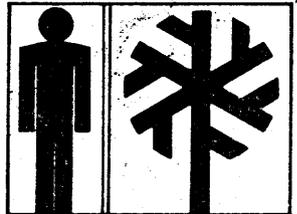


STATEMENT FOR MANAGEMENT

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GRAND CANYON



National Park / Arizona

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April 1985 Revision

MGT 116

GRAND CANYON NATIONAL PARK
STATEMENT FOR MANAGEMENT

April 1985

Recommended: Richard Marks Date 5/10/85
Superintendent

Approved: Lawrence H. Chapman Date 6/26/85
Regional Director

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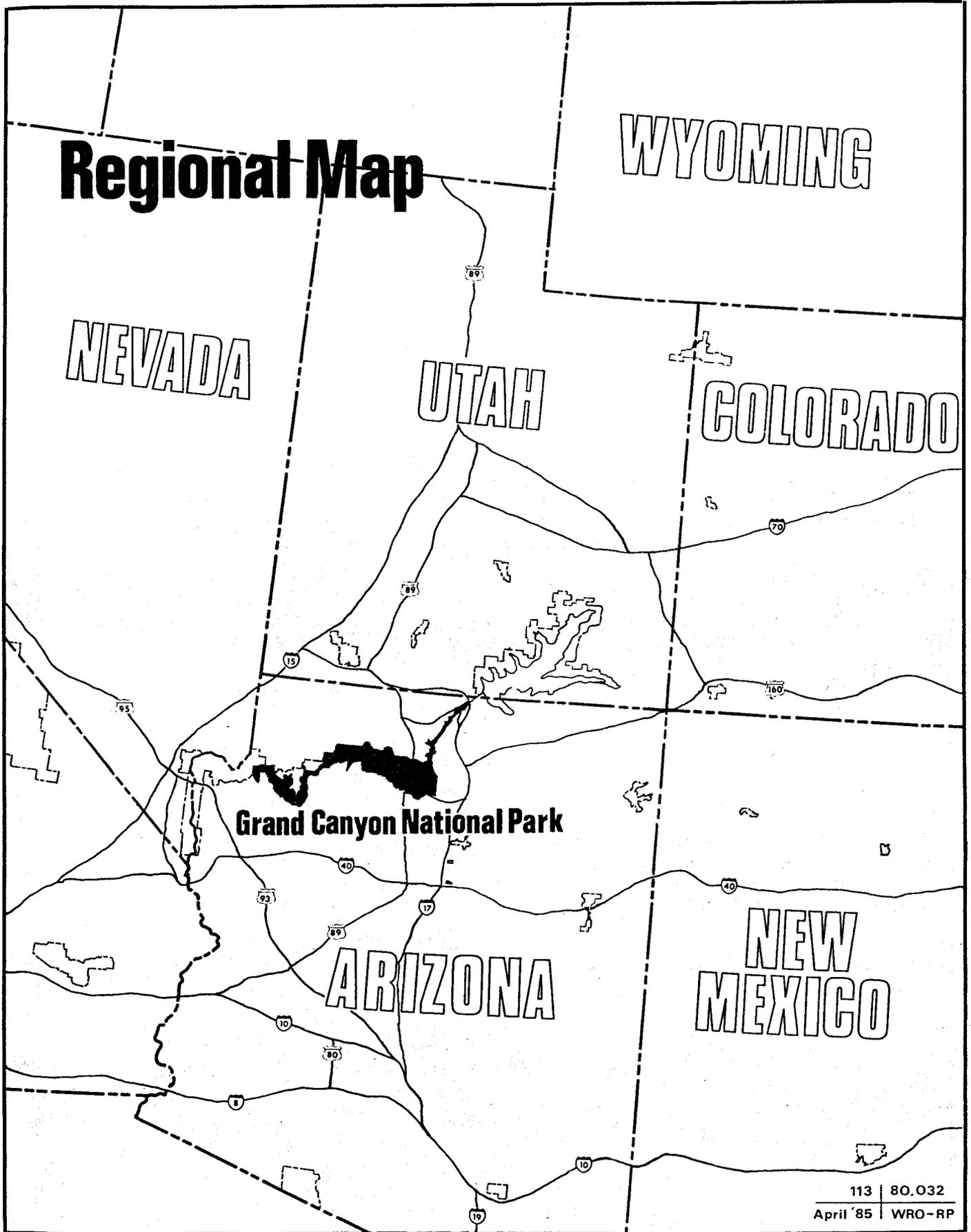
I. LOCATION

The regional setting for Grand Canyon National Park is the Colorado Plateau located across northwestern Arizona. The plateau is a vast, semiarid land of raised plateaus and structural basins, typical of the southwestern United States. Drainage systems are deeply incised, forming numerous steep-walled canyons. The higher elevations of the plateau are forested; the lower elevations are a series of desert basins.

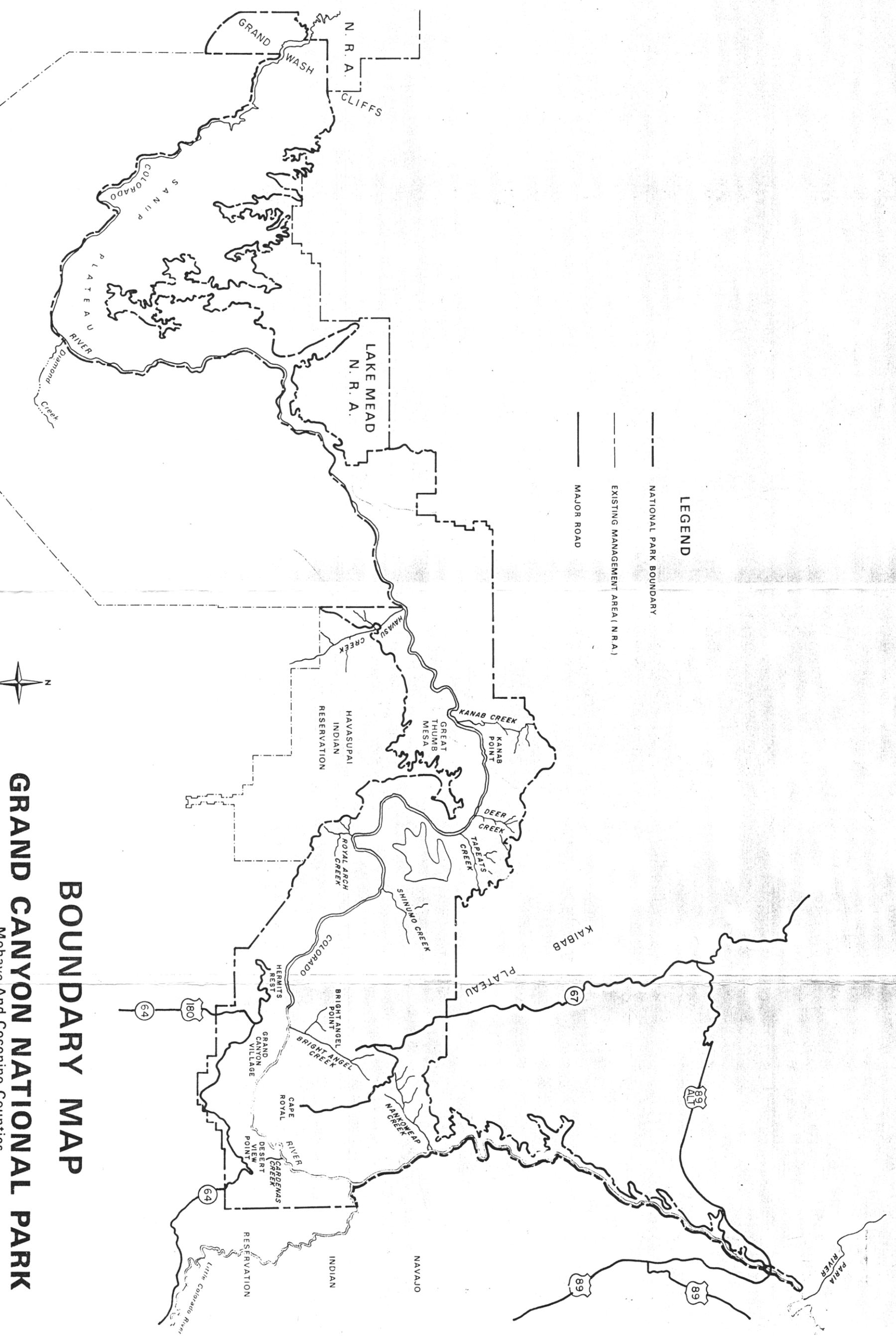
On the Colorado Plateau approximately half of the land is Federally owned and is administered by the Bureau of Land Management, Forest Service, and National Park Service. The other lands are primarily Indian-owned.

Grand Canyon National Park, encompassing 1,215,734.64 acres, is primary among regional resources. The park is bounded on the north by Kaibab National Forest and the Bureau of Land Management, Arizona Strip District, on the east by the Navajo Reservation, on the south by Kaibab National Forest and Hualapai and Havasupai Reservations, and on the west by the upper reaches of Lake Mead National Recreation Area. The park is located within Mohave and Coconino Counties and Congressional District Number 3.

Regional Map



Grand Canyon National Park



LEGEND

- NATIONAL PARK BOUNDARY
- - - EXISTING MANAGEMENT AREA (N.R.A.)
- MAJOR ROAD

BOUNDARY MAP

GRAND CANYON NATIONAL PARK

Mohave And Coconino Counties
ARIZONA



II. PURPOSE AND SIGNIFICANCE

Grand Canyon National Park was officially established as a "public park for the benefit and enjoyment of the people" on February 26, 1919 (40 stat. 1175 Grand Canyon National Park Establishment Act). In 1975, the park was significantly enlarged "in order to further protect and interpret the outstanding scenic, natural, and scientific values" (P.L. 93-620 Grand Canyon National Park Enlargement Act). In all, there are approximately 20 pieces of legislation contributing to the establishment of Grand Canyon National Park and the protection of wild animals, objects of unusual scientific interest, and geologic and paleontologic features and objects and other scientific and natural values (see Appendix A).

Grand Canyon National Park is significant in many ways. As a scientific resource it is a mecca for geologists, geographers, and biologists throughout the world. For the layman, it is a place of tremendous natural, scenic and historic interest. For the casual visitor, it is a place of beauty, peace, and quiet.

Best known for its geologic significance, the Grand Canyon offers a geologic record covering the first three eras of geological time, 2.5 billion years making it one of the most complete records of geological history anywhere in the world. Canyon significance, however, is not limited to geology.

Grand Canyon National Park includes 277 miles of the Colorado River; with 160 recognized rapids, it is one of the longest and most challenging recreational white water rivers in the world.

Within the park, there are over 1,500 plant species, 287 bird species, 88 species of mammals, 58 reptile and amphibian species, and 26 native species of fish.

Grand Canyon contains more than 2,500 known archeological sites with artifacts indicating 4,000 years of human habitation.

The park also includes 312 buildings determined eligible for the List of Classified Structures or on the National Register of Historic Places and at least another 138 structures considered potentially eligible.

From the rim to the river, one passes from subalpine to desert environments. Normally, a person would have to travel from Mexico to Canada to pass through as many different climatic zones.

Grand Canyon National Park plays an integral role in the 78 percent representation of natural themes within the Colorado Plateau natural region (Part two of the National Park System Plan). The Grand Canyon contains significant examples of the following themes: plains, plateaus, and mesas; work of volcanism, sculpture of the land; river systems and lakes; geologic history; boreal forest; and dry coniferous forest and woodland.

P.L. 93-620, the Grand Canyon Enlargement Act, summarizes the park's significance by stating that Grand Canyon National Park is a "natural feature of national and international significance." The park's significance is further recognized as a designated World Heritage Site (October 1979).

III. INFLUENCES: INVENTORY AND ANALYSIS

A. LEGISLATIVE AND ADMINISTRATIVE REQUIREMENTS

Legislation influencing resources management activities in Grand Canyon National Park includes the National Park Service Organic Act of 1916, Archeological Resources Protection Act of 1979, Antiquities Act of 1906, National Environmental Policy Act of 1969, the American Indian Religious Freedom Act of 1978, the National Historic Preservation Act of 1966 and as amended in 1980, Executive Order 11593, Executive Order 11987, the Wilderness Act of 1964, the Federal Water Pollution Control Act as amended in 1977, the Endangered Species Act of 1973, and the Clean Air Act Amendments of 1977. In addition, there is numerous legislation specific to Grand Canyon.

Most of the early legislation specifically affecting Grand Canyon National Park was very general. The most significant piece of legislation affecting Grand Canyon management is the 1975 Grand Canyon Enlargement Act (Public Law 93-620). The major acts affecting Grand Canyon are arranged topically below to present the evolution of issues over time.

1. Use of Park Lands for Reclamation Projects

The law establishing the original Grand Canyon National Park in 1919 (40 Stat. 1175) states in Section 7 that:

"whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein for development and maintenance of a Government reclamation project."

Section 5 of the same act opens the parklands to irrigation projects and railroads rights-of-way. Public Law 93-620 amended section 7 of 40 Stat. 1175 to read:

"Whenever consistent with the primary purposes of such park, the Secretary of the Interior is authorized to permit the utilization of those areas formerly within the Lake Mead National Recreation Area immediately prior to enactment of the Grand Canyon National Park Enlargement Act, and added to the park by such Act, which may be necessary for the development and maintenance of a Government reclamation project."

In September 1984, Secretary of the Interior William Clark revoked the last remaining public land orders that would have allowed for possible future construction of dams, reservoirs, and related hydroelectric facilities inside Grand Canyon National Park. Authorization, however, to use park lands for reclamation projects (as noted above) still exist and therefore continues to pose a threat.

2. Mineral Entry within Grand Canyon

The 1919 Grand Canyon Establishment Act (40 Stat. 1175) permitted continued mineral entry within the park. However, the area was closed to mineral entry only 12 years later (46 Stat. 1043). In 1962, Congress authorized acquisition of the last active mine in the park - the Orphan Mine - because of its "adverse effects on public enjoyment of the park" (76 Stat. 79). However, already established mineral claims, both within and adjacent to the park, pose a threat in terms of adverse impacts from extraction activities.

3. Sale of Grand Canyon Water to Tusayan

Public Law 91-383 (1970), an act to improve administration of the National Park System, authorized the National Park Service to enter into contracts or lease agreements with persons, states, or other political subdivisions to provide services, resources, or water under the following provisions: (1) that they provide public accommodations or other services to park visitors in the immediate vicinity of the park, and (2) that they demonstrate to the Secretary that there are no reasonable alternatives to utilization of park resources. The Senate Report No. 91-1014 on P.L. 91-383 points out that while it is not required to report these arrangements, it is advisable for the National Park Service to submit in writing any such proposals received to the appropriate Committee for review prior to entering into any legally or morally binding commitments. Title XII of P.L. 95-586 (1978) expanded upon the authorities granted to the National Park Service in P.L. 91-383. This law allowed the United States to sell water from Grand Canyon National Park to a nonprofit entity authorized to receive and distribute water within Tusayan upon its determination that such sales would not be detrimental to the resources of or visitors to Grand Canyon. Water sales to Tusayan between 1980 and 1984 have risen from 6.0 to 10 million gallons per year.

In accordance with P.L. 95-586, all receipts from the sale of water are deposited into the U.S. Treasury. Accordingly, the park's account for maintenance and operation of the water system, which is a unique and expensive one to maintain, is not reimbursed.

4. Boundary Studies

There was considerable debate on both the House and Senate sides as to exactly which lands should be included within an enlarged Grand Canyon National Park under P.L. 93-620.

Senate Bill 1296, as introduced, did not call for inclusion of three areas: Tuckup Point, Slide Mountain, and Jensen Tank, which were formerly within Grand Canyon National Monument. While these areas were not part of the canyon proper, both the House Report (#93-1374) and Senate Report (#93-406) recognized

that these areas contained rich archeological resources and recommended these areas not be deleted prior to further study. However, the Senate-passed version recommended deletion of these areas. This dispute led to Section 3(c) of P.L. 93-620 which required the Secretary to conduct a one-year study of Tuckup Point, Slide Mountain, and Jensen Tank to determine whether these lands were suitable for park purposes. The study, which was completed in February 1976, recommended that all three areas be retained due to the significant archeological resources. These areas have remained within the park.

The other area of boundary discussion centered on whether Parashant, Andrus, Whitmore, and Kanab Canyons, and the Shivwits Plateau should be included within the park. The House-passed version, H.R. 5900, included all five of these areas, totalling 400,000 acres. The House Report (# 93-1374) found inclusion of these areas was consistent with the intent of the law to preserve all of the lands within the geographic Grand Canyon and some of the tributary side canyons. The Senate passed version of the bill did not include any of these areas. The Conference Committee Report (#93-1611) resolved that dispute by directing the Secretary to study these lands and determine if any of them should be included in the park. The Grand Canyon Adjacent Lands Study was completed in November 1981. The report recommended that the lands continue to be administered by the Bureau of Land Management, U.S. Forest Service, and Lake Mead National Recreation Area, and no change in ownership status has resulted.

5. Land Acquisition

Ninety-seven percent of the 1,215,734.64 acres included in Grand Canyon National Park are already federally owned. The Grand Canyon Enlargement Act specified the following methods of acquisition for non-Federal lands: The Secretary may acquire private land and interest in land by donation or purchase with donated or appropriated funds or exchange. A prohibition against condemnation was removed from an earlier bill. However, lands owned by the State of Arizona or any political subdivision thereof may only be acquired by donation or exchange.

At the present time, approximately 97 percent of park lands are in Federal ownership, 1 percent of park lands are in State ownership, 2 percent of park lands are Navajo Tribal Reservation lands, and the rest (392.54 acres) is privately owned.

6. Cooperative Agreements for Unified Interpretation

Section 6 of P.L. 93-620 authorizes and encourages the Secretary to enter into cooperative agreements with Federal, State, and local governments, as well as Indian tribes to provide interpretation. No such agreements currently exist; however, an agreement is in existence with the U.S. Forest Service, Kaibab National Forest, to operate the Jacob Lake Information Station.

7. Grazing

Section 7 of P.L. 93-620 provided for a systematic phaseout of grazing in Grand Canyon National Park. The three individuals with grazing privileges on former Grand Canyon National Monument lands had those grazing privileges extended for their lifetime. Since passage of P.L. 93-620, all lifetime permits have extinguished. Five individuals with grazing privileges on former Lake Mead National Recreation Area lands had their grazing privileges extended ten years until January 3, 1985.

8. Aircraft Regulation

Section 8 of P.L. 93-620 states that whenever the Secretary has reason to believe that aircraft flights occurring or about to occur over the canyon will have an effect on the visitor health, welfare, or safety, or the natural quiet of the canyon, he shall submit to Federal Aviation Administration or Environmental Protection Agency recommendations for aircraft regulation. Aircraft use over the park has continued to accelerate, and there are currently about 40 companies giving tours over the park. Three requests have been made to pilots regarding maintaining certain altitudes over the park, but there are currently no Federal Aviation Administration regulations in force which protect park values. (See Section IV. MAJOR ISSUES).

9. Indian Use of Grand Canyon National Park Lands

One of the more controversial aspects of P.L. 93-620 revolved around the enlargement of the Havasupai Reservation. The Senate-approved version of S. 1296 provided for the Secretaries of Interior and Agriculture to study the needs of the Havasupai Tribe and develop proposals for submission to Congress on the enlarged boundaries. The House-passed version provided for immediate enlargement of the reservation by incorporation of 120,000 acres of National Forest Service lands and 65,000 acres of park and monument lands above the rim. One of the major reasons for this controversy was the fact that the Indian Claims Commission had already reviewed the case for an expanded reservation and made an award to the Havasupai Tribe of cash and free grazing permits. The House amendment was eventually adopted along with several stipulations to provide for protection of park resources from adverse impacts resulting from development on Havasupai Tribe rim lands adjacent to the park. These stipulations included: developing a land use plan compatible with park preservation, reviewing this plan with the public, limiting use of lands to traditional purposes, permitting the Secretary of Interior to determine the capacity of the land for grazing or agriculture, prohibiting commercial development, and requiring the Secretary to establish conservation measures to provide protection from erosion, overgrazing, or pollution.

