miles) contain historic features (i.e., retaining walls, tread riprap, log cribbing, etc.), and ten have been determined eligible for the National Register of Historic Places. Most trails have received little or no stabilization or rehabilitation since Park establishment over 75 years ago. Consequently, these trails are in various states of disrepair as cultural features and natural components deteriorate.

Trail standards are necessary to meet the 1995 General Management Plan's management objectives to provide a variety of primitive recreational opportunities consistent with wilderness and NPS policies on accessibility. Standards are also necessary to meet the objectives of this Wilderness Management Plan (See Chapter 1, Introduction) by providing a trail system consistent with wilderness values, including protection of natural and cultural resources, and preservation of the character of individual trails.

The NPS will conduct administrative activities for trail maintenance in a manner consistent with *NPS Management Policies* regarding wilderness management and the use of Minimum Requirements (See Appendix D, Minimum Requirement Decision Process).

7.1 Criteria for Establishing Trail Standards and Specifications

Trails are widely recognized as consistent with wilderness. Controversy can center on the appropriateness of trail type. Research indicates that wilderness visitors favor low-standard trails (somewhat like a game trail—narrow, varying grade, winding, not the shortest route) more than high-standard trails (wide, steady grades, fairly straight) (Lucas 1980).

In 1988, Grand Canyon adopted specific trail standards based on these criteria:

- Natural Resource Protection
- Cultural Resource Protection and Stabilization
- Management Zone Classification
- Trail Character and Visitor Experience
- Recreational Use Levels
- Visitor Safety

Regarding visitor safety, *NPS Management Policies* (6:8), states

> *[p]ark visitors must accept wilderness largely on its own terms, without modern facilities provided for their comfort or convenience. Users must also accept certain risks, including possible dangers arising from wildlife, weather conditions, physical features, and other natural phenomena, that are inherent in the various elements and conditions that comprise a wilderness experience and primitive methods of travel.*

7.2 Trail Classification

Trail classification is specified by the *NPS Trails Management Handbook* (1983). Classification of each trail includes both trail type and maintenance level.

Types of Trails

Type A Major Trails
(nonwilderness: Cross-Canyon Corridor and Arizona Trail). Trails are marked routes improved and maintained for foot and horseback traffic. They may contain bridges, corduroy elements, drainages, and necessary shelters.

Type B Minor Trails
These trails are marked, improved, and maintained to accommodate foot or horseback traffic, but contain an overall lower construction standard than Type A.

Type C Wilderness Trails
These trails are marked, but are generally unimproved except for clearing and some work on eroding or dangerous areas.

Maintenance Levels

Level I
Maintained for high use. Traffic is heavy. Maintained at the highest level.

Level II
Traffic is medium to heavy. Tread is maintained at a high standard for user convenience and comfort. Requires high maintenance.

Level III
Maintained for intermediate use. Traffic is medium. Tread is maintained for user convenience.

Level IV
These trails are maintained for semi-primitive use. Traffic is low to medium. The tread is often not smooth, having a dirt and rock surface. Maintained for either foot or horse use. Less maintenance is required than on the previous levels.

Level V
Maintained for primitive use. Traffic is low. These foot trails require custodial care. Minimal maintenance is required.

7.3 Grand Canyon Trail Standards

Each of the Park's 63 established trails is classified by type and level of maintenance. The standards, based on trail classification, are described in three categories as follows. Figure 7.1 details the complete list of trails, classification, and trail mileage.

Corridor Trails (Nonwilderness)

Type A, Level I
The North Kaibab, South Kaibab, Bright Angel, Plateau Point, River, and the Tonto between Bright Angel and South Kaibab, are designated *Corridor Trails.* The Arizona Trail also falls under this category.

Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed.

Wallace Stegner
Wilderness
Letter
1960

Threshold Trails

Generally Type B, Level IV
These trails are constructed with significant historic features within or leading to use areas within the Threshold Opportunity Class.

Trail maintenance will be performed on previously constructed sections to protect the integrity of historical features including outside retaining walls, rock riprap, log cribbing, and drainage structures.

Trail width should be a maximum of 18 inches, except where historically constructed to wider dimensions, or where environmental conditions require wider tread (e.g., switchback junctions). Average trail width of 12 to 15 inches on relatively level sections should be preserved.

Slough removal to a minimum safe trail width (8 to 12 inches, depending on slide slope angle) will be conducted. A 10% out-slope of trail tread (one-inch drop for every ten inches of tread width) will be attempted where possible to facilitate drainage. Outside berm should generally be removed, unless environmental considerations support retention of the feature.

Loose rock removal may be conducted. Obstructive tree limbs or brush may be cut or removed to prevent detours and multiple trailing. Drainage structures (waterbars, drainage dips, check dams, sand ladders) may be used as necessary to correct trail erosion. The discriminate placement of essential cairns is permitted.

Threshold trails include the Hermit, Clear Creek, Thunder River, Whitmore, and Grandview Trails.

Primitive Trails

Type C (wilderness), Level V
Constructed historic features are absent or much less evident than those present on Threshold Trails.

Trail maintenance will consist of resource rehabilitation efforts at impacted sections, including stabilization of historic features. Trail width should be an average maximum of 18 inches, unless environmental considerations require a wider tread. Low-key maintenance techniques such as out-sloping and drainage dips may be used where necessary.

Multiple trail eradication and route delineation and/or minor relocation may be necessary to mitigate resource damage. In areas of severe or potentially severe resource damage, rock or log checks, waterbars or cribbing may be used. Outside rock retaining lining, buried and generally no more than two layers high, may be used to control sloughing on traverses. The discriminate placement of essential cairns is permitted.

Primitive trails include: Havasu, South Bass, Tonto, Boucher, Hance, Tanner, Beamer, South Canyon, Nankoweap, North Bass, Deer Creek, Kanab Creek, Tuckup, Lava Falls, and river-attraction-site trails.

Routes or Wild Trails

Routes or wild trails are defined as a nondelineated access with no evident historical trail construction and minimal user-defined path development. Rehabilitation on such routes will be to mitigate unacceptable resource damage only. Once an impacted section is identified, and appropriate clearances are conducted, rehabilitation efforts not to exceed Primitive Trail (Type C, Level V) standards may be undertaken for the specified site.

Borrow Pits

The need to use borrow pits for trail maintenance will be minimized; trail maintenance materials will be brought from outside the Park whenever possible (U.S. Department of the Interior, National Park Service 1991a, *Special Directive 91*; and *NPS Management Policies* 1988). This direction is also provided in the GMP (1995:10,17,55).

7.4 Monitoring

The focus of trail management is on specific problem segments. The probability that any trail segment will deteriorate is a function of the trail's immediate environment, its design and maintenance, and the amount, type and timing of use it receives. The factors that most influence trail conditions are trail location and design. This suggests that the principal solutions to trail problems involve increasing the ability of the trail to withstand use (through improved engineering) or changing the location of the trail to one that is more capable of withstanding use. Problem segments are identified, and those segments are either redesigned or relocated. Experience demonstrates that a descriptive log of trail problems and prescriptive actions will usually be more useful than a system of trail-monitoring samples (Cole 1991). Grand Canyon currently maintains a log of trail problems.

7.5 The Arizona Trail

The Arizona Trail will be completed as an unpaved trail from Grand Canyon Village to Kaibab National Forest lands on the South Rim, and, on North Rim, to connect the Kaibab National Forest section to the North Kaibab Trail. It will be used for hiking, biking, and horseback riding (GMP 1995:28, 45, 55). The Cross-Canyon Corridor trail system will be designated as part of the Arizona Trail, but restrictions on bicycle, livestock, and overnight hiking use will continue, consistent with this Wilderness Management Plan.

7.6 Restoration and Implementation Priorities

As mentioned above, over 400 miles of wilderness trails wind through the canyons and rimlands of Grand Canyon National Park. During the past decade, Park staff conducted trail-condition surveys on approximately 150 miles of this system. Based upon these surveys, the NPS identified the following trails or trail complexes as high priority maintenance efforts:

Hermit Trail Complex

(Hermit, Hermit Creek, Waldron, and Dripping Spring Trails; 16 miles). The Park conducted intensive restoration efforts on sections of the Hermit Trail during the 1997 season. This popular trail complex contains abundant historical features consisting of unique stone riprap and stone-retaining walls. Landslides, rockfall, and intense runoff adversely impacted significant sections of the complex. The 1997 maintenance effort mitigated many of the most seriously damaged sections of the main Hermit Trail. Additional restoration work is required on sections of the Dripping Spring and Waldron Trails. Minimal routine maintenance is necessary to protect the natural and cultural values of the trail and its immediate environment.

Grandview Trail Complex

(Grandview, Horseshoe Mesa, Page Springs, and Cottonwood Trails; 7 miles). The Park conducted intensive restoration efforts on sections of the Grandview Trail during the 1997 season. This popular trail contains abundant historical features consisting of unique stone riprap and stone-retaining walls similar to the Hermit. The 1997 maintenance effort mitigated many of the most seriously damaged sections of the main Grandview Trail, although substantial restoration work is required on sections of the Page Springs and Cottonwood Creek Trails.

Thunder River/Deer Creek Complex

(Thunder River, Deer Creek, and Tapeats Trails; 20 miles). This popular and extensive trail system consists of the Bill Hall (Monument Point), Thunder River (Indian Hollow), and Deer Creek access trails. Portions of the Thunder River Trail, probably the oldest Anglo-constructed trail in the Canyon, contain historic features possibly dating back to the 1870s (Dutton 1882). Park staff have routinely performed maintenance and reconstruction of trail sections since 1980. Restoration of the Redwall section and some historic retaining walls near Indian Hollow is still needed, as is periodic minimal maintenance of the entire trail complex.

Colorado River Trails

The Colorado River provides ready access to approximately 70 miles of wilderness trails. The NPS routinely conducts winter river trips addressing restoration and routine maintenance of these important access routes.

Rim Access Trails

(Tanner, New Hance, South Bass, South Canyon and Nankoweap Trails; 47 miles). These historic, primitive trails provide important access to the inner canyon. The upper (Kaibab to the base of the Redwall) reaches of each trail contain severely eroded sections, resulting in significant damage to soil and vegetation, as well as loss of historic features.

The Old Bright Angel Trail

This trail will be slightly upgraded from route/wild trail standards to primitive trail standards (GMP 1995:57).

Restoration and maintenance efforts directed at the wilderness trail system traditionally relied on special funding and volunteer programs. Currently, the NPS is actively pursuing long-term funding for a professional workforce to continue this important program. An implementation schedule, based on the priorities identified above, will be developed and implemented as funding becomes available (See Chapter 16, Implementation Schedule). Continued survey and monitoring efforts may identify additional priority sections.

7.7 Other Considerations

The Hermit and Grandview Trails will be suggested as alternatives to the Cross-Canyon Corridor trails for visitors with experience hiking in the Grand Canyon. However, neither trail use nor maintenance will be increased to levels that will alter their status as threshold trails. The Hermit and Grandview Trails will also be the subject of a separate monitoring program and carrying-capacity study to ensure that resources and visitor experiences do not significantly change on those trails as a result of dispersing some corridor trail use to them. Measures may be taken if carrying capacities are exceeded (GMP 1995:55).

7.8 Summary of Changes and Actions

See Figure 7.2 for a list of actions mentioned in this chapter.

Figure 7.1 Grand Canyon National Park Trails

Trail	Classification	Mileage
Arizona Trail	**Corridor**	**11.0**
Basin	Primitive	9.2
Beamer	**Primitive**	**8.0**
Bill Hall (Monument Point)	Threshold	2.6
Boucher	**Primitive**	**11.0**
Brady Hollow	Primitive	9.0
Bright Angel*	**Corridor**	**7.8**
Cape Final	Primitive	2.0
Cape Solitude	**Primitive**	**9.6**
Carbon-Chuar Creek	Primitive	3.2
Clear Creek	**Threshold**	**9.0**
Cliff Springs	Threshold	0.42
Colorado River Trail*	**Corridor**	**1.8**
Cove	Threshold	10.0
Cottonwood Creek	**Threshold**	**1.26**
Deer Creek/Deer Springs	Threshold	1.33
Dripping Spring	**Threshold**	**4.6**
Fire Point	Threshold	1.0
Fort Garrett	**Primitive**	**1.0**
Francois Matthes Point	Primitive	4.7
Grandview*	**Threshold**	**3.2**
Great Thumb Point	Primitive	2.0
Havasu Creek	**Primitive**	**3.3**
Hermit Trail*	Threshold	8.0
Hermit Creek	**Primitive**	**1.1**
Horseshoe Mesa	Primitive	1.5
Kanab Plateau	**Primitive**	**10.0**
Ken Patrick	Primitive	8.6
Komo Point	**Primitive**	**5.0**
Lava Trail	Primitive	1.5
Little Colorado River	**Primitive**	**1.6**
Long Jim	Threshold	3.9
Monument Canyon	**Threshold**	**1.5**
Nankoweap	Primitive	14.0
New Hance*	**Primitive**	**7.5**
North Bass*	Primitive	14.0
North Kaibab*	**Corridor**	**14.0**
Old Bright Angel (N. Kaibab)	Primitive	7.0
Page Springs	**Threshold**	**0.86**
Powell Plateau	Threshold	1.2
Plateau Point	**Corridor**	**1.5**
Ribbon Falls	Threshold	0.5
Saddle Canyon	**Primitive**	**0.7**
South Bass*	Threshold	9.0
South Canyon	**Primitive**	**6.2**
South Kaibab*	Corridor	7.3
Stone Creek	**Primitive**	**2.06**
Surprise Valley	Primitive	1.6

Trail	Classification	Mileage
Tanner	**Primitive**	**8.1**
Tapeats Creek	Threshold	3.2
Tapeats/Deer River Trail	**Primitive**	**1.9**
Tiyo Point	Primitive	6.2
Tonto	**Primitive**	**72.0**
Thunder River*	Threshold	10.5
Tuckup	**Primitive**	**64.0**
Uncle Jim	Threshold	3.4
Upper Ribbon Falls	**Primitive**	**1.0**
Waldron	Threshold	2.0
Walhalla Glades	**Primitive**	**7.5**
Walhalla Spur	Primitive	2.7
Whitmore	**Threshold**	**1.2**
Widforss Point	Primitive	4.7
Widforss	**Primitive**	**4.0**
63 Trails		**Total Miles: 439.53**

*Eligible properties for the National Register of Historic Places

Figure 7.2 Summary of Actions

Trail/Complex	Miles	Management Action/ Treatment
Hermit Trail Complex	16	*Hermit Trail*: restoration in 1997. *Dripping Spring and Waldron Trails:* restoration work needed. Schedule routine/cyclic maintenance of each trail following restoration work.
Grandview Trail Complex	7	*Grandview Trail:* restoration in 1997 *Page Spring/Cottonwood Creek Trails:* restoration work needed. Schedule routine/cyclic maintenance of each trail following restoration work.
Thunder River/ Deer Creek Complex	20	*Thunder River/Deer Creek Trails:* routine maintenance conducted during winter river restoration trips. *Bill Hall and Surprise Valley Trails:* Routine/cyclic maintenance conducted during winter river restoration trips.
Colorado River Trails	~70	Routine/cyclic maintenance conducted during winter river restoration trips.
Rim Access Trails	~47	*Tanner, New Hance, South Bass, South Canyon, Nankoweap*: Restoration of upper reaches; periodic maintenance.
Old Bright Angel Trail	4.1	Upgrade to primitive trail standards.

CHAPTER 8

Semi-Primitive Access and Facilities

In accordance with the Final Wilderness Recommendation, the NPS will retain ten primitive roads to overlooks and trailheads in the Park. At least 15 other primitive roads on adjacent public lands provide access to Grand Canyon scenic overlooks (See Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands). With the exception of the ten Grand Canyon primitive roads described below, all other roads in the proposed wilderness will be closed and returned to a natural state or converted to trails (See Appendix L, Natural Conditions). This position is consistent with *NPS Management Policies* (6.5) which states that permanent roads will not be built or retained in wilderness. Where abandoned roads have been included within wilderness, they will be used as trails or restored to natural conditions. The Wilderness Recommendation identifies approximately 70 miles of primitive roads on the Kanab Plateau, approximately 40 miles on the Kaibab Plateau, and an estimated 20 miles elsewhere in the Park for either conversion to trails or restoration.

8.1 Issues and Public Concerns

As mentioned above, the Final Wilderness Recommendation identifies approximately 130 miles of primitive roads that will be restored to a natural condition or converted to trails. Roads result in significant resource impacts. The additional vehicular access provided by primitive roads facilitates illegal excavating and collecting of archaeological resources. For example, improvement in mine-related roads in the 1980s outside the Park resulted in an increase of visitors to the Kanab Plateau, and a corresponding increase in vandalism to cultural resources (Huffman 1993).

In addition to impacts on archaeological resources, adequate maintenance of primitive roads in remote locations imposes significant costs. Poorly located or unmaintained roads often result in serious erosional problems (Moll 1996; Ketcheson and Megahan 1996). Severe gully formation negatively impacts soils, vegetation, and Park archaeological resources. The most practical and economical long-term mitigation of these problems lies with closure and revegetation (Moll 1996; Fleischner 1992). Primitive roads, maintained or not, create adverse impacts on natural resources. For example:

- Vehicular traffic directly destroys biological resources by crushing vegetation and microbiotic crusts, and retards revegetation through soil compaction.

- Disturbed surfaces provide ideal habitat and avenues for exotic plants to spread (Amor and Stevens 1976). *NPS Management Policies* (4:12) require management of exotic species whenever prudent or feasible. The restoration of disturbed areas is an important management tool for protecting native biodiversity.

• Other undesirable consequences of road access include illegal collecting of rare plants and animals (Noss 1995).

• Even though roads occupy a small fraction of the landscape in terms of total area, their influence extends far beyond their immediate boundaries. Roads precipitate habitat fragmentation by dissecting otherwise large patches into smaller ones, and thus creating edge habitat along both sides of the road, potentially at the expense of interior habitat (Reed, Barnard, and Baker 1996).

• Roads result in frequent and often negative encounters between wildlife and humans (Buckley and Pannell 1990; Stankey 1980). Wildlife biologists have recognized problems with open roads that expose large mammals such as deer, cougar and bighorn sheep to heavy hunting pressure, poaching, and harassment. Open-road density has been found to be a good predictor of habitat suitability for large mammals, with habitat effectiveness and population viability declining as road density increases (Noss and Cooperrider 1994). Studies have indicated that in order to protect species sensitive to legal or illegal hunting and persecution, habitat must have low road density (Thiel 1985; Mech, Fritts, Raddle, and Paul 1988).

During the Public Scoping Process for this Plan, people were asked to comment about Grand Canyon backcountry and wilderness toilets. The majority of respondents stated that toilets are needed in popular areas. Many felt that toilets were not intrusive, and were a solution to dealing with human waste, toilet paper, and wildfires caused by burning toilet paper. Several suggestions were made for location, type, and design of toilet structures in the backcountry. Of those who did not support placement of toilets, some felt they were intrusive and did not belong in a wilderness setting. Others suggested alternative ways for dealing with the problem of human-waste disposal such as a carry-out system and better education.

Very few comments on roads were received. General comments regarding road access included support for maintaining primitive access to Pasture Wash and Swamp Ridge, and closing the road to Cape Solitude.

8.2 Primitive Roads Management

Primitive roads will be managed according to standards set forth in the Semi-Primitive Mechanized Access in Nonwilderness Corridors section of this Plan (Chapter 3, Wilderness Management Planning Framework). This is a modified version of the Forest Service's Semi-Primitive Motorized Recreation Opportunity Spectrum classification (U.S. Department of Agriculture, Forest Service 1982), and constitutes a separate Opportunity Class. The Semi-Primitive Mecha-

The hour is late, the opportunities diminish with each passing year, and we must establish here a Common Market of conservation knowledge which will enable us to achieve our highest goals and broadest purposes. With each day that passes, the natural world shrinks as we exert greater artificial control over our environment.

Stewart L. Udall

Figure 8.1 Primitive Roads Open to Trailheads and Overlooks

Trailhead or Overlook	Access	
North Rim		
1 North Bass Trailhead	1 Swamp Point Road	7.5 miles
2 Point Sublime	2 Point Sublime Road	14.7 miles
Kanab Plateau		
1 Kanab Point	1 Kanab Point Road	4.4 miles
2 SB Point	2 SB Point Road	7.7 miles
3 150 Mile Canyon Trailhead	3 150 Mile Canyon Road	5.9 miles
4 Tuckup Canyon Trailhead	4 Tuckup Canyon Road	8.4 miles
Tuweep		
1 Toroweap Overlook	1 Tuweep Road	6.6 miles
2 Lava Trailhead	2 Vulcan's Throne Road	2.0 miles
South Rim		
1 Havasupai Point	1 Havasupai Point Road	2.7 miles
2 South Bass Trailhead	2 Pasture Wash Road	4.2 miles

nized Opportunity Class consists of nonwilderness corridors with the following characteristics:

- the area is predominantly natural in appearance
- interaction between users is low
- evidence of other users is present
- camping is permitted only in designated sites
- wilderness group-size limits apply
- mechanized (motorized and bicycle) access is permitted

Figure 8.1 summarizes primitive road access to trailheads and overlooks. The map, Figure 8.2, shows road locations.

Primitive Roads Standards

Nonwilderness corridors containing primitive roads are generally 300-feet wide (See 1993 Wilderness Update).

The NPS will maintain these primitive roads in an unpaved condition without major improvements. With the exception of the Tuweep Road, only improvements that reduce resource impacts in keeping the road minimally open for high-clearance or four-wheel-drive vehicles will be considered (GMP:11). The Tuweep Road will remain dirt, and have limited maintenance, with vehicle sizes restricted to a maximum of 22 feet in length (GMP:51).

8.3 Primitive Roads to Be Restored or Converted to Trails

North Rim

The 1980 Wilderness Recommendation originally called for the closure of most primitive roads in wilderness on the North Rim. "Nonwilderness corridors" providing access to Point Sublime and the North Bass Trailhead are

allowed (U.S. Department of the Interior, National Park Service 1980c). The one-mile road to Fire Point and the 2.7 mile Walhalla Spur will be closed to mechanized access, and converted to hiking trails. The six former "fire roads" (Komo Point, Francois Matthes Point, Walhalla Glades, Widforss, and Tiyo Point), and the section of W-1 from the landfill to its junction with the Point Sublime Road are closed to mechanized access, and designated as wilderness trails. Minimum requirements for emergency situation temporary vehicular access are defined in Appendix D, Minimum Requirement Decision Process and in Chapter 9, Safety and Emergency Operations. Requirements specific to fire management, including minimal trail standards and prescribed fire operations, will be addressed in the upcoming revision of the Fire Management Plan.

Kanab Plateau

The 1993 Final Wilderness Recommendation proposes most of the Kanab Plateau within Grand Canyon National Park for wilderness designation. The exceptions consist of five nonwilderness corridors for mechanized access to trailheads and overlooks.

In order to remain consistent with the 1980 Wilderness Recommendation, this Plan retains approximately 27 miles of existing roads necessary to provide access to Kanab Point, S.B. Point, 150 Mile Canyon Trailhead, and the Tuckup Trailhead. As specified in the GMP, the Wilderness Recommendation, and *NPS Management Policies,* the proposed action calls for the conversion of 70 miles of additional

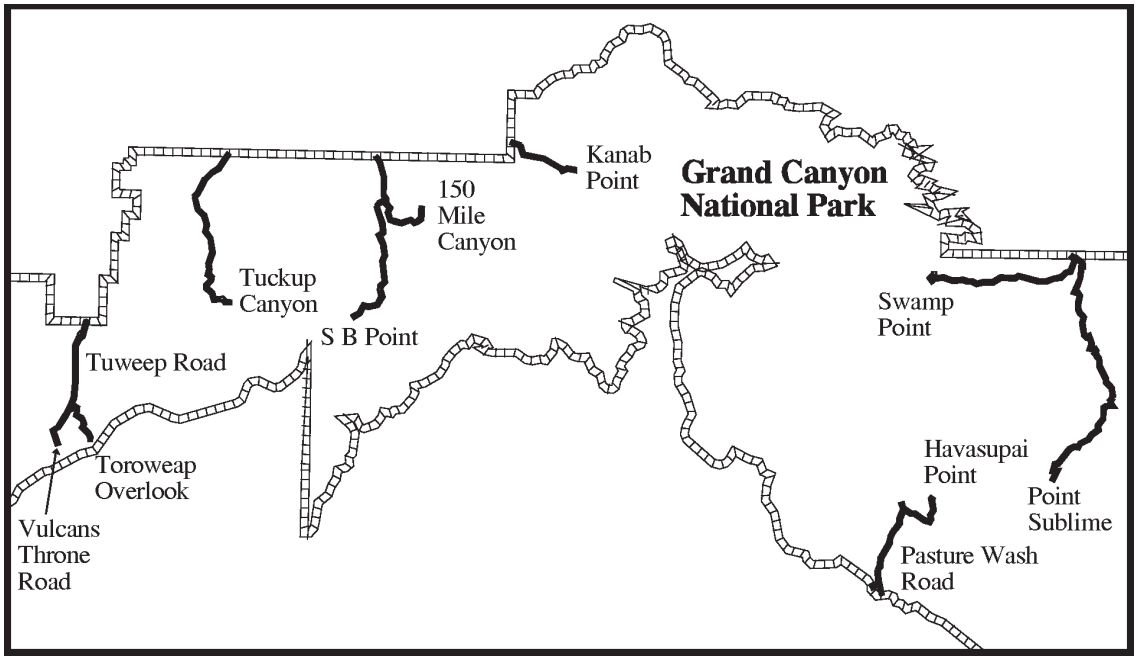


Figure 8.2 Primitive Roads Open to Trailheads and Overlooks

roads to trails or restoration to a natural condition. This Plan establishes a ten-mile section of this road network as the "Kanab Plateau Trail" connecting Kanab Point with the 150 Mile Canyon Road.

This Plan also establishes the closure to mechanized access of the so-called "Toroweap Point Overlook" Road on the mesa above the Tuweep Ranger Station. This primitive road should not be confused the popular Toroweap overlook road at Tuweep. Although the 1980 Wilderness Recommendation provides for retaining a nonwilderness corridor to Toroweap Point, the existing 7.85-mile road is severely damaged in numerous locations and fades completely in the pinyon-juniper forest well before reaching any vista. This Plan establishes a nine-mile section of this road network as the "Brady Hollow Trail."

Toroweap Valley

The ten-mile primitive road to "The Cove" will be converted to a trail.

A two-mile section of a west-trending spur of the Vulcan's Throne Road and a one-mile section of the Toroweap Landfill and Access Road will be restored to a natural condition.

Other Areas

Sanup Plateau The Fort Garrett road will be converted to a trail.

The Hook The two primitive roads north of New Water Springs in the Park will be restored to a natural condition.

Cape Solitude The Final Wilderness Recommendation calls for the closure of the Cape Solitude Road to mechanized access. The GMP provides for the establishment of a trail along the old road alignment from Desert View to Cape Solitude.

Pasture Wash Restore the "Huitzal Spur Road" to a natural condition.

8.4 Facilities

Wilderness is undeveloped Federal land retaining its primeval character and influence, without permanent improvements (Wilderness Act 1964). Accordingly, authorizations of NPS administrative facilities located in wilderness will be limited to the types and minimum number essential to meet the minimum requirements for the administration of the Wilderness area. A decision to construct, maintain, or remove an administrative facility will be based primarily on whether such a facility is required to preserve wilderness character or values or essential to ensure public safety—not on considerations of administrative convenience, economy of effect, or convenience to the public. Maintenance or removal of historic structures will additionally comply with cultural resource protection policies (*NPS Management Policies*, 6:5).

The Kanabownits cabin and fire tower are classified as administrative sites excluded from wilderness (1980 Wilderness Recommendation). The NPS will conduct a record search and his-

torical documentation to determine their eligibility for the National Register of Historic Places. Upon completion of this process, a determination regarding course of action will be made.

Cabins

Ranger stations, patrol cabins, associated storage or support structures, drift fences, and facilities supporting trailstock operations may be placed in wilderness only if they are necessary to carry out wilderness management objectives and provisions of this Plan.

Currently there is one administrative cabin in wilderness. The Muav Saddle cabin, constructed in 1927, remains on the List of Classified Structures. It is a contributing element to the National Register of Historic Places nomination for Bass Camp and Trails Historic District. The District was determined eligible for listing by the Arizona SHPO in August 1997.

The construction or reconstruction of shelters for public use generally will not be allowed, since wilderness users are self-supporting. An existing shelter will be maintained only if the facility is necessary to achieve wilderness management objectives or cultural resource protection objectives. Currently, there is only one shelter in the wilderness, the Santa Maria shelter on the Hermit Trail. The shelter and associated rock outhouses have been determined eligible for listing on the National Register of Historic Places and will be protected as significant cultural resources.

Fire Towers, Cable Crossings, Radio Repeaters, Etc.

Hydrologic, hydrometeorologic, seismographic, and other research and monitoring devices may be installed and operated in wilderness only upon a finding that (1) the desired information is essential and cannot be obtained from a location outside wilderness, and (2) the proposed device meets the Minimum Requirement to accomplish the objective safely and successfully (see Appendix D, Minimum Requirement Decision Process). Devices located in wilderness will be removed when determined to be no longer essential. All research activities and the installation, servicing, and monitoring of research devices will be accomplished in compliance with NPS wilderness management policies and procedures contained in this Plan.

Facilities such as fire lookouts, radio antennas, and radio repeaters will be placed in wilderness only if they are the minimum required to carry out essential administrative functions and are specifically authorized by the regional director (*NPS Management Policies*, 6:5).

The Signal Hill Fire Tower

lies within the proposed wilderness. The NPS will conduct a record search and historical documentation to determine its eligibility for National Register of Historic Places. Upon completion of this process, a determination regarding the appropriate action will be made.

The Mt. Emma Repeater, constructed in 1983, lies within the proposed wilderness of Grand Canyon National Park (Thomas, J.T. 1983). Originally envisioned as a temporary facility, the continued need for this facility will be evaluated under the requirements of *NPS Management Policies*. Upon completion of this process, a determination regarding the appropriate action will be made.

Colorado River Cable Crossings

Currently, two cable crossings are located within the proposed wilderness, one just above the Little Colorado River confluence and the other just above Diamond Creek. These facilities were constructed in 1982 to assist in the Glen Canyon Environmental Studies. The continued need for these facilities will be evaluated under the requirements of *NPS Management Policies*. Upon completion of this process, a determination regarding the appropriate action will be made.

Helispots

No permanent heliports, helipads, or airstrips are allowed in wilderness. Temporary landing facilities may be used to meet the minimum requirements of emergency situations. Site improvements determined to be essential for safety reasons during individual emergency situations may be authorized, but the site will be restored to a natural condition after the emergency has ended. Natural openings may be used for authorized nonemergency aircraft landings, but no site markings or improvements of any kind will be installed to support nonemergency use (*NPS Management Policies*, 6:6).

Campsites

Although the development of facilities to serve users will generally be avoided, campsites may be designated when essential for resource protection or enhancement of opportunities for solitude. In keeping with the terms of this Plan, campsite facilities may include a site marker, a tent site, a food-storage device, and a toilet, but only if determined by the superintendent to be the minimum facilities necessary for the health and safety of wilderness users or for the protection of wilderness resources and values. Picnic tables will not be placed in wilderness (*NPS Management Policies*, 6:6).

Toilets

Toilets will be placed only in locations where their presence and use will resolve health and sanitation problems

or prevent serious damage and where reducing or dispersing visitor use has failed to alleviate the problems or is impractical. (*NPS Management Policies*, 6:6).

Signs

Signs detract from the wilderness character of an area and make the imprint of management more noticeable. Only those signs necessary to protect wilderness resources or for public safety will be permitted. Where signs are used, they will be compatible with their surroundings and be the minimum size possible (*NPS Management Policies*, 6:6).

Bat Cave Tram Towers

The 1980 Wilderness Recommendation called for the removal of the mining tram towers near River Mile 266. To restore wilderness values, the park service proposed in 1995 to remove the three towers and the surrounding debris located within Grand Canyon National Park (U.S. Department of Interior, National Park Service, 1995b. FONSI Transmittal Memo.). Due to public controversy, the Park chose not to implement the proposed action at that time (U.S. Department of Interior, National Park Service 1995b).

This issue will be reviewed by the Superintendent, and appropriate actions will be pursued.

8.5 Summary of Changes and Actions

- Retain ten primitive roads (nonwilderness corridors) to trailheads or overlooks (Figure 8.1). Manage these areas as part of the Semi-Primitive Mechanized Opportunity Class spectrum

- Maintain primitive roads to minimal standards, allowing only improvements that reduce resource impacts while keeping the roads minimally open for high-clearance or four-wheel-drive vehicles

- Convert to trails or restore to a natural condition approximately 140 miles of primitive roads described in Figure 8.3.

Figure 8.3 Summary of Actions

Primitive Road	Miles	Management Action/ Treatment
North Rim "Fire Roads"	27.4	Designate as wilderness trails. Requirements specific to fire management will be addressed in the Fire Management Plan
Basin W-1 Road	9.2 1.4	Designate as wilderness trails. Requirements specific to fire management will be addressed in the Fire Management Plan. Relocate 1.4 miles of trail cross the Basin. Restore the Basin section of old W-1 to a natural condition.
Kanab Plateau Roads (except those described in Figure 8.1)	40 10	Restore to a natural condition. Establish sections of road net work as Kanab Plateau Trail
Toroweap Point Overlook Road	9	Establish severely damaged section of road network as Brady Hollow Trail
Toroweap Valley Cove Road Vulcan's Spur Tuweep Landfill and Access Road	 10 2 1	 Designate as Cove Trail Restore to a natural condition Restore to a natural condition
Cape Solitude	9.6	Establish trail on old road alignment from Desert View
Fort Garrett	1	Convert to trail
Two Primitive Roads North of New Water Springs on The Hook	3.8	Restore to a natural condition
Huitzal Spur	2	Restore to a natural conditon

CHAPTER 9

Safety and Emergency Operations

As stated in Chapter One, an objective of the Wilderness Management Plan is to provide a reasonable level of public safety, consistent with wilderness areas and in accordance with *NPS Management Policies*. The saving of human life will take precedence over all other management actions. The National Park Service and its concessioners, contractors, and cooperators will seek to provide a safe and healthful environment for visitors and employees. The Park Service will work cooperatively with other Federal, State, and local agencies, organizations, and individuals to carry out this responsibility. However, visitors assume a certain degree of risk and responsibility for their own safety when visiting areas that are managed and maintained as natural, cultural or recreational environments. (*NPS Management Policies,* 8:5).

Additionally, *Policies* emphasizes that visitors must accept wilderness largely on its own terms, and accept certain risks, including possible dangers that are inherent in the various elements and conditions that comprise a wilderness experience. In wilderness areas in particular, management efforts focus on educating visitors about conditions and possible risks (*NPS Management Policies,* 6:8; See this Plan's Chapter 10, Interpretation, Education and Information).

9.1 Issues and Public Concerns

The extreme conditions (temperature, aridity, and elevation) of Grand Canyon's environment, the topography and remoteness, combined with the challenges inherent in wilderness travel sometimes result in unexpected events that may require the need for emergency services.

Trained NPS staff handle at least 480 rescues below the rim each year for injuries, hypothermia, dehydration, and heat-related illnesses. While the highest proportion of emergency services occur in the Cross-Canyon Corridor, many also occur in wilderness including the Colorado River. Emergency operations in these remote areas are often hazardous.

Heat-related emergencies are common during the summer months. During this time, the staff spends most of its time dealing with emergency responses at the expense of other responsibilities including resource protection and visitor education. A major concern is that many of the situations are often a result of ill-prepared, uninformed hikers, and the Park recognizes the need for an increased effort toward visitor education (See Chapter 10, Interpretation and Education).

The public revealed safety concerns about day use and hiker education in the Public Scoping Process held in 1995. Most respondents suggested that the Park needs to disseminate more information on potential risks of

traveling in the Canyon. Restrictions on hiking distances, time of day, and number of open trails were also suggested as ways to reduce NPS emergency responses. Another frequent suggestion was to charge victims for all emergency medical services rendered by the NPS and other providers. In recognition of the Canyon's wilderness values, several respondents stated that the NPS should not be responsible for each visitor's safety, and that part of the wilderness experience is the risk and challenge.

9.2 Grand Canyon National Park Emergency Operations

NPS Management Policies provides overall guidance to evaluate the urgency of emergency incidents and to allocate available resources. Operational procedures are directed through the Grand Canyon National Park Emergency Medical Service (EMS) Plan (U.S. Department of the Interior. National Park Service. 1995d) and the Grand Canyon National Park Search and Rescue (SAR) Plan (U.S. Department of the Interior. National Park Service 1993a). The EMS Plan requires specific levels of training for all emergency response personnel. This Plan also includes guidance for emergency services provided to visitors and medical evacuations. The SAR Plan governs all search and rescue operations.

During a SAR incident, consideration will be given to protecting the Park's natural and cultural resources. While hazard mitigation may be required, under no circumstances will pure convenience dictate the destruction of any Park resources or allow the significant interference of visitor enjoyment (SAR Plan:6).

Safety

The SAR Plan stresses safety priorities of responders and protection of resource values. Safety of responders comes before the life of a victim; this philosophy will guide all SAR operations. The Incident Commander is responsible for the health and safety of all involved responders.

The Grand Canyon National Park Safety Policy (U.S. Department of the Interior. National Park Service 1996) sets direction for managing a safe work environment for all Park employees. The Park Safety Policy emphasizes prevention of accidents by proper training, maintenance of equipment, and conformance to safety process and procedures.

In addition to safety policies and operational plans, the Park has established Standard Operating Procedures (SOP) that deal specifically with emergency operations and hazardous work-related procedures. These SOPs are as follows:

- Emergency Communications for Backcountry Operations (1996a)
- Emergency Reporting Procedures (1996b)
- Emergency Medical Requirements for Backcountry Operations (1996c)

Ability to see the cultural value of wilderness boils down, in the last analysis, to a question of intellectual humility. The shallow-minded modern who has lost his rootage in the land assumes that he has already discovered what is important....

Aldo Leopold
A
Sand County
Almanac

- Hazards from Intentional Movement *of* Objects During Trail Restoration (1996d).

Minimum Requirement

NPS Management Policies (6:4) provides for the administrative use of motorized equipment or mechanical transport, including motorboats and aircraft, "in emergency situations involving human health or safety." For the purposes of this Plan, "emergency situations" include:

- responses to those in need of medical or physical assistance when threats to human health and safety are reasonably assumed (SAR Plan:3)
- responses to those who are determined to be unjustifiably overdue and threats to human health and safety are reasonably assumed (SAR Plan:8)
- any response to downed aircraft
- any response to an "unknown emergency" (e.g., mirror flash, radio distress signal) (SAR Plan:9)
- any reported disaster
- responses to wildfire which threatens life, property, cultural resources or natural resources (Fire Management Plan:76).

There are six wilderness trails on the North Rim available for emergency mechanized access. These are E-4 (Komo Point), E-5 (Francois Matthes Point), E-6 (Walhalla Glades, W-1C (Widforss), W1-D (Tiyo Point), and a portion of W-1 (the junction of W-4 with W-1 to the west end of the abandoned landfill). Temporary mechanized access is allowed for wildfire operations as defined above. Administrative use, such as required for prescribed burning programs, will be addressed on a project-by-project basis through the Minimum Requirement Decision Process (See Appendix D).

Fire Management

Fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. Actions taken to suppress wildfires will use the Minimum Requirement Decision Process, and will be conducted in such a way as to protect natural and cultural features, and to minimize the lasting impacts of suppression actions and the fires themselves (*NPS Management Policies*, 6:7).

Aircraft

No permanent heliports, helipads, or airstrips will be allowed in wilderness. Temporary landing facilities may be used to meet the minimum requirements of emergency situations. Site improvements determined to be essential for safety reasons during individual emergency situations may be authorized, but the site will be restored to natural conditions after the emergency has ended (*NPS Management Policies*, 6:6).

The Grand Canyon National Park Internal Aviation Policy (U.S. Department of the Interior. National Park Service 1991b) directs use of helicopters for emergency response opera-

tions. NPS staff are required to evaluate methods of travel for response and evacuation if needed. This evaluation is done within the context of the Minimum Requirement Decision Process.

9.3 Preventative Search and Rescue (PSAR)

Grand Canyon environmental conditions often present unexperienced desert hikers with a greater challenge than expected. For example, in 1996 alone Grand Canyon staff performed over 480 rescues below the rim. Any reduction in the frequency of necessary medical assistance is dependent on providing users with adequate information regarding their planned activities. While personal safety is always the responsibility of the individual, the agency can reduce risk by providing relevant, pre-trip information, including accurate trail information, timely weather reports, maps, and appropriate advice for both day and overnight hikes.

Because of increasing injuries, illnesses, and even deaths due to heat-related factors, the Park initiated a task force to review this issue. Their recommendations resulted in a concerted visitor information effort in the spring of 1997 which consisted of additional information at trailheads, local restaurants, and local newspapers and radio stations. In addition, warning signs were installed on popular trails and “PSAR” rangers and volunteers provided personal contact with visitors.

9.4 Summary of Changes and Actions

- The Park will continue to stress the safety priorities of responders and the protection of resource values
- Fire-management activities conducted in wilderness areas will conform to the basic purposes of wilderness. Actions taken to suppress wildfires will use the minimum-requirement concept, and will be conducted to protect natural and cultural features and to minimize the lasting impacts of suppression actions and the fires themselves. The Park will develop minimum requirements for wilderness prescribed-burning programs in the revision of the Fire Management Plan
- No permanent heliports, helipads, or airstrips will be allowed in wilderness
- While personal safety is always the responsibility of the individual, the Park will attempt to reduce risk by providing relevant, pre-trip information, including accurate trail information, timely weather reports, maps, and appropriate advice for both day and overnight hikes.

CHAPTER 10

Interpretation, Education, and Information

10.1 Public Concerns

During the Public Scoping Process for the Wilderness Management Plan conducted in 1995, people were asked to provide suggestions to solve the issues surrounding hiker education including damage to natural and cultural resources; the accumulation of human waste and litter; lost, ill-prepared hikers; and backcountry users who venture on to Tribal lands without permission.

The most prevalent suggestion was that wilderness users (defined as river runners, overnight and day hikers, and stock users) should attend some type of *mandatory orientation* prior to their Grand Canyon hike, the most popular being a video or slide presentation. Others felt that direct contact with knowledgeable staff was the most effective way to educate hikers.

Another popular suggestion involved having wilderness users pass a *written test* to acquire a "license" or certificate demonstrating proficiency in wilderness skills and ethics. Most agreed that educating inexperienced hikers was best accomplished when permits were picked up. Some thought that experienced hikers should be issued advance permits, and that inexperienced people should be required to pick up their permits.

Wilderness users want *more information*, especially when permits are issued. Several comments were made regarding the need for better maps and water-resource information. People also commented on the *types of information* hikers should receive including: improved pre-hike guidance; low-impact and wilderness ethics for group leaders; Leave No Trace ethics for all users; information on expectations, for example, where aircraft will be heard or where encounters may occur with river runners or other groups; hiker etiquette; proper human waste disposal methods; and sensitivity to archaeological sites.

Some comments regarded use of *adjacent Tribal lands*. Respondents stated it was difficult to communicate with Tribal offices which resulted in an inability to obtain permits. It was stated that the NPS needs to develop a better permitting and access system for working with appropriate Tribal offices.

Respondents also suggested various *media* to provide information, including: improved educational literature; an automated video; brochures; written trail descriptions, displays at visitor centers or trailheads, and ranger talks. Many respondents suggested improved and/or increased *signing*, including: trailhead signs showing level of difficulty; signs with mileages, warnings and hiking times; signs that describe energy expenditure and water loss required to climb up vs. down; signs showing cost of rescues and medical aid; "scary warning signs" with death statistics and cost of rescues; signs in ten languages; signs with proper camping techniques; and signs at archaeological sites to educate hikers about sensitivity, and to demarcate boundaries.

A number of ideas were offered to provide better *permitting-office services*, including: effective phone and FAX services; on-line permitting services; training for inexperienced staff giving inaccurate or insufficient information; extended office hours; improved staffing numbers; a backcountry office in Flagstaff; information to permittees about size and location of other groups in a Use Area; information about archaeological site etiquette; staff and volunteers patrolling corridor trails to inform visitors and prevent emergencies; contact stations above and below the rim for dispersing information; organized educational sessions; guided hikes, and staff at the three main trailheads.

10.2 Wilderness Education

Wilderness Education Objectives

The objectives of the wilderness education program set forth in this Plan are to:

> *1) Establish a coordinated interpretive program to provide hikers access to adequate and accurate information to (a) plan and execute a rewarding and safe expedition, whether hiking for a day or for an extended period, and (b) conduct themselves in a manner which is not damaging to wilderness resources and values.*
>
> *2) Establish a coordinated, interagency wilderness educational program for staff (permanent, seasonal, and volunteer) to include (a) wilderness management principles and philosophy; (b) Leave No Trace; (c) application of the Minimum Requirement Concept; (d) proficiency in the use of primitive tools; (e) minimum-impact trail maintenance techniques and fire suppression tactics; (f) wilderness safety practices and (g) appropriate medical response skills*.

NPS Management Policies (6:10) provides guidance on wilderness interpretation:

> *The National Park Service will develop and maintain an effective public education program designed to promote and perpetuate public awareness of and appreciation for wilderness character, resources, and ethics without stimulating an unacceptable demand for use. Efforts will focus on the fostering of an understanding of the concept of wilderness that includes respect for the resource, willingness to exercise self-restraint in demanding access to it, and an ability to adhere to appropriate, minimum-impact techniques when using it.*

Establish a Coordinated Interpretive Program

Grand Canyon National Park will adhere to this policy when planning or presenting information and interpretation regarding wilderness and backcountry resources.

A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.

Aldo Leopold

Wilderness education must be balanced with the essential spirit of wilderness. Just as *management* of wilderness is a paradox, so to is providing information or a "safe" experience. *Wilderness* is an area devoid of "mans" influence, where nature is taken on its own terms. It is essential that prospective wilderness users have access to information with which they can plan safe and rewarding expeditions. It is equally important to the continuance of wilderness conditions that users have enough information to preserve the very essence they came to find. But, while it is essential to be adequately informed, it is important that users have a true wilderness experience, not one filled with signs, pamphlets, brochures, videos, rules, regulations, and contacts. Information and education must be accurate, up-to-date, readily available, easily understood, concise, and appropriate to maintain wilderness conditions. Not only must wilderness users adhere to minimum-impact techniques, but so must managers in their maintenance of wilderness.

At Grand Canyon National Park, 40 to 100 hikers a day crowd the Backcountry Office. An estimated 800,000 day hikers trek the Corridor trails. Over 50,000 backpackers sleep under the wild stars, and over 20,000 river runners yearly experience the Canyon's wilderness from the soft sand of remote beaches. The NPS will never be able to reach each and every hiker who treads Grand Canyon's wilderness. Since wilderness is inherently dangerous, it can never provide a completely safe experience. But the NPS will attempt, through various media, to make accurate information available to Grand Canyon wilderness users.

10.3 What Needs to be Communicated

There are three main ideas to which wilderness users need exposure, and which, with hope, they will come to understand and incorporate into their wilderness practices: wilderness values, personal safety, and resource protection.

The need to teach *wilderness values* is clearly expressed in *NPS Management Policies (6:10)*

> *The National Park Service will develop and maintain an effective public education program designed to promote and perpetuate public awareness of and appreciation for wilderness character, resources, and ethics*. . . .

Wilderness Values

Wilderness may mean something different to different people, but three central themes have consistency emerged: *experiential*, the direct value of the wilderness experience; the value of wilderness as a *scientific* resource and environment baseline; and the *symbolic* and *spiritual* values of wilderness to the nation and the world (Hendee 1990). While words may fail to convey all aspects of wilderness, an essential role of interpretation and education in wilderness is to promote and perpetuate the values expressed in the Wilderness Act.

Personal Safety

Due to the high number of wilderness users requiring medical assistance (in 1996, Grand Canyon performed over 480 rescues below the rim), it is essential that users have access to adequate information about their planned activities. *Personal safety* is always the responsibility of the individual, and much depends on pre-trip preparations. It is important that users have access to correct trail information, maps, and techniques both for day and overnight hikes. The environmental conditions of the Grand Canyon may present inexperienced desert hikers with a greater challenge than expected, and users need access to information specific to this location and environment.

Although the Wilderness Act briefly addresses public safety, *NPS Management Policies* (6:8) states,

> *Park visitors must accept wilderness largely on its own terms, without modern facilities provided for their comfort or convenience. Users must also accept certain risks, including possible dangers arising from wildlife, weather conditions, physical features, and other natural phenomena, that are inherent in the various elements and conditions that comprise a wilderness experience and primitive methods of travel. The National Park Service will not eliminate or unreasonably control risks that are normally associated with wilderness, but it will strive to provide users with general information concerning possible risks, recommended precautions, minimum-impact use ethics and applicable restrictions and regulations.*

Due to increasing injuries, illnesses, and even deaths at Grand Canyon due to heat-related factors, the Park initiated a task force to review this issue. Their recommendations resulted in a concerted visitor information effort in the spring of 1997 which consisted of addition information at trailheads, local restaurants, newspapers, and radio stations. In addition, warning signs were installed on popular trails and "PSAR" rangers and volunteers provided personal contact with visitors (See Chapter 9, Safety and Emergency Operations).

Resource Protection

Resource protection is essential to the preservation of wilderness attributes and experience, and critical to the mission of a national park. The purpose of wilderness is to provide a certain experience for people based on an intact natural resource. Protection of the natural and cultural resources for current and future use is the very basis of wilderness. It is important that visitors to wilderness understand the purpose and parameters of wilderness so to leave it unimpaired *as wilderness.*

Leave No Trace

The National Park Service has entered into an agreement with the National Outdoor Leadership School (NOLS) to teach Leave No Trace (LNT) practices

and ethics for national park users. See Figure 10.1.

10.4 Communicating Information Successfully

There are a number of options for effective interpretation and education; these include Personal Services (i.e., person-to-person) and Nonpersonal Services (i.e., written materials, video productions, signs, etc.). Other parameters taken into account when presenting information include Target Audience, Timing, and Location.

Since different people have differing learning styles, it is important to realize that there is no "best way" to provide information, thus information must be provided repeatedly in a variety of media. People who enjoy reading will read wilderness information brochures. People who enjoy watching television will benefit from video productions, etc. Thus, Grand Canyon will provide information to wilderness users in a variety of media hoping to reach the widest number of people.

Personal Services

Personal Services (people talking to people) have been shown to be the most effective means of communicating information. Due to the overwhelming number of people using Grand Canyon wilderness, it is impossible for park personnel to contact even a small percentage. The Public Scoping Process for this Plan revealed that numerous respondents felt that personal services needed improvement. With the arrival of Fee Demonstration monies available during the years 1997-2000, a number of concerns expressed by the public will, with hope, be addressed. Included would be longer backcountry office hours, better phone and fax services, increased staffing, better trained staff, and increased visibility on trails or at trailheads. When the planned Mather Orientation Center comes online in the year 2000, potential day users of wilderness will have a better and more complete source of information than is currently provided.

Nonpersonal Services

Nonpersonal Services include brochures, videos, site bulletins, permit attachments, signs, and exhibits. As of 1997, brochures and a backcountry video are underway to increase wilderness user access to information. Although the Scoping Process identified that many respondents felt more signs are needed to insure wilderness values are preserved, *NPS Management Policies* (6:6) states,

> *Signs detract from the wilderness character of an area and make the imprint of man and management more noticeable. Only those signs necessary to protect wilderness resources or for public safety, such as signs identifying trails and distances, will be permitted. Where signs are used, they should be compatible with their surroundings and be the minimum size possible.*

Grand Canyon has always maintained that signs are an intrusion in wilder-

ness, and that they will be used sparingly. Standards and criteria for use and placement of signs is outlined in Figure 3.2.

Target Audience, Timing, and Location

It is essential that the right message get to the right people at the right place. For example, it would be less than effective to provide river-user information at the rims, or day-hiking information at Phantom Ranch. It is essential that users get as much information as far in advance of their trip as possible so that adequate preparations can be made. In many ways, day hikers who often begin a hike on the spur of the unprepared moment are often the most difficult group to reach. The timing and location of such information will be critical to these users.

Wilderness users are identified as river runners, overnight hikers, day hikers, and stock users. Since many of these users reach the Canyon from different directions and through permitting processes, information can be targeted appropriate to each group. Studies are needed to determine the most appropriate place and time to present information for the greatest effect. Plans are underway to make information more accessible to users.

Locations

- Backcountry Office
- Trailheads
- Wilderness Users' Homes
- Flagstaff Locations
- Grand Canyon Contact Stations
- Inner canyon locations
  - Indian Garden
  - Cottonwood
  - Phantom Ranch
- Rest houses
- Lees Ferry
- Meadview
- Concession Operations
  - River
  - Hiker
- U.S. Forest Service Offices in Tusayan and Jacob Lake
- Bureau of Land Management Offices in St. George

Timing

- Pre-arrival (user home)
- Pre-arrival (in region)
- Pre-trip (in-park)
- As trip begins (trailheads, etc.)
- During trip

Media

- Brochures
- Video
- Permit attachments
- Site bulletins
- Signing
- Exhibits
- Personal contacts
- Internet
- Mailouts
- Audio tapes
- Regional information distributors
- Bulletin boards
- Park and other newspapers

Audience

- River runners
- Day hikers and stock users
- Overnight hikers and stock users
- Guides
- Concessioners
- Local and organized runners

Messages

- Wilderness Ethics
  - Leave No Trace Principles
  - Hiking etiquette
  - Waste disposal
  - Multiple trailing
  - Resource issues
  - Expectations
  - Overflights
  - Encountering other groups
- Safety
  - Proper gear
  - Rescue statistics and information
  - Pre-trip planning
  - Fitness
  - Canyon environment
    - Desert limitations
    - Weather
    - Elevation
    - Proper mind set
    - Animals (wild and mules)
- Resource Protection
  - Regulations
  - Fishing and other rules
  - Closures
  - Archeology
  - Feeding wildlife

In 1993, the superintendent of Grand Canyon National Park requested the establishment of a field institute in order to extend available Park interpretive opportunities. The Grand Canyon Association established and administers the Field Institute in cooperation with the National Park Service. The Institute conducts a variety of educational field courses to accomplish this task (U.S. Department of the Interior, National Park Service 1993b).

10.5 Wilderness Education for Staff

This program includes permanent, seasonal, and volunteers and consists of training in 1) wilderness management principles and philosophy; 2) application of the minimum-tool/requirement concept; 3) proficiency in the use of primitive tools; 4) minimum impact trail maintenance techniques and fire suppression tactics; 5) wilderness safety practices; 6) appropriate medical response skills; and 7) Leave No Trace (LNT). LNT is the management and education program promoting responsible use of wildlands by encouraging an attitude of stewardship and responsibility (U.S. Department of Agriculture, et al. 1994).

Grand Canyon's interpretation of wilderness will strive toward a sound wilderness ethic, both in influencing the actions of wilderness users and in the presentation of information and interpretation.

10.6 Summary of Changes and Actions

- Establish a coordinated public Interpretive Program which communicates wilderness values, personal safety, and resource protection

- Establish a wilderness education program for Park staff

Leave No Trace Principles*

Figure 10.1 Leave No Trace Principles

Plan Ahead and Prepare
- Know the regulations and special concerns for the area you visit
- Visit the backcountry in small groups
- Avoid popular areas during times of high use
- Repackage food into reusable containers

Camp and Travel on Durable Surfaces
On The Trail
- Stay on designated trails. Walk in single file in the middle of the path
- Do not shortcut switchbacks
- Hike on the most durable surfaces: rock, gravel, dry grass or snow
- Step to the inside of the trail when encountering pack stock

At Camp
- Choose an established, legal site that will not be damaged by your stay
- Restrict activities to the area where vegetation is absent or compacted
- Camp at least 200 feet (70 paces) from water sources

Pack It In; Pack It Out
- Take everything out that you brought
- Protect wildlife and your food by storing securely
- Pick up all spilled foods and microtrash

Properly Dispose of What you Can't Pack Out
- Deposit human waste in cathole six- to eight-inches deep, at least 200 feet from water, camp or trails. Cover and disguise cathole when finished
- Use toilet paper sparingly, and PACK IT OUT
- When washing, carry water 200 feet from sources. Strain dishwater, and carry out food scraps

Leave What You Find
- Respect the resource. Leave plants, rocks, and artifacts where found
- Good campsites are found not made. Altering a site is not necessary
- Do not build structures, furniture or dig trenches
- Let nature's sounds prevail. Keep loud noise to a minimum

Minimize Use and Impacts of Fires**
- Carry a lightweight stove for cooking

* Printed with cooperation of the National Outdoor Leadership School (NOLS), Inc.

** Campfires are prohibited in the Grand Canyon wilderness. River trips are allowed driftwood campfires contained in regulation firepans.

CHAPTER 11

Ecosystem Management

11.1 Wilderness and Ecosystem Management

This chapter outlines the development of the interagency ecosystem management strategy specified as a management objective in Chapter One. This strategy emphasizes the restoration and maintenance of natural processes and viable populations of all native species in natural patterns of abundance and distribution.

Ecosystem management is management driven by explicit goals, executed by specific practices, and made adaptable by research and monitoring based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function (Christensen, et al. 1996). The ecosystem concept provides the fundamental premise for regional management, and brings a compelling new vision to the ongoing debate over the future of public lands (Keiter 1989).

Within the national park system, all wilderness is classified as a *Natural Zone (NPS Management Policies*, 6:3). According to *NPS Management Policies* the primary objective in natural zones is the protection of natural resources and values for appropriate types of enjoyment while ensuring their availability to future generations. Wilderness requires additional consideration for outstanding opportunities for solitude or a primitive and unconfined type of recreation, i.e., a wilderness experience.

Natural resources will be managed with a concern for supporting basic and fundamental ecological processes as well as for individual species and features. Managers will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and ecological integrity of plants and animals (*NPS Management Policies*). Wilderness management includes maintenance and/or restoration of sustainable natural processes and viable populations of all native species in natural patterns of abundance and distribution (See Appendix L, Natural Conditions).

In wilderness, managers must maintain and protect ecological processes and natural conditions as well as provide for a wilderness experience (Wilderness Act, Section 2[a][c]). While this apparently contradictory *preserve and use* philosophy reiterates a fundamental premise of the NPS Organic Act (39 Stat. 535, 16 U.S.C. 1), the Redwoods Act Amendment (16 U.S.C. Section 1a-1) emphasizes a rigorous standard of protection, and prohibits use-related *derogation* of all park values (Lockhart 1988:31-32).

Protection of park values must be accomplished within the context of surrounding lands which often have conflicting management mandates. To meet wilderness objectives, wilderness management programs must develop a thorough understanding of the conditions and processes that make up the wilderness resource such as air and water quality, wildfire, and recreation to

name a few (Cole 1990b). Land use practices, such as mining, grazing, logging and road construction, occurring on adjacent lands may pose environmental threats to the Park. Attainment of the long-term management goals of protecting the ecological integrity of individual wilderness requires looking beyond the wilderness boundary and adopting what is called an *ecosystem management approach*.

11.2 Fundamental Scientific Principles for Ecosystem Management

Effective ecosystem management incorporates critical scientific precepts into an integrated land-management strategy:

(1) *Spatial and temporal scales are critical.* Ecosystem function includes inputs, outputs, cycling of nutrients and energy, and the interactions of organisms. Boundaries defined for the study or management of one process are often inappropriate for the study of others. Ecosystem management requires the broadest, most comprehensive view (Christensen, et al. 1996).

(2) *Ecosystem function depends on its structure, diversity and integrity.* Ecosystem management seeks to maintain biological diversity as a critical component in strengthening ecosystems against unnatural disturbance. Management of biological diversity requires a broad perspective and recognition that the complexity and function of any particular location is influenced heavily by the surrounding systems (Christensen, et al. 1996).

(3) *Ecosystems are dynamic in space and time.* Ecosystem management is challenging in part because ecosystems are constantly changing. Over time scales of decades or centuries, many landscapes are altered by natural disturbances that lead to a mosaic of successional patches of different ages. Such patch dynamics are critical to ecosystem structure and function (Christensen, et al. 1996).

(4) *Uncertainty, surprise, and limits to knowledge are unavoidable aspects of ecosystem management.* Ecological systems are complex. Their dynamics are expressed in probabilities, and random (stochastic) influences may be strong (Meffe, et al. 1997). Ecosystem management acknowledges that, given sufficient time and space, unlikely events such as catastrophic fires and floods, are certain to occur. Consequently, conservationists should include safety margins in the design of management and recovery strategies. Adaptive management addresses this uncertainty by combining democratic principles (i.e., citizen and expert involvement; See Grumbine 1992: 204), scientific analysis, education, and institutional learning to increase our understanding of ecosystem processes. The consequences of

The supreme reality of our time is...the vulnerability of our planet.

John F. Kennedy

management interventions, and the improvement of the quality of data upon which decisions must be made, need to be addressed in ecosystem management (Christensen, et al. 1996).

11.3 Legal Basis for Ecosystem Management

Public law traditionally has accorded Federal land-management agencies considerable discretion in administering lands based principally on the agency boundary line (Keiter 1989). It should be noted that, based upon existing law, the judiciary has given ecosystem management a tentative stamp of approval (Keiter 1996). Current law not only emphasizes environmental protection as a primary responsibility of Federal land-management agencies, it also obligates land managers to view their responsibilities regionally, taking account of trans-boundary environmental impacts (Grumbine 1997). Ecosystem management will require unparalleled coordination among Federal agencies.

Ecosystem management does not necessarily alter the Federal land-management agencies' basic legislative mandates. Rather, it changes the agencies' approach to fulfilling their stewardship responsibilities through a better understanding, not only of ecologic relationships, but between the agencies themselves (Government Accounting Office 1994). Over the past several years, all four of the primary Federal land-management agencies (National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and the Forest Service) have independently announced that they are implementing or will implement an ecosystem management approach (Keiter 1996; Government Accounting Office 1994; Keystone Center 1991, 1996; Grand Canyon Resource Management Plan 1997a:47-48). This gives hope of a new vision of public land management based on ecosystem principles rather than on traditional boundaries (Keiter 1989).

Unfortunately, disparate missions and planning requirements set forth in Federal land management statutes and regulations hamper and limit the implementation of such efforts. Although ecosystem management requires collaboration and consensus-building among Federal and non-Federal parties, incentives, authorities, interests, and limitations embedded in the larger national-land and natural-resource use framework constrain these parties' efforts to work together effectively (Primm and Clark 1996:143; National Research Council 1992; Goldstein 1992:184). Improving interagency relations demands innovative and bold approaches in light of the ideological and political history of interagency conflict (Grumbine 1991; 1994).

11.4 Implementing Ecosystem Management

Implementing sound ecosystem management requires taking practical steps that clearly identify what must be done and which agencies and parties must be involved (Government Accounting Office 1994). To facilitate

implementation of the ecosystem management concept, the Park established the Science Center Partnership Program (Resource Management Plan 1997a:47-48). The purpose of this partnership is to integrate the efforts of State and Federal land-managing agencies, American Indian Tribes, educational institutions, and science and environmental advocates to achieve the shared mission of protecting and managing natural and cultural resources within the Park.

Moving from concept to practice is a daunting challenge and will require the steps and actions outlined in Figure 11.1 (Christensen, et al. 1996; Government Accounting Office 1994):

Step 1

Define Sustainable Goals and Objectives

Understanding regional ecology, including current ecosystem conditions and trends, the minimum level of integrity and functioning needed to maintain or restore ecosystem health, and the effects of human activities, is critical (Christensen, et al. 1996). Ecosystem management requires choices about desired future ecologi-

Step 1	Define Sustainable Goals and Objectives
	Goal 1.1 Protect Ecological Processes Objective a Wild and Scenic Designation **Goal 1.2 Protect Native Biodiversity** Objective b Protect and Preserve Genetic Integrity Objective c Protect Rare and Listed Species Objective d Maintain Long-term Viable Carnivore Populations Objective e Restore Altered Ecosystems **Goal 1.3 Restore Altered Ecosystems** Objective f Restore Natural Fire Objective g Restore Extirpated Species Objective h Control Nonnative Plants and Animals Objective i Manage Naturalized Ecosystems Objective j Protect Air Quality
Step	2 Restore Spatial Scales Goal 2.1 Develope and Implement a Regional Wildlife Conservation Strategy
Step	3 Reconcile Temporal Scales
Step	4 Develop Adaptable and Accountable Management Systems

Figure 11.1 Steps, Goals, and Objectives Needed to Implement Ecosystem Management

cal conditions (i.e., processes); the types, levels, and mixes of activities that can be sustained; and the distribution of activities over time among the various land units within the ecosystems (Government Accounting Office 1994).

Step 1, Goal 1

Protect Ecological Processes

The Wilderness Act (Section 2[c]) defines wilderness as an area *where the earth and its community of life are untrammeled by man.* Untrammeled lands are not subject to human controls that hamper the free play of natural forces (Stankey 1990:106). Other phrases in the Wilderness Act useful in defining goals include *primeval character and influence, wilderness character, and unimpaired condition*. These phrases imply that wilderness managers maintain or restore, to the extent possible, the wilderness conditions and processes existing prior to the period of increasing population, and growing mechanization that spurred Congress to pass the Wilderness Act (Cole 1995:42).

Park policy provides general direction for preserving, protecting, and interpreting the Park's ecological processes (Grand Canyon General Management Plan 1995:7). It also requires, to the maximum extent possible, the restoration of altered ecosystems to their natural conditions. Policy emphasizes reliance on natural processes to control populations of native species to the greatest extent possible (RMP 1997a:112; See U. S. Department of the Interior. National Park Service. *Final Draft Strategic Plan. 1996f:13).*

Step 1, Goal 1 Objective 1a

Wild and Scenic Rivers

Riparian areas comprise some of the most diverse and endangered ecosystems in the southwestern United States (Noss and Cooperrider 1994; Noss and Peters 1995; Noss, et al. 1995). Protection of riparian water quality and instream flows requires protection of a variety of ecological processes. The Wild and Scenic Rivers Act provides the most comprehensive legal protection available for the instream values of rivers (U.S. Department of the Interior. National Park Service 1991, 4:26). The Act is potentially as significant to the Park's water resources as the Wilderness Act is to land resources (Gray 1988). Because an adequate supply of water is necessary to preserve the free-flowing conditions of designated rivers, the Act stands as the clearest expression yet of Congress' intent to assert Federal rights to water (Gray 1988). Designation as Wild and Scenic would afford long-term instream flow protection for the Colorado River in Grand Canyon and especially for its tributaries, some of which are already threatened by activities such as well drilling and development. More than 285 miles of the Colorado River and its tributaries in Grand Canyon National Park are eligible for consideration as wild or scenic rivers. The Park has committed to actively pursue the designation of eligible segments of the Colorado River and its tributaries as part of the

National Wild and Scenic Rivers System (GMP 1995:7). (See Appendix M, Wild and Scenic Rivers).

Step 1, Goal 1.2

Protect Native Biodiversity

Preserving viable populations of the Park's native flora and fauna requires management considerations of activities occurring beyond the Canyon's boundary (RMP 1997a:112). The NPS has committed to preserve natural genetic integrity and species composition, consistent with ecosystem processes (RMP 1997a:50). A general strategy for accomplishing this goal is outlined in the RMP (See RMP 1997a, Chapter 3; See Appendix L, Natural Conditions).

Step 1, Goal 1.2, Objective 1b

Protect and Preserve Genetic Integrity

The Park has also committed to preserve Grand Canyon's natural genetic integrity and species composition, consistent with ecosystem processes, and protect genetic diversity through perpetuating natural evolutionary processes and minimizing human interference (GMP:7; RMP:50,112). While the general strategy for accomplishing this goal is outlined in the RMP, further refinement of management objectives and implementation schedules will be addressed in subsequent revisions of the RMP and the Fire Management Plan (See Appendix N, Developing a Regional Wildlife Conservation Strategy).

Step 1, Goal 1.2, Objective 1c

Protect Rare and Listed Species

The GMP (p. 7) calls for preserving of critical processes and linkages that ensure the protection of rare, endemic, and specially protected (threatened/endangered) plant and animal species. This also requires improving inventories, including invertebrates. The GMP (p. 17) also directs the park service to develop and implement an ecosystem approach to managing threatened and endangered species, and to institute an active research and recovery program.

Park policy requires the restoration, enhancement, and protection of populations of threatened or endangered species (RMP:50). Current funding levels are inadequate to achieve these objectives. Conservation strategies for these animals will be strengthened in subsequent revisions of the RMP and Fire Management Plan.

Step 1, Goal 1.2, Objective 1d

Maintain Long-term Viable Carnivore Populations

Carnivores play a significant role in ecological processes and constitute an important, if precarious, component of the region's fauna. The presence of self-sustaining populations of large carnivores, as part of a full complement of native species, is indicative of a healthy environment. Historically, the Grand Canyon ecoregion contained a diversity of mammalian carnivores,

including the mountain lion, bobcat, coyote, jaguar, grizzly and black bear. Persecution decimated wolf, grizzly bear, and jaguar populations and these creatures are extirpated in the Grand Canyon ecoregion (Brown 1983; Clark, et al. 1996). The current status of cougar, black bear, otter, and bobcat populations is unknown.

Historically, large-scale extermination and loss of habitat were the major threats to large carnivores. Now the most significant ecological threats to carnivore survival are related to loss and alteration of habitat resulting from exploitation of natural resources, permanent facilities, and associated infrastructure outside Park boundaries (Paquet and Hackman 1995:17).

Few conservation challenges demand as much innovation and interagency cooperation as the conservation of large carnivorous mammals. Key to this approach is the recognition that the fate of these animals depends on sociological, political, as well as biological solutions (Paquet and Hackman 1995: Preface). The Park will develop, as part of its Science Center Partnership Program, an interagency carnivore management program (RMP:47-48; See Appendix N, Developing a Regional Wildlife Conservation Strategy).

Step 1, Goal 1.3

Restore Altered Ecosystems

An overall goal of wilderness management is to allow a wilderness area to remain as wild and natural as possible. This includes restoring wilderness character when it has been damaged by human use (Society of American Foresters [SAF] 1989a). Grand Canyon National Park is committed, to the maximum extent possible, to restore altered ecosystems to their natural conditions (GMP:7; See Appendix L, Natural Conditions). Managers not only have a responsibility to maintain, preserve and protect present wilderness qualities, but also to restore those which are below minimum standards specified in planning documents described below (*NPS Management Policies,* 6:2; Society of American Foresters 1989b).

Step 1, Goal 1.3, Objective 1f

Restore Natural Fire

The primary goal of the fire management program in the national park system is to integrate fire into sustainable naturally functioning ecosystems (Botti, et al. 1994:4). The Park's goals include ensuring the perpetuation of Park ecosystems and the restoration of natural fire regimes (GMP:17; RMP:50; Fire Management Plan:1).

In order to achieve this goal, the Park's Fire Management Plan will be updated to be consistent with the direction provided in the management objectives and other sections of the GMP (GMP:57). Revisions of the Fire Management Plan will address the restoration of the natural fire regime in wilderness areas, using practices consistent with this Wilderness Management Plan

(GMP: 57; See Wilderness Management Plan, Chapter 2).

Step 1, Goal 1.3, Objective 1g

Restore Extirpated Species

Extirpated species include the burrowing owl, southwestern river otter, razorback sucker, zebra-tailed lizard, sage grouse, prairie dog, wolf, grizzly bear, jaguar, Colorado squawfish, and the bonytail and roundtail chubs (RMP:31; See Project Statement GRCA-270,100). The Park has committed to restore extirpated native animals wherever possible and will conduct feasibility studies on reintroducing extirpated species (GMP:17; RMP:112).

Restoration of extirpated animals requires varying degrees of effort as well as institutional tenacity. The reintroduction of condors is underway (Kiff, et al. 1996). Cattle interests eliminated the prairie dog from the South Rim in the 1930s (Brown, et al. 1987:195). Reestablishing burrowing owls, dependant on abandoned prairie dog burrows for nesting, may simply require the reintroduction of that otherwise ubiquitous rodent.