In addition, Section 10(e) provided for Havasupai Tribe use of 95,300 acres of Grand Canyon National Park land designated as

the Havasupai Use Land. This land is located below the rim and was made available "for grazing and other traditional use purposes." The major outstanding issue regarding the Havasupai Use Lands is grazing. The area is currently populated by 25-35 horses claimed by the Havasupai Tribe (see Section IV).

A small band of 15 to 20 Havasupai have occupied lands within Grand Canyon National Park near the South Rim since the 1920's. Section 10(f) of P.L. 93-620 extinguished any claims of the Tribe to this area, but Indians and non-Indian friends have continued to occupy this area known as Supai Camp.

10. Wilderness Study

Wilderness studies of Grand Canyon National Park were begun in the early 1970's. However, controversy over motorized raft use on the Colorado River and its effect on wilderness designation led to postponement of the study until the motor/oar issue could be resolved. The House version of S. 1296 provided for a study of all lands within Grand Canyon, including the Colorado River, to determine their wilderness suitability. The Senate version called for no study. Public Law 93-620 as passed contained no provision for a wilderness study. However, it was amended only six months later by P.L. 94-31, which called for completion of a wilderness study within two years. The National Park Service released for public comment a draft environmental impact statement (DES 76-28) and preliminary wilderness recommendation in 1976. This preliminary recommendation was for designation of 82 percent of the park area as wilderness and an additional 10 percent of the park area as potential wilderness. Following incorporation of comments, a final environmental impact statement was completed in August of 1980 and forwarded to the National Park Service Washington Office. No further action has taken place.

11. Colorado River Management

Management of the Colorado River, specifically the motors vs. no motors issue, generated considerable debate in the 1970's. In 1979, the National Park Service released a plan which called for a five-year phaseout of all motorized craft on the Colorado River within Grand Canyon National Park. Before that plan could be implemented, Amendment No. 1754 to the FY81 Department of the Interior Appropriation Bill was passed which precluded a reduction in the launching of motorized craft below 1978 levels. While this amendment only precluded enactment of the plan for the one-year life of the appropriation bill, the National Park Service revised the Colorado River Management Plan to permit motorized travel.

B. RESOURCES

The park is broken into four natural geographic areas ranging in elevation from 1,200 to 9,000 feet. The North Rim is the area on the north side of the Colorado River, above but not including the canyon.

The South Rim is the area on the south side of the river, excluding the canyon itself. The Inner Canyon is the area of the canyon itself including the river. The Inner Gorge is a portion of the Inner Canyon below the Tapeats Sandstone, in places over 1,500 feet deep, and composed of hard metamorphic and igneous rocks.

On both rims, the topography is relatively flat, making travel relatively easy. In contrast, the topography of the Inner Canyon is severe: steep talus slopes, precipitous cliffs, crumbly decomposing rock ledges, and long declivitous side canyons make travel within the Inner Canyon limited and hazardous. Many areas are difficult if not impossible to enter without the aid of specialized equipment.

1. Climate

Starting at sea level, an individual would have to travel all the way from northern Mexico (a Sonoran desert environment) to Southern Canada (a ponderosa pine Canadian environment) to find as much climatic variation as there is within Grand Canyon National Park. This is due partially to elevation changes and partially to the unique effect the canyon itself has on weather.

The North and South Rims have rather severe winter temperatures, while summer weather is usually mild. In the winter, the North Rim is closed, often buried under as much as 10 feet of snow. Average winter high and low temperatures range from 39°F to 18°F. In the summer, days are generally clear and crisp with occasional afternoon thunderstorms or heavy rain. Evenings are chilly. Average high and low temperatures range from 75°F to 43°F.

On the South Rim, winter often brings snow with average high and low temperatures of 43°F to 20°F. During the summer, afternoon showers, thunderstorms, and occasional heavy rains can be expected. Average high and low temperatures range from 82°F to 51°F.

In the Inner Canyon, daytime temperatures are extremely high during the summer months, July being the most severe with daytime highs averaging 106°F. The summer nights however are mild, with the average low being 78°F. Winters are mild with maximum temperatures averaging 56°F and the lows rarely dipping below freezing.

Precipitation also varies depending on location within the park. The North Rim receives the most precipitation with an average of 25 inches per year, while the Inner Canyon receives only 8 inches per year. Precipitation falls as winter frontal rain or snow showers, or mid to late summer thunder showers. The former develop off the coast of California and move west over Arizona and Grand Canyon. If these fronts move slowly, rain may fall for several days. Summer thunderstorms develop almost daily from local convectional disturbances resulting from excessive heating of the ground. These thunderstorms many times result in

intense rain and lightning. Storms usually last less than 30 minutes but often produce an inch or more of rain. During the months of July and August, thunderstorms are common all over Grand Canyon. In the Inner Canyon, these showers produce the greatest monthly precipitation of the year.

2. Geology

The Grand Canyon of the Colorado River has long been recognized as a geological showplace. The canyon is carved into four plateaus of the Colorado Plateau Province, a large area of the Southwest characterized by nearly horizontal sedimentary rocks that have been uplifted 5,000 to 13,000 feet above sea level. The arid climate of the plateau has resulted in a wide range of striking erosional forms culminating in the Grand Canyon.

The mile high walls of the Grand Canyon display a fairly undisturbed cross section of the earth's crust extending back some two billion years, from the Proterozoic Era essentially to the present.

The early to middle Proterozoic (Precambrian) Era is represented in the crystalline rock of the three "Granite Gorges." Originally deposited as sediments and lava flows, these rocks were intensely metamorphosed about 1,750 million years ago.

Late Proterozoic rocks are only seen in the eastern Grand Canyon where a 13,000-foot sequence of sedimentary rock and lava flows was deposited in a coastal/shallow marine environment. Mountain building about 830 million years ago lifted and tilted these rocks. Subsequent erosion removed much of the sequence from most areas.

The Paleozoic Era's layers are the most conspicuous in the Grand Canyon's walls. 2400-5,000 feet of sandstones, limestones, and shales were deposited by several marine incursions from the west occurring from 550 to 250 million years ago. Layers from the Cambrian, Devonian, Mississippian, Pennsylvanian, and Permian Periods are found.

The record of the Mesozoic Era has been largely removed from the park, although there are small remnants, particularly in the western Grand Canyon. Studies of nearby outcrops indicate that as much as 4,000 to 8,000 feet of sedimentary layers from the "Age of Dinosaurs" once covered the Grand Canyon area.

Cenozoic Era layers are limited to the western Grand Canyon. A few sedimentary deposits formed in lakebeds, but most spectacular are the lava flows and cinder cones of the westernmost Shivwits and Uinkaret Plateaus. Volcanic activity began about 6 million years ago and has continued to within the last several thousand years. Spectacular lava cascades down the canyon walls have helped date the Grand Canyon's carving.

The Grand Canyon itself is a late Cenozoic feature, characteristic of the renewed erosion of this time. Vigorous downcutting by the snow-fed Colorado River has carved the depth of the canyon. Widening of the canyon has been held in check by the region's dry climate, resulting in the Grand Canyon rather than a more typical broad (and nondescript) river valley. Although violent storms may send flash floods gouging down narrow side canyons, the lack of steady moisture supplies has created a stark landscape of mostly naked rock. Harder erosion-resistant rocks such as the Coconino Sandstone and the Redwall Limestone have eroded into bold cliffs. Softer layers melt into slopes like the Tonto Plateau (in Bright Angel Shale) and the Esplanade (in Hermit Shale). The oldest, crystalline rocks are chiseled into the craggy cliffs of the Granite Gorges.

Nearly 40 identified layers of rock are found in the Grand Canyon's walls, and their lack of deformation have attracted students of the earth's history since Newberry's work in 1857. Because most of the layers are exposed through the canyon's 277-mile length, they also afford the opportunity to make detailed studies of environmental changes from place to place (within a formation) as well as from time to time (with different formations).

It was the work of geologists that began changing the public's opinion of the Grand Canyon region from that of "a worthless local" (Ives, 1861) to "the most sublime of earthly spectacles" (Dutton, 1880). Today, the frontiers of geology have moved on from the Grand Canyon to the earth's crustal plate boundaries and to the planets and moons. Yet, studies of the Grand Canyon are not completed. In the mid-1970's, a new rock layer was identified in the canyon walls. Investigations of environmental effects on rock formation continue. Perhaps the biggest question of all - how the Colorado River chose this course and began the canyon's carving still awaits a clear answer.

3. Soils

Extensive soil surveys have not been conducted within the canyon. However, analysis to date indicates that soils throughout the canyon are poorly developed.

The Inner Canyon soil is an azonic, sandy loam that erodes very easily and regenerates slowly. The sandy nature of the soil allows for immediate absorption of water, leaving the ground dry even shortly after rain showers. The soils are typically fragile and require little disturbance to create erosional problems.

The soils along the Colorado River are known in more detail due to recently completed research. Land areas in immediate association with the river are characterized by fine-grained fluvial terraces (beaches), coarse-grained cobble bars, and tributary fan deposits. The fine-grained deposits found on the terraces of the river may be classified according to age of deposition (pre- or post-Glen Canyon Dam), agent of deposition (floods,

eolian action, or fluvial reworking in the zone below present highwater), and grain size cohesive silts, (predominantly silt content, and sands, with negligible silt).

4. Hydrology

Water is a vitally necessary natural resource, especially in the arid southwestern United States. Here, legal and institutional systems are organized to control the use of water. In the Grand Canyon region, the use of water is subject to Federal law, the laws of individual states, and interstate compacts and agreements to apportion the waters of interstate streams. Water rights are generally based on the appropriation doctrine in which first-in-time is first-in-right. Most surface water has already been assigned to specific applicants or users. The remaining supply is usually desired and actively pursued by numerous state and interstate groups as well as private individuals.

The Federal government has asserted, and the courts have affirmed, that it has the right to sufficient water to develop Federal "reserved" land such as that reserved for national parks, provided that the water is used for purposes of the reservation. The right is effective as of the date of the reservation action. The Federal government thus has the use right to all waters originating in, or flowing through, Grand Canyon National Park for park purposes. As of now, Grand Canyon has not quantified its Federal reserve water rights for use of the Colorado River.

Because of the complex nature of water development projects, cooperation among water users is usually essential to make the projects possible. In 1922 the Colorado River states drafted the Colorado River Compact to apportion the waters of the Colorado River. This compact was approved by Congress in the Boulder Canyon Project Act of December 21, 1928, and declared to be in effect by President Hoover on June 25, 1929. The compact divided the Colorado River into two drainage basins, Upper and Lower, with Lees Ferry, Arizona, being used as the dividing line between them.

Most of the flow of the Colorado River through the Grand Canyon originates in the high mountain areas that rim the Upper Colorado Region. The estimated annual virgin runoff in the Colorado River at Lees Ferry, Arizona, at the head of Marble Canyon, has ranged from 5.6 to 24.0 million acre-feet. The 10-year means have ranged from 11.6 to 18.8 million acre-feet. Opinions thus differ concerning the period of record that best predicts future runoff. The significance is the fact that a period of about 25 years (1906-1930) of predominantly above-average runoff was utilized in development of the 1928 apportionment scheme and has been followed by a 40-year period (1931-1970) of predominantly below-average runoff. Current usage accounts for essentially complete utilization of the Colorado River with more water users scheduled to go on line at the completion of the Central Arizona Project in the late 1980's.

Springs and tributaries between Lees Ferry and Lake Mead contribute approximately 0.5 million acre-feet of water to the Colorado River annually.

Despite the tremendous quality of water flowing through the mile deep canyon, the history of water supply at Grand Canyon has been one of insufficiency. As the river cut a canyon through the rock units, the ground water drained into the canyon. Collections of surface water are temporary and rare because of the ease with which precipitation penetrates into the substrata.

Some water was carried by mules to rim developments from the springs at Indian Gardens prior to 1900 and other amounts were collected in natural or dug tanks and cistern catchments. The railroad to Grand Canyon Village was completed on October 12, 1901, and water was then brought to the canyon in tank cars. A sewage disposal plant was completed on May 28, 1926, and reclaimed effluent became available for nonpotable uses. On August 26, 1932, the Santa Fe Railroad completed a pipeline to Indian Gardens, about 3,200 feet below the rim at Grand Canyon Village. Pumps were installed with a capacity of 278,000 gallons per day.

The amount of water lifted from Indian Gardens proved to be sufficient until the large influx of park visitors following World War II. Additional reservoirs were constructed on the rim to provide storage for water pumped during the slack winter season. Water storage was approximately 4 million gallons by 1958 and reached 13 million gallons by 1968. Water consumption in that year reached 96 million gallons, virtually the entire flow of the springs at Indian Gardens.

For many years, the developed area on the North Rim at Bright Angel Point had obtained its water through a pipeline from Roaring Springs, a major source of Bright Angel Creek. In August 1970, a 13-mile long transcanyon pipeline was completed which connected Roaring Springs with the pumping facilities at Indian Gardens. The pipeline operates continuously, delivering 700 gallons per minute to Indian Gardens pumping station except for those times when breaks occur in the line. The waterline has a maximum carrying capacity of 208.8 million gallons of water per year. The original 1932 pipeline still carries water from Indian Gardens to the South Rim. Water in excess of Indian Gardens' pumping capacity (approximately 420 gallons per minute) is released into Garden Creek to return to the Colorado River. The springs at Indian Gardens are now allowed to flow freely into Garden Creek.

The unincorporated village of Tusayan, just outside the south entrance to the park on private property does not have an adequate water supply and must haul its water by truck from Williams, Arizona, approximately 60 miles to the south. The park currently sells water to the Tusayan Water District when it has water in excess of its needs.

Major water quality concerns include: radioactive discharge (and possible contamination) from nearby uranium mining activities, high fecal coliform counts in the Colorado River during periods of high runoff, contamination of surface and ground water from park sewage disposal facilities, and natural contaminants found in backcountry water sources used by hikers.

5. Air Quality

Grand Canyon National Park has been designated as a Class I area under the Clean Air Act as amended in 1977 (Public Law 95-217). This means that visibility within the park is not to be impaired by any man-made source, and that methods must be devised to monitor such visibility.

Air quality monitoring at Grand Canyon has been ongoing since 1959, utilizing a number of different techniques. These studies show a trend of increased air pollution due to anthropogenic sources; however, visibility conditions in the Grand Canyon region are still superior to the rest of the country. It is important to note that because of the high quality of visual resources in Grand Canyon, the area is highly susceptible to degradation, even by small additions of pollutants.

Monitoring data indicates the primary cause of visibility reduction within Grand Canyon is long distance transport of sulfates from metropolitan southern California and from southern Arizona smelters. According to Malm (1984) these sources account for 50-70 percent of the visibility reduction within Grand Canyon. Presently, maximal visibility conditions occur only 1 percent of the time, but visibility reduction of 50 percent or more occurs almost half of the time.

6. Vegetation

Plant communities in Grand Canyon are distinctly zoned from river to rim. Along the river is a riparian community totally distinct from most other areas of the Inner Canyon. The river corridor represents an oasis in an otherwise arid area. Riparian vegetation exists because of the river and is dominated by arrowweed, willow, seep willow, mesquite and exotic saltcedar.

Inner Gorge vegetation outside the river corridor includes two different communities. The Mohave desertscrub community has its center of distribution at low elevations in southern Nevada and California. The most complete development of this community in Grand Canyon is at the extreme western end of the canyon. This plant community is dominated by creosote bush, white bursage, ocotillo, catclaw, and some grasses. Upstream, in the Inner Gorge and above the river on the Tonto Plateau, the narrow ribbon of Mohave Desert plants gradually decreases in species diversity and community development as the blackbrush plant community increases. The predominant plant of the Tonto Plateau is blackbrush. Other common plants in this area are wolfberry,

agave, and narrowleaf yucca. While there are some species in common between the Tonto Plateau and the Inner Gorge, the two communities differ in dominant species, general aspect, and environment.

The fourth plant association, the pinyon-juniper woodland, at still higher elevations on the canyon rims contains very few species in common with the other two. Characteristic species of the pinyon-juniper woodland include several grasses, manzanita, pine, juniper, and snakewood.

The yellow or ponderosa pine association is more extensive on the North Rim than it is on the South Rim. Some typical plants in this community are: yellow (ponderosa) pine, Gambel oak, locust, mountain mahogany, blue elderberry, creeping mahoma, and fescue.

Higher still in elevation (above 8,200 feet) we find the spruce-fir forest with an intermixing of aspens. Typical plants in this community are Englemann spruce, blue spruce, Douglas fir, white fir, aspen, and mountain ash.

7. Wildlife

a. Mammals

Approximately 22 species of terrestrial mammals and 7 species of bats are known to occur within the riparian zone of the Colorado River. On the beach and terrace habitats, rodent species are most common, comprising an average density of about 20 individuals per acre (Carothers 1976). Carnivorous mammals, bobcats, coyotes, foxes, and mountain lions, are uniform in distribution, but rare. Spotted skunks, ringtail cats, have reached high population densities in developed areas. The larger mammals are represented by the mule deer and the desert bighorn.

Approximately 25 species of terrestrial mammals and 7 species of bats are known to occur within the Inner Gorge and pinyon-juniper communities on the rim. Again the most common mammal group is the rodents, with 16 species inhabiting the desertscrub community of the Tonto Plateau. Such large mammals as coyotes, foxes, mountain lions, and mule deer are present but rarely seen.

b. Birds

Most birds of the Grand Canyon are part-time residents, either transient or seasonal inhabitants. Of the 287 species, only 43 are permanent residents. Many of the seasonal residents utilize Grand Canyon environs for nesting. Many of the water birds found along the river are migratory and use the river corridor for a few weeks during the

spring and fall. Birds of the Tonto Plateau use the sparse, open scrub and small trees found there for nesting sites.

c. Amphibians and Reptiles

Amphibian species are not common on the Tonto Plateau or even along the river and tributaries. The arid conditions that prevail most of the time preclude an abundance of these animals. The species that are present show a high degree of specialization for a desert environment. Reptilian species fare much better in the arid climate of the Inner Canyon. The Tonto Plateau has a well-represented inventory of lizards and snakes.

8. Endangered/Protected Species

The following park animals are on the official list of endangered or threatened wildlife that is maintained by the Fish and Wildlife Service.

Bald Eagle	<u>Haliaeetus leucocephalus</u>
American Peregrine Falcon	<u>Falco peregrinus anatum</u>
California Brown Pelican	<u>Pelecanus occidentalis</u>
Humpback Chub	<u>Gila cypha</u>
Colorado River Squawfish	<u>Ptychocheilus lucius</u>

The List of Threatened and Unique Wildlife of Arizona, developed by the Arizona Game and Fish Commission, includes several species found within the park. (See Appendix B for a complete list).

In Grand Canyon, there are 58 known protected plant species. This includes species protected under the federal Endangered Species Act of 1973 and those protected by the Arizona Native Plant Law.

The Federal Register, Part III, November 28, 1983, calls for candidate species to be treated as endangered species for planning purposes. While there are no known federally listed plant species in the park, there are four candidate species for the federal list. In addition, a federally listed endangered plant occurs immediately adjacent to the park boundary. There has been no survey within the park for this plant, but because suitable habitat exists, it likely occurs within the park. Through work done primarily by Museum of Northern Arizona, some autecological data on these species has been collected.

The Arizona Commission of Agriculture and Horticulture developed a Native Plant Law for the state. This law protects certain native plants and makes unauthorized collection illegal. Grand Canyon supports this law by requiring researchers to obtain authorization from the Commission, as well as a federal permit to collect these plants. The Resources Management Division maintains an updated copy of this state plant list.

9. Cultural Resources

Grand Canyon National Park is rich in cultural resources. The cultural history of the area began around 4,000 years ago. Resource categories described below are prehistoric resources, ethnic and ethnohistoric groups, and historic resources. The List of Classified Structures (LCS) and the National Register of Historic Places are management tools which are used in the active monitoring and preservation of the resources.

Knowledge about Grand Canyon's cultural resources has come from research and reporting begun in A.D. 1540 during a trip by Spaniards to the canyon rim. However, most knowledge has been acquired in the last few decades. Extensive inventories of archaeological resources have been accomplished over the last 10 years. Preliminary evaluations of architectural and historic resources were done in 1974 and 1976 by historians and architectural historians from the Western Regional Office and Denver Service Center. These studies were part of a Servicewide commitment to identify properties eligible for the LCS and were required for completion of the Grand Canyon Village Development Concept Plan.

a. Prehistoric Resources

The earliest evidence of utilization of the Grand Canyon is found in caves of the Redwall Limestone and dates 3,000 to 4,000 years ago. At that time, Archaic hunters, possibly of the Pinto Basin Desert Culture, placed willow or cottonwood split-twig figurines in caches in the caves for the purpose of imitative magic. Dates have been arrived at through radiocarbon analyses of the figurines. At this time, no diagnostic artifacts have been found in direct association with the figurines although Pinto Basin projectile points have been found in the vicinity.

The next tangible evidence of human use of the canyon was left by the people of the Kayenta Tradition of the Anasazi beginning around A.D. 500 or slightly earlier. Diagnostic Basketmaker projectile points have been found eroding from a few middens, and information from excavation of a cluster of pithouses in the Tuweep District attest to this presence. Slab structures and circular pithouse-like dwellings along with early Kayenta ceramics and lithics are found in rockshelters and occasionally in the open.

Peak prehistoric population and maximum utilization of the canyon appear to have occurred roughly between A.D. 1000 and A.D. 1150. Sites are found in almost every possible type of location from the river to both rims. Riverine sites consist mainly of masonry pueblos of one to several rooms with occasional water/soil control features. The high Pleistocene and other terraces are also characterized by open masonry pueblos. Granaries and small habitation

sites are found on top of the talus of the Inner Gorge. The remains of single room sites and mescal pits dot the Tonto Plateau. The Esplanade (topographically a higher platform) has revealed a number of open masonry pueblos, rockshelter sites, and mescal pits. Other trailside sites, usually granaries, caches, and small habitation sites, are found throughout the Supai formation. A few hundred meters higher, a series of small cliff dwellings may be found, and at the rims are located small open masonry sites of from one to a dozen rooms, many of which are accompanied by check dams and terraces. Single and multiroom dwellings, kivas, and granaries were built of jacal and masonry, dry and wetlaid, coursed and uncoursed. These types of sites as well as caches, water/soil control systems, and more ephemeral sites such as artifact scatters and low masonry walls in rockshelters attest to full use of the seasonal abundance of the canyon, and range in size from a single broken ceramic vessel to a 20-room masonry structure with associated kiva (up to 3000m²).

At about the same time, members of another Anasazi group from the vicinity of the Virgin River were occupying the western part of the park north of the Colorado River. In addition, intensive use was made by the Cohonina of the South Rim, the Esplanade and Havasu Canyon. The activities of this occupation include similar intense utilization of the canyon's various microenvironments. However, there is more variability in types of structures and less emphasis on agriculture with a consequent increase in gathering. Hundreds of mescal roasting pits in protecting rockshelters and abundant lithics are scattered over the Esplanade.

Climatic shifts apparently dictated the abandonment of Grand Canyon shortly after A.D. 1150. Tree ring analysis indicates that Tusayan Ruin on the South Rim was one of the last sites occupied. Around A.D. 1300, Southern Paiute Indians moved into the area north of the canyon and made occasional use of the resources below the rim. Rockshelters and other limited activity campsites are found on the North Rim, where dense forest and alpine meadows created good habitat for wildlife such as deer and below the rims, where water and edible plants would have been more plentiful. Occasional Paiute ceramics found south of the river indicate contact with the population there. More research needs to be done to determine the nature and extent of this contact as well as that which existed between North and South Rim peoples prior to A.D. 1150.

During the same time period, Indians of the Cerbat Branch moved from the Lower Colorado River Valley into abandoned Cohonina territory. Cerbat sites resemble those of the Paiute with the exception of ceramic types and the more intense exploitation of the abundant mescal growing on the Esplanade. Also, agriculture played a fairly important

part in the economy, as shown by ethnographic analogy. Little change seems to have occurred in the subsistence patterns and cultural traits from A.D. 1300, with the arrival of the Cerbat, until the nineteenth century and the intrusion of the Anglo-American culture into the Havasupai way of life.

The historic period begins with Don Garcia Lopez de Cardenas' exploration in A.D. 1540 of the South Rim and possible routes to the river. In three unfruitful days, he reached neither the river nor the Havasupai of whom he had been told by local Indians. European contact with both Havasupai and Southern Paiute in their homelands occurred in 1776 with visits by the Franciscan priests, Francisco Garces and Silvestre Velez de Escalante, respectively. Both accounts of the Indians, although relatively brief, are the first descriptions of any type of cultural resource within the park.

b. Historic Resources

Evidence of the interaction of European man with the canyon is another phase of cultural development within the park. For the Europeans, the immense chasm was a barrier from the beginning. Not until the arrival of John Hance and other prospectors was the economic or recreational potential of the canyon recognized. In the latter part of the nineteenth century, gold fever was spreading throughout the West. The exposure of so many rock formations and fault zones in the canyon led some to believe that precious metals could be easily found. In reality, high grade asbestos, copper, silver, lead, and more recently, uranium ores were located, but the logistical problems of building and stocking mining camps and of transporting the ore to the rim made mining attempts economically unfeasible. By the park's inception in 1919, all mining except at the Orphan Mine near Grand Canyon Village had ceased. Evidence of these ventures is still very visible in the park. Examples are found in Asbestos Canyon, Copper Canyon, Shinumo Gardens, Point Sublime, Hakatai Canyon, Horseshoe Mesa, and Red Canyon. They consist of trailwork and masonry along access routes, mine adits and tailings, masonry and wooden cabins, tent floors, grinders, sawed-off shovels and other tools and human refuse.

Many of the prospectors turned to tourism as a more effective way to make money. John Hance's cabin near Grandview became the nucleus of a tent camp hotel, the first tourist facility at the Grand Canyon. It was located at the terminus of the Flagstaff-Grand Canyon stageline. The Grandview Hotel, the first hotel constructed on the rim, was built in 1897, and replaced a cabin used by miners from Horseshoe Mesa. In 1906, Martin Buggeln constructed a large frame hotel beside the old Hance tent hotel. All of these struc-

tures were razed by the NPS in the 1960's. For a time, these hotels, the Grandview Trail down to Horseshoe Mesa, and the river were the center of tourist activity in the park.

A more remote, but no less interesting area, was that of Bass Camp established by W. W. Bass in 1890. He built a trail to the river and located several mineral claims, but his primary goal was to show the canyon to as many people as possible. He built a road to the canyon from Ashfork and ran a stage, guiding tourists from both there and Williams. The foundations of some of the buildings, the tramway, and the trash dumps of the camp are still visible.

The arrival of the Santa Fe Railroad in 1901 shifted the primary tourist focus to the area of the South Rim near the Bright Angel Trailhead. The Santa Fe Railroad Station was unique among railroad stations in its rustic design. The Bright Angel Hotel was begun as a tent camp by J. W. Thurber, a stage operator who extended the stage route from Hance's Hotel to Bright Angel Canyon in 1895. Probably the first person to build in this area was "Bucky" O'Neill, the journalist, mayor, sheriff, soldier, and promoter who was also fond of the canyon. His log cabin is the oldest surviving structure on the rim. Ralph Cameron, another early canyon entrepreneur, moved a cabin to the area and added on a porch and second story in 1902, naming it the Cameron Hotel. Development of tourist facilities by the Fred Harvey Company in conjunction with the Santa Fe Railway began during this time. The El Tovar Hotel and Hopi House curio shop were completed in 1905. Mary Elizabeth Jane Colter designed the Hopi House as a replication of structures indigenous to the Hopi mesas east of the canyon. She then designed both Lookout Studio and Hermits Rest concession building to blend with natural rock formations. John G. Verkamp built a souvenir shop on the rim in 1905-1906 which is still operated by members of his family.

From 1905 until 1916, the U.S. Forest Service administered the Grand Canyon area. Even though it developed a townsite plan, very little development was completed until after the area became Grand Canyon National Park in 1919. The NPS developed its own town site plan and, working closely with the Santa Fe Railway and Fred Harvey Company, expanded the visitor and administration facilities in the park over the next two decades.

During the early 1900's, administration, housing, and maintenance facilities were constructed by both the NPS and the concessioner. Most of the buildings constructed during this development period are still standing in the park, and many are being used for their originally designed purpose. The Grand Canyon Village Historic District includes many of

these structures, though the district has more structures built by the Fred Harvey Company during these years than by the NPS.

The park development changed from a tourist trade based on railroad transportation to one based on the automobile in the late 1920's. Even though the Depression caused a decline in park visitation, the decline was short-lived and the need for continued facilities development existed. In 1935, the Bright Angel Lodge complex, designed by Mary Colter, was completed. By this time, Fred Harvey Company had developed tourist facilities in the bottom of the canyon at Phantom Ranch. Also, the Union Pacific Railway, at the urging of the NPS, had developed facilities on the North Rim at Bright Angel Point.

In the mid 1930's the NPS used assistance from the Civilian Conservation Corps (CCC) to maintain and expand visitor-related facilities. Projects involving the CCC were integrated within the canyon at places like Indian Gardens and Phantom Ranch, as well as in the developed areas on both the North and South Rims.

C. LAND USE AND TRENDS

1. Adjacent Land Uses

Grand Canyon National Park is entirely surrounded by other Federal lands managed by a variety of agencies.

To the west and to the northeast, the park is bounded by Lake Mead and Glen Canyon National Recreation Areas respectively. While these areas are managed more on a multiple use basis than the park, uses along contiguous areas are compatible.

The major area of interface with Glen Canyon National Recreation Area is at Lees Ferry, where the confluence of the Paria and Colorado Rivers mark the boundary between the two NPS areas. From here, Grand Canyon river trips launch in a downstream direction while numerous fishermen launch upstream to fish within Glen Canyon NRA. The Lees Ferry site is within the boundaries of Glen Canyon, but both areas have on-site personnel. Glen Canyon is actively involved in the management of the trophy trout fishery below the dam and works with Arizona Fish and Game in stocking of 50,000 exotic rainbow trout annually in the Colorado River. These fish have populated most sections of the post-dam altered aquatic environment of the Colorado River within the park.

The major interface between Grand Canyon NP and Lake Mead NRA are at Pierce Ferry and along the Grand Wash Cliffs. Pierce Ferry is a major takeout point for Colorado River trips. A drift fence along the Grand Wash Cliffs is relatively successful in preventing egress of wild burros from Lake Mead onto adjacent Grand Canyon lands.

To the north of the park is Kaibab National Forest and the Bureau of Land Management's Arizona Strip District. Both of these areas are managed under a multiple use concept. Within Kaibab National Forest, the major use is timber production. Thinning, slash burning, pest control, and other forestry management techniques are regularly practiced. Grazing is also permitted on these forest lands. These management practices require that Grand Canyon work with national forest personnel to provide boundary protection from fire. In addition, Grand Canyon needs to reconstruct a failing boundary fence to prevent trespass grazing.

On the Arizona Strip, use had been restricted to scattered grazing leases and limited recreational use until about 1980, when rich deposits of uranium ore began to be mined. There are currently three mines operating in close proximity to the park. The potential impact of greatest concern to the park is introduction of radioactive wastes and/or mine water into watersheds leading into the park. However, runoff is minimal due to low precipitation and on-site water discovered in these mines to date has been extremely limited. Therefore, possibility of discharge into park watersheds is remote. The other impact which is already occurring is increased visitor use resulting from improved access to this area. The actual magnitude of increased fugitive dust and other visitor-related impacts will be directly related to uranium market conditions and cannot be estimated at this time.

Trespass cattle grazing does occur on Grand Canyon land, and the National Park Service plans to construct adequate fencing to eliminate this problem. The inexact boundary location, inaccessibility to the area, and requirement for rock-drilling to set fence posts will make this fence very expensive.

Approximately 400,000 acres of land in the Bureau of Land Management Arizona Strip District, including several units immediately adjacent to the park have recently received wilderness designation. This designation is compatible with Grand Canyon land use.

To the south, the park is bordered by the Kaibab National Forest and the Hualapai and Havasupai Indian Reservations. Issues of concern between the national forest and the park are similar to issues on the North Rim.

There are two management issues involving the Hualapai: 1) take-out fees for removal of river craft at Diamond Creek and 2) location of the park boundary. In terms of the take-out fees, the Hualapai regularly charge takeout fees for removal of boats at Diamond Creek, but these fees vary in amount as does who is charged. In terms of the boundary, the Hualapai Tribe claims their treaty (which predates the park act) gives them ownership to the middle of the river. The National Park Service claims ownership to the historic (pre-dam) high water mark.

Interaction with the Havasupais is limited since most of their activities are limited to isolated Havasu Canyon. Limited grazing does occur on rim lands, but a fence proposed by the Tribe will provide adequate resource protection. The park and Bureau of Indian Affairs have executed a cooperative agreement on management of fires occurring along the common boundary.

To the east, the park is bounded by the Navajo Reservation. There are two issues of mutual concern with this adjacent landowner. The first issue involves grazing which continues along the east park boundary. To mitigate grazing impacts, the park constructed about 2 miles of fence along the Desert View boundary in 1982 and 1983. The second issue concerns the approximately 25,000 acres of Navajo lands included within the park boundary. Aquisition of these lands by the NPS has been deferred indefinitely.

2. Within Park Land Use

Virtually all lands within the park are federally owned at the present time (see table below).

Land Ownership in Grand Canyon National Park

<u>Owner</u>	<u>Acreage</u>	<u>Percent</u>
Navajo Nation	24,288.00	2.0%
State of Arizona	11,860.00	1.0
Private	392.54	-
Federal (NPS)	1,179,194.10	97.0
Total	1,215,734.64	100%

Lands in state and private ownership are undeveloped and not currently used for nonpark purposes. Lands belonging to the Navajo Nation, however, are currently being utilized for grazing and other nonpark subsistence uses.

The State-owned lands consist of 1 tract, the Colorado River bottom. There is virtually no potential for development of these lands. Public Law 93-620 states that State lands can only be acquired by donation or exchange.

The highest priority acquisitions are the Hearst and Lee privately owned tracts. The Hearst property is the largest tract, consisting of 16 potential mining claims on 325.87 acres below the Grandview overlook and on the north bank of the Colorado River. The Lee property consists of 66.67 acres and is located on the north side of the Colorado River in the Toroweap Valley.

Lands on the east side of the Colorado River in the former Marble Canyon National Monument are included within the Navajo Reservation. Although these lands are currently being used for

nonpark purposes, acquisition by NPS in the near future is unlikely. Section 5(2) of P.L. 93-620 only allows for the transfer of lands held in trust for Indian tribes to the United States upon approval of the Indian governing body.

D. VISITOR USE ANALYSIS

In 1919, the year Grand Canyon National Park was established, the park received 44,173 visitors. Since that time, although there have been up and down years, visitation has experienced a gradual increase. By 1956, the park was receiving over one million visitors per year. In 1969, the 2 million mark was topped. In 1976, the Bicentennial year, the park received 3,026,235 visitors - its heaviest annual visitation to date. (See Appendix C for Annual Visitation figures).

The reason for increased visitation over the years has never been carefully studied. However, population growth, increased mobility, expanded communication/media networks, a growth in discretionary income and time, and an increase in the number of available lodging units/campground spaces have all been contributing factors.

Since 1976, visitation has fluctuated between a high of 2,984,138 in 1978 and a low of 2,275,712 in 1979. Seasonal use variations include 22-percent spring use, 48-percent summer use, 22-percent fall use, and 8-percent winter use. Surges in visitation occur during Easter week, Christmas week, and the first 2 weeks in August.

In 1983 the park received 2,448,545 visitors (down 2 percent from 1982); 13,120 backcountry permits were issued to 36,614 users who spent 83,585 nights in the backcountry (although an exact figure is not known, the park estimates that approximately 250,000 visitors per year hike below the rims into Grand Canyon); and 14,000 river runners spent 126,000 user days on the Colorado River. Visitor statistics also reveal that approximately 13,500 visitors per year ride mules into the canyon, while 250,000 visitors enjoy air-tours.

A thorough analysis of existing data is needed to develop comprehensive visitor profiles and visitor use patterns for Grand Canyon National Park and to identify data gaps. The following conclusions, however, are substantiated by existing data.

1. Since 1976, visitation has leveled off at between the 2-1/2 and 3 million visitors per year.
2. Approximately 10 percent of the park's visitors venture below the rim.
3. A large percent of the park's visitors (between 33-42 percent) come from other countries.
4. The mean length of stay is approximately 2 days with a majority of the park visitors spending the night in lodges, motels, and campgrounds in and adjacent to the park.

5. Most visitors are not traveling as a part of an organized tour group but rather travel with 2 or 3 other people, usually members of the same family, and arrive via privately owned vehicles.
6. Most park visitors are well educated and earn over \$20,000 annually.
7. Viewing the canyon from park overlooks, and knowing that the park resources and values are being protected, is extremely important to a vast majority of all park visitors.

(See Appendix C for visitation bar charts and graphs, and detailed findings from park visitor surveys.)

E. FACILITIES AND EQUIPMENT ANALYSIS

1. Roads

The Grand Canyon road system contains 176.73 miles (centerline mileage) of roads divided among the following Federal Highway Administration (FHWA) categories:

7 major park routes (destination routes-e.g., South Rim Entrance Road)	75.40 miles
11 minor park routes (e.g., Center Road)	58.35
16 special purpose routes (e.g. campground roads)	19.48
13 administrative routes (e.g., sewage lagoon routes)	15.14
2 one-way routes (e.g. Village Loop)	1.65
5 city street routes (e.g., housing area)	6.71
	<u>176.73</u> miles

There are 22 parking areas associated with these various routes totalling 116,394 sq. yds. Although an exact count of actual parking spaces has not been done, rough calculations indicate the inventoried parking areas would accommodate approximately 7,000 vehicles.

The Grand Canyon road system also includes:

2 traffic beacons
4 cattle guards
412 culverts
390 delinators (post with reflector)
70.75 miles of ditches
6.47 miles of fence
5,333 linear feet rock guidewall
850 signs

The priority listing of backlog road needs prepared by the Federal Highways Administration as a part of the Road Inspection/Inventory Program for Grand Canyon indicates that approximately 78 miles of the road system (44%) require improvement under the component sufficiency rating using the combined criteria for structure safety and service components. Another 40 miles of the road system (23%) require improvement under the structure criteria alone. Total estimated cost for these improvements is \$91.9 million (1982 figure).

2. Trails

The Grand Canyon trails system contains 61 individual trails totalling 346.3 miles of graded and surfaced trails, including dry and mortared stone masonry walls, stone and timber water bars, guard rails, and 9 bridges. The majority of these trails are in good condition.

3. Nonhistoric Buildings and Facilities

Buildings within Grand Canyon National Park total approximately 1,000 in number. Of this number, approximately 500 are classified as historic structures.

Of the remaining 500 nonhistoric buildings, a majority are located in the developed areas on the South Rim. About 300 of these buildings are under the responsibility of the park concessioners, and 200 are government buildings. 179 buildings are visitor use facilities, divided, 145 concessioner, 34 government. There are 219 residential buildings, of which 95 are concessioner and 124 government. Miscellaneous buildings such as separate garages, storage buildings, and shelters total 53, divided, 29 concessioner and 24 government.

The park has seven campgrounds; one on the North Rim (83 sites and group area); one at Tuweep (12 sites); two on the South Rim-Mather (325 sites and group area) and Desert View (50 sites); and three in the Inner Canyon-Indian Gardens (16 sites), Cottonwood (14 sites), and Bright Angel (33 sites). The South Rim Village area also includes a concessioner-operated recreational vehicle hook-up facility (Trailer Village) with 84 sites. There are seven picnic areas in the park; two on the North Rim, one in the South Rim Mather Campground area, and four on the East Rim Drive.