Habitat conditions in the mainstem river continue to favor nonnative species and preclude the successful reintroduction of extirpated native fish (Carothers and Brown 1991:84; RMP: Project Statement GRCA-N-270). Restoration measures necessary for successful reintroduction, ranging from increasing water temperatures by modifying Glen Canyon Dam to removal of the dam, may prove expensive and controversial.

Reintroduction of large carnivores, such as the grey wolf, presents additional challenges. These species require enormous areas to maintain viable populations. Successful maintenance and restoration of these species will require development and implementation of a regional wildlife conservation strategy (Noss and Cooperrider 1994:161). The Park will establish partnerships, as described in the Science Center Partnership Program, to facilitate the design and implementation of a feasibility studies for the reintroduction of extirpated species (RMP:47-48; See Appendix N, Developing a Regional Wildlife Conservation Strategy).

Step 1, Goal 1.3, Objective 1h

Control Nonnative Plants and Animals

Invasive nonnative plants cause tremendous damage to park resources. Called exotics, or aliens, fast-growing nonnative plants, such as brome grasses, Russian olive, tamarisk, camelthorn, lovegrass and ravenna grass, encroach from populations established outside the Park. Consequently, the ecological balance achieved over many thousands of years is disrupted and often destroyed. Displacement of native plants directly and adversely affects the creatures dependant on often complex food-web relationships (U.S. Depart-

ment of the Interior. National Park Service 1996g).

The Park will preserve the Canyon's natural genetic integrity and species composition, consistent with ecosystem processes, including the elimination of nonnative plant and animal species wherever possible (RMP:50). A general management strategy and implementation program is outlined in the RMP (pp. 96-107). Control of exotic plant invasions will require additional cooperation with adjacent land managers. The necessary cooperative agreements and implementation programs will be coordinated by the Natural Resources staff.

Step 1, Goal 1.3 Objective 1i

Manage Altered Ecosystems

In 1992, Congress enacted the Grand Canyon Protection Act (Public Law 102-575) which instructed the Secretary of the Interior to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established. The Record of Decision (U.S. Department of the Interior, Bureau of Reclamation 1996) implemented a long-term monitoring and adaptive management program, as required by the Grand Canyon Protection Act, and outlined in *Operation of Glen Canyon Dam Final EIS's* preferred alternative (U.S. Department of the Interior, Bureau of Reclamation 1995).

Until Glen Canyon Dam was completed in 1963, the Colorado River's aquatic system was dominated by native fish. These native species are specifically adapted to highly variable seasonal fluctuations in sediment load, flow, and temperature, and were severely impacted by dramatic changes resulting from the dam. The introduction of nonnative fish contributed to competition and direct mortality. Of the eight native species found in the River before 1963, three species are now extirpated (the Colorado Squawfish, and the bonytail and roundtail chubs).

The Park is committed, to the maximum extent possible, to the restoration of altered ecosystems to their natural conditions (See Appendix L, Natural Conditions), and will maintain, rehabilitate and perpetuate the inherent integrity of water resources and aquatic ecosystems (GMP:7; RMP:83). The NPS has also committed to manage the Colorado River to restore or "mimic," to the degree feasible, pre-dam natural and physical processes, including fish, wildlife and plant populations, and ecological relationships (RMP:50). In managing altered ecosystems, such as the River corridor, the Park will ensure the preservation of native components through the active management of nonnative components and processes. Achieving these goals through an interagency, adaptive management process is coordinated by the Grand Canyon Monitoring and Research Center.

Step 1, Goal 1.3, Objective 1j

Protect Air Quality

Grand Canyon enjoys some of the cleanest air remaining in the United States. This is a fragile resource, and existing levels of human-caused pollution create a clearly visible haze. The Park is committed to the preservation, protection, and enhancement of air quality and air-quality related values by ensuring compliance with the requirements of the Clean Air Act and the NPS Organic Act (RMP:90). The NPS will strive for the preservation of Grand Canyon's Class I airshed, and to protect it from within-Park, as well as, external degradation (RMP:50). Development of a regional air quality plan is addressed in the RMP (p.215).

Step 2

Reconcile Spatial Scales

Step 2, Goal 2.1

Develop and Implement a Regional Wildlife Conservation Strategy

Protection of native species requires developing an ecosystem-based conservation strategy for wildlife (including large carnivores) that transcends political boundaries. It also requires a concerted integrated research and management effort consisting of steps described in Appendix N, Developing a Regional Wildlife Conservation Strategy. The Park will establish partnerships, as described in the Science Center Partnership Program, to facilitate the design and implementation of a wildlife conservation strategy (RMP:47-48; See Appendix N, Developing a Regional Wildlife Conservation Strategy).

Step 3

Reconcile Temporal Scales

Ecosystem management is challenging because, over time scales of decades or centuries, natural disturbances alter the landscape in both predictable and unpredictable ways. Environmental uncertainty, including variation over time in habitat quality and the impacts of natural catastrophes, must be integrated in the spatial evaluation of existing vegetative communities and wildlife population distribution (Murphy and Noon 1992:5). For conservation planning, reserve designs including connectivity should be evaluated at several spatial and temporal scales, ranging from daily movements within home ranges to long-distance dispersal events connecting populations once every generation or two (Noss and Cooperrider 1994:152). The design of management and recovery strategies must include risk analysis and safety margins which account for random (stochastic) influences, including catastrophic events. The regional wildlife conservation strategy proposed above in Step 2 will include these temporal considerations (See Appendix N, Developing a Regional Wildlife Conservation Strategy).

In addition, ecosystem management must deal with time scales that tran-

scend human lifetimes, and requires long-term planning and commitment (Christensen, et al. 1996). Land management agencies, accustomed and often required to make decisions on a fiscal-year basis, will need flexibility and support to achieve long-term ecosystem management goals. This issue will be addressed in subsequent planning revisions and as part of establishing ecosystem management partnerships.

Step 4

Develop Adaptable and Accountable Management Systems

Understanding ecosystems requires collecting and linking large volumes of scientific data. Although ecosystem management will require greater reliance on ecological and socioeconomic information, the available data, collected independently by various agencies for different purposes, are often not comparable and insufficient, and scientific understanding of ecosystems is far from complete (Government Accounting Office 1994). Furthermore, there is still much uncertainty about how ecosystems function. This uncertainty contributes to strong differences in the interpretation of scientific evidence (Government Accounting Office 1994).

Successful ecosystem management requires institutions that are adaptable to changes in ecosystem characteristics and in our knowledge base. The conservation of native biodiversity should be viewed adaptively and dynamically in terms of ecological processes. The methodology used to obtain information and implement a region-wide adaptive management strategy must be hypothesis-driven, and based on solid, objective science (See Weaver 1993; Ruggiero, et al. 1994). Agencies must adapt management strategies on the basis of continually researching, monitoring, and assessing ecological conditions (Christensen, et al. 1996; Government Accounting Office 1994). By constructing networks for information sharing and learning with partners, managers expand their role as facilitator in a large-scale societal conversation about conservation (Grumbine 1997). To act prudently, managers need to understand how the current Grand Canyon ecoregion evolved and the ways in which humans have altered, often radically, the structure of the ecosystems inhabited by native species. Without understanding the present-day condition and its historical origins, managers have little hope of ensuring that future decisions will be beneficial for native biodiversity (Paquet and Hackman 1995:29).

The development of an ecosystem research program, based on a baseline inventory and long-term monitoring program is a Park priority (GMP:17). The RMP (p. 50) specifies, through the development and operation of a science-based comprehensive natural resource inventory and monitoring program, the understanding of the status and trends of populations, communities and ecosystems. The completion of the Glen Canyon Dam Environmental Impact Statement (EIS) initiated a process of adaptive river manage-

ment whereby the effects of dam operations on downstream resources would be assessed and the results of those resource assessments form the basis for future modifications of dam operations (U.S. Department of the Interior. Bureau of Reclamation 1995). The Adaptive Management Program (AMP) was developed and designed to provide a process for cooperative integration of dam operations, resource protection and management, and monitoring and research information (U.S. Department of the Interior. Bureau of Reclamation 1995:34-38). In addition, the Park is developing a new, comprehensive research program within the Science Center to obtain accurate information about the Grand Canyon's resources, ecological processes, and human influences. The role of parnerships will be a key element in achieving Park objectives (RMP:47-48;174).

11.5 Summary of Changes and Actions

- The Park is committed to actively pursue the designation of eligible segments of the Colorado River and its tributaries as part of the National Wild and Scenic Rivers System.

- Further refinement of management objectives and implementation schedules to protect and preserve genetic integrity will be addressed in subsequent revisions of the 1997 Resource Management Plan and the Fire Management Plan.

- Conservation strategies for the restoration, enhancement, and protection of populations of threatened or endangered species will be strengthened in subsequent revisions of the 1997 Resource Management Plan and Fire Management Plan.

- The Park will develop an interagency management program to maintain long-term viable carnivore populations.

- Revisions of the Fire Management Plan will specifically address the restoration of the natural fire regime in wilderness areas, using practices consistent with the Wilderness Management Plan.

- The Park will establish partnerships to facilitate the design and implementation of feasibility studies for the reintroduction of extirpated species.

- The Park will strive to preserve the Canyon's natural genetic integrity and species through the elimination of nonnative plant and animal species wherever possible. Park staff will develop the necessary cooperative agreements and implementation program with agencies and nongovernmental organizations.

- To the maximum extent possible, the Park will restore altered ecosystems, and maintain, rehabilitate and perpetuate the inherent integrity of aquatic ecosystems. Achieving these goals will be accomplished

through an interagency, adaptive management process coordinated by the Grand Canyon Monitoring and Research Center.

- The Park will establish partnerships to facilitate the design and implementation of a wildlife conservation strategy.

- The Park will expand its comprehensive research program within the Science Center to obtain accurate information about the Grand Canyon's resources, ecological processes, and human influences. The role of partnerships will be a key element in achieving this Plan's objectives.

CHAPTER 12

Monitoring and Research Programs

Integral to the Limits of Acceptable Change (LAC) framework is the implementation of monitoring programs which identify and track the condition of wilderness resources and values. At Grand Canyon, monitoring programs for campsites, trails, archeological sites, and visitor experience have been in place for several years. This chapter will describe each of those programs. The Monitoring Matrix (Figures 12.1 - 12.5) summarizes the indicators, standards, management actions, and monitoring programs for specific resources.

Monitoring by itself cannot mitigate the impacts that have already or are currently occurring to natural and cultural resources and the wilderness experience. Monitoring is not an end product; it is a method for tracking and evaluating resource conditions and wilderness values so managers can develop appropriate actions for protection. Law enforcement and public education provide avenues for preventing future impacts, but cannot address the impacts which have already occurred. For long-term monitoring to be worthwhile, it is essential that the monitoring programs be directly linked with other treatment programs that can address the ongoing impacts to natural resources including wildlife, vegetation, and water; to nonrenewable heritage resources; and those values that characterize a wilderness experience. This integrated program is outlined in Chapter 13, Rehabilitation and Restoration of Recreational Impacts.

12.1 Campsite Monitoring Program

At Grand Canyon, a campsite-inventory program began in 1981, prior to the establishment of the use-area management strategy. The early program was built on an overall inventory of the most popular wilderness campsites. The 1983 Backcountry Management Plan mandated a monitoring plan to evaluate campsite condition and distribution. At that time, however, specific management objectives were not articulated. The 1988 Backcountry Management Revised Plan established management objectives which set standards for campsite condition and distribution, with the exception of designated sites in use areas within the Threshold Opportunity Class. This Wilderness Management Plan further describes indicators and standards for all wilderness opportunity classes, and identifies potential management actions to meet specific management objectives.

The current campsite monitoring program was adapted from the ecological studies done by Cole (1985, 1989a). The methodology includes an assessment of several variables or “indicators,” culminating in a campsite-condition rating. The overall condition is rated on the type and level of impact to each campsite. The standards describe the relative amount of impact, or the “Condition Class” of each campsite. The Condition Class is the overall descriptor used to evaluate management objectives for desired campsite conditions. Standards are also described for the total amount of im-

pacted ground or barren core in any square mile within the use area. (Barren core is defined as, an area devoid of vegetation and organic litter, with compacted soil and trampled perimeter vegetation). The campsite-monitoring methods, rating system, and procedures are described in the Campsite Monitoring Manual included as Appendix O.

The distribution of campsites within use areas has sociological and ecological management implications. This is of greatest importance for use areas with at-large camping. The proximity of campsites to one another has a direct bearing on the number and type of encounters hiking parties may have. The standards describe the maximum number of campsites in any square-mile area.

Campsite-monitoring data collection and analysis have been documented since 1988. The most recent results of the monitoring data indicate a negative trend in campsite condition overall. When comparing field data to management objectives, the monitoring data show that management standards are not being met, specifically for campsite condition and campsite density (Hoffman 1989; Jalbert 1993 and 1996).

Management treatments have been applied to rehabilitate these impacted campsites and surrounding areas. These treatments have included revegetation, obliteration of social trails and barren ground, and definition of trails and campsites. The campsite monitoring program has also produced information that has resulted in changes to use area boundaries and campsite classification. These changes are described in Chapter Six, Wilderness Campsite Management. These treatments or management actions have been implemented to ensure conformity with environmental and sociological standards developed for each Opportunity Class.

Under this Wilderness Management Plan, the current methodology of campsite assessment will continue. Wilderness Rangers and Resource Specialists will establish a monitoring schedule based on use statistics and trend information. In addition, emphasis will be placed on conducting an inventory of campsites in use areas within the Wild Opportunity Class. (See Figure 12.1, Campsite Condition and Distribution).

12.2 Monitoring Visitor Experience

A sociological study of backcountry users was conducted in a twelve-month period beginning in June 1984 and concluding in December 1985. The purpose of the study was to develop a sociological database to provide a basis for effective management decisions when combined with resource information. The objectives of the study were 1) to identify the overnight users of the Park's backcountry, 2) to determine user motivations, expectations and preferences, 3) to measure user levels of satisfaction with their Grand Canyon experience, 4) to evaluate user reaction to the reservation and permit system, 5) to

In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness.

The Wilderness Act of 1964

develop a sociological monitoring system to be used by Park staff, and, 6) to suggest management actions that best meet social needs of visitors (Underhill, et al. 1986).

A significant outcome of this study was the development of management objectives in the 1988 Backcountry Management Plan that described desired social conditions. The sociological standards describe the acceptable number and duration of contacts an overnight user may have while hiking and at campsites. These standards are based on data which correlates users' reported satisfaction level with the number of other parties they encounter while travelling or at campsites. Wilderness researchers have found that most overnight hikers are more sensitive to being within sight or sound of others while at camp, compared to when they are hiking (Underhill, et al. 1986; and Hendee, et al. 1990).

In keeping with goals outlined in the Park's General Management Plan, wilderness areas will be managed so visitors have the "opportunity for a variety of personal outdoor experiences, ranging from solitary to social." The standards for maintaining or enhancing visitor experience are described for each Opportunity Class. The Wilderness Act of 1964 also defines a wilderness experience as one with "outstanding opportunities for solitude or a primitive and unconfined type of recreation." The standards for contact levels at the primitive and wild end of the recreational opportunity spectrum therefore reflect the desired experience. On the other hand, opportunities for more social contact are available in the wilderness Threshold Use Areas as well as in the Cross-Canyon Corridor.

Two monitoring programs were developed from the 1986 sociological study. One program was established to collect data on the actual number of encounters an overnight hiker may have. A random sampling of hikers in each Opportunity Class were asked to complete a short survey form by recording the number of people and groups they encountered during the day and at their camp, and to rate their level of satisfaction associated with each contact. Analysis of the data determined 1) the number of contacts made, and 2) at what level the number of contacts became unacceptable. The results were measured against the management objectives described for each Opportunity Class.

The second monitoring program involved a lengthy questionnaire based on the original sociological study. A mail-back survey was completed by overnight hikers who had done a recent trip. This monitoring program, which was conducted on a five-year cycle, provided Park staff with feedback on management actions and policies. The survey also provided basic demographic information, background on the user's skill level, and information on visitor expectations and motivations. These data were considered for determining changes in the permitting operations and group-size limits, and for developing a structure for the cost recovery program. Overall, this program provided an evaluation of man-

agement objectives, and an assessment of strategies for providing a range of opportunities for personal experiences.

This Wilderness Management Plan establishes a schedule for implementing a monitoring program based on sociological research and previous monitoring programs. The monitoring program will be initiated by 2002, and will focus on users in the wilderness areas of the backcountry, specifically use areas within the Threshold, Primitive, and Wild Opportunity Classes (See Figure 12.2, Visitor Experience).

12.3 Archeological Site Monitoring

During the late 1980s, Grand Canyon National Park initiated a monitoring program for archeological sites in the backcountry and wilderness. Prior to this time, monitoring of archeological sites occurred on a highly irregular basis, and was focused primarily on highly visible structural sites that were easily accessible from the Colorado River corridor. Beginning in 1989, Park archaeologists initiated a more comprehensive monitoring program that included sites along primary hiking trails and other heavily visited backcountry and wilderness areas.

The current monitoring program improves management and protection of cultural resources by 1) identifying sources of impacts to archeological sites, 2) prioritizing sites for future monitoring and treatment, and 3) providing information for the development and implementation of plans to mitigate impacts and prevent or substantially reduce those impacts in the future. To do this, it is necessary to establish detailed baseline information on the current attributes and condition of sites, as well as gather information suitable for evaluating long-term impact trends.

The wilderness areas of Grand Canyon National Park have never been systematically inventoried for cultural resources, so baseline information is still lacking. The only trails that have been systematically inventoried are the Bright Angel, North and South Kaibab, plus the uppermost portions of the Grandview and Hermit Trails. Most documented sites in the backcountry are known from reconnaissance helicopter surveys in the mid-1960s and early 1970s, from a few small-scale reconnaissance pedestrian surveys by outside researchers and Park personnel, and from sporadic visitor reports. Many of the “known” sites have not been revisited by a trained archaeologists since they were originally reported (some as long ago as the 1930s). In many cases, the only available information consists of an inaccurate map and a few lines of descriptive text. Most sites in the wilderness need to be relocated and documented according to current standards so they can be incorporated in the monitoring program.

The current archeological monitoring program was adapted from a program developed by Cole (1985, 1989a) for monitoring impacts to wilderness campsites. Elements from archeologi-

cal monitoring programs in other southwestern national parks are also incorporated. The methodology involves ranking several impact variables to produce an overall condition class assessment. Change in site condition is documented with repeat photographs, supplemented by written descriptions.

Unlike the campsite-monitoring objectives, levels of acceptable impacts to archeological sites do not vary by Opportunity Class. The Park is mandated by law to protect the integrity of all significant archeological resources, no matter where they occur in the Park. The monitoring program serves mainly to document whether impact levels are increasing, decreasing, or continuing without significant change. Sites which have received or are currently receiving high levels of impact are given the highest priority for future intervention, while those with no or low impact levels continue to be monitored at regular intervals based on a monitoring priority ranking system.

The distribution of archeological sites in the backcountry has important sociological and ecological implications for wilderness management because many of the environmental attributes that attracted prehistoric occupants to settle in a location 1000 or 5000 years ago such as level terrain, shelter from the elements, proximity to water and trails, or a good view are the same ones that attract modern campers. Consequently, many places occupied by prehistoric and historic inhabitants of Grand Canyon are still used by visitors as camps. Many impacts from on-site camping can be reduced or eliminated through improved visitor education, physical deterrents, stabilization and restoration techniques, or formal site closures. Generally, the intervention strategy that is least intrusive to the visitor will be tried first, and the results will be monitored to see if the desired results (elimination or substantial reduction of impacts) are achieved. If monitoring reveals that desired results have not been achieved, more direct forms of intervention can be implemented. If none of the intervention techniques achieve the desired results, excavation may be undertaken as a last resort.

In a few wilderness areas, archeological sites offer the only reasonable place to camp. If the site still retains archeological integrity and contains potentially valuable information about the past, the National Park Service is legally obligated to mitigate impacts that are occurring to the site from this use. In most instances, mitigation will involve recovering and preserving information from the site by means of a professional archeological excavation. In some instances, it may be possible to stabilize a site and protect its integrity without complete excavation, but some level of archeological excavation is usually required as a component of stabilization.

This Wilderness Management Plan establishes a systematic method of archaeological inventory and monitoring in wilderness use areas. A schedule will be established based on use trends and patterns, and will focus on

areas that receive moderate to high use levels. Archaeological site surveys, inventories, and compliance will be conducted prior to developing resource protection action plans. (See Figure 12.3, Cultural Resources).

12.4 Monitoring Water Resources

The objectives of the water resource inventory and monitoring program are 1) inventory all Park water resources, 2) develop baseline water resource information on water quality and quantity for a wide variety of management needs, including identification and mitigation of human health hazards, identification and mitigation of human impacts to the resource, and water rights issues, 3) develop and maintain high-quality data for streamflow and water chemistry on South Rim springs, 4) interpret water resources from the Grand Canyon, and 5) identify future research and monitoring needs. (RMP 1997a)

An intensive, three-year seasonal water quality sampling program was conducted from 1990 to 1994. The study sites were located in 20 Park tributaries along the Colorado River. The objective of the study was to inventory water quality characteristics of state-protected waters at locations of potential impact (Mazzu 1995).

Although the intensive study focused on many high-use recreational tributaries, it did not include wilderness source areas for creeks and springs that dry up before reaching the Colorado River. These water sources are vital to overnight hikers in the Grand Canyon wilderness. In recent years, intensive studies have been conducted on water quantity and quality at popular wilderness destinations, many of which address water chemistry of ground water emerging from Canyon springs (Rihs 1997).

The water quality and flow data-monitoring program is conducted at periodic intervals annually. Water quality data includes discharge, conductivity, dissolved solids and oxygen, alkalinity, turbidity, and temperature. Water quality information includes bacterial analyses for fecal coliform and streptococcus, chemical analyses of several variables, and testing for radionuclides and radioisotopes at selected sites. Monitoring results are reported annually and included in periodic updates on water availability and quality for public use.

This Plan establishes a schedule for monitoring water quality in tributaries within wilderness use areas. The schedule will be based on use trends and patterns, and will focus on use areas with moderate to high use levels. Site specific water quality data will be provided to the Backcountry Office for visitor education and public information (See Figure 12.4, Water Resources).

12.5 Monitoring Trail Condition

Over 400 miles of established trails exist in Grand Canyon National park. Of this total, approximately 380 lie

within the proposed wilderness areas. Some contain historic features, and most trails have received little or no stabilization or rehabilitation work, and currently exist in various states of disrepair. Until recently, monitoring trail conditions focused on problem segments. A trail-condition survey using a descriptive log of trail problems and prescriptive actions has proven useful at Grand Canyon in developing action plans for trail rehabilitation.

While there has been no systematic method for trail-condition monitoring, Park staff have conducted trail surveys on approximately 150 miles of the wilderness trail system. This Plan establishes a strategy for routinely conducting trail-condition surveys on wilderness trails and routes. The focus will be on trails that contain historic features, and those that receive moderate to high use by backpackers and river users. Trail-condition surveys will be conducted in conjunction with routine trail maintenance and rehabilitation river trips. Following rehabilitation or restorative work, trails will be monitored on a cyclic basis (See Figure 12.5, Trail Condition; Chapter 7, Trail Management).

Figures 12.1-12.5 Wilderness Resources Monitoring Matrix

The following matrices summarize the indicators, standards, management actions, and monitoring programs for specific wilderness resources and values. Below is a brief description of the components of the matrix.

Indicators can be measured to track change in conditions caused by human activity. The purpose of indicators is to focus data collection efforts on what is important. Monitoring indicators are a means to ensure that standards are being met.

Standards are developed to ensure desired conditions of wilderness resources and values are maintained or enhanced. These are measurable statements that describe the resource and experience conditions that are considered realistic, attainable, and acceptable. Standards are specific and measurable so they clearly trigger the need for corrective management action. They are established to promote achievement of desired conditions.

Management Action(s) to be Implemented are identified and may be implemented as needed depending on the resource conditions. The NPS recognizes that, especially in wilderness areas, the lowest level of intervention will be implemented to address problems. In many cases, indirect management actions such as visitor education accompany more direct actions such as site rehabilitation to achieve desired conditions.

Monitoring Programs currently being conducted are identified. The frequency of each program is determined by the staff specialists based on the level of potential impacts to the resources in specific wilderness areas. Where monitoring programs have not been identified, resource inventory will be conducted.

Figure 12.1 Campsite Condition and Distribution

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring and Sampling Procedures
Campsite Condition and Distribution	Barren core area within each site Tree and perimeter vegetation damage Soil compaction Number of access trails at campsite Fire impacts Trail erosion adjacent to site Disturbance of archeological features Number of campsites	**THRESHOLD OPPORTUNITY CLASS** **Designated sites:** Condition Class: 5% or less in CC5 85% or less in CC5 or 4 **At-Large camping:** Condition Class: 5% or less in CC5 25% or less in CC5 or 4 50% or less in CC5,4, or 3 85% or less in CC5,4,3 or 2 Total Barren Core Area: Maximum of 2000 ft^2 in designated or at-large sites. **PRIMITIVE OPPORTUNITY CLASS** Condition Class: 0% in CC5 5% or less in CC4 20% or less in CC4 or 3 50% or less in CC4,3 or 2 Total Barren Core: Maximum of 1000 ft^2 per square mile. **WILD OPPORTUNITY CLASS** Condition Class: 0% in CC5,4 or 3 25% or less in CC2 Total Barren Core Area: Maximum of 500 ft^2 per square mile.	Routine patrols for resource protection. Low-impact wilderness use education. Minor rehabilitation and obliteration of illegal sites in designated site use areas. Action plans for major work projects for trail and campsite rehabilitation. Designation of additional camping sites or areas. Decrease use limits. Closure of campsite on temporary or permanent basis. Mitigation to recreational impacts along beaches and at river-use attraction sites (Little Colorado River, Elves Chasm, Thunder River, Deer Creek, etc.) outlined in the Colorado River Management Plan.	Permit system: data provided for assessing actual use vs levels of impact. Rapid Campsite Assessment: 5 to 10 Use Areas per year. Baseline inventories for all use areas, subsequent monitoring based on Opportunity Class, use levels, patrol schedules, and mitigation priorities. Intensive Campsite Assessment conducted when additional campsite data is needed, such as when major changes in Use Area status or boundaries is proposed. Study of 24 sites in 3 vegetation types conducted on five year cycle. (Cole, 1985)

Figure 12.2 Visitor Experience

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring Programs and Sampling Procedures
Visitor Experience	Number of backcountry visitors: actual density Campsite Density Perceived Crowding Number of groups camped w/in sight or sound Number of parties contacted while travelling Number of encounters between different types of users Litter Number of occurrences of human noises per hour or day (e.g. aircraft, motors)	**CORRIDOR OPPORTUNITY CLASS** Developed, designated sites in main cluster. High probability of contacts w/ up to 30 parties in camps and large numbers on corridor trails. High probability of contacts with mules (concession and NPS) on Bright Angel, S.Kaibab and N.Kaibab trails. Frequent use of helicopter for administrative purposes. No tour operator flights in Bright Angel Flight Free Zone. **THRESHOLD OPPORTUNITY CLASS** Campsite density limited by designated sites. Max. 20 campsites in any square mile area in at-large camping use areas. 80% probability of camp contacts with up to 5 parties per night. 80% probability of up to 10 contacts with other overnight parties per day except in Monument and Hermit where up to 15 contacts may occur. Low probability of contacts with stock, except for NPS maintenance.	Routine compilation of Backcountry and Rim Use Areas use statistics. Routine patrols and maintenance. Visitor contacts. Interpretive programs. Education on low-impact camping techniques. Obliteration of illegal sites in designated camp areas. Obliteration of selected sites in use areas where density exceeds standards. Dispersal of use in clustered designated site use areas, by trail and campsite relocation or rehabilitation. Pre-trip information on aircraft use and zoning for trip planning purposes. Pre-trip information on river runners use of popular camping beaches along the Colorado River.	Campsite density (number per square mile area) data collected in Rapid Campsite Assessment (RCA) monitoring program. See Appendix J. Backcountry user survey for camp and trail encounters. Use of diary, or survey form based on programs developed by Underhill and Stewart et.al., (1986). Correlate number of encounters with satisfaction levels in non-corridor use areas. Surveys approved by OMB. Aircraft monitoring program: Observation and recordation of number and type of flights over Flight Corridors. Correlation of visitor satisfaction with levels of aircraft noise.

Figure 12.2 Visitor Experience (Continued)

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring Programs and Sampling Procedures
Visitor Experience	Number of backcountry visitors: actual density Campsite Density Perceived Crowding Number of groups camped w/in sight or sound Number of parties contacted while travelling Number of encounters between different types of users Litter Number of occurrences of human noises per hour or day (e.g. aircraft, motors)	**PRIMITIVE OPPORTUNITY CLASS** Maximum of 10 campsites in any square mile area per Use Area. 80% probability of camp contacts with up to 2 parties per night except in rim areas and Tanner where more may occur. 80% probability of up to 5 contacts with other overnight parties per day except in rim areas and Tanner, and along Colorado River where more may occur. Low probability of contacts with stock, except for NPS maintenance. **WILD OPPORTUNITY CLASS** Maximum of 5 campsites in any square mile area per Use Area. No contacts with other overnight parties. 80% probability of contacts with one overnight party per day. Probably no contact with day hikers. No probability of contacts with stock. **ALL AREAS:** High probability of occurrences with aircraft noise in use areas beneath designated flight corridors. High probability of occurrences of noise from motors in areas adjacent to the Colorado River during the Primary Use Period (5/1-9/15).	Education on low-impact camping techniques. Obliteration of illegal sites in designated camp areas. Obliteration of selected sites in use areas where density exceeds standards. Dispersal of use in clustered designated site use areas, by trail and campsite relocation or rehabilitation. Pre-trip information on aircraft use and zoning for trip planning purposes. Pre-trip information on river runner use of popular camping beaches along the Colorado River.	Campsite density (number per square mile area) data collected in RCA monitoring program. See Appendix J. Backcountry user survey for camp and trail encounters. Use of diary, or survey form based on programs developed by Underhill and Stewart et.al., (1986). Correlate number of encounters with satisfaction levels in non-corridor use areas. Surveys approved by OMB. Aircraft monitoring program: Observation and recordation of number and type of flights over Flight Corridors. Correlation of visitor satisfaction with levels of aircraft noise.

Figure 12.3 Cultural Resources

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring and Sampling Procedures
Cultural Resources	Site Integrity Vandalism (potholes, graffiti) Site Alterations (fallen or stacked rock elements) Collector's Piles Loss of Artifacts Trailing Soil Compaction Vegetation Trampling	No significant cultural resource which is being damaged by human use or eroded by natural forces--to the point there is a danger of loosing integrity or informational values--will be acceptable.	Public information and education through written materials, and visitor contacts. Impose site specific regulations and special use limitations in compliance with National Historic Preservation Act and NPS policies. Recreational use may be restricted to areas outside designated historic districts, traditional cultural places, and other areas where cultural resources are threatened by visitation. Restoration and rehabilitation of disturbed sites will be conducted and may include stabilization, trail re-routing, etc. Areas where cultural sites are threatened as a result of recreational use will be closed. Sites will be excavated, data analyzed, and crated.	Archeological surveys of main wilderness trails, designated camp areas, and popular at-large sites in all use areas. Cyclic site monitoring conducted in conjunction with campsite monitoring and trail surveys.

Figure 12.4 Water Resources

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring and Sampling Procedures
Water Quality	Fecal coliform Temperature Dissolved Oxygen Turbidity	State and Federal standards for chemical and biological parameters. Maintain natural water quality to promote healthy habitat.	Health Advisories. Alteration of camping facilities. Use area limits may be modified based on potential hazards or impacts to water sources.	Periodic sampling of water quality parameters to: 1) develop baseline data, 2) characterize natural conditions, 3) identify impact of management actions and visitor use.
Water Quantity	Instream flow levels Vegetation type Vegetation condition Presence of wildlife	Maintain natural flow regimes of springs, seeps, and tributaries of the Colorado River.	Water chemistry studies. Inventory all tributaries and quantify flows to greatest extent possible. Conduct Wild & Scenic Rivers suitability studies for major tributary streams.	Periodic sampling of water chemistry and routine discharge measurements. Inventory & monitor riparian vegetation extent and composition to document changes.

Figure 12.5 Trail Condition

Value to be Maintained and Enhanced	Indicators	Standards	Management Action(s) to be Implemented	Monitoring and Sampling Procedures
Trail Condition	Number of permitees Number of day users Stock Use (commercial, noncommercial and administrative) Erosion Number of multiple trails (incl. switchback cuts)	**CORRIDOR TRAILS** Type A, Level I. Maintained for high use. The N. Kaibab, S. Kaibab, Bright Angel, Plateau Point, Colorado River, and Arizona trails are designated Corridor Trails. **THRESHOLD TRAILS** Generally, Type C, Level IV. Maintained for semi-primitive, medium to low use levels. Special management actions apply to trails listed on National Register. Threshold trails include the Hermit, Clear Creek N.Kaibab to Clear Creek drainage, Thunder River, and Grandview trails. **PRIMITIVE TRAILS** Type C, Level V. Maintained for primitive, low use levels. Historic features are generally absent. Primitive trails include the Havasu, Tonto, S.Bass, Boucher, Hance, Tanner, Beamer, Nankoweap, N.Bass, S.Canyon, Deer Creek, Kanab Creek, Tuckup, Lava Falls, and river attraction site trails. **WILD TRAILS/ROUTES** Type C, Level V. Maintained for primitive, low use levels. No evident historical trail construction, user-defined paths in more remote areas.	On-going, routine maintenance of heavily used Corridor trails. Development of Action Plans for maintenance and rehabilitation of Threshold and Primitive trails. Trail maintenance performed to protect integrity of historical features, maintain maximum trail width and outslope. Development of Action Plans for rehabilitation work on Routes to mitigate unacceptable resource damage only. Trail rehabilitation on Routes performed not to exceed standards for Primitive Trails. Trail closure as necessitated by extensive damage to natural and cultural resources, or for human safety.	Trail condition surveys conducted on Threshold and Primitive trails on cyclic basis. Monitoring of river attraction site trails and some Threshold and Primitive trails that lead to camps adjacent to the Colorado River, conducted annually in the fall following primary river use period.

12.6 Research in Wilderness

A wide range of scientific studies are conducted within wilderness management areas in Grand Canyon National Park. Wilderness-related topics include studies of backcountry and river recreation and of ecosystem management alternatives. An overview of the entire research program, including a listing of current science information needs is contained within the Grand Canyon National Park Resource Management Plan (1997a). A complete listing of ongoing studies is prepared annually as the compiled Investigator's Annual Report (available on request from the Grand Canyon Science Center).

Information gained through inventories, monitoring, and research is essential for scientifically based resource management. Collection of complete, accurate, and high-quality data is basic to science, and frequently study objectives can be accomplished only through use of the best available technology. However, the tools and methods of scientific study can also have undesirable impacts on the character of wilderness. Such study-related impacts can be temporary or long-lasting. Examples of temporary effects include visitor disturbance, noise from survey helicopters or boats, and brightly colored dyes released during hydrologic studies. Longer lasting effects can include permanent markers, scarring of woody vegetation and rock outcrops, excavation pits, and equipment installations. In Grand Canyon National Park, every reasonable effort is taken to minimize impacts while simultaneously maximizing the benefits of scientific investigations (See Appendix B, *NPS Management Policies*).

Approval for scientific studies within wilderness areas is guided by principles established by Congress. Among these principles are that the imprint of man's work be substantially unnoticeable, that the wilderness area have outstanding opportunities for solitude, that wilderness be preserved and used in an unimpaired condition, and that wilderness contain ecological, geological, or other features of scientific, educational, scenic, or historical value. In many cases, Federal law and Departmental policy allow sufficient latitude to achieve the investigators' objectives

> *An area should not be excluded from wilderness designation solely because established or proposed management practices require the use of tools, equipment or structures, if these practices are necessary for the health and safety of wilderness travelers, or the protection of the wilderness area. Managers will use the minimum tool, equipment or structure necessary to successfully, safely and economically accomplished the objective... economic factors should be considered the least important of the criteria. The chosen tool should be the one that least degrades wilderness values temporarily or permanently* (U.S. Department of the Interior, National Park Service 1972).