4. Utility Systems

a. Potable Water

All water for Grand Canyon National Park originates from a large limestone cave, Roaring Springs, located high in Bright Angel Canyon, 2,000 feet below the North Rim's developed Bright Angel Point area. For the North Rim developed complex, water is pumped directly up from the spring

area to tanks on the rim. For the South Rim areas, water flows by gravity through a pipeline that descends to the Colorado River, crossing the river near Phantom Ranch, and then descending to its gravity flow termination point at Indian Gardens, 3,200 feet below the South Rim. From Indian Gardens, the water is pumped to a tank farm complex on the South Rim, located on the edge of the Village area. The pipeline route from Indian Gardens to the Village is essentially a vertical ascent, as the Indian Gardens development is directly below the Bright Angel Lodge of the Village.

Water to developed areas on the South Rim outside of the Village complex, such as Desert View, and Hermits Rest is trucked from a water loading facility off of the Village water supply system. The town of Tusayan on the south boundary of the park, receives trucked water from the Village system on an as-available basis. U.S. Forest Service and Federal Aviation Administration areas at Tusayan also benefit from this arrangement.

Water storage capacity at the South Rim is 13.3 million gallons; at the North Rim, 4 million gallons; at Desert View, 150,000 gallons; and at Hermits Rest, 10,000 gallons. Distribution piping ranges from 12-inch diameter for one 1/2 mile section in the Village area, down to 2-inch size in some historical housing sections of the park. More than 50 miles of piping are involved in the Village system alone.

The transcanyon pipeline is primarily 6-inch size, and buried; however, many segments of this pipeline are on the surface because of the cliffs and hard rock terrain traversed. The pipeline crosses the river on a pipe/pedestrian suspension bridge just west of the junction of Bright Angel Creek and the Colorado River. The transcanyon pipeline and the old pipeline to the rim from Indian Gardens, combined, are approximately 17 miles in length.

b. Waste Water (Sewage)

Three sewage treatment plants are located within the park serving three separate areas. A 450,000-gallon per day activated sludge plant with extended aeration serves the South Rim Village complex. A 150,000-gallon per day activated sludge extended aeration plant with tertiary treatment (currently operating at 60 percent of capacity) serves the North Rim complex, and a similar smaller 12,000-gallon per day plant serves the Phantom Ranch area. Sewage at the Desert View area is treated by means of sewage lagoons. At Indian Gardens a septic tank/leach field system has reached its saturation point; sewage is currently collected and flown out of the canyon by helicopter slingload until a long-term solution can be implemented.

Sewage collection systems for the North and South Rim complexes include sewage lift stations and interceptor pipes of 16- and 10-inch diameter, down to feeder pipes of 6-inch size. The majority of the sewer system piping is of the smaller size. Pipe types range from clay to concrete to malleable iron.

The South Rim's sewage system includes a reclaimed water treatment plant that produces up to 100,000 gallons of reclaimed water per day (depending on demand). The reclaimed water is utilized for lawn sprinkling, vehicle washing, and some toilet flushing in the Village area. Current reclaimed water storage capacity is 50,000 gallons, to be replaced by a 200,000-gallon tank currently under construction (summer 1984). The reclaimed water plant and distribution system dates from the 1920's, and the equipment reliability and the corrosion deterioration are commensurate with this age.

c. Electric Power

All primary (high voltage) electric power distribution and essentially all secondary distribution in Grand Canyon National Park is provided by two electric power companies: Arizona Public Service (APS) for the South Rim areas, and Garkane Power Association, Inc., for the North Rim areas. The inner canyon areas are served by these same two companies, generally in the same south and north division of territory, except that APS serves one facility just north of the river at Phantom Ranch. At Tuweep the park generates its own power.

Most primary power distribution is aerial construction, except for a section of underground primary on the run between Indian Gardens and Phantom Ranch. Also, portions of the visitor areas of Grand Canyon Village and most of the visitor areas of Desert View are served with underground primary. Approximately 70 percent of the secondary power distribution within the park is aerial construction; however, most facilities built during and since the Mission 66 era are supplied by direct underground secondary distribution burial cables.

d. Radios

Grand Canyon National Park has 230 radio units and two repeater systems. The repeaters are located at the Hopi Fire Tower on the South Rim and the Kaibab Lodge on the North Rim. This system was designed in 1965 primarily for the North and South Rim visitor use areas. At the present time radio coverage takes care of 90 percent of the visitor use area but is inadequate for backcountry and river use areas which have had a substantial increase in visitation over the past few years. Present coverage of areas below the

rim is estimated at approximately 20 percent. Search, rescue, safety, law enforcement, and resource management needs of the area are sorely wanting for adequate radio coverage.

The main radio base unit has four channels of which two are National Park Service. One of these channels operates off of the repeaters while the other channel is strictly line of sight. The other two channels are monitored for Coconino County Sheriffs Office and Fred Harvey Company.

5. Historic Structures

Two hundred and twenty-five prehistoric and historic structures with standing walls greater than one meter high have been evaluated and placed on the List of Classified Structures (LCS). The Western Archeological and Conservation Center prepared the list of 61 prehistoric structures with recommendations and estimates for treatment. Western Region personnel prepared the reports for the 164 historic sites and buildings on the LCS, including 10 structures on the South Rim, 135 on the North Rim, 2 at Tuweep, and 17 in the Inner Canyon. Computer printouts of the list are sent periodically from Washington for review and updating.

At present, five historic districts, one prehistoric site, and two individual historic structures are listed on the National Register of Historic Places. In addition, one historic district and one prehistoric site have been determined eligible for the register, and in 1983, the entire park area was determined eligible by the State Historic Preservation Officer as a archeological multiple resource area.

A list of historic buildings and structures in Grand Canyon National Park can be found in Appendix D.

6. Major Equipment

A listing of major equipment owned or leased by the park, including automobiles, trucks, and heavy equipment can be found in Appendix E.

F. STATUS OF PLANNING

<u>Name of Plan/Study</u>	<u>Preparer</u>	<u>Date Approved</u>	<u>Comment on Adequacy</u>
Master Plan	DSC	June 25, 1976	Current
Grand Canyon Village Development Concept Plan	DSC	August 22, 1976	Current

North Rim-Comprehensive Design Plan	WRO	August 10, 1982	Current
Park Suitability Study	DSC	February 1976	Current
Adjacent Lands Study	WRO	November 1981	Current
Desert View-Development Concept Plan	GRCA	--	To be completed in FY85
Preliminary Corridor Development Concept Plan	DSC	June 1972	To be completed in FY86
Wilderness Recommendation	DSC	August 1980	Submitted to NPS WASO, but no action taken
Natural and Cultural Resources Management Plan	GRCA	January 11, 1985	Current
Colorado River Management Plan	GRCA	December 13, 1981	Current
Feral Burro Management Plan	GRCA	January 30, 1980 (FEIS Released)	Current
Backcountry Management Plan	GRCA	September 1983	Current
Trail Maintenance Plan	GRCA	March 25, 1982	Current
Hazard Tree Plan	GRCA	October 5, 1982	Current
Cave Management Plan	GRCA	January 1980	Outdated, revision to be completed in FY85
Fire Management Plan	GRCA	1977	Outdated, revision to be completed in FY85

Vista Clearing Plan	GRCA	--	To be completed in FY85
Water Resource Management Plan	GRCA	October 1984	To be completed in FY85
Land Protection Plan	GRCA	--	To be completed in FY85

G. EXISTING MANAGEMENT ZONING

The park has four different land classification zones. The percent of park land contained in each zone is summarized below.

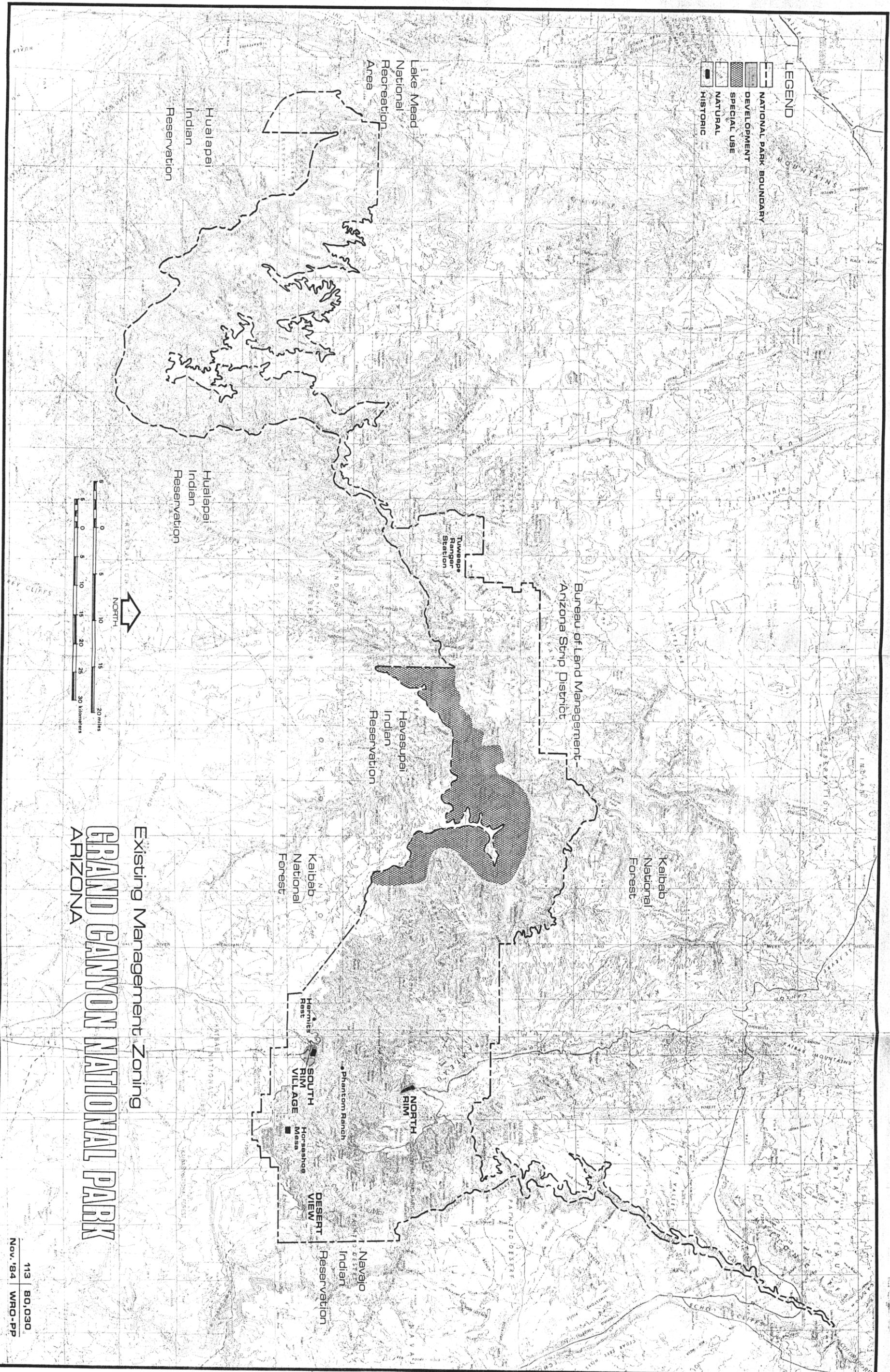
	<u>Acreage</u>	<u>Percent of Park Land</u>
Development Zone	2,418	.2
Historic Zone	298.25	-
Special Use Zone	95,300	7.8
Natural Zone	<u>1,117,718.39</u>	<u>92</u>
Total	1,215,734.64	100

The development zone is comprised of four distinct areas within the park. These areas are the South Rim Village Area (2,200 acres), Desert View (50 acres), North Rim Developed Area (150 acres), and Phantom Ranch (18 acres).

The historic zone is comprised of five National Register districts on the North and South Rims. There are three districts on the North Rim: the Bright Angel Lodge District (73.05 acres), the National Park Service Headquarters District (2.2 acres), and the North Rim Inn District (77 acres). The South Rim Village Historic District (73.5 acres) extends along the rim from the Bright Angel Lodge to the Verkamp's Store. The Grandview Historic District (91 acres) is located just below the Grandview overlook on Horseshoe Mesa. As previously noted, the entire park has been found eligible for nomination to the National Register of Historic Places as a multiple resources area.

The special use zone includes the 95,300 acre Havasupai Use Land.

The balance of the park (1,117,718.39 acres) is classified as a natural zone.

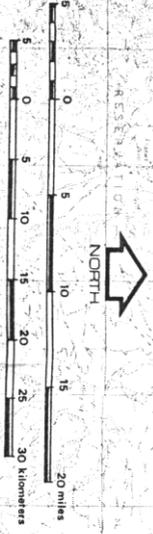


LEGEND

-  NATIONAL PARK BOUNDARY
-  DEVELOPMENT
-  SPECIAL USE
-  NATURAL
-  HISTORIC

Existing Management Zoning

GRAND CANYON NATIONAL PARK
ARIZONA



IV. MAJOR ISSUES

Due to the size, complexity, and varied interests in Grand Canyon National Park, the number, importance and status of major issues is constantly changing. A few of the key issues, at this particular point in time, are summarized below.

Aircraft Monitoring

In 1975, with the passage of the Grand Canyon National Park Enlargement Act, Congress recognized the potential impact of aircraft flights over and within the Grand Canyon on the "health, welfare, or safety of visitors" or "the natural quiet and experience of the park." The Secretary was directed to submit "complaints, information, or recommendations for rules and regulations or other actions" to responsible agencies. In compliance, the park has undertaken a study of aircraft use in the park to determine whether there is or is not, a significant impact on other park experiences.

In addition to military, private, and commercial aircraft, there are currently over 40 air-tour operators that fly over Grand Canyon National Park carrying an estimated 250,000 visitors annually. Existing FAA regulations only require that aircraft fly a minimum of 500 feet from any person, vehicle, or structure and 1,000 feet over congested areas.

Recognizing the demand and importance of air service over Grand Canyon, noise and flight frequency data is being collected and assessed, a sociological study of visitor perceptions is underway, and data related to impacts on wildlife and other sensitive resources is being compiled. Study conclusion and recommendations are expected in FY 85.

Havasupai Traditional Use Land Horses

The Grand Canyon Enlargement Act (Public Law 93-620) permits the Havasupai Tribe to graze on 95,300 acres of park lands, referred to as Havasupai Use Lands (HUL), provided there is no significant impact from such grazing activities. However, a 1982 study by the U.S. Forest Service, under contract with NPS, indicates that the carrying capacity of the HUL for grazing is zero, and therefore grazing is resulting in a significant impact. Horses have been grazing on the HUL since the latter part of the 19th century. There are approximately 30 horses still grazing on the HUL. In a September 1982 Memorandum of Understanding (MOU) with the Havasupai, they agreed to remove all horses from the HUL. Since the 1982 MOU, the Havasupai have determined horse removal to be a more difficult and costly process than initially anticipated and have claimed continued grazing is within the authority of P.L. 93-620. Alternative methods for horse removal are presently under study.

Rail Passenger Service to the South Rim

Railroad Resources, Inc., a private transportation firm from Phoenix, Arizona, is planning to reinstitute a scenic steam locomotive, rail passenger service from the City of Williams to the South Rim of Grand Canyon National Park in FY 85. In May 1984, Railroad Resources, Inc., submitted a draft environmental assessment and operational plan as well as a draft maintenance agreement. All documents were accepted in principle with a

temporary Special Use Permit subsequently issued which authorized continued planning, work required to make the tracks operational, and a maximum of 12 test train runs in 1984. A final draft environmental assessment is now out for public review and comment. An historic structure report (HSR) is being prepared on the depot facilities and is to be completed in early 1985. The HSR will help in determining the feasibility and cost of providing needed and suggested improvements to the depot facility.

Facilities, staff, equipment, and funding on the South Rim are not adequate to serve the projected increased visitation in FY 85 if the railroad proposal is fully implemented. If additional funding is found for FY 85, and the operational analysis, historic structure report, and environmental assessment are determined adequate, the National Park Service will issue a 5-year Special Use Permit and a 2-year Commercial Use License to Railroad Resources, Inc., for commercial operators beginning January 1, 1985. Should the operation become highly successful, it is anticipated that additional staff, buses, and facility improvements will be required to adequately serve the visitor in FY86 and beyond.

Visitor Transportation System

The Visitor Transportation System (VTS) at Grand Canyon National Park was initiated in 1974 to reduce parking problems, traffic congestion, air pollution, and resource deterioration. The system carries an average of 1.6 million passengers per year, over one-half of the parks total visitation. It is free to the passengers but costs the Government approximately \$700,000 in annual operating expenses. Over the past few years, funding for the VTS has been uncertain until the very last minute. A new 5-year contract is to be insured for service starting in 1985. No funding is guaranteed for FY85 and beyond.

Funding for the VTS needs to be more secure. It is estimated that costs of road repairs, parking construction, law enforcement, losses from accidents, etc., could reach \$1 million annually, not to mention the incalculable costs of resource damage and degradation without a VTS. If appropriated funding cannot be secured, the park has proposed a user fee be collected at the entrance stations and retained in the park as a viable method of financing part or all of the annual operating expenses of the VTS. Retention of user fees by the park for the VTS would require special legislation.

Staff Housing

There is a severe shortage of adequate housing at Grand Canyon which adversely affects morale of employees and causes excessive delays in filling vacant positions. The end result is slippage of programs and operations.

At the present time, the park has available for assignment and/or loan, 197 house/apartment units, 43 trailers, and 35 trailer sites. Comparing these with the 165 permanent employees and 160 seasonal employees we have a deficit of approximately 85 units. This does not account for the inadequacy of existing units which range from 19 to 64 years in age. An estimated 50 percent of our existing dwelling units are substandard,

energy inefficient, and beyond practical rehabilitation. The shortfall in housing is made up by hiring persons who have concessioner or Government housing by virtue of other family members working in the park or have their own house trailer, and by doubling and/or tripling up in roommate situations. There is no private housing market within commuting distance.

Funding requests for new construction have been deferred to other pressing needs, especially water, sewer, and public health concerns. Project proposals for renovation and rehabilitation of quarters have likewise been unsuccessful. An estimated \$4.5 million is needed to address the park's housing shortage at this time.

National Park Service/Bureau of Reclamation Glen Canyon Dam Impact Studies

On December 16, 1982, the BR Commissioner and NPS Director initiated the interagency Glen Canyon Dam Impact Studies to investigate effects of fluctuating discharge on: sediment transport/erosion, aquatic ecosystems (including the federally endangered humpback chub), riparian ecosystems, and river recreation and economics. These studies are being conducted as a cooperative effort between BR (lead agency, funding source), NPS, Arizona Game and Fish, and U.S. Fish and Wildlife Service. The current study budget is \$4 million for FY84-86. The NPS will be conducting the riparian and recreation studies. Costs for NPS staff and studies for FY84-86 will be \$264,000, which will be funded by BR. A final project report is scheduled for October 1986. If significant changes in Glen Canyon Dam operating criteria are recommended, an EIS will be prepared as an interagency effort.

Airport Expansion

The State of Arizona, Aeronautics Division of the Arizona Department of Transportation (ADOT) recently contracted with a private consulting firm for the development of a master plan for the expansion of the Grand Canyon Airport. Expansion proposals call for the addition of a 150-unit motel, a 150-seat restaurant, an extended runway to accommodate larger aircraft, and an enlarged aircraft parking area. Potential peripheral development includes lodging, housing, resorts, and other auxiliary facilities. In addition, ADOT has leased airport operations and airport facility development to a private firm. The state decided to lease the airport because of financial gains for the state and because of the opportunity to develop commercial enterprises at the airport. As a part of the 25-year contract, which includes a 25-year renewal option, the private firm is obligated to build a 150-room hotel and restaurant.