Grand Canyon National Park applies a multistep review process to ensure that studies within wilderness management areas will benefit the public and the park units in which the studies are conducted. Permits are required for scientific research, specimen collection, and for access to restricted locations. Scientists wishing to work within the Park are invited to submit proposals specifically outlining the objectives, methods, location, and expected benefits of their proposed work. Proposals are required of both Federal and non-Federal investigators. Proposals undergo scientific and administrative review prior to the permitting decision. Scientific reviews are generally conducted by independent qualified subject-matter experts, who are invited to comment on the significance and urgency of the study, validity of the methods, and qualifications of the scientist. Administrative reviews, which are conducted by park management, are intended to evaluate the proposed activities relative to standards of legislative authority, and visitor and resource protection. Well designed studies with a high potential for positive benefits to the Park are generally reviewed favorably.

Guidelines for the preparation of study proposals and general research permit conditions and restrictions are contained within the *Application Procedures for Research and Collecting Permits, December 1996, Grand Canyon National Park and Glen Canyon National Recreation Area* (1996). Copies are distributed to prospective researchers on request. This document provides general guidance about conducting scientific studies within these parks, and permitting schedules. It contains the application form used for requesting research and collecting permits; proposals are accepted throughout the year. Each proposal is evaluated on its own merit, starting with the premise that opportunities for resource-based scientific investigation are basic to the Park's mission, and that the information gained through scientific studies will help protect park resources and benefit public programs.

Consideration for wilderness-related issues is part of both the scientific and administrative review processes. A conceptual representation of the administrative-review process pertaining to wilderness issues is contained in Figure 12.6. When potentially significant effects to Park resources, safety concerns, or excessive costs are discovered in the course of a permitting evaluation, joint reevaluation of the proposed study by the principal investigator and Park management may be required.

Investigators who concur with the stipulations of their permits can be authorized to conduct studies within the Park for as long as five years, depending primarily on their study plan. Progress on all studies is reevaluated at least annually. When necessary, permits can be canceled for noncompliance or significant deviations from the study plan.

Figure 12.6 Wilderness-related decision matrix for scientific permit applications

Each column of this table represents one set of ranking criteria (e.g., significance, safety, effects on park resources, etc.). Proposals that match descriptions at the top of a column are frequently complex and controversial. Some will require lengthy impact assessments and negotiation prior to a permit decision. Decision making is simpler for proposals matching descriptions near the bottom of a column.

Means of Access[1]	Mechanized Equipment[2]	Magnitude of Effects	Duration of Effects
Helicopter Fixed-wing aircraft Off-road motorized vehicle (e.g., truck, auto, ATV, snowmobile) Sport or utility watercraft (i.e., frequent upriver travel) Motorized watercraft (i.e., principally downriver travel) Nonmotorized wheeled vehicles (e.g., bike, wagon) Oar-powered watercraft (e.g., raft, dory, kayak) Stock animals Human powered (e.g., day hike, backpack, x-country ski, sled, climb)	Combustion engines (e.g., generators, pumps, motors) Solar, battery, wind, current, and hand-powered devices No powered devices	Potential regional or greater effect (e.g., species introductions) Potential effects extend over a broad area within or adjacent to the Park unit (e.g., fire, river manipulation, extensive aircraft use) Potential effects confined to multiple small areas (e.g., multiple small sampling plots, excavations, campsites) Probable effects confined to a single study site, which will be restored and is out of public view. Probable effects will be hard to detect without prior knowledge (e.g., limited sampling of loose geologic materials, seasonal plant growth, water, or air) No physical site impacts anticipated (e.g., photography, survey, sound or climate monitoring)	Permanent modification of park resources or adjacent areas (e.g., construction of a permanent study platform, field laboratory, or quarters; alteration of non-renewable resources, excavation of archaeological or paleontological sites) Long-term impacts (6 months to several years) to renewable resources (e.g., tree damage, population manipulation, excavations in recent sediments above mean high water) Seasonal impact (2 - 6 months, e.g., removal of seasonal plant growth, disturbance of beach deposits) Extended impact (obvious to casual observers for 2-4 weeks) Short term impact (1 day to 2 weeks, e.g., surface water dye studies, overnight field excursion) Instantaneous disturbance (e.g., seismic survey blast) No apparent impact
[1] Use restrictions apply to all forms of access except day hikes and public roads.	[2] Use of quietest available technology may be required.		

Frequency of Disturbance	Field Crew	Safety	Cost/Benefit Factors
Continuous or near continuous activity (e.g., permanent field laboratory) Frequent, long term activities (seasonal encampments) Multiple overnight site visits Multiple daytime site visits (e.g., repetitive surveys, data collection) Single overnight site visit Single daytime site visit No site visit (e.g., high altitude remote sensing)	Multiple group encampments or very large groups (e.g. 12 or more persons) Large group encampment (e.g., 7-11 persons) Small group encampment (2-6 individuals) Single individual No additional personnel placed on site, activities concurrent with approved site visits for other studies No site visit	High perceived risk to project personnel, visitors, or park staff from proposed activities. Training, safety gear, and other reasonable precautions do not appear sufficient to mitigate risk. Participation of essential personnel will not be possible under existing safety or logistical stipulations. Other qualified personnel are not available (i.e., can't complete primary study objectives given current restrictions). Participation of preferred, but non-essential personnel may be limited by safety or logistical considerations, inaccessibility of site, or personal capabilities (e.g., technical rock climbing, hike out from river). Other qualified individuals can be available to complete tasks. Broad participation of study team may be possible, but will require development of additional skills, special training or certification, guide services, special supplies or equipment (e.g., backpack, river trip, winter camping, electrofishing). Participation of study team is not limited by safety, logistical considerations or permit stipulations. Risks or other limitations associated with proposed activities can be significantly reduced by alternate methods acceptable to all cooperators.	Cost of NPS requirements associated with the proposed activities will make completion of the primary study objective infeasible. Permit stipulations are expected to increase cost to the point that meeting the secondary objectives will not be achieved. Permit stipulations will increase costs to the point that other, equally important, studies will be negatively affected. Permit stipulations have no lasting significant effect on ability to complete the study, or on institutional capabilities. Proposed alternatives are expected to reduce total project costs

Scheduling	Significance/Urgency		
Timing of access is critical, and may be spur-of-the-moment. Essential data can only be collected within a short window of time. (e.g., studies of short term or unpredictable phenomena, floods, migrations, fire, seismic activity). Study has specific seasonality and site visits must be made during pre-established time frames (e.g., migratory wildlife, plant or animal reproduction, seasonal growth, seasonal visitation). Study objectives can be met at any time of year subject to convenient scheduling of personnel, equipment, access, funding, etc. (i.e., work is not seasonal, resources are relatively stable, e.g., geologic strata, archaeology, paleontology, forest history) Study objectives have a high probability of being met through opportunistic sampling (e.g. river guide monitoring of beach sites, participation on river trips on a space-available basis)	Proposed activity is deemed inappropriate for NPS areas (permit will be denied) Importance of study, or the need for conducting the study within an NPS area, is not supported by the proposal (permitting decision will be postponed pending major proposal revision) Significance of study and need for conducting activities in protected NPS areas is documented in letters of recommendation from the investigator's institution and colleagues, but is not supported by qualified independent peer reviews (permitting decision may depend on a compelling justification by principal investigator or other recognized authority if there is any potential for resource impacts or interference with visitors) Significance of study and value to the park unit is clearly recognized by qualified independent peer reviews and by park management Broad recognition for the importance of the study exists at park, regional, and national/international level. Data are deemed important to solving immediate threats to public resources or human safety Need for studies on this topic is documented in the Park's current Resource Management Plan		

12.7 Summary of Changes and Actions

- Continue Rapid Campsite Assessment methodology for campsite monitoring. Establish a monitoring schedule based on use statistics and trend information. Conduct an inventory of campsites in use areas within the Wild Opportunity Class

- Implement a monitoring program based on sociological research and previous monitoring programs by 2002. Focus on users in wilderness areas (Threshold, Primitive and Wild Opportunity Classes)

- Develop a systematic schedule of archaeological inventory and monitoring in wilderness use areas based on use trends and patterns. Archaeological site surveys, inventories, and compliance will be conducted prior to developing resource-protection action plans

- Establish a strategy to conduct routine trail-condition surveys on wilderness trails and routes. Focus will be on trails that contain historic features, and those that receive moderate to high use levels by backpackers and river users. Conduct trail-condition surveys will be conducted in conjunction with routine trail maintenance and fall and spring rehabilitation river trips. Monitor trail-restoration work, on a cyclic basis

- Prepare biennial monitoring reports for Park staff including wilderness rangers, trail crew, and interpretation staff

- Continue to evaluate the tools and methods of scientific study for impacts on wilderness character applying the minimum-requirement decision process.

CHAPTER 13

Rehabilitation and Restoration of Recreational Impacts

An overall goal of wilderness management is to keep and make wilderness as wild and as natural as possible. This includes restoring wilderness character when it has been damaged by human use (Society of American Foresters [SAF] 1989a). Managers not only have a responsibility to maintain, preserve and protect present wilderness qualities, but also to restore those which are below minimum standards (*NPS Management Policies*, 6:2; SAF 1989b).

13.1 Revegetation and Site Rehabilitation

The primary objective of Grand Canyon's revegetation program is to restore native vegetation cover in impacted areas (Grand Canyon Resource Management Plan 1997a:97). This effort consists of four distinct yet interrelated aspects: 1) rehabilitating and restoring impacted sites to a natural condition; 2) establishing a dependable seed and propagule source for restoration efforts; 3) educating the public and workforce; and 4) monitoring the program's effectiveness.

Rehabilitating Impacted Sites

There are at least two critical steps in restoring impacted sites. The first is to identify the area of concern and determine why impacts occurred. For example, if multiple trailing is the issue, it would make little sense to intervene with an aggressive multiple-trail rehabilitation project without first delineating an adequate trail to accommodate recreationists. Otherwise, a new multiple trail pattern will develop. The second step is to determine the nature of the impacted site requiring rehabilitation and devise an appropriate mitigation plan.

Restoration

Restoration to a "natural" condition (See Appendix L, Natural Conditions) includes restoration and maintenance of natural processes and viable populations of all native species in natural patterns of abundance and distribution. For this discussion, the term "impact" will refer to human-induced alterations of natural processes, native biotic community compositions, and/or aesthetic elements.

In widespread degraded areas restoration may consist of landscape-scale actions, such as reducing or removing nonnative grazing animals and/or the restoration of natural fire regimes (See Chapter 11, Ecosystem Management). The restoration of small-scale sites resulting from recreational impacts, usually consists of returning impacted sites to the vegetative composition and aesthetic conditions of the area.

Rehabilitation

Rehabilitation consists of returning an impacted site or area to a specified (generally *natural*) level of soil conditions and biological productivity (including vegetation composition) (See Appendix L, Natural Conditions). Aesthetic considerations are also important. Since complete restoration is a long-term process, the steps taken by

managers generally constitute a sequence of rehabilitation actions which anticipate eventual restoration to a natural condition.

Rehabilitation of High-Use Sites

Given the same environmental setting, more highly impacted sites will require longer recovery periods. When different environmental settings are compared, however, it is difficult to predict how long recovery will take merely on the basis of how badly the site is impacted. There is some evidence that differences in recovery rates between different environments may exceed differences in deterioration rates. In addition, it may be more effective to speed recovery rather than slow deterioration (Cole 1994).

Sometimes anticipatory actions may not have the intended effect. For example, the seemingly logical strategy of rotating use—temporarily closing sites to allow recovery or frequently relocating trails—is likely to be counterproductive because it usually results in a pronounced increase in total impact. Many closed restoration sites recover slowly as displaced activity creates new impacts as visitors go elsewhere. This increases the areal extent of impact and therefore, total impact (Cole 1994).

The most likely effective strategy in controlling impacts in high-use sites is simply to select durable sites and to confine use to as small an area as possible. The characteristics of durable campsites and other areas of concentrated use include (1) either lack of ground-cover vegetation or presence of tolerant vegetation (grasslike plants are most tolerant—short woody plants are least), (2) an open rather than closed tree canopy, (3) thick organic soils, and (4) a relatively flat but well-drained site.

Rehabilitation of Little-Used Sites

Conversely much can be gained by reducing use in places that receive light use. Study results emphasize the importance of minimizing impacts in parts of the backcountry that are currently relatively undisturbed. Most of the backcountry falls under this category, especially the Esplanade and Tonto regions. This Plan emphasizes visitor education to encourage low-impact behaviors, such as selection of durable sites, as a key element in minimizing recreational impacts (See Chapter 10, Interpretation, Education, and Information).

Other management strategies with the most promise include (1) controlling type of use, (2) avoiding use during seasons when soil and vegetation are particularly vulnerable to disturbance (e.g., North Rim meadows) (3) confining use in popular places, and (4) perhaps, dispersing use widely in lightly used places. This latter strategy is risky and if attempted, conditions will be monitored closely (Cole 1994).

I know it is a daring thing--for a man whose life lasts 40, 50, 60, 70, or 80 years to be talking in terms of eternity, but that is indeed what we are doing. We are thinking of the eternity of the past that now exists in these areas of wilderness, and we have the presumption to say that we are going to do our best to make it possible for those areas from the eternity of the past to exist on into the eternity of the future. That is our faith.

Howard Zahniser
Author of the Wilderness Act

13.2 Site Restoration Recommendations

Disturbed sites in desert environments are inherently difficult to revegetate (Gelt 1993; Jackson, McAuliffe, and Roundy 1991; Heim 1994; Young, et al. 1994). Poor soil properties, extremely high surface temperatures, and lack of moisture retard or even prevent seedling establishment. On most sites, the relative contribution of wind and water to erosion in semiarid environments depends on soil conditions, and topography, and the nature and extent of impacts. The resulting erosion causes an almost irreversible loss in productivity (Ladyman and Muldavin 1996). Since geologic soil formation is estimated to be one inch per 300-1,000 years, significant soil loss on even a modest scale can be devastating. Erosional processes may also lead to an impoverished soil seedbank (Francis 1994). Site restoration recommendations include

- using the Minimum-Requirement Decision Process (Appendix D)
- identifying the source of impact
- preparing the site, including
    - moisture
    - catchments
    - mulch and shade
    - ripping
    - seeding

These elements are discussed in detail below.

Minimum Requirements

Grand Canyon National Park will apply only the minimum tools, equipment, device, force, regulation, or practice that will bring the desired result (See Appendix D, Minimum Requirement Decision Process). This not only applies to methods of transporting personnel and equipment to the site, and the selection of the types of tools required for successful implementation, but also the selection of materials needed for restoration. Materials used for soil stabilization and mulching will consist of native vegetation, soil, and rock sources, if possible. Potentially intrusive materials such as jute matting (See Mulch and Shade below), will be carefully camouflaged. Work projects will consist of the minimum number of participants (generally less than the maximum hiker group size of 11). If possible, a project date will be selected that avoids conflict with recreational users. In general, project dates, tools, and materials will be selected that least impact the resource and visitor experience.

Identify the Source of Impact

Generally, rehabilitation of natural perturbations such as floods, fire and landslides will not be attempted in wilderness. Exceptions may be made regarding exotics or rehabilitation of degraded landscapes (See Chapter 11, Ecosystem Management). Unacceptable recreational impacts, as defined through the LAC process, require active intervention. As dis-

cussed above, it makes little sense to initiate a rehabilitation project without understanding the cause of the original impact. Attempts to reduce the size or number of barren core areas (barren core areas have compacted soil, trampled perimeter vegetation, and are devoid of vegetation and organic litter) will be futile if the allowed group size or total group numbers exceed the area's capacity. Elimination of multiple (social) trailing may be counterproductive without first delineating an adequate primary trail. Otherwise, the area of impact simply increases as "rehabilitated" trails reappear and new ones develop. Since many archeological features occupy sites providing shelter, shade, and proximity to water—conditions deemed desirable by modern hikers—restoration may not succeed unless adequate alternative sites and education are provided, or as a last resort, the area is closed to camping or visitation.

Site Preparation

Moisture

Moisture is not only necessary for immediate germination and growth, but seedlings must grow large enough to tolerate drier, normal conditions. Even in undisturbed deserts, seeding establishment occurs infrequently and only when there is unusually plentiful rainfall. Irrigation is beneficial in establishing vegetation, but in wilderness settings it is often impractical, impossible, or in some cases may exceed minimum tool. Some of the actions Grand Canyon may take include, contoured water catchments (to concentrate moisture); mulching with coarse, woody debris that is slow to break down; and seeding prior to winter rains to increase the probability of successful seedling establishment (Jackson, McAuliffe, and Roundy 1991; Gelt 1993).

Catchments

The use of contoured berms (resembling contour plowing) on slopes, depressions, and checks (small dams) in arroyos provides for water concentration, and greatly enhances soil moisture. Since these measures require some degree of site manipulation, care will be taken to assure that only low-key, unobtrusive, minimally visible features consisting only of natural materials are used. An archaeological evaluation as part of the compliance process is necessary before any surface disturbance occurs.

Mulch and Shade

Mulch reduces soil surface temperatures and greatly improves soil moisture accumulation, not only near the surface but at depth (Jackson, McAuliffe, and Roundy 1991). The preferred mulch in wilderness settings consists of woody debris and natural leaf litter (preferably from beneath native trees and large shrubs). Locally derived leaf litter provides additional benefits such as a source of native seeds and important microbiotic soil elements. It is also readily removed by winds unless stabilized through soil scarification (roughing the surface) or covering with heavier woody debris or commercially prepared jute matting.

For this discussion, jute matting refers to commercial blanket or matting consisting of wood fibers or burlap which is used to stabilize exposed soils. Jute matting also functions as a mulch by reducing soil temperatures and increasing soil moisture, as well as capturing windblown seeds. It is useful when the restoration surface area is large, especially when native mulch sources are limited. Because of its visually intrusive nature, jute matting will be used only when native material sources are insufficient for adequate site preparation. Native woody debris and leaf litter will be used to camouflage the jute matting. In addition, some jute matting comes with a fine, plastic netting that degrades in sunlight. Since animals ranging in size from elk to reptiles can become entangled, this netting will be removed after placement.

Another useful (albeit labor intensive) method of shading or blocking restoration sites is to "plant" dead brush and deadfall in the disturbed area. The material used consists mainly of dead brush found in various states of abundance. If carefully and patiently done, this method can facilitate restoration in a variety of ways. First, an artfully crafted planting, along with a liberal application of leaf litter, can visually blend the disturbed site with the surrounding vegetation. This creates a passive, visual barrier which, since the site is no longer recognized as a trail or camp, reduces or eliminates subsequent recreational impacts. In addition, the planting activity provides a small scale de-compaction of soil as each element is planted. The brush also shades the immediate area, providing an ameliorated microclimate of reduced temperature and improved moisture. Grand Canyon will incorporate these ecologically sensitive measures into its rehabilitation program.

Ripping (Decompaction) of Soil

Tillage, scarification, or ripping compacted soils allows water to penetrate much more easily, and this treatment is important, but not critical, in improving soil moisture. Because of the widespread presence of archaeological features in Grand Canyon, this practice will not occur unless specifically authorized by the Park archaeologist. Often, the freeze-thaw cycle affecting most of the Park generally breaks up soil surfaces to a sufficient depth for many grass species—provided additional impacts do not occur. If ripping is approved, a variety of methods will be used depending on the area's extent. Generally, hand tools such as picks, shovels, pulaskis, and occasionally rock bars will be used for small areas. Stock-drawn rippers resembling plows may be used by qualified persons for larger-scale projects. Mechanical alternatives, a last resort, are addressed in Appendix D, Minimum Requirement Decision Process. Soils formed in arid and semiarid conditions are extremely shallow; ripping should involve soil de-compaction with an absolute minimum of soil mixing (Jackson, McAuliffe, and Roundy 1991).

Seeding

Seeding will be derived from local sources suitable to the restoration site.

Depending on the life of the seeds in the soil, an area might need to be re-seeded. If stands of native plants exist nearby, natural introduction of seeds may be adequate provided the site preparation work persists or is refurbished (Jackson, McAuliffe, and Roundy 1991; Day and Ludeke 1990). The value of fertilizers in arid and semiarid environments is questionable (Morgan 1994).

Some research and experience indicates that seeding in the fall will result in higher probability of seedling establishment. If fall-winter-spring precipitation is sufficient to start seedling emergence, midsummer moisture events may be very important in native seedling establishment. A commonly accepted rule of thumb for seeding grasses in rangeland seedbeds is to plant at a depth two and one-half times the diameter of the seed. Deep planting increases likelihood of adequate moisture, and may make it more difficult for rodents to locate and recover artificially planted seeds (Jackson, McAuliffe, and Roundy 1991).

cryptogamic crust

A cryptogamic crust is a brown, black, grey, or white soil cover composed of either algae, lichen, moss, fungi, or liverwort, alone or combined (Ladyman and Muldavin 1996). Living cryptogamic crusts should not be confused with inorganic desert crusts which appear similar to the organic structures, but reduce water infiltration and increase runoff and erosion. In contrast, the cryptogamic crust minimizes erosion and provides nitrogen to the soil (Fletcher and Martin 1948; Harper and Marble 1988). As early as 1948, researchers observed that Southwest crusts composed of algae and lichen had the beneficial function of reducing erosion and adding organic matter to the soil (Fletcher and Martin 1948). There is a growing body of quantitative evidence that cryptogamic crusts are important in stabilizing soil against erosional forces, especially in arid and semiarid environments that cannot support lush grass growth and are particularly susceptible to erosion (See Ladyman and Muldavin 1996).

Microbiotic crusts are extremely fragile and are prone to destruction with slight impacts (Belnap 1993; Beymer and Klopatek 1992; Cole 1990a). Trampling by backcountry recreationists is capable of seriously impacting large areas. Very low levels of ongoing use will maintain high levels of disturbance. This shows most commonly as webs of trails that surround trail junctions, camping areas, and points of interest (Cole 1990a).

Although lichen and moss growth tends to be slow, other microbiotic crusts have the potential for rapid recolonization (Cole 1990a). Inoculation with cryptogam preparation is one way to hasten cryptogamic crust development (St. Clair, et al. 1984; Belnap 1993). Dry inoculation—crumbling material from one area spread as thinly and evenly as possible over another area—is an effective method. Studies indicate that inoculation contributes significantly to reestablishing crusts in as little as two

years, although not to levels of undisturbed sites (Belnap 1993). Studies conducted in Grand Canyon indicate surprisingly rapid recovery of crusts in as little as five years, provided the source of perturbation is eliminated (Cole 1990a).

Cryptogam are significant ecosystem components. They contribute to landscape stability and increasing nutrient status and biodiversity. In arid parks it is important to educate visitors about the nature, importance, and fragility of cryptogamic crusts. It is also important to locate trails, camping areas, and other activity sites away from places with well-developed crust and, where this is not possible, try to confine traffic to one well-developed route (Cole 1990a). Grand Canyon will consider cryptogam life forms when planning backcountry facilities, rehabilitation, and a sustainable ecosystem-management strategy.

Establish a Dependable Seed and Propagule Source

Seed Collection

The more plants from which seeds are harvested, the greater the chance that the collection will contain potentially important genes, and that these genes will be represented in the same frequencies as in the original population.

Grand Canyon National Park will choose plants from which to harvest seed in a random fashion, trying to avoid both conscious and unconscious selection by paying little attention to plant phenotype. This will enhance the probability of including genes for survival under varying conditions, not just the conditions that contributed to the phenotype and the vigor of the plant at the time the seed was harvested (Knapp and Rice 1994).

Collecting seed from a population growing in a similar environment as the target environment, on both a regional and local scale, can increase the odds that a well-adapted germplasm will be selected for restoration. Without knowledge of the gene combinations that determine adaptation to a certain environment, the best we can do is to collect material from environments with potentially similar section pressures as the planting site. Reasonable regional adaptation can also be attained by just selecting plant material from sites with similar elevation, latitude, climate, and so on as the site to be restored (Knapp and Rice 1994).

Less obvious, but perhaps equally important, genetic variation may be associated with local edaphic gradients, biotic factors, microclimate, and soils. Aspect of a site is another potentially strong local selective force, with plants growing on a sunny, southern exposure more likely to contain genes for drought stress than plants growing just over the hill on more shaded northerly slopes (Knapp and Rice 1994).

Cultivation and Nursery Considerations

If the seed cultivation (seed increase) environment is different from the even-

tual target environment, selective pressures may greatly alter the seed's genetic composition. The best way to avoid genetic shifts is to cultivate seed in an environment as similar as possible to the target site. In addition, upon replanting a seed-increase field, it is important to use originally collected seed, not seed from a previous seed increase (Knapp and Rice 1994). Grand Canyon will adhere to these specifications.

The Park currently has a nursery operation, including two greenhouses on the South Rim devoted to the propagation of native plants. In addition, the Science Center staff is developing a partnership relationship with Glen Canyon national Recreation Area to establish a native grass seed cultivation area at Lees Ferry.

Educate the Public and Workforce

An effective restoration effort requires an effective educational program (See Chapter 10, Interpretation, Education and Information). An educated public and workforce can effectively reduce the extent of recreational impacts that would otherwise require active restoration intervention. In addition, the public and staff needs to understand the need for restoration, not only to support such efforts, but also to decrease the likelihood of dismantling labor-intensive projects. An effective education program will be established to create

- a coordinated interpretive program to provide visitors access to adequate and accurate information regarding protection of natural and cultural resources

- a coordinated wilderness education program for staff (permanent, seasonal, and volunteer) to develop resource protection and restoration skills. These include 1) wilderness management principles and philosophy; 2) Leave No Trace training; 3) application of minimum requirements, 4) development proficiency in the use of primitive tools; 5) development of minimum-impact trail maintenance, site restoration, and minimum-impact fire suppression tactics and techniques.

Implement Restoration/ Rehabilitation Program

Currently, two winter river trips (approximately 6 weeks total) are dedicated to the restoration and rehabilitation of impacts within the proposed wilderness. Work crews of paid and volunteer staff conduct site restoration and revegetation, trail maintenance, and exotic plant control in remote locations throughout the inner canyon. Additional volunteer crews are occasionally organized to perform similar work on the rims during the summer.

Park staff will continue to expand its partnership relationships with conservation groups, schools, and other agencies in order to achieve restoration goals.

Develop an Effective Monitoring Program

Grand Canyon will implement an effective monitoring program which evaluates restoration treatment effectiveness (See Chapter 12, Monitoring and Research). All the good intentions in the world will not guarantee a successful restoration program without adequate evaluation of the techniques used.

13.3 Summary of changes and actions

- The Park will continue its winter river-based restoration program. This will be accomplished during two three-week trips, and will generally consist of work parties of 16 crew members.

- Park staff will continue and expand supplemental restoration programs, including the establishment of partnerships with governmental and nongovernmental organizations.

- The Park will continue its plant nursery program. Science Center staff will develop, in cooperation with Glen Canyon National Recreation Area, a native grass cultivation program.

CHAPTER 14

Cultural Resources Management

14.1 Issues and Public Concerns

Through the Scoping process for this Plan, public comments concerning cultural resources were received; the majority related to site-preservation efforts and education. Numerous comments were received suggesting ways to better protect archeological resources. Improved education, in a variety of formats, was by far the most common suggestion. Posting notices on archeological sites, closing sites, increasing interpretive information provided to hikers, educating park personnel, increasing patrols, and adding information to written guidebooks were all suggested to mitigate site impacts. Education is the most important aspect of an active approach to management, and is discussed in Chapter Ten. On-site mitigation efforts, increased monitoring and signage, and active changes in trails and designated campsites are discussed in this section and also in Chapter 12, Archeological Monitoring, and Chapter 16 Implementation Plan and Schedule.

14.2 Program Overview

The Cultural Resource Management Program at Grand Canyon is devoted to the management of program requirements, maintenance, ongoing projects, and activities. Cultural Resources Program include archaeology, ethnography, curation, cultural landscapes, historic preservation and American Indian consultation. All these elements are a component of wilderness management at Grand Canyon.

Cultural resources management is mandated by law and policy. Major historic preservation laws include the Historic Sites Act of 1935, the National Historic Preservation Act of 1966 (as amended 1992), the National Environmental Policy Act of 1969, the Archeological and Historic Preservation Act of 1974, and the Archeological Resources Protection Act (ARPA) of 1979 (as amended 1988). Of particular importance are additional documents such as *NPS Management Policies* (1988*)*, the Antiquities Act of 1906, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and Executive Order 13007 Indian Sacred Sites signed May 24, 1996.

The primary objective of the Cultural Resource Management Program is to meet the basic requirements outlined in the Cultural Resource Management Guidelines, (NPS-28) to ensure cultural resources are identified, properly managed, and preserved. This objective is accomplished through a systematic program of research, planning, and stewardship.

According to *NPS Management Policies* (5:2), the NPS will conduct a coordinated program of basic and applied research to support planning for and management of park cultural resources. In addition, *NPS Management Policies* (6:7) states

> *Cultural features such as archeological sites, historic trails or routes, or structures that have been included within wilderness will be*

protected and maintained using methods that are consistent with the preservation of wilderness character and values and cultural resource protection requirements.

Cultural resources management within the Park's wilderness areas is focused on archeological resources (historic and prehistoric), ethnographic resources (traditional cultural properties and access accommodations), historic resources (buildings, trails, landscapes), and objects (artifacts preserved *in situ*).

14.3 Archeological Resources

Archeological resources are those physical remains that provide the basis for understanding and interpreting prehistory and history. Of all cultural resources found in Grand Canyon, the greatest conflict in visitor use and management relates to archeological resources. This situation is caused, in part, by the fact that humans have used the Grand Canyon for thousands of years—a good route prehistorically has become a good trail today; a good campsite 1000 years ago was a good campsite 100 years ago, and is still a good campsite. Remains of prehistoric and historic activity is evident in a large portion of the more popular wilderness use areas.

As stated in Chapter Two of this Plan, the existing inventory of archeological sites is based on a survey of only two percent of the Park. Most of the inventory has been conducted along the Cross-Canyon Corridor trails, the primary wilderness trails, and near popular use areas such as Hermit Creek and Tanner. The monitoring program focuses primarily on sites located at existing and potential camp or day use areas (See Chapter 12.3, Monitoring and Research Programs).

Monitoring by itself can not mitigate the impacts that have already occurred or are currently occurring to archeological resources. Monitoring provides the means of tracking and evaluating the condition of archeological resources so that managers can develop appropriate protection actions. Law enforcement and public education provide avenues for preventing future impacts but cannot address the impacts which have already occurred. For long-term monitoring to be worthwhile, it is essential that the monitoring program be directly linked with other treatment programs that can address the ongoing impacts to these nonrenewable heritage resources through stabilization, rehabilitation, or, if no other reasonable options are available, through site closure or excavation.

Specific treatments to mitigate impacts to archeological sites, especially in the more popular wilderness areas include designating campsites to concentrate use in areas with high concentrations of archeological resources, and to reroute and redesign trails to avoid impacts from foot traffic. These management actions are identified for specific areas in Chapter Sixteen, Implementation Plan and Schedule.

Every place, like every person, is elevated by the love and respect shown toward it, and by the way in which its bounty is received.

Richard Nelson
The Island Within

14.4 Ethnographic Resources

An ethnographic resource is any natural or cultural resource linked to the traditional practices, values, beliefs, history and/or ethnic identity of a cultural group or groups. Specific direction on management of these resources is found in NPS-28 and *NPS Management Policies*. In addition to specific NPS direction, legal direction is also found in the American Indian Religious Freedom Act, the Religious Freedom Restoration Act, and Executive Order 13007 (Indian Sacred Sites).

Grand Canyon has been home to various groups for thousands of years. These people, both American Indian and more recent Euro-Americans, have used the Canyon as both a home and a place linked to traditional practices, values and beliefs. Euro-Americans recognized the Canyon's spiritual values in the establishment of the national park in 1919. World Heritage designation told the world that Grand Canyon had value beyond the American people. The 1975 Grand Canyon Enlargement Act specified natural quiet and the view as important, yet intangible qualities, that must be protected. These are all ethnographic resources.

Through the integration and improvement of resource management, visitor experience, and personnel sensitivity, the ethnographic program seeks to raise the level of the public's and park personnel's understanding and appreciation for natural, cultural, and ethnic diversity.

Tribal interest in management of wilderness areas at Grand Canyon National Park is significant. The Park's management staff is committed to ongoing integration of Tribal perspectives into Park programs. Effective government-to-government relationship with eight separate Indian Tribes (represented by six Tribal governments) will be maintained through the Cultural Resource Management Program.

Traditional Cultural Properties

Closely linked with ethnographic resources, *traditional cultural properties* (TCP) are defined as "one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (U.S. Department of the Interior, National Park Service, Undated). Given the thousands of years of American Indian association with the Canyon, it is likely that many traditional cultural properties can be defined in the Park. Locations can only be defined by those cultural groups whose association with Park resources and values can be defined within National Register contexts. Ongoing consultations with groups affiliated with Grand Canyon National Park will further identification of important traditional cultural properties.

Access and Accommodation

On May 24, 1996, President Clinton signed Executive Order 13007 to accommodate access to American Indian sacred sites by Indian religious practitioners, and to provide additional protection for the physical integrity of such sites on Federal lands. EO 13007 directs the NPS (and other Federal agencies) to accommodate access to and ceremonial use of sacred sites by American Indian people to the fullest extent possible under the law.

Wilderness areas of Grand Canyon National Park are likely to contain locations of importance to American Indian religious practitioners, requiring accommodation for access and use. *NPS Management Policies* (6:7) is specific when referencing cultural resources and American Indian use in wilderness areas, and implementation of EO 13007 will be consistent with existing policy:

> *Cultural features such as archeological sites, historic trails or routes, or structures that have been included within wilderness will be protected and maintained using methods that are consistent with the preservation of wilderness character and values and cultural resource protection requirements.... Native American religious areas and other ethnographic resources will be inventoried and protected. Native Americans will be permitted non-motorized access within wilderness for sacred or religious purposes in accordance with criteria for special park uses.*

NPS wilderness policy and management does not preclude accommodation and use of sacred sites. In contrast, NPS management has the ability to embrace and implement the broad provisions of EO 13007.

14.5 Historic Resources

Historic resources are those buildings, trails, and objects that have achieved their significance during the recent past. At Grand Canyon, literally hundreds of buildings and hundreds of miles of trails are considered significant historic structures. A structure is a "constructed work...consciously created to serve some human activity."

Although by its very nature, wilderness areas are typically devoid of evidence of recent human activity, wilderness areas may contain features of historical value. Proposed wilderness within the Park contains significant historic structures, mainly in the form of constructed trails. These trails represent a continuum of use, from prehistoric to historic times, and are the link between the rim and inner canyon. Historic trails may serve and be maintained as part of the wilderness trail system (*NPS Management Policies*, 6:2).

Cultural Landscapes

A cultural landscape is "a geographical area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with an historic event, activity, or person or exhibiting other cultural or

aesthetic values." In the broadest sense, a cultural landscape reflects human adaptation and use of natural resources. This is often evident in the division and organization of the land, the presence of both natural and cultural biotic features, the systems of circulation that allow movement, and the types of structures that are built. A cultural landscape's character is defined by physical material, use, and function. Individual features, such as roads, buildings, walls and vegetation are material components that, taken together, create the whole landscape. Patterns of use and function reflect cultural values and traditions. The Grandview Trail leading to Horseshoe Mesa and the Last Chance Mining District is considered a cultural landscape.

14.6 Objects

Although we typically think of historic objects as curatorial materials within museum collections, preservation *in situ* (in its original place) is often the preferred management decision. The range of historic and prehistoric objects found in Grand Canyon's wilderness is wide, from broken pottery and projectile points to cast iron stoves, tin cans and wooden burro panniers. All of these objects are part of the cultural landscape, the archeological site, or the historic resource, and are afforded the same protection as other cultural resources.