Airport expansion has a direct bearing on the park's responsibilities outlined in Section 8 of the Grand Canyon National Park Enlargement Act, Public Law 93-620, which specifically states that the Secretary of the Interior shall act to protect the health, welfare, and safety of the park visitors, and the natural quiet and experience of the park, where it may be jeopardized by aircraft activity over the park. Specific park concerns include the effects of increased air visitation on a fixed capacity for park visitation opportunities (e.g., overnight lodging), safety considerations, and the relationship of possible airport expansion to available land, water, and sewage treatment capacities.

The Arizona Department of Transportation states that Grand Canyon Airport, located 5 miles south of the park, is now the third busiest transient airport in the state of Arizona, with 98,000 flights in 1983 and an estimated increase to 210,000 flights by the year 2003.

Sewage Treatment

Grand Canyon sewage treatment facilities include: three extended aeration plants - one on the South Rim (10 years old), one on the North Rim (8 years old), and one at Phantom Ranch (1 year old); sewage lagoons at Desert View; and a septic tank and leach field at Indian Gardens. To correct problems that the South Rim plant has with flow equalization one of the three aeration tanks is being converted to a flow equalization tank. The South Rim reclaimed water plant, built in the 1920's, is in an extremely deteriorated state, unable to continue producing water of the quality required by the State, and presenting unsafe working conditions. A new tertiary plant is needed behind the South Rim extended aeration plant. Discontinuance of reclaiming water will place an additional demand on existing potable water supplies (for flushing toilets, etc.) that the system is unable to handle. Existing irrigation would also have to be discontinued. The North Rim plant's undersized sludge return equipment must be manually operated in order to keep up with the current sewage load. At Desert View facilities should be adequate when the new lagoon is added. The Phantom Ranch treatment plant generally works well, but there are still mechanical and process problems which require the periodic diversion of wastewater to the failing septic tank/disposal field. With modifications to the plant and the construction of a new secondary disposal area, the Phantom Ranch liquid waste situation should be manageable. It should be noted, however, that the Phantom Ranch plant is operating at peak design capacity during periods of peak use.

Indian Gardens remains the most urgent wastewater problem in the park. The solution that was implemented in 1978 (i.e., sling-loading "blue-goo" out by helicopter to the South Rim) is costly, troublesome, and totally inadequate, leading to a warning by the State of a potential shutdown. Approval has been received from the Regional Budget Office to fund a study to assess the situation, recommend a treatment facility, and prepare working drawings and specifications. Project completion is targeted for late 1986 or 1987.

Transept Canyon Development

Transept Canyon, North Rim, Grand Canyon National Park, was identified in the North Rim Development Concept Plan for future concession facilities development to relieve severe congestion problems at current developed areas. Therefore, as part of negotiations for a new 20-year concession contract, TW Services, Inc., has committed to an investment of \$3+ million for development of visitor and employee facilities at the Transept Canyon site. In order for the concessioner (TW Services) to meet its commitment for the subject development, the National Park Service must first fund approximately \$1.6 million in infrastructure development. The Director, NPS, through the Regional Director, WRO, has verbally committed to providing infrastructure funding; however, specified source of funding has not been identified and/or committed at this time.

V. MANAGEMENT OBJECTIVES

Natural and Cultural Resources

Maintain, preserve, and perpetuate the aesthetic setting, natural/cultural resources, and natural ecological processes of Grand Canyon National Park as a unit of the National Park System.

1. Perpetuate native plant and animal life for its essential role in the natural ecosystem.
2. Insure native diseases function unimpeded except where control is necessary to stop the spread of epidemic populations to developed zones or onto adjacent non-park lands.
3. Reintroduce the natural role of fire in park ecosystems to the maximum extent possible.
4. Eliminate existing and prohibit new occurrences of all activities inconsistent with protection of the natural ecosystem, except in the park's developed areas as noted in the park's management plans, and including but not limited to grazing and mining.
5. Protect the natural quiet and control activities causing excessive or unnecessary noise in, over, and adjacent to the park which detract from the visitor's enjoyment of natural park values or adversely affect park resources.
6. Protect and conserve sources and quality of existing natural water resources, and where contamination has occurred, restore water quality to its original state. Minimize water withdrawal impacts on natural water systems.
7. Preserve the air quality and protect it from within park as well as external degradation.
8. Perpetuate the natural, geological, and ecological conditions and historic associations of the park's cave resources.
9. Perpetuate unimpaired the park's cultural and archeological resources, protecting them from vandalism or unauthorized excavation, collection, appropriation, or visitor use.
10. Support research programs pertaining to natural and cultural resources and to social sciences consistent with the park's resource protection and visitor services mission.

Visitor Use

Provide for the use and enjoyment of park resources by park visitors compatible with resource protection goals.

Maintain the South Rim and Inner Canyon Corridor for heavy visitor use consistent with safety and environmental considerations.

Encourage a slower pace and more intimate involvement with the environment of the North Rim.

Interpretive Services

1. Offer a variety of quality information services differing in format, media, intensity of presentation, and sensitive to the special needs, interests, and cultural backgrounds of a diverse mix of visitors.
2. Offer visitors any understanding of park values and resources and include as an integral part of interpretive materials major park management and resource protection challenges.
3. Maximize opportunities for visitor enjoyment of interpretive services, facilities, and resources consistent with other park management objectives.
4. Maintain an effective library and study collection operation that is up-to-date and reflects current preservation policies.

Recreational Activities

1. Permit access to all areas of the park consistent with resource protection objectives and within optimum carrying capacities/use limits.
2. Offer a variety of recreational opportunities sensitive to the range of visitor interest, physical capabilities, and time and financial limitations.
3. Limit mechanized access below the rims to emergency and management use.

Facilities and Services

1. Compatible with resource protection goals and carrying capacity limits provide facilities and services to accommodate visitor needs.
2. Maximize use of existing visitor facilities and utilize vacated buildings to accommodate necessary expansion of visitor facilities. Build new facilities or expand existing facilities only when a clearly demonstrated, continuing need exists.
3. Minimize environmental impact if additional facilities are needed.
4. Recognize, protect, and utilize the park's existing architectural heritage.

5. Provide attractive alternatives to automobile transportation.
6. Separate and buffer conflicting land uses.
7. Expand, strengthen, and diversify interpretive facilities as recommended in the Master Plan.
8. Mitigate and work towards the removal of haphazard and unsightly development and congestion along the rim.
9. Retain primitive access to the backcountry and uncrowded canyon viewing opportunities.
10. Maintain backcountry corridors for heavy visitor use consistent with safety and environment considerations.
11. Consolidate National Park Service and concessioners support facilities.
12. Centralize National Park Service administration, operations, and the communications center in the visitor use zone.
13. Screen concessioner and National Park Service operations and maintenance from visitor areas.
14. Separate service and residential access and circulation from visitor circulation and transportation systems.
15. Develop utilities and telephone service only as needed. Investigate alternative energy systems to minimize energy consumption and environmental impact.
16. Expand and improve the water supply and reclamation systems to insure a maximum supply of potable water and maximum use of reclaimed water within the Village.

Concessioners

1. Maintain, preserve, and perpetuate an aesthetic setting for commercial services and community support services, with Grand Canyon Village retained as the focal point on the South Rim and the North Rim Developed Area retained as the focal point on the North Rim.
2. Perpetuate the use of historical structures and facilities consistent with their historic significance for commercial purposes.
3. Provide year-round commercial facilities and services on the South Rim at Hermits Rest, Desert View, and Grand Canyon Village and at Phantom Ranch.
4. Provide seasonal commercial facilities and services at the North Rim while evaluating the potential and desirability of eventual year-round operations.

5. Maintain all commercial service facilities in accordance with applicable public health and safety standards.
6. Assure that the types and prices of commercial services provided will accommodate a range of park visitors and needs.
7. Limit commercial development and services to that necessary and appropriate for public use and enjoyment of the park and within optimum carrying capacities and resource capabilities.
8. Eliminate or relocate commercial facilities which intrude on primary park resources.
9. Provide seasonal levels of commercial services which are responsive to visitor use patterns.
10. Within budgetary and technological limits, design new commercial facilities or rehabilitate existing commercial facilities so as to be energy efficient.

Operations

1. Provide for the safety of the park visitor and employee.
2. Maintain a quality visitor experience through the protection of person, property, and resources and the absence of crime.
3. Rehabilitate and/or maintain all facilities at a level that meets all local, state, and federal codes and regulations for health and safety.
4. Maintain cost effective and energy efficient management and utilization of funds, manpower, and equipment.
5. Utilize reclaimed water to supplement fresh water supplies.
6. Perpetuate an integrated team organization that maximizes inter-divisional communications while promoting individual initiative.
7. Perpetuate management efficiency through the efficient, effective, and appropriate use of available public funding sources, private sector support, fees, low/no cost labor, productivity enrichment strategies, concessioners, and contracts consistent with the mission of the National Park Service.
8. Provide timely service to park employees in personnel management, procurement, finance, word-processing, mail, and warehouse operations, thereby improving morale and allowing park staff to better utilize their time in meeting visitor needs.

Regional Planning and Cooperation

Cooperate with other Federal, State, and local agencies and private interest in the development of plans, facilities and programs in order to provide more effective service to the public.

1. Assist the local Indian tribes in the planning, development, and management of tribal lands for recreational use and resource protection.
2. Encourage the tasteful and orderly development of visitor use facilities outside park boundaries.
3. Carry the National Park Service concern for the environment beyond the boundaries of Grand Canyon, including the protection of park resources from external influences.
4. Work with the park's cooperating association to provide both an active partner in assisting park educational programs and a sound business operation that will assure the association's continued success.
5. Promote the most efficient use of governmental funds and services by developing formal agreements with adjacent land management agencies to meet wildland fire suppression, emergency medical services, search and rescue, law enforcement, and other mutual needs.

APPENDIX

APPENDIX A

Summary of Significant Grand Canyon Legislative Documents

1. Executive Orders (unnumbered) (June 8, 1880, November 23, 1880, March 31, 1882) Yavai Suppai Indian reservation was withdrawn from sale and settlement.
2. Presidential Proclamation No. 15 (February 20, 1893) Grand Canyon Forest Reserve established and lands exempted from all public land laws except those involving mineral claims.
3. Chapter 3593, An Act for the protection of wild animals in the Grand Canyon Forest Reserve (June 29, 1906) Established Grand Canyon Game Preserve, wherein hunting, trapping, killing and capturing game animals on the Grand Canyon Forest Reserve were prohibited.
4. Presidential Proclamation No. 794 (January 11, 1908) Grand Canyon National Monument was established for protection of this "object of unusual scientific interest". Grand Canyon Forest Reserve lands were combined with other federal lands to form the monument. All monument lands were withdrawn from any new claims. Destruction and appropriation of monument features was prohibited.
5. 40 Stat. 1175 Grand Canyon National Park Establishment Act (February 26, 1919) Converted Grand Canyon National Monument to Grand Canyon National Park, established as a "public park for the benefit and enjoyment of the people." Concessions are to be competitively bid. Havasupai reservation rights reaffirmed. Secretary of Interior permitted to establish rights-of-way within the park for reclamation projects, irrigation projects, and railroads, wherever consistent with the primary purposes of the park. Mineral exploration and development within the park was permitted. Provisions of Grand Canyon Game Reserve were revoked on park lands.
6. 43 Stat. 423 Department of the Interior Appropriations Bill (June 5, 1924) Secretary authorized to purchase the Bright Angel Toll Road and construct a south entrance road.
7. 44 Stat. 497 (May 10, 1926) Exchange of patented lands within the park for park land is authorized.
8. 44 Stat 1238 An Act to revise the boundary of Grand Canyon National Park (February 25, 1927) Grand Canyon NP enlarged and exempted from the 1920 Federal Power Act.
9. 46 Stat 1043 (January 26, 1931) Grand Canyon closed to mineral entry.

10. Presidential Proclamation No. 2022 (December 22, 1932) Established Grand Canyon National Monument (under Antiquity Act authority) for protection of portions of the canyon below the national park which are of unusual scientific interest. Destruction or removal of any monument features is prohibited.
11. Presidential Proclamation No. 2393 (April 4, 1940) Certain lands were excluded from Grand Canyon National Monument because they were not necessary for proper care and management of objects of scientific interest situated in the monument.
12. 76 Stat. 79 An Act to provide for the acquisition of a patented mining claim on the South Rim of the Grand Canyon (May 28, 1962) Permitted Secretary to acquire Orphan Mine which was found to be strategically located to adversely affect visitor enjoyment of the park. Mineral rights were reserved to the owner for 25 years at which time they would revert to the Federal government.
13. Presidential Proclamation No. 3889 (January 21, 1969) Established Marble Canyon National Monument to permanently protect "unusual geologic and paleontologic features and objects and other scientific and natural values."
14. P.L. 91-383 To improve the Administration of the National Park System (August 18, 1970) Section 3(c) authorized the Secretary to enter into contracts to sell or lease to persons, States, or their political subdivisions services, resources, or water from a national park if (1) they provide services or accommodations in the immediate vicinity of the park, and (2) there are no reasonable alternatives to provide these services without these resources or water. The House Report on this bill (H.R.91-1265) suggests that NPS should provide reports to Congress prior to entering into any legally or morally binding commitments.
15. P.L. 93-620 Grand Canyon National Park Enlargement Act (January 3, 1975). Combined Marble Canyon and Grand Canyon National Monuments with existing Grand Canyon National Park. Purpose was to "further protect the outstanding scenic natural and scientific values of the Grand Canyon." Congress recognized that the entire Grand Canyon from the Paria to Grand Wash Cliffs, including side canyons is a natural feature of national and international significance. Congress provided for "further protection and interpretation of the Grand Canyon in accord with its true significance". Studies of Tuckup Point, Jensen Tank, and Slide Mountain were required in order to determine their suitability as park lands. Authority to acquire private lands was vested in the Secretary, but lands owned by the State of Arizona or any political subdivision thereof could only be acquired through donation or exchange. Cooperative agreements with other federal, state, and local public departments or Indian Tribes are authorized in order to provide uniform interpretation of the park. Continuation of grazing rights for either 10 years or the life of the leaseholder was provided.

The Secretary was empowered to make recommendations to control aircraft traffic to protect the park's natural quiet. The Secretary is authorized to permit utilization of former Lake Mead lands (now within Grand Canyon) for the development and maintenance of reclamation projects. A total of 95,300 acres were withdrawn from Grand Canyon to be held in trust by the United States for Havasupai Tribe traditional use purposes (i.e. gathering/hunting native wild plants or animals, medicinal gathering, grazing, burials, etc.). However, no uses were to be made of this land which will impact the existing scenic and natural values. Further, the Secretary is responsible for conservation programs for fire protection, grazing management and erosion control, etc., on these lands. Elimination of Supai Camp was provided for.

16. P.L. 94-31 To Amend the Grand Canyon Enlargement Act (June 10, 1975)
Provided the Secretary 2 years to make a recommendation as to the suitability or unsuitability of any portion of Grand Canyon National Park as wilderness.
17. P.L. 95-589 Title XII (November 3, 1978) Authorizes the Secretary, without derogation of any U.S. water rights, to sell Grand Canyon water to Tusayan customers upon his determination that such sale is not detrimental to the resources of Grand Canyon or its visitors.
18. Hatch Amendment No. 1754 to the FY81 Department of the Interior Appropriations Bill (Congressional Record, November 14, 1980).

None of the funds appropriated in this act shall be used for the implementation of any management plan for the Colorado River within the Grand Canyon National Park which reduces the number of user days or passenger launches for commercial motorized watercraft excursions below 1978 levels for the preferred use period.

Appendix B
List of Threatened and Unique Wildlife of Arizona

Group I. Species or subspecies extirpated from Arizona that may possibly be reestablished.

-None found in the Grand Canyon

Group II. Species, or subspecies in danger of being eliminated from Arizona.

Mammals - River Otter (Lutra canadensis)
Birds - Bald Eagle (Haliaeetus leucocephalus)
 - Peregrine Falcon (Falco peregrinus anatum)
Fishes - Humpback Chub (Gila cypha)
 - Bonytail Chub (Gila elegans)
 - Colorado River Squawfish (Ptychocheilus lucius)
Reptiles and Amphibians - Tiger Salamander (Ambystoma Tigrinum stebbinsi)

Group III. Species or subspecies whose status in Arizona may be in jeopardy in the foreseeable future.

Mammals - Spotted Bat (Euderma maculata)
 - Desert Bighorn Sheep (Ovis canadensis mexicana)
Birds - Zone-tailed Hawk (Buteo albonotatus)
 - Osprey (Pandion haliaetus carolinensis)
 - Beardless Flycatcher (Camptostoma imberbe)
Fishes - Razorback Sucker (Xyrauchen texanus)
Reptiles and Amphibians - Desert Tortoise (Gopherus agassizi)
 - Gila Monster (Heloderma suspectum)

Group IV. Species and subspecies of special interest because of limited distribution in Arizona.

Mammals - Kaibab Squirrel (Sciurus aberti kaibabensis)
Birds - none
Fishes - Round-tailed Chub (Gila robusta)
 - Little Colorado River Spindace (Lepidomeda m. mollispinis)
Reptiles and Amphibians - Grand Canyon Rattlesnake (Crotalus viridis abyssus)

APPENDIX C

Visitor Use Analysis

The following data summarized findings from visitor surveys conducted within the last 2 years at Grand Canyon National Park.

Technical Report No. 12, International Visitors to Grand Canyon National Park, Cooperative National Park Resources Studies Unit, University of Arizona, May 1983

1,846 questionnaires were completed.

1. Approximately 33 percent of all visitors to Grand Canyon National Park are foreign.
2. Foreign visitors come from 112 different countries, with Germans, French, English, and Japanese constituting 48.7 percent of the total foreign visitation.
3. 85 percent of the foreign visitation is 45 years of age or younger, with the largest age group being between 26 and 45 years of age.
4. One out of every two foreign visitors spent the night.

A 1983 Visitor Center Parking Lot License Plate Survey

Approximately 23 percent of the park's visitors arriving by car originated in California, with 20-21 percent originating in Arizona, and the rest originating from all over the United States and Canada.

1983 Summer Visitor Survey, Cooperative National Park Resources Studies Unit, University of Arizona.

655 questionnaires were completed.

1. Activities most participated in were:

a. viewing the canyon	97 percent of persons surveyed
b. buying souvenirs	62 percent
c. riding shuttle	56 percent
d. eating at concessions	54 percent
e. touring visitor center	48 percent
f. day hiking trails	40 percent
g. ranger tour	14 percent
2. 56 percent used the shuttle system and supported its continuation with 55 percent favoring adding \$1 to the entrance station and 29 percent favoring a separate shuttle ticket if funding is lost. Only 3 percent favored abolishment of the shuttle.

3. 18 percent took sightseeing flights over the canyon with 66 percent supporting continued or expanded sightseeing operations.
4. The mean length of stay was 2 days with 76 percent spending the night in the park vicinity. Of those spending the night, 50 percent stayed in a lodge or motel, 41 percent stayed in the trailer park or camped, and 9 percent were reported as other.
5. 13.8 percent of the responding visitors were from California, 8.3 percent from Arizona, 36 percent from the rest of the U.S. and 42 percent were from foreign countries. Of the foreign visitors, 26.8 percent were Japanese, 21.7 percent were German, 12.5 percent were French, and 7.3 percent were English.
6. 69 percent were first time visitors to Grand Canyon.
7. 15 percent were with a group. Of the group visitors, 30 percent were in groups of 10-20 people and 49 percent were in a group of 21-30.
8. Of the nontour group park visitors, 41 percent were in groups of 2 people, with 35 percent being in groups of 3 or 4 people.
9. 60.3 percent were traveling with family members and 27.2 percent were traveling with friends.
10. 54 percent arrived at the park via privately owned vehicles, 21 percent utilized public transportation, and 16 percent rented cars.
11. The most important attribute of their trip was knowing that park resources and values are being protected, with visitors being "completely captivated" by the grandeur of Grand Canyon as a natural phenomenon.
12. 24 percent reported they did not participate in activities they had previously planned on doing while in the park. Although there were a variety of reasons for this, the most frequently mentioned was a failure to know or understand reservations systems or other advance requirements.
13. 78 responses indicated that NPS gave out little or poor information on the park. (Features not adequately explained; impossible to get reliable information before traveling to the park; very poor signing within the park; inadequate brochure and maps at entrance; no weekly schedule of events, etc.). In addition, 44 responses indicated dissatisfaction with Mather Campground. It should also be noted that respondents who had visited other parks were significantly more critical of Grand Canyon National Park Service staff than those who had not been to other parks. With the concessioners, the reverse was true.