Collection of objects, be they historic or prehistoric, is not undertaken by archaeologists without clear program definition and research orientation. "Park archeological resources are left *in situ* and undisturbed, unless removal of artifacts or intervention into cultural material is justified in the planing process by preservation treatment, protection, research, interpretation, or development requirements. They are preserved in a stable condition to prevent degradation and loss of research values or *in situ* exhibit potential" (U.S. Department of the Interior, National Park Service 1994a). Tribal consultations have recommended that archeological remains be left in their original location if at all possible. Objects that are collected are curated in Grand Canyon's Museum Collection.

14.7 Native American Graves Protection and Repatriation (NAGPRA)

NAGPRA was signed into law by President George Bush on November 16, 1990. This law addresses the rights of lineal descendants, Indian Tribes, and Native Hawaiian organizations to certain Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony with which they are affiliated. All provisions of implementation specified in NAGPRA and its implementing regulations will be followed by Grand Canyon.

The possibility of inadvertently discovering American Indian human remains, funerary objects, sacred objects or objects of cultural patrimony within Park wilderness is very real. Although human remains are rare in the archeological inventory, we acknowledge that human

remains could be found anywhere people have lived and traveled. Grand Canyon National Park will enter into agreements with affiliated Tribes regarding inadvertent discoveries. Ongoing consultations with Tribes affiliated with the Canyon suggest that *in situ* preservation and reburial as close to the original location as possible are preferred. The details related to appropriate treatment under NAGPRA will be included in individual Memoranda of Understanding (MOU). Until such time as individual MOUs are in place, provisions specified in the final rule for NAGPRA §10.4 will be followed.

14.8 Cultural Resource Stewardship

Responsibilities are accomplished by many Park units, with the majority carried out by the Cultural Resource Management Program. The Division of Maintenance is involved in cultural resources preservation through historic structures, trails, and landscapes. The Division of Visitor and Resource Protection is key to cultural resource protection. Through ARPA-related patrols and monitoring efforts with the archeological staff, evaluations and recommendations for management actions are presented to the superintendent.

In addition, the Cultural Resource Program Manager, serves as liaison with the eight affiliated American Indian Tribes. An active consultation process involves working in cooperation with the affiliated Tribes when proposed management actions have potential impact to cultural resources and values.

14.9 Summary of Changes and Actions

Figure 14.1

Summary of Changes and Actions

Program Area	Management Actions	Stewardship Responsibilities
Archeological Resources •Prehistoric •Historic	Inventory and Monitoring Site Protection Site Preservation Education	Archaeologist Wilderness Ranger Trail Crew Interpreters
Ethnographic Resources •Traditional Cultural Properties •Access Accommodations	Consultation Education	Cultural Resource Manager Archaeologist Interpreters
Historic Resources •Buildings, Trails, Roads, Objects •Cultural Landscapes	Inventory and Monitoring Site Protection Site Preservation Education	Archaeologist Wilderness Ranger Maintenance Crew Interpreters
NAGPRA	Consultation Development of MOU	Cultural Resource Manager Archaeologist Wilderness Ranger

CHAPTER 15

Havasupai Traditional Use Lands

15.1 Issues and Public Concerns

Access to Park lands through the area known as the Havasupai Use Lands was another concern identified during the public scoping process. The majority of concerns were expressed by individuals who cross the Great Thumb and Esplanade, included within the Havasupai Use Lands, to Park areas around Royal Arch and Elves Chasm. This chapter addresses access and permitting on Havasupai lands adjacent to the Park (See also Chapter Five, Backcountry Permits System; and Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands).

15.2 Background

The Grand Canyon Enlargement Act of 1975 (Public Law 93-620), greatly enlarged Grand Canyon National Park by incorporating Marble Canyon National Monument, Grand Canyon National Monument, and portions of lands previously administered by the Bureau of Land Management and Lake Mead National Recreation Area into the legal boundaries of Grand Canyon National Park. In addition to enlarging the Park, significant additions were made to the Havasupai Reservation. Section 10 (a) of the Act provided an additional 185,000 acres to be held in trust by the Federal government for the Havasupai Tribe. Subsection (b)(6) of the Act states

. . .nonmembers of the tribe shall be permitted to have access across such lands at locations established by the Secretary in consultation with the Tribal Council in order to visit adjacent parklands, and with the consent of the tribe, may be permitted (i) to enter and temporarily utilize lands within the reservation in accordance with the approved land use plan described in paragraph (4) of this section for recreation purposes or (ii) to purchase licenses from the tribe to hunt on reservation lands subject to limitations and regulations imposed by the Secretary of the Interior.

(7) except for the uses permitted in paragraphs 1 through 6 of this section, the lands hereby transferred to the tribe shall remain forever wild and no uses shall be permitted under the plan which detract from the existing scenic and natural values of such lands.

In addition to the description of lands added to the reservation, Section 10(e) of the Act directed the Secretary of the Interior to "permit the tribe to use lands within Grand Canyon National Park which are designated as Havasupai Use Lands." This provided Havasupai use "for grazing and other traditional purposes" of 95,300 acres of Grand Canyon National Park generally known as the Esplanade, and extending approximately from Royal Arch Creek on the east to National Canyon on the west."

15.3 Management of the Havasupai Use Lands

In 1982, Grand Canyon National Park and the Havasupai Tribe developed a Memorandum of Understanding (MOU) (U.S. Department of the Interior, National Park Service 1982a) which governed the use of what has become known as the Havasupai *traditional use lands* (TUL). Although the MOU lapsed in 1987, incorporation of the essential elements of the agreement into the Wilderness Management Plan will continue to provide guidance to Grand Canyon National Park management and the Tribal government regarding use and access on the TUL.

• Both the National Park Service and the Havasupai Tribe concur that the Tribe retains grazing rights in the TUL consistent with acceptable range-management practices for the particular acreage.

• The Havasupai will not graze sheep in the TUL, and horses presently grazing in the TUL that are unclaimed will be removed by the Havasupai. Havasupai livestock in the TUL will be branded.

• Consistent with traditional use, the Havasupai may hunt in the TUL, except in the summer, in such a manner as is consistent with acceptable wildlife-management practices, and concurred in by the Secretary of the Interior. Individuals who are not members of the Havasupai Tribe will not be permitted to hunt in the TUL. Bighorn sheep, predators, and rare and endangered species will not be hunted. Problem predators will be reported to Grand Canyon National Park management, and a joint and mutually satisfactory solution developed.

• As originally identified in the Act, Havasupai use of the TUL will continue for traditional purposes. This includes gathering edible wild plants, materials for paints and medicines, other legitimate traditional substances, and minimally improving existing springs to maximize available water for wildlife and visitors in such a manner that the natural and scenic beauty of the TUL will not be marred.

• Grand Canyon National Park will limit visitor access to the TUL from the Havasupai Reservation to two trails leading from the rim: the Apache Point Trail and the 140 Mile Canyon Trail. Permits will be granted only to experienced hikers who request them. Visitors remaining overnight in the TUL must have Grand Canyon National Park permits, and, to access and/or camp on the Havasupai Reservation, Tribal permits. Grand Canyon National Park will forward individual permit information to the Tribe whenever overnight hikers access the Park via Tribal lands. Confirmation of a Tribal permit will be required prior to issuing a Grand Canyon backcounty permit. For the benefit of those visitors permitted to hike across the Great Thumb to the head of Apache Point and/or 140 Mile Canyon Trails, the Havasupai Tribe will designate adequate parking facilities on the Topocoba Hilltop Road and, by means of a sign, bulletin

There may be people who feel no need for nature. They are fortunate, perhaps. but for those of us who feel otherwise, who feel something is missing unless we can hike across land distrubed only by our footsteps or see creatures roaming freely as they have always done, we are sure there should be wilderness.

Margaret E. Murie

board, or other appropriate information device, inform the visitor of Tribal regulations to be observed while crossing the reservation to gain Park access.

• No vehicular access or use of horses by non-Tribal members will be permitted on the Great Thumb north of the Topocoba Road and north and west of a line running south from Forster Canyon, except in an emergency, such as when human life is endangered, for forest-fire suppression, and for official Park administrative and protective functions. Havasupai Tribal members may guide nonmembers on Tribal horses in the TUL.

• Numbers of visitors permitted in the TUL have been determined and are consistent with hiker limitations in other areas of the Park. These areas are managed as "wild" zones, with no more than two hiking groups and a maximum of 16 people permitted within the TUL at any given time, with a maximum stay in each area not to exceed seven nights.

• All visitors to the traditional use area, regardless of route or access, will at all times abide by NPS regulations and/or hiking permit conditions (See Chapter Four, Recreational Use of Wilderness). In addition, visitors to the traditional use area must pay particular attention to the following permit conditions

- •No firearms
- •No open campfires
- •No removal of, marking on, or breaking any natural object
- •No removal or disturbance of archeological materials, artifacts, or ruins
- •No camping at springs, archaeological sites, or around Mt. Sinyella
- •During foot travel across the Great Thumb, whether on Tribal or Park land, visitors will use what has been called the Great Thumb Jeep Trail. Camping will be permitted within 50 yards (45 meters) of the trail
- •No permits will be issued to climb Mt. Sinyella
- •Visitors seeking water near 140 Mile Canyon should obtain it only from the spring running along the bottom of the wash at the head of 140 Mile Canyon
- •Visitors must not disturb Tribal livestock

15.4 Native American Graves Protection and Repatriation Act

Although the provisions related to the Native American Graves Protection and Repatriation Act (NAGPRA) were discussed in Chapter Fourteen, mention of law in relation to TUL management is appropriate. The TUL, as land within Grand Canyon National Park, is subject to the same provisions regarding implementation of NAGPRA for all other areas of the Park. However, Havasupai traditional use of the TUL presents a unique opportunity to work cooperatively with the Tribe in the development of appropriate treatment for human remains and sacred objects discovered within the TUL.

A specific agreement will be developed with the Havasupai Tribe regarding inadvertent discoveries on the TUL. Although identification of cultural affiliation is critical, consultation with the Havasupai and other affected Tribes will be used in drafting a Memorandum of Understanding related specifically to the Havasupai use lands within Grand Canyon National Park.

15.5 Culturally Sensitive Areas

Certain reservation and TUL areas hold special meaning to the Havasupai people. These areas, discussed in general in Chapter Fourteen as traditional cultural properties, ethnographic resources, and sacred areas, are defined by the Tribe. Grand Canyon National Park will incorporate information provided by the Tribe in an attempt to protect the physical and spiritual integrity of those places and use as defined in EO 13007. (See Chapter 14, Cultural Resources Management).

15.6 Summary of Changes and Actions

- Incorporate essential elements of the MOU governing the use of the TUL including actions related to traditional uses and visitor access
- Establish a cooperative permitting system with the Havasupai Tribe that includes exchange of information on requested visitor use of the area, and confirmation on permit issuance from either the Park or the Tribe. (See also Chapter 5, Backcountry Permit System)
- Under the provisions of NAGPRA, develop a specific agreement with the Havasupai Tribe regarding the inadvertent discovery of human remains on the TUL
- Under the provisions of EO 13007, incorporate information provided by the Havasupai Tribe on culturally sensitive areas, and assure accommodation of the traditional use of these areas.

CHAPTER 16

Wilderness Management Implementation Plan

The following is a compilation of future and ongoing management actions to be taken to fully implement this Wilderness Management Plan. Each management action, described earlier in this Plan, is listed under a corresponding Management Objective (see Chapter 1, Goals and Objectives). In addition, the actions are referenced by the chapter(s) in which they are described. A summary table follows which outlines the action, target goals, and staff responsibilities.

Wilderness Management Plan Goals

1. *Provide guidance and describe strategies for meeting legislative and policy mandates on wilderness management while providing recreational opportunities consistent with wilderness for a broad range of visitor experiences and settings, and preserving and protecting the natural, cultural, and social resources of Grand Canyon National Park.*

2. *Provide for the continuity of wilderness management throughout changes of park administration and staff.*

Actions

- Implement wilderness management policies for areas of proposed wilderness in Grand Canyon National Park.

- Implement minimum requirement strategy for public and administrative use in Grand Canyon National Park.

- Prepare other Park management plans consistent with the Wilderness Management Plan.

- Establish and maintain Park staffing levels needed to ensure that wilderness management responsibilities are being met in accordance with the NPS Wilderness Management Guidelines, including the
  - Wilderness Steering Committee
  - Wilderness Coordinator
  - Wilderness Rangers
  - Wilderness Trail Crew

Management Objective One

Establish and implement a permit system that

a) serves the visitor by providing the opportunity to obtain permits for wilderness and nonwilderness areas that yield the type of experience they seek

b) serves Park management by providing an effective way to educate the public on low-impact practices, ethics, and safety

c) serves Park management by providing data on hiker use levels and distribution in order to make informed decisions regarding the management and protection of backcountry and wilderness resources.

Actions

- Upgrade automated reservation and permits system, and improve customer service by increasing staff, communications and hours of operation. [Chapter 5, Backcountry Permit System; Appendix G, Backcountry Reservation and Permit System]

- Distribute quarterly wilderness-use statistics to Wilderness District, Trail Crew, Interpretive Staff and Science Center. [Chapter 5, Backcountry Permit System; Chapter 10: Interpretation and Education; Chapter 12, Monitoring and Research]

- Show educational video in the Visitor Contact Stations and the Backcountry Office; distribute to permit holders, and interested groups. [Chapter 5, Backcountry Permit System; Chapter 10, Interpretation, Education, and Information]

- In cooperation with the Navajo, Havasupai and Hualapai Tribes, establish a cooperative permitting system for use on Tribal and Park lands. [Chapter 5, Backcountry Permit System; Chapter 15, Havasupai Traditional Use Lands; Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands]

Management Objective Two

Establish indicators and standards for desired visitor experiences, and biophysical and cultural resources; monitor regularly the condition of these indicators; and take management action as necessary to meet these standards.

Actions

- Continue Rapid Campsite Assessment methodology for campsite monitoring. Establish a monitoring schedule based on use statistics and trend information. Conduct baseline campsite inventory in new use areas, and complete inventory in Wild use areas. [Chapter 6, Campsite Management; Chapter 12, Monitoring and Research]

- Implement a monitoring program based on sociological research and previous monitoring programs. Focus on users in wilderness areas. [Chapter 12, Monitoring and Research]

- Conduct archeological survey and monitoring along popular trails and campsites in the following areas: Grandview Complex, Hermit-Monument Complex, Thunder River/Deer Creek Complex [Chapter 6, Campsite Management; Chapter 7, Trails Management; Chapter 12, Monitoring and Research; Chapter 14, Cultural Resources Management]

- Develop and implement action plans for rehabilitation of campsites and trails in the following use areas: Horseshoe Mesa, Hermit Creek, Monument Creek, Upper Tapeats. [Chapter 6, Campsite Management; Chapter 7, Trails Management; Chapter 12, Monitoring and Research; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

- Establish designated campsites, and rehabilitate impacted areas in the following use areas: Deer Creek, Cape Final, Point Sublime, Fire Point, Swamp Point, and Pasture Wash. [Chapter 6, Campsite Management: Chapter 12, Monitoring and Research; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

- Develop and implement site data recovery plan for archeological sites located in the following use areas: Hermit Creek, Monument Creek, Horseshoe Mesa, Cottonwood Creek, Clear Creek, Cremation, Tanner. [Chapter 12, Monitoring and Research; Chapter 14, Cultural Resources Management]

- Establish Semi-Primitive Mechanized Opportunity Class to describe conditions and standards for nonwilderness primitive road corridors. [Chapter 3, Wilderness Management Planning Framework; Chapter 4, Recreational Uses of Wilderness; Chapter 6, Wilderness Campsite Management; Chapter 8, Semi-Primitive Access and Facilities]

- Determine eligibility for National Register of Historic Places for the Santa Maria Springs shelter, Signal Hill Firetower, Kanabownits Cabin, and the Kanabownits Firetower. Upon completion of this process, a determination regarding course of action will be made. [Chapter 8, Semi-Primitive Access and Facilities; Chapter 14, Cultural Resources Management]

- Conduct water quality and flow data monitoring at wilderness destinations and potential areas of impact on a cyclic basis. [Chapter 12, Monitoring and Research Program]

- Conduct an inventory of all tributary streams to quantify flow data and riparian vegetation. Adopt methods for determining suitability of the Colorado River and its tributaries for inclusion in the National Wild and Scenic Rivers System. [Chapter 11, Ecosystem Management; Chapter 12, Monitoring and Research Program]

Management Objective Three

Provide access consistent with wilderness values including protection of natural and cultural resources. Preserve the character of individual trails and establish minimal standards for primitive road maintenance.

Actions

- Restore historic trails in Hermit, Grandview, and Thunder River/Deer Creek Complexes. [Chapter 7, Trails Management; Chapter 8, Semi-Primitive Access and Facilities; Chapter 12, Monitoring and Research; Chapter 14, Cultural Resources Management]

- Conduct cyclic maintenance and rehabilitation of Colorado River trails to backcountry attraction sites. [Chapter 7, Trails Management; Chapter 12, Monitoring and Research; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

- Develop and implement action plans for rehabilitation of rim access trails including: Tanner, New Hance, South Bass, South Canyon, and Nankoweap. Concentrate rehabilitation on upper reaches of trail (within Kaibab to Redwall formations). [Chapter 7, Trails Management; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

- Upgrade condition of Old Bright Angel from a route to primitive trail standards. [Chapter 7, Trails Management]

- Develop and implement action plan to establish a trail on the old road alignment from Desert View to Cape Solitude. [Chapter 7, Trails Management; Chapter 8, Semi-Primitive Access and Facilities; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

- Develop and implement an action plan that establishes the "Kanab Plateau Trail," a ten-mile section of existing road network. This will connect Kanab Point with the 150 Mile Canyon Road, and involves restoration of roads to natural conditions. [Chapter 8, Semi-Primitive Access and Facilities; Chapter 13, Restoration and Rehabilitation of Recreational Impacts]

- Develop and implement an action plan that establishes the "Brady Hollow Trail," a nine-mile section of severely damaged road known as the Toroweap Point Overlook Road. This will involve restoration of road sections to natural conditions. [Chapter 8, Semi-Primitive Access and Facilities; Chapter 13, Restoration and Rehabilitation of Recreational Impacts]

- Develop and implement an action plan that establishes the "Cove Trail," a ten-mile section of road to the Cove. [Chapter 8, Semi-Primitive Access and Facilities; Chapter 13, Restoration and Rehabilitation of Recreational Impacts]

- Restore to a natural condition: a) two primitive roads north of New Water Springs on the Hook, b) the Huitzal Spur Road, and c) the Toroweap Valley landfill and access road. [Chapter 8, Semi-Primitive Access and Facilities; Chapter 13, Restoration and Rehabilitation of Recreational Impacts]

- Develop and implement an action plan to relocate 1.4 miles of trail across the Basin. Restore the Basin section of the old W-1 to a natural condition. [Chapter 7, Trails Management; Chapter 7, Semi-Primitive Access and Facilities; Chapter 13, Rehabilitation and Restoration of Recreational Impacts]

Management Objective Four

Establish a coordinated interpretive/ educational program to provide hikers adequate information to plan and execute an enjoyable and safe expedition, whether hiking for a day or for an extended period, and to conduct themselves in a manner which is not damaging to wilderness resources and values.

Actions

- Establish a public Interpretive Program which provides relevant, pre-trip information and focuses on wilderness values, personal safety, and resource protection. [Chapter 5, Backcountry Permit System; Chapter 9, Safety and Emergency Operations; Chapter 10, Interpretation, Education, and Information]

- Establish a coordinated, interagency wilderness educational program for staff which includes 1) wilderness management principles and philosophy; 2) Leave No Trace training; 3) application of the minimum requirement concept; 4) development proficiency in the use of primitive tools; 5) development of minimum impact trail maintenance techniques and fire suppression tactics; 6) development of wilderness safety practices and 7) development of appropriate medical response skills. [Chapter 9, Safety and Emergency Operations; Chapter 10, Interpretation, Education, and Information; Appendix D, Minimum Requirement Decision Process]

Management Objective Five

Provide, through partnerships with adjacent land-managing agencies, information on wilderness and nonwilderness recreational opportunities on adjacent lands, including National Forest Service, Bureau of Land Management, State, and Tribal lands.

Actions

- Provide information on recreational opportunities outside the Park. [Chapter 4, Recreational Use of Wilderness; Chapter 5, Backcountry Permit System; Chapter 15, Havasupai Traditional Use Lands; Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands]

- In cooperation with the Navajo, Havasupai and Hualapai Tribes, establish a cooperative permitting system for use on Tribal and Park lands. [Chapter 5, Backcountry Permit System; Chapter 15, Havasupai Traditional Use Lands; Appendix E, Recreational Opportunities and Permit Information for Adjacent Lands]

Management Objective Six

Provide a reasonable level of public safety, consistent with wilderness areas in accordance with NPS Management Policies and Park guidelines.

Actions

- Establish a coordinated public Interpretive Program which provides relevant, pre-trip information and focuses on wilderness values, personal safety, and resource protection. [Chapter 9, Safety and Emergency Operations; Chapter 10, Interpretation, Education, and Information]

- Distribute educational video to the Visitor Center, permit holders, and interested groups. [Chapter 5, Backcountry Permit System; Chapter 10, Interpretation, Education, and Information.]

Management Objective Seven

Encourage research which adds to an understanding of the Park and contributes to the body of knowledge required for effective management and protection of wilderness resources and values.

Actions

- Expand the Park's research program to obtain accurate information about the Grand Canyon's resources, ecological processes and human influences. [Chapter 11, Ecosystem Management]

- Evaluate the tools and methods of scientific study for impacts on the character of the wilderness. Take reasonable efforts to minimize impacts while maximizing the benefit of scientific investigations by applying the minimum requirement decision process. [Chapter 12, Monitoring and Research; Appendix D, Minimum Requirement Decision Process]

Management Objective Eight

Develop, through partnerships with adjacent land-management agencies, conservation organizations, and institutes of higher learning, an interagency ecosystem-management strategy. The strategy will emphasize restoration and maintenance of natural processes, and viable populations of all native species in natural patterns of abundance and distribution.

Actions

- In the revision of the Fire Management Plan address 1) the restoration of the natural fire regime in wilderness areas, 2) the protection and preservation of genetic integrity, and 3) strategies for restoration, enhancement and protection of threatened or endangered species. [Chapter 11, Ecosystem Management]

- Develop partnership programs to 1) maintain long-term viable carnivore populations, 2) address the control of nonnative plant and animal species, 3) facilitate the design and implementation of studies for the reintroduction of extirpated species, and 4) facilitate the design and implementation of a wildlife conservation strategy. [Chapter 11, Ecosystem Management]
- Adopt methods for determining suitability of the Colorado River and its tributaries for inclusion in the National Wild and Scenic Rivers System. [Chapter 11, Ecosystem Management; Chapter 12, Monitoring and Research Program]

Figure 16.1
Implementation Schedule

Action	Target Date	Responsible Work Units and Partners
1. Upgrade automated permits system, improve communications, increase staffing and hours of operation.	FY98	•Backcountry Office
2. Use area changes: boundaries, use limits, and classification.	FY98	•Backcountry Office •Wilderness District
3. Produce and distribute educational video.	FY98	•Backcountry Office •Interpretation
4. Distribute quarterly wilderness use reports to Park work units.	Ongoing	•Backcountry Office
5. Establish cooperative permit system with Navajo, Havasupai, and Hualapai Tribes.	FY99	•Backcountry Office
6. Conduct baseline campsite inventory in new use areas; complete inventory of Primitive and Wild use areas.	FY00	•Wilderness District •Science Center
7. Conduct sociological monitoring program.	FY00	•Science Center
8. Conduct archeological survey and monitoring along popular trails and campsites.	FY99	•Science Center •Wilderness District

Action	Target Date	Responsible Work Units and Partners
9. Develop and implement actions plans for rehabilitation of designated campsites and trails:		•Trail Crew •Wilderness District •Science Center
a. Horseshoe Mesa	FY99	
b. Hermit Creek	FY99	
c. Monument Creek	FY99	
d. Upper Tapeats	FY99	
10. Establish designated campsites and rehabilitate impacted areas for:		•Trail Crew •Wilderness District •Science Center
a. Deer Creek	FY98	
b. Cape Final	FY98	
c. Point Sublime	FY98	
d. Fire Point and Swamp Point	FY98	
e. Pasture Wash	FY98	
11. Develop and implement site data recovery plans for:		•Science Center •Wilderness District
a. Horseshoe Mesa	FY99	
b. Hermit Creek	FY99	
c. Monument Creek	FY99	
d. Cottonwood Creek	FY00	
e. Tanner	FY00	
f. Cremation	FY01	
g. Clear Creek	FY01	
12. Evaluate significance and determine eligibility for the National Register of Historic Places for:		•Science Center
a. Santa Maria Springs Shelter	FY00	
b. Signal Hill Firetower	FY00	
c. Kanabownits Cabin	FY00	
d. Kanabownits Firetower	FY00	
13. Conduct cyclic water quality and flow data monitoring at potential areas of impact including Hermit Creek, Deer Creek, Tapeats Creek, Horn Creek, and Monument Creek	Annual	•Science Center
14. Conduct inventory of all tributary streams to quantify flow data and riparian vegetation.	FY00	•Science Center •River District

Figure 16.1 Implementation Schedule (Continued)

Figure 16.1 Implementation Schedule (Continued)

Action	Target Date	Responsible Work Units and Partners
15. Develop and implement action plans for historic trail restoration: a. Hermit Complex b. Grandview Complex c. Thunder River/Deer Creek Complex	 FY99 FY99 FY99	•Science Center •Trail Crew •Wilderness District
16. Conduct cyclic maintenance and rehabilitation of Colorado River trails to attraction sites.	Annual	•Trail Crew •Wilderness District •River District •Science Center
17. Develop and implement action plans for rehabilitation of rim access trails: a. Tanner b. New Hance c. South Bass d. South Canyon e. Nankoweap	 FY00 FY00 FY00 FY01 FY01	•Trail Crew •Science Center •Wilderness District •U.S. Forest Service
18. Upgrade condition of Old Bright Angel Trail from a route to primitive trail standards.	FY00	•Trail Crew •Corridor District •Science Center
19. Develop and implement action plan to establish trails on the old road alignments: a. Desert View to Cape Solitude b. Kanab Point to 150 Mile Canyon Road c. 9 miles of Toroweap Point Overlook Road d. 10 miles of road to The Cove	 FY99 FY00 FY00 FY00	•Science Center •Trail Crew •North Rim District
20. Restore to natural conditions: a. Two roads north of New Water Springs on the Hook b. Huitzal Spur road c. Vulcan Spur road d. Toroweap landfill and access road	 FY00 FY01 FY01 FY01	•Science Center •Wilderness District •Lake Mead NRA •Bureau of Land Management
21. Develop and implement action plan to relocate trail across the Basin. Restore old W-1 road to natural condition.	FY00	•Science Center •North Rim District •Road and Trail Crews

Action	Target Date	Responsible Work Units and Partners
22. Establish public Interpretive Program on wilderness values, personal safety and resource protection.	FY99	•Interpretation •Wilderness District •Backcountry Office •Grand Canyon Association Field Institute •National Outdoor Leadership School (NOLS)
23. Establish interagency wilderness education program for staff.	FY99	•Interpretation •Arthur Carhart National Wilderness Training Center •National Outdoor Leadership School (NOLS)
24. Expand research program.	FY02	•Science Center •Grand Canyon Monitoring and Research Center
25. Develop partnership programs which address a. viable carnivore populations b. control of nonnative species c. studies for reintroduction of extirpated species d. wildlife conservation strategy	 FY04 Ongoing FY98 FY04	•Science Center
26. Conduct suitability study for Colorado River and tributaries for inclusion in the National Wild and Scenic Rivers System.	FY03	•Science Center •River District •Grand Canyon Association Field Institute

Figure 16.1 Implementation Schedule (Continued)

Appendix A

Wilderness Act of 1964

Public Law 88-577
(16 U.S. C. 1131-1136)
88th Congress, Second Session
September 3, 1964

AN ACT

To establish a National Wilderness Preservation System for the permanent good of the whole people, and for other purposes. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

Short Title

SECTION 1. This Act may be cited as the "Wilderness Act."

WILDERNESS SYSTEM ESTABLISHED—
STATEMENT OF POLICY

SECTION 2.(a) In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition, it is hereby declared to be the policy of the Congress to secure for the American people of present and future generations the benefits of an enduring resource of wilderness. For this purpose there is hereby established a National Wilderness Preservation System to be composed of federally owned areas designated by the Congress as "wilderness areas," and these shall be administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness; and no Federal lands shall be designated as "wilderness areas" except as provided for in this Act or by a subsequent Act.

(b) The inclusion of an area in the National Wilderness Preservation System notwithstanding, the area shall continue to be managed by the Department and agency having jurisdiction thereover immediately before its inclusion in the National Wilderness Preservation System unless otherwise provided by Act of Congress. No appropriation shall be available for payment of expenses or salaries for the administration of the National Wilderness Preservation System as a separate unit nor shall any appropriations be available for additional personnel stated as being required solely for the purpose of managing or administering areas solely because they are included within the National Wilderness Preservation System.

DEFINITION OF WILDERNESS

(c) A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of

wilderness is further defined to mean in this Act 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 five thousand 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.

NATIONAL WILDERNESS PRESERVATION SYSTEM—EXTENT OF SYSTEM

SECTION 3.(a) All areas within the national forests classified at least 30 days before the effective date of this Act by the Secretary of Agriculture or the Chief of the Forest Service as "wilderness," "wild," or "canoe" are hereby designated as wilderness areas. The Secretary of Agriculture shall—
(1) Within one year after the effective date of this Act, file a map and legal description of each wilderness area with the interior and Insular Affairs Committees of the United States Senate and the House of Representatives, and such descriptions shall have the same force and effect as if included in this Act: Provided, however, That correction of clerical and typographical errors in such legal descriptions and maps may be made.

(2) Maintain, available to the public, records pertaining to said wilderness areas, including maps and legal descriptions, copies of regulations governing them, copies of public notices of, and reports submitted to Congress regarding pending additions, eliminations, or modifications. Maps, legal descriptions, and regulations pertaining to wilderness areas within their respective jurisdictions also shall be available to the public in the offices of regional foresters, national forest supervisors, and forest rangers.

(b) The Secretary of Agriculture shall, within ten years after the enactment of this Act, review, as to its suitability or nonsuitability for preservation as wilderness, each area in the national forests classified on the effective date of this Act by the Secretary of Agriculture or the Chief of the Forest Service as "primitive" and report his findings to the President. The President shall advise the United States Senate and House of Representatives of his recommendations with respect to the designation as "wilderness" or other reclassification of each area on which review has been completed, together with maps and a definition of boundaries. Such advice shall be given with respect to not less than one-third of all the areas now classified as "primitive" within three years after the enactment of this Act, and the remaining areas within ten years after the enactment of this Act. Each recommendation of the President for designation as "wilder-

ness" shall become effective only if so provided by an Act of Congress. Areas classified as "primitive" on the effective date of this Act shall continue to be administered under the rules and regulations affecting such areas on the effective date of this Act until Congress has determined otherwise. Any such area may be increased in size by the President at the time he submits his recommendations to the Congress by not more than five thousand acres with no more than one thousand two hundred acres in any one compact unit; if it is proposed to increase the size of any such area by more than five thousand acres or by more than one thousand two hundred and eighty acres in any one compact unit the increase in size shall not become effective until acted upon by Congress. Nothing herein contained shall limit the President in proposing, as part of his recommendations to Congress, the alteration of existing boundaries of primitive areas or recommending the addition of any contiguous area of national forest lands predominantly of wilderness value. Notwithstanding any other provisions of this Act, the Secretary of Agriculture may complete his review and delete such areas as may be necessary, but not to exceed seven thousand acres, from the southern tip of the Gore Range-Eagles Nest Primitive Area, Colorado, if the Secretary determines that such action is in the public interest.

(c) Within ten years after the effective date of this Act the Secretary of the Interior shall review every roadless area of five thousand contiguous acres or more in the national parks, monuments, and other units of the national park system and every such area of, and every roadless island within, the national wildlife refuges and game ranges, under his jurisdiction on the effective date of this Act and shall report to the President his recommendation as to the suitability or nonsuitability of each such area or island for preservation as wilderness. The President shall advise the President of the Senate and the Speaker of the House of Representatives of his recommendation with respect o the designation as wilderness of each such area or island on which review has been completed, together with a map thereof and a definition of its boundaries. Such advice shall be given with respect to not less than one-third of the areas and islands to be reviewed under this subsection within three years after enactment of this Act, not less than two-thirds within seven years of enactment of this Act, and the remainder within ten years of enactment of this Act. A recommendation of the President for designation as wilderness shall become effective only if so provided by an Act of Congress. Nothing contained herein shall, by implication or otherwise, be construed to lessen the present statutory authority of the Secretary of the Interior with respect to the maintenance of roadless areas within units of the national park system.

(d)(1) The Secretary of Agriculture and the Secretary of the Interior shall, prior to submitting any recommendations to the President with respect to the suitability of any area for preservation as wilderness—

(A) give such public notice of the proposed action as they deem appropriate, including publication in the Federal Register and in a newspaper having general circulation in the area or areas in the vicinity of the affected land;

(B) hold a public hearing or hearings at a location or locations convenient to the area affected. The hearings shall be announced through such means as the respective Secretaries involved deem appropriate, including notices in the Federal Register and in newspapers of general circulation in the area: Provided. That if the lands involved are located in more than one State, at least one hearing shall be held in each State in which a portion of the land lies;

(C) at least thirty days before the date of a hearing advise the Governor of each State and the governing board of each county, or in Alaska the borough, in which the lands are located, and Federal departments and agencies concerned, and invite such officials and Federal agencies to submit their views on the proposed action at the hearing or by not later than thirty days following the date of the hearing.

(2) Any views submitted to the appropriate Secretary under the provisions of (1) of this subsection with respect to any area shall be included with any recommendations to the President and to Congress with respect to such area.

(e) Any modification or adjustment of boundaries of any wilderness area shall be recommended by the appropriate Secretary after public notice of such proposal and public hearing or hearings as provided in subsection (d) of this section. The proposed modification or adjustment shall then be recommended with map and description thereof to the President. The President shall advise the United States Senate and the House of Representatives of his recommendations with respect to such modification or adjustment and such recommendations shall become effective only in the same manner as provided for in subsections (b) and (c) of this section.

USE OF WILDERNESS AREAS

SECTION 4. (a) The purposes of this Act are hereby declared to be within and supplemental to the purposes for which national forests and units of the national park and wildlife refuge systems are established and administered and—

(1) Nothing in this Act shall be deemed to be in interference with the purpose for which national forests are established as set forth in the Act of June 4, 1897 (30 Stat. 11), and the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 Stat. 215).
(2) Nothing in this Act shall modify the restrictions and provisions of the Shipstead-Nolan Act (Public Law 539, Seventy-first Congress, July 10, 1930; 46 Stat. 1020), the Thye-Blatnik Act (Public Law 733, Eightieth Congress, June 2, 1948; 62 Stat. 568), and the Humphrey-Thye-Blatnik-Andresen Act (Public Law 607, Eighty-fourth Congress, June 22, 1956; 70 Stat. 326), as applying to the Superior National

Forest or the regulations of the Secretary of Agriculture.
(3) Nothing in this Act shall modify the statutory authority under which units of the national park system are created. Further, the designation of any area of any park, monument, or other unit of the national park system as a wilderness area pursuant to this Act shall in no manner lower the standards evolved for the use and preservation of such park, monument, or other unit of the national park system in accordance with the Act of August 25, 1916, the statutory authority under which the area was created, or any other Act of Congress which might pertain to or affect such area, including, but not limited to, the Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 432 et seq.); section 3(2) of the Federal Power Act (16 U.S.C. 796 (2); and the Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 461 et seq.).
(b) Except as otherwise provided in this Act, each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.

PROHIBITION OF CERTAIN USES

(c) Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.