Visibility Impairments, Study, Report No. 1 Colorado State University
Based on 2,593 visitor observations, 1,766 visitor interviews, and 1,786 questionnaires.

1. Average group size: 2.9 people.
2. Average length of time at vista: 2 min/14.8 sec.
3. Percent of visitors looking at interpretive panels:
43.4 percent did not look; 56.7 did look.
4. Mean length of visit: 1.9 days.
5. Number of overlooks visited in a day: 4.8.
6. Age: Mean - 42
Median - 40
Mode - 36
7. Highest year of formal schooling completed:
Elementary (1-8 years) - 1 percent
High school or vocational school (9-12 years) - 25 percent
College or technical school (13-16 years) - 49 percent
Graduate school (17-22 years) - 25 percent
8. Gross 1982 household income:

Under \$5,000	2 percent
\$ 5,000-\$9,000	3 percent
\$10,000-\$14,999	7 percent
\$15,000-\$19,999	8 percent
\$20,000-\$29,999	11 percent
\$30,000-\$39,999	12 percent
\$40,000-\$49,999	21 percent
\$50,000-\$59,000	9 percent
\$60,000-\$69,999	6 percent
\$70,000 and over	8 percent
9. Day visitors: 40 percent
10. Overnight lodging:

Day Visitor - 40 percent
Lodge, motel or cabin - 32 percent
Campground - 30 percent
Private residence - 1 percent

(Percentages exceed 100 because of multiple lodging during some visitor's stay at park).
11. Activities and percent of visitors participating:

<u>South Rim Activities</u>	<u>Percent Participating</u>
Viewing from Scenic Overlooks	97.2
Picture Taking	93.2

<u>South Rim Activities</u>	<u>Percent Participating</u>
Visiting the Visitor Center	77.4
Viewing Flowers and Trees	77.1
Watching Other Park Visitors	61.4
Watching Animals	61.0
Visiting the Yavapai Museum	55.0
Sunrise/Sunset Viewing	44.0
Visiting the Tusayan Ruins	41.3
Hiking Along the South Rim	40.3
Park Naturalist Talk	32.4
Picnicking	28.6
Visiting Archeological Sites	28.3
Bus Tour	26.8
Camping	20.7
Hiking into the Canyon	17.3
Evening Campfire Program	10.5
Hiking Along the North Rim	8.4
Helicopter/Airplane Tours	7.2
Mule Riding	2.0
Boat/Raft Trip	1.0

North Rim Activities

Viewing from Scenic Overlooks	98.2
Picture Taking	97.0
Viewing Flowers and Trees	88.7
Watching Animals	84.5
Visiting the Visitor Center	76.2
Hiking Along the North Rim	75.0
Sunrise/Sunset Viewing	73.8
Watching Other Park Visitors	63.1
Park Naturalist Talk	57.7
Picnicking	49.4
Hiking into the Canyon	38.1
Camping	37.5
Visiting Archeological Sites	33.3
Hiking Along the South Rim	29.2
Evening Campfire Programs	23.2
Visiting the Yavapai Museum	22.0
Mule Riding	19.0
Visiting the Tusayan Ruins	14.9
Bus Tour	7.7
Helicopter/Airplane tours	6.0
Boat/Raft Trip	5.4

12. When asked how important a variety of recreation features were to their park experience, over 40 percent of the respondents identified the following features as "extremely important":

South Rim

Cleanliness of park
 Deep Gorges
 Clean, clear air
 Colorful rock formations
 Viewing from canyon rims
 Unusually shaped rocks

North Rim

Clean, clear air
 Cleanliness of park
 Deep gorges
 Variety of flowers, shrubs, trees
 Viewing from canyon rims
 Variety of birds and animals

In addition, over 40 percent of the respondents identified the following features as "not at all important":

South Rim

Campground reservation system
 Backcountry permit system

North Rim

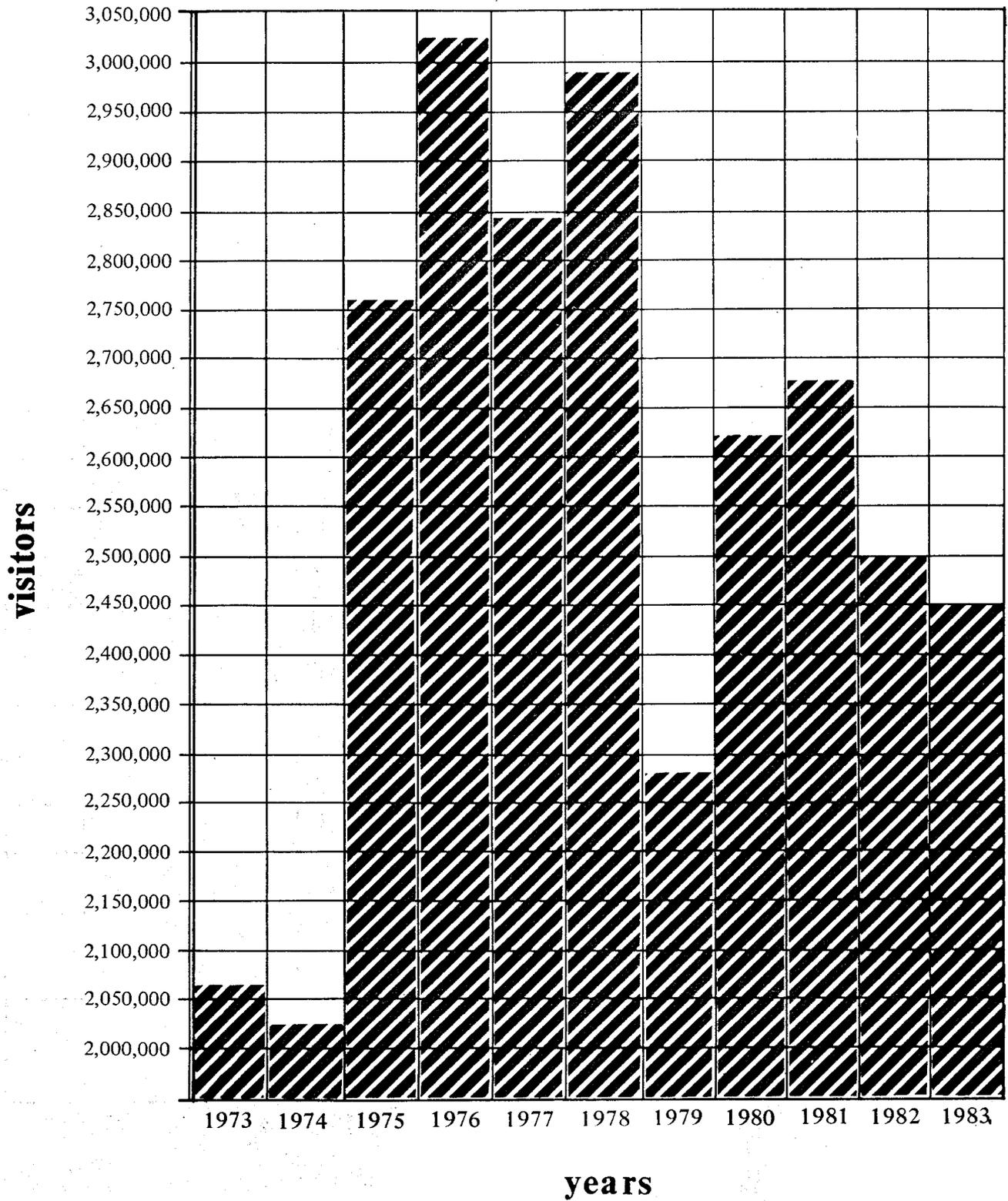
Campground reservation system
 Backcountry permit system
 Bus tour by concessionner

13. Over 81 percent of the respondents indicated that knowing the park resources and values are being protected is a very important or an extremely important aspect of the park experience.

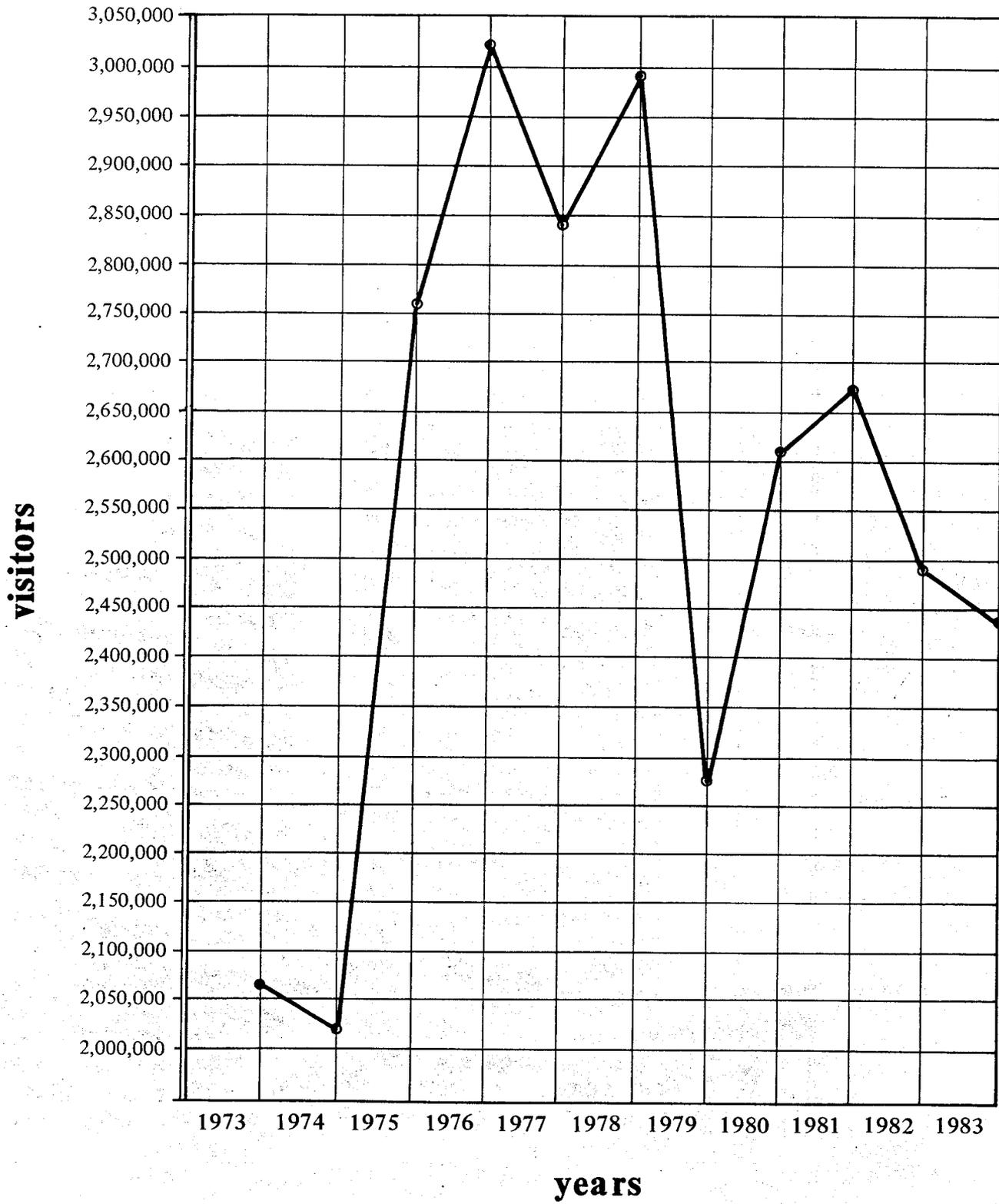
ANNUAL VISITATION
GRAND CANYON NATIONAL PARK

<u>Calendar Year</u>	<u>Visitors</u>	<u>Calendar Year</u>	<u>Visitors</u>
1915	106,000	1950	665,281
----	----	1951	682,152
1919	44,173	1952	736,159
1920	71,601	1953	836,878
1921	69,485	1954	814,130
1922	85,474	1955	891,930
1923	108,500	1956	1,033,404
1924	113,106	1957	1,101,819
1925	136,527	1958	1,063,529
1926	133,880	1959	1,168,807
1927	162,542	1960	1,186,916
1928	164,665	1961	1,252,183
1929	188,204	1962	1,446,453
1930	166,711	1963	1,538,666
1931	154,871	1964	1,575,737
1932	117,700	1965	1,689,238
1933	108,823	1966	1,806,033
1934	146,850	1967	1,804,876
1935	214,407	1968	1,926,270
1936	272,253	1969	2,192,574
1937	304,794	1970	2,258,195
1938	334,039	1971	2,402,058
1939	405,585	1972	2,698,344
1940	369,234	1973	2,064,300
1941	436,566	1974	2,028,194
1942	132,584	1975	2,754,791
1943	72,100	1976	3,026,235
1944	64,568	1977	2,848,519
1945	169,960	1978	2,984,138
1946	486,834	1979	2,275,712
1947	622,363	1980	2,618,713
1948	618,033	1981	2,674,117
1949	600,448	1982	2,499,799
		1983	2,448,545

Grand Canyon National Park VISITOR USE

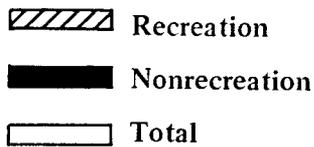


Grand Canyon National Park VISITOR USE

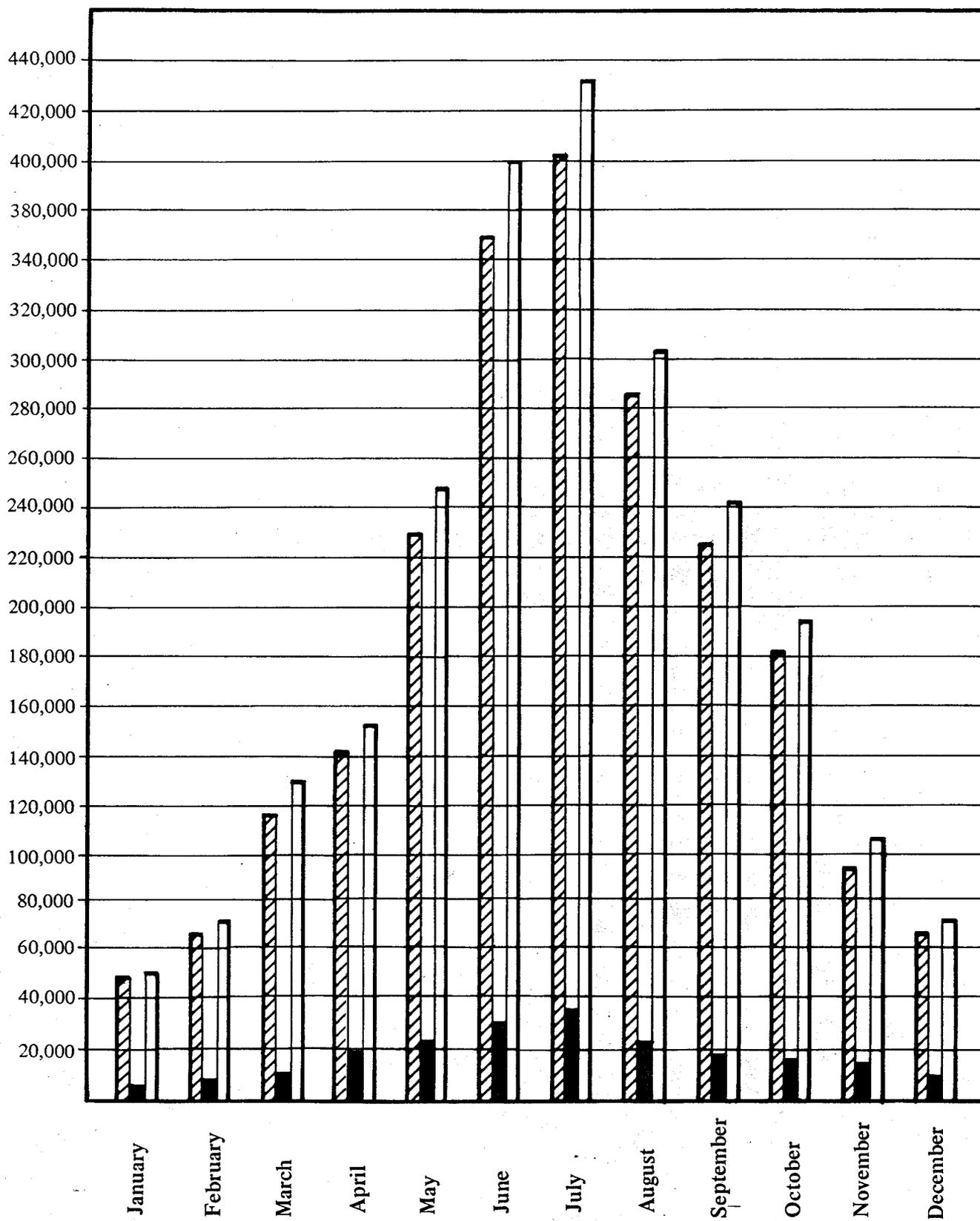


1983 Monthly Visitation Figures

	<u>Recreation</u>	<u>Nonrecreation</u>	<u>Total</u>
January	49,146	4,910	54,056
February	65,862	7,115	72,977
March	118,768	12,786	131,554
April	141,134	14,814	155,948
May	233,043	22,568	255,611
June	364,817	34,527	399,344
July	400,961	33,871	434,832
August	305,589	21,512	327,101
September	226,922	16,344	243,266
October	181,782	15,063	196,845
November	94,483	9,674	104,157
December	65,575	7,279	72,854
	<u>2,248,082</u>	<u>200,463</u>	<u>2,448,545</u>