SPECIAL PROVISIONS

(d) The following special provisions are hereby made:

(1) Within wilderness areas designated by this Act the use of aircraft or motorboats, where these uses have already become established, may be permitted to continue subject to such restrictions as the Secretary of Agriculture deems desirable. In addition, such measure may be taken as may be necessary in the control of fire, insects, and diseases, subject to such conditions as the Secretary deems desirable.
(2) Nothing in this Act shall prevent within national forest wilderness areas any activity, including prospecting, for the purpose of gathering information about mineral or other resources, if such activity is carried on in a manner compatible with the preservation of the wilderness environment. Furthermore, in accordance with such program as the Secretary of the Interior shall develop and conduct in consultation with the Secretary of Agriculture, such areas

shall be surveyed on a planned, recurring basis consistent with the concept of wilderness preservation by the Geological Survey and the Bureau of Mines to determine the mineral values, if any, that may be present; and the results of such surveys shall be made available to the public and submitted to the President and Congress. Mineral leases, claims, etc.

(3) Notwithstanding any other provisions of this Act, until midnight December 31, 1983, the United States mining laws and all laws pertaining to mineral leasing shall, to the same extent as applicable prior to the effective date of this Act, extend to those national forest lands designated by this Act as "wilderness areas"; subject, however, to such reasonable regulations governing ingress and egress as may be prescribed by the Secretary of Agriculture consistent with the use of the land for mineral location and development and exploration, drilling, and production, and use of land for transmission lines, waterlines, telephone lines, or facilities necessary in exploring, drilling, production, mining, and processing operations, including where essential the use of mechanized ground or air equipment and restoration as near as practicable of the surface of the land disturbed in performing prospecting, location, and, in oil and gas leasing, discovery work, exploration, drilling, and production, as soon as they have served their purpose. Mining locations lying within the boundaries of said wilderness areas shall be held and used solely for mining or processing operations and uses reasonably incident thereto; and hereafter, subject to valid existing rights, all patents issued under the mining laws of the United States affecting national forest lands designated by this Act as wilderness areas shall convey title to the mineral deposits within the claim, together with the right to cut and use so much of the mature timber therefrom as may be needed in the extraction, removal, and beneficiation of the mineral deposits, if the timber is not otherwise reasonably available, and if the timber is cut under sound principles of forest management as defined by the national forest rules and regulations, but each such patent shall reserve to the United States all title in or to the surface of the lands and products thereof, and no use of the surface of the claim or the resources therefrom not reasonably required for carrying on mining or prospecting shall be allowed except as otherwise expressly provided in this Act: Provided, That, unless hereafter specifically authorized, no patent within wilderness areas designated by this Act shall issue after December 31, 1983, except for the valid claims existing on or before December 31, 1983. Mining claims located after the effective date of this Act within the boundaries of wilderness areas designated by this Act shall create no rights in excess of those rights which may be patented under the provisions of this subsection. Mineral leases, permits, and licenses covering lands within national forest wilderness areas designated by this Act shall contain such reasonable stipulations as may be prescribed by the Secretary of Agriculture for the protection of the wilderness character of the land consistent with the use of the land for the purposes for

which they are leased, permitted, or licensed. Subject to valid rights then existing, effective January 1, 1984, the minerals in lands designated by this Act as wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing and all amendments thereto.
(4) Within wilderness areas in the national forests designated by this Act, (1) the President may, within a specific area and in accordance with such regulations as he may deem desirable, authorize prospecting for water resources, the establishment and maintenance of reservoirs, water-conservation works, power projects, transmission lines, and other facilities needed in the public interest, including the road construction and maintenance essential to development and use thereof, upon his determination that such use or uses in the specific area will better serve the interests of the United States and the people thereof than will its denial; and (2) the grazing of livestock, where established prior to the effective date of this Act, shall be permitted to continue subject to such reasonable regulations as are deemed necessary by the Secretary of Agriculture.
(5) Other provisions of this Act to the contrary notwithstanding, the management of the Boundary Waters Canoe Area, formerly designated as the Superior, Little Indian Sioux, and Caribou Roadless Areas, in the Superior National Forest, Minnesota, shall be in accordance with regulations established by the Secretary of Agriculture in accordance with the general purpose of maintaining, without unnecessary restrictions on other uses, including that of timber, the primitive character of the area, particularly in the vicinity of lakes, streams, and portages: Provided, That nothing in this Act shall preclude the continuance within the area of any already established use of motorboats.
(6) Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the areas.
(7) Nothing in this Act shall constitute an express or implied claim or denial on the part of the Federal Government as to exemption from State water laws.
(8) Nothing in this Act shall be construed as affecting the jurisdiction or responsibilities of the several States with respect to wildlife and fish in the national forests.

STATE AND PRIVATE LANDS WITHIN WILDERNESS AREAS

SECTION 5.(a) In any case where State-owned or privately owned land is completely surrounded by national forest lands within areas designated by this Act as wilderness, such State or private owner shall be given such rights as may be necessary to assure adequate access to such State-owned or privately owned land by such State or private owner and their successors in interest, or the State-owned land or privately owned land shall be exchanged for federally owned land in the same State of approximately equal value under authorities available to the Secretary of Agriculture: Provided, however, That the United States shall

not transfer to a State or private owner any mineral interests unless the State or private owner relinquishes or causes to be relinquished to the United States the mineral interest in the surrounded land.

(b) In any case where valid mining claims or other valid occupancies are wholly within a designated national forest wilderness area, the Secretary of Agriculture shall, by reasonable regulations consistent with the preservation of the area as wilderness, permit ingress and egress to such surrounded areas by means which have been or are being customarily enjoyed with respect to other such areas similarly situated.
(c) Subject to the appropriation of funds by Congress, the Secretary of Agriculture is authorized to acquire privately owned land within the perimeter of any area designated by this Act as wilderness if (1) the owner concurs in such acquisition or (2) the acquisition is specifically authorized by Congress.

GIFTS, BEQUESTS, AND CONTRIBUTIONS

SECTION 6.a) The Secretary of Agriculture may accept gifts or bequests of land within wilderness areas designated by this Act for preservation as wilderness. The Secretary of Agriculture may also accept gifts or bequests of land adjacent to wilderness areas designated by this Act for preservation as wilderness if he has given sixty days advance notice thereof to the President of the Senate and the Speaker of the House of Representatives. Land accepted by the Secretary of Agriculture under this section shall become part of the wilderness area involved. Regulations with regard to any such land may be in accordance with such agreements, consistent with the policy of this Act, as are made at the time of such gift, or such conditions, consistent with such policy, as may be included in, and accepted with, such bequest.

(b) The Secretary of Agriculture or the Secretary of the Interior is authorized to accept private contributions and gifts to be used to further the purposes of this Act.

ANNUAL REPORTS

SECTION 7. At the opening of each session of Congress, the Secretaries of Agriculture and Interior shall jointly report to the President for transmission to Congress on the status of the wilderness system including a list and descriptions of the areas in the system, regulations in effect, and other pertinent information, together with any recommendations they may care to make.

Approved September 3, 1964.

Legislative History

House Reports: No. 1538 accompanying H.R. 9070 (Committee on Interior & Insular Affairs) and No. 1829 (Committee of Conference).
Senate Report: No. 109 (Committee on Interior & Insular Affairs). Congressional Record:
Vol. 109 (1963): April 4, 8, considered in Senate.
April 9, considered and passed Senate.
Vol. 110 (1964): July 28, considered in House.
July 30, considered and passed House, amended, in lieu of H.R. 9070.
August 20, House and Senate agreed to conference report.

Appendix B

NPS Management Policies 1988

Chapter 6 Wilderness Management and Preservation

Management Policies
U.S. Department of the Interior
National Park Service
1988

[Editor's Note: Chapter references at the end of each section refer to chapters *of NPS Management Policies*.]

The National Park Service will manage wilderness areas for the use and enjoyment as the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness. Management will include the protection of these areas, the preservation of their wilderness character, and the gathering and dissemination of information regarding their use and enjoyment as wilderness. Public purpose of wilderness will include recreation, scenic preservation, scientific study, education, conservation, and historical use.

The NPS wilderness management policies are based on statutory provisions of the 1916 NPS Organic Act (16 USC 1 et seq.), and legislation establishing individual units of the national park system.

Although these policies are intended to establish consistent servicewide direction for the preservation, management, and use of wilderness, certain policies may be superseded by statutory provisions that apply to individual wilderness areas, by rights reserved by former landowners, and in Alaska, by applicable provisions of the Alaska National Interest Lands Conservation Act (ANILCA, 16 USC 3101 et seq.).

The following characteristics are used in the Wilderness Act to define and describe a wilderness area. Wilderness is an area

- where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain
- of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation
- which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable
- which is protected and managed so as to preserve its natural conditions
- which has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- which has at least five thousand acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition
- which may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

These attributes serve both as standards for studying areas and evaluating their suitability for inclusion in the national wilderness preservation system and as objectives to guide NPS actions pertaining to the preservation and use of wilderness areas.

Wilderness Reviews

The National Park Service will continue to review areas that qualify for wilderness study, consistent with provision of the Wilderness Act and subsequent legislation directing that wilderness studies be made.

Wilderness studies will be supported by appropriate documentation of compliance with the National Environmental Policy Act (42 USC 4371 et seq.) and the National Historic Preservation Act (16 USC 470 et seq.).

(See Park Planning Process and Products 2:4)

Criteria for Recommended Wilderness

Lands and waters found to possess the characteristics and values of wilderness, as defined in the Wilderness Act, will be studied for recommendation to Congress for wilderness designation.

Lands that have been logged, farmed, grazed, or otherwise utilized in ways not involving extensive development or alteration of the landscape will be considered for wilderness if at the time of study the effects of these activities are substantially unnoticeable or their wilderness character could be restored through appropriate management actions.

An area will not be excluded from a wilderness recommendation solely because established or proposed management practices require the use of tools, equipment, or structures if those practices are necessary for the health and safety of wilderness travelers or protection of the wilderness area.

Lands will not be excluded from a wilderness recommendation solely because of prior rights or privileges, such as grazing and stock driveways, provided these operations do not involve the routine use of motorized or mechanical equipment and do not involve development and structures to such an extent that the human imprint is substantially noticeable.

Lands subject to mineral exploration and development should be recommended for wilderness only if it is likely that mineral rights will be relinquished, acquired, exchanged, or otherwise eliminated in the foreseeable future.

Lands containing aboveground utility lines will not be recommended for wilderness. Areas containing underground utility lines may be included if the area otherwise qualifies as wilderness and the maintenance of the utility line does not require the routine use of mechanized and motorized equipment. No new utility lines may be

installed in wilderness, and existing utility lines may not be extended or enlarged.

Historic features that are primary attractions for park visitors will not be recommended for wilderness. However, an area that attracts visitors primarily for the enjoyment of solitude and unconfined recreation in a primitive setting may also contain historic features and still be included in wilderness. Typical historic features that may be included are archeological sites, historic trails, travel routes, battle sites, and minor structures. Historic trails may serve and be maintained as part of the wilderness trail system. However, if the planned scope and standard of maintenance would result in the imprint of man's work being substantially noticeable, the trail or other feature should not be included in wilderness.

(See Management Zoning 2:7, Land Protection Plans 3:1, Mineral Development 6:10, Mineral Development 8:12, Grazing 8:14, Trails and Walks (9:9)

Potential Wilderness

A wilderness review may identify lands that are surrounded by or adjacent to lands proposed for wilderness designation but that do not themselves qualify for immediate designation due to temporary incompatible conditions. The legislative proposal may recommend these lands for future inclusion in wilderness when the incompatible condition has been removed. If so authorized by Congress, these potential wilderness areas will become designed wilderness upon the Secretary's determination, published in the *Federal Register*, that they have met the qualifications for designation.

(See General Policy 6:3, Mineral Development 6:10)

Wilderness Management

General Policy

For the purposes of these policies, the term "wilderness" includes the categories of designated wilderness, potential wilderness, and recommended/study wilderness, and these policies apply regardless of category. Designated wilderness is wilderness that has been established by Congress; potential wilderness is wilderness that has been authorized by Congress but not yet established due to temporary incompatible conditions; recommended/study wilderness is in an area that has been recommended to Congress, or is being studied for recommendation, for establishment as wilderness. Caves with all entrances in wilderness will be managed as wilderness.

Wherever a wilderness area is designated within a park, the preservation of wilderness character and resources becomes an additional statutory purpose of the park. Within a designated wilderness area, the preservation of wilderness character and resources while providing for appropriate use is the primary management responsibility (other than activities related to the saving of human life). Activities to

achieve all other statutory purposes of an area designated as wilderness will be carried out in accordance with applicable provisions of the Wilderness Act so as to preserve wilderness resources and character. The establishment of wilderness within a park will in no manner lower the standards evolved for the use and preservation of that area under other statutes.

The National Park Service will manage areas of potential wilderness as wilderness, to the extent that existing nonconforming uses will allow, and will seek to eliminate the temporary conditions that preclude wilderness designation.

The Park Service will take no action that would diminish the wilderness suitability of an area recommended for wilderness study or for wilderness designation until the legislative process has been completed. Until that process has been completed, management decisions pertaining to recommended wilderness and wilderness study areas will be made in expectation of eventual wilderness designation.

All categories of wilderness lands will be classified as natural zones. A wilderness subzone may be used if such a designation will facilitate or support planning activities or management actions.

The National Park Service will seek to achieve consistency in wilderness management objectives, techniques, and practices, on both a servicewide and an interagency basis. The Service will seek to maintain effective intra-agency and interagency communications and will encourage, sponsor, and participate in intra-agency and inter-agency workshops and seminars designed to promote the sharing of ideas, concerns, and techniques related to wilderness management.

(See Management Zoning 2:7, Land Protection Plans 3:1, Potential Wilderness 6:3)

Responsibility

NPS responsibility for carrying out wilderness preservation mandates will be shared by the Director, regional directors, and superintendents of parks with designated, potential, or recommended\study wilderness. Interagency cooperation and coordination and training responsibilities will also be carried out at the Washington, region, and park levels. Wilderness management coordinators will be assigned at each of these administrative levels to carry out these responsibilities effectively and to facilitate efforts to seek servicewide and interagency consistency in wilderness management techniques.

Wilderness Management Plan

The superintendent of each park containing wilderness will develop and maintain a wilderness management plan to guide the preservation, management, and use of that wilderness. This plan may be developed as a separate document or as an action component of another appropriate management plan, such as the general management plan or backcountry

management plan, and it will be supported by appropriate documentation of compliance with the National Environmental Policy Act and the National Historic Preservation Act. The plan will be developed with public involvement and will contain specific, measurable management objectives that address the preservation of wilderness-dependent cultural and natural resources and values in order to achieve the public purposes specified by the Wilderness Act and other appropriate legislation.

(See Park Planning Process and Products 2:4)

Management Techniques

The Wilderness Act generally prohibits motorized equipment or mechanized transport in designated wilderness areas; however, it allows them "as necessary to meet minimum requirements for the administration of the area for the purpose of this Act." In protecting wilderness character and resources and in managing wilderness use in accordance with the Wilderness Act, the National Park Service will adhere closely to the "minimum tool" concept. Superintendents, in accordance with the wilderness management plan, will select the minimum tool or administrative practice necessary to successfully and safely accomplish the management objective with the least adverse impact on wilderness character and resources. All decisions pertaining to administrative practices and use of equipment in wilderness will be based on this concept. Potential disruption of wilderness character and resources and applicable safety concerns will be considered before, and given significantly more weight than, economic efficiency. If some compromise of wilderness resources or character is unavoidable, only those actions that have localized, short-term adverse impacts will be acceptable.

Administrative use of motorized equipment or mechanical transport, including motorboats and aircraft, will be authorized in accordance with the park's wilderness management plan only (1) if determined by the superintendent to be the minimum tool needed by management to achieve the purposes of the area, or (2) in emergency situations involving human health or safety or the protection of wilderness values. Such management activities will be conducted in accordance with all applicable regulations, policies, and guidelines and, where practicable, will be scheduled to avoid creating adverse resource impacts or conflicts with visitor use.

The wilderness management plan will establish indicators, standards, conditions, and thresholds above which management actions will be taken to reduce impacts. The National Park Service will monitor resources and document use. Where resource impacts or demands for use exceed established thresholds or capacities, superintendents may limit or redirect use. Physical alterations, public education, general regulations, special regulations, and permit systems, as well as local restrictions, public use limits, closures, and designations imple-

mented under the discretionary authority of the superintendent (36 CFR 1.5), may all be used in managing and protecting wilderness.

(See Monitoring of Wilderness Resource 6:5, Management of Recreational Use 8:2, Emergency Preparedness and Emergency Operations 8:6, Search and Rescue 8:6, Aircraft Use 8:8)

Monitoring of Wilderness Resources

In every park containing wilderness, the conditions and long-term of wilderness resources will be monitored to identify needs for, and results of management actions. Given that wilderness is described in the Wilderness Act as an area untrammeled by man, where outstanding opportunities for solitude and unconfined recreation exist, every wilderness monitoring program will not only assess physical and biological resources, but also identify what impacts people have on resources and values and what impacts they have on other people using the wilderness. These monitoring programs will also be designed to identify whether or not wilderness resources are being impacted by human activities conducted outside the wilderness, and if so, to determine the nature, magnitudes, and probable sources of those impacts.

(See Science and Research 4:2, Inventory and Monitoring 4:4, Research 6:6)

Management Facilities

Part of the definition of wilderness as provided by the Wilderness Act is undeveloped federal land retaining its primeval character and influence, without permanent improvements. Accordingly, authorizations of NPS administrative facilities located in wilderness will be limited to the types and minimum number essential to meet the minimum requirements for the administration of the wilderness area. A decision to construct, maintain, or remove an administrative facility will be based primarily on whether such a facility is required to preserve wilderness character or values or essential to ensure public safety, not on considerations of administrative convenience, economy of effect, or convenience to the public. Maintenance or removal of historic structures will additionally comply with cultural resource protection policies.

Ranger stations, patrol cabins, associated storage or support structures, drift fences,a nd facilities supporting trail stock operations may be placed in wilderness only if they are necessary to carry out wilderness management objectives and provisions of the park's wilderness management plan. Facilities such as fire lookouts, radio antennas, and radio repeater sites may be placed in wilderness only if they constitutes the minimum facility required to carry out essential administrative functions and are specifically authorized by the regional director.

Permanent roads will not be built or retained in wilderness. Temporary vehicular access may be permitted only to meet the minimum requirements of emergency situations. Where abandoned roads have been included within wilderness, they will be used as trails or restored to natural conditions.

Unpaved trails and trail bridges may be provided where they are essential for resource protection or where significant safety hazards exist during the normal period of use.

No permanent heliports, helipads, or airstrips will be allowed in wilderness. Temporary landing facilities may be used to meet the minimum requirements of emergency situations. Site improvements determined to be essential for safety reasons during individual emergency situations may be authorized, but the site for authorized nonemergency aircraft landings, but no site markings or improvements of any kind may be installed to support nonemergency use.

The construction or reconstruction of shelters for public use generally will not be allowed, since wilderness users should be self-supporting in terms of shelter. An existing shelter may be maintained only if the facility is necessary to achieve wilderness management objectives or cultural resource protection objectives. The construction, use, and occupancy of cabins and other structures in wilderness areas in Alaska are governed by applicable provision of ANILCA and by NPS regulations in 36 CFR 13, and they may be permitted under conditions prescribed in the park's wilderness management plan.

Although the development of facilities to serve users will generally be avoided, campsites may be designated when essential for resource protection or enhancement of opportunities for solitude. In keeping with the terms of the park's wilderness management plan, campsite facilities may include a site marker, a fire ring, a tent site, a food-storage device, and a toilet, but only if determined by the superintendent to be the minimum facilities necessary for the health and safety of wilderness users or for the protection of wilderness resources and values. Toilets will be placed only in locations where their presence and use will resolve health and sanitation problems or prevent serious damage and where reducing or dispersing visitor use has failed to alleviate the problems or is impractical. Picnic tables will not be placed in wilderness.

(See Water Quality and Quantity 4:15, Planning and Proposal Formulation 5:4, Treatment of Cultural Resources 5:5, Backcountry Use 8:3, Emergency Preparedness and Emergency Operations 8:6, Aircraft Use 8:8, Access and Circulation Systems 9:7, Campgrounds 9:13, Comfort Stations 9:14)

Signs

Signs detract from the wilderness character of an area and make the imprint of man and management more noticeable. Only those signs necessary to protect wilderness resources or for

public safety, such as signs identifying trails and distances, will be permitted. Where signs are used, they should be compatible with their surroundings and be the minimum size possible.

(See Signs 9:11)

Research

The statutory purposes of wilderness include scientific and educational use, and the National Park Service will fully support the value of wilderness areas as natural outdoor laboratories. A research project may be conducted in wilderness if it meets all of the following requirements

- The research activities are otherwise allowable under federal laws and regulations.

- There is no alternative to conducting the research in a wilderness area.

- The project will not adversely affect physical or biological resources, ecosystem processes, or aesthetic values over an area or duration greater than necessary to meet research objectives.

- The project will not interfere with recreational, scenic, or conservation purposes of the wilderness over a broad area or long duration.

Hydrologic, hydrometeorologic, seismographic, and other research and monitoring devices may be installed and operated in wilderness only upon a finding that (1) the desired information is essential and cannot be obtained from a location outside of wilderness, and (2) the proposed device is the minimum tool necessary to accomplish the objective safely and successfully. Devices located in wilderness will be removed when determined to be no longer essential. All research activities and the installation, servicing, and monitoring of research devices will be accomplished in compliance with NPS wilderness management policies and procedures contained in the park's wilderness management plan. Non-NPS research activities that might disturb resources or visitors or require the waiver of any regulation may be allowed only pursuant to the terms and conditions of a permit.

(See Science and Research 4:2, Inventory and Monitoring 4:4, Weather and Climate 4:19, Research 5:2, Ethnographic Research and Inventories 5:12, Research and Collection Activities 8:15)

Fire Management

[Note: Fire management policies are under review by the Interagency Fire Management Policy Review Team and will be modified as necessary pursuant to their recommendations.]

Fire management activities conducted in wilderness areas will conform to the basic purposes of wilderness. The park's fire management and wilderness management plans together will identify the natural and historic roles of fire in the wilderness and will provide a prescription for response, if any, to natural and human-caused wildfires. If a prescribed fire program is implemented, these plans will also include

the prescriptions and procedures under which the program will be conducted.

Actions taken to suppress wildfires will use the minimum tool concept and will be conducted in such a way as to protect natural and cultural features and to minimize the lasting impacts of the suppression actions and the fires themselves. Information on developing a fire management program is contained in the *Fire Management Guideline* (NPS-18).

(See Fire Management 4:14, Fire Detection and Suppression 5:13)

Cultural Resources

Cultural features such as archeological sites, historic trails or routes, or structures that have been included within wilderness will be protected and maintained using methods that are consistent with the preservation of wilderness character and values and cultural resource protection requirements. Burial plots or commemorative features, such as plaques or memorials, that have been included in wilderness may be retained, but no new additions may be made unless authorized by federal statute, existing reservations, or retained rights. Native American religious areas and other ethnographic resources will be inventoried and protected. Native Americans will be permitted nonmotorized access within wilderness for sacred or religious purposes in accordance with criteria for special park uses.

(See Planning and Proposal Formulation 5:4, Treatment of Cultural Resources 5:5, Ethnographic Resources 5:11, Native American Use 8:8, Special Park Uses 8:10, Cemeteries and Burials 8:16, Commemorative Works and Plaques 9:17)

Use Of Wilderness

The National Park Service will encourage and facilitate those uses of wilderness that require the wilderness environment and do not degrade wilderness resources and character. NPS wilderness management actions will be directed toward providing opportunities for primitive and unconfined types of recreation by park visitors. Appropriate restrictions may be imposed on any authorized activity in the interest of preserving wilderness character and resources or to ensure public safety. Visitors will be encouraged and in some situations may be required through the regulatory process to comply with the concept of no-trace or minimum-impact wilderness use for both themselves and their livestock.

(See Management of Recreational Use 8:2)

General Public Use

Park visitors must accept wilderness largely on its own terms, without modem facilities provided for their comfort or convenience. Users must also accept certain risks, including possible dangers arising from wildlife, weather conditions, physical features, and other natural phenomena, that are inherent in

the various elements and conditions that comprise a wilderness experience and primitive methods of travel. The National Park Service will not eliminate or unreasonably control risks that are normally associated with wilderness, but it will strive to provide users with general information concerning possible risks, recommended precautions, minimum-impact use ethics, and applicable restrictions and regulations.

Wilderness users will be required to carry out all refuse as defined in 36 CFR 1.4.

As a general rule, public use of motorized equipment or any form of mechanical transport will be prohibited in wilderness. Operating a motor vehicle or possessing a bicycle in designated wilderness outside Alaska is prohibited by NPS regulations in 36 CFR 4. However, the Wilderness Act authorizes continuation of motorboat and aircraft use under certain circumstances where those activities were established prior to wilderness designation. The National Park Service will limit authorizations for the continued use of any motorized equipment in wilderness to situations where such use has been specifically authorized by Congress and determined by Congress or the Park Service to be compatible with the purpose, character, and resource values of the particular wilderness area involved. The use of motorized equipment by the public in wilderness areas in Alaska is governed by applicable provisions of ANILCA and NPS regulations in 36 CFR 13. The specific conditions under which motorized equipment may be used by the public will be outlined in each park's wilderness management plan.

The use of hand-propelled watercraft may be allowed in wilderness. However, the watercraft and all other supplies and equipment must be removed at the end of each wilderness trip.

Mobility-impaired persons may use wheelchairs (as defined in 36 CFR 1.4) in wilderness.

(See Accessibility for Disabled Persons 8:5, Accessibility for Disabled Persons 9:3)

Commercial Services

Wilderness-oriented commercial services that contribute to achieving public enjoyment of wilderness values or that provide opportunities for primitive and unconfined types of recreation may be authorized if they meet the "necessary and appropriate" tests of the Concessions Policy and Wilderness acts and if they are consistent with the wilderness management objectives contained in the park's wilderness management plan. Activities such as guide services for outfitted horseback, hiking, mountain climbing, or river trips and similar activities may be appropriate and may be authorized if conducted under terms and conditions outlined in the park's wilderness management plan and in documents authorizing concessions or commercial use. The only structures or facilities to support such commercial services that will be allowed in wilderness will be temporary shelters, such

as tents, which will be removed from the wilderness after each trip.

(See Commercial Services 8:3, Planning Criteria for Park Concessions 10:1, Commercial Use License 10:3, Rates Charged to Visitors 10:6, Interpretation 10:9)

Special Events

The National Park Service will not sponsor or issue permits for special events to be conducted in wilderness if those events might be inconsistent with wilderness resources and character.

(See Special Events 8:10)

Grazing and Livestock Driveways

Commercial grazing or driving of livestock in park wilderness will be allowed only when authorized by Congress. Where these activities are so authorized, they will be managed under conditions outlined in the wilderness management plan to protect wilderness resources and values. The use of motorized or mechanical equipment will not be allowed. The construction of facilities incompatible with wilderness values or management objectives will be prohibited.

Noncommercial grazing of trail stock incidental to recreational use of wilderness may be authorized in accordance with NPS regulations and conditions outlined in the wilderness management plan that ensure protection of wilderness resources and character. Superintendents will be responsible for monitoring livestock use of wilderness to the same degree as human use and may use the same management tools and techniques to manage livestock use that are available for managing other wilderness uses.

(See Grazing 8:14)

Rights-of-Way

Existing rights-of-way that have been included in wilderness should be phased out where practicable. Where it is not practicable, rights-of-way subject to NPS administrative control may be renewed under conditions outlined in the park's wilderness management plan that protect wilderness character and resources and limit the use of motorized or mechanical equipment. The National Park Service will not issue any new rights-of-way or widen or extend any existing rights-of-way in wilderness.

Rights-of-way and access procedures affecting wilderness areas in Alaska are governed by applicable provisions of ANILCA and regulations in 43 CFR 36 and 36 CFR 13.

(See Land Protection Plans 3:1, Rights-of-Way 8:11)

Mineral Development

The National Park Service will seek to eliminate valid mining claims and nonfederal mineral interests in wilderness through acquisition. In parks where Congress has authorized the

leasing of federal minerals, the Park Service will take appropriate actions to preclude the leasing of lands or minerals that are included within wilderness. Lands included within wilderness will be listed as excepted areas under applicable regulations in 43 CFR 3100 and 3500.

(See Land Protection Plans 3:1, Mineral Development 8:12)

Public Education

The National Park Service will develop and maintain an effective public education program designed to promote and perpetuate public awareness of and appreciation for wilderness character, resources, and ethics without stimulating an unacceptable demand for use. Efforts will focus on the fostering of an understanding of the concept of wilderness that includes respect for the resource, willingness to exercise self-restraint in demanding access to it, and an ability to adhere to appropriate, minimum-impact techniques when using it.

(See Interpretive Programs 7:1, Interpretive Services 7:2)

Appendix C

History of the Wilderness Recommendation at Grand Canyon

Wilderness Act Requirements

The passage of the 1964 Wilderness Act, Public Law 88-577, Section 3(c), instructed the Secretary of the Interior to review all roadless areas of at least 5,000 acres in the National Park System, and to submit a report regarding the suitability of these areas for wilderness classification. The Act provided a ten-year review period and timetable.

Grand Canyon National Park Wilderness Recommendations

In 1970, the National Park Service released for public review *its Preliminary Wilderness Study for Grand Canyon National Park, Marble Canyon National Monument, and Grand Canyon National Monument*. The study recommended phasing out motorized use on the Colorado River, and closing the network of fire roads on the North Rim to qualify these areas for wilderness. The total wilderness recommendation was 569,200 acres, or approximately 63% of the 900,000-acre Park. Absent from the study are any South Rim lands except the "Palisades of the Desert rim area" (U.S. Department of the Interior, National Park Service 1970).

In August of 1971, the Park issued a *Final Draft Wilderness Recommendation* of 508,500 acres, approximately 60,000 acres less than the earlier study (U.S. Department of the Interior, National Park Service 1971). Deleted from the recommendation were the North Rim and river corridor. The river corridor was excluded because of the planned continued use of motors on the river. The perceived requirement for fire roads, and projected use of mechanical equipment, resulted in the exclusion from wilderness consideration of North Rim lands until completion of a fire-hazard reduction program.

The November, 1971 Wilderness Recommendation reflected the August "Final Draft" acreage and rationale (U.S. Department of the Interior, National Park Service 1971a). Included within the recommendation was a rationalization for a 1/8-mile "management zone" between the Park boundary and the wilderness boundary.

In 1972, the Service released another Wilderness Recommendation consisting of 512,870 acres, due to environmental concerns. This action resulted in the "potential wilderness" addition of Grand Canyon National Monument and the North Rim, based upon projected elimination of grazing in the former, and elimination of fuel buildup in the latter. The 1/8-mile "management zones" were also eliminated as a result of public input (U.S. Department of the Interior, National Park Service 1972; Hardy and Associates 1971).

In 1973, the Park released its *Final Environmental Statement for the Proposed Wilderness Classification of 1972* (U.S. Department of the Interior, National Park Service 1973).

The passage of the *Grand Canyon National Park Enlargement Act* of 1975, Public Law 93-620, (amended PL 94-31), Section 11, required that the Secretary of the Interior submit within two years a new wilderness recommendation accommodating an enlarged Grand Canyon National Park.

The July 1976 *Preliminary Wilderness Proposal* called for 992,046 acres as suitable for wilderness. An additional 120,965 acres, including the river corridor, was recommended as potential wilderness (U.S. Department of the Interior, National Park Service 1976). The total proposal was 1,113,011 acres. A Draft Environmental Statement was also prepared in 1976 (U.S. Department of the Interior, National Park Service 1976a).

In August 1976, the Service conducted public wilderness hearings in Flagstaff, Grand Canyon, Phoenix, and St. George, Utah. A total of 509 letters and written statements resulted from the hearings and the document review process. The Park received comments from 23 Federal agencies, 17 State agencies, three Indian Tribes, 39 organizations, 24 companies, and 501 individuals (U.S. Department of the Interior, National Park Service 1980:14).

The *Final Wilderness Recommendation*, February 1977, signed by the Director, recommended 1,004,066 acres (including the river corridor, p.16, and most of the North Rim) for immediate wilderness designation with an additional 108,945 recommended as potential wilderness (U.S. Department of the Interior, National Park Service 1977). The total "recommended for immediate wilderness designation" and "recommended potential wilderness" acreage of both the 1976 and 1977 proposals was 1,113,011 acres. The NPS sent this recommendation to the Legislative Counsel in 1977, where it was held in abeyance pending completion of the River Management Plan (U.S. Department of the Interior, National Park Service 1977a: U.S. Department of the Interior 1979).

Upon completion of the 1980 *Colorado River Management Plan*, a memorandum from the Director of the National Park Service to the Assistant Secretary for Fish, Wildlife and Parks recommended 980,088 acres for immediate wilderness designation, and an additional 131,814 acres as "potential wilderness" (U.S. Department of the Interior, National Park Service 1980c). Attached was a revised 1977 recommendation that eliminated from wilderness consideration the 1,109-acre area between the Kaibab and the Bright Angel Trails (U.S. Department of the Interior, National Park Service 1980; May 1992). The river corridor was also recommended as potential wilderness until the planned phase-out of motors in 1985. The so-called *Hatch Amendment* to the 1981 *Department of the Interior Appropriations Bill* resulted in the abandonment of the 1980 *Colorado River Management Plan* and its wilderness emphasis.

A new river plan was written, and motor use on the river continued indefinitely (U.S. Department of the Interior, National Park Service 1981).

In 1993, the Park conducted an internal review and update of *the 1980 Wilderness Recommendation* (U.S. Department of the Interior, National Park Service 1993). Revisions were made, based upon the acquisition of mining, grazing, and other leases, the 1969 Field Solicitor's Opinion regarding the western boundary of the Navajo Reservation, and refinement in acreage determined by the Geographical Information System (GIS). All modifications were consistent with the letter or intent of the 1980 Recommendation. On August 3, 1993, the superintendent transmitted this recommendation to the Director of the National Park Service (U.S. Department of the Interior, National Park Service 1993a).

Appendix D

Minimum Requirement Decision Process for Grand Canyon National Park

The purpose of the minimum-requirement process is to determine the "minimum tool or administrative practice necessary to successfully and safely accomplish the management objective with the least adverse impact on wilderness character and resources." (*NPS Management Policies*, 6:4). In doing so, the following matrix provides Park staff and managers with a framework to guide the decision-making process while triggering consideration of specific variables which may affect wilderness values, resources, and experiences.

The following minimum-requirement matrix should be completed for administrative activities in the proposed wilderness. These activities include, but are not limited to, fire management, wildlife management, archaeological monitoring and treatments, research, and resource protection. The minimum-requirement decision process may be applied at a programmatic level but should describe specific activities. The minimum-requirement decision process may be applied at a programmatic level for proposed actions, but should describe specific activities.

Things to consider when completing the Grand Canyon National Park Minimum Requirement Matrix for actions in proposed wilderness:

Step 1

Is This An Emergency?

Emergency minimum-requirement standard operational procedures are defined in the Grand Canyon National Park Emergency Medical Service (EMS) Plan, the Grand Canyon National Park Search and Rescue (SAR) Plan, and the Grand Canyon National Park Fire Management Plan (See Chapter 11, Ecosystem Management).

If the action is not an emergency, continue with the process outlined below.

Step 2

Determine if the proposed action is essential to achieve planned wilderness objectives.

These objectives are presented in approved plans (e.g., Wilderness Management Plan, Colorado River Management Plan, General Management Plan, Resource Management Plan, Fire Management Plan, etc.). For this purpose, approved research is considered essential.

Step 3

Can the desired action be accomplished through visitor and staff education?

According to the Wilderness Act, wilderness is an area "which has outstanding opportunities for solitude or a primitive and unconfined type of recreation." The National Park Service will not eliminate or unreasonably control risks that are normally associated with wilderness; it will strive to provide users with general information concerning possible risks, recommended precautions, minimum-impact use ethics, and

applicable restrictions and regulations (*NPS Management Policies,* 6:8).

The emphasis of visitor contacts will be educational prior to embarking on a backcountry or river experience.[1] This will be accomplished through an expanded permitting process and other efforts including brochures, staff contact, displays, and pre-departure orientations (See Chapter 10, Interpretation, Education, and Information).