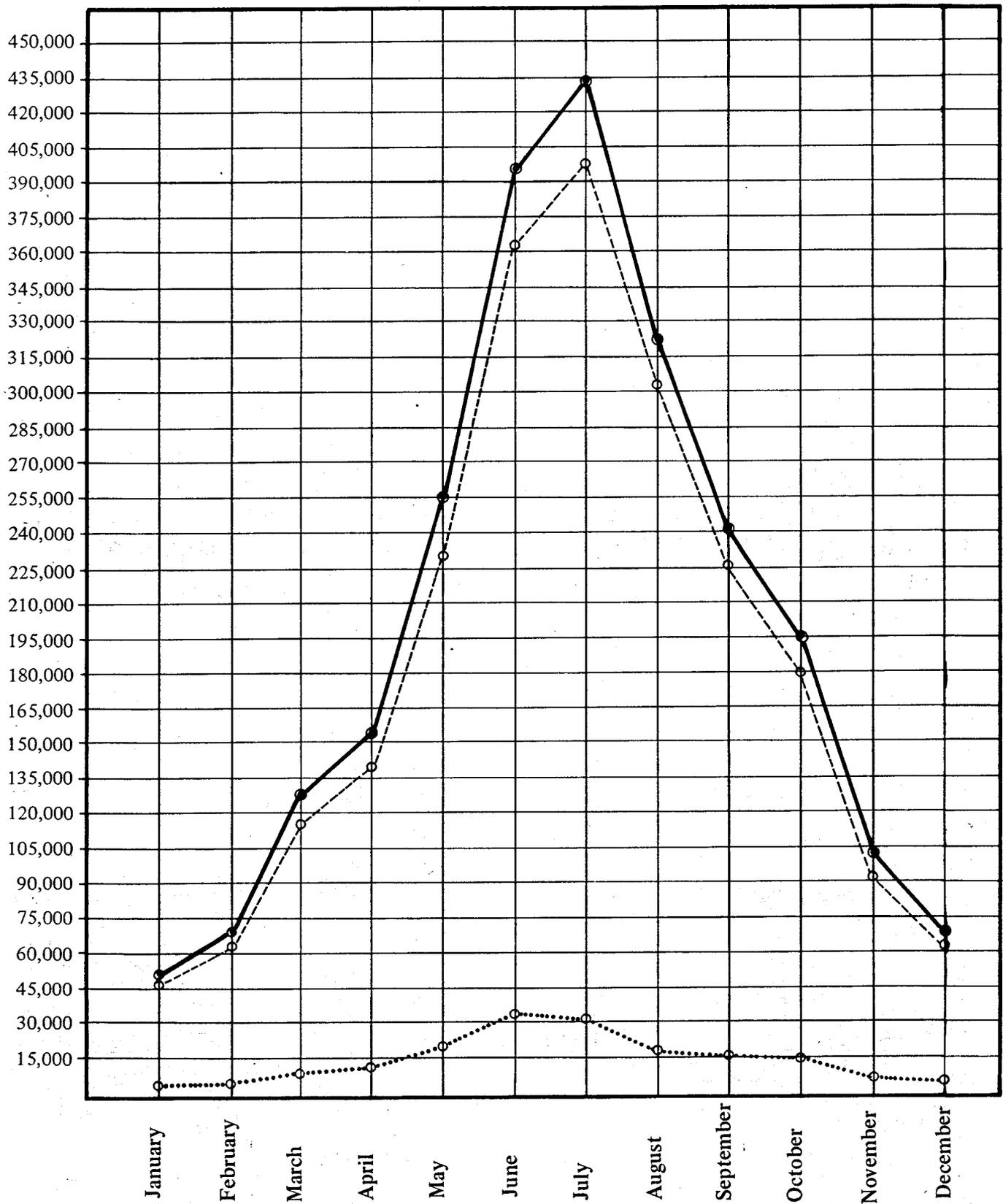


1983 MONTHLY VISITATION



----- Recreation
 Nonrecreation
 ——— Total

1983 MONTHLY VISITATION

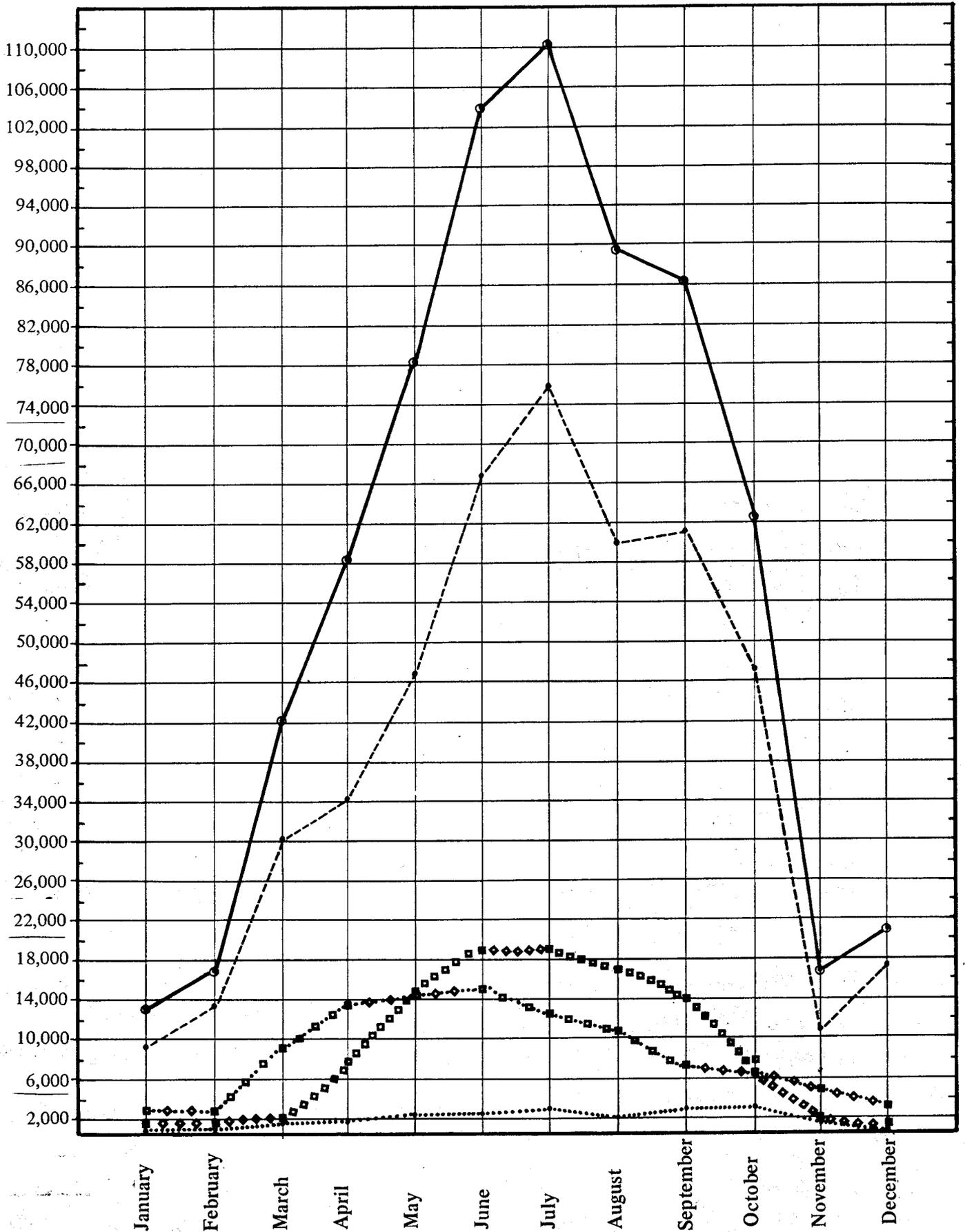


1983 Recreation Overnight Stays

	<u>Concessioner Lodging</u>	<u>Concessioner Campground</u>	<u>NPS Campgrounds</u>	<u>NPS Backcountry</u>	<u>Total</u>
January	9,435	134	545	3,196	13,310
February	13,485	342	651	2,670	17,148
March	30,182	1,140	1,819	8,878	42,019
April	34,403	1,880	8,033	13,903	58,219
May	47,109	2,100	14,786	14,592	78,587
June	67,151	2,434	19,219	15,187	103,991
July	76,016	2,599	19,604	12,208	110,427
August	60,003	2,011	17,199	10,380	89,593
September	61,745	2,520	14,206	7,653	86,124
October	46,998	2,329	6,336	7,518	63,181
November	10,680	837	906	4,930	17,353
December	17,791	367	714	2,778	21,650
Total	<u>474,998</u>	<u>18,693</u>	<u>104,018</u>	<u>103,893</u>	<u>701,602</u>

- NPS Campground
- ◆◆◆◆◆ NPS Backcountry
- - - - - Concessioner Lodging
- Concessioner Campground
- Total

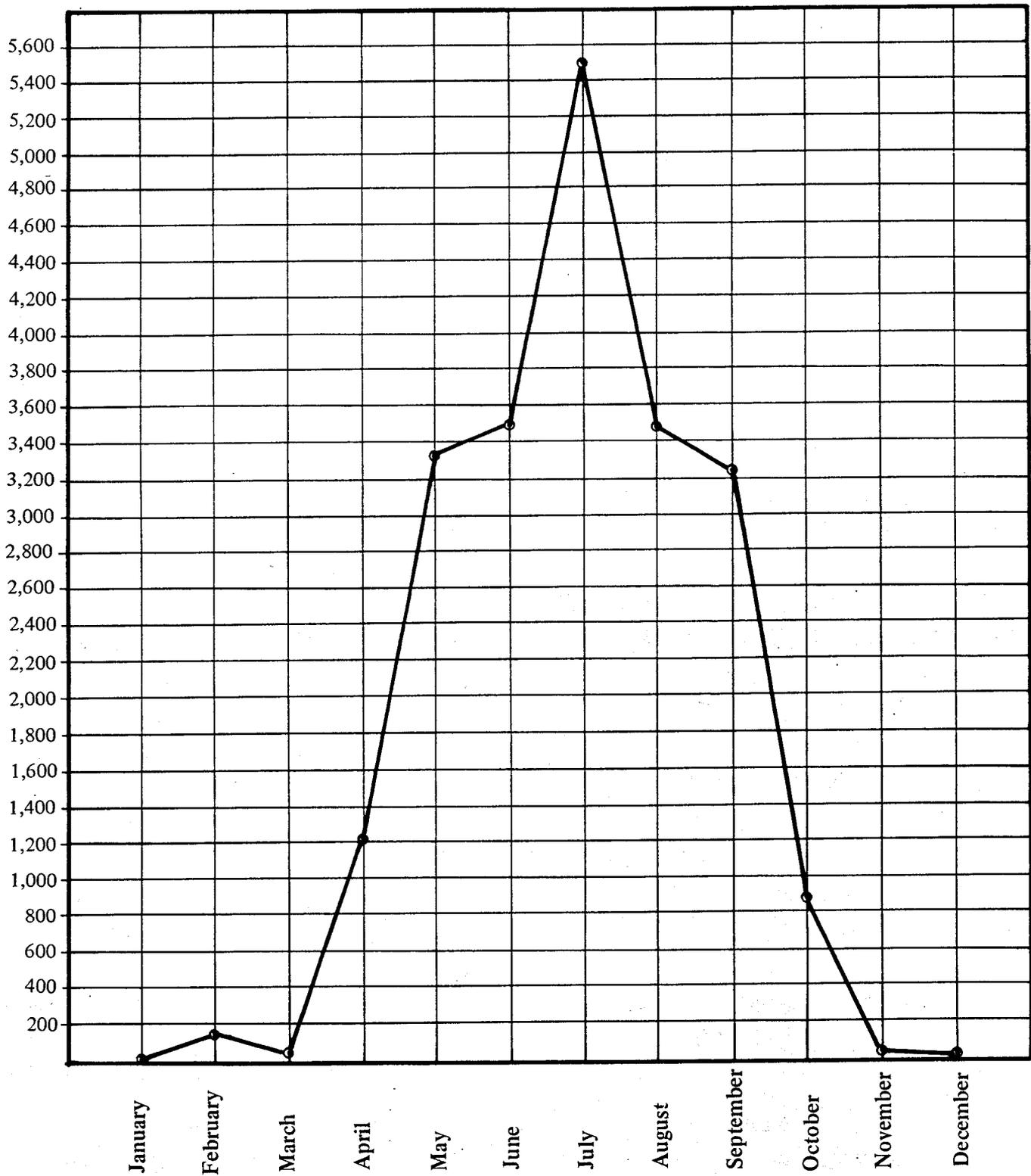
1983 RECREATION OVERNIGHT STAYS



1983 Nonrecreation Overnight Stays

January	0
February	169
March	48
April	1,238
May	3,367
June	3,494
July	5,501
August	3,512
September	3,258
October	916
November	42
December	37
Total	<u>21,582</u>

1983 NONRECREATION OVERNIGHT STAYS



APPENDIX D

LIST OF HISTORIC BUILDINGS AND STRUCTURES
IN GRAND CANYON NATIONAL PARKGRAND CANYON LODGE HISTORIC DISTRICT
NORTH RIM

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Budget Cabin	972	09329	X
Budget Cabin	973	09405	X
Budget Cabin	974	09406	X
Budget Cabin	975	09407	X
Budget Cabin	976	09408	X
Budget Cabin	977	09409	X
Budget Cabin	978	09410	X
Budget Cabin	979	09411	X
Budget Cabin	980	09412	X
Budget Cabin	981	09413	X
Budget Cabin	982	09414	X
Budget Cabin	983	09415	X
Budget Cabin	984	09337	X
Budget Cabin	985	09348	X
Budget Cabin	986	09354	X
Budget Cabin	987	09359	X
Budget Cabin	988	09324	X
Budget Cabin	989	09330	X
Budget Cabin	990	09338	X
Budget Cabin	991	09350	X
Budget Cabin	992	09355	X
Budget Cabin	993	09360	X
Budget Cabin	994	09319	X
Budget Cabin	995	09325	X
Budget Cabin	996	09331	X
Budget Cabin	997	09341	X
Budget Cabin	998	09351	X
Budget Cabin	999	09361	X
Budget Cabin	1,000	12105	X
Budget Cabin	1,001	09332	X
Budget Cabin	1,002	09343	X
Budget Cabin	1,003	09352	X
Budget Cabin	1,004	09367	X
Budget Cabin	1,005	09374	X
Budget Cabin	1,006	09379	X
Budget Cabin	1,007	09383	X
Budget Cabin	1,008	09368	X
Budget Cabin	1,009	09371	X
Budget Cabin	1,010	09375	X
Budget Cabin	1,011	09369	X
Budget Cabin	1,012	09372	X
Budget Cabin	1,013	09373	X

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Budget Cabin	1,014	09376	X
Budget Cabin	1,015	09380	X
Budget Cabin	1,016	09385	X
Budget Cabin	1,017	09384	X
Budget Cabin	1,018	09320	X
Budget Cabin	1,019	09322	X
Budget Cabin	1,020	09327	X
Budget Cabin	1,021	09333	X
Budget Cabin	1,022	09344	X
Budget Cabin	1,023	09321	X
Budget Cabin	1,024	09323	X
Budget Cabin	1,025	09328	X
Budget Cabin	1,026	09353	X
Budget Cabin	1,027	09358	X
Budget Cabin	1,028	09357	X
Budget Cabin	1,029	09362	X
Budget Cabin	1,030	09356	X
Budget Cabin	1,031	09365	X
Budget Cabin	1,032	09364	X
Budget Cabin	1,033	09363	X
Budget Cabin	1,034	09340	X
Budget Cabin	1,035	09370	X
Budget Cabin	1,036	09366	X
Budget Cabin	1,037	09378	X
Budget Cabin	1,038	09377	X
Budget Cabin	1,039	09382	X
Budget Cabin	1,040	09381	X
Budget Cabin	1,041	09388	X
Budget Cabin	1,042	09387	X
Budget Cabin	1,043	09386	X
Budget Cabin	1,044	09392	X
Budget Cabin	1,045	09391	X
Budget Cabin	1,046	09390	X
Budget Cabin	1,047	09389	X
Budget Cabin	1,048	09396	X
Budget Cabin	1,049	09395	X
Budget Cabin	1,050	09394	X
Budget Cabin	1,051	09393	X
Budget Cabin	1,052	09399	X
Budget Cabin	1,053	09398	X
Budget Cabin	1,054	09397	X
Budget Cabin	1,055	09401	X
Budget Cabin	1,056	09400	X
Budget Cabin	1,057	09402	X
Budget Cabin	1,058	09404	X
Budget Cabin	1,059	09416	X
Budget Cabin #1/ First Aid Stn.	1,061	09318	X
No. Budget Washroom	1,062	09310	X
So. Budget Washroom	1,063	09311	X

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Dirty Linen Rm./			
Horse Guide Cabin	1,064	09315	X
Garage/Wood Storage	1,065	09314	X
Budget Dirty Linen Rm.	1,067	09313	X
(hose house)			
Res./Linen Storage	1,068	09403	X
Deluxe Cabin	1,069	09417	X
Deluxe Cabin	1,070	09418	X
Deluxe Cabin	1,071	09419	X
Deluxe Cabin	1,072	09420	X
Deluxe Cabin	1,073	09421	X
Deluxe Cabin	1,074	09422	X
Deluxe Cabin	1,075	09423	X
Deluxe Cabin	1,076	09424	X
Deluxe Cabin	1,077	09425	X
Deluxe Cabin	1,078	09426	X
Deluxe Cabin	1,079	09427	X
Deluxe Cabin	1,080	09428	X
Deluxe Cabin	1,081	09429	X
Deluxe Cabin	1,082	09430	X
Deluxe Cabin	1,083	09431	X
Deluxe Cabin	1,084	09432	X
Deluxe Cabin	1,085	09433	X
Deluxe Cabin	1,086	09434	X
Deluxe Cabin	1,087	09435	X
Deluxe Cabin	1,088	09436	X
Deluxe Cabin	1,089	09437	X
Deluxe Cabin	1,090	09438	X
Deluxe Cabin	1,091	09439	X
Grand Canyon Lodge	1,092	09309	X
Exhibit Bldg./			
Trail Shelter	215	09463	X

NORTH RIM HEADQUARTERS DISTRICT

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Residence	101		X
Residence	102		X
Garage	102 A		X
Dormitory	111		X
Plumbing & Electrical Shop	123		X
Machine & Blacksmith Shop	124		X
Gas & Oil Station	125		X
Fire Equipment Shed	126		X
Horse Barn	129		X
Equipment Shed	171		X

NORTH RIM INN (GRAND CANYON INN) HISTORIC DISTRICT
NORTH RIM

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Grand Canyon Inn	917		X
Exposed Frame Duplex Cabin	918		X
Exposed Frame Duplex Cabin	919		X
Exposed Frame Duplex Cabin	920		X
Manager's Cabin	921		X
Washroom (prev. women's dorm)	922		X
Laundry & Firehose house	923		X
Linen House	924		X
NPS Cabin (Comfort Stn.)	925	09317	X
NPS Cabin/Duplex	926	09334	X
NPS Cabin/Duplex	927	09335	X
NPS Cabin/Duplex	928	09336	X
NPS Cabin/Duplex	929	09339	X
NPS Cabin/Duplex	930	09342	X
NPS Cabin/Duplex	931	09345	X
NPS Cabin/Duplex	932	09346	X
NPS Cabin/Duplex	933	09347	X
NPS Cabin/Duplex	934	09349	X
Exposed Frame Cabin (single)	935		X
Exposed Frame Cabin (single)	936		X
Exposed Frame Cabin (single)	937		X
Exposed Frame Cabin (single)	938		X
Exposed Frame Cabin (single)	939		X
Exposed Frame Cabin (single)	940		X
Exposed Frame Cabin (single)	941		X
Exposed Frame Cabin (single)	942		X
Exposed Frame Cabin (single)	943		X
Exposed Frame Cabin (single)	944		X
Exposed Frame Cabin (single)	945		X

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Exposed Frame Cabin (single)	946		X
Exposed Frame Cabin (single)	947		X
Exposed Frame Cabin (single)	948		X
Exposed Frame Cabin (single)	949		X
Exposed Frame Cabin (single)	950		X
Exposed Frame Cabin (single)	951		X
Exposed Frame Cabin (single)	952		X
Exposed Frame Cabin (single)	953		X
Exposed Frame Cabin (single)	954		X
Exposed Frame Cabin (single)	955		X
Exposed Frame Cabin (single)	956		X
Exposed Frame Cabin (single)	957		X
Exposed Frame Cabin (single)	958		X
Exposed Frame Cabin (single)	959		X
Exposed Frame Cabin (single)	960		X
Exposed Frame Cabin (single)	961		X
(2) log restrooms	134 and 135		X
Drinking Fountain			X
(6) stone woodpile enclosures			X
Amphitheater			X

GRAND CANYON NATIONAL PARK - NORTH RIM
NO DISTRICT DESIGNATION

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
No. Rim Entrance Sta.	121	09443	
No. Rim Gate Residence	122	09444	
No. Rim Gate Residence Garage	122 A	09445	
Greenland Lake Salt Cabin		09461	

GRAND CANYON NATIONAL PARK - NORTH RIM
TOROWEAP (TUWEEP) DISTRICT

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Toroweap Ranger Station	320	07664	
Toroweap Garage/Barn	321	07665	

GRAND CANYON NATIONAL PARK - INNER CANYON
CORRIDOR DISTRICT

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
North Kaibab Trail		09454	X
Cottonwood Ranger Stn. and Residence	092	09441	X