Leave No Trace (LNT)

LNT is a management and education program which promotes minimum-impact camping and hiking techniques in wildlands (See Chapter Ten). Wilderness travelers, both recreational and administrative, can greatly reduce their impacts by adhering to LNT principles.

Minimum-Impact Suppression Tactics (MIST) and Light Hand on the Land

These concepts are associated with low-impact fire suppression tactics and trail maintenance, and describe an appropriate wilderness work ethic (U.S. Department of Agriculture. National Forest Service. 1995). A light-hand approach is one in which the work is accomplished with the least necessary disturbance of wilderness resources, including visitor experience. The manager and field personnel must keep in mind that people working in wilderness often have a greater impact than the private visitor. Field crews must scrupulously adhere to minimum-impact camping (LNT) techniques.

Authority of the Resource

The Arthur Carhart National Wilderness Training Center teaches that agency—visitor contacts in wilderness should be conducted in a manner that respects visitor's expectations for a wilderness experience (Arthur Carhart National Wilderness Training Center 1993). Many violations are careless, unskilled, or uninformed actions which result in impacts on wilderness resources or other visitors' wilderness experience. When contacting visitors who exhibit undesirable behavior reference *Authority of the Resource*. This concept requires the manager and visitor to evaluate the consequence of their actions on an environment that both value. The agency representative should attempt to resolve the matter by following a three-step approach:

1) Give an objective description of the situation. Referencing the regulation or the visitor as violator is not required at this time.

2) Explain the implications of the action or situation that was observed. It is here that the agency representative attempts to reveal the authority of the resource or interpret what detrimental impacts will occur if the action is continued. This may include social impacts or reference to what will happen to other visitors' interaction with nature if the action continues.

3) Inform the visitor how the manager/ ranger (and the agency) feels about

[1] The most desirable times to contact the visitor or to make regulations known is during the anticipation/ planning phase of the wilderness experience. Researchers suggest the agency regulate at the entry level rather than the activity level within an area. (See Hendee, John C., et al. 1990:188-189; 401-422)

the action and what steps can or should be taken to improve the situation. The agency representative can then decide whether or not it is necessary to cite the regulation per se, and whether to escalate the level of law enforcement (Wallace 1990).

Wilderness rangers are guided by *NPS-9, Law Enforcement Guidelines* (U.S. Department of the Interior, National Park Service 1989a). The goals of NPS-9, which include visitor and staff safety, park resource protection, and the enhancement of visitor enjoyment, are achieved through the application of the lowest level of enforcement technique necessary to gain compliance.

Step 4

Decide if the action can be accommodated outside wilderness.

If possible, locate activities or facilities determined "essential" (e.g., visitor orientation, information signs or a radio-repeater station) outside wilderness.

Step 5

List alternatives appropriate for wilderness management.

For the Minimum-Requirement Process to work, it is important to develop and seriously consider a range of realistic alternatives. This process involves a tiered analysis beginning with the least obtrusive, nonmechanized alternative.

[2] "Routine" is defined as "a regular, more or less unvarying procedure, customary, prescribed, or habitual, as of business or daily life."

Primitive Skills

Primitive skills involve the proficient use of tools and skills of the pre-motorized or pioneering era (e.g., the double-bit axe, the crosscut saw, the pack string, and oar-powered and paddle-powered watercraft). The working understanding of primitive skills is important to appropriately plan for their use. Managers must take the lead in demonstrating that tasks can be performed well by primitive or traditional, nonmotorized methods. Field staff require adequate training in primitive-tool selection, use, and care to efficiently accomplish planned work. While agency staff should constantly stress the importance of using primitive skills in accomplishing management objectives, they should understand that minimum-requirement analysis will not always lead to the use of a primitive tool.

Mechanized Use in Wilderness

The use of motorized equipment is prohibited when other reasonable alternatives are available to protect wilderness values. While Congress mandated a ban on motors and mechanized equipment, it also recognized that managers may occasionally need those sorts of tools. While this provision complicates the decision-making process, it remains an *exception* to be exercised very sparingly and only when it meets the test of being the *minimum necessary* for *wilderness purposes* (Worf 1987; Colorado State University 1991). Administrative use of motorized equipment or mechanical transport, including motorboats and aircraft, may

be authorized only if determined by the superintendent to be the minimum tool needed to protect wilderness values. Such management activities will be conducted in accordance with all applicable regulations, polices, and guidelines and, where practicable, will be scheduled to avoid creating adverse resource impacts or conflicts with visitor use (*NPS Management Policies,* 6:4-5).

Routine[2] nonemergency restoration, visitor contact, monitoring, and maintenance in proposed wilderness should consist of nonmechanized tools. Nonroutine (preferably one-time) use of motorized equipment such as pionjars, chain saws, etc., during extensive trail reconstruction, stabilization, and relocation may be permitted on a case-by-case determination by the superintendent.[3] Nonroutine helicopter support may be authorized if nonmechanized transport is deemed unreasonable or hazardous. If some compromise of wilderness resources or character is unavoidable, only those actions that have localized, short-term adverse impacts will be acceptable (*NPS Management Policies*, 6:4).

Step 6

Evaluate the alternatives to determine which has the least impact on wilderness resources. Can the desired action be accomplished safely and effectively with primitive skills?

The manager must determine how to safely accomplish the action with the least impact on the wilderness resource and visitor experience. Remember that potential disruption of wilderness character and resources and applicable safety concerns will be considered before, and given significantly more weight than, economic efficiency.

The net result of a minimum-requirement analysis is a carefully weighed project or action found to be the most effective way of meeting wilderness objectives and the *minimum necessary* for Wilderness Act purposes.

Step 7

Select the appropriate minimum tool or action.

Obtain review from the Division Chief and Wilderness Coordinator, and approval from the superintendent. Coordinate the preparation of a project proposal with the Park environmental compliance officer unless the proposed action has been addressed at the programmatic level.

[3] The "reoccurring" need for mechanized equipment, such as chainsaws or mechanized transport, may be necessary to accomplish fire management objectives on the existing temporary fire roads until the natural fire regime is restored. At that time, the roads will be restored to a natural condition, or converted into trails as specified by Management Policies, Chapter 6:5. This issue will be addressed in the revision of the *Grand Canyon National Park Fire Management Plan*.

Note

The following individuals provided comment on this document:

- Judy Alderson*
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  NPS Alaska System Support Office
- Jim Walters*
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  Great Smoky Mountains National Park
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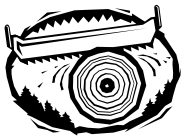
  District Ranger
  Crater Lake National Park
- Doug Morris*
  Superintendent
  Saquaro National Monument
- Dan Oltrogge
  Fire Management Officer
  Grand Canyon National Park

* National Wilderness Steering Committee

Process for Determining Minimum Requirement

Grand Canyon National Park



Proposed Action: _____

To be undertaken by: _____

1 IS THIS AN EMERGENCY?

YES → Act according to approved emergency minimum-tool SOPs

NO ↓

2 IS ACTION ESSENTIAL? (to meet planned wilderness objectives[1])

YES ↓

NO → Don't Do It

3 Can this action be accomplished through visitor education?

YES → Do it

NO ↓

4 Can Action Be Accomplished Elsewhere? (Outside of Wilderness area)

YES → Do It There

NO ↓

Go to Page two

•List the Objective(s) met by this action:

[1]Management objectives are listed in approved plans, for example:
- *Wilderness Management Plan*
- *Colorado River Management Plan*
- *Fire Management Plan*
- *General Management Plan*
- *Management Policies*
- *Strategic Plan for GCNP*
- *Resource Management Plan*
- *Approved Research*

•Other (non-wilderness) areas considered:

Process for Determining Minimum Requirement

5 List alternative ways to accomplish this action.

•List alternatives:

6 Evaluate which alternative would have the Least Impact on:
- Wilderness resources?
- Visitor experience?

Can this action be safely and effectively accomplished with primitive skills? (Economic efficiency and convenience are not primary considerations)

YES

NO

7 **Select Appropriate Primitive Tools and Skills**

7 **Select Appropriate Mechanized Tool** (non-routine[2] uses only) or Administrative/Research Facility

Considerations:

•What is the best group size to complete this action with the least impact on resources and visitor experience?

•What is the best time of year to complete action while minimizing impact on resources and visitor experience?

•If mechanized equipment is selected, how often will it be used, and how long will the project last?

•If this action cannot be accomplished through visitor education alone, how can it contribute to the accomplishment/enhancement of this action?

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[2]Routine is defined as: "A regular, more or less unvarying procedure, customary, prescribed, or habitual, as of business or daily life."

Givens:
•We will manage for wilderness.
•River is included
•Economics and convenience are secondary

Process for Determining Minimum Requirement

Action: _____

List selected alternative and justification here:

Prepared by Date Reviewed by Division Chief Date

Reviewed by Wilderness Coordinator

Approved by Superintendent, Grand Canyon National Park Form Approved 1998, GRCA

Appendix E

Recreational Opportunities and Permit Information for Adjacent Lands

Navajo Tribal Lands

There are a number of trails and routes on Navajo land used by Grand Canyon hikers: Lees Ferry to the confluence with the Little Colorado River; and the Little Colorado River Gorge from Cameron to the confluence of the Colorado River. Permits are required from the Tribe for backcountry use and camping on Navajo Nation lands.

Permits and information may be obtained at three locations throughout the year:

Navajo Nation Parks and Recreation Department
P.O. Box 9000
Window Rock, AZ 86515
(520) 871-6647

Cameron Visitor Center (at junction of Hwy 89 and Hwy 64)
P.O. Box 549
Cameron, AZ 86020
(520) 679-2303

LeChee Sub-Office
Located near LeChee Chapter House, seven miles south of Page, Arizona
(520) 698-3360

Navajo Nation fishing and hunting permits, fees, and dates can be obtained by contacting:

Fish and Wildlife Department
P.O. Box 1480
Window Rock, AZ 86515
(520) 871-5338

Havasupai Tribal Lands

A one-time entrance fee is charged by the Tribe for use of Havasupai lands. The main trail into Supai village is located at Hualapai Hilltop. Nightly camping fees for the campground are required. The campground is located two miles from the village between Havasu Falls and Mooney Falls. Backcountry use of Great Thumb areas requires a permit from the Havasupai Tribe as well as the Grand Canyon National Park.

Havasupai entrance and camping fees differ for the high-use season (April 1 through October 31) and the off-season (November 1 through March 31).

For information and campground reservations, contact

Havasupai Tourist Enterprise
General Delivery
Supai, AZ 86435
(520) 448-2141

Hualapai Tribal Lands

The primary access to the Colorado River in the western part of Grand Canyon is by the Diamond Creek Road. Hualapai permits and fees are required for private boat launching or take-out, camping, and sight-seeing. Commercial whitewater rafting trips may also be scheduled through Hualapai River Runners. Hunting permits are also available through the Department of Natural Resources.

For information on various recreational activites on Hualapai Tribal lands, contact

Hualapai Enterprises, Inc.
P.O. Box 359
Peach Springs, AZ 86434
(520) 769-2419

Bureau Of Land Management

Arizona Strip District

A variety of wilderness and nonwilderness recreational activities are available on public lands to the north and northwest of Grand Canyon National Park near the Utah border. Many of the public lands on the "Arizona Strip" are administered by the Bureau of Land Management (BLM).

Primitive roads on BLM lands provide access to Fort Garrett Point and Whitmore Point, two scenic overlooks in western Grand Canyon.

Permit fees are required for day-use and overnight camping in the Paria Canyon, Buckskin Gulch, and Coyote Buttes portions of the Paria Canyon—Vermilion Cliffs Wilderness Area. Visitors to the area can deposit fees at self-serve stations located at White House, Buckskin, and Wire Pass Trailheads.

Information on the various BLM recreational opportunities on the Arizona Strip may be obtained by contacting

Interagency Office and
Information Center
345 East Riverside Drive
St. George, UT 84790
(801) 688-3200

U.S. Forest Service (USFS)

Kaibab National Forest

The north and south boundaries of Grand Canyon National Park are shared with the Kaibab National Forest. The Tusayan District is located near the South Rim, and the North Kaibab District is located north of the Park. The Saddle Mountain and Kanab Creek Wilderness Areas are located in the North Kaibab District.

Primitive roads in the North Kaibab District provide access to several Grand Canyon scenic overlooks including Indian Hollow, Monument Point, Crazy Jug Point, Timp Point, and Marble View.

USFS permits are not required for backcountry use. Reservations and fees are required for overnight campground use on Forest Service areas.

Information may be obtained by contacting:

For areas adjacent to South Rim

Kaibab National Forest
Recreation and Visitor Information
200 W. Railroad Ave.
Williams, AZ 86046
(520) 635-4061

For areas adjacent to North Rim

North Kaibab Ranger District
P.O. Box 248
Fredonia, AZ 86022
(520) 643-7395

Kaibab Plateau Visitor Information
Center at Jacob Lake
May through October
(520) 643-7298

National Park Service

Glen Canyon National Park
Lake Mead National Park

Water-based recreation such as motor boating, water skiing, sailboarding, and fishing are found on the reservoirs at Lake Powell, which is managed by Glen Canyon National Recreation Area, and at Lake Mead, which is managed by Lake Mead National Recreation Area.

Access to Grand Canyon scenic overlooks at Whitmore Wash and Twin Point is through primitive roads in Lake Mead National Recreation Area.

For information, contact

Glen Canyon National Recreation Area
P.O. Box 1507
Page, AZ 86040-1507
(520) 608-6404
Lake Mead National Recreation Area
601 Nevada Highway
Boulder City, NV 89005
(702) 293-8990

Appendix F

Wilderness Use by Persons with Disabilities

(1) In General—Congress reaffirms that nothing in the Wilderness Act is to be construed as prohibiting the use of a wheelchair in a wilderness area by an individual whose disability requires use of a wheelchair, and consistent with the Wilderness Act, no agency is required to provide any form of special treatment or accommodation, or to construct any facilities or modify any conditions of lands within a wilderness area to facilitate such use.

(2) Definition — For the purposes of paragraph (1), the term wheelchair means a device designed solely for the use by a mobility-impaired person for locomotion that is suitable for use in an indoor pedestrian area. (Section 507(c), 104 Stat. 327, 42 USC. 12207, Americans with Disabilities Act of 1990 [ADA])

All requests involving wilderness use by persons with disabilities shall be in accordance with the Architectural Barriers Act, the Rehabilitation Act of 1973 (amended in 1978), Section 507(c) of the Americans with Disabilities Act of 1990 and be reviewed to ensure that wilderness resources and character are not damaged or diminished.

The NPS is not required to provide any modification or special treatment to accommodate accessibility by persons with disabilities. However, managers should explore solutions for reasonable accommodations when not in conflict with the Wilderness Act (e.g. barrier-free trails, accessible campsites).

Wheelchairs are appropriate in Wilderness only if they meet the ADA definition. The intent of this definition was that a wheelchair is a person's primary mode of locomotion, manual or electric, but not an all terrain vehicle. This definition was also intended to ensure that persons using wheelchairs were reasonably accommodated in wilderness without the need to compromise the resource and character of wilderness.

Service animals are permitted in wilderness. Service animals are not to be confused with "pets." The ADA defines a service animal as "any guide dog, signal dog, or other animal individually trained to provide assistance to a person with a disability. They are required by persons with disabilities in day-to-day activities."

A publication entitled Wilderness Access Decision Tool (available through the Arthur Carhart National Wilderness Training Center) has been developed and should be followed to make appropriate, objective, and consistent decisions regarding the use of wilderness areas by persons with disabilities. Any decision should insure that it does not inadvertently discriminate against persons with disabilities (U.S. Department of the Interior, National Park Service.1997d).

Appendix G

Backcountry Reservation and Permit System

The demand for permits for over night use from March through October far exceeds the use limits that protect wilderness resources and the quality of recreational experiences. An automated reservation system ensures a fair and equitable distribution of opportunities for recreation in the Park's wilderness areas. "Backcountry" is defined as all areas outside the developed areas (i.e., rims, Cross-Canyon Corridor, and Proposed Wilderness); "wilderness" refers to the Proposed Wilderness areas only.

Backcountry Permits Information

Permits are required for all backcountry and wilderness overnight use, and must be in possession at all times. Maximum group size is 11 people.

Advance permit requests are accepted up to four months prior to the trip start date.

By Mail
Backcountry Office
Grand Canyon National Park
P.O. Box 129
Grand Canyon, AZ 86023

By FAX
(520) 638-2125

Information Telephone
(520) 638-7875
1:00 p.m. to 5:00 p.m. daily
Reservations are not accepted by phone.

In-Person
The South Rim Backcountry Office at the Maswik Transportation Center
Hours: 8 a.m. to noon; 1 p.m. to 5 p.m.

The North Rim Backcountry Office in the North Rim Administrative Area
Hours: 8 a.m. to noon; 1 p.m. to 5 p.m.

Requirements

A Backcountry Use Permit is required for all overnight use in wilderness and backcountry areas. Phantom Ranch Lodge guests do not need a backcountry use permit.

Backcountry permits are not required for private day hikes or day rides; however, day users must observe wilderness and backcountry regulations. Incidental Business Permits (IBP) are required for all commercially guided day hikes, including those accompanying a motor-vehicle tour or other Park use. (See Appendix I, Commercial Use Policy).

Permits are valid only for the trip leader, number of people, itinerary, and dates specified on the permit. Backcountry and wilderness travelers must have their permit in their possession and in plain view while hiking or camping so it can be easily checked by rangers.

Obtaining Permits

The demand for a Grand Canyon backcountry permit far exceeds availability, resulting in a highly competitive process. Obtaining a permit in advance is strongly recommended. There are no guarantees that there will be any last

minute walk-in permits available. The demand for permits is greatest for use between March and early November, and all holiday periods. November through February is considered a low-use period.

Permit requests for overnight backcountry and wilderness use are accepted only by mail, in person, or by FAX (520-638-2125), and are issued on a first-come, first-served basis. Fees should be paid at this time by credit card, check, or money order.

A written response will be sent via U.S. Mail to all mail-request and FAX applicants with the request's results.

For in-person requests, the South Rim Backcountry Office, located at the Maswik Transportation Center, is open from 8:00 a.m. to 12:00 noon and 1:00 p.m. to 5:00 p.m. daily. The North Rim Backcountry Office is open daily mid-May through October only (weather permitting) during the same hours. Note: Grand Canyon is on Mountain Standard Time all year, and does not participate in Daylight Savings Time.

Permit Fees

In 1996, Congress mandated the Secretary of the Interior to implement a three-year Recreation Fee Demonstration Program in up to 100 national park areas. This program directs parks to increase current fees and establish new fees for recreational uses, and retains a large portion of the resulting revenues at the collecting park for new services and facilities. Grand Canyon National Park is participating in the Recreation Fee Demonstration Program, which increased entrance fees and created a backcountry permit/impact fee. The benefits realized at Grand Canyon will be additional service to the public, increased protection of Park resources, and construction of needed facilities according to the Park's General Management Plan.

All fees paid to the Backcountry Office are nonrefundable. Current fees include a $20 Basic Permit Fee plus a $4 per-person, per-night Impact Fee. Frequent users may wish to purchase a one-year Frequent Hiker membership for $50. This membership will waive the initial $20 fee for each permit obtained by the member trip leader (who must be on the trip). This membership is valid for twelve months from the date of purchase.

Advance Permit Requests

Beginning with the first day of a month, permit requests will be accepted for a proposed trip starting on any date in that month or the following four months.

Apply On Or After	For Dates Through
January 1	May
February 1	June
March 1	July
April 1	August
May 1	September
June 1	October
July 1	November
August 1	December
September 1	January
October 1	February
November 1	March
December 1	April

For example: Beginning on December 1, 1998, any start date through April 30, 1999, would be available for request.

A permit request that starts in an open month and ends in a closed month, but is seven days or fewer in duration, will be processed as a valid request. Trips extending beyond that guideline into the closed month will require an additional permit request for the closed month once that month becomes available.

Mail or FAX Request Procedures

Permit requests sent by mail or FAX will be accepted if mailed or FAXed on or after the appropriate date as specified above. The envelope postmark or FAX machine received date will be used to determine if the request is valid. Requests postmarked or FAXed earlier than the specified date will be returned without processing.

If available, a Backcountry Use Permit will be issued and mailed to the trip leader. The permit will be valid only for the trip leader named on the permit. If a permit has been requested and not received prior to trip departure, contact the Backcountry Office. A valid permit must be in possession before a trip begins.

Each mail-in or FAX permit request must specify the following:

- Name, address, and phone number of the trip leader
- Credit card number, expiration date, signature and date, amount authorized
- Name of organization (if applicable)
- The number of people and livestock (if applicable)
- Proposed night-by-night itinerary showing use-area codes, and dates for each night of the proposed trip
- State and license plate numbers of vehicles that will be parked at a trailhead (if applicable)
- Alternate proposed itineraries in case the first itinerary is not available

Permits will not be issued unless complete information is provided. The listing of at least three alternate itineraries with this information is strongly recommended.

Phone Information

Backcountry Office staff answer questions between 1 p.m. and 5 p.m. Monday through Friday (except on Federal holidays) at (520)638-7875. Permit requests are not accepted by phone.

The Backcountry Office does not make reservations for campground space on the rims, for river trips, mule trips, Phantom Ranch lodging, or trips into the Canyon on the Havasupai Indian Reservation.

Other Locations

Reservations and/or permits may sometimes be obtained from rangers on duty at the Tuweep, Meadview, and Lees Ferry Ranger Stations. However, these rangers have other patrol respon-

sibilities and may not be available to provide assistance. Consequently, it is recommended that trips be planned in advance through the Backcountry Office to be certain permits are available. Grand Canyon permits may also be available on a limited basis at Pipe Spring National Monument; the Bureau of Land Management offices in St. George and Kanab, Utah; and at the U.S. Forest Service offices in Fredonia, Arizona.

Organized Groups

An organization is any number of persons united for some purpose, whether commercial or noncommercial.

No more than eight small groups or four large groups (not to exceed 48 persons) from the same organization may camp below the rim on the same night. Only one large group of 11 maximum or one small group of six maximum from the same organization are allowed in the same campground or use area on the same night. A small group is defined as six people or less on a permit. A large group is defined as 7-11 people on a permit. Maximum group size is 11 people.

Groups of more than 11 must divide between different campgrounds or use areas. Only one group per night will be allowed in use areas in the Wild Opportunity Class. Only a small percent of permits are issued to large groups. A group size to six or less improves the chance of obtaining a permit.

Wilderness Private Stock Use

Permit application procedures for wilderness stock users are the same as those described for backpackers, except that stock users need to include the number of stock as well as the number of people in their permit application. For wilderness use areas, the limit is six animals and six people with no more than five animals to one mounted packer.

Grazing is not permitted. Stock handlers must bring enough feed for the trip's duration. Any feed packed into the backcountry or wilderness must be sterile to protect the Park from the introduction of nonnative plants and noxious weeds. For more information on private stock use, see Appendix H, Wilderness Stock Use Guidelines. An information sheet on stock use in the Cross-Canyon Corridor is available on request from the Grand Canyon Backcountry Office.

Last-Minute Permits

Persons without advance reservations may be able to obtain a Backcountry Use Permit by placing their name on the waiting list for cancellations. This must be done in person at the Backcountry Office on the South Rim (or North Rim, when open).

North Rim Winter Use

During the winter season (approximately late October through mid-May), a Backcountry Permit is required for

overnight use of the North Rim from the Park's northern boundary to Bright Angel Point on the Canyon rim. Winter access is by hiking, snowshoeing, or Nordic skiing.

Permittees are allowed to camp at-large between the Park's north boundary and the Widforss Road junction, but not at the North Kaibab Trailhead. Between the Widforss Road junction and the Bright Angel Point area, camping is permitted only at the North Rim Campground group campsite.

Human waste should be deposited at the base of a tree well away from any road or developed area where it will not be encountered by a summer visitor after the snow has melted. During the winter months, burning toilet paper is acceptable if the area is snow covered.

Appendix H

Wilderness Stock Use Guidelines

Current recreational stock day use within the proposed wilderness is essentially unknown but believed to exist at relatively low levels. Recreational stock use is permitted where, 1) impacts to resources lie within acceptable levels (See Figure 3.2), and 2) the potential conflict with other established wilderness users is minimal.

Stock Use Guidelines

Proposed Wilderness

In the proposed wilderness, stock are permitted on following designated trails

Cape Solitude
Fort Garrett
Brady Hollow
Kanab Plateau
Tiyo Point
Uncle Jim
Whitmore
Cove

Nonwilderness Areas

Additional riding opportunities are available on the following nonwilderness trails and roads

South Bass Trailhead Road
Havasupai Point Road
North Bass Trailhead Road
Point Sublime Road
Arizona Trail
Cross-Canyon Corridor

An information sheet on private stock use in the Cross-Canyon Corridor is available from the Grand Canyon National Park Backcountry Office.

Recreational stock use is permitted in the areas mentioned above provided the following environmental-protection requirements are met (see Cole, Peterson, and Lucas 1987; and Cole 1989, 1990)

A Backcountry Permit is required for overnight private livestock trips. Permit availability is determined by use-area limits.

- Total numbers for wilderness overnight parties will not exceed the small group size of six stock and six people (with a limit of five stock to one mounted packer)

- Total numbers for wilderness day users will not exceed twelve stock and 12 people

- When taking a break, stock should be moved off trail far enough so that other parties can pass safely and unnoticed. Select a durable site for the break, tying stock in a place and manner that will not cause avoidable impacts. Do not tie directly to trees and other vegetation. Keep stock well away from destination overlooks.

- Stock must stay on established trails or primitive roads. Pack stock should be tied together and led single file, not turned loose and herded. Animals are not allowed to spread out or walk on parallel or developing trails.

- Grazing is not permitted. Stock parties must carry adequate feed free of exotic weeds. Feed and salt will be placed on a tarp or in a feedbag.

• All stock should be contained outside camping or overlook areas.

• Stock should be tied to existing hitch rails where provided. Where not provided, the use of trees and a hitch line with wide nylon "tree saver" straps is recommended. These straps come with a quick-adjusting buckle for convenience while a rope is tied to the straps and not directly to vegetation. A resistant site of hard, rocky ground is usually best. It is suggested that two or more horses be tied together to reduce the tendency to paw the ground. Animals inclined to paw should be hobbled.

• Stock parties will renovate any pawed area, pack-out excess feed and salt, and scatter manure before leaving camp.

The Basis of the Stock Use Guidelines

Trails

Stock typically have more impact on wilderness ecosystems than an equal number of hikers, especially on fragile sites (Hendee, et al. 1990; Hammitt and Cole 1987; Whittaker 1978). Horse trails and campsites have been shown to be ten times as impacted as sites used by only backpackers (Hammit and Cole). Since horses, mules, and other types of recreational stock are heavier than humans and weight is concentrated on a smaller surface area, stock exerts much more pressure on the ground. Effects due to greater concentrated weight contribute to substantial gouging and ripping of ground, and the potential for causing impacts is much more pronounced than with human traffic (Hammit and Cole 1987). Problems resulting from this high potential for trampling disturbance are compounded by the tendency for shod hooves to loosen the soil making it more susceptible to erosion. As a result, stock trails are more prone to erosion and more likely to require extensive supplemental maintenance (Hammit and Cole 1987; McQuaid-Cook 1978; Weaver and Dale 1978). This is of particular concern at Grand Canyon where inner canyon trails are generally steep.

Research and experience indicate that creation of multiple trails and new trails will occur much more rapidly with stock use than with hiker use (Cole 1990; Weaver and Dale 1978; Nagy and Scotter 1974). The trails created will also be wider, deeper, more compacted, and less vegetated (Weaver and Dale 1978; Cole 1989). Widening, for example, results from horse use on side hills. Horses tend to walk on the downhill side of the trail, which breaks down this outer edge and widens the trail (Hammit and Cole 1987).

Campsites

An campsites, differences in the magnitude of impact caused by hikers as opposed to stock parties are even more pronounced than on trails. The action of shod hooves causes rapid site deterioration through loss of organic soil horizons, increased compaction, and decreased infiltration rates (Cole 1990). Research indicates

and experience demonstrates that campsites used by stock parties result in significantly larger barren core areas as sites used primarily by backpackers (Cole 1990). Damage to vegetation and soil, as well as the accumulation of manure and urine, result in severe ecological and aesthetic damage to campsites (Cole 1989). In addition, seeds of exotic plants contained in horsefeed readily geminate and grow on such disturbed sites (Cole 1990).

Stock parties disturb a larger area because of the need for an adjacent area to accommodate stock (Cole 1990). Horses and mules, particularly when overnight use is involved, require additional space at campsite locations and lead to impacts beyond the specific campsite boundaries (Hammit and Cole 1987).

In areas where stock are grazed or confined for the night, impacts result from both trampling and defoliation of plants. These impacts are unique to stock parties and often affect a much larger area than all other recreational impacts combined (Cole 1990).

Visitor Conflicts

Although few stock users consider meeting hikers as inherently unpleasant, hikers generally find it undesirable to meet stock in wilderness (Watson, Niccolucci, and Williams 1994). For many wilderness users, meeting parties with stock or finding evidence of stock use, such as manure or corrals, also detracts greatly from their experience. This is particularly true in the majority of wildernesses where stock use is a small minority, such as in Grand Canyon (Cole, 1990).

The underlying ecological arguments currently framing the livestock-hiker debate are set in cultural traditions and symbols that fuel the emotions on each side (Moore and McClaran 1991). While the ultimate resolution of these issues lies beyond the scope of this document, Park management recognizes the inescapable conclusion that social, environmental, and administrative costs associated with stock use are much more pronounced than those associated with comparable amounts of hiker use (Cole, 1990). This situation is exacerbated by the large number of backpackers who feel that use of stock and its impacts are inappropriate. Park management also recognizes that adequate areas have been provided for stock use.

Appendix I

Commercial Use Policy

Goal

The goal of commercial use management in wilderness and backcountry areas is to provide quality services for guided hikes, winter use, equipment rental, and other services which have been determined by the National Park Service to be necessary and appropriate and enhance visitor enjoyment consistent with NPS wilderness policy.

The NPS strives to interpret regulations consistently regarding organizational status (i.e., commercial versus educational). Commercial organizations, as defined in 36 CFR 5.3, must be responsive to commercial authorization requirements. Educational organizations, as defined in 36 CFR 71.13(d), are exempt from securing commercial authorizations and paying certain fees.

Some organizations have declared themselves to be nonprofit, and do not pay taxes but, in fact, they are businesses providing services with a paid staff in return for payment by their clients. These organizations fall under the purview of 36 CFR 5.3 and the Concessions Management Program (NPS-48). They are properly authorized via Incidental Business Permits (IBP).

Organizations providing "field trips" are not viewed as educational institutions in the same sense as elementary, junior, and senior high schools, colleges, and universities whether public or private. These "field trip" organizations must secure commercial authorizations and pay applicable entrance and user fees.

Definitions

Commercial

Any or all goods, services, agreements, or anything offered to park visitors and/or the general public for recreational purposes, which uses park resources, or is undertaken for or results in compensation, monetary gain, benefits or profit to an individual, organization, or corporation, whether or not such entity is organized for purposes recognized as nonprofit under local, State, or Federal law.

Verifiable Clients

Trip participants whom the commercial operator can identify by name, address, and telephone number are verifiable clients. When required, verifiable client information is submitted at the time a reservation is made through the Backcountry Office.

Noncommercial

All nonprivate trips not covered under the commercial definition are considered noncommercial trips (including trips conducted by the organizations or organization types listed below). Organizations not listed below may submit their qualifications for consideration of noncommercial status to the superintendent for review.

Specific Noncommercial Groups

- Girl Scouts of America
- Boy Scouts of America
- Campfire Girls
- 4-H Clubs of America

Other Noncommercial Group Types

- Bona fide educational institutions when academic credit is given to enrollees for the in-park activity
- Certain governmental entities (e.g., city, county, or State recreation districts, etc.)
- Certain civic organizations (e.g., Helping Hands, Big Brothers/Sisters, etc.)
- Religious organizations (when participants are official members of record of the religious organization)

Procedures

Noncommercial Use Authorizations

Noncommercial organizations are permitted to make backcountry reservations in advance without a verifiable list of participants. However, in order to assure an equitable use of the system, all noncommercial organizations must confirm their reservations no later than 30 days prior to their trip start. Unconfirmed reservations will be cancelled and made available to the general public.

Any single noncommercial entity (e.g., Boy Scout Troop #30 of Grand Canyon, Arizona) will be permitted to make no more than two (2) advance backcountry reservations in any given calendar year except when a verifiable list of participants (names, addresses and telephone numbers) is provided for the additional reservations. There is no reservation limit for noncommercial organizations making reservations for hikes when they have a verifiable participant list.

Overnight Commercial Use Authorizations

An appropriate commercial authorization will be required for all overnight backcountry or wilderness commercial use. The authorization will be initiated by request through the Backcountry Office, and upon receipt of a commercial group's reservation request, will be prepared by the Concessions Office, and approved or disapproved by the superintendent.

All applicants for Incidental Business Permits (IBP) will be required to meet the following minimum qualifications and conditions prior to issuance of a permit.

- Proof of liability insurance coverage (Certificate of Insurance) naming the United States Government as an additional insured. Minimum acceptable level of insurance is $300,000 per occurrence and $500,000 aggregate, if the policy specifies aggregate limits.

- Payment of all required fees. A nonrefundable $200 fee is charged for application and administration of the IBP, irrespective of the IBP's length. Entrance fees and overnight use fees are also required.

- Certification that all guides/leaders meet the following qualifications
  - •Must be 18 years of age or older
  - •Must hold a current Advanced

First Aid, First Responder, or higher, Emergency Medical Services (EMS) certification.

- All IBP holders must assume rescue expenses incurred by any member of their group.

- The National Park Service reserves the right to establish commercial use-night limitations for the time periods and/or Use Areas as future conditions may warrant. Commercial use in the Cross-Canyon Corridor and wilderness areas, including North Rim winter use, are not limited at this time except as follows:

  - Incidental Business Permits will not be issued to authorize activities granted to existing concessioners under the terms of current concession contracts.

  - An exception to the limitations and restrictions on overnight Corridor use may be made for commercially guided special populations groups (physically or otherwise handicapped). Commercial use for Corridor trips for these groups may be granted by the superintendent on a need basis, after careful review of each request individually on its own merits.

- Commercial operators will be issued a date-specific IBP covering one or more trips occurring within the same reservation window as defined by the Backcountry Reservation and Permit System (Appendix G). A separate IBP is required for each reservation period, and commercial operators must compete for permits on the same basis as noncommercial and private groups. No special consideration or exceptions to reservation policies, campground and/or Use Area limits, etc., will be granted. All commercial operators may have equal access to the backcountry reservation system in order to book verifiable client reservations. Verifiable clients are trip participants whom the commercial operator can identify by name, address and telephone number.

Commercial operators who have received proper authorization and have verifiable clients may offer guided hikes in all backcountry areas where visitation is allowed on a first-come, first-served basis according to the requirements specified herein.

Day-use Commercial Use Authorizations

Commercially guided day hikes below the rim are authorized under the Incident Business Permit (IBP) program. IBPs are mandatory for conducting commercial trips in the Park; their issuance is a courtesy not an entitlement. Requests for day-hike IBPs are handled through the Division of Concessions Management. Commercial services are not authorized until the IBP is final. Prospective permittees should allow two to four weeks for permit processing, and should not schedule any commercial trips to the Park prior to obtaining a fully executed IBP.

All applicants for an IBP will be required to meet the following requirements prior to issuance of an IBP:

- Proof of liability insurance coverage (Certificate of Insurance) naming the United States Government as an additional insured. Minimum acceptable level of insurance is $300,000 per occurrence.

- Payment of all required fees. A nonrefundable $200 fee is charged for application and administration of the IBP, irrespective of the IBP's length. Entrance fees as required at the Entrance Stations will be paid by the permittee.

- Certification that all guides/leaders meet the following qualifications
    - •Must be 18 years of age or older.
    - •Must hold a valid Emergency Responder, Wilderness Advanced First Aid, or higher, Emergency Medical Services (EMS) certification.

The permittee must ensure that staff have the expertise to operate all services authorized under the IBP. The permittee must furnish the Park with a list that identifies staff members and their qualifications. A staff registration form must be submitted prior to working in the Park.

The maximum size for a commercially guided day hike is 16, including guides in the Corridor Use Area. In wilderness, group size is limited to 11 (two guides for nine clients).

Commercial day hiking will be on established trails only. Permit holders are required to submit a trip form prior to each trip which identifies the specific trails to be hiked. Rim-to-river-to-rim hikes are prohibited. Commercial day hikes must not be advertised as athletic achievements. The permittee is responsible for organizing and providing reasonable hikes for their clients' abilities.

All backcountry use and environmental protection regulations apply. Specific guidelines are outlined in the Requirements for Commercial Day Hiking Use, available through the Grand Canyon National Park Division of Concessions Management.

Bike Tour Commercial Use Authorizations

Commercially guided bike trips are authorized under the Incidental Business Permit (IBP) program. IBPs are mandatory for conducting commercial trips into the Park; their issuance is a courtesy not an entitlement. Requests for bike tour IBPs are handled through the Division of Concessions Management. Commercial services are not authorized until the IBP is finalized. Prospective permittees should allow two to four weeks for permit processing, and should not schedule any commercial trips to the Park prior to obtaining a fully executed IBP.
All applicants for an IBP will be required to meet the following requirements prior to issuance of an IBP

- Proof of liability insurance coverage (Certificate of Insurance) naming the United States Government as an additional insured. Minimum acceptable level of insurance is $300,000 per occurrence.

- Payment of all required fees. A nonrefundable $200 fee is charged for application and administration of the IBP, irrespective of the IBP's length. Entrance fees as required at the Entrance Stations will be paid by the permittee.

- Certification that all guides/leaders meet the following qualifications
    - •Must be 18 years of age or older.
    - •Must hold a valid Emergency Responder, Wilderness Advanced First Aid, or higher, Emergency Medical Services (EMS) certification.

The permittee must ensure that staff have the expertise to operate all services authorized under the IBP. The permittee must furnish the Park with a list that identifies staff members and their qualifications. A staff registration form must be submitted prior to working in the Park.

The maximum size for a commercially guided bike tour is 14, including guides. There should be no less than one guide/leader for every six clients. Bicycle use in wilderness areas is prohibited (36 CFR 4.30 (d)1).

Commercial bike tours will be limited to the following unpaved roads which are open to the public.

- Rowe Well Road
- Pasture Wash Road from FS 328 to South Bass Trailhead (W-9 and W9-A)
- Havasupai Point Road from Pasture Wash Road to Havasupai Point (W-9B)
- Grandview Entrance Road (E-10) from East Rim Drive to Grandview Entrance
- Desert View—Cedar Mountain Road (E-14) from Desert View to Cedar Mountain Entrance

Commercial bike tours are limited to roads specified in the IBP. All bikes must stay on designated roads. Off-road travel is prohibited.

Commercial bike tours must not be advertised as athletic achievements. The permittee is responsible for organizing and providing reasonable rides for their clients' abilities.

All backcountry use and environmental protection regulations apply. Specific guidelines are outlined in the Requirements for Commercial Bike Tours, available through the Grand Canyon National Park Division of Concessions Management.

Appendix J

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
GRAND CANYON NATIONAL PARK

CAVE ENTRY APPLICATION AND PERMIT

Permission is hereby granted to enter the following sensitive cave:

_____ _____ ____/____/____
(Cave Name) (Cave Number) (Date of Entry)

Approved by: _____ on ____/____/____

The group leader (18 years old minimum) will sign below in the first space, and will accompany the group at all times. The group leader assumes responsibility for the group's actions.

Your signature indicates you have read and understand all conditions of this permit.

Name (sign above, print below)	Age	Address and Phone Number
1. _____ *Trip Leader*	____	_____
_____		_____
2. _____	____	_____
_____		_____
3. _____	____	_____
_____		_____
4. _____	____	_____
_____		_____
5. _____	____	_____
_____		_____
6. _____	____	_____
_____	____	_____

IN CASE OF EMERGENCY CONTACT: _____

This permit authorizes the permittee to enter and explore the cave indicated on the reverse side of this permit. Persons signing this permit accept responsibility for informing themselves of the inherent dangers of exploring undeveloped caves, accept full responsibility for their conduct, and personal safety. The permittees shall hold harmless the Federal Government and it's employees, for any mental or physical injury or damages resulting from entering or exploring the above cave, and that the Federal Government assumes no responsibility therefore.

Removal or destruction of any natural formations, minerals, rocks, or artifacts in or near caves is prohibited. Strict adherence to all rules and regulations stated on this form is understood and agreed to.

Conditions of this Permit:

1. This permit is valid only on the date specified for cave entry.
2. This permit must be returned, even if canceling the trip.
3. The permittee copy must be in your possession while visiting the cave. All party members must sign their names, provide a phone number, and address before entering the cave. This permit is valid only for those listed on the permit.
4. The group leader must be over 18 years of age and accompany the group at all times.
5. The minimum number allowed on the trip is three (3) people, unless special permission is obtained.
6. The maximum number of people allowed on a trip is six (6) unless special permission is obtained.
7. Each person shall carry three (3) separate sources of light, a hard hat, and non-skid footwear.
8. For your safety please leave the gate key in a safe location just inside the gate, known to all members of your party.
9. The trip leader is responsible for replacing the lock and gate at the end of the cave trip.
10. All materials carried into the cave by the group must be removed and properly disposed of. The disposal of any human waste within caves is prohibited.
11. The permittee agrees that information concerning the location of this sensitive cave will not be dispersed, published, duplicated, or in any other way disseminated, unless permission is first obtained from the park service. Dissemination of cave location information can lead to vandalism or destruction of cave resources.
12. Failure to comply with any of the above requirements may result in curtailment of future cave-access privileges.

NOTICE: If you find a gate broken, please do not enter the cave, even though you have a valid permit. Entering the cave may destroy evidence needed by investigators. Notify the Park Service of any evidence of forced entry, or if you notice damage to cave resources.

If you find anyone doing damage to a cave, please get all possible information (names, date & time, vehicle descriptions, License numbers, etc.) and report the incident to the park service as soon as possible.

Please return this permit, and any cave gate keys, to Grand Canyon Science Center within seven working days.

Under Comments, please report any gates which are unlocked, have missing locks, or have locks in poor condition. Report any damage noticed in the cave.

COMMENTS:

Appendix K

Use Area Classification and Limits

Overnight Use-Area Code Characters and What They Represent

The three-digit codes used to reference the various overnight backcountry use areas, campsites, and campgrounds can be deciphered as follows:

First Character

The first character is always a letter and tells *where* the use area is in general terms.

Code	Location
A	on the north side of the Colorado River below the Canyon rim
B	on the south side of the Colorado River below the Canyon rim
C	within the popular Cross-Canyon Corridor
L	within the Lower Gorge
N	above the rim on the north side of the Canyon
S	above the rim on the south side of the Canyon

Second Character

The second character is always a letter and indicates the relative location of the use area from east to west. The eastern-most use area is designated by the letter "a" and the western-most is designated by the letter "z." The approximate location of the use area can be derived from its alphabetical relationship.

Third Character

Except when an area is limited to day use only, the third character is either the letter "G" or a numeral ranging from 0 to 9. This character signifies the following:

Code	Used only for
0	shared at-large use areas (i.e., when the first two characters of the code are shared with another use area)
9	at-large use areas where the first two characters are not shared with another use area
8	designated campsites near the Colorado River
7	designated campsites below the rim near perennial water
6 to 4	other designated campsites below the rim
3 to 1	designated campsites on the rim
G	designated campground within the popular Cross-Canyon Corridor

Figure K1: Use Area Codes, Limits, and Camping Classification
(A/L = At-Large camping, D/S = Designated Camping)

Use Area	Map ID	Opportunity Class	Large Group		Small Group	Camper Limit	Camp Type
Badger	AA9	Primitive	1		1	17	A/L
Blacktail Canyon	AU9	Wild	1	or	2	12	A/L
Boucher	BN9	Primitive	1		2	23	A/L
Boysag	LB9	Wild	1	or	2	12	A/L
Burnt Point	LK9	Wild	1	or	2	12	A/L
Cape Final	NA1	Threshold	0	or	1	6	D/S
Cape Solitude	SA9	Primitive	1		2	23	A/L
Cedar Mountain	SB9	Threshold	2		2	34	A/L
Cheyava	AJ9	Wild	1	or	2	12	A/L
Chuar	AF9	Wild	1	or	2	12	A/L
Clear Creek	AK9	Threshold	1		3	29	A/L
Cottonwood Creek	BG9	Primitive	1		2	23	A/L
Cremation	BJ9	Primitive	1		2	23	A/L
Deer Creek	AX7	Threshold	1		1	17	D/S
Diamond Creek	LG9	Wild	1	or	2	12	A/L
Eminence Break	SF9	Primitive	1		1	17	A/L
Eremita Mesa	SC9	Threshold	1	or	1	11	A/L
Escalante	BC9	Primitive	1		2	23	A/L
Esplanade	AY9	Primitive	1		2	23	A/L
Fishtail	AZ9	Wild	1	or	2	12	A/L
Fossil	BS9	Wild	1	or	2	12	A/L
Garnet	BR9	Primitive	1		2	23	A/L
Grand Wash Cliffs	LM9	Primitive	1	or	2	12	A/L
Grapevine	BH9	Primitive	1		2	23	A/L
Greenland Spring	AL9	Wild	1	or	2	12	A/L
Hance Creek	BE9	Primitive	1		2	23	A/L

Use Area	Map ID	Opportunity Class	Large Group		Small Group	Camper Limit	Camp Type
Hermit Creek	BM7	Threshold	1		3	29	D/S
Hermit Rapids	BM8	Threshold	1		1	17	D/S
Horseshoe Mesa	BF5	Threshold	2		2	36	D/S
Indian Hollow	AN9	Primitive	1		1	17	A/L
Jackass	SI9	Threshold	1		1	17	A/L
Kanab Creek	LA9	Primitive	1		2	23	A/L
Ken Patrick	NC9	Primitive	1	or	2	12	A/L
Kanab Point	NK9	Primitive	1		3	29	A/L
Lava	NN9	Threshold	1		1	17	A/L
Monument Cluster							
Horn Creek	BL4	Threshold	0		1	6	D/S
Salt Creek	BL5	Threshold	0		1	6	D/S
Cedar Spring	BL6	Threshold	0		1	6	D/S
Monument Creek	BL7	Threshold	1		3	29	D/S
Granite Rapids	BL8	Threshold	1		2	23	D/S
Nankoweap	AE9	Primitive	1		2	23	A/L
National	BU9	Wild	1	or	2	12	A/L
North Bass	AS9	Primitive	1		1	17	A/L
Olo	BT9	Wild	1	or	2	12	A/L
Outlet	NG9	Primitive	1		2	17	A/L
Palisades	BA9	Primitive	1		2	17	A/L
Parashant	LE9	Wild	1	or	2	12	A/L
Pasture Wash Cluster							
Signal Hill	SE1	Threshold	0		1	6	D/S
Ruby Point	SE2	Threshold	0		1	6	D/S
S. Bass Trailhead	SE3	Threshold	1	or	2	12	D/S
Pasture Wash	SE0	Threshold	1		1	17	A/L

Use Area	Map ID	Opportunity Class	Large Group		Small Group	Camper Limit	Camp Type
Phantom Creek	AP9	Wild	1	or	2	12	A/L
Point Sublime	NH1	Threshold	1		1	17	D/S
Powell Plateau	AT9	Primitive	1		2	23	A/L
Red Canyon	BD9	Primitive	1		2	23	A/L
Rider	AB9	Primitive	1	or	1	17	A/L
Robbers Roost	ND9	Primitive	1		3	29	A/L
Ruby	BP9	Primitive	1		2	23	A/L
Saddle Canyon	AD9	Primitive	1		1	17	A/L
Saltwater Wash	SH9	Primitive	1		1	17	A/L
Scorpion Ridge	AR9	Wild	1	or	2	12	A/L
Separation	LH9	Wild	1	or	2	12	A/L
Shinumo Wash	SG9	Primitive	1		1	17	A/L
Slate	BO9	Primitive	1		2	17	A/L
Snap Point	LL9	Primitive	1	or	2	12	A/L
Soap Creek	AB0	Primitive	1	or	2	17	A/L
South Bass	BQ9	Primitive	1		1	17	A/L
South Canyon	AC9	Threshold	1		1	17	A/L
Surprise	LJ9	Wild	1	or	2	12	A/L
Surprise Valley	AM9	Primitive	1		1	17	A/L
Swamp Ridge Cluster							
Fire Point	NJ1	Primitive	1	or	1	11	D/S
Swamp Point	NJ2	Primitive	2	or	2	22	D/S
Swamp Ridge	NJ0	Primitive	1		1	17	A/L
Tanner	BB9	Primitive	1		3	29	A/L
Tapeats Cluster							
Upper Tapeats	AW7	Threshold	1		2	23	D/S
Lower Tapeats	AW8	Threshold	1		1	17	D/S
Tapeats Ampitheatre	AV9	Wild	1	or	2	12	A/L
The Dome	LC9	Primitive	1	or	2	12	A/L

Use Area	Map ID	Opportunity Class	Large Group		Small Group	Camper Limit	Camp Type
Thompson Canyon	NB9	Wild	1	or	2	12	A/L
Toroweap Valley	NM9	Threshold	1		2	17	A/L
Trail Canyon	LF9	Wild	1	or	2	12	A/L
Trinity	AQ9	Wild	1	or	2	12	A/L
Tuckup Point	NL9	Primitive	1		3	29	A/L
Unkar	AG9	Wild	1	or	2	12	A/L
Vishnu	AH9	Wild	1	or	1	11	A/L
Walhalla Plateau	NA0	Primitive	1		2	23	A/L
Whitmore	LI9	Threshold	1		1	17	A/L
Widforss	NF9	Threshold	1		2	23	A/L

Figure K2: *Cross-Canyon Corridor Campgrounds and Use Limits*

Use Area	Map ID	Large Group	Small Group	Camper Limit
Bright Angel	CBG	2	31	90
Cottonwood (Summer)	CCG	1	11	40
Cottonwood (Winter)	CCG	1	11	16
Indian Garden	CIG	1	15	50

Figure K3: *Designated Day Use Areas in Wilderness*

Use Area	Map ID
Havasupai Point	HAV
Long Jim	LJM
Manzanita	MAN
Transept	TRA
Uncle Jim Point	UNJ

Appendix L

Natural Conditions

Of all the concepts dealt with in conservation history, the term *natural* is one of the most persistent and difficult to address due, in part, to its cultural, aesthetic and spiritual significance (Noss 1995:26). Anderson (1991) offered three criteria for assessing the relative naturalness of an area: (1) the amount of cultural energy required to maintain the system in its present state; (2) the extent to which the system would change if humans were removed from the scene; and (3) the proportion of the fauna and flora composed of native versus nonnative species. Although it may be difficult to define such concepts as *natural* (or *wilderness* or *wildness*, for that matter), the philosophy behind the original establishment of national parks and wilderness requires that we make the effort (Kilgore and Heinselman 1990:308).

Considerable confusion has resulted from a widespread misconception of the dynamics about ecosystems. Some envision these systems as having a natural balance or static equilibrium that in fact does not exist (Johnson and Agee, 1988:7). Although periods of stability may exist, and multiple levels of stability can be defined, park and wilderness ecosystems are described as nonequilibrium systems (Holling, 1978). According to some authors, a *balance of nature* occurs only over short and constrained periods. The constant in these systems, they maintain, is change (Grumbine 1992:61-63).

This fact is fundamental to establishing realistic goals for park and wilderness management (Johnson and Agee, 1988:7). Components of these ecosystems cannot be defined at a particular level that will unequivocally be perceived as natural. The word *natural* often evokes diverse value judgments difficult to reconcile. Some authors suggest that the tern natural has to be defined in terms of the special attributes of each park and wilderness area (Kilgore and Nichols 1995: 27). For example, plant species (e.g., ponderosa and pinyon pine) have reacted individually to climatic changes for millennia, so that the communities seen today on the landscape are in part a result of past climatic shifts and the differential colonization rates associated with each species (Brubaker 1988). They represent the state of the vegetation of the ecosystem today, but are not necessarily representative of some past equilibrium vegetation mosaic.

For fire, some authors suggest the NPS set specific ecosystem policy goals (e.g., fire policy goals) that vary somewhat from park to park and wilderness to wilderness, based on variables in fire history, fire behavior, fire effects, and fire responses (Kilgore and Nichols 1995: 27; Parsons and Botti 1996:30). A working definition for *natural*, developed for the 1983 Wilderness Fire Symposium, involved both the fire process and the resulting effects. According to this definition, a natural fire for any given ecosystem (1) burns within the range and frequency distribution of fire intensities, frequencies, seasons, and size found in that ecosystem before arrival of technologi-

cal man, and (2) yields the range of fire effects found in that ecosystem before the arrival of technological man (Kilgore 1985).

Even with this definition in mind, philosophical and policy questions remain about the appropriateness of specific restoration efforts. While the GMP (p.7) requires the restoration of altered ecosystems, the level and extent of all restoration techniques relies on a Minimum Requirement analysis (See Chapter13; Appendix D, Minimum Requirement Decision Process). In regard to large-scale techniques such as fire, wilderness managers must decide whether to (1) simply allow natural fires to burn; (2) reduce obvious fuel accumulations in certain zones with prescribed fires or other methods and then allow natural fires to burn; or (3) carefully restore natural stand structure to estimated presettlement conditions before allowing natural fires to burn (Bancroft, et al. 1985; Bonnicksen 1985; Bonnicksen and Stone 1985; Lucas 1985; Parsons, et al. 1986; Worf 1985).

While admitting that change is natural, we must also accept extreme fluctuation is abnormal in many ecosystems and, when caused by human activity, often threatens native biodiversity (Noss 1995:11). In protecting natural ecosystems, human-generated change must be constrained because nature has functional, historical, and evolutionary limits (Pickett, et al. 1992).

Ecological Integrity

A sound definition of integrity must be based on evolutionary and bio-geographic context (Noss 1995:20). For this Wilderness Management Plan, ecological integrity is defined as

> *...a state of ecosystem development that is optimized for its geographic location, including energy input, available water, nutrients and colonization history. For national parks, this optimal state has been referred to by such terms as natural, naturally evolving, pristine and untouched. It implies that ecosystem structures and functions are unimpaired by human-caused stresses and the native species are present at viable population levels* (Woodley 1993; See Noss 1995:20).

Population Viability

Population viability should be considered over centuries and should be highly probable, e.g., 95-99% probability using the best available population viability analysis (PVA) models (Noss 1995:11).

Biodiversity

This Wilderness Management Plan adopts the definition of biodiversity from the Keystone Report (1991:6) as

> *...the variety of life, and its process; including the variety of living organisms, the genetic differences among them, and the communities and ecosystems In which they occur.*

Native biodiversity extends this definition to include *viable populations of all native species in natural patterns of abundance and distribution*.

Appendix M

Wild and Scenic Rivers

Public Law 90-542, the Wild and Scenic Rivers Act of 1968, as amended and supplemented, establishes a national policy that certain selected rivers of the nation containing "outstandingly remarkable" values shall be preserved in their free-flowing condition and protected for the benefit and enjoyment of present and future generations (*NPS Management Policies*, Chapter 4:26-31).

In response to the 1990 Special Directive 90-4, *Determination of Rivers on National Park System Lands which are Eligible for National Wild and Scenic Rivers System Designation*, 285 miles of the Colorado River and its tributaries in Grand Canyon National Park were reported as eligible for consideration as wild or scenic rivers (see GMP 1995:3). The GMP states that the NPS will actively pursue the designation of eligible segments of the Colorado River and its tributaries as part of the national wild and scenic rivers system.

The Wild and Scenic Rivers Act provides two methods for adding river segments to the system. The first method is by an act of Congress to designate a river directly or following a Congressionally mandated study and a positive recommendation by a study team for designation. The second method is for the Secretary of the Interior, upon application by a governor, to add a state designated river to the National System (USDI and USDA 1982).

Suitability Study

Suitability studies are initiated by Congress under Section 5(a) of the Act, or by a Federal land management agency as part of its ongoing land management planning process under Section 5(d).[1] Content of the study as provided in Section 4 of the Act includes:

- a determination of the suitability of the river for inclusion in the national system.
- a description and analysis of existing protection, current land ownership, and use in the study area.
- alternatives for administration of the river area that should be included in the system as well as an alternative proposing that no action be taken to add the river to the national system.
- an analysis of the impacts of the proposal and alternatives, including benefits and costs.
- a record of consultation and coordination with other agencies and interests and public involvement during the study.

The basis for the judgment will be documented in the study report (NPS 1990:39457). The determination of whether a river area contains *outstandingly remarkable* values is a professional judgement on the part of the study team. Rationales for proposing designation include, but are not limited to, 1) protection of park resources from internal or external threats, 2) to extend into or out of a park a designation or proposed designation of the river on other public lands, 3) to recognize the

outstanding values of the river, or 3) as a perceived aid in managing a river area in the park.

River study reports contain an NPS position on which of the alternatives presented should be selected. Congress may request additional input from the NPS. In any event, an administrative process is required environmental assessment or environmental impact statement must be prepared to evaluate the environmental implications of the recommendation.

[1] Section 5(d) states that *[i]n all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to Congress shall consider and discuss any such potentials. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.*

Appendix N

Developing a Regional Wildlife Conservation Strategy

Developing a conservation strategy for wildlife, including large carnivores, requires a concerted, integrated research and management effort consisting of at least ten steps:

Step 1

Confirm The Focal Region For The Strategy

In this case, it would be the Grand Canyon ecoregion (*Resource Management Plan 1997a*:2). This area consists of protected core areas (national parks, national monuments and national recreation areas, etc.) with significant defacto wilderness lands. In order to meet the needs of viable populations of native species including large carnivores, the study area may need to be reconfigured as new information becomes available. Significantly, no single conservation area can be expected to function as a self-sustaining island. The land manager's immediate concern is to define a focal region in which implementation of the strategy will effectively counter the continuing erosion of large terrestrial carnivore range (Paquet and Hackman 1995:30).

Step 2

Review the Region's Ecological History

There are two reasons why this is important. First, it is useful to know what changes have occurred in the landscape, especially since European settlement. Among other things, this record will help establish benchmarks for restoration, and document the temporal and spatial relationship between human activities and wildlife and carnivore status. Secondly, a review could be designed to obtain important information about how residents of the region, especially private landowners, perceive the proposed conservation program. This is an important step in enlisting local support (Meffe and Carroll 1997).

Step 3

Determine Conservation Goals for Target Species

Managers can estimate the status of populations using Population Viability Analysis (PVA) (Shaffer and Samson 1985; Suchy, et al. 1985; and Boyce 1992). This will require better information on sex ratios, mortality and life span, social structure, population size and changes in carrying capacity, and genetic variability. Long-term monitoring of a species in the field can reveal temporal changes in population size, and help to distinguish short-term fluctuations from long-term declines. Demographic studies are particularly valuable in assessing the long-term resilience of a population. In undertaking PVA the efforts should focus initially on species for which sufficient data is available for exploratory modeling, e.g., the gray wolf (U.S. Department of the Interior, U.S. Fish and Wildlife Service 1996).

Step 4

Improve Understanding Of The Implications Of Small Population Sizes

Step 5

Determine maximum sustainable annual mortality rates, and for exploited species, incorporate a system to regulate nonnatural deaths.

This task must acknowledge the transboundary movements of the species involved (Paquet and Hackman 1995:31).

Step 6

Identify essential ecological requirements and long-term ecological processes that affect individual species.

Managers can use various methods of habitat evaluation, including interaction assessment (INTASS), multispecies matrix models, multispecies virtual population analysis (MSVPA), Gap Analysis Habitat Evaluation Procedures (HEP), and cumulative impacts assessment.

Step 7

Provide details on the interspecific relationships of species that constitute the large carnivore associations in the Grand Canyon ecoregion.

A strategy based on an ecosystem approach has to encompass community and population level relationships (see Laundre and Lopez-Gonalez 1993). Carnivore community structure is thought to be influenced by predator size relative to prey size (Rosenweig 1966), spatial and temporal differences in habitat use (Bothma et al. 1984), habitat configuration (Rabinowitz and Walker 1991), and interspecific relationships (Rosensweig 1966; Paquet and Hackman 1995:31).

Step 8

Determine tolerance limits of sensitive species for human activities.

Understanding how sensitive species can be preserved on multiple-use land including areas of intense human activity needs expanding. It is not known how close animals already are to a threshold level of disturbance in which direct and cumulative effects will result in disruption. (Paquet and Hackman 1995:31).

Step 9

Design a Network Reserve Strategy..

Assuring long-term survival of critical wildlife species, such as large predators, require enormous areas. For example, researchers estimate that an effective population of mountain lions, approximately 1000-2000 adults, would require about 100 million acres

of wildland (Jordan 1991; Noss 1991). Single reserves of this magnitude do not exist in the Grand Canyon ecoregion, but the problem becomes manageable when we recognize that viable populations can be distributed over a much larger area in smaller protected units comprising the metapopulation. Metapopulations are discontinuous populations distributed over spatially disjunct patches of suitable habitat separated by intervening less-suitable habitat (McCullough 1996). Generally, viable populations are possible—provided effective connectivity exists between protected subpopulations of the metapopulation.

Although Grand Canyon National Park is not large enough to support long-term viable populations of all native species, especially species with large area requirements, linking other core areas by corridors holds great promise (Noss and Cooperrider 1994:144). In simplified form, the regional reserve network model consists of reserves connected by broad corridors, surrounded by a gradation of multiple-use buffer zones, and connected to other biogeographically appropriate areas by interregional corridors (Noss and Cooperrider 1994:146).

Core areas consist of protected areas such as existing National Park Service units, BLM areas of critical concern, wilderness areas (designated and proposed), research natural areas, certain State preserves, and national wildlife refuges. An emphasis on restoring native biodiversity and ecological processes (e.g., fire), and reducing road densities would possibly qualify areas like the Grand Canyon Game Preserve (North Kaibab, USFS) and BLM resource conservation areas as core areas.

Multiple-use buffer zones endure a greater range of activities than core areas, but still provide important ecological functions. They enlarge the effective size of reserves and may contribute to overall metapopulation persistence by at least temporarily supporting resident individuals while serving as connections between source habitats (Noss and Cooperrider:150; McCullough 1996). The vast areas of BLM public lands and national forests provide excellent opportunities for this ecological function.

Connectivity, essentially the opposite of fragmentation, is fundamental to the concept of regional reserve networks. Instead of breaking the landscape into pieces, connectivity seeks ways to preserve existing connections and restore severed connections. The connectivity of interest is *functional connectivity*, usually measured according to the potential for movement and population interchange of target species. (Noss and Cooperrider:150-151). Connectivity implies more than physical corridors. For species that disperse in more or less random directions, such as goshawks and spotted owls, connectivity is affected more by the suitability of the overall landscape matrix than by the presence or absence of discrete corridors. Multiple-use landscapes with low road density and minimal human disturbance generally

provide adequate connectivity for most native organisms (Noss and Cooperrider 1994:151).

For corridors or other habitat linkages to serve conservation goals, their functions must be stated explicitly and analyzed carefully (Soule 1991). While the scientific literature has concentrated on the discrete, species-specific conduit function of corridors, habitat linkages have several functions affecting many species. Landscape linkages (1) provide dwelling habitat for plants and animals and (2) serve as a conduit for movement. The conduit role (a) permits daily and seasonal movement of animals; (b) facilitates dispersal and consequent gene flow between populations, and rescues small populations from extinction; and (c) allows long-distance range shifts of species, such as in response to climate change (Noss and Cooperrider 1994:152).

Step 10

Implement Interagency Cooperation

The General Management Plan (pp. 8-9) establishes the goal to carry the NPS concern for the environment beyond Park boundaries, including the protection of Park resources and values from external influences and to understand, assess, and consider the effects of Park decisions outside the Park as well as inside.

Appendix O

Campsite Monitoring Manual

Rapid Campsite Assessment (RCA)

Goals

To provide basic data for every campsite in the wilderness backcountry that is reasonably located.

To provide managers with an accurate representation of campsite location, distribution, and condition in Use Areas with a range of use levels and management practices for the Threshold, Primitive, Semi-Primitive Mechanized, and Wild Opportunity Classes.

Purpose

- To gather information that provides evaluation of the standards for campsite management described in the Wilderness Management Plan concerning:
  - Campsite Distribution
    - Number of campsites in a square mile area
    - Amount of barren core area of campsites in any ten-acre area within Use Areas
  - Campsite Condition

- To provide a basis for management actions required to meet management objectives that may include treatments such as trail and campsite rehabilitation, site restoration, and/or other strategies to reduce impacts to the physical and social environments.

Method

The Rapid Campsite Assessment (RCA) method was developed to collect as much information on campsites as possible during a routine backcountry patrol or field session. The RCA has also been designed so that inventories are repeatable, and the campsite-monitoring program could continue on a long-term basis. The collection of campsite information should also be consistent over time.

Tools needed for a field session include
- RCA Data Sheets
- A camera with 35-50 mm lens and color slide film
- Data Sheets and slides from previous RCAs of the Use Area
- USGS quad map of area 7.5 Minute Series. (Copies may be used in the field then transferred to master copy)
- Compass
- Clipboard and/or *Write in the Rain Notebook*, pens, etc.
- 50-foot measuring tape (optional)

Instructions for Conducting RCA and Completing Data Sheet (Attached)

The Rapid Campsite Assessment Data Sheet is relatively self explanatory. The format of the Data Sheet corresponds to the dBase III+ program used for data storage and analysis. It is also important to remember that when evaluating impacts, a certain level of subjectivity is in order.

Campsite Number

This number should correspond with the previous inventory. If an inventory has not been conducted, field staff should number campsites consecutively as the inventory proceeds.

The following may be completed prior to field work:

Use-Area ID

The three-character code used to identify use areas.

Use-Area Name

Full name of use area such as “Hermit Creek.”

Recorder(s)

Personnel conducting inventory or monitoring.

Date

Survey month, day and year.

Date of Last RCA

Date of last monitoring work from forms on file. If this is the first inventory, mark as *Baseline.*

General Location and Description

Provide enough information so that someone who’s never been there before could find the site. Note GPS coordinates, if available, and compass bearings. Information from previous RCA, and the slides will help locate the campsite.

USGS Quad

List the 7.5 Minute Series quad map on which campsite is located.

The following information will be recorded in the field:

Barren-Core Area

A barren-core area is typically the most obvious indicator of impact. Characteristics of barren core areas include: devoid of vegetation and organic litter, compacted soil, and trampled perimeter vegetation.

- Record the number of barren-core areas within the individual campsite; “tent spaces,” cooking, and/or social areas, etc.
- Measure the size of each barren-core area with a tape, or by pacing. Record the dimensions of each barren core, enter as core A, B, C**,** etc.
- Record the total barren core area. This may be calculated on site, or later.

Impact Evaluation

This is a total of ratings given to the various impacts observed at the site.

- Core Area
  Assign a rating (0 to 10) based on total from (c) above. Which is highest and lowest.

- Core Soil Compaction
  Determine soil compaction by firmly poking your finger onto the area. If there’s any depression, consider this a rating of two. Use your best judgement, considering current environmental conditions.

•Access Trails
Number of distinct trails leading to/ from the campsite. This does not include the main trail.

•Perimeter Vegetation Damage
This does not include tree damage. The most common damage observed is a result of trampling; however, more severe impacts such pulled grass for bedding has also been observed.

•Tree Damage
Determine whether or not damage is new. Compare to previous data sheets, if any.

•Access Trail Erosion
Determine if over two inches of erosion has occurred on access trails. Record number of trails affected.

•Fire Impacts
Evaluate evidence of fire impacts. Note presence of charcoal, fire scars, etc.

Total Impact Rating

Record impact rating by adding the score for each variable (described above).

Condition Class Rating

Record condition class rating based on total impact score.

Photo Log

Color slides are used in the field for relocating campsites, and for evaluating change over time. Any changes seen should be noted in the comments section. It may not be necessary to duplicate photos each monitoring period if no changes are noted. The duplication of photos provides a tool for illustrating backcountry campsite condition. When taking baseline photos, it is useful to include landmarks within the frame, or take general location photos, and label accordingly.

The photo log enables you to transfer this information to the slides when they have been developed. It is also useful to carry a separate photo log to record information other than the campsite slides. Noting the compass bearing enables the next monitor to relocate the photo direction. The description should be brief such as: “Cores A and B looking SSE from 16' away,” or, “245° 10' away from trail.”

Overall Condition Rating

Based on previous information and judgement, rate the condition of the campsite in comparison to the previous monitoring session. Circle “Baseline” if this is the initial inventory. This information is used in evaluating the overall condition of wilderness campsites by use areas, and for determining a monitoring schedule.

Comments

This may include additional information (1) useful in relocating the site, or if it was not reasonably relocated, (2) reference to archeological sites, and distance to water, (3) changes from previous RCA, (4) notes on impacts or

improvement of site, and (5) observations or recommendations for management action.

After Completing the Field Session

- Make sure information on Data Sheet is complete and legible.
- Send in slides for processing. Label when returned (see below).
- Complete *Campsite Monitoring Trip Report* to summarize activities and campsites monitored.
- Plot all campsites on master map.
- Return report, data sheets and labeled slides to master file at the Science Center.

Slide Labeling

All slides should be labeled with use-area name and number, photo number, campsite number, date, and description similar to that recorded on data sheet.

RAPID CAMPSITE ASSESSMENT (RCA) DATA SHEET

1. Campsite #_____ 2. Use Area ID_____ 3. Use Area Name _____
4. Recorder(s)_____ 5. Date_____ 6. Date of Last RCA_____
7. General location & Description (GPS) _____

_____

_____

8. USGS Quad _____
9. **BARREN CORE MEASUREMENTS:** Number of barren core areas _____
   Size of each **A:** ___x___=___ **B:** ___x___=___ **C:** ___x___=___ **D:**___x___=___ **E:** ___x____=_____
   TOTAL of all barren core areas in square feet: _____
10. **IMPACT EVALUATION:** **RATING**
   Core Area Rating: 0:<25 2:26-50 4:51-100 6:101-250 8:251-500 10: >500 _____
   Core Soil Compaction as result of human impacts:
   0: Minimal surface disturbance
   2: Surface Compacted but not cement like
   3: Surface cement like in compaction _____
   Access Trails: 0: No distinct trails 1: 1-2 distinct trails
   2: >2 distinct trails _____
   Perimeter Vegetation Damage: 0: Not apparent off trails
   2: Obvious damage to perimeter vegetation _____
   Tree Damage: 0: Not evident 1: Old damage 3: New damage _____
   Access Trails eroded >2 inches below ground surface: 0: No 1: Yes _____
   Number of trails eroded below ground surface: _____
   Permanent impacts from fires 0: Not evident 1: Small impact 3: Large impact _____

TOTAL IMPACT RATING _____

Impact Rating: 0 - 5	Condition Class #1
6 - 10	#2
11 - 15	#3
16 - 20	#4
20 - 25	#5

CONDITION CLASS RATING _____

Photo Log: **Roll #**___ Focal length of lens ____
Photo # ____ Compass Bearing____ Description _____
Photo # ____ Compass Bearing____ Description _____
Photo # ____ Compass Bearing____ Description _____
Photo # ____ Compass Bearing____ Description _____

Overall Condition Rating based on comparison of previous RCA (circle one):
No Change Positive Change Negative Change Baseline Other _____

Comments: (Use back for maps)

CAMPSITE MONITORING TRIP REPORT

Trip Date(s):_____ **Name(s)** _____
Use Area Name:_____ **Use Area Number:**_____

Campsites Inventoried (Numbers and Locations):

Campsites Located but not Inventoried:
(Describe where they are located. Have they been plotted on the map?)

Description of area that was surveyed sufficiently to find approximately 95% of all existing campsites:

Description of areas that need additional surveys to find 95% of campsites:

OTHER COMMENTS:

POST-TRIP CHECKLIST:

___ 1. Location and number of all campsites plotted on map?
___ 2. Sketch maps for cluster sites completed (Redrawn for clarity)?
___ 3. Data sheets checks to ensure accuracy?
___ 4. Photographs labeled and place in folder with data sheets?

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