Phantom Ranch Structures

River Ranger Stn.	091		X
The Rock House	154		X
Mule Shelter & Corral	222	09451	X
Trailcrew Bunkhouse	870		X
Comfort Stn. (near Bunkhouse)	871		X
Corral (Fred Harvey)	872		X
Cowboy Dorm	875		X
Recreation Bldg.	878		X
Shower and Bathhouse	879		X
Guest Cabin	880		X
Guest Cabin	881		X
Guest Cabin	882		X
Manager's Cabin	883		X
Guest Cabin	884		X
Guest Cabin	885		X
Guest Cabin	886		X
Guest Cabin	887		X
Stone Cabin	888		X
Guest Cabin (stone/wood)	889		X
Stone Cabin	890		X
Stone Cabin	891		X
Dining Hall	892		X
Connecting River Trail		09456	X

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
--------------------------	-------------	-------------	--------------------------------

Bright Angel Trail Designations

Bright Angel Trail		09455	X
Indian Gdns. Res. (Rock House)	018	09440	X
Indian Gdns. Ranger Res.	093	09442	X
Trailside Shelter (1-1/2 mi. house)	141	09446	X
Trailside Shelter (3 mi. house)	142	09447	X
Trailside Shelter (Indian Gdns.)	143	09448	X
Trailside Shelter (Pipe Creek)	179		X

END of Bright Angel Trail Listings

So. Kaibab Trail Suspension Bridge (So. Kaibab Trail)		09453	X
Fossil Fern Exhibit Case	220	09452	X
		09450	

GRAND CANYON NATIONAL PARK - SOUTH RIM
GRAND CANYON VILLAGE HISTORIC DISTRICT

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Old Admin. Bldg./			
Supt's. res.	001	12020	X
Ranger Dorm	076	07659	X
Operations Bldg.	103	07660	X
Old Post Office	166	07663	X
Buckey O'Neill Cabin	508		X
Red Horse Stage Stn.	526		X
Lookout Studio	532		X
Kolb Brothers Studio	533	07666	X
El Tovar Hotel	542		X
Hopi House	545		X
Verkamp's Curio Shop	546		X
Grand Canyon/			
SF Railroad Depot	549		X
Blacksmith Shop	564		X
Grand Canyon Powerhouse	567		X
Kolb Garage	617	07667	X
Apache St. Residence	799		X
Apache St. Residence	800		X
Apache St. Residence	801		X
Apache St. Residence	802		X
Apache St. Residence	803		X
Apache St. Residence	804		X
Apache St. Residence	805		X
Apache St. Residence	806		X
Apache St. Residence	807		X
Apache St. Residence	808		X
Apache St. Residence	809		X
Apache St. Residence	810		X
Apache St. Residence	811		X
Apache St. Residence	812		X
Apache St. Residence	813		X
Apache St. Residence	814		X
Apache St. Residence	815		X
Apache St. Residence	816		X
Apache St. Residence	817		X
Apache St. Residence	818		X
Apache St. Residence	819		X
Apache St. Residence	820		X
Apache St. Residence	821		X
Apache St. Residence	823		X
Bright Angel Lodge	507		X
Bright Angel Lodge			
Cabins			X
Fred Harvey Mule Barn	562		X
Fred Harvey Horse Barn	563		X

GRAND CANYON NATIONAL PARK - INNER CANYON
GRANDVIEW MINE HISTORIC DISTRICT

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Stone Cabin (Horseshoe Mesa)		09457	X
Grandview Trail		09458	

GRAND CANYON NATIONAL PARK - SOUTH RIM
INDIVIDUAL PROPERTIES

<u>Name of Structure</u>	<u>NPS#</u>	<u>LCS#</u>	<u>Nat'l. Register Listing</u>
Water Disposal Plant		12021	X
Powell Memorial (West Rim Dr.)		12022	
Yavapai Pt. Museum Obsrvn. Stn.	110	07661	
Tusayan Museum (East Rim Dr.)	114	07662	
Hermit's Rest Concession Bldg.			X

BUILDINGS CONSTRUCTED PRIOR TO 1940 WHICH REQUIRE CONSIDERATION AS
HISTORIC PROPERTIES WITHIN GRAND CANYON NATIONAL PARK

<u>INDIVIDUAL PROPERTY</u>	<u>NPS#</u>
Community Building	44
Fred Harvey Carpenter & Paint Shop	575
Shirley Hall (Dorm & Tack)	557
Telephone Office	500
Recreation Center	501
Fred Harvey Executive Residence	
Fred Harvey Executive Residence	
Fred Harvey Garage & General Office	551
Victor Hall	576
Victor Hall Annex	578
Residence	504
Residence	809
Residence	810
Residence	824
Fred Harvey Employee Cabins	595-608
Fred Harvey Employee Cabins	610-616
Fred Harvey Employee Cabins	581-589
Brown Building	537
Original Hospital	100
Old Schoolhouse	208
Middle School	227
Service Station/Auto Shop	
Fred Harvey Boiler House	630(or 632A)
Visitor Information Bldg. at Mushwhip	
NPS Housing	2-7 & 9
NPS Housing	11-19 & 21
NPS Housing	46-48
NPS Housing	50-55
NPS Housing	66,67
NPS Housing	159,161
NPS Housing	163,169
Labor Cabins	60-65
Boulder Street Houses	845-856
NPS Maintenance Area Bldgs.(11 total)	
Tusayan Museum Residence	
Supai Village	
Yaki Point Residence	
Yaki Point Barns & Sheds	
Desert View Watchtower	907
Fred Harvey Residence at Desert View	
NPS Residence at Desert View	
Hermit Trail	
Indian Gardens Pumphouse	
Colter Hall	539
Fred Harvey Laundry	
Fred Harvey Maintenance Bldg.	
Fuel Shed	101A
Administrative Offices	119

INDIVIDUAL PROPERTYNPS#

Equipment Shed	127
Residences	151,152
Residences	153,155
Residences	175,177,150
Residences	176,178

APPENDIX E

Major Equipment (Vehicles) Owned/Leased
by Grand Canyon National ParkInterior Owned

Cushman Scooter	3	
AERO Scooter	12	
Minibus Power Units	22*	(7 units reported to GSA for sale)
Minibus Trailer Units	19	
Trailer, House	38	
Trailer, Horse	2	
Trailer, Kitchen	1	
Trailer, Office	3	
Trailer, Storage	3	
Trailer, R/R-Shower Facility	1	
Fire Truck	3	(Willys on excess)
Ambulance	2	
Van	1	
Fork Lift	2	
Grader	3	
Road Roller	2	(1-rubber wheel, 1-steel wheel)
Dozer	2	
Wrecker	1	
Road Striper	1	
Road Broom	3	
Bobcat	2	
Flat Bed Trailer	2	
Water Trailer	3	
Loader	3	
Tractor, Allis-Chalmers	1	
Water Truck	1	
Fuel Delivery Truck	1	
Road Oil Pot	1	
Oil Distributor	1	
Toter	2	
Garbage Truck	4	(2-to be sold)
Stake Bed Truck	1	(1-in process of donation)
4X4 Pickup	4	
1-Ton Pickup	1	
Station Wagon	2	
Sedan	8	

GSA Rental

Sedan	6
Compact Station Wagon	2
Van	5
1/2-Ton Pickup	10
Compact Pickup	13
3/4-Ton Pickup	21
Small Dump Truck	1
1-Ton Truck	2
3/4-Ton 4X4 Truck	3
1-1/2 Ton Truck	2
2/1/2 - 3 Ton Truck	6
5-Ton Truck	1
Total	<u>72</u>

Western Fleet Lease

Flatbed Stake Truck	1
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Appendix F
Outline of Planning Requirements

<u>Priority</u>	<u>Issues</u>	<u>Task</u>	<u>10-237 or 10-238 No.</u>	<u>Responsible Office</u>
1.	-Resolution of the aircraft/backcountry user conflict	2 yr study plan w/EA	Inc. No. 427	GRCA
2.	-Human wastes at IG must be hauled out due to lack of on-site treatment	1 yr study 1 yr design plan w/EA	Pkg. No. 353	DSC
3.	-Refine backcountry monitoring technique -Develop backcountry livestock plan	3 yr study plan w/CE	Inc. 446, 397	GRCA
4.	-Safety conflict with heliport in maintenance area	1 yr study 1 yr design plan w/EA	Pkg. No. 429	DSC
5.	-Inadequate holding facility for arrested persons	1 yr study 1 yr design plan w/EA	Pkg. No. 117	DSC
6.	-Inadequate interpretive facility at Yavapai	1 yr study 1 yr design	Pkg. No. 135	DSC/HFC
7.	-Inadequate government housing	1 yr study 1 yr design	Pkg. No. 143	DSC
8.	-Inadequate interpretive facility for visitors entering park	2 yr design	Pkg. No. 367	DSC

APPENDIX G

Park: Grand Canyon
Date: 4/19/85

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE/WESTERN REGION
OPERATING PROGRAM PRIORITY LIST
(10-237's)

Reg. Pri.	Park Inc. No.	Dev. Area	FTE Perm	FTE Other	Description	Yearly Amount	Rec. Base	Non Rec.	Reg. C.M.	Cul. C.M.
1	470	PG		3.5	Correct Deteriorated Roads/Prev. Maint.	\$127,000	X			
2	491	GV			Computerized Backcountry Reservation System	74,000		X		
3	483	IC		1.9	Maintain Critical Inner Canyon Facilities	63,000	X			
4	222	GV		2.0	Meet Vis. Info/Interp Demands-V.C. & Yavapai	31,000	X			
5	485	GV			Cover Existing Concessions Shortfall	33,000	X			
6	481	PG			Prov.Essent.Mnt.Srv.Defrd.to Meet Util.Costs	128,000	X			
7	439	NR		3.2	Extend North Rim Operating Schedule	68,000	X			
8	445	PG			Provide Mandated Safety Program Services	16,000	X			
9	472	PG	1.0		Fulfill Hist.Pres.Mandates-Hist.Arch.Position	37,000	X			
10	369	IC		2.0	Meet Safety/Interp. Demands-Corridor Trails	37,000	X	X		
11	474	PG			Improve Mgmt.Effy.-Computer Knowledge/Systems	69,000	X	X		
12	490	PG		3.0	Ensure Nec. Levels of Visitor Service - BRO	63,000	X			
13	147	PG		5.0	Provide Adequate Visitor Protection Patrol	134,000	X	X		
14	438	PG		1.4	Maintain Boundary Fence	40,000	X			
15	467	PG		4.0	Cyclic Maint. - National Reg. Properties	169,000	X			
16	482	PG	3.0		Historic Structures Maintenance	112,000	X			
17	453	DV		2.0	Provide Interpretive Services - Desert View	40,000	X			
18	477	GV			Replace 5 3-Bedroom Houses	300,000		X		
19	475	PG			Contracted Quarters Maintenance	95,000	X			
20	443	PG			Hazard Tree Removal	10,000	X			

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE/WESTERN REGION
OPERATING PROGRAM PRIORITY LIST
(10-237's)

Reg. Pri.	Park Pri. No.	Inc. No.	Dev. Area	FTE Perm	FTE Other	Description	Yearly Amount	Rec. Base	Non Rec.	Reg. C.M.	Cul. C.M.
21	480		PG			Restore Park Oper.Neg.Impacted by Inflation	490,000	X			
22	161		PG	4.6		Increase Entr. Stations' Operating Schedules	83,000	X			
23	478		GV	1.0		VTS Contract Administration	28,000	X			
24	484		GV			Kolb Stabilization	13,000	X			
25	479		GV	0.7		Lost and Found Clerk	15,000	X	X		
26	486		GV		0.5	Museum Minicomputer	32,000	X	X		
27	404		PG	0.9		Establish Permanent Sanitarian Position	37,000	X			
28	201		PG		1.6	Maintain Chemical Toilets - Bus Route	32,000	X			
29	462		PG		5.5	Provide Wildlands Fire Program	125,000	X			
30	459		PG			Provide Funding for Minor Search and Rescue	14,000	X			
31	217		PG		1.0	Provide Additional Structural Fire Support	29,000	X			
32	394		PG	0.9		Establish Physical Science Tech. Position	21,000	X			
33	471		PG	1.0		Establish Park Research Administrator	38,000	X			
34	450		PG		1.5	Provide Staff-Building Plans/Maps Inventory	49,000	X			
35	458		PG		1.8	Provide Additional Investigator Staffing	52,000	X	X		
36	473		PG	0.9		Provide Payroll/Personnel Support Services	26,000	X	X		
37	460		IC		1.0	Provide Add. Staff-Lees Ferry & Meadview	25,000	X			
38	193		PG			Elect. Serv.-New DV & Vil. Ctr. Comfort Sta.	16,000	X			X
39	416		PG	0.9	2.0	Provide Base Funding for Curatorial Services	54,000	X			
40	487		GV		0.5	Catalog Museum Objects	9,000	X			

Park: Grand Canyon
Date: 4/19/85

UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE/WESTERN REGION
OPERATING PROGRAM PRIORITY LIST
(10-237's)

Reg. Pri.	Park Pri.	Inc. No.	Dev. Area	FTE Perm	FTE Other	Description	Yearly Amount	Rec. Base	Non Rec.	Reg. Cul.
41	455	PG	0.9		0.9	Provide Special Populations Program	19,000	X		
42	461	GV	2.0		2.0	Increase Staff - Cmpgrnd. Reserv. (Ticketron)	30,000	X		
43	468	PG	1.0		1.0	Implementation of Prescribed Burn Prog.	25,000	X		
44	488	GV	0.5		0.5	Photograph Catalogued Museum Objects	11,000	X		
45	452	PG				Energy Conservation	25,000	X		
46	489	GV	0.5		0.5	Recatalog Museum Specimens	10,000	X		
47	200	PG	0.5		0.5	Provide Interp. Orient. for Concessions	9,000	X		
48	523	PG	0.2		0.2	Cyclic Maintenance - Masonry Ruins	5,000	X		
49	097	TW	1.0		1.0	Provide Additional Resources Protection	55,000	X	X	
50	226	GV	2.5		2.5	Provide Interpretive Services at Kolb Studio	47,000	X		
51	456	NR				Expand Jacob Lake Information Station	35,000	X	X	
52	476	GV	3.0		3.0	Visitor Services Support for Rail Service	590,000	X	X	

APPENDIX H

10-238 Priority List

Park Pri.	Dev. Area	Description	Net Amount
1.0	GV	Replace Water Distribution System	8,415,000
2.0	SR	Modify South Rim Sewage Treatment Plant	1,104,000
3.0	NR	Modify North Rim Sewage Treatment Plant	30,000
4.0	IC	Repl. TC Pipeline, Colorado River Plateau Pt.	500,000
5.0	NR	Overlay North Rim Entrance Road	1,055,000
6.0	GV	Replace Warehouse	254,000
7.0	IC	Replace 6" Pipeline, Indian Gardens-South Rim	6,926,000
8.0	IG	Increase Pumping Capacity	450,000
9.0	NR	Replace Electrical Distribution System	2,000,000
9.5	SR	Reconstruct South Entrance Road	3,600,000
10.0	NR	Rehab Water System, Phase II	3,300,000
11.0	IG	Construct Sewage Treatment System	
11.5	NR	NR Development-Transept Cany. & Bright Angel Pt.	12,660,000
12.0	GV	Construct Potable Water Storage Tanks	2,859,500
12.5	PG	Repair/Rehab Quarters	240,000
13.0	GV	Construct Trail, Mather CG to Bus Stop	18,100
14.0	GV	Repair VC Patio and Provide Bus Parking	28,900
14.5	PG	Rehab Comfort Stations	127,600
15.0	SR	Rehab East Rim Drive, 12 miles	2,300,000
15.5	PG	Rehab Public Use Buildings	160,000
16.0	GV	Repl Util & Provide Adapt Restor. Kolb Studio	194,100
17.0	SR	Repair Business & Residential Streets	645,000
18.0	SR	Relocate Heliport	275,000
19.0	NR	Install Lightning Protection, NR Buildings	47,000
20.0	DV	Construct Comfort Station, Tusayan Museum	124,000
21.0	PC	Excavate Heavily Impacted Ruins	60,000
22.0	NR	Const. Boundary Fence, Tuweep Area	105,000
23.0	IG	Install Flood Protection Alarm System	302,000
24.0	PG	Upgrade Central Communications Center	26,400
25.0	PG	Expand Radio Communications System	
26.0	DV	Upgrade Comfort Station at Campground	33,000
27.0	GV	Provide West Rim Traffic Control	13,000
28.0	PG	Install Burglar Alarm Sys., Park Museums	65,000
29.0	NR	Improve NR Fire Suppression System	126,000
30.0	IC	Install Fire Suppression Sys., Delta Area	50,300
31.0	GV	Modify Curbing/Parking for Handicapped Access	12,100
32.0	GV	Install Additional Street Lighting	
33.0	DV	Construct Boundary Fence, 4 miles	172,000
34.0	NR	Survey & Const. Boundary Fence, Sanup Plateau	346,000
35.0	GV	B & U Study, Railroad Station	15,000
36.0	GV	Construct Public Safety Building (Jail)	
37.0	GV	Reconst. Village Amphitheatre	70,200
38.0	PG	Repair/Rehab Offices	263,000
39.0	DV	Pave Service Road	125,800

Park Pri.	Dev. Area	Description	Net Amount
40.0	NR	Const. Access Rd./Parking-N. Kaibab Trailhead	208,000
41.0	NR	Const. Parking Area-Bright Angel Point	70,000
42.0	GV	Const. Yavapai Interpretive Center	4,000,000
43.0	GV	Rehab. Exhibits, Kolb Studio	145,000
44.0	GV	Construct Government Quarters	2,605,000
45.0	NR	Repl/Repair N Rim Boundary Fence	59,000a
46.0	PG	Study Fire Effects on Cultural Resources	5,000
47.0	SR	Const. Mather Pt. Center & Parking	12,000,000
48.0	SR	Const. Road, Center-Business-Entrance	750,000
49.0	DV	Rehab. Interp Exhibits, Tusayan Museum	
50.0	GV	Const. Boat Maint/Storage Building	1,500,000
51.0	GV	Const. Comfort Station, Business Center	
52.0	GV	Rehab. & Entend Reclaimed Water System	
53.0	GV	Const. Add'l Reclaimed Water Storage Tanks	2,000,000
54.0	GV	Rehab. Operations Building (LCS)	250,000
55.0	SR	Reconstr. Center Road to Village Loop	275,000
56.0	GV	Rehabilitate Mather Campground	600,000
57.0	GV	Relocate Electrical Substation	1,026,300
58.0	GV	Repl. Asbestos/Cement Water Main	104,000
59.0	GV	Const. New Water Main Sections	250,000
60.0	GV	Const. Picnic Area & Comfort Station	
61.0	DV	Const. Permanent Helipad	
62.0	GV	Const. Walks & Lighting, Yavapai Lodge Area	285,000
63.0	SR	Special Study, Tusayan Water	
64.0	TW	Const. Water Storage & Rehab. Collect System	
65.0	IG	Improve Water Delivery System	100,000
66.0	GV	Const. Water Main, Clinic-Business Center	150,000
67.0	SR	Tertiary Treatment Plant	1,400,000
68.0	IG	Rehabilitate Former Pumphouse	
69.0	SR	Reconst. South Entrance Road	
70.0	IC	Reconst. Rest Shelters, Bright Angel Trail	90,000
71.0	IC	Rehab. Phantom Ranch & IG Campgrounds	75,000
72.0	NR	Survey & Const. Boundary Fence, Kanab Plateau	137,000
73.0	NR	Rehb. and Enlarge Campground	500,000
74.0	NR	Reconst. Point Sublime Road	1,700,000
75.0	DV	Const. 500,000-gal. Water Storage Tank	550,000
76.0	DV	Rehab. Tusayan Museum and Residence	100,000
77.0	DV	Construct Amphitheatre	75,000
78.0	DV	Enlarge Concessioner Parking Area	150,000
79.0	DV	Rehab. Comfort Station, Business Area	75,000
80.0	DV	Construct Picnic Area	40,000